

TBS | Catalogue 2010/2011



# Transient voltage and lightning protection systems

THINK CONNECTED.

## Welcome to Customer Service

---

**Service telephone: +49 (0)2373 89-1500**

---

**Telefax for enquiries: +49 (0)2373 89-7777**

**Telefax for orders: +49 (0)2373 89-7755**

---

**E-mail: [info@obo.de](mailto:info@obo.de)**

**Internet: [www.obo.de](http://www.obo.de)**



Use the direct line to OBO Customer Service! On the Service Hotline +49 (0)2373 89-1500, we are available every day from 7.30 am - to 5.00 p.m. for any questions about the OBO product range for electrical installations. The newly structured OBO Customer Service can offer you the full service:

- Competent contacts from your region
- All the information on the OBO product range
- Knowledgeable advice on special application topics
- Quick, direct access to all the technical data of the OBO products – we also want to provide the best in customer relations!

# Contents

	Planning aids	5
	Surge protection energy technology, arrester, Type 1	117
	Surge protection energy technology, arrester, Type 1+2	127
	Surge protection energy technology, arrester, Type 2	151
	Surge protection energy technology, arrester, Type 2+3	175
	Surge protection energy technology, arrester, Type 3	187
	Sure protection, photovoltaics	199
	Data and information technology	213
	Protection and spark gaps	249
	Measuring and test systems	253
	Equipotential bonding systems	257
	Earthing systems	269
	Interception and arrester systems	287
	Directories	337



### **OBO TBS seminars: First-hand knowledge**

With a comprehensive programme of training courses and seminars on the subject of surge voltage and lightning protection systems, OBO is able to support its customers with specialist knowledge from a single source. Alongside the basic theoretical principles, the programme also deals with practical implementation in everyday applications. Special calculation and application examples round off the comprehensive programme of knowledge transfer.

### **Invitations to tender, product information and datasheets**

We can make life easier for you: With our comprehensive selection of materials designed for practical applications, which provide you with effective support with the planning and calculation of a project. These include:

- Invitations to tender
- Product information
- Information sheets
- Datasheets











These documents are continually updated and can be downloaded at no charge at any time from the Internet download area at [www.obo.de](http://www.obo.de).

### **Invitations to tender on the Internet at [www.ausschreiben.de](http://www.ausschreiben.de)**

More than 10,000 entries from the KTS, BSS, TBS, LFS, EGS and UFS ranges can be called up free of charge. Regular updates and expansions mean that you always have a comprehensive overview of the OBO products. All the current file formats – PDF, DOC, GAEB, HTML, TEXT, XML, ÖNORM – are available.

[www.ausschreiben.de](http://www.ausschreiben.de)

## Contents, planning aids

	Basic principles of surge voltage protection	6
	Surge protection energy technology	19
	Sure protection, photovoltaics	27
	Surge protection of data and information technology	39
	Protection and spark gaps	59
	Measuring and test systems	63
	Equipotential bonding systems	67
	Earthing systems	71
	Interception and arrestor systems	77
	Additional information	108





## Minor cause, major effect: Damage caused by surge voltages



Our dependency on electrical and electronic equipment continues to increase, in both our professional and private lives. Data networks in companies, for auxiliary equipment in hospitals and fire departments for example, are vital for the real time transfer of information that has long since been indispensable. Sensitive databases, e.g. in banks or media publishers, need reliable transmission paths. It is not only lightning strikes that pose a latent threat to these systems. More and more frequently, today's electronic aids are damaged by surges caused by remote lightning discharges or switching operations in large electrical systems. During thunderstorms, too, high volumes of energy are instantaneously released. These voltage peaks can penetrate a building through all - manner of conductive connections and cause enormous damage.





### What are the consequences of damage caused by surges in our daily lives?

The most obvious one is the destruction of electrical equipment. In private households, these are specifically:

- TV/entertainment systems
- Telephone system
- Computer systems, stereo systems
- Kitchen appliances
- Monitoring systems
- Fire alarm systems

The failure of such equipment certainly incurs great expense. What happens when the following suffer outage times/ and the possible consequential damage:

- Computers (loss of data),
- Heating/hot water systems,
- Lift, garage door and roller shutter drives,
- Triggering or destruction of fire/burglar alarm systems (costs from a false alarm)?

A vital topic perhaps, particularly in

office buildings, because:

- Can work continue in your company without a central computer/server?
- Was all the important data backed up "in time"?

### Growing sums of damage

Current statistics and estimates of insurance companies show: Damage levels caused by surges – excluding consequential or outage costs – long since reached drastic levels due to the growing dependency on electronic "aids". It's no surprise, then, that property insurers are checking more and more claims and stipulating the use of devices to protect against surges. Information on protection measures is contained, e.g. in Directive VDS 2010.



## Creation of lightning discharges



Creation of lightning discharges: 1 = approx. 6,000 m, approx.  $-30\text{ }^{\circ}\text{C}$ , 2 = approx. 15,000 m, approx.  $-70\text{ }^{\circ}\text{C}$

### Discharge types

Some 90% of all lightning discharges between a cloud and the ground are negative cloud-earth strikes. The lightning begins in a negatively charged area of the cloud and spreads to the positively charged surface of the earth. Additional discharges are divided into:

- Negative earth-cloud strikes
- Positive cloud-earth strikes
- Positive earth-cloud strikes.

The most common discharges actually occur within a cloud or between different clouds.

### Creation of lightning discharges

When warm, damp air masses rise, the air humidity condenses and ice crystals are formed at great heights. Storm fronts can occur when the clouds expand to heights of up to 15,000 m. The strong upwind of up to 100 kilometres per hour causes the light ice crystals to enter the higher area and the sleet particles enter the lower area. Knocks and friction cause electrical discharge.

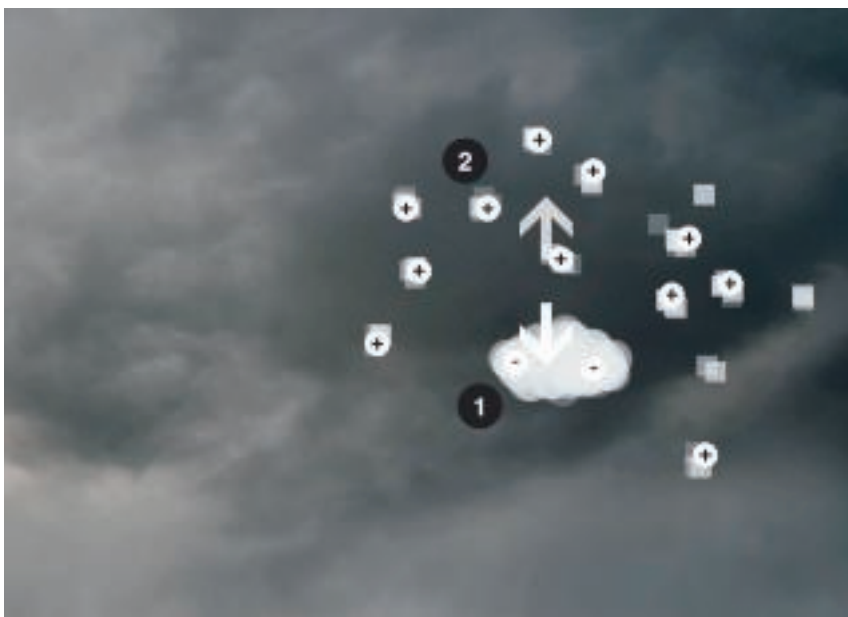


### Negative and positive charges

Studies have proved that the sleet falling down (area warmer than  $-15\text{ }^{\circ}\text{C}$ ) has a negative charge and the ice crystals being thrown upwards (area colder than  $-15\text{ }^{\circ}\text{C}$ ) has a positive charge. The light ice crystals are carried into the upper areas of the cloud by the upwind and the sleet falls to the central areas of the cloud. This divided the clouds into the three areas:

- Top: Positively charged zone
- Centre: Weakly negative charged zone
- Bottom: Weakly positive charged zone

This separation of charges forms a voltage in the cloud.

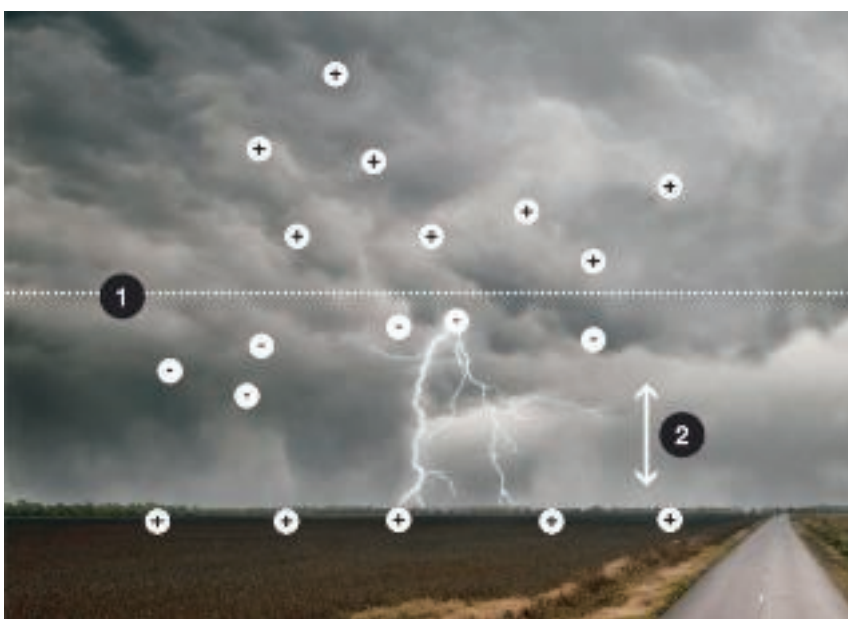


Negative and positive charges: 1 = Sleet, 2 = Ice crystals

### Load distribution

Typical load distribution:

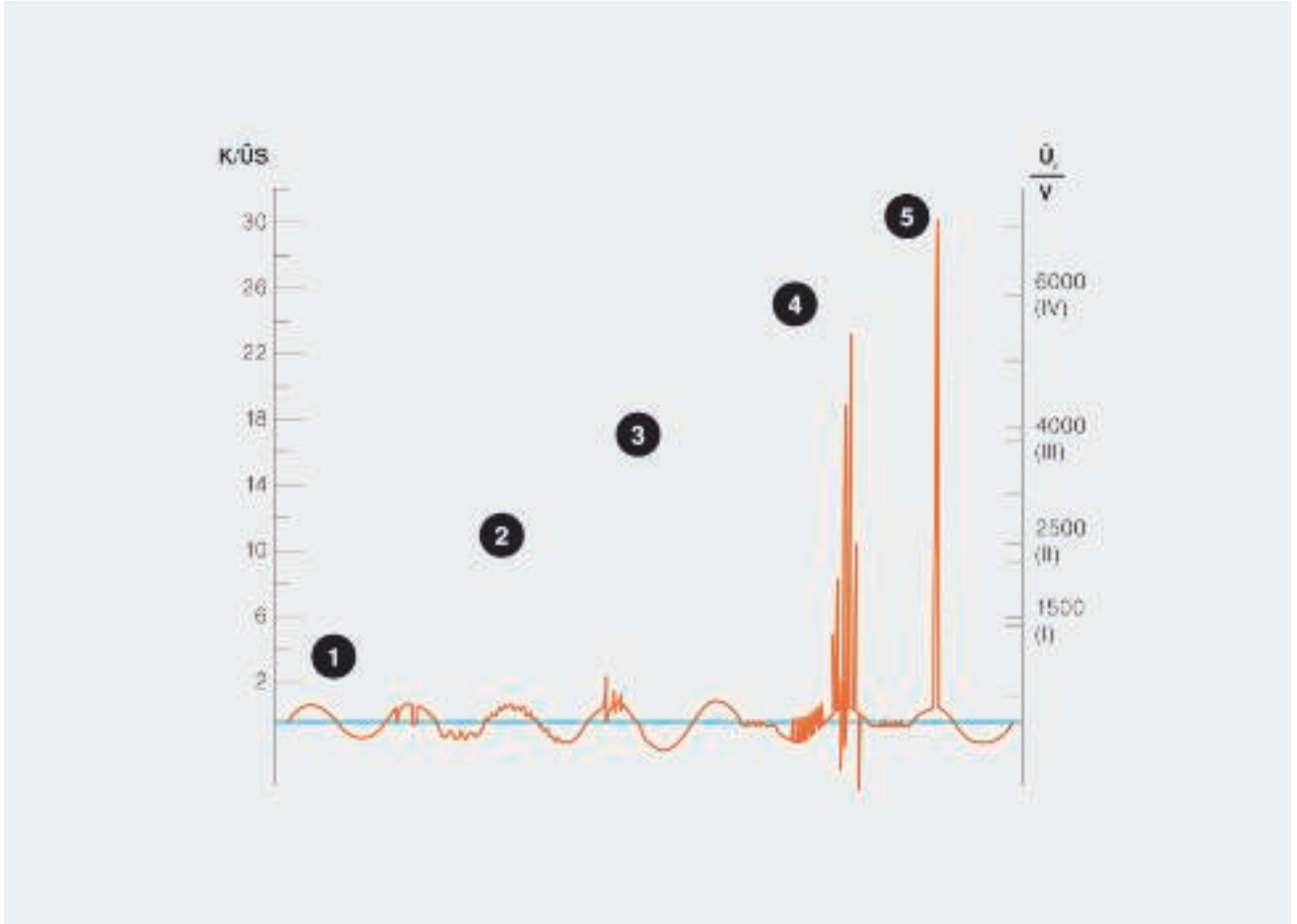
- Positive at the top, negative in the centre and weakly positive at the bottom.
- Positive charges can also be found in the area near the - ground.
- The field strength required to trigger lightning is dependent on the insulating ability of the air and is between 0.5 and 10 kV/cm.



Charge distribution: 1 = approx. 6,000 m, 2 = Electrical field



## What are transient surges?



Transient surge voltages: 1 = Voltage drops/short interruptions, 2 = Harmonic waves due to slow and fast voltage changes, 3 = Temporary voltage increases, 4 = Switching surges, 5 = Lightning surges

Transient surge voltages are brief voltage peaks lasting microseconds, which may be a multiple of the attached mains nominal voltage.

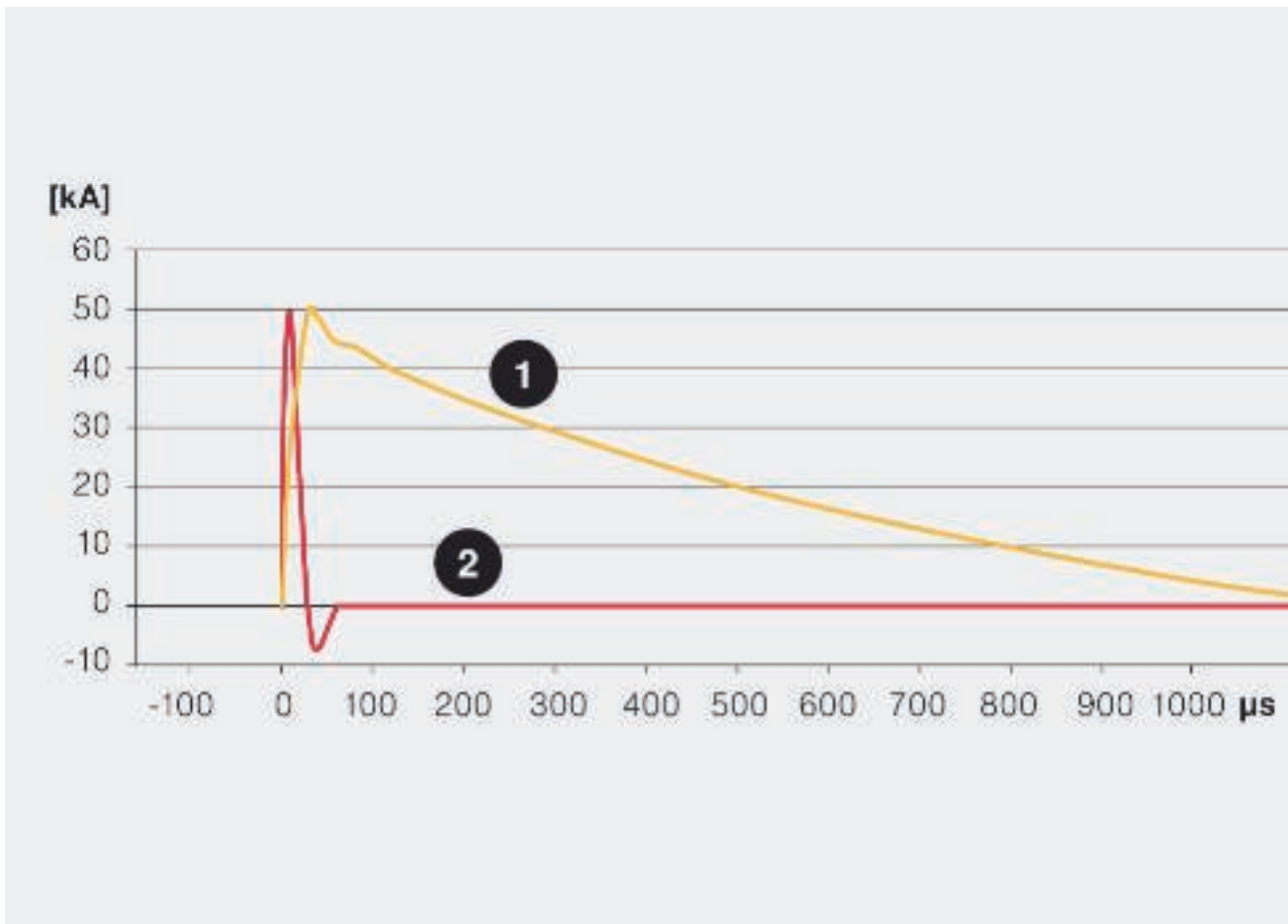
The largest voltage peaks in the low-voltage consumer network are caused by lightning discharges. The high energy content of lightning surges when a direct strike hits the external lightning protection system or a low-voltage open-wire line usually causes – without internal lightning and surge protection – total outage of the connected consumers and damage to the insulation. Yet induced voltage peaks in building installations and

energy or data cable supply cables can also reach many times the nominal operating voltage. Switching surges, too, which in fact do not cause such high voltage peaks as lightning discharges but occur much more frequently, can result in immediate system failure. As a rule, switching surges amount to twice to three times the operating voltage, lightning surges, on the other hand, can sometimes reach 20 times the nominal voltage value and transport a high energy content. Often, failures occur only after a time delay as the aging process of electronic components in the affected devices triggered by smaller transient surges

causes insidious damage. A number of different protection measures are required. These depend on the exact cause and/or impact point of the lightning discharge.



## What pulse forms are there?



Pulse types and their characteristics: Yellow = pulse shape 1, direct lightning strike, 10/350 µs simulated lightning pulse, red = pulse shape 2, remote lightning strike or switching operation, 8/20 µs simulated lightning pulse (Surge)

High lightning currents can flow to the ground during a storm. If a building with external lightning protection receives a direct hit, a voltage drop occurs on the earthing resistor of the lightning protection equipotential bonding system, which represents a surge voltage against the distant environment. This rise in potential poses a threat to the electrical systems (e.g. voltage supply, telephone systems, cable TV, control cables, etc.) that are routed into the building. Suitable test currents for testing different lightning and surge protectors have been defined in national and international standards.

### Direct lightning strike: Pulse shape 1

Lightning currents that can occur during a direct lightning strike can be imitated with the surge current of wave form 10/350 µs. The lightning test current imitates both the fast rise and the high energy content of natural lightning. Lightning current arrester Type 1 and external lightning protection components are tested using this current.

### Remote lightning strikes or switching operations: Pulse shape 2

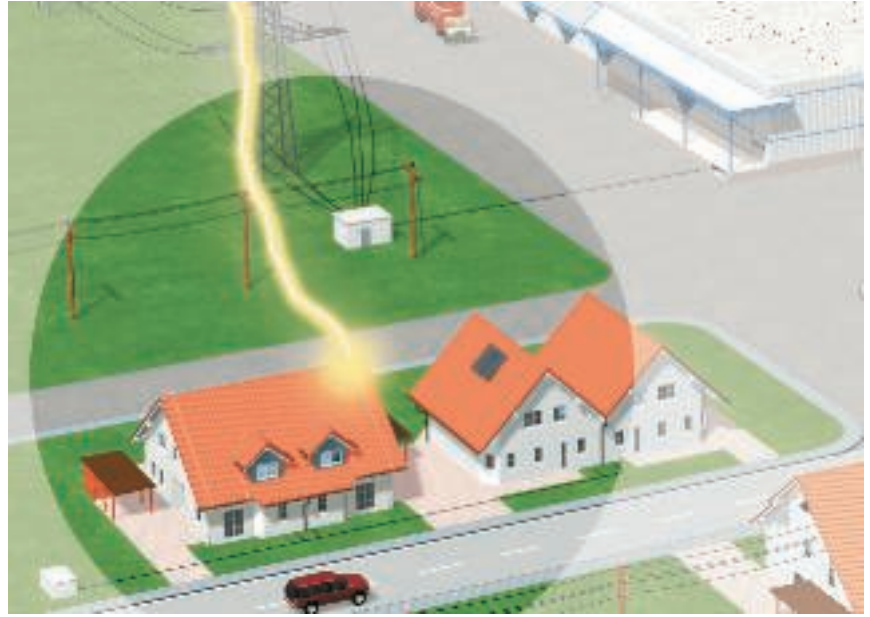
The surges created by remote lightning strikes and switching operations are imitated with test impulse 8/20 µs. The energy content of this impulse is significantly lower than the lightning test current of surge current wave 10/350 µs. Surge arrester Type 2 and Type 3 are impacted with this test impulse.



## Causes of lightning currents

### Direct lightning strike into a building

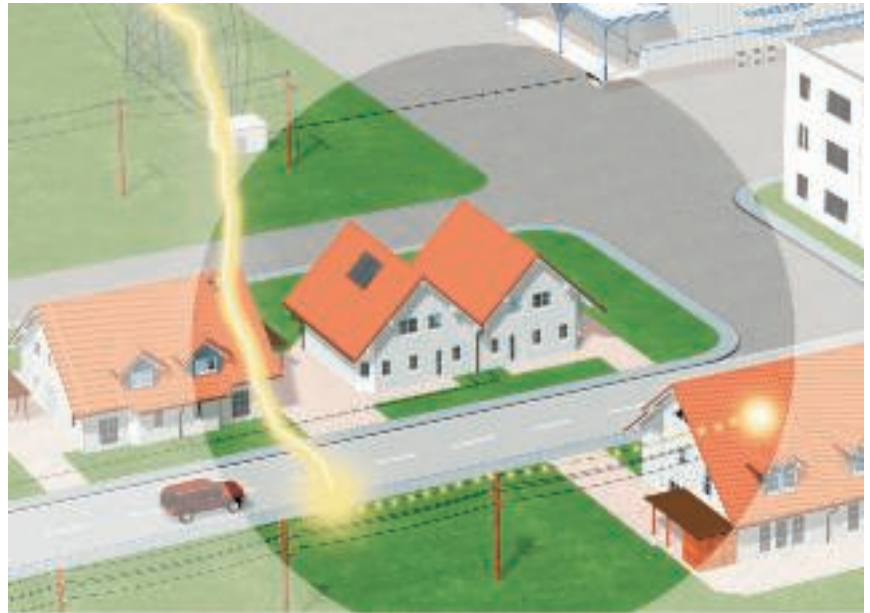
If a lightning strike hits the external lightning protection system or earthed roof structures capable of carrying lightning current (e.g. roof aerial), then the lightning energy can be arrested to the ground in advance. However, a lightning protection system on its own is not enough: Due to its impedance, the building's entire earthing system is raised to a high potential. This potential increase causes the lightning current to spill over the building's earthing system and also over the power supply systems and data cables to the adjacent earthing systems (adjacent building, low-voltage transformer).



**Threat value: Up to 200 kA (10/350)**

### Direct lightning strike into a low-voltage open-wire line

A direct lightning strike into a low-voltage open wire line or data cable can couple high partial lightning currents in an adjacent building. Electrical equipment in buildings at the end of the low-voltage open-wire line are at particular risk of damage caused by surges.



**Threat value: Up to 100 kA (10/350)**

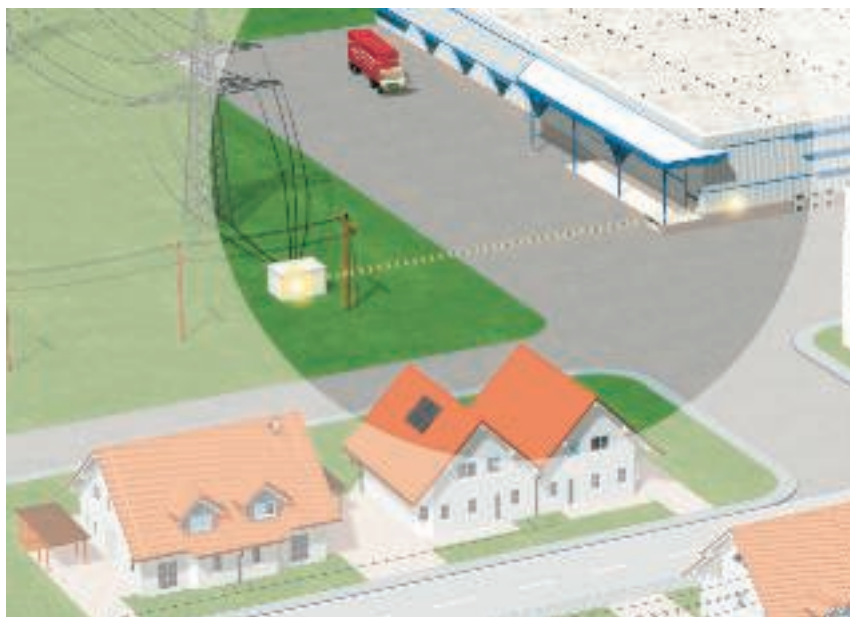


## Causes of surges

### Switching surges in the low-voltage system

Switching surges are caused by switch-on and switch-off operations, by switching inductive and capacitive loads and by interrupting short-circuit currents. Particularly when production plants, lighting systems or transformers are switched off, electrical equipment located in close proximity can be damaged.

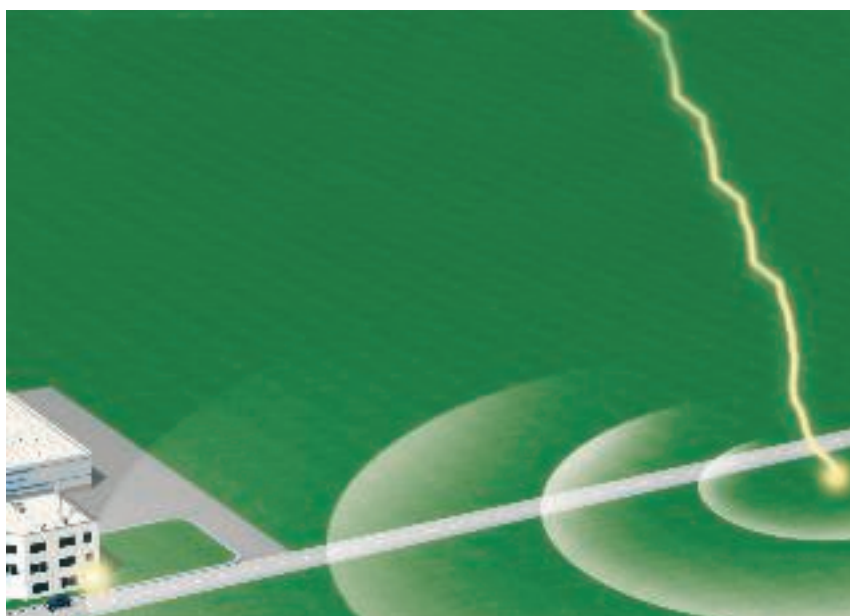
**Threat value: Several kA (8/20)**



### Coupling of surges through local or remote lightning strike

Even if lightning protection and surge protection measures are already installed: A local lightning strike creates additional high magnetic fields, which in turn induce high voltage peaks in line systems. Inductive or galvanic coupling can cause damage within a radius of up to 2 km around the lightning impact point.

**Threat value: Several kA (8/20)**





## Gradual surge reduction with lightning protection zones



### Lightning protection zone concept

The lightning protection zone concept described in international standard IEC 62305-4 (DIN VDE 0185 Part 4) has proved to be practical and efficient. This concept is based on the principle of - gradually reducing surges to a safe level before they reach the terminal device and cause damage. In order to achieve this situation, a building's entire energy network is split into lightning protection zones (LPZ = Lightning Protection Zone). Installed at each transi-

tion from one zone to another is a surge arrester for equipotential bonding. These arrestors correspond to the requirement class in question.

### Lightning protection zone

<b>LPZ 0 A</b>	Unprotected zone outside the building. Direct lightning impacts, no shielding against electromagnetic interference pulses LEMP (Lightning Electromagnetic Pulse)
<b>LPZ 0 B</b>	Zone protected by external lightning protection system. No shielding against LEMP.
<b>LPZ 1</b>	Zone inside the building. Low partial lightning energies possible.
<b>LPZ 2</b>	Zone inside the building. Low surges possible.
<b>LPZ 3</b>	Zone inside the building (can also be the metal housing of a consumer). No interference pulses through LEMP or surges present.



## Zone transitions and protective devices

### Benefits of the lightning protection zone concept

- Minimisation of the couplings into other cable systems through arresting the energy-rich, dangerous lightning currents directly at the point the cables enter the building.
- Malfunction prevention with - magnetic fields.
- Economic, well-plannable individual protection concept for new and old buildings and reconstructions.

### Type classes of the surge protection devices

OBO surge protection devices are classified in accordance with DIN EN 61643-11 into three type classes – Type 1, Type 2 and Type 3 (previously B, C and D). These standards contain building regulations, requirements and tests for surge arrestors used in AC networks with nominal voltages of up to 1,000 V and nominal frequencies of between 50 and 60 Hz. This classification enables arrestors to be matched to different requirements with regard to location, protection level and current-carrying capacity. The table below provides an overview of the zone transitions. It also shows which OBO surge protectors are to be installed in the energy supply network and their respective function.

### Zone transitions

<b>Zone transition LPZ 0 B to LPZ 1</b>	Protection device for lightning protection equipotential bonding in accordance with DIN VDE 0185-3 for direct or close lightning strikes. <ul style="list-style-type: none"> <li>• Devices: Type 1 (Class I, requirements class B), e. g. MC50-B VDE</li> <li>• Max. protection level according to standard: 4 kV</li> <li>• Installation e.g. in the main distributor/at building entry</li> </ul>
<b>Zone transition LPZ 1 to LPZ 2</b>	Protection device for surge protection to DIN VDE 0100-443 for surge voltages arriving through the supply network due to remote strikes or switching operations. <ul style="list-style-type: none"> <li>• Devices: Type 2 (Class II, requirements class C), e.g. V20-C</li> <li>• Max. protection level according to standard: 2.5 kV</li> <li>• Installation e.g. in the power distributor, subdistributor</li> </ul>
<b>Zone transition LPZ 2 to LPZ 3</b>	Protection device, intended for surge protection of portable consumers at sockets and power supplies <ul style="list-style-type: none"> <li>• Devices: Type 3 (Class III, requirements class D), e.g. FineController FC-D</li> <li>• Max. protection level according to standard: 1.5 kV</li> <li>• Installation e.g. on end consumer</li> </ul>



## BET – testing centre for lightning protection, electrical engineering and support systems



*Lightning current test*

### **BET with countless tasks**

If only lightning current, environmental and electrical testing was possible at BET up to now, the BET Test Centre is now a competent partner for testing of cable support systems. This combination has made it necessary to revise the meaning of the name. If BET previously stood for "Blitzschutz- und EMV-Technologiezentrum" (Lightning protection and EMC technology centre), since 2009 these letters have meant BET Test centre for lightning protection, electrical engineering and support systems.

### **Test generator for lightning current tests**

The test generator, planned in 1994 and built in 1996, allows the execution of lightning current tests of up to 200 kA. The generator was planned and constructed in conjunction with the Soest Technical College. Due to the intensive

planning and scientific consultation required in the construction of the testing system, this system has worked without fault for 12 years and still meets the current standard testing requirements.

The main load of the test generator is generated by the testing of products from the TBS product unit. Here, tests to accompany development are carried out on new developments, modifications of existing OBO products and also comparison tests on competing products. These include lightning protection components, surge protection devices and lightning current arrestors. Tests of lightning protection components are carried out according to DIN EN 50164-1, those for spark gaps according to DIN EN 50164-3 and those for lightning and surge protection devices according to DIN EN 61643-11. This is just a small portion of the testing standards used for tests in the BET Test Centre.



Lightning current generator

### Testing types for lightning and surge protection

Both lightning current tests and surge voltage tests can be carried out at up to 20 kV. A hybrid generator is used for these tests, which was also developed as part of a cooperation with the Soest Technical College. EMC testing of cable support systems can also be carried out using this test generator. All kinds of cable routing and cable support systems of up to 8 m length can be tested without any difficulties. Tests for electrical conductivity according to DIN EN 61537 are also carried out.



Salt spray trough

### Simulation of real environmental conditions

To carry out standardised tests on components intended for external use, they must be pretreated under real environmental conditions. This takes place in a salt spray trough and a sulphur dioxide testing chamber. Depending on the test, the test length and the concentration of the salt spray or sulphur dioxide in the testing chambers may vary. This means that it is possible to conduct tests according to IEC 60068-2-52, ISO 7253, ISO 9227 and EN ISO 6988.



Load test

### Testing cable support systems

The well-known KTS testing system, newly installed in the BET Test Centre, allows the investigation of the load capacities of any cable support system manufactured by OBO. The basis for this is DIN EN 61537 and VDE 0639. In the BET Test Centre, OBO Bettermann has a testing department in which products can be tested according to standards, even during the development phase.





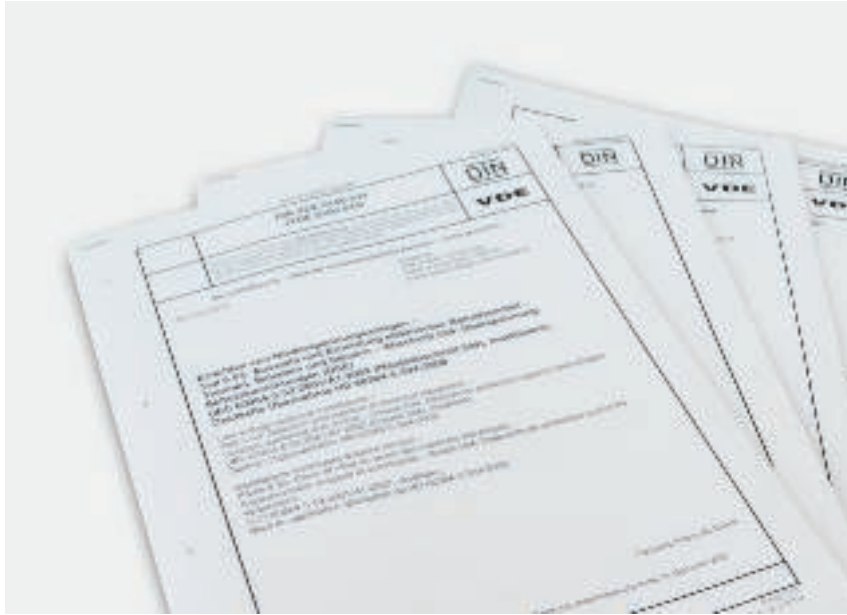
# Contents, surge protection energy technology



Standards, surge protection	20
Installation instructions	21
4-cable networks	22
5-cable networks	23
Selection aid, energy technology	24



## Standards, surge protection



**You must take various standards into account when erecting surge protection. You can find the most important European regulations here.**

**DIN VDE 0100-410:2007  
(IEC 60364-4-41:2005)**

Low-voltage electrical installations – Part 4-41: Protection for safety – protection against electric shock.

**DIN VDE 0100-540:2007  
(IEC 60364-5-54:2002)**

Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – earthing arrangements, protective conductors and protective bonding conductors

**DIN VDE 0100-443:2007**

Low-voltage electrical installations – Part 4-44: Protection for safety – protection against voltage distur-

bances and electromagnetic disturbances – Clause 443: Protection against surge voltages of atmospheric origin or due to switching

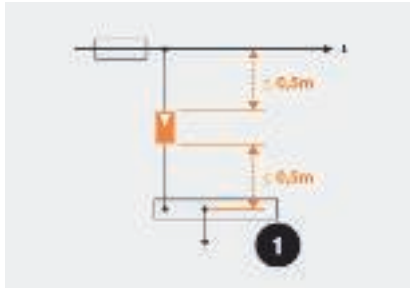
**DIN VDE 0100-534:2009**

Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – isolation, switching and control – Clause 534: Devices for protection against surge voltages

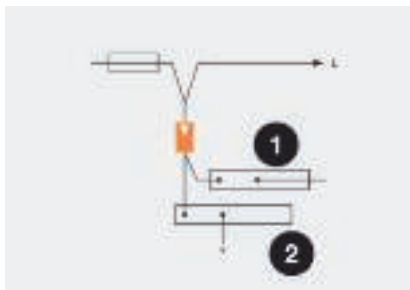
**DIN EN 61643-11:2007  
(IEC 61643-1)**

Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – requirements and tests

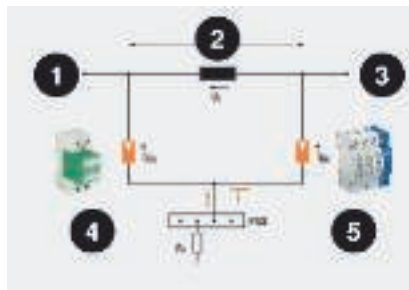
# Installation instructions



Length of the feed line, 1 = Equipotential bonding rail or terminal or protective conductor rail



V wiring, 1 = Protective conductor rail, 2 = Main equipotential bonding rail or terminal



1= Power supply, 2 = Cable length, 3 = Consumer, 4 = Response voltage 2 kV, e.g. MC 50-B VDE 5 = Response voltage 1.4 kV, e.g. V20 C

## Connection length, V-wiring

The connection cable to the protector is crucial for achieving an optimum protection level. In accordance with IEC installation directives, the length of the branch line to the arrester and the length of the line from the protection device to the equipotential bonding should in each case be less than 0.5 m. If the cables are longer than 0.5 m, then V-wiring must be chosen.

## Decoupling

Lightning current and surge arrestors perform a number of functions. These arrestors must be used in coordination. This coordination is guaranteed by the existing line length or special lightning current arrestors (MCD series). For example, in the protection set, Type 1 and Type 2 arrestors (Classes B and C) can be used adjacent to each other.

## Example cable length > 5 m

- No additional decoupling required

## Example cable length < 5 m

- Use decoupling: MC 50-B VDE + LC 63 + V20-C
- Alternatively: MCD 50-B + V20-C, no additional decoupling required (e.g. protection set)

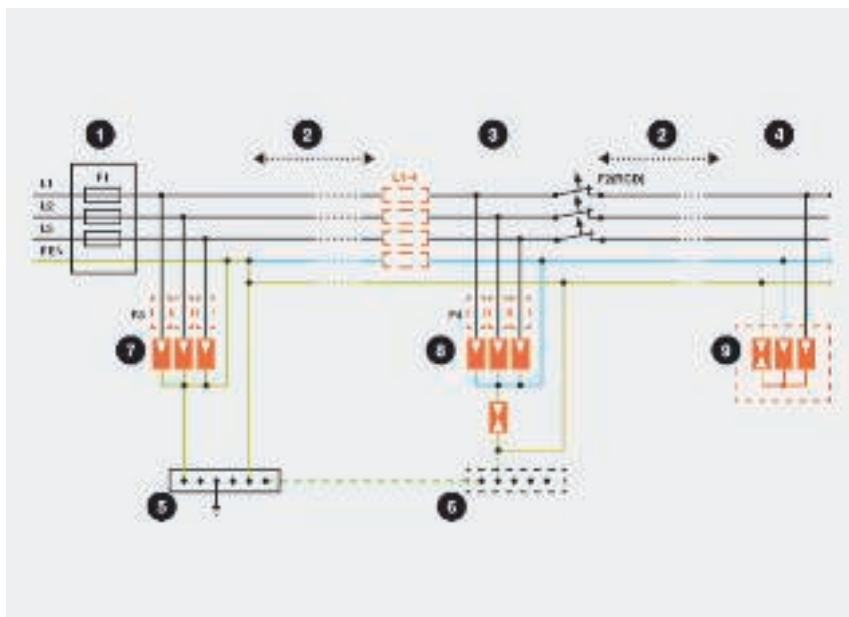
## Minimum cross-sections for the lightning protection equipotential bonding system

The following minimum cross-sections should be observed for lightning protection equipotential bonding: For copper, a cable cross-section of 16 mm<sup>2</sup>, for aluminium 25 mm<sup>2</sup> and for iron 50 mm<sup>2</sup>. At the lightning protection zone transition from LPZ 0 to LPZ 1, all the metallic installations must be included in the equipotential bonding. Active lines must be earthed using suitable arrestors.





## 4-cable networks, TN-C network system



1 = Main distributor, 2 = Cable length, 3 = Circuit distributor, e.g. subdistributor, 4 = Fine power protection, 6 = Main EBS, 7 = Local EBS, 8 = Type 1, 9 = Type 2, 10 = Type 3

In the TN-C-S network system, the electrical unit is supplied through the three external lines (L1, L2, L3) and the combined PEN line. Usage is described in DIN VDE 0100-534 (DIN EN 61643-11).

### Lightning current arrester Type 1

Type 1 lightning current arrestors are used in the 3-pole circuit (e.g.: 3x MC 50-B). The connection is effected parallel to the external lines, which are connected to the PEN via the arrester. Following consultation with the local energy provider and in accordance with the VDN Directive, use before the main meter device is also possible.

### Surge arrester, type 2

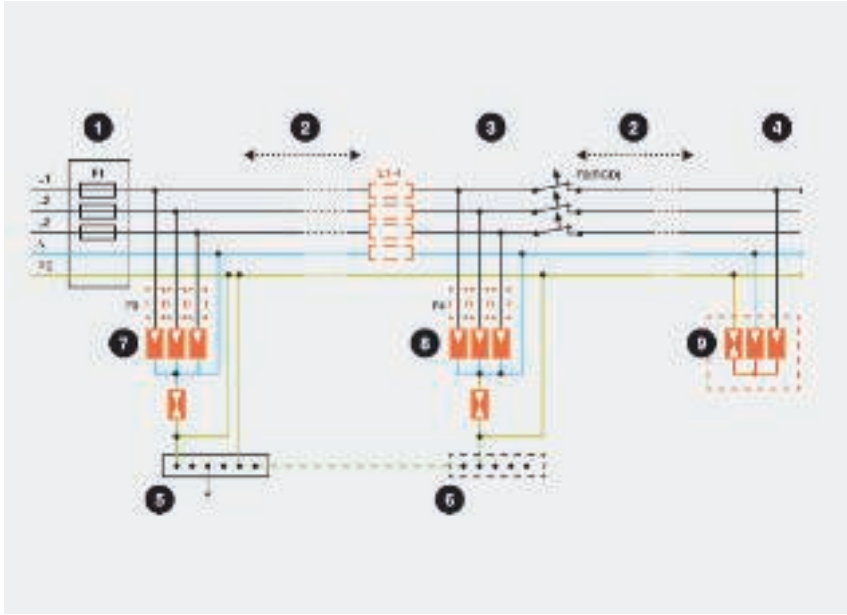
Surge arrestors of Type 2 are usually used after the split in the PEN line. If the split is more than 0.5 m away, the network from here onwards is 5-line. The arrestors are used in the 3+1 circuit (e.g. V20-C 3+NPE). With the 3+1 circuit, the external lines (L1, L2, L3) are con-

nected to the neutral cable (N) via arrestors. The neutral cable (N) is connected to the protective earth via a collective spark gap. The arrestors must be used before a residual current protective device (RCD), as it would otherwise interpret the surge current as a residual current and interrupt the power circuit.

### Surge arrester, type 3

Surge arrestors of Type 3 are used to protect against surges in the device power circuits. These transverse surges occur primarily between L and N. A Y circuit protects the L and N lines with varistor circuits and makes the connections to the PE line through a collective spark gap (e.g.: KNS-D). This protection circuit between L and N prevents surge currents from transverse voltages being conducted towards PE, the RCD thus interprets no residual current. The relevant technical data is contained on the product pages.

## 5-cable networks, TN-S and TT network system



1 = Main distributor, 2 = Cable length, 3 = Circuit distributor, e.g. subdistributor, 4 = Fine power protection, 6 = Main EBS, 7 = Local EBS, 8 = Type 1, 9 = Type 2, 10 = Type 3

In the TN-S network system, the electrical unit is supplied through the three external lines (L1, L2, L3), the neutral cable (N) and the earth cable (PE). In the TT network, however, the electrical unit is supplied through the three external lines (L1, L2, L3), the neutral cable (N) and the earth cable (PE). Usage is described in DIN VDE 0100-534 (DIN EN 61643-11).

### Lightning current arrester Type 1

Type 1 lightning current arresters are used in the 3+1 circuit (e.g. 3x MC 50-B and one MC 125-B NPE). With the 3+1 circuit, the external lines (L1, L2, L3) are connected to the neutral cable (N) via arresters. The neutral cable (N) is connected to the protective earth via a collective spark gap. Following consultation with the local energy provider and in accordance with the VDN Directive, use before the main meter device is also possible.

### Surge arrester, Type 2

Surge arresters of Type 2 are used in the 3+1 circuit (e.g.: V20-C 3+NPE). With the 3+1 circuit, the external lines (L1, L2, L3) are connected to the neutral cable (N) via arresters. The neutral cable (N) is connected to the protective earth via a collective spark gap. The arresters must be used before a residual current protective device (RCD), as it would otherwise interpret the surge current as a residual current and interrupt the power circuit.

### Surge arrester, Type 3

Surge arresters of Type 3 are used to protect against surges in the device power circuits. These transverse surges occur primarily between L and N. A Y circuit protects the L and N lines with varistor circuits and makes the connection to the PE line through a collective spark gap (e.g. KNS-D). This pro-

tection circuit between L and N prevents surge currents from transverse voltages being conducted towards PE, the RCD thus interprets no residual current. The relevant technical data is contained on the product pages.



# Selection aid, energy technology



- TN/TT network systems



- No external lightning protection system
- Earthing cable connection
- Private building, e.g. single-family house

**Installation location 1**  
(Main distributor, Type 1/Type 2)

V10 Compact  
Type 2/Type 3  
Art. no.: 5093380  
Other versions available



**Installation location 2**  
(Sub-distributor Type 2)


Not required

**Installation location 3**  
(In front of a Type 3 terminal)

e.g. FineController FC-D  
Type 3  
Art. no.: 5092800  
Other versions available



- TN/TT network systems



- No external lightning protection system
- Earthing cable connection
- Multi-family homes, industry commerce

**Installation location 1**  
(Main distributor, Type 1/Type 2)

V20-C 3 + NPE  
Type 2  
Art. no.: 5094656  
Other versions available



**Installation location 2**  
Distance between main distributor box and sub-distributor box is greater than 10m, Type 2

V20-C 3 + NPE  
Type 2  
Art. no.: 5094656  
Other versions available




**Installation location 3**  
(In front of a Type 3 terminal)

e.g. CNS-3-D  
Type 3  
Art. no.: 5092701  
Other versions available



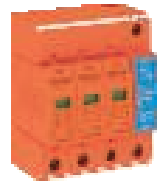
- TN/TT network systems



- External lightning protection system
- Open-wire connection
- Earthed antenna structures
- Lightning protection class III and IV

**Installation location 1**  
(Main distributor, Type 1/Type 2)

V50 B+C 3+NPE  
Type 2/Type 3  
Art. no.: 5093654  
Other versions available



**Installation location 2**  
Distance between main distributor box and sub-distributor box is greater than 10m, Type 2

V20-C 3 + NPE  
Type 2  
Art. no.: 5094656  
Other versions available



**Installation location 3**  
(In front of a Type 3 terminal)

e.g. KNS-3-D  
Type 3  
Art. no.: 5092057  
Other versions available





- TN-S/TT network systems

- External lightning protection system
- Open-wire connection
- Earthed antenna structures
- Lightning protection class I to IV (e.g. industrial building, computer centres and hospitals)

**Installation location 1**  
 (Main distributor, Type 1/Type 2)

MC 50-B/3+1, Type 1  
 Art. no: 5096878  
 Other versions available



**Installation location 2**  
 Distance between main distributor box and sub-distributor box is greater than 10 m, Type 2

V20-C 3 + NPE, Type 2  
 Art. no.: 5094656  
 Other versions available



**Installation location 3**  
 (In front of a Type 3 terminal)

e.g. V10 Compact, Type 2, Type 3  
 Art. no.: 5093380  
 Other versions available



- TN-C network systems

- External lightning protection system
- Open-wire connection
- Earthed antenna structures
- Lightning protection class I to IV (e.g. industrial building, computer centres and hospitals)

**Installation location 1**  
 (Main distributor, Type 1/Type 2)

MC 50-B/3+1, Type 1  
 Art. no: 5096877  
 Other versions available



**Installation location 2**  
 Distance between main distributor box and sub-distributor box is greater than 10 m, Type 2

V20-C 3 + NPE, Type 2  
 Art. no.: 5094656  
 Other versions available



**Installation location 3**  
 (In front of a Type 3 terminal)

e.g. VF 230-AC/DC, Type 3  
 Art. no.: 5097650  
 Other versions available

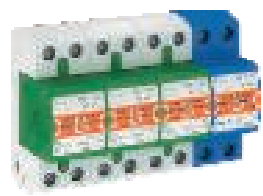


- TN-S/TT network systems

- External lightning protection system
- Open-wire connection
- Earthed antenna structures
- Lightning protection class I to IV (e.g. industrial building, computer centres and hospitals)

**Installation location 1**  
 (Main distributor, Type 1/Type 2)

MC 50-B/3+1, Type 1  
 Art. no: 5096879  
 Other versions available



**Installation location 2**  
 Distance between main distributor box and sub-distributor box is greater than 10 m, Type 2

V20-C 3 + NPE, Type 2  
 Art. no.: 5094656  
 Other versions available



**Installation location 3**  
 (In front of a Type 3 terminal)

e.g. ÜSM-A, Type 3  
 Art. no.: 5092451  
 Other versions available





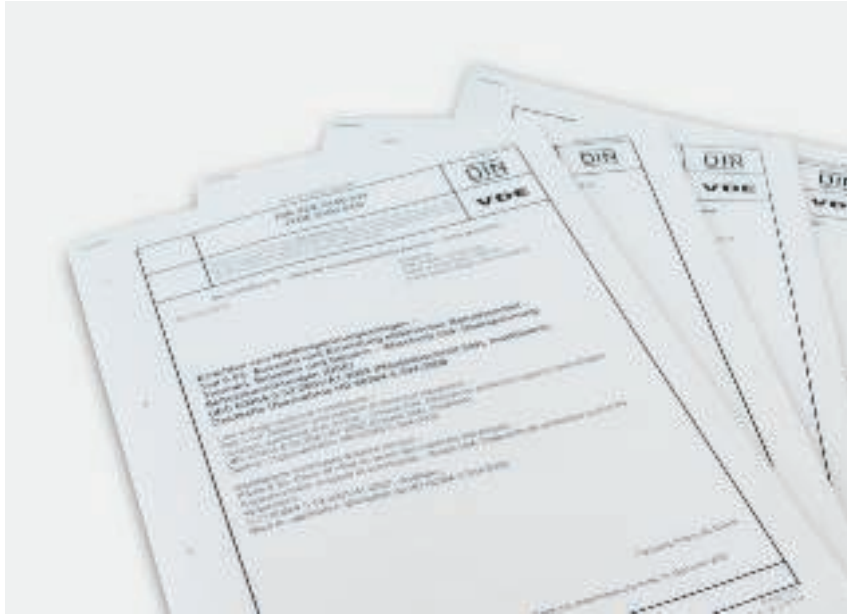
## Contents, lightning and surge protection, photovoltaics



Standards, photovoltaics	28
Statutory requirements and insurance requirements	29
Sunny outlooks – photovoltaics	30
Lightning protection equipotential bonding system and separation distance	31
Rolling sphere method	32
Protective angle method	33
Cable routing, cable support and fire protection systems	34
Installation principle, housing	35
Installation principle, industrial and commercial building	36
Installation principle, outdoor system	37



## Standards, photovoltaics



Various standards must be complied with when erecting a photovoltaic system. You can find the most important European regulations here.

**DIN EN 62305-1  
(IEC 62305-1:2006):2006-10**

Protection against lightning – Part 1: General principles

**DIN EN 62305-2  
(IEC 62305-2:2006):2006-10**

Protection against lightning – Part 2: Risk management

**DIN EN 62305-3  
(IEC 62305-3:2006):2006-10**

Protection against lightning – Part 3: Physical damage to structures and life hazard

**DIN EN 62305-4  
(IEC 62305-4:2006):2006**

Protection against lightning – Part 4: Electrical and electronic systems within structure

**DIN EN 62305-3 Bbl 5  
(VDE 0185-305-3 Bbl 5):2009-10**

Protection against lightning – Part 3: Physical damage to structures and life hazard – Supplement 5: Lightning and surge voltage protection for photovoltaic power supply systems

**DIN EN 61643-1  
(IEC 61643-1)**

Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems

**DIN VDE 0100-534  
(IEC 60364-5-534)**

Part 5-53: Selection and erection of electrical equipment – isolation, switching and control – Clause 534: Devices for protection against surge voltages

**DIN VDE 0100-443  
(IEC 60364-4-44)**

low-voltage electrical installations – Part 4-44: Protection for safety – protection against voltage disturbances and electromagnetic disturbances – Clause 443: Protection against surge voltages of atmospheric origin or due to switching

**VDE 0100-712  
(IEC 60364-7-712):2006-06**

Requirements for solar photovoltaic (PV) power supply systems

## Statutory requirements and insurance requirements



Besides the current standards, the general statutory conditions and the requirements of the insurance companies must be taken into account. Please also observe the appropriate local legal requirements.

### Statutory requirements

State construction regulations (LBO): Irrespective of a PV system, certain buildings require an external lightning protection system. Buildings requiring lightning protection by law include high-rise buildings, hospitals, schools and meeting places.

### Insurance requirements: VdS directive 2010 for risk-orientated lightning and surge voltage protection

PV systems larger than 10 kW require a lightning protection system of class III and internal surge protection.

Freestanding PV systems require surge protection measures and equipotential bonding.



## Sunny outlooks – Photovoltaic solutions from OBO



Nowadays, the solar sector is a booming part of the electrical industry. Because every investor sees a correlation between system function and claw-back time, protection against lightning and surge voltages plays a key role.

### Protection of the converter

The current inverter is the heart of the plant and seriously exposed to couplings from surge impulses. The couplings can be dampened using lightning protection, earthing, equipotential bonding and shielding measures and through correct cable routing. Damage to photovoltaic systems can have various causes:

### Damage from galvanic coupling

Partial lightning currents flow through parts of the PV system and generated voltages of several hundred thousand volts.

### Damage through magnetic field coupling

Lightning currents couple surges through magnetic induction. Distance reduces the coupling.

### Damage through electrical field coupling

Surges through the electrical field of the lightning current. Compared to the magnetic field coupling, the couplings are very small.

### Lightning protection for PV power supply systems

A lightning protection system of protection class III meets the normal requirements for PV systems in DIN EN 62305-3, Supplement 5 (VDE 0185-305-3 Supplement 5): 2009. In addition, a lightning protection class calculation can be made according to DIN EN 62305 (IEC 62305).

# Lightning protection equipotential bonding system and separation distance



Figure 1: Separating distance (s) between the lightning protection system and cable support system

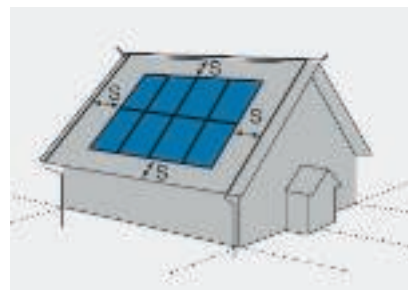


Figure 2: Separation distance (s) between the PV and the lightning protection system

## Important measures

The following points must be taken into account in order to ensure comprehensive protection of the PV system:

- The local earthing (EBS) must be connected to the main equipotential bonding systems (MEBS).
- Equipotential bonding conductors must be routed closely and in parallel to the DC cables.
- Data cables must be included in the protection concept.

Table 1 provides an overview of the protective measures.

## Separation distance

According to DIN EN 62305, the lightning protection system must be erected at a separation distance (s) from the parts of the PV system. Usually, a separation distance (s) (= safety distance) of 0.5 m to 1 m is sufficient.

Table 1: Overview of the protective measures

External lightning protection available	Measure	Separation spacing according to DIN EN 62305 maintained	Equipotential bonding	Surge protection
Yes	Adjusting the lightning protection system according to DIN EN 62305	Yes	min. 6 mm <sup>2</sup>	DC: Type 2 AC: Type 1
Yes	Adjusting the lightning protection system according to DIN EN 62305	No	min. 16 mm <sup>2</sup>	DC: Type 1 AC: Type 1
No	Testing of the requirements: State construction regulations, VdS 2010, risk analysis, etc.	-	min. 6 mm <sup>2</sup>	DC: Type 2 AC: Type 2





## Rolling sphere method



Figure 1: Planning method: Rolling sphere ( $R$ ), rolling sphere method and penetration depth ( $p$ ) and spacing of the interception rods ( $d$ )

### The method

As a geometric electric model, the lightning globe method is a method of testing the protection area against a direct lightning strike. An actual globe is unrolled on a model of the system, in which all the contact points represent points of direct lightning strikes.

### Protect photovoltaic systems with several interception rods

If you use several interception rods to protect an object, you must take into consideration the penetration depth between them. Table 2 provides an overview of this.

Table 2: Penetration depth by lightning protection class according to VDE 0185-305

Distance of interception system ( $d$ ) in m	Penetration depth, lightning protection class I Lightning protection sphere: $R=20$ m	Penetration depth, lightning protection class II Lightning protection sphere: $R=30$ m	Penetration depth, lightning protection class III Lightning protection sphere: $R=45$ m	Penetration depth, lightning protection class IV Lightning protection sphere: $R=60$ m
2	0.03	0.02	0.01	0.01
3	0.06	0.04	0.03	0.02
4	0.10	0.07	0.04	0.04
5	0.16	0.10	0.07	0.05
10	0.64	0.42	0.28	0.21
15	1.46	0.96	0.63	0.47
20	2.68	1.72	1.13	0.84

## Protective angle method



Figure 2:  $\alpha^\circ$  = Lightning protection angle

### The method

The protection angle method can be used for interception rods, parapet cables and buildings. The area protected against a direct lightning strike is dependent on the protection class and the height of the interception unit.

### Example

A 10 m high parapet interception cable offers a protection angle of  $60^\circ$ . The separation distance between the PV and the lightning protection systems must be maintained.

### Step 1: Test the separation distance

If the required separation distance cannot be maintained, then the metallic parts must be interconnected in order to deal with lightning currents.

### Step 2: Check protective measures according to table 1

Example: Lightning current arrestors (Type 1) for lightning protection equipotential bonding are used on the DC and the AC side.

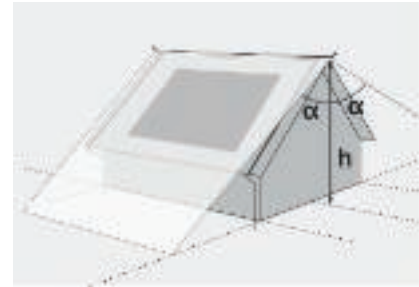


Figure 3: Protection angle ( $\alpha$ ), parapet cable

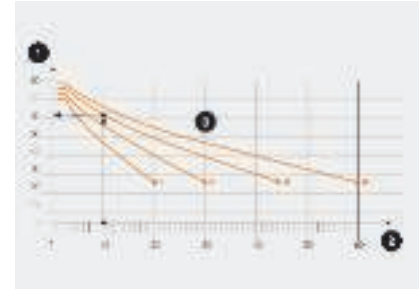


Figure 4: 1 =  $\pm$  = Lightning protection angle, 2 = Parapet height, 3 = Lightning protection class

### Step 3: Inclusion of data cables

Data cables must be included in the protection concept.

### Step 4: Provision of equipotential bonding

Local equipotential bonding should be provided on the inverter.



## Cable routing, cable support and fire protection systems



Figure 5: Separation distance (s) between cable duct and lightning interception unit

### Cable routing

- Close, parallel cable routing minimised coupling.
- Cables, shielded to carry lightning current, divides up the lightning current.
- Interceptor and arrester cables must be routed at a separation distance to PV systems (Figure 5).

### Cable support systems

- Metallic cable trays minimise couplings.
- Closed systems with lids reduce the UV load of the cables in outdoor loads.
- The separation distance should be maintained between the cables of the PV system and the lightning protection system.

### Fire protection systems

- Public buildings have very high fire protection requirements.
- OBO insulation systems can offer the proper protection against the spread of fire, smoke and heat.
- OBO fire protection systems can offer cable routing with tested safety, especially in emergency and escape routes.

## Installation principle, housing



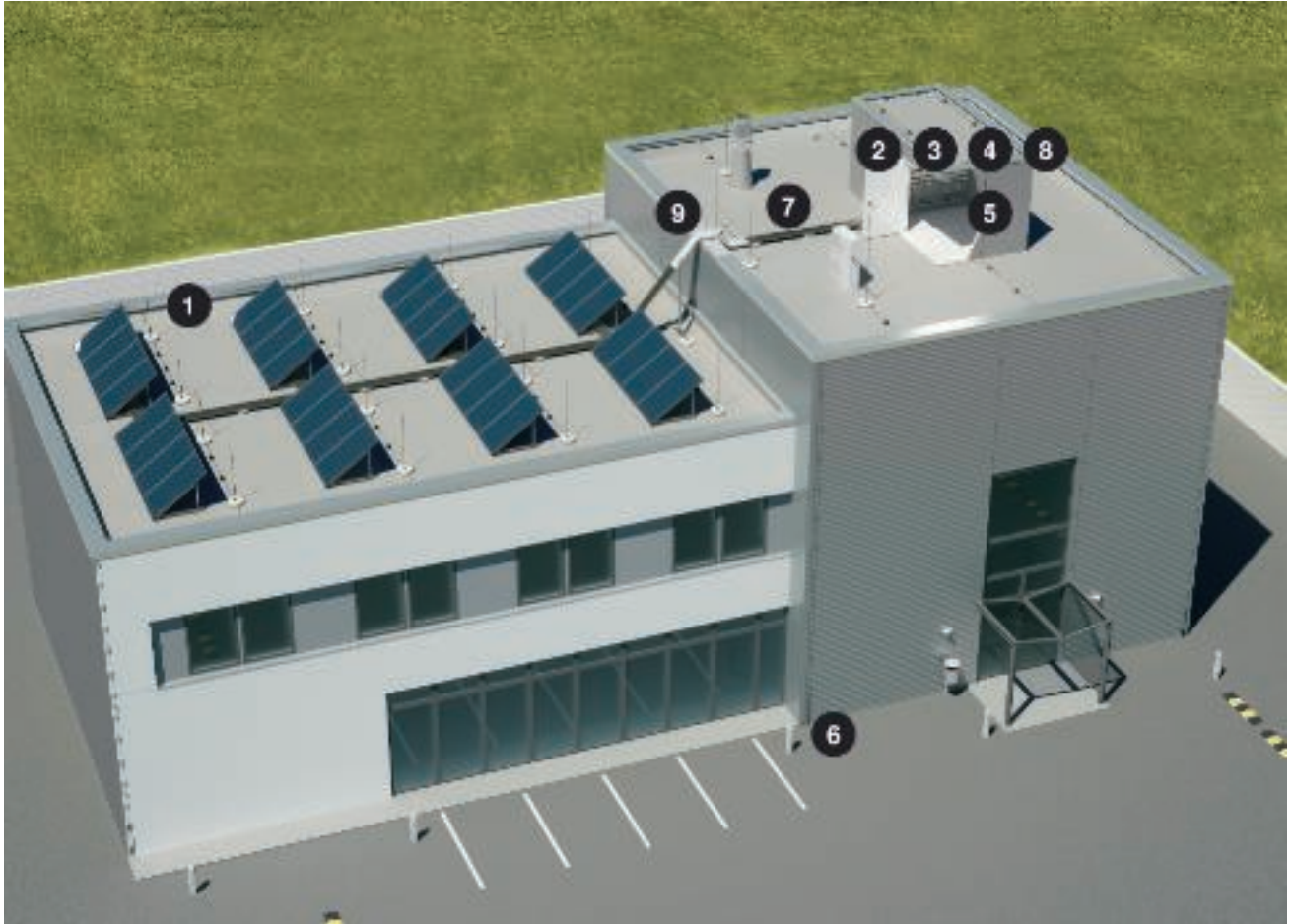
PV systems are an interesting investment for private investors. However, amortisation of the PV system may be delayed through damages and lack of income. Proper installation and cable routing as well as lightning and surge protection measures increase the availability of the system.

### System components

1	Intercepting device and arrester system
2	Surge arrester for AC energy technology
3	Surge arrester for data technology
4	Lightning current and surge arrester for DC photovoltaic systems
5	Equipotential bonding system
6	Arresting cable to earthing system
7	Cable routing system
8	Installation solutions
9	Construction fire protection



## Installation principle, industrial and commercial building

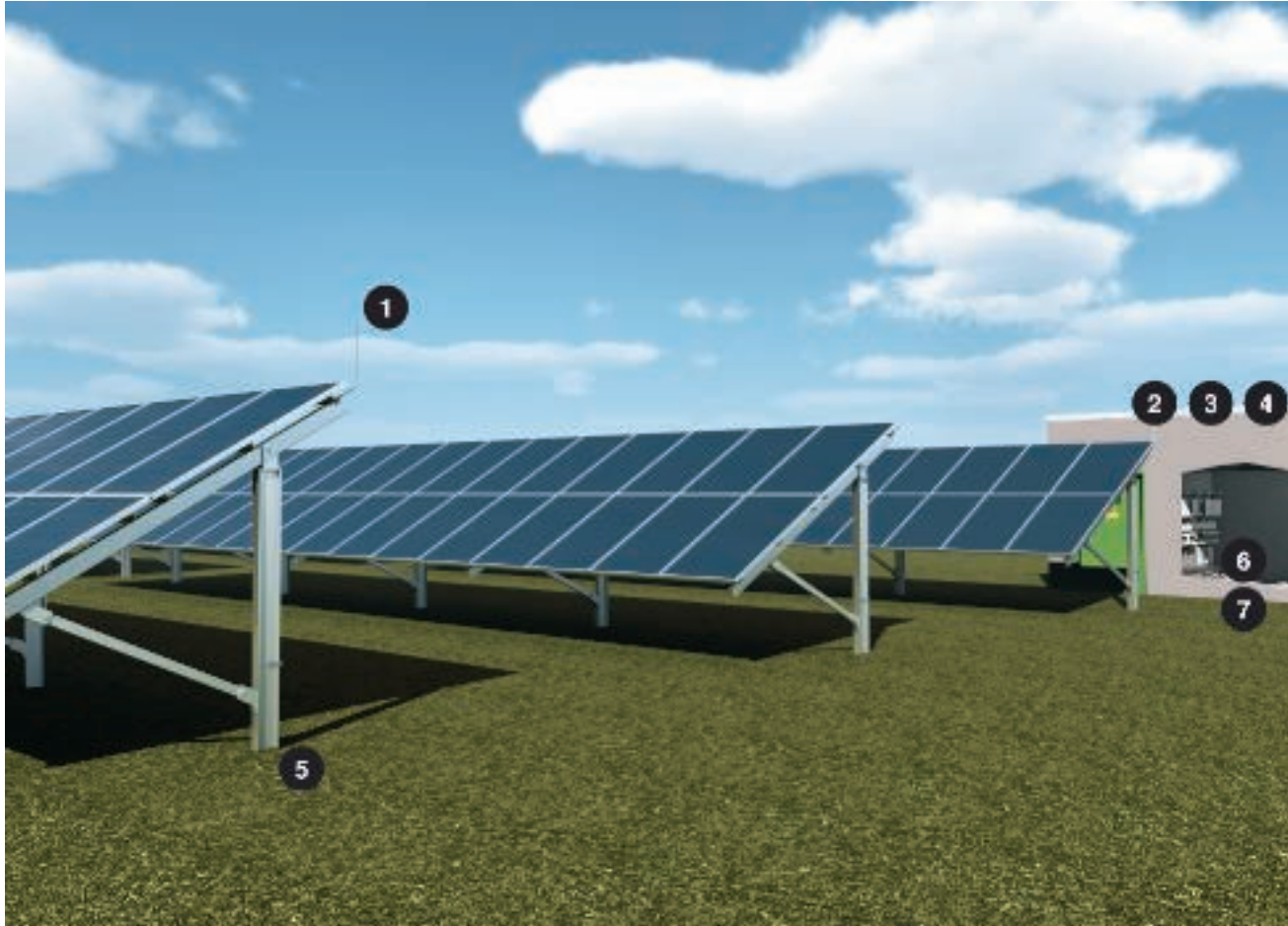


PV systems are a very interesting investment for commercial investors. For systems > 10 kW, insurers require an external lightning protection system of Class III to DIN EN 62305 (IEC 62305) with surge protection and equipotential bonding measures. Proper installation and cable routing as well as lightning and surge protection measures increase the availability of the system and guarantee the income of the PV system.

### System components

1	Intercepting device and arrestor system
2	Surge arrester for AC energy technology
3	Surge arrester for data technology
4	Lightning current and surge arrester for DC photovoltaic systems
5	Equipotential bonding system
6	Earthing system
7	Cable routing system
8	Installation solutions
9	Construction fire protection

## Installation principle, outdoor system



In freestanding systems, deep earthers down to the depth of the permafrost are ineffective. A low earthing resistance (less than 10  $\Omega$ , measured as a low frequency) is recommended. With earthing systems, a loop size of 20 m x 20 m up to 40 m x 40 m has proved effective. The metallic supporting tables and frames must be interconnected. In addition, surge protection devices must be used.

### System components

1	Intercepting device and arrester system
2	Surge arrester for data technology
3	Lightning current and surge arrester for DC photovoltaic systems
4	Equipotential bonding system
5	Earthing system
6	Cable routing system
7	Installation solutions



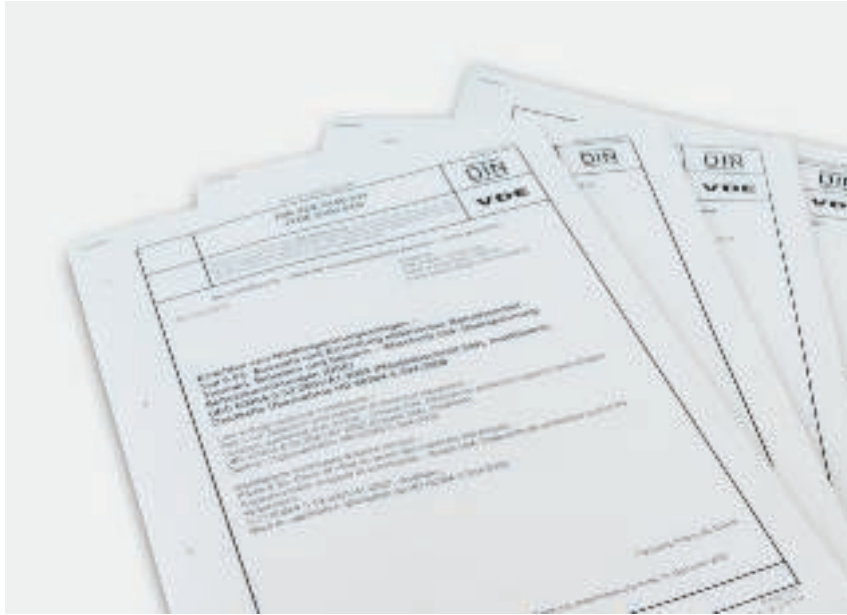


# Contents, surge protection device for data and information technology



Standards, data and information technology	40
Important terms and basic principles	41
Network topologies	42
Installation instructions, lightning barriers	44
Limit frequency and installation instructions	46
Equipotential bonding of data cables	47
Terms and explanations on PC interfaces	48
Selection aids, surge protection	50





Various standards have a role to play in the area of data and telecommunications technology. All kinds of standards must be taken into account, from building structure cabling, through equipotential bonding through to EMC. Some of the most important are listed here.

**IEC 61643-21:2000-09**

Low voltage surge protective devices – Part 21: surge protective devices connected to telecommunications and signalling networks – performance requirements and testing methods

**DIN EN 50173-1:2007**

Information technology – generic cabling systems – Part 1: General requirements

**DIN VDE 0845-1:1987-10**

Protection of telecommunication systems against lightning, electrostatic discharges and surge voltages from electric power installations; provisions against surge voltages

**DIN VDE 0845-2:1993-10**

Protection of data processing and telecommunications equipment against the impact of lightning, discharge of static electricity and surge voltages from heavy current systems – requirements and tests

of surge voltage protection devices

**DIN EN 50310:2006  
(VDE 0800-2-310)**

Application of equipotential bonding and earthing in buildings with information technology equipment

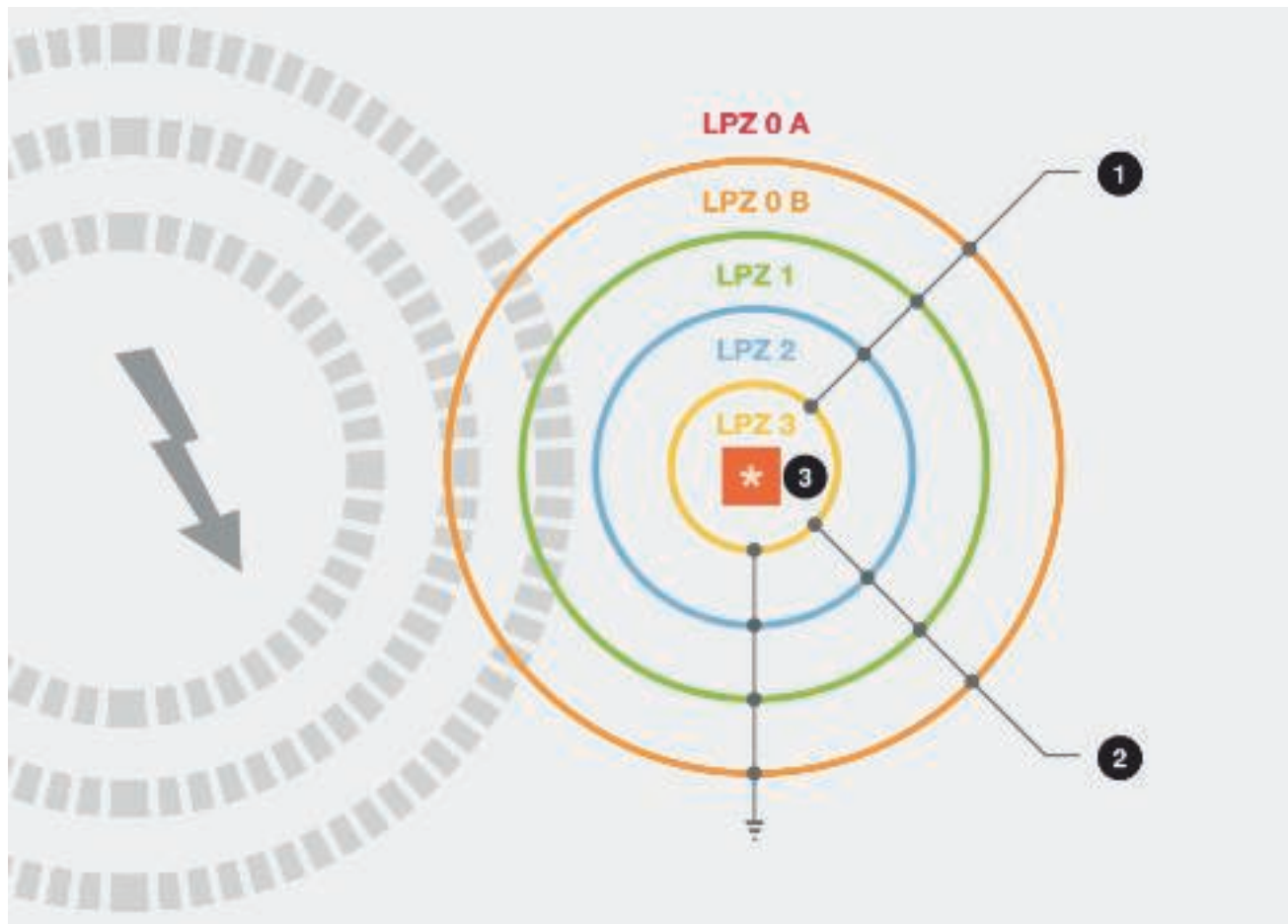
**EN 61000-4-5:2007  
(VDE 08457-4-5)**

Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – surge immunity test

**EN 60728-11  
(VDE 855-1:2005-10)**

Cable networks for television signals, sound signals and interactive services – Part 11: Safety (IEC 60728-11:2005)

## Important terms and basic principles



1 = power lines, 2 = data lines, 3 = item to be protected, LPZ = Lightning Protection Zone

### Basic principles

Today, communication and IT systems form the lifeblood of almost every company. In the worst-case scenario, voltage surges, caused by galvanic, capacitive or inductive couplings in data cables, can destroy IT and telecommunications equipment within a network. To avoid such failures, suitable protection measures must be undertaken.

Due to a wide range of current information, telecommunication and measurement systems, the selection of the right surge protection device is often difficult in practice. The following factors must be taken into account:

- The connection system of the protection device must match the device to be protected.

- Parameters such as the highest signal level, highest frequency, maximum protection level and the installation environment must be taken into account.
- The protection device may only have a minor impact on transmission route, such as attenuation and reflection.

### Protection principle

A device is only protected against surges if all energy and data cables connected to the device are integrated into the equipotential bonding system at the lightning protection zone transitions. OBO Bettermann offers a complete range of tried-and-tested, highly functional and reliable data cable protection devices for all standard telecommunication and information technology systems.

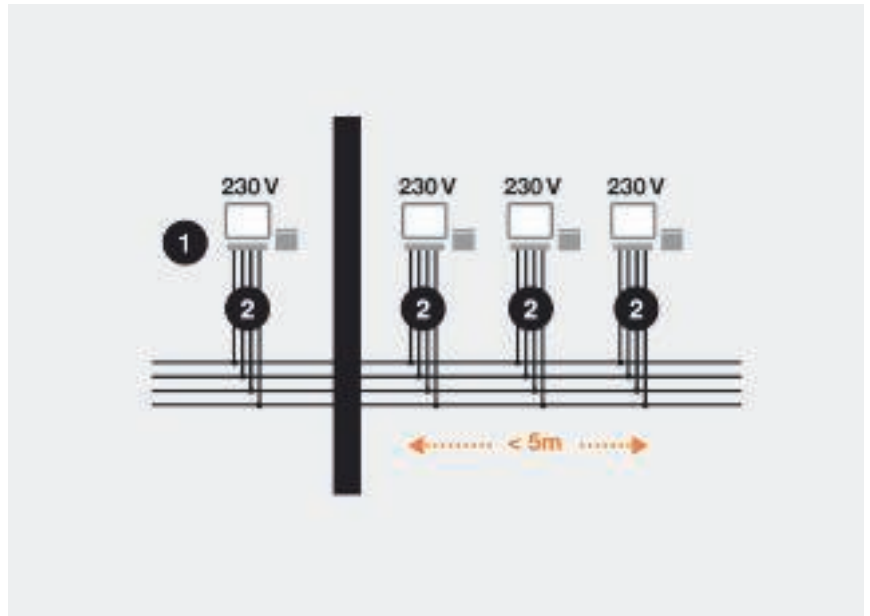




## Network topologies

### Bus networks

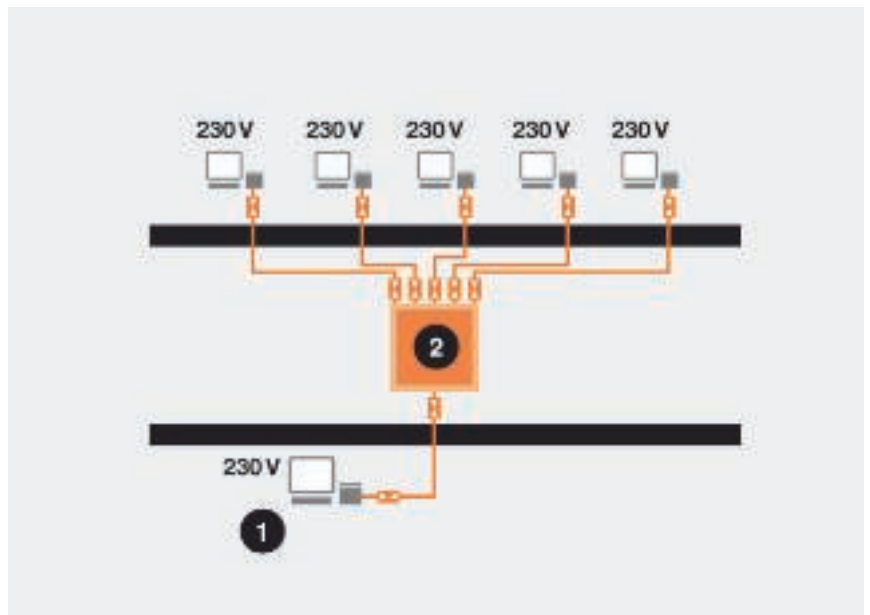
In a bus network, all the users are connected in parallel. At its end, the bus must have an anechoic closure. Typical applications are 10Base2, 10Base5 and machine controllers such as PROFIBUS and telecommunications systems such as ISDN.



1 = IT devices, 2 = Surge protection devices

### Star networks

In a star network, every workstation is supplied by a separate cable from a central star point (HUB or Switch). Typical applications are 10BaseT and 100BaseT.



1 = Server, 2 = Switch/Hub

# Network topologies and connection types

## Ring network

In a ring network, every workstation is connected to precisely one predecessor and one successor via a ring-shaped network. If one station fails, the entire network fails. Ring networks are used in WLAN applications and Token Ring applications.

## Telephone systems

In many cases, modern telephone systems also act as interfaces for a number of different data services, e.g. the Internet. Many terminal devices that enable this access are connected into the lines themselves and must be integrated into the surge protection concept accordingly. As there are now a number of different systems, these devices must have selective protection. There are three distinctly different essential systems:

### Standard analogue connection

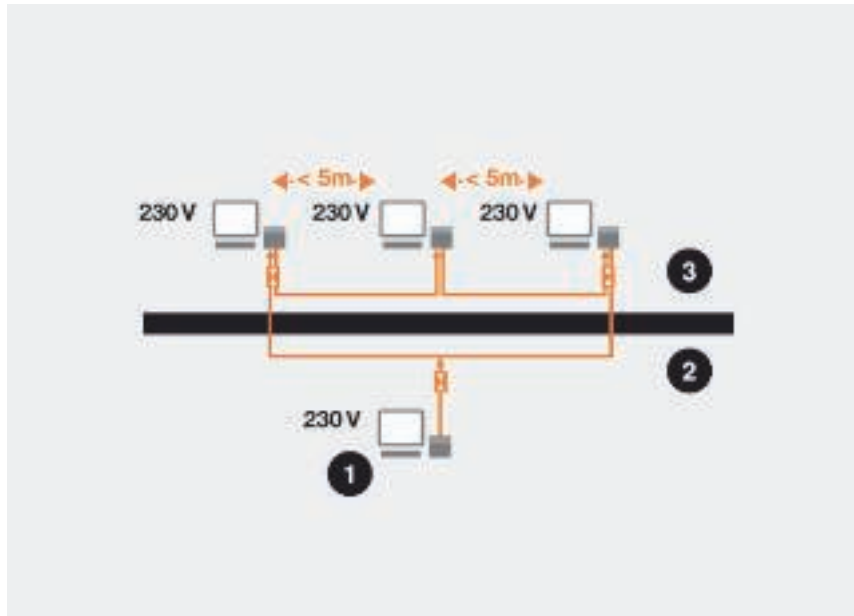
Unlike other systems, the standard analogue connection offers no additional services. One or several telephones are wired in a star-shape and ring simultaneously when a call comes in. Access to the Internet is via a separate modem. Because the analogue connection without technical accessories provides only one channel, the Internet cannot be accessed while telephoning and likewise, no telephone call is possible while surfing.

### ISDN (Integrated Services Digital Network System)

In contrast to the analogue connection, ISDN allows two conversations to take place at the same time via a special bus system (S0 bus), which provides two channels. This enables the user to surf on the Internet while telephoning and at higher data rates than is possible with the analogue connection (64 kBit/s over one channel). ISDN also offers other services such as call-waiting, call-back, etc.

### DSL system (Digital Subscriber Line)

Today, the most commonly used system is the DSL system. Speech



The number of wires varies according to the network type. 1 = Server, 2 = Ground floor, 3 = 1st floor

and data channels are separated by splitters and the data channel is routed to a special modem (NTBBA), which is connected to the PC via a network card. DSL data rates are higher than those of analogue and ISDN systems and therefore enable fast downloading of music and films from the Internet. Because there are a number of different DSL versions such as A-DSL and S-DSL, the general DSL is also designated X-DSL. X-DSL permits the use of analogue telephones without additional hardware, as well as a combination with ISDN.

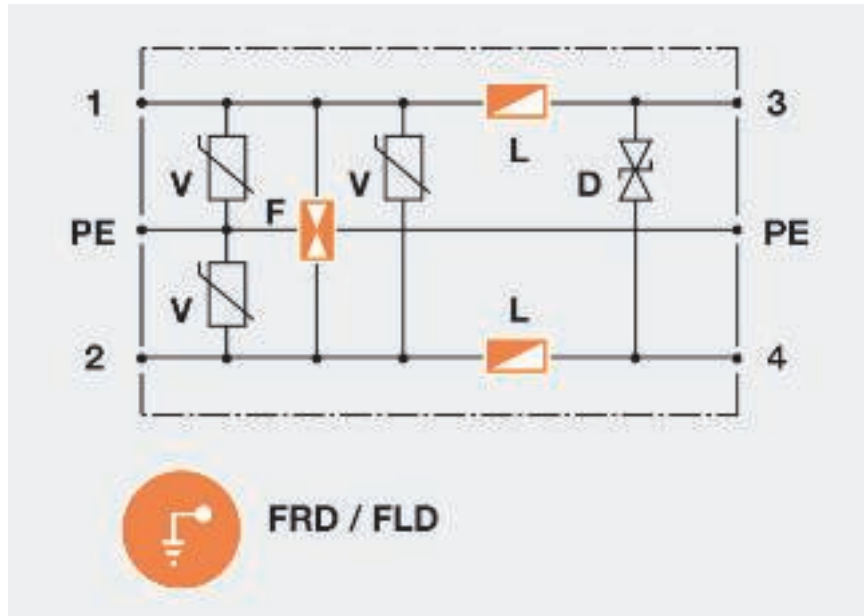


## Installation instructions, lightning barriers

### FRD/FLD

Lightning barriers TKS-B, FRD, FLD, FRD 2 and FLD 2 protect electronic measuring, controlling and regulating systems from surges. Lightning barriers of type MDP are used in areas requiring particularly small installation widths with simultaneously high numbers of poles.

Type FRD, FLD and MDP lightning barriers are designed for use in so-called floating (asymmetrical, potential-free) two-core systems. These are systems whose signal circuits have no common reference potential with other signal circuits, e.g. 20 mA current loops. These devices can be used universally.

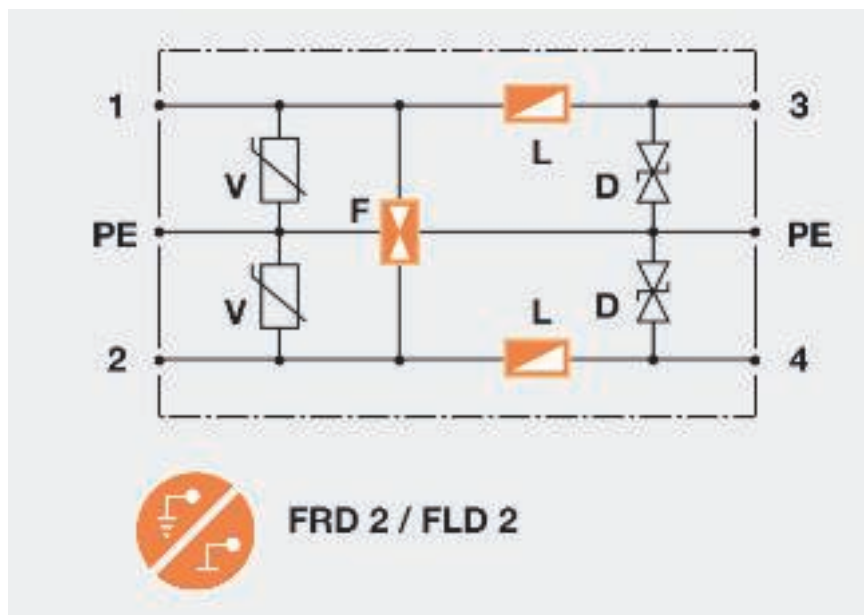


Circuit diagram of the lightning barrier FRD/FLD

### FRD2/FLD2

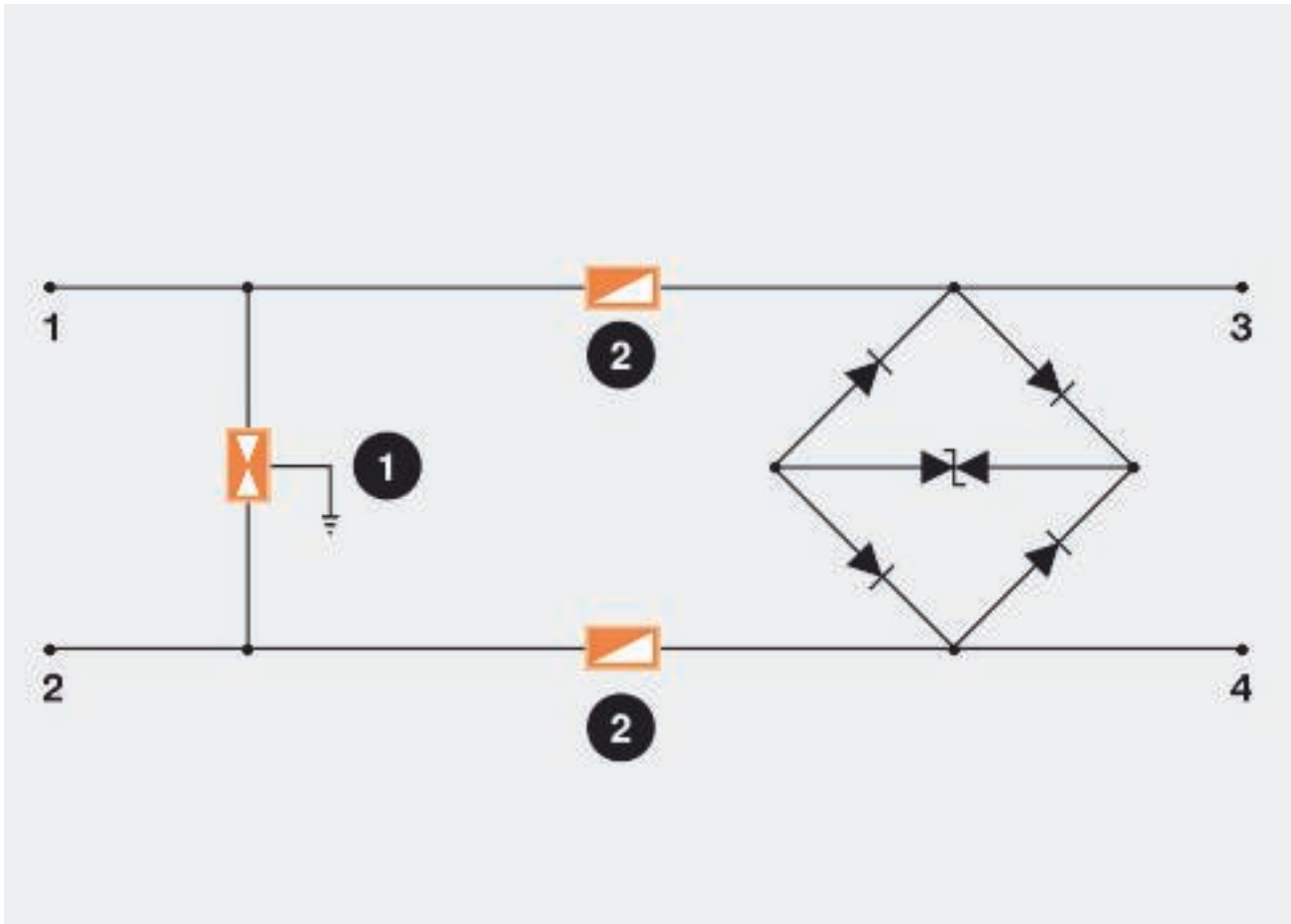
Type FRD2 and FLD2 are intended for use in ground-referenced (symmetrical, potential-referenced) single-wire systems.

Earth-referenced systems are signal circuits that have a common reference potential with other signal circuits. In these systems, two further data cables besides earth are protected. The decision to use FRD (with resistive decoupling) or FLD (with inductive decoupling) depends on the system to be protected.



Circuit diagram of the lightning barrier FRD2/FLD2

# Lightning barriers in measurement circuits and terms for HF technology



Lightning barriers in measuring circuit, 1 = Earth, 2 R/L

## Use of lightning barriers in measuring circuits

Before lightning barriers are used in measuring circuits, it must first be confirmed whether a resistance increase is permitted. Depending on the decoupling, resistance increases in the measuring circuits can occur with types FRD and FRD2. This can result in errors with current loop measurements. FLD/FLD2 and/or MDP devices should therefore be used in this case. The maximum operating current should also be verified to ensure that the dissipated energy does not cause thermal destruction of the decoupling elements.

## Insertion loss

Insertion loss describes the damping of a system from input to output. It shows the transfer function of the system and accommodates the 3dB point (see figure Limit frequency).

## Return loss

This parameter indicates in dB how much input power is reflected back. In 50  $\Omega$  systems, these values are around -20 db. This value is important for antenna systems. In the case of arrestors with integrated inductivities for decoupling, the signal is damped at high transfer frequencies. Therefore, when used in measuring circuits with high transfer frequencies, lightning barriers with resistive decoupling elements are the preferred solution.

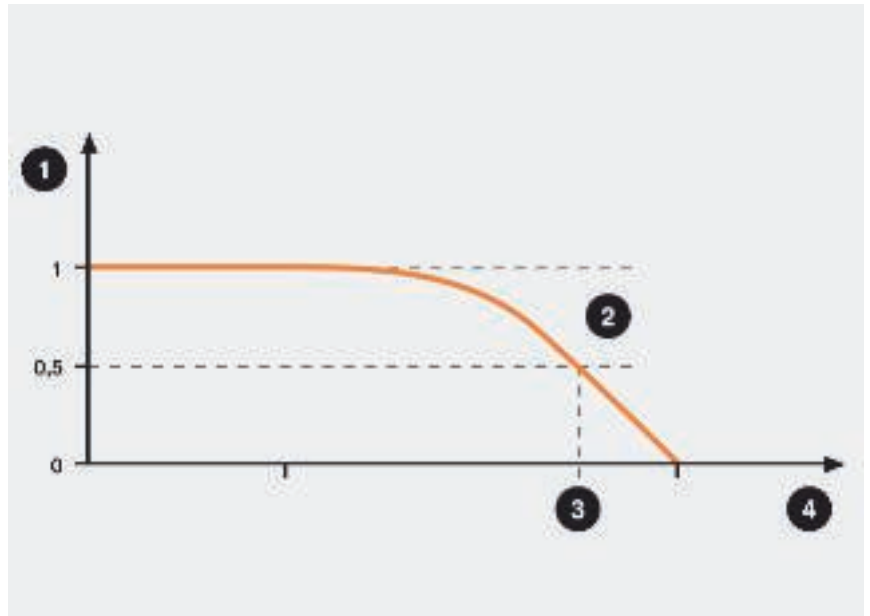




## Terms for HF technology and installation instructions

### Cut-off frequency $f_g$

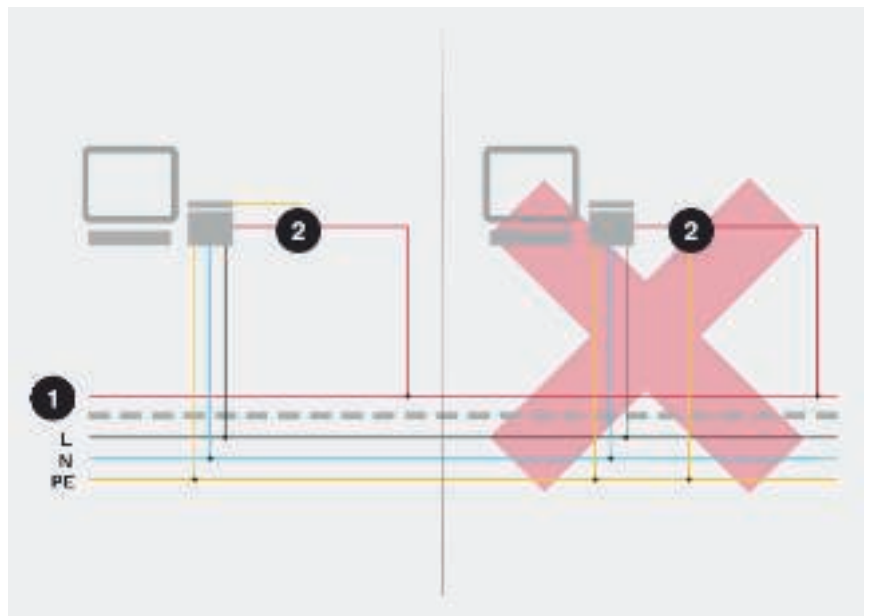
The cut-off frequency  $f_g$  describes the frequency-dependent behaviour of the arrestor. Capacitive and/or inductive component properties ensure signal damping at higher frequencies. The critical point is described as the cut-off frequency  $f_g$ . From this point onwards, the signal has lost 50% (3 dB) of its input power. The cut-off frequency is determined according to certain measuring criteria. Usually, in the absence of any values, the cut-off frequency relates to so-called 50  $\Omega$  systems.



Limit frequency, 1 =  $|A|$ , 2 = 3 dB, 3 =  $f_g$ , 4 =  $f$

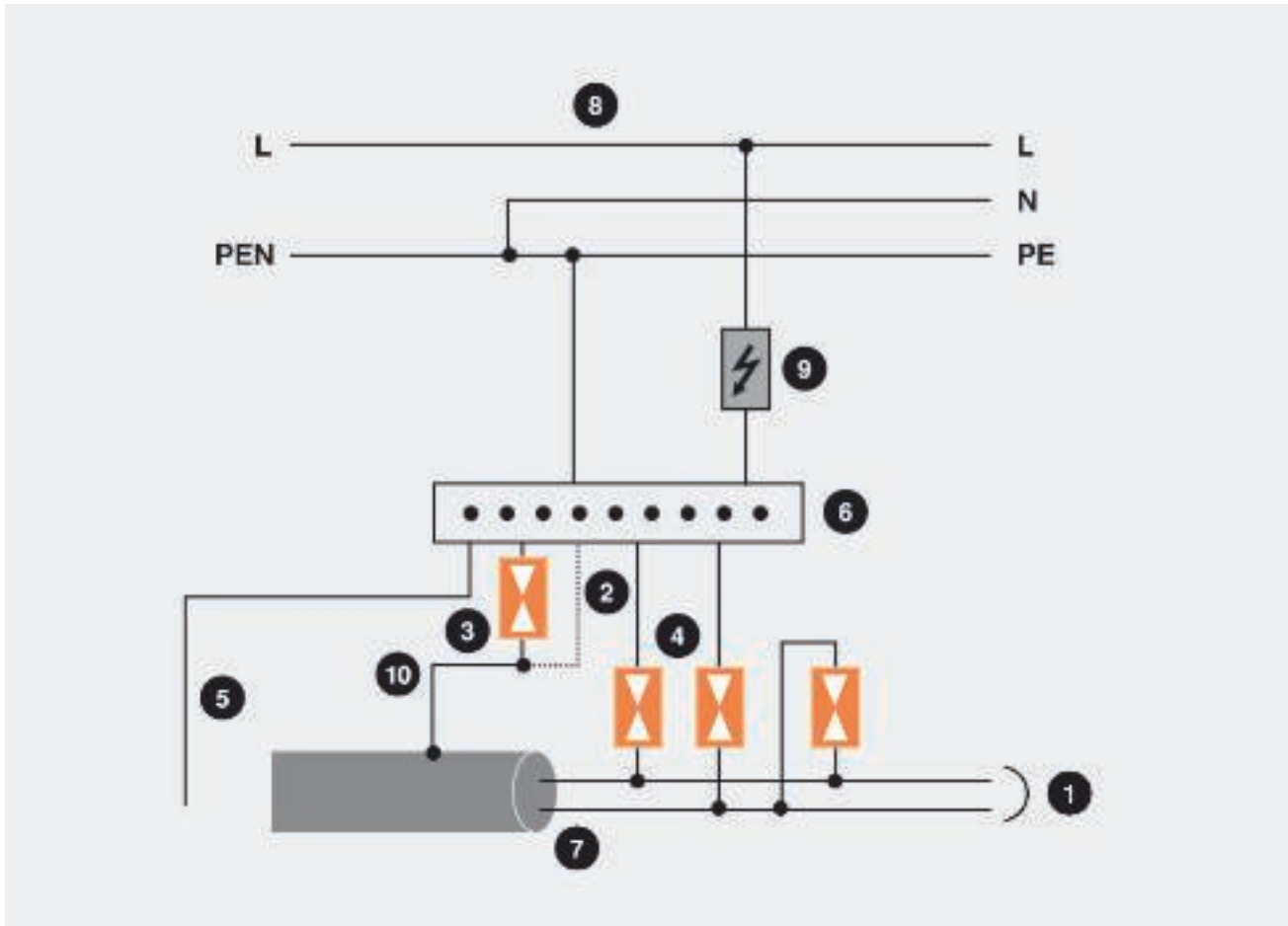
### Installation instructions

The surge protection device must be connected as close as possible to the device to be protected. The housing of the device to be protected should if necessary be defined as a local earthing point. In addition, care should be taken to ensure short PE line distances from surge protection device to earthing point (housing) – line length max. 0.5 m.



Installation instructions: 1 = ISDN, 2 = Net Defender

# Equipotential bonding of data cables



## Equipotential bonding of data cables

In contrast to energy technology, data technology has lengthwise and transverse voltages, which - must be minimised using suitable arrestors with voltage-limiting components.

To achieve low protection levels, these surge protection devices - must be included in the equipotential bonding via the shortest route. Long cable routes should be avoided. The best solution is local equipotential bonding.

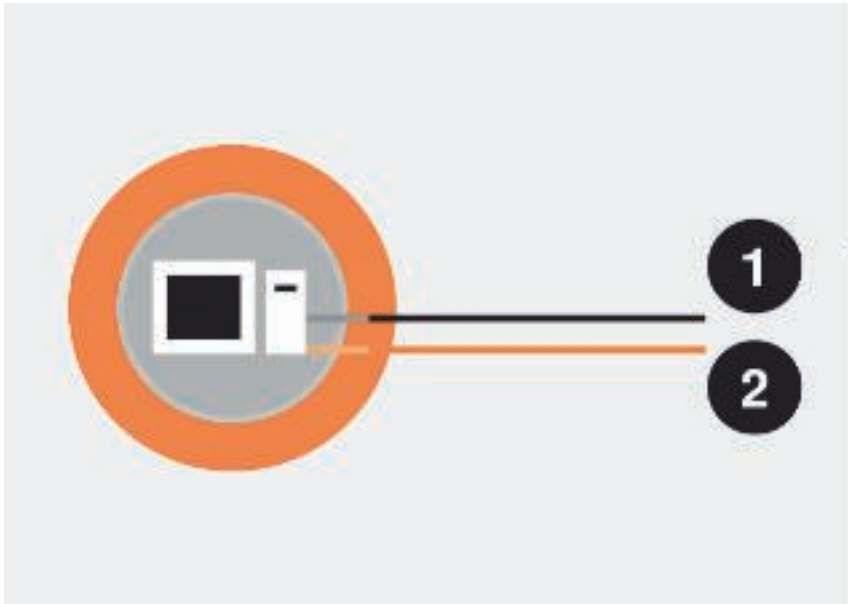
The inclusion of the shields is also of key importance. Complete shield action against capacitive and inductive coupling can only be effective when the shield is included with low impedance on both sides in the equipotential bonding.

1	Device to be protected / telecom line
2	Direct connection to equipotential bonding (preferred)
3	Gas discharge arrester (indirect shielding)
4	Gas discharge arrester
5	Connection to equipotential bonding
6	Equipotential bonding rail
7	Telecommunications cable
8	Electrical power cable
9	Surge protection device (energy technology)
10	Conductive shield of the data cable





## Terms and explanations for PC interfaces



1 = Data cable, 2 = 230 V

**Do not forget: Surge protection exists only when data and energy lines are protected!**

### Interfaces

External devices such as printers, scanners and control systems activated via serial or parallel interfaces must be additionally integrated into the surge protection concept. There are a range of interfaces for different applications: from bus lines for telecommunication and data transfer through to simple terminal devices such as printers or scanners. OBO also offers a host of protective devices that are simple to install, depending on the particular application.

### RS232 interface

The RS232 is a frequently used interface. It is often used, for example, for modems and other peripherals. Although now largely replaced by the USB interface, The RS232 standard is still frequently used for control cables.

### RS422

The RS422 is a serial high-speed standard suitable for communication between a maximum of ten users, which is designed as a bus. The system can be designed for a maximum of eight data cables,

although two are always used as send and receive cables.

### RS485 interface

The RS485 industrial bus interface differs slightly from the RS422 in that the RS485 enables the connection of several transmitters and receivers (up to 32 users) via a protocol. The maximum length of this bus system, when twisted-pair cables are used, is approx. 1.2 km with a data rate of 1 MBit/s (dependent upon serial controllers).

### TTY system

Unlike the RS-232 or other serial interfaces, the TTY system is not voltage-controlled – instead it delivers an imposed current (0/4-20 mA). This enables line lengths of up to several hundred metres to be realised.

### V11 interface

V11 is the German designation for the RS422. The American nomenclature, however, is the most widely used.

### V24 interface










V24 is the German designation for the RS232. The American nomenclature, however, is the most widely used.

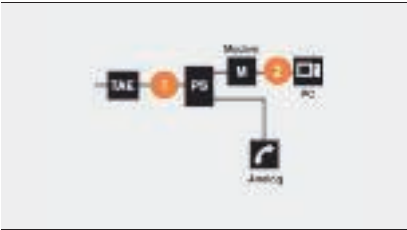


The SD adapters are installed simply by plugging-in between data cable and device to be protected. Using screwless clamp connections, ASP adapters enable quick, simple installation into the cable section itself immediately before the device to be protected. A Velcro strip is supplied for attaching to any ASP device. In order to guarantee optimum surge protection, the earth line of the ASP protection device should be connected to the metal chassis of the device to be protected via the shortest possible distance.



# Selection aid, surge protection for telecommunications systems

Analogue connection	ISDN connection	ISDN multiplex
		
<ul style="list-style-type: none"> <li>Up to 2 two-core wires</li> <li>e.g. with private connection</li> <li>Installation location 1: Behind the TC transfer point/building entry point</li> <li>Installation location 2: On TC terminal, modem or PC</li> </ul>	<ul style="list-style-type: none"> <li>Installation location 1: Behind the TC transfer point/building entry point</li> <li>Installation location 2: On TC terminal, modem or PC</li> </ul>	<ul style="list-style-type: none"> <li>Installation location 1: Behind the TC transfer point/building entry point</li> <li>Installation location 2: On TC terminal, modem or PC</li> </ul>
<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>Basic protection device or combination protection device</li> <li>Installation before TC system</li> </ul> <p>SC-Tele 4-C-G Art. no. 5081688</p> 	<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>Basic protection device or combination protection device</li> <li>Installation before NTBA</li> </ul> <p>TKS-B Art. no. 5097976</p> 	<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>Basic protection device</li> </ul> <p>LSA-B-MAG Basic protection for 10 two-cores Art. no. 5084020</p> 
<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>Fine protection device before analogue terminal</li> </ul> <p>FineController FC-TAE-D Art. no. 5092824</p> 	<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>Fine protection device on ISDN/TC terminal</li> </ul> <p>RJ11-ISDN 4-F Art. no. 5081858</p> 	<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>Fine protection device on ISDN/TC terminal</li> </ul> <p>RJ11-ISDN/4-F Art. no. 5081858</p> 



- Installation location 1: Behind the TC transfer point/building entry point
- Installation location 2: On TC terminal, modem or PC

**Installation location 1**

- Basic protection device or combination protection device
- Installation before DSL splitter

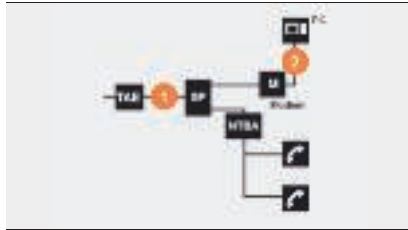
SC-Tele/4-C-G  
Art. no.: 5081688



**Installation location 2**

- Fine protection for computer on network side

Net Defender ND CAT6A/EA  
Art. no. 5081800



- Installation location 1: Behind the TC transfer point/building entry point
- Installation location 2: On TC terminal, modem or PC

**Installation location 1**

- Basic protection device or combination protection device
- Installation before DSL splitter

SC-Tele/4-C-G  
Art. no.: 5081688



**Installation location 2**

- Fine protection for computer on network side

Net Defender ND CAT6A/EA  
Art. no. 5081800



# Selection aid, surge protection for MSR systems

Heating controller	Control application with higher nominal currents	4–20 mA current loop PT 100 (measuring sensor) PT 1000 (measuring sensor)
<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>· In front of controller</li> <li>· Power supply</li> <li>· For alternating current systems (AC) and direct current systems (DC)</li> <li>· 230 V version</li> </ul> <p>VF 230-AC/DC-N Art. no. 5097650</p> 	<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>· In front of controller</li> <li>· Power supply</li> <li>· For alternating current systems (AC) and direct current systems (DC)</li> <li>· 24 V version</li> </ul> <p>VF 24-AC/DC-N Art. no. 5097607</p> 	<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>· In front of controller</li> <li>· Power supply</li> <li>· For alternating current systems (AC) and direct current systems (DC)</li> <li>· 230 V version</li> </ul> <p>VF 230-AC/DC-N Art. no. 5097650</p> 
<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>· Behind the control unit and before the receiver/transmitter</li> <li>· Data cable/measurement sensor cable</li> <li>· Installation only before the control unit e. g. measuring sensor</li> <li>· 24 V version</li> </ul> <p>FLD 24-N Art. no. 5098611</p> 	<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>· Behind the control unit and before the receiver/transmitter</li> <li>· Data cable/measurement sensor cable</li> <li>· 24 V version with test function</li> </ul> <p>MDP-4/D-5-T-10 Art. no. 5098413</p> 	<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>· Behind the control unit and before the receiver/transmitter</li> <li>· Data cable/measurement sensor cable</li> <li>· 24 V version with test function</li> </ul> <p>MDP-4/D-24-T Art. no. 5098431</p> 

**EIB****Installation location 1**

- In front of controller
- Power supply
- For alternating current systems (AC) and direct current systems (DC)
- 230 V version

VF 230-AC/DC-N  
Art. no. 5097650

**Installation location 2**

- Behind the control unit and before the receiver/transmitter
- Data cable/measurement sensor cable
- Installation only before the control unit e. g. measuring sensor

TKS-B  
Art. no. 5098976

**BUS systems  
Interbus, Profibus****Installation location 1**

- In front of controller
- Power supply
- For alternating current systems (AC) and direct current systems (DC)
- 230 V version

VF 230-AC/DC-N  
Art. no. 5097650

**Installation location 2**

- Behind the control unit and before the receiver/transmitter
- Data cable/measurement sensor cable
- Installation only before the control unit e. g. measuring sensor

TKS-B  
Art. no. 5098976

**Intrinsically safe measuring circuits****Installation location 1**

- In front of controller
- Power supply
- For alternating current systems (AC) and direct current systems (DC)
- 24 V version

VF2-24-AC/DC-FS  
Art. no. 5097931

**Installation location 2**

- Behind the control unit and before the receiver/transmitter
- Data cable/measurement sensor cable
- Installation only before the control unit e. g. measuring sensor

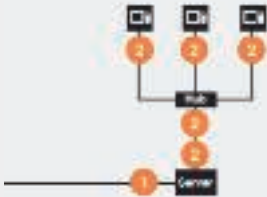
FDB-2/24-M  
For use in Ex areas (2-pole)  
Art. no. 5098380

FDB-3/24-M  
For use in Ex areas (3-pole)  
Art. no. 5098382



# Selection aid, surge protection for data technology

## Star topology



- e.g. 10BaseT, 100BaseT, 10Gbit, Power over Ethernet applications

### Installation location 1

- On server with external communication line
- Combination protection with a level lower than that of the basic protection device

SC-TELE/4-C-G  
Art. no. 5081688



### Installation location 2

- On hub/switch/terminal

Net Defender ND CAT6A/EA  
Art. no. 5081800



## Bus topology



- e.g. 10Base2, 100Base5

### Installation location 1

- On server with external communication line
- Combination protection with a level lower than that of the basic protection device

CoaxB-E2/MF-C  
Art. no. 5082412



### Installation location 2

- terminal

CoaxB-E2/MF-F for 10Base2  
Art. no. 5082420



## Ring topology



- e.g. Token Ring

### Installation location 1

- On server with external communication line

LSA-BF-180 for 180 V  
Art. no. 5084024

and LSA-T-Lei separating strip for 10 two-cores  
Art. no. 5084012

and LSA-E earthing strip  
Art. no. 5084012

RJ45S-E100/4-B  
Art. no. 5081726



### Installation location 2

- On hub/switch

Net Defender ND CAT6A/EA  
Art. no. 5081800



### Ring topology



· e.g. Token Ring

### Installation location 1

- On server with external communication line
- Combination protection with a level lower than that of the basic protection device

SC-TELE/4-C-G  
Art. no. 5081688









### Installation location 2

Net Defender ND CAT6/EA  
Art. no. 5081800



# Selection aid, surge protection for TV and radio

Broadband (Cable TV)	SAT receiver unit	SAT receiver unit
<ul style="list-style-type: none"> <li>Cable TV</li> </ul>	<ul style="list-style-type: none"> <li>With receiver, e.g. in single family house</li> </ul>	<ul style="list-style-type: none"> <li>With multiswitch, with multi-way LNB, (e.g. in multiple family house)</li> </ul>
<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>Between BC transition point and booster</li> </ul> <p>DS-F m/f Art. no.: 5093275</p> <p>DS-F f/f Art. no.: 5093272</p> 	<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>Between LNB and receiver</li> <li>Directly on device to be protected</li> </ul> <p>DS-F m/f Art. no.: 5093275</p> <p>DS-F f/f Art. no.: 5093272</p> 	<p><b>Installation location 1</b></p> <ul style="list-style-type: none"> <li>Between LNB and Multiswitch</li> <li>Directly on device to be protected</li> </ul> <p>DS-F m/f Art. no.: 5093275</p> <p>DS-F f/f Art. no.: 5093272</p> <p>TV 4+1 compact protection device (4 x SAT, 1 x terrestrial) Art. no. 5083400</p> 
<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>Before each terminal (TV, video, HiFi)</li> <li>Fine protection devices with integrated surge protection module for TV supply cable for the protection of TVs or video recorders, incl. adapter cables</li> </ul> <p>FineController FC-TV-D Art. no. 5092808 Other versions available</p> 	<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>Before each terminal (TV, video, HiFi)</li> <li>Fine protection devices with integrated surge protection module for TV/SAT supply cable for the protection of TV/SAT receivers, incl. adapter cables</li> </ul> <p>FineController FC-SAT-D Art. no. 5092816 Other versions available</p> 	<p><b>Installation location 2</b></p> <ul style="list-style-type: none"> <li>Before each terminal (TV, video, HiFi)</li> <li>Fine protection devices with integrated surge protection module for TV/SAT supply cable for the protection of TV/SAT receivers, incl. adapter cables</li> </ul> <p>FineController FC-SAT-D Art. no. 5092816 Other versions available</p> 

---

## Terrestrial receiver unit

---

- Analogue TV
- DVB-T

---

### Installation location 1

- Between antenna and booster

DS-F m/f  
Art. no. 5093275

DS-F f/f  
Art. no. 5093272

TV 4+1 compact protection device  
(4 x SAT, 1 x terrestrial)  
Art. no. 5083400



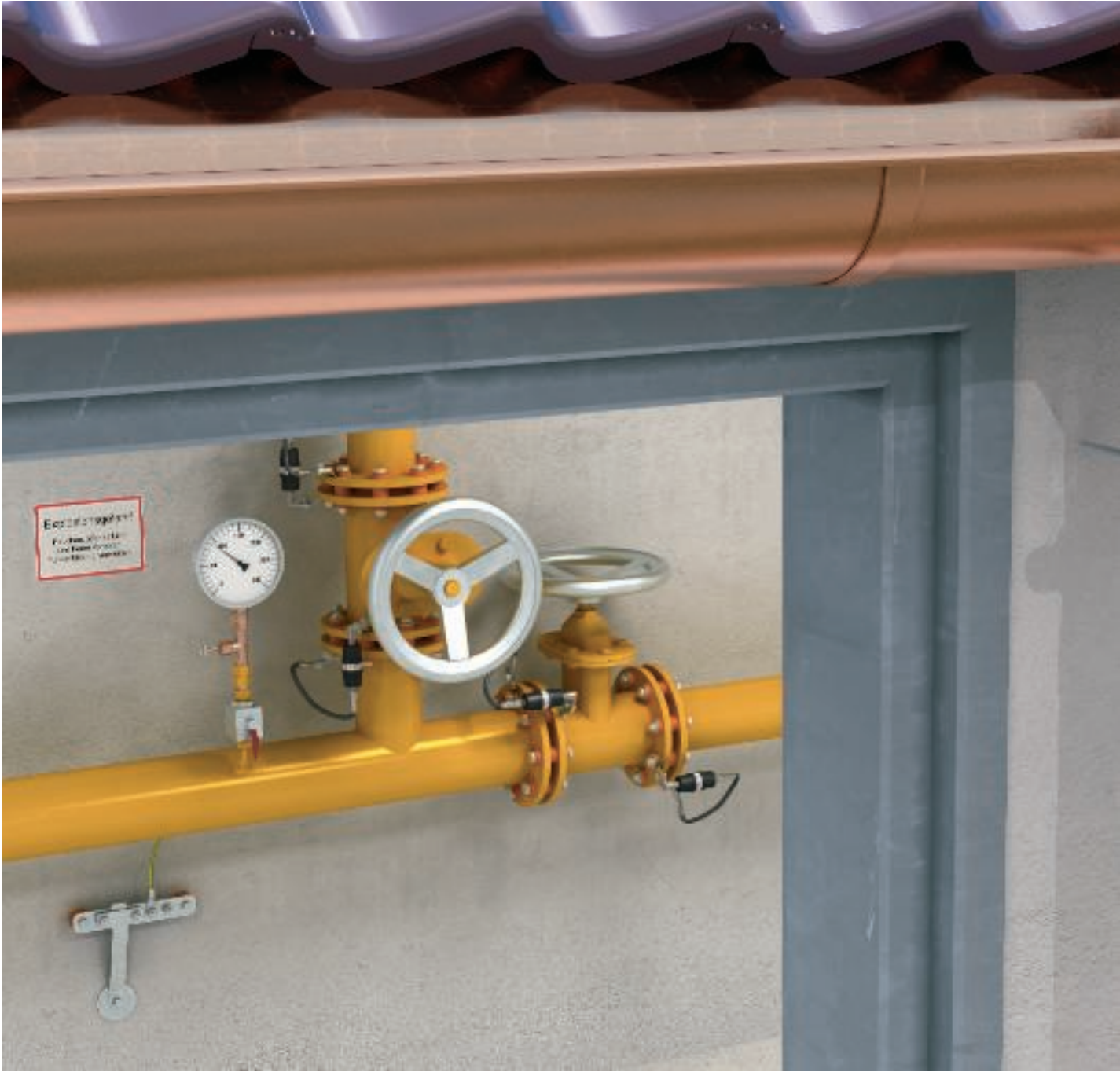
---

### Installation location 2

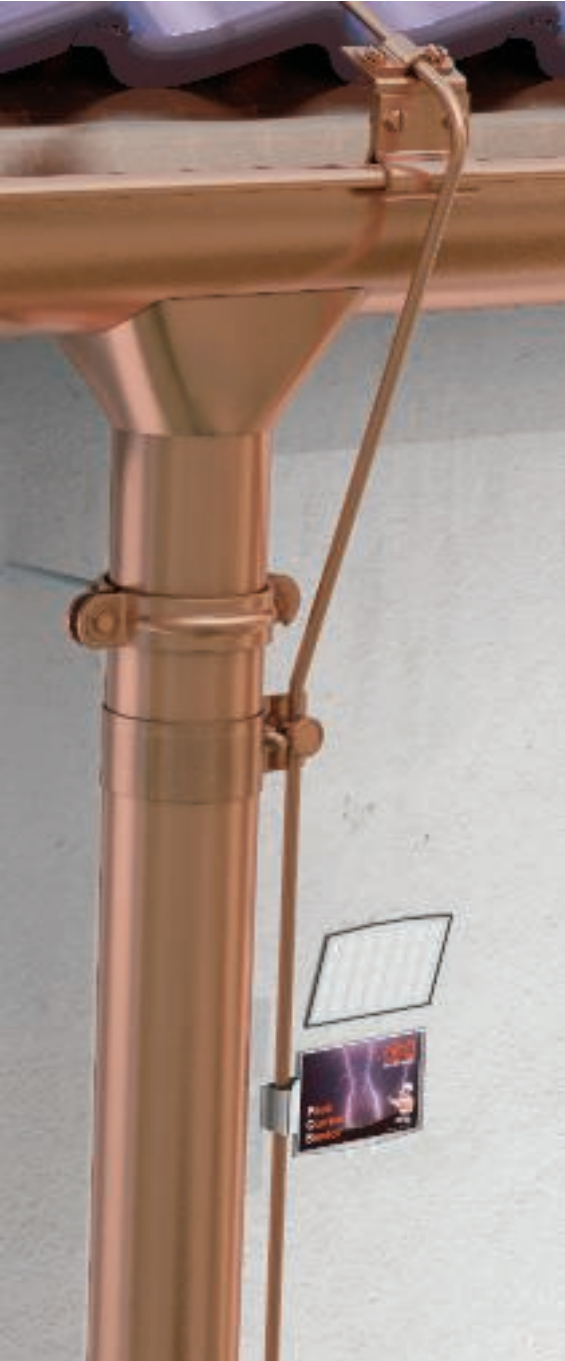
- Before each terminal (TV, video, HiFi)
- Fine protection devices with integrated surge protection module for TV supply cable for the protection of TVs or video recorders, incl. adapter cables

FineController FC-TV-D  
Art. no. 5092808  
Other versions available





# Contents, protection and spark gaps



Standards, protection and spark gaps/ATEX approval	60
Installation principle for protection and spark gaps	61



# Protection and spark gaps/ATEX approval

Planning aid, protection and spark gaps



### Task

OBO isolating and protective spark gaps are designed to isolate electrical system components, which under normal operating conditions are not connected together. If lightning strikes cause a potential increase in one of the electrical system components, the isolating spark gap guarantees a conductive connection and therefore equipotential bonding.

### Function

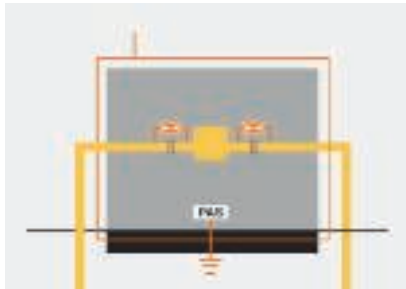
As their name suggests, isolating and protective spark gaps comprise a spark gap. This gap transfers from the insulating to the current-permeable condition when an electric arc is ignited by a surge voltage. An isolating spark gap differs from a protective spark gap in its purpose for use. Isolating spark gaps isolate varying earth potentials, while the protective spark gaps are used only in roof standard open-wire lines.

### Applications

- For producing an indirect connection between insulating flanges (cathodic corrosion protection).
- For bridging insulating flanges, also in ex-protected areas (tested in accordance with ATEX Directive 94/9/EC).
- Avoidance of drag in residual voltages, especially TT systems.
- For lightning protection equipotential bonding according to DIN VDE 0185-305 (IEC 62305).
- For connecting different earthing systems, the aim being to - make optimum use of all earthers for lightning protection equipotential bonding.
- As a measure that saves isolating connections for measuring and test purposes.

# Installation principle for protection and spark gaps

## Spark gaps for insulating flange



- e.g. in a gas pressure control station
- Especially suitable for explosion-protected area
- For lightning current-compatible bridging of insulating flanges or insulating threaded joints

Type 480, 94/9/EG (ATEX Directive)

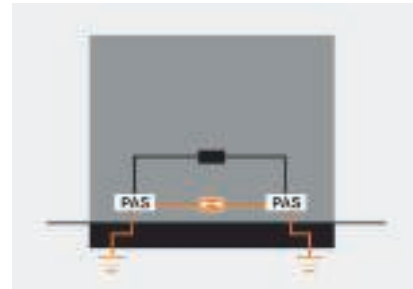
## Open-wire connection



- Roof standard spark gaps for insulation
- Largest possible distance between the roof stand of a low voltage outdoor cable and a lightning protection system
- Distance < 0.5 m: Encapsulated spark gap in agreement with energy provider

Type 482

## Spark gaps for potential isolation



- Several earthing systems in one building, e.g. foundation earther and deep earther
- No electrochemical corrosion
- Entire earther surface is effective in the event of a direct lightning strike

Type 481

## Coupling of earthing systems



- Several earthing systems in one building
- If the operation of special electronic equipment requires a separate earthing system, this function earth must be connected to the operating earth.
- Prevention of dangerously high voltage differences
- An additional throttle is fitted to keep high-frequency voltages away from the functional earthing.

Type FS-V20







Measuring and test systems	64
----------------------------	----

## Measuring and test systems



Life Control testing unit

### Testing surge protection devices within data cables

Often, it is necessary to check the functionality of the surge protection devices within the data cable. Of particular importance is that the actual testing of the protection devices has no negative impact on the data signal.

The Life Control testing unit, developed by OBO Bettermann, allows testing of the protection devices when installed, without influencing the data signal. A thin testing pin creates the contact with the integrated lightning barrier. The integrated microprocessor displays the test result on the OLED display and also emphasises it with acoustic signals. A connectable LED within the testing pin is an additional feature, allowing orientation, even in the darkest switchgear cabinet.

A high-quality testing case for safe transport and the documentation of the testing results are a component part of this innovation from OBO Bettermann.

### Testing of the arrester covers V50, V25, V20 and V10

The ISOLAB testing unit allows the checking of the arrester covers V50, V25, V20 and V10. A rotary controller allows the selection of

the appropriate OBO Bettermann arrester. Then, the cover of the appropriate combination and/or surge arrester is placed in the appropriate opening in the device. The function of the varistor is then checked by pressing the test button. Besides arrester testing, the ISOLAB also allows insulation testing according to VDE 0100-610.



ISOLAB testing device





### Testing of lightning protection systems with the PCS system

The peak current sensor (PCS) records and stores pulsed currents in the form of a magnetic card. This is a method of monitoring whether lightning has hit the lightning protection and which maximum lightning current has occurred.

If the PCS system is mounted between the interface from equipotential bonding to earthing system, the coupled lightning current in a building can also be measured. The results can provide information on potential damage in the electrical installation. The PCS card is mounted by snapping a card holder onto the round conductor at a defined distance. The measuring range of the card is between 3 and 120 kA. The magnetic card reader offers the option of evaluating peak current sensors. The appropriate peak current value is shown on the display. Alternatively, OBO Bettermann can

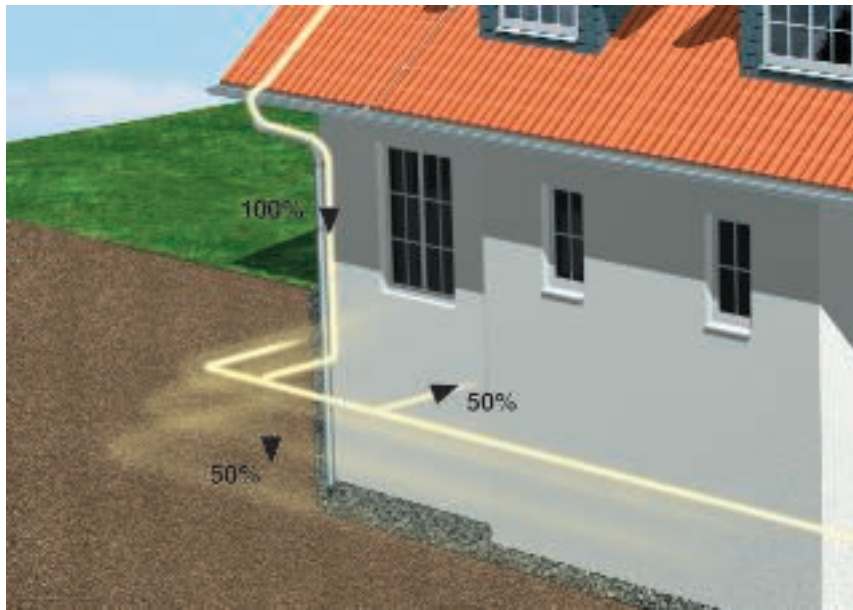
read it off for you. In this case please contact your OBO Bettermann agency or subsidiary.







# Planning the lightning protection equipotential bonding



Path of the lightning current



Equipotential bonding bar, Type 1801

## Tasks and function of internal lightning protection

The task of an internal lightning protection system is to prevent dangerous sparking within the building to be protected. Sparking can occur especially when high potential differences with metallic or electrically operated system components occur due to a conductor (arrestor) passing from the lightning current. Electrical energy and information technology systems in particular require special protection, as a direct connection between the external lightning protection system and the building installation exists via the earthing system and the equipotential bonding. In order to avoid damage inside the building, a lightning protection equipotential bonding in accordance with DIN EN 62305 (IEC 62305) is necessary.

## System components to be connected

In addition, the following system components must be connected to the equipotential bonding:

- Metal carcass of the structure
- Metal installations
- External conductive components
- Electrical energy and information technology systems

## Installing the equipotential bonding

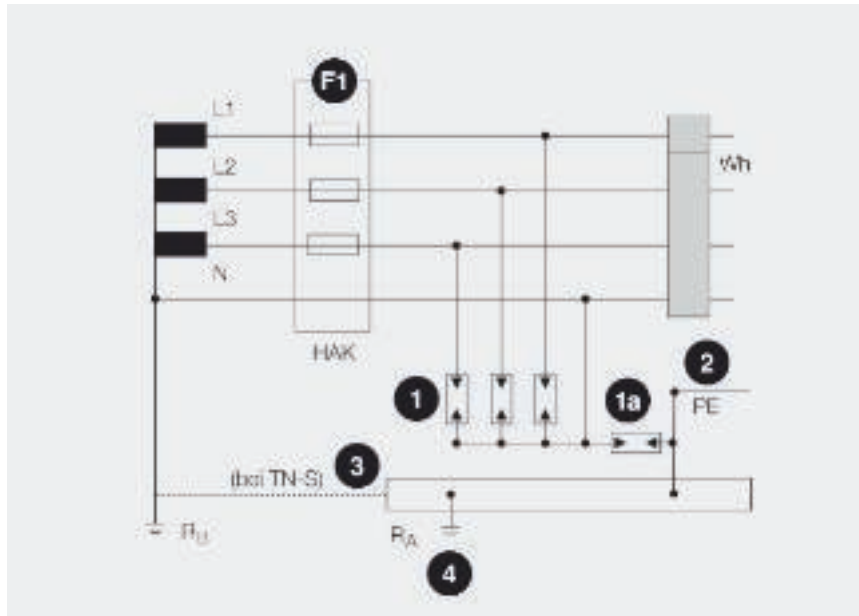
The equipotential bonding should be installed at the basement or at ground level. The electrical energy and information technology lines - must be connected to the equipotential bonding via Type 1 lightning current arrestors. The arrestors - must be connected to the equipotential bonding as close as possible to where the lines enter the building. The surge arrester connection must comply with DIN VDE 0100-534. The following cross-sections apply as minimum dimensions for connections in the lightning protection equipotential bonding (unless larger cross-sections are specified in other standards):

- Copper: 16 mm<sup>2</sup>
- Aluminium: 25 mm<sup>2</sup>
- Steel: 50 mm<sup>2</sup>



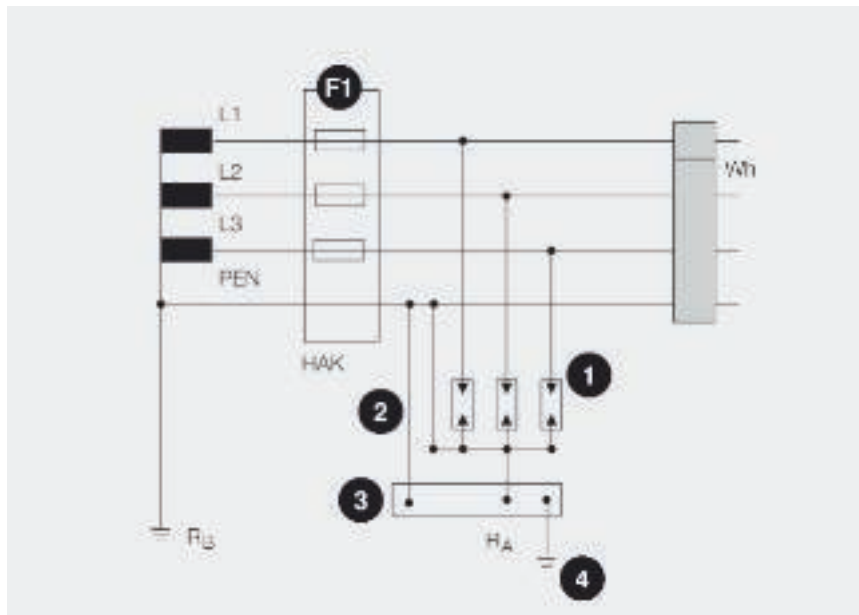
# Planning the lightning protection equipotential bonding

## TT system and TN-S system



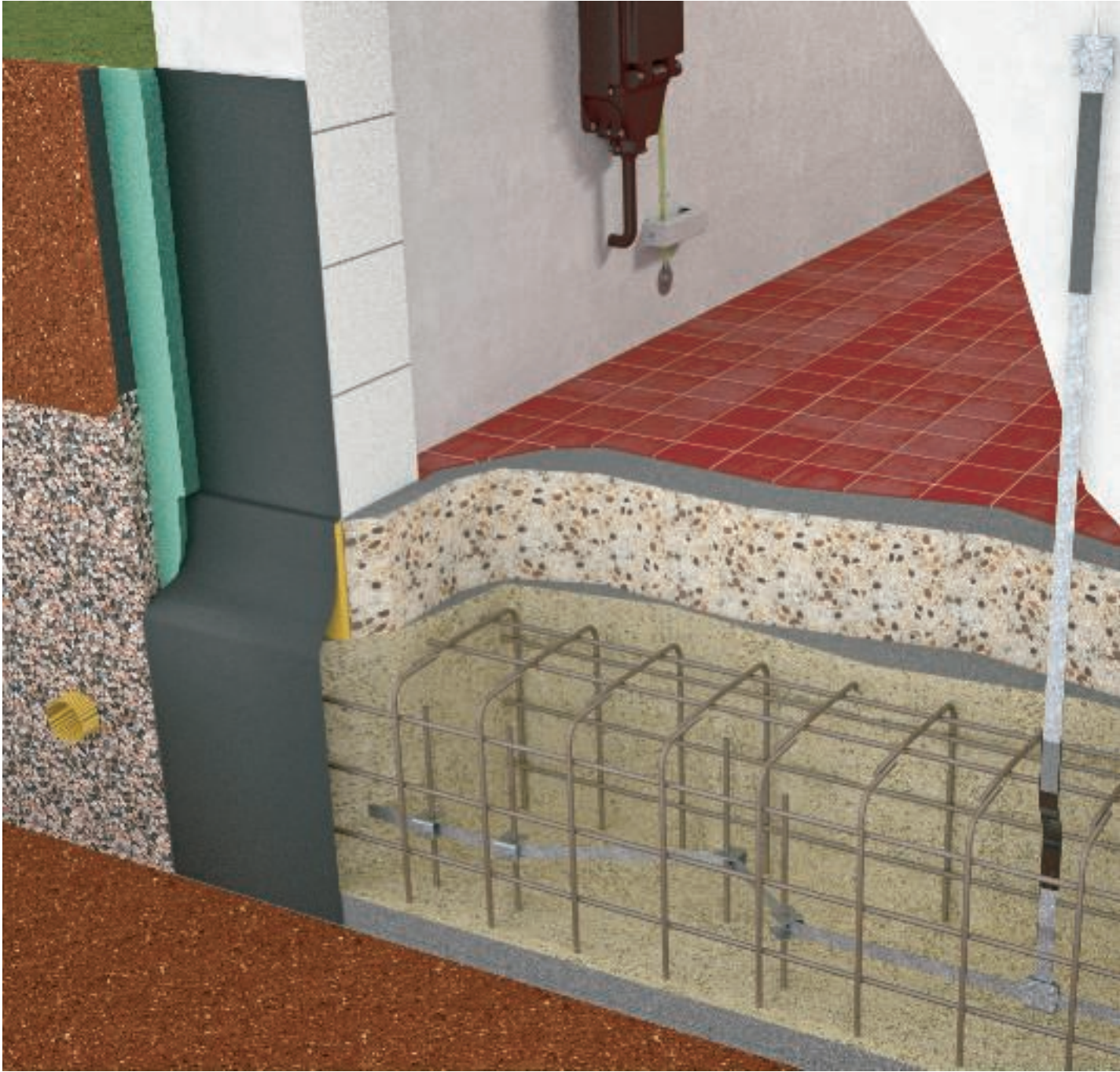
Installation examples: 1 = Lightning current arrester, 1a = NPE spark gap, 2 = Equipotential bonding conductor, 3 = Main equipotential bonding rail, 4 = Earth connection, F1 = Main fuses

## TN-C system



Installation examples: 1 = Lightning current arrester, 2 = Equipotential bonding conductor, 3 = Main equipotential bonding rail, 4 = Earth connection, F1 = Main fuses





# Contents, earthing systems



Planning an earthing system – standards	72
Installation principle, deep earther	73
Installation principle, ring earther	74
Installation principle, foundation earther	75



## Planning an earthing system – standards



1 = Earthing fixed point, 2 = Equipotential bonding rail, 3 = Corrosion protection strips, 4 = Cable material, 5 = Connection terminals

### Tasks of an earthing system

The earthing system is part of the external lightning protection system, which routes the lightning current into the ground where it is to be distributed. The key criteria for an even lightning current distribution without dangerous surges occurring are form and dimensions. In accordance with DIN VDE V 0185 Part 3 (IEC 62305-3) Section 4.4.1, a lower earthing resistance  $< 10 \Omega$  is generally recommended. An earthing system can be constructed from one of the three arrangements described below. It is possible to connect different earthing arrangements, although the risk of corrosion must be taken into account.

Important note: Earthing systems - must be connected to the equipotential bonding.

### Deep earther

A deep earther is an earther that

is generally integrated vertically and deep into the ground. The simplest solution for retrofitting a lightning protection system.

### Ring earther

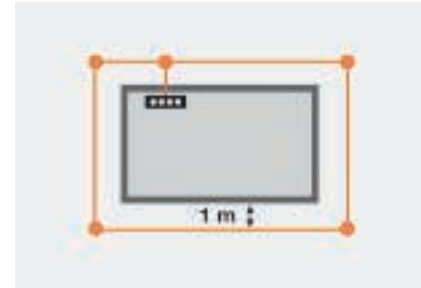
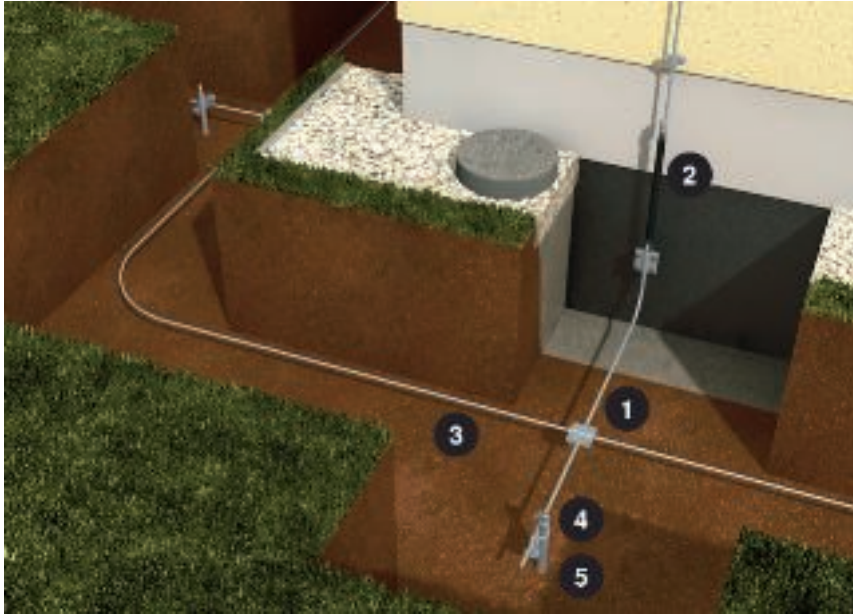
A ring earther is a surface earther, which should be routed as a closed ring at a distance of 1.0 m and 0.5 m deep in the earth around the external foundation of the system. The better although - more expensive solution for retrofitting a lightning protection system.

### Foundation earthers

A foundation earther (required by TAB 1974 for new buildings) is an earther that is embedded into the concrete foundation of a building. The basis for the installation of the foundation earther is DIN 18014. It acts as a lightning protection earther if the lugs required for connecting the arrestors protrude from the foundation.



## Installation principle, deep earther



1 = Cross-connectors, 2 = Corrosion protection strip, 3 = Round conductor, 4 = Connection terminals, 5 = Earthing rod, 6 = Impact points (Observe corrosion protection for connectors)

A deep earther (arrangement Type A) is an earther that is generally integrated vertically and deep into the ground.

### Function

As single earthers, a deep earther of 9.0 m in length is recommended. This should be installed at a distance of 1.0 m from the foundation of the building. The minimum dimension (according to DIN VDE V 0185 Part 3 Fig. 2) is a length of 2.5 m for vertical installation and 5 m for horizontal installation for Type A earthers for lightning protection classes III and IV. The required earther lengths may be split into several lengths connected in parallel. Depending on the soil conditions, deep earthers can be driven into the ground by hand or using suitable electric, petrol or pneumatic hammers.

All deep earthers must be connected with a ring earther inside or outside of the building and with a lead to the equipotential bonding rail.

### Materials

The following materials can be used:

- Rods made of galvanised steel, Ø 20 mm

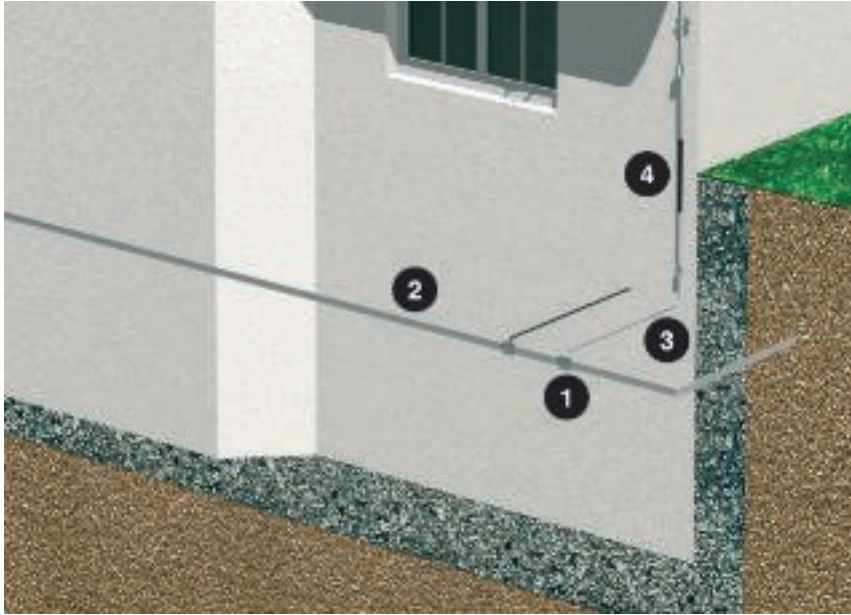
- Rods made of stainless steel, Ø 20 mm
- Pipes made of galvanised steel, Ø 25 mm (2 mm wall thickness)
- Flat conductors made of galvanised steel 30 x 3.5 mm
- Flat conductors made of stainless steel 30 x 3.5 mm

### Corrosion protection

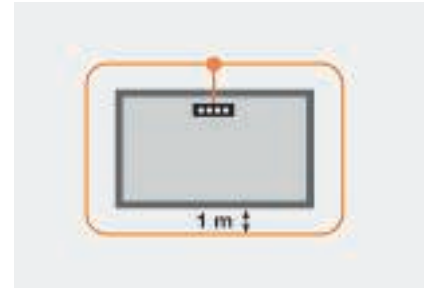
In potentially corrosive areas, stainless steel must always be used. Detachable connections in the ground must be protected against corrosion (plastic corrosion protection strip).



## Installation principle, ring earther



1 = Cross-connectors, 2 = Flat conductors, 3 = Round conductors, 4 = Corrosion protection strip



### Function

Outside the building, at least 80% of the ring earther's (surface earther) overall length must be in contact with the ground. It must be installed as a closed ring at a distance of 1.0 m and a depth of 0.5 m around the external foundation of the building. A ring earther is an earther according to arrangement type B.

### Materials

The following materials can be used:

- Flat conductors made of galvanized steel 30 x 3.5 mm
- Flat conductors made of stainless steel 30 x 3.5 mm
- Round conductors made of copper, Ø 8 mm
- Round conductors made of galvanized steel, Ø 10 mm
- Round conductors made of stainless steel, Ø 10 mm

### Corrosion protection

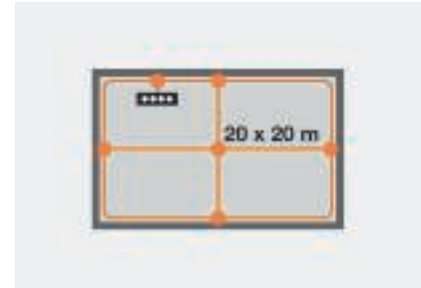
In potentially corrosive areas, stainless steel (V4A) must always be used. Detachable connections in the ground must be protected against corrosion (plastic corrosion protection strip).



### Time intervals between repeat tests

	Lightning protection class I and II	Lightning protection class III and IV
Interval between the complete tests	2 years	4 years
Interval between the visual checks of construction systems	1 year	2 years

## Installation principle, foundation earther



1 = Flat conductors, 2 = Diagonal clamps, 3 = Spacers

### Function

A foundation earther is an earther that is embedded into the concrete foundation of a building. It acts as a lightning protection earther if the lugs required for connecting the arrestors protrude from the foundation. The steel strip is to be connected to reinforcements at a distance of approx. 3 m. The basis for the installation of the foundation earther is DIN 18104. Wedge connectors may not be used in the earth. In order to achieve a clean insertion, the use of strip holders is recommended for the installation of foundation earthers. The holders must be inserted at a distance of approx. 2 m.

### Materials

The following materials, among others, can be used for foundation earthers:

- Flat conductors made of galvanised steel 30 x 3.5 mm
- Flat conductors made of stainless steel 30 x 3.5 mm
- Round conductors made of copper, Ø 8 mm
- Round conductors made of galvanised steel, Ø 10 mm
- Round conductors made of stainless steel, Ø 10 mm

Connection lugs must be made of materials with permanent corrosion protection. Hot galvanised steels with plastic jacketing or rust-proof stainless steels of V4A with material number 1.4571 must be used.





# Contents, planning aid, basic principles for equipotential bonding and lightning protection



Standards for general lightning protection	78
Task of standard lightning protection	79
Lightning protection classes	80
Materials for external lightning protection	81
Testing of lightning protection systems	82
Component testing/testing classes	83
Separating distance	84
Installation principle for building with pitched roof	87
Installation principle for building with flat roof	90
Installation principle for building with roof structures	94
Insulated lightning protection	98
OBO interception rod system, isFang	102
OBO isCon® system	104
Planning an arrester system	106



# Standards for general lightning protection



You must take various standards into account when erecting lightning protection systems. You can find the most important European regulations here.

**DIN EN 62305-1  
(IEC 62305-1:2006)**

Protection against lightning – Part 1: General principles

**DIN EN 62305-2  
(IEC 62305-2:2006)**

Protection against lightning – Part 2: Risk management

**DIN EN 62305-3  
(IEC 62305-3:2006)**

Protection against lightning – Part 3: Risk management

**DIN EN 62305-4  
(IEC 62305-4:2006)**

Protection against lightning – Part 4: Electrical and electronic systems within structure

**DIN EN 50164-1  
Lightning Protection Components**

Part 1: Requirements for connection components.

**DIN 18014:2007**  
Foundation earthers

**DIN VDE 0100-410:2007  
(IEC 60364-4-41:2005)**  
Low-voltage electrical installations – Part 4-41: Protection for safety – protection against electric shock.

**DIN VDE 0100-443:2007**  
Low-voltage electrical installations – Part 4-44: Protection for safety – protection against voltage disturbances and electromagnetic disturbances – Clause 443: Protection against surge voltages of atmospheric origin or due to switching

**Classification of standard series DIN EN 62305 (IEC 62305)**

<b>Section 1</b>	General principles
<b>Section 2</b>	Risk management – estimate of the risk of damage for buildings
<b>Section 3</b>	Protection of buildings and people
<b>Section 4</b>	Protection of electric and electronic systems in buildings



## Task of standard lightning protection



1 = Interception unit, 2 = Arrestor, 3 = Earthing system, 4 = Equipotential bonding

### **The challenge: the huge levels of damage through approx. 2.5 million lightning strikes\* in Germany each year**

Thunderstorms have always been a fascinating natural phenomenon. However, they also present a risk for man and environment that should not be underestimated. Especially in July and August, electrical charging differences between clouds or cloud and the earth give rise to thundery fronts. The lightning strikes we perceive - mostly consist of a negative current that flows from clouds to the earth. If a building is hit by a lightning strike, the lightning current heats up both the impact point and the stonework. This poses a significant fire risk. Every year in Germany, lightning strikes cause damage amounting to several hundred millions of euros. Lightning protection systems installed professionally and in accordance with the regulations provide effective

protection against direct lightning strikes.

\*Source: [www.blids.de](http://www.blids.de)

### **The solution DIN/VDE-compliant lightning protection from OBO**

The task of a lightning protection system is to intercept all lightning strikes entering a building. The lightning current must be intercepted at the impact point, be deflected towards the earth and distributed in the ground. The idea is to prevent thermal, mechanical or electrical effects that cause damage to the building to be protected or humans through contact or step voltages inside the building.



# Lightning protection classes



## Lightning protection classes and allocation

Before a lightning protection system is planned, the object to be protected must be assigned to one of four lightning protection classes. Efficiency in lightning protection class I is the highest at 99% and in lightning protection class IV the lowest at 84% (see table of hazard parameters). The cost of erecting a lightning protection system (e.g. necessary protection angles, distances from loops, protection profiles, distances from arrestors) is more involved for lightning protection class I systems than for lightning protection class IV systems. The required lightning protection class is determined by assessing the damage risk in accordance with DIN-EN 62305-2

(IEC 62305-2), unless specified in regulations. Directive VdS 2010 (risk-oriented lightning and surge protection, published by Gesamtverband der Deutschen Versicherungswirtschaft e. V. (GDV)) offers alternative method of determining the lightning protection class.

You can obtain further information under [www.vds.de](http://www.vds.de), via the OBO Hotline +49 (0)2373 89-1500 or at [www.obo.de](http://www.obo.de).

## Hazard parameters in dependence of lightning protection classes

Lightning protection class	Peak lightning current value min.	Peak lightning current value max.	Capture probability
I	3 kA	200 kA	98%
II	5 kA	150 kA	95%
III	10 kA	100 kA	88%
IV	16 kA	100 kA	78%

## Lightning protection classes based on Directive VdS 2010

Application	Lightning protection class
Explosion-protected areas in industry and the chemicals sector	II
Computer centres, military applications, nuclear power stations	I
Photovoltaic systems > 10 kW	III
Museums, schools, hotels with more than 60 beds	III
Hospitals, churches, storage facilities, meeting places accommodating more than 100 to 200 people	III
Administrative buildings, sales points, offices and bank buildings of over 2,000 m <sup>2</sup>	III
Residential buildings with more than 20 apartments, multi-storey buildings over 22 m high	III



# Materials for external lightning protection



Materials: Example of round conductor, 8 mm and variable earthing connector, type 249 in steel (FT), steel (VA), copper and aluminium



Correct installation with bi-metal connector (Al/copper)



Incorrect installation: Corroded aluminium conductor through open routing on the wall

## Substances and materials

The following materials are preferred for use in external lightning protection systems: Hot galvanised steel, rust-proof steel (VA), copper, aluminium.

## Corrosion

A risk of corrosion occurs especially when joining different material types. Therefore, no copper parts may be installed above galvanised surfaces or above aluminium parts as copper particles worn away by rain or other environmental influences can penetrate the galvanised surface. In addition, a galvanic element occurs, which accelerates corrosion of the contact surface.

## Examples

As you can see from the examples, the copper connection on the steel water pipe is corroded and could become detached. If two different materials that are not recommended need to be joined, bi-metal connectors can be used. The example shows the use of bi-metal connectors on a copper gutter to which an aluminium round conductor is attached. Points at increased risk of corrosion, such as insertion points into the concrete

or soil, must be corrosion-protected. A suitable coating is to be applied as corrosion protection to connection points in the ground. Aluminium must not be placed directly (without a distance) on, in or under plaster, mortar or concrete or in the ground – the potential consequences of doing so are shown in our example, below right. In the "Material combinations" table, possible metal combinations are evaluated with regard to contact corrosion in air.

## Overview of material combinations

	Steel, hot-dip galvanised (FT)	Aluminium (Al)	Copper (Cu)	Stainless steel(VA)
Steel, hot-dip galvanised (FT)	++	O	-	O
Aluminium (Al)	O	++	-	O
Copper (Cu)	-	-	++	O
Stainless steel(VA)	O	O	O	++



# Testing of lightning protection systems



## Scope of tests

Lightning protection systems should, even after the acceptance test, be checked at regular intervals to ensure correct functioning, establish any faults and carry out any necessary repairs. The test involves checking the technical documentation and inspecting and measuring of the lightning protection system.

The testing and servicing activities should be carried out on the basis of the standard and the technical principles of DIN VDE 0185-305 Part 3 (IEC 62305-3). The following points must be observed: The tests also comprise checking the internal lightning protection system. This includes checking the lightning protection equipotential bonding and the connected lightning and surge arrestors. A test report or test log is used to record the testing and servicing of lightning protection systems and must be updated or recreated at each test/service.

## Testing criteria

- Checking all records and documentation, including compliance with the standards
- General condition of interception and arrestor equipment and all connecting components (no loose connections), check volume resistance
- Checking the earthing system and the earthing resistors incl. transitions and connections
- Checking internal lightning protection, incl. surge arrestors and fuses
- General corrosion status
- Reliability of fastening the lines of the LPS and its components
- Documentation of all modifications and upgrades to LPS and modifications to buildings

Note: Critical systems (e.g. Ex systems) must be checked annually.

## Time intervals between repeat tests

	Lightning protection class I and II	Lightning protection class III and IV
Interval between the complete tests	2 years	4 years
Interval between the visual checks of construction systems	1 year	2 years

## Component testing/testing classes



### Connections (tested lightning protection components)

The function of components for lightning protection systems is tested in accordance with DIN EN 50164-1 "Requirements for connection components". After a conditioning phase lasting 10 days, the components are impacted with three lightning strikes. The interception unit is tested with  $3 \times I_{imp}$  100 kA (10/350), meaning test class H. The arrestors, along which the lightning current can split up (at least two arrestors) are tested with  $3 \times I_{imp}$  50 kA (10/350), meaning test class N.

### Test classes of connecting components

Test class	Tested with	Application
H to DIN EN 50 164-1	$3 \times I_{imp}$ 100 kA (10/350)	Interception system
N according to DIN EN 50 164-1	$3 \times I_{imp}$ 50 kA (10/350)	Multiple arrestors, via which the lightning current can split up, at least arrestors



## Separation distance



Correctly observed separation distance (s) between arrestor equipment and camera

All metallic parts of a building and electrically powered equipment and their supply cables must be integrated into the lightning protection system. This measure is required to avoid dangerous sparking between both interception system and arrestor and also the metallic building parts and electrical equipment.

### What is a separation distance?

If there is an adequate distance between the conductor passing from the lightning current and the metallic building parts, the risk of sparking is practically non-existent. This distance is described as the separation distance (s).

### Components with direct connection to lightning protection system

A separation distance does not have to be observed in buildings with cross-connected, reinforced walls and roofs or with cross-connected metal facades and metal roofs. Metallic components with no conductive lead into the building to be protected and whose distance to the conductor of the external lightning protection system is less than one metre, must be connected directly to the lightning protection system. These include, although are not limited to, metallic

railings, doors, pipes (with non-flammable and/or explosive content), facade elements, etc.

### Application Example 1

Situation: Metallic structures such as railings, windows, doors, pipes (with non-flammable and/or explosive contents) or facade elements without conductive lead into the building.

Solution: Connect the lightning protection system to the metallic components.

### Application Example 2

Situation: Air-conditioning systems, photovoltaic systems, electrical sensors/actuators or metallic vent pipes with conductive lead into the building.

Solution: Insulation by separation distance.



## Calculate separation distance with formula



Correctly observed separation distance ( $s$ ) between interception system and SAT system

$$s = k_i \frac{k_c}{k_m} L(m)$$

The distance is calculated using this formula.

Calculation of the separation distance to DIN EN 62305-3 (IEC 62305-3)

### Step 1:

#### Calculate the value of the coefficient $k_i$

$k_i$  is dependent on the selected protection class of the lightning protection system.

- Protection class I =  $0.08 k_i$
- Protection class II =  $0.06 k_i$
- Protection class III, IV =  $0.04 k_i$

### Step 2: Calculate the value of the coefficient $k_c$

(Simplified system)  $k_c$  is dependent on the lightning current that flows into the arrestors:

1 arrestor

- Earther, type A = 1
- Earther, type B = 1

2 arrestors

- Earther, type A = 0.66
- Earther, type B = 0.5 ... 1

3 arrestors and more

- Earther, type A = 0.44
- Earther, type B = 0.25 ... 0.5

### Step 3: Calculate the value of the coefficient $k_m$

$k_m$  is dependent on the material of the electrical insulation.

- Material, air = 1

- Material, concrete, tiles = 0.5

### Step 4: Calculate the value L

L is the vertical distance from the point at which the separation distance  $s$  is to be calculated up to the closest point of the equipotential bonding.

#### Example:

- Building with more than 4 arrestors
- Lightning protection class III
- Maximum distance  $L = 10$  m high
- $k_i = 0.05$  m
- $k_m =$  Concrete, tiles = 0.5
- Separation distance = 0.44 m



## Planning an interception system



The interception system is part of the external lightning protection, which is responsible for intercepting lightning strikes. In principle, an interception system is to be installed so that the corners and edges of the building are protected.

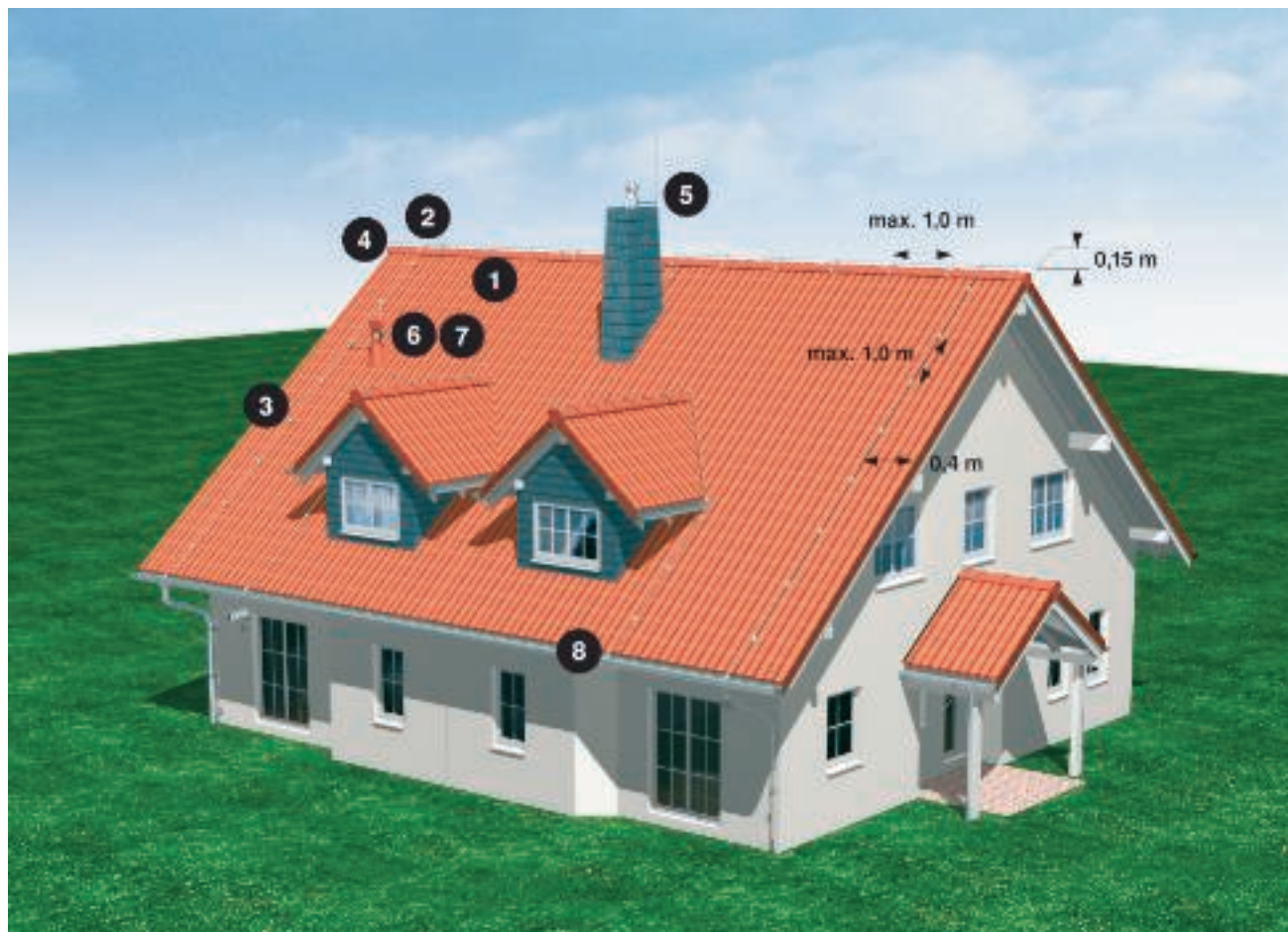
### 1st question: What is the building type?

The protection method depends on the building type in question. Select the protective angle method for buildings with a pitched roof. Use the loop method for buildings with flat roofs. Both methods are used combined for buildings with a flat roof and structures on the roof.

### 2nd question: What is the lightning protection class of the building?

Before a lightning protection system is planned, a lightning protection class for the property to be protected must be defined. According to the applicable standard, a detailed knowledge of the property and the resultant risk factors are required to establish the lightning protection class. If Table 3 in VDS Directive 2010 is used, this detailed knowledge and/or risk factors are not required to classify the building. For example, lightning protection class III is recommended for a public administration building.

## Installation principle for building with pitched roof



Perfect lightning protection system on a building with pitched roof

### System components

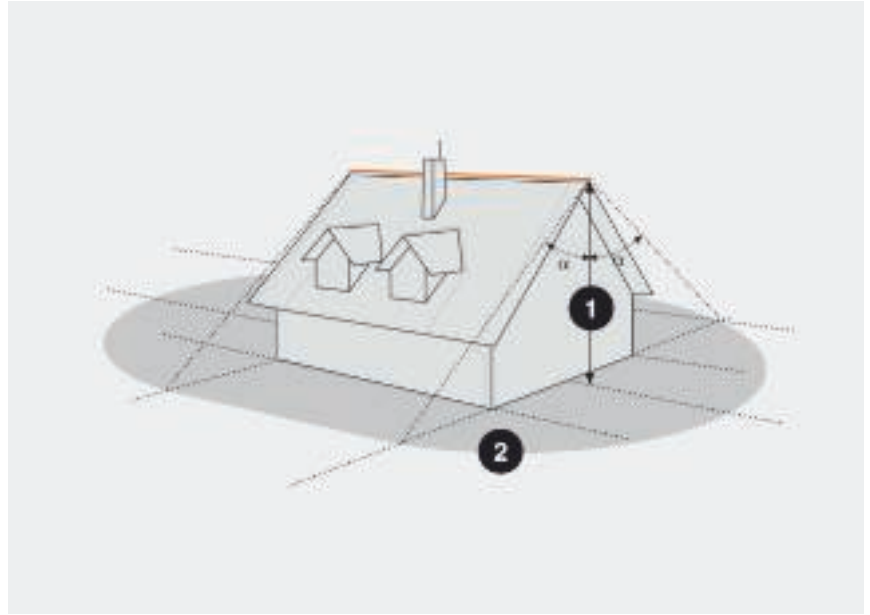
1	Roof cable holder for ridge tiles
2	Variable earthing connector
3	Roof cable holder
4	Round conductor
5	Insulating rods
6	Terminal blocks
7	Pipe clamps
8	Gutter clamps



# Installation principle for building with pitched roof

## 1st step. Determine the height of the building

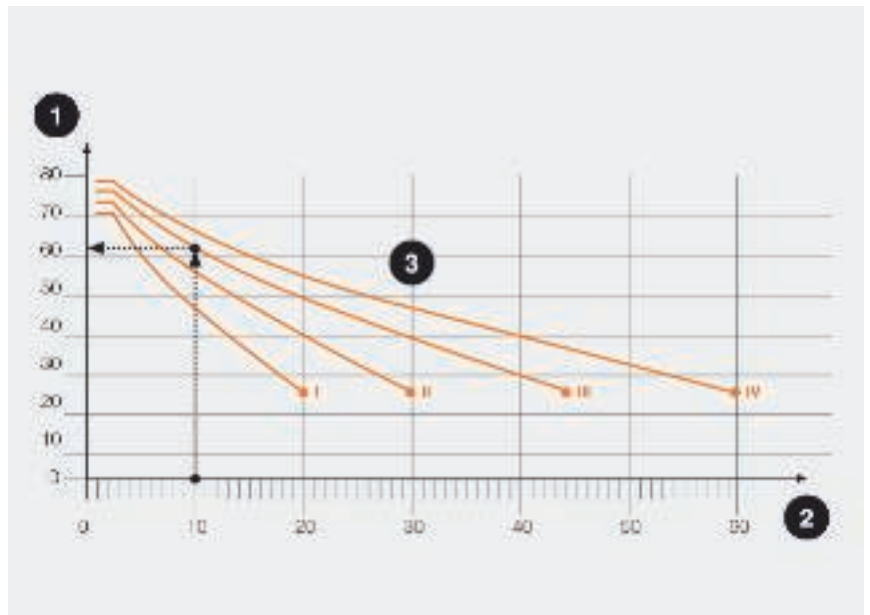
Determine the ridge height of the building (see diagram:  $h$ ). This height is the starting point for planning the entire lightning protection system. The ridge conductor is arranged on the ridge and thus forms the "backbone" for the interception system. In our example, the building is 9 m high.



1 = Building height  $h$ , 2 = Protected area,  $\alpha^\circ$  = Lightning protection angle,  $h$  = Fall height, I / II / III / IV = Lightning protection classes

## 2nd step: Determine the protective angle $\alpha$

The height of the building (in this case: 9 m) is entered onto the horizontal axis on the diagram (see - graphic opposite). Then proceed vertically until you meet the curve for your lightning protection class (in this case: III). You can now read the protective angle from the vertical axis  $\alpha$ . In our example, the angle is  $62^\circ$ . Transfer the protective angle to the building. All building parts within this angle are protected (see diagram opposite).



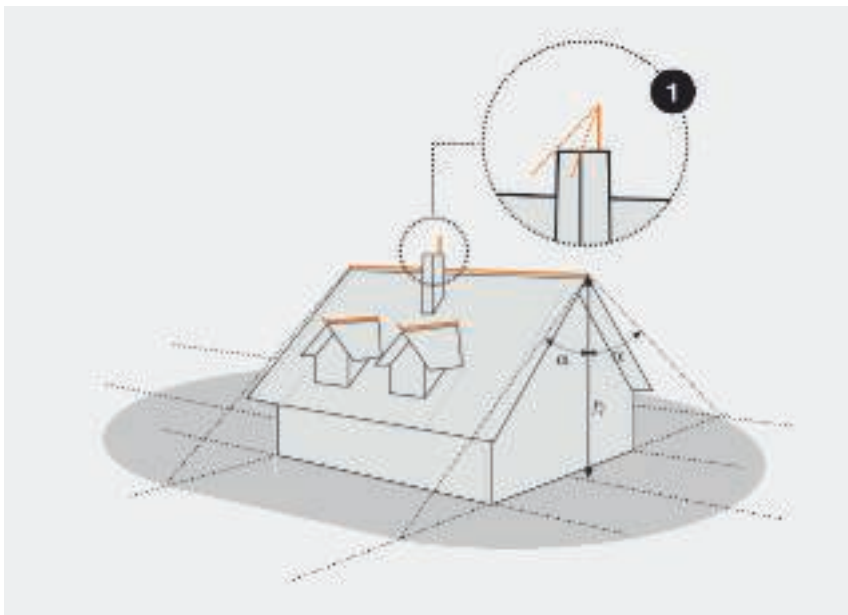
1 =  $\alpha$  = Lightning protection angle, 2 = Parape height, 3 = Lightning protection class



## Installation principle for building with pitched roof

### 3rd step: Building parts outside of the protective angle

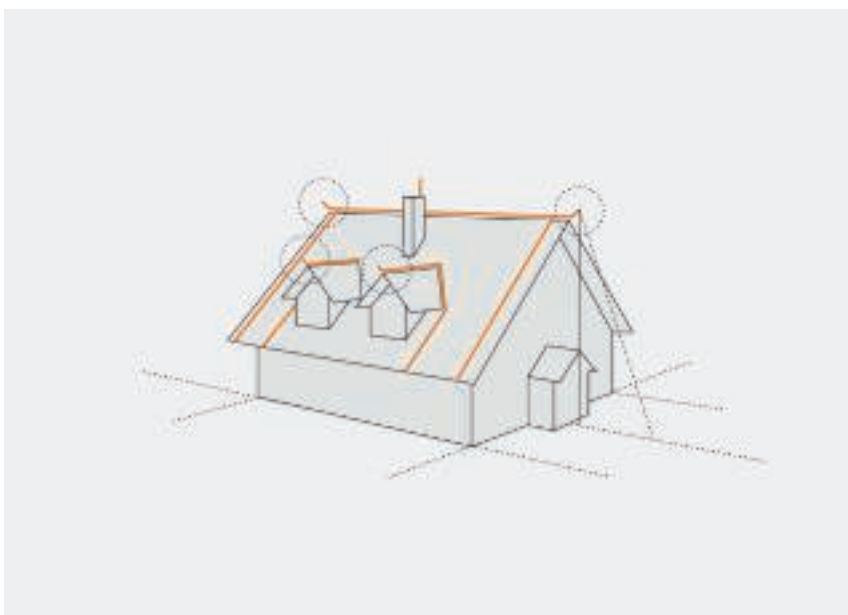
Building parts outside of the protective angle must be protected separately. The chimney in our example has a diameter of 70 cm and therefore requires a 1.50 m long interception rod. In each case, observe the length diagonals, as described on the following pages. Dormer windows have their own ridge conductor.



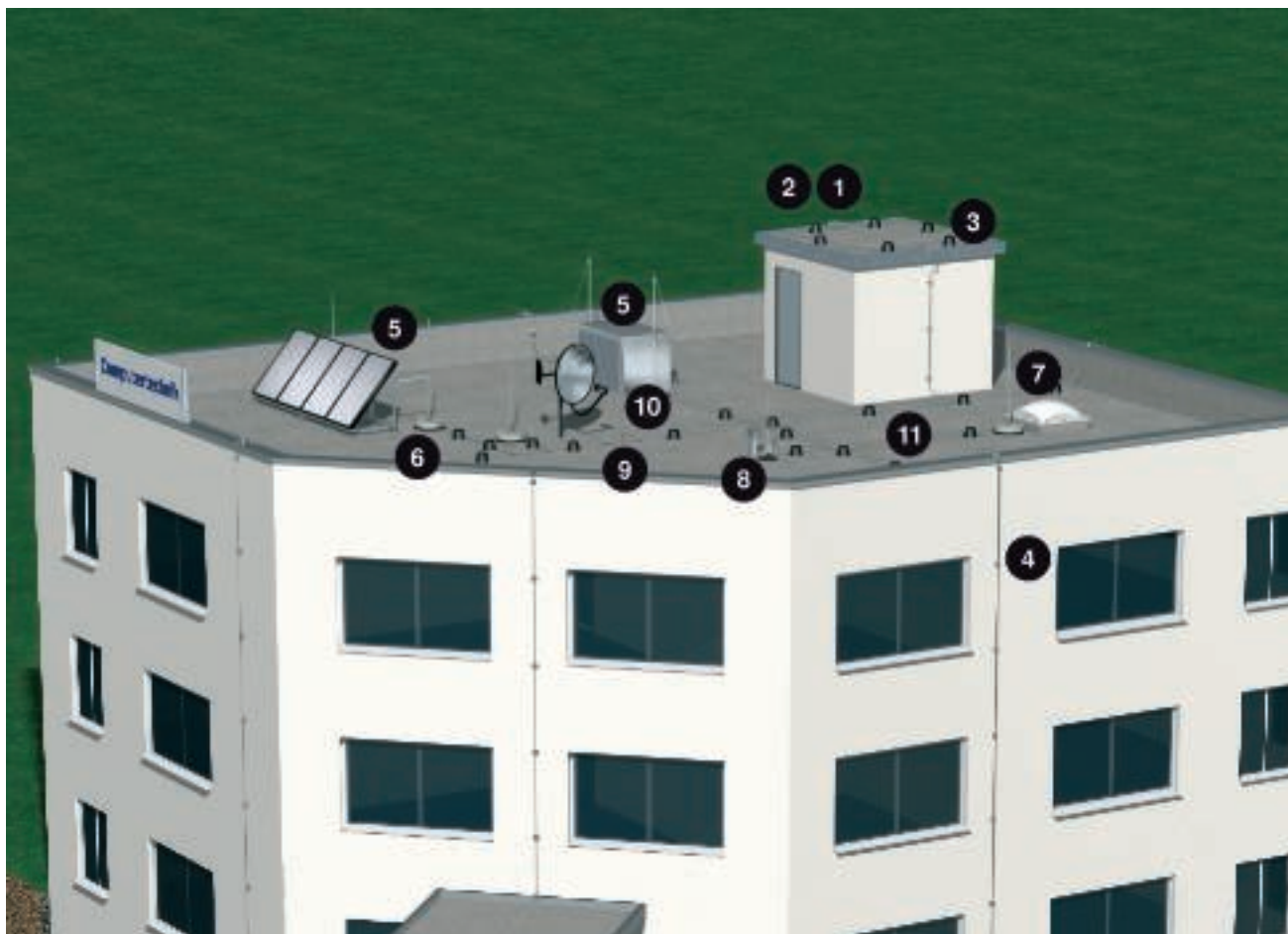
1 = Please observe diagonals

### 4th step: Completing the interception system

Take the interception system down to the arrestor equipment. The ends of the ridge conductor should protrude and curve upwards by 0.15 m. This also protects any projecting canopies.



## Installation principle for building with flat roof



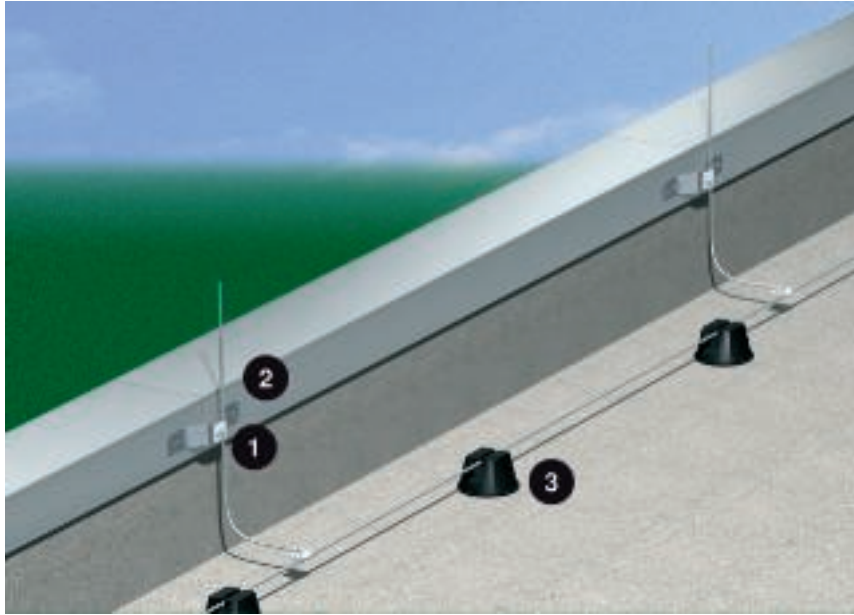
A perfectly protected building with flat roof

### System components

1	Terminal blocks
2	Bridging components
3	Roof cable holder
4	Cable bracket
5	Insulated interception systems
6	Stands
7	Interception rods
8	FangFix
9	Expansion pieces
10	Variable earthing connector
11	Round conductor



## Installation principle for building with flat roof



1 = Terminal blocks, 2 = Bridging components, 3 = Roof cable holder

### Parapet plates as a component part of the interception system

Parapet plates can be used as a natural component of the interception system if they have a certain minimum thickness, as indicated in the above table, and have a conductive connection between them.

Conductors are connections created by hard soldering, welding, pressing, bolting or riveting. Individual parapet plates can also be joined via bridging components and the corresponding bolts or rivets as defined by the standard (see table below).

### Material thicknesses

Material, e.g. of the parapet plate	Thickness (t) in mm	Thickness (t) with no risk of melting, overheating or ignition at the low end of the strike in mm
FE	0.5	4
Cu	0.5	5
Al	0.65	7

### Fastening of the bridging component

Quantity	Diameter in mm
5 blind rivets	3.5
4 blind rivets	5
2 blind rivets	6
2 plate screws	6.3

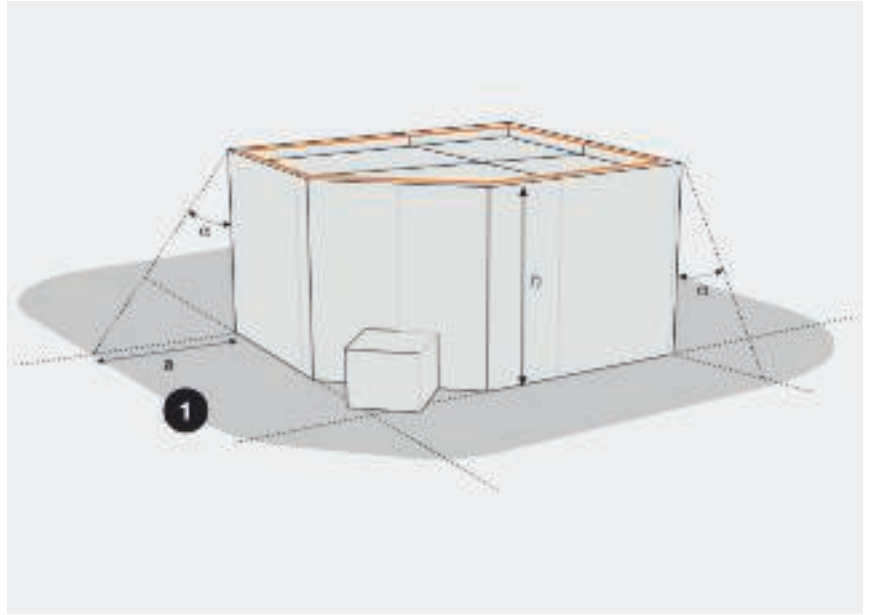


# Installation principle for building with flat roof

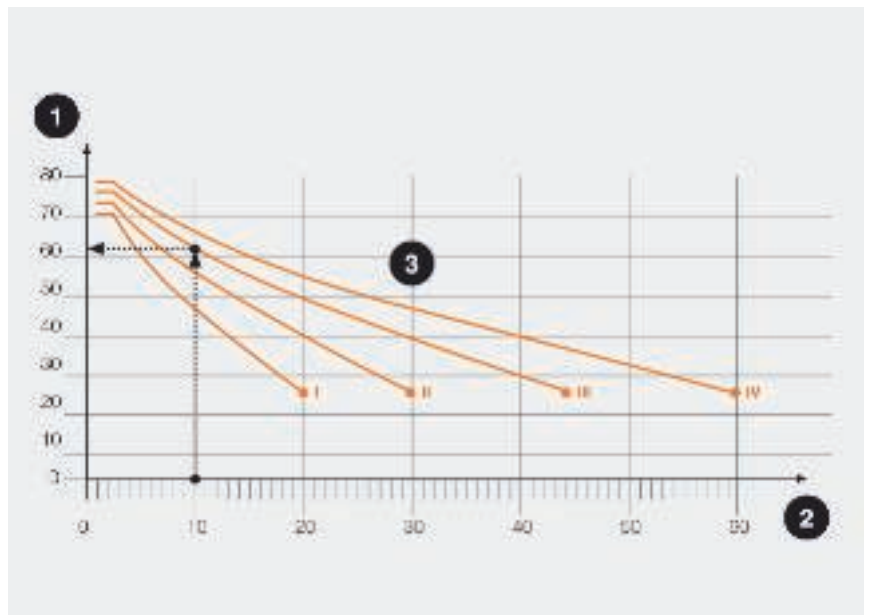
## 1st step: Installing the interception system – Part 1

First, a round conductor is installed at all primary impact points such as ridges, crests or edges. The protected area is determined as follows:

Transfer the height of the building to the diagram and read off the protective angle. In our example, this angle is  $60^\circ$  with protection class III and a building height up to 10 m. Transfer the protective angle to the building. All building parts within this angle are protected.



1 = Protected area



1 =  $\alpha$  = Lightning protection angle, 2 = Parapet height, 3 = Lightning protection class

## Protection area by classes

Height of the interception rod	1	2	3	4	5	6	8	10	12	14	16	18	20
Class 2, protection area a in m	2.9	5.8	8.7	10.4	10.7	11.2	12.8	13.7	14.3	15.0	15.4	15.1	15.0
Class 3, protection area a in m	3.4	6.9	10.4	12.3	13.7	14.8	16.4	18.0	19.2	19.9	21.2	21.4	22.2



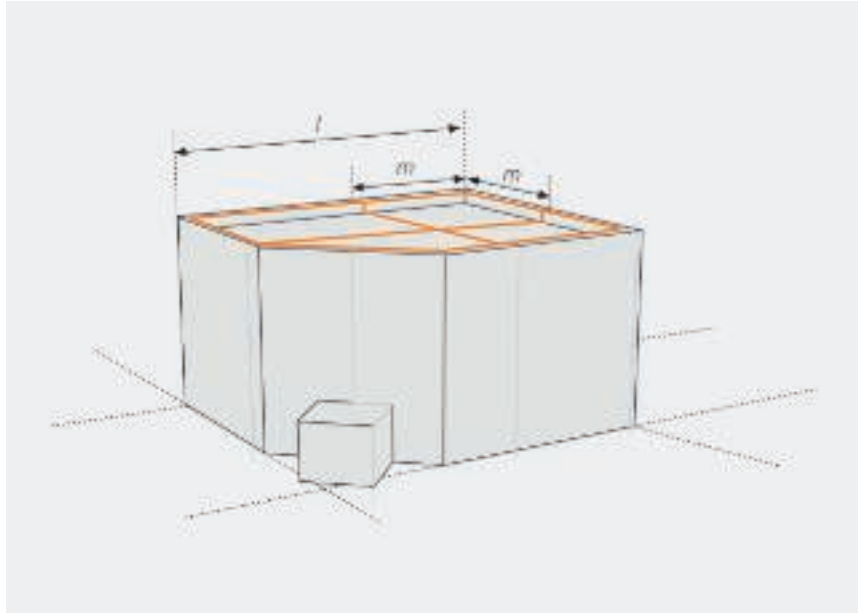
## Installation principle for building with flat roof

### 2nd step: Installing the loops

A number of different loop sizes are suitable for the particular lightning protection class of the building. The building in our example has building lightning protection class III. A loop size of  $m \times 15 \times 15 \text{ m}$  must therefore not be exceeded. If, as in our example, the overall length  $l$  is greater than 20 m, an expansion piece must also be integrated for temperature-controlled length change.

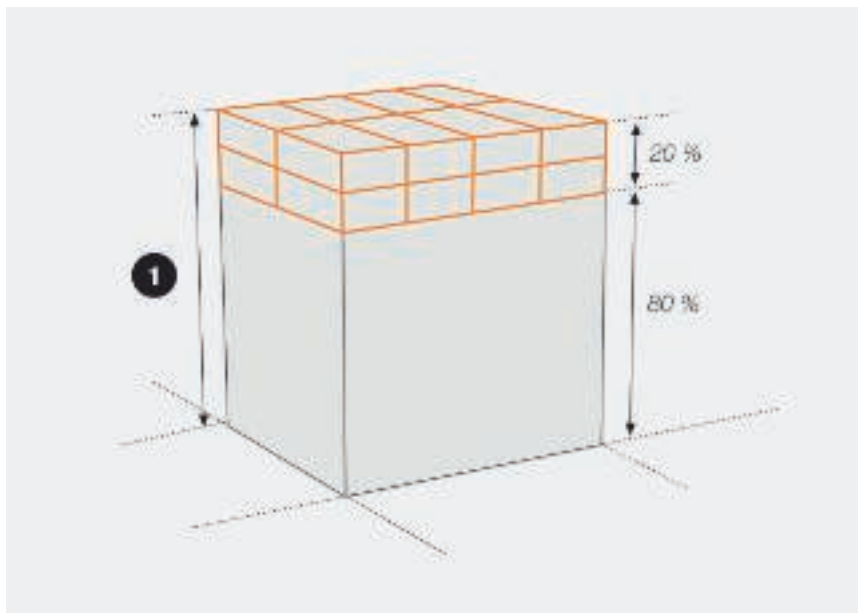
### Loop size by lightning protection class

- Class I =  $5 \times 5 \text{ m}$
- Class II =  $10 \times 10 \text{ m}$
- Class III =  $15 \times 15 \text{ m}$
- Class IV =  $20 \times 20 \text{ m}$



### Protection against lateral impact

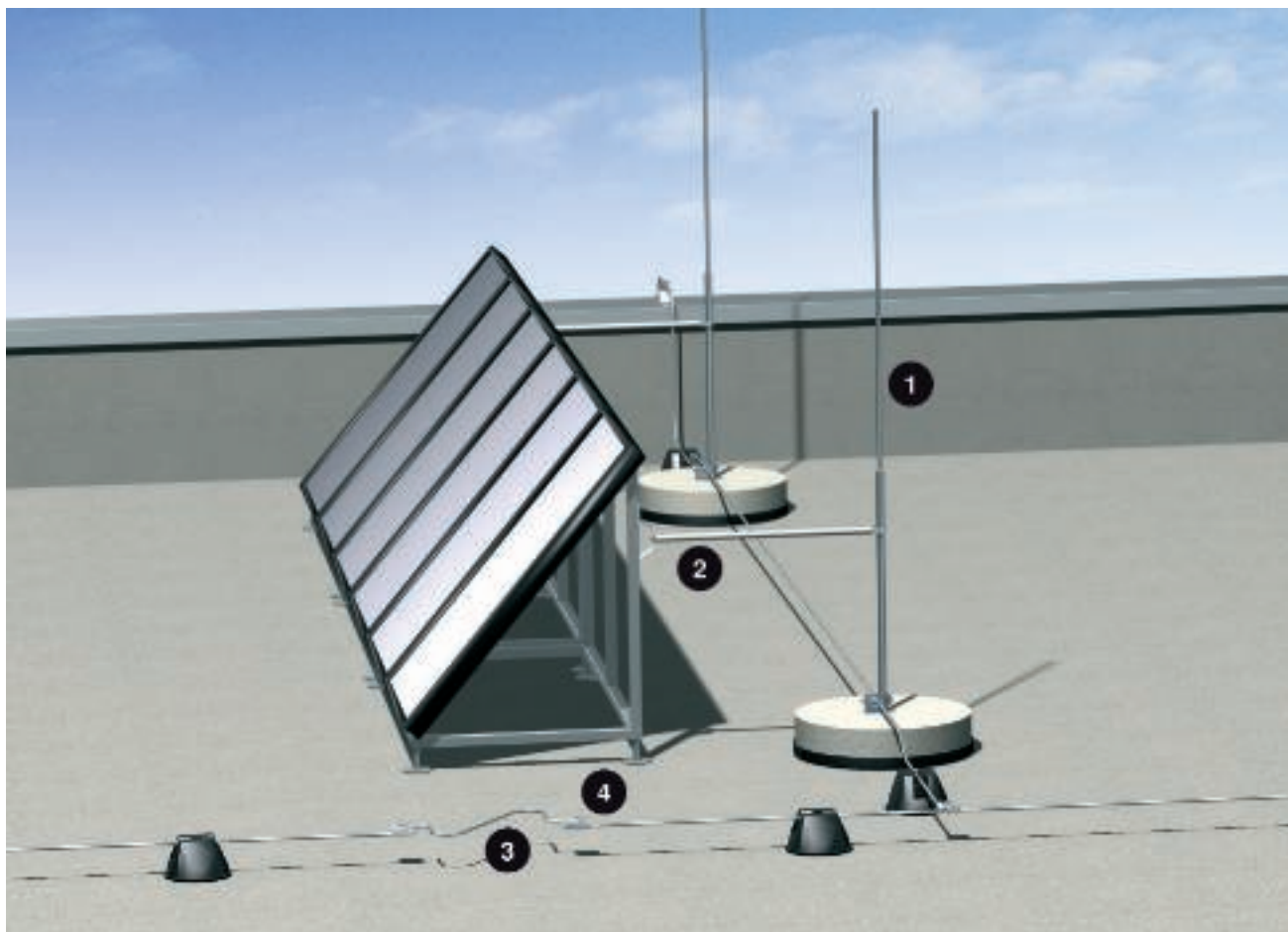
From a building height of 60 m and the risk of serious damage (e.g. with electrical or electronic devices) it is advisable to install a ring circuit to protect against lateral impact. The ring is installed at 80% of the building's overall height, the loop size depends – as it does in the case of roof installation – on the lightning protection class, e.g. lightning protection class corresponds to a loop size of  $15 \times 15 \text{ m}$ .



1 = Building height > 60 m



## Installation principle for building with roof structures



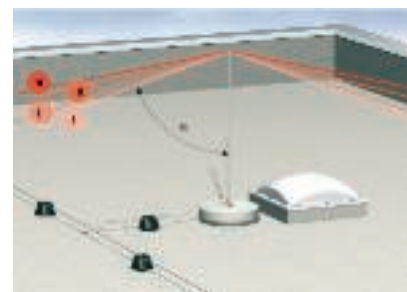
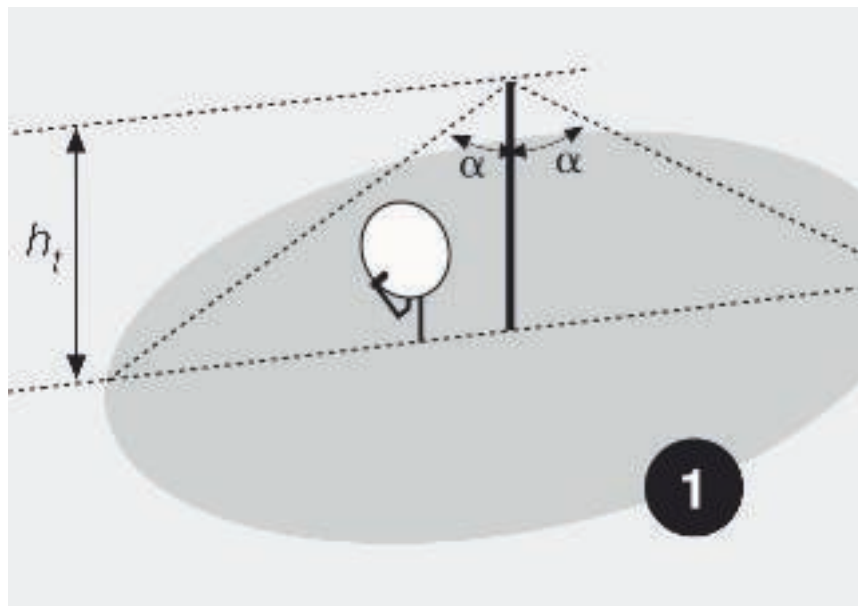
*Solar system protected with two interception rods (with insulating beam for high wind loads)*

### System components

1	Interception rods
2	Insulating rod
3	Expansion piece
4	Variable earthing connector



# Installation principle for building with roof structures



1 = Protected area,  $\alpha$  = Protection angle,  $h$  = Height of the interception rod

Protective angle using the example of an interception rod with roof window

## 1st step: Protective angle method for roof structures

You have protected the flat-roof building as described in Example 2. You must now protect all roof structures with interception rods. This involves observing the separation distances. If the roof structure has a conductive lead into the building (e.g. through a stainless steel pipe connected to the ventilation or air-conditioning system), observance of the separation distances is crucial. The interception rod must be installed at a certain distance (see below) from the object to be protected. In all other cases (e.g. roof windows without motor drive or brick-lined chimney), the interception rod must be installed as close as possible to the object to be protected.

## 2nd step: Protect all roof structures with a single interception rod

The protective angle for interception rods varies according to lightning protection class. The table shows the protective angle  $\alpha$  for the most commonly used interception rods of up to 2 m in length.

### Protection angle according to lightning protection class

Lightning protection class	Protection angle $\alpha$ for interception rods of up to 2 m length
I	70°
II	72°
III	76°
IV	79°



# Installation principle for building with roof structures



Wind load zones in Germany

### 3rd step: Determining the wind load

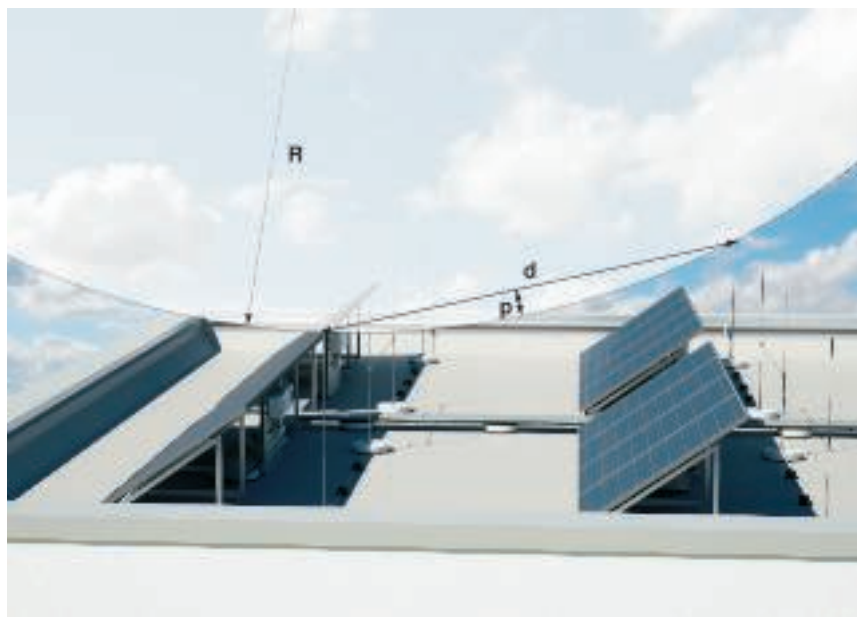
Use the table to determine how many stones you need to securely install the interception rod. The values in this table relate to fastening tapered interception rods in the 101/V OBO range using the FangFix system.

### FangFix blocks according to wind zones and interception rod height

	Zone 1: Areas with relief heights of up to 600 m above sea-level	Zone 2: Northern German plain	Zone 3: North Sea and Baltic Sea coastal area	Zone 4: Islands with German bay
Interception rod height 1.5 m	1 x 10	1 x 10	1 x 16	1 x 16
Interception rod height 2 m	1 x 16	1 x 16	1 x 16 and 1 x 10	1 x 16 and 1 x 10
Interception rod height 2.5 m	1 x 16	1 x 16 and 1 x 10	2 x 16	2 x 16 and 1 x 10
Interception rod height 3 m	2 x 16	2 x 16	2 x 16 and 1 x 10	on request
Interception rod height 3.5 m	2 x 16	3 x 16	on request	on request
Interception rod height 4 m	2 x 16 and 1 x 10	3 x 16 and 1 x 10	on request	on request



## Installation principle for building with roof structures



$$p = R - \sqrt{R^2 - \left(\frac{d}{2}\right)^2}$$

*p = penetration depth, R = radius of lightning ball, d = distance of the interception device*

### 4th step: Protect roof structures with several interception rods

If you use several interception rods to protect an object, you must take into consideration the penetration depth between them. For a precise calculation, use the following formula:

**Table 2: Penetration depth by lightning protection class according to DIN EN 62305**

Distance of interception system (d) in m	Penetration depth, lightning protection class I, lightning protection sphere: R=20 m	Penetration depth, lightning protection class II, lightning protection sphere: R=30 m	Penetration depth, lightning protection class III, lightning protection sphere: R=45 m	Penetration depth, lightning protection class IV, lightning protection sphere: R=60 m
2	0.03	0.02	0.01	0.01
3	0.06	0.04	0.03	0.02
4	0.10	0.07	0.04	0.04
5	0.16	0.10	0.07	0.05
10	0.64	0.42	0.28	0.21
15	1.46	0.96	0.63	0.47
20	2.68	1.72	1.13	0.84



## Insulation lightning protection



Insulated intercepting devices run the lightning current at a safe distance (separation distance  $s$ ) to roof structures and also prevent the lightning currents entering the building to be protected. Insulated intercepting devices are used for electrical devices, which have electrically conductive connections into the building to be protected, such as air-conditioning systems, photovoltaic systems, electrically powered motors and controls and metallic aeration and venting pipes, etc.

The separate interception unit allows protection even of complex contours of the building to be protected. The electrical and metallic equipment are protected against a direct lightning strike and partial lightning currents into the building system are avoided. The separation distance ( $s$ ) can be calculated using DIN EN 62305-3 (IEC 62305-3). An insulating, fibre-glass reinforced plastic pipe (GFK pipe)

creates the separation distance. The system of insulated lightning protection allows individual and economic installations of separate interception devices. Besides the modular system, OBO can also offer preinstalled set solutions.

### 16 mm GFK rods

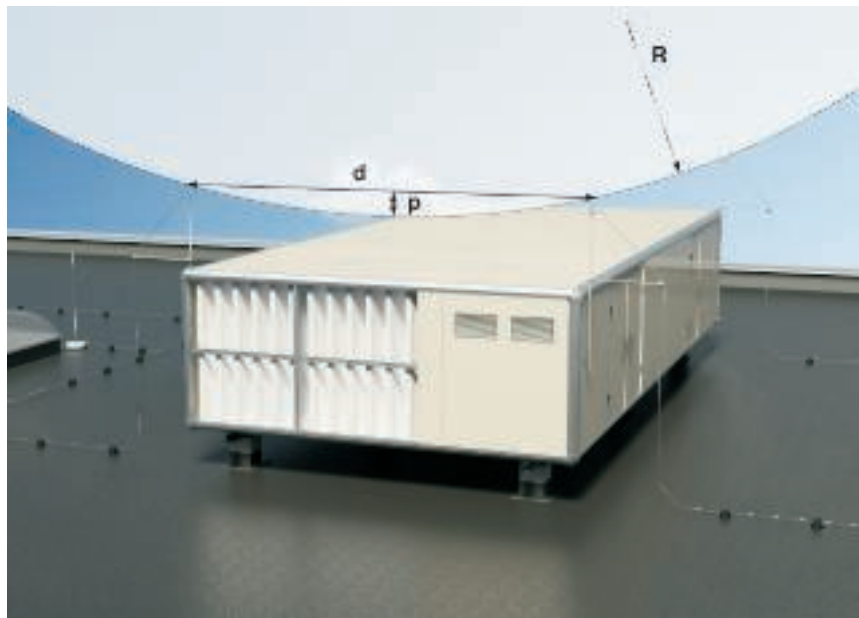
- 16 mm rods of up to 3 m in length
- UV-stable
- Light grey
- Material factor  $k_m = 0.7$
- Section modulus  $> 400 \text{ mm}^3$
- Support load = 54 N (1.5 m)

### 20 mm GFK rods

- 20 mm rods of up to 3 m in length
- UV-stable
- Light grey
- Material factor  $k_m = 0.7$
- Section modulus  $> 750 \text{ mm}^3$
- Support load = 105 N (1.5 m)



Air-conditioning system in protection angle,  $\alpha$  = Protection angle



Cooling system protection area of the lightning globe,  $p$  = penetration depth,  $R$  = radius of lightning ball,  $d$  = distance of the interception device



## Insulation lightning protection – sets



In the field of insulating lightning protection systems, OBO can offer sets with which separated insulating devices can be created quickly and simply. The electrical and metal equipment of buildings/systems protruding beyond the roof are protected against direct lightning strikes. The separation distance ( $s$ ) prevents uncontrolled arcing and spark formation. The aim is to prevent partial lightning currents from entering into the interior of the building or the system. The separation distances can be calculated using DIN EN 62305-3 (IEC 62305-3). The separation distance is created by the insulating, fibre-glass reinforced plastic rods. The sets are pre-mounted. The material factor  $km = 0.7$  is used to determine the separation distance (length of the distance rod).

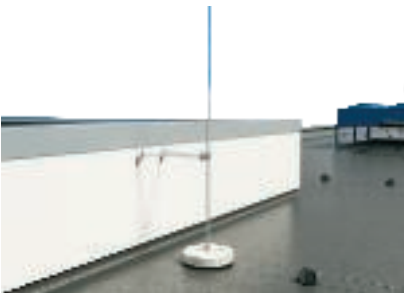
### Iso-Combi set for 3-corner fastening



Iso-Combi set for 3-corner fastening for the erection of an insulated interception system at a safe separation distance, see Mounting on walls and roof structures with two fastening plates. To accept interception rods and round conductors of 8, 16 and 20 mm diameter.

- Type: 101 3-ES-16
- Article No. 5408976
- L = 750 mm
- H = 1,500 mm

### Iso-Combi set for V fastening



Iso-Combi set for V fastening for the erection of an insulated interception system at a safe separation distance, see Mounting on walls and roof structures with two fastening plates. To accept interception rods and round conductors of 8, 16 and 20 mm diameter.

- Type: 101 VS-16
- Article No. 5408978
- L = 750 mm

### Iso-Combi set for fold fastening



Iso-Combi set for fold fastening for the erection of an insulated interception system at a safe separation distance, see Mounting on the fold of supports and roof structures with folding clamps of up to 20 mm fold thickness. To accept interception rods and round conductors of 8, 16 and 20 mm diameter.

- Type: 101 FS-16
- Article No. 5408980
- L = 750 mm

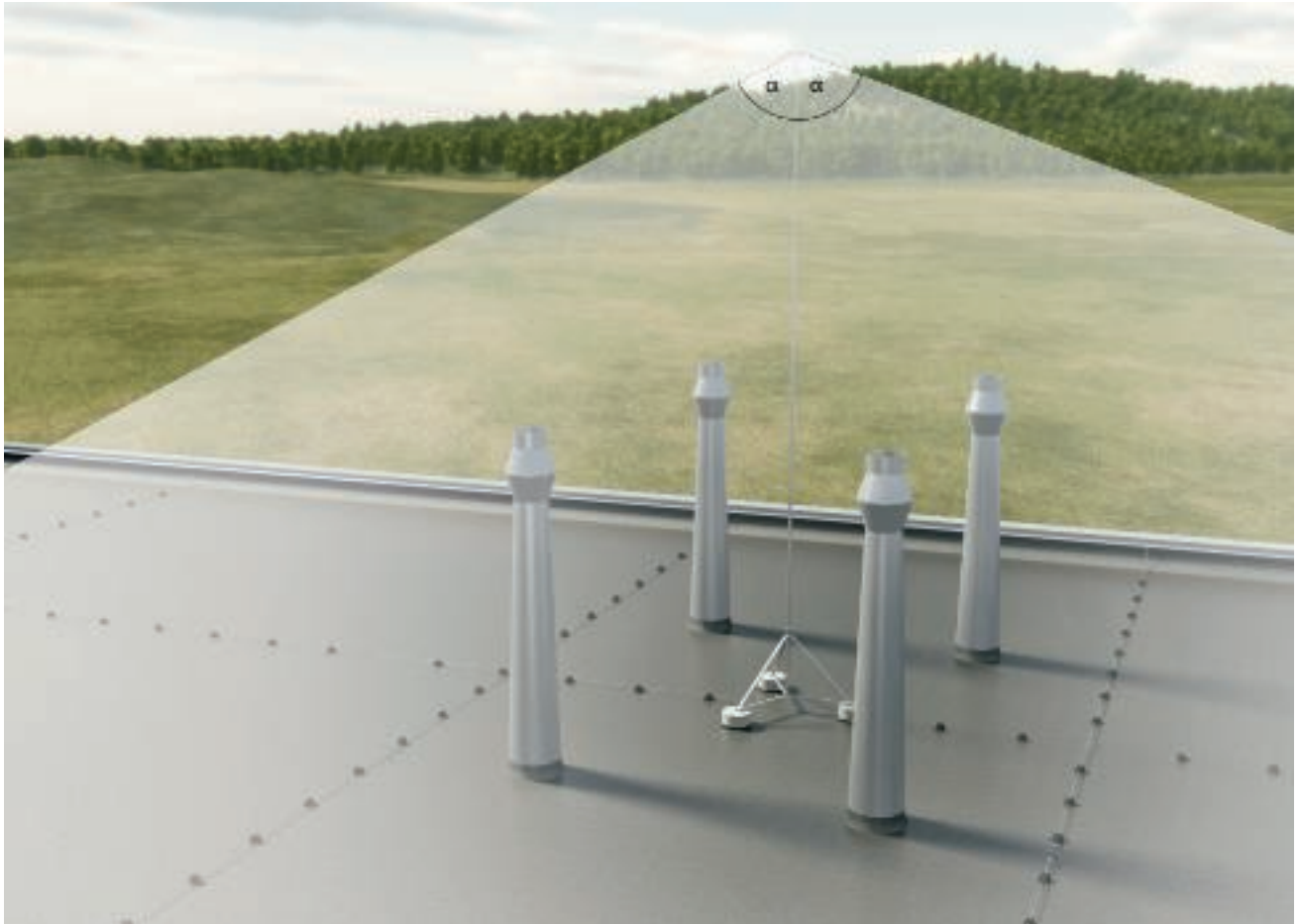
### Iso-Combi set for pipe V fastening



Iso-Combi set for pipe V fastening for the erection of an insulated interception system at a safe separation distance, see Mounting on pipes with two pipe clips. To accept interception rods and round conductors of 8, 16 and 20 mm diameter.

- Type: 101 RVS-16
- Article no. 5408982
- L = 750 mm

## OBO interception rod system, isFang



$\alpha$  = Protection angle

### isFang – interception rod stand installed quickly and easily

The OBO isFang module interception rod system can offer a quick, screwless and freely combinable solution for isolated interception rod systems as well as high interception rods for the greatest possible protection angle.

The insulated interception rods protect electrical and metallic roof structures, taking the calculated separation spacings according to IEC 62305 into account. An insulated section of 1.5 metres of fibreglass reinforced plastic (GFK) ensures a sufficient distance to all roof structures. Complex building structures can also be protected by the comprehensive system accessories.

The aluminium interception rods, which come in three sections, and which are between 4 and 8 metres long, supplement the conventional interception system of an interception rod and block, which is used

for heights of up to 4 metres. Various brackets are available to fasten the different interception rods to the walls, pipes and corner pipes. In addition, there are two tripod stands with various spreading widths. The selection aid overleaf shows a simplified version of the component combination.





### Combination of isFang system

High interception rod, made of aluminium	High insulated interception rod, made of GFK/VA	Spreading width, tripod stand	Quantity of 16 kg FangFix blocks	Quantity of FangFix edge protection units	Long threaded rod
	3 m Art. no. 5408 94 2	1 m Art. no. 5408 96 8	3 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	270 mm Art. no. 5408 97 1
4 m Art. no. 5402 86 4		1 m Art. no. 5408 96 8	3 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	270 mm Art. no. 5408 97 1
4.5 m Art. no. 5402 86 6		1 m Art. no. 5408 96 8	3 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	270 mm Art. no. 5408 97 1
	5 m Art. no. 5408 94 6	1 m Art. no. 5408 96 8	6 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	340 mm Art. no. 5408 97 2
5 m Art. no. 5402 86 8		1 m Art. no. 5408 96 8	6 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	340 mm Art. no. 5408 97 2
5.5 m Art. no. 5402 87 0		1 m Art. no. 5408 96 8	6 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	340 mm Art. no. 5408 97 2
6 m Art. no. 5402 87 2		1.5 m Art. no. 5408 96 9	6 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	340 mm Art. no. 5408 97 2
6.5 m Art. no. 5402 87 4		1.5 m Art. no. 5408 96 9	6 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	340 mm Art. no. 5408 97 2
7 m Art. no. 5402 87 6		1.5 m Art. no. 5408 96 9	6 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	340 mm Art. no. 5408 97 2
7.5 m Art. no. 5402 87 8		1.5 m Art. no. 5408 96 9	9 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	430 mm Art. no. 5408 97 3
8 m Art. no. 5402 88 0		1.5 m Art. no. 5408 96 9	9 blocks Art. no. 5403 22 7	3 x edge protection Art. no. 5403 23 5	430 mm Art. no. 5408 97 3



## OBO isCon® system



### OBO isCon® system

Ever more complex requirements of architects and clients mean that planners of lightning protection systems require deep technical knowledge. The lightning protection system must be matched to the building structure, whilst, at the same time, its full function must be guaranteed when lightning strikes. In external lightning protection, the separation distance is a key component. There are a range of points to be observed when - maintaining the separation distance. The isCon® cable was designed for simple and safe maintenance of the separation distance, even with complex building structures.

### arrestors insulated against high voltages

To simplify compliance with the necessary separation spacing, the arrester can be surrounded with a high-voltage-resistant insulation. High-voltage-resistant insulation can safely insulate up to several kilovolts. A direct arc to the installation to be protected is no longer possible.

However, partial discharges may occur on the insulating layer along the layer adjacent to and running along the field. This thus disrupts the homogeneous course of the electrical field and surface discharge above the insulating layer -

may occur. To avoid spark formation, these surface discharges - must be arrested against a reference potential using equipotential bonding.

### Structure of the OBO isCon® cable

The OBO isCon® cable consists of five parts. The twisted copper core has a cross-section of 35 mm<sup>2</sup> and is coated by an inner conductive layer and high-voltage-resistance VPE insulation. This in turn is coated with an external conductive layer and an additional electrical, weakly conductive material. The lightning current flows through the copper core. The copper core must be connected to the weakly conductive jacket for operation. The isCon® cable is delivered on disposable cable rolls. This means that the user can cut it to size on-site and terminate it as necessary.





Test setup in high-voltage laboratory

### Planning and installation

Special knowledge is required to be able to plan and install the isCon® cable correctly. This knowledge is provided in special workshops and with the help of the current installation instructions. Principally, during the planning of a lightning protection system with isCon®, attention must be paid to the interception and arresting unit.

### Routing of interception system

The routing of the interception system must be planned taking DIN EN 62305 (IEC 62305) into account. The area to receive special protection, which determine the height and arrangement of the interception unit, must be specified here.

### Routing the arrester

The routing of the isCon® cable should be planned and executed according to the current mounting and installation instructions. The - maximum cable length is calculated from the defined lightning protection class of the system and the calculated separation distance (see table).

### Standardised

The cross-section of the copper core is 35 mm<sup>2</sup>, meaning that the required minimum diameter of 28 mm<sup>2</sup> for copper arrestors as - given in DIN EN 62305 (IEC

62305) is maintained.

### Universal

The OBO isCon® cable can be used flexibly. It is delivered by the metre on disposable cable reels. The user cuts the individual arrester and terminates the connection in situ.

### Tested

Construction and function confirmed by comprehensive tests by different testing institutions. The cable replaces a separation distance of 0.75 metre in the air.

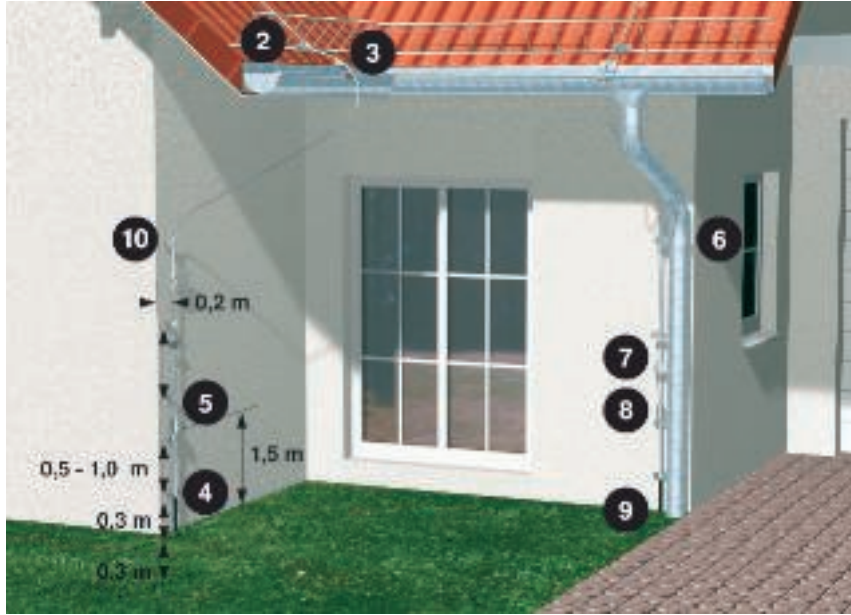
Standardised, reliable and safe protection can be installed anywhere when all the aspects for the planning and installation of the OBO isCon® system are taken into account.

### Maximum length of the isCon® cable for $s = " \ddot{z} ' m$

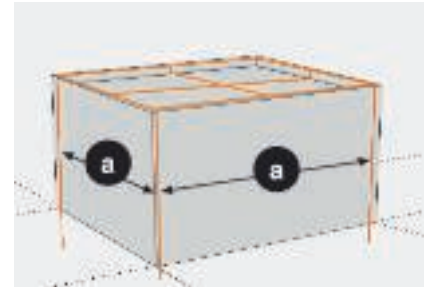
LPS (Lightning protection class)	Maximum length of the isCon® cable
I	9.37 m
II	12.50 m
III + IV	18.75 m



## Planning an arrestor system



2 = Snow catching grate clamps, 3 = Gutter clamps, 4 = Cable brackets, 5 = Separating pieces, 6 = Downspout clips, 7 = Terminal blocks, 8 = Separating pieces, 9 = Earth entry rods, 10 = Cable brackets



a = Distance between the arrestors

### Number of arrestors

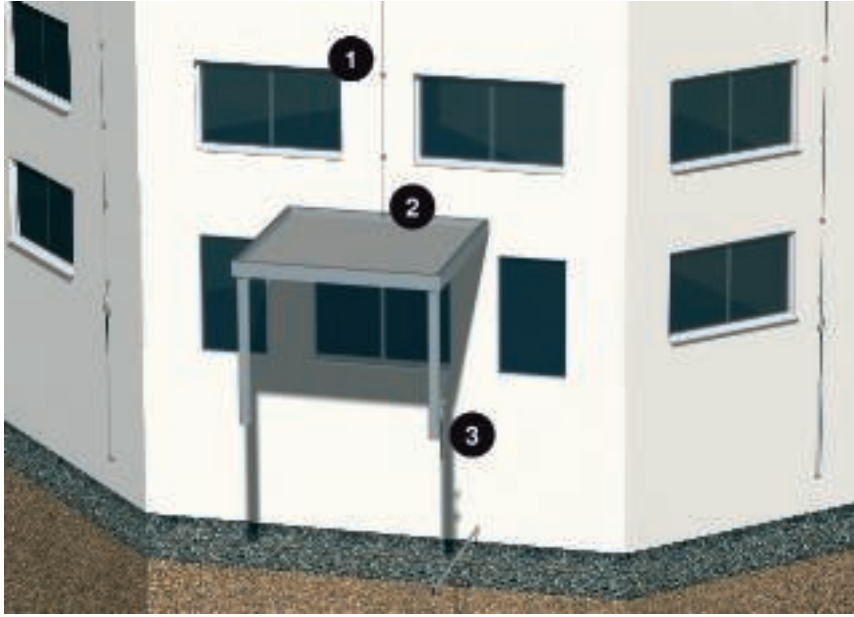
The arrestor system routes the lightning current from interception system to earthing system. The number of arrestors is derived from the scope of the building to be protected, although at least two arrestors are required in every case. Care must be taken to ensure that the current paths are short and installed without loops. The table shows the distances between the arrestors and the corresponding lightning protection classes.

### Arrangement of the arrestors

The arrestors should preferably be installed near the corners of the building. In order to achieve optimum splitting of the lightning current, the arrestors must be evenly distributed around the outer walls of the building.

### Assigning the lightning protection classes to the distances

Lightning protection class	Distance between the arrestors a
I	10 m
II	10 m
II	15 m
IV	20 m



*Metal roof integrated into the arrester: 1 = Cable bracket, 2 = Construction clamp, 3 = Earth entry rods*

**Metallic building sections**

















Metallic building sections, such as canopies can be integrated into the arrester system.

**Secure fastening**

A lightning strike releases an enormous amount of energy. An example from our BET testing laboratory shows an incorrectly installed round conductor with bends of more than 90°, both before and after the lightning pulse.




## Test marks

	Lightning current-tested
	Lightning current-tested, Class H (100 kA)
	ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV, Czech Republic
	ATEX certificate for explosive areas
	Russia, GOST The State Committee for Standards
	KEMA-KEUR, Netherlands
	Indication of metric products
	MAGYAR ELEKTROTECHNIKAI ELLENŐRZŐ INTÉZET Budapest, Hungary
	Österreichischer Verband für Elektrotechnik, Austria
	Underwriters Laboratories Inc., USA
	Eidgenössisches Starkstrominspektorat, Switzerland
	Underwriters Laboratories Inc., USA
	Verband der Elektrotechnik, Elektronik, Informationstechnik e.V., Germany
	German Association of Electricians, tested safety
	5-year warranty
	Halogen-free; without chlorine, fluorine and bromine









# Pictogram explanation




















## Lightning protection classes

	Protection device to DIN EN 61643-11 or IEC 61643-11
	Combination protection device made of Type 1 and Type 2
	Protection device to DIN EN 61643-11 or IEC 61643-11
	Protection device to DIN EN 61643-11 or IEC 61643-11
	Protection device to DIN EN 61643-11 or IEC 61643-11











## Lightning protection zone

	Transition from LPZ 0 to LPZ 1
	Transition from LPZ 0 to LPZ 2
	Transition from LPZ 0 to LPZ 3
	Transition from LPZ 1 to LPZ 2
	Transition from LPZ 1 to LPZ 3
	Transition from LPZ 2 to LPZ 3








## Applications

	Remote signalling
	Remote signalling with fuse monitoring
	Acoustic signalling
	Integrated Service Digital Network, ISDN applications
	Digital Subscriber Line, DSL applications
	Analogue telecommunication
	Category 5 TwisterPair
	Channel Performance to American EIA/TIA standard
	Measuring, controlling and regulating systems
	TV applications
	SAT-TV applications
	Multibase base
	LifeControl
	Intrinsically safe protection device for areas with a risk of explosions
	Channel Performance to ISO / IEC 11801
	Power over Ethernet
	230/400 V-system
	Protection rating IP 54
	Protection rating IP 65








## Metals

	Aluminium
	Stainless steel, 1.4301
	Stainless steel, 1.4401
	Stainless steel, 1.4404
	Stainless steel, 1.4571
	Copper
	Brass
	Steel
	Cast iron
	Die-cast zinc

## Plastics

	Fibreglass-reinforced plastic GFK
	Petrolatum
	Polyamide
	Polycarbonate
	Polyethylene
	Polypropylene
	Polystyrene

## Surfaces

	Strip-galvanised
	Hot-dip galvanised
	Electro-galvanised
	Hot-dip galvanised
	Copper-plated
	Nickel-plated
	Galvanised, Deltatone 500



## Metallic materials

**Alu — Aluminium**

**VA (1.4301) — Stainless steel, 1.4301**

**VA (1.4401) — Stainless steel, 1.4401**

**VA (1.4404) — Stainless steel, 1.4404**

**VA (1.4571) — Stainless steel, 1.4571**

**Cu — Copper**

**CuZn — Brass**

**St — Steel**

**TG — Cast iron**

Electrogalvanised

**Zn — Die-cast zinc**



# Plastic materials

## GFK — Fibreglass-reinforced plastic GFK

Temperature resistance:  
-50 to 130 °C.

### Resistant to

High chemical resistance  
Corrosion resistance  
UV light resistance

## PETR — Petrolatum

## PA — Polyamide

Temperature resistance:  
permanently up to approx. 90 °C, briefly up to about 130 °C  
and to about minus 40 °C\*.

Chem. resistance generally as for polyethylene.

### Resistant to

Petrol, benzene, diesel oil, acetone, solvents for paints and lacquers,  
oils and greases.

### Unstable with

Bleach, most acids, chlorine.

Low in air-humid conditions; only with some aqueous salt solutions.  
Highly desiccated parts (high temperature and extremely low air  
humidity) are highly sensitive to fuels and various solvents.

## PC — Polycarbonate

Temperature resistance:  
permanently up to approx. 110 °C (in water 60 °C), briefly up to 125  
°C, and to below minus 35 °C.

### Resistant to

Petrol, turpentine, most weak acids.

### Unstable with

Acetone, benzene, chlorine, methylene chloride, most concentrated  
acids.

Relatively low.

Media which can cause tension cracking include benzene, aromatic  
hydrocarbons, methanol, butanol, acetone, turpentine.

## PE — Polyethylene

Temperature resistance:  
hard types permanently up to about 90 °C, briefly up to about 105 °C,  
soft types permanently up to about 80 °C, briefly up to about 100 °C  
and to about minus 40 °C\*.

### Resistant to

Alkalis and inorganic acids.

### Conditionally resistant to

Acetone, organic acids, petrol, benzene, diesel oil, most oils.

### Unstable with

Chlorine, hydrocarbons, oxidising acids.

Relatively high.

Stress cracks can be caused by, among others, acetone, various  
alcohols, formic acid, ethanol, petrol, benzene, butyric acid, acetic acid,  
formaldehyde, various oils, petroleum, propanol, nitric acid,  
hydrochloric acid, sulphuric acid, soap solutions, turpentine,  
trichloroethylene, citric acid.

## PP — Polypropylene

Temperature resistance:  
permanently up to approx. 90 °C, briefly up to about 110 °C  
and to about minus 30 °C\*.

Chem. resistance generally as for polyethylene.

### Resistant to

Alkalis and inorganic acids.

### Conditionally resistant to

Acetone, organic acids, petrol, benzene, diesel oil, most oils

### Unstable with

Chlorine, hydrocarbons, oxidising acids.

Low, only with some acids such as chromic acid, hydrofluoric acid and  
hydrochloric acid, as well as nitrogen oxide.

## PC — Polystyrene

Temperature resistance:  
Because of its relatively high sensitivity to the effects of chemicals, its  
use is not recommended at temperatures above normal room  
temperature, about 25 °C.

Resistance to cold: to about minus 40 °C\*.

### Resistant to

Alkalis, most acids, alcohol.

### Conditionally resistant to

Oils and greases.

### Unstable with

Butyric acid, concentrated nitric acid, concentrated acetic acid,  
acetone, ether, petrol and benzene, solvents for paints and lacquers,  
chlorine, diesel fuel.

Relatively high.

Stress cracks can be caused by, among other things, acetone, ether,  
petrol, cyclohexane, heptane, methanol, propanol and the softeners  
used in some PVC cable mixes.

\*The minus values apply only for parts in the quiescent condition with  
no severe impact stress.

There is no plastic that is resistant to every chemical. The agents listed  
are only a small selection. Plastic parts are especially at risk in the  
presence of chemicals and high temperatures. Stress cracks may  
occur. If in doubt, please consult us and/or ask for a detailed chemical  
resistance table.

Stress crack formation: stress cracks may occur if plastic parts under  
tension are exposed to chemicals at the same time. Parts made of  
polystyrene and polyethylene are particularly susceptible. Stress cracks  
may even be caused by agents to which the plastic in question is  
resistant in the absence of stress. Typical examples of parts under  
constant stress when used as intended: grip clips, intermediate  
supports of cable glands, ribbon clips.



# Tested lightning protection components

## Tightening torques

M5 = 4 Nm

M6 = 6 Nm

M8 = 12 Nm

M10 = 20 Nm

Detailed data can be provided on request.

# The little A to Z of surge protection

## 100% response lightning impulse voltage

The 100% response lightning impulse voltage is the value of the lightning impulse voltage 1.2/50  $\mu$ s, causing the arrester to switch. With this testing voltage, the surge protection device must respond ten times to ten loads.

## Arrester

Arresters are resources, which primarily consist of voltage-dependent resistors and/or spark gaps. Both elements can be switched in series or in parallel or used individually.

Arresters are used to protect other electrical resources and electrical systems against surge voltages.

## Arrester measured voltage $V_c$

For arresters without a spark gap, the measured voltage is the maximum permitted effective value of the mains voltage on the arrester terminals. The measured voltage may constantly be applied to the arrester without changing its operational characteristics.

## Back-up fuse before the arresters

There must be a back-up fuse before the arresters. If the upstream fuse is greater than the maximum approved back-up fuse of the arrester elements (see technical data of the device), the arrester must be protected selectively with the required value.

## Cut-off unit

The cut-off unit cuts the arrester off from the mains or the earthing system if it is overloaded, thus preventing a fire risk and also signalling the switch-off of the protection device.

## Equipotential bonding

Electrical connection, which brings the bodies of electrical resources and other conductive parts to the same or almost the same potential.

## Equipotential bonding rail (PAS)

A terminal or rail, intended to connect the protective conductor, the equipotential bonding conductor and, if necessary, the conductor for function earthing with the earthing cable and the earthers.

## Error current protection unit (RCD)

Resource for protection against electric shocks and fire protection (e.g. FI protection switches).

## Lightning protection equipotential bonding system

The lightning protection equipotential bonding is a key measure in reducing the risk of fire and explosion on the room or building to be protected. The lightning protection equipotential bonding is achieved using equipotential bonding cables or arresters, which connect the external lightning protection system, metallic parts of the building or room, the installation, the other conductive parts and the electrical energy and telecommunications systems.

## Lightning protection system (LPS)

A lightning protection system (LPS) is considered as the entire system used to protect a room or building against the impact of a lightning strike. This includes both internal and external lightning protection.

## Lightning protection zone (LPZ)

Lightning protection zones are those areas in which the electromagnetic environment of the lightning is to be defined and mastered. At the zone transitions, all cables and metallic parts must be integrated into the equipotential bonding system.

## Lightning surge current (Iimp)

A lightning surge current (lightning current carrying capacity per path) is a standardised surge current curve of the shape 10/350  $\mu$ s. With its parameters

- Peak value
- Charge
- Specific energy

it represents the load from natural lightning currents. Type 1 lightning current arresters (previously requirement class B) must be able to arrest such lightning currents without being destroyed.

## Line follow current quenching (If)

The follow current – also called network follow current – is the current which flows through the surge protection device after an arresting operation and is supplied by the network. The follow current is considerably different from the continuous operating current. The level of the network follow current is dependent on the feed line from the transformer to the arrester.

## Nominal current (In)

The nominal current is the maximum permitted operating current which may be run continually through the appropriately labelled connection terminals.

## Nominal discharge surge current (In)

Peak value of the current flowing through the arrester with the wave shape 8/20. It is used to classify the testing of surge arresters of Type 2 (formerly requirements Class C).

## Nominal frequency (fn)

The nominal frequency is that frequency for which a resource is measured, by which it is called and upon which other nominal parameters refer.

## Nominal voltage (Vn)

The rated voltage is the voltage value for which a resource is designed. In so doing it might be a direct voltage value or the effective value of a sine-form alternating voltage.

## Surge protection device (ÜSG)

A device intended for the limitation of transient surge voltages and arresting of surge voltages. It contains at least one non-linear construction element. In general speech, surge protection devices are also termed arresters.

## Protection level (Up)

The protection level is the highest current voltage value on the terminals of the surge protection device before response.

## Residual voltage (Vres)

The peak voltage value, occurring via the terminals of the surge protection device during or immediately after the arresting surge current has flowed.

## Short-circuit resistance

The surge protection device must be able to conduct the short-circuit current, until it is either interrupted by the device itself or by an internal or external cut-off unit or by mains-side over-current protection (e.g. back-up fuse).

## Response time (ta)

The response time primarily characterises the response behaviour of the individual protection elements used in arresters. Depending on the slope  $du/dt$  of the surge voltage or  $di/dt$  of the surge current, the response times may vary within specific limits.

## SPD

Surge protection device.

## Surge arrester, Type 1

Arresters, which, due to their special structure, are able to arrest lightning currents or partial lightning currents during direct strikes.

## Surge arrester, Type 2

Arresters, which are able to arrest surge voltages caused by remote or nearby strikes or switching actions.

## Surge arrester, Type 3

Arresters, used for surge protection of individual consumers or consumer groups and are employed directly on sockets.



# The little A to Z of surge protection

## Surge voltage

A surge voltage is a voltage occurring briefly between conductors or between a conductor and the earth, which exceeds the highest permissible operating voltage value by a long way, but does not have the operating frequency. It can be created by storms or by earthing or short-circuits.

## Temperature range

The operating temperature specifies within which temperature limits the perfect function of the surge protection device is guaranteed.

## Transient surge voltage (TOV)

Temporary surge voltages are short-term (i.e. temporary) surge voltages, which may occur due to errors within the medium and low-voltage network.

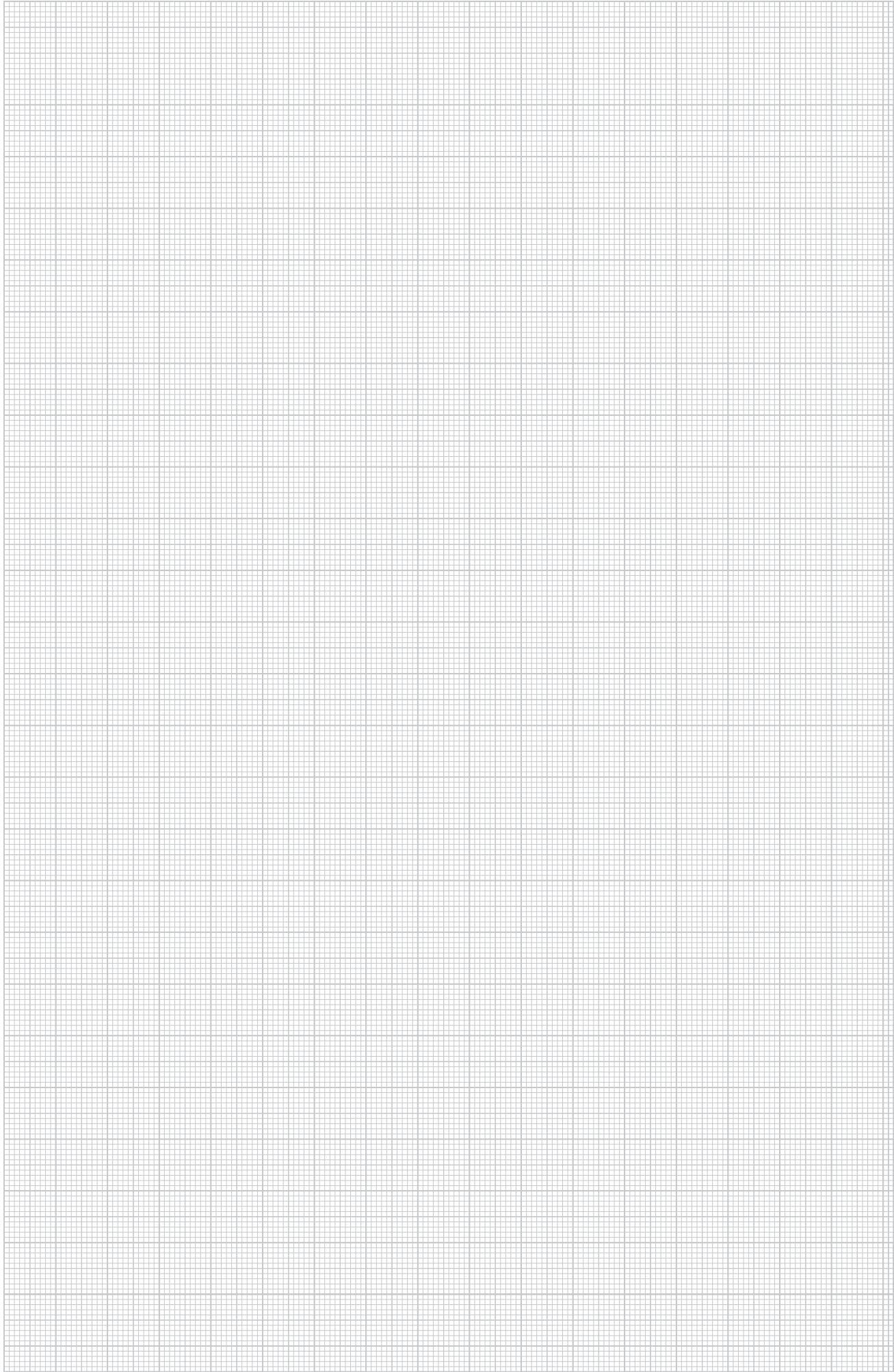
## Transmission frequency (fg)

The transmission frequency specifies up to which frequency the insertion damping of the employed resource is less than 3 dB.

## Volume resistance per path, series resistance





The volume resistance per path specifies the ohmic resistance increase of the conductor path per wire caused by the use of the surge protection device.





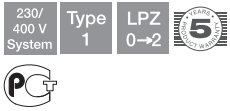


## Surge protection device for energy technology, arrester, Type 1 (industry)

	Combination arrester	118
	Combination arrester in VG housing	121
	Lightning current arrester	122
	Accessories, covers and bases	124



# Combination arrester MCD, 255 V for TN-S and TT networks



Combination arrester, surge arrester, Type 1

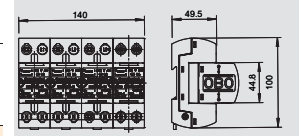
- Protection level < 1.3 kV allows device protection
- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 150 kA (10/350) in total
- Line following current quenching 25 kA I<sub>peak</sub>, arrester backup fuse to 500 A gL/gG
- Suitable for use in pre-meter area according to the VDEW directive
- Encapsulated, non-extinguishing spark gap arrester for use in distributor housings

Application: Industrial systems and buildings with external lightning protection of the highest class I to IV.

## Combination arrester, 3-pole + NPE



Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MCD 50-B 3+1</b>	255	3 + NPE	1	168.000	<b>5096 87 9</b>

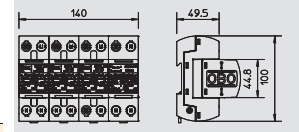


/pc.

## Combination arrester, 3-pole + NPE with function display



Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MCD 50-B 3+1-OS</b>	255	3 + NPE	1	172.000	<b>5096 83 6</b>

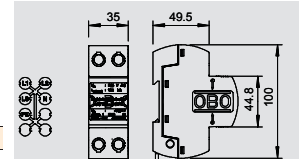


/pc.

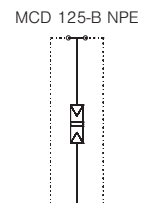
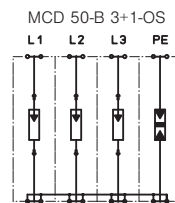
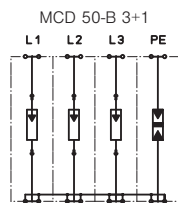
## Combination arrester, 1-pole NPE



Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MCD 125-B NPE</b>	255	NPE	1	46.500	<b>5096 86 5</b>



/pc.



		MCD 50-B 3+1	MCD 50-B 3+1-OS	MCD 125-B NPE
Nominal voltage	V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1	Type 1	Type 1
SPD to IEC 61643-1		class I	class I	class I
LPZ		0-2	0-2	0-2
Lightning impulse current (10/350)	kA	50 kA	50 kA	125 kA
Lightning impulse current (10/350) [total]	kA	125 kA	125 kA	125 kA
Nominal discharge surge current (8/20)	kA	50 kA	50 kA	125 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	125 kA	125 kA	125 kA
Voltage protection level	kV	1,3 kV	1,3 kV	<1,3 kV
Response time	ns	<100 ns	<100 ns	<100 ns
Follow current quenching capacity I <sub>peak</sub>	kA	25 kA	25 kA	0,1 kA
Maximum back-up fuse	A	500 A	500 A	
Temperature range	θ °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		8	8	2
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 87 9</b>	<b>5096 83 6</b>	<b>5096 86 5</b>

# Combination arrester MCD, 255 V for TN networks

Combination arrester, surge arrester, Type 1



- Protection level < 1.3 kV allows device protection
- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 150 kA (10/350) in total
- Line following current quenching 25 kA Ipeak, arrester backup fuse to 500 A gL/gG
- Suitable for use in pre-meter area according to the VDEW directive
- Encapsulated, non-extinguishing spark gap arrester for use in distributor housings

Application: Industrial systems and buildings with external lightning protection of the highest class I to IV.

### Combination arrester, 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
MCD 50-B 3	255	3-pole	1	117.000	5096 87 7

/pc.

### Combination arrester, 3-pole with function display

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
MCD 50-B 3-OS	255	3-pole	1	118.000	5096 83 5

/pc.

### Combination arrester, 1-pole

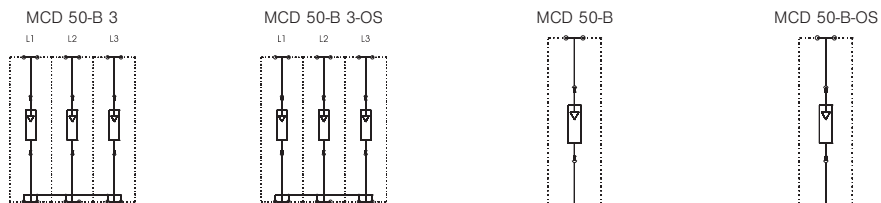
Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
MCD 50-B	255	1-pole	1	34.400	5096 84 9

/pc.

### Combination arrester, 1-pole with function display

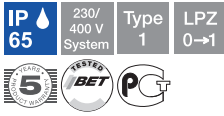
Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
MCD 50-B-OS	255	1-pole	1	34.800	5096 85 2

/pc.



		MCD 50-B 3	MCD 50-B 3-OS	MCD 50-B	MCD 50-B-OS
Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1	Type 1	Type 1	Type 1
SPD to IEC 61643-1		class I	class I	class I	class I
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	50 kA	50 kA	50 kA	50 kA
Lightning impulse current (10/350) [total]	kA	150 kA	150 kA	50 kA	50 kA
Nominal discharge surge current (8/20)	kA	50 kA	50 kA	50 kA	50 kA
(Nennableitstrom (8/20) [gesamt])	kA	150 kA	150 kA	50 kA	50 kA
Voltage protection level	kV	1,3 kV	1,3 kV	<1,3 kV	1,3 kV
Response time	ns	<100 ns	<100 ns	<100 ns	<100 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA	25 kA	25 kA
Maximum back-up fuse	A	500 A	500 A	500 A	500 A
Temperature range	θ °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		6	6	2	2
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 87 7</b>	<b>5096 83 5</b>	<b>5096 84 9</b>	<b>5096 85 2</b>

# Combination arrester in VG housing for TN-S and TT network systems



System solution in insulating housing (IP65), surge arrester, Type 1

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 125 kA (10/350) in total
- Line following current quenching 25 kA Ipeak, arrester backup fuse to 500 A gL/gG
- Suitable for use in pre-meter area according to the VDEW directive
- Encapsulated, non-extinguishing spark gap arrester, preterminated in insulated housing (IP65)

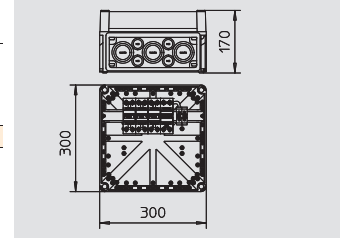
Application: Industrial systems and buildings with external lightning protection of the highest class I to IV.

## VG housing with MC 50-B/3+1



Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG 4-B TNS+TT</b>	255	3 + NPE	1	290.000	<b>5089 20 0</b>

/pc.

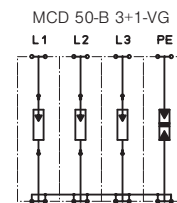
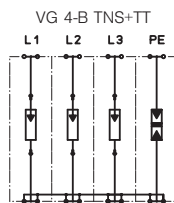
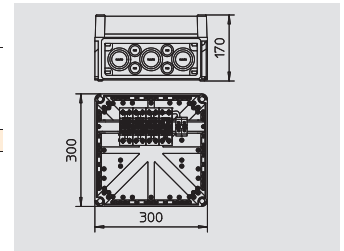


## VG housing with MCD 50-B/3+1



Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MCD 50-B 3+1-VG</b>	255	3 + NPE	1	290.000	<b>5096 87 5</b>

/pc.

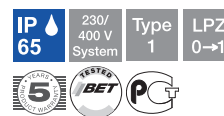


		VG 4-B TNS+TT	MCD 50-B 3+1-VG
Nominal voltage	V	230 V	230 V
SPD to EN 61643-11		Type 1	Type 1
SPD to IEC 61643-1		class I	class I
LPZ		0→1	0→2
Lightning impulse current (10/350)	kA	50 kA	50 kA
Lightning impulse current (10/350) [total]	kA	125 kA	125 kA
Nominal discharge surge current (8/20)	kA	50 kA	50 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	125 kA	125 kA
Voltage protection level	kV	<2,0 kV	<1,3 kV
Response time	ns	<100 ns	<100 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA
Maximum back-up fuse	A	500 A	500 A
Temperature range	ø °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		8	8
Protection rating		IP54	IP54
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5089 20 0</b>	<b>5096 87 5</b>

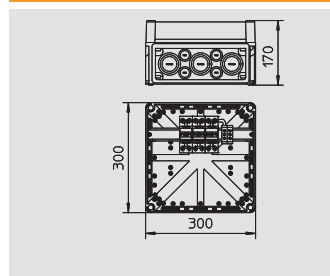
# Combination arrester in VG housing for TN-C network systems

System solution in insulating housing (IP65), surge arrester, Type 1

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 150 kA (10/350) in total
- Line following current quenching 25 kA Ipeak, arrester backup fuse to 500 A gL/gG
- Suitable for use in pre-meter area according to the VDEW directive
- Encapsulated, non-extinguishing spark gap arrester, preterminated in insulated housing (IP65)



Application: Industrial systems and buildings with external lightning protection of the highest Class I to IV.

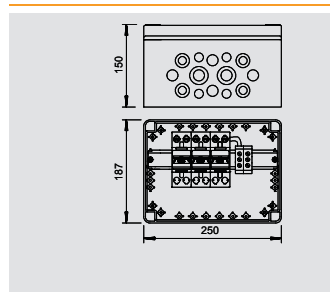


## VG housing with MC 50-B/3

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG 3-B TNC</b>	255	3-pole	1	250.000	<b>5089 21 2</b>



/pc.

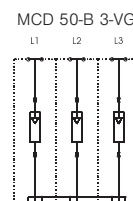
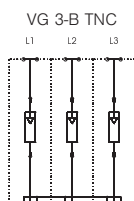


## VG housing with MCD 50-B/3

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MCD 50-B 3-VG</b>	255	3-pole	1	315.000	<b>5096 87 4</b>



/pc.



	VG 3-B TNC	MCD 50-B 3-VG
Nominal voltage	V	230 V <sup>PE</sup>
SPD to EN 61643-11	Type 1	Type 1
SPD to IEC 61643-1	class I	class I
LPZ	0→1	0→2
Lightning impulse current (10/350)	kA	50 kA
Lightning impulse current (10/350) [total]	kA	150 kA
Nominal discharge surge current (8/20)	kA	50 kA
(Nennableitstrom (8/20) [gesamt])	kA	150 kA
Voltage protection level	kV	<2,0 kV
Response time	ns	<100 ns
Follow current quenching capacity Ipeak	kA	25 kA
Maximum back-up fuse	A	500 A
Temperature range	θ °C	-40 - +85 °C
Division unit TE (17.5 mm)		6
Protection rating		IP54
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>	<b>5089 21 2</b>	<b>5096 87 4</b>



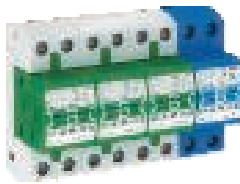
# Lightning current arrester MC, 255 V for TN-S and TT networks



## Surge arrester, Type 1

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 150 kA (10/350) in total
- Line following current quenching 25 kA Ipeak, arrester backup fuse to 500 A gL/gG
- Suitable for use in pre-meter area according to the VDEW directive
- Encapsulated, non-extinguishing spark gap arrester for use in distributor housings

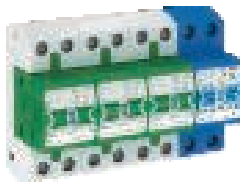
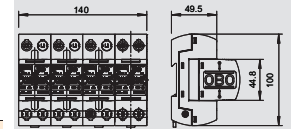
Application: Industrial systems and buildings with external lightning protection of the highest class I to IV.



### Lightning current arrester, 3-pole + NPE

Type	Highest continuous voltage	Version	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MC 50-B 3+1</b>	255	3 + NPE	1	168.000	<b>5096 87 8</b>

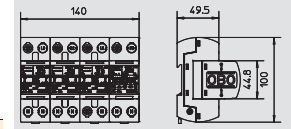
/pc.



### Lightning current arrester, 3-pole + NPE with function display

Type	Highest continuous voltage	Version	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MC 50-B 3+1-OS</b>	255	3 + NPE	1	170.000	<b>5096 83 2</b>

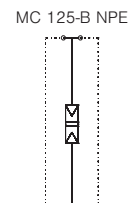
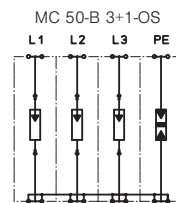
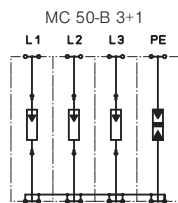
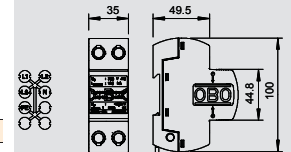
/pc.



### Lightning current arrester, 1-pole NPE

Type	Highest continuous voltage	Version	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MC 125-B NPE</b>	255	NPE	1	52.000	<b>5096 86 3</b>

/pc.

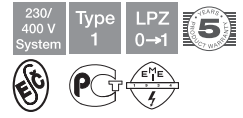


Nominal voltage	V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1	Type 1	Type 1
SPD to IEC 61643-1		class I	class I	class I
LPZ		0→1	0→1	0→1
Lightning impulse current (10/350)	kA	50 kA	50 kA	50 kA
Lightning impulse current (10/350) [total]	kA			
Nominal discharge surge current (8/20)	kA	50 kA	50 kA	50 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	125 kA	125 kA	125 kA
Voltage protection level	kV	< 2,0 kV	< 2,0 kV	< 2,5 kV
Response time	ns	<100 ns	<100 ns	< 100 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA	0,1 kA
Maximum back-up fuse	A	500 A	500 A	
Temperature range	∅ °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		8	8	2
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 87 8</b>	<b>5096 83 2</b>	<b>5096 86 3</b>

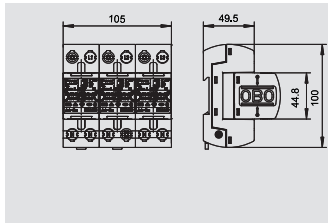
# Lightning current arrester MC, 255 V for TN networks

## Surge arrester, Type 1

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 125 kA (10/350) in total
- Line following current quenching 25 kA Ipeak, arrester backup fuse to 500 A gL/gG
- Suitable for use in pre-meter area according to the VDEW directive
- Encapsulated, non-extinguishing spark gap arrester for use in distributor housings



Application: Industrial systems and buildings with external lightning protection of the highest class I to IV.

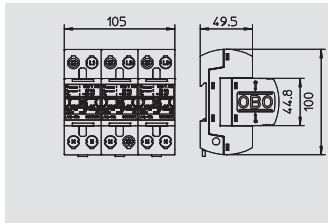


### Lightning current arrester, 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
MC 50-B 3	255	3-pole	1	117.000	5096 87 6



/pc.

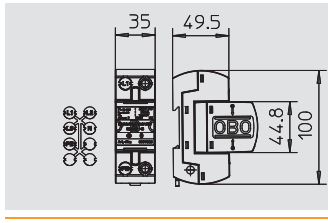


### Lightning current arrester, 3-pole with function display

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
MC 50-B 3-OS	255	3-pole	1	118.000	5096 83 1



/pc.

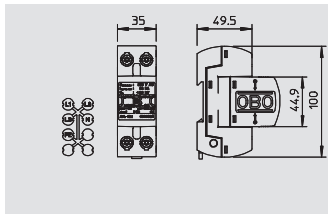


### Lightning current arrester, 1-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
MC 50-B VDE	255	1-pole	1	34.400	5096 84 7



/pc.

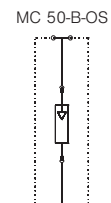
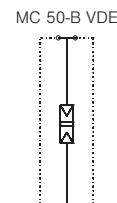
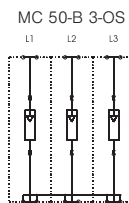
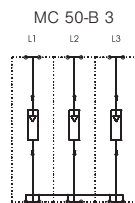


### Lightning current arrester, 1-pole with function display

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
MC 50-B OS	255	1-pole	1	34.800	5096 85 1



/pc.



02\_TBS-Katalog\_2010\_Neuer\_Stand\_en / 30/03/2010 (LLEExport\_00986)

	MC 50-B 3	MC 50-B 3-OS	MC 50-B VDE	MC 50-B OS
Nominal voltage	V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1	Type 1	Type 1
SPD to IEC 61643-1		class I	class I	class I
LPZ		0→1	0→1	0→1
Lightning impulse current (10/350)	kA	50 kA	50 kA	50 kA
Lightning impulse current (10/350) [total]	kA	150 kA	150 kA	150 kA
Nominal discharge surge current (8/20)	kA	50 kA	50 kA	50 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	150 kA	150 kA	150 kA
Voltage protection level	kV	< 2,0 kV	< 2,0 kV	< 2,0 kV
Response time	ns	<100 ns	<100 ns	<100 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA	25 kA
Maximum back-up fuse	A	500 A	500 A	500 A
Temperature range	θ °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		6	6	2
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 87 6</b>	<b>5096 83 1</b>	<b>5096 84 7</b>

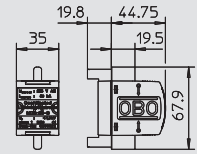
## Accessories, covers and bases



### Cover, combination arrester

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MCD 50-B 0</b>	255	1-pole	1	24.000	<b>5096 82 2</b>

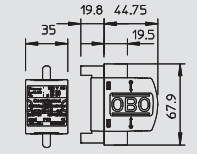
/pc.



### Cover, combination arrester with function display

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MCD 50-B 0-OS</b>	255	1-pole	1	19.500	<b>5096 82 7</b>

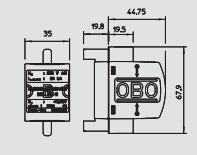
/pc.



### Cover, lightning current arrester

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MC 50-B 0 VDE</b>	255	1-pole	1	24.000	<b>5096 82 0</b>

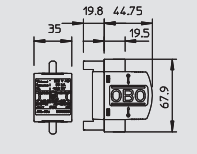
/pc.



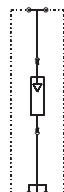
### Cover, lightning current arrester with function display

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MC 50-B 0-OS</b>	255	1-pole	1	19.500	<b>5096 82 5</b>

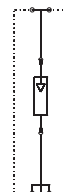
/pc.



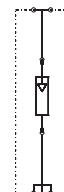
MCD 50-B 0



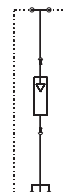
MCD 50-B 0-OS



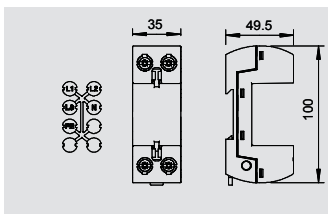
MC 50-B 0 VDE



MC 50-B 0-OS



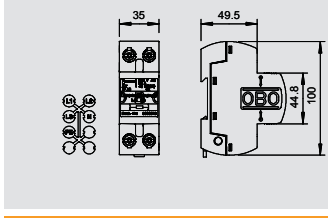
	V	230 V	230 V	230 V	230 V
Nominal voltage		230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1	Type 1	Type 1	Type 1
SPD to IEC 61643-1		class I	class I	class I	class I
LPZ		0→2	0→2	0→1	0→1
Lightning impulse current (10/350)	kA	50 kA	50 kA	50 kA	50 kA
Lightning impulse current (10/350) [total]	kA	50 kA	50 kA	50 kA	50 kA
Nominal discharge surge current (8/20)	kA	50 kA	50 kA	50 kA	50 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	<1,3 kV	1,3 kV	<2,0 kV	< 2,0 kV
Response time	ns	<100 ns	<100 ns	<100 ns	<100 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA	25 kA	25 kA
Maximum back-up fuse	A	500 A	500 A	500 A	500 A
Temperature range	θ °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		2	2	2	2
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 82 2</b>	<b>5096 82 7</b>	<b>5096 82 0</b>	<b>5096 82 5</b>



**Base, combination arrester/lightning current arrester**

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>MC 50-B U VDE</b>	1-pole	1	18.000	<b>5096 83 9</b>

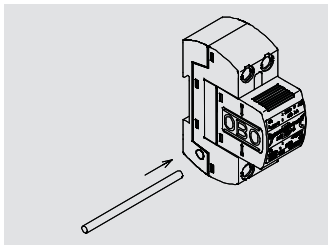
/pc.



**Decoupling inductivity**

Type	Nominal load current	Version	Version	Pack.	Weight	Item No.
	A			pcs	kg/100 pcs.	
<b>LC 63</b>	63	1-pole	63 A	1	43.500	<b>5096 97 0</b>

/pc.

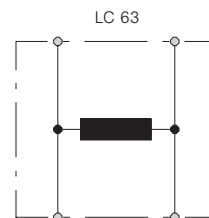


**Connecting bridge**

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>MC V3</b>	3-pole	10	1.440	<b>5096 88 4</b>
<b>MC V4</b>	4-pole	10	1.940	<b>5096 88 6</b>

**Cu** Copper







/pc.



Maximum continuous voltage	V	500 V
Nominal load current	A	63 A
Inductivity	μH	5 μH
Maximum back-up fuse	A	63 A
Temperature range	θ °C	-40 - +85 °C
Protection rating		IP 20
Division unit TE (17.5 mm)		2
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 97 0</b>



## Surge protection energy technology, arrester, Type 1+2 (office and housing)

	Combination arrester	V50, 280 V	128
	Accessories, covers and bases V50		130
	Combination arrester	V25, 150 V	132
		V25, 280 V	134
		V25, 385 V	139
	Accessories, covers and bases V25		141
	Combination arrester, protection set for TN and TT network systems		145

# Combination arrester, V50 280 V, for TN and TT network systems



Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 12.5 kA (10/350) per pole and up to 50 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

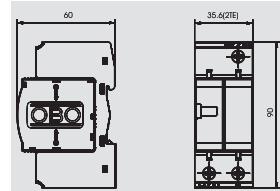
Application: Residential building with external lightning protection of Class III and IV.



## Lightning current and surge arrester, 1-pin + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 1+NPE	280	1+NPE	1	31.300	5093 65 3

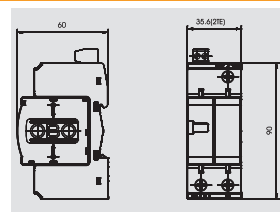
/pc.



## Lightning current and surge arrester, 1-pin + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 1+NPE+FS	280	1+NPE with FS	1	26.100	5093 66 1

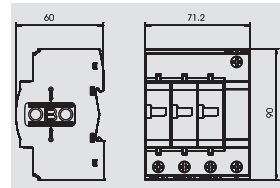
/pc.



## Lightning current and surge arrester, 3-pin + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 3+NPE	280	3+NPE	1	55.000	5093 65 4

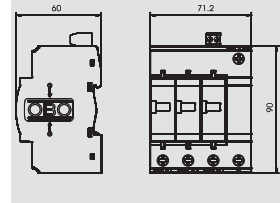
/pc.



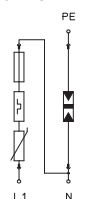
## Lightning current and surge arrester, 3-pin + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 3+NPE+FS	280	3+NPE with FS	1	55.000	5093 66 2

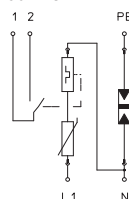
/pc.



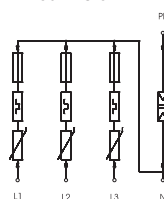
V50-B+C 1+NPE



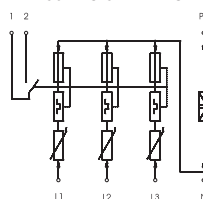
V50-B+C 1+NPE+FS



V50-B+C 3+NPE



V50-B+C 3+NPE+FS



Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II	class I+II
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	12,5 kA	12,5 kA	12,5 kA	12,5 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA	50 kA	50 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
(Nennableitstrom (8/20) [gesamt])	kA	50 kA	50 kA	50 kA	50 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV	< 1,3 kV	< 1,3 kV
Response time	ns	<25 ns	<25 ns	<25 ns	<25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	2	4	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5093 65 3</b>	<b>5093 66 1</b>	<b>5093 65 4</b>	<b>5093 66 2</b>

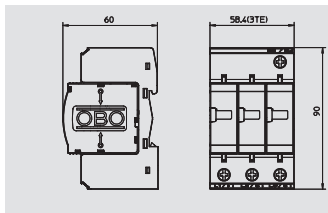
# Combination arrester, V50 280 V, for TN-C network systems

Combination arrester, lightning current and surge arrester, Type 1+2



- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 12.5 kA (10/350) per pole and up to 50 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

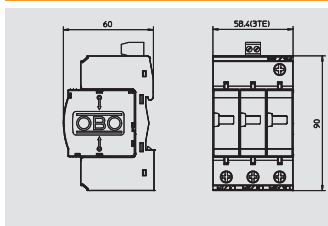
Application: Residential building with external lightning protection of Class III and IV.



## Lightning current and surge arrester, 3-pin

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 3-280	280	3-pole	1	42.300	5093 62 7

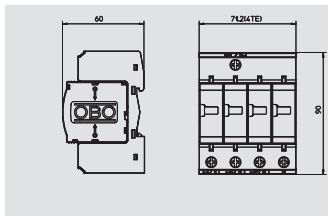
/pc.



## Lightning current and surge arrester, 3-pin with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 3+FS280	280	3-pole with FS	1	43.000	5093 64 3

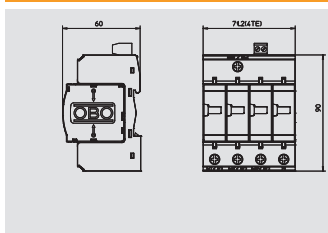
/pc.



## Lightning current and surge arrester, 4-pin

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 4	280	4-pole	1	53.000	5093 63 1

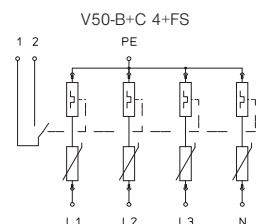
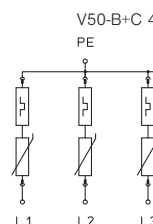
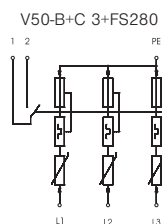
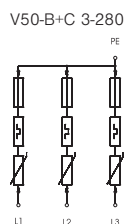
/pc.



## Lightning current and surge arrester, 4-pin with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 4+FS	280	4-pole with FS	1	53.200	5093 64 7

/pc.



	V	230 V	230 V	230 V	230 V
Nominal voltage		230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II	class I+II
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	12,5 kA	12,5 kA	12,5 kA	12,5 kA
Lightning impulse current (10/350) [total]	kA	37,5 kA	37,5 kA	50 kA	50 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	90 kA	90 kA	120 kA	120 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV	< 1,3 kV	< 1,3 kV
Response time	ns	<25 ns	<25 ns	<25 ns	<25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		3	3	4	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5093 62 7</b>	<b>5093 64 3</b>	<b>5093 63 1</b>	<b>5093 64 7</b>



## Accessories, covers and bases V50



V 50-B+C/0...: CombiController, upper part – Type 1+2 CombiArrester

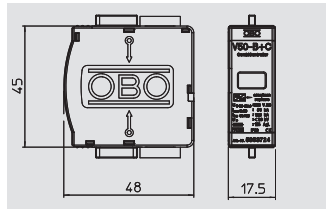
- Plug-in upper part; upper part can be separated from base without tools and current cut-off in bottom part
- Including thermal and dynamic separating device and visual fault display
- High current conductivity and long service life



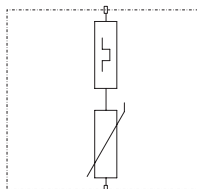
### Cover, CombiController V50

Type	Highest continuous voltage V	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V50-B+C 0-280	280	350	1-pole cover	1	8.000	5093 72 4

/pc.



V50-B+C 0-280



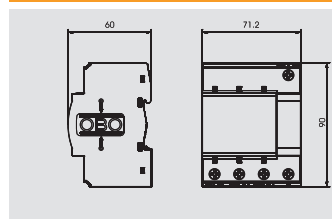
Nominal voltage	V	230 V
SPD to EN 61643-11		Type 1+2
SPD to IEC 61643-1		class I+II
LPZ		0→2
Lightning impulse current (10/350)	kA	12,5 kA
Lightning impulse current (10/350) [total]	kA	12,5 kA
Nominal discharge surge current (8/20)	kA	30 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	30 kA
Maximum discharge current	kA	50 kA
Voltage protection level	kV	< 1,3 kV
Response time	ns	<25 ns
Maximum back-up fuse	A	125 A
Temperature range	°C	-40 - +80 °C
Division unit TE (17.5 mm)		1
Protection rating		IP20
<b>Item No.</b>		<b>5093 72 4</b>

MB...: Base for V 50-B+C, combination arrester, lightning and surge voltage arrester type 1+2 according to DIN EN 61643-11 (B+C according to VDE 0675 part 6).



- Also suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Upper part can be rotated through 180 degrees
- 3+1 protection circuit for TN-S and TT network systems

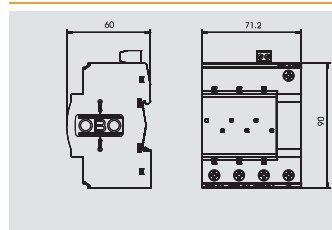
Application: lightning protection equipotential bonding for buildings also with external lightning protection of Classes III and IV and in standard distributor housings.



### Base, CombiController V50

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MB 50-3+NPE</b>	280	3+NPE base	1	27.000	<b>5096 67 5</b>

/pc.



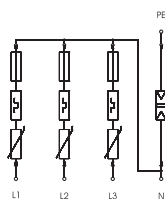
### Base, CombiController V50 with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MB 50-3+NPE+FS</b>	280	3+NPE with FS	1	29.000	<b>5096 67 7</b>

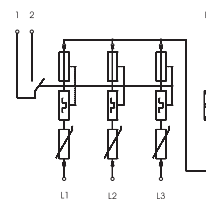
/pc.



MB 50-3+NPE



MB 50-3+NPE+FS



Nominal voltage	V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II
LPZ		0→2	0→2
Lightning impulse current (10/350) [total]	kA	50 kA	50 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV
Response time	ns	<25 ns	<25 ns
Maximum back-up fuse	A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP20	IP20
Division unit TE (17.5 mm)		4	4
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 67 5</b>	<b>5096 67 7</b>



# Combination arrester, V25 150 V, for TN and TT network systems



Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

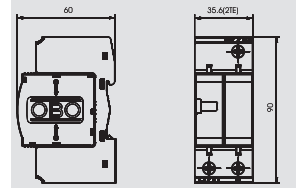
Application: Building with outdoor line infeed or lightning risk.



## Combination arrester, 1-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 1NPE150	150	1+NPE	1	24.900	5094 44 8

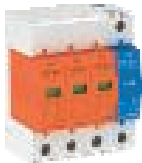
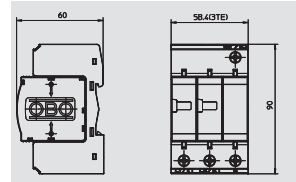
/pc.



## Combination arrester, 2-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 2NPE150	150	2+NPE	1	34.500	5094 45 1

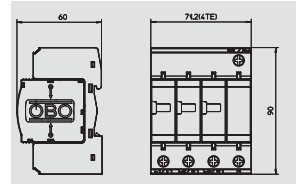
/pc.



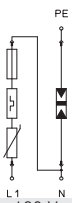
## Combination arrester, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3NPE150	150	3+NPE	1	45.900	5094 45 4

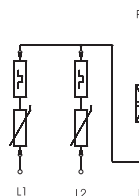
/pc.



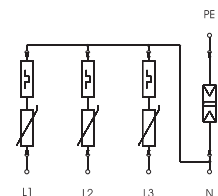
V25-B+C 1NPE150



V25-B+C 2NPE150



V25-B+C 3NPE150

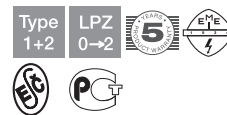


Nominal voltage	V	130 V	130 V	130 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II
LPZ		0→2	0→2	0→2
Lightning impulse current (10/350)	kA	8 kA	8 kA	8 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	60 kA	90 kA	120 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA
Voltage protection level	kV	<0,6 kV	<0,6 kV	<0,6 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	160 A	160 A	160 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	3	4
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 44 8</b>	<b>5094 45 1</b>	<b>5094 45 4</b>

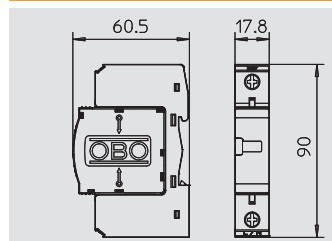
# Combination arrester V25, 150 V

Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings



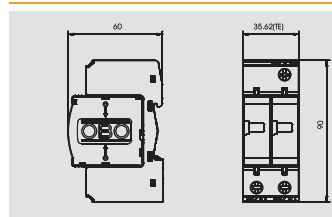
Application: Building with outdoor line infeed or lightning risk.



## Combination arrester, 1-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 1-150	150	1-pole	1	13.500	5094 40 1

/pc.



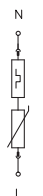
## Combination arrester, 2-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 2-150	150	1-pole	1	25.500	5094 40 3

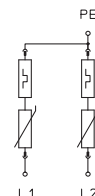
/pc.



V25-B+C 1-150



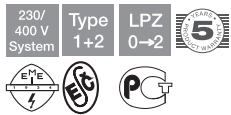
V25-B+C 2-150



Nominal voltage	V	130 V	
SPD to EN 61643-11		Type 1+2	
SPD to IEC 61643-1		class I+II	
LPZ		0→2	
Lightning impulse current (10/350)	kA	8 kA	25 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA
(Nennableitstrom (8/20) [gesamt])	kA	30 kA	60 kA
Maximum discharge current	kA	50 kA	50 kA
Voltage protection level	kV	<0,6 kV	<0,6 kV
Response time	ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	160 A	160 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	2
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 40 1</b>	<b>5094 40 3</b>



# Combination arrester, V25 280 V, for TN and TT network systems



Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

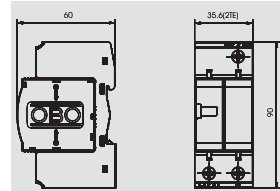
Application: Building with outdoor line infeed or lightning risk.



## Combination arrester, 1-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V25-B+C 1+NPE</b>	280	1-pole complete with NPE; 280 V	1	28.000	<b>5094 45 7</b>

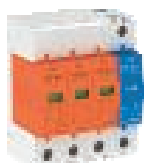
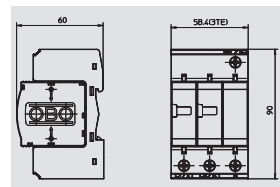
/pc.



## Combination arrester, 2-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V25-B+C 2+NPE</b>	280	2-pole complete with NPE; 280 V	1	37.000	<b>5094 46 0</b>

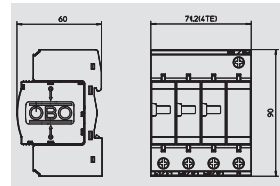
/pc.



## Combination arrester, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V25-B+C 3+NPE</b>	280	3-pole complete with NPE; 280 V	1	51.000	<b>5094 46 3</b>

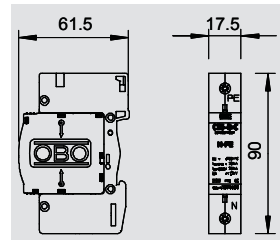
/pc.



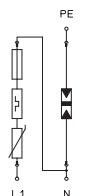
## Combination arrester, 1-pole NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>C 25-B+C 1</b>	255	NPE	1	12.500	<b>5095 60 6</b>

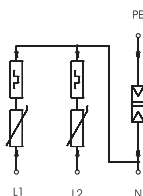
/pc.



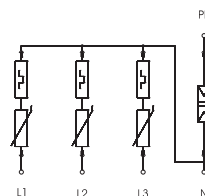
V25-B+C 1+NPE



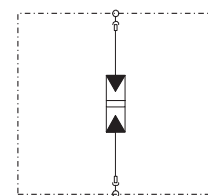
V25-B+C 2+NPE



V25-B+C 3+NPE



C 25-B+C 1



	V	230 V	230 V	230 V	230 V
Nominal voltage		230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II	class I+II
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	7 kA	7 kA	7 kA	25 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA	25 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
(Nennableitstrom (8/20) [gesamt])	kA	60 kA	90 kA	120 kA	30 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 0,9 kV	< 0,9 kV	< 0,9 kV	< 1,2 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 100 ns
Maximum back-up fuse	A	160 A	160 A	160 A	
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	3	4	1
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
Follow current quenching capacity Ipeak	kA				0,1 kA
<b>Item No.</b>		<b>5094 45 7</b>	<b>5094 46 0</b>	<b>5094 46 3</b>	<b>5095 60 6</b>

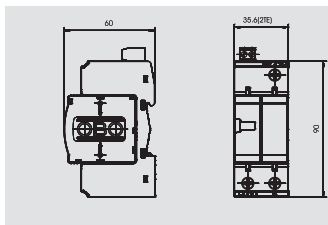
# Combination arrester, V25, 280 V, for TN and TT network systems with remote signalling

Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings



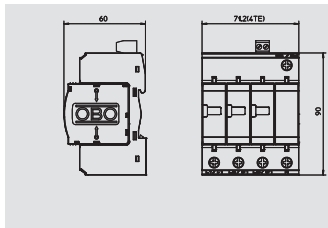
Application: Building with outdoor line infeed or lightning risk.



## Combination arrester, 1-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 1+NPE+FS	280	1+NPE with FS	1	27.500	5094 44 4

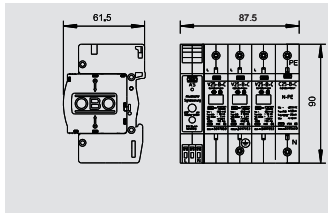
/pc.



## Combination arrester, 3-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3+NPE-FS	280	3+NPE with FS	1	52.500	5094 51 0

/pc.



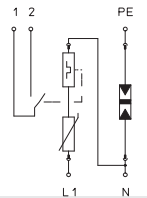
## Combination arrester, 3-pole + NPE with acoustic signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3+NPE+AS	280	3 + NPE	1	70.000	5097 43 2

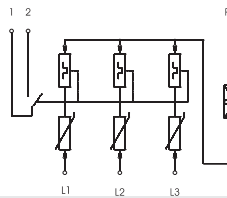
/pc.



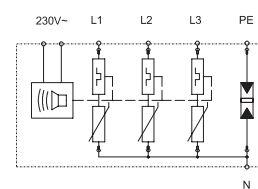
V25-B+C 1+NPE+FS



V25-B+C 3+NPE-FS



V25-B+C 3+NPE+AS



Nominal voltage	V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II
LPZ		0-2	0-2	0-2
Lightning impulse current (10/350)	kA	7 kA	7 kA	7 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	60 kA	120 kA	120 kA
Maximum discharge current	kA	50 kA	150 kA	150 kA
Voltage protection level	kV	< 0,9 kV	< 0,9 kV	< 0,9 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	160 A	160 A	160 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	3	5
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
Follow current quenching capacity Ipeak	kA			
<b>Item No.</b>		<b>5094 44 4</b>	<b>5094 51 0</b>	<b>5097 43 2</b>



# Combination arrester V25, 280 V



Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

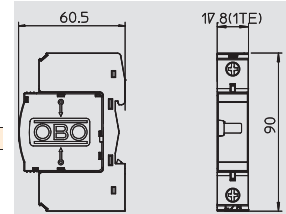
Application: Building with outdoor line infeed or lightning risk.



## Combination arrester, 1-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 1-280	280	1-pole	1	15.300	5094 41 8

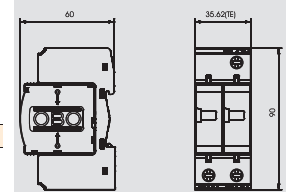
/pc.



## Combination arrester, 2-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 2-280	280	2-pole	1	28.500	5094 42 1

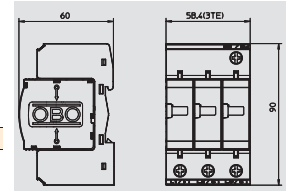
/pc.



## Combination arrester, 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3-280	280	3-pole	1	42.500	5094 42 3

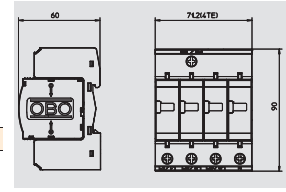
/pc.



## Combination arrester, 4-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 4-280	280	4-pole	1	53.000	5094 42 6

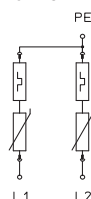
/pc.



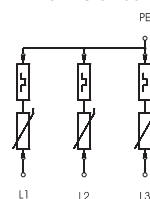
V25-B+C 1-280



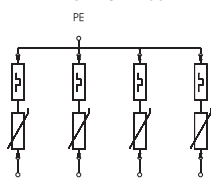
V25-B+C 2-280



V25-B+C 3-280



V25-B+C 4-280



Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 2	Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class II	class I+II	class I+II	class I+II
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	7 kA	7 kA	21 kA	7 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA	25 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
(Nennableitstrom (8/20) [gesamt])	kA	30 kA	60 kA	90 kA	120 kA
Maximum discharge current	kA	50 kA	100 kA	50 kA	50 kA
Voltage protection level	kV	< 0,9 kV	< 0,9 kV	< 0,9 kV	< 0,9 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	160 A	160 A	160 A	160 A
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	2	3	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 41 8</b>	<b>5094 42 1</b>	<b>5094 42 3</b>	<b>5094 42 6</b>

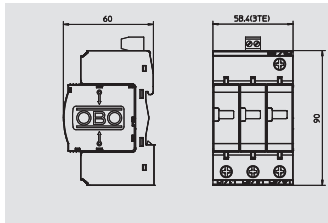
# Combination arrester, V25, 280 V, with remote signalling

Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings



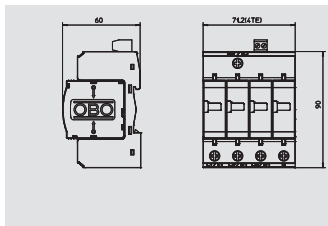
Application: Building with outdoor line infeed or lightning risk.



## Combination arrester, 3-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3-FS280	280	3-pole with FS	1	42.700	5094 49 0

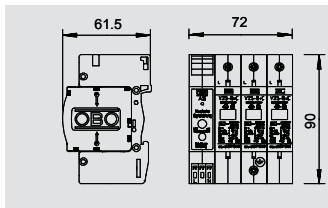
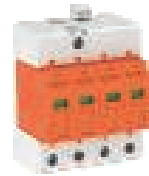
/pc.



## Combination arrester, 4-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 4-FS280	280	4-pole with FS	1	53.200	5094 49 3

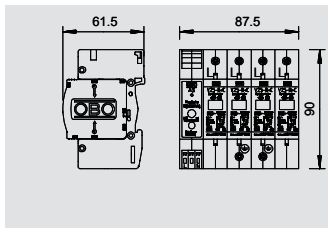
/pc.



## Combination arrester, 3-pole with acoustic signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3+AS	280	3-pole	1	50.500	5097 18 5

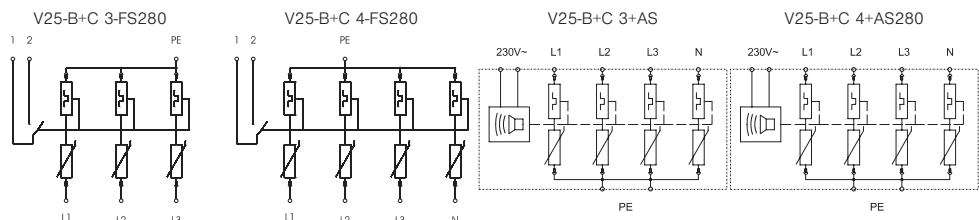
/pc.



## Combination arrester, 4-pole with acoustic signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 4+AS280	280	4-pole	1	70.000	5097 19 3

/pc.



02 TBS-Katalog\_2010\_Neuer\_Stand / en / 30/03/2010 (LLEExport\_00986)

Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II	class I+II
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	7 kA	7 kA	7 kA	7 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA	25 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
(Nennableitstrom (8/20) [gesamt])	kA	90 kA	120 kA	90 kA	120 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 0,9 kV	< 0,9 kV	< 0,9 kV	< 0,9 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	160 A	160 A	160 A	160 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		3	4	4	5
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
Follow current quenching capacity Ipeak	kA				
<b>Item No.</b>		<b>5094 49 0</b>	<b>5094 49 3</b>	<b>5097 18 5</b>	<b>5097 19 3</b>



# Combination arrester V25, 280 V



Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

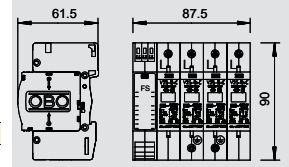
Application: Building with outdoor line infeed or lightning risk.



## Combination arrester, 4-pole, with voltage monitoring

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 4+FS-SÜ	280	4-pole	1	67.500	5097 35 5

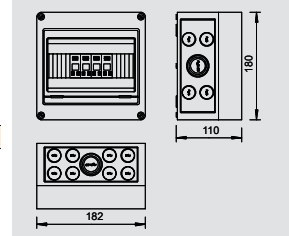
/pc.



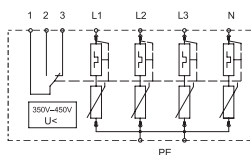
## Combination arrester, 4-pole in housing with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 4+FS-G	280	4-pole	1	127.000	5094 55 2

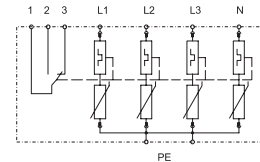
/pc.



V25-B+C 4+FS-SÜ



V25-B+C 4+FS-G

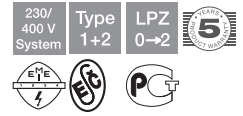


Nominal voltage	V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II
LPZ		0-2	0-2
Lightning impulse current (10/350)	kA	7 kA	7 kA
Lightning impulse current (10/350) [total]	kA		25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA
(Nennableitstrom (8/20) [gesamt])	kA	120 kA	120 kA
Maximum discharge current	kA	50 kA	50 kA
Voltage protection level	kV	< 0,9 kV	< 0,9 kV
Response time	ns	< 25 ns	< 25 ns
Follow current quenching capacity Ipeak	kA		
Maximum back-up fuse	A	160 A	160 A
Temperature range	ø °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		5	2
Protection rating		IP20	IP65
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 35 5</b>	<b>5094 55 2</b>

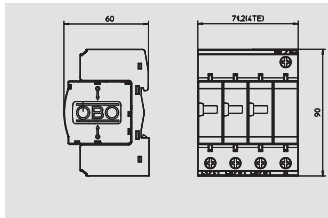
# Combination arrester, V25 385 V, for TN and TT network systems

Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings



Application: Building with outdoor line infeed or lightning risk.

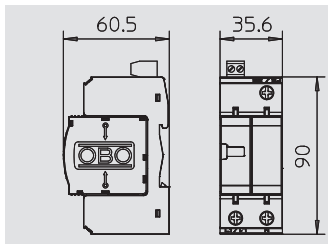


## Combination arrester, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3NPE385	385	3-pole with NPE; 385 V	1	53.700	5094 47 8



/pc.

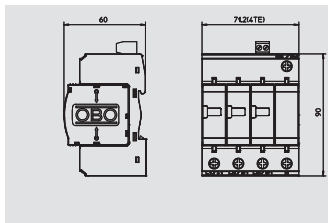


## Combination arrester, 1-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 1NPEFS38	385	1 + NPE	1	26.500	5094 44 6



/pc.

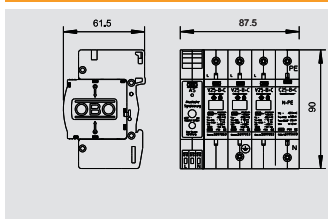


## Combination arrester, 3-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3NPEFS38	385	3 + NPE	1	51.000	5094 52 6

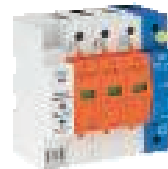


/pc.



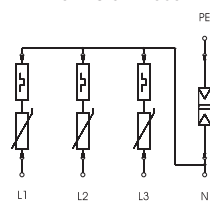
## Combination arrester, 3-pole + NPE with acoustic signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3NPEAS38	385	3 + NPE	1	60.300	5097 11 1

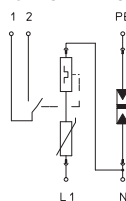


/pc.

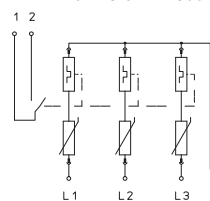
V25-B+C 3NPE385



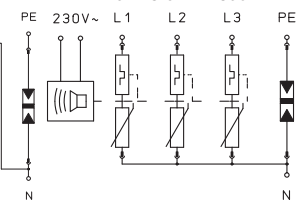
V25-B+C 1NPEFS38



V25-B+C 3NPEFS38



V25-B+C 3NPEAS38



02\_TBS\_Katalog\_2010\_Neuer\_Stand\_en\_30032010\_LLExport\_00986

	V	350 V	350 V	350 V	350 V
Nominal voltage		350 V	350 V	350 V	350 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II	class I+II
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	7 kA	7 kA	7 kA	7 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA	25 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
(Nennableitstrom (8/20) [gesamt])	kA	120 kA	60 kA	120 kA	120 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 1,5 kV	< 1,5 kV	< 1,5 kV	< 1,5 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	160 A	160 A	160 A	160 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		4	2	4	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, multi-wire	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, flexible	mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²
<b>Item No.</b>		<b>5094 47 8</b>	<b>5094 44 6</b>	<b>5094 52 6</b>	<b>5097 11 1</b>



# Combination arrester V25, 385 V



Combination arrester, lightning current and surge arrester, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity 7 kA (10/350) per pole and up to 25 kA (10/350) in total
- Arrester, plug-in, with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

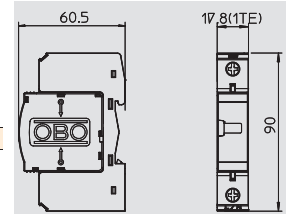
Application: Building with outdoor line infeed or lightning risk.



## Combination arrester, 1-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 1-385	385	1-pole complete; 385 V	1	14.500	5094 43 1

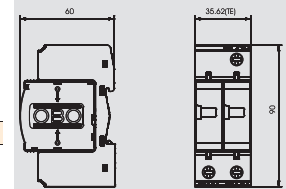
/pc.



## Combination arrester, 2-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 2-385	385	2-pole complete; 385 V	1	27.500	5094 43 4

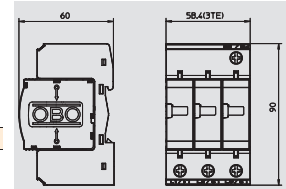
/pc.



## Combination arrester, 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3-385	385	3-pole complete; 385 V	1	42.000	5094 43 7

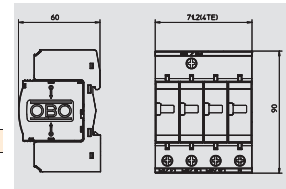
/pc.



## Combination arrester, 4-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 4-385	385	4-pole complete; 385 V	1	51.000	5094 44 0

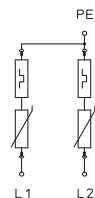
/pc.



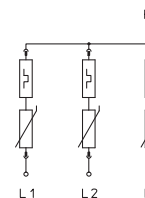
V25-B+C 1-385



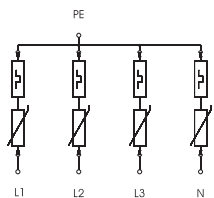
V25-B+C 2-385



V25-B+C 3-385



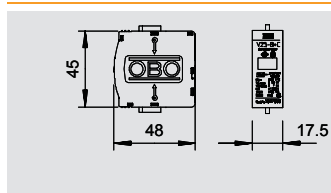
V25-B+C 4-385



	V	350 V	350 V	350 V	350 V
Nominal voltage	V	350 V	350 V	350 V	350 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II	class I+II
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	7 kA	7 kA	7 kA	7 kA
Lightning impulse current (10/350) [total]	kA	25 kA	25 kA	25 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
(Nennableitstrom (8/20) [gesamt])	kA	30 kA	60 kA	90 kA	120 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 1,5 kV	< 1,5 kV	< 1,5 kV	< 1,5 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	160 A	160 A	160 A	160 A
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	2	3	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 43 1</b>	<b>5094 43 4</b>	<b>5094 43 7</b>	<b>5094 44 0</b>

# Accessories, covers and bases V25

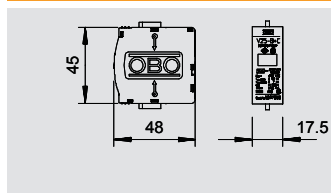
Surge protection, arrester, Type 1+2 (office and housing)



## Cover, combination arrester 150 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 0-150	150	200	1-pole	1	9.500	5097 08 8

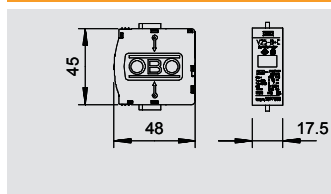
/pc.



## Cover, combination arrester 280 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 0-280	280	350	1-pole	1	9.500	5097 05 3

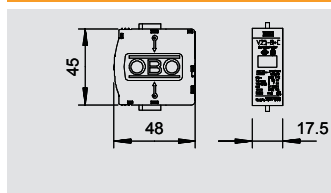
/pc.



## Cover, combination arrester 320 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 0-320	320	420	1-pole	100	10.000	5097 29 0

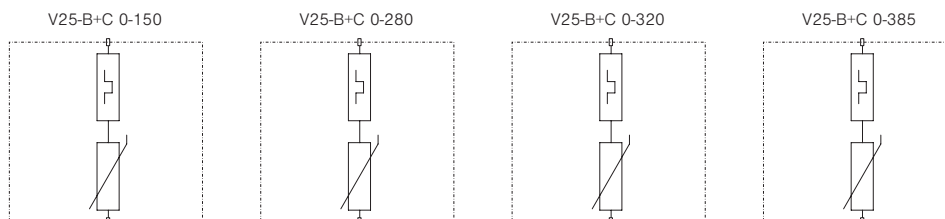
/pc.



## Cover, combination arrester 385 V

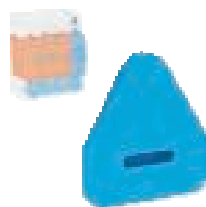
Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 0-385	385	505	1-pole	1	9.500	5097 06 1

/pc.



	V	130 V	230 V	350 V
Nominal voltage	V	130 V	230 V	350 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II	class I+II
LPZ		0→2	0→2	0→2
Lightning impulse current (10/350)	kA	8 kA	7 kA	7 kA
Lightning impulse current (10/350) [total]	kA	30 kA	30 kA	30 kA
Nominal discharge surge current (8/20) (Nennableitstoßstrom (8/20) [gesamt])	kA	30 kA	30 kA	30 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 0,6 kV	< 0,9 kV	< 1,3 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Follow current quenching capacity Ipeak	kA			
Maximum back-up fuse	A	160 A	160 A	160 A
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	1	1
Protection rating		IP20	IP20	IP20
<b>Item No.</b>		<b>5097 08 8</b>	<b>5097 05 3</b>	<b>5097 06 1</b>

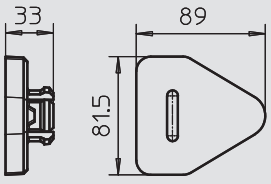
## Accessories, covers and bases V25

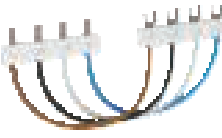


### Shock Guard for Multibase base

Type	Colour	Version	Pack.	Weight	Item No.
<b>MB-SG</b>	<b>Blue</b>	Locking system for covers	100 pcs	0.060 kg/100 pcs.	<b>5096 69 5</b>

**PA** Polyamide /pc.

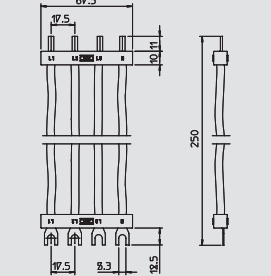





### Connection bridge, Multibase base

Type	Version	Pack.	Weight	Item No.
<b>VB-MULTIBASE250</b>	4-pole	1 pcs	6.800 kg/100 pcs.	<b>5089 65 5</b>

/pc.

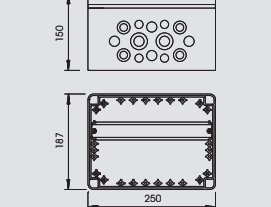





### Empty housing for arrester

Type	Pack.	Weight	Item No.
<b>VG LM</b>	1 pcs	139.100 kg/100 pcs.	<b>5088 87 9</b>

**PA** Polyamide /pc.

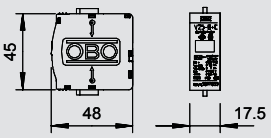




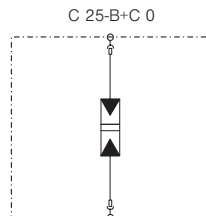
### Cover total spark gap between N and PE 255 V

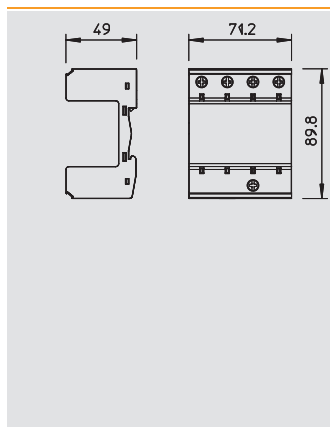
Type	Highest continuous voltage V	Version	Pack.	Weight	Item No.
<b>C 25-B+C 0</b>	255	NPE	1 pcs	5.195 kg/100 pcs.	<b>5095 60 3</b>

/pc.



Maximum continuous voltage	V	255 V
SPD to EN 61643-11		Type 1+2
SPD to IEC 61643-1		class I+II
LPZ		0→2
Nominal discharge surge current (8/20) (N-PE)	kA	30 kA
Maximum discharge current	kA	50 kA
Voltage protection level	kV	<1,2 kV
Response time	ns	< 100 ns
Maximum back-up fuse	A	160 A
Temperature range	°C	-40 - +80 °C
Protection rating		IP 20
Division unit TE (17.5 mm)		1
<b>Item No.</b>		<b>5095 60 3</b>





## Base, Multibase

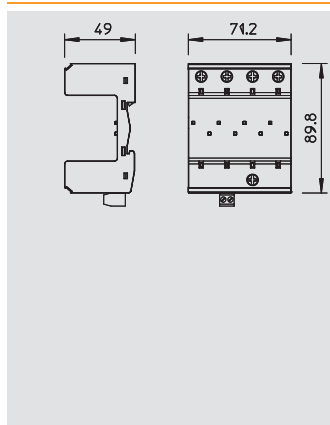


Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1</b>	1-pole	1	1	6.200	<b>5096 64 8</b>
<b>MB 2</b>	2-pole	2	1	11.200	<b>5096 65 3</b>
<b>MB 3</b>	3-pole	3	1	16.000	<b>5096 66 5</b>
<b>MB 4</b>	4-pole	4	1	21.000	<b>5096 68 0</b>

/pc.

MB...: Base for V25-B+C, V20-C and V10-C

- Suitable for V25-B+C, V20-C and V10-C
- Pre-mounted and ready for connection
- For TN systems
- Multifunction terminals for easy circuit of series-mounted devices
- Covers can be rotated through 180 degrees



## Base, Multibase with remote signalling

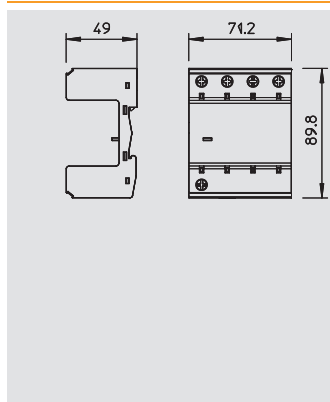


Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+FS</b>	1-pole	1	1	6.700	<b>5096 64 9</b>
<b>MB 2+FS</b>	2-pole	2	1	11.700	<b>5096 65 4</b>
<b>MB 3+FS</b>	3-pole	3	1	16.500	<b>5096 66 7</b>
<b>MB 4+FS</b>	4-pole	4	1	21.000	<b>5096 68 2</b>

/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- With remote signalling, potential-free NO contact, for function monitoring



## Base, Multibase + NPE

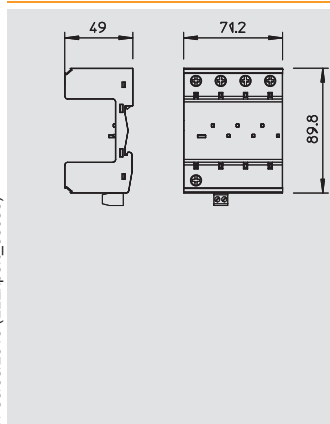


Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+NPE</b>	1 + NPE	2	1	11.500	<b>5096 65 0</b>
<b>MB 2+NPE</b>	2 + NPE	3	1	16.100	<b>5096 65 5</b>
<b>MB 3+NPE</b>	3 + NPE	4	1	20.000	<b>5096 66 9</b>

/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- For TN-S and TT network systems



## Base, Multibase + NPE with remote signalling



Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+NPE+FS</b>	1 + NPE	2	1	11.600	<b>5096 65 1</b>
<b>MB 2+NPE+FS</b>	2 + NPE	3	1	16.000	<b>5096 65 7</b>
<b>MB 3+NPE+FS</b>	3 + NPE	4	1	21.300	<b>5096 67 1</b>

/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- With remote signalling, potential-free NO contact, for function monitoring
- 3+1 protection circuit for TN-S and TT network systems



## Accessories, covers and bases V25



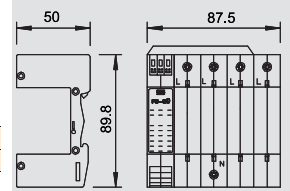
### Base, Multibase with fuse monitoring

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>V20-C U-3 FS-SU</b>	3-pole	1	26.000	<b>5096 35 9</b>
<b>V20-C U-4 FS-SU</b>	4-pole	1	33.000	<b>5096 36 7</b>

/pc.

V 20-C/U...: Base.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With voltage monitoring of phases and function monitoring of arrester upper part, remote signalling
- With remote signaling, potential-free changeover contact, for function monitoring
- Pre-mounted and ready for connection



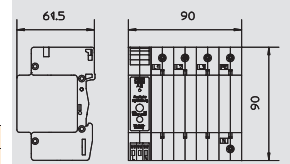
### Base, Multibase with acoustic signalling

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>V20-C U-2 AS</b>	2-pole	1	23.000	<b>5096 41 3</b>
<b>V20-C U-3 AS</b>	3-pole	1	29.000	<b>5096 42 1</b>
<b>V20-C U-4 AS</b>	4-pole	1	35.000	<b>5096 44 8</b>
<b>V20-C U-3+NPE-AS</b>	3 + NPE	1	32.500	<b>5096 37 2</b>

/pc.

V 20-C/U...: Base.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With remote signaling, potential-free changeover contact, for function monitoring
- With acoustic signalling for function monitoring, signal tone can be shut down for 24 h
- Pre-mounted and ready for connection



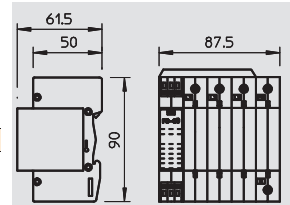
### Base, Multibase + NPE with fuse monitoring

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>V20-C U-3+NPE</b>	3-NPE with FS-SÜ	1	30.000	<b>5096 37 0</b>

/pc.

V 20-C/U...: Base.

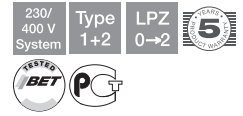
- Suitable for V 25-B+C, V 20-C and V 10-C
- With voltage monitoring of phases and function monitoring of arrester upper part, remote signalling
- With remote signaling, potential-free changeover contact, for function monitoring
- For TN-S and TT network systems
- Pre-mounted and ready for connection



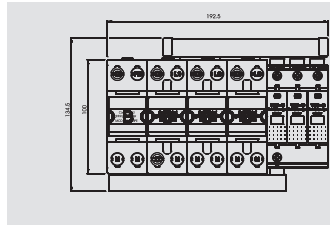
# Combination arrester, protection set for TN and TT network systems

Protection set, lightning and surge arrester combination, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 125 kA (10/350) N-PE
- Arrester, connectable, including connecting bridges, labelled connection terminals
- Encapsulated, non-extinguishing arrester for use in distributor housings



Application: Mobile telecommunications systems and industrial systems with special requirements.

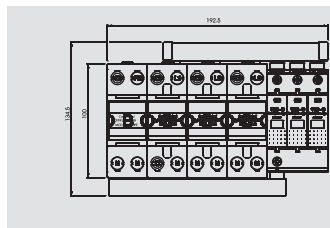


## Protection set MCD + V20 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
PS4-B+C TT+TNS	255	3 + NPE	1	206.000	5089 76 1



/pc.

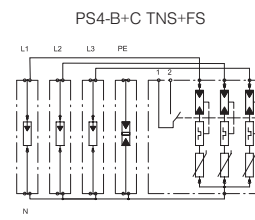
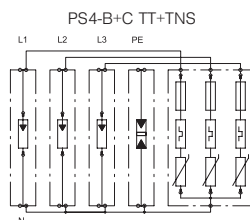


## Protection set MCD + V20 3-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
PS4-B+C TNS+FS	255	3 + NPE	1	211.000	5089 76 3



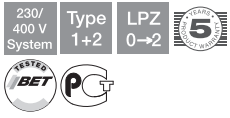
/pc.



Nominal voltage	V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II
LPZ		0→2	0→2
Lightning impulse current (10/350)	kA	100 kA	100 kA
Lightning impulse current (10/350) [total]	kA		
Nominal discharge surge current (8/20)	kA	100 kA	100 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	100 kA	100 kA
Maximum discharge current	kA	100 kA	100 kA
Voltage protection level	kV	<1,3 kV	<1,3 kV
Response time	ns	<25 ns	<25 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA
Maximum back-up fuse	A	125 A	125 A
Temperature range	θ °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		11	11
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5089 76 1</b>	<b>5089 76 3</b>



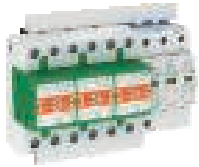
# Combination arrester, protection set for TN-C network systems



Protection set, lightning and surge arrester combination, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 125 kA (10/350) N-PE
- Arrester, connectable, including connecting bridges, labelled connection terminals
- Encapsulated, non-extinguishing arrester for use in distributor housings

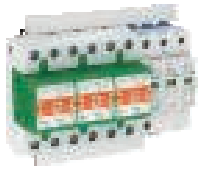
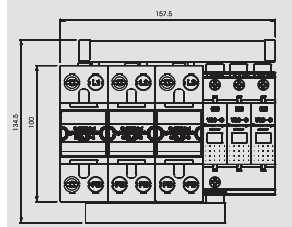
Application: Mobile telecommunications systems and industrial systems with special requirements.



## Protection set MCD + V20 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>PS3-B+C TNC-FS</b>	255	3-pole	1	158.000	<b>5089 75 4</b>

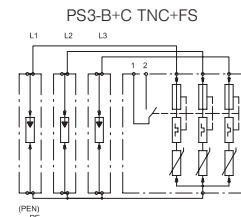
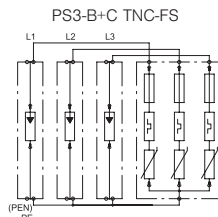
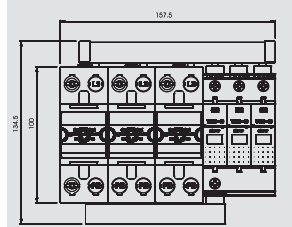
/pc.



## Protection set MCD + V20 3-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>PS3-B+C TNC+FS</b>	255	3-pole	1	163.000	<b>5089 75 6</b>

/pc.

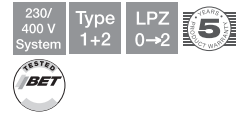


Nominal voltage	V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2
SPD to IEC 61643-1		class I+II	class I+II
LPZ		0-2	0-2
Lightning impulse current (10/350)	kA	100 kA	100 kA
Lightning impulse current (10/350) [total]	kA		
Nominal discharge surge current (8/20)	kA	100 kA	100 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	100 kA	100 kA
Maximum discharge current	kA	100 kA	100 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV
Response time	ns	< 25 ns	< 25 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA
Maximum back-up fuse	A	125 A	125 A
Temperature range	ø °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		9	9
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5089 75 4</b>	<b>5089 75 6</b>

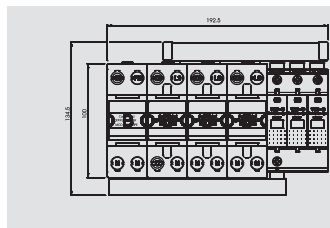
# Combination arrester, protection set VA for TN and TT network systems

Protection set VA, lightning and surge arrester combination, Type 1+2

- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 125 kA (10/350) N-PE
- Free of leak current and suitable for use in pre-meter area according to the VDEW directive
- Arrester, connectable, including connecting bridges, labelled connection terminals
- Encapsulated, non-extinguishing arrester for use in distributor housings

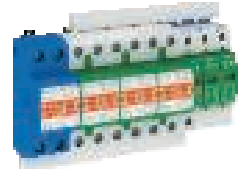


Application: pre-meter area and industrial systems with special requirements.

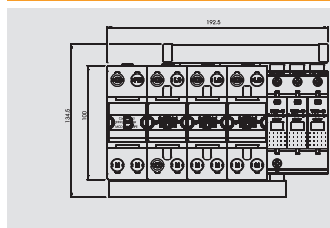


## Protection set MCD + V20, leak current-free, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
PS4-VA TT+TNS	255	3 + NPE	1	210.000	5089 77 0



/pc.

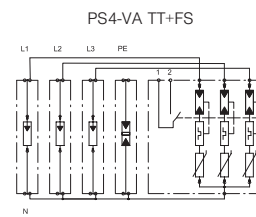
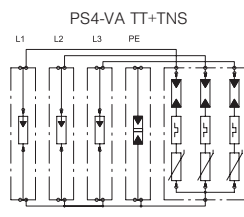


## Protection set MCD + V20, leak current-free, 3-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
PS4-VA TT+FS	255	3 + NPE	1	215.000	5089 77 7



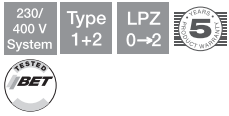
/pc.



Nominal voltage	V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2
SPD to IEC 61643-1		class I	class I
LPZ		0→2	0→2
Lightning impulse current (10/350)	kA	100 kA	100 kA
Lightning impulse current (10/350) [total]	kA		
Nominal discharge surge current (8/20)	kA	100 kA	100 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	100 kA	100 kA
Maximum discharge current	kA	100 kA	100 kA
Voltage protection level	kV	<1,3 kV	<1,3 kV
Response time	ns	<25 ns	<25 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA
Maximum back-up fuse	A	125 A	125 A
Temperature range	θ °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		11	11
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5089 77 0</b>	<b>5089 77 7</b>



# Combination arrester, protection set VA for TN-C network systems



Protection set VA, lightning and surge arrester combination, Type 1+2

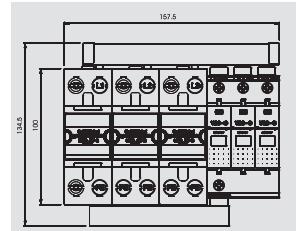
- For lightning protection equipotential bonding to VDE 0185-305 (IEC 62305)
- Lightning current arresting capacity to 50 kA (10/350) per pole and up to 125 kA (10/350) N-PE
- Free of leak current and suitable for use in pre-meter area according to the VDEW directive
- Arrester, connectable, including connecting bridges, labelled connection terminals
- Encapsulated, non-extinguishing arrester for use in distributor housings

Application: pre-meter area and industrial systems with special requirements.

## Protection set MCD + V20, leak current-free, 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>PS3-VA TNC</b>	255	3-pole	1	162.000	<b>5089 76 8</b>

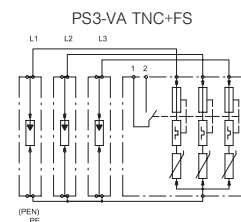
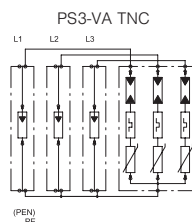
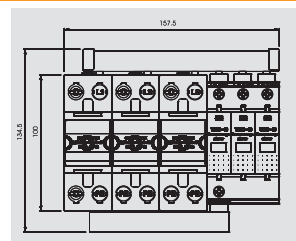
/pc.



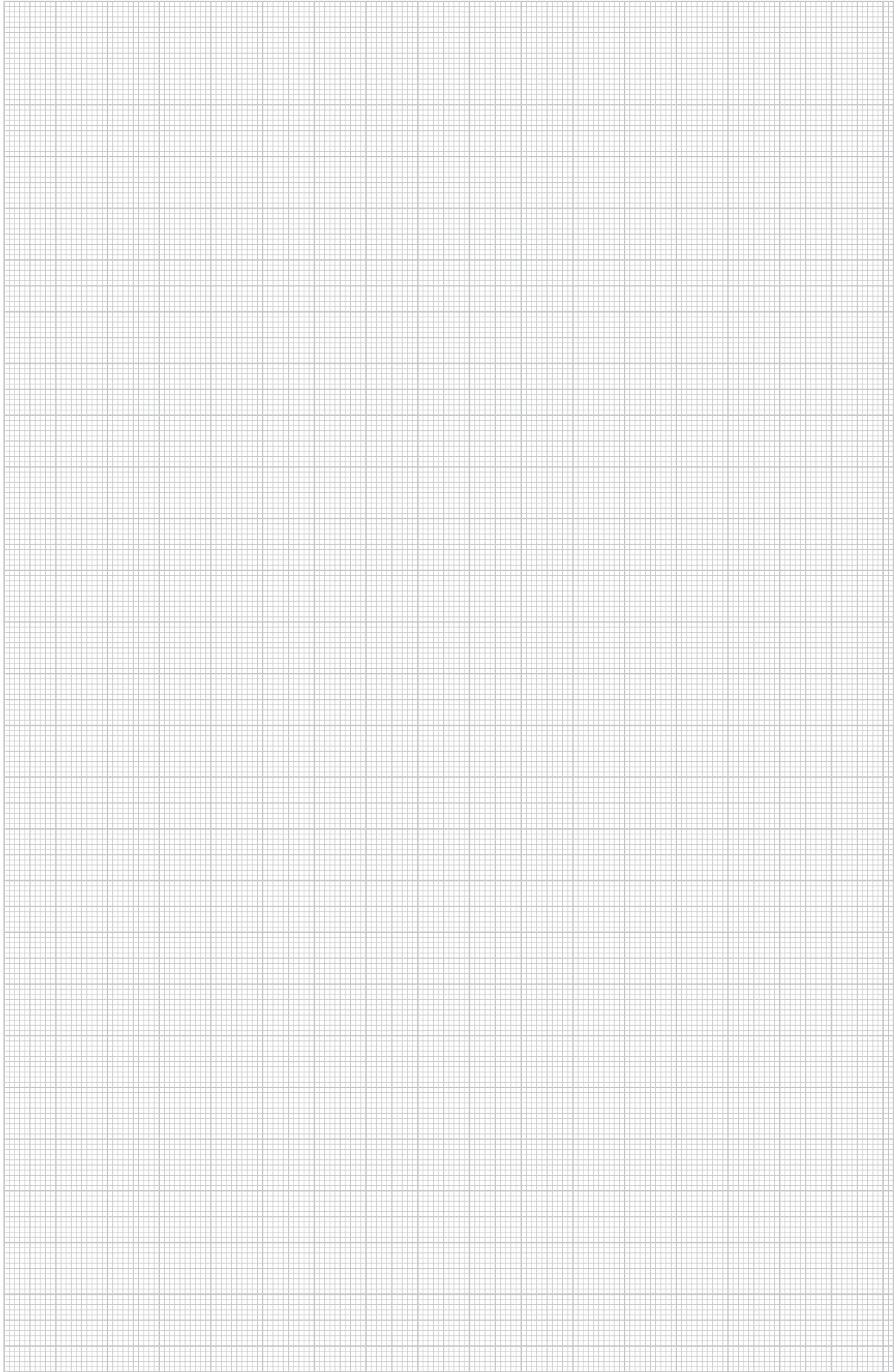
## Protection set MCD + V20, leak current-free, 3-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>PS3-VA TNC+FS</b>	255	3-pole	1	167.000	<b>5089 77 5</b>

/pc.



Nominal voltage	V	230 V	230 V
SPD to EN 61643-11		Type 1+2	Type 1+2
SPD to IEC 61643-1		class I	class I
LPZ		0-2	0-2
Lightning impulse current (10/350)	kA	100 kA	100 kA
Lightning impulse current (10/350) [total]	kA		
Nominal discharge surge current (8/20)	kA	100 kA	100 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	100 kA	100 kA
Maximum discharge current	kA	100 kA	100 kA
Voltage protection level	kV	<1,3 kV	<1,3 kV
Response time	ns	<25 ns	<25 ns
Follow current quenching capacity Ipeak	kA	25 kA	25 kA
Maximum back-up fuse	A	125 A	125 A
Temperature range	ø °C	-40 - +85 °C	-40 - +85 °C
Division unit TE (17.5 mm)		9	9
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	10 - 50 mm <sup>2</sup>	10 - 50 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	10 - 35 mm <sup>2</sup>	10 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	10 - 25 mm <sup>2</sup>	10 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5089 76 8</b>	<b>5089 77 5</b>














Diese Anlage ist ein  
Überspannungsschutz  
gerät entsprechend  
der Herstellerangaben unter der CEI 11411  
oder IEC 61643-11 Klasse II/III/IV für 230V/50Hz  
Bitte beachten: Überspannungsschutz-Geräte  
müssen immer in Abschnitten für 100 kV/10 kV  
oder 100 kV/10 kV/10 kV/10 kV/10 kV/10 kV/10 kV  
geinstalliert werden.

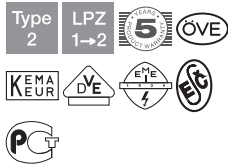
**OBO**  
SYSTEME

## Surge protection energy technology, arrester, Type 2

	Surge arrester	V20, 150 V for TN and TT networks	152
		V20, 150 V for TN networks	154
		V20, 280 V for TN and TT networks	156
		V20, 280 V for TN networks	158
		V20, 385 V for TN and TT networks	162
		V20, 385 V for TN networks	169
		V20, 550 V for TN networks	166
		V20, leak current-free version	168
	Accessories, covers and bases V20		169



# Surge arrester V20, 150 V for TN and TT networks



Surge arrester, Type 2, 150 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

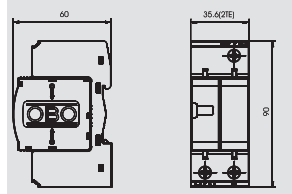
Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



## Surge arrester, 1-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1+NPE-150	150	1 + NPE	1	21.500	5094 63 9

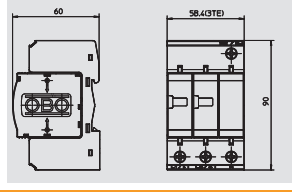
/pc.



## Surge arrester, 2-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2+NPE-150	150	2 + NPE	1	32.000	5094 64 1

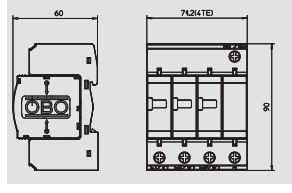
/pc.



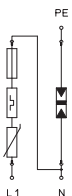
## Surge arrester, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+NPE-150	150	3 + NPE	1	39.600	5094 64 4

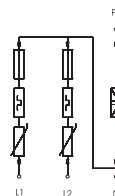
/pc.



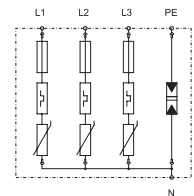
V20-C 1+NPE-150



V20-C 2+NPE-150



V20-C 3+NPE-150



Nominal voltage	V	130 V	130 V	130 V
SPD to EN 61643-11		Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II
LPZ		1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA
(Nennableiststoßstrom (8/20) [gesamt])	kA	40 kA	60 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 0,8 kV	< 0,8 kV	< 0,8 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	3	4
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 63 9</b>	<b>5094 64 1</b>	<b>5094 64 4</b>



# Surge arrester V20, 150 V for TN and TT networks

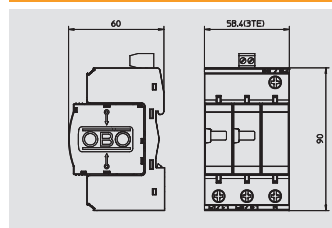
Surge arrester, Type 2, 150 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin



- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

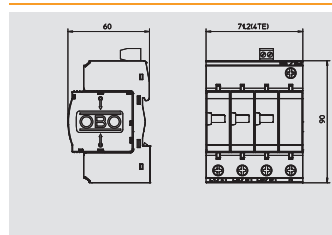
Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



## Surge arrester, 2-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2+NPEFS15	150	2 + NPE	1	32.200	5094 75 0

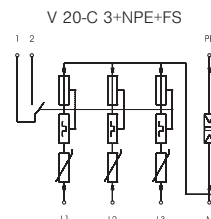
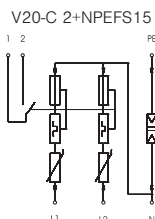
/pc.



## Surge arrester, 3-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V 20-C 3+NPE+FS	150	3 + NPE	1	41.300	5094 76 4

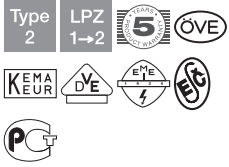
/pc.



Nominal voltage	V	130 V	
SPD to EN 61643-11		Type 2	Type 2
SPD to IEC 61643-1		class II	class II
LPZ		1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	60 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA
Voltage protection level	kV	< 0,8 kV	< 0,8 kV
Response time	ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		3	4
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 75 0</b>	<b>5094 76 4</b>



# Surge arrester V20, 150 V for TN networks



Surge arrester, Type 2, 150 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.

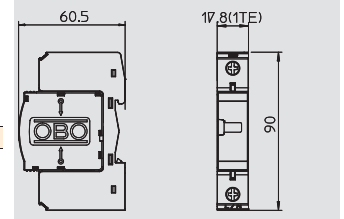
Surge protection, arrester, Type 2



## Surge arrester, 1-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1-150	150	1-pole	1	11.300	5094 67 7

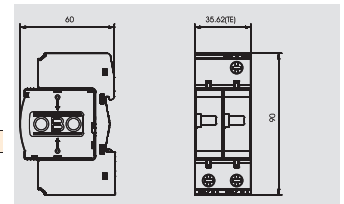
/pc.



## Surge arrester, 2-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2-150	150	2-pole	1	21.300	5094 67 9

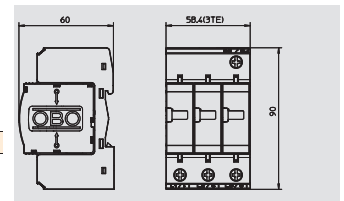
/pc.



## Surge arrester, 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3-150	150	3-pole	1	31.500	5094 68 0

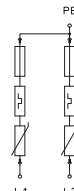
/pc.



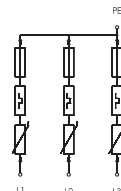
V20-C 1-150



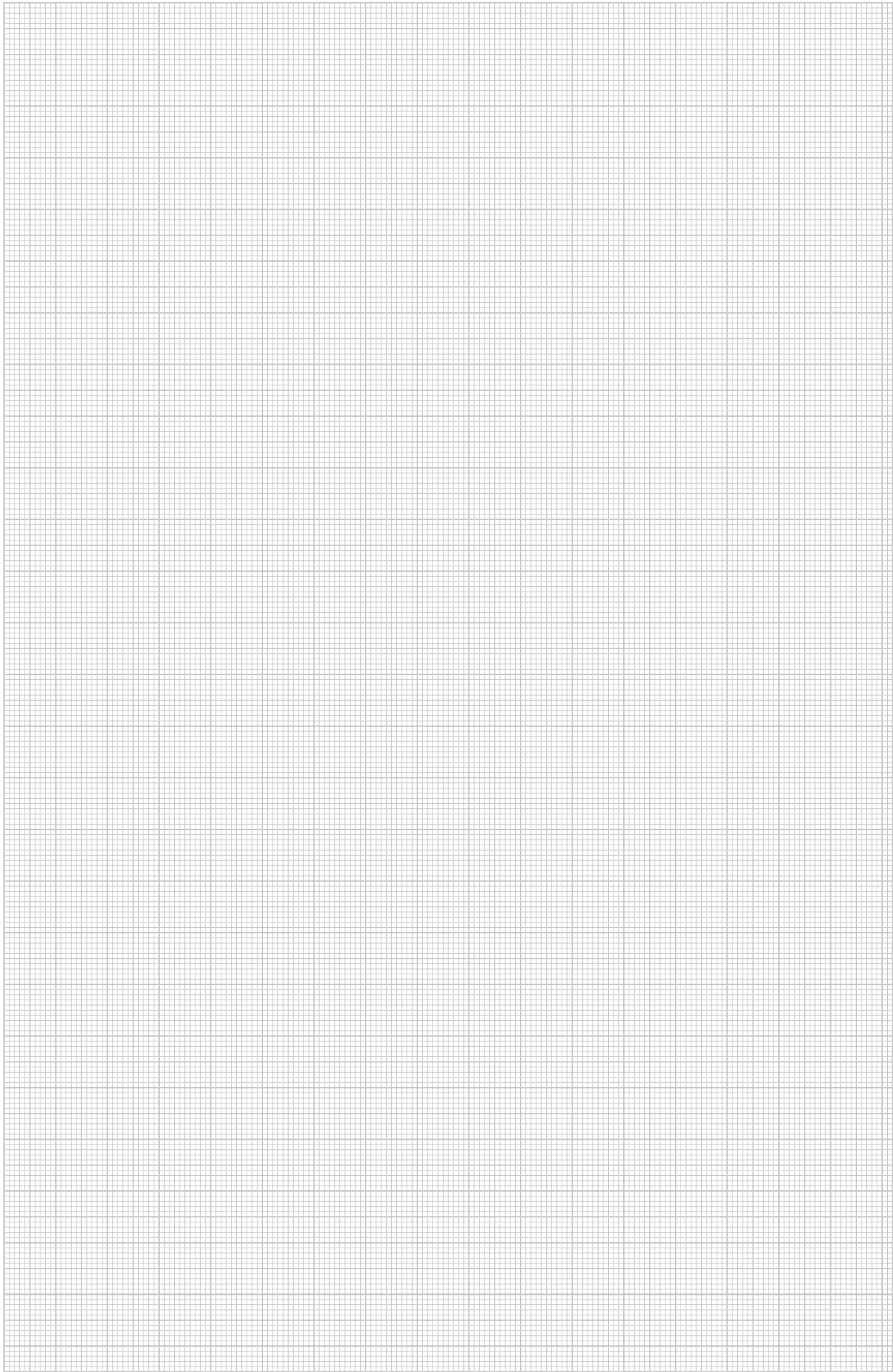
V20-C 2-150



V20-C 3-150



Nominal voltage	V	130 V	130 V	130 V
SPD to EN 61643-11		Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II
LPZ		1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA
(Nennableitstrom (8/20) [gesamt])	kA	20 kA	40 kA	60 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 0,8 kV	< 0,8 kV	< 0,8 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	2	3
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 67 7</b>	<b>5094 67 9</b>	<b>5094 68 0</b>



# Surge arrester V20, 280 V for TN and TT networks

230/400 V System  
 Type 2  
 LPZ 1→2  

Surge arrester, Type 2, 280 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

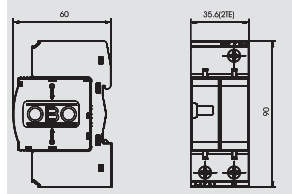
Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



## Surge arrester, 1-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1+NPE-280	280	1 + NPE	1	22.300	5094 65 0

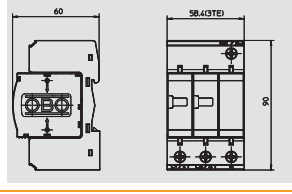
/pc.



## Surge arrester, 2-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2+NPE-280	280	2 + NPE	1	32.300	5094 65 3

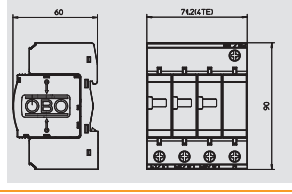
/pc.



## Surge arrester, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+NPE-280	280	3 + NPE	1	41.700	5094 65 6

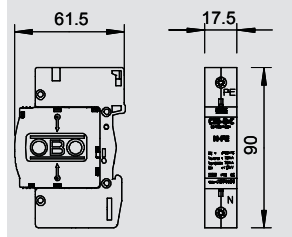
/pc.



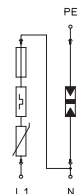
## Surge arrester, 1-pole NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
C 25-B+C 1	255	NPE	1	12.500	5095 60 6

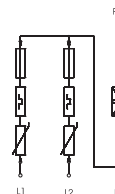
/pc.



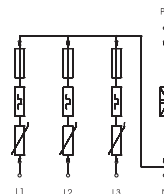
V20-C 1+NPE-280



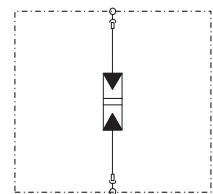
V20-C 2+NPE-280



V20-C 3+NPE-280



C 25-B+C 1



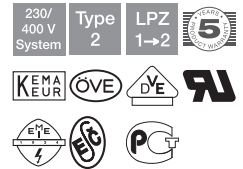
Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 1+2
SPD to IEC 61643-1		class II	class II	class II	class I+II
LPZ		1→2	1→2	1→2	0→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA	30 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	40 kA	60 kA	120 kA	30 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	50 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV	< 1,3 kV	< 1,2 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 100 ns
Maximum back-up fuse	A	125 A	125 A	125 A	
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	3	4	1
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
Lightning impulse current (10/350)	kA				25 kA
Follow current quenching capacity Ipeak	kA				0,1 kA
<b>Item No.</b>		<b>5094 65 0</b>	<b>5094 65 3</b>	<b>5094 65 6</b>	<b>5095 60 6</b>



# Surge arrester V20, 280 V for TN and TT networks

Surge arrester, Type 2, 280 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals



Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.

### Surge arrester, 1-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1+NPE+FS	280	1 + NPE	1	22.500	5094 76 0

/pc.

### Surge arrester, 2-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2+NPE+FS	280	2 + NPE	1	32.500	5094 76 2

/pc.

### Surge arrester, 3-pole + NPE with remote signalling

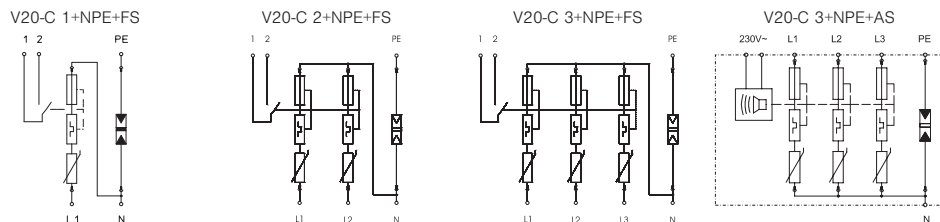
Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+NPE+FS	280	3 + NPE	1	43.300	5094 76 5

/pc.

### Surge arrester, 3-pole + NPE, with acoustic signalling

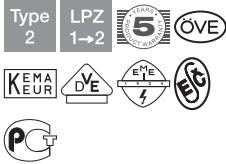
Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+NPE+AS	280	3 + NPE	1	57.000	5096 39 7

/pc.



Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II	class II
LPZ		1→2	1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	40 kA	60 kA	80 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV	< 1,3 kV	< 1,3 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	3	4	5
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, multi-wire	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, flexible	mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²
<b>Item No.</b>		<b>5094 76 0</b>	<b>5094 76 2</b>	<b>5094 76 5</b>	<b>5096 39 7</b>

# Surge arrester V20, 280 V for TN networks



Surge arrester, Type 2, 280 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.

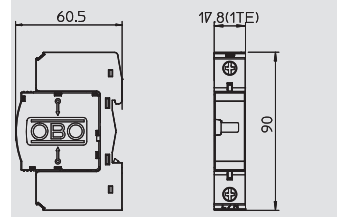
Surge protection, arrester, Type 2



## Surge arrester, 1-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1-280	280	1-pole	1	12.000	5094 61 8

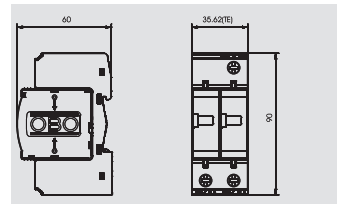
/pc.



## Surge arrester, 2-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2-280	280	2-pole	1	22.700	5094 62 1

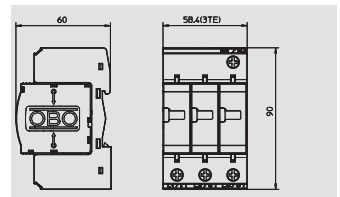
/pc.



## Surge arrester, 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3-280	280	3-pole	1	33.500	5094 62 4

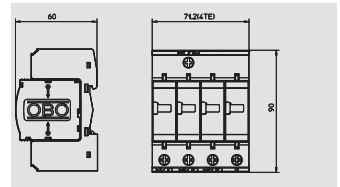
/pc.



## Surge arrester, 4-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 4-280	280	4-pole	1	43.000	5094 62 7

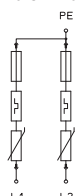
/pc.



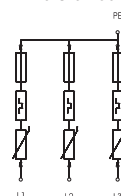
V20-C 1-280



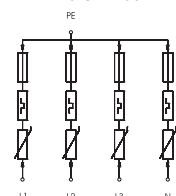
V20-C 2-280



V20-C 3-280



V20-C 4-280

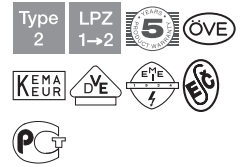


Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II	class II
LPZ		1→2	1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	20 kA	40 kA	60 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV	< 1,3 kV	< 1,3 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	2	3	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 61 8</b>	<b>5094 62 1</b>	<b>5094 62 4</b>	<b>5094 62 7</b>

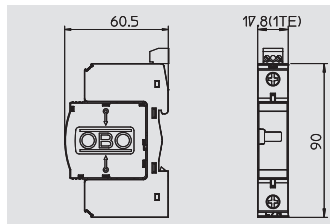
# Surge arrester V20, 280 V for TN networks

Surge arrester, Type 2, 280 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals



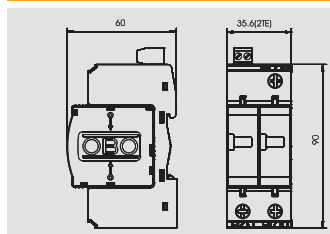
Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



## Surge arrester, 1-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1+FS-280	280	1-pole	1	12.400	5094 72 7

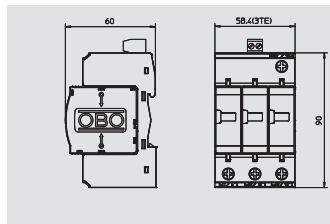
/pc.



## Surge arrester, 2-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2+FS-280	280	2-pole	1	22.500	5094 63 2

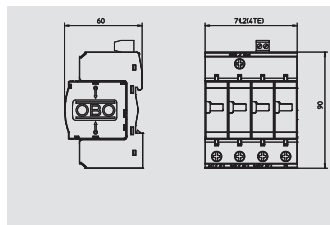
/pc.



## Surge arrester, 3-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+FS-280	280	3-pole	1	33.700	5094 73 1

/pc.



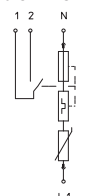
## Surge arrester, 4-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 4+FS-280	280	4-pole	1	43.000	5094 73 4

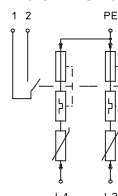
/pc.



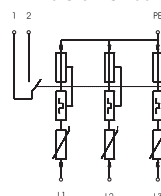
V20-C 1+FS-280



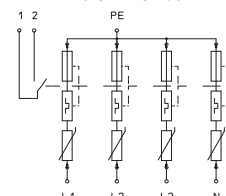
V20-C 2+FS-280



V20-C 3+FS-280



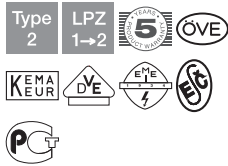
V20-C 4+FS-280



Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II	class II
LPZ		1→2	1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	20 kA	40 kA	60 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV	< 1,3 kV	< 1,3 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	2	3	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, multi-wire	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, flexible	mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²
<b>Item No.</b>		<b>5094 72 7</b>	<b>5094 63 2</b>	<b>5094 73 1</b>	<b>5094 73 4</b>



# Surge arrester V20, 280 V for TN networks



Surge arrester, Type 2, 280 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.

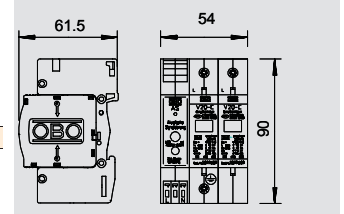
Surge protection, arrester, Type 2



## Surge arrester, 2-pole, with acoustic signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2+AS-280	280	2-pole	1	35.000	5096 37 5

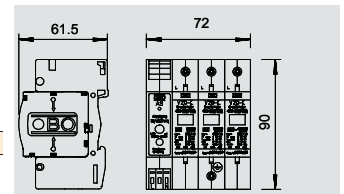
/pc.



## Surge arrester, 3-pole with acoustic signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+AS-280	280	3-pole	1	44.000	5096 38 3

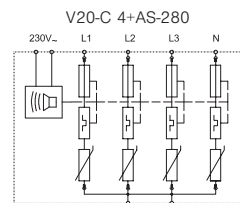
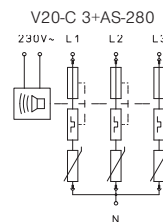
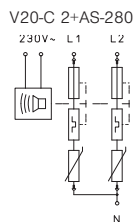
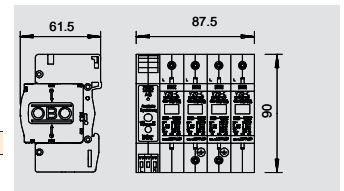
/pc.



## Surge arrester, 4-pole with acoustic signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 4+AS-280	280	4-pole	1	57.000	5096 39 1

/pc.

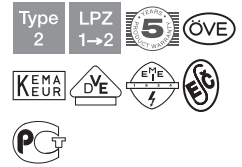


Nominal voltage	V	230 V	230 V	230 V
SPD to EN 61643-11		Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II
LPZ		1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA
(Nennableiststrom (8/20) [gesamt])	kA	40 kA	60 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV	< 1,3 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		3	4	5
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 37 5</b>	<b>5096 38 3</b>	<b>5096 39 1</b>

# Surge arrester V20, 280 V for TN networks

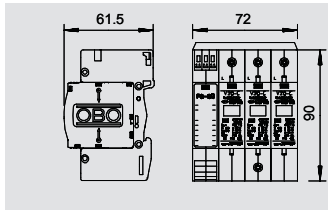
Surge arrester, Type 2, 280 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin



- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

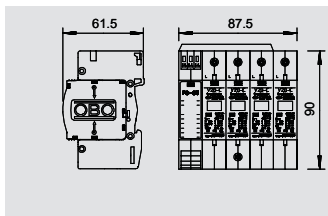
Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



## Surge arrester, 3-pole with fuse monitoring

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+FS-SU	280	3-pole	1	45.000	5096 25 1

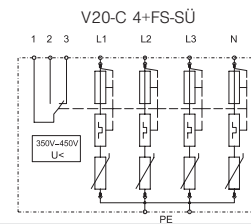
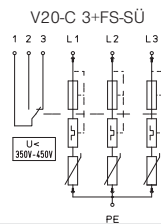
/pc.



## Surge arrester, 4-pole with fuse monitoring

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 4+FS-SU	280	4-pole	1	56.500	5096 27 8

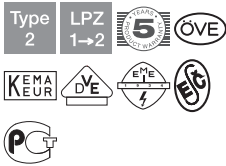
/pc.



Nominal voltage	V	230 V	230 V
SPD to EN 61643-11		Type 2	Type 2
SPD to IEC 61643-1		class II	class II
LPZ		1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	60 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA
Voltage protection level	kV	< 1,3 kV	< 1,3 kV
Response time	ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		4	5
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5096 25 1</b>	<b>5096 27 8</b>



# Surge arrester V20, 385 V for TN and TT networks



Surge arrester, Type 2, 385 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

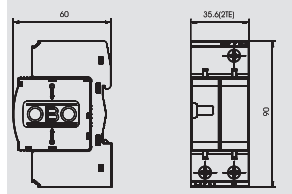
Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



## Surge arrester, 1-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1+NPE-385	385	1 + NPE	1	23.300	5094 66 6

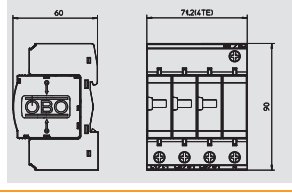
/pc.



## Surge arrester, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+NPE-385	385	3 + NPE	1	42.600	5094 66 8

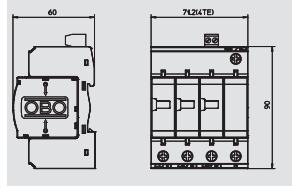
/pc.



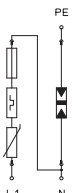
## Surge arrester, 3-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+NPEFS38	385	3 + NPE	1	45.200	5094 78 8

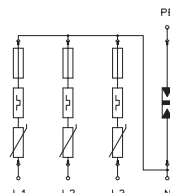
/pc.



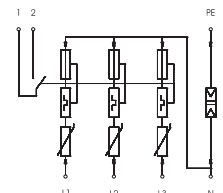
V20-C 1+NPE-385



V20-C 3+NPE-385



V20-C 3+NPEFS38



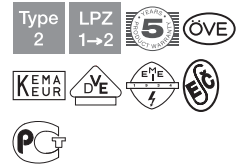
Nominal voltage	V	350 V	350 V	350 V
SPD to EN 61643-11		Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II
LPZ		1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	40 kA	80 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 1,7 kV	< 1,7 kV	< 1,7 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	4	4
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 66 6</b>	<b>5094 66 8</b>	<b>5094 78 8</b>



# Surge arrester V20, 385 V for TN networks

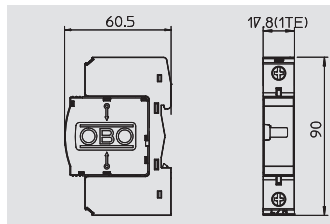
Surge arrester, Type 2, 385 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin



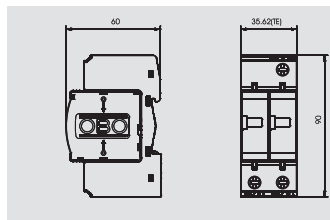
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



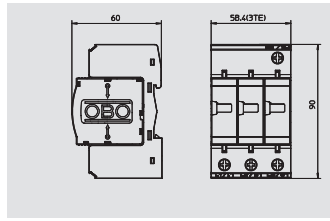
Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1-385	385	1-pole	1	12.500	5094 70 3

/pc.



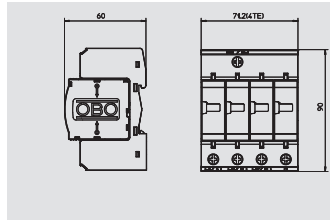
Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2-385	385	2-pole	1	23.700	5094 70 4

/pc.



Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3-385	385	3-pole	1	34.500	5094 70 5

/pc.



Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 4-385	385	4-pole	1	44.000	5094 70 8

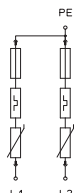
/pc.



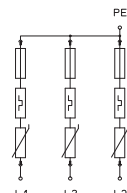
V20-C 1-385



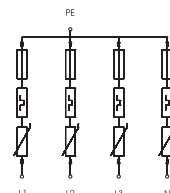
V20-C 2-385



V20-C 3-385



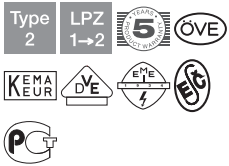
V20-C 4-385



Nominal voltage	V	350 V	350 V	350 V	350 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II	class II
LPZ		1→2	1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	20 kA	40 kA	60 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 1,7 kV	< 1,7 kV	< 1,7 kV	< 1,7 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	2	3	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, multi-wire	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, flexible	mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²
<b>Item No.</b>		<b>5094 70 3</b>	<b>5094 70 4</b>	<b>5094 70 5</b>	<b>5094 70 8</b>



# Surge arrester V20, 385 V for TN networks



Surge arrester, Type 2, 385 V

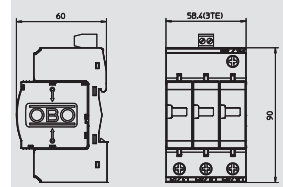
- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



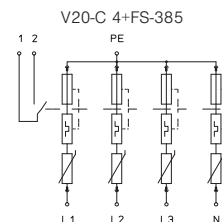
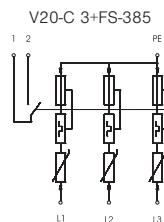
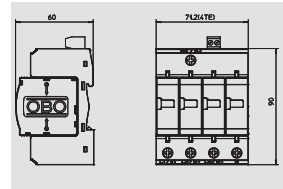
## Surge arrester, 3-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+FS-385	385	3-pole	1	34.700	5094 78 0 /pc.



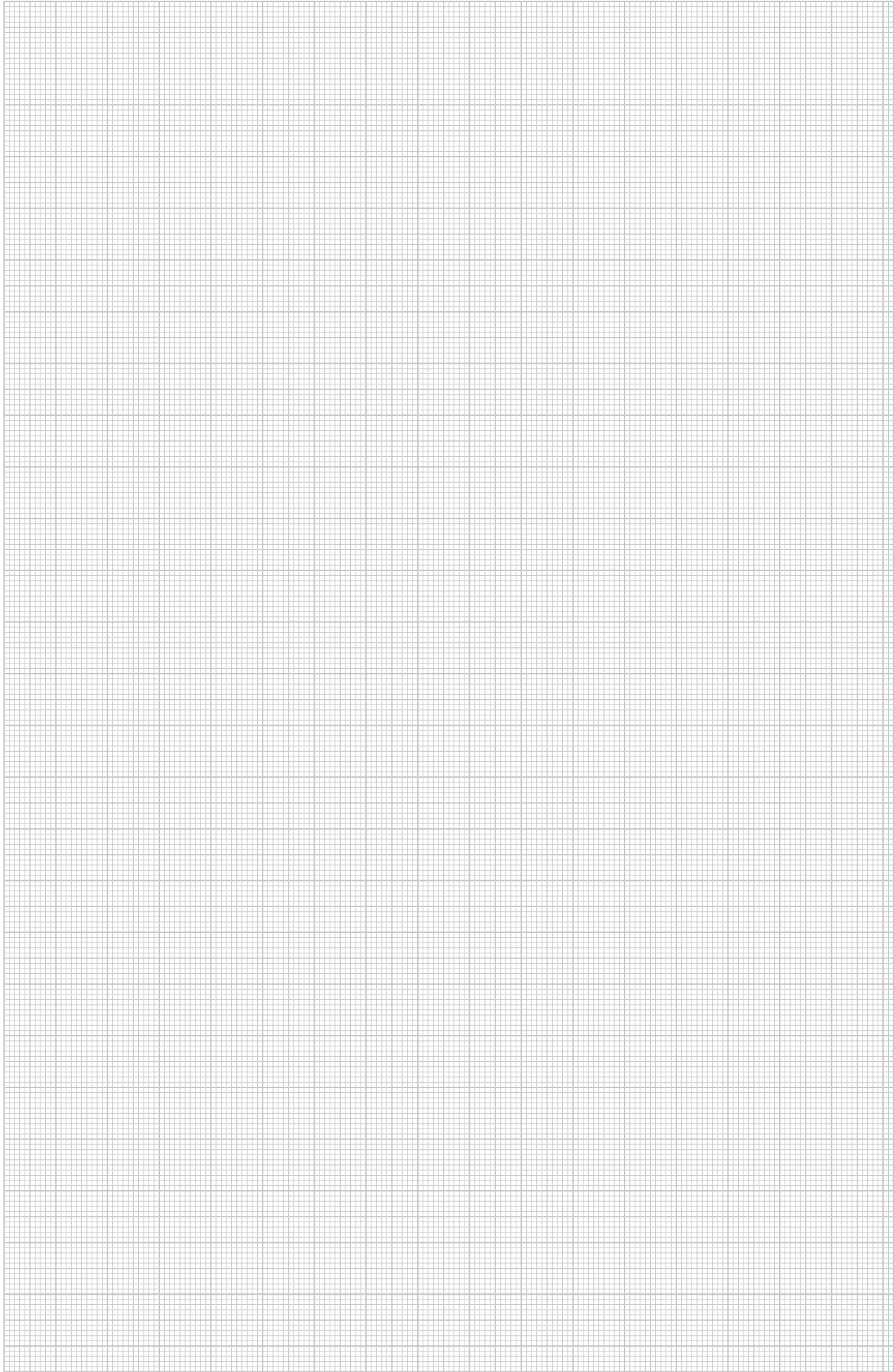
## Surge arrester, 4-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 4+FS-385	385	4-pole	1	44.300	5094 78 3 /pc.



Nominal voltage	V	350 V	350 V
SPD to EN 61643-11		Type 2	Type 2
SPD to IEC 61643-1		class II	class II
LPZ		1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	60 kA	80 kA
Maximum discharge current	kA	40 kA	40 kA
Voltage protection level	kV	< 1,7 kV	< 1,7 kV
Response time	ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A
Temperature range	ø °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		3	4
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 78 0</b>	<b>5094 78 3</b>





# Surge arrester V20, 550 V for TN networks



Surge arrester, Type 2, 550 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.

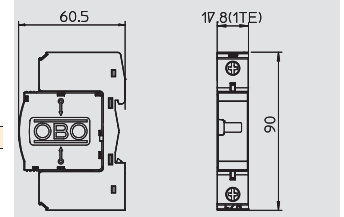
Surge protection, arrester, Type 2



## Surge arrester, 1-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 1-550	550	1-pole	1	12.900	5094 71 3

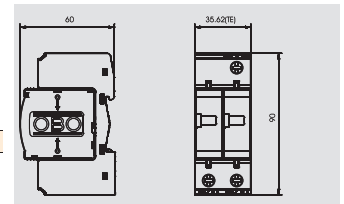
/pc.



## Surge arrester, 2-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2-550	550	2-pole	1	24.300	5094 71 4

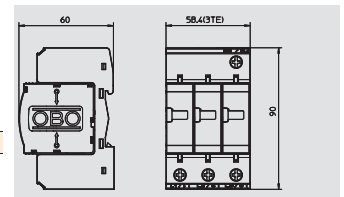
/pc.



## Surge arrester, 3-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3-550	550	3-pole	1	36.000	5094 71 5

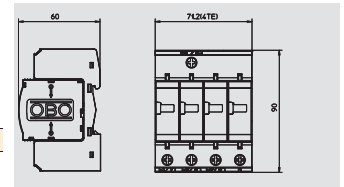
/pc.



## Surge arrester, 4-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 4-550	550	4-pole	1	45.500	5094 71 8

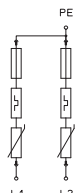
/pc.



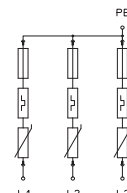
V20-C 1-550



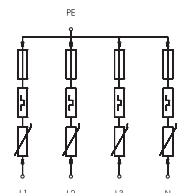
V20-C 2-550



V20-C 3-550



V20-C 4-550

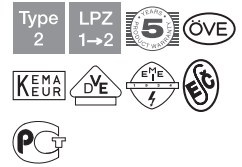


Nominal voltage	V	500 V	500 V	500 V	500 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II	class II
LPZ		1→2	1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	15 kA	15 kA	15 kA	15 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	15 kA	30 kA	45 kA	60 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 2,4 kV	< 2,4 kV	< 2,4 kV	< 2,4 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	2	3	4
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 71 3</b>	<b>5094 71 4</b>	<b>5094 71 5</b>	<b>5094 71 8</b>

# Surge arrester V20, 550 V for TN networks

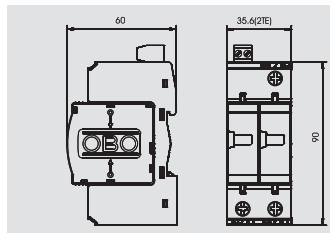
Surge arrester, Type 2, 550 V

- VDE-tested
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin



- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

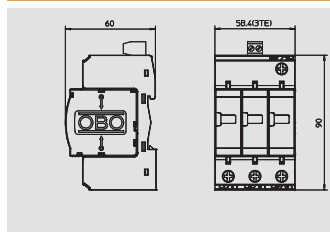
Application: Equipotential bonding (LPZ 1 to 2) and device protection in main and subdistributors.



## Surge arrester, 2-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2+FS-550	550	2-pole	1	24.100	5094 63 6

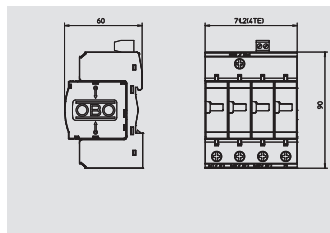
/pc.



## Surge arrester, 3-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3+FS-550	550	3-pole	1	36.200	5094 79 2

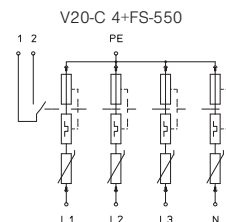
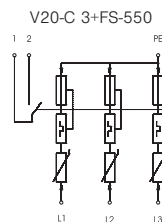
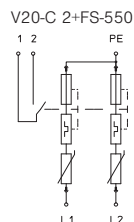
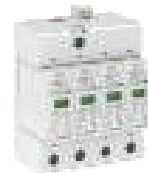
/pc.



## Surge arrester, 4-pole with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 4+FS-550	550	4-pole	1	45.700	5094 79 5

/pc.



	V	500 V	500 V	500 V
Nominal voltage	V	500 V	500 V	500 V
SPD to EN 61643-11		Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II
LPZ		1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	15 kA	15 kA	15 kA
(Nennableitstoßstrom (8/20) (gesamt))	kA	30 kA	45 kA	60 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 2,4 kV	< 2,4 kV	< 2,4 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2	3	4
Protection rating		IP20	IP20	IP20
Connection cross-section, rigid	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, multi-wire	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, flexible	mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²
<b>Item No.</b>		<b>5094 63 6</b>	<b>5094 79 2</b>	<b>5094 79 5</b>



# Surge arrester V20, leak current-free version



Surge arrester, Type 2, VA version

- Leak current-free varistor spark gap arrester, use, for example, for permanent insulation monitoring
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 25 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing varistor spark gap arrester for use in distributor housings
- Base with multiple connection terminals

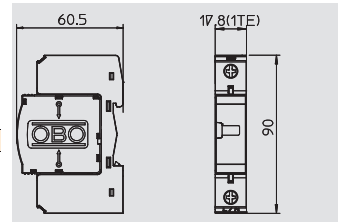
Application: Pre-meter area and industrial systems with strong power variations.



## Surge arrester, 1-pole, leak current-free

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-VA 1-385	385	1-pole	1	12.500	<b>5099 47 5</b>

/pc.



Surge protection, arrester, Type 2

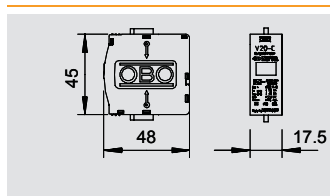


V20-VA 1-385



Nominal voltage	V	350 V
SPD to EN 61643-11		Type 2
SPD to IEC 61643-1		class II
LPZ		1→2
Nominal discharge surge current (8/20)	kA	20 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	20 kA
Maximum discharge current	kA	25 kA
Voltage protection level	kV	< 1,8 kV
Response time	ns	< 100 ns
Maximum back-up fuse	A	125 A
Temperature range	ø °C	-40 - +80 °C
Division unit TE (17.5 mm)		1
Protection rating		IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5099 47 5</b>

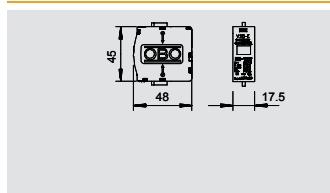
# Accessories, covers and bases V20



## Cover, surge arrestor 75 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 0-75	75	100	1-pole	1	5.160	5099 57 9

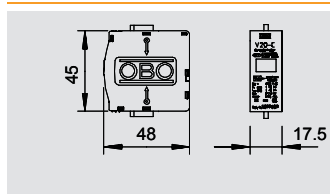
/pc.



## Cover, surge arrestor 150 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 0-150	150	200	1-pole	1	4.794	5096 70 7

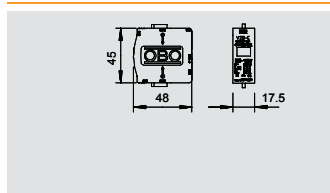
/pc.



## Cover, surge arrestor 280 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 0-280	280	350	1-pole	1	8.500	5099 60 9

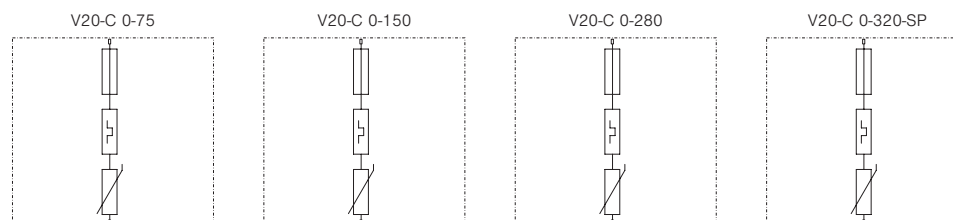
/pc.



## Cover, surge arrestor 320 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 0-320-SP	320	420	1-pole	1	5.545	5099 84 8

/pc.



V20-C 0-75

V20-C 0-150

V20-C 0-280

V20-C 0-320-SP

Maximum continuous voltage	V	75 V	150 V	280 V	320 V
U max DC	V	100 V	200 V	350 V	420 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II	class II
LPZ		1→2	1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	15 kA	20 kA	20 kA	20 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 0,5 kV	< 0,8 kV	< 1,3 kV	< 1,4 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		1	1	1	1
<b>Item No.</b>		<b>5099 57 9</b>	<b>5096 70 7</b>	<b>5099 60 9</b>	<b>5099 84 8</b>



# Accessories, covers and bases V20

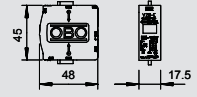
Surge protection, arrester, Type 2



## Cover, surge arrester 335 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 0-335</b>	335	420	1-pole	1	5.545	<b>5099 85 0</b>

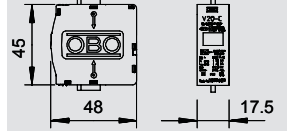
/pc.



## Cover, surge arrester 385 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 0-385</b>	385	505	1-pole	1	5.826	<b>5099 59 5</b>

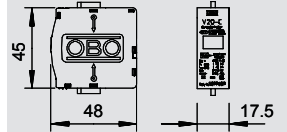
/pc.



## Cover, surge arrester 440 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 0-440</b>	440	585	1-pole	1	6.452	<b>5099 70 6</b>

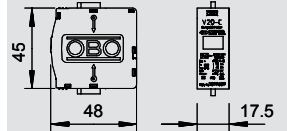
/pc.



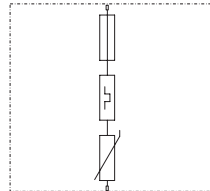
## Cover, surge arrester 550 V

Type	Highest continuous voltage V	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 0-550</b>	550	745	1-pole	1	6.452	<b>5099 61 7</b>

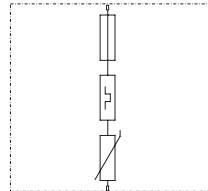
/pc.



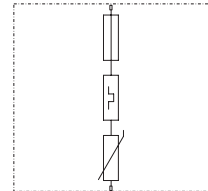
V20-C 0-335



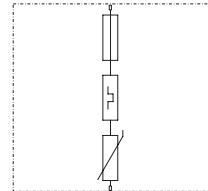
V20-C 0-385



V20-C 0-440

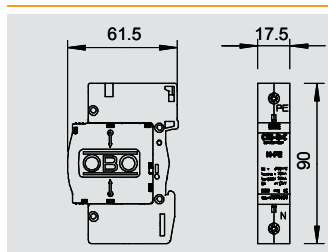


V20-C 0-550



Maximum continuous voltage	V	335 V	385 V	440 V	550 V
U max DC	V	420 V	505 V	585 V	745 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
SPD to IEC 61643-1		class II	class II	class II	class II
LPZ		1→2	1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA	15 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 1,4 kV	< 1,7 kV	< 2,0 kV	< 2,4 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		1	1	1	1
<b>Item No.</b>		<b>5099 85 0</b>	<b>5099 59 5</b>	<b>5099 70 6</b>	<b>5099 61 7</b>

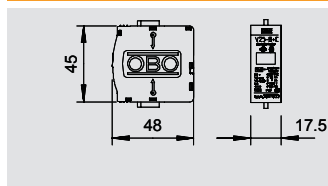
# Accessories, covers and bases V20



## Surge arrester, 1-pole NPE

Type	Highest continuous voltage	Version	Pack.	Weight	Item No.
	V		pcs	kg/100 pcs.	
<b>C 25-B+C 1</b>	255	NPE	1	12.500	<b>5095 60 6</b>

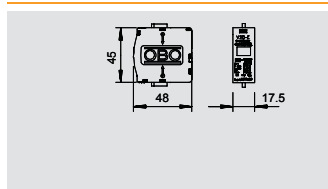
/pc.



## Cover total spark gap between N and PE 255 V

Type	Highest continuous voltage	Version	Pack.	Weight	Item No.
	V		pcs	kg/100 pcs.	
<b>C 25-B+C 0</b>	255	NPE	1	5.195	<b>5095 60 3</b>

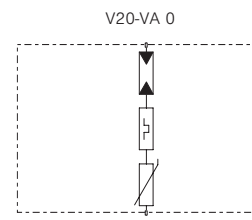
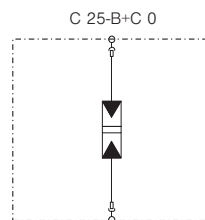
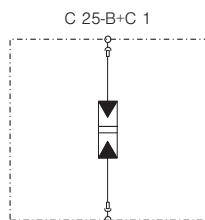
/pc.



## Cover, surge protection, leak current-free

Type	Highest continuous voltage	Version	Pack.	Weight	Item No.
	V		pcs	kg/100 pcs.	
<b>V20-VA 0</b>	385	1-pole	1	6.018	<b>5099 61 3</b>

/pc.



Nominal voltage	V	230 V		
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 2
SPD to IEC 61643-1		class I+II	class I+II	class II
LPZ		0-2	0-2	1-2
Lightning impulse current (10/350)	kA	25 kA	50 kA	25 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	< 1,8 kV
(Nennableitstoßstrom (8/20) [gesamt])	kA	30 kA		< 100 ns
Maximum discharge current	kA	50 kA	160 A	125 A
Voltage protection level	kV	<1,2 kV	<1,2 kV	< 1,8 kV
Response time	ns	< 100 ns	< 100 ns	< 100 ns
Follow current quenching capacity Ipeak	kA	0,1 kA		
Maximum back-up fuse	A		160 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	1	1
Protection rating		IP20		
Connection cross-section, rigid	mm²	2,5 - 35 mm²		
Connection cross-section, multi-wire	mm²	2,5 - 35 mm²		
Connection cross-section, flexible	mm²	2,5 - 25 mm²		
Maximum continuous voltage	V		255 V	385 V
Nominal discharge surge current (8/20) (N-PE)	kA		30 kA	
Protection rating		IP 20	IP 20	IP 20
Lightning impulse current (10/350) (L-N)	kA			
Lightning impulse current (10/350) (N-PE)	kA			
Lightning impulse current (10/350) [total]	kA			
Nominal discharge surge current (8/20) (L-N)	kA			
<b>Item No.</b>		<b>5095 60 6</b>	<b>5095 60 3</b>	<b>5099 61 3</b>

Surge protection, arrester, Type 2



# Accessories, covers and bases V20



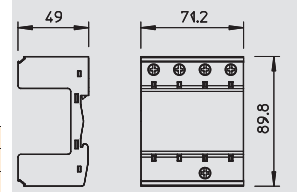
## Base, Multibase

Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1</b>	1-pole	1	1	6.200	<b>5096 64 8</b>
<b>MB 2</b>	2-pole	2	1	11.200	<b>5096 65 3</b>
<b>MB 3</b>	3-pole	3	1	16.000	<b>5096 66 5</b>
<b>MB 4</b>	4-pole	4	1	21.000	<b>5096 68 0</b>

/pc.

MB...: Base for V25-B+C, V20-C and V10-C

- Suitable for V25-B+C, V20-C and V10-C
- Pre-mounted and ready for connection
- For TN systems
- Multifunction terminals for easy circuit of series-mounted devices
- Covers can be rotated through 180 degrees



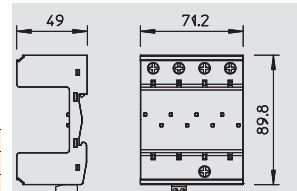
## Base, Multibase with remote signalling

Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+FS</b>	1-pole	1	1	6.700	<b>5096 64 9</b>
<b>MB 2+FS</b>	2-pole	2	1	11.700	<b>5096 65 4</b>
<b>MB 3+FS</b>	3-pole	3	1	16.500	<b>5096 66 7</b>
<b>MB 4+FS</b>	4-pole	4	1	21.000	<b>5096 68 2</b>

/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- With remote signalling, potential-free NO contact, for function monitoring



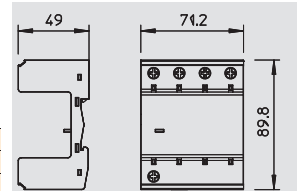
## Base, Multibase + NPE

Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+NPE</b>	1 + NPE	2	1	11.500	<b>5096 65 0</b>
<b>MB 2+NPE</b>	2 + NPE	3	1	16.100	<b>5096 65 5</b>
<b>MB 3+NPE</b>	3 + NPE	4	1	20.000	<b>5096 66 9</b>

/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- For TN-S and TT network systems



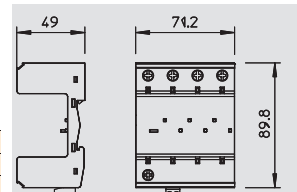
## Base, Multibase + NPE with remote signalling

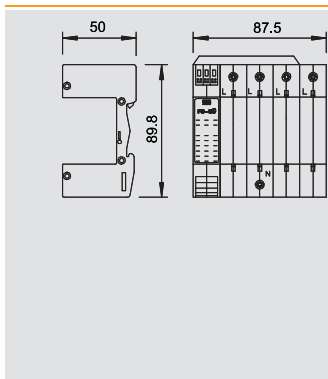
Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+NPE+FS</b>	1 + NPE	2	1	11.600	<b>5096 65 1</b>
<b>MB 2+NPE+FS</b>	2 + NPE	3	1	16.000	<b>5096 65 7</b>
<b>MB 3+NPE+FS</b>	3 + NPE	4	1	21.300	<b>5096 67 1</b>

/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- With remote signalling, potential-free NO contact, for function monitoring
- 3+1 protection circuit for TN-S and TT network systems





## Base, Multibase with fuse monitoring



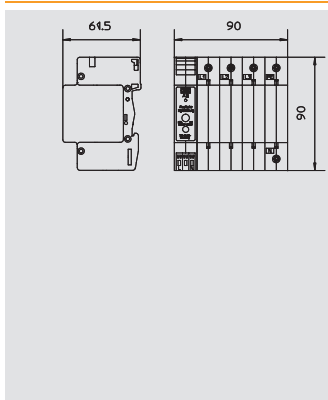
Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
V20-C U-3 FS-SU	3-pole	1	26.000	5096 35 9
V20-C U-4 FS-SU	4-pole	1	33.000	5096 36 7

/pc.



V 20-C/U...: Base.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With voltage monitoring of phases and function monitoring of arrester upper part, remote signalling
- With remote signaling, potential-free changeover contact, for function monitoring
- Pre-mounted and ready for connection



## Base, Multibase with acoustic signalling



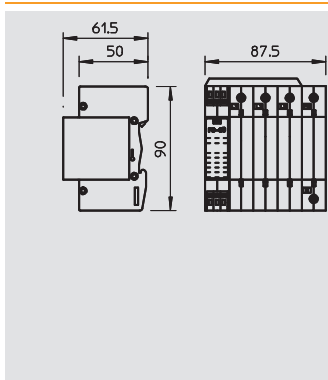
Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
V20-C U-2 AS	2-pole	1	23.000	5096 41 3
V20-C U-3 AS	3-pole	1	29.000	5096 42 1
V20-C U-4 AS	4-pole	1	35.000	5096 44 8
V20-C U-3+NPE-AS	3 + NPE	1	32.500	5096 37 2

/pc.



V 20-C/U...: Base.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With remote signaling, potential-free changeover contact, for function monitoring
- With acoustic signalling for function monitoring, signal tone can be shut down for 24 h
- Pre-mounted and ready for connection



## Base, Multibase + NPE with fuse monitoring



Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
V20-C U-3+NPE	3-NPE with FS-SU	1	30.000	5096 37 0

/pc.








V 20-C/U...: Base.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With voltage monitoring of phases and function monitoring of arrester upper part, remote signalling
- With remote signaling, potential-free changeover contact, for function monitoring
- For TN-S and TT network systems
- Pre-mounted and ready for connection





## Surge protection energy technology, arrester, Type 2+3

	Surge arrester	V10 Compact	176
		V10, 280 V	178
		V10, 320 V	179
	Accessories, covers and bases V10		180
	Protection packages		184

# Surge arrester V10 Compact



Surge arrester, compact module, Type 2+3

- For surge protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 60 kA (8/20) in total
- Incl. thermal and dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Integrated 3+1 solution for TN and TT network systems of a 45 mm module width

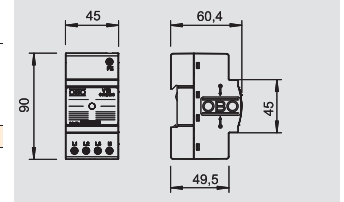
Application: Industry, housing and device protection of rotary current systems.



## Surge arrester Compact

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V10 COMPACT 150</b>	150	3 + NPE	1	15.800	<b>5093 37 8</b>

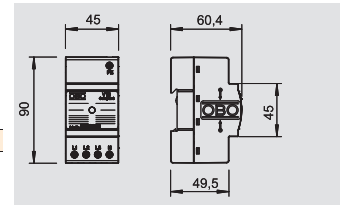
/pc.



## Surge arrester Compact

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V10 COMPACT 255</b>	255	3 + NPE	1	15.800	<b>5093 38 0</b>

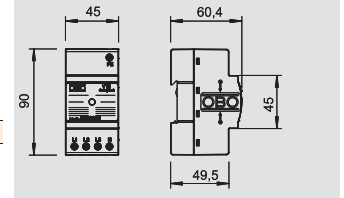
/pc.



## Surge arrester Compact

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V10 COMPACT 385</b>	385	3 + NPE	1	16.800	<b>5093 38 4</b>

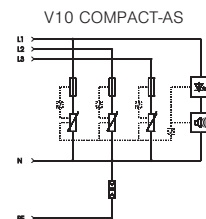
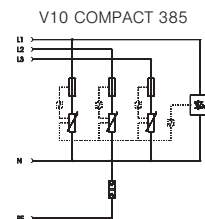
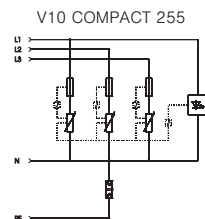
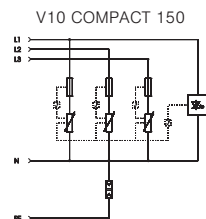
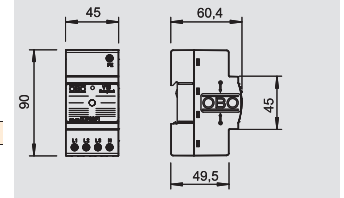
/pc.



## Surge arrester Compact with acoustic signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V10 COMPACT-AS</b>	255	3 + NPE	1	15.800	<b>5093 39 1</b>

/pc.



Nominal voltage	V	130 V	230 V	385 V	230 V
SPD to EN 61643-11		Type 2+3	Type 2+3	Type 2+3	Type 2+3
SPD to IEC 61643-1		class II+III	class II+III	class II+III	class II+III
LPZ		1-3	1-3	1-3	1-3
Nominal discharge surge current (8/20)	kA	10 kA	10 kA	10 kA	10 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	60 kA	60 kA	60 kA	60 kA
Maximum discharge current	kA	20 kA	20 kA	20 kA	20 kA
Voltage protection level	kV	< 0,7 kV	< 1,1 kV	< 1,5 kV	< 1,1 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	63 A	63 A	63 A	63 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		2.5	2.5	2.5	2.5
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>	2,5 - 10 mm <sup>2</sup>
<b>Item No.</b>		<b>5093 37 8</b>	<b>5093 38 0</b>	<b>5093 38 4</b>	<b>5093 39 1</b>



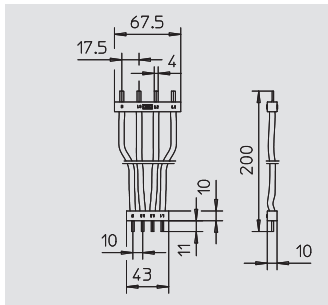
# Surge arrester V10 Compact

Surge arrester, compact module, Type 2+3



- For surge protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 60 kA (8/20) in total
- Incl. thermal and dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Integrated 3+1 solution for TN and TT network systems of a 45 mm module width

Application: Industry, housing and device protection of rotary current systems.

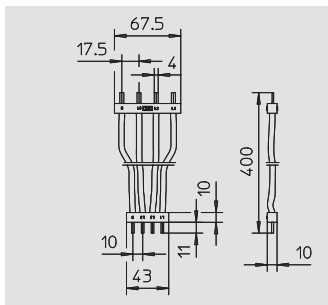


## Connection bridge for V10 Compact

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>VB-V10 COMPACT-2</b>	200 mm	1	5.300	<b>5089 65 0</b>



/pc.



## Connection bridge for V10 Compact

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>VB-V10 COMPACT-4</b>	400 mm	1	8.900	<b>5089 65 2</b>



/pc.

Surge protection, arrester, Type 2+3



# Surge arrester V10, 280 V



Surge arrester, Type 2+3

- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 20 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding and device protection in main and subdistributors

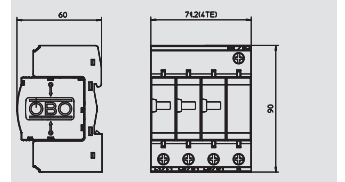
Surge protection, arrester, Type 2+3



## Surge arrester, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V10-C 3+NPE</b>	280	3 + NPE	1	37.800	<b>5094 92 0</b>

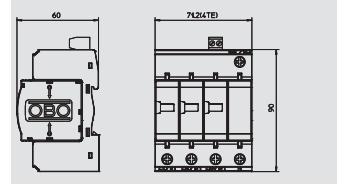
/pc.



## Surge arrester, 3-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V10-C 3+NPE+FS</b>	280	3 + NPE	1	37.900	<b>5094 93 1</b>

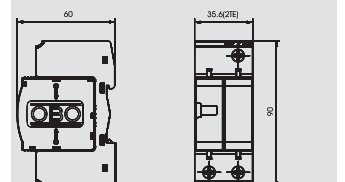
/pc.



## Surge arrester, 1-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V10-C 1+NPE-280</b>	280	1 + NPE	1	22.200	<b>5093 41 8</b>

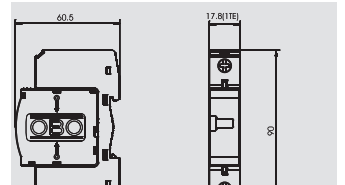
/pc.



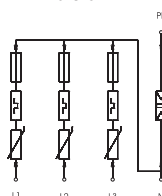
## Surge arrester, 1-pole

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V 10-C/1-280</b>	280	1-pole	1	9.860	<b>5093 41 4</b>

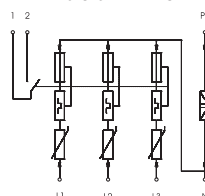
/pc.



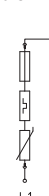
V10-C 3+NPE



V10-C 3+NPE+FS



V10-C 1+NPE-280



V 10-C/1-280



Nominal voltage	V	230 V	230 V	230 V	230 V
SPD to EN 61643-11		Type 2+3	Type 2+3	Type 2+3	Type 2+3
SPD to IEC 61643-1		class II+III	class II+III	class II+III	class II+III
LPZ		1→3	1→3	1→3	1→3
Nominal discharge surge current (8/20)	kA	10 kA	10 kA	10 kA	10 kA
(Nennableitstrom (8/20) [gesamt])	kA	40 kA	40 kA	40 kA	10 kA
Maximum discharge current	kA	20 kA	20 kA	20 kA	20 kA
Voltage protection level	kV	< 1,1 kV	< 1,1 kV	< 1,1 kV	< 1,1 kV
Response time	ns	<25 ns	<25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		4	4	2	1
Protection rating		IP20	IP20	IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 92 0</b>	<b>5094 93 1</b>	<b>5093 41 8</b>	<b>5093 41 4</b>

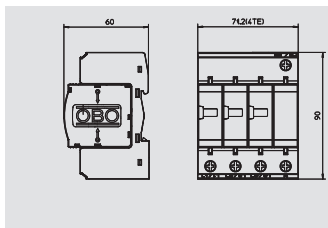
# Surge arrester V10, 320 V

## Surge arrester, Type 2+3



- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 20 kA (8/20) per pin
- Arrester, connectable with dynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- Base with multiple connection terminals

Application: Equipotential bonding and device protection in main and subdistributors

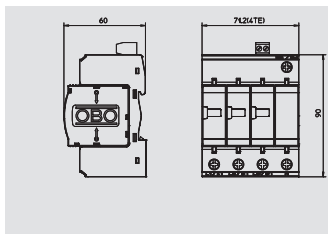


### Surge arrester, 3-pole + NPE

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V10-C 3+NPE-320	320	3 + NPE	1	39.000	5094 92 4



/pc.



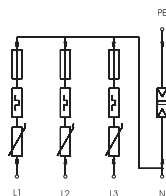
### Surge arrester, 3-pole + NPE with remote signalling

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V10-C 3+NPEFS320	320	3 + NPE	1	40.000	5094 93 5

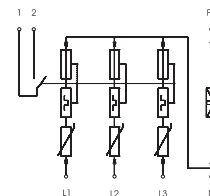


/pc.

V10-C 3+NPE-320



V10-C 3+NPEFS320



Nominal voltage	V	320 V	320 V
SPD to EN 61643-11		Type 2+3	Type 2+3
SPD to IEC 61643-1		class II+III	class II+III
LPZ		1→3	1→3
Nominal discharge surge current (8/20)	kA	10 kA	10 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	40 kA	40 kA
Maximum discharge current	kA	20 kA	20 kA
Voltage protection level	kV	< 1,2 kV	< 1,2 kV
Response time	ns	<25 ns	<25 ns
Maximum back-up fuse	A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		4	4
Protection rating		IP20	IP20
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 92 4</b>	<b>5094 93 5</b>

# Accessories, covers and bases V10

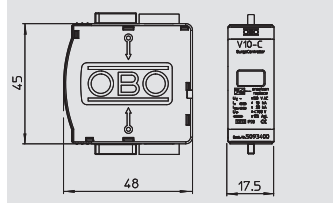
Surge protection, arrester, Type 2+3



## Cover, surge arrester 150 V

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V10-C 0-150	150	1-pole	1	3.300	5093 40 0

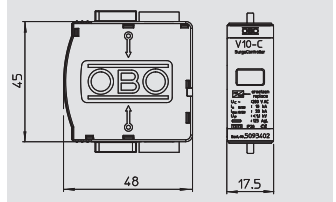
/pc.



## Cover, surge arrester 280 V

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V10-C 0-280	280	1-pole	1	3.360	5093 40 2

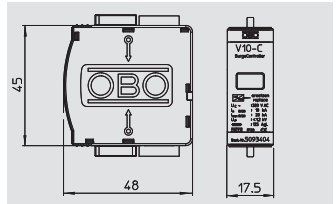
/pc.



## Cover, surge arrester 320 V

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V10-C 0-320	320	1-pole	1	3.510	5093 40 4

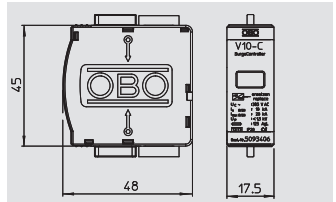
/pc.



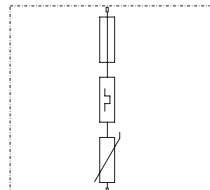
## Cover, surge arrester 385 V

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V10-C 0-385	385	1-pole	30	3.630	5093 40 6

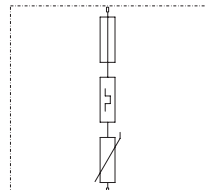
/pc.



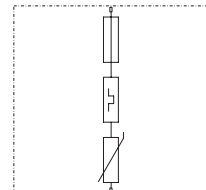
V10-C 0-150



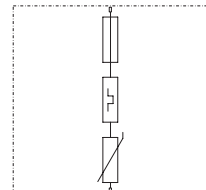
V10-C 0-280



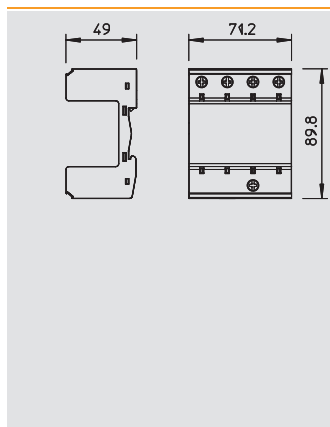
V10-C 0-320



V10-C 0-385



	V	150 V	230 V	320 V	385 V
Nominal voltage		150 V	230 V	320 V	385 V
SPD to EN 61643-11		Type 2+3	Type 2+3	Type 2+3	Type 2+3
SPD to IEC 61643-1		class II+III	class II+III	class II+III	class II+III
LPZ		1→3	1→3	1→3	1→3
Nominal discharge surge current (8/20)	kA	10 kA	10 kA	10 kA	10 kA
(Nennableitstoßstrom (8/20) [gesamt])	kA	10 kA	10 kA	10 kA	10 kA
Maximum discharge current	kA	20 kA	20 kA	20 kA	20 kA
Voltage protection level	kV	< 0,7 kV	< 1,1 kV	< 1,2 kV	< 1,5 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	125 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Division unit TE (17.5 mm)		1	1	1	1
Protection rating		IP20	IP20	IP20	IP20
<b>Item No.</b>		<b>5093 40 0</b>	<b>5093 40 2</b>	<b>5093 40 4</b>	<b>5093 40 6</b>



## Base, Multibase



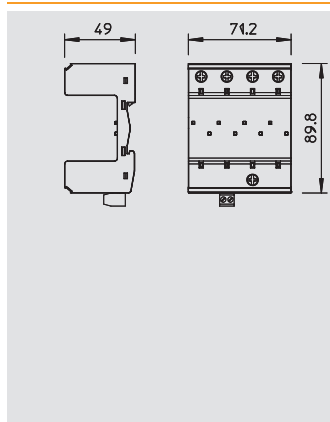
Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1</b>	1-pole	1	1	6.200	<b>5096 64 8</b>
<b>MB 2</b>	2-pole	2	1	11.200	<b>5096 65 3</b>
<b>MB 3</b>	3-pole	3	1	16.000	<b>5096 66 5</b>
<b>MB 4</b>	4-pole	4	1	21.000	<b>5096 68 0</b>



/pc.

MB...: Base for V25-B+C, V20-C and V10-C

- Suitable for V25-B+C, V20-C and V10-C
- Pre-mounted and ready for connection
- For TN systems
- Multifunction terminals for easy circuit of series-mounted devices
- Covers can be rotated through 180 degrees



## Base, Multibase with remote signalling



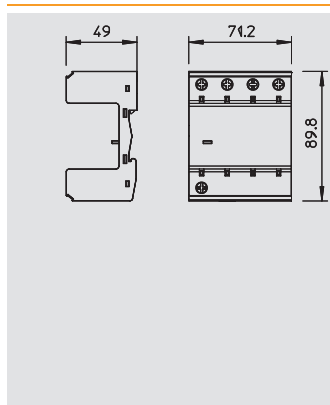
Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+FS</b>	1-pole	1	1	6.700	<b>5096 64 9</b>
<b>MB 2+FS</b>	2-pole	2	1	11.700	<b>5096 65 4</b>
<b>MB 3+FS</b>	3-pole	3	1	16.500	<b>5096 66 7</b>
<b>MB 4+FS</b>	4-pole	4	1	21.000	<b>5096 68 2</b>



/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- With remote signalling, potential-free NO contact, for function monitoring



## Base, Multibase + NPE



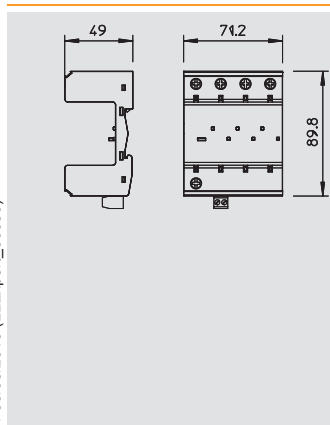
Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+NPE</b>	1 + NPE	2	1	11.500	<b>5096 65 0</b>
<b>MB 2+NPE</b>	2 + NPE	3	1	16.100	<b>5096 65 5</b>
<b>MB 3+NPE</b>	3 + NPE	4	1	20.000	<b>5096 66 9</b>



/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- For TN-S and TT network systems



## Base, Multibase + NPE with remote signalling



Type	Version	Division unit TE (17.5 mm)	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB 1+NPE+FS</b>	1 + NPE	2	1	11.600	<b>5096 65 1</b>
<b>MB 2+NPE+FS</b>	2 + NPE	3	1	16.000	<b>5096 65 7</b>
<b>MB 3+NPE+FS</b>	3 + NPE	4	1	21.300	<b>5096 67 1</b>



/pc.

MB...: Base for V 25-B+C, V 20-C and V10-C

- Suitable for V 25-B+C, V 20-C and V10-C
- Pre-mounted and ready for connection
- Multifunction terminals for easy connection to series-mounted devices
- Covers can be rotated through 180 degrees
- With remote signalling, potential-free NO contact, for function monitoring
- 3+1 protection circuit for TN-S and TT network systems

# Accessories, covers and bases V10



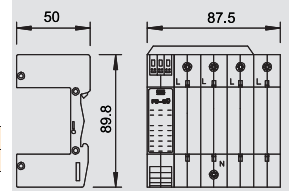
## Base, Multibase with fuse monitoring

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>V20-C U-3 FS-SU</b>	3-pole	1	26.000	<b>5096 35 9</b>
<b>V20-C U-4 FS-SU</b>	4-pole	1	33.000	<b>5096 36 7</b>

/pc.

V 20-C/U...: Base.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With voltage monitoring of phases and function monitoring of arrester upper part, remote signalling
- With remote signaling, potential-free changeover contact, for function monitoring
- Pre-mounted and ready for connection



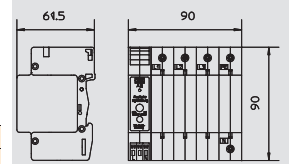
## Base, Multibase with acoustic signalling

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>V20-C U-2 AS</b>	2-pole	1	23.000	<b>5096 41 3</b>
<b>V20-C U-3 AS</b>	3-pole	1	29.000	<b>5096 42 1</b>
<b>V20-C U-4 AS</b>	4-pole	1	35.000	<b>5096 44 8</b>
<b>V20-C U-3+NPE-AS</b>	3 + NPE	1	32.500	<b>5096 37 2</b>

/pc.

V 20-C/U...: Base.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With remote signaling, potential-free changeover contact, for function monitoring
- With acoustic signalling for function monitoring, signal tone can be shut down for 24 h
- Pre-mounted and ready for connection



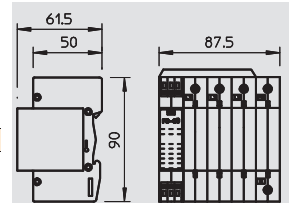
## Base, Multibase + NPE with fuse monitoring

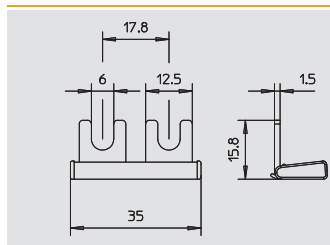
Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>V20-C U-3+NPE</b>	3-NPE with FS-SÜ	1	30.000	<b>5096 37 0</b>

/pc.

V 20-C/U...: Base.

- Suitable for V 25-B+C, V 20-C and V 10-C
- With voltage monitoring of phases and function monitoring of arrester upper part, remote signalling
- With remote signaling, potential-free changeover contact, for function monitoring
- For TN-S and TT network systems
- Pre-mounted and ready for connection



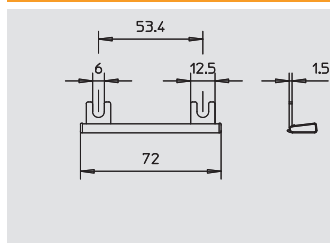


## Copper bridges with step width 17.6 mm

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>KB MB</b>	Step width 17.6 mm	10	0.900	<b>5089 66 0</b>

/pc.

The KB... bridges allow parallel switching of bases and poles of the MultiBase bases.  
The bridges are available in various widths.

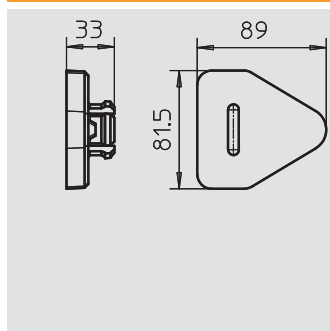


## Copper bridges with step width 53.4 mm

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>KB MB</b>	Step width 53.4 mm	10	1.470	<b>5089 66 2</b>

/pc.

The KB... bridges allow parallel switching of bases and poles of the MultiBase bases.  
The bridges are available in various widths.



## Shock Guard lock

Type	Colour	Version	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>MB-SG</b>	Blue	Locking system for covers	100	0.060	<b>5096 69 5</b>

**PA** Polyamide

/pc.

Shock Guard: Locking for connector technology on MultiBase bases

Locking system for the plug-in modules/covers  
Vibration and shock-tested  
Use in housing hole of the connection terminals  
Covers can be removed without tools



# Protection packages



OBO protection packages with surge arrester

- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Type 2 surge protection with arresting capacity to 40 kA (8/20) per pin
- Type 2 arrester, connectable with dynamic cut-off unit and function display
- Type 3 (fine protection device) in TC, SAT or TV version

The appropriate adapters and data cables are included in the protection package.

Application: Equipotential bonding and device protection, VDE and GS tested.



## Protection package, telecommunication

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>P-TK</b>	1 x V20-C/3+NPE 2 x FC-D 1 x FC-TAE-D	1	92.000	<b>5086 01 9</b>

/pc.



## Protection package, SAT applications

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>P-TK+SAT</b>	1 x V20-C/3+NPE 1 x FC-D 1 x FC-TAE-D 1 x FC-SAT-D	1	98.000	<b>5086 02 3</b>

/pc.

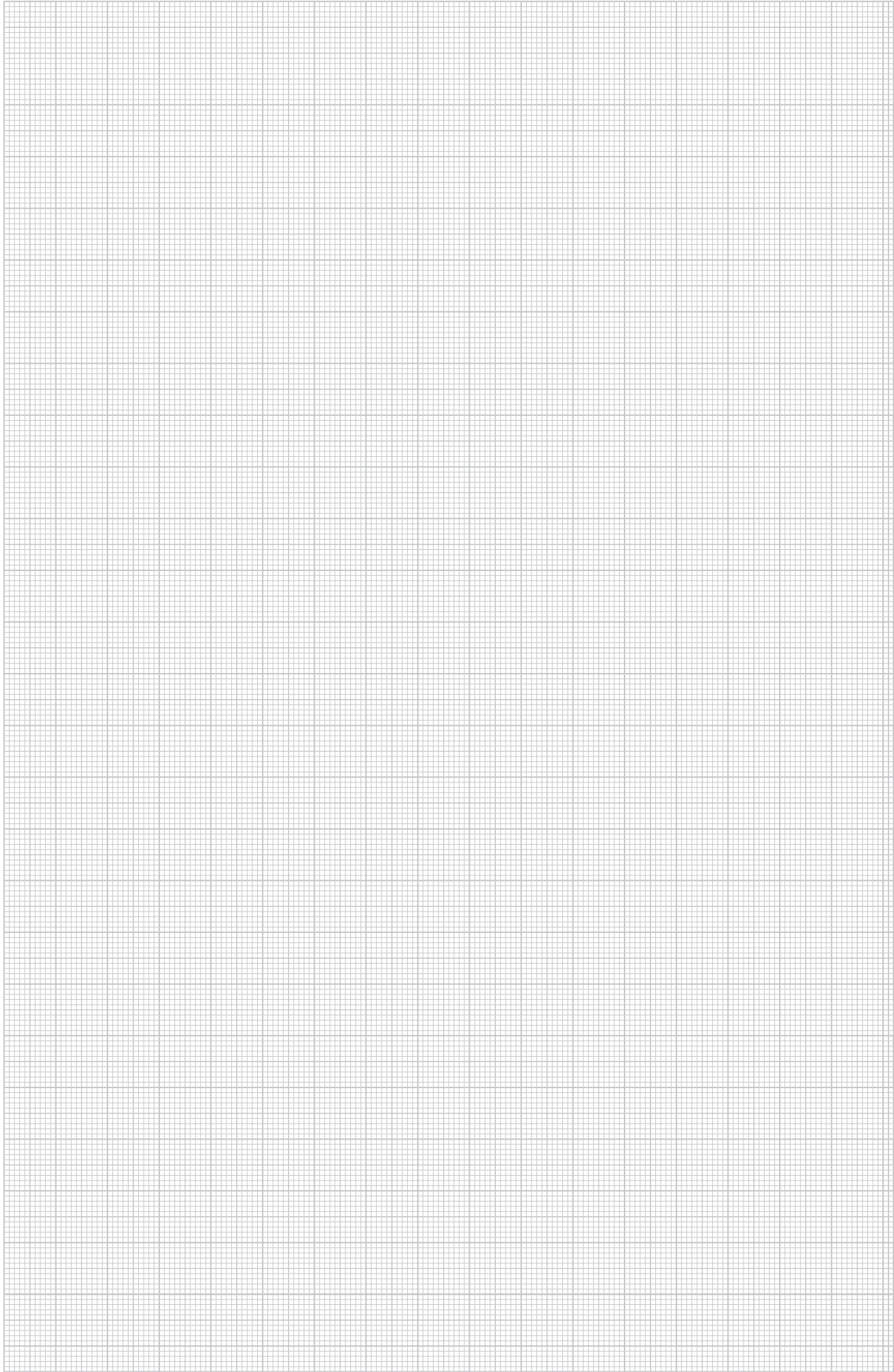


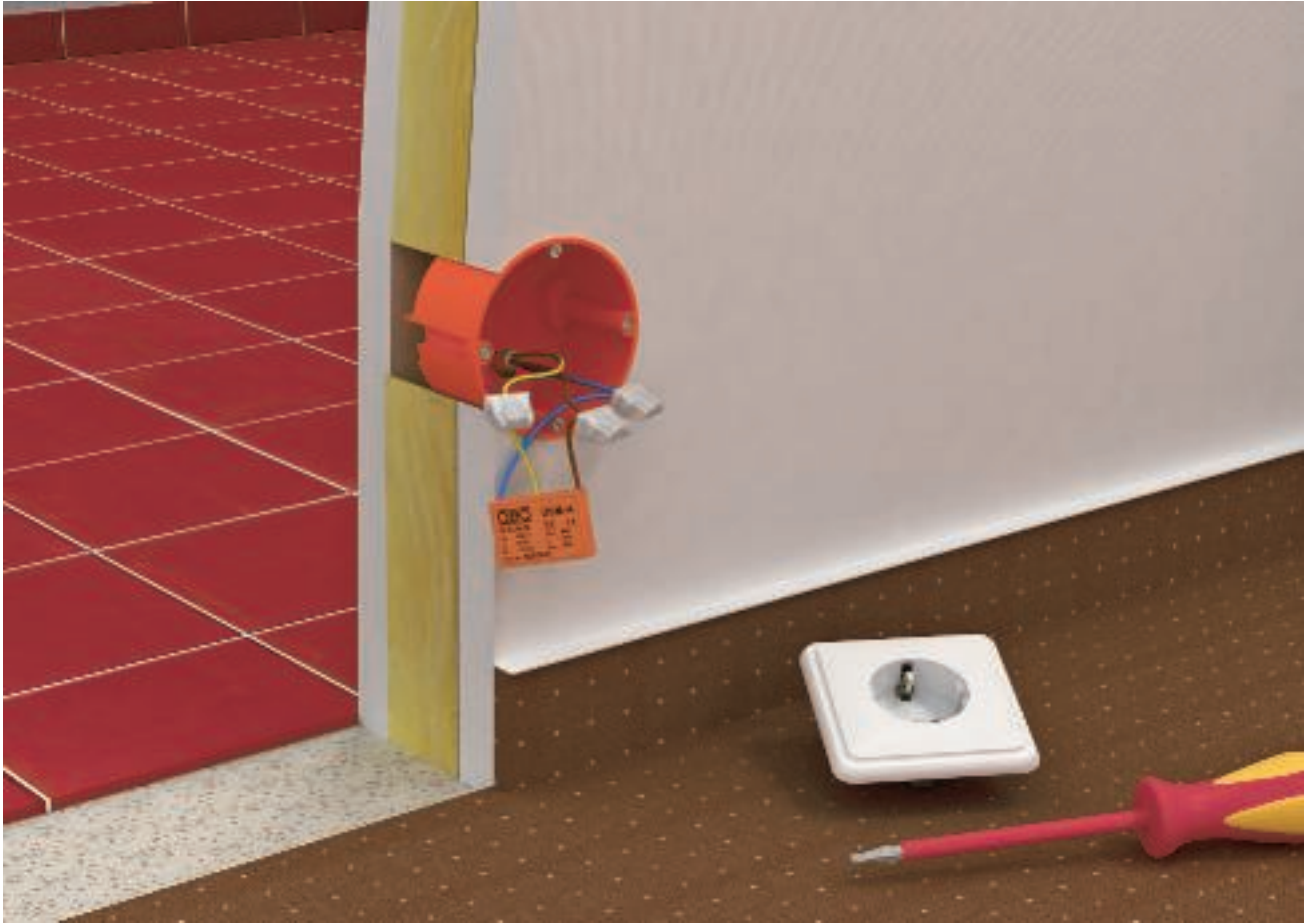
## Protection package TV

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>P-TK+TV</b>	1 x V20-C/3+NPE 1 x FC-D 1 x FC-TAE-D 1 x FC-TV-D	1	98.000	<b>5086 02 7</b>




/pc.







## Surge protection energy technology, arrester, Type 3

	Fine power protection	Plug-in	188
		Fixed installation	190
		Series mounting	193



# Fine power protection, plug-in



Surge protection/fine network protection, Type 3, for Schuko systems

- VDE and GS tested and with child protection
- Combined protection for power supply with SAT, TV or telephone protection
- Incl. adapter cable (0.5 m)
- Telephone protection (TAE-D, RJ-D and ISDN-D) is DSL-compatible
- Function display on device

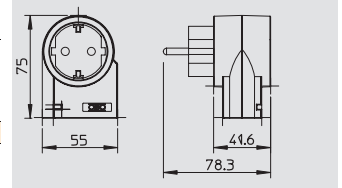
Application: Protection adapter directly on end consumer.



## FineController for Schuko socket

Type	Country version	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FC-D</b>	EN	Pure white	1	12.000	<b>5092 80 0</b>

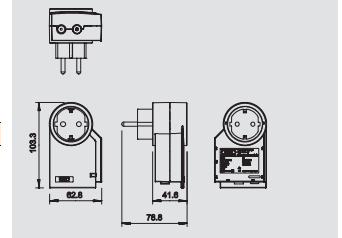
/pc.



## FineController for video, TV and HiFi systems

Type	Country version	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FC-TV-D</b>	EN	Pure white	1	18.000	<b>5092 80 8</b>

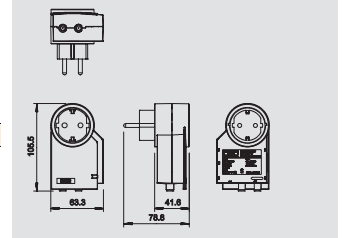
/pc.



## FineController for SAT systems and receivers

Type	Country version	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FC-SAT-D</b>	EN	Pure white	1	18.000	<b>5092 81 6</b>

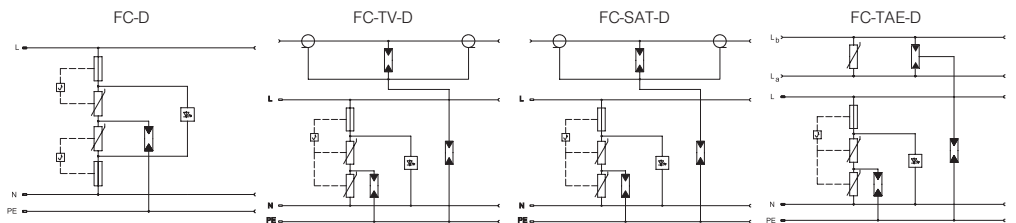
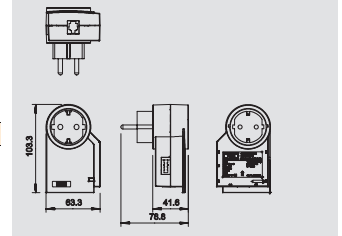
/pc.



## FineController for telephone systems and terminals

Type	Country version	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FC-TAE-D</b>	EN	Pure white	1	18.000	<b>5092 82 4</b>

/pc.



Nominal voltage	V	230 V	230 V	230 V	230 V
Maximum continuous voltage	V	275 V	275 V	275 V	275 V
SPD to EN 61643-11		Type 3	Type 3	Type 3	Type 3
SPD to IEC 61643-1		class III	class III	class III	class III
LPZ		2→3	2→3	2→3	2→3
Nominal discharge surge current (8/20)	kA	3 kA	3 kA	3 kA	3 kA
Protection level (L-N)	kV	< 1,2 kV	< 1,2 kV	< 1,2 kV	< 1,2 kV
Protection level (N-PE)	kV	< 1,5 kV	< 1,5 kV	< 1,5 kV	< 1,5 kV
Maximum back-up fuse	A	16 A	16 A	16 A	16 A
Response time	ns	<25 ns	<25 ns	<25 ns	<25 ns
<b>Item No.</b>		<b>5092 80 0</b>	<b>5092 80 8</b>	<b>5092 81 6</b>	<b>5092 82 4</b>

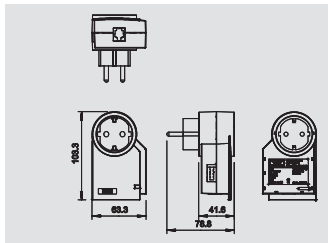


Surge protection/fine network protection, Type 3, for Schuko systems



- VDE and GS tested and with child protection
- Combined protection for power supply with SAT, TV or telephone protection
- Incl. adapter cable (0.5 m)
- Telephone protection (TAE-D, RJ-D and ISDN-D) is DSL-compatible
- Function display on device

Application: Protection adapter directly on end consumer.

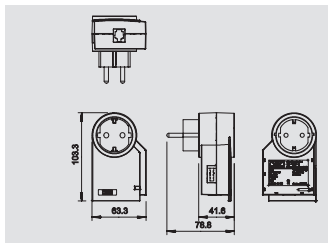


### FineController for ISDN telephone systems and terminals

Type	Country version	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FC-ISDN-D</b>	EN	Pure white	1	18.000	<b>5092 81 2</b>



/pc.

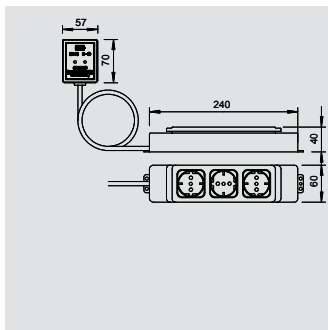


### FineController for telephone systems with RJ11

Type	Country version	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FC-RJ-D</b>	EN	Pure white	1	18.000	<b>5092 82 8</b>



/pc.

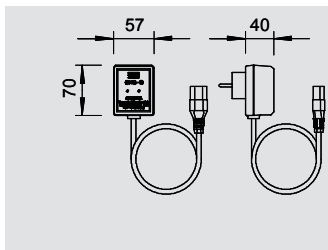


### Fine power protection/socket bar

Type	Country version	Colour	Connection cable length m	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>CNS 3-D-D</b>	EN	Black	2	1	65.000	<b>5092 70 1</b>



/pc.

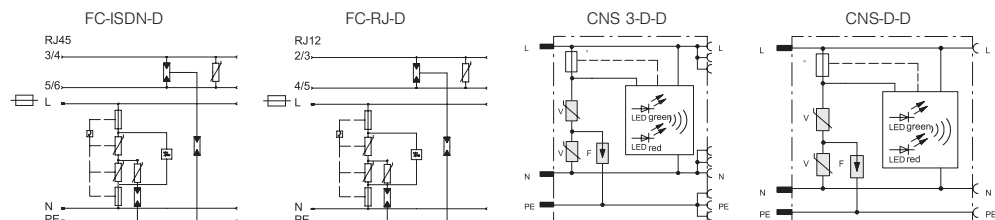


### Fine power protection/adapter with cold device connector

Type	Country version	Colour	Connection cable length m	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>CNS-D-D</b>	EN	Light grey	1.5	1	30.000	<b>5092 60 4</b>



/pc.



	FC-ISDN-D	FC-RJ-D	CNS 3-D-D	CNS-D-D
Nominal voltage	V 230 V	V 230 V	V 230 V	V 230 V
Maximum continuous voltage	V 275 V	V 275 V	V 255 V	V 255 V
SPD to EN 61643-11	Type 3	Type 3	Type 3	Type 3
SPD to IEC 61643-1	class III	class III	class III	class III
LPZ	2→3	2→3	2→3	2→3
Nominal discharge surge current (8/20)	kA 3 kA	kA 3 kA	kA 2.5 kA	kA 2.5 kA
Protection level (L-N)	kV < 1,2 kV	kV < 1,2 kV	kV < 1,0 kV	kV < 1,0 kV
Protection level (N-PE)	kV < 1,5 kV	kV < 1,5 kV	kV < 1,5 kV	kV < 1,5 kV
Maximum back-up fuse	A 16 A	A 16 A	A 16 A	A 16 A
Response time	ns <25 ns	ns <25 ns	ns <25 ns	ns <25 ns
Voltage protection level	kV <1,5 kV	kV <1,5 kV	kV <1,5 kV	kV <1,5 kV
Nominal load current	A 16 A	A 16 A	A 16 A	A 16 A
Maximum discharge current	kA 7 kA	kA 7 kA	kA 7 kA	kA 7 kA
<b>Item No.</b>	<b>5092 81 2</b>	<b>5092 82 8</b>	<b>5092 70 1</b>	<b>5092 60 4</b>



# Fine power protection, fixed installation



Surge protection/fine network protection, Type 3

- ÜSM-A with acoustic defect message
- Y connection
- Small dimensions
- ÜSM-A-4 and TW with bracket and partition function for installation in mounting boxes

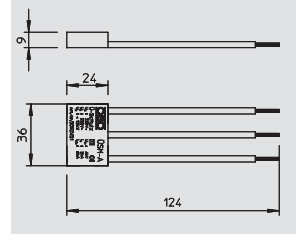
Application: Can be used in any installation system.



## Fine power protection for all installation systems

Type	Signalling on device	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ÜSM-A</b>	Audible	Acoustic function display	1	1.500	<b>5092 45 1</b>

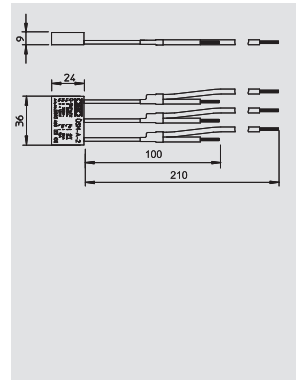
/pc.



## Fine power protection for through wiring

Type	Signalling on device	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ÜSM-A-2</b>	Audible	V connection	1	2.200	<b>5092 46 0</b>

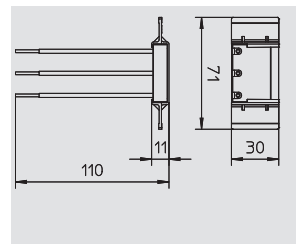
/pc.



## Fine power protection with holder for mounting boxes GB2 and GB3

Type	Signalling on device	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ÜSM-A-4</b>	Audible	Incl. holder with partition function	1	2.000	<b>5092 47 2</b>

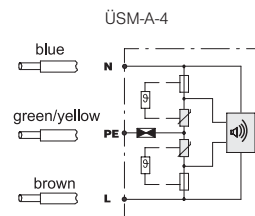
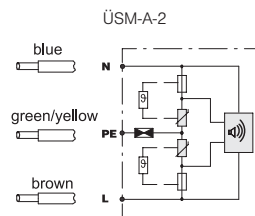
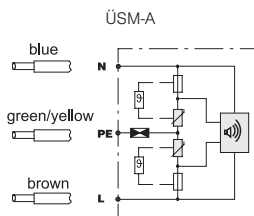
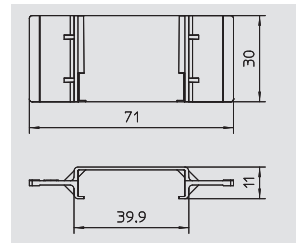
/pc.



## Holder for installation in GB2 and GB3 mounting boxes

Type	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ÜSM-A-TW</b>	Holder with partition function	1	0.500	<b>5092 47 0</b>

/pc.



Nominal voltage	V	230 V	230 V	230 V
Maximum continuous voltage	V	255 V	255 V	255 V
SPD to EN 61643-11		Type 3	Type 3	Type 3
SPD to IEC 61643-1		class III	class III	class III
LPZ		2→3	2→3	2→3
Nominal discharge surge current (8/20)	kA	3 kA	3 kA	3 kA
Protection level (L-N)	kV	< 1,3 kV	< 1,3 kV	< 1,3 kV
Protection level (N-PE)	kV	< 1,5 kV	< 1,5 kV	< 1,5 kV
Maximum back-up fuse	A	16 A	16 A	16 A
Response time	ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	°C	-15 - +60 °C	-15 - +60 °C	-15 - +60 °C
Maximum discharge current	kA			6 kA
Nominal load current	A			16 A
<b>Item No.</b>		<b>5092 45 1</b>	<b>5092 46 0</b>	<b>5092 47 2</b>



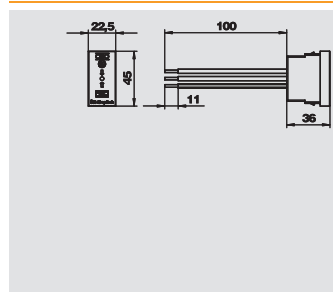
# Fine power protection, fixed installation

Surge protection/fine network protection, Type 3

- ÜSM-A with acoustic defect message
- Y connection
- Small dimensions
- ÜSM-A-4 and TW with bracket and partition function for installation in mounting boxes



Application: Can be used in any installation system.

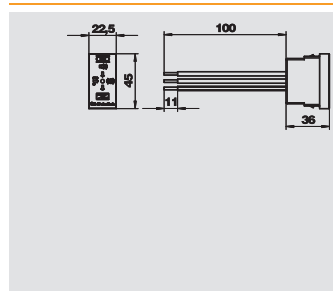


## Fine power protection/dado duct installation Modul 45

Type	Colour	Signalling on device	Pack. pcs	Weight kg/100 pcs.	Item No.
USS 45-O-RW	Pure white	Visual	1	2.411	6117 47 3
USS 45-O-ALU	Aluminium paint	Visual	1	2.411	6117 47 5



/pc.

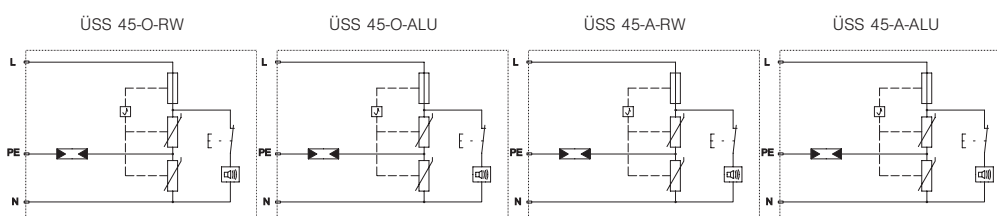


## Fine power protection/dado duct installation Modul 45

Type	Colour	Signalling on device	Pack. pcs	Weight kg/100 pcs.	Item No.
USS 45-A-RW	Pure white	Audible	1	2.800	6117 46 5
USS 45-A-ALU	Aluminium paint	Audible	1	2.800	6117 46 7



/pc.



	ÜSS 45-O-RW	ÜSS 45-O-ALU	ÜSS 45-A-RW	ÜSS 45-A-ALU
Nominal voltage	V 230 V	V 230 V	V 230 V	V 230 V
Maximum continuous voltage	V 255 V	V 255 V	V 255 V	V 255 V
SPD to EN 61643-11	Type 3	Type 3	Type 3	Type 3
SPD to IEC 61643-1	class III	class III	class III	class III
LPZ	2-3	2-3	2-3	2-3
Nominal discharge surge current (8/20)	kA 2.5 kA	kA 2.5 kA	kA 2.5 kA	kA 2.5 kA
Protection level (L-N)	kV < 1,5 kV	kV < 1,5 kV	kV < 1,5 kV	kV < 1,5 kV
Protection level (N-PE)	kV < 1,5 kV	kV < 1,5 kV	kV < 1,5 kV	kV < 1,5 kV
Maximum back-up fuse	A 16 A	A 16 A	A 16 A	A 16 A
Response time	ns 25 ns	ns 25 ns	ns 25 ns	ns 25 ns
Temperature range	°C -25 - +45 °C	°C -25 - +45 °C	°C -25 - +45 °C	°C -25 - +45 °C
<b>Item No.</b>	<b>6117 47 3</b>	<b>6117 47 5</b>	<b>6117 46 5</b>	<b>6117 46 7</b>

Surge protection, arrester, Type 3



02 TBS-Katalog\_2010\_Neuer\_Stand / en / 30/03/2010 (LLEXPOR\_00986)

# Fine power protection, fixed installation



Surge protection/fine network protection, Type 3

- ÜSM-A with acoustic defect message
- Y connection
- Small dimensions
- ÜSM-A-4 and TW with bracket and partition function for installation in mounting boxes

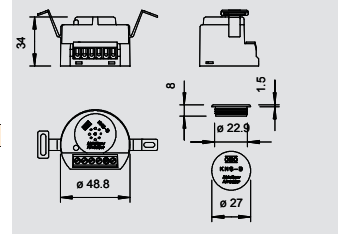
Application: Can be used in any installation system.



## Fine power protection/device for concealed box

Type	Signalling on device	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>KNS-D</b>	Visual and audible	1	8.500	<b>5092 50 7</b>

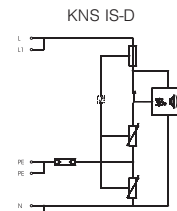
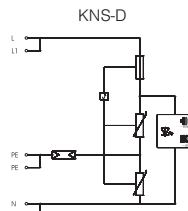
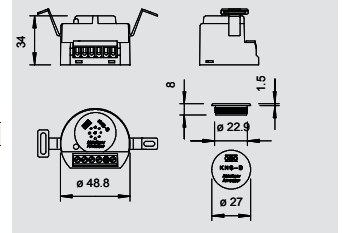
/pc.



## Fine power protection/device for concealed box

Type	Version	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>KNS IS-D</b>	Visual and acoustic signal with switch-off during insulation measurement.	1	8.500	<b>5092 52 3</b>

/pc.



Maximum continuous voltage	V	255 V	255 V
SPD to EN 61643-11		Type 3	Type 3
SPD to IEC 61643-1		class III	class III
LPZ		2-3	2-3
Nominal discharge surge current (8/20)	kA	1.5 kA	1.5 kA
Maximum discharge current	kA	5 kA	5 kA
Nominal load current	A	16 A	16 A
Protection level (L-N / L/N-PE)	V	< 1100 / < 1300 V	< 1100 / < 1300 V
Response time	ns	< 25 ns	< 25 ns
Connection cross-section, rigid	mm <sup>2</sup>	0,5 - 1,5 mm <sup>2</sup>	0,5 - 1,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,5 - 1,5 mm <sup>2</sup>	0,5 - 1,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,5 - 1,5 mm <sup>2</sup>	0,5 - 1,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5092 50 7</b>	<b>5092 52 3</b>

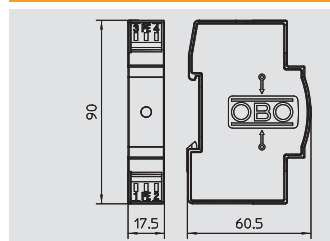


Surge protection device, fine protection Type 3 for distributor installation



- Suitable for DC and AC voltage systems
- With visual function display
- With installation-friendly, screwless connection clamps
- In a space-saving 17.5 mm grid
- Y connection

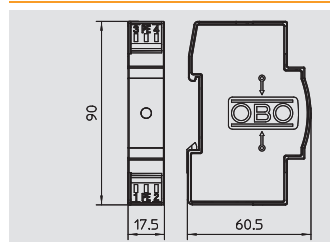
Application: Universal use on 35 mm U-rail in every normal commercially available distribution housing.



### MCR protection for 2-pin for power supply, 12 V

Type	Version	U <sub>max AC</sub> V	U <sub>max DC</sub> V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF12-AC DC</b>	12 V version	13.5	18	1	9.000	<b>5097 45 3</b>

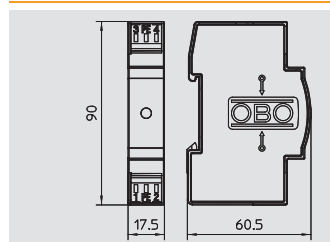
/pc.



### MCR protection for 2-pin for power supply, 24 V

Type	Version	U <sub>max AC</sub> V	U <sub>max DC</sub> V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF24-AC/DC</b>	24 V version	34	46	1	8.000	<b>5097 60 7</b>

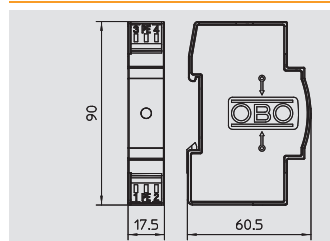
/pc.



### MCR protection for 2-pin for power supply, 48 V

Type	Version	U <sub>max AC</sub> V	U <sub>max DC</sub> V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF48-AC/DC</b>	48 V version	60	80	1	8.000	<b>5097 61 5</b>

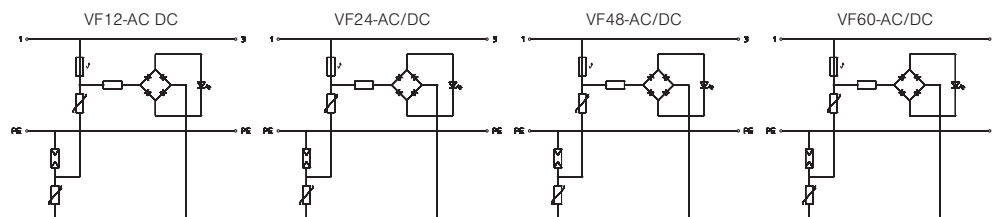
/pc.



### MCR protection for 2-pin for power supply, 60 V

Type	Version	U <sub>max AC</sub> V	U <sub>max DC</sub> V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF60-AC/DC</b>	60 V version	80	110	1	8.000	<b>5097 62 3</b>

/pc.



U <sub>max AC</sub>	V	13,5 V	34 V	60 V	80 V
U <sub>max DC</sub>	V	18 V	46 V	80 V	110 V
SPD to EN 61643-11		Type 3	Type 3	Type 3	Type 3
SPD to IEC 61643-1		class III	class III	class III	class III
LPZ		2→3	2→3	2→3	2→3
Nominal discharge surge current (8/20)	kA	0,7 kA	0,7 kA	0,7 kA	0,7 kA
Maximum discharge current	kA	2 kA	2 kA	2 kA	2 kA
Nominal load current	A	20 A	20 A	20 A	20 A
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection level wire/wire	V	<110 V	<130 V	<220 V	<280 V
Protection level wire/earth	V	<1200 V	<1200 V	<1200 V	<1200 V
Division unit TE (17.5 mm)		1	1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 45 3</b>	<b>5097 60 7</b>	<b>5097 61 5</b>	<b>5097 62 3</b>



# Fine power protection, series installation



Surge protection device, fine protection Type 3 for distributor installation

- Suitable for DC and AC voltage systems
- With visual function display
- With installation-friendly, screwless connection clamps
- In a space-saving 17.5 mm grid
- Y connection

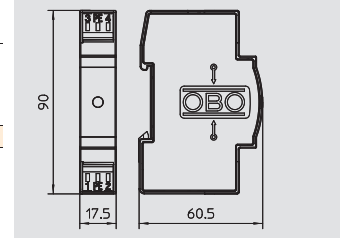
Application: Universal use on 35 mm U-rail in every normal commercially available distribution housing.



## MCR protection for 2-pin for power supply, 110 V

Type	Version	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF110-AC DC</b>	110 V version	150	200	1	8.000	<b>5097 63 1</b>

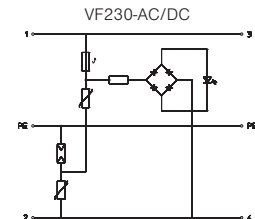
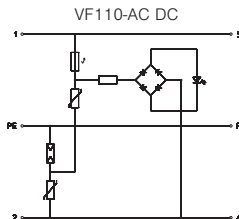
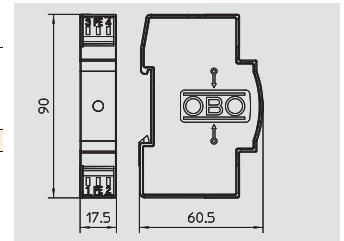
/pc.



## MCR protection for 2-pin for power supply, 230 V

Type	Version	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF230-AC/DC</b>	230 V version	255	350	1	8.000	<b>5097 65 0</b>

/pc.



U <sub>max</sub> AC	V	150 V	255 V
U <sub>max</sub> DC	V	200 V	350 V
SPD to EN 61643-11		Type 3	Type 3
SPD to IEC 61643-1		class III	class III
LPZ		2-3	2-3
Nominal discharge surge current (8/20)	kA	2 kA	2,5 kA
Maximum discharge current	kA	6,5 kA	7 kA
Nominal load current	A	20 A	20 A
Response time	ns	< 25 ns	< 25 ns
Temperature range	ø °C	-40 - +80 °C	-40 - +80 °C
Protection level wire/wire	V	< 500 V	< 1000 V
Protection level wire/earth	V	< 1400 V	< 1400 V
Division unit TE (17.5 mm)		1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 63 1</b>	<b>5097 65 0</b>



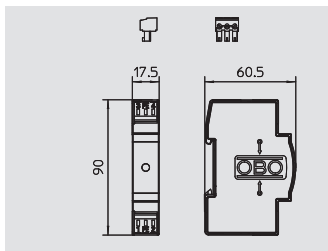
# Fine power protection, series installation

Type 3 surge protection/fine network protection with remote signalling

- With remote signalling: Potential-free changeover contact
- Suitable for AC systems
- With visual function display
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- Y circuit



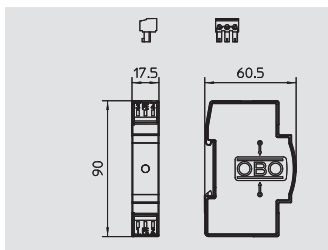
Application: Universal use on 35 mm hat profile rails in any standard distributor housing.



## MCR protection for 2-pin for power supply with remote signalling, 24 V AC/DC

Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF24-AC/DC-FS</b>	34	46	1	6.700	<b>5097 82 0</b>

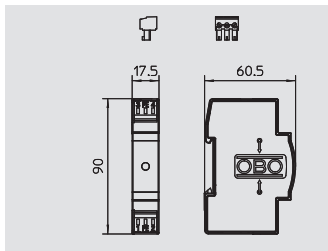
/pc.



## MCR protection for 2-pin for power supply with remote signalling, 110 V AC/DC

Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF110-AC DC-FS</b>	150	200	1	6.900	<b>5097 84 6</b>

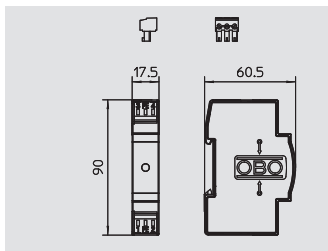
/pc.



## MCR protection for 2-pin for power supply with remote signalling, 230 V AC/DC

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF230-AC/DC-FS</b>	350	255	1	6.900	<b>5097 85 2</b>

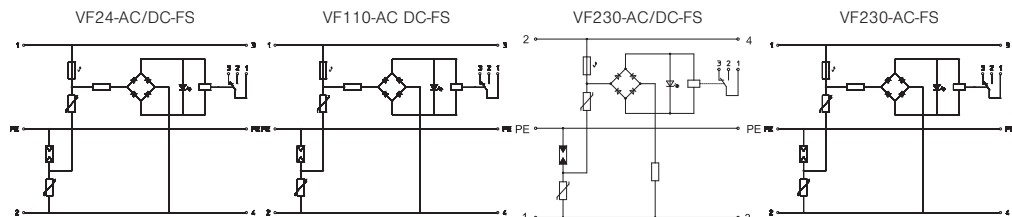
/pc.



## MCR protection for 2-pin for power supply with remote signalling, 230 V AC

Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF230-AC-FS</b>	255	—	1	6.900	<b>5097 85 8</b>

/pc.



U <sub>max</sub> AC	V	34 V	150 V	255 V	255 V
U <sub>max</sub> DC	V	46 V	200 V	350 V	—
SPD to EN 61643-11		Type 3	Type 3	Type 3	Type 3
SPD to IEC 61643-1		class III	class III	class III	class III
LPZ		2-3	2-3	2-3	2-3
Nominal discharge surge current (8/20)	kA	0,7 kA	2 kA	2,5 kA	2,5 kA
Maximum discharge current	kA	2 kA	6,5 kA	7 kA	7 kA
Nominal load current	A	20 A	20 A	20 A	20 A
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection level wire/wire	V	<160 V	<500 V	<1060 V	<1060 V
Protection level wire/earth	V	<1200 V	<1300 V	<1400 V	<1400 V
Division unit TE (17.5 mm)		1	1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 82 0</b>	<b>5097 84 6</b>	<b>5097 85 2</b>	<b>5097 85 8</b>

Always indicate the article number when ordering.

# Fine power protection, series installation



Type 3 surge protection/fine network protection with leak current-free remote signalling

- With remote signalling: Potential-free NC contact for function monitoring
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- Y circuit

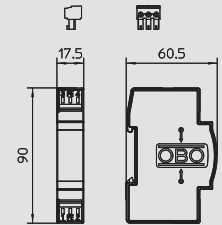
Application: Universal use on 35 mm hat profile rails in any standard distributor housing.



## MCR protection for 2-pin for power supply with leak current-free remote signalling, 24 V AC/DC

Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF2-24-AC/DC-FS</b>	34	46	1	5.500	<b>5097 93 1</b>

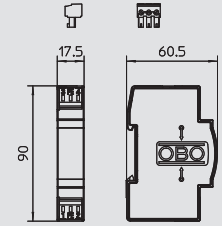
/pc.



## MCR protection for 2-pin for power supply with leak current-free remote signalling, 110 V AC/DC

Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF2-110-AC/DCFS</b>	150	200	1	5.600	<b>5097 93 5</b>

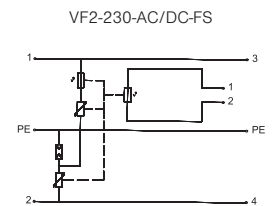
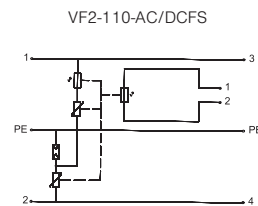
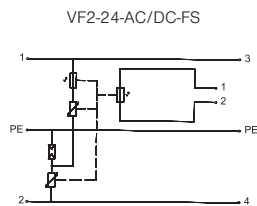
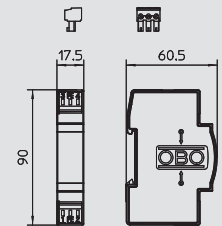
/pc.



## MCR protection for 2-pin for power supply with leak current-free remote signalling, 230 V AC/DC

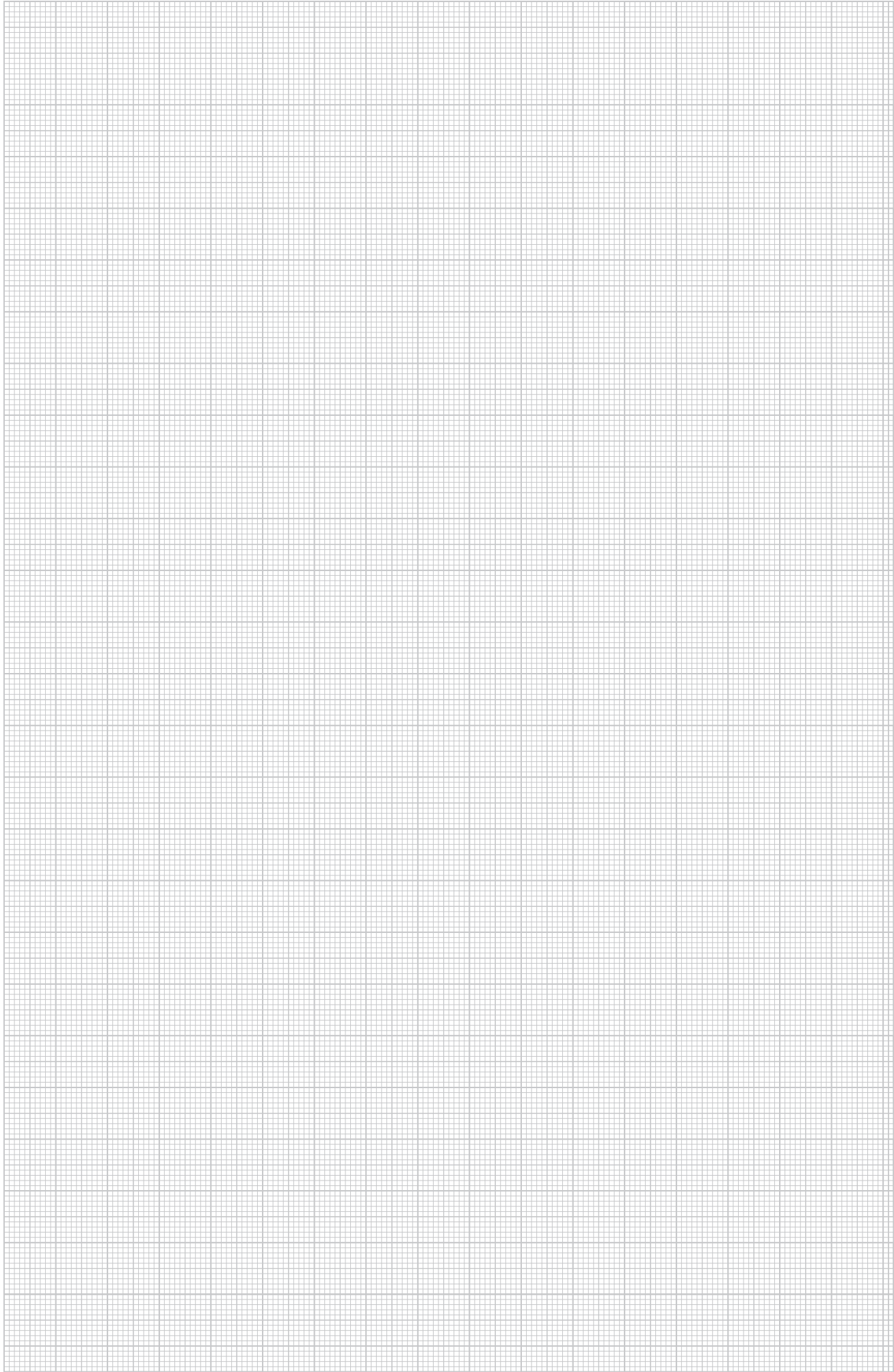
Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF2-230-AC/DC-FS</b>	255	350	1	5.700	<b>5097 93 9</b>

/pc.



U <sub>max</sub> AC	V	34 V	150 V	255 V
U <sub>max</sub> DC	V	46 V	200 V	350 V
SPD to EN 61643-11		Type 3	Type 3	Type 3
SPD to IEC 61643-1		class III	class III	class III
LPZ		2-3	2-3	2-3
Nominal discharge surge current (8/20)	kA	2.5 kA	2.5 kA	2.5 kA
Maximum discharge current	kA	7 kA	7 kA	7 kA
Nominal load current	A	20 A	20 A	20 A
Response time	ns	<25 ns	<25 ns	<25 ns
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection level wire/wire	V	< 130 V	< 220 V	< 1000 V
Protection level wire/earth	V	< 1200 V	< 1200 V	< 1400 V
Division unit TE (17.5 mm)		1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 93 1</b>	<b>5097 93 5</b>	<b>5097 93 9</b>







## Photovoltaic systems

	Photovoltaic systems	Lightning current and surge arrester, Type 1+2, photovoltaic systems 600 V DC	200
		Lightning current and surge arrester, Type 1+2, photovoltaic systems 900 V DC	201
		Surge arrester, type 2, photovoltaics 600 V DC	202
		Surge arrester, type 2, photovoltaics 1,000 V DC	203
		Photovoltaic system solution with MC4 connector	204
		System solution with MC4 connector, un-equipped	205
		Photovoltaic housing with connection terminals	206
		Photovoltaic housing with V-Tec entry	207
		Surge arrester, system solution, photovoltaics AC + DC	208
		Photovoltaic covers	209
		Photovoltaic bases	210



# Lightning current and surge arrester, Type 1+2, photovoltaic systems 600 V DC



Combination arrester, type 2, for photovoltaic systems

- Error-resistant Y circuit for use according to VDE 0100-712 (IEC 60364-7-712)
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin

- Low DC protection level: < 2.6 kV (Voc max = 600 V DC)
- Arrester, connectable with thermodynamic cut-off unit and function display
- Encapsulated, non-blow out zinc oxide varistor arrester for use in distributor housings

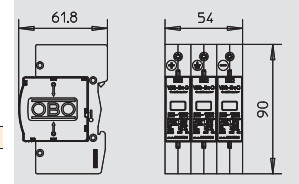
Application: PV systems with separated insulated lightning protection system



## Complete photovoltaic block V50, 600 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V50-B+C 3-PH600</b>	600	3-pole for PV systems	1	41.000	<b>5093 62 3</b>

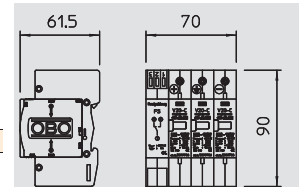
/pc.



## Complete photovoltaic block V50, 600 V DC with IR

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V50-B+C 3PHFS600</b>	600	3-pole for PV systems with FS	1	49.600	<b>5093 62 5</b>

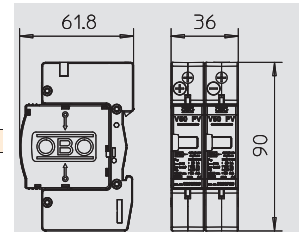
/pc.



## Complete photovoltaic block V50, 600 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V50-B+C 2-PH600</b>	600	2-pole for earthed PV systems	1	30.000	<b>5093 62 8</b>

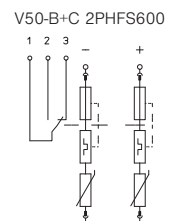
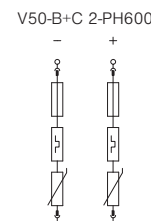
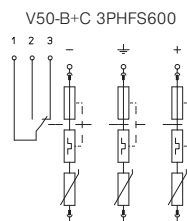
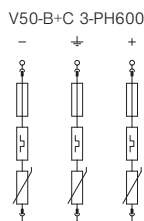
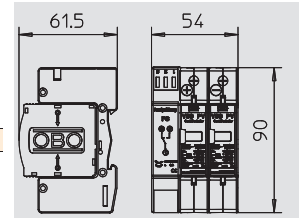
/pc.



## Complete photovoltaic block V50, 600 V DC with IR

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V50-B+C 2PHFS600</b>	600	2-pole for earthed PV systems with FS	1	24.400	<b>5093 62 9</b>

/pc.



U <sub>max</sub> DC	V	600 V	600 V	600 V	600 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2	Type 1+2
LPZ		0→2	0→2	0→2	0→2
Lightning impulse current (10/350)	kA	12,5 kA	12,5 kA	12,5 kA	12,5 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 2,6 kV	< 2,6 kV	< 2,6 kV	< 2,6 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		3	4	2	3
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5093 62 3</b>	<b>5093 62 5</b>	<b>5093 62 8</b>	<b>5093 62 9</b>



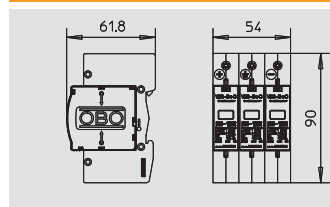
# Lightning current and surge arrester, Type 1+2, photovoltaic systems 900 V DC

Combination arrester, type 2, for photovoltaic systems



- Error-resistant Y circuit for use according to VDE 0100-712 (IEC 60364-7-712)
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 7 kA (10/350) and 50 kA (8/20) per pin
- Low DC protection level: < 3.0 kV (Voc max = 900 V DC)
- Arrester, connectable with thermodynamic cut-off unit and function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

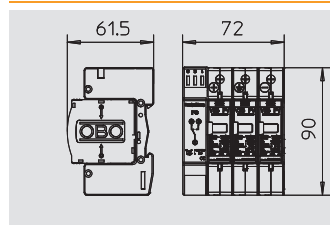
Application: PV systems with separated insulated lightning protection system



## Complete photovoltaic block V25, 900 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3-PH900	900	3-pole for PV systems	1	42.200	5097 44 7

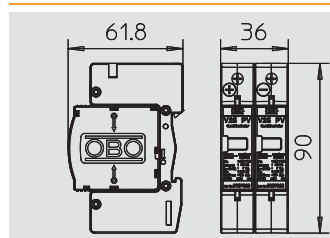
/pc.



## Complete photovoltaic block V25, 900 V DC with IR

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 3PHFS900	900	3-pole for PV systems with FS	1	53.500	5097 44 8

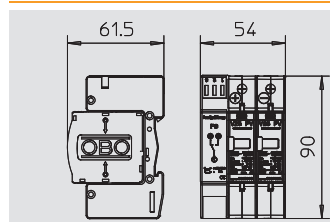
/pc.



## Complete photovoltaic block V25, 900 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 2-PH900	900	2-pole for earthed PV systems	1	30.800	5097 45 7

/pc.



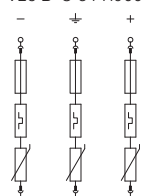
## Complete photovoltaic block V25, 900 V DC with IR

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V25-B+C 2PHFS900	900	2-pole for earthed PV systems with FS	1	37.000	5097 45 8

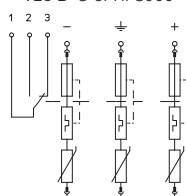
/pc.



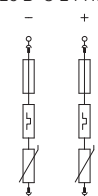
V25-B+C 3-PH900



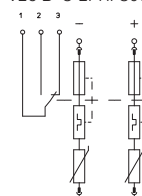
V25-B+C 3PHFS900



V25-B+C 2-PH900



V25-B+C 2PHFS900



U <sub>max</sub> DC	V	900 V	900 V	900 V	900 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 1+2	Type 1+2
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	7 kA	7 kA	7 kA	7 kA
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	30 kA	30 kA
Maximum discharge current	kA	50 kA	50 kA	50 kA	50 kA
Voltage protection level	kV	< 3,0 kV	< 3,0 kV	< 3,0 kV	< 3,0 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		3	4	2	3
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
Item No.		5097 44 7	5097 44 8	5097 45 7	5097 45 8



# Surge arrester, Type 2, photovoltaics 600 V DC



Surge arrester, Type 2, for photovoltaic systems

- Error-resistant Y circuit for use according to VDE 0100-712 (IEC 60364-7-712)
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Low DC protection level: < 2.6 kV (Voc max = 600 V DC)
- Arrestor, connectable with thermodynamic cut-off unit and function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

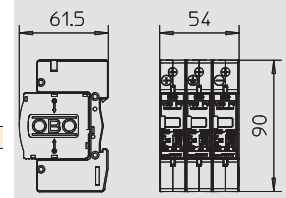
Application: PV systems with or without separated insulated lightning protection system



## Complete photovoltaic block V20, 600 V DC

Type	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 3PH-600</b>	600	3-pole for PV systems	1	33.500	<b>5094 60 5</b>

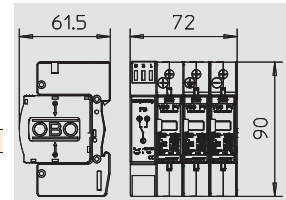
/pc.



## Complete photovoltaic block V20, 600 V DC with IR

Type	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 3PHFS-600</b>	600	3-pole for PV systems with FS	1	41.500	<b>5094 57 6</b>

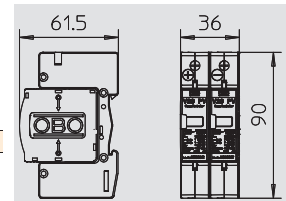
/pc.



## Complete photovoltaic block V20, 600 V DC

Type	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 2PH-600</b>	600	2-pole for earthed PV systems	1	25.000	<b>5094 61 3</b>

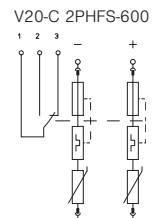
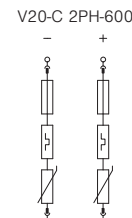
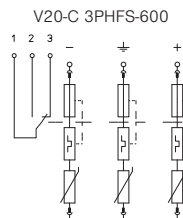
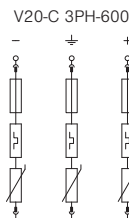
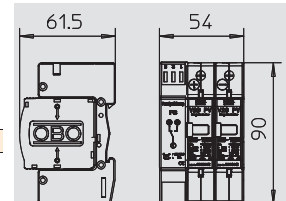
/pc.



## Complete photovoltaic block V20, 600 V DC with IR

Type	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 2PHFS-600</b>	600	2-pole for earthed PV systems with FS	1	29.000	<b>5094 57 2</b>

/pc.



U max DC	V	600 V	600 V	600 V	600 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
LPZ		1-2	1-2	1-2	1-2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA	20 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 2,6 kV	< 2,6 kV	< 2,6 kV	< 2,6 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		3	4	2	3
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
<b>Item No.</b>		<b>5094 60 5</b>	<b>5094 57 6</b>	<b>5094 61 3</b>	<b>5094 57 2</b>



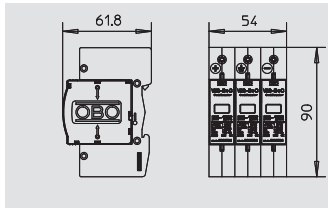
# Surge arrester, Type 2, photovoltaics 1,000 V DC

Surge arrester, Type 2, for photovoltaic systems



- Error-resistant Y circuit for use according to VDE 0100-712 (IEC 60364-7-712)
- For surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 40 kA (8/20) per pin
- Low DC protection level: < 4.0 kV (Voc max = 1,000 V DC)
- Arrester, connectable with thermodynamic cut-off unit and function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

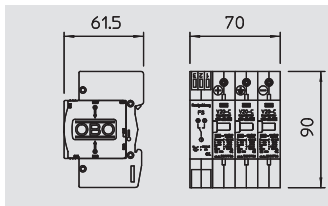
Application: PV systems with or without separated insulated lightning protection system



## Complete photovoltaic block V20, 1,000 V DC

Type	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3-PH-1000	1000	3-pole for PV systems	1	36.500	5094 60 8

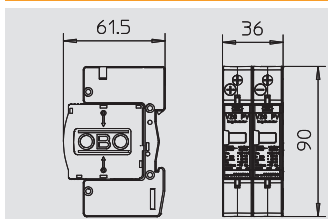
/pc.



## Complete photovoltaic block V20, 1,000 V DC with IR

Type	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 3PHFS-1000	1000	3-pole for PV systems with FS	1	44.500	5094 57 4

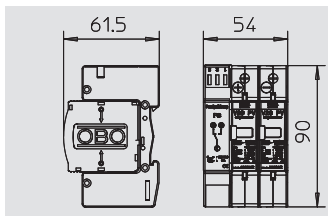
/pc.



## Complete photovoltaic block V20, 1,000 V DC

Type	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2-PH-1000	1000	2-pole for earthed PV systems	1	27.000	5094 61 7

/pc.



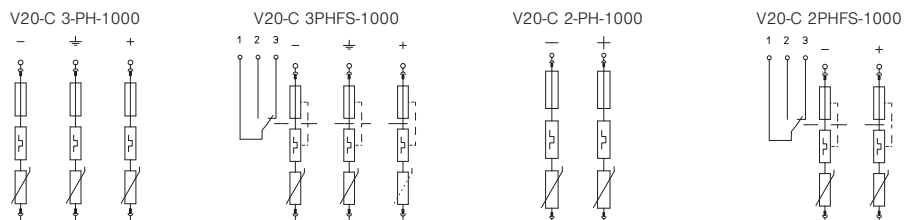
## Complete photovoltaic block V20, 1,000 V DC with IR

Type	U max DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C 2PHFS-1000	1000	2-pole for earthed PV systems with FS	1	31.000	5094 61 5

/pc.



02\_TBS-Katalog\_2010\_Neuer\_Stand / en / 30/03/2010 (LLEExport\_00986)



	V	1000 V	1000 V	1000 V	1000 V
U max DC	V	1000 V	1000 V	1000 V	1000 V
SPD to EN 61643-11		Type 2	Type 2	Type 2	Type 2
LPZ		1→2	1→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA	20 kA
Maximum discharge current	kA	40 kA	40 kA	40 kA	40 kA
Voltage protection level	kV	< 4,0 kV	< 4,0 kV	< 4,0 kV	< 4,0 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		3	4	2	3
Connection cross-section, rigid	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, multi-wire	mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²	2,5 - 35 mm²
Connection cross-section, flexible	mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²	2,5 - 25 mm²
<b>Item No.</b>		<b>5094 60 8</b>	<b>5094 57 4</b>	<b>5094 61 7</b>	<b>5094 61 5</b>



# Photovoltaic system solution with MC4 connector

Type	LPZ	Type	LPZ
2	1→2	1+2	0→2



System solution for photovoltaic systems with MC4 connector

- Error-resistant Y circuit for use according to VDE 0100-712 (IEC 60364-7-712)
- Low DC protection level: < 4.0 kV (Voc max = 1,000 V DC with V20-C/0-500PV)
- Low DC protection level: < 3.0 kV (Voc max = 900 V DC with V25-B+C/0-450PV)
- Low DC protection level: < 2.6 kV (Voc max = 600 V DC with V50-B+C/0-300PV)
- DC connection with MC4 plug connector (Series: PV-AD...P 4/6), pre-mounted in IP65 housing

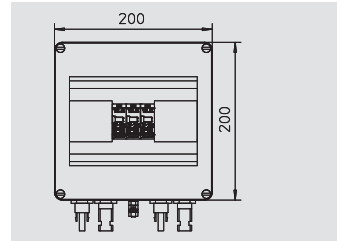
Application: PV systems to protect the inverter



## Photovoltaic system solution, Type 1+2, with MC connector, 600 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-BC DCPH-Y600</b>	600	Equipped in housing with MC4 connector	1	174.600	<b>5088 67 6</b>

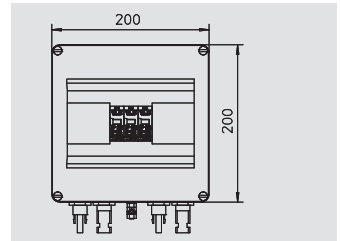
/pc.



## Photovoltaic system solution, Type 1+2, with MC connector, 900 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-BC DCPH-Y900</b>	900	Equipped in housing with MC4 connector	1	178.500	<b>5088 67 8</b>

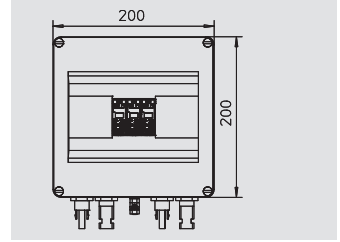
/pc.



## Photovoltaic system solution, Type 2, with MC connector, 600 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-C DCPH-Y600</b>	600	Equipped in housing with MC4 connector	1	166.500	<b>5088 67 0</b>

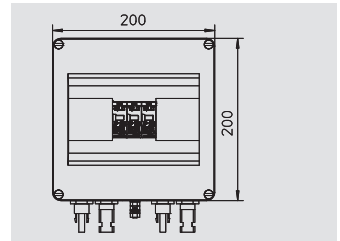
/pc.



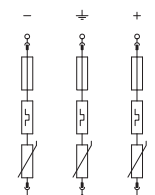
## Photovoltaic system solution, Type 2, with MC connector, 1,000 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-C DCPH-Y1000</b>	1000	Equipped in housing with MC4 connector	1	169.500	<b>5088 67 2</b>

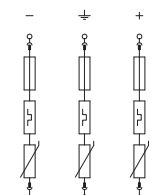
/pc.



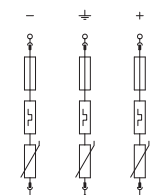
VG-BC DCPH-Y600



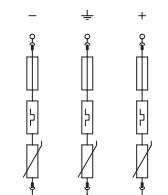
VG-BC DCPH-Y900



VG-C DCPH-Y600



VG-C DCPH-Y1000



U <sub>max</sub> DC	V	600 V	900 V	600 V	1000 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 2	Type 2
LPZ		0→2	0→2	1→2	1→2
Lightning impulse current (10/350)	kA	12,5 kA	7 kA		
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	20 kA	20 kA
Maximum discharge current	kA	50 kA	50 kA	40 kA	40 kA
Voltage protection level	kV	< 2,6 kV	< 3,0 kV	< 2,6 kV	< 4,0 kV
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	∅ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP65	IP65	IP65	IP65
<b>Item No.</b>		<b>5088 67 6</b>	<b>5088 67 8</b>	<b>5088 67 0</b>	<b>5088 67 2</b>



# Photovoltaic system solution with MC4 connector, unequipped

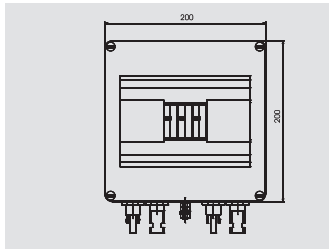
System solution for photovoltaic systems with MC4 connector



- Error-resistant Y circuit for use according to VDE 0100-712 (IEC 60364-7-712)
- Low DC protection level: < 4.0 kV (Voc max = 1,000 V DC with V20-C/0-500PV)
- Low DC protection level: < 3.0 kV (Voc max = 900 V DC with V25-B+C/0-450PV)
- Low DC protection level: < 2.6 kV (Voc max = 600 V DC with V50-B+C/0-300PV)
- DC connection with MC4 plug connector (Series: PV-AD...P 4/6), pre-mounted in IP65 housing

Unequipped, order covers separately.

Application: PV systems to protect the inverter

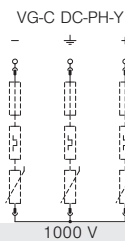


## Surge arrester, system solution, photovoltaics

Type	Version	Pack.	Item No.
VG-C DC-PH-Y	Unequipped in housing with MC4 connector	pcs	1 5088 69 9



/pc.



U max DC	V	
SPD to EN 61643-11		
LPZ		
Lightning impulse current (10/350)	kA	
Nominal discharge surge current (8/20)	kA	
Maximum discharge current	kA	
Voltage protection level	kV	
Response time	ns	
Temperature range	θ	-40 - +80 °C
Protection rating		IP 65
<b>Item No.</b>		<b>5088 69 9</b>



# Photovoltaic housing with connection terminals

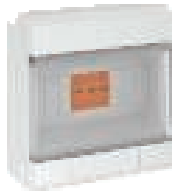
Type 1+2	Type 2	LPZ 0→1	LPZ 1→2
----------	--------	---------	---------



System solution for photovoltaic systems with connection terminals

- Error-resistant Y circuit with 3 varistors for use according to VDE 0100-712 (IEC 60364-7-712)
- Low DC protection level: < 4.0 kV (Voc max = 1.000 V DC with V20-C/0-500PV)
- Low DC protection level: < 3.0 kV (Voc max = 900 V DC with V25-B+C/0-450PV)
- Low DC protection level: < 2.6 kV (Voc max = 600 V DC with V50-B+C/0-300PV)
- 6 parallel connection terminals up to 6 mm<sup>2</sup> for each polarity (+ and -)
- Pre-mounted in IP65 housing

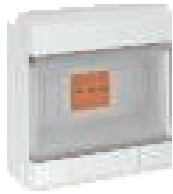
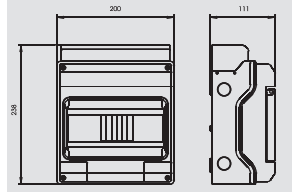
Note: 5 PV strings can be switched in parallel on the terminals. The technical data (string voltage, etc.) and the conditions of the inverter (number of MPP trackers) must be taken into account.



## Photovoltaic housing with connection terminals, Type 1+2, 600 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-BC DCPH-MS600</b>	600	Type 1+2 in housing with terminals	1	159.000	<b>5088 69 3</b>

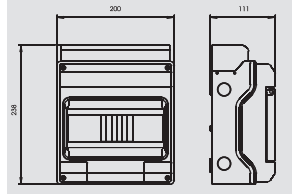
/pc.



## Photovoltaic housing with connection terminals, Type 1+2, 900 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-BC DCPH-MS900</b>	900	Type 1+2 in housing with terminals	1	160.000	<b>5088 69 2</b>

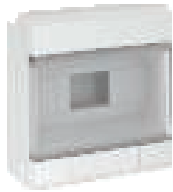
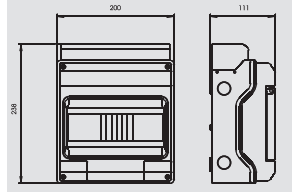
/pc.



## Photovoltaic housing with connection terminals, Type 2, 1,000 V DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-C DCPH-MS1000</b>	1000	Type 2 in housing with terminals	1	154.000	<b>5088 69 1</b>

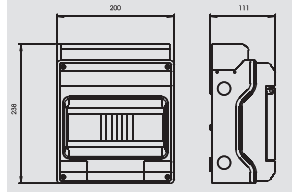
/pc.



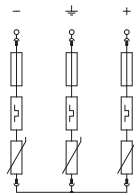
## Photovoltaic housing with connection terminals, unequipped

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-C DC-PH-MS</b>	—	Unequipped in housing with terminals	1	135.000	<b>5088 69 4</b>

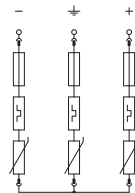
/pc.



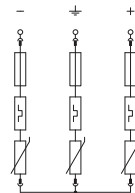
VG-BC DCPH-MS600



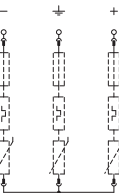
VG-BC DCPH-MS900



VG-C DCPH-MS1000



VG-C DC-PH-MS



U <sub>max</sub> DC	V	600 V	900 V	1000 V	
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 2	
LPZ		0→2	0→2	1→2	
Lightning impulse current (10/350)	kA	12,5 kA	7 kA		
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	20 kA	
Maximum discharge current	kA	50 kA	50 kA	40 kA	
Voltage protection level	kV	< 2,6 kV	< 3,0 kV	< 4,0 kV	
Response time	ns	< 25ns ns	< 25ns ns	< 25ns ns	
Connection cross-section, rigid	mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>
Temperature range	∅ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 65	IP 65	IP 65	IP 65
<b>Item No.</b>		<b>5088 69 3</b>	<b>5088 69 2</b>	<b>5088 69 1</b>	<b>5088 69 4</b>



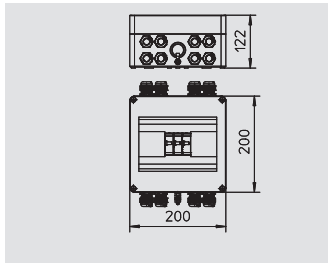
# Photovoltaic housing with V-Tec entry

System solution for photovoltaic systems with connection terminals and entry



- Error-resistant Y circuit for use according to VDE 0100-712 (IEC 60364-7-712)
- Low DC protection level: < 4.0 kV (Voc max = 1,000 V DC with V20-C/0-500PV)
- 5 parallel connection terminals up to 6 mm<sup>2</sup> for each polarity (+ and -)
- 8 V-Tec entries per side, pre-mounted in IP65 housing
- arrester, connectable with thermodynamic cut-off unit and visual function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

Note: 5 PV strings can be switched in parallel on the terminals. The technical data (string voltage, etc.) and the conditions of the inverter (number of MPP trackers) must be taken into account.



## Surge arrester, system solution, photovoltaics

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-C DC-PH1000-4</b>	1000	Type 2 in housing with V-Tec insertion	1	145.000	<b>5088 70 3</b>

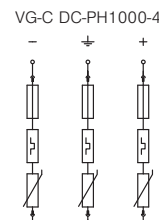


/pc.

Sure protection, photovoltaics



02\_TBS\_Katalog\_2010\_Neuer\_Stand / en / 30/03/2010 (LLEExport\_00986)



U <sub>max</sub> DC	V	1000 V
SPD to EN 61643-11		Type 2
LPZ		1-2
Nominal discharge surge current (8/20)	kA	20 kA
Maximum discharge current	kA	40 kA
Voltage protection level	kV	< 4,0 kV
Response time	ns	< 25ns ns
Connection cross-section, rigid	mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,5 - 6 mm <sup>2</sup>
Temperature range	°C	-40 - +80 °C
Protection rating		IP 65
<b>Item No.</b>		<b>5088 70 3</b>

# Surge arrester, system solution, photovoltaics AC + DC

Type 2 LPZ 1→2 

System solution for photovoltaic systems with AC and DC protection

- DC error-resistant Y circuit for use according to VDE 0100-712 (IEC 60364-7-712)
- Low DC protection level: < 4.0 kV (Voc max = 1,000 V DC with V20-C/0-500PV)
- DC connection with MC4 plug connector (Series: PV-AD...P 4/6), pre-mounted in IP65 housing
- AC side with 1+NPE protection circuit
- arrester, connectable with thermodynamic cut-off unit and function display
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings

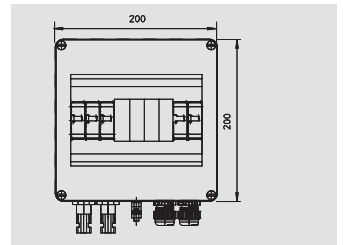
Application: PV systems to protect the inverter



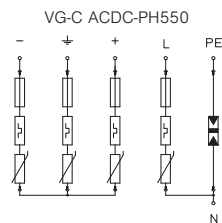
## Surge arrester, system solution, photovoltaics AC + DC

Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VG-C ACDC-PH550</b>	745	Type 2 AC protection: 1+NPE, DC: Y connection	1	200.000	<b>5088 68 6</b>

/pc.



Sure protection, photovoltaics



U <sub>max</sub> DC	V	745 V
U <sub>max</sub> AC	V	280 V
SPD to EN 61643-11		Type 2
LPZ		0→2
Lightning impulse current (10/350)	kA	15 kA
Nominal discharge surge current (8/20)	kA	40 kA
Maximum discharge current	kA	40 kA
Voltage protection level	kV	DC: <4,0 kV
Response time	ns	< 25ns ns
Temperature range	ø °C	-40 - +80 °C
Protection rating		IP65
<b>Item No.</b>		<b>5088 68 6</b>

Cover, combination and surge controller, Type 1+2 and 2 arrestors for photovoltaic systems

- Lightning and surge voltage equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 12.5 kA (10/350) and 50 kA (8/20) per pin

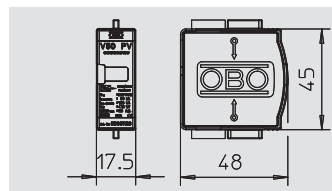
Type 1+2	Type 2	LPZ 0→1	LPZ 1→2
----------	--------	---------	---------



- DC protection level: < 2.0 kV per pole (for Y circuit: 40 kV and Voc to 1000 V DC)
- arrestor, connectable with thermodynamic cut-off unit and function display
- Encapsulated, non-blow out zinc oxide varistor arrestor for use in distributor housings
- High current carrying capacity with long lifespan

Application: Surge and lightning protection for PV systems

## Photovoltaic cover – lightning and surge arrestors

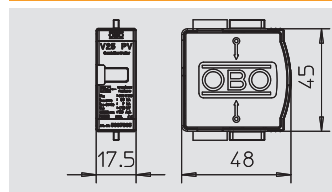


Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V50-B+C 0-300PV</b>	300	1-pole, PV cover, Type 1+2	1	8.200	<b>5093 72 6</b>

/pc.



## Photovoltaic cover – lightning and surge arrestors

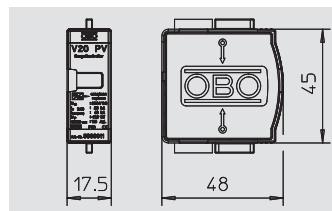


Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V25-B+C 0-450PV</b>	450	1-pole, PV cover, Type 1+2	1	9.500	<b>5097 06 5</b>

/pc.



## Photovoltaic cover – surge arrestors

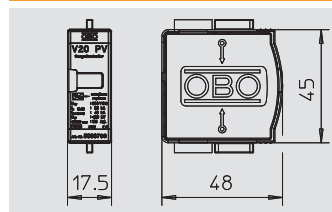


Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 0-300PV</b>	300	1-pole, PV cover, type 2	1	5.500	<b>5099 61 1</b>

/pc.



## Photovoltaic cover – surge arrestors



Type	U <sub>max</sub> DC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>V20-C 0-500PV</b>	500	1-pole, PV cover, type 2	1	6.500	<b>5099 70 8</b>

/pc.



V50-B+C 0-300PV



V25-B+C 0-450PV



V20-C 0-300PV



V20-C 0-500PV



U <sub>max</sub> DC	V	300 V	450 V	300 V	500 V
SPD to EN 61643-11		Type 1+2	Type 1+2	Type 2	Type 2
SPD to IEC 61643-1		class I+II	class I+II	class II	class II
LPZ		0→2	0→2	1→2	1→2
Nominal discharge surge current (8/20)	kA	30 kA	30 kA	20 kA	20 kA
Lightning impulse current (10/350)	kA	12,5 kA	7 kA		
Maximum discharge current	kA	50 kA	50 kA	40 kA	40 kA
Voltage protection level	kV	< 1,3 kV	< 1,5 kV	< 1,3 kV	< 2,0 kV
Response time	ns	<25 ns	< 25 ns	< 25 ns	< 25 ns
Maximum back-up fuse	A	125 A	160 A	125 A	125 A
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		1	1	1	1
<b>Item No.</b>		<b>5093 72 6</b>	<b>5097 06 5</b>	<b>5099 61 1</b>	<b>5099 70 8</b>



# Photovoltaic bases

Type 1+2	Type 2	LPZ 0→1	LPZ 1→2
FS	5		

Base for combination and surge controller, Type 1+2 and 2 for photovoltaic systems

- Error resistant Y circuit with 3 varistors (2 for earthed systems)
- Lightning and surge voltage protection equipotential bonding to VDE 0100-443 (IEC 60364-4-44)
- Arresting capacity to 12.5 kA (10/350) and 50 kA (8/20) per pin

- DC protection level: < 2.0 kV per pole (Y circuit: 4.0 kV and max. Voc to 1,000 V DC)
- Encapsulated, non-extinguishing zinc oxide varistor arrester for use in distributor housings
- High current carrying capacity with long lifespan
- Bases unequipped

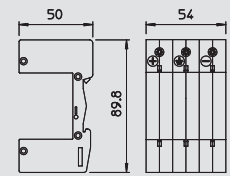
Application: Surge and lightning protection for PV systems



## PV base, 3-pole in Y circuit

Type	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C U-3PH-Y	3-pole Y circuit for PV	1	17.000	5096 64 7

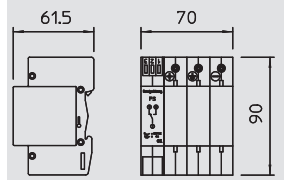
/pc.



## PV base, 3-pole in Y circuit, with remote signalling

Type	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C U-3PH-Y-FS	3-pole Y circuit for photovoltaic systems with FS	1	25.000	5096 64 6

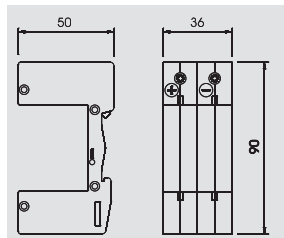
/pc.



## PV base, 2-pole in Y circuit

Type	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C U-2 PH	2-pole for earthed PV systems	1	14.000	5096 63 7

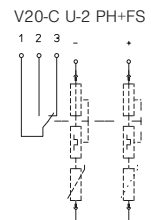
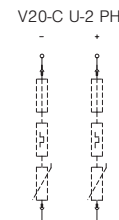
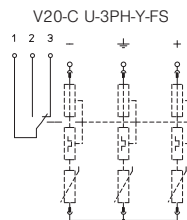
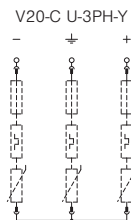
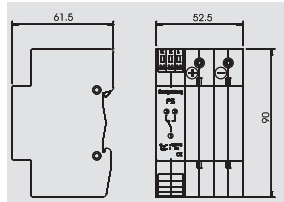
/pc.



## PV base, 2-pole in Y circuit, with remote signalling

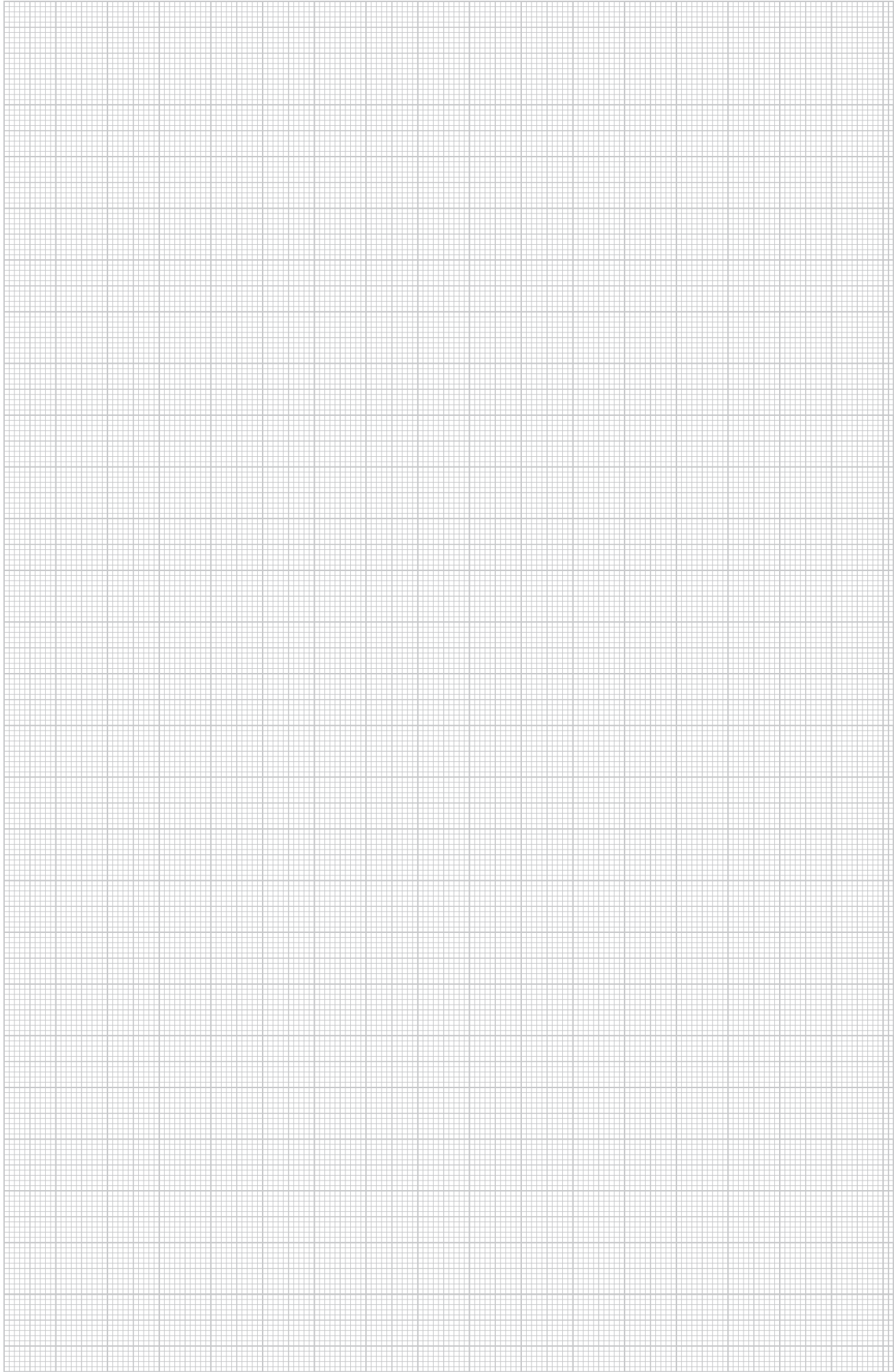
Type	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
V20-C U-2 PH+FS	2-pole for earthed PV systems with FS	1	18.000	5096 63 9

/pc.







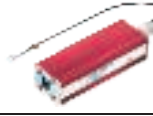




Temperature range	0 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		3	4	2	3
Connection cross-section, rigid	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>	2,5 - 35 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>	2,5 - 25 mm <sup>2</sup>
Item No.		5096 64 7	5096 64 6	5096 63 7	5096 63 9







## Surge protection of data and information technology

	Surge protection	For telecommunication	214
		LSA-Plus systems	217
	Coaxial protection devices	Send-and-receive technology	220
	Surge protection	Network technology	223
		Data technology	224
		Serial interfaces	226
	MCR protection	2-pole power supply	229
		Two-core systems	233
		Multi-wire system (testable)	241



# Surge protection for telecommunication systems



Data cable protection devices for telecommunications equipment

- Available as basic, medium and fine protection
- Low protection level at high current load
- Screwless terminals
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting

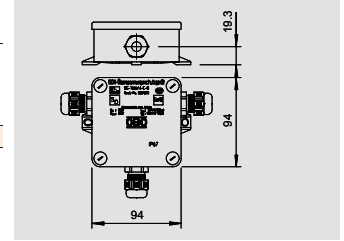
Application: DSL systems, ISDN or analogue telecommunications



## Basic protection device for ISDN and DSL systems

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SC-TELE 4-C-G</b>	Combi protection	Terminal	1	30.000	<b>5081 68 8</b>

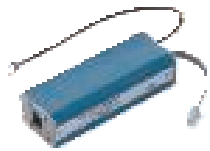
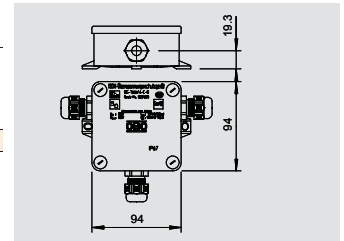
/pc.



## Data cable protection device for telecommunication systems

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SC-TELE 4-C-G</b>	Combi protection	Terminal	1	30.000	<b>5081 68 8</b>

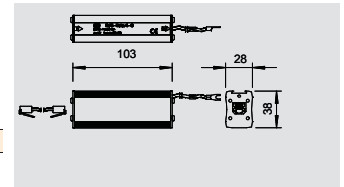
/pc.



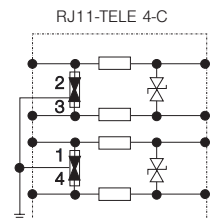
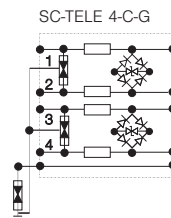
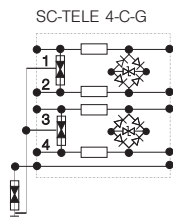
## Combination protection device for ISDN

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RJ11-TELE 4-C</b>	Combi protection, 4 wires	RJ45	1	20.000	<b>5081 92 0</b>

/pc.



Surge protection, data and information technology



U max AC	V	122 V	122 V	122 V
U max DC	V	170 V	170 V	170 V
LPZ		0-3	0-3	0-3
Lightning impulse current (10/350)	kA	5 kA	5 kA	1,5 kA
Nominal discharge surge current (8/20)	kA	15 kA	15 kA	7,5 kA
Transmission frequency	f	100 MHz	100 MHz	< 100 kHz
Insertion loss	a/dB    dB	0,1 @ 144 kHz	0,1 @ 144 kHz	0,5 @ 36 kHz
Series resistance	R    Ohm	3,3 Ohm	3,3 Ohm	8,2 Ohm
Protection level (sym.) with In C2		≤300 V	≤300 V	≤300 V
Protection level (asym.) with In C2		≤500 V	≤500 V	≤500 V
Protection level (asym.) with 1 kV/μs C3		≤245 V	≤245 V	≤245 V
Protection rating		IP 54	IP 54	IP40
Plug-in system		Terminal	Terminal	RJ45
<b>Item No.</b>		<b>5081 68 8</b>	<b>5081 68 8</b>	<b>5081 92 0</b>

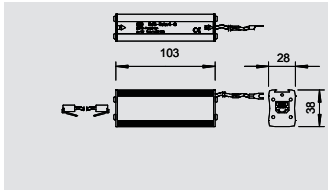
# Surge protection for telecommunication systems

Data cable protection device for analogue telecommunications systems



- In aluminium housing
- With 2-stage protection circuit
- Simple mounting
- Incl. 150 mm connection cable with RJ 11 and/or RJ 45 connectors
- Optimised bandwidth for TC systems

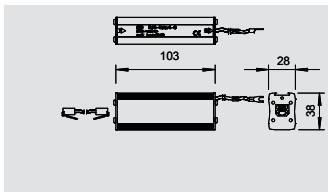
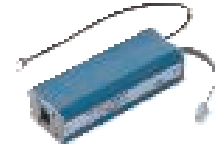
Application: for analogue telecommunication systems.



## Combination protection device for ISDN, RJ11

Type	Version	Connection system	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>RJ11-TELE 4-C</b>	Combi protection, 4 wires	RJ45	1	20.000	<b>5081 92 0</b>

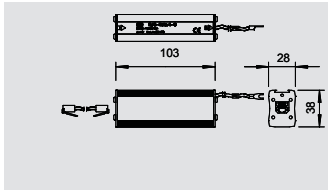
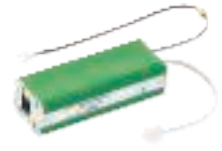
/pc.



## Fine protection device for ISDN RJ11

Type	Version	Connection system	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>RJ11-TELE 4-F</b>	Fine protection, 4 wires	RJ45	1	20.000	<b>5081 93 9</b>

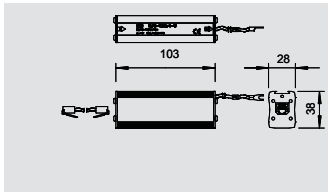
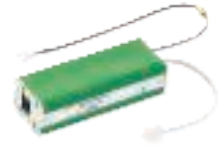
/pc.



## Combination protection device for ISDN, RJ45

Type	Version	Connection system	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>RJ45-TELE 4-C</b>	Combi protection, 4 wires	RJ45	1	20.000	<b>5081 96 3</b>

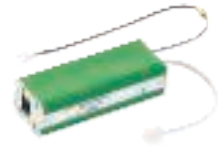
/pc.



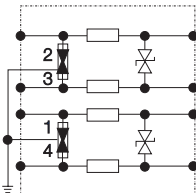
## Fine protection device for ISDN RJ45

Type	Version	Connection system	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>RJ45-TELE 4-F</b>	Fine protection, 4 wires	RJ45	1	20.000	<b>5081 97 1</b>

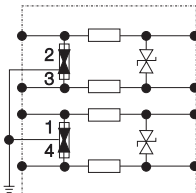
/pc.



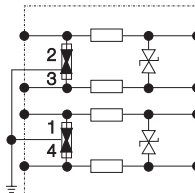
RJ11-TELE 4-C



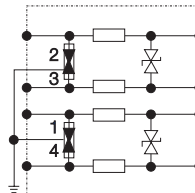
RJ11-TELE 4-F



RJ45-TELE 4-C



RJ45-TELE 4-F



U max AC	V	122 V	122 V	122 V	122 V
U max DC	V	170 V	170 V	170 V	170 V
LPZ		0→3	1→3	0→3	1→3
Lightning impulse current (10/350)	kA	1,5 kA	- kA	1,5 kA	- kA
Nominal discharge surge current (8/20)	kA	7,5 kA	7,5 / 0,5 kA	7,5 kA	7,5 / 0,5 kA
Transmission frequency	f	< 100 kHz f	< 100 kHz f	< 100 kHz f	< 100 kHz f
Insertion loss	a/dB	0,5 @ 36 kHz dB	0,5 @ 36 kHz dB	0,5 @ 36kHz dB	0,5 @ 36 kHz dB
Series resistance	R	Ohm	8.2 Ohm	2.2 Ohm	8.2 Ohm
Protection level (sym.) with In C2			≤300 V	≤300 V	≤300 V
Protection level (asym.) with In C2			≤500 V	≤500 V	≤500 V
Protection level (asym.) with 1 kV/μs C3			≤245 V	≤245 V	≤245 V
Protection rating			IP40	IP40	IP40
Plug-in system			RJ45	RJ45	RJ45
<b>Item No.</b>			<b>5081 92 0</b>	<b>5081 93 9</b>	<b>5081 96 3</b>
					<b>5081 97 1</b>

Always indicate the article number when ordering.



# Surge protection for telecommunication systems



Data cable protection devices for telecommunications equipment

- Available as basic, medium and fine protection
- Low protection level at high current load
- Screwless terminals
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting

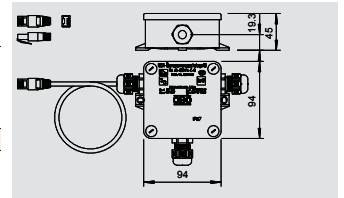
Application: NTBA protection, bus-side



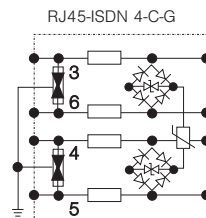
## Combination protection device for ISDN, bus side

Type	Version	Connection system	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>RJ45-ISDN 4-C-G</b>	Combi protection, 4 wires	RJ45	1	30.000	<b>5081 54 8</b>

/pc.



Surge protection, data and information technology



U max AC	V	4,2 V
U max DC	V	6,2 V
LPZ		0→3
Lightning impulse current (10/350)	kA	2 kA
Nominal discharge surge current (8/20)	kA	10 kA
Transmission frequency	f	< 6 MHz
Insertion loss	a/dB    dB	0,1 @ 144 kHz
Series resistance	R    Ohm	4,7 Ohm
Protection level (sym.) with In C2		≤500 V
Protection level (asym.) with In C2		≤12 V
Protection level (asym.) with 1 kV/μs C3		≤8 V
Protection rating		IP 54
Plug-in system		RJ45
<b>Item No.</b>		<b>5081 54 8</b>

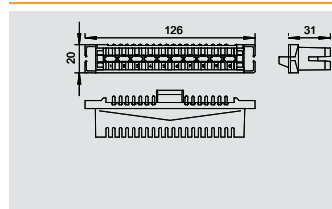
# Surge protection for LSA-Plus systems

Data cable protection for multi-wire systems (LSA-Plus)

- Available as basic and combination protection
- Protects up to 10 two-cores
- Low protection level
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting



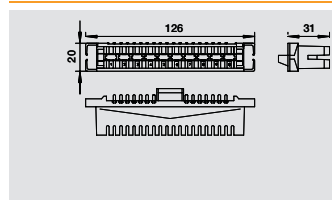
Application: Telecommunications switchboards, TC extensions



## LSA-Plus technology/LSA connection strip

Type	Colour	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>LSA-A-LEI</b>	Grey	1	5.100	<b>5084 00 8</b>

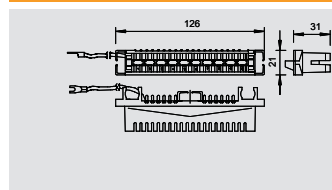
/pc.



## LSA-Plus technology/LSA separating strip

Type	Colour	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>LSA-T-LEI</b>	White	1	5.400	<b>5084 01 2</b>

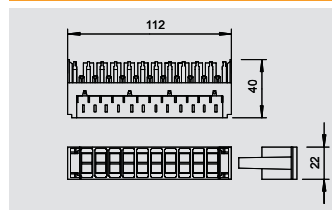
/pc.



## LSA-Plus technology/LSA earthing strip

Type	Colour	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>LSA-E-LEI</b>	Red	1	6.500	<b>5084 01 6</b>

/pc.



## LSA-Plus technology/LSA basic protection

Type	Highest continuous voltage V	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>LSA-B-MAG</b>	180	1	8.600	<b>5084 02 0</b>

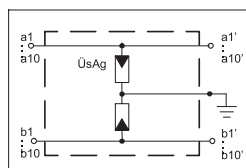
/pc.



Surge protection, data and information technology



LSA-B-MAG



Maximum continuous voltage	V	180 V
LPZ		0-2
Lightning impulse current (10/350)	kA	1 kA
Nominal discharge surge current (8/20)	kA	5 kA
Maximum discharge current	kA	10 kA
Voltage protection level	kV	<0,700 kV
Temperature range	θ °C	-40 - +80 °C
<b>Item No.</b>		<b>5084 02 0</b>

# Surge protection for LSA-Plus systems



Data cable protection for multi-wire systems (LSA-Plus)

- Available as basic and combination protection
- Protects up to 10 two-cores
- Low protection level
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting

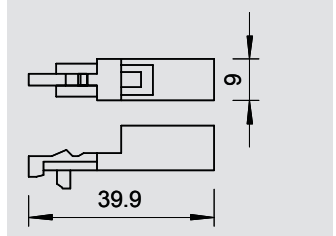
Application: Telecommunications switchboards, TC extensions



## LSA-Plus technology/LSA basic and fine protection

Type	Highest continuous voltage V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>LSA-BF-180</b>	180	1	0.500	<b>5084 02 4</b>

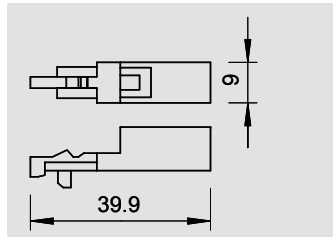
/pc.



## LSA-Plus technology/LSA basic and fine protection

Type	Highest continuous voltage V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>LSA-BF-24</b>	24	1	0.500	<b>5084 02 8</b>

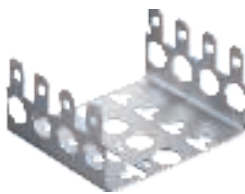
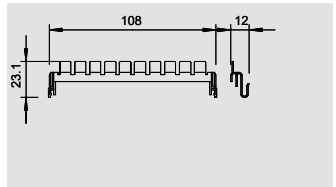
/pc.



## LSA-Plus technology/LSA earthing rail for LSA-BF

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>LSA-E</b>	1	1.000	<b>5084 03 2</b>

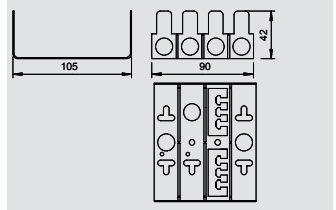
/pc.



## LSA-Plus technology/LSA installation trough

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>LSA-M</b>	1	7.500	<b>5084 03 6</b>

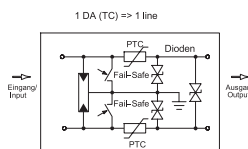
**ST** Steel /pc.



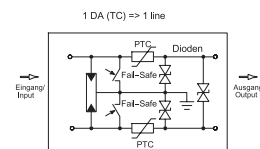
Surge protection, data and information technology



LSA-BF-180



LSA-BF-24



Maximum continuous voltage	V	180 V	24 V
LPZ		0-3	0-3
Lightning impulse current (10/350)	kA	0,5 kA	0,5 kA
Nominal discharge surge current (8/20)	kA	2,5 kA	2,5 kA
Maximum discharge current	kA	5 kA	5 kA
Nominal load current	A	0,12 A	0,09 A
Voltage protection level	kV	< 300 kV	<0,05 kV
Temperature range	°C	-40 - +80 °C	-40 - +80 °C
<b>Item No.</b>		<b>5084 02 4</b>	<b>5084 02 8</b>

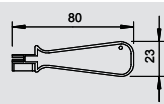
# Surge protection for LSA-Plus systems

## Data cable protection for multi-wire systems (LSA-Plus)

- Available as basic and combination protection
- Protects up to 10 two-cores
- Low protection level
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting



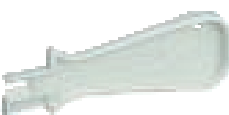
Application: Telecommunications switchboards, TC extensions

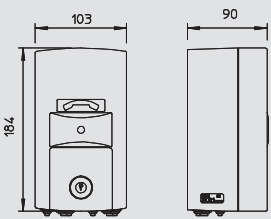


### LSA-Plus technology/LSA simple tool

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>LSA-TOOL</b>	1	0.600	<b>5084 04 0</b>

/pc.






### LSA-Plus technology/protective housing

Type	Colour	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>LSA-G</b>	Light grey	1	57.500	<b>5084 04 8</b>

**PA** Polyamide /pc.





# Coaxial protection devices for send and receive technology



Data cable protection devices for transmission and reception technology

- Different connection systems available
- Low protection level at high current load
- Low reflection behaviour
- Bandwidth-optimised for secure transmission
- Available in 50 Ω and 75 Ω technology

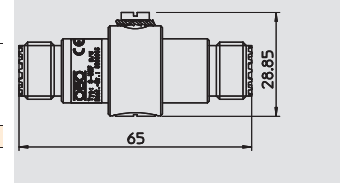
Application: BOS radio, SAT and TV systems, mobile radio



## Coaxial protection devices for S-UHF connection: Male/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>S-UHF M/W</b>	UHF connector	0 - 5 GHz	1	7.000	<b>5093 02 3</b>

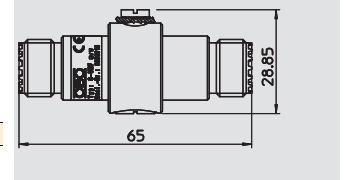
/pc.



## Coaxial protection devices for S-UHF connection: Female/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>S-UHF W/W</b>	UHF connector	0 - 5 GHz	1	6.500	<b>5093 01 5</b>

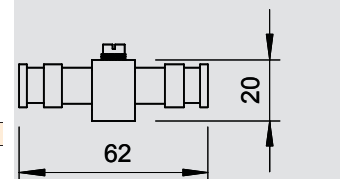
/pc.



## Coaxial protection device for BNC connection: Male/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-BNC M/W</b>	BNC, 50 Ohm	0 - 2.5 GHz	1	6.500	<b>5093 25 2</b>

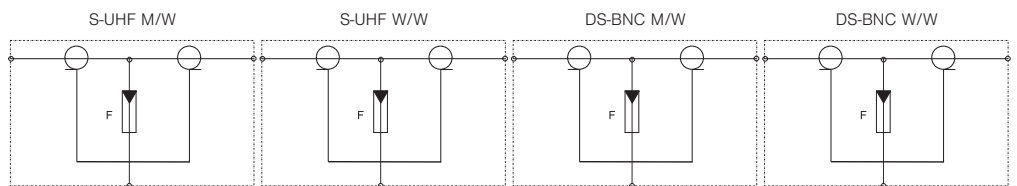
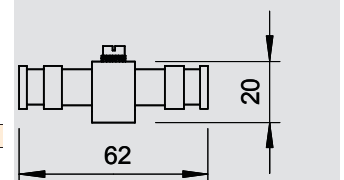
/pc.



## Coaxial protection device for BNC connection: Female/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-BNC W/W</b>	BNC, 50 Ohm	0 - 2.5 GHz	1	6.000	<b>5093 23 6</b>

/pc.



			S-UHF M/W	S-UHF W/W	DS-BNC M/W	DS-BNC W/W
U max AC	V		130 V	130 V	130 V	130 V
U max DC	V		180 V	180 V	180 V	180 V
LPZ			0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA		2,5 kA	2,5 kA	2 x 2,5 kA	2 x 2,5 kA
Nominal discharge surge current (8/20)	kA		10 kA	10 kA	5 kA	5 kA
Wave resistance	Ω		50 Ω	50 Ω	50 Ω	50 Ω
Transmission power	W		400 W	400 W	400 W	400 W
Transmission frequency	f		0 - 5 GHz f	0 - 5 GHz f	0 - 2.5 GHz f	0 - 2.5 GHz f
Insertion loss	a/dB	dB	3 @ 5 GHz dB	3 @ 5 GHz dB	3 @ 2,5 GHz dB	3 @ 2,5 GHz dB
Temperature range	θ	°C	-40 - +80 °C	-40 - +80 °C	-35 - +80 °C	-35 - +80 °C
Plug-in system			UHF connector	UHF connector	BNC, 50 Ohm	BNC, 50 Ohm
<b>Item No.</b>			<b>5093 02 3</b>	<b>5093 01 5</b>	<b>5093 25 2</b>	<b>5093 23 6</b>



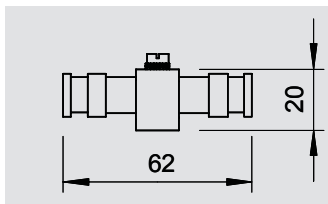
# Coaxial protection devices for send and receive technology

Data cable protection devices for transmission and reception technology



- Different connection systems available
- Low protection level at high current load
- Low reflection behaviour
- Bandwidth-optimised for secure transmission
- Available in 50 Ω and 75 Ω technology

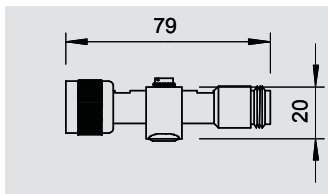
Application: BOS radio, SAT and TV systems, mobile radio



## Coaxial protection device for BNC connection: Male/male

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-BNC M/M</b>	BNC, 50 Ohm	0 - 2.5 GHz	1	7.000	<b>5093 26 0</b>

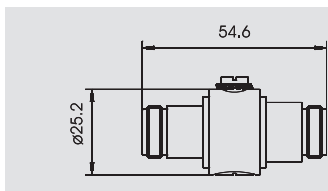
/pc.



## Coaxial protection device for N connection: Male/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-N M/W</b>	N connector	0 - 5,3 GHz	1	12.200	<b>5093 99 6</b>

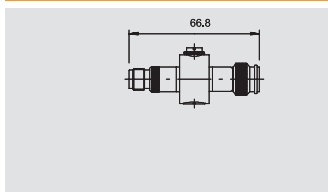
/pc.



## Coaxial protection device for N connection: Female/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-N W/W</b>	N connector	2,5	1	12.500	<b>5093 98 8</b>

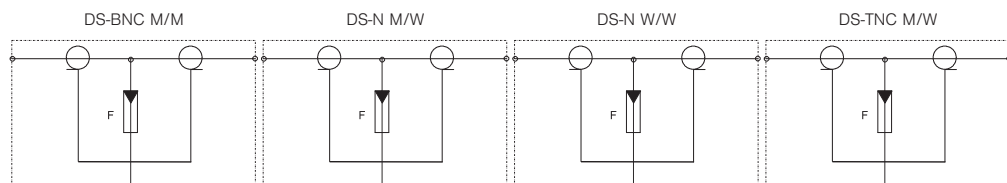
/pc.



## Coaxial protection device for TNC connection: Male/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-TNC M/W</b>	Coax connector	0 - 2,5 GHz	1	9.000	<b>5093 27 0</b>

/pc.



U max AC	V	130 V	130 V	130 V	130 V
U max DC	V	180 V	180 V	180 V	180 V
LPZ		0-2	0-2	0-2	0-2
Lightning impulse current (10/350)	kA	2 x 2,5 kA	2 x 2,5 kA	2,5 kA	2 x 2,5 kA
Nominal discharge surge current (8/20)	kA	5 kA	10 kA	5 kA	10 kA
Wave resistance	Ω	50 Ω	50 Ω	50 Ω	50 Ω
Transmission power	W	400 W	400 W	400 W	400 W
Transmission frequency	f	0 - 2.5 GHz f	0 - 5,3 GHz f	2,5 f	0 - 2,5 GHz f
Insertion loss	a/dB	3 @ 2,5 GHz dB	3 @ 5,3 GHz dB	3 @ 5,3 GHz dB	3 @ 2,5 GHz dB
Temperature range	θ	-35 - +80 °C	-40 - +80 °C	-35 - +80 °C	-35 - +80 °C
Plug-in system		BNC, 50 Ohm	N connector	N connector	Coax connector
<b>Item No.</b>		<b>5093 26 0</b>	<b>5093 99 6</b>	<b>5093 98 8</b>	<b>5093 27 0</b>

# Coaxial protection devices for send and receive technology



Data cable protection devices for transmission and reception technology

- Different connection systems available
- Low protection level at high current load
- Low reflection behaviour
- Bandwidth-optimised for secure transmission
- Available in 50 Ω and 75 Ω technology

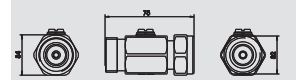
Application: BOS radio, SAT and TV systems, mobile radio



## Coaxial protection device for 7/16 connection: Male/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-7 16 M/W</b>	7/16 connector	0 - 4,25 GHz	1	35.500	<b>5093 17 1</b>

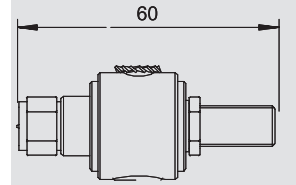
/pc.



## Coaxial protection device for F connection: Male/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-F M/W</b>	SAT-F	0 - 4 GHz	1	9.000	<b>5093 27 5</b>

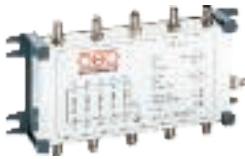
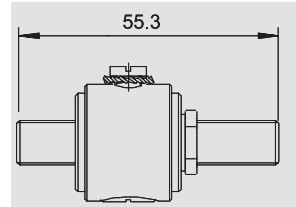
/pc.



## Coaxial protection device for F connection: Female/female

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>DS-F W/W</b>	SAT-F	0 - 4 GHz	1	9.000	<b>5093 27 2</b>

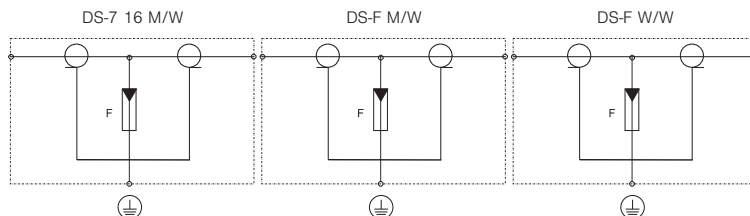
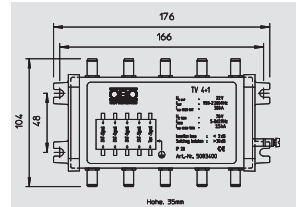
/pc.



## Coaxial protection device for SAT and cable multiswitch

Type	Connection system	Transmission frequency	Pack.	Weight	Item No.
		f	pcs	kg/100 pcs.	
<b>TV 4+1</b>	SAT-F	0,5 - 2,8 GHz	1	37.000	<b>5083 40 0</b>

/pc.



U max AC	V	130 V	130 V	130 V	
U max DC	V	180 V	180 V	180 V	
LPZ		0→2	0→2	0→2	1→3
Lightning impulse current (10/350)	kA	2,5 kA	2,5 kA	2,5 kA	
Nominal discharge surge current (8/20)	kA	10 kA	10 kA	10 kA	
Wave resistance	Ω	50 Ω	75 Ω	75 Ω	75 Ω
Transmission power	W	500 W	400 W	400 W	
Transmission frequency	f	0 - 4,25 GHz f	0 - 4 GHz f	0 - 4 GHz f	0,5 - 2,8 GHz f
Insertion loss	a/dB dB	3 @ 4,25 GHz dB	3 @ 3,5 GHz dB	3 @ 3,5 GHz dB	3 @ 2,8 GHz dB
Temperature range	θ °C	-40 - +80 °C	-30 - +80 °C	-35 - +80 °C	-40 - +80 °C
Plug-in system		7/16 connector	SAT-F	SAT-F	SAT-F
<b>Item No.</b>		<b>5093 17 1</b>	<b>5093 27 5</b>	<b>5093 27 2</b>	<b>5083 40 0</b>



# Surge protection for network technology

Data cable protection devices for network technology up to 10 GBit/s

- Different connection systems available
- Low protection level at high current load
- Support for Power over Ethernet (POE)
- Tested transmission quality in networks up to 10 GBit (Class EA)
- Quick installation through connectable



Application: 10 GBit Ethernet, 10/100 MBit Ethernet, PoE applications

### Surge protection for high-speed networks up to 10 GBit (Class EA/CAT6A)

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
ND-CAT6A/EA	8-pole	RJ45	1	16.600	5081 80 0

/pc.

### Fine protection for Ethernet networks (Class D/CAT 5)

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
RJ45 S-ATM 8-F	Fine protection	RJ45	1	21.000	5081 79 3

/pc.

### Combination arrester for 10Base2-/10Base5 networks

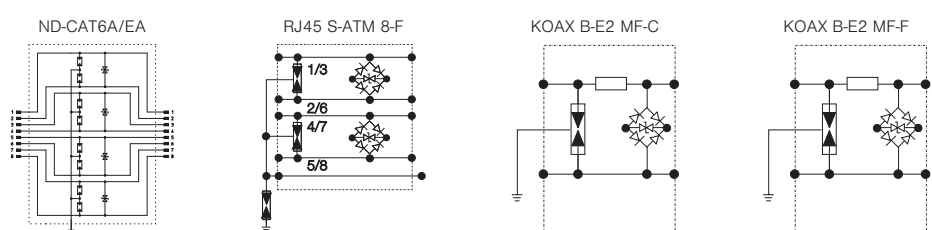
Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
KOAX B-E2 MF-C	Combi protection	Coax connector	1	15.000	5082 41 2

/pc.

### Fine protection for 10Base2-/10Base5 networks

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
KOAX B-E2 MF-F	Fine protection	Coax connector	1	15.000	5082 42 0

/pc.



U max AC	V	41 V	4,2 V	4,2 V	4,2 V
U max DC	V	58 V	6 V	6,2 V	6,2 V
LPZ		1→3	1→3	0→3	1→3
Channel performance ISO/IEC		Class EA	Class D	Class D	Class D
Channel performance Ansi/EA		CAT 6A	CAT 5	Cat 5	Cat 5
Rated arresting surge current In to C2 (total)	kA	7 kA	5 kA	10 kA	10 kA
Rated arresting surge current In to C2 (wire-wire)	kA	0,15 kA	0,25 kA	0,5 kA	0,5 kA
Protection level wire/earth	V	<700 V	< 12 V	< 500 V	< 500 V
Protection level wire/wire	V	<120 V	< 800 V	< 12 V	< 12 V
Nominal load current	A	1 A			
Serial impedance per wire	Ω			5 Ω	5 Ω
Transmission frequency	f	500 MHz f	> 155 MHz f	< 113 MHz f	< 200 MHz f
Protection rating		IP10	IP40	IP40	IP40
Plug-in system		RJ45	RJ45	Coax connector	Coax connector
Testing standard		IEC 61643-21	IEC 61643-21	IEC 61643-21	IEC 61643-21
<b>Item No.</b>		<b>5081 80 0</b>	<b>5081 79 3</b>	<b>5082 41 2</b>	<b>5082 42 0</b>

Surge protection, data and information technology



02\_TBS-Katalog\_2010\_Neuer\_Stand / en / 30/03/2010 (LLEExport\_00986)

# Surge protection for data technology



Data cable protection device for information technology systems

- In aluminium housing
- RJ 45 Connector
- Incl. 150 mm connecting cable with RJ 45 connectors
- Simple mounting using adapter plug
- Two-stage protective circuit

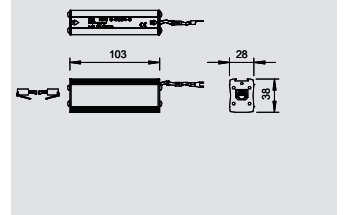
Application: Twisted pair, control circuits, communication cables



## Basic protection for 4-wire information technology systems with RJ45

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RJ45 S-E100 4-B</b>	Basic protection, 4 wires	RJ45	1	21.000	<b>5081 72 6</b>

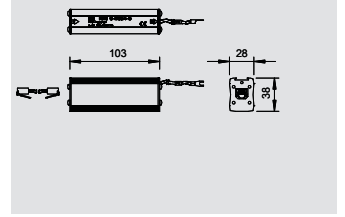
/pc.



## Combination arrester for 4-wire information technology systems with RJ45

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RJ45 S-E100 4-C</b>	Combi protection, 4 wires	RJ45	1	21.000	<b>5081 73 4</b>

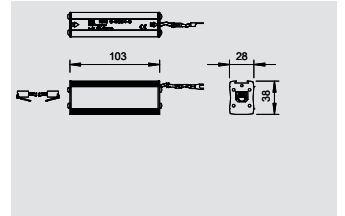
/pc.



## Fine protection for 4-wire information technology systems with RJ45

Type	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RJ45 S-E100 4-F</b>	Fine protection, 4 wires	RJ45	1	21.000	<b>5081 74 2</b>

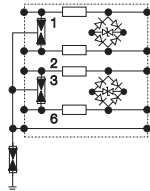
/pc.



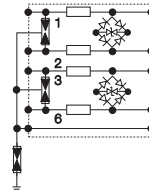
Surge protection, data and information technology



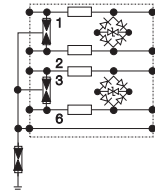
RJ45 S-E100 4-B



RJ45 S-E100 4-C



RJ45 S-E100 4-F



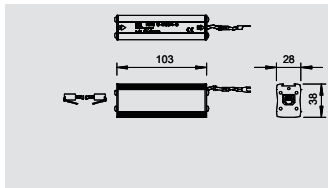
U max AC	V	122 V	4,2 V	4,2 V
U max DC	V	170 V	6,2 V	6,2 V
LPZ		0→2	0→2	2→3
Lightning impulse current (10/350)	kA	1,5 kA	1,5 kA	- kA
Nominal discharge surge current (8/20)	kA	7,5 kA	7,5 kA	7,5 / 0,5 kA
Transmission frequency	f	155 MHz f	70 MHz f	100 MHz f
Insertion loss	a/dB dB	0,3 @ 100 MHz dB	5 @ 100 MHz dB	3 @ 100 MHz dB
Series resistance	R Ohm	- Ohm	4,7 Ohm	- Ohm
Protection level (sym.) with In C2		≤500 V	≤12 V	≤12 V
Protection level (asym.) with In C2		≤800 V	≤800 V	≤800 V
Protection level (asym.) with 1 kV/μs C3		≤500 V	≤8 V	≤8 V
Protection rating		IP 40	IP 40	IP 40
Plug-in system		RJ45	RJ45	RJ45
<b>Item No.</b>		<b>5081 72 6</b>	<b>5081 73 4</b>	<b>5081 74 2</b>

Data cable protection device for information technology systems



- In aluminium housing
- RJ 45 Connector
- Incl. 150 mm connecting cable with RJ 45 connectors
- Simple mounting using adapter plug
- Two-stage protective circuit

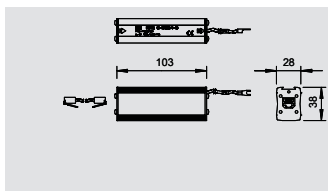
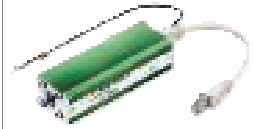
Application: Twisted pair, control circuits, communication cables



## Fine protection for 4-wire information technology systems, RJ45

Type	Version	Connection system	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>RJ45S-V24T 4-F</b>	Fine protection, 4 wires	RJ45	1	21.000	<b>5081 64 5</b>

/pc.



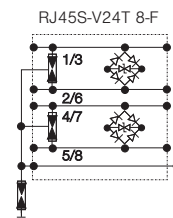
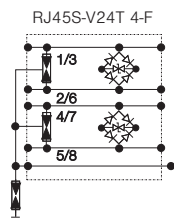
## Fine protection for 8-wire information technology systems, RJ45

Type	Version	Connection system	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>RJ45S-V24T 8-F</b>	Fine protection, 8 wires	RJ45	1	21.000	<b>5081 64 7</b>

/pc.



Surge protection, data and information technology



U max AC	V	10 V	10 V
U max DC	V	15 V	15 V
LPZ		2→3	2→3
Nominal discharge surge current (8/20)	kA	7,5 / 0,25 kA	7,5 / 0,15 kA
Protection level (sym.) with In C2		≤30 V	≤30 V
Protection level (asym.) with In C2		≤800 V	≤800 V
Protection level (asym.) with 1 kV/μs C3		≤25 V	≤25 V
Protection rating		IP40	IP40
Plug-in system		RJ45	RJ45
<b>Item No.</b>		<b>5081 64 5</b>	<b>5081 64 7</b>

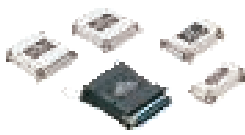
# Surge protection for serial interfaces



Data cable protection devices, serial interface

- Different connection systems available
- Low protection level

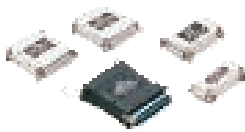
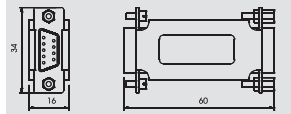
Application: PLC, alarm systems, controllers



## Fine protection for 9-pole RS232 interface

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SD09-V24 9</b>	18	SUB-D-9; V24 RS232	1	6.000	<b>5080 05 3</b>

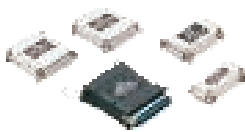
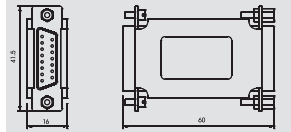
/pc.



## Fine protection for 15-pole RS232 interface

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SD15-V24 15</b>	18	SUB-D-15; V24 RS232	1	7.000	<b>5080 15 0</b>

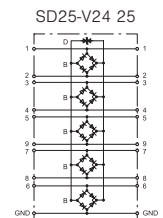
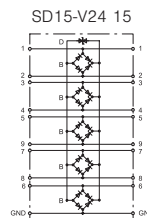
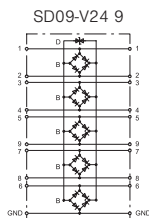
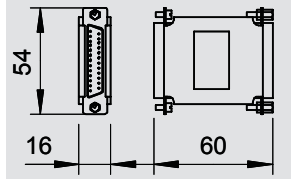
/pc.



## Fine protection for 25-pole RS232 interface

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SD25-V24 25</b>	18	SUB-D-25; V24 RS232	1	8.000	<b>5080 27 4</b>

/pc.



Maximum continuous voltage	V	18 V	18 V	18 V
LPZ		2→3	2→3	2→3
Nominal discharge surge current (8/20)	kA	0,34 kA	0,34 kA	0,34 kA
Protection level (sym.) with In C2		≤50 V	≤50 V	≤50 V
Protection level (asym.) with In C2		≤50 V	≤50 V	≤50 V
Protection level (asym.) with 1 kV/μs C3		≤25 V	≤25 V	≤25 V
Plug-in system		D-Sub 9 pole	D-Sub 15 pole	D-Sub 25 pole
<b>Item No.</b>		<b>5080 05 3</b>	<b>5080 15 0</b>	<b>5080 27 4</b>

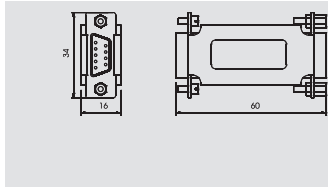


Data cable protection devices, serial interface



- Different connection systems available
- Low protection level

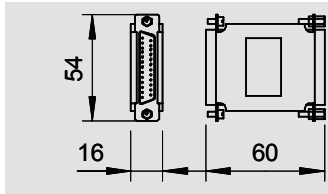
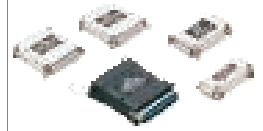
Application: PLC, alarm systems, controllers



## Fine protection for 9-pole RS485 interface

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SD09-V11 9</b>	7.5	SUB-D-9; V11 RS485	1	6.000	<b>5080 06 1</b>

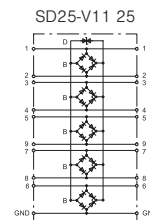
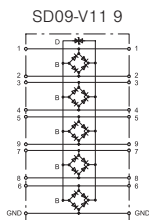
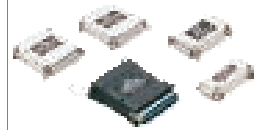
/pc.



## Fine protection for 25-pole RS485 interface

Type	Highest continuous voltage V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SD25-V11 25</b>	7.5	SUB-D-25; V11 RS485	1	8.000	<b>5080 28 2</b>

/pc.



Maximum continuous voltage	V	7,5 V	7,5 V
LPZ		2→3	2→3
Nominal discharge surge current (8/20)	kA	0.75 kA	0.75 kA
Protection level (sym.) with In C2		≤100 V	≤100 V
Protection level (asym.) with In C2		≤100 V	≤100 V
Protection level (asym.) with 1 kV/μs C3		≤10 V	≤10 V
Plug-in system		D-Sub 9 pole	D-Sub 25 pole
<b>Item No.</b>		<b>5080 06 1</b>	<b>5080 28 2</b>



# Surge protection for data technology



Data cable protection device, serial port

- Screwless terminal connections
- Direct installation in the cable run
- Adhesive Velcro strip included
- Fastening set for Twinax-AS4/..., Coax B-E2/..., Coax N-E5/..., RJ 11-Tele/4..., RJ 45 S-...

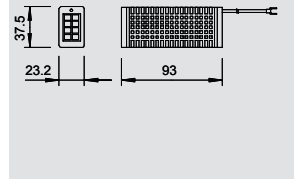
Application: Direct installation in the cable run.



## Fine protection for RS232 with screwless terminals

Type	Highest continuous voltage V	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ASP-V24T 4</b>	18	4 pole, V24	Terminal	1	7.500	<b>5083 06 0</b>

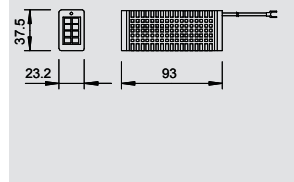
/pc.



## Fine protection for RS485 with screwless terminals

Type	Highest continuous voltage V	Version	Connection system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ASP-V11EI 4</b>	7.5	4 pole, V11	Terminal	1	7.500	<b>5083 08 7</b>

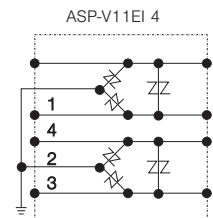
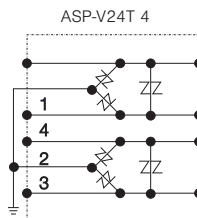
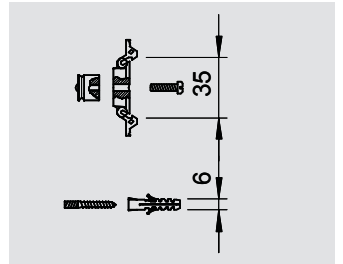
/pc.



## Fastening set for hat profile rail

Type	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>DLS-BS</b>	—	1	5.000	<b>5082 38 2</b>

/pc.



Maximum continuous voltage	V	18 V	7,5 V
LPZ		2→3	2→3
Nominal discharge surge current (8/20)	kA	0.34 kA	0.75 kA
Protection level (sym.) with In C2		≤65 V	≤110 V
Protection level (asym.) with In C2		≤55 V	≤120 V
Protection level (asym.) with 1 kV/μs C3		≤25 V	≤10 V
Plug-in system		Terminal	Terminal
<b>Item No.</b>		<b>5083 06 0</b>	<b>5083 08 7</b>



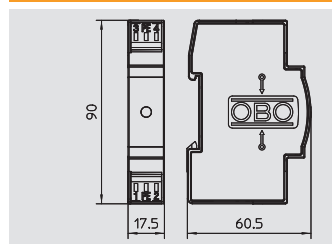
# MCR protection for 2-pin for power supply

Surge protection device, fine protection Type 3 for distributor installation



- Suitable for DC and AC voltage systems
- With visual function display
- With installation-friendly, screwless connection clamps
- In a space-saving 17.5 mm grid
- Y connection

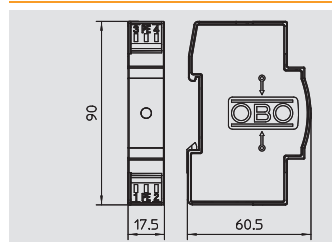
Application: Universal use on 35 mm U-rail in every normal commercially available distribution housing.



## MCR protection for 2-pin for power supply, 12 V

Type	Version	U <sub>max AC</sub> V	U <sub>max DC</sub> V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF12-AC DC</b>	12 V version	13.5	18	1	9.000	<b>5097 45 3</b>

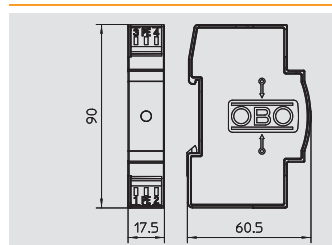
/pc.



## MCR protection for 2-pin for power supply, 24 V

Type	Version	U <sub>max AC</sub> V	U <sub>max DC</sub> V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF24-AC/DC</b>	24 V version	34	46	1	8.000	<b>5097 60 7</b>

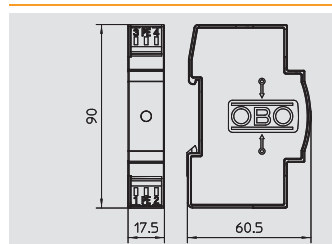
/pc.



## MCR protection for 2-pin for power supply, 48 V

Type	Version	U <sub>max AC</sub> V	U <sub>max DC</sub> V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF48-AC/DC</b>	48 V version	60	80	1	8.000	<b>5097 61 5</b>

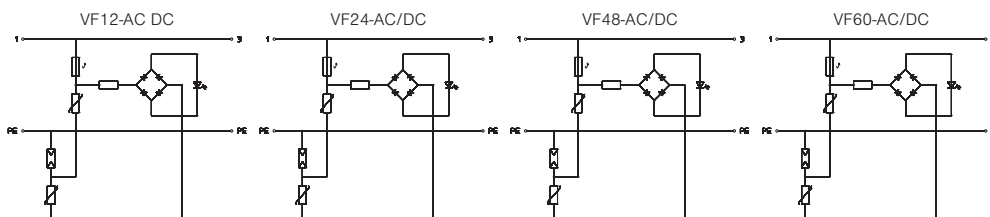
/pc.



## MCR protection for 2-pin for power supply, 60 V

Type	Version	U <sub>max AC</sub> V	U <sub>max DC</sub> V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF60-AC/DC</b>	60 V version	80	110	1	8.000	<b>5097 62 3</b>

/pc.



U <sub>max AC</sub>	V	13,5 V	34 V	60 V	80 V
U <sub>max DC</sub>	V	18 V	46 V	80 V	110 V
SPD to EN 61643-11		Type 3	Type 3	Type 3	Type 3
SPD to IEC 61643-1		class III	class III	class III	class III
LPZ		2→3	2→3	2→3	2→3
Nominal discharge surge current (8/20)	kA	0,7 kA	0,7 kA	0,7 kA	0,7 kA
Maximum discharge current	kA	2 kA	2 kA	2 kA	2 kA
Nominal load current	A	20 A	20 A	20 A	20 A
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection level wire/wire	V	<110 V	<130 V	<220 V	<280 V
Protection level wire/earth	V	<1200 V	<1200 V	<1200 V	<1200 V
Division unit TE (17.5 mm)		1	1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 45 3</b>	<b>5097 60 7</b>	<b>5097 61 5</b>	<b>5097 62 3</b>

# MCR protection for 2-pin for power supply



Surge protection device, fine protection Type 3 for distributor installation

- Suitable for DC and AC voltage systems
- With visual function display
- With installation-friendly, screwless connection clamps
- In a space-saving 17.5 mm grid
- Y connection

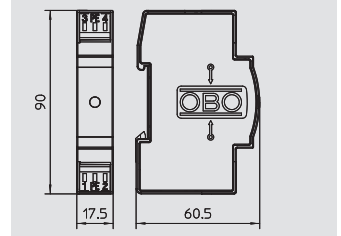
Application: Universal use on 35 mm U-rail in every normal commercially available distribution housing.



## MCR protection for 2-pin for power supply, 110 V

Type	Version	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF110-AC DC</b>	110 V version	150	200	1	8.000	<b>5097 63 1</b>

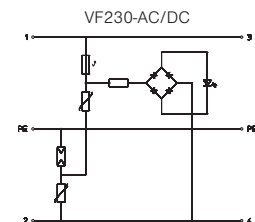
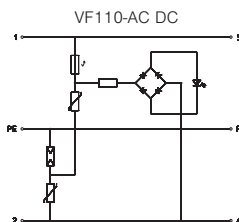
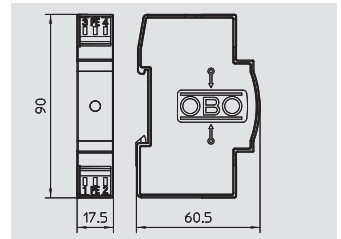
/pc.



## MCR protection for 2-pin for power supply, 230 V

Type	Version	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF230-AC/DC</b>	230 V version	255	350	1	8.000	<b>5097 65 0</b>

/pc.



U <sub>max</sub> AC	V	150 V	255 V
U <sub>max</sub> DC	V	200 V	350 V
SPD to EN 61643-11		Type 3	Type 3
SPD to IEC 61643-1		class III	class III
LPZ		2-3	2-3
Nominal discharge surge current (8/20)	kA	2 kA	2.5 kA
Maximum discharge current	kA	6,5 kA	7 kA
Nominal load current	A	20 A	20 A
Response time	ns	< 25 ns	< 25 ns
Temperature range	ø °C	-40 - +80 °C	-40 - +80 °C
Protection level wire/wire	V	< 500 V	< 1000 V
Protection level wire/earth	V	< 1400 V	< 1400 V
Division unit TE (17.5 mm)		1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 63 1</b>	<b>5097 65 0</b>



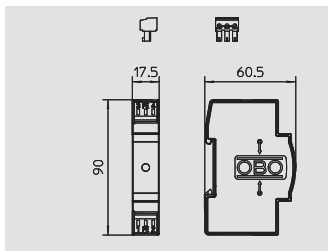
# MCR protection for 2-pin for power supply with remote signalling

Type 3 surge protection/fine network protection with remote signalling

- With remote signalling: Potential-free changeover contact
- Suitable for AC systems
- With visual function display
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- Y circuit



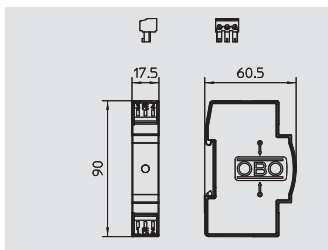
Application: Universal use on 35 mm hat profile rails in any standard distributor housing.



## MCR protection for 2-pin for power supply with remote signalling, 24 V AC/DC

Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF24-AC/DC-FS</b>	34	46	1	6.700	<b>5097 82 0</b>

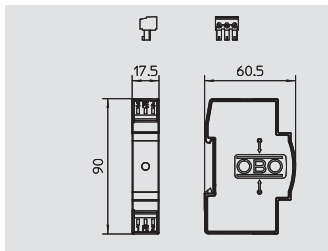
/pc.



## MCR protection for 2-pin for power supply with remote signalling, 110 V AC/DC

Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF110-AC DC-FS</b>	150	200	1	6.900	<b>5097 84 6</b>

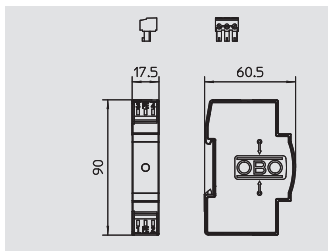
/pc.



## MCR protection for 2-pin for power supply with remote signalling, 230 V AC/DC

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF230-AC/DC-FS</b>	350	255	1	6.900	<b>5097 85 2</b>

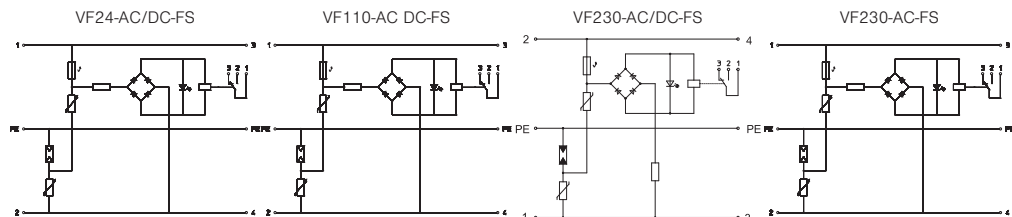
/pc.



## MCR protection for 2-pin for power supply with remote signalling, 230 V AC

Type	U <sub>max</sub> AC V	U <sub>max</sub> DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF230-AC-FS</b>	255	—	1	6.900	<b>5097 85 8</b>

/pc.



U <sub>max</sub> AC	V	34 V	150 V	255 V	255 V
U <sub>max</sub> DC	V	46 V	200 V	350 V	—
SPD to EN 61643-11		Type 3	Type 3	Type 3	Type 3
SPD to IEC 61643-1		class III	class III	class III	class III
LPZ		2-3	2-3	2-3	2-3
Nominal discharge surge current (8/20)	kA	0,7 kA	2 kA	2,5 kA	2,5 kA
Maximum discharge current	kA	2 kA	6,5 kA	7 kA	7 kA
Nominal load current	A	20 A	20 A	20 A	20 A
Response time	ns	< 25 ns	< 25 ns	< 25 ns	< 25 ns
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection level wire/wire	V	<160 V	<500 V	<1060 V	<1060 V
Protection level wire/earth	V	<1200 V	<1300 V	<1400 V	<1400 V
Division unit TE (17.5 mm)		1	1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 82 0</b>	<b>5097 84 6</b>	<b>5097 85 2</b>	<b>5097 85 8</b>

Always indicate the article number when ordering.

# MCR protection for 2-pin for power supply with leak current-free remote signalling



Type 3 surge protection/fine network protection with leak current-free remote signalling

- With remote signalling: Potential-free NC contact for function monitoring
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- Y circuit

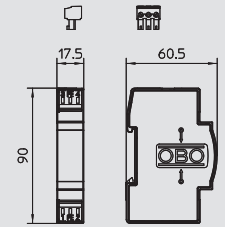
Application: Universal use on 35 mm hat profile rails in any standard distributor housing.



## MCR protection for 2-pin for power supply with leak current-free remote signalling, 24 V AC/DC

Type	U max AC V	U max DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF2-24-AC/DC-FS</b>	34	46	1	5.500	<b>5097 93 1</b>

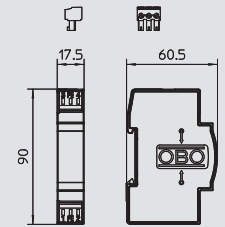
/pc.



## MCR protection for 2-pin for power supply with leak current-free remote signalling, 110 V AC/DC

Type	U max AC V	U max DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF2-110-AC/DCFS</b>	150	200	1	5.600	<b>5097 93 5</b>

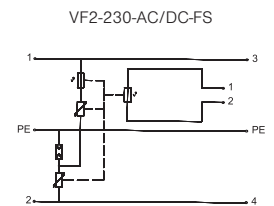
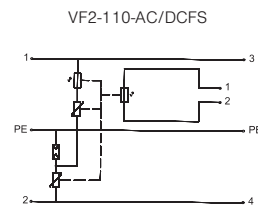
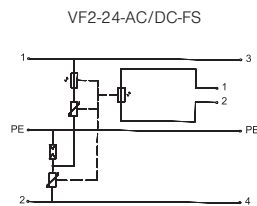
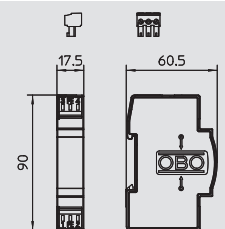
/pc.



## MCR protection for 2-pin for power supply with leak current-free remote signalling, 230 V AC/DC

Type	U max AC V	U max DC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>VF2-230-AC/DC-FS</b>	255	350	1	5.700	<b>5097 93 9</b>

/pc.



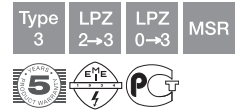
U max AC	V	34 V	150 V	255 V
U max DC	V	46 V	200 V	350 V
SPD to EN 61643-11		Type 3	Type 3	Type 3
SPD to IEC 61643-1		class III	class III	class III
LPZ		2→3	2→3	2→3
Nominal discharge surge current (8/20)	kA	2.5 kA	2.5 kA	2.5 kA
Maximum discharge current	kA	7 kA	7 kA	7 kA
Nominal load current	A	20 A	20 A	20 A
Response time	ns	<25 ns	<25 ns	<25 ns
Temperature range	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection level wire/wire	V	< 130 V	< 220 V	< 1000 V
Protection level wire/earth	V	< 1200 V	< 1200 V	< 1400 V
Division unit TE (17.5 mm)		1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5097 93 1</b>	<b>5097 93 5</b>	<b>5097 93 9</b>



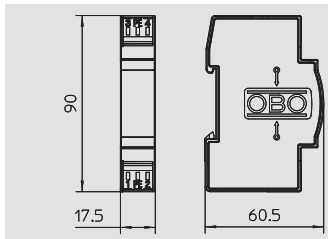
# MCR protection for two-core systems

Data cable protection devices for two-wire dual core systems

- Available as basic, medium and fine protection
- Low protection level at high current load
- Screwless terminals
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting



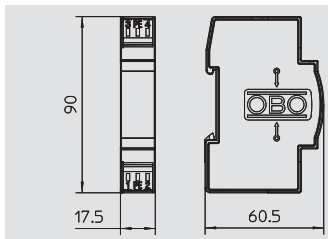
Application: Control systems, bus systems, communications systems



## Basic protection for two-core systems with HF applications 120 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>TKS-B</b>	170	120	1	7.500	<b>5097 97 6</b>

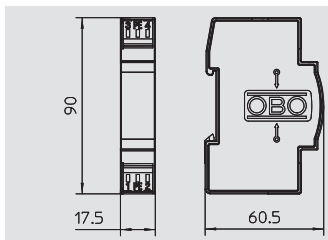
/pc.



## Combination protection for two-core systems with HF applications 5 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 5 HF</b>	6	4.2	1	5.000	<b>5098 57 1</b>

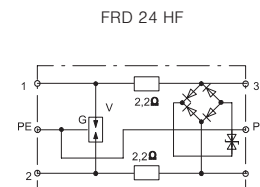
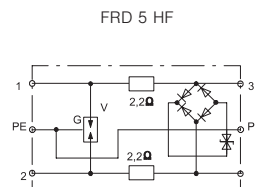
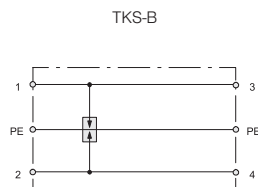
/pc.



## Combination protection for double-core systems with HF applications 24 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 24 HF</b>	28	19.7	1	5.000	<b>5098 57 5</b>

/pc.



02\_TBS-Katalog\_2010\_Neuer\_Stand / en / 30/03/2010 (LLEExport\_00986)

Nominal voltage	V	150 V	5 V	24 V
U <sub>max</sub> AC	V	120 V	4,2 V	19,7 V
U <sub>max</sub> DC	V	170 V	6 V	28 V
LPZ		0-2	0-3	0-3
Lightning impulse current (10/350)	kA	6 kA	6 kA	6 kA
Nominal discharge surge current (8/20)	kA	20 kA	20 kA	20 kA
Nominal load current	A	20 A	0,45 A	0,45 A
Series resistance	R	Ohm	2,2 Ohm	2,2 Ohm
Protection level wire/wire	V	<500 V	<18 V	<40 V
Protection level wire/earth	V	<500 V	<500 V	<500 V
Response time	ns	< 100 ns	< 1 ns	< 1 ns
Temperature range	θ	°C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	1,4 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	1,4 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	1,4 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Transmission frequency	f	0-100MHz f	0-100MHz f	0-100MHz f
<b>Item No.</b>		<b>5097 97 6</b>	<b>5098 57 1</b>	<b>5098 57 5</b>



# MCR protection for two-core systems



Surge protection for use in measurement and control technology

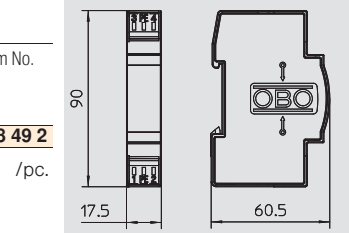
- Medium and fine protection
- Standard design for double core systems
- Two-stage protection circuit
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- With ohmic decoupling in the longitudinal branch

Application: Universal use on any 35 mm hat profile rail in every commercially available distributor housing.



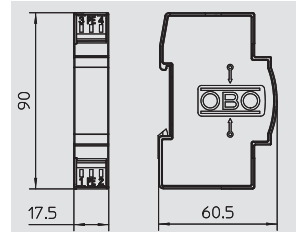
## Medium and fine protection for two-core systems 5 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 5</b>	6	4.2	1	9.500	<b>5098 49 2</b>



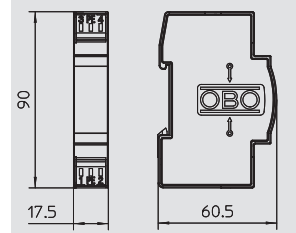
## Medium and fine protection for two-core systems 12 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 12</b>	13.5	9.5	1	9.500	<b>5098 50 6</b>



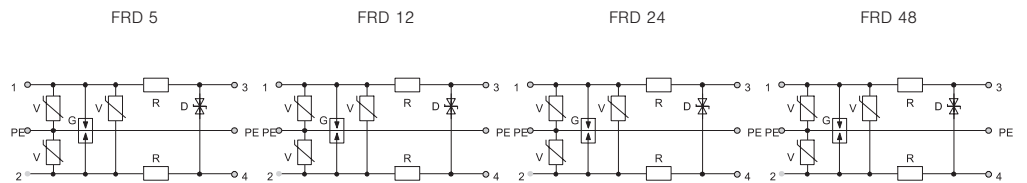
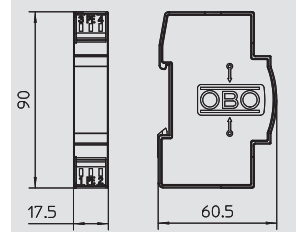
## Medium and fine protection for two-core systems 24 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 24</b>	27	19	1	9.500	<b>5098 51 4</b>



## Medium and fine protection for two-core systems 48 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 48</b>	53	37.5	1	9.500	<b>5098 52 2</b>



Nominal voltage	V	5 V	12 V	24 V	48 V
U <sub>max</sub> AC	V	4,2 V	9,5 V	19 V	37,5 V
U <sub>max</sub> DC	V	6 V	13,5 V	27 V	53 V
LPZ		0-3	0-3	0-3	0-3
Lightning impulse current (10/350)	kA	6 kA	6 kA	6 kA	6 kA
Nominal discharge surge current (8/20)	kA	10 kA	10 kA	10 kA	10 kA
Nominal load current	A	0,2 A	0,2 A	0,2 A	0,2 A
Series resistance	R	Ohm	15 Ohm	15 Ohm	15 Ohm
Protection level wire/wire	V	<500 V	<32 V	<65 V	<125 V
Protection level wire/earth	V	<18 V	<500 V	<500 V	<500 V
Response time	ns	< 1 ns	< 1 ns	< 1 ns	< 1 ns
Temperature range	θ	°C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating			IP 20	IP 20	IP 20
Division unit TE (17.5 mm)			1	1	1
Connection cross-section, rigid	mm <sup>2</sup>		0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>		0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>		0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>			<b>5098 49 2</b>	<b>5098 50 6</b>	<b>5098 51 4</b>
					<b>5098 52 2</b>



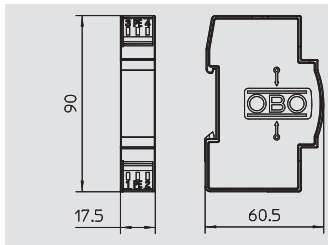
# MCR protection for two-core systems

Surge protection for use in measurement and control technology



- Medium and fine protection
- Standard design for double core systems
- Two-stage protection circuit
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- With ohmic decoupling in the longitudinal branch

Application: Universal use on any 35 mm hat profile rail in every commercially available distributor housing.



## Medium and fine protection for two-core systems 110 V

Type	U max DC V	U max AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 110</b>	122	86.2	1	9.500	<b>5098 55 7</b>

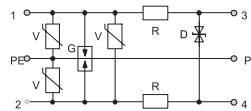


/pc.

Surge protection, data and information technology



FRD 110



Nominal voltage	V	110 V
U max AC	V	86,2 V
U max DC	V	122 V
LPZ		0-3
Lightning impulse current (10/350)	kA	6 kA
Nominal discharge surge current (8/20)	kA	10 kA
Nominal load current	A	0,2 A
Series resistance	R Ohm	15 Ohm
Protection level wire/wire	V	<255 V
Protection level wire/earth	V	<500 V
Response time	ns	< 1 ns
Temperature range	θ °C	-40 - +80 °C
Protection rating		IP 20
Division unit TE (17.5 mm)		1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5098 55 7</b>

# MCR protection for two-core systems



Surge protection for use in measurement and control technology

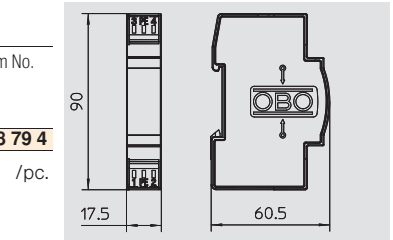
- Medium and fine protection
- Standard design for single core systems
- Two-stage protection circuit
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- With ohmic decoupling in the longitudinal branch

Application: Universal use on any 35 mm hat profile rail in every commercially available distributor housing.



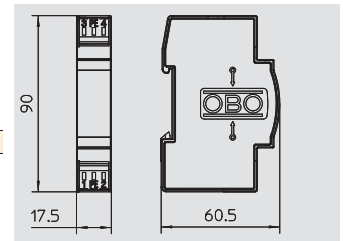
## Medium and fine protection for two-core systems 5 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 2-5</b>	6	4.2	1	9.500	<b>5098 79 4</b>



## Medium and fine protection for two-core systems 24 V

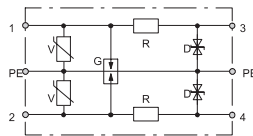
Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRD 2-24</b>	27	19	1	9.500	<b>5098 72 7</b>



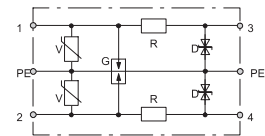
Surge protection, data and information technology



FRD 2-5



FRD 2-24



Nominal voltage	V	5 V	24 V
U <sub>max</sub> AC	V	4,2 V	19 V
U <sub>max</sub> DC	V	6 V	27 V
LPZ		0-3	0-3
Lightning impulse current (10/350)	kA	6 kA	6 kA
Nominal discharge surge current (8/20)	kA	10 kA	10 kA
Nominal load current	A	0,2 A	0,2 A
Series resistance	R Ohm	15 Ohm	15 Ohm
Protection level wire/wire	V	<18 V	<65 V
Protection level wire/earth	V	<28 V	<125 V
Response time	ns	< 1 ns	< 1 ns
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20
Division unit TE (17.5 mm)		1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5098 79 4</b>	<b>5098 72 7</b>

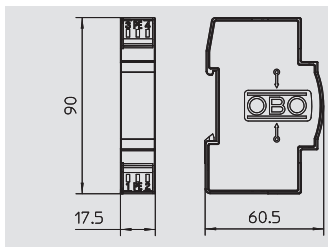
# MCR protection for two-core systems

Surge protection for use in measurement and control technology



- Medium and fine protection
- Standard design for single core systems
- Two-stage protection circuit
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- With inductive decoupling in the longitudinal branch

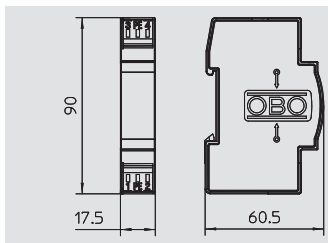
Application: Universal use on any 35 mm hat profile rail in every commercially available distributor housing.



## Medium and fine protection for two-core systems 5 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 5</b>	6	4.2	1	9.500	<b>5098 60 0</b>

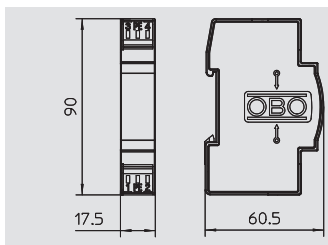
/pc.



## Medium and fine protection for two-core systems 12 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 12</b>	13.5	9.5	1	9.500	<b>5098 60 3</b>

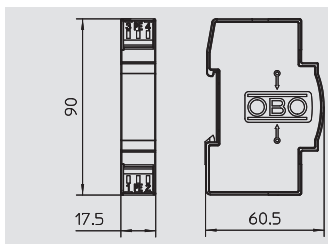
/pc.



## Medium and fine protection for two-core systems 24 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 24</b>	27	19	1	9.500	<b>5098 61 1</b>

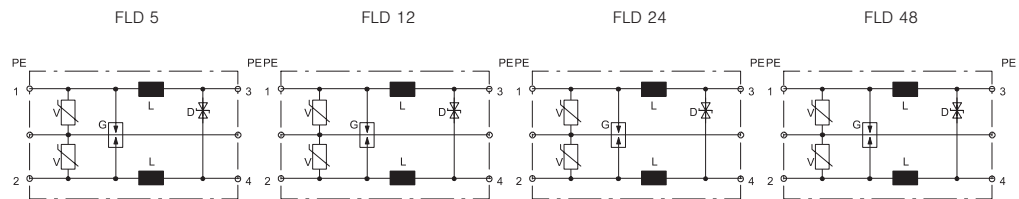
/pc.



## Medium and fine protection for two-core systems 48 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 48</b>	53	37.5	1	9.500	<b>5098 63 0</b>

/pc.



Nominal voltage	V	5 V	12 V	24 V	48 V
U <sub>max</sub> AC	V	4,2 V	9,5 V	19 V	37,5 V
U <sub>max</sub> DC	V	6 V	13,5 V	27 V	53 V
LPZ		0-3	0-3	0-3	0-3
Lightning impulse current (10/350)	kA	6 kA	6 kA	6 kA	6 kA
Nominal discharge surge current (8/20)	kA	10 kA	10 kA	10 kA	10 kA
Nominal load current	A	1 A	1 A	1 A	1 A
Inductivity	μH	100 μH	100 μH	100 μH	100 μH
Protection level wire/wire	V	<18 V	<32 V	<65 V	<125 V
Protection level wire/earth	V	<500 V	<500 V	<500 V	<500 V
Response time	ns	< 1 ns	< 1 ns	< 1 ns	< 1 ns
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		1	1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5098 60 0</b>	<b>5098 60 3</b>	<b>5098 61 1</b>	<b>5098 63 0</b>

# MCR protection for two-core systems



Surge protection for use in measurement and control technology

- Medium and fine protection
- Standard design for single core systems
- Two-stage protection circuit
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- With inductive decoupling in the longitudinal branch

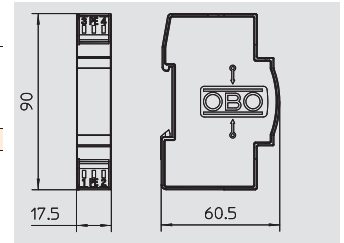
Application: Universal use on any 35 mm hat profile rail in every commercially available distributor housing.



## Medium and fine protection for two-core systems 60 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 60</b>	93	66	1	9.500	<b>5098 63 8</b>

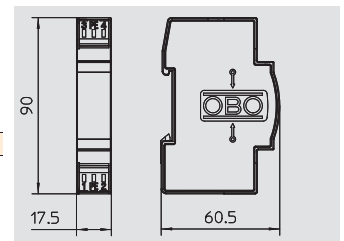
/pc.



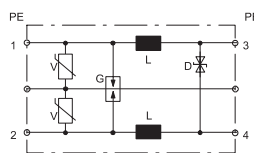
## Medium and fine protection for two-core systems 110 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 110</b>	122	86.2	1	9.500	<b>5098 64 6</b>

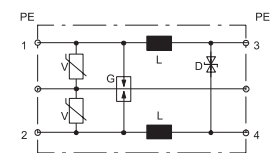
/pc.



FLD 60



FLD 110



Nominal voltage	V	60 V	110 V
U <sub>max</sub> AC	V	66 V	86,2 V
U <sub>max</sub> DC	V	93 V	122 V
LPZ		0-3	0-3
Lightning impulse current (10/350)	kA	6 kA	6 kA
Nominal discharge surge current (8/20)	kA	10 kA	10 kA
Nominal load current	A	1 A	1 A
Inductivity	µH	100 µH	100 µH
Protection level wire/wire	V	<150 V	<255 V
Protection level wire/earth	V	<500 V	<500 V
Response time	ns	<1 ns	<1 ns
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20
Division unit TE (17.5 mm)		1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5098 63 8</b>	<b>5098 64 6</b>



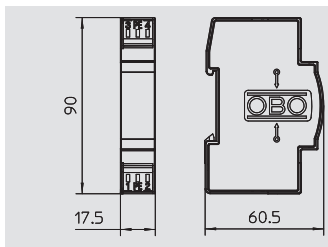
# MCR protection for two-core systems

Surge protection for use in measurement and control technology



- Medium and fine protection
- Standard design for single core systems
- Two-stage protection circuit
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- With inductive decoupling in the longitudinal branch

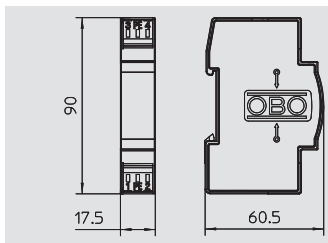
Application: Universal use on any 35 mm hat profile rail in every commercially available distributor housing.



## Medium and fine protection for two-core systems 5 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 2-5</b>	8	5.5	1	9.500	<b>5098 86 7</b>

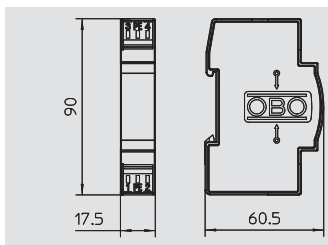
/pc.



## Medium and fine protection for two-core systems 12 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 2-12</b>	13.5	9.5	1	9.500	<b>5098 80 8</b>

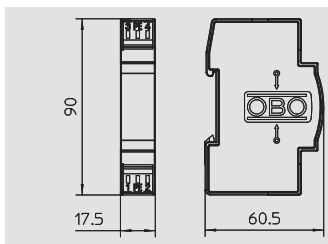
/pc.



## Medium and fine protection for two-core systems 24 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 2-24</b>	27	19	1	9.500	<b>5098 81 6</b>

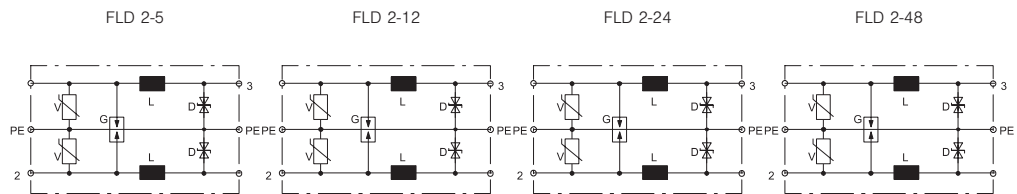
/pc.



## Medium and fine protection for two-core systems 48 V

Type	U <sub>max</sub> DC V	U <sub>max</sub> AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 2-48</b>	53	37.5	1	9.500	<b>5098 82 4</b>

/pc.



	FLD 2-5	FLD 2-12	FLD 2-24	FLD 2-48	
Nominal voltage	V	5 V	12 V	24 V	48 V
U <sub>max</sub> AC	V	5,5 V	9,5 V	19 V	37,5 V
U <sub>max</sub> DC	V	8 V	13,5 V	27 V	53 V
LPZ		0-3	0-3	0-3	0-3
Lightning impulse current (10/350)	kA	6 kA	6 kA	6 kA	6 kA
Nominal discharge surge current (8/20)	kA	10 kA	10 kA	10 kA	10 kA
Nominal load current	A	1 A	1 A	1 A	1 A
Inductivity	μH	100 μH	100 μH	100 μH	100 μH
Protection level wire/wire	V	<18 V	<32 V	<65 V	<125 V
Protection level wire/earth	V	<28 V	<65 V	<125 V	<250 V
Response time	ns	< 1 ns	< 1 ns	< 1 ns	< 1 ns
Temperature range	θ °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C	-40 - +80 °C
Protection rating		IP 20	IP 20	IP 20	IP 20
Division unit TE (17.5 mm)		1	1	1	1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5098 86 7</b>	<b>5098 80 8</b>	<b>5098 81 6</b>	<b>5098 82 4</b>

# MCR protection for two-core systems



Surge protection for use in measurement and control technology

- Medium and fine protection
- Standard design for single core systems
- Two-stage protection circuit
- With installation-friendly, screwless connection terminals
- In space-saving 17.5 mm grid
- With inductive decoupling in the longitudinal branch

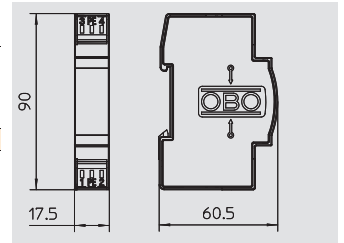
Application: Universal use on any 35 mm hat profile rail in every commercially available distributor housing.



## Medium and fine protection for two-core systems 110 V

Type	U max DC V	U max AC V	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FLD 2-110</b>	122	86.2	1	9.500	<b>5098 85 9</b>

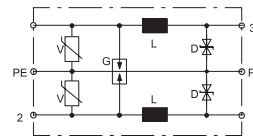
/pc.



Surge protection, data and information technology



FLD 2-110



Nominal voltage	V	110 V
U max AC	V	86,2 V
U max DC	V	122 V
LPZ		0→3
Lightning impulse current (10/350)	kA	6 kA
Nominal discharge surge current (8/20)	kA	10 kA
Nominal load current	A	1 A
Inductivity	µH	100 µH
Protection level wire/wire	V	<255 V
Protection level wire/earth	V	<500 V
Response time	ns	< 1 ns
Temperature range	θ °C	-40 - +80 °C
Protection rating		IP 20
Division unit TE (17.5 mm)		1
Connection cross-section, rigid	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	0,14 - 2,5 mm <sup>2</sup>
<b>Item No.</b>		<b>5098 85 9</b>

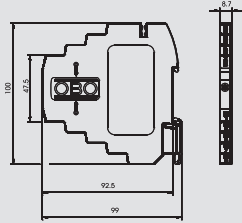
# MCR protection for multi-wire systems (testable)

Testable data cable protection devices for multi-wire systems




- Narrow installation width of only 8 mm
- Low protection level for high current load
- Screwless terminals
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting
- Testable in installed state

Application: Measuring technology, switchgear cabinet construction, etc.

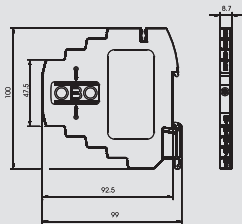


### Series protection device, 2-pole, 5 V version

Type	Nominal voltage V	Version	Maximum continuous voltage Vc/AC	Maximum continuous voltage Vc/DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-2 D-5-T</b>	5	2-pole	7	10	1	6.000	<b>5098 40 4</b>




/pc.

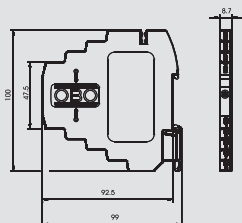


### Series protection device, 3-pole, 5 V version

Type	Nominal voltage V	Version	Maximum continuous voltage Vc/AC	Maximum continuous voltage Vc/DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-3 D-5-T</b>	5	3-pole	7	10	1	6.000	<b>5098 40 7</b>




/pc.

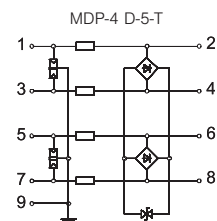
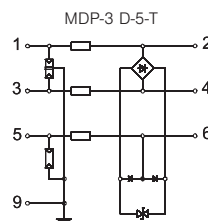
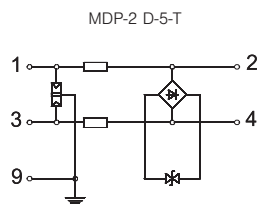


### Series protection device, 4-pole, 5 V version

Type	Nominal voltage V	Version	Maximum continuous voltage Vc/AC	Maximum continuous voltage Vc/DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-4 D-5-T</b>	5	4-pole	7	10	1	5.800	<b>5098 41 1</b>



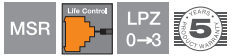
/pc.



Version		2-pole	3-pole	4-pole
Nominal voltage	V	5 V	5 V	5 V
Maximum continuous voltage Vc/AC	V	7 V	7 V	7 V
Maximum continuous voltage Vc/DC	V	10 V	10 V	10 V
LPZ		1-3	1-3	1-3
Nominal load current	A	0,58 A	0,58 A	0,58 A
Protection level, wire-wire @ C1 (0.5 kV / 0.25 kA)	V	≤ 35 V	≤ 35 V	≤ 35 V
Protection level, wire-wire @ C1 (1 kV / 0.5 kA)	V	≤ 50 V	≤ 50 V	≤ 50 V
Protection level, wire-earth @ C2 (10 kA)	V	≤ 750 V	≤ 750 V	≤ 750 V
Lightning impulse current (10/350) [total]	kA			
Rated arresting surge current In to C2	kA	5 kA	5 kA	5 kA
Serial impedance per path	Ω	2,35 Ω	2,35 Ω	2,35 Ω
Insertion loss	a/dB	3 @ 100 MHz dB	3 @ 100 MHz dB	3 @ 100 MHz dB
Protection rating		IP20	IP20	IP20
Life Control testing option		Yes	Yes	Yes
Connection cross-section, rigid	mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	1,5 mm <sup>2</sup>	1,5 mm <sup>2</sup>	1,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>
Testing standard		IEC 61643-21	IEC 61643-21	IEC 61643-21
<b>Item No.</b>		<b>5098 40 4</b>	<b>5098 40 7</b>	<b>5098 41 1</b>



# MCR protection for multi-wire systems (testable)



Testable data cable protection devices for multi-wire systems

- Narrow installation width of only 8 mm
- Low protection level for high current load
- Screwless terminals
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting
- Testable in installed state

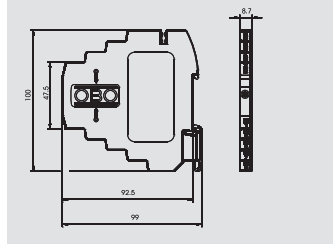
Application: Measuring technology, switchgear cabinet construction, etc.



## Series protection device, 2-pole, 24 V version

Type	Nominal voltage V	Version	Maximum continuous voltage V <sub>c</sub> /AC	Maximum continuous voltage V <sub>c</sub> /DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-2 D-24-T</b>	24	2-pole	20	28	1	6.000	<b>5098 42 2</b>

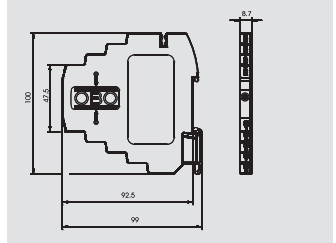
/pc.



## Series protection device, 3-pole, 24 V version

Type	Nominal voltage V	Version	Maximum continuous voltage V <sub>c</sub> /AC	Maximum continuous voltage V <sub>c</sub> /DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-3 D-24-T</b>	24	3-pole	20	28	1	6.000	<b>5098 42 7</b>

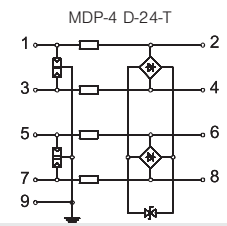
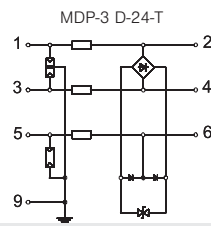
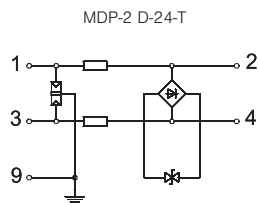
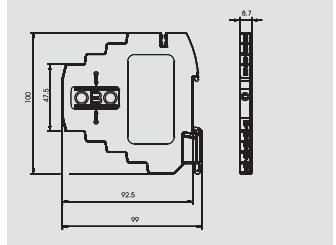
/pc.



## Series protection device, 4-pole, 24 V version

Type	Nominal voltage V	Version	Maximum continuous voltage V <sub>c</sub> /AC	Maximum continuous voltage V <sub>c</sub> /DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-4 D-24-T</b>	24	4-pole	20	28	1	5.800	<b>5098 43 1</b>

/pc.



Version		2-pole	3-pole	4-pole
Nominal voltage	V	24 V	24 V	24 V
Maximum continuous voltage V <sub>c</sub> /AC	V	20 V	20 V	20 V
Maximum continuous voltage V <sub>c</sub> /DC	V	28 V	28 V	28 V
LPZ		1→3	1→3	1→3
Nominal load current	A	0,58 A	0,58 A	0,58 A
Protection level, wire-wire @ C1 (0.5 kV / 0.25 kA)	V	≤ 55 V	≤ 55 V	≤ 55 V
Protection level, wire-wire @ C1 (1 kV / 0.5 kA)	V	≤ 65 V	≤ 65 V	≤ 65 V
Protection level, wire-earth @ C2 (10 kA)	V	≤ 750 V	≤ 750 V	≤ 750 V
Lightning impulse current (10/350) [total]	kA	1 kA	2 kA	2 kA
Rated arresting surge current I <sub>n</sub> to C2	kA	5 kA	5 kA	5 kA
Serial impedance per path	Ω	2,35 Ω	2,35 Ω	2,35 Ω
Insertion loss	a/dB    dB	3 @ 100 MHz dB	3 @ 100 MHz dB	3 @ 100 MHz dB
Protection rating		IP20	IP20	IP20
Life Control testing option		Yes	Yes	Yes
Connection cross-section, rigid	mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	1,5 mm <sup>2</sup>	1,5 mm <sup>2</sup>	1,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>
Testing standard		IEC 61643-21	IEC 61643-21	IEC 61643-21
<b>Item No.</b>		<b>5098 42 2</b>	<b>5098 42 7</b>	<b>5098 43 1</b>



# MCR protection for multi-wire systems (testable)

Testable data cable protection devices for multi-wire systems



- Narrow installation width of only 8 mm
- Low protection level for high current load
- Screwless terminals
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting
- Testable in installed state

Application: Measuring technology, switchgear cabinet construction, etc.

### Series protection device, 2-pole, 48 V version

Type	Nominal voltage V	Version	Maximum continuous voltage V <sub>c</sub> /AC	Maximum continuous voltage V <sub>c</sub> /DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-2 D-48-T</b>	48	2-pole	41	58	1	6.000	<b>5098 44 2</b>

/pc.

### Series protection device, 2-pole, 48 V version

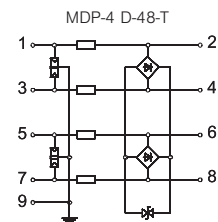
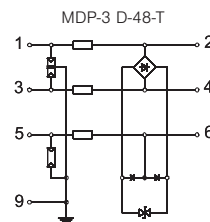
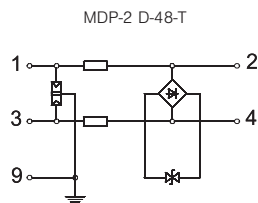
Type	Nominal voltage V	Version	Maximum continuous voltage V <sub>c</sub> /AC	Maximum continuous voltage V <sub>c</sub> /DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-3 D-48-T</b>	48	3-pole	41	58	1	6.000	<b>5098 44 6</b>

/pc.

### Series protection device, 2-pole, 48 V version

Type	Nominal voltage V	Version	Maximum continuous voltage V <sub>c</sub> /AC	Maximum continuous voltage V <sub>c</sub> /DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-4 D-48-T</b>	48	4-pole	41	58	1	5.800	<b>5098 45 0</b>

/pc.



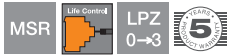
Version	2-pole		3-pole		4-pole	
Nominal voltage	V	48 V	V	48 V	V	48 V
Maximum continuous voltage V <sub>c</sub> /AC	V	41 V	V	41 V	V	41 V
Maximum continuous voltage V <sub>c</sub> /DC	V	58 V	V	58 V	V	58 V
LPZ		1-3		1-3		1-3
Nominal load current	A	0,58 A	A	0,58 A	A	0,58 A
Protection level, wire-wire @ C1 (0.5 kV / 0.25 kA)	V	≤ 95 V	V	≤ 95 V	V	≤ 95 V
Protection level, wire-wire @ C1 (1 kV / 0.5 kA)	V	≤ 110 V	V	≤ 110 V	V	≤ 110 V
Protection level, wire-earth @ C2 (10 kA)	V	≤ 750 V	V	≤ 750 V	V	≤ 750 V
Lightning impulse current (10/350) [total]	kA		kA		kA	
Rated arresting surge current I <sub>n</sub> to C2	kA	5 kA	kA	5 kA	kA	5 kA
Serial impedance per path	Ω	2,35 Ω	Ω	2,35 Ω	Ω	2,35 Ω
Insertion loss	a/dB	3 @ 100 MHz dB	a/dB	3 @ 100 MHz dB	a/dB	3 @ 100 MHz dB
Protection rating		IP20		IP20		IP20
Life Control testing option		Yes		Yes		Yes
Connection cross-section, rigid	mm <sup>2</sup>	2,5 mm <sup>2</sup>	mm <sup>2</sup>	2,5 mm <sup>2</sup>	mm <sup>2</sup>	2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	1,5 mm <sup>2</sup>	mm <sup>2</sup>	1,5 mm <sup>2</sup>	mm <sup>2</sup>	1,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 mm <sup>2</sup>	mm <sup>2</sup>	2,5 mm <sup>2</sup>	mm <sup>2</sup>	2,5 mm <sup>2</sup>
Testing standard		IEC 61643-21		IEC 61643-21		IEC 61643-21
<b>Item No.</b>		<b>5098 44 2</b>		<b>5098 44 6</b>		<b>5098 45 0</b>

02\_TBS-Katalog\_2010\_Neuer\_Stand / en / 30/03/2010 (LLEExport\_00986)

Surge protection, data and information technology



# MCR protection for multi-wire systems (testable) to 10 A



Testable data cable protection devices for multi-wire systems

- Narrow installation width of only 8 mm
- Low protection level for high current load
- Screwless terminals
- Bandwidth-optimised for secure transmission
- Quick mounting on hat rail or wall mounting
- Testable in installed state

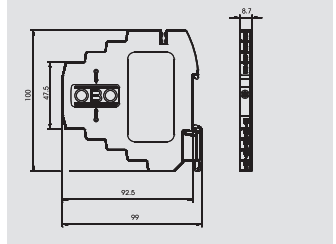
Application: Measuring technology, switchgear cabinet construction, etc.



## Series protection device, 4-pole, 5 V version

Type	Nominal voltage V	Version	Maximum continuous voltage V <sub>c</sub> /AC	Maximum continuous voltage V <sub>c</sub> /DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-4 D-5-T-10</b>	5	4-pole	7	10	1	7.200	<b>5098 41 3</b>

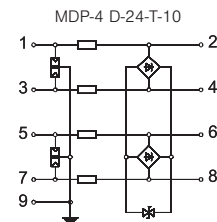
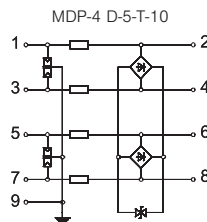
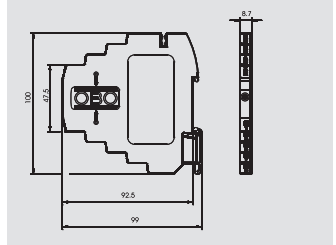
/pc.



## Series protection device, 4-pole, 24 V version

Type	Nominal voltage V	Version	Maximum continuous voltage V <sub>c</sub> /AC	Maximum continuous voltage V <sub>c</sub> /DC	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MDP-4 D-24-T-10</b>	24	4-pole	20	28	1	7.200	<b>5098 43 3</b>

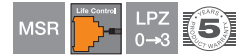
/pc.



Version		4-pole	4-pole
Nominal voltage	V	5 V	24 V
Maximum continuous voltage V <sub>c</sub> /AC	V	7 V	20 V
Maximum continuous voltage V <sub>c</sub> /DC	V	10 V	28 V
LPZ		1-3	1-3
Nominal load current	A	10 A	10 A
Protection level, wire-wire @ C1 (0.5 kV / 0.25 kA)	V	≤ 35 V	≤ 55 V
Protection level, wire-wire @ C1 (1 kV / 0.5 kA)	V	≤ 50 V	≤ 65 V
Protection level, wire-earth @ C2 (10 kA)	V	≤ 750 V	≤ 750 V
Rated arresting surge current I <sub>n</sub> to C2	kA	5 kA	5 kA
Serial impedance per path	Ω	2,35 Ω	2,35 Ω
Insertion loss	a/dB    dB	3 @ 100 MHz dB	3 @ 100 MHz dB
Protection rating		IP20	IP20
Life Control testing option		1	1
Connection cross-section, rigid	mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>
Connection cross-section, multi-wire	mm <sup>2</sup>	1,5 mm <sup>2</sup>	1,5 mm <sup>2</sup>
Connection cross-section, flexible	mm <sup>2</sup>	2,5 mm <sup>2</sup>	2,5 mm <sup>2</sup>
Testing standard		IEC 61643-21	IEC 61643-21
<b>Item No.</b>		<b>5098 41 3</b>	<b>5098 43 3</b>

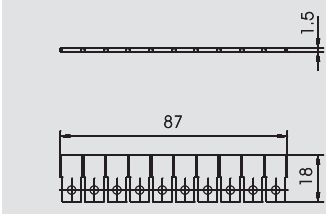


## Connecting bridge for 8 mm lightning barriers



- Length of bridge can be adjusted
- Material: Copper
- Allows quick equipotential bonding

Application: Parallel switching of the MDP lightning barriers



### Accessories for series terminal



Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>VB-MDP 10-MD</b>	1	2.300	<b>5098 47 0</b>
<b>Cu</b> Copper			/pc.



# MCR protection for explosive areas



Data cable protection devices for intrinsically-safe measuring circuits and bus systems

- Different connection systems available (metric/NPT)
- Low protection level at high current load
- Easy mounting on field devices
- Negligible internal capacitance and inductance
- Easy retrofitting

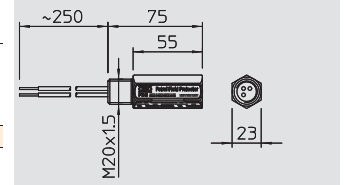
Application: Flow sensors, temperature sensors



## MCR protection for explosive areas, 2-pole, 24 V

Type	U max DC V	U max AC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FDB-2 24-M</b>	32	22	—	1	0.000	<b>5098 38 0</b>

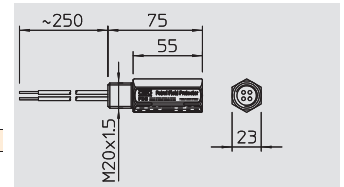
/pc.



## MCR protection for explosive areas, 3-pole, 24 V

Type	U max DC V	U max AC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FDB-3 24-M</b>	32	22	—	1	0.000	<b>5098 38 2</b>

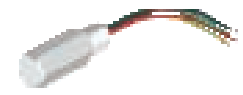
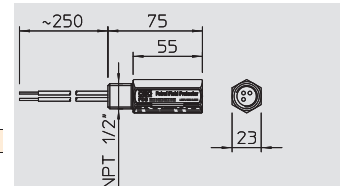
/pc.



## MCR protection for explosive areas, 2-pole, 24 V

Type	U max DC V	U max AC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FDB-2 24-N</b>	32	22	—	1	0.000	<b>5098 39 0</b>

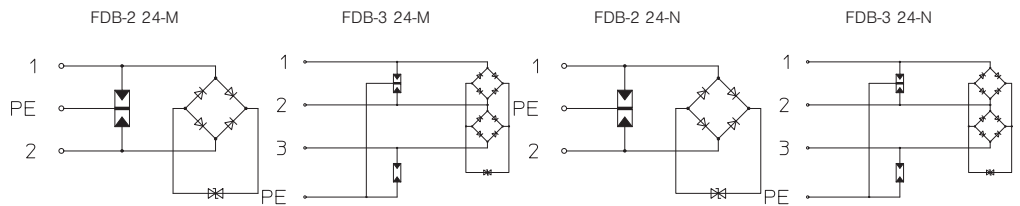
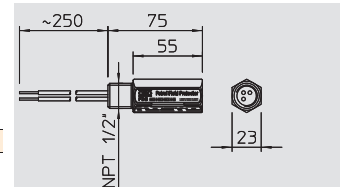
/pc.



## MCR protection for explosive areas, 3-pole, 24 V

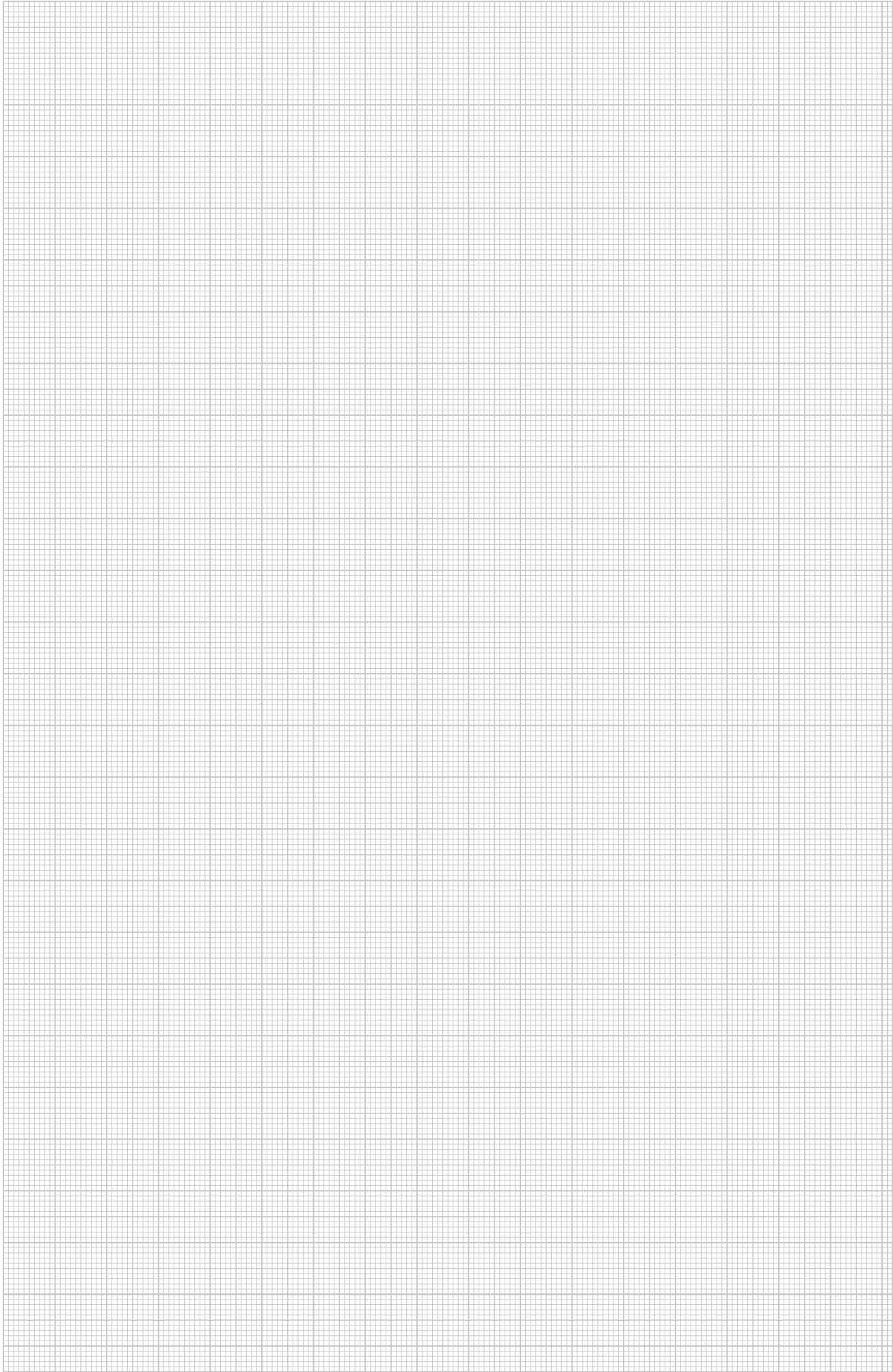
Type	U max DC V	U max AC V	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FDB-3 24-N</b>	32	22	—	1	0.000	<b>5098 39 2</b>

/pc.





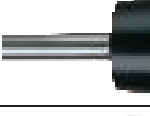



U max AC	V	22 V	22 V	22 V	22 V
U max DC	V	32 V	32 V	32 V	32 V
Rated arresting surge current In to C2 (total)	kA	10 kA	10 kA	10 kA	10 kA
Rated arresting surge current In to C2 (wire-wire)	kA	0,25 kA	0,25 kA	0,25 kA	0,25 kA
Protection level wire/earth	V	< 850 V	< 850 V	< 850 V	< 850 V
Protection level wire/wire	V	< 80 V	< 80 V	< 80 V	< 80 V
Temperature range	°C	-20 - +70 °C	-20 - +70 °C	-20 - +70 °C	-20 - +70 °C
Signalling on device		None	None	None	None
Capacity (wire-wire)		< 27 pF	< 27 pF	< 27 pF	< 27 pF
Capacity (wire-earth)		< 27 pF	< 27 pF	< 27 pF	< 27 pF
Mounting of input / output		M20 x 1.5 external thread	M20 x 1.5 external thread	1/2" NPT	1/2" NPT
Mounting of field / device side:		Connection cable 1.5 mm <sup>2</sup> Length ~ 250 mm	Connection cable 1.5 mm <sup>2</sup> Length ~ 250 mm	Connection cable 1.5 mm <sup>2</sup> Connection cable Length ~ 250 mm	Connection cable 1.5 mm <sup>2</sup> Connection cable Length ~ 250 mm
Earthing via:					
Housing material		V2A	V2A	V2A	V2A
Approval		ATEX	ATEX	ATEX	ATEX
<b>Item No.</b>		<b>5098 38 0</b>	<b>5098 38 2</b>	<b>5098 39 0</b>	<b>5098 39 2</b>







## Surge protection, protection and spark gaps

	Spark gap	Explosion-protected	250
		Connection lugs	250
		Closed	250
	Protective spark gap	-	250
	Spark gap/surge voltage protection	To couple earthing systems	251
	Spark gap	To couple earthing systems	251



# Protection and spark gaps



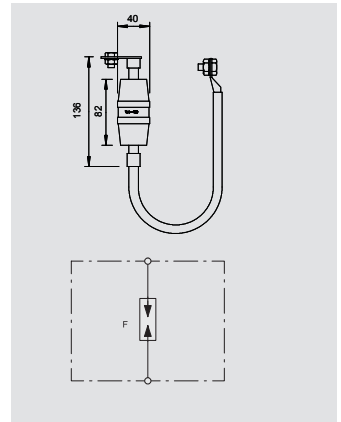
## Explosion-proof, closed spark gap

Type	Connection cable length m	Contact voltage kV	Impulse current (10/350) kA	Nom. discharge impulse current (8/20) kA	Protection level kV	Temperature range °C	Pack. pcs	Weight kg/100 pcs.	Item No.
480 180	0.18	1	100	100	< 3,0	-20 -50.0	1	48.000	5240 03 4
480 250	0.25	1	100	100	< 3,0	-20 -50.0	1	50.000	5240 07 7
480 350	0.35	1	100	100	< 3,0	-20 -50.0	1	53.000	5240 06 9

/pc.

- Ex-tested to ATEX directive 94/9/EG
- Designation: Ex II 2G EEx d IIC T6
- Incl. connector cable 25 mm<sup>2</sup> Cu, highly-flexible, with cable lug, screw (M 10), nut and lock washer
- Pulsed current 100 kA (10/350µs)
- BET tested

Application: Indirect by-passing of insulating flanges and insulating glands.



## Connection lug for Parex spark gap

Type	Bore hole Ø mm	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
484 M12	13	For M10 bolt	10	8.100	5240 22 0
484 M16	17	For M16 bolt	10	7.700	5240 23 9
484 M20	21	For M20 bolt	10	7.300	5240 24 7
484 M24	25	For M24 bolt	10	6.800	5240 25 5

**ST** Steel **F** Hot-dip galvanised

/pc.

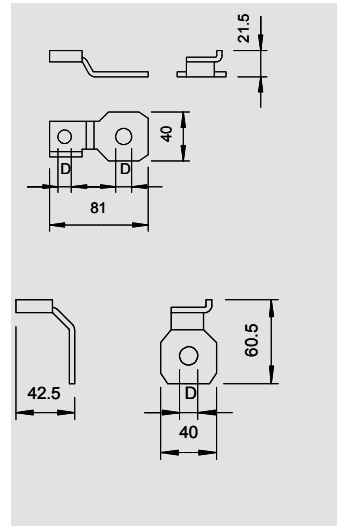
Attaching flange for installing OBO Parex spark gap 480 on insulating flanges.

Type	Bore hole Ø mm	Version	Pack. pcs	Weight kg/100 pcs.	Item No.
485 M12	13	For M10 bolt	10	8.100	5240 32 8
485 M10	11	For M16 bolt	10	8.300	5240 30 1
485 M16	17	For M20 bolt	10	7.700	5240 33 6
485 M20	21	For M24 bolt	10	7.300	5240 34 4

**ST** Steel **F** Hot-dip galvanised

/pc.

Attaching flange for installing OBO Parex spark gap 480 on insulating flanges.



## Closed spark gap, able to carry lightning current

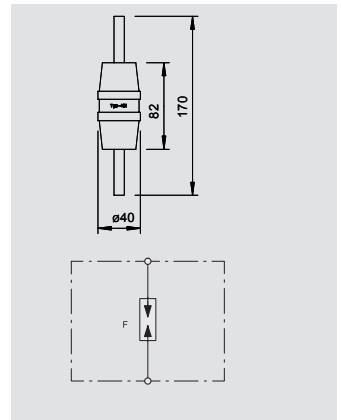
Type	Impulse current (10/350) kA	Nom. discharge impulse current (8/20) kA	Protection level kV	Contact voltage kV	Temperature range °C	Pack. pcs	Weight kg/100 pcs.	Item No.
481	50	100	< 5	2.5	-20 -50.0	1	26.500	5240 08 5

/pc.

Closed, lightning current carrying spark gap for separation of electrically conductive plant components.

- Connection bolts; Ø 10 mm; stainless steel.
- Pulsed current 50 kA (10/350)
- BET

Tested Application: Installation of electrical isolations for external lighting protection and earthing systems, e.g. two earthing systems on account of mutual influence or corrosion (corrosion current prevention).



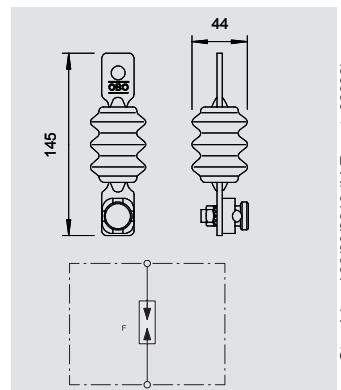
## Protective spark gap

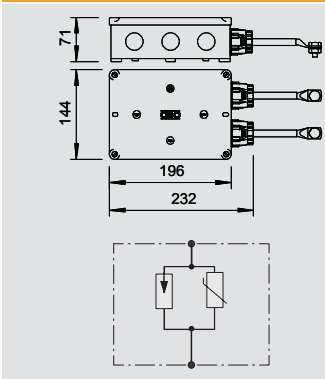
Type	Protection level kV	Contact voltage kV	Pack. pcs	Weight kg/100 pcs.	Item No.
482	< 10 kV	10	1	56.000	5240 05 0

/pc.

Closed spark gap for bridging a proximity point between roof standard of low-voltage system and components of outer lightning protection system

- Protection rating IP 54
- With pre-mounted type 5001 connector for attaching round conductors Rd 8 - 10





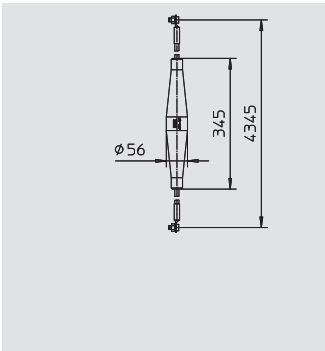
## Spark gap/surge voltage protection for coupling earthing systems

Type	Dimension mm	Highest continuous voltage V	Impulse current (10/350) kA	Nom. discharge impulse current (8/20) kA	Protection level kV	Protection type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FS-V20</b>	196 x 144 x 71	280	100	100	< 1,5	IP 54	1	170.000	<b>5099 80 3</b>

/pc.

The FS-V 20 device is a discharge gap with parallel-connected surge voltage protector. It is used to couple different earthing systems. It is connected directly to the equipotential bonding rail concerned.

Application: Coupling earthing systems in data technology sector (functional and operational earthing)



## Spark gap for earth

Type	Connection cable length m	Contact voltage kV	Impulse current (10/350) kA	Nom. discharge impulse current (8/20) kA	Protection level kV	Temperature range °C	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>483 SN</b>	2	0.07	75	100	0,6 - 0,9	-20 -50.0	1	200.000	<b>5239 91 4</b>

/pc.






- 2 connection cables 25 mm<sup>2</sup> Cu, highly flexible with cable lug
- Waterproof jacketing
- Bolt (M10), nut and lock washer
- Pulse current 75 kA (10/350 μs)
- BET-tested

Application: Installation above or below ground





## Measuring and test systems

	ISOLAB measuring system arrester tester	254
	Testing unit for lightning barriers	254
	Magnetic card PCS	255
	Magnetic card holder PCS-H	255
	Card reader PCS-CS..	255



## ISOLAB measuring system arrester tester

Type	Country version	Nominal voltage V	Measuring range	Pack. pcs	Weight kg/100 pcs.	Item No.
ISOLAB	D/GB	6	0 V 999 V	1	165.000	5096 81 2

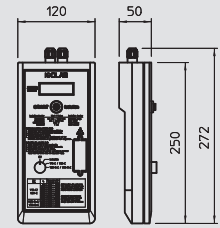
/pc.

To test the insulation resistance to DIN VDE 0100 Part 610 and the characteristic curve behaviour of the following surge voltage and lightning current arrestors:

- V10-C and V20-C:
 

Uc	Tolerance range
75 V	-> 110 V - 130 V
150 V	-> 215 V - 265 V
280 V	-> 385 V - 475 V
320 V	-> 460 V - 560 V
335 V	-> 460 V - 560 V
385 V	-> 560 V - 680 V
440 V	-> 645 V - 785 V
550 V	-> 820 V - 1,000 V
- V25-B+C and V50-B+C:
 

Uc	Tolerance range
150 V	-> 215 V - 265 V
280 V	-> 385 V - 475 V
320 V	-> 460 V - 560 V
385 V	-> 560 V - 680 V
- Varistor arrestors of other manufacturers can be tested for 1 or 3 mA characteristic curve behaviour
- Battery operation
- Measuring cables contained in the scope of delivery.



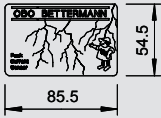
## Testing unit for lightning barriers

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
LFC	1	164.500	5096 78 6

/pc.

OBO Life Control allows function control of the MDP lightning barriers. The lightning barriers can be checked while installed. Life Control will not have any influence on the measuring signal. Life Control possesses an integrated OLED with visual and acoustic defect signalling. A separate LED inside the testing pin is also integrated. Life Control is delivered in a case, complete with a CD and instructions.





## Magnetic card PCS



Type

Pack.	Weight	Item No.
PU	kg/100 PUs	

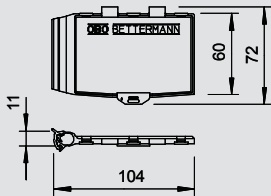
<b>PCS</b>	1	8.000	<b>5091 43 8</b>
------------	---	-------	------------------



Magnetic card for recording pulsed/lightning currents.

- Contents = 10 pieces

/VPE



## Magnetic card holder PCS-H

Type

Pack.	Weight	Item No.
PU	kg/100 PUs	

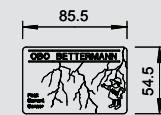
<b>PCS-H</b>	1	31.000	<b>5091 52 7</b>
--------------	---	--------	------------------



Magnetic card holder for mounting PCS cards.

- Sealable holder
- For installing on round conductor Rd 8-10
- Simple holder installation by means of clamp
- 1 PU = 10 pieces

/VPE



## Magnetic card and holder MK-B

Type

Pack.	Weight	Item No.
PU	kg/100 PUs	

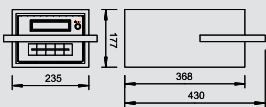
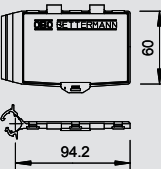
<b>MK-B</b>	1	31.000	<b>5091 32 2</b>
-------------	---	--------	------------------



PCS magnetic card to record pulse/lightning currents including holder

- Holder can be leaded
- For mounting on round conductor Rd 8-10
- Simple holder mounting through clamping
- 1 PU = 10 units

/VPE



## Card reader PCS-CS...



Type	Country version	Nominal voltage V	Measuring range	Measuring tolerances	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>PCS-CS-D</b>	EN	230	3 120 kA	< 2 kA (< 2%)	1	750.000	<b>5091 68 3</b>
<b>PCS-CS-GB</b>	GB	120	3 120 kA	< 2 kA (< 2%)	1	750.000	<b>5091 69 1</b>








Magnetic card reader for reading and analysing PCS cards.

- Inc. rechargeable battery for 4 h continuous, no-mains operation
- Large, clear display

/pc.



## Equipotential bonding systems

	Equipotential bonding rails	For indoor use	258
		For outdoor use	262
		For industrial use	263
	Strip earthing clips		264
	Earthing clips		265



# Equipotential bonding rails for indoor use



## Equipotential bonding rail for indoors, VDE-tested

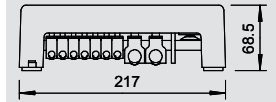
Type	Colour	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>1801 VDE</b>	Grey	1	55.000	<b>5015 65 0</b>

**CuZn** Brass /pc.

Equipotential bonding rail for equipotential bonding according to DIN VDE 0100-410 / -540 and lightning protection equipotential bonding according to DIN VDE 0185-305

Connection options:

- 7 single or multi-wire cables 2.5–25 mm<sup>2</sup> or fine-wire cables to 16 mm<sup>2</sup> (max. Ø 7 mm)
- 2 single or multi-wire cables 25–95 mm<sup>2</sup> or fine-wire cables to 70 mm<sup>2</sup> (max. Ø 13.5 mm)
- 1 flat conductor 30 x 3.5 mm
- According to VDE 0618, part 1
- With clamping rail 10 x 10 mm, nickel-plated brass
- With close-contact series terminals made of electrogalvanised steel
- Cover hood and rail stand made of grey polystyrene
- Lightning current carrying capacity 100 kA (10/350)
- Tension clamp with screw lock against self-loosening (e.g. required in industry and in explosion-protected areas)

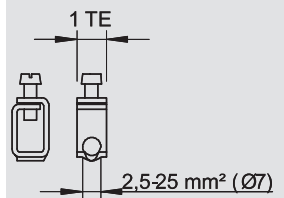


## Round conductor terminal to 25 mm<sup>2</sup> for 1801 VDE

Type	Connection option	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>1801 RK25</b>	2.5–25 mm <sup>2</sup>	10	2.080	<b>5015 75 8</b>

**ST** Steel **G** Electrogalvanised /pc.

- For single or multi-wire cables 2.5–25 mm<sup>2</sup>
- For fine-wire cables to 16 mm<sup>2</sup> (max. Ø 7 mm)
- 1 division unit
- Lightning current carrying capacity 100 kA (10/350)
- Electrogalvanised steel
- Tension clamp with screw lock against self-loosening (e.g. required in industry and in explosion-protected areas)

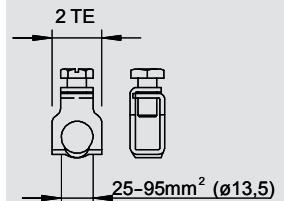


## Round conductor terminal from 25 mm<sup>2</sup> for 1801 VDE

Type	Connection option	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>1801 RK95</b>	25–95 mm <sup>2</sup>	10	4.700	<b>5015 76 6</b>

**ST** Steel **G** Electrogalvanised /pc.

- For single or multi-wire cables 25–95 mm<sup>2</sup>
- For fine-wire cables to 70 mm<sup>2</sup> (max. Ø 13.5 mm)
- 2 division units
- Lightning current carrying capacity 100 kA (10/350)
- Electrogalvanised steel
- Tension clamp with screw lock against self-loosening (e.g. required in industry and in explosion-protected areas)

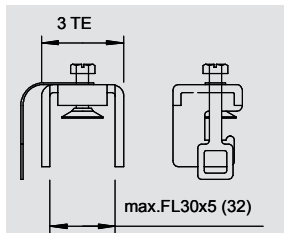


## Flat conductor terminal, to FL 30 for 1801 VDE

Type	Connection option	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>1801 RK30</b>	FL30 x 5	10	18.410	<b>5015 73 1</b>

**ST** Steel **G** Electrogalvanised /pc.

- For flat conductors to FL 30 and thickness to 5 mm
- Captive design with plastic safety strap
- 3 division units
- Lightning current carrying capacity 100 kA (10/350)
- Electrogalvanised steel

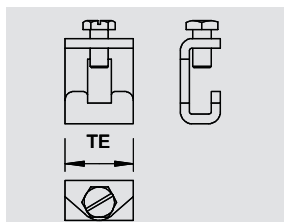


## Flat conductor terminal, from FL 30 for 1801 VDE

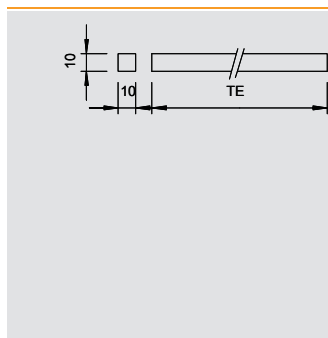
Type	Connection option	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>1801 RK40</b>	FL40 x 5	10	7.300	<b>5015 77 4</b>

**ST** Steel **G** Electrogalvanised /pc.

- For flat conductors from FL 30
- 2 terminals always required for each flat conductor connection
- Lightning current carrying capacity 100 kA (10/350)
- Electrogalvanised steel



# Equipotential bonding rails for indoor use

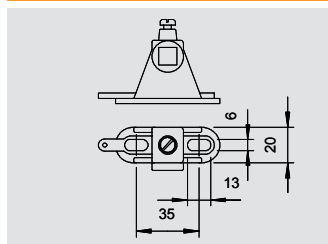


## Contact strip for 1801 VDE

Type	Length mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>1801 KL1</b>	212	1	18.000	<b>5015 72 3</b>
<b>1801 KL2</b>	430	1	36.000	<b>5015 80 4</b>
<b>1801 KL3</b>	645	1	54.000	<b>5015 81 2</b>

**CuZn** Brass /pc.

- 10 x 10 mm from nickel-plated brass
- 1801/KL 1: 14 units
- 1801/KL 2: 28 units
- 1801/KL 3: 42 units

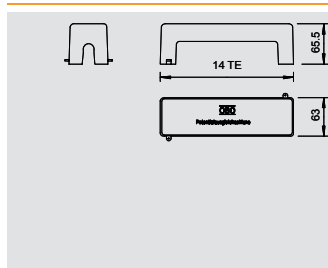


## Rail stands for 1801 VDE

Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>1801 SCH</b>	Grey	10	1.490	<b>5015 71 5</b>

**PS** Polystyrene /pc.

- 2 rail stands required per 14 units
- With 6 x 13 mm slot

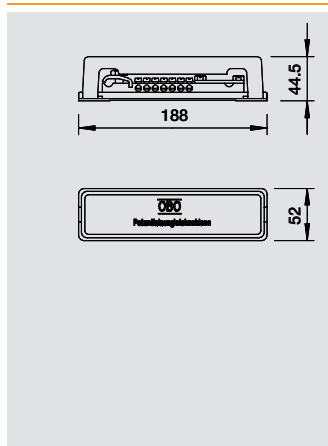


## Cover for 1801 VDE

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>1801 AH</b>	10	6.450	<b>5015 70 7</b>

**PS** Polystyrene /pc.

- 1 covering hood required per 14 division units
- Fastening to rail stands 1801/Sch
- Sealable



## Equipotential bonding rail with plastic base plate

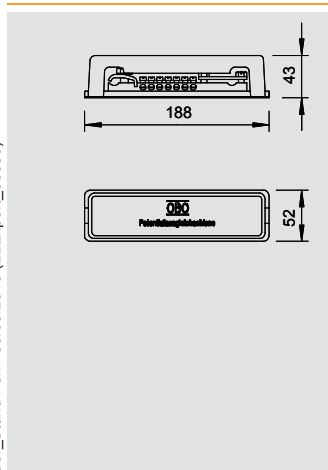
Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>1809</b>	Grey	1	23.000	<b>5015 07 3</b>

**CuZn** Brass /pc.

Equipotential bonding rails for equipotential bonding to DIN VDE 0100-410 / -540 and lightning protection equipotential bonding to DIN VDE 0185-305

Connection options:

- 7 single or multiple-core conductors to 25 mm<sup>2</sup> or fine-core conductors to 16 mm<sup>2</sup>
- 1 round conductor Rd 8-10
- 1 flat strip to FL30 or round conductor Rd 8-10
- Base plate and covering hood, polystyrene, grey
- Contact strip, nickel-plated brass
- Screws and over-piece, galvanised steel
- Capable of carrying lightning current 100 kA (10/350)



## Equipotential bonding rail with metal base plate

Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>1809 M</b>	Grey	1	28.100	<b>5015 08 1</b>

**CuZn** Brass /pc.

Equipotential bonding rails with metal stand for equipotential bonding to DIN VDE 0100-410 / -540 and lightning protection equipotential bonding to DIN VDE 0185-305

Connection options:

- 7 single or multi-core conductors to 25 mm<sup>2</sup> or fine-core conductors to 16 mm<sup>2</sup>
- 1 round conductor Rd 8-10
- 1 flat strip to FL30 or round conductor Rd 8-10
- Covering hood, polystyrene, grey
- Base plate, strip galvanised steel
- Contact strip, nickel-plated brass
- Screws and over-piece, galvanised steel
- Capable of carrying lightning current 100 kA (10/350)



# Equipotential bonding rails for indoor use

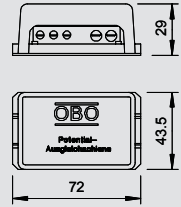


## Equipotential bonding rail for small systems

Type	Colour	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>1809 BG</b>	Grey	1	9.000	<b>5015 50 2</b>

**CuZn** Brass /pc.

- Connection options:
- 3 multi-core conductor to 6 mm<sup>2</sup>
  - 2 multi-core conductor to 16 mm<sup>2</sup>
  - Covering hood from polystyrene, grey
  - Base plate from strip galvanised steel
  - Contact strip and screws from nickel-plated brass

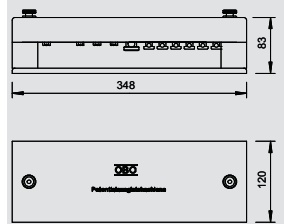


## Equipotential bonding rail, solid version

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>1810</b>	1	173.000	<b>5015 05 7</b>

**ST** Steel **F** Hot-dip galvanised /pc.

- Connection options:
- 6 conductors 6-16 mm<sup>2</sup>
  - 1 round conductor Rd 8-10
  - 1 flat conductor to FL 40
  - 2 cable lug M8
  - Base plate from screw-on covering hood, strip galvanised steel
  - Contact strip, galvanised steel
  - Screws and over-piece, hot-dip galvanised or electro-plated steel

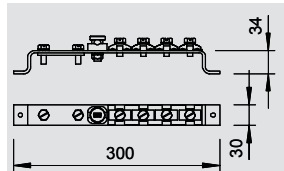


## Equipotential bonding rail, simple version

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>1808</b>	1	67.000	<b>5015 01 4</b>

**CuZn** Brass /pc.

- Connection options:
- 8 conductor to 25 mm<sup>2</sup>
  - 1 round conductor Rd 8-10
  - 1 flat conductor to FL 40
  - Strap and over-piece, galvanised steel
  - Clamping element and contact strip, brass, screws, hot dipped galvanised steel

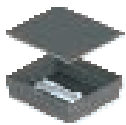
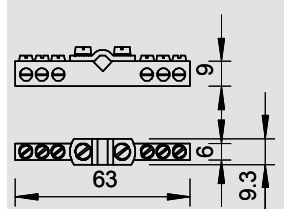


## Equipotential bonding rail for bathrooms

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>1804</b>	5	3.000	<b>5015 55 3</b>

**CuZn** Brass /pc.

- Connection options:
- 6 conductors 1.5-10 mm<sup>2</sup>
  - 1 conductor 6-16 mm<sup>2</sup>
  - Uncut
  - Contact strip from nickel-plated brass
  - Screws and clamp strap from hot-dip galvanised steel

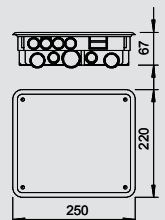


## Equipotential bonding rail for flush-mounting with 1809

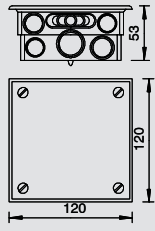
Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>1809 UP</b>	1	74.500	<b>5015 06 5</b>

**CuZn** Brass /pc.

- Connection options:
- 7 conductor to 25 mm<sup>2</sup>
  - 1 round conductor Rd 8-10
  - 1 flat conductor to FL30 or round conductor Rd 8-10
  - With mounted potential equalisation rail 1809 (without covering hood)
  - Pre-marked boxes for inserting required conductors and cover



# Equipotential bonding rails for indoor use



## Equipotential bonding rail for flush-mounting with 1804

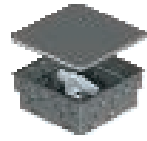
Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>1804 UP</b>	5	20.700	<b>5015 54 5</b>

**CuZn** Brass

/pc.

Connection options:

- 6 conductors 1.5-10 mm<sup>2</sup>
- 1 conductor 6-16 mm<sup>2</sup>
- Uncut
- With mounted potential equalisation rail 1804
- Pre-marked boxes for inserting required conductors and cover



# Equipotential bonding systems for outdoor use



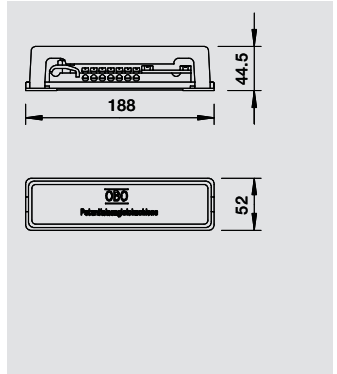
## Equipotential bonding rail for outside installation

Type	Colour	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>1809 A</b>	<b>Black</b>	1	23.000	<b>5015 11 1</b>

V2A Stainless steel, 1.4301 /pc.

### Connection options:

- 7 single or multi-core conductors to 25 mm<sup>2</sup> or fine-core conductors to 16 mm<sup>2</sup>
- 1 round conductor Rd 8-10
- 1 flat strip to FL30 or round conductor Rd 8-10
- Base plate and covering hood from polystyrene
- Colour: black, UV-resistant
- Screws and over-piece from VA
- Capable of carrying lightning current 100 kA (10/350)



# Equipotential bonding rail for industrial application



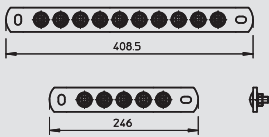
## Equipotential bonding rail BigBar for industrial application



Type	Material symbol	Number of connections	Width mm	Length mm	Height mm	Pack. pcs	Weight kg/100 pcs.	Item No.
1802 5 CU	Cu	5	40	246	5	1	80.000	5015 83 0
1802 6 CU	Cu	6	40	278.5	5	1	98.400	5015 83 2
1802 8 CU	Cu	8	40	343.5	5	1	116.550	5015 83 6
1802 10 CU	Cu	10	40	408.5	5	1	180.000	5015 84 2
1802 12 CU	Cu	12	40	473.5	5	1	152.850	5015 84 4
1802 14 CU	Cu	14	40	538.5	5	1	171.000	5015 84 7
1802 20 CU	Cu	20	40	733.5	5	1	225.450	5015 84 9

**Cu** Copper /pc.

- Main potential equalisation to VDE 0100 Part 410 and Part 540, and also lightning protection potential equalisation to VDE 0185-305 (IEC 62305)
- Insulation feet
- Quick, simple assembly of connection conductors to the contact rail using lock bolts M10
- The high-grade stainless steel versions (V2A) are suitable for outdoor use
- Complete with anchors and bolts for wall mounting
- With lock washer (DIN 137) for bolt locking against loosening (e.g. required in industry and explosion-protected areas)



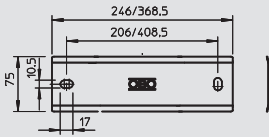
Type	Material symbol	Number of connections	Width mm	Length mm	Height mm	Pack. pcs	Weight kg/100 pcs.	Item No.
1802 5 VA	V2A	5	40	246	6	1	90.000	5015 85 4
1802 10 VA	V2A	10	40	408.5	6	1	190.000	5015 86 6

**V2A** Stainless steel, 1.4301 /pc.

- Main potential equalisation to VDE 0100 Part 410 and Part 540, and also lightning protection potential equalisation to VDE 0185-305 (IEC 62305)
- Insulation feet
- Quick, simple assembly of connection conductors to the contact rail using lock bolts M10
- The high-grade stainless steel versions (V2A) are suitable for outdoor use
- Complete with anchors and bolts for wall mounting
- With lock washer (DIN 137) for bolt locking against loosening (e.g. required in industry and Ex areas)



## Cover for BigBar equipotential bonding rail

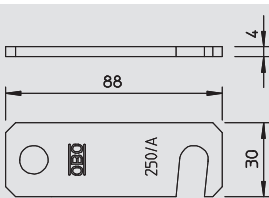


Type	Material symbol	Number of connections	Pack. pcs	Weight kg/100 pcs.	Item No.
1802 AH 5	V2A	5	1	25.800	5015 88 0
1802 AH 10	V2A	10	1	36.300	5015 88 4

**V2A** Stainless steel, 1.4301 /pc.

- Complete with all installation components

## Crossbar for equipotential bonding rail

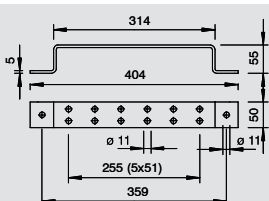


Type	Material symbol	Inter-face	Connection option	Pack. pcs	Weight kg/100 pcs.	Item No.
1802 KL	V2A	—	FL30	1	7.000	5015 89 0

**V2A** Stainless steel, 1.4301 /pc.

- For clamping flat conductors 30 x 3.5
- Fit BigBar 1802 potential equalisation rail

## Potential and earth connection block



Type	Length mm	Pack. pcs	Weight kg/100 pcs.	Item No.
1805 2 FT	200	10	54.800	5016 02 9
1805 4 FT	302	20	77.000	5016 03 7
1805 6 FT	404	10	97.100	5016 04 5
1805 2 VA	200	10	54.800	5016 09 6
1805 4 VA	302	20	77.000	5016 11 8
1805 6 VA	404	10	97.100	5016 12 6

**ST** Steel    **V4A** Stainless steel, 1.4571    **FT** Hot-dip galvanised /pc.

- With 2 mounting holes Ø 11 mm
- 1805/2: With 4 attaching holes
- 1805/4: With 8 attaching holes
- 1805/6: With 12 attaching holes



# Strip earthing clips

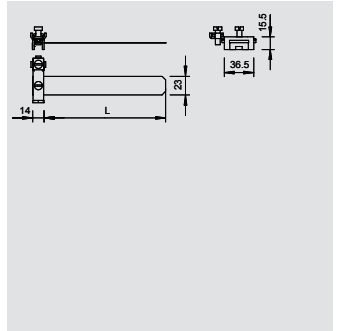


## Strip earthing clip VA

Type	For pipe Ø		Pack.	Weight	Item No.
	inch	mm			
927 1	3/8-1 1/2	17.2-48	10	7.780	5057 51 5
927 2	3/8-4	17.2-114	10	8.550	5057 52 3
927 4	3/8-6	17.2-185	10	8.900	5057 55 8

V2A Stainless steel, 1.4301 /100 pc.

- For pipes of Ø 3/8 - 6"
- Connection options: Max. 2 cables 2.5-25 mm<sup>2</sup>
- Round conductor Rd 8
- Clip element, bolts and tightening strap made of rustproof stainless steel (VA)

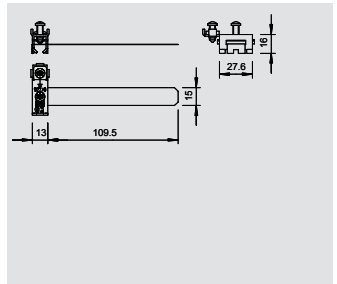


## Strip earthing clip, nickel-plated

Type	For pipe Ø		Surface finish	Pack.	Weight	Item No.
	inch	mm				
927 0	—	8-22	Nickel-plated	10	5.000	5057 50 7

CuZn Brass N Nickel-plated /100 pc.

- For pipe Ø 8-22 mm
- Connection options: max. 2 conductors 2.5-10 mm<sup>2</sup>
- Clip elements and screws from nickel-plated brass
- Tightening strip from high-grade stainless steel (V2A)

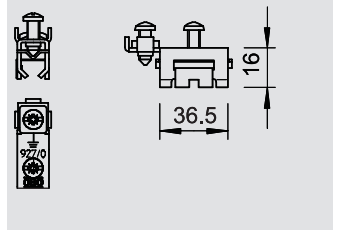


## Clamp lock for strip earthing clip

Type	Material symbol	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
927 SCH-K-VA	V2A	20	4.700	5057 93 0

V2A Stainless steel, 1.4301 /100 pc.

- Connection option: max. 2 conductors 2.5-25 mm<sup>2</sup>
- Possible to connect round conductor Rd 8

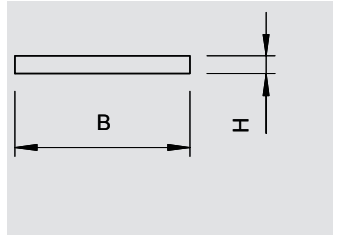


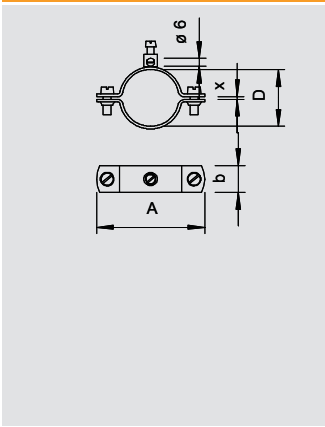
## Installation strip for strip earthing clip

Type	Material symbol	Inter-face	Dimen-	Dimen-	Pack.	Weight	Item No.
			sion B	sion H			
			mm	mm	m	kg/100 m	
927 BAND-VA	V2A	—	23	0.3	40	6.000	5057 92 2

V2A Stainless steel, 1.4301 /100 m

- 40 m roll
- Ready for transport and installation in unroll pack

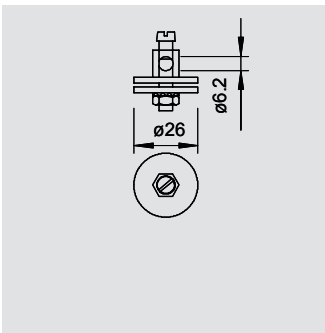




Earthing clip, type 925

Type	Dimension A mm	Clamping range D mm	Dimension x mm	For pipe Ø inch	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
925 1/4	48	11.5-13.5	2	1/4	300	25	4.100	5040 03 5
925 3/8	52	15.2-17.2	2	3/8	300	25	4.360	5040 05 1
925 1/2	56	19.3-21.3	2	1/2	300	25	4.788	5040 07 8
925 3/4	62	24.9-26.9	2	3/4	250	25	5.316	5040 09 4
925 1	70	31.7-33.7	2	1	250	25	5.956	5040 11 6
925 1 1/4	81	40.4-42.4	2	1 1/4	300	25	7.744	5040 13 2
925 1 1/2	88	46.3-48.3	2	1 1/2	240	20	9.615	5040 15 9

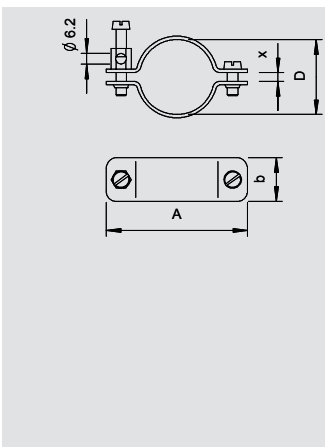
- ST** Steel      **G** Electrogalvanised      /100 pc.
- For pipes 1/4"-1 1/2" or Ø 11.5-48.3 mm
  - Connection options: conductors to 16 mm<sup>2</sup> with connecting terminal, riveted with brass and 1 cylinder screw M5 x 12
  - To 1 1/2" with 2 cylinder screws M6 x 16 (G)



Earthing terminal for mounting earthing strap

Type	Surface finish	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
928	Nickel-plated	240	10	5.700	5040 50 7

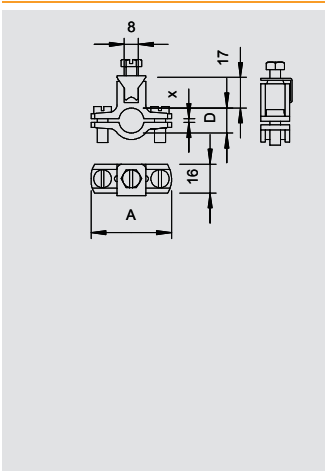
- CuZn** Brass      **N** Nickel-plated      /100 pc.
- For use in bathtubs or shower lutes etc.
  - Connection option: conductors to 16 mm<sup>2</sup>
  - Clamping element with threaded connection M6, 1 hexagonal nut M6, 1 serrated dimension washer and 1 cylinder screw M5 x 8
  - Clamping element, nut and screws from copper-plated brass
  - Serrated washer from stainless steel; 2 washers from galvanised steel



Earthing clip, type 942

Type	Dimension A mm	Clamping range D mm	Dimension x mm	For pipe Ø inch	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
942 11	44	8-11	3.5	1/8	420	10	4.480	5038 01 4
942 15	50	13-15	3	1/4	320	10	4.800	5038 03 0
942 18	52	16-18	2	3/8	200	10	5.170	5038 05 7
942 22	55	19-22	3	1/2	180	10	5.550	5038 07 3
942 28	63	24-28	3	3/4	180	10	6.170	5038 08 1
942 35	71	30-35	5	1	120	10	8.570	5038 11 1
942 43	81	39-43	5	1 1/4	100	10	9.740	5038 13 8
942 49	86	44-49	5	1 1/2	100	10	10.540	5038 15 4

- Cu** Copper      **N** Nickel-plated      /100 pc.
- For pipes 1/8"-1 1/2" or Ø 8-49 mm
  - Connection options: conductors to 16 mm<sup>2</sup>
  - With attaching clamp and cylinder screw M6 x 16 from nickel-plated brass
  - Top and bottom clip sections from nickel-plated copper



Earthing strap, type 950

Type	Dimension A mm	Clamping range D mm	Dimension x mm	For pipe Ø inch	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
950 Z 1/4	45	12-14	2	1/4	300	10	5.830	5050 03 0
950 Z 3/8	50	15.5-17.5	2	3/8	180	10	6.020	5050 05 7
950 Z 1/2	54	20-22.5	2.5	1/2	120	10	7.000	5050 07 3
950 Z 3/4	61	25-28	3	3/4	120	10	7.620	5050 08 1
950 Z 1	66	31.5-34.5	3	1	150	10	8.410	5050 11 1
950 Z 1 1/4	78	40.5-43.5	3	1 1/4	160	10	10.030	5050 13 8
950 Z 1 1/2	84	46.5-49.5	3	1 1/2	150	10	10.410	5050 15 4
950 Z 1 3/4	88	51-54	3	1 3/4	100	10	11.820	5050 17 0
950 Z 2	96	58.5-61.5	3	2	80	10	12.150	5050 19 7

- Zn** Die-cast zinc      **G** Electrogalvanised      /100 pc.
- For pipes Ø 1/4"-2"
  - Connection options: conductors to 35 mm<sup>2</sup> or round conductors to Ø 6 mm
  - With captive pressure strip, 2 cylinder screws M6 x 16 and 1 hex-head screw M6 x 16 from galvanised steel, top and bottom part of clip from die-cast zinc



# Earthing clips

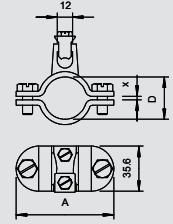


## Earthing clip, type 952

Type	Dimension A mm	Clamping range D mm	Dimension x mm	For pipe Ø inch	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
952 Z 1/2	65	18.5-21.5	3	1/2	50	5	24.880	5052 07 6
952 Z 3/4	71	24-27	3	3/4	50	5	26.780	5052 09 2
952 Z 1	77	30.5-33.5	3	1	50	5	28.560	5052 11 4
952 Z 1 1/4	87	39.5-42.5	3	1 1/4	50	5	32.200	5052 13 0
952 Z 1 1/2	94	45.5-48.5	3	1 1/2	20	5	34.720	5052 15 7
952 Z 2	105	57-60	3	2	30	5	38.520	5052 18 1

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- For pipes 1/2-2" or Ø 11.5-60 mm
- Connection options: conductors 16-70 mm<sup>2</sup> and/or round conductors to Rd 10 with captive pressure strip from stainless steel
- With 2 hexagonal bolts M6 x 16 and 2 hexagonal bolts M6 x 20 from hot-dip galvanised steel
- Top section of clip with cast contact point from die-cast zinc, bottom section of clip from hot-dip galvanised steel

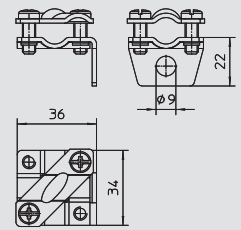


## Earthing terminal, type 951

Type	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
951	120	10	5.400	5051 50 9

**V2A** Stainless steel, 1.4301 /100 pc.

- Longitudinal and transverse conductor routing
- With 1 attaching hole Ø 9 mm
- With 2 cylinder bolts M6 x 16

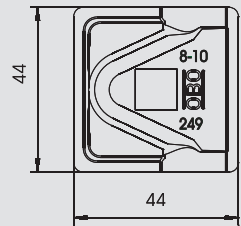


## Connection terminal, equipotential bonding, Rd 8-10 mm

Type	Fit mm	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
249 8-10 ALU-OT	Rd 8-10	Al	—	100	2.100	5311 58 5
249 8-10 ST-OT	Rd 8-10	ST	FT	100	3.240	5311 50 3

**ST** Steel **Al** Aluminium **FT** Hot-dip galvanised /100 pc.

- For round conductor fastening Rd 8-10
  - Suitable for M10 bolts
- Application: Equipotential bonding on PV frames

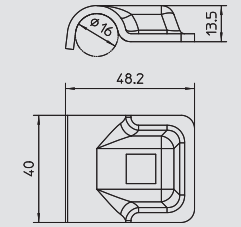


## Connection terminal, equipotential bonding, Rd 16 mm

Type	Fit mm	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
249 VA-OT	16	V2A	—	100	5.700	5311 57 3

**V2A** Stainless steel, 1.4301 /100 pc.

- For round conductor fastening RD 16
- Suitable for M10 bolts

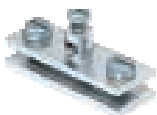
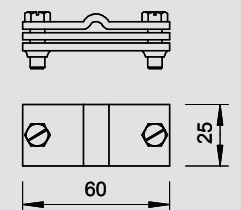


## Earth connection terminal for round conductor and flat conductor

Type	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
937 50	100	10	11.750	5043 01 8

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- For round and flat conductors
- Fit: cable 50 mm<sup>2</sup> x max. FL 40
- Rd 8 x max. FL 40
- With 2 hexagonal bolts M6 x 20 (F)

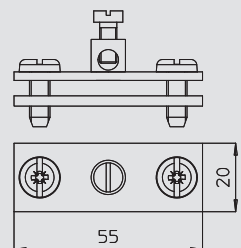


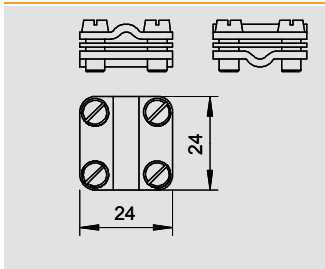
## Earthing terminal for cables and flat conductors

Type	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
939	300	25	5.932	5043 10 7

**ST** Steel **G** Electrogalvanised /100 pc.

- For cables to 16 mm<sup>2</sup> and flat conductors
- Fit: cable to 16 mm<sup>2</sup> x max. FL 30
- With riveted brass connection terminal and one cylinder bolt, M5 x 12, with two cylinder bolts, M6 x 16

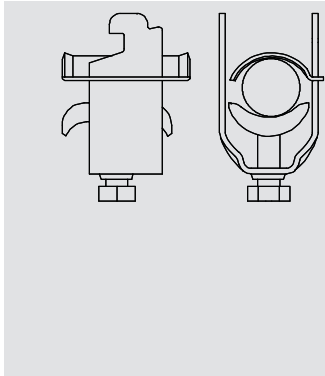




## Clip branch terminal

Type	Surface finish	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>470 4-16</b>	Nickel-plated	50	2.856	<b>5064 01 5</b>
<b>CuZn</b> Brass	<b>N</b> Nickel-plated	/100 pc.		

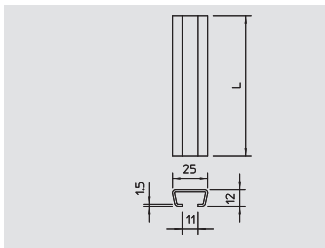
- For conductors 4-16 mm<sup>2</sup>
- Fit: 4-16 mm<sup>2</sup> x 4-16 mm<sup>2</sup>
- With 4 cylinder bolts M4 x 16



## Bundle clips for screen connection

Type	Clamping range D	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>2056N SAS 8 VA</b>	4-8	100	2.900	<b>1167 00 6</b>
<b>2056N SAS 12 VA</b>	8-12	100	3.700	<b>1167 01 4</b>
<b>2056N SAS 16 VA</b>	12-16	100	4.200	<b>1167 02 2</b>
<b>2056N SAS 22 VA</b>	16-22	100	4.850	<b>1167 03 0</b>
<b>2056N SAS 28 VA</b>	22-28	100	6.600	<b>1167 04 9</b>
<b>V2A</b> Stainless steel, 1.4301	/100 pc.			

For electrical connection of the braided shield of stripped cables, delivery complete with counter-trough; pressure trough and VA counter-trough. A cable screen for protection against electromagnetic influences, can also contribute towards equipotential bonding as both ends are connected to the reference potential.



## Profile rails





Type	Version	Interface	Dimension b x h	Material thickness	Length	Bundle	Weight	Item No.
			mm	mm	mm	m	kg/100 m	
<b>2066 2M F</b>	Unperforated	F	25 x 12	1.5	2,000	20	65.000	<b>1117 02 5</b>
<b>2066 2M FS</b>	Unperforated	FS	25 x 12	1.5	2,000	20	58.300	<b>1117 03 3</b>
<b>ST</b> Steel	<b>FS</b> Strip-galvanised	<b>F</b> Hot-dip galvanised	/100 m					

Profile rail, unperforated, slot width 11 mm.



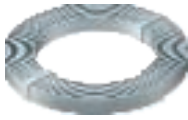


## Earthing systems

	Cable material	270
	Deep earther and plate earther	272
	Connection material	277
	Holders and accessories	284



# Conduction material

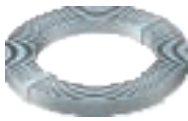
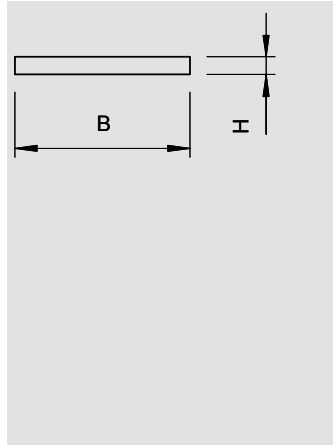


## Flat conductor, galvanised steel for ground

Type	Material symbol	Inter-face	Dimension b x h mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
5052 DIN 20X2.5	St	FT	20 x 2,5	50	122	50	41.000	5019 34 0
5052 DIN 25X3	St	FT	25 x 3	75	84	50	59.700	5019 34 2
5052 DIN 30X3	St	FT	30 x 3	90	71	50	70.650	5019 34 4
5052 DIN 30X3.5	St	FT	30 x 3,5	105	30	25	84.000	5019 34 5
5052 DIN 30X3.5	St	FT	30 x 3,5	105	60	50	84.000	5019 34 7
5052 DIN 30X4	St	FT	30 x 4	120	52	50	97.000	5019 35 0
5052 DIN 40X4	St	FT	40 x 4	160	40	50	128.000	5019 35 5
5052 DIN 40X5	St	FT	40 x 5	200	30	50	162.000	5019 36 0

**ST** Steel **FT** Hot-dip galvanised /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- Zinc coating: 500 g/m<sup>2</sup> (approx. 70 µm)
- For lightning protection, earthing systems and ring equipotential bonding

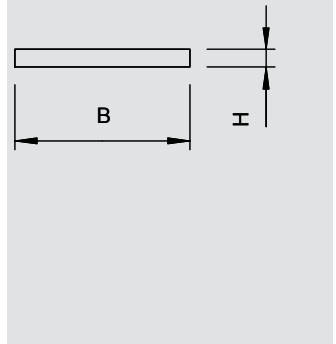


## Stainless steel flat conductor

Type	Material symbol	Dimension b x h mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
5052 V2A 30X3.5	V2A	30 x 3,5	105	50	42	82.500	5018 50 1
5052 V4A 30X3.5	V4A	30 x 3,5	105	50	42	82.425	5018 70 6
5052 V4A 30X3.5	V4A	30 x 3,5	105	25	21	82.425	5018 73 0

**V2A** Stainless steel, 1.4301 **V4A** Stainless steel, 1.4571 **V4A** Stainless steel, 1.4401 /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- For use in areas at risk of corrosion
- For lightning protection, earthing systems and ring equipotential bonding

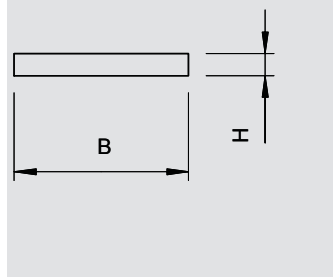


## Copper flat conductor

Type	Material symbol	Dimension b x h mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
FL 20-CU	Cu	20 x 2,5	50	45	20	44.500	5021 80 4

**Cu** Copper /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- Version: E-Cu S7 F24 soft
- For lightning protection, earthing systems and ring equipotential bonding

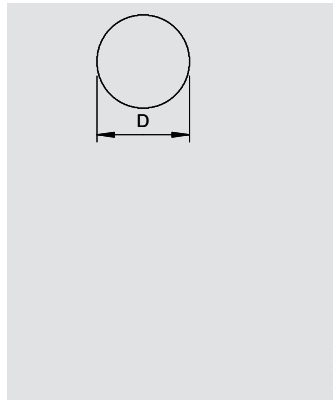


## Round aluminium cable

Type	Material symbol	Inter-face	Nominal size Ø mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
RD 8-ALU	Al	—	8	50	150	20	13.500	5021 28 6
RD 8-ALU-T	Al	—	8	50	150	20	13.500	5021 29 4
RD 10-ALU	Al	—	10	78	95	20	21.000	5021 30 8

**Al** Aluminium /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- RD 8/ALU: Semi-hard (E-ALMgSi0.5 corresponds to DIN 48801)
- RD 8/ALU-T: Twistable (E-ALMgSi0.5 corresponds to DIN 48801)
- RD 10/ALU: Pure aluminium (E-Al corresponds to DIN 48801)
- AL and ALMgSi may not be routed directly on, in or under the plaster, mortar or concrete nor underground

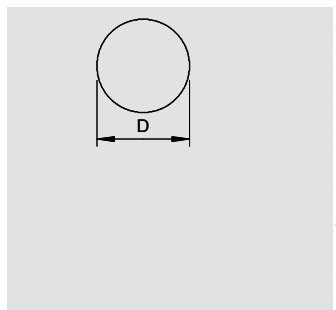


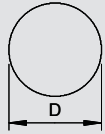
## Round galvanised steel cable

Type	Material symbol	Inter-face	Nominal size Ø mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
RD 8-FT	St	FT	8	50	125	50	40.000	5021 08 1
RD 10	St	FT	10	78	80	50	63.000	5021 10 3

**ST** Steel **FT** Hot-dip galvanised /100 m

- According to DIN EN 50164-2 (VDE 0185 part 202)
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)
- RD 10 can also be used in earth
- Zinc coating: 350 g/m<sup>2</sup> (approx. 50 µm)



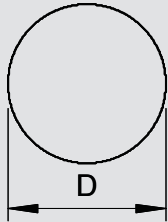


Round copper cable

Type	Material symbol	Nominal size Ø mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>RD 8-CU</b>	Cu	8	50	100	45	45.000	<b>5021 48 0</b>
<b>RD 10-CU</b>	Cu	10	78	50	35	70.000	<b>5021 50 2</b>

**Cu** Copper /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)

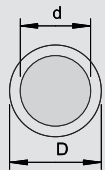


Round stainless steel cable

Type	Material symbol	Nominal size Ø mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>RD 8-V2A</b>	V2A	8	50	125	50	40.000	<b>5021 23 5</b>
<b>RD 10-V2A</b>	V2A	10	78	50	32	63.000	<b>5021 22 7</b>
<b>RD 10-V2A</b>	V2A	10	78	80	50	63.000	<b>5021 23 9</b>
<b>RD 8-V4A</b>	V4A	8	50	125	50	40.000	<b>5021 64 4</b>
<b>RD 10-V4A</b>	V4A	10	78	50	32	63.000	<b>5021 64 2</b>
<b>RD 10-V4A</b>	V4A	10	78	80	50	63.000	<b>5021 64 7</b>

**V2A** Stainless steel, 1.4301 **V4A** Stainless steel, 1.4571 /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- RD 10-V4A for applications in the ground

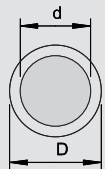


Round aluminium cable with PVC sheathing

Type	Material symbol	Colour	Dimension d mm	Dimension D mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>RD 8-PVC</b>	Al	Cream	8	11	50	75	15	20.000	<b>5021 33 2</b>

**Al** Aluminium /100 m

- Meets the requirements of VDE 0185-305 (IEC 62305)
- With PVC jacketing (halogen-free)
- Suitable for routing on, in or under plasterwork, mortar or concrete

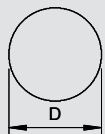


Round galvanised steel cable with PVC sheathing

Type	Material symbol	Interface	Colour	Dimension d mm	Dimension D mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>RD 10-PVC</b>	St	FT	Black	10	13	78	75	50	67.200	<b>5021 16 2</b>

**ST** Steel **FT** Hot-dip galvanised /100 m

- Conforms to the requirements according to VDE V 0185-305, (IEC 62305)
- Zinc coating: 350 g/m<sup>2</sup> (approx. 50 µm)
- With PVC sheathing



Copper cable

Type	Material symbol	Dimension D mm	Individual wires	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>S 9-CU</b>	Cu	9	7 x Ø3	50	100	44.5	44.500	<b>5021 65 0</b>

**Cu** Copper /100 m

- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)
- 7 individual wires of Ø 3 mm (overall cross-section 50 mm<sup>2</sup>)



# Deep earther and plate earther

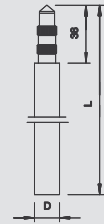
## Earthing rod for standard applications



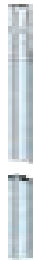
Type	Length	Outer-Ø	Pack.	Weight	Item No.
	mm	mm		pcs	
<b>219 20 ST FT</b>	1,500	20	5	360.000	<b>5000 75 0</b>
<b>219 25 ST FT</b>	1,500	25	5	573.000	<b>5000 76 9</b>
<b>219 20 ST FT</b>	1,000	—	5	250.000	<b>5000 74 2</b>

**ST** Steel **FT** Hot-dip galvanised /pc.

- High corrosion resistance
- Zinc support 70 µm
- With peg and bore for linking together
- Round pegs with two knurls
- Conforms to the requirements according to VDE 0185-305 (IEC 62305)
- Short-circuit current I<sub>k</sub> (50 Hz), time 1 s, max. temp 300 °C: 7.9 kA (219/20 ST)



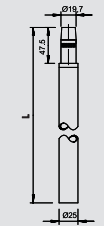
## LightEarth earthing rod



Type	Length	Outer-Ø	Pack.	Weight	Item No.
	mm	mm		pcs	
<b>LE ERDER FT</b>	1,500	25	5	220.000	<b>5000 30 0</b>
<b>LE ERDER FT</b>	1,000	25	5	157.600	<b>5000 29 7</b>
<b>LE ERDER V4A</b>	1,500	25	5	235.000	<b>5000 33 5</b>

**ST** Steel **V4A** Stainless steel, 1.4571 **FT** Hot-dip galvanised /pc.

- Expandable earthing rod system for erecting earthing connections (type A)
- Also suitable for difficult soil conditions
- The LightEarth earthing system is connected using the pre-mounted sleeve
- Satisfies requirements according to DIN VDE 0185-305 (IEC 62305)
- For use with antenna earthing systems, lightning earthing systems, etc.



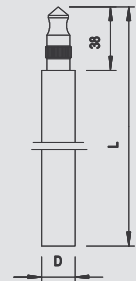
## Earthing rod BP made of VA



Type	Length	Outer-Ø	Pack.	Weight	Item No.
	mm	mm		pcs	
<b>219 20 BP V4A</b>	1,000	20	5	250.000	<b>5000 85 8</b>
<b>219 20 BP V4A</b>	1,500	20	5	365.000	<b>5000 86 6</b>

**V4A** Stainless steel, 1.4401 /pc.

- DIN 48852, Z shape, "BP" system (German Post Office)
- Very good contacting properties with lead ball in the bore hole
- With peg and bore for linking together
- Version FT with zinc support, min. 70 µm
- Conforms to the requirements according to VDE 0185-305 (IEC 62305)
- Short-circuit current I<sub>k</sub> (50 Hz), time 1 s, max. temp. 300 °C: 4.5 kA (219/20BP-VA)



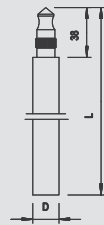
## Earthing rod BP with copper jacket



Type	Length	Outer-Ø	Pack.	Weight	Item No.
	mm	mm		pcs	
<b>219 20 BP CU</b>	1,500	20	6	365.400	<b>5000 50 5</b>

**ST** Steel **Cu** Copper-plated /pc.

- DIN 48852, Form Z, BP system (Bundespost)
- Very good contacting properties with lead insert in the bore hole
- With peg and bore for linking together
- Cu version with a 0.5 mm copper sheath
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



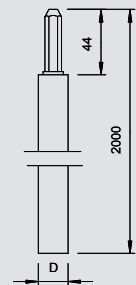
## Earthing rod OMEX

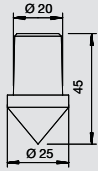


Type	Length	Outer-Ø	Pack.	Weight	Item No.
	mm	mm		pcs	
<b>219 20 OMEX FT</b>	1,500	20	5	365.400	<b>5000 01 7</b>
<b>219 20 OMEX FT</b>	2,000	20	5	491.400	<b>5000 20 3</b>
<b>219 25 OMEX FT</b>	1,500	25	5	577.200	<b>5000 02 5</b>

**ST** Steel **FT** Hot-dip galvanised /pc.

- DIN 48852, Form Z, OMEX system
- With peg and bore for linking together
- With hardened steel pins
- Version FT with zinc support, min. 60 µm
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

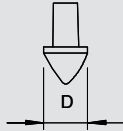




## Impact point for LightEarth earthing rod

Type	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>LE SPITZE</b>	St	FT	10	10.000	<b>3041 40 9</b>

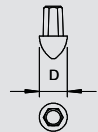
**ST** Steel **FT** Hot-dip galvanised /pc.  
 • Suitable for LightEarth system



## Impact point for ST and BP earthing rod

Type	For deep earthers Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>1819 20BP</b>	20	10	3.500	<b>3041 21 2</b>
<b>1819 25BP</b>	25	10	6.700	<b>3041 95 6</b>

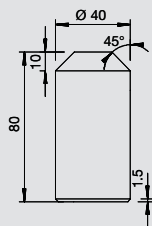
**TG** Cast iron **FT** Hot-dip galvanised /pc.  
 • Suitable for ST and BP system



## Impact point for OMEX earthing rod

Type	For deep earthers Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>1819 20</b>	20	10	3.300	<b>3041 20 4</b>
<b>1819 25</b>	25	10	4.900	<b>3041 25 5</b>

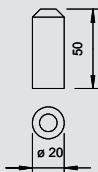
**TG** Cast iron **FT** Hot-dip galvanised /pc.  
 • Suitable for OMEX system  
 • DIN 48852, Form SP



## Impact head for LightEarth earthing rod

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>LE KOPF</b>	1	70.000	<b>3042 30 8</b>

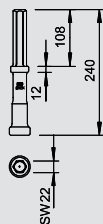
**ST** Steel **FT** Hot-dip galvanised /pc.  
 • Suitable for LightEarth system  
 • For driving earthing rods using hand-held hammer  
 • Hardened



## Impact head for earthing rod ST, BP and OMEX

Type	For deep earthers Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>1820 20</b>	20	1	62.600	<b>3042 20 0</b>
<b>1820 25</b>	25	1	70.000	<b>3042 25 1</b>

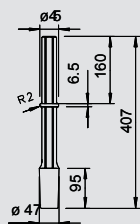
**ST** Steel /pc.  
 • Suitable for ST, BP and OMEX systems  
 • Hardened  
 • DIN 48852, Form SP



## Hammer insert, type 2500, for earthing rod ST, BP and OMEX

Type	For deep earthers Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>2500 20</b>	20	1	120.800	<b>3043 20 7</b>
<b>2500 25</b>	25	1	143.100	<b>3043 25 8</b>

**ST** Steel /pc.  
 • Manufactured by Cobra BBM 47 SPA-Super, Tex11 and COBRA 248  
 • Fits earthing rod system ST, BP and OMEX  
 • Hardened



## Hammer insert, type 2510, for earthing rod ST, BP and OMEX

Type	For deep earthers Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>2510 20</b>	20	1	310.000	<b>3043 31 2</b>

**ST** Steel /pc.  
 • Manufactured by Atlas Copco, type FB 60 S-Super  
 • Fits earthing rod system ST, BP and OMEX  
 • Hardened



# Deep earther and plate earther

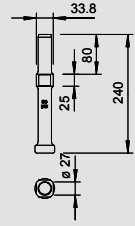


## Hammer insert, type 2520, for earthing rod ST, BP and OMEX

Type	For deep earthers Ø mm	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
2520 20	20	1	197.000	3043 70 3
2520 25	25	1	197.000	3043 75 4

**ST** Steel /pc.

- Manufactured by Wacker BHF 25, BHF 30S, EHU 25/220
- Fits earthing rod system ST, BP and OMEX
- Hardened

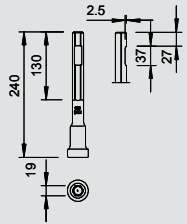


## Hammer insert, type 2530, for earthing rod ST, BP and OMEX

Type	For deep earthers Ø mm	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
2530 20	20	1	125.000	3043 40 1
2530 25	25	1	125.000	3043 45 2

**ST** Steel /pc.

- Manufactured by Bosch USH 10, HSH 10
- Fits earthing rod system ST, BP and OMEX
- Hardened

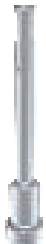


## Hammer insert, type 2531, for earthing rod ST, BP and OMEX

Type	For deep earthers Ø mm	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
2531 20	20	1	200.000	3043 90 8

**ST** Steel /pc.

- Make: Bosch GSH 27, USH 27 (WAF 28 mm)
- Suitable for ST, BP and OMEX earthing rod systems
- Hardened

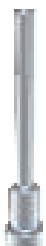
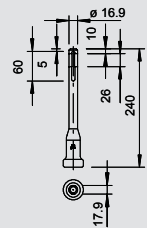


## Hammer insert, type 2535, for earthing rod ST, BP and OMEX

Type	For deep earthers Ø mm	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
2535 20	20	1	100.000	3043 91 6
2535 25	25	1	100.000	3044 91 2

**ST** Steel /pc.

- Manufactured by Hilti TE 52/42, TE 72/60, TE 92
- Fits earthing rod system ST, BP and OMEX
- Hardened

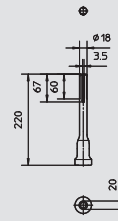


## Hammer insert, type 2536, for earthing rod ST, BP and OMEX

Type	For deep earthers Ø mm	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
2536 20	20	1	63.000	3044 90 4
2536 25	25	1	61.000	3044 83 1

**ST** Steel /pc.

- Fits earthing rod system ST, BP and OMEX
- For vibration hammers with SDS- Max/TEY- mounting
- Hardened





## Hammer insert for LightEarth earthing rod

Type	Material symbol	Version	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>LE HAMMER-W</b>	St	Wacker	1	132.000	<b>3043 60 6</b>
<b>LE HAMMER-H</b>	St	Hilti	1	76.000	<b>3043 61 0</b>
<b>LE HAMMER-B</b>	St	Bosch	1	87.000	<b>3043 61 4</b>
<b>LE HAMMER-SDS-M</b>	St	SDS-Max	1	76.000	<b>3043 60 2</b>
<b>LE HAMMER-AC</b>	St	Atlas Copco	1	76.000	<b>3043 61 8</b>
<b>LE HAMMER-B-II</b>	St	—	1	200.000	<b>3043 62 8</b>

**ST** Steel /pc.

- Suitable for LightEarth system
- 3043606 for Wacker (BHF 25, BHF 30S)
- 3043610 for Hilti (TE 52/42, TE72/60, TE92)
- 3043614 for Bosch (USH 10, HSH 10)
- 3043602 for SDS-Max
- 3043618 for Atlas Copco (Hexagon seat)
- 3043628 for Bosch GSH27/UH27 (11304) / HS28 (12314)  
Hitachi H65SD  
Makita HM 1500B / HM1800
- Hardened

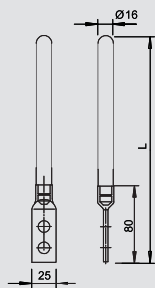


## Interception/earth entry rod, rounded on both ends

Type	Material symbol	Length mm	Nominal size Ø mm	Pack.	Weight	Item No.
				pcs	kg/100 pcs.	
<b>101 A-1500</b>	St	1,500	16	10	240.000	<b>5400 15 5</b>
<b>101 A-CU</b>	Cu	1,500	16	10	272.100	<b>5400 62 7</b>

**ST** Steel **Cu** Copper **FT** Hot-dip galvanised /100 pc.

- Full material Ø 16 mm
- Rounded on both sides
- Suitable for FangFix stand system



## Interception/earth entry rod with connection tabs

Type	Material symbol	Inter- face	Length mm	Nominal size Ø mm	Pack.	Weight	Item No.
					pcs	kg/100 pcs.	
<b>101 F1500</b>	St	FT	1,500	16	10	240.000	<b>5424 15 1</b>
<b>101 F2000</b>	St	FT	2,000	16	10	320.000	<b>5424 20 8</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- With 2 attaching holes Ø 12 mm
- One end rounded



## Interception/earth entry rods

Type	Dimen- sion L mm	Nominal size Ø mm	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>200 VA-1500</b>	1,500	16	10	242.000	<b>5420 50 4</b>
<b>200 1500</b>	1,500	16	10	242.000	<b>5420 15 6</b>

**ST** Steel **V4A** Stainless steel, 1.4571 **FT** Hot-dip galvanised /100 pc.

- Both ends rounded



## Earth entry rod, tapered and partially insulated

Type	Material symbol	Inter- face	Length mm	Nominal size Ø mm	Pack.	Weight	Item No.
					pcs	kg/100 pcs.	
<b>204 KS-2000</b>	St	F	2,000	16/10	1	230.000	<b>5430 01 1</b>
<b>204 KS-2500</b>	St	F	2,500	16/10	1	310.000	<b>5430 06 2</b>

**ST** Steel **F** Hot-dip galvanised /pc.

- 16 mm earth entry with 10 mm connection
- With mounted heat-shrinkable sleeve (corrosion protection)



# Deep earther and plate earther

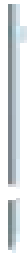
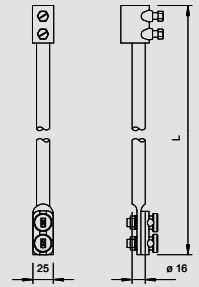


## Earth entry rod with separating piece and connector

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>204 KL-1500</b>	Rd 8-10	10	260.700	<b>5430 15 1</b>

**ST** Steel **FT** Hot-dip galvanised /pc.

- With separating piece type 223 DIN and connector type 5002 DIN

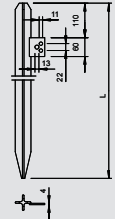


## Profile rod earth connector with connecting lug

Type	Length	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>213 1000 DIN</b>	1,000	5	240.500	<b>5003 00 8</b>
<b>213 1500 DIN</b>	1,500	5	364.500	<b>5003 01 6</b>
<b>213 2000 DIN</b>	2,000	5	488.400	<b>5003 02 4</b>
<b>213 2500 DIN</b>	2,500	3	612.400	<b>5003 03 2</b>
<b>213 3000 DIN</b>	3,000	3	736.400	<b>5003 04 0</b>

**ST** Steel **FT** Hot-dip galvanised /pc.

- Cross-profile 50 x 50 x 3 mm
- With connecting strap
- 1 through hole Ø 13 mm
- 2 through holes Ø 11 mm

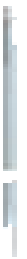
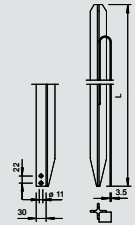


## Profile rod earth connector with steel strip lug

Type	Length	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>213 1000 M</b>	1,000	3	403.700	<b>5003 25 3</b>
<b>213 1500 M</b>	1,500	3	527.600	<b>5003 26 1</b>
<b>213 2000 M</b>	2,000	3	651.600	<b>5003 28 8</b>
<b>213 2500 M</b>	2,500	3	783.800	<b>5003 29 6</b>
<b>213 3000 M</b>	3,000	3	899.500	<b>5003 31 8</b>

**ST** Steel **FT** Hot-dip galvanised /pc.

- With 2 m strip steel section FL 30 x 3.5
- With 2 through holes Ø 11 mm
- Does not conform to DIN 48852, Part 1

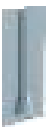
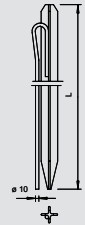


## Profile rod earth connector with round conductor lug

Type	Length	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>213 1500 F</b>	1,500	3	486.900	<b>5003 77 6</b>
<b>213 2000 F</b>	2,000	3	610.900	<b>5003 78 4</b>

**ST** Steel **FT** Hot-dip galvanised /pc.

- With 2 m round conductor lugs Rd 10
- Does not conform to DIN 48852, Part 1

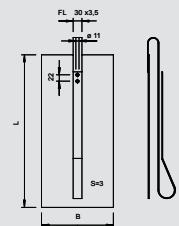


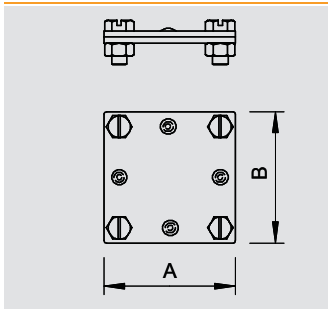
## Earthing plate

Type	Dimension B x L x S	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>1816 F-500X500</b>	500 x 500 x 3	1	800.000	<b>5009 21 9</b>
<b>1816 F-500X1000</b>	500 x 1000 x 3	1	1,329.300	<b>5009 22 7</b>
<b>1816 F-1000X1000</b>	1000 x 1000 x 3	1	2,700.000	<b>5009 23 5</b>

**ST** Steel **FT** Hot-dip galvanised /pc.

- With 3 m strip steel section FL30 x 3.5
- With 2 attaching holes Ø 11 mm

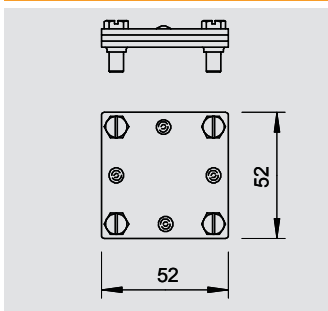
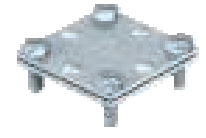




**Cross-connector for flat conductor**

Type	Fit	Dimension A	Dimension B	Material symbol	Interface	Pack.	Weight	Item No.
	mm	mm	mm			pcs	kg/100 pcs.	
<b>255 A-FL30 FT</b>	max. FL30	60	60	St	FT	20	11.500	<b>5314 53 4</b>

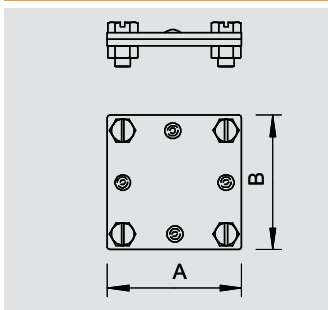
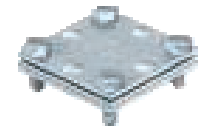
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Fit: max. FL 30 x FL 30
  - Without separator plate
  - Installed with 4 hexagonal bolts M6 x 20 (F)



**Cross-connector for flat conductor, with intermediate plate**

Type	Fit	Dimension A	Dimension B	Material symbol	Interface	Pack.	Weight	Item No.
	mm	mm	mm			pcs	kg/100 pcs.	
<b>255 30</b>	max. FL30	52	52	St	FT	20	16.650	<b>5314 51 8</b>

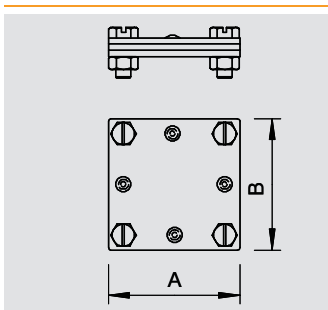
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Fit: max. FL 30 x FL 30
  - With separator plate
  - Installed with 4 hexagonal bolts M6 x 20 (F)



**DIN cross-connector for flat conductor**

Type	Fit	Dimension A	Dimension B	Material symbol	Interface	Pack.	Weight	Item No.
	mm	mm	mm			pcs	kg/100 pcs.	
<b>256 A-DIN 30 FT</b>	max. FL30	60	60	St	FT	10	27.800	<b>5314 65 8</b>
<b>256 A-DIN 40 FT</b>	max. FL40	80	80	St	FT	10	38.800	<b>5314 66 6</b>

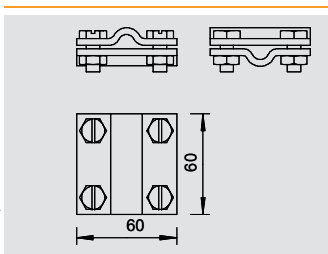
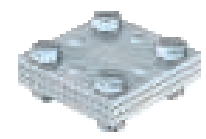
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Fit: max. FL 30 x FL 30, max. FL 40 x max. FL 40 (F)
  - Without separator plate
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8
  - DIN 48845, Form H



**DIN cross-connector for flat conductor, with intermediate plate**

Type	Fit	Dimension A	Dimension B	Material symbol	Interface	Pack.	Weight	Item No.
	mm	mm	mm			pcs	kg/100 pcs.	
<b>256 DIN 30 FT</b>	max. FL30	60	60	St	FT	10	35.860	<b>5314 61 5</b>
<b>256 DIN 40 FT</b>	max. FL40	80	80	St	FT	10	54.650	<b>5314 62 3</b>

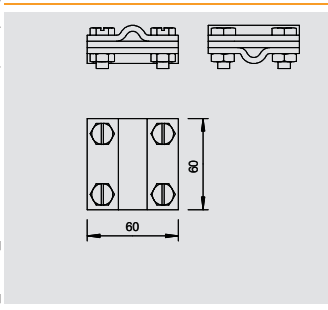
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Fit: max. FL 30 x FL 30 (256/DIN 30), max. FL 40 x FL 40 (256/DIN 40)
  - With separator plate
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8



**Cross-connector for round conductor Rd 8–10**

Type	Fit	Material symbol	Interface	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>253 8X8</b>	Rd 8-10	St	F	25	30.700	<b>5312 60 4</b>

- ST** Steel **F** Hot-dip galvanised /100 pc.
- Fit: Rd 8-10 x Rd 8-10
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8 (F)



**Cross-connector with intermediate plate for round conductor, Rd 8–10**

Type	Fit	Material symbol	Interface	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>252 8-10 V4A</b>	Rd 8-10	V4A	—	25	33.530	<b>5312 31 8</b>

- V4A** Stainless steel, 1.4571 /100 pc.
- Fit: Rd 8-10 x Rd 8-10
  - With separator plate
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8



# Connection material



## Cross-connector with intermediate plate for round conductor, Rd 8-10

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>252 8-10 CU</b>	Rd 8-10	Cu	—	25	38.940	<b>5312 41 8</b>

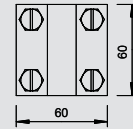
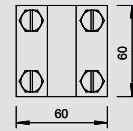
**Cu** Copper

- Fit: Rd 8-10 x Rd 8-10
- With separator plate
- Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>252 8-10 FT</b>	Rd 8-10	St	FT	25	33.530	<b>5312 31 0</b>

**ST** Steel **FT** Hot-dip galvanised

- Fit: Rd 8-10 x Rd 8-10
- With separator plate
- Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8

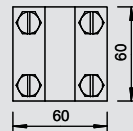


## Cross-connector for round conductor Rd 8-10 x Rd 16

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>253 10X16</b>	Rd 8-10 x 16	St	F	25	29.800	<b>5312 80 9</b>

**ST** Steel **F** Hot-dip galvanised

- Fit: Rd 8-10 x Rd 16
- Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8 (F)

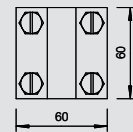


## Cross-connector with intermediate plate for round conductor, Rd 8-10 x Rd 16

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>252 8-10X16 FT</b>	Rd 8-10 x 16	St	FT	25	38.800	<b>5312 34 5</b>

**ST** Steel **FT** Hot-dip galvanised

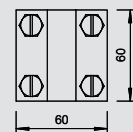
- Fit: Rd 8-10 x Rd 16
- With separator plate
- Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8
- DIN 48845, Form E



Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>252 8-10X16 CU</b>	Rd 8-10 x 16	Cu	—	25	43.985	<b>5312 44 2</b>

**Cu** Copper

- Fit: Rd 8-10 x Rd 16
- With separator plate
- Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8
- DIN 48845, Form E

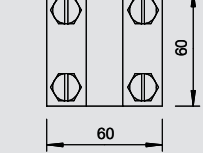
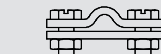


## DIN cross-connector for flat and round conductors

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>252 8-10XFL30 FT</b>	8-10 x FL30	St	F	25	28.500	<b>5312 65 5</b>

**ST** Steel **F** Hot-dip galvanised

- Fit: Rd 8-10 x FL 30
- Installed with 4 hexagonal bolts M8-25, 4 hexagonal nuts M8 (F)
- DIN 48845, Form F

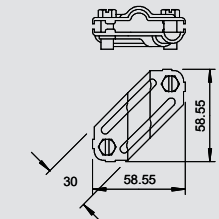


## Cross-connector for flat and round conductors

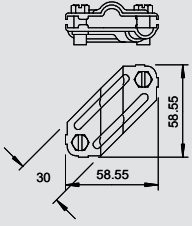
Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>250 VA</b>	Rd 8-10/FL30	V2A	—	25	10.260	<b>5312 92 2</b>
<b>250 V4A</b>	Rd 8-10/FL30	V4A	—	25	10.260	<b>5312 92 5</b>

**V2A** Stainless steel, 1.4301 **V4A** Stainless steel, 1.4571

- Fit: Rd 8-10 x Rd 8-10
- Fit: Rd 8-10 x FL 30
- Fit: FL 30 x FL 30
- Installed with 2 hexagonal bolts M8 x 20 (F)



**Cross-connector for flat and round conductors**

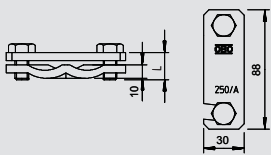


Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
250	Rd 8-10/FL30	St	FT	25	10.260	<b>5312 90 6</b>

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Fit: Rd 8-10 x Rd 8-10
  - Fit: Rd 8-10 x FL 30
  - Fit: FL 30 x FL 30
  - Installed with 2 hexagonal bolts M8 x 20 (F)

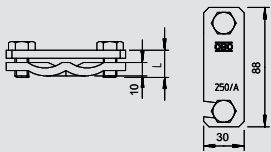


**Diagonal clamp**



Type	Inter- face	Dimen- sion L mm	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
250 A-VA	—	40	Rd 6-22/max. FL50	25	28.800	<b>5313 02 3</b>

- V2A** Stainless steel, 1.4301 /100 pc.
- For reinforced steels Ø 6-22 mm and flat conductor 50 x 4
  - Installed with screws M10 x 40
  - AS version with screws M10 x 20
  - Simple installation with open slot

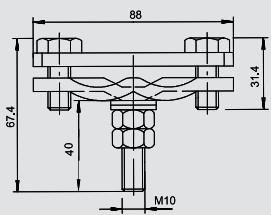


Type	Inter- face	Dimen- sion L mm	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
250 A-FT	FT	40	Rd 6-22/max. FL50	25	28.800	<b>5313 01 5</b>
250 AS-FT	FT	20	Rd 6-22/max. FL50	25	26.000	<b>5313 03 1</b>

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- For reinforced steels Ø 6-22 mm and flat conductor 50 x 4
  - Installed with screws M10 x 40
  - AS version with screws M10 x 20
  - Simple installation with open slot



**Diagonal clamp with bolt**

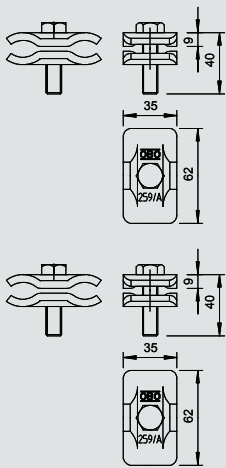


Type	Material symbol	Inter- face	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
250 A-BO	St	F	Rd 6-22/max. FL50	25	30.000	<b>5313 06 6</b>

- ST** Steel **F** Hot-dip galvanised /100 pc.
- For reinforced steels Ø 6-22 mm and flat conductor 50 x 4
  - Installed with screws M10 x 25
  - Simple installation with open slot
  - With flange-welded bolts M10 x 40, inc. 2 washers and 2 nuts



**Parallel clamp**



Type	Material symbol	Inter- face	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
259 A VA	V2A	—	Ø 10-20	25	18.800	<b>5315 52 2</b>

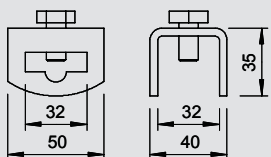
- V2A** Stainless steel, 1.4301 /100 pc.
- For connecting reinforced steels Ø 10-20 mm
  - Mounted with M10 x 40 bolts

Type	Material symbol	Inter- face	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
259 A ST	St	—	Ø 10-20	25	18.800	<b>5315 55 7</b>
259 A FT	St	FT	Ø 10-20	25	18.800	<b>5315 51 4</b>

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- For connecting reinforced steels Ø 10-20 mm
  - Mounted with M10 x 40 bolts

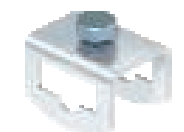


**Variable earthing terminal**

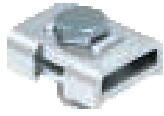


Type	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
1813 KL	FL30 x Rd 8-10	50	18.000	<b>5014 42 5</b>

- ST** Steel **FT** Hot-dip galvanised /pc.
- Suitable for connecting Rd 10 x FL 30, FL 30 x FL 30
  - Quick mounting using a hexagonal bolt M10 x 20 (F)



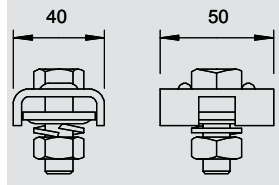
# Connection material



## Connection terminal for round conductor

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>1818</b>	Rd 8-10	10	17.600	<b>5012 01 5</b>

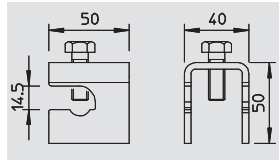
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- For connecting round conductor Rd 8-10
  - With 1 hexagonal bolt M12 x 40, 1 hexagonal nut M12 and 1 lock washer, stainless steel



## Connection terminal for reinforced steels

Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>1814 FT</b>	St	FT	FL30x5 x Rd8-14	25	20.000	<b>5014 46 8</b>
<b>1814 ST</b>	St	—	FL30x5 x Rd8-14	25	20.000	<b>5014 47 6</b>

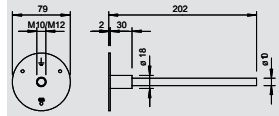
- ST** Steel **FT** Hot-dip galvanised /pc.
- For reinforced steels with diameters 8–14 mm and FL 30 x 5
  - Simple installation with open slot
  - Side suspension option



## Earthing fixed point

Type	Thread	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>205 B-M10 VA</b>	M10	25	25.500	<b>5420 00 8</b>
<b>205 B-M12 VA</b>	M12	25	25.500	<b>5420 01 6</b>

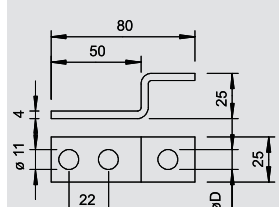
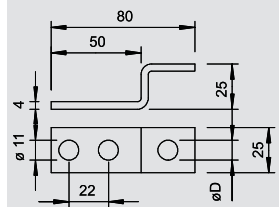
- V4A** Stainless steel, 1.4404 /pc.
- Connection to earthing systems, arrestors and reinforcement
  - Contact plate: Ø 79 mm, made of rustproof stainless steel (V4A)
  - Clamping bolt Ø 10 mm, rustproof (V2A)
  - Incl. plastic cover for simple installation



## End piece

Type	Material symbol	Inter-face	Dimension D	Pack.	Weight	Item No.
			Ø mm	pcs	kg/100 pcs.	
<b>5011 VA M12</b>	V4A	—	13	50	7.048	<b>5334 94 2</b>
<b>5011 VA M10</b>	V4A	—	11	50	7.064	<b>5334 93 4</b>

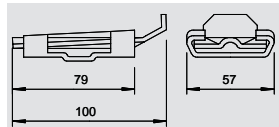
- V4A** Stainless steel, 1.4571 /100 pc.
- For attaching to steel structures or bolting to earthing fixed points
  - For attachments: Round conductor Rd 8-10 and flat conductor FL 30 x 3.5
  - 2 attaching holes Ø 11 mm
  - 1 attaching holes Ø D mm
- | Type        | Material symbol | Inter-face | Dimension D | Pack. | Weight      | Item No.         |
|-------------|-----------------|------------|-------------|-------|-------------|------------------|
|             |                 |            | Ø mm        | pcs   | kg/100 pcs. |                  |
| <b>5011</b> | St              | FT         | 11          | 50    | 7.064       | <b>5304 99 7</b> |
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- For attaching to steel structures or bolting to earthing fixed points
  - For attachments: Round conductor Rd 8-10 and flat conductor FL 30 x 3.5
  - 2 attaching holes Ø 11 mm
  - 1 attaching holes Ø D mm

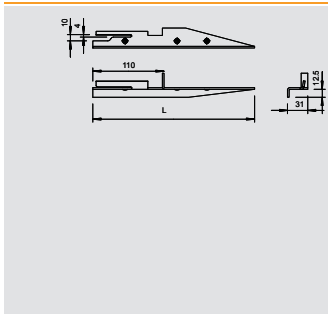


## Wedge connector

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>1813 DIN</b>	10/FL30 x FL30	5	20.000	<b>5014 21 2</b>

- ST** Steel **FT** Hot-dip galvanised /pc.
- DIN 48834, Form A
  - Suitable for connecting Rd 10 x FL 30, FL 30 x FL 30
  - Quick installation with high contact force



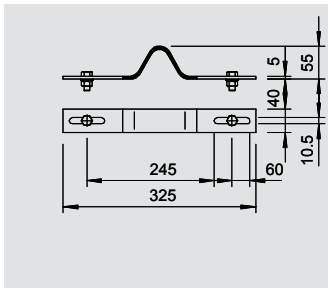
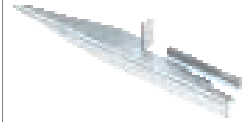


## Spacer

Type	Fit	Length	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
1811	10/FL30 x 3,5	250	25	19.000	5014 01 8
1811 L	10/FL30 x 3,5	400	25	31.500	5014 02 6

**ST** Steel **FT** Hot-dip galvanised /pc.

- For professional laying of round conductors and flat conductors according to DIN VDE 0185-305 (IEC 62305)
- DIN 48833
- Suitable for mounting round conductors Rd 10 or flat conductors FL 30 x 3.5

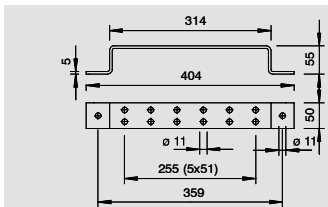


## Expansion piece

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
1807	25	27.000	5016 14 2

**Al** Aluminium /pc.

- For expansion joints when laying foundation earthers
- With 2 hexagonal bolts M10 x 30
- 2 hexagonal nuts M10, 2 steel washers, hot galvanised, and 2 rustproof steel serrated washers



## Earthing connection block

Type	Length	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
1805 2 FT	200	10	54.800	5016 02 9
1805 4 FT	302	20	77.000	5016 03 7
1805 6 FT	404	10	97.100	5016 04 5

**ST** Steel **FT** Hot-dip galvanised /pc.

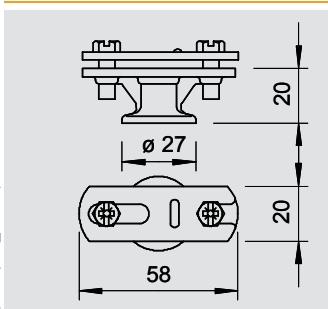
- With 2 mounting holes Ø 11 mm
- 1805/2: With 4 attaching holes
- 1805/4: With 8 attaching holes
- 1805/6: With 12 attaching holes

Type	Length	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
1805 2 VA	200	10	54.800	5016 09 6
1805 4 VA	302	20	77.000	5016 11 8
1805 6 VA	404	10	97.100	5016 12 6

**V4A** Stainless steel, 1.4571 /pc.

1805/...: For connecting different earthing systems

- With 2 mounting holes Ø 11 mm
- 1805/2: With 4 attaching holes
- 1805/4: With 8 attaching holes
- 1805/6: With 12 attaching holes

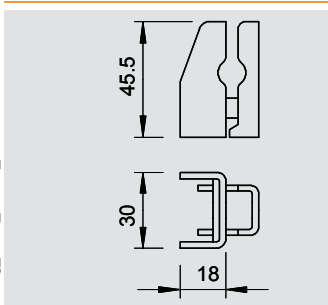


## Cable bracket for flat conductors

Type	Material symbol	Inter-face	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
113 BZ-FL	Zn	G	100	6.280	5230 44 6
113 B-Z-HD-FL	Zn	G	100	7.000	5230 46 2

**Zn** Die-cast zinc **G** Electrogalvanised /100 pc.

- With female thread M8 or through hole for wood screws
- For flat conductor FL 30
- Sliding over-piece for quick installation



## Cable bracket for Rd 8–10 and FL 30

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
835	Rd 8/10/ FL30x3,5	1	12.100	5033 20 9

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- For round conductor Rd 8-10 and flat conductor FL 30 x 3.5
- Supplied with hexagonal wood bolt 6 x 70 and straddling dowel 910/N



# Connection material

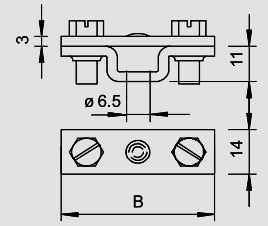


## Spacer clip for flat conductor, with fastening hole Ø 6.5

Type	Fit	Dimension B	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>831 30</b>	max. FL30	54	25	3.580	<b>5032 03 2</b>
<b>831 40</b>	max. FL40	65	25	3.894	<b>5032 04 0</b>

ST Steel      FT Hot-dip galvanised      /100 pc.

- Fit: FL 30 and FL 40
- With mounting hole Ø 6.5 and 2 hexagonal bolts M6 x 16 (F)

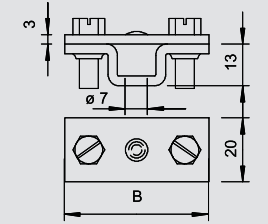


## Spacer clip for flat conductor, with fastening hole Ø 7

Type	Fit	Dimension B	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>832 30</b>	max. FL30	55	25	7.416	<b>5032 53 9</b>
<b>832 40</b>	max. FL40	65	25	7.612	<b>5032 54 7</b>

ST Steel      FT Hot-dip galvanised      /100 pc.

- Fit: FL 30 and FL 40
- With mounting hole Ø 7 mm and 2 hexagonal bolts M6 x 16

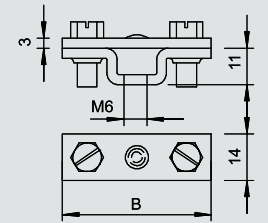


## Spacer clip for flat conductor, with threaded connection M6

Type	Fit	Dimension B	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>831 30 M6</b>	max. FL30	54	25	3.712	<b>5032 23 7</b>
<b>831 40 M6</b>	max. FL40	65	25	3.880	<b>5032 24 5</b>

ST Steel      FT Hot-dip galvanised      /100 pc.

- Fit: FL 30 and FL 40
- With attaching thread M6 and 2 hexagonal bolts M6 x 16 (F)

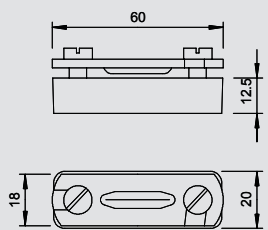


## Spacer clip for flat conductor, with polyamide base

Type	Fit	Dimension B	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>833 35</b>	max. FL30	60	25	4.228	<b>5033 03 9</b>

ST Steel      FT Hot-dip galvanised      /100 pc.

- Fit: FL 30
- With mounting hole 6.2 x 22 mm
- With 2 cylinder bolts M6 x 16 and over-piece from hot-dip galvanised steel
- Bottom section from polyamide, black

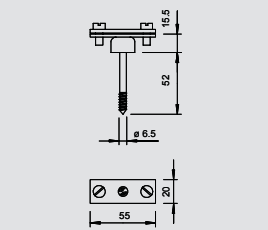


## Spacer clip for flat conductor, with wood screw and spacer

Type	Fit	Dimension B	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>370 H</b>	max. FL30	55	100	10.200	<b>5025 20 6</b>

ST Steel      FT Hot-dip galvanised      /100 pc.

- Fit: FL 30
- With spacer and cylinder bolts M6 x 16 (G)
- With wood bolts

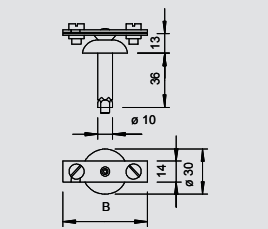


## Spacer clip for flat conductor, with steel spreading anchor Ø 10

Type	Fit	Dimension B	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>710 30</b>	max. FL30	52	25	5.044	<b>5028 03 5</b>
<b>710 40</b>	max. FL40	62	25	5.360	<b>5028 04 3</b>

ST Steel      G Electrogalvanised      /100 pc.

- Fit: FL 30 and FL 40
- With steel straddling dowel Ø 10 mm, spacer and 2 cylinder bolts M5 x 14 (G)

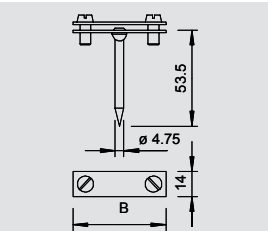


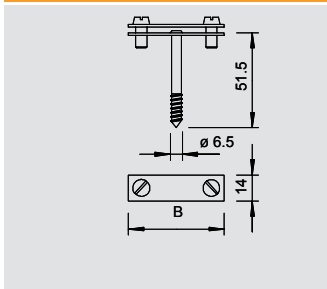
## Spacer clip for flat conductor, with square pin

Type	Fit	Dimension B	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>708 30 SP</b>	max. FL30	52	50	3.148	<b>5030 02 1</b>

ST Steel      G Electrogalvanised      /100 pc.

- Fit: FL 30 and FL 40
- With 2 cylinder bolts M5 x 12 (G) and over-piece
- With square pin



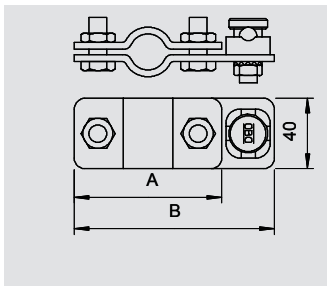


Spacer clip for flat conductor, with wood screw

Type	Fit	Dimension B	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
708 30 HG	max. FL30	52	50	3.148	5030 23 4
708 40 HG	max. FL40	52	50	3.474	5030 24 2

**ST** Steel **G** Electrogalvanised /100 pc.

- Fit: FL 30 and FL 40
- With 2 cylinder bolts M5 x 12 (G) and over-piece
- With wood bolt

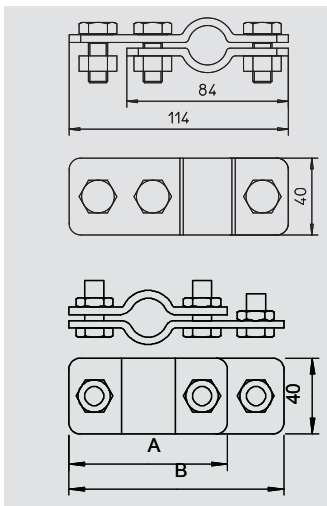


Connection terminal for earthing rod to round conductors Rd 8-10

Type	Material symbol	Interface	For deep earthers Ø mm	Dimension A mm	Dimension B mm	Pack.	Weight	Item No.
				mm	mm	pcs	kg/100 pcs.	
2710 20	St	FT	20	84	114	5	39.900	5001 21 8
2710 25	St	FT	25	89	119	5	42.300	5001 22 6

**ST** Steel **FT** Hot-dip galvanised /pc.

- ST, BP, OMEX and LightEarth systems
- On round conductor Rd 8-10
- Including connector 5001 DIN



Connection terminal for earthing rod on flat conductor

Type	Material symbol	Interface	For deep earthers Ø mm	Dimension A mm	Dimension B mm	Pack.	Weight	Item No.
				mm	mm	pcs	kg/100 pcs.	
2730 20 VA	V2A	—	20	84	114	5	35.900	5001 36 6

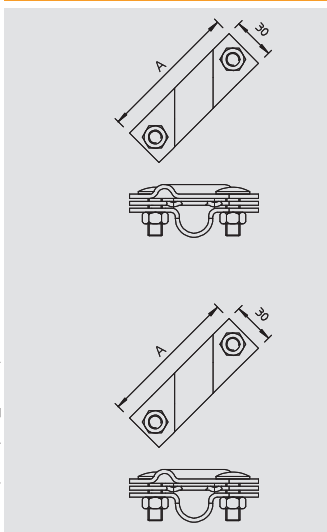
**V2A** Stainless steel, 1.4301 /pc.

- ST, BP, OMEX and LightEarth systems
- On flat conductors
- Including hexagonal bolt for attaching flat conductors

Type	Material symbol	Interface	For deep earthers Ø mm	Dimension A mm	Dimension B mm	Pack.	Weight	Item No.
				mm	mm	pcs	kg/100 pcs.	
2730 25 FT	St	FT	25	89	119	5	38.800	5001 41 2
2730 20 FT	St	FT	20	84	114	5	35.900	5001 40 4

**ST** Steel **FT** Hot-dip galvanised /pc.

- ST, BP, OMEX and LightEarth systems
- On flat conductors
- Including hexagonal bolt for attaching flat conductors



Connection terminal for earthing rod, universal

Type	Interface	Dimension A mm	For deep earthers Ø mm	Fit	Pack.	Weight	Item No.
				mm	pcs	kg/100 pcs.	
2760 20 FT	FT	101	20	Rd 8-10/FL40	5	32.400	5001 64 1
2760 25 FT	FT	110	25	Rd 8-10/FL40	5	38.400	5001 66 8

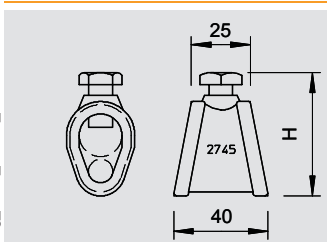
**ST** Steel **FT** Hot-dip galvanised /pc.

- Suitable for attaching round conductors Rd 8-10 or flat conductors to FL 40
- With separator plate
- Installed with 2 hexagonal bolts M10 x 30 and 2 hexagonal nuts M10

Type	Interface	Dimension A mm	For deep earthers Ø mm	Fit	Pack.	Weight	Item No.
				mm	pcs	kg/100 pcs.	
2760 20 VA	—	101	20	Rd 8-10/FL40	5	32.400	5001 61 7

**V2A** Stainless steel, 1.4301 /pc.

- Suitable for attaching round conductors Rd 8-10 or flat conductors to FL 40
- With separator plate
- Installed with 2 hexagonal bolts M10 x 30 and 2 hexagonal nuts M10



Connection terminal for earthing rod or cables

Type	Material symbol	Interface	For deep earthers Ø mm	Fit	Pack.	Weight	Item No.
				mm	pcs	kg/100 pcs.	
2745 20 MS	CuZn	Cu	20	7-12,5/S95 mm <sup>2</sup>	5	16.000	5001 56 0

**CuZn** Brass **Cu** Copper-plated /pc.

- For earthing rod connector Ø 20 or conductors 95 mm<sup>2</sup>
- For round conductor attachments Rd 7-12.5 with hexagonal bolts M10 x 25, copper (Cu)



# Holders and accessories



## Plastic corrosion protection strip

Type	Width mm	Length m	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>356 50</b>	50	10	1	71.500	<b>2360 05 5</b>
<b>356 100</b>	100	10	1	122.200	<b>2360 10 1</b>

Petrolatum /pc.

- Approx. 1.1 mm thick
- Width: 50 mm or 100 mm, made of petrolatum-coated chemical fibre fabric
- Can be processed cold

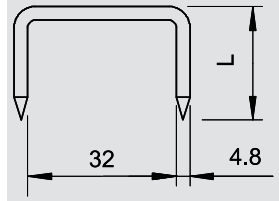


## Strip steel crimp

Type	Length mm	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>366 35</b>	35	max. FL30	100	1.737	<b>5059 35 6</b>
<b>366 50</b>	50	max. FL30	100	2.300	<b>5059 49 6</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- Fit: FL 30



## Number plates

Type	Fit mm	Material symbol	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>311 N-CU 8-10</b>	RD 8 10 / FL30	Cu	50	6.400	<b>3049 20 5</b>
<b>311 N-CU 16</b>	RD 16 FL3	Cu	50	6.800	<b>3049 30 2</b>

**Cu** Copper /100 pc.

- To identify the point of separation to DIN 48821
- Suitable for universal labelling (e.g. stamped numbers)



Type	Fit mm	Material symbol	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>311 N-VA 8-10</b>	RD 8 10 / FL30	V2A	50	5.600	<b>3049 22 1</b>
<b>311 N-VA 16</b>	RD 16 FL3	V2A	50	6.400	<b>3049 32 9</b>

**V2A** Stainless steel, 1.4301 /100 pc.

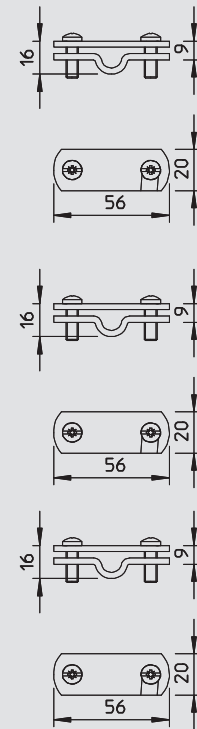
- To identify the point of separation to DIN 48821
- Suitable for universal labelling (e.g. stamped numbers)

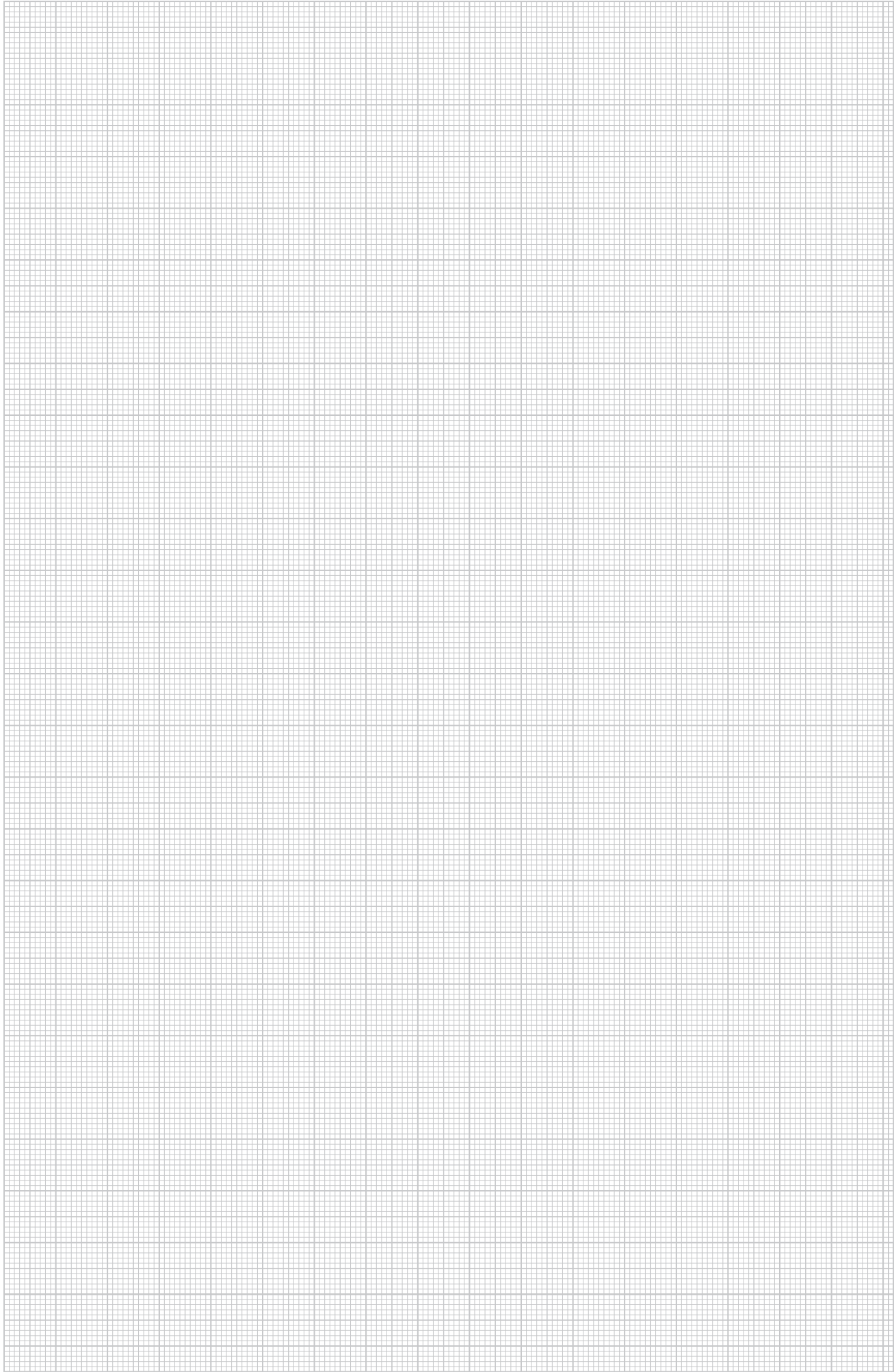


Type	Fit mm	Material symbol	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>311 N-ALU 8-10</b>	RD 8 10 / FL30	Al	50	2.500	<b>3049 25 6</b>
<b>311 N-ALU 16</b>	RD 16 FL3	Al	50	2.800	<b>3049 34 5</b>

**Al** Aluminium /100 pc.

- To identify the point of separation to DIN 48821
- Suitable for universal labelling (e.g. stamped numbers)





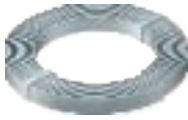


## Interception and arrestor systems

	Cable material	288
	Interception system	290
	Roof cable holder	295
	Cable bracket	301
	Insulated lightning protection	307
	OBO isCon® system	311
	Connection terminals	316
	Connection and separating terminals	329
	Earth entries	332
	Accessories	333



# Conduction material

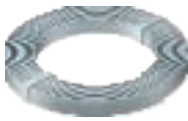
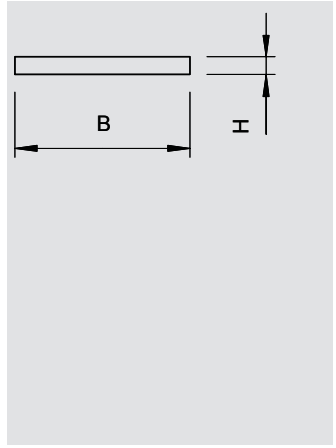


## Flat conductor, galvanised steel for ground

Type	Material symbol	Inter-face	Dimension b x h mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
5052 DIN 20X2.5	St	FT	20 x 2,5	50	122	50	41.000	5019 34 0
5052 DIN 25X3	St	FT	25 x 3	75	84	50	59.700	5019 34 2
5052 DIN 30X3	St	FT	30 x 3	90	71	50	70.650	5019 34 4
5052 DIN 30X3.5	St	FT	30 x 3,5	105	30	25	84.000	5019 34 5
5052 DIN 30X3.5	St	FT	30 x 3,5	105	60	50	84.000	5019 34 7
5052 DIN 30X4	St	FT	30 x 4	120	52	50	97.000	5019 35 0
5052 DIN 40X4	St	FT	40 x 4	160	40	50	128.000	5019 35 5
5052 DIN 40X5	St	FT	40 x 5	200	30	50	162.000	5019 36 0

**ST** Steel **FT** Hot-dip galvanised /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- Zinc coating: 500 g/m<sup>2</sup> (approx. 70 µm)
- For lightning protection, earthing systems and ring equipotential bonding

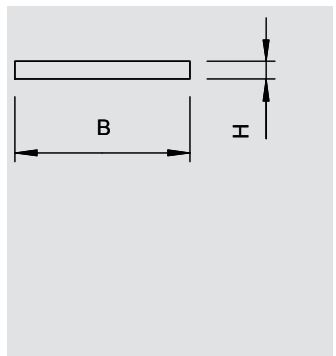


## Stainless steel flat conductor

Type	Material symbol	Dimension b x h mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
5052 V2A 30X3.5	V2A	30 x 3,5	105	50	42	82.500	5018 50 1
5052 V4A 30X3.5	V4A	30 x 3,5	105	50	42	82.425	5018 70 6
5052 V4A 30X3.5	V4A	30 x 3,5	105	25	21	82.425	5018 73 0

**V2A** Stainless steel, 1.4301 **V4A** Stainless steel, 1.4571 **V4A** Stainless steel, 1.4401 /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- For use in areas at risk of corrosion
- For lightning protection, earthing systems and ring equipotential bonding

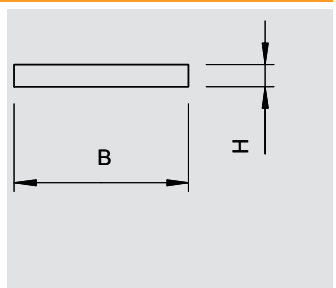


## Copper flat conductor

Type	Material symbol	Dimension b x h mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
FL 20-CU	Cu	20 x 2,5	50	45	20	44.500	5021 80 4

**Cu** Copper /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- Version: E-Cu S7 F24 soft
- For lightning protection, earthing systems and ring equipotential bonding

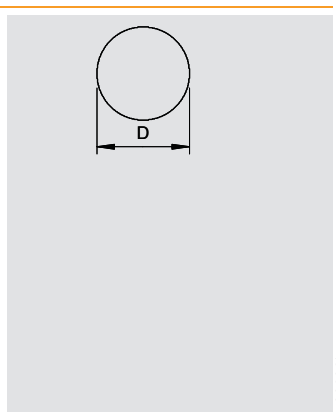


## Round aluminium cable

Type	Material symbol	Inter-face	Nominal size Ø mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
RD 8-ALU	Al	—	8	50	150	20	13.500	5021 28 6
RD 8-ALU-T	Al	—	8	50	150	20	13.500	5021 29 4
RD 10-ALU	Al	—	10	78	95	20	21.000	5021 30 8

**Al** Aluminium /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- RD 8/ALU: Semi-hard (E-ALMgSi0.5 corresponds to DIN 48801)
- RD 8/ALU-T: Twistable (E-ALMgSi0.5 corresponds to DIN 48801)
- RD 10/ALU: Pure aluminium (E-Al corresponds to DIN 48801)
- AL and ALMgSi may not be routed directly on, in or under the plaster, mortar or concrete nor underground

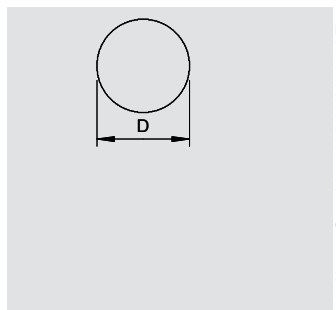


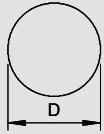
## Round galvanised steel cable

Type	Material symbol	Inter-face	Nominal size Ø mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
RD 8-FT	St	FT	8	50	125	50	40.000	5021 08 1
RD 10	St	FT	10	78	80	50	63.000	5021 10 3

**ST** Steel **FT** Hot-dip galvanised /100 m

- According to DIN EN 50164-2 (VDE 0185 part 202)
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)
- RD 10 can also be used in earth
- Zinc coating: 350 g/m<sup>2</sup> (approx. 50 µm)



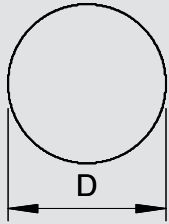


Round copper cable

Type	Material symbol	Nominal size Ø mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>RD 8-CU</b>	Cu	8	50	100	45	45.000	<b>5021 48 0</b>
<b>RD 10-CU</b>	Cu	10	78	50	35	70.000	<b>5021 50 2</b>

**Cu** Copper /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)

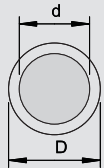


Round stainless steel cable

Type	Material symbol	Nominal size Ø mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>RD 8-V2A</b>	V2A	8	50	125	50	40.000	<b>5021 23 5</b>
<b>RD 10-V2A</b>	V2A	10	78	50	32	63.000	<b>5021 22 7</b>
<b>RD 10-V2A</b>	V2A	10	78	80	50	63.000	<b>5021 23 9</b>
<b>RD 8-V4A</b>	V4A	8	50	125	50	40.000	<b>5021 64 4</b>
<b>RD 10-V4A</b>	V4A	10	78	50	32	63.000	<b>5021 64 2</b>
<b>RD 10-V4A</b>	V4A	10	78	80	50	63.000	<b>5021 64 7</b>

**V2A** Stainless steel, 1.4301 **V4A** Stainless steel, 1.4571 /100 m

- According to DIN EN 50164-2 (VDE 0185 Part 202)
- Meets the requirements of VDE 0185-305 (IEC 62305)
- RD 10-V4A for applications in the ground

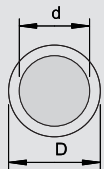


Round aluminium cable with PVC sheathing

Type	Material symbol	Colour	Dimension d mm	Dimension D mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>RD 8-PVC</b>	Al	Cream	8	11	50	75	15	20.000	<b>5021 33 2</b>

**Al** Aluminium /100 m

- Meets the requirements of VDE 0185-305 (IEC 62305)
- With PVC jacketing (halogen-free)
- Suitable for routing on, in or under plasterwork, mortar or concrete

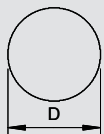


Round galvanised steel cable with PVC sheathing

Type	Material symbol	Interface	Colour	Dimension d mm	Dimension D mm	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>RD 10-PVC</b>	St	FT	Black	10	13	78	75	50	67.200	<b>5021 16 2</b>

**ST** Steel **FT** Hot-dip galvanised /100 m

- Conforms to the requirements according to VDE V 0185-305, (IEC 62305)
- Zinc coating: 350 g/m<sup>2</sup> (approx. 50 µm)
- With PVC sheathing



Copper cable

Type	Material symbol	Dimension D mm	Individual wires	Cross-section mm <sup>2</sup>	Normal ring ca. m	Normal ring ca. kg	Weight kg/100 m	Item No.
<b>S 9-CU</b>	Cu	9	7 x Ø3	50	100	44.5	44.500	<b>5021 65 0</b>

**Cu** Copper /100 m

- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)
- 7 individual wires of Ø 3 mm (overall cross-section 50 mm<sup>2</sup>)



# Interception system

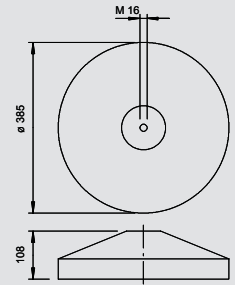


## Base, 16 kg, with female thread

Type	Thread	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>101 B-16 M16</b>	M16	1	1,600.000	<b>5402 95 6</b>

/100 pc.

- Weight 16 kg
- From frost-resistant concrete
- Female thread M16
- Recommended interception rod length max. 3.0 m, depending on wind load zone

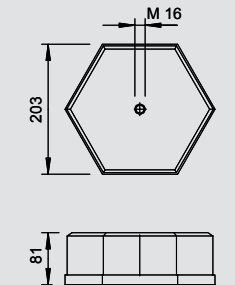


## Base, 6.9 kg, with female thread

Type	Thread	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>101 ST</b>	M16	4	690.000	<b>5402 89 1</b>

/100 pc.

- Weight 6.9 kg
- From frost-resistant concrete
- Female thread M16
- Recommended interception rod length max. 1.0 m



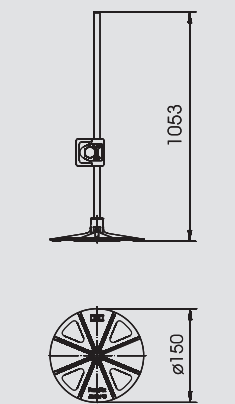
## Stand for FangFix Junior system

Type	Length	Nominal size Ø	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>F-FIX-JUNIOR</b>	1,000	10	10	32.000	<b>5403 30 8</b>

**Al** Aluminium

/pc.

- Incl. aluminium interception rod 1,000 mm long (Ø 10 mm)
- Quick mounting of the interception rod in the base using plug technology
- With Vario quick connector 249



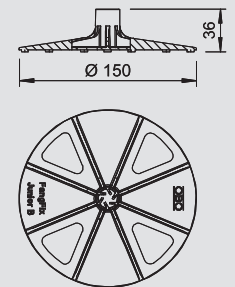
## Base for FangFix Junior

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>F-FIX-BASIS</b>	10	3.790	<b>5403 32 4</b>

**PP** Polypropylene

/pc.

- For mounting Ø 10 mm interception rods up to an overall length of 1000 mm
- Quick installation of interception rod in base using plug-in system
- Quick and easy installation



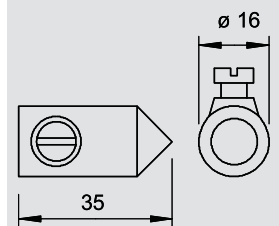
## Interception tip

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>120 A</b>	Rd 8-10	50	2.500	<b>5405 06 8</b>

**Zn** Die-cast zinc      **G** Electrogalvanised

/100 pc.

- To be used for Rd 8–10 (corrosion protection)
- With cylinder bolt M6 x 10
- Made of die-cast zinc, bolts made of hot-galvanised steel



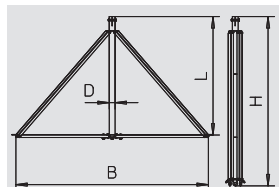
## isFang interception rod stand

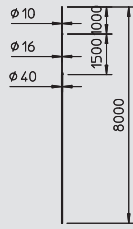
Type	Dimension B	Dimension D	Dimension L	Dimension H	Pack.	Weight	Item No.
	mm	Ø mm	mm	mm	pcs	kg/100 pcs.	
<b>isFang 3B-100</b>	1,000	40	—	—	1	620.000	<b>5408 96 8</b>
<b>isFang 3B-150</b>	1,500	40	—	—	1	950.000	<b>5408 96 9</b>

**V2A** Stainless steel, 1.4301

/pc.

Tripod stand for screwless installation of freestanding interceptor rods and insulated interception rods with 40 mm diameter, e.g. for OBO isCon® cable. Roof slope to max. 5 degrees. Concrete plinths as well as threaded rods should be ordered separately.





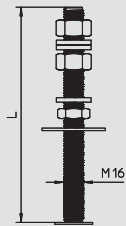
## isFang interception rod

Type	Nominal size Ø	Dimension B	Dimension D	Dimension H	Length	Pack.	Weight	Item No.
						pcs	kg/100 pcs.	
101 3B-4000	40/ 16/ 10	2,000	1,000	1,000	4,000	1	400.000	5402 86 4
101 3B-4500	40/ 16/ 10	2,500	1,000	1,000	4,500	1	480.000	5402 86 6
101 3B-5000	40/ 16/ 10	3,000	1,000	1,000	5,000	1	550.000	5402 86 8
101 3B-5500	40/ 16/ 10	3,500	1,000	1,000	5,500	1	630.000	5402 87 0
101 3B-6000	40/ 16/ 10	4,000	1,000	1,000	6,000	1	700.000	5402 87 2
101 3B-6500	40/ 16/ 10	4,500	1,000	1,000	6,500	1	780.000	5402 87 4
101 3B-7000	40/ 16/ 10	5,000	1,000	1,000	7,000	1	850.000	5402 87 6
101 3B-7500	40/ 16/ 10	5,500	1,000	1,000	7,500	1	930.000	5402 87 8
101 3B-8000	40/ 16/ 10	5,500	1,500	1,000	8,000	1	1,000.000	5402 88 0

Al Aluminium

/pc.

Tapered interception rod for isFang tripod stand.



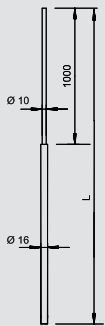
## isFang-3B threaded rod

Type	Dimension L	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
isFang 3B-G1	270	3	48.000	5408 97 1
isFang 3B-G2	340	3	0.000	5408 97 2
isFang 3B-G3	430	3	0.000	5408 97 3

V2A Stainless steel, 1.4301

/pc.

Threaded rod to fasten 1, 2 or 3 FangFix concrete bases with tripod stand. To mount the threaded rods, the edge protection must be drilled.



## Tapered pipe interception rod

Type	Material symbol	Length	Nominal size Ø	Pack.	Weight	Item No.
				pcs	kg/100 pcs.	
101 VL1500	Al	1,500	10/16	10	38.000	5401 98 0
101 VL2000	Al	2,000	10/16	10	55.000	5401 98 3
101 VL2500	Al	2,500	10/16	10	72.000	5401 98 6
101 VL3000	Al	3,000	10/16	10	88.000	5401 98 9
101 VL3500	Al	3,500	10/16	10	105.000	5401 99 3
101 VL4000	Al	4,000	10/16	10	120.000	5401 99 5

Al Aluminium

/100 pc.

- Suitable for high wind loads
- Final metre tapered from Ø 16 mm to Ø 10 mm
- Suitable for FangFix stand system



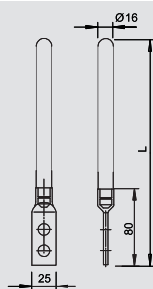
## Interception/earth entry rod, rounded on both ends

Type	Material symbol	Length	Nominal size Ø	Pack.	Weight	Item No.
				pcs	kg/100 pcs.	
101 A-1500	St	1,500	16	10	240.000	5400 15 5
101 A-CU	Cu	1,500	16	10	272.100	5400 62 7

ST Steel    Cu Copper    FT Hot-dip galvanised

/100 pc.

- Full material Ø 16 mm
- Rounded on both sides
- Suitable for FangFix stand system



## Interception/earth entry rod with connection tabs

Type	Material symbol	Inter-face	Length	Nominal size Ø	Pack.	Weight	Item No.
					pcs	kg/100 pcs.	
101 F1000	St	FT	1,000	16	10	160.000	5424 10 0
101 F1500	St	FT	1,500	16	10	240.000	5424 15 1
101 F2000	St	FT	2,000	16	10	320.000	5424 20 8

ST Steel    FT Hot-dip galvanised

/100 pc.

- With 2 attaching holes Ø 12 mm
- One end rounded

# Interception system

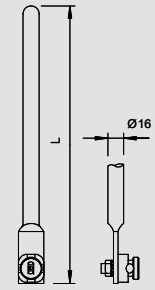


## Interception/earth entry rod with connection tabs and connectors

Type	Material symbol	Inter-face	Length mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
101 G1000	St	FT	1,000	16	10	164.300	5402 10 7
101 G1500	St	FT	1,500	16	10	240.000	5402 15 8

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- 1 attaching hole Ø 12 mm
- With pre-mounted conductor for Rd 8-10
- One end rounded



## Interception rod for FangFix Junior

Type	Material symbol	Length mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
101 J1000	Al	1,000	10	10	21.800	5401 97 0

**Al** Aluminium /100 pc.

- Ø 10 mm, Al
- Without thread
- Suitable for use in FangFix Junior



## Interception rod, one end rounded

Type	Material symbol	Length mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
101 ALU-1000	Al	1,000	16	10	55.000	5401 77 1
101 ALU-1500	Al	1,500	16	10	81.000	5401 80 1
101 ALU-2000	Al	2,000	16	10	109.000	5401 83 6
101 ALU-2500	Al	2,500	16	10	136.000	5401 85 2
101 ALU-3000	Al	3,000	16	5	162.000	5401 87 9

**Al** Aluminium /100 pc.

- Ø 16 mm, Al
- For stand system with female thread M16

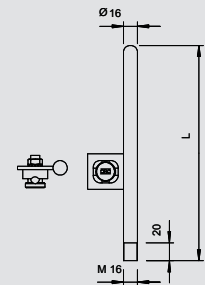


## Interception rod, one end rounded with connection lug

Type	Material symbol	Inter-face	Length mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
101 A-L100	St	FT	1,000	16	10	160.000	5402 80 8
101 A-L150	St	FT	1,500	16	10	240.000	5402 85 9

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- With thread M16 x 20
- With connecting strap
- Including pre-mounted connector type 5001 DIN for round conductor Rd 8-10
- For stands with female thread M16

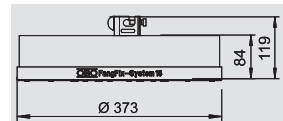


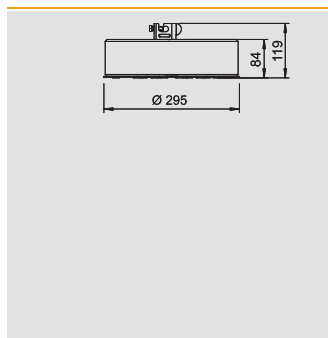
## Stand for FangFix system, 16 kg

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
F-FIX-16	1	1,732.500	5403 20 0

/100 pc.

- System consists of FangFix stone with base and clamp
- FangFix clamp made of VA; lightning current tested with 100 kA (10/350)
- 16 kg stone of Ø 365 mm, high level of stability
- Quick and easy mounting of interception rod using anchors
- Concrete, frost-resistant
- The FangFix stone can be stacked



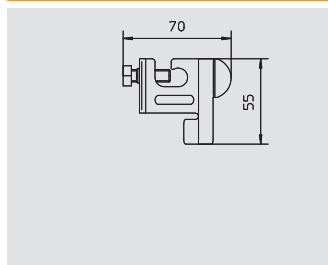


## Stand for FangFix system, 10 kg

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>F-FIX-10</b>	1	1,058.000	<b>5403 10 3</b>

/100 pc.

- System consists of FangFix stone with base and clamp
- FangFix clamp made of VA; lightning current tested with 100 kA (10/350)
- 10 kg stone of Ø 289 mm, high level of stability
- Quick and easy mounting of interception rod using anchors
- Concrete, frost-resistant
- The FangFix stone can be stacked



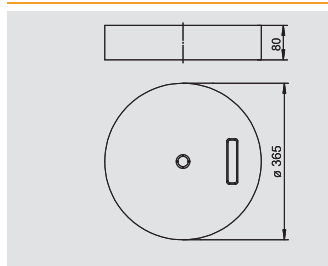
## Terminal for FangFix system

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>F-FIX-KL</b>	5	8.700	<b>5403 21 9</b>

/100 pc.

V2A Stainless steel, 1.4301

- FangFix terminal, VA for RD 8 mm
- Tested with H (100 kA) to DIN EN 50164-1
- Round conductor installed on the interception rod with only one screw

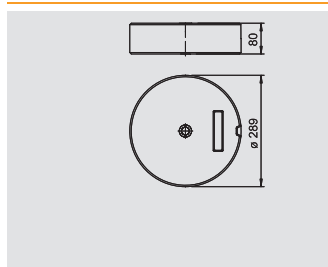


## Concrete stone for FangFix system 16 kg

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>F-FIX-S16</b>	1	1,700.000	<b>5403 22 7</b>

/100 pc.

- 16 kg stone of Ø 365 mm, high level of stability
- Concrete, frost-resistant
- Stackable

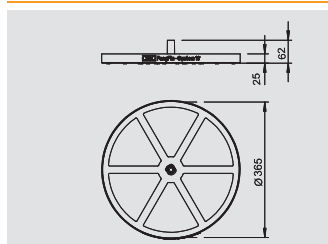


## Concrete stone for FangFix system 10 kg

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>F-FIX-S10</b>	1	1,000.000	<b>5403 11 7</b>

/100 pc.

- 10 kg stone of Ø 289 mm, high level of stability
- Concrete, frost-resistant
- Stackable



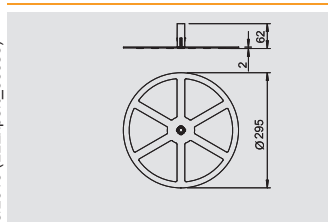
## Base for FangFix system 16 kg

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>F-FIX-B16</b>	10	12.600	<b>5403 23 5</b>

/100 pc.

PP Polypropylene

Edge protection with integrated dowel (basic) suitable for FangFix system.



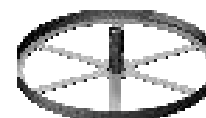
## Base for FangFix system 10 kg

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>F-FIX-B10</b>	10	5.800	<b>5403 12 4</b>

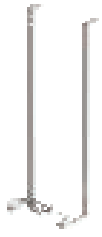
/100 pc.

PP Polypropylene

Edge protection with integrated dowel (basic) suitable for FangFix 10 system.



# Interception system



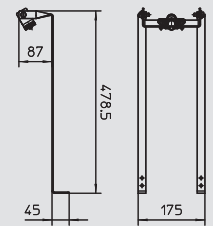
## Interception rod holder for sloping roof

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>SD-Fix</b>	1	81.000	<b>5403 33 5</b>

/pc.

Stand system: Rod holder for sloping roofs, for simple, quick and secure fastening of Ø 16 mm interception rods.

- System consists of a bracket made of V2A stainless steel
- Quick and easy mounting
- Adjustable angle
- In the case of high interception rods, additional fastening with insulated spaces is necessary



## Interception rod holder for ridge tiles

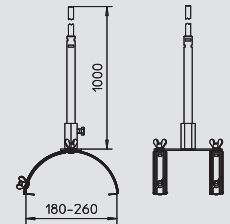
Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>F-FIX-132</b>	1	62.000	<b>5403 33 0</b>

V2A Stainless steel, 1.4301 /pc.

Rod holder for ridge tiles, for simple, quick and safe fastening of Ø 16 mm interception rods.

- System consisting of holder made of V2A stainless steel and aluminium interception rod
- Quick and easy mounting thanks to pre-mounted interception rod
- Interception rod length: 1,000 mm
- Width adjustable between 180–260 mm
- Spacing of the ridge holders: 110 mm

Application: To protect roof structures such as photovoltaic and TV/SAT systems.

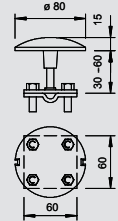


## Mushroom-shaped interceptor with connector

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>128 F</b>	5	40.000	<b>5405 76 9</b>

ST Steel FT Hot-dip galvanised /pc.

- Mushroom-shaped interceptor from aluminium
- With pre-mounted cross-piece and hexagonal bolt M8 x 25, hot-dip galvanised steel
- For round conductor Rd 8-10 and flat conductor FL 30

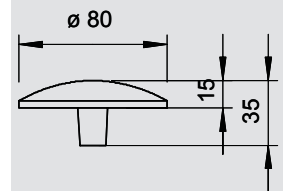


## Mushroom-shaped interceptor, head part

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>128 K</b>	10	20.000	<b>5405 86 6</b>

Al Aluminium /pc.

- With threaded connection M8

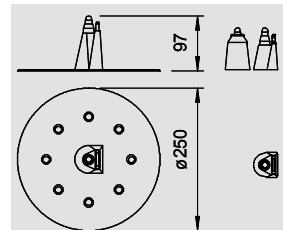


## Roof penetration

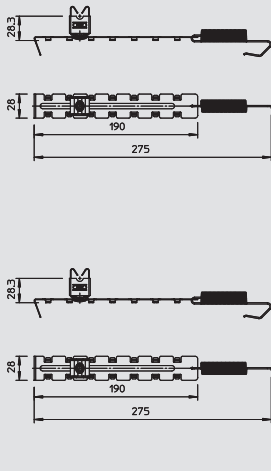
Type	Fit	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>330 K</b>	Rd 8-10/ FL20 u. FL30	20	14.400	<b>5201 10 1</b>

PA Polyamide /100 pc.

- For round conductor Rd 8-10
- Interception rods Rd 16
- Flat conductor FL 20 and FL 30
- Colour: black



## Ridge conductor holder with tensioning spring



Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>132 U</b>	V2A	—	Rd 8	20	6.000	<b>5203 01 5</b>

V2A Stainless steel, 1.4301 /100 pc.

- For round conductor Rd 8
- Clamping range 280–380 mm
- Version-CU: copper-plated

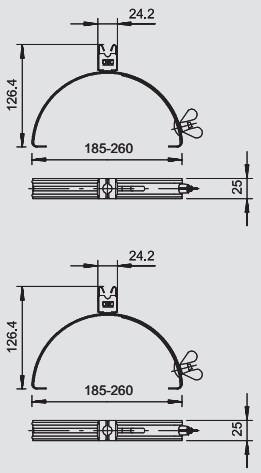
Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>132 U-CU</b>	V2A	Cu	Rd 8	20	0.600	<b>5203 02 3</b>

V2A Stainless steel, 1.4301 **Cu** Copper-plated /100 pc.

- For round conductor Rd 8
- Clamping range 280–380 mm
- Version-CU: copper-plated



## Roof cable holder for ridge tiles, 185–260 mm, Rd 8



Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>132 VA</b>	V2A	Rd 8	50	12.900	<b>5202 83 3</b>

V2A Stainless steel, 1.4301 /100 pc.

- Adjustable width from 185–260 mm
- Fast installation using wing screw

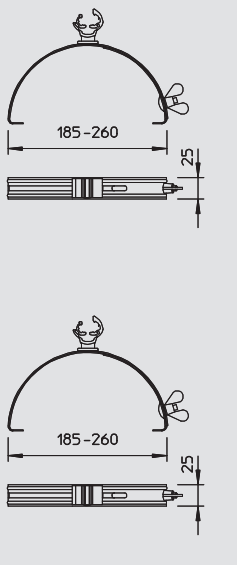
Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>132 CU</b>	Cu	Rd 8	50	13.400	<b>5202 86 8</b>

**Cu** Copper /100 pc.

- Adjustable width from 185–260 mm
- Fast installation using wing screw



## Roof cable holder for ridge tiles, 185–260 mm, Rd 8–10



Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>132 K-VA</b>	V2A	Rd 8-10	50	10.900	<b>5202 51 5</b>

V2A Stainless steel, 1.4301 /100 pc.

- Adjustable width from 185–260 mm
- Bottom part made of non-rusting stainless steel (V2A) or of copper
- Infinitely adjustable conductor holder
- Conductor holder of polyamide
- Fast installation using wing screw

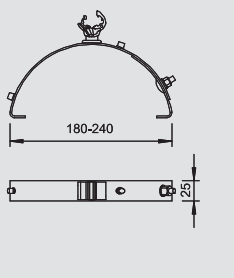
Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>132 K-CU</b>	Cu	Rd 8-10	50	11.600	<b>5202 59 0</b>

**Cu** Copper /100 pc.

- Adjustable width from 185–260 mm
- Bottom part made of non-rusting stainless steel (V2A) or of copper
- Infinitely adjustable conductor holder
- Conductor holder of polyamide
- Fast installation using wing screw



## Roof cable holder for ridge tiles, 180–240 mm, Rd 8–10



Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>132 N-DK</b>	St	FT	Rd 8-10	50	19.700	<b>5202 56 6</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- Adjustable from 180–240 mm
- With conductor 177/20, polyamide, grey
- With 3 M8 threaded nipples for positioning the holder
- Bottom section, hot-dip galvanised steel



# Roof cable holder

## Roof cable holder for tiled roofs, Rd 8

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
157 F-VA 230	V2A	Rd 8	230	50	8.350	5215 55 2
157 F-VA 280	V2A	Rd 8	280	50	10.170	5215 57 9
157 F-VA 410	V2A	Rd 8	410	50	14.880	5215 59 5

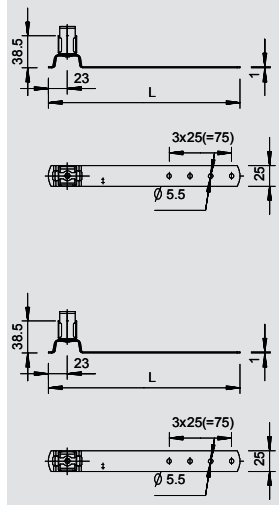
V2A Stainless steel, 1.4301 /100 pc.

- Conductor holder from stainless steel (V2A) or copper plated stainless steel (V2A)
- Including drill hole in bottom section for quick installation

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
157 F-CU 230	Cu	Rd 8	230	50	10.300	5216 19 2
157 F-CU 280	Cu	Rd 8	280	50	11.100	5216 20 6
157 F-CU 410	Cu	Rd 8	410	50	14.500	5216 25 7

Cu Copper /100 pc.

- Conductor holder from stainless steel (V2A) or copper plated stainless steel (V2A)
- Including drill hole in bottom section for quick installation



## Roof cable holder for tiled roofs, Rd 8-10

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
157 FK-VA 230	V2A	Rd 8-10	230	50	7.800	5215 54 4
157 FK-VA 280	V2A	Rd 8-10	280	50	10.170	5215 58 7
157 FK-VA 410	V2A	Rd 8-10	410	50	14.880	5215 60 9

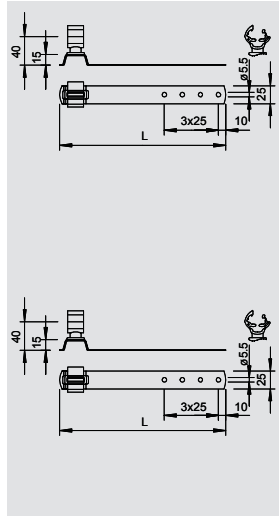
V2A Stainless steel, 1.4301 /100 pc.

- Conductor holder of polyamide
- Including drill hole in bottom section for quick installation

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
157 FK-CU 230	Cu	Rd 8-10	230	50	8.800	5216 18 4
157 FK-CU 280	Cu	Rd 8-10	280	50	9.600	5216 21 4
157 FK-CU 410	Cu	Rd 8-10	410	50	13.000	5216 26 5

Cu Copper /100 pc.

- Conductor holder of polyamide
- Including drill hole in bottom section for quick installation



## Roof cable holder for tiled roofs, angled, Rd 8

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
157 I-VA	V2A	Rd 8	140	50	7.150	5215 62 5

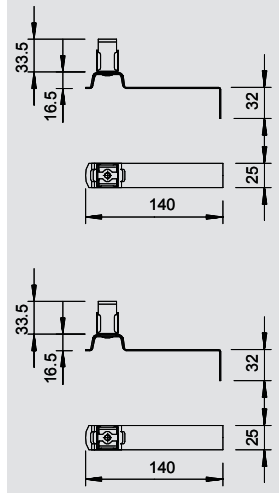
V2A Stainless steel, 1.4301 /100 pc.

- Conductor holder high-grade stainless steel (V2A) or copper plated high-grade stainless steel (V2A)
- Curved bottom strip for quick installation

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
157 I-CU	Cu	Rd 8	140	50	7.800	5215 74 9

Cu Copper /100 pc.

- Conductor holder high-grade stainless steel (V2A) or copper plated high-grade stainless steel (V2A)
- Curved bottom strip for quick installation

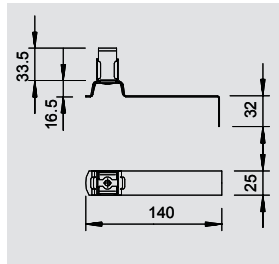


## Roof cable holder for tiled roofs, angled, flexible, Rd 8

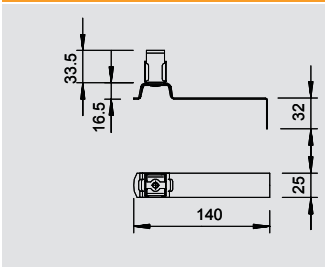
Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
157 FX-AL	Al	Rd 8	140	50	3.900	5215 87 5

Al Aluminium /100 pc.

- With flexible bottom section from aluminium or copper for matching to roof tiles (easy to flex)
- Holder from stainless steel (V2A) or copper plated stainless steel (V2A)
- Curved bottom section for quick installation



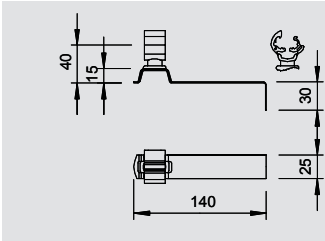
## Roof cable holder for tiled roofs, angled, flexible, Rd 8



Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 FX-CU</b>	Cu	Rd 8	140	50	7.500	<b>5215 87 9</b>

- Cu** Copper /100 pc.
- With flexible bottom section from aluminium or copper for matching to roof tiles (easy to flex)
  - Holder from stainless steel (V2A) or copper plated stainless steel (V2A)
  - Curved bottom section for quick installation

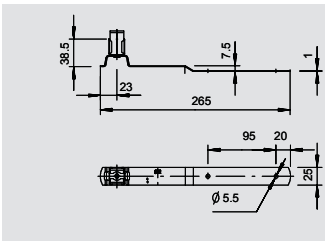
## Roof cable holder for tiled roofs, angled, Rd 8-10



Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 IK-VA</b>	V2A	Rd 8-10	140	50	7.150	<b>5215 66 8</b>

- V2A** Stainless steel, 1.4301 /100 pc.
- Conductor holder of polyamide
  - Curved bottom strip for quick installation

## Roof cable holder for slated roofs, crimped, Rd 8



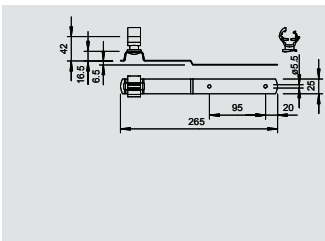
Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 E-CU</b>	Cu	Rd 8	265	50	9.050	<b>5215 80 3</b>

- Cu** Copper /100 pc.
- Conductor holder from stainless steel (V2A) or copper plated stainless steel (V2A).
  - With Ø 5.5 mm drill hole

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 E-VA</b>	V2A	Rd 8	265	50	9.050	<b>5215 50 1</b>

- V2A** Stainless steel, 1.4301 /100 pc.
- Conductor holder from stainless steel (V2A) or copper plated stainless steel (V2A).
  - With Ø 5.5 mm drill hole

## Roof cable holder for slated roofs, crimped, Rd 8-10



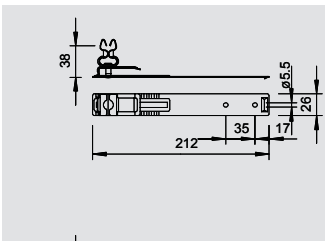
Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 EK-VA</b>	V2A	Rd 8-10	265	50	7.800	<b>5215 83 8</b>

- V2A** Stainless steel, 1.4301 /100 pc.
- Conductor holder of polyamide
  - With Ø 5.5 mm drill hole

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 EK-CU</b>	Cu	Rd 8-10	265	50	8.800	<b>5215 85 4</b>

- Cu** Copper /100 pc.
- Conductor holder of polyamide
  - With Ø 5.5 mm drill hole

## Roof cable holder for slated roofs, Rd 8



Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 L-VA</b>	V2A	Rd 8	212	50	8.000	<b>5215 43 9</b>

- V2A** Stainless steel, 1.4301 /100 pc.
- With Ø 5.5 mm drill hole and beading

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 L-CU</b>	Cu	Rd 8	212	50	9.900	<b>5215 47 1</b>

- Cu** Copper /100 pc.
- With Ø 5.5 mm drill hole and beading

# Roof cable holder

## Roof cable holder for slated roofs, Rd 8-10



Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 LK-VA</b>	V2A	Rd 8-10	212	50	8.000	<b>5215 37 4</b>

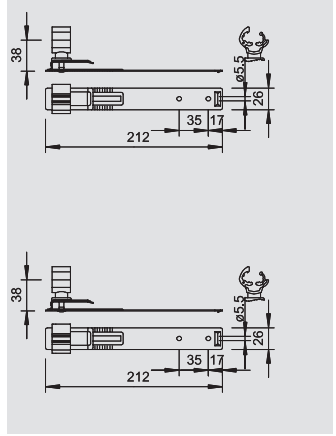
V2A Stainless steel, 1.4301 /100 pc.

- With Ø 5.5 mm drill hole and beading
- Conductor holder of polyamide

Type	Material symbol	Fit	Length	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>157 LK-CU</b>	Cu	Rd 8-10	212	50	8.400	<b>5215 38 2</b>

Cu Copper /100 pc.

- With Ø 5.5 mm drill hole and beading
- Conductor holder of polyamide



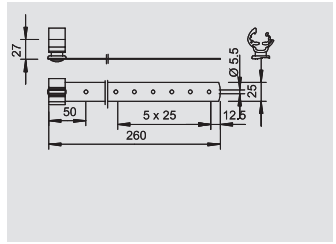
## Roof cable holder for tiled and slated roofs, Rd 8-10



Type	Fit	Material symbol	Length	Pack.	Weight	Item No.
	mm		mm	pcs	kg/100 pcs.	
<b>157 NB-VA</b>	Rd 8-10	V2A	260	100	6.000	<b>5215 27 7</b>

V2A Stainless steel, 1.4301 /100 pc.

- With Ø 5.5 mm drill hole
- Conductor holder of polyamide



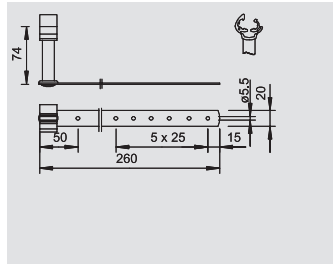
## Roof cable holder for tiled and slated roofs, height 74 mm



Type	Fit	Material symbol	Length	Pack.	Weight	Item No.
	mm		mm	pcs	kg/100 pcs.	
<b>157 ND-VA</b>	Rd 8-10	V2A	260	100	17.060	<b>5215 30 7</b>

V2A Stainless steel, 1.4301 /100 pc.

- High roof cable holder: 74 mm
- With perforation Ø 5.5 mm
- Polyamide cable bracket



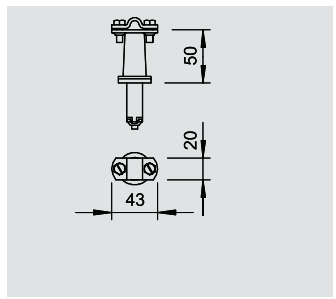
## Roof cable holder for tiled, slated and corrugated roofs, with crossbar



Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>133 A</b>	Rd 8-10	50	9.000	<b>5202 24 8</b>

PA Polyamide /100 pc.

- With weatherproof clamping collar from soft PVC
- Required drill hole-Ø = 16 mm
- Spacer from polyamide, grey



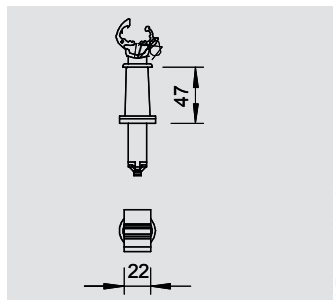
## Roof conductor holder for tiled, slated and corrugated roofs, with cable bracket



Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>133 NB</b>	Rd 8-10	50	8.000	<b>5202 21 3</b>

PA Polyamide /100 pc.

- With weather-proof clamping collar from soft-PVC
- Required drill hole-Ø = 16 mm
- Spacer and conductor holder from polyamide, grey



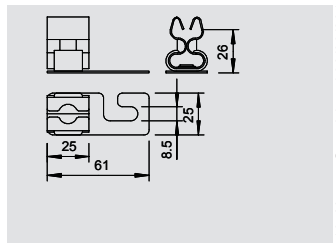
## Roof cable holder for tiled, slated and corrugated roofs, Rd 8

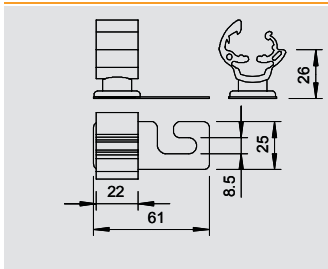


Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>159 VA-V</b>	V2A	Rd 8	50	3.900	<b>5217 07 5</b>

V2A Stainless steel, 1.4301 /100 pc.

- Bottom section and conductor holder stainless steel (V2A)
- Bottom section with Ø 8.5 mm slot



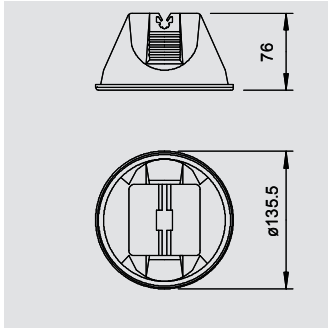


## Roof cable holder for tiled, slated and corrugated roofs, Rd 8-10

Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>159 K-VA</b>	V2A	Rd 8-10	50	2.540	<b>5216 81 8</b>

V2A Stainless steel, 1.4301 /100 pc.

- Bottom section stainless steel (V2A)
- Bottom section with Ø 8.5 mm slot
- Conductor holder of polyamide

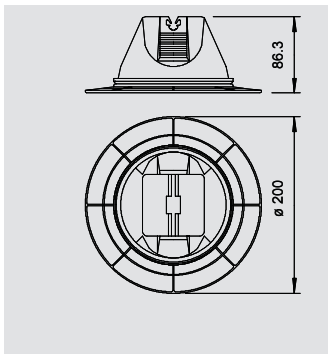


## Roof cable holder for flat roofs

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>165 MBG-10</b>	Rd 10	12	106.000	<b>5218 67 5</b>
<b>165 MBG-8</b>	Rd 8	12	106.000	<b>5218 69 1</b>

PE Polyethylene /100 pc.

- DIN 48829 Form B 1
- Closed form with bottom
- With double conductor holder
- Filling weight 1 kg (frost-resistant concrete)
- Sleeve from polyethylene, black, bottom polypropylene, black

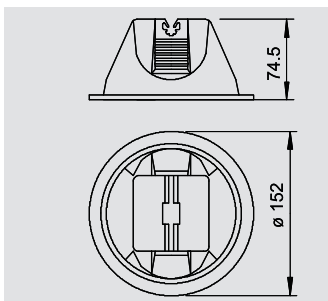


## Roof cable holder for flat roofs, with increased base section

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>165 MBG-8 200</b>	Rd 8	12	111.000	<b>5218 74 8</b>
<b>165 MBG-10 200</b>	Rd 10	12	111.000	<b>5218 75 6</b>

PE Polyethylene /100 pc.

- DIN 48829 Form B 1
- Closed form with bottom
- With double conductor holder
- Filling weight 1 kg (frost-resistant concrete)
- Sleeve from polyethylene, black, bottom polypropylene, black
- With larger bottom section (Ø 200 mm) for improved stability

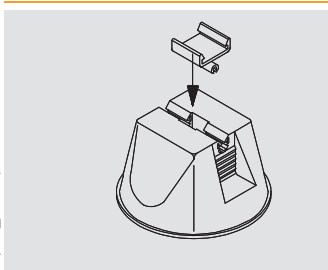


## Roof cable holder for flat roofs, without base

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>165 OBG-8</b>	Rd 8	12	100.000	<b>5218 68 3</b>

PE Polyethylene /100 pc.

- Without bottom
- With double conductor holder
- Filling weight 1 kg (frost-resistant concrete)
- Sleeve from polyethylene, black

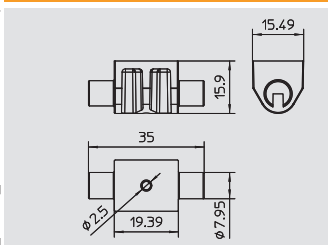


## Flat conductor adapter for roof cable holder, Type 165/MBG

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>165 MBG HFL</b>	12	0.670	<b>5218 88 5</b>

PP Polypropylene /100 pc.

- Flat conductor holder FL 30 x 3.5 mm
- For fastening to 165/MBG in fit Rd 8
- Colour: black



## Universal adapter for roof cable holder, Type 165/MBG

Type	Fit	Colour	Pack.	Weight	Item No.
	mm		pcs	kg/100 pcs.	
<b>165 MBG UH</b>	Rd 8	Black	25	0.280	<b>5218 88 2</b>

PP Polypropylene /pc.

Universal adapter with drillhole Ø 2.5 mm e.g. for OBO Golden Sprint screw, type 4758 4 x L (L = depending on application), for fastening to 165/MBG.



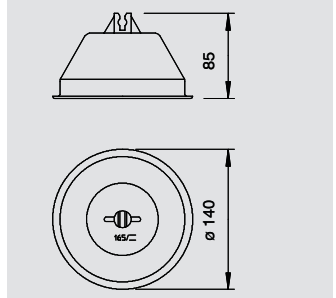
# Roof cable holder



## Roof cable holder for flat roofs, plastic sleeve

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>165 KR</b>	Rd 8	50	5.300	<b>5218 86 1</b>

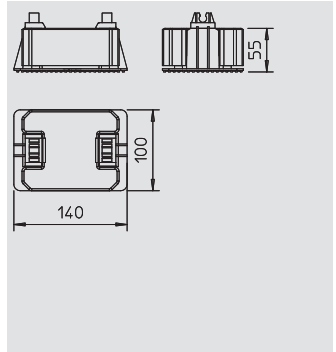
- PE** Polyethylene /100 pc.
- For self-filling with concrete
  - Potential filling weight: approx. 1.3 kg
  - Sleeve from polyethylene, black



## Roof cable holder for flat roofs, recyclable

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>165 R-8-10</b>	Rd 8-10	10	106.000	<b>5218 99 7</b>

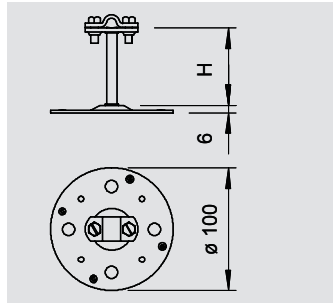
- PE** Polyethylene /100 pc.
- 165/R-8-10: Roof conductor holder for flat roofs
- For round conductor Rd 8 to 10
  - With plastic mount, polyethylene, black
  - Stone from frost-resistant concrete
  - Weight 1 kg
  - Stone separable into plastic and concrete (recyclable)



## Roof cable holder, suitable for bonding straight to flat roofs

Type	Fit	Installation height	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>165 B 60</b>	Rd 8-10	60	50	26.100	<b>5218 81 0</b>
<b>165 B 100</b>	Rd 8-10	100	50	27.700	<b>5218 82 9</b>

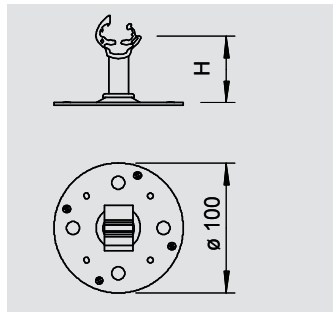
- ST** Steel      **FT** Hot-dip galvanised /100 pc.
- With conductor holder and bottom section, hot-dip galvanised steel
  - Bottom section Ø 100 mm

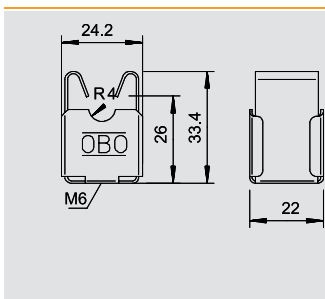


## Roof cable holder, 55 mm, suitable for bonding straight to flat roofs

Type	Fit	Length	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>165 NBK 55</b>	Rd 8-10	55	75	17.060	<b>5218 31 4</b>

- PA** Polyamide /100 pc.
- Suitable for bonding straight to flat roofs
  - Conductor holder of polyamide
  - Bottom section, hot-dip galvanised steel
  - Bottom section Ø 100 mm



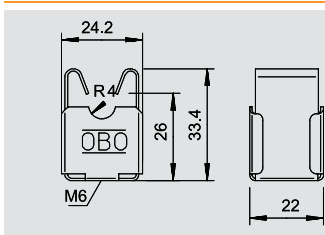


**Screwless cable bracket for Rd 8 mm, Ø 5 mm pass**

Type	Fit	Installation height	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>177 20 VA-VK M6</b>	Rd 8	20	50	2.500	<b>5207 80 0</b>
<b>177 20 VA M6</b>	Rd 8	20	50	2.500	<b>5207 33 9</b>

V2A Stainless steel, 1.4301 **Cu** Copper-plated /100 pc.

- With female thread M6 or through hole Ø 5 mm
- From stainless steel (V2A)
- Version -VK: copper-plated

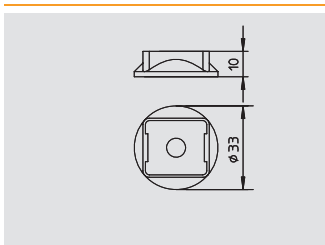


**Screwless cable bracket for Rd 8 mm, Ø 7 mm pass**

Type	Fit	Installation height	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>177 20 VA M8</b>	Rd 8	20	50	1.900	<b>5207 34 7</b>

V2A Stainless steel, 1.4301 /100 pc.

- With female thread M8 or through hole Ø 5 mm
- From stainless steel (V2A)

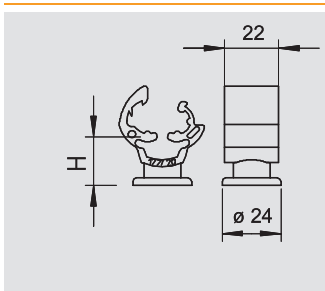


**Washer for cable bracket, type 177**

Type	Colour	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>177 U</b>	Light grey	50	0.295	<b>5207 37 1</b>

PP Polypropylene /100 pc.

- For simple wall installation
- UV-resistant

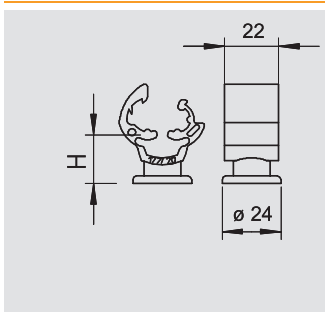


**Universal cable bracket Rd 8-10 mm**

Type	Fit	Installation height	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>177 20 M8</b>	Rd 8-10	20	50	1.050	<b>5207 44 4</b>
<b>177 30 M8</b>	Rd 8-10	30	50	1.200	<b>5207 46 0</b>
<b>177 55 M8</b>	Rd 8-10	55	50	1.450	<b>5207 48 7</b>

PA Polyamide /100 pc.

- With female thread M8 or through hole Ø 7 mm
- Weather and temperature-resistant from -35 °C to +90 °C

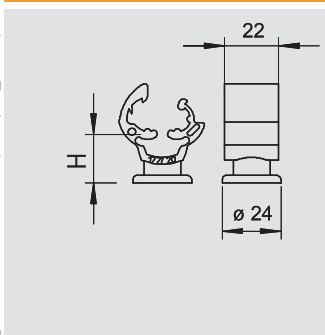


**Universal cable bracket Rd 8-10 mm, copper-plated**

Type	Fit	Installation height	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>177 20 CU</b>	Rd 8-10	20	50	1.050	<b>5207 74 6</b>
<b>177 30 CU</b>	Rd 8-10	30	50	1.200	<b>5207 75 4</b>
<b>177 55 CU</b>	Rd 8-10	55	50	1.450	<b>5207 76 2</b>

PA Polyamide /100 pc.

- With female thread M8 for screwing and through hole for wood screws
- Colour: copper
- Weather and temperature-resistant from -35 °C to +90 °C



**Universal cable bracket Rd 8-10 mm with pre-mounted wood screw**

Type	Fit	Installation height	Pack.	Weight	Item No.
	mm	mm	pcs	kg/100 pcs.	
<b>177 B-HD20</b>	Rd 8-10	20	100	1.930	<b>5207 85 1</b>
<b>177 B-HD30</b>	Rd 8-10	30	100	2.080	<b>5207 87 8</b>

PA Polyamide /100 pc.

- With female thread M8 for screwing and through hole for wood screws
- For round conductor Rd 8-10
- Weather and temperature-resistant from -35 °C to +90 °C
- With pre-mounted wood screws (5 x 60) and plastic dowels (8 x 40).



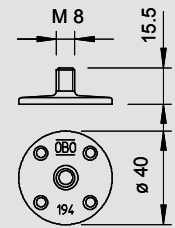
# Cable bracket



## Bonding base

Type	Colour	Thread	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>194</b>	Grey	M8	100	0.548	<b>5207 25 8</b>

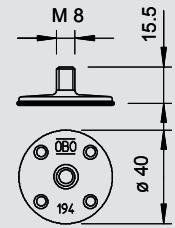
- PA** Polyamide /100 pc.
- With threaded stem M8
  - For mounting conductor supports with M8 female thread
  - For bonding to concrete, steel or brickwork



## Bonding base including industrial bonding pad

Type	Colour	Thread	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>194 K</b>	Grey	M8	100	0.600	<b>5207 26 6</b>

- PA** Polyamide /100 pc.
- With threaded pin M8
  - To accept cable supports with M8 internal thread
  - For bonding to concrete, steel or smooth substrates
  - Not suitable for rough surfaces such as plaster, wood, bitumen strips
  - Processing at > +15 °C and on cleaned substrate
  - To route the arrestor, cannot be used on the roof
  - Use on sheet roofs after agreement with the responsible roofing contractors



## Cable bracket, Rd 8–10 mm with bonding base

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>177 20 KL</b>	100	1.650	<b>5207 45 1</b>

- PA** Polyamide /100 pc.
- For bonding to concrete, steel or smooth substrates
  - Not suitable for rough surfaces such as plaster, wood, bitumen strips
  - Processing at > +15 °C and on cleaned substrate
  - To route the arrestor, cannot be used on the roof
  - Use on sheet roofs after agreement with the responsible roofing contractors



## Cable bracket with crossbar Rd 8–10 mm

Type	Material symbol	Interface	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>113 Z8-10</b>	Zn	G	Rd 8-10	50	6.202	<b>5229 96 0</b>

- Zn** Die-cast zinc **G** Electrogalvanised /100 pc.
- With female thread M8 or through hole Ø 7 mm
  - Over-piece installed with 2 hexagonal bolts
  - Version HD with wood screws (5 x 60) and plastic dowels (8 x 40)



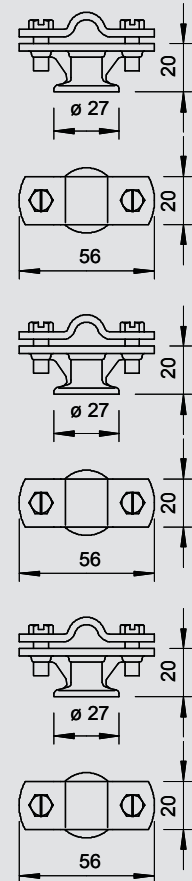
Type	Material symbol	Interface	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>113 B-Z-HD</b>	Zn	VZ	Rd 8-10	100	6.580	<b>5230 32 2</b>

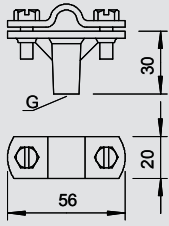
- Zn** Die-cast zinc **VZ** Galvanised /100 pc.
- With female thread M8 or through hole Ø 7 mm
  - Over-piece installed with 2 hexagonal bolts
  - Version HD with wood screws (5 x 60) and plastic dowels (8 x 40)



Type	Material symbol	Interface	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>113 8-10</b>	Zn	Cu	Rd 8-10	50	9.600	<b>5230 21 7</b>
<b>113 B-MS-HD 8-10</b>	Zn	Cu	Rd 8-10	100	7.280	<b>5230 36 5</b>

- Zn** Die-cast zinc **Cu** Copper-plated /100 pc.
- With female thread M8 or through hole Ø 7 mm
  - Over-piece installed with 2 hexagonal bolts
  - Version HD with wood screws (5 x 60) and plastic dowels (8 x 40)



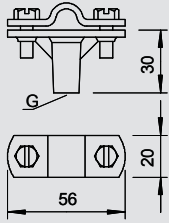


**Cable bracket with crossbar Rd 8–10, 30 mm mounting height**

Type	Material symbol	Inter-face	Fit	Thread	Pack.	Weight	Item No.
			mm		pcs	kg/100 pcs.	
<b>168 8-10 M6</b>	Zn	G	Rd 8-10	M6	50	7.800	<b>5229 16 2</b>
<b>168 DIN-K-M6</b>	Zn	G	Rd 8-10	M8	50	7.780	<b>5229 83 9</b>

**Zn** Die-cast zinc **G** Electrogalvanised /100 pc.

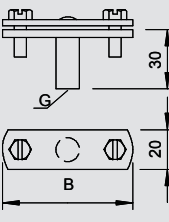
- With female thread (G)
- With over-piece and 2 hexagonal bolts
- Installed height 30 mm



Type	Material symbol	Inter-face	Fit	Thread	Pack.	Weight	Item No.
			mm		pcs	kg/100 pcs.	
<b>168 ZN-M6</b>	Zn	Cu	Rd 8-10	M6	50	8.660	<b>5229 36 7</b>
<b>168 DIN-K-M8</b>	Zn	Cu	Rd 8-10	M8	50	8.440	<b>5229 38 3</b>

**Zn** Die-cast zinc **Cu** Copper-plated /100 pc.

- With female thread (G)
- With over-piece and 2 hexagonal bolts
- Installed height 30 mm

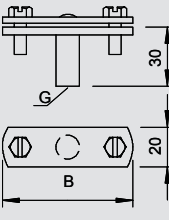


**Cable bracket with crossbar FL 30 mm mounting height**

Type	Material symbol	Dimen-sion B	Fit	Thread	Pack.	Weight	Item No.
		mm	mm		pcs	kg/100 pcs.	
<b>168 FL30-M6</b>	Zn	56	FL 30	M6	50	7.640	<b>5229 46 4</b>
<b>168 DIN 30</b>	Zn	56	FL 30	M8	50	7.320	<b>5229 48 0</b>

**Zn** Die-cast zinc **G** Electrogalvanised **VZ** Galvanised /100 pc.

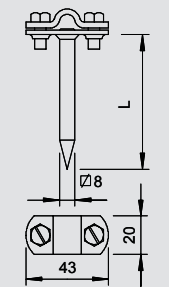
- For flat strip
- With female thread (G)
- Installed height 30 mm



Type	Material symbol	Dimen-sion B	Fit	Thread	Pack.	Weight	Item No.
		mm	mm		pcs	kg/100 pcs.	
<b>168 FL40-M8</b>	TG	66	FL 40	M8	50	8.200	<b>5229 55 3</b>

**TG** Cast iron **FT** Hot-dip galvanised /100 pc.

- For flat strip
- With female thread (G)
- Installed height 30 mm

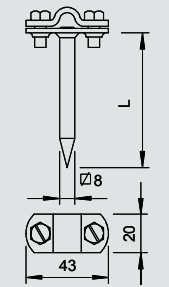


**Cable bracket with crossbar Rd 8–10 mm, with square pin**

Type	Material symbol	Inter-face	Fit	Length	Pack.	Weight	Item No.
			mm	mm	pcs	kg/100 pcs.	
<b>163 70 FT</b>	St	FT	Rd 8-10	70	50	8.476	<b>5223 07 5</b>
<b>163 100 FT</b>	St	FT	Rd 8-10	100	50	10.056	<b>5223 10 5</b>
<b>163 150 FT</b>	St	FT	Rd 8-10	150	50	14.400	<b>5223 15 6</b>
<b>163 200 FT</b>	St	FT	Rd 8-10	200	20	18.880	<b>5223 20 2</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- Complete with over-piece and hexagonal bolts
- With square pin for quick installation
- With hexagonal bolts, VA



Type	Material symbol	Inter-face	Fit	Length	Pack.	Weight	Item No.
			mm	mm	pcs	kg/100 pcs.	
<b>163 100 CU</b>	Cu	—	Rd 8-10	100	50	10.840	<b>5223 60 1</b>

**Cu** Copper /100 pc.

- Complete with over-piece and hexagonal bolts
- With square pin for quick installation
- With hexagonal bolts, VA



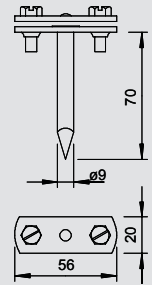
# Cable bracket



## Cable bracket with crossbar FL 30 mm, with round pin

Type	Material symbol	Inter-face	Fit	Length	Pack.	Weight	Item No.
			mm	mm	pcs	kg/100 pcs.	
166 LS 70	St	FT	FL30	70	50	9.140	5226 57 0

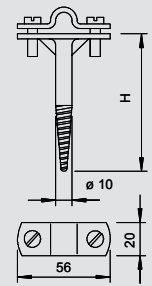
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- With over-piece and 2 hex-head screws (VA)
  - Round pin Ø 9 mm



## Cable bracket with crossbar Rd 8-10 mm, with wood screw thread

Type	Material symbol	Inter-face	Fit	Dimension H	Pack.	Weight	Item No.
			mm	mm	pcs	kg/100 pcs.	
176 A 65	TG	F	Rd 8-10	65	50	9.536	5227 07 0
176 A 80	TG	F	Rd 8-10	80	50	10.025	5227 08 9
176 A 100	TG	F	Rd 8-10	100	50	11.500	5227 10 0
176 A 150	TG	F	Rd 8-10	150	20	13.100	5227 15 1

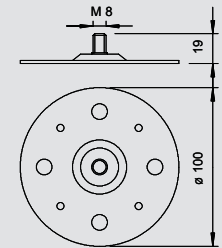
- TG** Cast iron **F** Hot-dip galvanised /100 pc.
- Also for flat conductor to FL 30
  - With wood screw thread
  - Bottom section, hot-dip galvanised cast iron
  - Over-piece and screws, hot dipped galvanised steel



## Base plate

Type	Thread	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
199 DIN	M8	100	14.200	5208 01 7

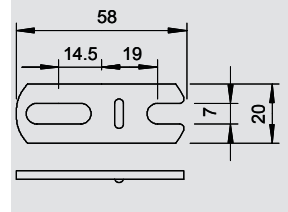
- ST** Steel **FS** Strip-galvanised /100 pc.
- With threaded pin M8
  - Suitable for direct bonding
  - Threaded pin brass and base plate hot-dip galvanised steel



## Hinge crossbar FL 30 mm

Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
156 FL	St	FT	FL30	100	2.460	5228 32 8

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- With slot for quick installation



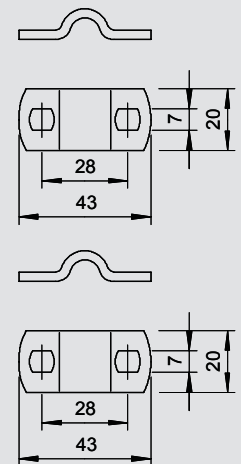
## Crossbar for Rd 8-10 mm

Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
156 K8-10 ST	St	FT	Rd 8-10	100	2.000	5228 12 3

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- For round conductor Rd 8-10

Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
156 K8-10 CU	Cu	—	Rd 8-10	100	2.260	5228 13 1

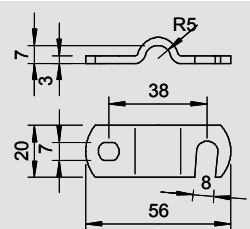
- Cu** Copper /100 pc.
- For round conductor Rd 8-10

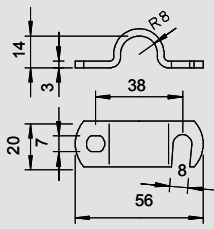


## Hinge crossbar, Rd 8-10 mm

Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
156 8-10	St	FT	Rd 8-10	100	2.680	5228 02 6

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- With open slot for quick installation

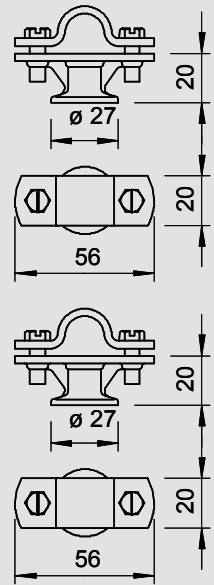




**Crossbar, round conductors and interception rods 16 mm**

Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>156 16</b>	St	FT	Rd 16	100	3.230	<b>5228 22 0</b>
<b>ST</b>	Steel	<b>FT</b>	Hot-dip galvanised			/100 pc.

- With open slot for quick installation



**Rod holder for 16 mm interception and earth entry rods**

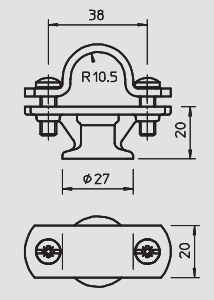
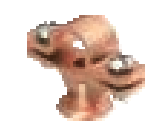
Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>113 Z-16</b>	Zn	Rd 16	50	6.000	<b>5412 60 9</b>
<b>Zn</b>	Die-cast zinc	<b>VZ</b>	Galvanised		/100 pc.

- For lightning and ground insertion rods Rd 16
- Installed with over-piece and hex-head screws M6 x 16
- With female thread M8 or through hole Ø 7 mm



Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>113 ZN-16</b>	Zn	Rd 16	50	10.100	<b>5412 63 3</b>
<b>Zn</b>	Die-cast zinc	<b>Cu</b>	Copper-plated		/100 pc.

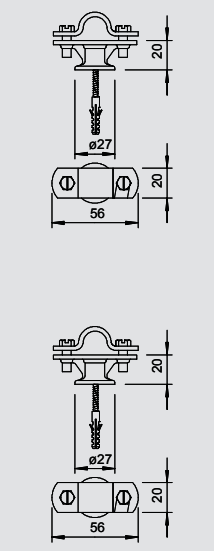
- For lightning and ground insertion rods Rd 16
- Installed with over-piece and hex-head screws M6 x 16
- With female thread M8 or through hole Ø 7 mm



**Rod holder for 20 mm rods**

Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>113 Z-20</b>	Zn	Rd 20	100	6.450	<b>5230 52 7</b>
<b>Zn</b>	Die-cast zinc	<b>VZ</b>	Galvanised		/100 pc.

With female thread M8 or through hole Ø 7 mm.



**Rod holder for 16 mm interception and earth entry rods, with bolt and anchor**

Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>113 B-Z-HD</b>	Zn	VZ	Rd 16	100	6.000	<b>5412 80 3</b>
<b>Zn</b>	Die-cast zinc	<b>VZ</b>	Galvanised		/100 pc.	

- For lightning and ground insertion rods Rd 16
- Installed with over-piece and hexagonal bolts M6 x 16 (VA)
- Female thread M8 for screwing and through hole for wood screws
- Pre-mounted with wood screw 5 x 60 and plastic dowels 8 x 40

Type	Material symbol	Inter-face	Fit	Pack.	Weight	Item No.
			mm	pcs	kg/100 pcs.	
<b>113 B-HD-16</b>	Zn	Cu	Rd 16	100	10.100	<b>5412 81 1</b>
<b>Zn</b>	Die-cast zinc	<b>Cu</b>	Copper-plated		/100 pc.	

- For lightning and ground insertion rods Rd 16
- Installed with over-piece and hexagonal bolts M6 x 16 (VA)
- Female thread M8 for screwing and through hole for wood screws
- Pre-mounted with wood screw 5 x 60 and plastic dowels 8 x 40



02 TBS-Katalog\_2010\_Neuer\_Stand / en / 30/03/2010 (LLExport\_00986)

Interception and arrester systems

# Cable bracket



## Rod holder for 16 mm interception and earth entry rods, with square pin

Type	Material symbol	Fit	Dimension H	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>112 DIN-100</b>	St	Rd 16	100	50	12.412	<b>5410 09 6</b>

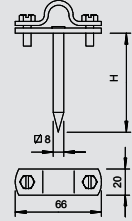
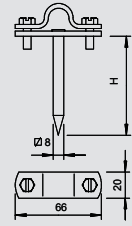
**ST** Steel **F** Hot-dip galvanised /100 pc.

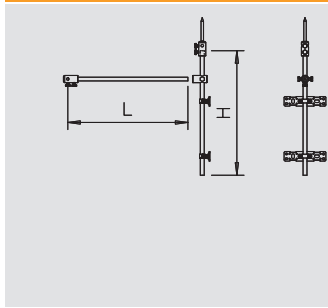
- For lightning and ground insertion rods
- Over-piece with 2 hexagonal bolts M6 x 16 (VA)
- With square pin

Type	Material symbol	Fit	Dimension H	Pack.	Weight	Item No.
		mm	mm	pcs	kg/100 pcs.	
<b>112 DIN-CU-100</b>	Cu	Rd 16	100	50	13.630	<b>5410 30 4</b>

**Cu** Copper /100 pc.

- For lightning and ground insertion rods
- Over-piece with 2 hexagonal bolts M6 x 16 (VA)
- With square pin



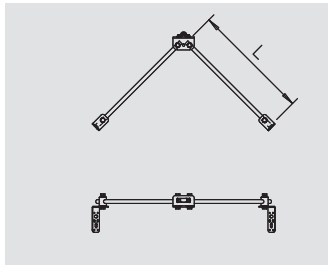


## Insulation lightning protection set, 3-corner fastening

Type	Dimension D Ø mm	Dimension L mm	Dimension H mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 3-ES-16</b>	16	750	1,500	1	207.100	<b>5408 97 6</b>

/pc.

3-corner fastening: For an insulated interceptor unit at the separation distance, see mounting on walls and roof structures with two fastening plates. Seat for interception rods and round conductors of 8, 16 and 20 mm diameter.

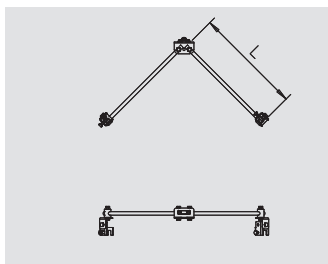


## Insulation lightning protection set, V fastening

Type	Dimension D Ø mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 VS-16</b>	16	750	1	201.800	<b>5408 97 8</b>

/pc.

V fastening: For an insulated interceptor unit at the separation distance, see mounting on walls and roof structures with two wall connection brackets. To accept interception rods and round conductors of 8, 16 and 20 mm diameter.

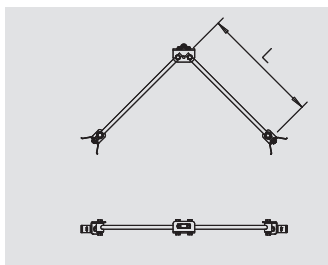


## Insulation lightning protection set, FS fastening

Type	Dimension D Ø mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 FS-16</b>	16	750	1	235.500	<b>5408 98 0</b>

/pc.

Fold fastening: For an insulated interceptor unit at the separation distance, see mounting on folds with fold thicknesses of up to 20 mm. To accept interception rods and round conductors of 8, 16 and 20 mm diameter.

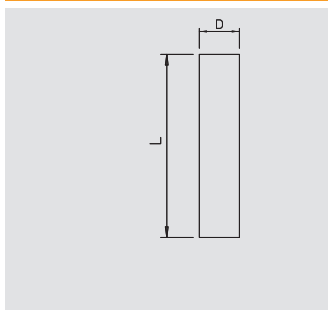


## Insulation lightning protection set, VRS fastening

Type	Dimension D Ø mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 VRS-16</b>	16	750	1	209.400	<b>5408 98 2</b>

/pc.

Pipe V fastening: For an insulated interceptor unit at the separation distance, see mounting on pipes with two pipe clips. To accept interception rods and round conductors of 8, 16 and 20 mm diameter.



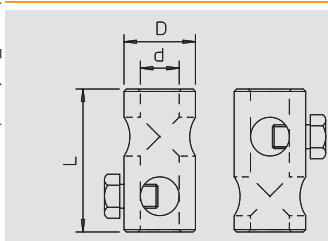
## Insulating rod

Type	Nominal size Ø mm	Length mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 20-3000</b>	20	3,000	5	190.000	<b>5408 10 5</b>
<b>101 20-6000</b>	20	6,000	5	380.000	<b>5408 14 8</b>
<b>101 16-750</b>	16	750	5	30.000	<b>5408 10 7</b>
<b>101 16-1500</b>	16	1,500	5	60.000	<b>5408 10 8</b>
<b>101 16-3000</b>	16	3,000	5	120.000	<b>5408 10 9</b>

**GFK** Fibreglass-reinforced plastic GFK

/pc.

To erect insulated interception devices to VDE 0185-305 (IEC 62305), km = 0.7



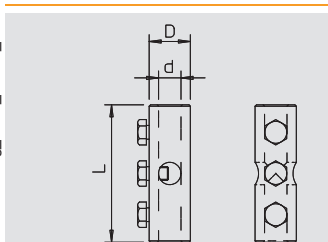
## T connector

Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 IT</b>	20	65	40	With M10 bolts	10	20.000	<b>5408 15 6</b>
<b>101 IT-16</b>	16	60	30	With M10 bolts	10	11.475	<b>5408 15 8</b>

**Al** Aluminium

/pc.

T-link for installation of insulation rods.



## K connector

Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 IK</b>	20	100	40	With M10 bolts	10	20.000	<b>5408 29 6</b>
<b>101 IK-16</b>	16	100	30	With M10 bolts	10	27.090	<b>5408 29 8</b>

**Al** Aluminium

/pc.

K-link for installation of insulation rods.



# Insulated lightning protection



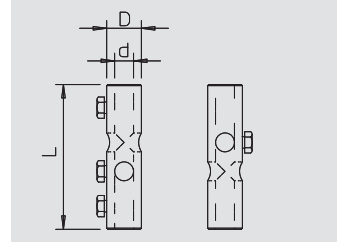
## DK connector

Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
101 IDK	20	125	40	With M10 bolts	10	40.000	5408 24 5
101 IDK-16	16	125	30	With M10 bolts	10	25.990	5408 24 7

Al Aluminium

/pc.

DK-connector link for installing insulation rods type 101 I.



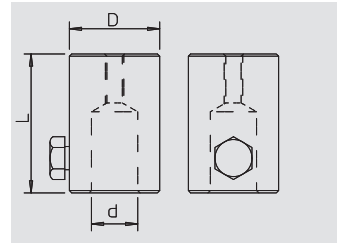
## Wall connection

Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
101 IW-M10	20	60	40	With M10 bolts	10	20.000	5408 68 7
101 IW-16	16	60	30	With M10 bolts	10	14.200	5408 68 9

Al Aluminium

/pc.

With female thread M8 for installing insulating rods to structures or walls.



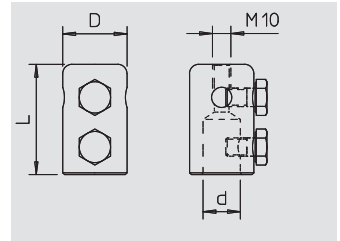
## End piece

Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
101 IES	20	60	35	With M10 bolts	10	20.000	5408 39 3
101 IES-16	16	60	30	With M10 bolts	10	0.000	5408 39 5

Al Aluminium

/pc.

End piece for attaching round conductors Rd 8-10 and interception tips, type 101 ISP.



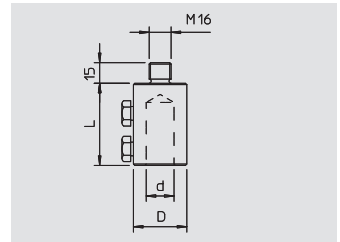
## Connector

Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
101 A-M16	20	60	40	With M10 bolts	10	20.000	5408 35 0
101 A-16	16	60	30	With M10 bolts	10	0.000	5408 35 2

Al Aluminium

/pc.

Fitting with M16 thread for installation on stands with M16 female thread.



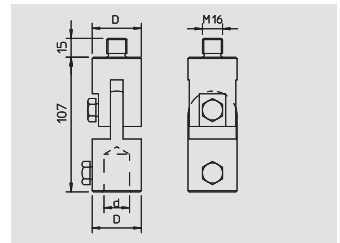
## Connection joint

Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
101 IAG	20	107	40	With M10 bolts	10	40.000	5408 50 4
101 IAG-16	16	107	30	With M10 bolts	10	27.160	5408 50 6

Al Aluminium

/pc.

Attaching link for installation on concrete stones with thread M16 on slanting roof surfaces.



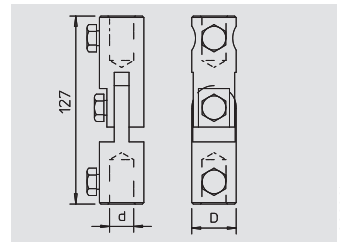
## Adjustable connector

Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
101 IGL	20	127	40	With M10 bolts	10	40.000	5408 62 8
101 IGL-16	16	127	30	With M10 bolts	10	32.000	5408 63 0

Al Aluminium

/pc.

Link for installation of insulation pipes.



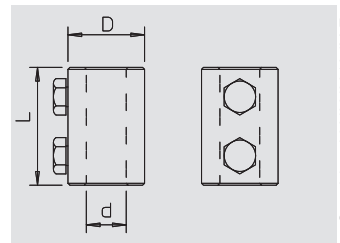
## Extension

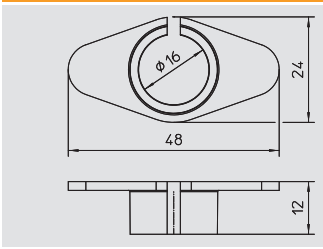
Type	Dimension d Ø mm	Length mm	Dimension D Ø mm	Product additional text 1	Pack. pcs	Weight kg/100 pcs.	Item No.
101 IV	20	60	40	With M10 bolts	10	20.000	5408 55 5
101 IV-16	16	60	30	With M10 bolts	10	16.000	5408 55 7

Al Aluminium

/pc.

Extension of insulating rods





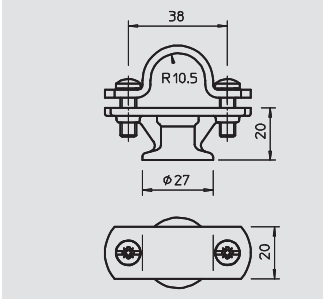
## FangFix reducing sleeve

Type	Colour	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>101 RH-16</b>	Black	16	25	0.190	<b>5408 10 1</b>

PA Polyamide

/pc.

Reduces the drill hole of the FangFix block from Ø 20 mm to Ø 16 mm. Suitable for the installation of GFK insulating rods of Ø 16 mm.



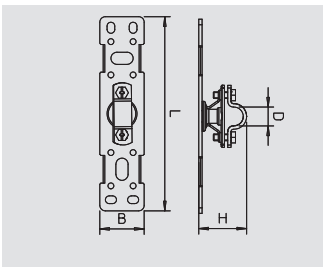
## Rod holders

Type	Material symbol	Fit	Pack.	Weight	Item No.
		mm	pcs	kg/100 pcs.	
<b>113 Z-20</b>	Zn	Rd 20	100	6.450	<b>5230 52 7</b>

Zn Die-cast zinc VZ Galvanised

/100 pc.

With female thread M8 or through hole Ø 7 mm.

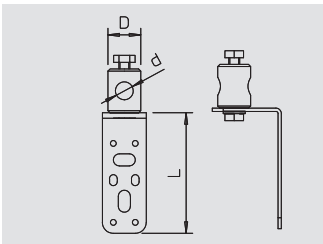


## Fastening plate

Type	Length	Dimension B	Dimension H	Pack.	Weight	Item No.
	mm	mm	mm	pcs	kg/100 pcs.	
<b>101 BP-16</b>	175	40	42	1	21.200	<b>5408 98 4</b>

/pc.

To mount insulating rods on constructions or walls  
Plate made of VA stainless steel  
Holder and crosspiece for 16 and 20 mm rods and Rd 8–10 mm

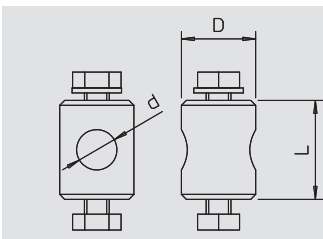


## Wall connection, angled

Type	Dimension d Ø	Dimension L	Dimension D	Pack.	Weight	Item No.
	mm	mm	Ø mm	pcs	kg/100 pcs.	
<b>101 WG-16</b>	16	110	30	1	27.960	<b>5408 98 6</b>

/pc.

Wall connection for GFK rods, Dimension D Ø: 16 mm

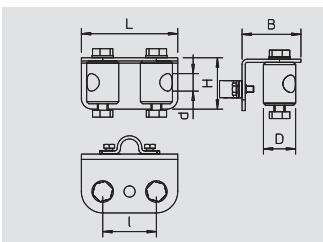


## Fastening bolts

Type	Dimension d Ø	Dimension L	Dimension D	Pack.	Weight	Item No.
	mm	mm	Ø mm	pcs	kg/100 pcs.	
<b>101 BB-16</b>	16	40	30	1	13.920	<b>5408 98 8</b>

/pc.

For GFK rods, Dimension D Ø: 16 mm

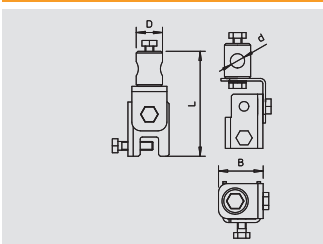


## Holder, V support

Type	Dimension d Ø	Dimension L	Dimension H	Dimension B	Pack.	Weight	Item No.
	mm	mm	mm	mm	pcs	kg/100 pcs.	
<b>101 HV-16</b>	16	90	55	48	1	50.700	<b>5408 99 0</b>

/pc.

Rod holder to accept two GFK rods, Dimension D Ø: 16 mm



## Fold fastening

Type	Dimension d Ø	Dimension L	Dimension D	Pack.	Weight	Item No.
	mm	mm	Ø mm	pcs	kg/100 pcs.	
<b>101 F-16</b>	16	121	30	1	45.120	<b>5408 99 2</b>

/pc.

To fasten a GFK rod on constructions of 4 to 20 mm, Dimension D Ø: 16 mm



# Insulated lightning protection

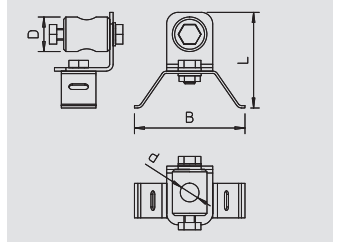


## Pipe fastening

Type	Dimension d Ø mm	Dimension L mm	Dimension D Ø mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 R-16</b>	16	81	30	96	1	26.830	<b>5408 99 4</b>

/pc.

For pipe fastening of a GFK rod using tightening strap, Dimension D Ø: 16 mm

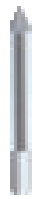
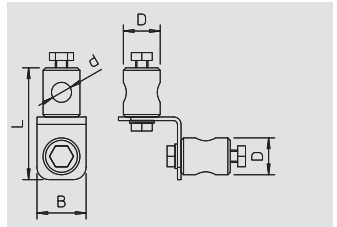


## Multi adapter

Type	Dimension d Ø mm	Dimension L mm	Dimension D Ø mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 MA-16</b>	16	91	30	40	1	36.280	<b>5408 99 6</b>

/pc.

Connector for two GFK rods, Dimension D Ø: 16 mm

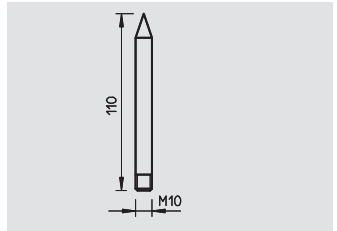


## Interception tip

Type	Length mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 ISP M10</b>	110	10	10.000	<b>5408 45 8</b>

/pc.

Interception tip for attaching to end piece, Type 101 IES, with M10 thread

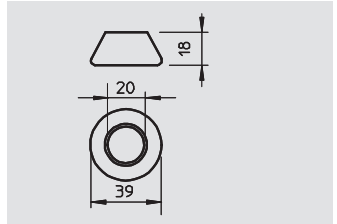


## Water repellent

Type	Length mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>101 IAB</b>	18	10	2.000	<b>5408 73 3</b>

/pc.

Water repellent for mounting on insulation rods with d = 20 mm



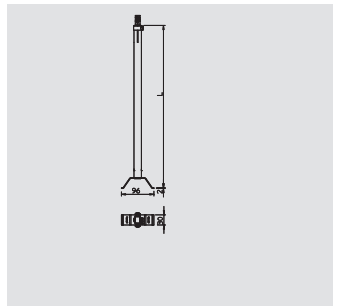
## Adjustable insulating beam – pipe

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ISAV1000R</b>	1	130.000	<b>5408 84 9</b>

/pc.

Variable spacer for cables and interception rods to maintain the separation distance.

- Infinitely adjustable distance range (L = 550–1,000 mm)
- Made of fibre glass-reinforced plastic (km = 0.7)
- For pipe mounting (including 2 m tightening strap and tension jack)



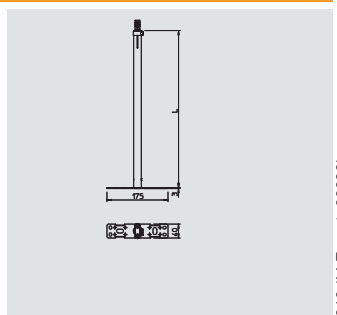
## Adjustable insulating beam – wall

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ISAV1000W</b>	1	130.000	<b>5408 85 2</b>

/pc.

Variable spacer for cables and interception rods to maintain the separation distance.

- Infinitely adjustable distance range (L = 550–1,000 mm)
- Made of fibre glass-reinforced plastic (km = 0.7)
- For wall mounting with 10 4.2 mm fastening holes and 4 6.9 mm fastening holes



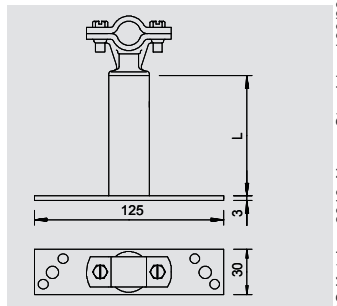
## Insulated spacer

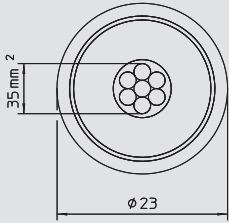
Type	Length mm	Fit	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>ISO-A-500</b>	500	Rd 16	15	36.000	<b>5408 80 6</b>
<b>ISO-A-800</b>	800	Rd 16	15	55.000	<b>5408 81 4</b>

/pc.

Insulated spacer for fastening interception rods Ø 16 mm at a separation distance to DIN VDE 0185-305-3.

- Mounting base with 4 connection holes Ø 6.5 mm and 2 connection holes Ø 8.5 mm





**isCon® arrester**

Type	Material symbol	Cross-section mm <sup>2</sup>	Nominal size Ø mm	Normal ring ca. m	Pack. m	Weight kg/100 m	Item No.
<b>isCon 1000 SW</b>	—	35	23	25	25	373.000	<b>5408 00 2</b>
<b>isCon 1000 SW</b>	—	35	23	100	100	373.000	<b>5408 00 4</b>

/100 m

Surface discharge-free and high voltage-resistant insulated arrester to maintain the separation distance according to IEC 62305. Equivalent separation spacing  $s \leq 0.75$  m in the air.

Please refer to the mounting instructions for information on routing the OBO isCon® cable.



**Insulation removal pliers**

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon stripper</b>	1	0.000	<b>5408 00 9</b>

/pc.

Pliers to remove the insulation of the OBO isCon® cable.

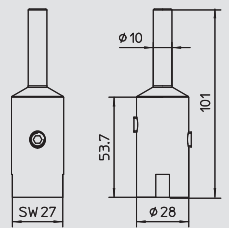


**Replacement knife**

Type	Material symbol	Dimension mm	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon cut</b>	—	34mm	—	5	0.000	<b>5408 01 1</b>

/pc.

Replacement blade for isCon® insulation removal pliers.



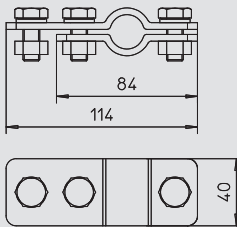
**Connection element**

Type	Material symbol	Dimension Ø mm	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon connect</b>	V2A	23	10	2	0.000	<b>5408 02 2</b>

V2A Stainless steel, 1.4301

/pc.

Screw-on termination of the connection for the isCon® cable. Including heat-shrinkable sleeve and screw lock.



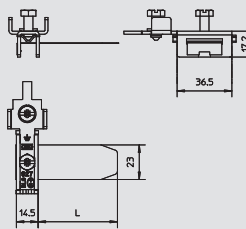
**Potential connection**

Type	Material symbol	Dimension Ø mm	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon PAE</b>	V2A	—	Ø 17-25mm	2	36.500	<b>5408 03 6</b>

V2A Stainless steel, 1.4301

/pc.

Potential control to avoid surface discharges on the isCon® cable. Installation takes place after the first 1.5 metres.



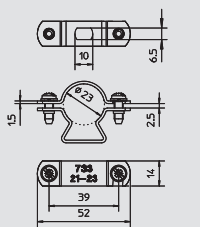
**Potential connection terminal for mounting on isFang**

Type	Material symbol	Dimension D	Fit	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>927 2 6-K</b>	V2A	—	3/8-4"	10	5.500	<b>5057 59 9</b>

V2A Stainless steel, 1.4301

/100 pc.

Potential connection for isCon® cable for mounting on insulated interception rods of type isFang.



**VA cable bracket**

Type	Material symbol	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon H VA</b>	V2A	23	1	2.850	<b>5408 05 6</b>

V2A Stainless steel, 1.4301

/pc.

Cable brackets for isCon® cable for mounting on roof/wall structures.

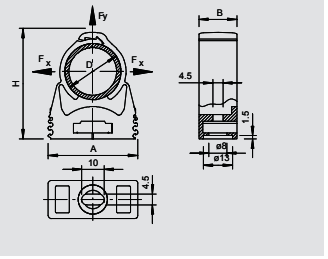




## starQuick cable bracket PA

Type	Colour	Dimension A mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SQ-20 SW</b>	<b>Jet black</b>	29	17	50	0.848	<b>2146 16 4</b>

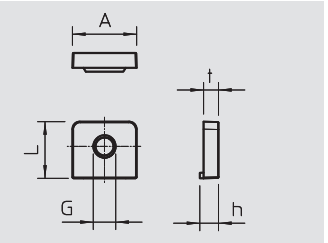
**PP** Polypropylene /100 pc.  
Cable brackets for isCon® cables for mounting on the building structure. Can also be used in the first 1.5 m.  
Can be arranged next to each other and are made from a UV and weather-resistant polyamide.



## starQuick nut M6

Type	Thread	Dimension L mm	Dimension h mm	Dimension t mm	Colour	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SQ M6</b>	<b>M6</b>	15	5	4	<b>Light grey</b>	12,000	100	0.070	<b>2146 50 9</b>

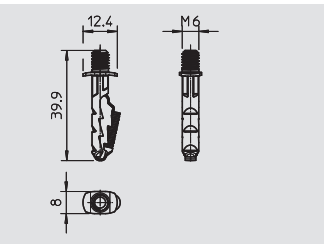
**PC** Polycarbonate /100 pc.  
The starQuick nut was developed especially for the starQuick clip. Simply push into the intended opening of the starQuick. The starQuick nut is captive in the clip. Suitable for M6/M8 threads.



## starQuick anchor M6

Type	Dowel Ø mm	Length mm	Bore hole Ø mm	Bore hole depth mm	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SQ PP</b>	6	30	6	35	6,000	50	0.100	<b>2351 70 6</b>

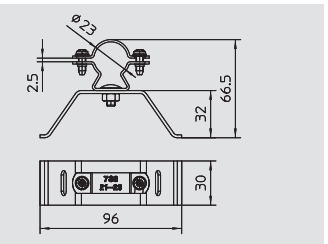
**PA** Polyamide /100 pc.  
Suitable for concrete, calcareous sandstone, brick or porous concrete masonry with interplay of the starQuick clip and starQuick nut.



## VA cable bracket with tightening strap

Type	Material symbol	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon HS VA</b>	<b>V2A</b>	23	10	0.000	<b>5408 05 2</b>

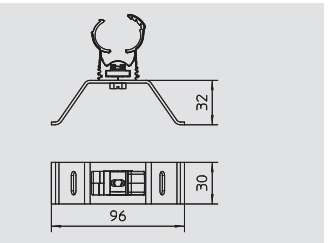
**V2A** Stainless steel, 1.4301 /pc.  
Cable brackets for isCon® cable for pipe mounting on 2 m tightening strap.



## PA cable bracket with tightening strap

Type	Material symbol	Dimension 550-1000mm	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon HS PA</b>	<b>PA</b>	550-1000mm	23	10	0.000	<b>5408 05 4</b>

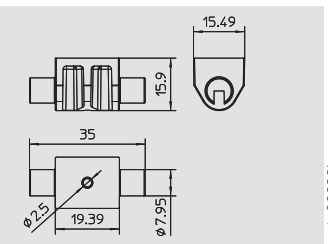
**PA** Polyamide /pc.  
Cable brackets for isCon® cable for pipe mounting on 2 m tightening strap.



## Roof cable holder, flat roof

Type	Fit mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>165 MBG UH</b>	<b>Rd 8</b>	<b>Black</b>	25	0.280	<b>5218 88 2</b>

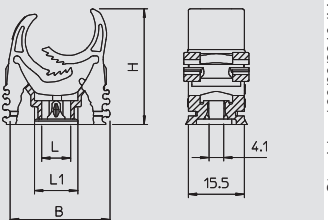
**PP** Polypropylene /pc.  
Universal adapter with drillhole Ø 2.5 mm e.g. for OBO Golden Sprint screw, type 4758 4 x L (L = depending on application), for fastening to 165/MBG.

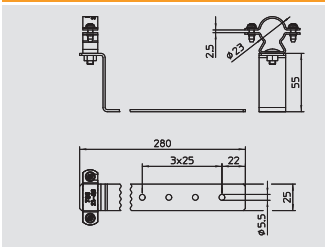


## M-Quick cable bracket PA

Type	Clamping range D mm	Pull-out value N	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>M-Quick M25 SW</b>	20-25	50	<b>Jet black</b>	50	0.930	<b>2153 78 7</b>

**PA** Polyamide /100 pc.  
Multi-quick metric  
Simple fastening  
Secure locking  
Radial arrangement  
Simplified storage  
Universally applicable

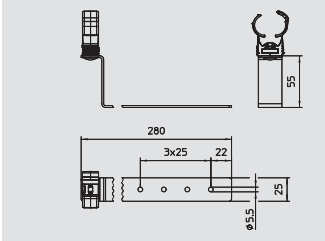




**VA roof cable holder, sloping roof**

Type	Material symbol	Installation height mm	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon H280 VA</b>	V2A	55	23	25	0.000	<b>5408 04 7</b>

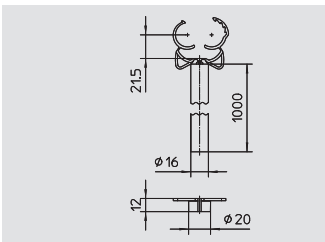
V2A Stainless steel, 1.4301 /pc.  
To route the isCon® cable on pitched roofs.



**PA roof cable holder, sloping roof**

Type	Material symbol	Dimension 280mm	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon H280 PA</b>	PA	280mm	23	25	0.000	<b>5408 04 9</b>

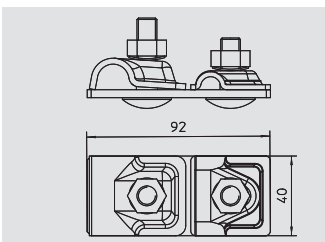
PA Polyamide /pc.  
To route the isCon® cable on pitched roofs.



**Spacer**

Type	Material symbol	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon DH</b>	GFK	23	2	41.400	<b>5408 04 3</b>

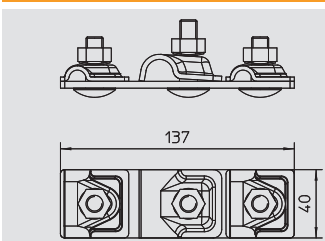
GFK Fibreglass-reinforced plastic GFK /pc.  
For stand-off installation of the isCon® cable in the area of the connection. Incl. reducing sleeve for mounting on FangFix concrete block 10 Kg.



**Connection plate for an isCon® cable**

Type	Material symbol	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon AP1-16 VA</b>	V2A	—	1	0.000	<b>5408 02 6</b>

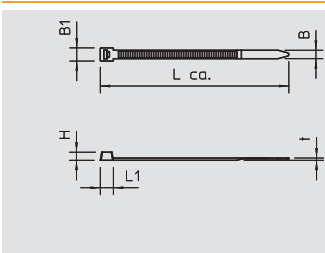
V2A Stainless steel, 1.4301 /pc.  
Connection plate to connect an isCon® cable with interception rod Ø 16 mm.



**Connection plate for two isCon® cables**

Type	Material symbol	Dimension 16x8-10mm	Dimension D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isCon AP2-16 VA</b>	V2A	16x8-10mm	—	1	0.000	<b>5408 02 8</b>

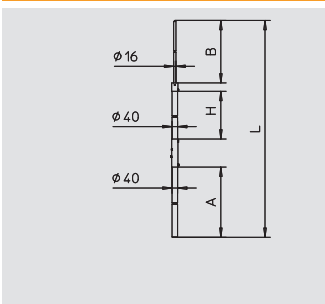
V2A Stainless steel, 1.4301 /pc.  
Connection plate to connect two isCon® cables with interception rod Ø 16 mm.



**Ribbon clip to fasten the isCon® cable to insulated interception rods**

Type	Dimension mm	Max. bundle Ø mm	Minimum breaking load kN	Colour	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>555 7.6x380 SW</b>	7.6 x 380	102	0.55	Black	1,000	100	0.500	<b>2332 75 2</b>

PA Polyamide /100 pc.  
For quick fixing



**Insulated interception rod**

Type	Dimension D Ø mm	Dimension A mm	Dimension H mm	Dimension B mm	Length mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isFang 3000</b>	40	1,240	1,500	865	3,865	1	680.000	<b>5408 94 2</b>
<b>isFang 5000</b>	40	3,340	1,500	865	5,865	1	1,260.000	<b>5408 94 6</b>

GFK Fibreglass-reinforced plastic GFK /pc.  
Insulated support pipe for separate installation of interception units and fastening the OBO isCon® cable.



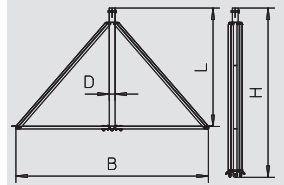
## isFang interception rod stand

Type	Dimension B	Dimension D	Dimension L	Dimension H	Pack.	Weight	Item No.
	mm	Ø mm	mm	mm			
<b>isFang 3B-100</b>	1,000	40	—	—	1	620.000	<b>5408 96 8</b>
<b>isFang 3B-150</b>	1,500	40	—	—	1	950.000	<b>5408 96 9</b>

V2A Stainless steel, 1.4301

/pc.

Tripod stand for screwless installation of freestanding interceptor rods and insulated interception rods with 40 mm diameter, e.g. for OBO isCon® cable. Roof slope to max. 5 degrees. Concrete plinths as well as threaded rods should be ordered separately.



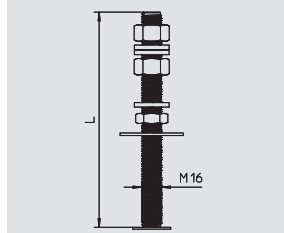
## isFang-3B threaded rod

Type	Dimension L	Pack.	Weight	Item No.
	mm			
<b>isFang 3B-G1</b>	270	3	48.000	<b>5408 97 1</b>
<b>isFang 3B-G2</b>	340	3	0.000	<b>5408 97 2</b>
<b>isFang 3B-G3</b>	430	3	0.000	<b>5408 97 3</b>

V2A Stainless steel, 1.4301

/pc.

Threaded rod to fasten 1, 2 or 3 FangFix concrete bases with tripod stand. To mount the threaded rods, the edge protection must be drilled.



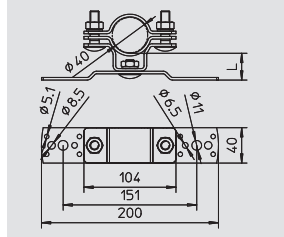
## isFang support for wall mounting, 15 mm spacing

Type	Dimension D	Dimension L	Pack.	Weight	Item No.
	Ø mm	mm			
<b>isFang TW30</b>	40	30	2	62.000	<b>5408 95 2</b>

V2A Stainless steel, 1.4301

/pc.

Fastening clip to fasten the insulated support pipes on the structure to be protected or on the wall.



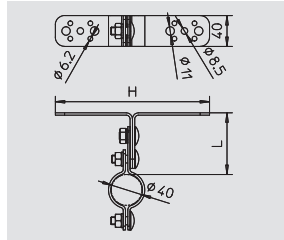
## isFang support for wall mounting, 80 mm spacing

Type	Dimension D	Dimension L	Pack.	Weight	Item No.
	Ø mm	mm			
<b>isFang TW80</b>	40	80	2	63.000	<b>5408 95 0</b>

V2A Stainless steel, 1.4301

/pc.

Fastening clip to fasten the insulated support pipes on the structure to be protected or on the wall.



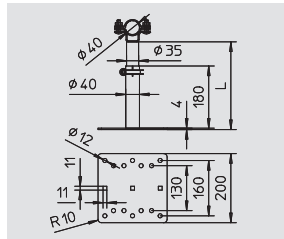
## isFang support for wall mounting, 200–300 mm spacing

Type	Dimension D	Dimension L	Pack.	Weight	Item No.
	Ø mm	mm			
<b>isFang TW200</b>	—	—	2	230.000	<b>5408 95 4</b>

V2A Stainless steel, 1.4301

/pc.

Fastening clip to fasten the insulated support pipes on the structure to be protected or on the wall.



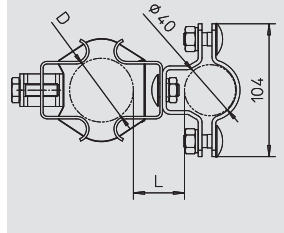
## isFang support for pipe mounting, Ø 100–300 mm

Type	Dimension D	Dimension L	Pack.	Weight	Item No.
	Ø mm	mm			
<b>isFang TR100</b>	300	40	2	77.000	<b>5408 95 6</b>

V2A Stainless steel, 1.4301

/pc.

Tightening strap clip to fasten the insulated support pipes on the structure to be protected or for construction-side pipes of Ø 100-300mm.



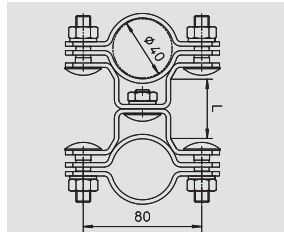
## isFang support for pipe mounting, Ø 40–50 mm

Type	Dimension D	Dimension L	Pack.	Weight	Item No.
	Ø mm	mm			
<b>isFang TS40-50</b>	50	40	2	90.000	<b>5408 95 8</b>

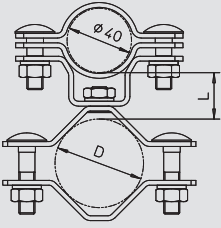
V2A Stainless steel, 1.4301

/pc.

Fastening clip to fasten the insulated support pipes on the structure to be protected or for construction-side pipes of Ø 40-50mm.



**isFang support for pipe mounting, ø 50–60 mm**



Type	Dimension D Ø mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isFang TS50-60</b>	60	30	2	76.000	<b>5408 96 0</b>

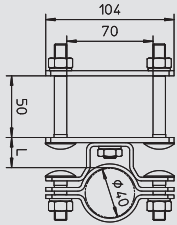
V2A Stainless steel, 1.4301

/pc.

Fastening clip to fasten the insulated support pipes on the structure to be protected or for construction-side pipes of ø 50-60mm.



**isFang support for corner pipe mounting, 50 x 50 mm**



Type	Dimension D Ø mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>isFang TS50x50</b>	—	30	2	82.000	<b>5408 96 4</b>

V2A Stainless steel, 1.4301

/pc.

Fastening clip to fasten the insulated support pipes on the structure to be protected or for construction-side corner pipes of 50x50mm.



# Connection clamps and connection terminals



## Variable earthing connector

Type	Fit	Dimension A	Material symbol	Pack.	Weight	Item No.
	mm	mm		pcs	kg/100 pcs.	
<b>249 8-10 ST</b>	Rd 8-10	40	St	50	10.800	<b>5311 50 0</b>
<b>249 8-10 ALU</b>	Rd 8-10	44	Al	30	6.600	<b>5311 51 9</b>
<b>249 8-10 VA</b>	Rd 8-10	40	V2A	50	10.700	<b>5311 55 1</b>

**ST** Steel    **V2A** Stainless steel, 1.4301    **Al** Aluminium    **FT** Hot-dip galvanised    /100 pc.

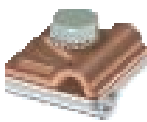
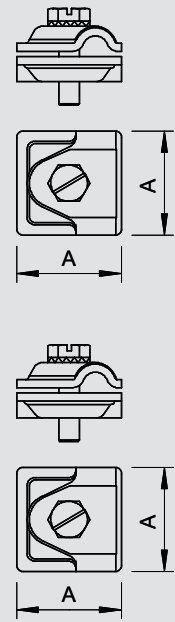
- For T, cross and parallel connectors
- Quick installation using hexagonal bolt M10 x 30, high-grade stainless steel
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



Type	Fit	Dimension A	Material symbol	Pack.	Weight	Item No.
	mm	mm		pcs	kg/100 pcs.	
<b>249 8-10 CU</b>	Rd 8-10	40	Cu	50	11.900	<b>5311 52 7</b>

**Cu** Copper    /100 pc.

- For T, cross and parallel connectors
- Quick installation using hexagonal bolt M10 x 30, high-grade stainless steel
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

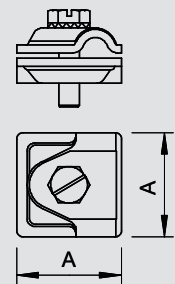


## Variable bi-metal quick connector

Type	Fit	Dimension A	Material symbol	Pack.	Weight	Item No.
	mm	mm		pcs	kg/100 pcs.	
<b>249 8-10 ZV</b>	Rd 8-10	44	Cu	50	14.220	<b>5311 53 5</b>

**Cu** Copper    /100 pc.

- Intermediate plate, aluminium/copper, top section aluminium and copper
- For T, cross and parallel connectors
- Quick installation using hexagonal bolt M10 x 30, high-grade stainless steel
- With spring washer according to DIN 137
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

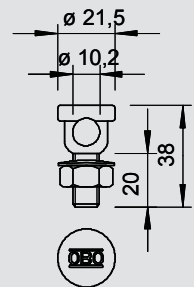


## Connector, Rd 8–10 mm with M10 thread

Type	Fit	Material symbol	Pack.	Weight	Item No.
	mm		pcs	kg/100 pcs.	
<b>5000</b>	Rd 8-10	St	100	4.630	<b>5304 00 8</b>

**ST** Steel    **F** Hot-dip galvanised    /100 pc.

- With bore hole 10.2 mm
- With thread M10
- Including pre-mounted nut M10 and serrated washer
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



## Connector, Rd 8–10 mm, single

Type	Fit	Material symbol	Pack.	Weight	Item No.
	mm		pcs	kg/100 pcs.	
<b>5001 DIN-FT</b>	—	St	100	7.450	<b>5304 10 5</b>

**ST** Steel    **FT** Hot-dip galvanised    /100 pc.

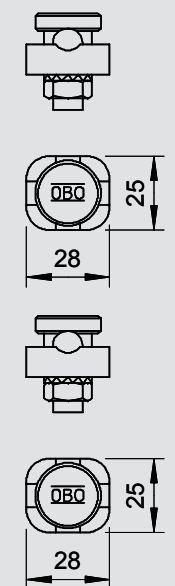
- With fix contact clamping screw, nut and serrated washer
- With bore hole 10.2 mm
- With pre-mounted pressure piece, die-cast zinc
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



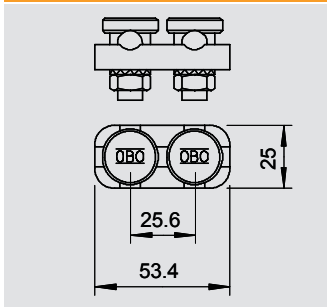
Type	Fit	Material symbol	Pack.	Weight	Item No.
	mm		pcs	kg/100 pcs.	
<b>5001 ZN-CU</b>	—	Zn	100	8.760	<b>5304 11 3</b>

**Zn** Die-cast zinc    **Cu** Copper-plated    /100 pc.

- With fix contact clamping screw, nut and serrated washer
- With bore hole 10.2 mm
- With pre-mounted pressure piece, die-cast zinc
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



# Connection clamps and connection terminals

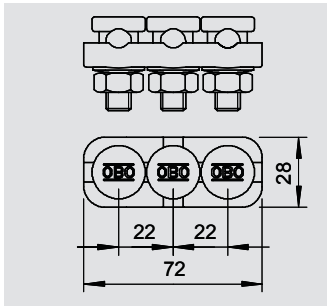


## Connector, Rd 8–10 mm, double

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
5002 DIN-FT	Rd 8-10	St	FT	50	14.240	5304 20 2

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- With 2 fix contact clamping screws, nut and serrated washer
- Including pre-mounted connecting pressure piece, die-cast zinc or copper-plated die-cast zinc
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

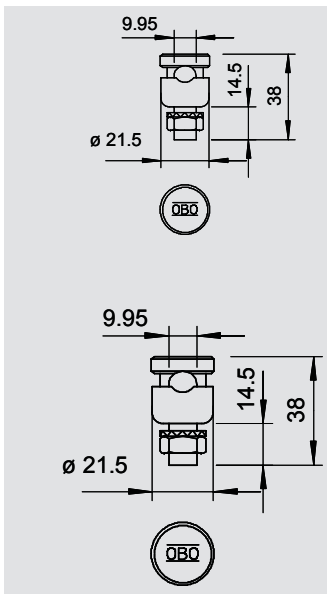


## Connector, Rd 8–10 mm, triple

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
5003	Rd 8-10	TG	FT	10	22.420	5304 31 8

**TG** Cast iron **FT** Hot-dip galvanised /100 pc.

- With 3 fix contact clamping screws, nut and serrated washer
- With pre-mounted connecting pressure piece, die-cast zinc
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



## Connector, Rd 8–10 mm with pressure trough

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
5001 N-FT	Rd 8-10	St	FT	100	5.900	5304 16 4
EKE-V	—	—	—	100	5.900	5492 80 7

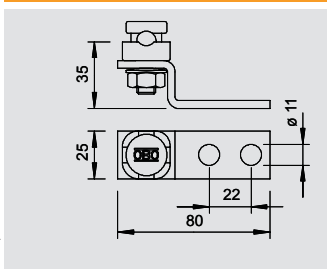
**ST** Steel **FT** Hot-dip galvanised /100 pc.

- With 1 fix contact clamping screw, nut and serrated washer
- Including pre-mounted pressure sump, steel
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
5001 N-CU	Rd 8-10	Cu	—	100	6.750	5304 17 2

**Cu** Copper /100 pc.

- With 1 fix contact clamping screw, nut and serrated washer
- Including pre-mounted pressure sump, steel
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

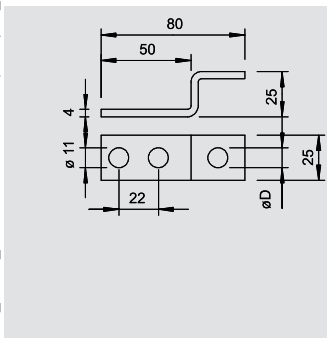


## Connection and end piece with connector

Type	Material symbol	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
5009	St	Rd 8-10	50	14.500	5304 97 0

**ST** Steel **F** Hot-dip galvanised /100 pc.

- With 2 attaching holes Ø 11 mm
- Installed with connector (single-piece) type 5001 DIN-FT
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



## Connection and end piece

Type	Material symbol	Inter- face	Dimen- sion D Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
5011	St	FT	11	50	7.064	5304 99 7
5011 VA M10	V4A	—	11	50	7.064	5334 93 4
5011 VA M12	V4A	—	13	50	7.048	5334 94 2

**ST** Steel **V4A** Stainless steel, 1.4571 **FT** Hot-dip galvanised /100 pc.

- For attaching to steel structures or bolting to earthing fixed points
- For attachments: Round conductor Rd 8-10 and flat conductor FL 30 x 3.5
- 2 attaching holes Ø 11 mm
- 1 attaching holes Ø D mm



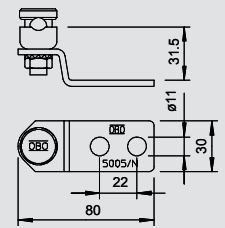
# Connection clamps and connection terminals



## Connection and end piece with connector and pressure trough

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>5005 N-FT</b>	Rd 8-10	St	FT	50	11.600	<b>5304 66 0</b>
<b>ST</b> Steel		<b>FT</b> Hot-dip galvanised				/100 pc.

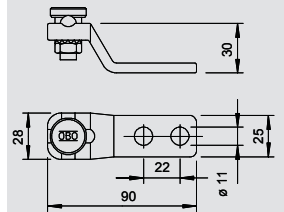
- With 2 attaching holes  $\varnothing$  11 mm
- Including pre-mounted connector 5001 N
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



## Connection and end piece, DIN version

Type	Fit	Material symbol	Pack.	Weight	Item No.
	mm		pcs	kg/100 pcs.	
<b>5005 DIN-FT</b>	Rd 8-10	St	50	15.518	<b>5304 60 1</b>
<b>ST</b> Steel		<b>F</b> Hot-dip galvanised			/100 pc.

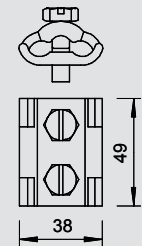
- With 2 attaching holes and 1 fix contact clamping screw 5000...
- With 2 attaching holes  $\varnothing$  11 mm
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



## Parallel connector Rd 8–10 mm, M8 x 25

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>259 8-10</b>	Rd 8	50	13.230	<b>5315 50 6</b>
<b>TG</b> Cast iron		<b>FT</b> Hot-dip galvanised		/100 pc.

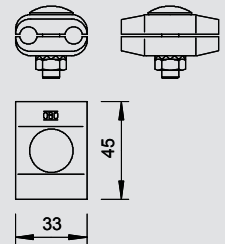
- With 2 hex-head screws M8 x 25, hot-dip galvanised steel



## Parallel connector Rd 8–10 mm, M10 x 30

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>260 8</b>	Rd 8	50	13.930	<b>5315 70 0</b>
<b>Zn</b> Die-cast zinc		<b>G</b> Electrogalvanised		/100 pc.

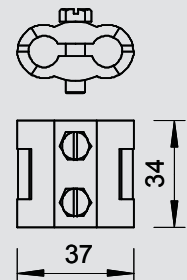
- With flat, round screw M10 x 30 and hexagonal nut, hot-dip galvanised steel



## Parallel connector Rd 8–10 mm, M6 x 20

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>260 8-10 MS</b>	Rd 8-10	50	15.820	<b>5315 65 4</b>
<b>CuZn</b> Brass		<b>Cu</b> Copper-plated		/100 pc.

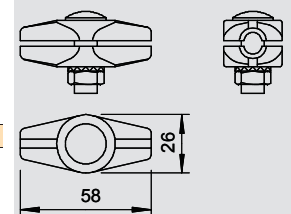
- With 2 hexagonal bolts M6 x 20 from copper



## Straight connector Rd 8 mm

Type	Fit	Material symbol	Pack.	Weight	Item No.
	mm		pcs	kg/100 pcs.	
<b>239</b>	Rd 8	Zn	50	12.510	<b>5329 07 8</b>
<b>Zn</b> Die-cast zinc		<b>G</b> Electrogalvanised		/100 pc.	

- With flat, round screw M10 x 30 and hexagonal nut M10



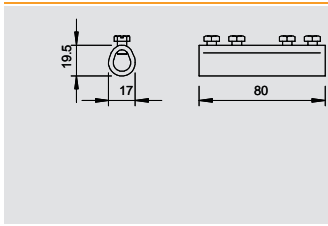
## Straight connector Rd 8–10 mm

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>237 N FT</b>	Rd 8-10	St	F	50	8.560	<b>5328 20 9</b>
<b>ST</b> Steel		<b>F</b> Hot-dip galvanised			/100 pc.	

- With 4 hexagonal bolts M6 x 10



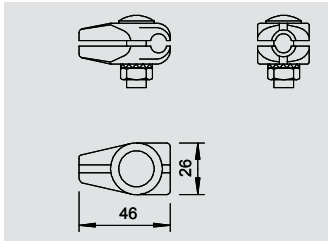
# Connection clamps and connection terminals



## Straight connector Rd 8-10 mm

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>237 N CU</b>	Rd 8-10	Cu	—	50	8.760	<b>5328 28 4</b>

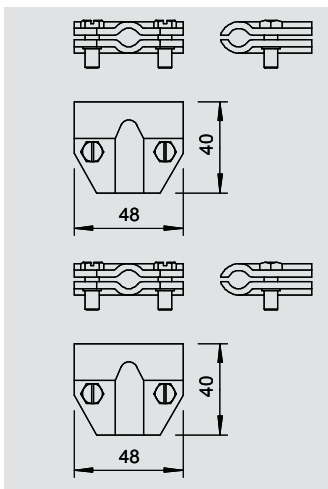
**Cu** Copper /100 pc.  
 • With 4 hexagonal bolts M6 x 10



## T connector Rd 8 mm

Type	Fit	Material symbol	Pack.	Weight	Item No.
	mm		pcs	kg/100 pcs.	
<b>244</b>	Rd 8	Zn	50	11.580	<b>5311 03 9</b>

**Zn** Die-cast zinc **G** Electrogalvanised /100 pc.  
 • With flat, round bolt M10 x 30 and hexagonal nut M10



## T connector Rd 8-10 mm

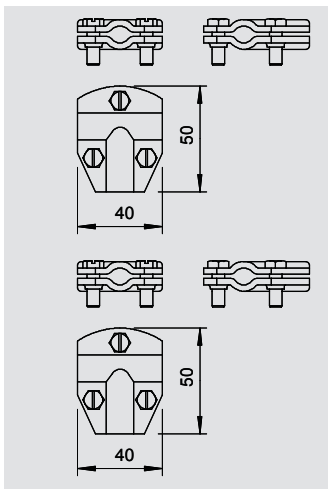
Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>245 8-10 FT</b>	Rd 8-10	St	FT	50	9.401	<b>5311 10 1</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.  
 • With 2 hexagonal bolts M6 x 16 (VA)



Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>245 8-10 CU</b>	Rd 8 - 10	Cu	—	50	11.560	<b>5311 15 2</b>

**Cu** Copper /100 pc.  
 • With 2 hexagonal bolts M6 x 16 (VA)



## T connector Rd 8-10 mm, triple-screwed

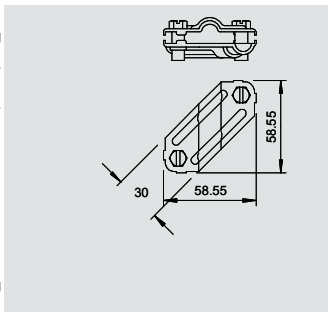
Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>247 8-10 FT</b>	Rd 8-10	St	FT	50	10.934	<b>5311 20 9</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.  
 • With 3 hexagonal bolts M6 x 16 (VA)



Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>247 8-10 CU</b>	Rd 8-10	Cu	—	50	10.750	<b>5311 26 8</b>

**Cu** Copper /100 pc.  
 • With 3 hexagonal bolts M6 x 16 (VA)



## Cross-connector for round and flat conductors

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>250 VA</b>	Rd 8-10/FL30	V2A	—	25	10.260	<b>5312 92 2</b>
<b>250 V4A</b>	Rd 8-10/FL30	V4A	—	25	10.260	<b>5312 92 5</b>

**V2A** Stainless steel, 1.4301 **V4A** Stainless steel, 1.4571 /100 pc.

- Fit: Rd 8-10 x Rd 8-10
- Fit: Rd 8-10 x FL 30
- Fit: FL 30 x FL 30
- Installed with 2 hexagonal bolts M8 x 20 (F)



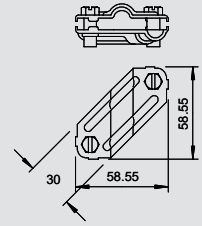
# Connection clamps and connection terminals



## Cross-connector for round and flat conductors

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
250	Rd 8-10/FL30	St	FT	25	10.260	<b>5312 90 6</b>

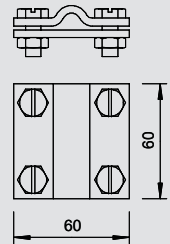
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Fit: Rd 8-10 x Rd 8-10
  - Fit: Rd 8-10 x FL 30
  - Fit: FL 30 x FL 30
  - Installed with 2 hexagonal bolts M8 x 20 (F)



## Cross-connector for round and flat conductors DIN

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
252 8-10XFL30	FT	8-10 x FL30	St F	25	28.500	<b>5312 65 5</b>

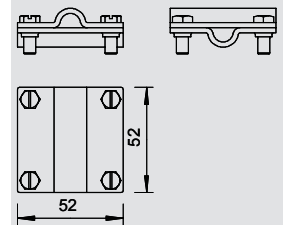
- ST** Steel **F** Hot-dip galvanised /100 pc.
- Fit: Rd 8-10 x FL 30
  - Installed with 4 hexagonal bolts M8-25, 4 hexagonal nuts M8 (F)
  - DIN 48845, Form F



## Cross-connector Rd 8–10 mm

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
251 8-10	Rd 8-10	St	FT	25	11.690	<b>5312 03 5</b>
251 CU	Rd 8-10	Cu		25	12.400	<b>5312 13 2</b>

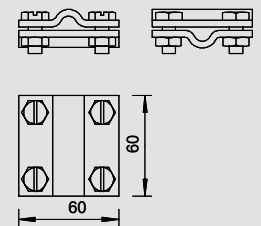
- ST** Steel **Cu** Copper **FT** Hot-dip galvanised /100 pc.
- For round conductor, fit Rd 8-10 x Rd 8-10
  - With 4 hexagonal bolts M6 x 16 (VA)



## Cross-connector Rd 8–10 mm, wide version

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
253 8X8	Rd 8-10	St	F	25	30.700	<b>5312 60 4</b>

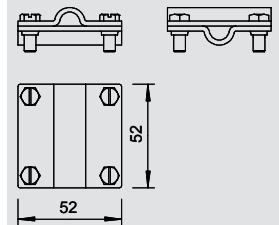
- ST** Steel **F** Hot-dip galvanised /100 pc.
- Fit: Rd 8-10 x Rd 8-10
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8 (F)



## Cross-connector with intermediate plate for Rd 8–10 mm

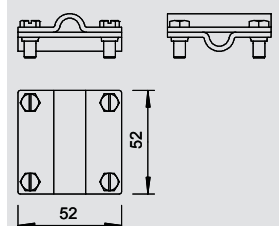
Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
254 DIN 8-10	FT	Rd 8-10	St FT	25	16.660	<b>5314 03 8</b>

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- For round conductor, fit Rd 8-10 x Rd 8-10
  - With separator plate
  - 4 hexagonal bolts M6 x 20 and 4 hexagonal nuts M6



Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
254 DIN 8-10	CU	Rd 8-10	Cu	25	17.410	<b>5314 13 5</b>

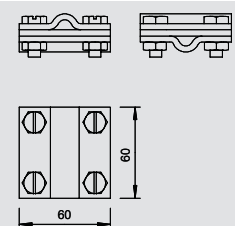
- Cu** Copper /100 pc.
- 254/...: DIN 48843, Form B for round conductor,
- fit: Rd 8 - 10 x Rd 8 - 10, Rd 8 - 10,
  - with separator plate and 4 hexagonal bolts M6 x 20 and 4 hexagon nuts M6 (F), stainless steel (VA)



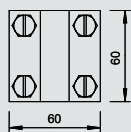
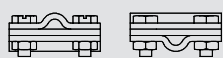
## Cross-connector with intermediate plate for Rd 8–10 mm, wide version

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
252 8-10	CU	Rd 8-10	Cu	25	38.940	<b>5312 41 8</b>

- Cu** Copper /100 pc.
- Fit: Rd 8-10 x Rd 8-10
  - With separator plate
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8



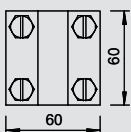
# Connection clamps and connection terminals



## Cross-connector with intermediate plate for Rd 8–10 mm, wide version

Type	Fit	Material symbol	Interface	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>252 8-10 FT</b>	Rd 8-10	St	FT	25	33.530	<b>5312 31 0</b>

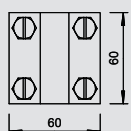
- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Fit: Rd 8-10 x Rd 8-10
  - With separator plate
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8



## Cross-connector for Rd 8–10 x Rd 16 mm

Type	Fit	Material symbol	Interface	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>253 10X16</b>	Rd 8-10 x 16	St	F	25	29.800	<b>5312 80 9</b>

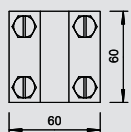
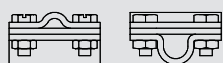
- ST** Steel **F** Hot-dip galvanised /100 pc.
- Fit: Rd 8-10 x Rd 16
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8 (F)



## Cross-connector with intermediate plate for Rd 8–10 x Rd 16 mm

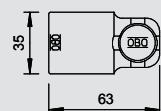
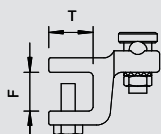
Type	Fit	Material symbol	Interface	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>252 8-10X16 FT</b>	Rd 8-10 x 16	St	FT	25	38.800	<b>5312 34 5</b>

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Fit: Rd 8-10 x Rd 16
  - With separator plate
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8
  - DIN 48845, Form E



Type	Fit	Material symbol	Interface	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>252 8-10X16 CU</b>	Rd 8-10 x 16	Cu	—	25	43.985	<b>5312 44 2</b>

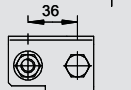
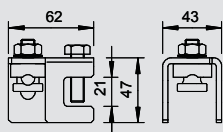
- Cu** Copper /100 pc.
- Fit: Rd 8-10 x Rd 16
  - With separator plate
  - Installed with 4 hexagonal bolts M8 x 25 and 4 hexagonal nuts M8
  - DIN 48845, Form E



## Folding and construction clamp, 10–20 mm

Type	Fit	Dimension T	Dimension L	Clamping area	Pack.	Weight	Item No.
	mm	mm	mm	mm	pcs	kg/100 pcs.	
<b>5004 DIN-FT 12</b>	Rd 8-10	20	55	max. 12	25	18.730	<b>5304 40 7</b>
<b>5004 DIN-FT 20</b>	Rd 8-10	25	63	10-20	25	30.600	<b>5304 50 4</b>

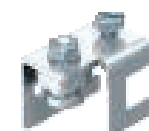
- TG** Cast iron **FT** Hot-dip galvanised /100 pc.
- Flange thickness to 12 and/or 10-20 mm
  - With pre-mounted fix contact clamping screw 5000
  - With 2 hexagonal bolts M8 x 20, bolts hot-dip galvanised steel
  - Clamping element hot-dip galvanised cast steel
  - Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



## Construction clamp to 20 mm

Type	Material symbol	Interface	Fit	Clamping area	Pack.	Weight	Item No.
			mm	mm	pcs	kg/100 pcs.	
<b>5010 20 FT</b>	St	FT	Rd 8-10	4-20	25	30.600	<b>5304 52 0</b>

- ST** Steel **FT** Hot-dip galvanised /100 pc.
- Round conductors can be installed vertical or transverse to structure
  - For affixing to structures with a flange thickness of up to 20 mm
  - Affixing to structures with a hexagonal bolt M10
  - Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



# Connection clamps and connection terminals

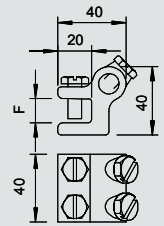


## Connection terminal to 14 mm

Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
272 8	TG	FT	Rd 8-10	max. 8	50	22.800	5318 08 4
272 14	TG	FT	Rd 8-10	max. 14	50	25.230	5318 14 9

**TG** Cast iron      **FT** Hot-dip galvanised      /100 pc.

- Flange thickness to 8 and/or 14 mm
- With 4 hexagonal bolts M8
- Conforms to the requirements according to DIN V VDE V 0185-3, Section 4.5



## Folding clamp, to 10 mm metal thickness

Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
269 8-10	Zn	G	Rd 8-10	max. 7	50	14.460	5317 01 0

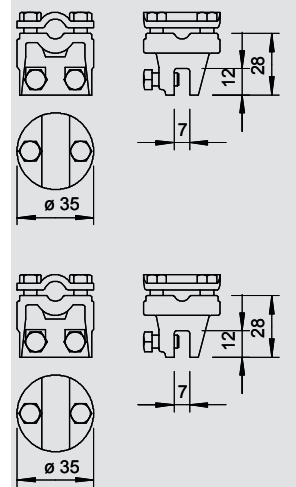
**Zn** Die-cast zinc      **G** Electrogalvanised      /100 pc.

- Plate thickness to 7 mm
- For conductor arrangement transverse and parallel to plate with 4 hexagonal bolts M6 x 16
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
269 MS	Zn	Cu	Rd 8-10	max. 7	50	14.480	5317 05 3

**Zn** Die-cast zinc      **Cu** Copper-plated      /100 pc.

- Plate thickness to 7 mm
- For conductor arrangement transverse and parallel to plate with 4 hexagonal bolts M6 x 16
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



## Folding clamp, Rd 10 to 10 mm metal thickness

Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
270 8-10	St	FT	—	max. 10	50	13.810	5317 20 7

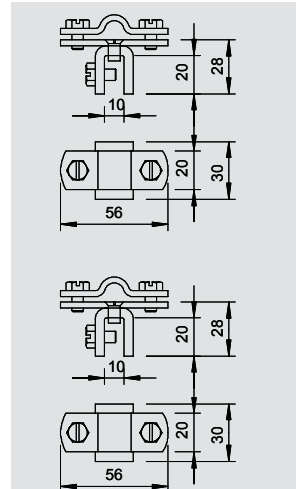
**ST** Steel      **FT** Hot-dip galvanised      /100 pc.

- Metal thickness to 10 mm
- For cable routing transverse and in parallel to the plate
- Corresponds to the requirements to DIN V VDE V 0185-3 section 4.5

Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
270 CU	Cu	—	Rd 10	max. 10	50	14.740	5317 25 8

**Cu** Copper      /100 pc.

- Metal thickness to 10 mm
- For cable routing transverse and in parallel to the plate
- Corresponds to the requirements to DIN V VDE V 0185-3 section 4.5



## Folding clamp, to 5 mm metal thickness

Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
271 8-10	St	FT	Rd 8-10	max. 5	50	14.060	5317 40 1

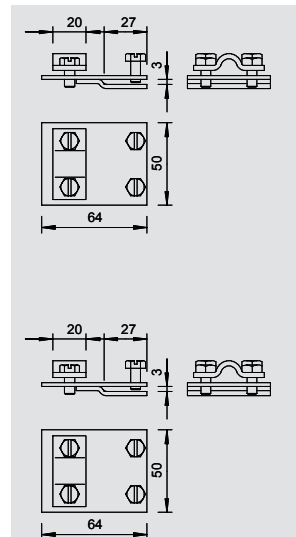
**ST** Steel      **FT** Hot-dip galvanised      /100 pc.

- Plate thickness to 5 mm
- For conductor routing transverse and longitudinal to plate
- With 4 hexagonal bolts M6 x 12
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)
- 271 Cu: with hexagonal bolts stainless steel (VA)

Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
271 CU	Cu	—	Rd 8-10	max. 5	50	15.230	5317 45 2

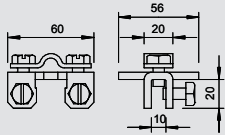
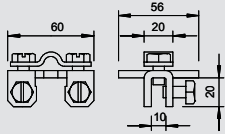
**Cu** Copper      /100 pc.

- Plate thickness to 5 mm
- For conductor routing transverse and longitudinal to plate
- With 4 hexagonal bolts M6 x 12
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)
- 271 Cu: with hexagonal bolts stainless steel (VA)



# Connection clamps and connection terminals

## Folding clamp, to 10 mm metal thickness



Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>273 8-10</b>	St	FT	Rd 8-10	max. 10	50	17.000	<b>5317 22 3</b>

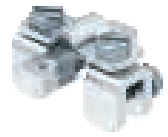
**ST** Steel **FT** Hot-dip galvanised /100 pc.

- Plate thickness to 10 mm
- Conductor routing transverse and longitudinal to plate with 2 hexagonal bolts M8 x 10 and 2 hexagonal bolts M8 x 16 (F)
- 273 Cu: with hexagonal bolts, stainless steel (VA)

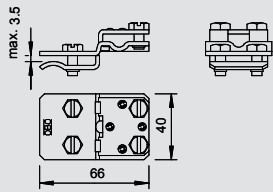
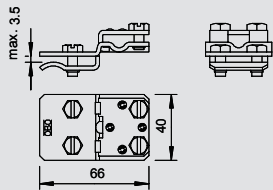
Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>273 CU</b>	Cu	—	Rd 8-10	max. 10	50	18.500	<b>5317 27 4</b>

**Cu** Copper /100 pc.

- Plate thickness to 10 mm
- Conductor routing transverse and longitudinal to plate with 2 hexagonal bolts M8 x 10 and 2 hexagonal bolts M8 x 16 (F)
- 273 Cu: with hexagonal bolts, stainless steel (VA)



## Folding clamp and connection terminal for panel thicknesses up to 10 mm



Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>274 8-10</b>	St	FT	Rd 8-10	max. 10	50	10.400	<b>5317 42 8</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- Plate thickness to 10 mm
- For conductor routing transverse and longitudinal to plate
- 4 hexagonal bolts M6 x 16
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

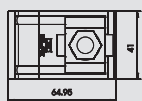
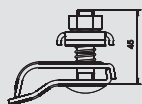
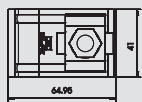
Type	Material symbol	Inter-face	Fit mm	Clamping area mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>274 CU</b>	Cu	—	Rd 8-10	max. 10	50	11.340	<b>5317 47 9</b>

**Cu** Copper /100 pc.

- Plate thickness to 10 mm
- For conductor routing transverse and longitudinal to plate
- 4 hexagonal bolts M6 x 16
- Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)



## Gutter clamp RK-FIX



Type	Fit mm	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RK-FIX</b>	2 x Rd 8	St	FT	25	19.100	<b>5316 45 0</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- For up to 2 round cables Rd 8
- With double crossbar
- Suitable for all bead thicknesses (15–25 mm)
- With 1 truss-head bolt M10 x 45
- Nut and bolt made of VA stainless steel
- With spring for prefixing for rain gutter
- VA version can also be used as bimetal connector (holder)

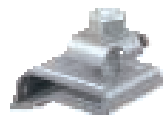
Tested to DIN EN 50164-1

Type	Fit mm	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RK-FIX VA</b>	2 x Rd 8	V2A	—	25	19.100	<b>5316 45 9</b>

**V2A** Stainless steel, 1.4301 /100 pc.

- For up to 2 round cables Rd 8
- With double crossbar
- Suitable for all bead thicknesses (15–25 mm)
- With 1 truss-head bolt M10 x 45
- Nut and bolt made of VA stainless steel
- With spring for prefixing for rain gutter
- VA version can also be used as bimetal connector (holder)

Tested to DIN EN 50164-1



# Connection clamps and connection terminals



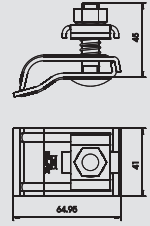
## Gutter clamp RK-FIX

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RK-FIX CU</b>	2 x Rd 8	V2A	Cu	25	21.000	<b>5316 46 8</b>

V2A Stainless steel, 1.4301 **Cu** Copper-plated /100 pc.

- For up to 2 round cables Rd 8
- With double crossbar
- Suitable for all bead thicknesses (15–25 mm)
- With 1 truss-head bolt M10 x 45
- Nut and bolt made of VA stainless steel
- With spring for prefixing for rain gutter
- VA version can also be used as bimetal connector (holder)

Tested to DIN EN 50164-1

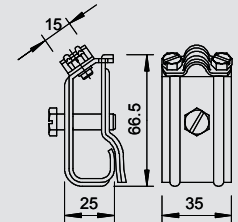


## Gutter clamp all bead thicknesses

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>267</b>	Rd 8-10	St	FT	25	13.950	<b>5316 30 8</b>
<b>267 VA</b>	Rd 8-10	V2A	—	25	11.360	<b>5316 32 4</b>

**ST** Steel **V2A** Stainless steel, 1.4301 **FT** Hot-dip galvanised /100 pc.

- Fits all bead thicknesses
- With 1 hexagonal bolt M8 x 30
- 2 hexagonal bolts M6 x 12
- VA version also for use as bimetal conductor (holder)

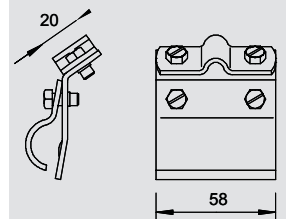


## Gutter clamp for bead thickness 15–22 mm

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>262 A-DIN FT</b>	Rd 8-10	St	FT	25	19.610	<b>5316 21 9</b>
<b>262 A-DIN CU</b>	Rd 8-10	Cu	—	25	20.840	<b>5316 25 1</b>

**ST** Steel **Cu** Copper **FT** Hot-dip galvanised /100 pc.

- Suitable for bulge thickness 15–22 mm
- With 4 hexagonal bolts M6 x 16 (VA)



## Roof gutter clamp for all bead thicknesses

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>262</b>	Rd 8-10	St	FT	25	20.300	<b>5316 01 4</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

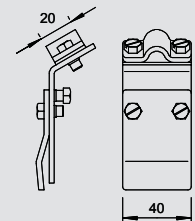
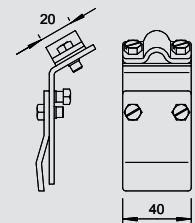
- With 4 hexagonal bolts M6 x 16
- Fits all bead thicknesses



Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>262 CU</b>	Rd 8-10	Cu	—	25	20.940	<b>5316 15 4</b>

**Cu** Copper /100 pc.

- With 4 hexagonal bolts M6 x 16
- Fits all bead thicknesses

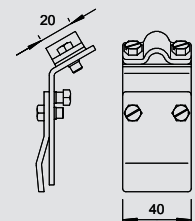


## Bi-metal roof gutter clamp for all bead thicknesses

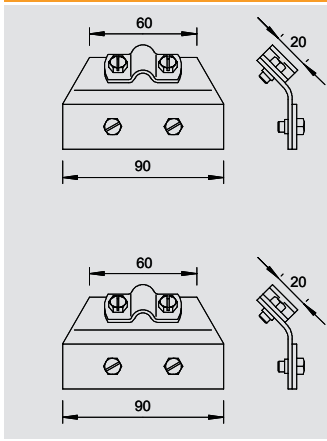
Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>262 ZM</b>	Rd 8-10	St	FT	25	23.100	<b>5316 17 0</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- Fits all bead thicknesses
- Bi-metal for attaching round conductors aluminium or steel to roof gutters without corrosion to different metals



# Connection clamps and connection terminals



## Snow catching grate clamp

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>264</b>	Rd 8-10	St	F	25	18.640	<b>5316 51 0</b>

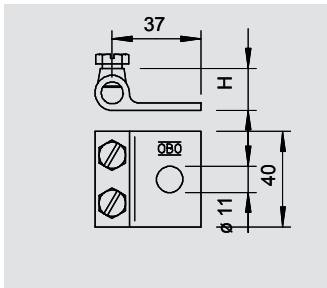
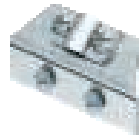
**ST** Steel **F** Hot-dip galvanised /100 pc.

- Plate thickness to 8 mm
- With 4 hexagonal bolts M6 x 16

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>264 CU</b>	Rd 8-10	Cu	—	25	21.140	<b>5316 55 3</b>

**Cu** Copper /100 pc.

- Plate thickness to 8 mm
- With 4 hexagonal bolts M6 x 16

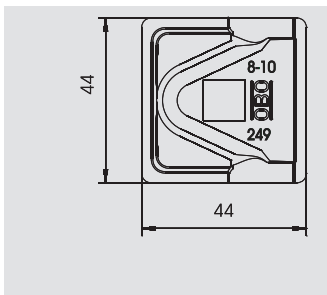
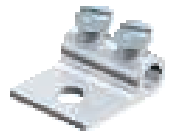


## Clamping shoe

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>319 8</b>	Rd 8	TG	F	25	7.800	<b>5325 30 7</b>
<b>319 10</b>	Rd 10	TG	F	25	9.650	<b>5325 31 5</b>

**TG** Cast iron **F** Hot-dip galvanised /100 pc.

- With Ø 11 mm attaching hole
- 2 hexagonal bolts M8 x 16
- Bolts hot-dip galvanised steel and clamping element hot dipped galvanised cast steel

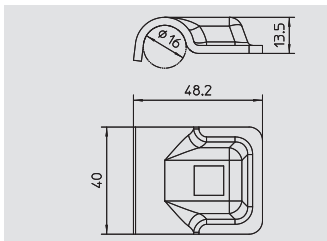


## Connection terminal, equipotential bonding, Rd 8-10 mm

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>249 8-10 ALU-OT</b>	Rd 8-10	Al	—	100	2.100	<b>5311 58 5</b>
<b>249 8-10 ST-OT</b>	Rd 8-10	ST	FT	100	3.240	<b>5311 50 3</b>

**ST** Steel **Al** Aluminium **FT** Hot-dip galvanised /100 pc.

- For round conductor fastening Rd 8-10
  - Suitable for M10 bolts
- Application: Equipotential bonding on PV frames

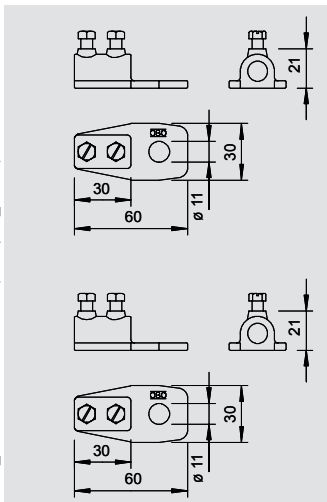
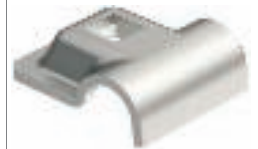


## Connection terminal, equipotential bonding, Rd 16 mm

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>249 VA-OT</b>	16	V2A	—	100	5.700	<b>5311 57 3</b>

**V2A** Stainless steel, 1.4301 /100 pc.

- For round conductor fastening RD 16
- Suitable for M10 bolts



## End piece

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>280 8-10</b>	Rd 8-10	Zn	G	20	6.300	<b>5320 01 1</b>

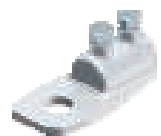
**Zn** Die-cast zinc **G** Electrogalvanised /100 pc.

- With Ø 11 mm attaching hole
- 2 hexagonal bolts M6 x 12, bolts hot-dip galvanised steel or VA
- Clamping element from die-cast zinc or copper-plated die-cast zinc

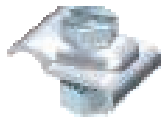
Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>280 VK</b>	Rd 8-10	Zn	—	20	9.000	<b>5320 05 4</b>

**Zn** Die-cast zinc /100 pc.

- With Ø 11 mm attaching hole
- 2 hexagonal bolts M6 x 12, bolts hot-dip galvanised steel or VA
- Clamping element from die-cast zinc or copper-plated die-cast zinc



# Connection clamps and connection terminals



## Universal clamping block Rd 8–10 mm

Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>324 S-VA</b>	Rd 8-10	V2A	—	50	3.400	<b>5326 31 1</b>

**V2A** Stainless steel, 1.4301 /100 pc.

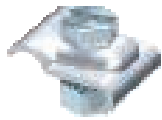
- Including hexagonal bolt M8 x 25, washer and nuts



Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>324 S-CU</b>	Rd 8-10	Cu	—	50	3.660	<b>5326 33 8</b>

**Cu** Copper /100 pc.

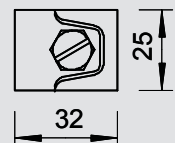
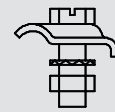
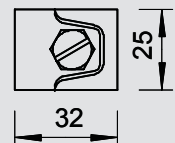
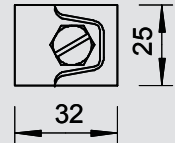
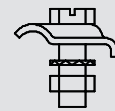
- Including hexagonal bolt M8 x 25, washer and nuts



Type	Fit mm	Material symbol	Inter- face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>324 S-FT</b>	Rd 8-10	St	FT	50	3.400	<b>5326 30 3</b>

**ST** Steel **FT** Hot-dip galvanised /100 pc.

- Including hexagonal bolt M8 x 25, washer and nuts

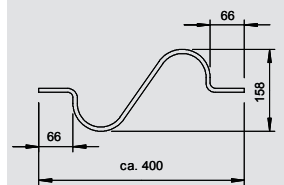


## Expansion piece

Type	Material symbol	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>172 AR</b>	Al	25	7.500	<b>5218 92 6</b>

**Al** Aluminium /100 pc.

- For equalising temperature-related length changes
- Necessary on conductor lengths over 20 m
- From round conductor Rd 8-Al



## Connection component

Type	Material symbol	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>287</b>	Al	50	1.600	<b>5320 70 4</b>

**Al** Aluminium /100 pc.

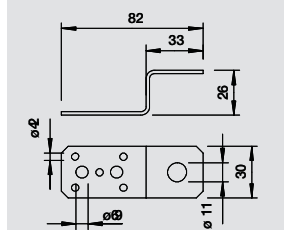
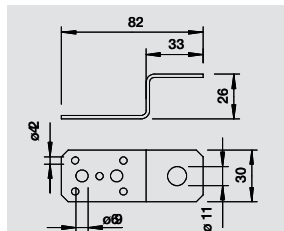
- With 1 attaching hole Ø 11 mm
- 5 mounting holes Ø 4.2 mm
- 2 mounting holes Ø 6.9 mm



Type	Material symbol	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>287 CU</b>	Cu	50	5.600	<b>5320 69 0</b>

**Cu** Copper /100 pc.

- With 1 attaching hole Ø 11 mm
- 5 mounting holes Ø 4.2 mm
- 2 mounting holes Ø 6.9 mm

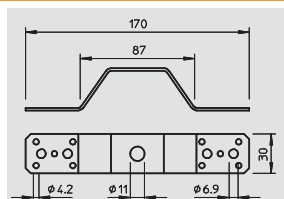


## Attaching and bridging component

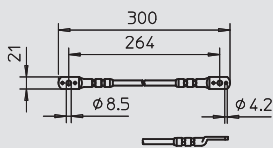
Type	Material symbol	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>288 DIN</b>	Al	50	3.000	<b>5320 71 2</b>

**Al** Aluminium /100 pc.

- With 1 attaching hole Ø 11 mm
- With 2 x 5 mounting hole Ø 4.2 mm
- With 2 x 2 mounting hole Ø 6.9 mm



# Connection clamps and connection terminals

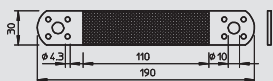


## Bridging cable

Type	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>853 DIN</b>	St	F	100	7.260	<b>5331 01 3</b>

**ST** Steel **F** Hot-dip galvanised /100 pc.

- From flexible copper cable 16 mm<sup>2</sup>
- Coating: black, chlorinated india rubber mixture
- With 1 mounting hole Ø 10.5 mm per attachment side
- With 2 mounting holes Ø 7.3 mm per attachment side
- For applications outside or inside suitable

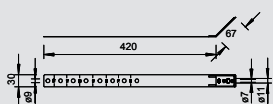
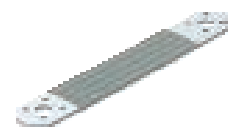


## Attaching and expansion strip

Type	Material symbol	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>856</b>	Cu	10	8.125	<b>5331 50 1</b>

**Cu** Copper /100 pc.

- Copper strip 35 mm<sup>2</sup>, tin-plated
- Highly-flexible with rigid ends
- Each end with mounting hole Ø 10 mm and 4 mounting holes Ø 4.3 mm



## Universal downspout clip 60–130 mm

Type	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>301 V</b>	St	FS	5	11.900	<b>5350 86 7</b>

**ST** Steel **FS** Strip-galvanised /100 pc.

- Adjustable for pipes from 60-130 mm
- With 2x attaching holes Ø 7 mm
- With 1x attaching hole Ø 9 mm
- With 1x attaching hole Ø 11 mm
- Including hexagonal bolt M6 x 20 and nuts M6

Type	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>301 V-VA</b>	V2A	—	5	11.800	<b>5350 90 5</b>

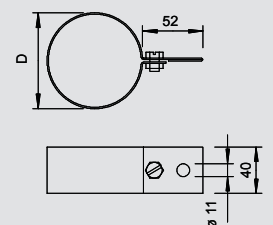
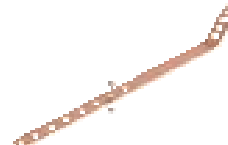
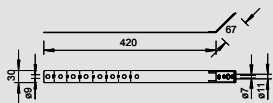
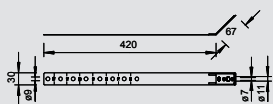
**V2A** Stainless steel, 1.4301 /100 pc.

- Adjustable for pipes from 60-130 mm
- With 2x attaching holes Ø 7 mm
- With 1x attaching hole Ø 9 mm
- With 1x attaching hole Ø 11 mm
- Including hexagonal bolt M6 x 20 and nuts M6

Type	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>301 V-CU</b>	Cu	—	5	13.500	<b>5350 88 3</b>

**Cu** Copper /100 pc.

- Adjustable for pipes from 60-130 mm
- With 2x attaching holes Ø 7 mm
- With 1x attaching hole Ø 9 mm
- With 1x attaching hole Ø 11 mm
- Including hexagonal bolt M6 x 20 and nuts M6



## Downspout clip

Type	Material symbol	Inter-face	For pipe mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>301 DIN-80</b>	St	FS	80	50	19.580	<b>5350 08 5</b>
<b>301 DIN-90</b>	St	FS	90	50	21.880	<b>5350 09 3</b>
<b>301 DIN-100</b>	St	FS	100	50	19.880	<b>5350 10 7</b>
<b>301 DIN-110</b>	St	FS	110	25	24.920	<b>5350 11 5</b>
<b>301 DIN-120</b>	St	FS	120	15	26.240	<b>5350 12 3</b>

**ST** Steel **FS** Strip-galvanised /100 pc.

- To connect cables and downspouts
- Similar to DIN 48818 C
- Strip galvanised (rd. 275 g/m<sup>2</sup> = 40 µm average value)
- With 1x hexagonal bolt M8 x 20
- With 1x hexagonal nut M8 and 1 stainless steel serrated washer
- With connection hole Ø 11 mm



# Connection clamps and connection terminals



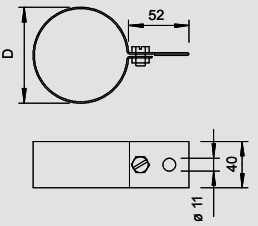
## Downspout clip

Type	Material symbol	Inter-face	For pipe mm	Pack. pcs	Weight kg/100 pcs.	Item No.
301 CU-80	Cu	—	80	50	22.500	5350 68 9
301 CU-90	Cu	—	90	50	24.800	5350 69 7
301 CU-100	Cu	—	100	50	26.230	5350 70 0
301 CU-110	Cu	—	110	25	30.400	5350 71 9
301 CU-120	Cu	—	120	15	31.400	5350 72 7

**Cu** Copper

/100 pc.

- With 1x hexagonal bolt M8 x 20
- With 1x hexagonal nut M8 and 1 serrated disc made of rustproof steel
- With connection hole Ø 11 mm



## Downspout clip for routing Rd 8-10 mm behind pipe

Type	Material symbol	Inter-face	For pipe mm	Pack. pcs	Weight kg/100 pcs.	Item No.
301 S-100	St	FS	100	50	5.200	5351 05 7
301 S-120	St	FS	120	50	5.950	5351 07 3

**ST** Steel

**FS** Strip-galvanised

/100 pc.

- With beading
- For round conductor Rd 8-10
- Including hexagonal bolt M6 x 20 and nuts M6



Type	Material symbol	Inter-face	For pipe mm	Pack. pcs	Weight kg/100 pcs.	Item No.
301 S-CU-100	Cu	—	100	50	5.850	5351 45 6
301 S-CU-120	Cu	—	120	50	6.700	5351 47 2

**Cu** Copper

/100 pc.

- With beading
- For round conductor Rd 8-10
- Including hexagonal bolt M6 x 20 and nuts M6



Type	Material symbol	Inter-face	For pipe mm	Pack. pcs	Weight kg/100 pcs.	Item No.
301 S-VA-100	V2A	—	100	50	5.200	5351 25 1
301 S-VA-120	V2A	—	120	50	5.950	5351 28 6

**V2A** Stainless steel, 1.4301

/100 pc.

- With beading
- For round conductor Rd 8-10
- Including hexagonal bolt M6 x 20 and nuts M6

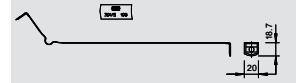
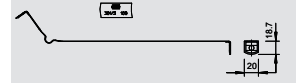
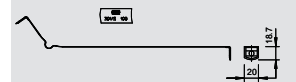


Type	Material symbol	Inter-face	For pipe mm	Pack. pcs	Weight kg/100 pcs.	Item No.
301 S-AL-100	Al	—	100	50	4.100	5351 35 9
301 S-AL-120	Al	—	120	50	4.600	5351 37 5

**Al** Aluminium

/100 pc.

- With beading
- For round conductor Rd 8-10
- Including hexagonal bolt M6 x 20 and nuts M6



## Pipe clamp

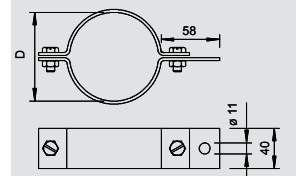
Type	Material symbol	Inter-face	For pipe mm	For pipe inch	Pack. pcs	Weight kg/100 pcs.	Item No.
303 DIN-3/8	St	FT	17.2	3/8	5	22.600	5102 05 7
303 DIN-1/2	St	FT	21.3	1/2	5	23.280	5102 07 3
303 DIN-3/4	St	FT	26.9	3/4	5	25.640	5102 08 1
303 DIN-1	St	FT	33.7	1	5	28.300	5102 11 1
303 DIN-1 1/4	St	FT	42.4	1 1/4	5	31.300	5102 13 8
303 DIN-1 1/2	St	FT	48.3	1 1/2	5	33.220	5102 15 4
303 DIN-2	St	FT	60.3	2	5	36.840	5102 19 7
303 DIN-2 1/2	St	FT	76.1	2 1/2	10	39.400	5102 21 9
303 DIN-3	St	FT	88.9	3	10	43.300	5102 23 5
303 DIN-3 1/2	St	FT	100	3 1/2	10	64.900	5102 25 1
303 DIN-4	St	FT	114.3	4	10	66.800	5102 27 8

**ST** Steel

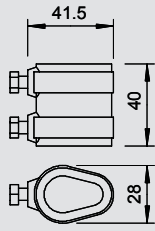
**FT** Hot-dip galvanised

/100 pc.

- DIN 48818, Form D
- With Ø 11 mm mounting hole
- 2 hexagonal bolts M8 x 20 (4 inch = M10)
- 2 hex-head nuts M8 (4 inch = M10)



# Connection and separating terminals

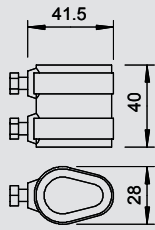


## Separating piece, open



Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>223 O DIN ZN</b>	Rd 8-10/16	Zn	G	50	12.500	<b>5335 14 0</b>

- Zn** Die-cast zinc      **G** Electrogalvanised      /100 pc.
- With 2 hexagonal bolts, stainless steel (VA)
  - 223 O DIN ZN: Clamping element, die-cast zinc
  - 223 O DIN MS: Clamping element, copper-plated die-cast zinc

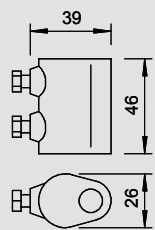


## Separating piece, open



Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>223 O DIN MS</b>	Rd 8-10/16	Zn	Cu	50	14.900	<b>5335 16 7</b>

- Zn** Die-cast zinc      **Cu** Copper-plated      /100 pc.
- With 2 hexagonal bolts, stainless steel (VA)
  - 223 O DIN ZN: Clamping element, die-cast zinc
  - 223 O DIN MS: Clamping element, copper-plated die-cast zinc

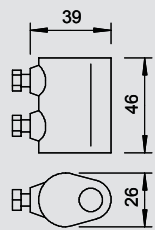


## Separating piece, closed



Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>223 DIN MS</b>	Rd 8-10/16	Zn	Cu	50	11.700	<b>5335 25 6</b>

- Zn** Die-cast zinc      **Cu** Copper-plated      /100 pc.
- For fitting round conductors Rd 8-10 to ground insertion rods Rd 16
  - Including 2 hexagonal bolts, high-grade stainless steel (V2A)
  - Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

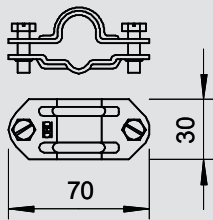


## Separating piece, closed



Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>223 DIN ZN</b>	Rd 8-10/16	Zn	G	50	10.500	<b>5335 20 5</b>

- Zn** Die-cast zinc      **G** Electrogalvanised      /100 pc.
- For fitting round conductors Rd 8-10 to ground insertion rods Rd 16
  - Including 2 hexagonal bolts, high-grade stainless steel (V2A)
  - Conforms to the requirements according to DIN VDE 0185-305 (IEC 62305)

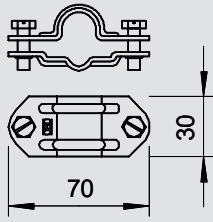


## Universal separating piece



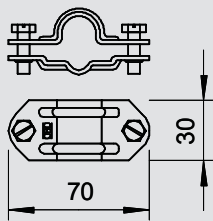
Type	Material symbol	Inter-face	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>226 8-10</b>	St	FT	50	8.600	<b>5336 00 7</b>

- ST** Steel      **FT** Hot-dip galvanised      /100 pc.
- For fitting round conductors Rd 8-10 to Rd 16 or flat conductors FL30
  - Including 2 hexagonal bolts M8 x 20 high-grade stainless steel (V2A)
  - Conforms to the requirements according to VDE 0185-305 (IEC 62305)



Type	Material symbol	Inter-face	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>226 VA</b>	V2A	—	50	8.700	<b>5336 05 8</b>

- V2A** Stainless steel, 1.4301      /100 pc.
- For fitting round conductors Rd 8-10 to Rd 16 or flat conductors FL30
  - Including 2 hexagonal bolts M8 x 20 high-grade stainless steel (V2A)
  - Conforms to the requirements according to VDE 0185-305 (IEC 62305)



## Universal separating piece



Type	Material symbol	Inter-face	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>226 CU</b>	Cu	—	50	9.700	<b>5336 02 3</b>

- Cu** Copper      /100 pc.
- For fitting round conductors Rd 8-10 to Rd 16 or flat conductors FL30
  - Including 2 hexagonal bolts M8 x 20 high-grade stainless steel (V2A)
  - Conforms to the requirements according to VDE 0185-305 (IEC 62305)



# Connection and separating terminals

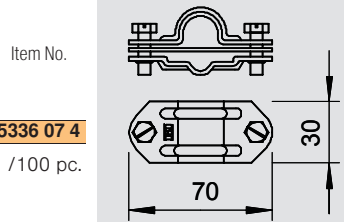


## Universal bi-metal separating piece

Type	Material upper part	Material lower part	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>226 ZV VA</b>	VA	Cu	50	11.000	<b>5336 07 4</b>

**Cu** Copper

- Fit: Rd 8-10 x 16, FL 30 x Rd 16
- With 2 hexagonal bolts M8 x 20, stainless steel (VA)
- Intermediate plate, aluminium/copper

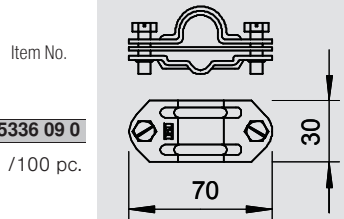


## Universal bi-metal separating piece

Type	Material upper part	Material lower part	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>226 ZV CU</b>	Cu	VA	50	11.900	<b>5336 09 0</b>

**V2A** Stainless steel, 1.4301

- Fit: Rd 8-10 x 16, FL 30 x Rd 16
- With 2 hexagonal bolts M8 x 20, stainless steel (VA)
- Intermediate plate, aluminium/copper



## Separating piece for Rd 8-10 and FL 30 mm

Type	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>233 VA</b>	V2A	—	50	8.300	<b>5336 34 1</b>

**V2A** Stainless steel, 1.4301

- For fitting round conductors Rd 8-10 or flat conductors FL 30
- With 2 hexagonal bolts M8 x 20, stainless steel (VA)

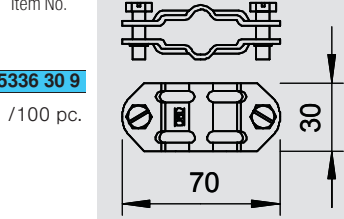
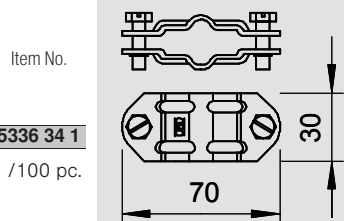


Type	Material symbol	Inter-face	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>233 8</b>	St	FT	50	8.200	<b>5336 30 9</b>

**ST** Steel

**FT** Hot-dip galvanised

- For fitting round conductors Rd 8-10 or flat conductors FL 30
- With 2 hexagonal bolts M8 x 20, stainless steel (VA)

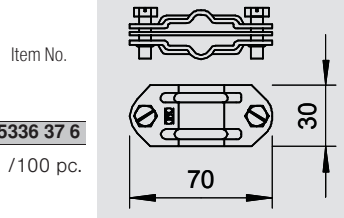


## Bi-metal separating piece for Rd 8-10 and FL 30 mm

Type	Material upper part	Material lower part	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>233 ZV</b>	Cu	VA	50	10.100	<b>5336 37 6</b>

**V2A** Stainless steel, 1.4301

- For fitting round conductors Rd 8-10 to flat conductors FL 30
- With 2 hexagonal bolts M8 x 20, stainless steel (VA)
- Intermediate plate aluminium/copper, top section copper, bottom section stainless steel

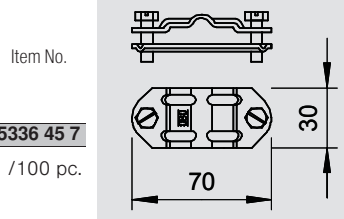


## Separating piece for Rd 8-10 and FL 30-40 mm

Type	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>233 A VA</b>	8-10xFL30-40	25	8.300	<b>5336 45 7</b>

**V2A** Stainless steel, 1.4301

- Fit: Rd 8-10 x FL 30-40
- With 2 hexagonal bolts M8 x 20 (VA)

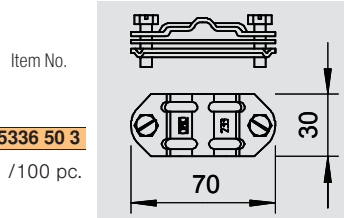


## Bi-metal separating piece for Rd 8-10 and FL 30-40 mm

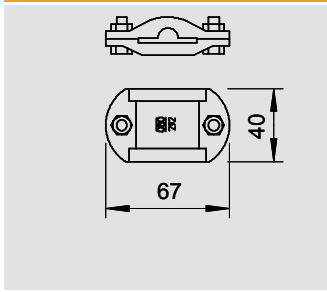
Type	Fit mm	Material upper part	Material lower part	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>233 A ZV</b>	Rd 8-10 x FL30-40	Cu	VA	25	10.400	<b>5336 50 3</b>

**Cu** Copper

- Fit: Rd 8-10 x FL 30-40, FL 30 x FL 30-40
- With 2 hexagonal bolts M8 x 20, stainless steel (VA)
- Intermediate plate, aluminium/copper
- Top section copper, bottom section stainless steel



## Connection and separating terminals

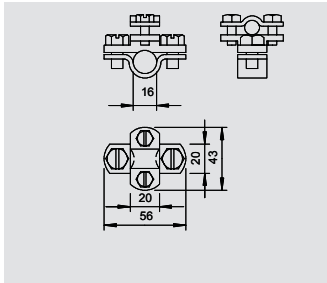


### Malleable iron separating piece

Type	Fit	Material symbol	Inter-face	Pack.	Weight	Item No.
	mm			pcs	kg/100 pcs.	
<b>292 DIN</b>	Rd 8-10 x FL30	TG	F	50	19.259	<b>5340 01 2</b>

**TG** Cast iron      **F** Hot-dip galvanised      /100 pc.

- For round conductor/flat conductor
- Fit: Rd 8-10 x FL 30
- With 2 hexagonal bolts M8 x 25 and 2 hexagonal nuts M8, stainless steel (VA)
- Clamping parts, hot-dip galvanised cast iron

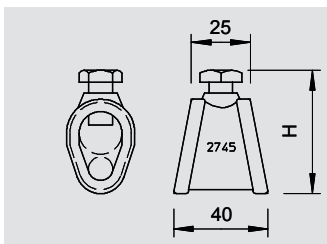


### Rod clamp

Type	Fit	Pack.	Weight	Item No.
	mm	pcs	kg/100 pcs.	
<b>108 B DIN</b>	Rd 8-10/16	10	13.970	<b>5416 56 6</b>

**ST** Steel      **FT** Hot-dip galvanised      /100 pc.

- Rod clamp for connecting round conductors Rd 8-10 to connector rods Rd 16
- Mounted with 2 hexagonal bolts M8 x 16 and M6 x 12
- Adapter from malleable iron
- Crossbar and bolts from hot dip galvanized steel



### Connection terminal

Type	Material symbol	Inter-face	For deep earthers Ø mm	Fit	Pack.	Weight	Item No.
				mm	pcs	kg/100 pcs.	
<b>2745 20 MS</b>	CuZn	Cu	20	7-12,5/S95 mm <sup>2</sup>	5	16.000	<b>5001 56 0</b>

**CuZn** Brass      **Cu** Copper-plated      /pc.

- For earthing rod connector Ø 20 or conductors 95 mm<sup>2</sup>
- For round conductor attachments Rd 7-12.5 with hexagonal bolts M10 x 25, copper (Cu)



# Earth entries



## Interception/earth entry rod, rounded on both ends

Type	Material symbol	Length mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
101 A-CU	Cu	1,500	16	10	272.100	5400 62 7
101 A-CU	Cu	1,500	16	10	272.100	5400 62 7

**Cu** Copper

/100 pc.

- Full material Ø 16 mm
- Rounded on both sides
- Suitable for FangFix stand system



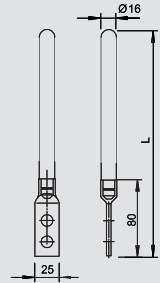
## Interception/earth entry rod with connection tabs

Type	Material symbol	Inter-face	Length mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
101 F1500	St	FT	1,500	16	10	240.000	5424 15 1
101 F2000	St	FT	2,000	16	10	320.000	5424 20 8

**ST** Steel      **FT** Hot-dip galvanised

/100 pc.

- With 2 attaching holes Ø 12 mm
- One end rounded



## Interception/earth entry rods

Type	Dimension L mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
200 VA-1500	1,500	16	10	242.000	5420 50 4

**V4A** Stainless steel, 1.4571

/100 pc.

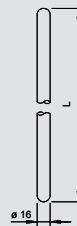
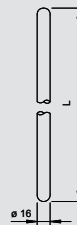
- Both ends rounded

Type	Dimension L mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
200 1500	1,500	16	10	242.000	5420 15 6

**ST** Steel      **FT** Hot-dip galvanised

/100 pc.

- Both ends rounded



## Earth entry rod, tapered and partially insulated

Type	Material symbol	Inter-face	Length mm	Nominal size Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
204 KS-2000	St	F	2,000	16/10	1	230.000	5430 01 1
204 KS-2500	St	F	2,500	16/10	1	310.000	5430 06 2

**ST** Steel      **F** Hot-dip galvanised

/pc.

- 16 mm earth entry with 10 mm connection
- With mounted heat-shrinkable sleeve (corrosion protection)



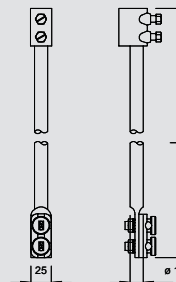
## Earth entry rod with separating piece and connector

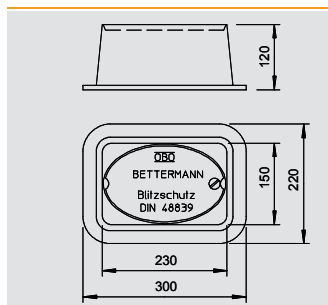
Type	Fit mm	Pack. pcs	Weight kg/100 pcs.	Item No.
204 KL-1500	Rd 8-10	10	260.700	5430 15 1

**ST** Steel

/100 pc.

- With separating piece type 223 DIN and connector type 5002 DIN



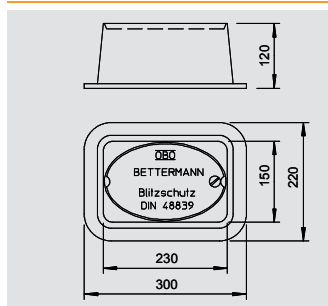


**Underfloor test boxes**

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>5700 DIN</b>	1	680.000	<b>5106 00 1</b>



- Without base
- Made of cast iron, painted black to DIN 48839-K
- Without separating piece
- Can be subjected to up to 1.5 tonne loads according to DIN EN 50085-2-2

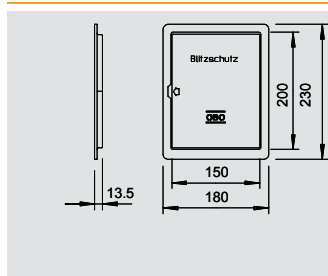


**Underfloor test boxes with integrated separation point**

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>5700 A DIN</b>	1	555.000	<b>5106 02 8</b>



- Without base
- Made of cast iron, painted black
- With integrated separation point for round conductors Rd 8–10 and flat conductor up to FL 40
- Can be subjected to up to 1.5 tonne loads according to DIN EN 50085-2-2

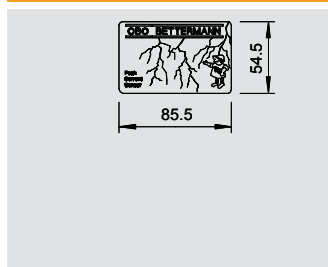


**Inspection door**

Type	Material symbol	Inter-face	Pack.	Weight	Item No.
			pcs	kg/100 pcs.	
<b>5800 VZ</b>	St	FS	1	46.000	<b>5106 13 3</b>
<b>5800 VA</b>	V2A	—	1	46.000	<b>5106 14 1</b>



- ST** Steel    **V2A** Stainless steel, 1.4301    **FS** Strip-galvanised
- Lightweight design for flush-mounted separation points
  - Claw length approx. 80 mm

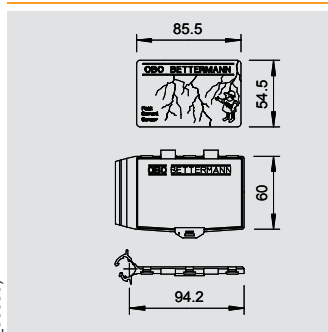


**Magnetic card PCS**

Type	Pack.	Weight	Item No.
	PU	kg/100 PUs	
<b>PCS</b>	1	8.000	<b>5091 43 8</b>



- Magnetic card for recording pulsed/lightning currents.
- Contents = 10 pieces

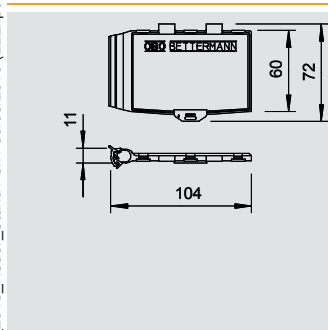


**Magnetic card and holder**

Type	Pack.	Weight	Item No.
	PU	kg/100 PUs	
<b>MK-B</b>	1	31.000	<b>5091 32 2</b>



- PCS magnetic card to record pulse/lightning currents including holder
- Holder can be leaded
  - For mounting on round conductor Rd 8-10
  - Simple holder mounting through clamping
  - 1 PU = 10 units



**Magnetic card holder**

Type	Pack.	Weight	Item No.
	PU	kg/100 PUs	
<b>PCS-H</b>	1	31.000	<b>5091 52 7</b>



- Magnetic card holder for mounting PCS cards.
- Sealable holder
  - For installing on round conductor Rd 8-10
  - Simple holder installation by means of clamp
  - 1 PU = 10 pieces



# Accessories



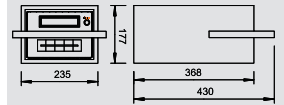
## Magnetic card reader

Type	Country version	Nominal voltage	Measuring range	Measuring tolerances	Pack.	Weight	Item No.
		V			pcs	kg/100 pcs.	
<b>PCS-CS-D</b>	EN	230	3 120 kA	< 2 kA (< 2%)	1	750.000	<b>5091 68 3</b>
<b>PCS-CS-GB</b>	GB	120	3 120 kA	< 2 kA (< 2%)	1	750.000	<b>5091 69 1</b>

/pc.

Magnetic card reader for reading and analysing PCS cards.

- Inc. rechargeable battery for 4 h continuous, no-mains operation
- Large, clear display



## Plastic corrosion protection strip

Type	Width	Length	Pack.	Weight	Item No.
	mm	m	pcs	kg/100 pcs.	
<b>356 50</b>	50	10	1	71.500	<b>2360 05 5</b>
<b>356 100</b>	100	10	1	122.200	<b>2360 10 1</b>

Petrolatum

/pc.

- Approx. 1.1 mm thick
- Width: 50 mm or 100 mm, made of petrolatum-coated chemical fibre fabric
- Can be processed cold



## Flat lead

Type	Length	Width	Pack.	Weight	Item No.
	m	mm	kg	kg/100 pcs.	
<b>198 60</b>	21	60	1	100.000	<b>5101 06 9</b>

/kg

- Material thickness 0.55 mm
- Strip width 60 mm
- Roll weight: 7 kg (+/- 0.5 kg)
- Ordering size per roll: 7kg



## Zinc repairs

Type	Pack.	Weight	Item No.
	pcs	kg/100 pcs.	
<b>ZSF</b>	1	45.000	<b>2362 97 0</b>

/pc.

Zinc spray for treatment of unprotected surfaces and cutting edges. Can contents: 400 ml.



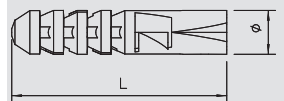
## Angler straddling dowel

Type	Dowel Ø	Length	Bore hole Ø	Pull-out force	Box quantity	Pack.	Weight	Item No.
	mm	mm	mm	N min/concrete	pcs	pcs	kg/100 pcs.	
<b>910 N 5x25 GRW</b>	5	25	5	300	9,000	100	0.051	<b>2349 04 3</b>
<b>910 N 6x30 GRW</b>	6	30	6	550	5,000	100	0.052	<b>2349 05 1</b>
<b>910 N 6x60 GRW</b>	6	60	6	550	3,000	100	0.080	<b>2349 07 8</b>
<b>910 N 8x40 GRW</b>	8	40	8	800	3,000	100	0.140	<b>2349 08 6</b>
<b>910 N 10x50 GRW</b>	10	50	10	1,150	1,500	50	0.306	<b>2349 10 8</b>
<b>910 N 12x60 GRW</b>	12	60	12	1,900	750	25	0.459	<b>2349 12 4</b>

PA Polyamide

/100 pc.

Required minimum screw length = anchor length + component thickness + 1 x screw Ø.  
Withdrawal force applies to wood screws of the largest screw diameter, required safety values - must be taken into account.



## Screw-in anchor with M6 thread

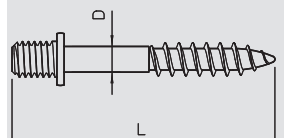
Type	Shank length	Shank-Ø	Thread length	Wood thread outer-Ø	Box quantity	Pack.	Weight	Item No.
	mm	mm	mm	mm	pcs	pcs	kg/100 pcs.	
<b>985 M6 25</b>	25	4.3	8	5	3,000	100	0.412	<b>3133 02 8</b>
<b>985 M6 35</b>	35	4.3	8	5	2,000	100	0.533	<b>3133 03 6</b>

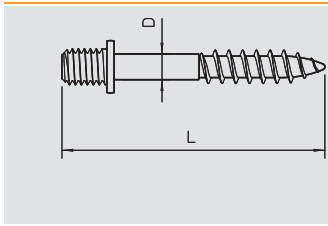
ST Steel

G Electrogalvanised

/100 pc.

With wood screw shank and M6 thread.

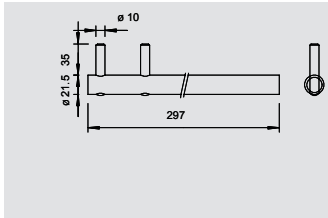




Screw-in anchor with M8 thread

Type	Shank length mm	Shank-Ø mm	Thread length mm	Wood thread outer-Ø mm	Box quantity pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>985 M8 35</b>	35	—	10	6	1,200	100	1.288	<b>3133 23 0</b>

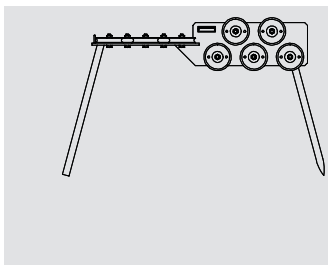
**ST** Steel **G** Electrogalvanised /100 pc.  
With wood screw shank and thread M8.



Directional irons

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>364</b>	1	35.000	<b>3051 01 3</b>

**ST** Steel **FT** Hot-dip galvanised /pc.  
Directional iron for bending and aligning conductors



Wire straightening machine

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>5900</b>	1	3,300.000	<b>3059 00 6</b>






**ST** Steel /pc.  

- Factory-set for round conductor Rd 8
- Structure, steel, painted
- Straightening rolls, galvanised cast iron





## Directories

	Alphabetical table of contents	338
	Numeric directory	344
	Type listing	348
		361
	Terms and conditions of sale and delivery	



## Alphabetical table of contents

### A

Accessories for series terminal, 245-245  
Adjustable connector, 308  
Adjustable insulating beam – pipe, 310  
Adjustable insulating beam – wall, 310  
Angler straddling dowel, 334  
Attaching and bridging component, 326  
Attaching and expansion strip, 327

### B

Base for FangFix Junior, 290  
Base for FangFix system 10 kg, 293  
Base for FangFix system 16 kg, 293  
Base plate, 304  
Base, 16 kg, with female thread, 290  
Base, 6.9 kg, with female thread, 290  
Base, CombiController V50, 131-131  
Base, CombiController V50 with remote signalling, 131-131  
Base, combination arrester/lightning current arrester, 125-125  
Base, Multibase, 143, 172, 181  
Base, Multibase + NPE, 143, 172, 181  
Base, Multibase + NPE with fuse monitoring, 144, 173, 182  
Base, Multibase + NPE with remote signalling, 143, 172, 181  
Base, Multibase with acoustic signalling, 144, 173, 182  
Base, Multibase with fuse monitoring, 144, 173, 182  
Base, Multibase with remote signalling, 143, 172, 181  
Basic protection device for ISDN and DSL systems, 214-214  
Basic protection for 4-wire information technology, 224-224 systems with RJ45  
Basic protection for two-core systems with HF, 233 applications 120 V  
Bi-metal roof gutter clamp for all bead thicknesses, 324  
Bi-metal separating piece for Rd 8–10 and FL 30 mm, 330  
Bi-metal separating piece for Rd 8–10 and FL 30–40, 330 mm  
Bonding base, 302  
Bonding base including industrial bonding pad, 302  
Bridging cable, 327  
Bundle clips for screen connection, 267

### C

Cable bracket for flat conductors, 281  
Cable bracket for Rd 8–10 and FL 30, 281  
Cable bracket with crossbar FL 30 mm mounting height, 303  
Cable bracket with crossbar FL 30 mm, with round pin, 304  
Cable bracket with crossbar Rd 8–10 mm, 302  
Cable bracket with crossbar Rd 8–10 mm, with square, 303 pin  
Cable bracket with crossbar Rd 8–10 mm, with wood, 304 screw thread  
Cable bracket with crossbar Rd 8–10, 30 mm mounting, 303 height  
Cable bracket, Rd 8–10 mm with bonding base, 302  
Card reader PCS-CS..., 255  
Clamp lock for strip earthing clip, 264  
Clamping shoe, 325  
Clip branch terminal, 267  
Closed spark gap, able to carry lightning current, 250  
Coaxial protection device for 7/16 connection:, 222-222 Male/female  
Coaxial protection device for BNC connection:, 220-220 Female/female  
Coaxial protection device for BNC connection:, 220-220 Male/female  
Coaxial protection device for BNC connection:, 221-221 Male/male  
Coaxial protection device for F connection:, 222-222 Female/female  
Coaxial protection device for F connection: Male/female, 222-222  
Coaxial protection device for N connection:, 221-221 Female/female  
Coaxial protection device for N connection: Male/female, 221-221  
Coaxial protection device for SAT and cable multiswitch, 222-222

### C

Coaxial protection device for TNC connection:, 221-221 Male/female  
Coaxial protection devices for S-UHF connection:, 220-220 Female/female  
Coaxial protection devices for S-UHF connection:, 220-220 Male/female  
Combination arrester for 10Base2-/10Base5 networks, 223-223  
Combination arrester for 4-wire information technology, 224-224 systems with RJ45  
Combination arrester, 1-pole, 119-119  
Combination arrester, 1-pole + NPE, 132, 134-132, 134-132, 134-134  
Combination arrester, 1-pole + NPE with remote, 135-135, 139-135, signalling 139  
Combination arrester, 1-pole NPE, 118-118, 134-118  
Combination arrester, 1-pole with function display, 119-119  
Combination arrester, 2-pole, 133, 136, 140-133, 136, 140-133, 136, 140  
Combination arrester, 2-pole + NPE, 132, 134-132, 134-132, 134-132, 134-134  
Combination arrester, 3-pole, 119-119, 140-136, 140-119, 136  
Combination arrester, 3-pole + NPE, 118-118, 134-132, 134-118, 134  
Combination arrester, 3-pole + NPE with acoustic, 135-135 signalling  
Combination arrester, 3-pole + NPE with function, 118-118 display  
Combination arrester, 3-pole + NPE with remote, 135-135 signalling  
Combination arrester, 3-pole with acoustic signalling, 137-137  
Combination arrester, 3-pole with function display, 119  
Combination arrester, 3-pole with remote signalling, 137-137  
Combination arrester, 4-pole, 136-136, 140-136, 140-136, 140-136, 140-136  
Combination arrester, 4-pole in housing with remote, 138-138 signalling  
Combination arrester, 4-pole with acoustic signalling, 137-137  
Combination arrester, 4-pole with remote signalling, 137-137  
Combination arrester, 4-pole, with voltage monitoring, 138-138  
Combination protection device for ISDN, 214-214  
Combination protection device for ISDN, bus side, 216-216  
Combination protection device for ISDN, RJ11, 215-215  
Combination protection device for ISDN, RJ45, 215-215  
Combination protection for double-core systems with, 233 HF applications 24 V  
Combination protection for two-core systems with HF, 233 applications 5 V  
Complete photovoltaic block V20, 1,000 V DC, 203-203  
Complete photovoltaic block V20, 1,000 V DC with IR, 203-203  
Complete photovoltaic block V20, 600 V DC, 202-202  
Complete photovoltaic block V20, 600 V DC with IR, 202-202  
Complete photovoltaic block V25, 900 V DC, 201-201  
Complete photovoltaic block V25, 900 V DC with IR, 201-201  
Complete photovoltaic block V50, 600 V DC, 200-200  
Complete photovoltaic block V50, 600 V DC with IR, 200-200  
Concrete stone for FangFix system 10 kg, 293  
Concrete stone for FangFix system 16 kg, 293  
Connecting bridge, 125-125  
Connection and end piece, 317  
Connection and end piece with connector, 317  
Connection and end piece with connector and pressure, 318 trough  
Connection and end piece, DIN version, 318  
Connection bridge for V10 Compact, 177-177  
Connection bridge, Multibase base, 142-142  
Connection component, 326  
Connection element, 311  
Connection joint, 308  
Connection lug for Parex spark gap, 250  
Connection plate for an isCon® cable, 313  
Connection plate for two isCon® cables, 313  
Connection terminal, 331  
Connection terminal for earthing rod on flat conductor, 283  
Connection terminal for earthing rod or cables, 283



# Alphabetical table of contents

## F

Fine power protection/device for concealed box, 192-192  
Fine power protection/socket bar, 189-189  
Fine protection device for ISDN RJ11, 215-215  
Fine protection device for ISDN RJ45, 215-215  
Fine protection for 10Base2-/10Base5 networks, 223-223  
Fine protection for 15-pole RS232 interface, 226-226  
Fine protection for 25-pole RS232 interface, 226-226  
Fine protection for 25-pole RS485 interface, 227-227  
Fine protection for 4-wire information technology, 224-224 systems with RJ45  
Fine protection for 4-wire information technology, 225-225 systems, RJ45  
Fine protection for 8-wire information technology, 225-225 systems, RJ45  
Fine protection for 9-pole RS232 interface, 226-226  
Fine protection for 9-pole RS485 interface, 227-227  
Fine protection for Ethernet networks (Class D/CAT 5), 223-223  
Fine protection for RS232 with screwless terminals, 228-228  
Fine protection for RS485 with screwless terminals, 228-228  
FineController for ISDN telephone systems and, 189-189 terminals  
FineController for SAT systems and receivers, 188-188  
FineController for Schuko socket, 188-188  
FineController for telephone systems and terminals, 188-188  
FineController for telephone systems with RJ11, 189-189  
FineController for video, TV and HiFi systems, 188-188  
Flat conductor adapter for roof cable holder, Type, 299 165/MBG  
Flat conductor terminal, from FL 30 for 1801 VDE, 259  
Flat conductor terminal, to FL 30 for 1801 VDE, 258  
Flat conductor, galvanised steel for ground, 270, 288  
Flat lead, 334  
Fold fastening, 309  
Folding and construction clamp, 10–20 mm, 321  
Folding clamp and connection terminal for panel, 323 thicknesses up to 10 mm  
Folding clamp, Rd 10 to 10 mm metal thickness, 322  
Folding clamp, to 10 mm metal thickness, 322-323  
Folding clamp, to 5 mm metal thickness, 322

## G

Gutter clamp all bead thicknesses, 324  
Gutter clamp for bead thickness 15–22 mm, 324  
Gutter clamp RK-FIX, 323-324

## H

Hammer insert for LightEarth earthing rod, 275  
Hammer insert, type 2500, for earthing rod ST, BP and, 273 OMEX  
Hammer insert, type 2510, for earthing rod ST, BP and, 273 OMEX  
Hammer insert, type 2520, for earthing rod ST, BP and, 274 OMEX  
Hammer insert, type 2530, for earthing rod ST, BP and, 274 OMEX  
Hammer insert, type 2531, for earthing rod ST, BP and, 274 OMEX  
Hammer insert, type 2535, for earthing rod ST, BP and, 274 OMEX  
Hammer insert, type 2536, for earthing rod ST, BP and, 274 OMEX  
Hinge crossbar FL 30 mm, 304  
Hinge crossbar, Rd 8–10 mm, 304  
Holder for installation in GB2 and GB3 mounting boxes, 190-190  
Holder, V support, 309

## I

Impact head for earthing rod ST, BP and OMEX, 273  
Impact head for LightEarth earthing rod, 273  
Impact point for LightEarth earthing rod, 273  
Impact point for OMEX earthing rod, 273  
Impact point for ST and BP earthing rod, 273

## I

Inspection door, 333  
Installation strip for strip earthing clip, 264  
Insulated interception rod, 313  
Insulated spacer, 310  
Insulating rod, 307  
Insulation lightning protection set, 3-corner fastening, 307  
Insulation lightning protection set, FS fastening, 307  
Insulation lightning protection set, V fastening, 307  
Insulation lightning protection set, VRS fastening, 307  
Insulation removal pliers, 311  
Interception rod for FangFix Junior, 292  
Interception rod holder for ridge tiles, 294  
Interception rod holder for sloping roof, 294  
Interception rod, one end rounded, 292  
Interception rod, one end rounded with connection lug, 292  
Interception tip, 290, 310  
Interception/earth entry rod with connection tabs, 275, 291, 332  
Interception/earth entry rod with connection tabs and, 292 connectors  
Interception/earth entry rod, rounded on both ends, 275, 291, 332  
Interception/earth entry rods, 275, 332  
isCon® arrestor, 311  
isFang interception rod, 291  
isFang interception rod stand, 290, 314  
isFang support for corner pipe mounting, 50 x 50 mm, 315  
isFang support for pipe mounting,  $\varnothing$  100–300 mm, 314  
isFang support for pipe mounting,  $\varnothing$  40–50 mm, 314  
isFang support for pipe mounting,  $\varnothing$  50–60 mm, 315  
isFang support for wall mounting, 15 mm spacing, 314  
isFang support for wall mounting, 200–300 mm spacing, 314  
isFang support for wall mounting, 80 mm spacing, 314  
isFang-3B threaded rod, 291, 314  
ISOLAB measuring system arrestor tester, 254

## K

K connector, 307

## L

LightEarth earthing rod, 272  
Lightning current and surge arrestor, 1-pin + NPE, 128-128  
Lightning current and surge arrestor, 1-pin + NPE with, 128-128 remote signalling  
Lightning current and surge arrestor, 3-pin, 129-129  
Lightning current and surge arrestor, 3-pin + NPE, 128-128  
Lightning current and surge arrestor, 3-pin + NPE with, 128-128 remote signalling  
Lightning current and surge arrestor, 3-pin with remote, 129-129 signalling  
Lightning current and surge arrestor, 4-pin, 129  
Lightning current and surge arrestor, 4-pin with remote, 129 signalling  
Lightning current arrestor, 1-pole, 123-123  
Lightning current arrestor, 1-pole NPE, 122-122  
Lightning current arrestor, 1-pole with function display, 123-123  
Lightning current arrestor, 3-pole, 123-123  
Lightning current arrestor, 3-pole + NPE, 122-122  
Lightning current arrestor, 3-pole + NPE with function, 122-122 display  
Lightning current arrestor, 3-pole with function display, 123-123  
LSA-Plus technology/LSA basic and fine protection, 218-218  
LSA-Plus technology/LSA basic protection, 217-217  
LSA-Plus technology/LSA connection strip, 217-217  
LSA-Plus technology/LSA earthing rail for LSA-BF, 218-218  
LSA-Plus technology/LSA earthing strip, 217-217  
LSA-Plus technology/LSA installation trough, 218-218  
LSA-Plus technology/LSA separating strip, 217-217  
LSA-Plus technology/LSA simple tool, 219-219  
LSA-Plus technology/protective housing, 219-219

**M**

Magnetic card and holder, 333  
 Magnetic card and holder MK-B, 255  
 Magnetic card holder, 333  
 Magnetic card holder PCS-H, 255  
 Magnetic card PCS, 255, 333  
 Magnetic card reader, 334  
 Malleable iron separating piece, 331  
 MCR protection for 2-pin for power supply with leak, 196, 232  
 current-free remote signalling, 110 V AC/DC  
 MCR protection for 2-pin for power supply with leak, 196, 232  
 current-free remote signalling, 230 V AC/DC  
 MCR protection for 2-pin for power supply with leak, 196, 232  
 current-free remote signalling, 24 V AC/DC  
 MCR protection for 2-pin for power supply with remote, 195, 231  
 signalling, 110 V AC/DC  
 MCR protection for 2-pin for power supply with remote, 195, 231  
 signalling, 230 V AC  
 MCR protection for 2-pin for power supply with remote, 195, 231  
 signalling, 230 V AC/DC  
 MCR protection for 2-pin for power supply with remote, 195, 231  
 signalling, 24 V AC/DC  
 MCR protection for 2-pin for power supply, 110 V, 194, 230  
 MCR protection for 2-pin for power supply, 12 V, 193, 229  
 MCR protection for 2-pin for power supply, 230 V, 194, 230  
 MCR protection for 2-pin for power supply, 24 V, 193, 229  
 MCR protection for 2-pin for power supply, 48 V, 193, 229  
 MCR protection for 2-pin for power supply, 60 V, 193, 229  
 MCR protection for explosive areas, 2-pole, 24 V, 246  
 MCR protection for explosive areas, 3-pole, 24 V, 246  
 Medium and fine protection for two-core systems 110 V, 235, 238,  
 240  
 Medium and fine protection for two-core systems 12 V, 234, 237, 239  
 Medium and fine protection for two-core systems 24 V, 234, 236-237,  
 239  
 Medium and fine protection for two-core systems 48 V, 234, 237, 239  
 Medium and fine protection for two-core systems 5 V, 234, 236-237,  
 239  
 Medium and fine protection for two-core systems 60 V, 238  
 M-Quick cable bracket PA, 312  
 Multi adapter, 310  
 Mushroom-shaped interceptor with connector, 294  
 Mushroom-shaped interceptor, head part, 294

**N**

Number plates, 284

**P**

PA cable bracket with tightening strap, 312  
 PA roof cable holder, sloping roof, 313  
 Parallel clamp, 279  
 Parallel connector Rd 8–10 mm, M10 x 30, 318  
 Parallel connector Rd 8–10 mm, M6 x 20, 318  
 Parallel connector Rd 8–10 mm, M8 x 25, 318  
 Photovoltaic cover – lightning and surge arrestors, 209  
 Photovoltaic cover – surge arrestors, 209  
 Photovoltaic housing with connection terminals, Type, 206-206  
 1+2, 600 V DC  
 Photovoltaic housing with connection terminals, Type, 206-206  
 1+2, 900 V DC  
 Photovoltaic housing with connection terminals, Type 2,, 206-206  
 1,000 V DC  
 Photovoltaic housing with connection terminals,, 206-206  
 unequipped  
 Photovoltaic system solution, Type 1+2, with MC, 204-204  
 connector, 600 V DC  
 Photovoltaic system solution, Type 1+2, with MC, 204-204  
 connector, 900 V DC  
 Photovoltaic system solution, Type 2, with MC, 204-204  
 connector, 1,000 V DC  
 Photovoltaic system solution, Type 2, with MC, 204-204  
 connector, 600 V DC  
 Pipe clamp, 328  
 Pipe fastening, 310

**P**

Plastic corrosion protection strip, 284, 334  
 Potential and earth connection block, 263  
 Potential connection, 311  
 Potential connection terminal for mounting on isFang, 311  
 Profile rails, 267  
 Profile rod earth connector with connecting lug, 276  
 Profile rod earth connector with round conductor lug, 276  
 Profile rod earth connector with steel strip lug, 276  
 Protection package TV, 184-184  
 Protection package, SAT applications, 184-184  
 Protection package, telecommunication, 184-184  
 Protection set MCD + V20 3-pole, 146-146  
 Protection set MCD + V20 3-pole + NPE, 145-145  
 Protection set MCD + V20 3-pole + NPE with remote, 145-145  
 signalling  
 Protection set MCD + V20 3-pole with remote signalling, 146-146  
 Protection set MCD + V20, leak current-free, 3-pole, 148-148  
 Protection set MCD + V20, leak current-free, 3-pole +, 147-147  
 NPE  
 Protection set MCD + V20, leak current-free, 3-pole +, 147-147  
 NPE with remote signalling  
 Protection set MCD + V20, leak current-free, 3-pole, 148-148  
 with remote signalling  
 Protective spark gap, 250  
 PV base, 2-pole in Y circuit, 210-210  
 PV base, 2-pole in Y circuit, with remote signalling, 210-210  
 PV base, 3-pole in Y circuit, 210-210  
 PV base, 3-pole in Y circuit, with remote signalling, 210-210

**R**

Rail stands for 1801 VDE, 259  
 Replacement knife, 311  
 Ribbon clip to fasten the isCon® cable to insulated, 313  
 interception rods  
 Ridge conductor holder with tensioning spring, 295  
 Rod clamp, 331  
 Rod holder for 16 mm interception and earth entry rods, 305  
 Rod holder for 16 mm interception and earth entry rods,, 306  
 with square pin  
 Rod holder for 16 mm interception and earth entry rods,, 305  
 with bolt and anchor  
 Rod holder for 20 mm rods, 305  
 Rod holders, 309  
 Roof cable holder for flat roofs, 299  
 Roof cable holder for flat roofs, plastic sleeve, 300  
 Roof cable holder for flat roofs, recyclable, 300  
 Roof cable holder for flat roofs, with increased base, 299  
 section  
 Roof cable holder for flat roofs, without base, 299  
 Roof cable holder for ridge tiles, 180–240 mm, Rd 8–10, 295  
 Roof cable holder for ridge tiles, 185–260 mm, Rd 8, 295  
 Roof cable holder for ridge tiles, 185–260 mm, Rd 8–10, 295  
 Roof cable holder for slated roofs, crimped, Rd 8, 297  
 Roof cable holder for slated roofs, crimped, Rd 8–10, 297  
 Roof cable holder for slated roofs, Rd 8, 297  
 Roof cable holder for slated roofs, Rd 8–10, 298  
 Roof cable holder for tiled and slated roofs, height 74, 298  
 mm  
 Roof cable holder for tiled and slated roofs, Rd 8–10, 298  
 Roof cable holder for tiled roofs, angled, flexible, Rd 8, 296-297  
 Roof cable holder for tiled roofs, angled, Rd 8, 296  
 Roof cable holder for tiled roofs, angled, Rd 8–10, 297  
 Roof cable holder for tiled roofs, Rd 8, 296  
 Roof cable holder for tiled roofs, Rd 8–10, 296  
 Roof cable holder for tiled, slated and corrugated roofs,, 298  
 Rd 8  
 Roof cable holder for tiled, slated and corrugated roofs,, 299  
 Rd 8–10  
 Roof cable holder for tiled, slated and corrugated roofs,, 298  
 with crossbar  
 Roof cable holder, 55 mm, suitable for bonding straight, 300  
 to flat roofs



### V

- VA cable bracket with tightening strap, 312
- VA roof cable holder, sloping roof, 313
- Variable bi-metal quick connector, 316
- Variable earthing connector, 316
- Variable earthing terminal, 279
- VG housing with MC 50-B/3, 121-121
- VG housing with MC 50-B/3+1, 120-120
- VG housing with MCD 50-B/3, 121-121
- VG housing with MCD 50-B/3+1, 120-120

### W

- Wall connection, 308
- Wall connection, angled, 309
- Washer for cable bracket, type 177, 301
- Water repellent, 310
- Wedge connector, 280
- Wire straightening machine, 335

### Z

- Zinc repairs, 334

# Numeric directory

Structure of the EAN number: Country code **40**

Manufacturer code **1219** (for articles beginning with **0: 1010**)

Individual EAN-C **5647589**

EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page
5046516	1117 02 5	/100 m	267	5244813	3059 00 6	/pc.	335	5002253	5015 83 0	/pc.	263	5384915	5038 13 8	/100 pc.	265
5046578	1117 03 3		267					5699330	5015 83 2		263	5384977	5038 15 4		265
								5699347	5015 83 6		263				
								5002260	5015 84 2		263	5385219	5040 03 5		265
5432371	1167 00 6	/100 pc.	267	5250395	3133 02 8	/100 pc.	334	5699354	5015 84 4		263	5385271	5040 05 1		265
5432432	1167 01 4		267	5250456	3133 03 6		334	5699361	5015 84 7		263	5385332	5040 07 8		265
5432494	1167 02 2		267	5250579	3133 23 0		335	5699408	5015 84 9		263	5385394	5040 09 4		265
5432555	1167 03 0		267					5002277	5015 85 4		263	5385455	5040 11 6		265
5432616	1167 04 9		267					5002284	5015 86 6		263	5385516	5040 13 2		265
				5371298	5000 01 7	/pc.	272	5033615	5015 88 0		263	5385578	5040 15 9		265
5655367	2146 16 4		312	5371359	5000 02 5		272	5033677	5015 88 4		263	5385936	5040 50 7		265
5016069	2146 50 9		312	5371472	5000 20 3		272	5033738	5015 89 0		263				
				5018001	5000 29 7		272					5385998	5043 01 8		266
				5617358	5000 30 0		272	5379096	5016 02 9		263	5386056	5043 10 7		266
5505396	2153 78 7		312	5708834	5000 33 5		272	5379157	5016 03 7		263				
				5371717	5000 50 5		272	5379218	5016 04 5		263	5386117	5050 03 0		265
				5018049	5000 74 2		272	5922216	5016 09 6		263	5386179	5050 05 7		265
5820215	2332 75 2		313	5814450	5000 75 0		272	5800354	5016 11 8		263	5386230	5050 07 3		265
				5111047	5000 76 9		272	5922278	5016 12 6		263	5386292	5050 08 1		265
5228851	2349 04 3		334	5740650	5000 85 8		272	5379270	5016 14 2		281	5386353	5050 11 1		265
5228912	2349 05 1		334	5371830	5000 86 6		272					5386414	5050 13 8		265
5228974	2349 07 8		334									5386476	5050 15 4		265
5229032	2349 08 6		334	5372370	5001 21 8		283	5800415	5018 50 1	/100 m	270	5386537	5050 17 0		265
5229155	2349 10 8		334	5372431	5001 22 6		283	5800477	5018 70 6		270	5386599	5050 19 7		265
5229216	2349 12 4		334	5635475	5001 36 6		283	5022015	5018 73 0		270				
				5372554	5001 40 4		283					5386650	5051 50 9		266
5016182	2351 70 6		312	5372615	5001 41 2		283	5680468	5019 34 0		270				
				5372851	5001 56 0		283	5694007	5019 34 2		270	5386834	5052 07 6		266
		/pc.		5635239	5001 61 7		283	5694014	5019 34 4		270	5386896	5052 09 2		266
5230533	2360 05 5		284	5372912	5001 64 1		283	5680475	5019 34 5		270	5386957	5052 11 4		266
5230595	2360 10 1		284	5372974	5001 66 8		283	5680482	5019 34 7		270	5387015	5052 13 0		266
								5680499	5019 35 0		270	5387077	5052 15 7		266
				5373575	5003 00 8		276	5680505	5019 35 5		270	5387190	5052 18 1		266
5518419	2362 97 0		334	5373636	5003 01 6		276	5680512	5019 36 0		270				
				5373698	5003 02 4		276					5388517	5057 50 7		264
				5373759	5003 03 2		276	5381556	5021 08 1		270	5388579	5057 51 5		264
5242710	3041 20 4		273	5373810	5003 04 0		276	5381617	5021 10 3		270	5388630	5057 52 3		264
5242772	3041 21 2		273	5373995	5003 25 3		276	5381730	5021 16 2		271	5388692	5057 55 8		264
5242833	3041 25 5		273	5374053	5003 26 1		276	5801375	5021 22 7		271	5699651	5057 59 9		311
5617235	3041 40 9		273	5374114	5003 28 8		276	5680529	5021 23 5		271			/100 m	
5242956	3041 95 6		273	5374176	5003 29 6		276	5680567	5021 23 9		271	5805458	5057 92 2		264
				5374237	5003 31 8		276	5381914	5021 28 6		270			/100 pc.	
5243137	3042 20 0		273	5374718	5003 77 6		276	5901273	5021 29 4		270	5805519	5057 93 0		264
5243199	3042 25 1		273	5374770	5003 78 4		276	5381976	5021 30 8		270				
5617297	3042 30 8		273					5067474	5021 33 2		271	5388876	5059 35 6		284
				5376873	5009 21 9		276	5382034	5021 48 0		271	5389057	5059 49 6		284
				5376934	5009 22 7		276	5382096	5021 50 2		271				
5243311	3043 20 7		273	5376996	5009 23 5		276	5902058	5021 64 2		271	5389231	5064 01 5		267
5243373	3043 25 8		273					5680574	5021 64 4		271				
5717492	3043 31 2		273					5680581	5021 64 7		271				
5243557	3043 40 1		274	5377719	5012 01 5	/100 pc.	280	5382218	5021 65 0		271				
5243618	3043 45 2		274					5382331	5021 80 4		270			/pc.	
5111160	3043 60 2		275									5915973	5080 05 3		226
5617419	3043 60 6		275	5377894	5014 01 8	/pc.	281			/100 pc.		5916277	5080 06 1		227
5087076	3043 61 0		275	5377955	5014 02 6		281	5382690	5025 20 6		282	5916031	5080 15 0		226
5087137	3043 61 4		275	5378013	5014 21 2		280					5916215	5080 27 4		226
5111641	3043 61 8		275	5901938	5014 42 5		279	5383055	5028 03 5		282	5916390	5080 28 2		227
5421627	3043 62 8		275	5105015	5014 46 8		280	5383116	5028 04 3		282	5889458	5081 54 8		216
5243793	3043 70 3		274	5105077	5014 47 6		280					5502630	5081 64 5		225
5243854	3043 75 4		274					5383413	5030 02 1		282	5502692	5081 64 7		225
5642312	3043 90 8		274	5378075	5015 01 4		260	5383659	5030 23 4		283	5834793	5081 68 8		214
5453796	3043 91 6		274	5378136	5015 05 7		260	5383710	5030 24 2		283	5239956	5081 72 6		224
				5378198	5015 06 5		261					5239895	5081 73 4		224
5642978	3044 83 1		274	5378259	5015 07 3		259	5383833	5032 03 2		282	5239833	5081 74 2		224
5643036	3044 90 4		274	5378310	5015 08 1		260	5383895	5032 04 0		282	5462439	5081 79 3		223
5453970	3044 91 2		274	5959427	5015 11 1		262	5383956	5032 23 7		282	5614364	5081 80 0		223
				5378372	5015 50 2		260	5384014	5032 24 5		282	5680536	5081 92 0		214
				5378433	5015 54 5		261	5384137	5032 53 9		282	5680413	5081 93 9		215
				5378495	5015 55 3		260	5384199	5032 54 7		282	5791119	5081 96 3		215
5631699	3049 20 5	/100 pc.	284	5378556	5015 65 0		258					5791058	5081 97 1		215
5631637	3049 22 1		284	5378617	5015 70 7		259	5384434	5033 03 9		282				
5631576	3049 25 6		284	5378679	5015 71 5		259	5433750	5033 20 9		281	5685333	5082 38 2		228
5631514	3049 30 2		284	5378730	5015 72 3		259					5684916	5082 41 2		223
5631453	3049 32 9		284	5378792	5015 73 1		258	5384557	5038 01 4		265	5684855	5082 42 0		223
5631392	3049 34 5		284	5378853	5015 75 8		258	5384618	5038 03 0		265				
				5378914	5015 76 6		258	5384670	5038 05 7		265	5917595	5083 06 0		228
				5455837	5015 77 4										

EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page
		/pc.				/pc.				/pc.				/pc.	
5525134	5084 00 8		217	5299448	5093 39 1		176	5240174	5094 71 5		166	5077084	5096 87 8		122
5525196	5084 01 2		217	5158103	5093 40 0		180	5240181	5094 71 8		166	5077091	5096 87 9		118
5525257	5084 01 6		217	5012825	5093 40 2		180	5406679	5094 72 7		159	5531135	5096 88 4		125
5525318	5084 02 0		217	5012832	5093 40 4		180	5240198	5094 73 1		159	5531197	5096 88 6		125
5525370	5084 02 4		218	5004660	5093 40 6		180	5240204	5094 73 4		159	5509899	5096 97 0		125
5525431	5084 02 8		218	5155287	5093 41 4		178	5240228	5094 75 0		153				
5525493	5084 03 2		218	5382799	5093 41 8		178	5382911	5094 76 0		157	5394099	5097 05 3		141
5525554	5084 03 6		218	5478546	5093 62 3		200	5240235	5094 76 2		157	5766636	5097 06 1		141
5525615	5084 04 0		219	5709022	5093 62 5		200	5616382	5094 76 4		153	5708896	5097 06 5		209
5110750	5084 04 8		219	5361893	5093 62 7		129	5240242	5094 76 5		157	5965664	5097 08 8		141
				5478553	5093 62 8		200	5240280	5094 78 0		164	5542056	5097 11 1		139
5017387	5086 01 9		184	5709060	5093 62 9		200	5240297	5094 78 3		164	5945314	5097 18 5		137
5017448	5086 02 3		184	5361909	5093 63 1		129	5240303	5094 78 8		162	5394211	5097 19 3		137
5017509	5086 02 7		184	5361916	5093 64 3		129	5240334	5094 79 2		167	5711551	5097 29 0		141
				5361923	5093 64 7		129	5240341	5094 79 5		167	5394396	5097 35 5		138
5708957	5088 67 0		204	5688426	5093 65 3		128	5363903	5094 92 0		178	5617532	5097 43 2		135
5708964	5088 67 2		204	5425120	5093 65 4		128	5363934	5094 92 4		179	5478683	5097 44 7		201
5709008	5088 67 6		204	5688433	5093 66 1		128	5363941	5094 93 1		178	5709121	5097 44 8		201
5709015	5088 67 8		204	5425137	5093 66 2		128	5363958	5094 93 5		179	5578116	5097 45 3		193
5023210	5088 68 6		208	5361954	5093 72 4		130					5478690	5097 45 7		201
5613701	5088 69 1		206	5708841	5093 72 6		209	5919391	5095 60 3		142	5709138	5097 45 8		201
5613718	5088 69 2		206	5962243	5093 98 8		221	5542957	5095 60 6		134	5578123	5097 60 7		193
5613725	5088 69 3		206	5805991	5093 99 6		221					5578130	5097 61 5		193
5371090	5088 69 4		206					5393191	5096 25 1		161	5578147	5097 62 3		193
5473206	5088 69 9		205	5457473	5094 40 1		133	5393252	5096 27 8		161	5578154	5097 63 1		194
5704010	5088 70 3		207	5382812	5094 40 3		133	5393559	5096 35 9		144	5578161	5097 65 0		194
5047155	5088 87 9		142	5406556	5094 41 8		136	5393610	5096 36 7		144	5578185	5097 82 0		195
				5382829	5094 42 1		136	5063407	5096 37 0		144	5578192	5097 84 6		195
5531012	5089 20 0		120	5239734	5094 42 3		136	5247104	5096 37 2		144	5578208	5097 85 2		195
5531074	5089 21 2		121	5239741	5094 42 6		136	5393672	5096 37 5		160	5578215	5097 85 8		195
5237341	5089 65 0		177	5406563	5094 43 1		140	5393733	5096 38 3		160	5578246	5097 93 1		196
5299400	5089 65 2		177	5382836	5094 43 4		140	5393795	5096 39 1		160	5578253	5097 93 5		196
5237358	5089 65 5		142	5239758	5094 43 7		140	5617471	5096 39 7		157	5578260	5097 93 9		196
5709350	5089 66 0		183	5239765	5094 44 0		140	5393856	5096 41 3		144	5578277	5097 97 6		233
5709367	5089 66 2		183	5374886	5094 44 4		135	5393917	5096 42 1		144				
5405528	5089 75 4		146	5374916	5094 44 6		139	5393979	5096 44 8		144	5683339	5098 38 0		246
5405535	5089 75 6		146	5382843	5094 44 8		132	5464457	5096 63 7		210	5683346	5098 38 2		246
5405542	5089 76 1		145	5239802	5094 45 1		132	5464464	5096 63 9		210	5683384	5098 39 0		246
5405559	5089 76 3		145	5239819	5094 45 4		132	5648499	5096 64 6		210	5683391	5098 39 2		246
5405566	5089 76 8		148	5382850	5094 45 7		134	5299455	5096 64 7		210	5406839	5098 40 4		241
5405573	5089 77 0		147	5239826	5094 46 0		134	5415732	5096 64 8		143	5406846	5098 40 7		241
5405580	5089 77 5		148	5239864	5094 46 3		134	5415749	5096 64 9		143	5406853	5098 41 1		241
5405597	5089 77 7		147	5239888	5094 47 8		139	5415770	5096 65 0		143	5625124	5098 41 3		244
				5239925	5094 49 0		137	5415787	5096 65 1		143	5406860	5098 42 2		242
		/VPE		5239932	5094 49 3		137	5415794	5096 65 3		143	5406877	5098 42 7		242
5461111	5091 32 2		255	5239949	5094 51 0		135	5415800	5096 65 4		143	5406884	5098 43 1		242
5461296	5091 43 8		255	5239994	5094 52 6		139	5067481	5096 65 5		143	5625131	5098 43 3		244
5461470	5091 52 7		255	5240013	5094 55 2		138	5067498	5096 65 7		143	5406891	5098 44 2		243
		/pc.		5709077	5094 57 2		202	5067504	5096 66 5		143	5406907	5098 44 6		243
5461654	5091 68 3		255	5648482	5094 57 4		203	5067535	5096 66 7		143	5406914	5098 45 0		243
5896111	5091 69 1		255	5709084	5094 57 6		202	5067542	5096 66 9		143	5410461	5098 47 0		245
				5708872	5094 60 5		202	5067559	5096 67 1		143	5578284	5098 49 2		234
5080886	5092 45 1		190	5478621	5094 60 8		203	5425144	5096 67 5		131	5578291	5098 50 6		234
5247098	5092 46 0		190	5708889	5094 61 3		202	5425151	5096 67 7		131	5578307	5098 51 4		234
5613589	5092 47 0		190	5709114	5094 61 5		203	5067566	5096 68 0		143	5578314	5098 52 2		234
5613596	5092 47 2		190	5478669	5094 61 7		203	5067597	5096 68 2		143	5578338	5098 55 7		235
5864851	5092 50 7		192	5406594	5094 61 8		158	5616375	5096 69 5		142	5578345	5098 57 1		233
5688754	5092 52 3		192	5382867	5094 62 1		158	5519133	5096 70 7		169	5578352	5098 57 5		233
5314837	5092 60 4		189	5240020	5094 62 4		158	5425182	5096 78 6		254	5578369	5098 60 0		237
5952817	5092 70 1		189	5240037	5094 62 7		158	5921738	5096 81 2		254	5578376	5098 60 3		237
5035053	5092 80 0		188	5374923	5094 63 2		159	5480730	5096 82 0		124	5578383	5098 61 1		237
5035114	5092 80 8		188	5374985	5094 63 6		167	5544517	5096 82 2		124	5578390	5098 63 0		237
5047223	5092 81 2		189	5382966	5094 63 9		152	5051428	5096 82 5		124	5578406	5098 63 8		238
5035176	5092 81 6		188	5240044	5094 64 1		152	5051473	5096 82 7		124	5578413	5098 64 6		238
5035237	5092 82 4		188	5240051	5094 64 4		152	5288237	5096 83 1		123	5578420	5098 72 7		236
5047254	5092 82 8		189	5382973	5094 65 0		156	5288244	5096 83 2		122	5578437	5098 79 4		236
				5240068	5094 65 3		156	5288282	5096 83 5		119	5578444	5098 80 8		239
5390671	5093 01 5		220	5240099	5094 65 6		156	5288299	5096 83 6		118	5578451	5098 81 6		239
5390732	5093 02 3		220	5382980	5094 66 6		162	5480792	5096 83 9		125	5578468	5098 82 4		239
5030881	5093 17 1		222	5240112	5094 66 8		162	5966388	5096 84 7		123	5578512	5098 85 9		240
5390978	5093 23 6		220	5406617	5094 67 7		154	5541158	509						

# Numeric directory

Structure of the EAN number: Country code **40**

Manufacturer code **1219** (for articles beginning with **0: 1010**)

Individual EAN-C **5647589**

EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page
5942498	<b>5099 70 6</b>	/pc.	170	5902478	<b>5215 85 4</b>	/100 pc.	297	5413233	<b>5240 30 1</b>	/pc.	250	5420019	<b>5316 21 9</b>	/100 pc.	324
5708933	<b>5099 70 8</b>		209	5531791	<b>5215 87 5</b>		296	5413295	<b>5240 32 8</b>		250	5420071	<b>5316 25 1</b>		324
5397458	<b>5099 80 3</b>		251	5531852	<b>5215 87 9</b>		297	5413356	<b>5240 33 6</b>		250	5420132	<b>5316 30 8</b>		324
5570318	<b>5099 84 8</b>		169					5413417	<b>5240 34 4</b>		250	5420194	<b>5316 32 4</b>		324
5481270	<b>5099 85 0</b>		170	5902652	<b>5216 18 4</b>		296					5433682	<b>5316 45 0</b>		323
				5902539	<b>5216 19 2</b>		296					5433729	<b>5316 45 9</b>		323
				5813019	<b>5216 20 6</b>		296			/100 pc.		5433736	<b>5316 46 8</b>		324
		/kg		5813071	<b>5216 21 4</b>		296	5415695	<b>5304 00 8</b>		316	5420316	<b>5316 51 0</b>		325
5399674	<b>5101 06 9</b>		334	5813132	<b>5216 25 7</b>		296	5415879	<b>5304 10 5</b>		316	5420378	<b>5316 55 3</b>		325
				5813194	<b>5216 26 5</b>		296	5415930	<b>5304 11 3</b>		316				
		/100 pc.		5813255	<b>5216 81 8</b>		299	5817512	<b>5304 16 4</b>		317	5420439	<b>5317 01 0</b>		322
5399797	<b>5102 05 7</b>		328					5817574	<b>5304 17 2</b>		317	5420491	<b>5317 05 3</b>		322
5399858	<b>5102 07 3</b>		328	5407959	<b>5217 07 5</b>		298	5416050	<b>5304 20 2</b>		317	5420552	<b>5317 20 7</b>		322
5399919	<b>5102 08 1</b>		328					5416234	<b>5304 31 8</b>		317	5420613	<b>5317 22 3</b>		323
5399971	<b>5102 11 1</b>		328	5904274	<b>5218 31 4</b>		300	5416357	<b>5304 40 7</b>		321	5420675	<b>5317 25 8</b>		322
5400035	<b>5102 13 8</b>		328	5408734	<b>5218 67 5</b>		299	5416418	<b>5304 50 4</b>		321	5420736	<b>5317 27 4</b>		323
5400097	<b>5102 15 4</b>		328	5408796	<b>5218 68 3</b>		299	5503057	<b>5304 52 0</b>		321	5420798	<b>5317 40 1</b>		322
5400158	<b>5102 19 7</b>		328	5408857	<b>5218 69 1</b>		299	5416470	<b>5304 60 1</b>		318	5420859	<b>5317 42 8</b>		323
5400219	<b>5102 21 9</b>		328	5904519	<b>5218 74 8</b>		299	5817758	<b>5304 66 0</b>		318	5420910	<b>5317 45 2</b>		322
5400271	<b>5102 23 5</b>		328	5814634	<b>5218 75 6</b>		299	5416951	<b>5304 97 0</b>		317	5420972	<b>5317 47 9</b>		323
5400332	<b>5102 25 1</b>		328	5408918	<b>5218 81 0</b>		300	5417071	<b>5304 99 7</b>		280				
5400394	<b>5102 27 8</b>		328	5408970	<b>5218 82 9</b>		300					5421030	<b>5318 08 4</b>		322
				5409038	<b>5218 86 1</b>		300					5421092	<b>5318 14 9</b>		322
5400875	<b>5106 00 1</b>	/pc.	333	5674580	<b>5218 88 2</b>		299	5417316	<b>5311 03 9</b>		319				
5400936	<b>5106 02 8</b>		333			/100 pc.		5417378	<b>5311 10 1</b>		319	5421276	<b>5320 01 1</b>		325
5900375	<b>5106 13 3</b>		333	5623052	<b>5218 88 5</b>		299	5417439	<b>5311 15 2</b>		319	5421337	<b>5320 05 4</b>		325
5900436	<b>5106 14 1</b>		333	5409090	<b>5218 92 6</b>		326	5417491	<b>5311 20 9</b>		319	5421511	<b>5320 69 0</b>		326
				5625889	<b>5218 99 7</b>		300	5417552	<b>5311 26 8</b>		319	5421573	<b>5320 70 4</b>		326
		/100 pc.						5417675	<b>5311 50 0</b>		316	5421634	<b>5320 71 2</b>		326
5401599	<b>5201 10 1</b>		294	5409458	<b>5223 07 5</b>		303	5737063	<b>5311 50 3</b>		266	5421870	<b>5325 30 7</b>		325
				5409519	<b>5223 10 5</b>		303					5421931	<b>5325 31 5</b>		325
5904335	<b>5202 21 3</b>		298	5409632	<b>5223 15 6</b>		303	5417736	<b>5311 51 9</b>		316				
5402138	<b>5202 24 8</b>		298	5409755	<b>5223 20 2</b>		303	5417798	<b>5311 52 7</b>		316	5422419	<b>5326 30 3</b>		326
5403036	<b>5202 51 5</b>		295	5409939	<b>5223 60 1</b>		303	5417859	<b>5311 53 5</b>		316	5422471	<b>5326 31 1</b>		326
5902294	<b>5202 56 6</b>		295					5417910	<b>5311 55 1</b>		316	5422532	<b>5326 33 8</b>		326
5902232	<b>5202 59 0</b>		295	5410416	<b>5226 57 0</b>		304	5693789	<b>5311 57 3</b>		266				
5403814	<b>5202 83 3</b>		295					5466192	<b>5311 58 5</b>		266	5453611	<b>5328 20 9</b>		318
5902171	<b>5202 86 8</b>		295	5410539	<b>5227 07 0</b>		304					5453673	<b>5328 28 4</b>		319
				5410591	<b>5227 08 9</b>		304	5417972	<b>5312 03 5</b>		320				
5038269	<b>5203 01 5</b>		295	5410652	<b>5227 10 0</b>		304	5418030	<b>5312 13 2</b>		320	5423195	<b>5329 07 8</b>		318
5289746	<b>5203 02 3</b>		295	5410713	<b>5227 15 1</b>		304	5418092	<b>5312 31 0</b>		278				
								5700869	<b>5312 31 8</b>		277	5423379	<b>5331 01 3</b>		327
5404651	<b>5207 25 8</b>		302	5410836	<b>5228 02 6</b>		304	5418153	<b>5312 34 5</b>		278	5423430	<b>5331 50 1</b>		327
5110392	<b>5207 26 6</b>		302	5410959	<b>5228 12 3</b>		304	5418214	<b>5312 41 8</b>		278				
5404774	<b>5207 33 9</b>		301	5411017	<b>5228 13 1</b>		304	5418276	<b>5312 44 2</b>		278	5629115	<b>5334 93 4</b>		280
5404835	<b>5207 34 7</b>		301	5411079	<b>5228 22 0</b>		305	5418337	<b>5312 60 4</b>		277	5959663	<b>5334 94 2</b>		280
5069546	<b>5207 37 1</b>		301	5411192	<b>5228 32 8</b>		304	5418399	<b>5312 65 5</b>		278				
5404897	<b>5207 44 4</b>		301					5418573	<b>5312 80 9</b>		278	5890058	<b>5335 14 0</b>		329
5009726	<b>5207 45 1</b>		302	5411499	<b>5229 16 2</b>		303	5418696	<b>5312 90 6</b>		279	5890119	<b>5335 16 7</b>		329
5404958	<b>5207 46 0</b>		301	5411550	<b>5229 36 7</b>		303	5418757	<b>5312 92 2</b>		278	5423614	<b>5335 20 5</b>		329
5405016	<b>5207 48 7</b>		301	5411611	<b>5229 38 3</b>		303	5700876	<b>5312 92 5</b>		278	5423676	<b>5335 25 6</b>		329
5904991	<b>5207 74 6</b>		301	5411673	<b>5229 46 4</b>		303								
5905059	<b>5207 75 4</b>		301	5411734	<b>5229 48 0</b>		303	5740537	<b>5313 01 5</b>		279	5424215	<b>5336 00 7</b>		329
5905110	<b>5207 76 2</b>		301	5411970	<b>5229 55 3</b>		303	5740476	<b>5313 02 3</b>		279	5424277	<b>5336 02 3</b>		329
5904878	<b>5207 80 0</b>		301	5412151	<b>5229 83 9</b>		303	5543015	<b>5313 03 1</b>		279	5424338	<b>5336 05 8</b>		329
5336433	<b>5207 85 1</b>		301	5412212	<b>5229 96 0</b>		302	5806530	<b>5313 06 6</b>		279	5424390	<b>5336 07 4</b>		330
5334811	<b>5207 87 8</b>		301									5424451	<b>5336 09 0</b>		330
				5446231	<b>5230 21 7</b>		302	5418993	<b>5314 03 8</b>		320	5424635	<b>5336 30 9</b>		330
5405252	<b>5208 01 7</b>		304	5629535	<b>5230 32 2</b>		302	5419112	<b>5314 13 5</b>		320	5424758	<b>5336 34 1</b>		330
				5629474	<b>5230 36 5</b>		302					5424819	<b>5336 37 6</b>		330
5903673	<b>5215 27 7</b>		298	5739999	<b>5230 44 6</b>		281	5419174	<b>5314 51 8</b>		277	5424871	<b>5336 45 7</b>		330
5903796	<b>5215 30 7</b>		298	5740056	<b>5230 46 2</b>		281	5419235	<b>5314 53 4</b>		277	5424932	<b>5336 50 3</b>		330
5811879	<b>5215 37 4</b>		298	5959601	<b>5230 52 7</b>		305	5419297	<b>5314 61 5</b>		277				
5811930	<b>5215 38 2</b>		298					5419358	<b>5314 62 3</b>		277	5424994	<b>5340 01 2</b>		331
5407171	<b>5215 43 9</b>		297					5419471	<b>5314 65 8</b>		277				
5812111	<b>5215 47 1</b>		297			/pc.		5419532	<b>5314 66 6</b>		277	5425595	<b>5350 08 5</b>		327
5407232	<b>5215 50 1</b>		297	5450894	<b>5239 91 4</b>		251					5425656	<b>5350 09 3</b>		327
5902591	<b>5215 54 4</b>		296									5425717	<b>5350 10 7</b>		327
5407294	<b>5215 55 2</b>		296	5412571	<b>5240 03 4</b>		250	5419716	<b>5315 50 6</b>		318	5425779	<b>5350 11 5</b>		327
5812234	<b>5215 57 9</b>		296	5412632	<b>5240 05 0</b>		250	5740414							

EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page
5426974	5351 05 7	/100 pc.	328	5699668	5408 05 6	/pc.	311	5430339	5424 20 8	/100 pc.	275
5427032	5351 07 3		328	5674924	5408 10 1		309				
5427094	5351 25 1		328	5690733	5408 10 5		307			/pc.	
5427155	5351 28 6		328	5613206	5408 10 7		307	5901457	5430 01 1		275
5890652	5351 35 9		328	5613213	5408 10 8		307	5901570	5430 06 2		275
5890713	5351 37 5		328	5613220	5408 10 9		307			/100 pc.	
5427216	5351 45 6		328	5636731	5408 14 8		307	5430575	5430 15 1		276
5427278	5351 47 2		328	5681496	5408 15 6		307				
				5613237	5408 15 8		307				
5427575	5400 15 5		275	5895817	5408 24 5		308	6001767	5492 80 7		317
5629054	5400 62 7		275	5613244	5408 24 7		308				
				5895879	5408 29 6		307				
5901334	5401 77 1		292	5613251	5408 29 8		307			/pc.	
5427810	5401 80 1		292	5674474	5408 35 0		308	6117611	6117 46 5		191
5427872	5401 83 6		292	5613268	5408 35 2		308				
5898399	5401 85 2		292	5674412	5408 39 3		308				
5902119	5401 87 9		292	5613275	5408 39 5		308				
5034810	5401 97 0		292	5674351	5408 45 8		310				
5105619	5401 98 0		291	5674290	5408 50 4		308				
5107774	5401 98 3		291	5613282	5408 50 6		308				
5108672	5401 98 6		291	5674238	5408 55 5		308				
5108733	5401 98 9		291	5613299	5408 55 7		308				
5045359	5401 99 3		291	5674177	5408 62 8		308				
5050803	5401 99 5		291	5613312	5408 63 0		308				
				5673811	5408 68 7		308				
5428053	5402 10 7		292	5613305	5408 68 9		308				
5428176	5402 15 8		292	5673750	5408 73 3		310				
5428411	5402 80 8		292	5542773	5408 80 6		310				
5428473	5402 85 9		292	5542834	5408 81 4		310				
		/pc.		5004608	5408 84 9		310				
5674733	5402 86 4		291	5009733	5408 85 2		310				
5674740	5402 86 6		291	5670056	5408 94 2		313				
5674757	5402 86 8		291	5670063	5408 94 6		313				
5674764	5402 87 0		291	5670070	5408 95 0		314				
5674795	5402 87 2		291	5670087	5408 95 2		314				
5674801	5402 87 4		291	5670094	5408 95 4		314				
5674818	5402 87 6		291	5670100	5408 95 6		314				
5674825	5402 87 8		291	5670117	5408 95 8		314				
5674856	5402 88 0		291	5670124	5408 96 0		315				
		/100 pc.		5670131	5408 96 4		315				
5428534	5402 89 1		290	5670148	5408 96 8		290				
5897910	5402 95 6		290	5674931	5408 96 9		290				
				5674948	5408 97 1		291				
5070054	5403 10 3		293	5674979	5408 97 2		291				
5070078	5403 11 7		293	5674986	5408 97 3		291				
5070085	5403 12 4		293	5613329	5408 97 6		307				
5548713	5403 20 0		292	5613336	5408 97 8		307				
5548775	5403 21 9		293	5613343	5408 98 0		307				
5548898	5403 22 7		293	5613350	5408 98 2		307				
5548959	5403 23 5		293	5613367	5408 98 4		309				
		/pc.		5613374	5408 98 6		309				
5034872	5403 30 8		290	5613381	5408 98 8		309				
5034933	5403 32 4		290	5613411	5408 99 0		309				
5613572	5403 33 0		294	5613428	5408 99 2		309				
5670735	5403 33 5		294	5613435	5408 99 4		310				
		/100 pc.		5613442	5408 99 6		310				
5428657	5405 06 8		290			/100 pc.					
		/pc.		5428893	5410 09 6		306				
5428718	5405 76 9		294	5429074	5410 30 4		306				
5428770	5405 86 6		294								
		/100 m		5429616	5412 60 9		305				
				5446415	5412 63 3		305				
5674573	5408 00 2		311	5752356	5412 80 3		305				
5674627	5408 00 4		311	5752295	5412 81 1		305				
		/pc.									
5674634	5408 00 9		311	5429678	5416 56 6		331				
5674641	5408 01 1		311								
5674689	5408 02 2		311			/pc.					
5674696	5408 02 6		313	5900498	5420 00 8		280				
5674702	5408 02 8		313	5629290	5420 01 6		280				
						/100 pc.					
5674719	5408 03 6		311	5429791	5420 15 6		275				
				5751571	5420 50 4		275				
5674863	5408 04 3		313								
5674870	5408 04 7		313	5430094	5424 10 0		291				
5674887	5408 04 9		313	5430216	5424 15 1		275				
5674726	5408 05 2		312								
5674917	5408 05 4		312								

02 TBS-Katalog\_2010\_Neuer\_Stand / en / 29/03/2010 / LLEExport\_00886

# Type listing

Structure of the EAN number: Country code 40

Manufacturer code 1219 (for articles beginning with 0: 1010)

Individual EAN-C 5647589

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
101 16-1500	1500 / GFK	5613213	5408 10 8	/pc.	307	101 HV-16	16 90	5613411	5408 99 0	/pc.	309
101 16-3000	3000 / GFK	5613220	5408 10 9		307	101 IAB	18 / AI	5673750	5408 73 3		310
101 16-750	750 / GFK	5613206	5408 10 7		307	101 IAG	20 107 / AI	5674290	5408 50 4		308
101 20-3000	3000 / GFK	5690733	5408 10 5		307	101 IAG-16	16 107 / AI	5613282	5408 50 6		308
101 20-6000	6000 / GFK	5636731	5408 14 8		307	101 IDK	20 125 / AI	5895817	5408 24 5		308
101 3B-4000	2000 / AI	5674733	5402 86 4		291	101 IDK-16	16 125 / AI	5613244	5408 24 7		308
101 3B-4500	2500 / AI	5674740	5402 86 6		291	101 IES	20 60 / AI	5674412	5408 39 3		308
101 3B-5000	3000 / AI	5674757	5402 86 8		291	101 IES-16	16 60 / AI	5613275	5408 39 5		308
101 3B-5500	3500 / AI	5674764	5402 87 0		291	101 IGL	20 127 / AI	5674177	5408 62 8		308
101 3B-6000	4000 / AI	5674795	5402 87 2		291	101 IGL-16	16 127 / AI	5613312	5408 63 0		308
101 3B-6500	4500 / AI	5674801	5402 87 4		291	101 IK	20 100 / AI	5895879	5408 29 6		307
101 3B-7000	5000 / AI	5674818	5402 87 6		291	101 IK-16	16 100 / AI	5613251	5408 29 8		307
101 3B-7500	5500 / AI	5674825	5402 87 8		291	101 ISP M10	110 / AI	5674351	5408 45 8		310
101 3B-8000	5500 / AI	5674856	5402 88 0		291	101 IT	20 65 / AI	5681496	5408 15 6		307
101 3-ES-16	750	5613329	5408 97 6		307	101 IT-16	16 60 / AI	5613237	5408 15 8		307
101 A-1500	1500 / St / FT	5427575	5400 15 5	/100 pc.	275	101 IV	20 60 / AI	5674238	5408 55 5		308
101 A-1500	1500 / St / FT	5427575	5400 15 5		291	101 IV-16	16 60 / AI	5613299	5408 55 7		308
101 A-16	16 60 / AI	5613268	5408 35 2	/pc.	308	101 IW-M10	20 60 / AI	5673811	5408 68 7		308
101 A-CU	1500 / Cu	5629054	5400 62 7	/100 pc.	332	101 J1000	1000 / AI	5034810	5401 97 0	/100 pc.	292
101 A-CU	1500 / Cu	5629054	5400 62 7		332	101 MA-16	16 91	5613442	5408 99 6	/pc.	310
101 A-CU	1500 / Cu	5629054	5400 62 7		275	101 R-16	16 81	5613435	5408 99 4		310
101 A-CU	1500 / Cu	5629054	5400 62 7		291	101 RH-16	Black / PA	5674924	5408 10 1		309
101 A-L100	/ St / FT	5428411	5402 80 8		292	101 ST	M16	5428534	5402 89 1	/100 pc.	290
101 A-L150	/ St / FT	5428473	5402 85 9		292	101 VL1500	1500 / AI	5105619	5401 98 0		291
101 ALU-1000	1000 / AI	5901334	5401 77 1		292	101 VL2000	2000 / AI	5107774	5401 98 3		291
101 ALU-1500	1500 / AI	5427810	5401 80 1		292	101 VL2500	2500 / AI	5108672	5401 98 6		291
101 ALU-2000	2000 / AI	5427872	5401 83 6		292	101 VL3000	3000 / AI	5108733	5401 98 9		291
101 ALU-2500	2500 / AI	5898399	5401 85 2		292	101 VL3500	3500 / AI	5045359	5401 99 3		291
101 ALU-3000	3000 / AI	5902119	5401 87 9		292	101 VL4000	4000 / AI	5050803	5401 99 5		291
101 A-M16	20 60 / AI	5674474	5408 35 0	/pc.	308	101 VRS-16	750	5613350	5408 98 2	/pc.	307
101 B-16 M16	M16	5897910	5402 95 6	/100 pc.	290	101 VS-16	750	5613336	5408 97 8		307
101 BB-16	16 40	5613381	5408 98 8	/pc.	309	101 W-16	16 60 / AI	5613305	5408 68 9		308
101 BP-16	175 40	5613367	5408 98 4		309	101 WG-16	16 110	5613374	5408 98 6		309
101 F1000	/ St / FT	5430094	5424 10 0	/100 pc.	291	108 B DIN	/ St / FT	5429678	5416 56 6	/100 pc.	331
101 F1500	/ St / FT	5430216	5424 15 1		275	112 DIN-100	/ St / F	5428893	5410 09 6		306
101 F1500	/ St / FT	5430216	5424 15 1		332	112 DIN-CU-100	/ Cu	5429074	5410 30 4		306
101 F1500	/ St / FT	5430216	5424 15 1		291	113 8-10	/ Zn / Cu	5446231	5230 21 7		302
101 F-16	16 121	5613428	5408 99 2	/pc.	309	113 B-HD-16	/ Zn / Cu	5752295	5412 81 1		305
101 F2000	/ St / FT	5430339	5424 20 8	/100 pc.	275	113 B-MS-HD 8-10	/ Zn / Cu	5629474	5230 36 5		302
101 F2000	/ St / FT	5430339	5424 20 8		332						
101 F2000	/ St / FT	5430339	5424 20 8		291						
101 FS-16	750	5613343	5408 98 0	/pc.	307						
101 G1000	/ St / FT	5428053	5402 10 7	/100 pc.	292						
101 G1500	/ St / FT	5428176	5402 15 8		292						

02 TBS-Katalog\_2010\_Neuer\_Stand / en / 29/03/2010 (LLEExport\_00986)

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
113 BZ-FL	/ Zn / G	5739999	5230 44 6	/100 pc.	281	157 I-VA	/ V2A	5407355	5215 62 5	/100 pc.	296
113 B-Z-HD	/ Zn / VZ	5629535	5230 32 2		302	157 L-CU	/ Cu	5812111	5215 47 1		297
113 B-Z-HD	/ Zn / VZ	5752356	5412 80 3		305						
113 B-Z-HD-FL	/ Zn / G	5740056	5230 46 2		281	157 LK-CU	/ Cu	5811930	5215 38 2		298
113 Z-16	/ Zn / VZ	5429616	5412 60 9		305	157 LK-VA	/ V2A	5811879	5215 37 4		298
113 Z-20	/ Zn / VZ	5959601	5230 52 7		305	157 L-VA	/ V2A	5407171	5215 43 9		297
113 Z-20	/ Zn / VZ	5959601	5230 52 7		309	157 NB-VA	/ V2A	5903673	5215 27 7		298
113 Z8-10	/ Zn / G	5412212	5229 96 0		302	157 ND-VA	/ V2A	5903796	5215 30 7		298
113 ZN-16	/ Zn / Cu	5446415	5412 63 3		305	159 K-VA	/ V2A	5813255	5216 81 8		299
120 A	/ Zn / G	5428657	5405 06 8		290	159 VA-V	/ V2A	5407959	5217 07 5		298
128 F	/ St / FT	5428718	5405 76 9	/pc.	294	163 100 CU	/ Cu	5409939	5223 60 1		303
128 K	/ Al	5428770	5405 86 6		294	163 100 FT	/ St / FT	5409519	5223 10 5		303
132 CU	/ Cu	5902171	5202 86 8	/100 pc.	295	163 150 FT	/ St / FT	5409632	5223 15 6		303
132 K-CU	/ Cu	5902232	5202 59 0		295	163 200 FT	/ St / FT	5409755	5223 20 2		303
132 K-VA	/ V2A	5403036	5202 51 5		295	163 70 FT	/ St / FT	5409458	5223 07 5		303
132 N-DK	/ St / FT	5902294	5202 56 6		295	165 B 100	/ St / FT	5408970	5218 82 9		300
132 U	/ V2A	5038269	5203 01 5		295	165 B 60	/ St / FT	5408918	5218 81 0		300
132 U-CU	/ V2A / Cu	5289746	5203 02 3		295	165 KR	/ PE	5409038	5218 86 1		300
132 VA	/ V2A	5403814	5202 83 3		295	165 MBG HFL	/ PP	5623052	5218 88 5	/pc.	299
133 A	/ PA	5402138	5202 24 8		298	165 MBG UH	Black / PP	5674580	5218 88 2		299
133 NB	/ PA	5904335	5202 21 3		298	165 MBG UH	Black / PP	5674580	5218 88 2		312
156 16	/ St / FT	5411079	5228 22 0		305	165 MBG-10	/ PE	5408734	5218 67 5	/100 pc.	299
156 8-10	/ St / FT	5410836	5228 02 6		304	165 MBG-10 200	/ PE	5814634	5218 75 6		299
156 FL	/ St / FT	5411192	5228 32 8		304	165 MBG-8	/ PE	5408857	5218 69 1		299
156 K8-10 CU	/ Cu	5411017	5228 13 1		304	165 MBG-8 200	/ PE	5904519	5218 74 8		299
156 K8-10 ST	/ St / FT	5410959	5228 12 3		304	165 NBK 55	55 / PA	5904274	5218 31 4		300
157 E-CU	/ Cu	5902355	5215 80 3		297	165 OBG-8	/ PE	5408796	5218 68 3		299
157 EK-CU	/ Cu	5902478	5215 85 4		297	165 R-8-10	/ PE	5625889	5218 99 7		300
157 EK-VA	/ V2A	5902416	5215 83 8		297	166 LS 70	/ St / FT	5410416	5226 57 0		304
157 E-VA	/ V2A	5407232	5215 50 1		297	168 8-10 M6	/ Zn / G	5411499	5229 16 2		303
157 F-CU 230	/ Cu	5902539	5216 19 2		296	168 DIN 30	56 / Zn / G	5411734	5229 48 0		303
157 F-CU 280	/ Cu	5813019	5216 20 6		296	168 DIN-K-M6	/ Zn / G	5412151	5229 83 9		303
157 F-CU 410	/ Cu	5813132	5216 25 7		296	168 DIN-K-M8	/ Zn / Cu	5411611	5229 38 3		303
157 FK-CU 230	/ Cu	5902652	5216 18 4		296	168 FL30-M6	56 / Zn / VZ	5411673	5229 46 4		303
157 FK-CU 280	/ Cu	5813071	5216 21 4		296	168 FL40-M8	66 / TG / FT	5411970	5229 55 3		303
157 FK-CU 410	/ Cu	5813194	5216 26 5		296	168 ZN-M6	/ Zn / Cu	5411550	5229 36 7		303
157 FK-VA 230	/ V2A	5902591	5215 54 4		296	172 AR	/ Al	5409090	5218 92 6		326
157 FK-VA 280	/ V2A	5812296	5215 58 7		296	176 A 100	/ TG / F	5410652	5227 10 0		304
157 FK-VA 410	/ V2A	5812418	5215 60 9		296	176 A 150	/ TG / F	5410713	5227 15 1		304
157 F-VA 230	/ V2A	5407294	5215 55 2		296	176 A 65	/ TG / F	5410539	5227 07 0		304
157 F-VA 280	/ V2A	5812234	5215 57 9		296	176 A 80	/ TG / F	5410591	5227 08 9		304
157 F-VA 410	/ V2A	5812357	5215 59 5		296	177 20 CU	/ PA	5904991	5207 74 6		301
157 FX-AL	/ Al	5531791	5215 87 5		296	177 20 KL	/ PA	5009726	5207 45 1		302
157 FX-CU	/ Cu	5531852	5215 87 9		297	177 20 M8	/ PA	5404897	5207 44 4		301
157 I-CU	/ Cu	5812593	5215 74 9		296	177 20 VA M6	/ V2A	5404774	5207 33 9		301
157 IK-VA	/ V2A	5812531	5215 66 8		297						

# Type listing

Structure of the EAN number: Country code **40**

Manufacturer code **1219** (for articles beginning with **0: 1010**)

Individual EAN-C **5647589**

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
177 20 VA M8	/ V2A	5404835	5207 34 7	/100 pc.	301	223 O DIN MS	/ Zn / Cu	5890119	5335 16 7	/100 pc.	329
177 20 VA-VK M6	/ V2A / Cu	5904878	5207 80 0		301	223 O DIN ZN	/ Zn / G	5890058	5335 14 0		329
177 30 CU	/ PA	5905059	5207 75 4		301	226 8-10	/ St / FT	5424215	5336 00 7		329
177 30 M8	/ PA	5404958	5207 46 0		301	226 CU	/ Cu	5424277	5336 02 3		329
177 55 CU	/ PA	5905110	5207 76 2		301	226 VA	/ V2A	5424338	5336 05 8		329
177 55 M8	/ PA	5405016	5207 48 7		301	226 ZV CU	/ V2A	5424451	5336 09 0		330
177 B-HD20	/ PA	5336433	5207 85 1		301	226 ZV VA	/ Cu	5424390	5336 07 4		330
177 B-HD30	/ PA	5334811	5207 87 8		301	233 8	/ St / FT	5424635	5336 30 9		330
177 U	Light grey / PP	5069546	5207 37 1		301	233 A VA	/ V2A	5424871	5336 45 7		330
194	Grey M8 / PA	5404651	5207 25 8		302	233 A ZV	/ Cu	5424932	5336 50 3		330
194 K	Grey M8 / PA	5110392	5207 26 6		302	233 VA	/ V2A	5424758	5336 34 1		330
198 60	21 60	5399674	5101 06 9	/kg	334	233 ZV	/ V2A	5424819	5336 37 6		330
199 DIN	M8 / St / FS	5405252	5208 01 7	/100 pc.	304	237 N CU	/ Cu	5453673	5328 28 4		319
200 1500	1500 / St / FT	5429791	5420 15 6		332	237 N FT	/ St / F	5453611	5328 20 9		318
200 1500	1500 / St / FT	5429791	5420 15 6		275	239	/ Zn / G	5423195	5329 07 8		318
200 VA-1500	1500 / V4A	5751571	5420 50 4		275	244	/ Zn / G	5417316	5311 03 9		319
200 VA-1500	1500 / V4A	5751571	5420 50 4		332	245 8-10 CU	/ Cu	5417439	5311 15 2		319
204 KL-1500	/ St	5430575	5430 15 1		276	245 8-10 FT	/ St / FT	5417378	5311 10 1		319
204 KL-1500	/ St	5430575	5430 15 1		332	247 8-10 CU	/ Cu	5417552	5311 26 8		319
204 KS-2000	/ St / F	5901457	5430 01 1	/pc.	275	247 8-10 FT	/ St / FT	5417491	5311 20 9		319
204 KS-2000	/ St / F	5901457	5430 01 1		332	249 8-10 ALU	44 / Al	5417736	5311 51 9		316
204 KS-2500	/ St / F	5901570	5430 06 2		275	249 8-10 ALU-OT	/ Al	5466192	5311 58 5		266
204 KS-2500	/ St / F	5901570	5430 06 2		332	249 8-10 ALU-OT	/ Al	5466192	5311 58 5		325
205 B-M10 VA	M10 / V4A	5900498	5420 00 8		280	249 8-10 CU	40 / Cu	5417798	5311 52 7		316
205 B-M12 VA	M12 / V4A	5629290	5420 01 6		280	249 8-10 ST	40 / St / FT	5417675	5311 50 0		316
213 1000 DIN	1000 / St / FT	5373575	5003 00 8		276	249 8-10 ST-OT	/ ST / FT	5737063	5311 50 3		266
213 1000 M	1000 / St / FT	5373995	5003 25 3		276	249 8-10 ST-OT	/ ST / FT	5737063	5311 50 3		325
213 1500 DIN	1500 / St / FT	5373636	5003 01 6		276	249 8-10 VA	40 / V2A	5417910	5311 55 1		316
213 1500 F	1500 / St / FT	5374718	5003 77 6		276	249 8-10 ZV	44 / Cu	5417859	5311 53 5		316
213 1500 M	1500 / St / FT	5374053	5003 26 1		276	249 VA-OT	/ V2A	5693789	5311 57 3		266
213 2000 DIN	2000 / St / FT	5373698	5003 02 4		276	249 VA-OT	/ V2A	5693789	5311 57 3		325
213 2000 F	2000 / St / FT	5374770	5003 78 4		276	250	/ St / FT	5418696	5312 90 6		279
213 2000 M	2000 / St / FT	5374114	5003 28 8		276	250	/ St / FT	5418696	5312 90 6		320
213 2500 DIN	2500 / St / FT	5373759	5003 03 2		276	250 A-BO	/ St / F	5806530	5313 06 6		279
213 2500 M	2500 / St / FT	5374176	5003 29 6		276	250 A-FT	40 / St / FT	5740537	5313 01 5		279
213 3000 DIN	3000 / St / FT	5373810	5003 04 0		276	250 AS-FT	20 / St / FT	5543015	5313 03 1		279
213 3000 M	3000 / St / FT	5374237	5003 31 8		276	250 A-VA	40 / V2A	5740476	5313 02 3		279
219 20 BP CU	1500 / St / Cu	5371717	5000 50 5		272	250 V4A	/ V4A	5700876	5312 92 5		278
219 20 BP V4A	1000 / V4A	5740650	5000 85 8		272	250 V4A	/ V4A	5700876	5312 92 5		319
219 20 BP V4A	1500 / V4A	5371830	5000 86 6		272	250 VA	/ V2A	5418757	5312 92 2		278
219 20 OMEX FT	1500 / St / FT	5371298	5000 01 7		272	250 VA	/ V2A	5418757	5312 92 2		319
219 20 OMEX FT	2000 / St / FT	5371472	5000 20 3		272	251 8-10	/ St / FT	5417972	5312 03 5		320
219 20 ST FT	1500 / St / FT	5814450	5000 75 0		272	251 CU	/ Cu	5418030	5312 13 2		320
219 20 ST FT	1000 / St / FT	5018049	5000 74 2		272	252 8-10 CU	/ Cu	5418214	5312 41 8		278
219 25 OMEX FT	1500 / St / FT	5371359	5000 02 5		272	252 8-10 CU	/ Cu	5418214	5312 41 8		320
219 25 ST FT	1500 / St / FT	5111047	5000 76 9		272	252 8-10 FT	/ St / FT	5418092	5312 31 0		278
223 DIN MS	/ Zn / Cu	5423676	5335 25 6	/100 pc.	329	252 8-10 FT	/ St / FT	5418092	5312 31 0		321
223 DIN ZN	/ Zn / G	5423614	5335 20 5		329	252 8-10 V4A	/ V4A	5700869	5312 31 8		277
						252 8-10X16 CU	/ Cu	5418276	5312 44 2		278
						252 8-10X16 CU	/ Cu	5418276	5312 44 2		321
						252 8-10X16 FT	/ St / FT	5418153	5312 34 5		278

02 TBS-Katalog\_2010\_Neuer\_Stand / en / 29/03/2010 (LLExport\_00986)

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
252 8-10X16 FT	/ St / FT	5418153	5312 34 5	/100 pc.	321	280 VK	/ Zn	5421337	5320 05 4	/100 pc.	325
252 8-10XFL30 FT	/ St / F	5418399	5312 65 5		278						
252 8-10XFL30 FT	/ St / F	5418399	5312 65 5		320	287	/ Al	5421573	5320 70 4		326
253 10X16	/ St / F	5418573	5312 80 9		278	287 CU	/ Cu	5421511	5320 69 0		326
253 10X16	/ St / F	5418573	5312 80 9		321	288 DIN	/ Al	5421634	5320 71 2		326
253 8X8	/ St / F	5418337	5312 60 4		277	292 DIN	/ TG / F	5424994	5340 01 2		331
253 8X8	/ St / F	5418337	5312 60 4		320						
254 DIN 8-10 CU	/ Cu	5419112	5314 13 5		320	301 CU-100	/ Cu	5426370	5350 70 0		328
254 DIN 8-10 FT	/ St / FT	5418993	5314 03 8		320	301 CU-110	/ Cu	5426431	5350 71 9		328
						301 CU-120	/ Cu	5426493	5350 72 7		328
255 30	52/ St / FT	5419174	5314 51 8		277	301 CU-80	/ Cu	5426257	5350 68 9		328
255 A-FL30 FT	60/ St / FT	5419235	5314 53 4		277	301 CU-90	/ Cu	5426318	5350 69 7		328
256 A-DIN 30 FT	60/ St / FT	5419471	5314 65 8		277	301 DIN-100	/ St / FS	5425717	5350 10 7		327
256 A-DIN 40 FT	80/ St / FT	5419532	5314 66 6		277	301 DIN-110	/ St / FS	5425779	5350 11 5		327
						301 DIN-120	/ St / FS	5425830	5350 12 3		327
256 DIN 30 FT	60/ St / FT	5419297	5314 61 5		277	301 DIN-80	/ St / FS	5425595	5350 08 5		327
256 DIN 40 FT	80/ St / FT	5419358	5314 62 3		277	301 DIN-90	/ St / FS	5425666	5350 09 3		327
						301 S-100	/ St / FS	5426974	5351 05 7		328
259 8-10	/ TG / FT	5419716	5315 50 6		318	301 S-120	/ St / FS	5427032	5351 07 3		328
259 A FT	/ St / FT	5740414	5315 51 4		279	301 S-AL-100	/ Al	5890652	5351 35 9		328
259 A ST	/ St	5237198	5315 55 7		279	301 S-AL-120	/ Al	5890713	5351 37 5		328
259 A VA	/ V2A	5740353	5315 52 2		279	301 S-CU-100	/ Cu	5427216	5351 45 6		328
260 8	/ Zn / G	5419839	5315 70 0		318	301 S-CU-120	/ Cu	5427278	5351 47 2		328
260 8-10 MS	/ CuZn / Cu	5419778	5315 65 4		318	301 S-VA-100	/ V2A	5427094	5351 25 1		328
						301 S-VA-120	/ V2A	5427155	5351 28 6		328
262	/ St / FT	5419891	5316 01 4		324	301 V	/ St / FS	5426790	5350 86 7		327
262 A-DIN CU	/ Cu	5420071	5316 25 1		324	301 V-CU	/ Cu	5426851	5350 88 3		327
262 A-DIN FT	/ St / FT	5420019	5316 21 9		324	301 V-VA	/ V2A	5426912	5350 90 5		327
262 CU	/ Cu	5419952	5316 15 4		324	303 DIN-1	/ St / FT	5399971	5102 11 1		328
262 ZM	/ St / FT	5818359	5316 17 0		324	303 DIN-1 1/2	/ St / FT	5400097	5102 15 4		328
						303 DIN-1 1/4	/ St / FT	5400035	5102 13 8		328
264	/ St / F	5420316	5316 51 0		325	303 DIN-1/2	/ St / FT	5399858	5102 07 3		328
						303 DIN-2	/ St / FT	5400158	5102 19 7		328
264 CU	/ Cu	5420378	5316 55 3		325	303 DIN-2 1/2	/ St / FT	5400219	5102 21 9		328
						303 DIN-3	/ St / FT	5400271	5102 23 5		328
267	/ St / FT	5420132	5316 30 8		324	303 DIN-3 1/2	/ St / FT	5400332	5102 25 1		328
						303 DIN-3/4	/ St / FT	5399919	5102 08 1		328
267 VA	/ V2A	5420194	5316 32 4		324	303 DIN-3/8	/ St / FT	5399797	5102 05 7		328
						303 DIN-4	/ St / FT	5400394	5102 27 8		328
269 8-10	/ Zn / G	5420439	5317 01 0		322	311 N-ALU 16	/ Al	5631392	3049 34 5		284
269 MS	/ Zn / Cu	5420491	5317 05 3		322	311 N-ALU 8-10	/ Al	5631576	3049 25 6		284
270 8-10	/ St / FT	5420552	5317 20 7		322	311 N-CU 16	/ Cu	5631514	3049 30 2		284
270 CU	/ Cu	5420675	5317 25 8		322	311 N-CU 8-10	/ Cu	5631699	3049 20 5		284
						311 N-VA 16	/ V2A	5631453	3049 32 9		284
271 8-10	/ St / FT	5420798	5317 40 1		322	311 N-VA 8-10	/ V2A	5631637	3049 22 1		284
271 CU	/ Cu	5420910	5317 45 2		322	319 10	/ TG / F	5421931	5325 31 5		325
272 14	/ TG / FT	5421092	5318 14 9		322	319 8	/ TG / F	5421870	5325 30 7		325
272 8	/ TG / FT	5421030	5318 08 4		322	324 S-CU	/ Cu	5422532	5326 33 8		326
273 8-10	/ St / FT	5420613	5317 22 3		323	324 S-FT	/ St / FT	5422419	5326 30 3		326
273 CU	/ Cu	5420736	5317 27 4		323	324 S-VA	/ V2A	5422471	5326 31 1		326
274 8-10	/ St / FT	5420859	5317 42 8		323	330 K	/ PA	5401599	5201 10 1		294
274 CU	/ Cu	5420972	5317 47 9		323						
280 8-10	/ Zn / G	5421276	5320 01 1		325	356 100	100 10	5230595	2360 10 1	/pc.	284

# Type listing

Structure of the EAN number: Country code 40

Manufacturer code 1219 (for articles beginning with 0: 1010)

Individual EAN-C 5647589

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
356 100	100 10	5230595	2360 10 1	/pc.	334	856	/ Cu	5423430	5331 50 1	/100 pc.	327
356 50	50 10	5230533	2360 05 5		284						
356 50	50 10	5230533	2360 05 5		334	910 N 10x50 GRW	10 50/ PA	5229155	2349 10 8		334
						910 N 12x60 GRW	12 60/ PA	5229216	2349 12 4		334
364	/ St / FT	5244219	3051 01 3		335	910 N 5x25 GRW	5 25/ PA	5228851	2349 04 3		334
				/100 pc.		910 N 6x30 GRW	6 30/ PA	5228912	2349 05 1		334
366 35	35/ St / FT	5388876	5059 35 6		284	910 N 6x60 GRW	6 60/ PA	5228974	2349 07 8		334
366 50	50/ St / FT	5389057	5059 49 6		284	910 N 8x40 GRW	8 40/ PA	5229032	2349 08 6		334
370 H	55/ St / FT	5382690	5025 20 6		282	925 1	70 31,7-33,7 / St / G	5385455	5040 11 6		265
470 4-16	/ CuZn / N	5389231	5064 01 5		267	925 1 1/2	88 46,3-48,3 / St / G	5385578	5040 15 9		265
						925 1 1/4	81 40,4-42,4 / St / G	5385516	5040 13 2		265
				/pc.		925 1/2	56 19,3-21,3 / St / G	5385332	5040 07 8		265
480 180		5412571	5240 03 4		250	925 1/4	48 11,5-13,5 / St / G	5385219	5040 03 5		265
480 250		5412755	5240 07 7		250	925 3/4	62 24,9-26,9 / St / G	5385394	5040 09 4		265
480 350		5412694	5240 06 9		250	925 3/8	52 15,2-17,2 / St / G	5385271	5040 05 1		265
481		5412816	5240 08 5		250	927 0	/ CuZn / N	5388517	5057 50 7		264
482		5412632	5240 05 0		250	927 1	/ V2A	5388579	5057 51 5		264
483 SN		5450894	5239 91 4		251	927 2	/ V2A	5388630	5057 52 3		264
484 M12	13/ St / F	5412991	5240 22 0		250	927 2 6-K	/ V2A	5699651	5057 59 9		311
484 M16	17/ St / F	5413059	5240 23 9		250	927 4	/ V2A	5388692	5057 55 8		264
484 M20	21/ St / F	5413110	5240 24 7		250	927 BAND-VA	/ V2A	5805458	5057 92 2	/100 m	264
484 M24	25/ St / F	5413172	5240 25 5		250	927 SCH-K-VA	/ V2A	5805519	5057 93 0	/100 pc.	264
485 M10	11/ St / F	5413233	5240 30 1		250	928	240/ CuZn / N	5385936	5040 50 7		265
485 M12	13/ St / F	5413295	5240 32 8		250	937 50	100/ St / FT	5385998	5043 01 8		266
485 M16	17/ St / F	5413356	5240 33 6		250	939	300/ St / G	5386056	5043 10 7		266
485 M20	21/ St / F	5413417	5240 34 4		250	942 11	44 8-11 / Cu / N	5384557	5038 01 4		265
555 7.6x380 SW	7.6 x 380 102/ PA	5820215	2332 75 2	/100 pc.	313	942 15	50 13-15 / Cu / N	5384618	5038 03 0		265
708 30 HG	52/ St / G	5383659	5030 23 4		283	942 18	52 16-18 / Cu / N	5384670	5038 05 7		265
708 30 SP	52/ St / G	5383413	5030 02 1		282	942 22	55 19-22 / Cu / N	5384731	5038 07 3		265
708 40 HG	52/ St / G	5383710	5030 24 2		283	942 28	63 24-28 / Cu / N	5384793	5038 08 1		265
710 30	52/ St / G	5383055	5028 03 5		282	942 35	71 30-35 / Cu / N	5384854	5038 11 1		265
710 40	62/ St / G	5383116	5028 04 3		282	942 43	81 39-43 / Cu / N	5384915	5038 13 8		265
831 30	54/ St / FT	5383833	5032 03 2		282	942 49	86 44-49 / Cu / N	5384977	5038 15 4		265
831 30 M6	54/ St / FT	5383956	5032 23 7		282	950 Z 1	66 31,5-34,5 / Zn / G	5386353	5050 11 1		265
831 40	65/ St / FT	5383895	5032 04 0		282	950 Z 1 1/2	84 46,5-49,5 / Zn / G	5386476	5050 15 4		265
						950 Z 1 1/4	78 40,5-43,5 / Zn / G	5386414	5050 13 8		265
831 40 M6	65/ St / FT	5384014	5032 24 5		282	950 Z 1 3/4	88 51-54 / Zn / G	5386537	5050 17 0		265
832 30	55/ St / FT	5384137	5032 53 9		282	950 Z 1/2	54 20-22,5 / Zn / G	5386230	5050 07 3		265
						950 Z 1/4	45 12-14 / Zn / G	5386117	5050 03 0		265
832 40	65/ St / FT	5384199	5032 54 7		282	950 Z 2	96 58,5-61,5 / Zn / G	5386599	5050 19 7		265
833 35	60/ St / FT	5384434	5033 03 9		282	950 Z 3/4	61 25-28 / Zn / G	5386292	5050 08 1		265
835	/ St / FT	5433750	5033 20 9		281	950 Z 3/8	50 15,5-17,5 / Zn / G	5386179	5050 05 7		265
						951	120/ V2A	5386650	5051 50 9		266
853 DIN	/ St / F	5423379	5331 01 3		327	952 Z 1	77 30,5-33,5 / St / FT	5386957	5052 11 4		266

02 TBS-Katalog\_2010\_Neuer\_Stand / en / 29/03/2010 (LLEExport\_00986)

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
952 Z 1 1/2	94 45,5-48,5 / St / FT	5387077	5052 15 7	/100 pc.	266	1808	/ CuZn	5378075	5015 01 4	/pc.	260
952 Z 1 1/4	87 39,5-42,5 / St / FT	5387015	5052 13 0		266	1809	Grey/ CuZn	5378259	5015 07 3		259
952 Z 1/2	65 18,5-21,5 / St / FT	5386834	5052 07 6		266	1809 A	Black/ V2A	5959427	5015 11 1		262
952 Z 2	105 57-60 / St / FT	5387190	5052 18 1		266	1809 BG	Grey/ CuZn	5378372	5015 50 2		260
952 Z 3/4	71 24-27 / St / FT	5386896	5052 09 2		266	1809 M	Grey/ CuZn	5378310	5015 08 1		260
985 M6 25	25 4,3/ St / G	5250395	3133 02 8		334	1809 UP	/ CuZn	5378198	5015 06 5		261
985 M6 35	35 4,3/ St / G	5250456	3133 03 6		334	1810	/ St / F	5378136	5015 05 7		260
985 M8 35	35/ St / G	5250579	3133 23 0		335	1811	250/ St / FT	5377894	5014 01 8		281
1801 AH	/ PS	5378617	5015 70 7	/pc.	259	1811 L	400/ St / FT	5377955	5014 02 6		281
1801 KL1	212/ CuZn	5378730	5015 72 3		259	1813 DIN	/ St / FT	5378013	5014 21 2		280
1801 KL2	430/ CuZn	5378976	5015 80 4		259	1813 KL	/ St / FT	5901938	5014 42 5		279
1801 KL3	645/ CuZn	5379034	5015 81 2		259	1814 FT	/ St / FT	5105015	5014 46 8		280
1801 RK25	/ St / G	5378853	5015 75 8		258	1814 ST	/ St	5105077	5014 47 6		280
1801 RK30	/ St / G	5378792	5015 73 1		258	1816 F-1000X1000	/ St / FT	5376996	5009 23 5		276
1801 RK40	/ St / G	5455837	5015 77 4		259	1816 F-500X1000	/ St / FT	5376934	5009 22 7		276
1801 RK95	/ St / G	5378914	5015 76 6		258	1816 F-500X500	/ St / FT	5376873	5009 21 9		276
1801 SCH	Grey/ PS	5378679	5015 71 5		259	1818	/ St / FT	5377719	5012 01 5	/100 pc.	280
1801 VDE	Grey/ CuZn	5378556	5015 65 0		258	1819 20	/ TG / FT	5242710	3041 20 4	/pc.	273
1802 10 CU	/ Cu	5002260	5015 84 2		263	1819 20BP	/ TG / FT	5242772	3041 21 2		273
1802 10 VA	/ V2A	5002284	5015 86 6		263	1819 25	/ TG / FT	5242833	3041 25 5		273
1802 12 CU	/ Cu	5699354	5015 84 4		263	1819 25BP	/ TG / FT	5242956	3041 95 6		273
1802 14 CU	/ Cu	5699361	5015 84 7		263	1820 20	/ St	5243137	3042 20 0		273
1802 20 CU	/ Cu	5699408	5015 84 9		263	1820 25	/ St	5243199	3042 25 1		273
1802 5 CU	/ Cu	5002253	5015 83 0		263	2056N SAS 12 VA	8-12 / V2A	5432432	1167 01 4	/100 pc.	267
1802 5 VA	/ V2A	5002277	5015 85 4		263	2056N SAS 16 VA	12-16 / V2A	5432494	1167 02 2		267
1802 6 CU	/ Cu	5699330	5015 83 2		263	2056N SAS 22 VA	16-22 / V2A	5432555	1167 03 0		267
1802 8 CU	/ Cu	5699347	5015 83 6		263	2056N SAS 28 VA	22-28 / V2A	5432616	1167 04 9		267
1802 AH 10	/ V2A	5033677	5015 88 4		263	2056N SAS 8 VA	4-8 / V2A	5432371	1167 00 6		267
1802 AH 5	/ V2A	5033615	5015 88 0		263	2066 2M F	/ St / F	5046516	1117 02 5	/100 m	267
1802 KL	/ V2A	5033738	5015 89 0		263	2066 2M FS	/ St / FS	5046578	1117 03 3		267
1804	/ CuZn	5378495	5015 55 3		260	2500 20	/ St	5243311	3043 20 7	/pc.	273
1804 UP	/ CuZn	5378433	5015 54 5		261	2500 25	/ St	5243373	3043 25 8		273
1805 2 FT	200/ St / FT	5379096	5016 02 9		263	2510 20	/ St	5717492	3043 31 2		273
1805 2 FT	200/ St / FT	5379096	5016 02 9		281	2520 20	/ St	5243793	3043 70 3		274
1805 2 VA	200/ V4A	5922216	5016 09 6		281	2520 25	/ St	5243854	3043 75 4		274
1805 2 VA	200/ V4A	5922216	5016 09 6		263	2530 20	/ St	5243557	3043 40 1		274
1805 4 FT	302/ St / FT	5379157	5016 03 7		263	2530 25	/ St	5243618	3043 45 2		274
1805 4 FT	302/ St / FT	5379157	5016 03 7		281	2531 20	/ St	5642312	3043 90 8		274
1805 4 VA	302/ V4A	5800354	5016 11 8		281	2535 20	/ St	5453796	3043 91 6		274
1805 4 VA	302/ V4A	5800354	5016 11 8		263	2535 25	/ St	5453970	3044 91 2		274
1805 6 FT	404/ St / FT	5379218	5016 04 5		263	1807	/ Al	5379270	5016 14 2		281
1805 6 FT	404/ St / FT	5379218	5016 04 5		281						
1805 6 VA	404/ V4A	5922278	5016 12 6		281						
1805 6 VA	404/ V4A	5922278	5016 12 6		263						

# Type listing

Structure of the EAN number: Country code 40

Manufacturer code 1219 (for articles beginning with 0: 1010)

Individual EAN-C 5647589

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
2536 20	/ St	5643036	3044 90 4	/pc.	274	5052 V4A 30X3.5	30 x 3,5/ V4A	5800477	5018 70 6	/100 m	288
						5052 V4A 30X3.5	30 x 3,5/ V4A	5022015	5018 73 0		270
2536 25	/ St	5642978	3044 83 1		274	5052 V4A 30X3.5	30 x 3,5/ V4A	5022015	5018 73 0		288
2710 20	/ St / FT	5372370	5001 21 8		283	5700 A DIN		5400936	5106 02 8	/pc.	333
2710 25	/ St / FT	5372431	5001 22 6		283	5700 DIN		5400875	5106 00 1		333
2730 20 FT	/ St / FT	5372554	5001 40 4		283	5800 VA	/ V2A	5900436	5106 14 1		333
2730 20 VA	/ V2A	5635475	5001 36 6		283	5800 VZ	/ St / FS	5900375	5106 13 3		333
2730 25 FT	/ St / FT	5372615	5001 41 2		283	5900	/ St	5244813	3059 00 6		335
2745 20 MS	/ CuZn / Cu	5372851	5001 56 0		283	ASP-V11E1 4		5917717	5083 08 7		228
2745 20 MS	/ CuZn / Cu	5372851	5001 56 0		331	ASP-V24T 4		5917595	5083 06 0		228
2760 20 FT	101/ St / FT	5372912	5001 64 1		283	C 25-B+C 0		5919391	5095 60 3		142
2760 20 VA	101/ V2A	5635239	5001 61 7		283	C 25-B+C 0		5919391	5095 60 3		171
2760 25 FT	110/ St / FT	5372974	5001 66 8		283	C 25-B+C 1		5542957	5095 60 6		134
5000	/ St / F	5415695	5304 00 8	/100 pc.	316	C 25-B+C 1		5542957	5095 60 6		156
5001 DIN-FT	/ St / FT	5415879	5304 10 5		316	C 25-B+C 1		5542957	5095 60 6		171
5001 N-CU	/ Cu	5817574	5304 17 2		317	CNS 3-D-D	EN Black	5952817	5092 70 1		189
5001 N-FT	/ St / FT	5817512	5304 16 4		317	CNS-D-D	EN Light grey	5314837	5092 60 4		189
5001 ZN-CU	/ Zn / Cu	5415930	5304 11 3		316	DLS-BS		5685333	5082 38 2		228
5002 DIN-FT	/ St / FT	5416050	5304 20 2		317	DS-7 16 MW		5030881	5093 17 1		222
5003	/ TG / FT	5416234	5304 31 8		317	DS-BNC M/M		5391098	5093 26 0		221
5004 DIN-FT 12	/ TG / FT	5416357	5304 40 7		321	DS-BNC M/W		5391036	5093 25 2		220
5004 DIN-FT 20	/ TG / FT	5416418	5304 50 4		321	DS-BNC W/W		5390978	5093 23 6		220
5005 DIN-FT	/ St / F	5416470	5304 60 1		318	DS-F M/W		5022732	5093 27 5		222
5005 N-FT	/ St / FT	5817758	5304 66 0		318	DS-F W/W		5022619	5093 27 2		222
5009	/ St / F	5416951	5304 97 0		317	DS-N M/W		5805991	5093 99 6		221
5010 20 FT	/ St / FT	5503057	5304 52 0		321	DS-N W/W		5962243	5093 98 8		221
5011	/ St / FT	5417071	5304 99 7		280	DS-TNC MW		5087250	5093 27 0		221
5011	/ St / FT	5417071	5304 99 7		317						
5011 VA M10	/ V4A	5629115	5334 93 4		280	EKE-V		6001767	5492 80 7	/100 pc.	317
5011 VA M10	/ V4A	5629115	5334 93 4		317						
5011 VA M12	/ V4A	5959663	5334 94 2		280						
5011 VA M12	/ V4A	5959663	5334 94 2		317						
5052 DIN 20X2.5	/ St / FT	5680468	5019 34 0	/100 m	270	FC-D	EN Pure white	5035053	5092 80 0	/pc.	188
5052 DIN 20X2.5	/ St / FT	5680468	5019 34 0		288	FC-ISDN-D	EN Pure white	5047223	5092 81 2		189
5052 DIN 25X3	/ St / FT	5694007	5019 34 2		270	FC-RJ-D	EN Pure white	5047254	5092 82 8		189
5052 DIN 25X3	/ St / FT	5694007	5019 34 2		288	FC-SAT-D	EN Pure white	5035176	5092 81 6		188
5052 DIN 30X3	/ St / FT	5694014	5019 34 4		270	FC-TAE-D	EN Pure white	5035237	5092 82 4		188
5052 DIN 30X3	/ St / FT	5694014	5019 34 4		288	FC-TV-D	EN Pure white	5035114	5092 80 8		188
5052 DIN 30X3.5	/ St / FT	5680475	5019 34 5		288	FDB-2 24-M	32 22	5683339	5098 38 0		246
5052 DIN 30X3.5	/ St / FT	5680475	5019 34 5		270	FDB-2 24-N	32 22	5683384	5098 39 0		246
5052 DIN 30X3.5	/ St / FT	5680482	5019 34 7		288	FDB-3 24-M	32 22	5683346	5098 38 2		246
5052 DIN 30X3.5	/ St / FT	5680482	5019 34 7		270	FDB-3 24-N	32 22	5683391	5098 39 2		246
5052 DIN 30X4	/ St / FT	5680499	5019 35 0		288						
5052 DIN 30X4	/ St / FT	5680499	5019 35 0		270						
5052 DIN 40X4	/ St / FT	5680505	5019 35 5		288						
5052 DIN 40X4	/ St / FT	5680505	5019 35 5		270						
5052 DIN 40X5	/ St / FT	5680512	5019 36 0		288						
5052 DIN 40X5	/ St / FT	5680512	5019 36 0		270						
5052 V2A 30X3.5	30 x 3,5/ V2A	5800415	5018 50 1		270	F-FIX-10		5070054	5403 10 3	/100 pc.	293
5052 V2A 30X3.5	30 x 3,5/ V2A	5800415	5018 50 1		288						
5052 V4A 30X3.5	30 x 3,5/ V4A	5800477	5018 70 6		270	F-FIX-132	/ V2A	5613572	5403 33 0	/pc.	294

02 TBS-Katalog\_2010\_Neuer\_Stand / en / 29/03/2010 (LLExport\_00986)

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
F-FIX-16		5548713	5403 20 0	/100 pc.	292	isCon cut		5674641	5408 01 1	/pc.	311
F-FIX-B10	/ PP	5070085	5403 12 4		293	isCon DH	/ GFK	5674863	5408 04 3		313
F-FIX-B16	/ PP	5548959	5403 23 5		293	isCon H VA	/ V2A	5699668	5408 05 6		311
F-FIX-BASIS	/ PP	5034933	5403 32 4	/pc.	290	isCon H280 PA	/ PA	5674887	5408 04 9		313
F-FIX-JUNIOR	1000/ AI	5034872	5403 30 8		290	isCon H280 VA	/ V2A	5674870	5408 04 7		313
F-FIX-KL	/ V2A	5548775	5403 21 9	/100 pc.	293	isCon HS PA	/ PA	5674917	5408 05 4		312
F-FIX-S10		5070078	5403 11 7		293	isCon HS VA	/ V2A	5674726	5408 05 2		312
F-FIX-S16		5548898	5403 22 7		293	isCon PAE	/ V2A	5674719	5408 03 6		311
FL 20-CU	20 x 2,5/ Cu	5382331	5021 80 4	/100 m	270	isCon stripper		5674634	5408 00 9		311
FL 20-CU	20 x 2,5/ Cu	5382331	5021 80 4		288	isFang 3000	1240/ GFK	5670056	5408 94 2		313
FLD 110	122 86,2	5578413	5098 64 6	/pc.	238	isFang 3B-100	1000/ V2A	5670148	5408 96 8		290
FLD 12	13,5 9,5	5578376	5098 60 3		237	isFang 3B-100	1000/ V2A	5670148	5408 96 8		314
FLD 2-110	122 86,2	5578512	5098 85 9		240	isFang 3B-150	1500/ V2A	5674931	5408 96 9		290
FLD 2-12	13,5 9,5	5578444	5098 80 8		239	isFang 3B-150	1500/ V2A	5674931	5408 96 9		314
FLD 2-24	27 19	5578451	5098 81 6		239	isFang 3B-G1	270/ V2A	5674948	5408 97 1		291
FLD 24	27 19	5578383	5098 61 1		237	isFang 3B-G1	270/ V2A	5674948	5408 97 1		314
FLD 2-48	53 37,5	5578468	5098 82 4		239	isFang 3B-G2	340/ V2A	5674979	5408 97 2		291
FLD 2-5	8 5,5	5578529	5098 86 7		239	isFang 3B-G2	340/ V2A	5674979	5408 97 2		314
FLD 48	53 37,5	5578390	5098 63 0		237	isFang 3B-G3	430/ V2A	5674986	5408 97 3		291
FLD 5	6 4,2	5578369	5098 60 0		237	isFang 3B-G3	430/ V2A	5674986	5408 97 3		314
FLD 60	93 66	5578406	5098 63 8		238	isFang 5000	3340/ GFK	5670063	5408 94 6		313
FRD 110	122 86,2	5578338	5098 55 7		235	isFang TR100	40/ V2A	5670100	5408 95 6		314
FRD 12	13,5 9,5	5578291	5098 50 6		234	isFang TS40-50	40/ V2A	5670117	5408 95 8		314
FRD 2-24	27 19	5578420	5098 72 7		236	isFang TS50-60	30/ V2A	5670124	5408 96 0		315
FRD 24	27 19	5578307	5098 51 4		234	isFang TS50x50	30/ V2A	5670131	5408 96 4		315
FRD 24 HF	28 19,7	5578352	5098 57 5		233	isFang TW200	/ V2A	5670094	5408 95 4		314
FRD 2-5	6 4,2	5578437	5098 79 4		236	isFang TW30	30/ V2A	5670087	5408 95 2		314
FRD 48	53 37,5	5578314	5098 52 2		234	isFang TW80	80/ V2A	5670070	5408 95 0		314
FRD 5	6 4,2	5578284	5098 49 2		234	ISO-A-500	500/ AI	5542773	5408 80 6		310
FRD 5 HF	6 4,2	5578345	5098 57 1		233	ISO-A-800	800/ AI	5542834	5408 81 4		310
FS-V20	196 x 144 x 71	5397458	5099 80 3		251	ISOLAB	D/GB	5921738	5096 81 2		254
ISAV1000R	/ GFK	5004608	5408 84 9		310	KB MB		5709350	5089 66 0		183
ISAV1000W	/ GFK	5009733	5408 85 2		310	KB MB		5709367	5089 66 2		183
isCon 1000 SW		5674573	5408 00 2	/100 m	311	KNS IS-D		5688754	5092 52 3		192
isCon 1000 SW		5674627	5408 00 4		311	KNS-D		5864851	5092 50 7		192
isCon AP1-16 VA	/ V2A	5674696	5408 02 6	/pc.	313	KOAX B-E2 MF-C		5684916	5082 41 2		223
isCon AP2-16 VA	/ V2A	5674702	5408 02 8		313	KOAX B-E2 MF-F		5684855	5082 42 0		223
isCon connect	/ V2A	5674689	5408 02 2		311	LC 63		5509899	5096 97 0		125
						LE ERDER FT	1500/ St / FT	5617358	5000 30 0		272
						LE ERDER FT	1000/ St / FT	5018001	5000 29 7		272
						LE ERDER V4A	1500/ V4A	5708834	5000 33 5		272
						LE HAMMER-AC	/ St	5111641	3043 61 8		275
						LE HAMMER-B	/ St	5087137	3043 61 4		275
						LE HAMMER-B-II	/ St	5421627	3043 62 8		275
						LE HAMMER-H	/ St	5087076	3043 61 0		275
						LE HAMMER-SDS-M	/ St	5111160	3043 60 2		275
						LE HAMMER-W	/ St	5617419	3043 60 6		275
						LE KOPF	/ St / FT	5617297	3042 30 8		273
						LE SPITZE	/ St / FT	5617235	3041 40 9		273
						LFC		5425182	5096 78 6		254

# Type listing

Structure of the EAN number: Country code **40**

Manufacturer code **1219** (for articles beginning with **0: 1010**)

Individual EAN-C **5647589**

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
LSA-A-LEI	Grey	5525134	5084 00 8	/pc.	217	MC 125-B NPE		5966449	5096 86 3	/pc.	122
LSA-BF-180		5525370	5084 02 4		218	MC 50-B 0 VDE		5480730	5096 82 0		124
LSA-BF-24		5525431	5084 02 8		218	MC 50-B 0-OS		5051428	5096 82 5		124
LSA-B-MAG		5525318	5084 02 0		217	MC 50-B 3		5077046	5096 87 6		123
LSA-E		5525493	5084 03 2		218	MC 50-B 3+1		5077084	5096 87 8		122
LSA-E-LEI	Red	5525257	5084 01 6		217	MC 50-B 3+1-OS		5288244	5096 83 2		122
LSA-G	Light grey/ PA	5110750	5084 04 8		219	MC 50-B 3-OS		5288237	5096 83 1		123
LSA-M	/ St	5525554	5084 03 6		218	MC 50-B U VDE		5480792	5096 83 9		125
LSA-T-LEI	White	5525196	5084 01 2		217	MC 50-B VDE		5966388	5096 84 7		123
LSA-TOOL		5525615	5084 04 0		219	MC 50-B OS		5051411	5096 85 1		123
MB 1		5415732	5096 64 8		143	MC V3	/ Cu	5531135	5096 88 4		125
MB 1		5415732	5096 64 8		172	MC V4	/ Cu	5531197	5096 88 6		125
MB 1		5415732	5096 64 8		181	MCD 125-B NPE		5541394	5096 86 5		118
MB 1+FS		5415749	5096 64 9		143	MCD 50-B		5541158	5096 84 9		119
MB 1+FS		5415749	5096 64 9		172	MCD 50-B 0		5544517	5096 82 2		124
MB 1+FS		5415749	5096 64 9		181	MCD 50-B 0-OS		5051473	5096 82 7		124
MB 1+NPE		5415770	5096 65 0		143	MCD 50-B 3		5077077	5096 87 7		119
MB 1+NPE		5415770	5096 65 0		172	MCD 50-B 3+1		5077091	5096 87 9		118
MB 1+NPE		5415770	5096 65 0		181	MCD 50-B 3+1-OS		5288299	5096 83 6		118
MB 1+NPE+FS		5415787	5096 65 1		143	MCD 50-B 3+1-VG		5362036	5096 87 5		120
MB 1+NPE+FS		5415787	5096 65 1		172	MCD 50-B 3-OS		5288282	5096 83 5		119
MB 1+NPE+FS		5415787	5096 65 1		181	MCD 50-B 3-VG		5362029	5096 87 4		121
MB 2		5415794	5096 65 3		143	MCD 50-B OS		5051466	5096 85 2		119
MB 2		5415794	5096 65 3		172	MDP-2 D-24-T		5406860	5098 42 2		242
MB 2		5415794	5096 65 3		181	MDP-2 D-48-T		5406891	5098 44 2		243
MB 2+FS		5415800	5096 65 4		143	MDP-2 D-5-T		5406839	5098 40 4		241
MB 2+FS		5415800	5096 65 4		172	MDP-3 D-24-T		5406877	5098 42 7		242
MB 2+FS		5415800	5096 65 4		181	MDP-3 D-48-T		5406907	5098 44 6		243
MB 2+NPE		5067481	5096 65 5		143	MDP-3 D-5-T		5406846	5098 40 7		241
MB 2+NPE		5067481	5096 65 5		172	MDP-4 D-24-T		5406884	5098 43 1		242
MB 2+NPE		5067481	5096 65 5		181	MDP-4 D-24-T-10		5625131	5098 43 3		244
MB 2+NPE+FS		5067498	5096 65 7		143	MDP-4 D-48-T		5406914	5098 45 0		243
MB 2+NPE+FS		5067498	5096 65 7		172	MDP-4 D-5-T		5406853	5098 41 1		241
MB 2+NPE+FS		5067498	5096 65 7		181	MDP-4 D-5-T-10		5625124	5098 41 3		244
MB 3		5067504	5096 66 5		143	MK-B		5461111	5091 32 2	/VPE	255
MB 3		5067504	5096 66 5		172	MK-B		5461111	5091 32 2		333
MB 3		5067504	5096 66 5		181	M-Quick M25 SW	20-25 / PA	5505396	2153 78 7	/100 pc.	312
MB 3+FS		5067535	5096 66 7		143	ND-CAT6A/EA		5614364	5081 80 0	/pc.	223
MB 3+FS		5067535	5096 66 7		172	PCS		5461296	5091 43 8	/VPE	255
MB 3+FS		5067535	5096 66 7		181	PCS		5461296	5091 43 8		333
MB 3+NPE		5067542	5096 66 9		143	PCS-CS-D	EN	5461654	5091 68 3	/pc.	255
MB 3+NPE		5067542	5096 66 9		172	PCS-CS-D	EN	5461654	5091 68 3		334
MB 3+NPE		5067542	5096 66 9		181	PCS-CS-GB	GB	5896111	5091 69 1		255
MB 3+NPE+FS		5067559	5096 67 1		143	PCS-CS-GB	GB	5896111	5091 69 1		334
MB 3+NPE+FS		5067559	5096 67 1		172	PCS-H		5461470	5091 52 7	/VPE	255
MB 3+NPE+FS		5067559	5096 67 1		181	PCS-H		5461470	5091 52 7		333
MB 4		5067566	5096 68 0		143	PS3-B+C TNC+FS		5405535	5089 75 6	/pc.	146
MB 4		5067566	5096 68 0		172	PS3-B+C TNC-FS		5405528	5089 75 4		146
MB 4		5067566	5096 68 0		181	PS3-VA TNC		5405566	5089 76 8		148
MB 4+FS		5067597	5096 68 2		143	PS3-VA TNC+FS		5405580	5089 77 5		148
MB 4+FS		5067597	5096 68 2		172						
MB 4+FS		5067597	5096 68 2		181						
MB 50-3+NPE		5425144	5096 67 5		131						
MB 50-3+NPE+FS		5425151	5096 67 7		131						
MB-SG	Blue/ PA	5616375	5096 69 5		142						
MB-SG	Blue/ PA	5616375	5096 69 5		183						

02 TBS-Katalog\_2010\_Neuer\_Stand / en / 29/03/2010 (LLEExport\_00986)

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
PS4-B+C TNS+FS		5405559	5089 76 3	/pc.	145	RK-FIX CU	/ V2A / Cu	5433736	5316 46 8	/100 pc.	324
PS4-B+C TT+TNS		5405542	5089 76 1		145	RK-FIX VA	/ V2A	5433729	5316 45 9		323
PS4-VA TT+FS		5405597	5089 77 7		147						
PS4-VA TT+TNS		5405573	5089 77 0		147						
P-TK		5017387	5086 01 9		184	S 9-CU	9/ Cu	5382218	5021 65 0	/100 m	271
P-TK+SAT		5017448	5086 02 3		184	S 9-CU	9/ Cu	5382218	5021 65 0		289
P-TK+TV		5017509	5086 02 7		184					/pc.	
						SC-TELE 4-C-G		5834793	5081 68 8		214
						SC-TELE 4-C-G		5834793	5081 68 8		214
RD 10	/ St / FT	5381617	5021 10 3	/100 m	270	SD09-V11 9		5916277	5080 06 1		227
RD 10	/ St / FT	5381617	5021 10 3		288						
RD 10-ALU	/ Al	5381976	5021 30 8		270	SD09-V24 9		5915973	5080 05 3		226
RD 10-ALU	/ Al	5381976	5021 30 8		288	SD15-V24 15		5916031	5080 15 0		226
RD 10-CU	/ Cu	5382096	5021 50 2		271	SD25-V11 25		5916390	5080 28 2		227
RD 10-CU	/ Cu	5382096	5021 50 2		289	SD25-V24 25		5916215	5080 27 4		226
RD 10-PVC	/ St / FT	5381730	5021 16 2		271						
RD 10-PVC	/ St / FT	5381730	5021 16 2		289	SD-Fix		5670735	5403 33 5		294
RD 10-V2A	/ V2A	5801375	5021 22 7		271						
RD 10-V2A	/ V2A	5801375	5021 22 7		289						
RD 10-V2A	/ V2A	5680567	5021 23 9		271					/100 pc.	
RD 10-V2A	/ V2A	5680567	5021 23 9		289	SQ M6	M6 15/ PC	5016069	2146 50 9		312
RD 10-V4A	/ V4A	5902058	5021 64 2		289	SQ PP	6 30/ PA	5016182	2351 70 6		312
RD 10-V4A	/ V4A	5902058	5021 64 2		271						
RD 10-V4A	/ V4A	5680581	5021 64 7		289	SQ-20 SW	Jet black 29/ PP	5655367	2146 16 4		312
RD 10-V4A	/ V4A	5680581	5021 64 7		271						
RD 8-ALU	/ Al	5381914	5021 28 6		270					/pc.	
RD 8-ALU	/ Al	5381914	5021 28 6		288	S-UHF M/W		5390732	5093 02 3		220
RD 8-ALU-T	/ Al	5901273	5021 29 4		270						
RD 8-ALU-T	/ Al	5901273	5021 29 4		288	S-UHF W/W		5390671	5093 01 5		220
RD 8-CU	/ Cu	5382034	5021 48 0		271	TKS-B	170 120	5578277	5097 97 6		233
RD 8-CU	/ Cu	5382034	5021 48 0		289	TV 4+1		5022978	5083 40 0		222
RD 8-FT	/ St / FT	5381556	5021 08 1		270	ÜSM-A		5080886	5092 45 1		190
RD 8-FT	/ St / FT	5381556	5021 08 1		288						
RD 8-PVC	Cream / Al	5067474	5021 33 2		271	ÜSM-A-2		5247098	5092 46 0		190
RD 8-PVC	Cream / Al	5067474	5021 33 2		289	ÜSM-A-4		5613596	5092 47 2		190
RD 8-V2A	/ V2A	5680529	5021 23 5		271	ÜSM-A-TW		5613589	5092 47 0		190
RD 8-V2A	/ V2A	5680529	5021 23 5		289						
RD 8-V4A	/ V4A	5680574	5021 64 4		271	ÜSS 45-A-ALU	Aluminium paint	5006220	6117 46 7		191
RD 8-V4A	/ V4A	5680574	5021 64 4		289	ÜSS 45-A-RW	Pure white	6117611	6117 46 5		191
						ÜSS 45-O-ALU	Aluminium paint	5006213	6117 47 5		191
						ÜSS 45-O-RW	Pure white	6117673	6117 47 3		191
RJ11-TELE 4-C		5680536	5081 92 0	/pc.	214	V 10-C/1-280		5155287	5093 41 4		178
RJ11-TELE 4-C		5680536	5081 92 0		215						
RJ11-TELE 4-F		5680413	5081 93 9		215	V 20-C 3+NPE+FS		5616382	5094 76 4		153
RJ45 S-ATM 8-F		5462439	5081 79 3		223						
RJ45 S-E100 4-B		5239956	5081 72 6		224	V10 COMPACT 150		5246268	5093 37 8		176
RJ45 S-E100 4-C		5239895	5081 73 4		224	V10 COMPACT 255		5076551	5093 38 0		176
RJ45 S-E100 4-F		5239833	5081 74 2		224	V10 COMPACT 385		5126041	5093 38 4		176
RJ45-ISDN 4-C-G		5889458	5081 54 8		216	V10 COMPACT-AS		5299448	5093 39 1		176
RJ45S-V24T 4-F		5502630	5081 64 5		225	V10-C 0-150		5158103	5093 40 0		180
RJ45S-V24T 8-F		5502692	5081 64 7		225	V10-C 0-280		5012825	5093 40 2		180
						V10-C 0-320		5012832	5093 40 4		180
						V10-C 0-385		5004660	5093 40 6		180
RJ45-TELE 4-C		5791119	5081 96 3		215	V10-C 1+NPE-280		5382799	5093 41 8		178
RJ45-TELE 4-F		5791058	5081 97 1		215						
						V10-C 3+NPE		5363903	5094 92 0		178
						V10-C 3+NPE+FS		5363941	5094 93 1		178
RK-FIX	/ St / FT	5433682	5316 45 0	/100 pc.	323	V10-C 3+NPE-320		5363934	5094 92 4		179

# Type listing

Structure of the EAN number: Country code **40**

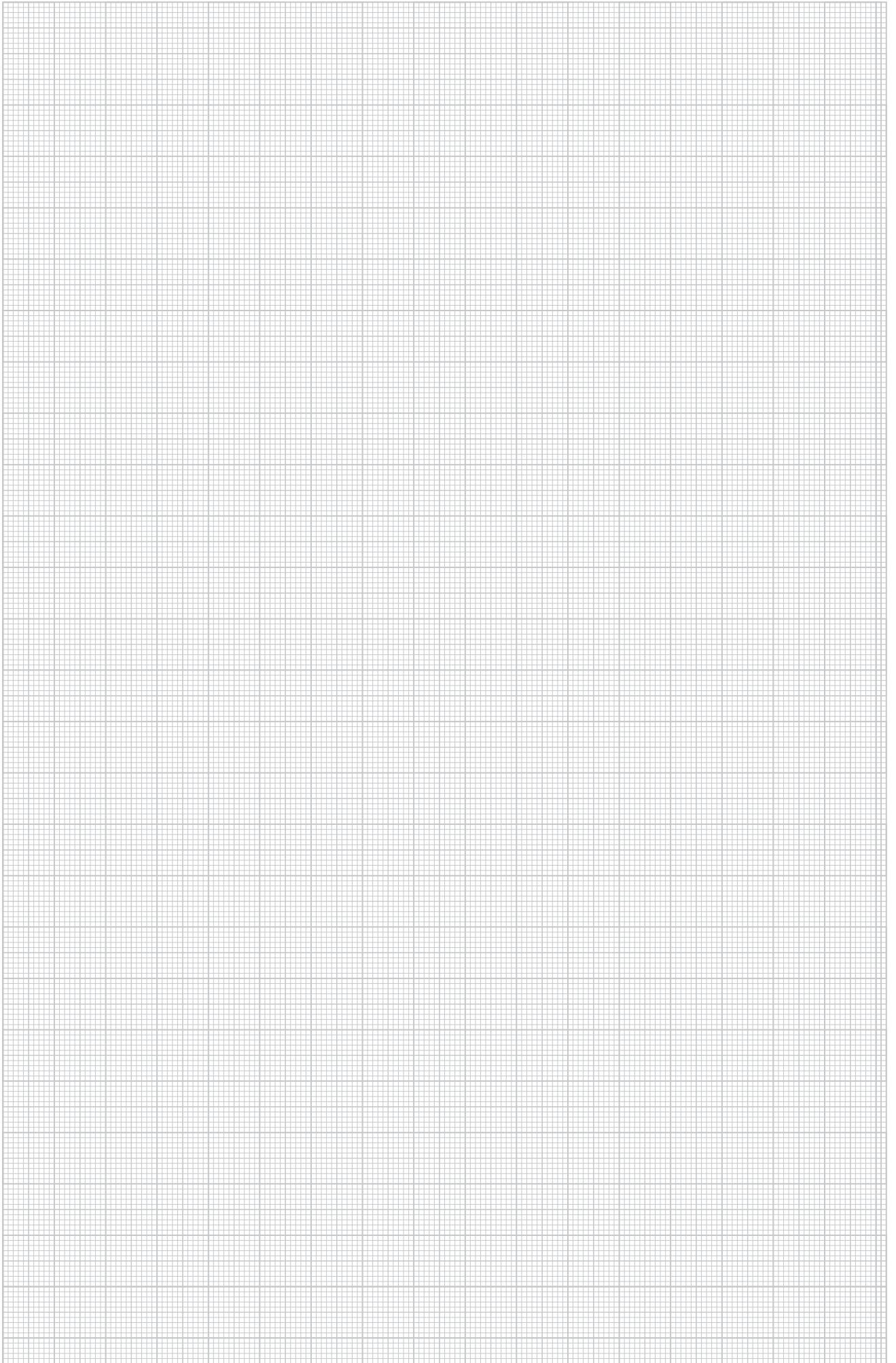
Manufacturer code **1219** (for articles beginning with **0: 1010**)

Individual EAN-C **5647589**

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page	Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page
V10-C 3+NPEFS320		5363958	5094 93 5	/pc.	179	V20-C U-3 AS		5393917	5096 42 1	/pc.	144
V20-C 0-150	200	5519133	5096 70 7		169	V20-C U-3 AS		5393917	5096 42 1		173
V20-C 0-280	350	5396918	5099 60 9		169	V20-C U-3 AS		5393917	5096 42 1		182
V20-C 0-300PV	300	5708902	5099 61 1		209	V20-C U-3 FS-SÜ		5393559	5096 35 9		144
V20-C 0-320-SP	420	5570318	5099 84 8		169	V20-C U-3 FS-SÜ		5393559	5096 35 9		173
V20-C 0-335	420	5481270	5099 85 0		170	V20-C U-3 FS-SÜ		5393559	5096 35 9		182
V20-C 0-385	505	5396857	5099 59 5		170	V20-C U-3+NPE		5063407	5096 37 0		144
V20-C 0-440	585	5942498	5099 70 6		170	V20-C U-3+NPE		5063407	5096 37 0		173
V20-C 0-500PV	500	5708933	5099 70 8		209	V20-C U-3+NPE		5063407	5096 37 0		182
V20-C 0-550	745	5396970	5099 61 7		170	V20-C U-3+NPE-AS		5247104	5096 37 2		144
V20-C 0-75	100	5396734	5099 57 9		169	V20-C U-3+NPE-AS		5247104	5096 37 2		173
V20-C 1+FS-280		5406679	5094 72 7		159	V20-C U-3+NPE-AS		5247104	5096 37 2		182
V20-C 1+NPE+FS		5382911	5094 76 0		157	V20-C U-3+PH-Y		5299455	5096 64 7		210
V20-C 1+NPE-150		5382966	5094 63 9		152	V20-C U-3+PH-Y-FS		5648499	5096 64 6		210
V20-C 1+NPE-280		5382973	5094 65 0		156	V20-C U-4 AS		5393979	5096 44 8		144
V20-C 1+NPE-385		5382980	5094 66 6		162	V20-C U-4 AS		5393979	5096 44 8		173
V20-C 1-150		5406617	5094 67 7		154	V20-C U-4 AS		5393979	5096 44 8		182
V20-C 1-280		5406594	5094 61 8		158	V20-C U-4 FS-SÜ		5393610	5096 36 7		144
V20-C 1-385		5406655	5094 70 3		163	V20-C U-4 FS-SÜ		5393610	5096 36 7		173
V20-C 1-550		5406662	5094 71 3		166	V20-C U-4 FS-SÜ		5393610	5096 36 7		182
V20-C 2+AS-280		5393672	5096 37 5		160	V20-VA 0		5807612	5099 61 3		171
V20-C 2+FS-280		5374923	5094 63 2		159	V20-VA 1-385		5406716	5099 47 5		168
V20-C 2+FS-550		5374985	5094 63 6		167	V25-B+C 0-150	200	5965664	5097 08 8		141
V20-C 2+NPE+FS		5240235	5094 76 2		157	V25-B+C 0-280	350	5394099	5097 05 3		141
V20-C 2+NPE-150		5240044	5094 64 1		152	V25-B+C 0-320	420	5711551	5097 29 0		141
V20-C 2+NPE-280		5240068	5094 65 3		156	V25-B+C 0-385	505	5766636	5097 06 1		141
V20-C 2+NPEFS15		5240228	5094 75 0		153	V25-B+C 0-450PV	450	5708896	5097 06 5		209
V20-C 2-150		5382881	5094 67 9		154	V25-B+C 1+NPE		5382850	5094 45 7		134
V20-C 2-280		5382867	5094 62 1		158	V25-B+C 1+NPE+FS		5374886	5094 44 4		135
V20-C 2-385		5382898	5094 70 4		163	V25-B+C 1-150		5457473	5094 40 1		133
V20-C 2-550		5382904	5094 71 4		166	V25-B+C 1-280		5406556	5094 41 8		136
V20-C 2-PH-1000	1000	5478669	5094 61 7		203	V25-B+C 1-385		5406563	5094 43 1		140
V20-C 2PH-600	600	5708889	5094 61 3		202	V25-B+C 1NPE150		5382843	5094 44 8		132
V20-C 2PHFS-1000	1000	5709114	5094 61 5		203	V25-B+C 1NPEFS38		5374916	5094 44 6		139
V20-C 2PHFS-600	600	5709077	5094 57 2		202	V25-B+C 2+NPE		5239826	5094 46 0		134
V20-C 3+AS-280		5393733	5096 38 3		160	V25-B+C 2-150		5382812	5094 40 3		133
V20-C 3+FS-280		5240198	5094 73 1		159	V25-B+C 2-280		5382829	5094 42 1		136
V20-C 3+FS-385		5240280	5094 78 0		164	V25-B+C 2-385		5382836	5094 43 4		140
V20-C 3+FS-550		5240334	5094 79 2		167	V25-B+C 2NPE150		5239802	5094 45 1		132
V20-C 3+FS-SÜ		5393191	5096 25 1		161	V25-B+C 2-PH900	900	5478690	5097 45 7		201
V20-C 3+NPE+AS		5617471	5096 39 7		157	V25-B+C 2PHFS900	900	5709138	5097 45 8		201
V20-C 3+NPE+FS		5240242	5094 76 5		157	V25-B+C 3+AS		5945314	5097 18 5		137
V20-C 3+NPE-150		5240051	5094 64 4		152	V25-B+C 3+NPE		5239864	5094 46 3		134
V20-C 3+NPE-280		5240099	5094 65 6		156	V25-B+C 3+NPE+AS		5617532	5097 43 2		135
V20-C 3+NPE-385		5240112	5094 66 8		162	V25-B+C 3+NPE-FS		5239949	5094 51 0		135
V20-C 3+NPEFS38		5240303	5094 78 8		162	V25-B+C 3-280		5239734	5094 42 3		136
V20-C 3-150		5240129	5094 68 0		154	V25-B+C 3-385		5239758	5094 43 7		140
V20-C 3-280		5240020	5094 62 4		158	V25-B+C 3-FS280		5239925	5094 49 0		137
V20-C 3-385		5240150	5094 70 5		163	V25-B+C 3NPE150		5239819	5094 45 4		132
V20-C 3-550		5240174	5094 71 5		166	V25-B+C 3NPE385		5239888	5094 47 8		139
V20-C 3-PH-1000	1000	5478621	5094 60 8		203	V25-B+C 3NPEAS38		5542056	5097 11 1		139
V20-C 3PH-600	600	5708872	5094 60 5		202	V25-B+C 3NPEFS38		5239994	5094 52 6		139
V20-C 3PHFS-1000	1000	5648482	5094 57 4		203	V25-B+C 3-PH900	900	5478683	5097 44 7		201
V20-C 3PHFS-600	600	5709084	5094 57 6		202	V25-B+C 3PHFS900	900	5709121	5097 44 8		201
V20-C 4+AS-280		5393795	5096 39 1		160	V25-B+C 4+AS280		5394211	5097 19 3		137
V20-C 4+FS-280		5240204	5094 73 4		159	V25-B+C 4+FS-SÜ		5394396	5097 35 5		138
V20-C 4+FS-385		5240297	5094 78 3		164	V25-B+C 4-280		5239741	5094 42 6		136
V20-C 4+FS-550		5240341	5094 79 5		167	V25-B+C 4-385		5239765	5094 44 0		140
V20-C 4+FS-SÜ		5393252	5096 27 8		161	V25-B+C 4-FS280		5239932	5094 49 3		137
V20-C 4-280		5240037	5094 62 7		158	V25-B+C 4-FS-G		5240013	5094 55 2		138
V20-C 4-385		5240167	5094 70 8		163	V50-B+C 0-280	350	5361954	5093 72 4		130
V20-C 4-550		5240181	5094 71 8		166	V50-B+C 0-300PV	300	5708841	5093 72 6		209
V20-C U-2 AS		5393856	5096 41 3		144	V50-B+C 1+NPE		5688426	5093 65 3		128
V20-C U-2 AS		5393856	5096 41 3		173	V50-B+C 1+NPE+FS		5688433	5093 66 1		128
V20-C U-2 AS		5393856	5096 41 3		182	V50-B+C 2-PH600	600	5478553	5093 62 8		200
V20-C U-2 PH		5464457	5096 63 7		210	V50-B+C 2PHFS600	600	5709060	5093 62 9		200
V20-C U-2 PH+FS		5464464	5096 63 9		210	V50-B+C 3+FS280		5361916	5093 64 3		129
						V50-B+C 3+NPE		5425120	5093 65 4		128
						V50-B+C 3+NPE+FS		5425137	5093 66 2		128
						V50-B+C 3-280		5361893	5093 62 7		129
						V50-B+C 3-PH600	600	5478546	5093 62 3		200
						V50-B+C 3PHFS600	600	5709022	5093 62 5		200
						V50-B+C 4		5361909	5093 63 1		129
						V50-B+C 4+FS		5361923	5093 64 7		129

02 TBS-Katalog\_2010\_Neuer\_Stand / en / 29/03/2010 (LLEExport\_00986)

Type	Dimensions/Colour/Div.	EAN-C.	Art. no.	Price	Page					
VB-MDP 10-MD	/ Cu	5410461	5098 47 0	/pc.	245					
VB-MULTIBASE250		5237358	5089 65 5		142					
VB-V10 COMPACT-2		5237341	5089 65 0		177					
VB-V10 COMPACT-4		5299400	5089 65 2		177					
VF110-AC DC	150	5578154	5097 63 1		194					
VF110-AC DC	150	5578154	5097 63 1		230					
VF110-AC DC-FS	150 200	5578192	5097 84 6		195					
VF110-AC DC-FS	150 200	5578192	5097 84 6		231					
VF12-AC DC	13,5	5578116	5097 45 3		193					
VF12-AC DC	13,5	5578116	5097 45 3		229					
VF2-110-AC/DCFS	150 200	5578253	5097 93 5		196					
VF2-110-AC/DCFS	150 200	5578253	5097 93 5		232					
VF2-230-AC/DC-FS	255 350	5578260	5097 93 9		196					
VF2-230-AC/DC-FS	255 350	5578260	5097 93 9		232					
VF2-24-AC/DC-FS	34 46	5578246	5097 93 1		196					
VF2-24-AC/DC-FS	34 46	5578246	5097 93 1		232					
VF230-AC/DC	255	5578161	5097 65 0		194					
VF230-AC/DC	255	5578161	5097 65 0		230					
VF230-AC/DC-FS	350 255	5578208	5097 85 2		195					
VF230-AC/DC-FS	350 255	5578208	5097 85 2		231					
VF230-AC-FS	255	5578215	5097 85 8		195					
VF230-AC-FS	255	5578215	5097 85 8		231					
VF24-AC/DC	34	5578123	5097 60 7		193					
VF24-AC/DC	34	5578123	5097 60 7		229					
VF24-AC/DC-FS	34 46	5578185	5097 82 0		195					
VF24-AC/DC-FS	34 46	5578185	5097 82 0		231					
VF48-AC/DC	60	5578130	5097 61 5		193					
VF48-AC/DC	60	5578130	5097 61 5		229					
VF60-AC/DC	80	5578147	5097 62 3		193					
VF60-AC/DC	80	5578147	5097 62 3		229					
VG 3-B TNC		5531074	5089 21 2		121					



# Terms and conditions of sale and delivery of the companies OBO BETTERMANN GmbH & Co. KG and OBO BETTERMANN Projekt und Systemtechnik GmbH, and OBO Befestigungselemente GmbH, Menden

1. All our supplies and services shall be governed exclusively by the following terms and conditions, including our additional terms and conditions for cable tray business transactions. Any terms and conditions of business and purchasing of the customer shall be valid only if we have acknowledged them in writing. Our quotations are without engagement; they are mere invitations to submit contract offers. Any and all transactions and agreements, including those entered into by our employees and agents shall only be binding upon our written confirmation or invoicing. The foregoing provision shall also apply to any modifications of the agreed formal requirements.

2. The documents and data pertaining to the quotation, such as illustrations, brochures, drawings, dimensions, loading capacity values and weight details are approximate only, unless they are expressly stipulated to be binding.

Samples are non-binding samples for inspection. Any purchase according to sample will be subject to customary deviations and variations resulting from normal production processes. The properties of the sample shall be no guaranteed quality of the purchase object unless expressly stated otherwise in the confirmation of order. Samples must be returned to us at the latest within four weeks in perfect condition. If they are not returned within this period in proper condition, we shall be entitled to charge the purchase price for the sample in accordance with our current price list. All information on our products, in particular the illustrations, drawings, weight, dimension and performance data included in our quotations and printed matter shall be regarded as approximate average values and shall not represent any quality guarantee.

With regard to products made according to customer drawings, samples and other instructions of the customer, we will not provide any warranty nor assume any liability for the due and proper functioning of the product or for any other defects if and to the extent they are based upon the customer's specifications. The customer shall indemnify us from any third party claims, including claims for product liability as may be asserted against us for damages resulting from the products unless we have caused such damages by intent or gross negligence. The customer shall warrant that the manufacture and supply of products made in accordance with his instructions will not infringe any proprietary rights of third parties. Should any proprietary rights be asserted against us, we shall be entitled, without any legal review of the third party claims, to withdraw from the contract after hearing the customer, unless the third party withdraws the claims asserted against us under its proprietary rights within eight days by written declaration. The customer shall compensate us for any damage sustained as a result of the assertion of proprietary rights. In case of withdrawal, the work we have carried out so far shall be remunerated. Further rights under the statutory provisions shall not be affected thereby.

Any moulds, tools and design data produced by us for the execution of the order shall be our exclusive property. Unless expressly agreed otherwise, the customer shall not have any claims thereto, even if he has contributed to the costs of producing any such moulds, tools and design data.

3. The packing, shipping route and means of transportation shall be left to our discretion in the absence of any other agreements. They shall be charged at their cost price. We will take back undamaged cases, when being returned carriage paid, at 2/3 of the amount invoiced. The one-way or pool pallets used for transport shall be either exchanged upon taking delivery or returned. The smallest packing units stocked and listed may not be broken up for rationalisation reasons. In case of orders for different quantities, the nearest packing unit will be supplied.

We reserve the right to deviate from the agreed delivery quantity, in particular in the case of custom-made products, to a customary extent or in conformity with national or international standards. In case of a demand for adhering to a precise quantity, an express reference is necessary and subject to confirmation.

Master and call orders shall oblige the customer to accept the total quantity on which the master/call order is based. Where no particular call orders are specified in the contract, the total quantity of the master call order must be called within twelve months. If the customer fails to adhere to call deadlines, we shall be entitled to deliver and charge the total quantity in full after four weeks from written notice with reference to the consequences of any failure to call. Our rights arising from any default of the customer shall not be affected thereby.

4. Unless otherwise agreed, our prices are quoted ex works and do not include packing and insurance. The value added tax at the rate applicable on the date of dispatch will be added to our prices. The purchaser shall ensure the correctness of his VAT identification number, which he must notify to us immediately without being asked. He shall undertake to inform both us and the competent domestic tax authority without delay of any change in his name, address and VAT identification number.

Delivery shall be franco domicile within Germany, i.e. carriage and packing prepaid, if the net order value is in excess of € 1,200. For small orders below € 100 (net excluding value added tax), we shall invoice a lower quantity surcharge of € 10 (net) per order. Upon transfer of our supplies and services to a carrier or forwarding agent, at the latest upon their leaving our warehouse or supply plant, the risk shall pass to the recipient, even in case of deliveries free place of destination.

5. Delivery periods and delivery deadlines shall be approximate only unless we have expressly stated in writing that they are binding. Delivery periods shall commence upon receipt of our confirmation of order, but not before clarification of all execution details, ex place of delivery. The customer shall only be entitled to withdraw from the contract after having granted a reasonable extension of time. We reserve the right to make partial deliveries. Claims for damages and reimbursement of expenses - for any reason whatsoever - shall be subject to the provisions set out in article 10.

In the event of any circumstances that are beyond our control within the scope of normal operating risks and obstruct or make impracticable any delivery, we shall be entitled to suspend delivery by the duration of such obstruction plus a reasonable start-up period or to withdraw from the contract for the part not yet fulfilled. The purchaser can demand a statement from us as to whether we wish to deliver within a reasonable period or withdraw. If we fail to make such a statement, the purchaser may withdraw. Our notice to the purchaser shall be deemed to be sufficient evidence that we have been prevented from delivering.

Delivery time is extended in case of such events as labour disputes, strikes and lockouts, orders from the authorities, difficulties with the procurement of materials, spoiled work or post-processing, shutdowns and staff shortage as well as shortage of means of transport, and general occurrence of unforeseen events beyond our scope of influence, by the length of duration of these events.

6. Payments shall be made upon receipt of invoice less a 3% cash discount for payment within 10 days or net after 30 days from date of invoice. Erection work and all paid labour work must be paid within 10 days without deduction of any cash discount. In case of non-cash payments, the date of the credit note will be deemed to be the date of receipt of payment. Payments received shall always be credited first against costs, then against interest and then against the earliest liability. Cheques and bills of exchange shall only be accepted as means of payment. Any payment by bill of exchange shall be subject to a prior separate and written agreement, whereby all bill costs shall be borne by the customer and no discount can be granted. The customer shall have no right to refuse performance and no right of retention - for any legal reason whatsoever - unless we have acknowledged his claim beforehand in writing or his claim has the force of law.

The customer shall only be entitled to set off claims which have the force of law, are undisputed or acknowledged by us in writing.

7. We shall retain title to the goods supplied by us until all our claims arising from our business transactions with the customer have been satisfied - current account clause - and all bills of exchange or cheques submitted for payment by the customer have been honoured.

Any treatment or processing of goods subject to our retention of title (reserved goods) shall be carried out for us as the manufacturer in accordance with § 950 BGB (German Civil Code) without any obligation on our part. If our reserved goods are to be regarded as the main item or the main item is owned by the customer, full title to the new item shall pass to us when it is created. In other cases, we shall acquire a co-ownership interest in the new item in the proportion of the sales value of our reserved goods to the other goods used for the new item at the time of processing, intermingling, joining or mixing. The customer shall take custody of our ownership or co-ownership interest free of charge; it shall be treated as reserved goods.

Before transfer of title, our goods shall be neither pledged nor assigned as collateral without our prior consent. In addition, any third party rights or pledges shall be notified to us immediately and we shall be given all details and provided all documents necessary for intervention; otherwise the customer must bear our loss. In the latter case, our total claims against the customer shall also be immediately payable.

The customer shall be entitled to sell or to use our reserved goods in the ordinary course of business subject to the condition that the relevant claims are transferred in accordance with article 8 below. This right shall lapse upon the customer's failure to promptly meet his payment obligations towards us or in the event of any cheque or bill protests or his suspension of payments. In such cases, we shall be entitled to take back the goods provisionally at the

customer's expense and to sell them at our duly exercised discretion after a corresponding reminder has been sent to the customer. We will then pass the due amount to the customer's credit.

8. If our goods are sold before payment of our claim, the customer shall be obliged to retain our title against his purchaser until the goods have been paid for in full by the purchaser. The claim arising against the purchaser from such resale as well as any other ancillary rights or security interests of the customer resulting from the sale and any claims for compensation in case of damage to or destruction of our reserved property, including the relevant insurance sum shall hereby be assigned to us. We hereby accept this assignment. Where our co-ownership interest is sold, the relevant claims shall be assigned in the amount corresponding to the value of our interest.

The customer shall, at our request, inform us of his purchasers, notify them of the assignment made and provide us with any and all documents required to assert our rights.

As long as the customer meets his contractual obligations without delay, he shall be authorised to collect the claims assigned. He shall keep the amounts collected on our behalf separately and remit them to us immediately as soon and as far as our claims become due. The authorisation shall lapse in case of any cheque or bill protest of the customer or his definite suspension of payments. The customer shall bear the costs incurred for any action taken against third parties and shall advance them upon request.

If the security provided to us by the retention of title and the anticipatory assignment should exceed the claims to be secured by more than 20%, we shall, at the customer's request, release paid supplies of our choice. Upon payment of all our claims by the customer, assigned claims shall pass to the customer.

9. Any complaints for obvious defects regarding the quantity or quality of our supplies and services that are identifiable upon careful inspection shall without delay, but at the latest within the period of limitation of eight days from arrival of the goods at the address of the customer or the person appointed by him, be notified in writing to us, not to our representatives. Slight deviations in dimensions and designs within the scope of defined technical tolerances shall not give rise to any right of complaint. Any rejected goods may only be returned to us with our prior written authorisation.

In case of justified complaints within the prescribed period, we shall, at our option, take remedial action by way of subsequent performance, by rectifying the defect, supplying non-defective goods or providing a credit note for the lower value calculated.

We shall be entitled to refuse subsequent performance in accordance with the statutory provisions. If we refuse subsequent performance, if any subsequent performance remains unsuccessful or if the customer cannot be reasonably expected to accept any subsequent performance, the latter shall be entitled to withdraw from the contract in compliance with the provisions of the following sentences. The customer shall only be entitled to withdraw from the contract - where a withdrawal is not excluded by law - upon the unsuccessful expiry of a reasonable period for subsequent performance set by him, unless this period was not required under the statutory provisions (§§ 281 para. 2, 323 para. 2, 440, 441 para. 1 BGB (German Civil Code)).

In case of his withdrawal, the customer shall be liable for any deterioration, destruction or loss of use resulting from any negligence or intent on his part. Any claims for damages or reimbursement of expenses of the customer shall be subject to the provisions set out in article 10.

In the case of any fraudulent concealment of a defect or in the case of any provision of a quality guarantee for the goods sold at the time of the passing of risk within the meaning of § 444 BGB (German Civil Code) (seller's declaration that the object sold has a specific property at the time of the passing of risk and that the seller, regardless of any fault on his part, intends to be answerable for any and all consequences resulting from its absence), the customer's rights shall be exclusively governed by the statutory provisions.

We shall - in addition to the statutory grounds for refusal - also be entitled to refuse subsequent performance if and as long as the customer fails to send us, at our request, the rejected goods or a sample thereof, the customer shall have no right of withdrawal for any such refusal. We may further refuse any subsequent performance if the goods concerned have been altered or modified without our consent unless the customer can prove that the defect was not caused by such alteration or modification.

The limitation period for any claims arising from defects shall be one year; in the case of goods which have been used in accordance with their intended purpose for a building and have caused its defectiveness, the limitation period shall be two years. The provisions of §§ 478, 479 BGB (German Civil Code) on recourse in the chain of suppliers shall not be affected thereby.

10. In the case of a pre-contractual, contractual or non-contractual breach of duty, including unsatisfactory delivery, tortious conduct and producer's liability, we shall only be liable for compensatory damages and reimbursement of expenses - subject to further contractual or statutory liability requirements - in the case of intent, gross negligence or slightly negligent breach of a material contractual duty (contractual duty the infringement of which jeopardises the fulfilment of the object of the contract). However - except in the case of intent - our liability shall be limited to the typical contractual damage that was foreseeable at the time the contract was entered into.

The purchaser shall not be permitted to make a claim for expenses incurred in vain.

Except for any breach of material duties, our liability for slight negligence shall be excluded, but in any case be limited to the amount of the purchase price.

Any claim asserted by the customer or a third party for payment of a contractual penalty shall be excluded.

With regard to damages caused by delay, we shall only be liable for slight negligence up to the amount of 5% of the purchase price agreed with us.

The exclusions and limitations of liability set forth above shall not apply in the event that a guarantee is given with respect to the quality of the object sold within the meaning of § 444 BGB (German Civil Code) if a defect is fraudulently concealed or in the event of injury to life, physical injury or injury to health, or strict liability under the German Product Liability Act.

Any and all claims for damages against us, for any legal reason whatsoever, shall become statute-barred at the latest after one year from delivery of the goods to the customer, in the case of tortious liability from the time of knowledge, or grossly negligent ignorance, of the circumstances giving rise to the claim and the person liable to pay damages. This provision shall not apply in the case of liability for intent and in the event that a guarantee is given for the quality of the object sold, in the case of fraudulent concealment of a defect or in the event of injury to life, physical injury or injury to health, or strict liability under the German Product Liability Act. Any shorter limitation periods shall take precedence.

11. We shall be entitled to process and store any customer data obtained with regard to or in connection with the business relationship in accordance with the German Federal Data Protection Act, irrespective of whether such data is provided by the purchaser himself or by any third parties.

12. Place of performance for delivery and payment is Menden/Sauerland. The court of competent jurisdiction for any and all disputes, including disputes with regard to bills of exchange and cheques, is the Local Court (Amtsgericht) of Menden or, at our option, the District Court (Landgericht) of Arnsberg, irrespective of the value of the object in dispute. We shall, however, also be entitled to take legal proceedings against the customer at the place of his registered office.

German law shall be exclusively applicable. The application of international purchase laws is hereby excluded.

Should, for any reason whatsoever, individual provisions of our terms and conditions of sale and delivery be invalid, the validity and binding nature of the other provisions shall not be affected thereby. The customer agrees, that the invalid provision shall be replaced by a valid provision that comes as close as possible to the economic meaning of the invalid provision.

13. The prices of products made of brass and copper are subject to certain fluctuations that are based on the relevant DEL listings. The prices of our brass articles are based on a DEL listing of € 150 for Ms 58, those of our copper products on a DEL value for electrolyte copper of € 200.

In case of any increase or reduction in these prices by more than € 15, a five per cent surcharge or deduction shall be made for each 15 points. The calculation of any such surcharges or deductions shall be based on the DEL listing of the date of our receipt of the order.

Valid from August 2004



#### **QR Code**

The QR Code gives you direct access to our products on the Internet.

You can find further information on the QR Code at [www.obo-bettermann.com](http://www.obo-bettermann.com).

#### **OBO Bettermann GmbH & Co. KG**

PO Box 1120  
58694 Menden, Germany

#### **Customer Service Germany**

Tel. +49 (0)2373 89-1500  
Fax +49 (0)2373 89-7777  
E-mail: [info@obo.de](mailto:info@obo.de)

[www.obo.de](http://www.obo.de)