Actuators and sensors from Malux

Actuators and sensors for HVAC systems

ExMax quarter turn actuators
Ex II 2GD

RedMax quarter turn actuators
Ex II 3GD

ExTurn quarter turn actuators
Ex II 2G

ExPlus linear actuators
Ex II 2GD

ExVent actuators for valves
Ex II 2GD

ExLine transducers
Ex II 1G / EEx [ia]

ExSens sensors
Ex II 1G / EEx ia

ExMag door holders
Ex II 2GD

Malux

Malux

SCHISCHEK EXPLOSIONPROOF

Did you forget anything?!

Which components have to be explosion proof?

In the diagram below demonstrating Ex and safe areas, you can see which equipment is allowed in the Ex area and which should only be placed in the safe area. If in doubt, you can consult us at Malux Finland Oy (phone +358 19 5745 700 or fax +358 19 5745 750) and we will advise you. A brief discussion in the early stages of planning can avoid substantial costs in remedial work later and give you the peace of mind that you have a safely installed and operating system.

Air dampers

Type
ExMax
RedMax
ExTurn

5...100 Nm
with/without spring return
On-off, 3-pos, modulating

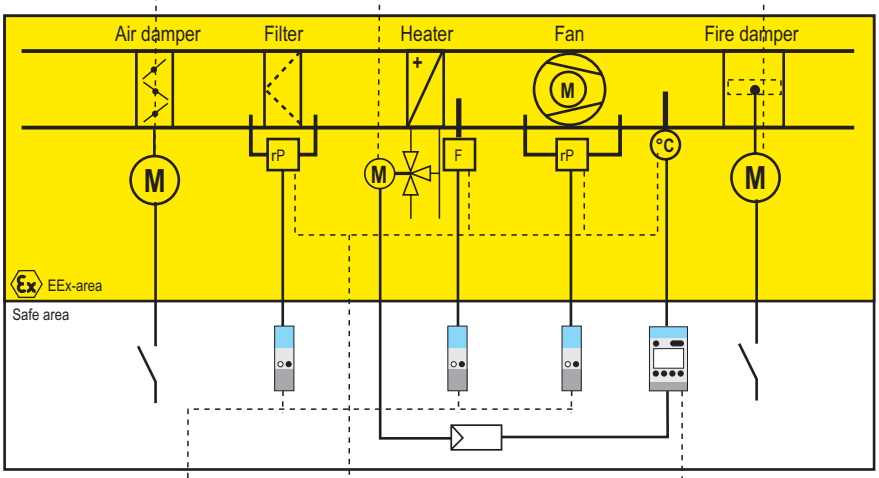
Motorized valve: heating, cooling

Type
EXV - 8.../8...-F16'
EXV - 20...
EXV - 45...
On-off, 3-pos, modulating
with/without spring return
800...4500 N

Fire / smoke dampers

Type
ExMax
RedMax
ExTurn

On-off
spring return
5...50 Nm



Switching module for: Filter, frost, belt protection, ...

Type
EXL - IRU-1

Contacts
Namur

Passive sensors with EEx-i manufacturer certificate

Type
ExSens

Temperature
Humidity
Belt protection
Pressure
Differential pressure

Transducer for: Temp., humidity, pressure

Type
EXL - IMU-1

Pt 100/200/500
Pt 1000
Ni 100/200/1000
0...1/0...10 KOhm
other sensors

Checklist

air damper	**YES**	**NO**
outside air damper	❒	❒
circulating air damper	❒	❒
supply air damper	❒	❒
mixing damper	❒	❒
fire damper	❒	❒
smoke extraction damper	❒	❒
.....	❒	❒
valves/fittings	**YES**	**NO**
heating valve	❒	❒
cooling valve	❒	❒
steam valve	❒	❒
butterfly valve	❒	❒
mixing valve	❒	❒
ball valve	❒	❒
.....	❒	❒
sensors	**YES**	**NO**
supply air temperature	❒	❒
exhaust air temperature	❒	❒
room temperature	❒	❒
recirculating air temperature	❒	❒
return air temperature	❒	❒
.....	❒	❒
supply air humidity	❒	❒
exhaust air humidity	❒	❒
room humidity	❒	❒
.....	❒	❒
supply air duct pressure	❒	❒
exhaust air duct pressure	❒	❒
room pressure	❒	❒
.....	❒	❒
safety components	**YES**	**NO**
filter monitoring	❒	❒
frost thermostat	❒	❒
drive belt monitoring	❒	❒
thermostat	❒	❒
humidistat	❒	❒
pressure switch	❒	❒
isolator	❒	❒
push button, switch	❒	❒
remote control	❒	❒
indicator	❒	❒
.....	❒	❒
other components	**YES**	**NO**
pump	❒	❒
fan	❒	❒
lamps and lights	❒	❒
.....	❒	❒

Note: This is not an exhausted list.

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Table of contents

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

More than 25 years of safety

Safety - worldwide - in thousands of plants

Explosion protection since 1975

For over 25 years Schischek has supplied electric explosion proof products worldwide for heating, ventilating and air conditioning for industrial and offshore applications.

Schischek explosion proof protection has become an important partner for consultants, public authorities, control companies, installers, O.E.M's and not least, the end user.
As component suppliers we have always considered it our duty to develop products in conjunction with other control equipment. Modern Ex equipment, reliable, proven and with the latest technology.

Safety is essential

With the above phrase, we want to say that explosion proof protection is not a question of statistics or half hearted solutions but 100% safety must be guaranteed, because

"only a little Ex protection is not possible!"

Explosion proof means taking responsibility. People have confidence in us as the Ex protection specialists and in you as consultants, installers and contractors. All Schischek Ex products are therefore PTB certified, approved by and produced according to the very latest standards and regulations. According to type and kind of protection, our products are suitable for operating in Ex areas, zones 0, 1, 2, 21 and 22, including gases, vapors, mists and dust, of course in acc. with ATEX 94/9/EG.

We listen to your requirements.

Are you looking for an Ex solution that does not exist? Why not talk to us? We cannot promise to find an answer to all your problems but we will look at it and give you an answer on the feasibility and cost.

We gladly give you our advice -freely.

We do not want to act as product suppliers only but also as suppliers of know-how. Contact us by telephone, fax or email with your queries. Quick, reliable answers to your questions have been part of our customer service for decades. We will gladly look at your installation scheme to detect any foreseeable problems. By being involved at the planning stage, we have been able to avoid future problems with complete safety i.e. extra delays mean extra costs!

New information technology.

The internet is another important way for communicating with Schischek. At **www.schischek.com** you will find the full Schischek product range, technical information and data sheets in pdf format for downloading. You can send us your enquiries or just give us your views.

Customer relationship management

Our sales team takes care and looks after the manufacturers of dampers, fire / smoke dampers, ball valvess, butterfly valves and AHU. That's part of our daily business.

Experience

Use our experience.
During the last 25 years we have solved many problems for hazardous areas in different fields of applications. Our know-how is at your disposal.

Heating, ventilation and air conditioning.

Schischek supplies control and O.E.M companies in the M&E building services market and have developed units that are compatible with most control systems. By compining Schischek products with conventional switching and control equipment, reliable high quality systems are produced that conform to Ex protection standards. Some examples of there use would be paint spray areas, extract ducts in chemical laboratories, battery rooms, sewage treatment plants, pumping stations etc.

Chemical, pharmaceutical and car industries

Whether you need air flow control in a pharmaceutical plant or temperature regulation of paint tanks in the car industry, Schischek offers low cost solutions specifically designed for control integration. Ex protection is required for applications from paint spray shops to drying stations and system compatibility with all aspects of control is essential from design to completion. Safety and reliability are guaranteed with correct planning and installation together with cost savings in maintenance free equipment.

Water treatment, compressor stations, power plants.

In cooperation with industrial control companies and valve/damper manufacturers Schischek products are used worldwide. Our products are characterised by the "highest protection class, compact size and ease of handling". We can provide solutions to problems of Ex ventilation and precise temperature control in industrial plants.

Offshore/onshore and ship building industry

Harsh environmental conditions make stringent design/ construction demands on components and materials. Designers of oil/gas platforms in the North Sea demanded a fast closing electric actuator for fire/smoke dampers of less than 1 second. After a development programme of approx. 1 year, including trials, a completely new concept in actuator engineering was produced. Since that time, thousands of Schischek actuators in special AISI 316 stainless steel housings have been delivered and installed, moreover the product range has been continuously developed and refined.

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Critical responsibilities in our house!

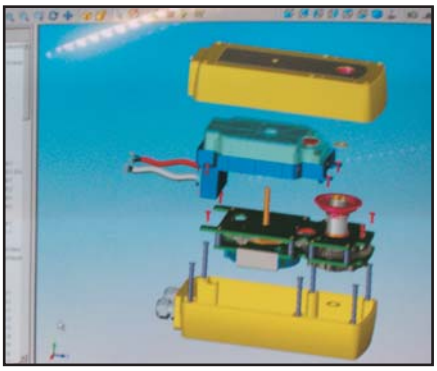
Quality with a system
Schischek has concentrated all it's important areas of responsibility in one place. We can ensure that all the necessary quality requirements are fulfilled, from the conception of a product, through its production, up to its completion. We always ensure that additional know-how, which has been gained in consultation with external specialists, is used in production.

Marketing
We determine what the customer wants, general market production and trends, the correct electric interfaces for control systems, the correct mechanical interfaces for air handling components and systems, the correct mechanical interfaces for hydraulic components and systems, standards and regulations, certifications and licensing terms. It is always a constant challenge to remain up-to-date.

Conception
We select a number of ideas and optimize them, taking customers and users into consideration. We always focus on the needs of the market, while simultaneously considering commercial and technical manufacturing feasibility. And the product must also look good!

Design and development
Based on decades of experience in the design and production of actuators and electronics, using modular CAD-Technology, we create functional and safe products in the shortest time possible and for the lowest possible price.
The data drawn up can be directly adopted and used in rapid prototyping. Collision observations are already possible on screen – the entire prototyping phase can be cut short.

Prototyping
Putting theory into practice. Does everything fit together? Is it guaranteed to work? Can the quality demanded be achieved?



Selecting materials, assembly, functionality, preparation for long life tests and viability tests.
When building the prototype, a short path and reaction time to the speedy customization of components, guarantees that only the highest level of quality is attained. Actuators can be modified and replaced in the stress test.

Procurement
We consider a long-term, and close co-operation with our supply partners, to be very important when obtaining materials. Therefore the selection of more suitable suppliers plays an integral part in our quality assurance. We select our suppliers according to the following criteria Quality – Supply Preparedness – Price – Transfer Know-how

Tests
From the very beginning, our actuators are strained by modern equipment checks for endurance, validation and durability. Extensive analysis regarding control response, temperature cycling and long-term stability are as much a part of the program as cyclical number testing and IP-protection. Naturally the vast majority of tests concern explosion protection. Schischek products are always certified according to the most recent standards and regulations, and are tested and accredited according to the highest protection standards. This guarantees the utmost safety for our customers and their equipment and systems.

Assembly
Assembling is the best word to describe how Schischek pursues a modern and efficient completion strategy. This involves a number of productions and tests, building a number of prototypes, and a number of certifications. However for the manufacture of components, for example press parts, die castings and PCB boards, we rely on our know-how and the technical equipment of our supply partners, most of whom have been with us for years. The advantages are obvious. Use of the "Three resources", low procurement costs, speedy delivery times and notably the pooling of specialized knowledge in regards to materials, production methods and technical detail optimization.

Validation
Each piece of equipment is fully tested before leaving the factory. Fully automated validation is carried out according to product and type, to ensure the printing of the label by computer, and clearance for the shipment can be given after the final tests have been passed. Our controls are not only concerned with explosion protection, but also with the functionality and appearance of the equipment.

Quality Assurance
A professional quality management and ISO 9001 certification are only the technical reasons for our quality claim. These are not sufficient on their own. First, employee identification and responsibility for the product already being manufactured, guarantee quality consistency. We believe that you cannot test quality, you can only produce it.

Shipment
Schischek supplies clients worldwide. In addition to the standard packaging and in accordance with the size of the shipment and the country it is being shipped to, special packaging can be selected, in agreement with the customer, that is suited to the mode of transportation. From quick delivery by air, on stable lattice box pallets, to packaging suitable for sea freight, we respond to what the customer requires.

Sales
Our team does not only specialize in Schischek products, but also in explosion protection, control engineering and

in mechanical engineering and construction. Please ask us when selecting more suitable products for your special requirements. Use our Ex-protection experience!

Service
We hope that you will always be satisfied with Schischek, and that you will be looked after , from the moment you first contact us, through consultation and shipment, until you receive your order. First class service is every company's goal – we aim to achieve this goal.

Schischek products certified in highest protection class

Are you sure that you are SAFE?

Explosion protection is not about statistics, but about 100% certainty!
The ATEX guidelines in force since July 1st 2003 play a very important role in improved safety in industrial plants and other hazardous areas.
Schischek equipment complies with ATEX guidelines 94/9/EC, according to the highest safety standards, and is certified for all gases, mists, vapors and dust. In other words, assured requirements for our products for the assured safety of our customers.

Highest protection

The highest safety standards mean that the ExMax, ExTurn, ExVent and ExPlus series of actuators can be installed and operated in hazardous areas of zone 1, 2 (for gases) and 21, 22 (for dust).
The series of RedMax actuators can be used in hazardous areas of zone 2 (for gases) and 22 (for dust).


Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

EC-TYPE-EXAMINATION CERTIFICATE
(Translation)

PTB 04 ATEX 1028 X

(4) Equipment: Actuator, model S, type Ex Max ...
(5) Manufacturer: Schischek Explosionsschutz GmbH
(6) Address: 90579 Langenzenn, Germany

(12) The marking of the equipment shall include the following:
II 2 G/D EEx d ia IIC T6 or T5 IP 66 T 80 °C or 95 °C

Braunschweig, August 31, 2004

sheet 1/3

ExLine switching modules, ExLine transducers and ExSens sensors cover zones 1, 2 and 22, according to type. Also our ExMag door holder magnets are certified to the highest safety standards for zone 1, 2 and NEW - for zone 21 and 22. They are certified by the PTB (Physikalisch Technische Bundesanstalt in Braunschweig/Federal German Physical and Technical Institute of Braunschweig). The PTB is a worldwide testing agency for explosion protection, with strict requirements for the way a test is performed and the necessary documentation.
ExMax equipment for the North American market is a certification procedure in accordance with standards by FM (Factory Mutual) authorities. Naturally this is carried out according to the highest safety standards for all gases, mists, vapors, dust and fibers.
As a manufacturer of explosion proof equipment, it is not sufficient to simply certify products, but it is required to certify the entire company according to ATEX and an EU QS standard.
Our customers are guaranteed that the company complies with the latest safety standards and that the products have been built in compliance with the highest safety and quality standards.

Made in Germany

The quality label "Made in Germany" can play a particularly important role in purchase decisions in the area of explosion protection. Germany, as an industrial location for production and manufacturing, unites engineering and product quality.

Over 25 years experience

Schischek explosion protection has been designing, manufacturing and selling explosion proof equipment for


Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

EC-TYPE-EXAMINATION CERTIFICATE
(Translation)

PTB 04 ATEX 2106

(4) Equipment: Explosion protected, electric actuator, type RedMax-.
(5) Manufacturer: Schischek Explosionsschutz GmbH
(6) Address: Mühlsteig 45, 90579 Langenzenn, Germany

(12) The marking of the equipment shall include the following:
II 3 G EEx nC II T6
II 3 (1) G EEx [ia] IIC
II 3 D IP66 T80°C

Braunschweig, October 20, 2004

sheet 1/3

over 25 years. This includes equipment for air and fire / smoke dampers, smoke extraction dampers, control dampers.., for valves, ball valves and reducing dampers as well as transducers, switching amplifiers and other Eex equipment. With worldwide project experience, Schischek not only offers the right product, but also helps its customers in planning potentially explosive installations and systems. In addition we provide comprehensive knowledge in the area of O.E.M (Original Equipment Manufacturer) companies.

The right choice

With our know-how in plant engineering and control engineering, you can be sure you've made the right choice – your safety comes first!


TÜV CERT
ZERTIFIKAT
Die TÜV CERT-Zertifizierungsstelle für QM-Systeme der RWTÜV Systems GmbH
bescheinigt gemäß TÜV CERT-Verfahren, dass das Unternehmen
SCHISCHEK
Schischek GmbH
Mühlensteig 45
90597 Langenzenn
für den Geltungsbereich
Elektrische Stellantriebe, Schaltverstärker, Messumformer und Haftmagnete (für die Bereiche Heizung, Lüftung, Klima in Chemie, Pharmazie, Industrie und Offshore)
ein Qualitätsmanagementsystem eingeführt hat und anwendet.
Durch ein Audit, Bericht-Nr. 2062929
wurde der Nachweis erbracht, dass die Forderungen der DIN EN ISO 9001 : 2000
erfüllt sind. Dieses Zertifikat ist gültig bis 14. März 2007
Zertifikat-Registrier-Nr. 0410020010465
Das Unternehmen ist zertifiziert seit 2000
Essen, 26.05.2004
RWTÜV

Headquarter: Production and sales

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Information about hazardous areas in acc. with ATEX 94/9/EG

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

ATEX 94/9/EG and more

Regulations for explosion protection

Explosion protection regulations in the EU member states are marked by the change of EU protection guideline 67/117/EWG ff to the two new EU guidelines 94/9/EG (ATEX 95) and 95/C 332/06 (ATEX 137). As a result of the new directives, explosion protection in European regulations there will be a harmonisation of standards. There will be a transitional period to adjust from the “old" to the “new" European law. The regulations covering the “old” law were in effect up to June 30th 2003.

Since July 1st 2003, electric explosion proof equipment must comply with ATEX Ex-protection guidelines in accordance with 94/9/EC – on the approximation of the laws of the Member States concerning equipment and protective systems for use in potentially explosive atmospheres.

Information on uniform classification of potentially explosive systems and how to use this as a basis for selecting and classifying systems and equipment, incl. their installation, can be found in guideline 1999/92/EG (ATEX 137).

ATEX: Guideline 94/9/EC of the European parliament and the Council from March 23rd 1994 brought the legislation of the member states, concerning equipment and protective systems for use in explosion risk areas, into line.

ExVO: Directive on the distribution of equipment and protection systems for potentially explosive areas – explosion protection prescription - 11.GSGV.

ElexV: Directive on electric installations in potentially explosive areas.

Certificates

Corresponding approvals and certificates are required for electrical explosion proof equipment. Testing must be carried out by an official testing agency (for example the PTB - Physikalisch Technische Bundesanstalt in Braunschweig/Federal German Physical and Technical Institute of Braunschweig). ATEX approvals are also accepted in many countries and states outside Europe.

Responsibilities

The responsibility for compliance with all regulations and guidelines, from production to planning, up until installation, operation and maintenance, has greatly increased

Each individual must be conscious about the fact that he accepts personal responsibility as part of a total project:

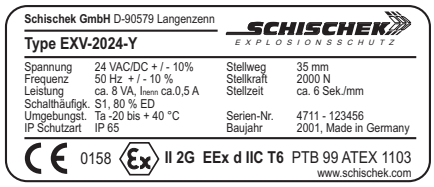
- building owner
- end-user
- architect
- consulting engineer
- control company
- inspection authority
- contractor/installer
- manufacturer
- product supplier
- maintenance engineers

The type plate and its components

From 1/7/2003 the new ATEX guidelines come into force. The then current legal bases for the certification and labelling of electric explosion proof equipment is the EC guideline:

ATEX 94/9/EC

Example, for the labelling of a valve actuator: Manufacturer’s name, manufacturer’s address, designation of type, electrical data (V, A, W, Hz) ambient temperature if different from – 20 to + 40°C, unit serial number, in addition to the classification of Ex protection.



Correct installation

For the installation of electrical systems in areas with explosive gas atmospheres of group II, rule IEC 60 079-14 (EN 60071-14) will apply.

Electric circuits of protection types d, e, q, o, m, p

Installation in the panel is identical to ”standard” installation, however the procedures for connecting EEx equipment must be followed. This refers, for example to voltage, current, fuses and motor protection equipment, etc. The requirements for specific products must be taken from their corresponding test certificates, standards and prescriptions as well as from the guidebook. It is only permitted to work on electric circuits within the Ex-area (for example when connecting to EEx-e terminal box if the voltage has been switched off). An EEx-e terminal box should only be opened after the voltage has been switched off.

Electric circuits of protection type "i" (intrinsically safe)

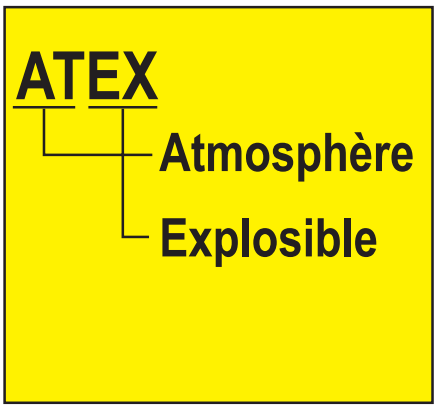
For the planning and operation of switchgears and control systems installed in the safe area, but which contain circuits leading into the Ex-area, certain requirements should be considered. This applies especially to intrinsically safe circuits. Intrinsically safe circuits and non-intrinsically safe circuits should be kept separate. Minimum distances (distances) between bare connections must be observed, the cables must not produce any inadmissible external inductance or capacitance. The maximum admissible electrical limits of EEx-i equipment must be observed at all times. Intrinsically safe and non-intrinsically safe electrical circuits should not cross, however it is allowed between two intrinsically safe circuits. Intrinsically safe circuits must be clearly marked

Intrinsically safe circuits are marked by a “light blue” color. This color is recommended for all intrinsically safe circuits to prevent confusion and/or linking up to a non-intrinsically safe circuit. Examples: cabels, cables, cable conduits, dampers, connection boxes, cable connectors,... A minimum distance of 50 mm should be allowed between intrinsically safe and non-intrinsically safe circuits, and a minimum distance of 6 mm between two different intrinsically safe circuits. During installation the cables of intrinsically safe and non-intrinsically safe circuits should be laid out separately!

Suggestion on how to create a pannel

It is necessary to keep intrinsically safe and non-intrinsically safe equipment separate. It is recommended, in this case, that a sufficient distance be kept, to avoid extra costs in the future.

Large transformers, frequency rectifiers, large relays and other electric equipment that may influence intrinsically safe circuits by inductance or capacitance should be installed at a sufficient distance. As a precaution EEx-i equipment should have a suitable cover to protect it from incorrect handling. The appropriate standards and regulations must be observed.



Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Labelling of explosion proof equipment

Classification and labelling of explosion proof areas

Flammable medium	Hazardous locations Probability of a potential explosive atmosphere occuring	Classification of explosion proof areas	Product classification: Product group	Product category		
Gases, vapours, mists	Always, temporarily or often present	zone 0	II	1G		
	Occasionally present	zone 1	II		2G	
	Very seldom or only present for a short period	zone 2	II			3G
Dusts	Always, temporarily or often present	zone 20	II	1D		
	Occasionally present	zone 21	II		2D	
	Does not occur or only seldom for a short period	zone 22	II			3D
Methane	-	mining	I	M1		
	-	mining	I		M2	

Classification of areas, hazardous due to flammable gases, vapours, mists

Explosion group	Examples depending on - explosion group - temperature class					
IIA	Ammonia Methane Ethane Propane	Ethylalcohol Cyclohexene n-Butane	Petrol Diesel fuel Fuel oil n-Hexane	Acetaldehyd		
IIB	City gas Acrylic nitrile	Ethylene Ehtylenoxyd	Ethylglycol Carbon hydrogen	Ethylether		
IIC	Hydrogen	Acetylene				Carbon disulphide

Attention: this list is only an extract of possible flammable mediums and makes no claim to be complete!

Temperature class	
T1	<450°C
T2	< 300 °C
T3	< 200 °C
T4	< 135 °C
T5	< 100 °C
T6	< 85 °C

Product use depending on temperature class (T1 - T6). The temperature class indicates the max. temperature of the exposed surface of the product.

Example:

CE 0158 Ex II 2G EEx d IIC T6 PTB 99 ATEX1103 -

Country	Country code	Institute Notified Body
Germany	0032	TÜV Hannover/ Sachsen-Anhalt e.V.
Germany	0102	PTB
Germany	0158	EXAM
Germany	0297	DQS
Germany	0588	FSA
Germany	0589	BAM
Germany	0837	IBExU
France	0080	INERIS
France	0081	LCIE
Netherlands	0344	KEMA
Sweden	0402	SP
UK	0800	EECS (BASEEFA)
UK	0618	SCS

Official institutes

Protection principle	Type of protection	Code	Symbol	To use in zone	CENELEC
Prevents transmission of the explosion outside	flameproof enclosure	EEx d		1 or 2	EN 50018
Prevents high temperatures and sparks	increased safety	EEx e		1 or 2	EN 50019
Low current/voltage supply	intrinsic safety	EEx i		0, 1 or 2***	EN 50020* EN 50039**
Positive pressure device	pressurised apparatus	EEx p		1 or 2	EN 50016**
Encapsulated	moulding	EEx m		1 or 2	EN 50028
Parts immersed in oil to isolate from explosive atmosphere	oil immersion	EEx o		1 or 2	EN 50015
Prevents transmission of explosion outside	powder filling	EEx q		1 or 2	EN 50017
As above, but for use in zone 2	protection "n"	EEx n		2	EN 50021

Protection principle - Type of protection - CENELEC regulations, Basic rule EN 50014

Application	Code
For common use	-
For use under special circumstances	X
This product is an Ex-certified component for use in a complete system.	U

Further information

* Product ** Systems ***ia** in zones 0, 1 and 2 **ib** in zones 1 and 2

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Where and when do I have to take explosion proof into consideration

Explosion proof means: "Preservation of Life. Health. Basic values"

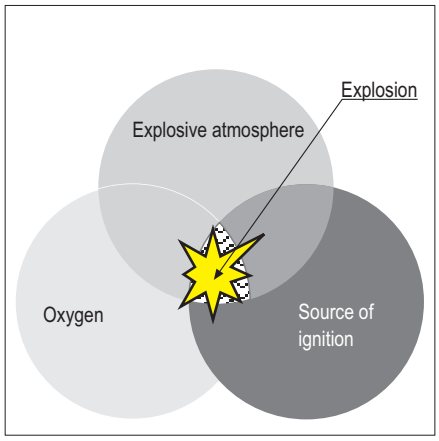
When can a danger of explosion occur?

A danger of explosion occurs when a flammable medium (gas, vapor, mist or dust) in a dangerous quantity is present.

What creates an explosion?

An explosion may occur when the following 3 components are present at the same time:

- Explosive atmosphere
- Source of ignition
- Air (oxygen)



Typical sources of ignition

Very often the reason for accidents is self-ignition, extraordinary surface temperatures and sparks due to mechanical reasons. But there are also a lot of other sources of ignition, caused by either mechanical and/or electrical equipment.

These are for example:

- Self-ignition
- Extraordinary surface temperatures
- Open flames
- Sparks caused by mechanical reasons
- Static electricity
- Lightning strike
- Ultra-sound
- Chemical sources of ignition

Please answer the following questions:

Yes	No	(we have the following situation now or in the future)
❒	❒	flammable materials are stored
❒	❒	flammable materials are used
❒	❒	flammable materials are bottled
❒	❒	flammable materials are used during the cleaning process
❒	❒	flammable materials are used in the production process
❒	❒	flammable materials will be produced during the production process

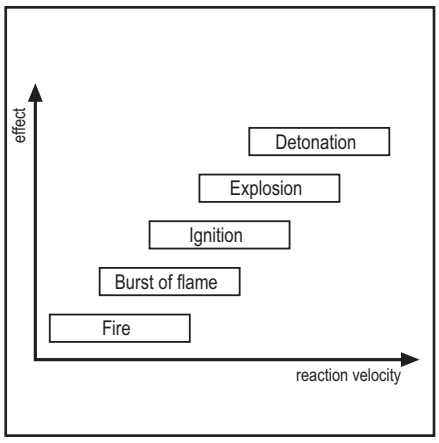
6 x "NO": Obviously you do not need explosion proof

at least 1 x "YES": When planning you have to consider rules, regulations and instructions concerning explosion proof

Example: **BetrSichV, ExVO, EX-RL**

From fire to detonation

Effect and reaction velocity increase significantly from fire, outburst flame, via ignition and explosion up to detonation. Explosions are more likely with gaseous media and detonations by dust media.



Typical Applications

- Chemical, pharmaceutical and industrial plants
- Refineries, petrol depots, gas stations
- Paint and solvent sho ps
- Drying and coating cabinets
- Laboratories in industry and schools
- Water treatment works, power plants
- Compressor stations, gas works
- All kinds of storekeeping and stocks
- All kinds of filling stations
- All kinds of cleaning stations
- Mills, silos, silos for bulk goods
- Offhore and onshore
- Oil and gas pipelines
- Printing works, food industry, ...

Schedule

- analyse whether you need explosion proof or not
- ask experts in order to analyse the risk of danger
- define zones, areas, categories, explosion groups and temperature classes
- planning according to all necessary rules and regulations
- choose the best supplier and the right product
- keep to the installation rules
- check the labelling of the equipment
- make sure that the appliance will be put into operation correctly
- confirm a final inspection by the responsible authority
- guarantee regular and correct maintenance according to the regulations
- the correct documentation has to be maintained

It is you who takes the responsibility as

- installer or contractor
- operator
- architect
- planning department
- control or consulting engineer
- inspection authority
- O.E.M. company
- manufacturer
- product supplier
- maintenance engineers

Remarks: All information, tables, checklists and further documentation are only for your assistance and do not claim to be complete. In no way do they replace official regulations and rules or even laws by the authorities. We want to point out that it is very important to undertake all measures for an exact classification of the Ex-area.

Is your system safe?

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Zones - explosion groups - temperature classes

Implementation

Potentially explosive areas should be divided into zones, and the equipment should be divided into groups and categories. The labelling on the identification plate of certified equipment indicates in which zone the explosion proof equipment can be used.

Division into product groups

Groups are divided into group I and group II. Group I consists of mining "underground" and group II deals with prevention of gas and dust explosion protection for all other applications.

Division into zones

Potentially explosive areas are divided into six zones, according to time-related and local probability, that a potentially explosive atmosphere (p.e.a.) exists. A distinction is made between combustible gases, mists, vapors and combustible dust. The zones are described in the accompanying table.

Gases, mists and vapors are placed in zones 0, 1 and 2, whereby the requirements for the chosen equipment increase from zone 2 to 0. Equipment in zone 0 must be built in a way "that even if a type of protection fails or if two faults occur, that sufficient explosion protection is guaranteed". Therefore for example a passive, potential free sensor, installed in zone 0, and connected to an intrinsically safe electric circuit (II2(1)G [EExia] IIC), must display current approval.

Zones 20, 21 und 22 are for dust, whereby the requirements for the chosen equipment increase from zone 22 to 20. Equipment in zone 20 and 21 need special approval.

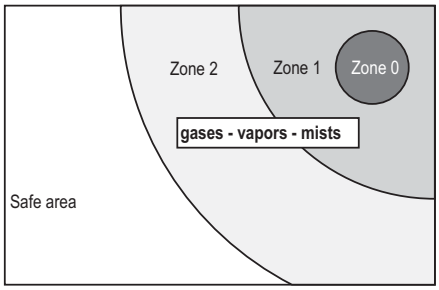
Division into product groups

Product groups determine, in which zones the equipment should be installed. Once again there are six categories. Categories1G, 2G and 3G are classifications for gas explosion protection (G = Gas); to which equipment with 1G for zone 0, 1 and 2, equipment with 2G for zone 1 und 2 and equipment with 3G for zone 2 are suited. Categories 1D, 2D and 3D are classifications for dust explosion protection (D = Dust); to which equipment with 1D for zone 20, 21 and 22, equipment with 2D for zone 21 and 22 and equipment with 3D for zone 22 are suited.

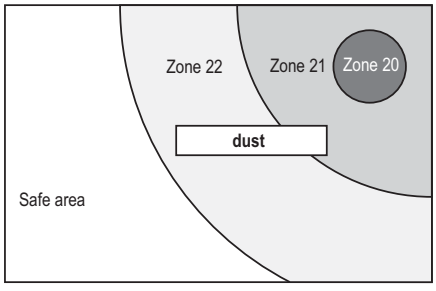
Classification and labelling of explosion proof areas

Flammable medium	Hazardous locations Probability of a potential explosive atmosphere occuring	Classification of explosion proof areas	Product classification		
			Product group	Product category	
Gases, vapours, mists	Always, temporarily or often present	Zone 0	II	1G	
	Occasionally present	Zone 1	II		2G
	Very seldom or only present for a short period	Zone 2	II		3G
Dusts	Always, temporarily or often present	Zone 20	II	1D	
	Occasionally present	Zone 21	II		2D
	Does not occur or only seldom for a short period	Zone 22	II		3D

An Example of a typical zone activity would be filling a barrel of petrol in an enclosed area.



An example of a typical zone activity would be filling a grain silo in an enclosed area.

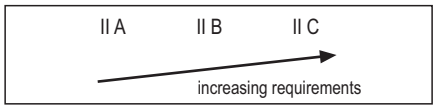


Explosion groups, temperature classes

The equipment groups and categories determine, in which zones the equipment should be installed, therefore the explosion groups and temperature classes determine, to which mediums inside the zones, the equipment is suited. The type of protection used is not a mark of quality but is instead a constructive solution for selecting equipment for explosion protection.

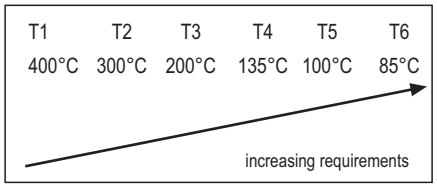
Division into explosion groups

Explosion proof equipment for gases, mists and vapors is divided into three explosion groups (IIA-IIB-IIC) according to the type of protection being used. The explosion group is a means to measure the ignitability of gases (potentially explosive atmospheres). The equipment requirements increase from II A to II C.



Division into temperature classes

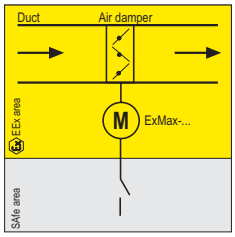
Explosion proof equipment, installed within the Ex area, is divided into 6 temperature classes (T1 to T6). Temperature class is not – as it is often wrongly believed – the operating temperature range of the equipment, but the maximum permissible surface temperature of the equipment, in relation to + 40°C ambient temperature on any surface area, and should not be exceeded at any time. The maximum surface temperature must remain below the ignition temperature of the surrounding medium at all times. The equipment requirements rise from T1 to T6.



Application 01

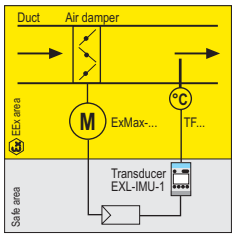
Air safety dampers - air control dampers - fire / smoke dampers

Air damper control



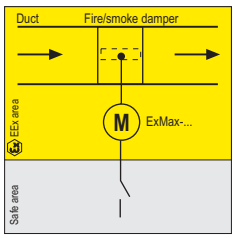
Schischek actuators are approved for direct installation and operation in explosion risk areas, as they are of the highest explosion groups and temperature class and are suitable for all gases, vapors, steam and dust. The electrical connection is made via an explosion proof terminal box (type ExBox-...). Please ensure during installation that all cables are securely fixed and connected in such a way that they are protected from mechanical damage.

Automatic air damper control



In this example the control system consists of an actuator in a flameproof enclosure installed directly into the Ex area. A passive sensor (type TF-...) is also installed in the Ex area via an intrinsically safe (IS) circuit from an EEx-i transducer (type EXL-IMU-1) which is housed in the safe area.
The IS circuit (cable) needs to be laid in light blue between the sensor and transducer. The transducer converts the passive sensor resistance change into an active signal (0...10 VDC or 4...20 mA) which in turn is connected to the BMS controller. The output signal from the controller goes directly to the actuator.

Control of fire/smoke dampers

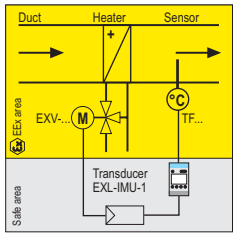


In applications for fire/smoke dampers, the actuator has to reliably return the damper to its safety position via a switch/contact cutting the power supply. The actuator will return the damper to its safety position by an internal spring.

Application 02

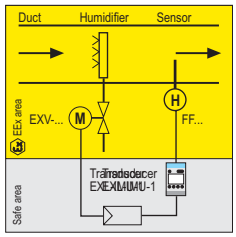
Heating - cooling - humidification - VAV control

Heating - cooling control



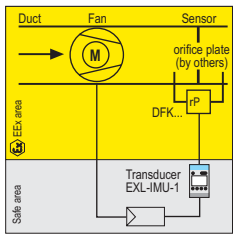
In this example, sensor and a valve actuator can be installed in the Ex area, provided they are selected and installed correctly. Usually control and switching are located in the safe area. The example shows a passive sensor (type TF-...) installed in the Ex area with an intrinsically safe (IS) circuit supplied via a transducer (EXL-IMU-1). The transducer output signal (0...10 VDC or 4...20 mA) is fed to the controller which in turn controls the actuator in the Ex area. The control unit (analogue/digital) must be installed in the safe area. For the actuators, the maximum permissible surface temperatures have to be taken into account.

Humidity control



In this example, sensor and actuator can be installed in the Ex area, provided they are selected and installed correctly. Usually control and switching are located in the safe area. The example shows a passive humidity sensor (type FF...) output resistance installed in the Ex area with an intrinsically safe (IS) circuit supplied via a transducer (EXL-IMU-1). The transducer output signal 0-10VDC or 4-20mA is fed to the controller which in turn controls the actuator in the Ex area. The control unit (analogue/digital) must be installed in the safe area. For the valve body, the maximum permissible surface temperature must be taken into account.

VAV and differencial pressure control

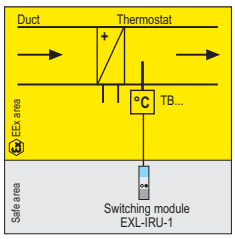


For the regulation of air flows/air volumes, a passive pressure sensor and/or differential pressure sensor (type DFK-...) is installed in the Ex area with an intrinsically safe circuit provided via a transducer (EXL-IMU-1). The transducer output signal of 0...10 VDC or 4...20 mA is fed to a controller. The controller, situated in the safe area will, depending on changing circumstances being monitored, control a fan (must be Ex proof) or a modulating damper actuator (also Ex proof) to maintain the required air volume/pressure. For fans it is essential that special motor protection with Ex approval is used.

Application 03

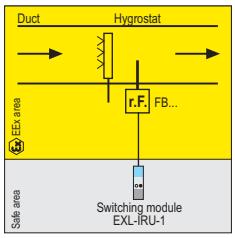
Thermostats - humidistats - pressurestats - filter protection - fan belt protection - frost protection

Thermostats



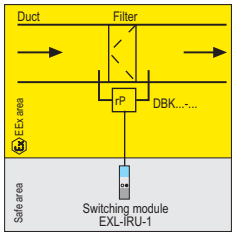
Thermostats are passive switching equipment without any electrical energy supply of their own (type TB...). The switching function is performed mechanically. The integrated switches are within a circuit designed as intrinsically safe by using a switching module (type EXL-IRU-1). The switching module should be installed in the safe area. The output contact can be used for sequence functions (relays, contacts, direct circuit..).

Hygrostats



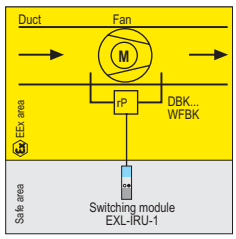
Hygrostats are passive switching equipment without any electrical energy supply of their own (type FB...). The switching function is performed mechanically. The integrated switches are within a circuit designed as intrinsically safe by using a switching module (type EXL-IRU-1). The switching module should be installed in the safe area. The output contact can be used for sequence functions (relays, contacts, direct circuit..).

Filter monitoring



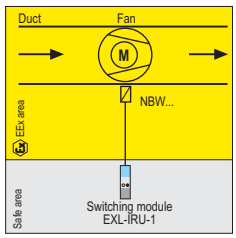
For monitoring air filters in hazardous areas, only passive differential pressure switches (type DBK...) can be used. The switching function is mechanical and is an intrinsically safe (IS) circuit that is supplied via a switching module (EXL-IRU-1). The switching module must be installed in the safe area. The output function can be used for switching relays, contacts etc.

Drive belt monitoring with differential pressure sensor/air paddle



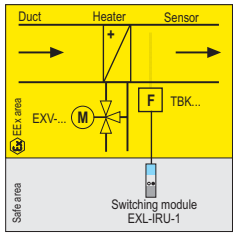
For monitoring fans in hazardous areas, only passive differential pressure switches (DBK-...) or ari paddle (type WFBK-...) can be used. The switching function is mechanical and is an intrinsically safe (IS) circuit that is supplied via a switching module (EXL-IRU-1). The switching module must be installed in the safe area. The output function can be used for switching relays, contacts etc. Switching modules to indicate fan failure, are delivered with integrated time running relay with delay on start up.

Drive belt monitoring with Namur sensor



For monitoring fans contact less in hazardous areas, only Namur sensors (NBW-...) can be used. The switching function is mechanical and is an intrinsically safe (IS) circuit that is supplied via a switching module (EXL-IRU-1). The switching module must be installed in the safe area. The output function can be used for switching relays, contacts etc. Switching modules to indicate fan failure, with integrated time running relay with delay on start up, monitor the fan shaft rotation via a Namur sensor.

Frost protection



For frost protection in hazardous areas you can use a frost thermostat (type TBK-...) in the duct together with a switching module (type EXL-IRU-1). The passive sensor in the hazardous area is connected via an intrinsically safe circuit (IS) to the switching module , mounted in the safe area. The output contact can be used to follow up functions (relays, contacts, ect...).

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Product Overview 2005 valid from April 1st 2005 with technical basics














Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

ExMax quarter turn actuators - **size S**

ExMax in acc. with 94/9/EG (ATEX) for zone 1, 2, 21 and 22.

Basic data
ExMax actuators are fully equipped in the basic version, with a lot of adjustable parameters to reduce types and increase parallel function. Only 1 size (S) is necessary to achieve torques from 5 to 30 Nm. ExMax actuators are explosion proof (gas: II2G EEx d ia IIC T6 and dust: II2D IP66T80°C) for use in all type of gas, mists, vapours and dust in zone 1, 2, 21 and 22. The standard version has a robust, antistatic aluminium housing, with an optional AISI 316 stainless steel housing for aggressive atmospheres e.g. for use in the food industry. The shaft connection is 12 mm squared. All actuators have an internal multifunctional power supply, with a wide working range from 24 to 230 VAC/DC. The universal power supply is auto selecting. For use down to -40°C the actuators are equipped with an internal heater.
Technical data: 24...230 VAC/DC multifunctional power supply, IP65, -40...+40°C/+50°C, overload protected.
Delivery with: 1 m cable, tool for simple manual override, 4 screws.

size S - (hxwxl 80 x 95 x 210 mm)

EEx-d quarter turn actuator, no spring return, 5...30 Nm, 24...230 VAC/DC, 95° angle of rotation

ExMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
ExMax- 5.10	5 and 10 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	-	S
ExMax-15.30	15 and 30 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	-	S
ExMax- 5.10 - S	5 and 10 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	2 internal aux. switches	S
ExMax-15.30 - S	15 and 30 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	2 internal aux. switches	S
ExMax- 5.10 - Y	5 and 10 Nm	7,5/15/30/60/120 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
ExMax-15.30 - Y	15 and 30 Nm	7,5/15/30/60/120 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S

EEx-d quarter turn actuator, with spring return, 5..15 Nm, 24...230 VAC/DC, 95° angle of rotation

ExMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
ExMax- 5.10 - F	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	-	S
ExMax- 15 - F	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	-	S
ExMax- 5.10 - SF	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	2 internal aux. switches	S
ExMax- 15 - SF	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	2 internal aux. switches	S
ExMax- 5.10 - YF	5 and 10 Nm	7,5/15/30/60/120 sec.	3 and 10 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
ExMax- 15 - YF	15 Nm	7,5/15/30/60/120 sec.	3 and 10 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
ExMax-5 .10 - BF	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off	-	EEx-i output+2xEPU	S
ExMax- 15 - BF	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off	-	EEx-i output+2xEPU	S

EEx-d rotary actuator, no spring return, 5...30 Nm, 24...230 VAC/DC, n x 360° angle of rotation

ExMax	Torque	Motor running 360°	Spring return	Control mode	Feedback	Size
ExMax 5.10 - R	5 and 10 Nm	60/120/240/480 sec.	-	On-off, 3-pos	-	S
ExMax 15.30 - R	15 and 30 Nm	60/120/240/480 sec.	-	On-off, 3-pos	-	S

Accessories (additional price)

Type	Technical data	
ExMax-.../VA	Size S, housing material stainless steel ss	type .../VA (Example ExMax-5.10/VA), available ~ I./II.quarter '06
ExSwitch	2 external, aux. switches adaptable to ExMax actuators	2 x EPU, adjustable, for zone 1, 2, 21 and 22
ExBox-3P	EEx-e terminal box II2G/II2D EEx e IIT6, for	ExMax-5.10, ExMax-15.30, ExMax-...-F, ExMax-...-R
ExBox-Y/S	EEx-e terminal box II2G/II2D EEx e IIT6, for	ExMax-...-S, ExMax-...-SF, ExMax-...-Y, ExMax-...-YF
ExBox-BF	EEx-e terminal box II2G/II2D EEx e IIT6, for	ExMax -..-BF
MKK-S	Mounting bracket for terminal boxes	connectable to actuators size S
D-F..-S	Adaptation with flange in acc. to DIN EN 5211	connectable to actuators size S
KB-S	Universal clamp for round and for square damper shafts	connectable to actuators size S, shaft ∅ 10 to 20 mm, ⍁ 10 to16 mm
HV-S	Easy grip manual override	connectable to actuators size S
DWB-S	Mechanical limitation of angle of rotation	connectable to actuators size S
FireSafe	Safety temperature sensor for fire / smoke dampers, switching at 72°C	connectable to EEx-i output of ExMax-..-BF actuators
AR-12-xx	Reduction of square damper connection from 12 mm to	11 mm (AR-12-11), 10 mm (AR-12-10)

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Availability planned approx. III. quarter 2005

ExMax quarter turn actuators - **size M**

ExMax in acc. with 94/9/EG (ATEX) for zone 1, 2, 21 and 22.

Size M - (hxwxl 116 x 150 x 286 mm)

Basic data

ExMax actuators are fully equipped in the basic version, with a lot of adjustable parameters to reduce types and increase parallel function. Only 1 size (M) is necessary to achieve torques from 30 to 100 Nm. ExMax actuators are explosion proof (gas: II2G EEx d ia IIC T6 and dust: II2D IP66T80°C) for use in all type of gas, mists, vapours and dust in zone 1, 2, 21 and 22. The standard version has a robust, antistatic aluminium housing, with an optional AISI 316 stainless steel housing for aggressive atmospheres e.g. for use in the food industry. The shaft connection is 16 mm squared. All actuators have an internal multifunctional power supply, with a wide working range from 24 to 230 VAC/DC. The universal power supply is auto selecting. For use down to -40°C the actuators are equipped with an internal heater.

Technical data: 24...230 VAC/DC multifunctional power supply, IP65, -40...+40°C/+50°C, overload protected.
Delivery with: 1 m cable, tool for simple manual override, 4 screws.

EEx-d quarter turn actuator, no spring return, 30..100 Nm, 24..230 VAC/DC, 95° angle of rotation

ExMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
ExMax- 50.75	50 and 75 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	-	M
ExMax- 100	100 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	-	M
ExMax- 50.75 - S	50 and 75 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	2 internal aux. switches	M
ExMax- 100 - S	100 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	2 internal aux. switches	M
ExMax- 50.75 - Y	50 and 75 Nm	60/90/120/180/240 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
ExMax- 100 - Y	100 Nm	60/90/120/180/240 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M

EEx-d quarter turn actuator, spring return, 30 & 50 Nm, 24..230 VAC/DC, 95°angle of rotation

ExMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
ExMax- 30 - F	30 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos	-	-	M
ExMax- 50 - F	50 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos	-	-	M
ExMax- 30 - SF	30 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos	-	2 internal aux. switches	M
ExMax- 50 - SF	50 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos	-	2 internal aux. switches	M
ExMax- 30 - YF	30 Nm	60/90/120/180/240 sec.	~ 20 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
ExMax- 50 - YF	50 Nm	60/90/120/180/240 sec.	~ 20 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
ExMax- 30 - BF	30 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off	-	EEx-i output+2xEPU	M
ExMax- 50 - BF	50 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off	-	EEx-i output+2xEPU	M

Accessories (additional price)

Type	Technical data	
ExMax-.../VA	Size M, housing material stainless steel ss	type .../VA (Example ExMax-50.75/VA), available ~ I./II.quarter '06
ExSwitch	2 external, aux. switches adaptable to ExMax actuators	2 x EPU, adjustable, for zone 1, 2, 21 and 22
ExBox-3P	EEx-e Klemmkasten II2G/II2D EEx e IIT6, for	ExMax-5.10, ExMax-15.30, ExMax-...-F, ExMax-...-R
ExBox-Y/S	EEx-e Klemmkasten II2G/II2D EEx e IIT6, for	ExMax-...-S, .ExMax-...-SF. ExMax-...-Y, ExMax-...-YF.
ExBox-BF	EEx-e Klemmkasten II2G/II2D EEx e IIT6, for	ExMax-...-BF
MKK-M	Mounting bracket for terminal boxes	connectable to actuators size M
D-F..-M	Adaptation with flange in acc. to DIN EN 5211	connectable to actuators size M
FireSafe	Safety temperature sensor for fire / smoke dampers, switching at 72°C	connectable to EEx-i output of ExMax-..-BF actuators
AR-16-xx	Reduction of square damper connection from 12 mm to	14 mm (AR-16-14), 12 mm (AR-16-12)

RedMax quarter turn actuators - **size S**

RedMax in acc. with 94/9/EG (ATEX) for zone 2, 22 and industry

Basic data

RedMax actuators are fully equipped in the basic version, with a lot of adjustable parameters to reduce types and increase parallel function. Only 1 size (S) is necessary to achieve torques from 5 to 30 Nm. RedMax actuators are explosion proof for use in all type of gas, mists, vapours and dust in zone 2 and 22 (gas II3G EEx nC II T6 and dust II3D IP66T80°C). The standard version has a robust, antistatic aluminium housing, with an optional AISI 316 stainless steel housing for aggressive atmospheres e.g. for use in the food industry. The shaft connection is 12 mm squared. All actuators have an internal multifunctional power supply, with a wide working range from 24 to 230 VAC/DC. The universal power supply is auto selecting. For use down to -40°C the actuators are equipped with an internal heater.

Technical data: 24...230 VAC/DC multifunctional power supply, IP65, -40...+40°C/+50°C, overload protected.

Delivery with: 1 m cable, tool for simple manual override, 4 screws.

Size S - (hxwxl 80 x 95 x 210 mm)

EEx-n quarter turn actuator, no spring return, 5...30 Nm, 24...230 VAC/DC, 95° angle of rotation

RedMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
RedMax- 5.10	5 and 10 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	-	S
RedMax-15.30	15 and 30 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	-	S
RedMax- 5.10 - S	5 and 10 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	2 integral aux. switches	S
RedMax-15.30 - S	15 and 30 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	2 integral aux. switches	S
RedMax- 5.10 - Y	5 and 10 Nm	7,5/15/30/60/120 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
RedMax-15.30 - Y	15 and 30 Nm	7,5/15/30/60/120 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S

EEx-n quarter turn actuator, with spring return, 5..15 Nm, 24...230 VAC/DC, 95° angle of rotation

RedMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
RedMax-5.10 - F	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	-	S
RedMax- 15 - F	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	-	S
RedMax-5.10 - SF	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	2 integral aux. switches	S
RedMax- 15 - SF	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	2 integral aux. switches	S
RedMax-5.10 - YF	5 and 10 Nm	7,5/15/30/60/120 sec.	3 and 10 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
RedMax- 15 - YF	15 Nm	7,5/15/30/60/120 sec.	3 and 10 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
RedMax-5.10 - BF	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off	-	EEx-i output+2xEPU	S
RedMax- 15 - BF	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off	-	EEx-i output+2xEPU	S

EEx-n rotary actuator, no spring return, 5...30 Nm, 24...230 VAC/DC, n x 360° angle of rotation

RedMax	Torque	Motor running 360°	Spring return	Control mode	Feedback	Size
RedMax 5.10 - R	5 and 10 Nm	60/120/240/480 sec.	-	On-off, 3-pos	-	S
RedMax 15.30 - R	15 and 30 Nm	60/120/240/480 sec.	-	On-off, 3-pos	-	S

Accessories (additional price)

Type	Technical data	
RedMax-.../VA	Size S, housing material stainless steel ss	type .../VA (Example RedMax-5.10/VA)
RedSwitch	2 external, aux. switches adaptable to RedMax actuators	2 x EPU, adjustable, for zone 2 and 22
RedBox-3P	Terminal box for zone 2, 22 for	RedMax-5.10, RedMax-15.30, RedMax-...-F, RedMax-...-R
RedBox-Y/S	Terminal box for zone 2, 22 for	RedMax-...-S, RedMax-...-SF, RedMax-...-Y, RedMax-...-YF
RedBox-BF	Terminal box for zone 2, 22 for	RedMax -..-BF
MKK-S	Mounting bracket for terminal boxes	connectable to actuators size S
D-F..-S	Adaptation with flange in acc. to DIN EN 5211	connectable to actuators size S
KB-S	Universal clamp for round and for squared damper shafts	connectable to actuators size S, shaft ∅ 10 to 20 mm, ⍁ 10 to16 mm
HV-S	Easy grip manual override	connectable to actuators size S
DWB-S	Mechanical limitation of angle of roation	connectable to actuators size S
FireSafe	Safety temperature sensor for fire / smoke dampers, switching at 72°C	connectable to EEx-i output of RedMax-..-BF actuators
AR-12-xx	Reduction of squared damper connection from 12 mm to	11 mm (AR-12-11), 10 mm (AR-12-10)

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Availability planned approx. III. quarter 2005

RedMax quarter turn actuators - **size M**

RedMax in acc. with 94/9/EG (ATEX) for zone 2, 22 and industry

Size M - (hxwxl 116 x 150 x 286 mm)

Basic data

RedMax actuators are fully equipped in the basic version, with a lot of adjustable parameters to reduce types and increase parallel function. Only 1 size (M) is necessary to achieve torques from 30 to 100 Nm. RedMax actuators are explosion proof for use in all type of gas, mists, vapours and dust in zone 2 and 22 (gas II3G EEx nC II T6 and dust II3D IP66T80°C. The standard version has a robust, antistatic aluminium housing, with an optional AISI 316 stainless steel housing for aggressive atmospheres e.g. for use in the food industry. The shaft connection is 16 mm squared. All actuators have an internal multifunctional power supply, with a wide working range from 24 to 230 VAC/DC. The universal power supply is auto selecting. For use down to -40°C the actuators are equipped with an internal heater.

Technical data: 24...230 VAC/DC multifunctional power supply, IP65, -40...+40°C/+50°C, overload protected.
Delivery with: 1 m cable, tool for simple manual override, 4 screws.

EEx-n quarter turn actuator, no spring return, 30..100 Nm, 24..230 VAC/DC, 95° angle of rotation

RedMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
RedMax- 50.75	50 and 75 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	-	M
RedMax- 100	100 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	-	M
RedMax- 50.75 - S	50 and 75 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	2 internal aux. switches	M
RedMax- 100 - S	100 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	2 internal aux. switches	M
RedMax-50.75 - Y	50 and 75 Nm	60/90/120/180/240 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
RedMax- 100 - Y	100 Nm	60/90/120/180/240 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M

EEx-n quarter turn actuator, with spring return, 30..50 Nm, 24..230 VAC/DC, 95° angle of rotation

RedMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
RedMax- 30 - F	30 Nm	60/90/120/180/240 sec.	16 Sek	On-off, 3-pos	-	-	M
RedMax- 50 - F	50 Nm	60/90/120/180/240 sec.	16 Sek	On-off, 3-pos	-	-	M
RedMax- 30 - SF	30 Nm	60/90/120/180/240 sec.	16 Sek	On-off, 3-pos	-	2 internal aux. switches	M
RedMax- 50 - SF	50 Nm	60/90/120/180/240 sec.	16 Sek	On-off, 3-pos	-	2 internal aux. switches	M
RedMax- 30 - YF	30 Nm	60/90/120/180/240 sec.	16 Sek	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
RedMax- 50 - YF	50 Nm	60/90/120/180/240 sec.	16 Sek	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
RedMax- 30 - BF	30 Nm	60/90/120/180/240 sec.	16 Sek	On-off	-	EEx-i output+2xEPU	M
RedMax- 50 - BF	50 Nm	60/90/120/180/240 sec.	16 Sek	On-off	-	EEx-i output+2xEPU	M

Accessories (additional price)

Type	Technical data	
RedMax-.../VA	Size M, housing material stainless steel ss	type .../VA (Example RedMax-50.75/VA), available ~ I./II.quarter '06
RedSwitch	2 external, aux. switches adaptable to RedMax actuators	2 x EPU, adjustable, for zone 2, 22
RedBox-3P	Terminal box for zone 2, 22 for	RedMax-30.50, RedMax-15.30, RedMax-...-F, RedMax-...-R
RedBox-Y/S	Terminal box for zone 2, 22 for	RedMax-...-Y, RedMax-...-YF, RedMax-...-S, RedMax-...-SF
RedBox-BF	Terminal box for zone 2, 22 for	RedMax-...-BF
MKK-M	Mounting bracket for terminal boxes	connectable to actuators size M
D-F..-M	Adaptation with flange in acc. to DIN EN 5211	connectable to actuators size M
FireSafe	Safety temperature sensor for fire / smoke dampers, switching at 72°C	connectable to EEx-i output of RedMax-..-BF actuators
AR-16-xx	Reduction of squared damper connection from 12 mm to	14 mm (AR-16-14), 12 mm (AR-16-12)

ExTurn quarter turn actuators

ExTurn in acc. with 94/9/EG (ATEX) for zone 1, 2, 21 and 22.

Basic data
The ExTurn series are quarter turn actuators with spring return and an angle of rotation of 93°. The actuators are explosion proof (gas: II2G EEx d IIC T6 and dust: II2D IP66T95°C) for all kind of gas, vapor, mist and dust hazardous areas zone 1, 2, 21 and 22. The standard version has a robust antistatic aluminium housing, with an optional AISI 316 stainles steel housing for aggressive atmospheres. The shaft connection is squared with 14 x 14 mm at EXT-15...-F1 as well as at EXT-50...-F3 .
Technical data: IP65, -20...+40°C/+50°C, overload protected
Delivery: Actuator with 1 m cable

EEx-d quarter turn actuator **15 Nm** with spring return in **< 1 sec**, 93°

ExTurn	Torque	Supply voltage	Motor running	Spring return	Control mode
EXT-15230-F1	15 Nm	230 VAC	~ 180 sec/90°	< 1 sec/90°	On-off
EXT- 1524-F1	15 Nm	24 VAC/DC	~ 180 sec/90°	< 1 sec/90°	On-off

EEx-d quarter turn actuator **50 Nm** with spring return in **< 3 sec**, 93°

ExTurn	Torque	Supply voltage	Motor running	Spring return	Control mode
EXT-50230-F3	50 Nm	230 VAC	~ 30 sec/90°	< 3 sec/90°	On-off
EXT- 5024-F3	50 Nm	24 VAC/DC	~ 30 sec/90°	< 3 sec/90°	On-off

Accessories (additional price)

Type	Technische Daten
EXT-.../2EE	2 integral potential free aux. switches, switching at 5° and 85°
EXT-.../K	Integral heater for low ambient temperatures to -20°C and/or high air humidity
EXT-15...-F1/CT	Housing in Amercoat painting, some parts in stainless steel
EXT-50...-F3/CT	Housing in Amercoat painting, some parts in stainless steel
EXT-15...-F1./VA	Housing in stainless steel AISI 316
EXT-50...-F3./VA	Housing in stainless steel AISI 316
EXC/K...	EEx-e terminal boxes II2G EEx e IIT6, II2D IP65T85°C
EXC-DS1/VA	Safety switch for duct mounting, switching at +75°C, II2G EEx d IIC T6, II2D IP65T85°C

ExPlus linear motion actuators

ExPlus in acc. with 94/9/EG (ATEX) for zone 1, 2, 21 and 22.

Basic data
The ExPlus series are linear motion actuators with stroke of 100 or 250 mm. The actuators are explosion proof (gas: II2G EEx d IIC T6 and dust: II2D IP66T95°C) for all kind of gas, vapor, mist and dust hazardous areas zone 1, 2, 21 and 22. The standard version has a robust antistatic aluminium housing. The actuators are not overload protected and must be able to reach internal end switches.
Technical data: IP65, -20...+40°C/+50°C, integral end switches, **not** overload protected.
Delivery: Actuator with 1 m cable.

EEx-d linear motion actuator 300 N, 100 or 250 mm stroke

ExPlus	Force	Supply voltage	Running time	Control mode	Feedback signal
EXP-3230	300 N	230 VAC	~100 sec/100 mm	On-off, 3-pos	-
EXP-3230-P	300 N	230 VAC	~100 sec/100 mm	On-off, 3-pos	1000 Ohm
EXP-324	300 N	24 VAC	~100 sec/100 mm	On-off, 3-pos	-
EXP-324-P	300 N	24 VAC	~100 sec/100 mm	On-off, 3-pos	1000 Ohm
EXP-324-Y	300 N	24 VAC	~100 sec/100 mm	2...10 V-	
EXP-324-Y/I	300 N	24 VAC	~100 sec/100 mm	4...20 mA	

Accessories (additional price)

Type	Technical data
ExBox-...	Different type of terminal boxes
EXP-3...-250	Actuators with a stroke of 250 mm
EXP-3.../2E	Integral end-switches, not potential free, only for EXP-324 and EXP-3230
EXP-3.../K	Integral heater for low ambient temperatures to -20°C and/or high air humidity
Stroke reduction	Reduction of stroke, less than 100 mm or less than 250 mm

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

ExVent valve actuators

ExVent gemäß 94/9/EG (ATEX) für Zone 1, 2, 21 und 22.

Basic data
The ExVent series are linear motion actuators for linear valves. The actuators are explosion proof (gas: II2G EEx d IIC T6 and dust: II2D IP66T95°C) for all kind of gas, vapor, mist and dust hazardous areas zone 1, 2, 21 and 22. The standard version has a robust antistatic aluminium housing. For mounting to a valve body a special valve adaptaion (accessory) is required.
Technical data: IP65, -20...+40°C/+50°C, overload protected
Delivery: Actuator with 1 m cable, 1 mounting bracket for EEx-e terminal box, 1 EEx-e terminal box, without valve and without valve adaptation.

EEx-d valve actuators without spring return 800 N / 2000 N / 4500 N

ExVent	Force	Supply	Running time	Spring return	Control mode	Max. stroke
EXV- 8230	800 N	230 VAC	6 sec/mm	-	On-off, 3-pos	40 mm
EXV- 8230-P	800 N	230 VAC	6 sec/mm	-	3-pos, feedback 1000 Ω	40 mm
EXV- 8230-Y	800 N	230 VAC	6 sec/mm	-	2...10 V-	40 mm
EXV- 8230-Y/I	800 N	230 VAC	6 sec/mm	-	4...20 mA	40 mm
EXV- 824	800 N	24 VAC/DC	6 sec/mm	-	On-off, 3-pos	40 mm
EXV- 824-P	800 N	24 VAC/DC	6 sec/mm	-	3-pos, feedback 1000 Ω	40 mm
EXV- 824-Y	800 N	24 VAC/DC	6 sec/mm	-	2...10 V-	40 mm
EXV- 824-Y/I	800 N	24 VAC/DC	6 sec/mm	-	4...20 mA	40 mm
EXV- 20230	2000 N	230 VAC	6 sec/mm	-	On-off, 3-pos	40 mm
EXV- 20230-P	2000 N	230 VAC	6 sec/mm	-	3-pos, feedback 1000 Ω	40 mm
EXV- 20230-Y	2000 N	230 VAC	6 sec/mm	-	2...10 V-	40 mm
EXV- 20230-Y/I	2000 N	230 VAC	6 sec/mm	-	4...20 mA	40 mm
EXV- 2024	2000 N	24 VAC/DC	6 sec/mm	-	On-off, 3-pos	40 mm
EXV- 2024-P	2000 N	24 VAC/DC	6 sec/mm	-	3-pos, feedback 1000 Ω	40 mm
EXV- 2024-Y	2000 N	24 VAC/DC	6 sec/mm	-	2...10 V-	40 mm
EXV- 2024-Y/I	2000 N	24 VAC/DC	6 sec/mm	-	4...20 mA	40 mm
EXV- 45230-35	4500 N	230 VAC	2,5 sec/mm	-	On-off, 3-pos	35 mm
EXV- 45230-P-35	4500 N	230 VAC	2,5 sec/mm	-	3-pos, feedback 1000 Ω	35 mm
EXV- 45230-Y-35	4500 N	230 VAC	2,5 sec/mm	-	2...10 V-	35 mm
EXV- 45230-Y/I-35	4500 N	230 VAC	2,5 sec/mm	-	4...20 mA	35 mm
EXV- 4524-35	4500 N	24 VAC	2,5 sec/mm	-	On-off, 3-pos	35 mm
EXV- 4524-P-35	4500 N	24 VAC	2,5 sec/mm	-	3-pos, feedback 1000 Ω	35 mm
EXV- 4524-Y-35	4500 N	24 VAC	2,5 sec/mm	-	2...10 V-	35 mm
EXV- 4524-Y/I-35	4500 N	24 VAC	2,5 sec/mm	-	4...20 mA	35 mm
EXV- 45...-75	Additional cost for actuators woth stroke of max 75 mm					

EEx-d valve actuators with spring return 800 N

ExVent	Force	Supply	Running time	Spring return	Control mode	Stroke
EXV- 8230-F16/R..	800 N	230 VAC	~ 5 sec/mm	16 sec	On-off	30 mm
EXV- 824-F16/R..	800 N	24 VAC/DC	~ 5 sec/mm	16 sec	On-off	30 mm
EXV- 824-YF16/R..	800 N	24 VAC	~ 5 sec/mm	16 sec	2...10 V-	30 mm

Attention!
Required data for purchase of valve actuators with spring return:
Valve safety position (without power)
- in = .../RI
- out = .../RO

Linkage
- valve manufacturer
- valve type
- valve size
- valve stroke

Accessories (additional price)

Type	Technical data
Adaptation	In acc. with valve type and DIN
EXV-...U/I	Feedback signal 4...20 mA for 3-pos actuators
EXV-.../K	Integral heater for low ambient temperatures to -20°C and/or high air humidity
EXV-.../2EE	2 integrals aux. switches, switching at about 10% and 90% of stroke
EXV-.../HV	Manual override
EXC-HSV	2 external, potential free aux. switches
EXC-K/HSV	EEx-e terminal box for EXC-HSV aux. switches, incl. mounting bracket

ExLine switching modules

EXL-IRU-1 in acc.with 94/9/EG (ATEX) for zone 0, 1, 2, 20, 21 and 22.

Basic data
The switching module type EXL-IRU-1 is an electronic module with intrinsic safe circuit II2(1)GD [EEx ia] IIC for passive potential free binary sensors, transferring signals from the hazardous area to the safe area. The module is for DIN rail mounting. Installation area of the module is the safe area. Connectable sensors are the binary sensors of the "ExSens" series.
Technical Data: 24 VAC/DC supply, intrinsic safe circuit, input for contacts and Namur sensors, output potential free contact, DIN rail mounting, Dimension w x h x l = 22,5 x 75 x 100 mm
Delivery: 1 EEx-i module

EEx-i switching module for DIN rail mounting

ExLine	Application (sensor input)	Output	for zone
EXL-IRU-1	°C, rP, %rH, fan belt protection, Namur DIN19234	Contact 1xEPU	0,1,2,20,21,22
N1 supply unit	Input 120...230 VAC, output24 VDC, max. 0,5 A, max. 4	EXL-IRU-1 connectable	
	The N1 supply unit is required only in case of 120..230 V supply !		

ExSens passive, binary sensors

ExSens in acc. with 94/9/EG (ATEX) for zone 1, 2 and 22.

Basic data
Passive potential free sensors for use in zone 1, 2, 22 (in acc. with type), connectable to switching module type EXL-IRU-1. The sensors come with manufacturer certification in acc. with ATEX 94/9/EG.
Technical data: passive binary sensor with manufacturer certification if connected to EXL-IRU-1
Delivery: 1 EEx-i sensor

EEx-i sensors connectable to switching module type EXL-IRU-1

ExSens	Function	Range/Hysteresis	Sensor	Zone
TBR-2G	Room thermostat	0...+40 °C, 1 K	Contact, 2-pos	1, 2
TBR-2G3D	Room thermostat (IP65)	-30...+30 °C, 2-15 K	Contact, 2-pos	1, 2, 22
TBK-2G3D	Duct thermostat (IP65)	0...+60 °C, 2-20 K	Contact, 2-pos, L=190 mm	1, 2, 22
TBT-2G3D	Probe thermostat (IP65)	20...+90 °C, 2-20 K	Contact, 2-pos, L=120 mm	1, 2, 22
TBK-FR-2G	Frost protection thermostat	-10 ...+ 12 °C	Contact, 2-pos, capillary 6 m	1, 2
FBR-2G	Room humidistat	35...100 % r.H., ~ 4%r.H.	Contact, 2-pos	1, 2
FBK-2G	Duct humidistat	35...100 % r.H., ~ 4%r.H.	Contact, 2-pos	1, 2
DBK-2G	Diff. pressure sensor	20-300,50-500,100-1000 Pa	Contact, 2-pos	1, 2
DBK-2G3D	Diff. pressure sensor (IP65)	40-125,100-400,350-1400 Pa	Contact, 2-pos	1, 2, 22
WFBK-2G	Air paddle	2...8 m/s, paddle in V2A	Contact, 2-pos	1, 2
NBW-K-2G3D	Fan belt protection (IP65)	up to **<** 20.000 m³/h	Namur sensor + bracket	1, 2, 22
NBW-G-2G3D	Fan belt protection (IP65)	more than **>** 20.000 m³/h	Namur sensor + bracket	1, 2, 22

Accessories (additional price)

Accessory	Function	Delivery
Installation kit 1	for frost protection sensor type TBK-FR-2G	Pg entry for capillaries, 6 brackets, support bracket
Installation kit 2	for diff. pressure sensor type DBK-2G	2 duct connectors, 2 m flexible PVC tube

Sensor selection. Example: Room thermostat type TBR-...

TBR-2G	Installation in zone 1 and 2		
TBR-2G3D	Installation in zone 1, 2 and 22		
Application for	Gas, mixtures , mists		Dust
Product group	2G		3D
For use in zone	1	2	22

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

ExLine transducer

EXL-IMU-1 in acc.with 94/9/EG (ATEX) for zone 0, 1, 2, 20, 21 and 22.

Basic data
The transducer type EXL-IMU-1 is an electronic module with intrinsic safe circuit II2(1)GD [EEx ia] IIC for passive potential free modulating sensors, transferring signals from the hazardous area to the safe area. The module is for DIN rail mounting. Installation area of the module is the safe area. Connectable sensors are the modulating sensors of the "ExSens" series.

Technical data: 24 VAC/DC supply, intrinsic safe circuit for sensors: Pt 100/500/1000 DIN, Ni 100/200/500/1000 DIN, LS-Ni (Siemens), LF 20 (Honeywell), KP 250 (Kieback & Peter), 0..1 KOhm, 0...10 KOhm, and other listed sensors. Output 0...10 VDC, 0(0)...20 mA, DIN rail mounting, Dimension w x h x l= 45 x 75 x 110 mm

Delivery: 1 EEx-i module

EEx-i transducer for DIN rail mounting

ExLine	Application (sensor input)	Output	for zone
EXL-IMU-1	°C, rP, %rH, m/s, ...	0..10VDC, 0(4)..20mA	0, 1, 2, 20, 21, 22
N1 supply unit	Input 120...230 VAC, output24 VDC, max. 0,5 A, max. 4 EXL-IRU-1 connectable		
	The N1 supply unit is required only in case of 120..230 V supply !		

ExSens passive, modulating sensors

ExSens in acc. with 94/9/EG (ATEX) for zone 1, 2 and 22.

Basic data
Passive potential free sensors for use in zone 1, 2, 22 (in acc. with type), connectable to transducer type EXL-IMU-1. The sensors come with manufacuterer certification in acc. with ATEX 94/9/EG.

Technical data: passive modulating sensor with manufacturer certification if connected to EXL-IMU-1

Delivery: 1 EEx-i sensor

EEx-i sensors connectable to transducer type EXL-IMU-1

ExSens	Function	Range	Sensor principle	Zone
TFR-2G	Room temperature	-30 ...+ 60 °C	Pt 100 DIN	1, 2
TFR-2G3D	Room temperature (IP65)	-50 ...+ 90 °C	Pt 100 DIN	1, 2, 22
TFK-2G3D	Duct temperature (IP65)	-30 ...+ 60 °C	Pt 100 DIN, 200 mm	1, 2, 22
TFT-2G3D	Probe temp. (IP65), tubing G1/2" Ms	-30 ...+150 °C	Pt 100 DIN, 100 mm	1, 2, 22
TFT-V4A-2G3D	Probe temp. (IP65), tubing G1/2" VA	-30 ...+150 °C	Pt 100 DIN, 100 mm	1, 2, 22
FFR-2G	Room humidity	30...100 % r.H.	0...1 kOhm	1, 2
FFK-2G	Duct humidity	30...100 % r.H.	0...1 kOhm	1, 2
TFFR-2G	Room combination humidity/temperature	30...100 % r.H., -10...+60°C	0...1 kOhm, Pt 100	1, 2
TFFK-2G	Duct combination humidity/temperature	30...100 % r.H., -20...+60°C	0...1 kOhm, Pt 100	1, 2
DFK-07-2G	Differential pressure	rP < 700 Pa	x..y Ohm	1, 2
DFK-17-2G	Differential pressure	rP < 1700 Pa	x..y Ohm	1, 2
VFK-07-2G	Volume control	0...15 m/s	x..y Ohm	1, 2
SGR-2G3D	Potentiometer (IP65)	Resistance	0...1 kOhm	1, 2, 22

Sensor selection. Example: Room temperature sensor typeTFR-...

TFR-2G	Installation in zone 1 and 2		
TFR-2G3D	Installation in zone 1, 2 and 22		
Application for	Gas, mixtures , mist		Dust
Product group	2G		3D
For use in zone	1	2	22

ExMag Doorholder magnets

ExMag in acc. with 94/9/EG (ATEX) for zone 1, 2, 21 and 22

Basic data
Electric explosion proof doorholder magnets II2G EEx m II T6, II2D IP66T85 for use in hazardous areas zone 1, 2, 21, 22
Technical data: doorholder magnet, 24 VDC, IP65
Delivery: 1 EEx-m magnet, 1 m cable

EEx-m magnets

ExMag	Force	Supply	Function	Current consumption
EXM- 650	650 N	24 VDC	Magnet	44 mA
EXM-1300	1300 N	24 VDC	Magnet	65 mA
EXM-2000	2000 N	24 VDC	Magnet	160 mA

Accessories (additional price)

Type	Technical data
GH 6	Anchor for EXM-650
GH 13/20	Anchor for EXM-1300 and EXM-2000
EXC-K4	EEx e terminal box, IP 66
EXC-K4/S	EEx e terminal box, IP 66, with integral fuse
EXC-T1	EEx d push button
MOL-230/24	Supply unit, input 230 VAC, output 24 VDC, max. 350 mA, rail mounting

NEW!!
Now also for use in zone 21 and 22!

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

NormPlus linear motion actuators

NormPlus linear motion actuators for industrial applications (NOT explosion proof)

Basic data
The NormPlus series are linear motion actuators with stroke of 100 or 300 mm. The actuators are for industrial application. The standard version has a robust antistatic aluminium housing. The actuators are overload protected.
Technical data: IP65, 0...+50°C (-40...+50°C), overload protected.
Delivery: Actuator with 1 m cable, 2 linkages.

Industrial actuators 1000 N, 100 or 300 mm stroke

NormPlus	Force	Supply	Running time	Control mode	Feedback	Stroke
NOP-1024-100	1000 N	24 VAC/DC	~1 sec/mm	On-off, 3-pos	-	100 mm
NOP-1024-P-100	1000 N	24 VAC/DC	~1 sec/mm	On-off, 3-pos	1000 Ohm	100 mm
NOP-1024-300	1000 N	24 VAC/DC	~1 sec/mm	On-off, 3-pos	-	300 mm
NOP-1024-P-300	1000 N	24 VAC/DC	~1 sec/mm	On-off, 3-pos	1000 Ohm	300 mm

Accessories (additional price)

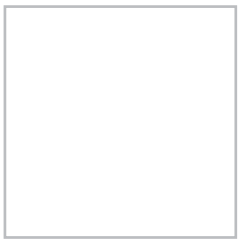
Type	Technical data
NOE-230	External, additional electronics for 230 VAC supply of NOP-1024...
NOE-Y24	External, additional electronics for 2..10 V- and 4...20 mA, compatible to NOP-1024-P...
NOK-230	Heater, 230 VAC, for use to -40°C or humidity
NOK-24	Heater, 24 VAC/DC, for use to -40°C or humidity
NOP-1024.../H80	Special edition for use at +80°C ambient temp., terminal box at ambient temp. of max. +50°C
Special stroke	Stroke adjustment of NOP actuators < 100 mm or < 300 mm, ex-work

Industrial actuator 3000 N, 145 mm stroke, down to -40°C

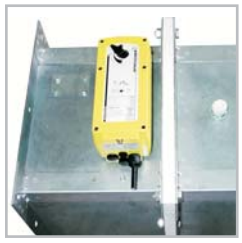
NormPlus	Force	Supply	Running time	Control mode	Stroke	Ambient temp.
NOP-30230-145/K4/BLM	3000 N	230 V/50Hz	0,7 Sek/mm	On-off, 3-pos	145 mm	-40°C to + 50°C

Product information
ExMax and RedMax actuators size S and M












Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Actuators with universal basic features

ExMax-15-YF (example)

All	5	2	4	2	4
Voltages	**Running time motor**	**Spring return**	**Control mode**	**Temperature range**	**EEx-areas**
24 to 230 VAC and DC	3 (7,5/60) sec./90° 15 sec./90° 30 sec./90° 60 sec./90° 120 sec./90° (240 sec/90°)	3 sec./90° 10 sec./90° (20 sec./90°)	On-off 3-pos 0...10 V- 4...20 mA	0...+ 40 (50) °C -40...+ 40 (50) °C	In acc. with ATEX for gas zone 1 + 2 In acc. with ATEX for dust zone 21 + 22 II2G EEx d ia IIC T6 II2D IP66T85°C
self adaptable	selectable on site	selectable on site	in acc. with wiring	integral heater	highest protection

Torque 5 Nm | 10 Nm | **15 Nm** | 30 Nm | 50 Nm | 75 Nm | 100 Nm

Accessories

Ex-terminal box ExBox	Ex-aux. switch ExSwitch	Mounting clamp KB-S	Brackets MKK-.., HV-..	Adaptations LIN-S, LIN-M	Stainless steel ..Max-..-VA
					
A range of terminal boxes	2 external potential free aux. switches, adjustable	Mounting clamp for round damper shaft.	- mounting brackets - manual override	Adaptations for different types of armatures for quarter turn and linear motion	Actuator with stainless steel housing for aggressive atmospheres.
adaptable	adaptable	adaptable	adaptable	adaptable	special version

Range of application

							?
VAV Round damper Chimneys	Control damper Shut off damper Exhaust damper	Air dampers for fire protection exhaust systems	Ball valve Mixing valve	Butterfly valve Shut off valve	Control valve Safety valve	Metering valve Metering pump	Special OEM applications

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

ExMax and RedMax actuator conception

100% safety – 100% explosion protection

Schischek has been designing and manufacturing explosion proof equipment for over 25 years. The equipment is approved and produced in accordance with only the highest safety standards. If you can guarantee that you have continuously chosen and installed the correct product, then explosion protection is not a question of statistics but of 100% safety!

With the ExMax und RedMax series for use in potentially explosive areas in industry, chemical, pharmaceutical, ship building, building automation and offshore applications, an extensive selection of equipment is available on the market, providing a large variety of torques, running times and power requirements and control modes.

They can be used in a whole range of areas from the motorization of air and fire / smoke dampers, on valves with quarter turn or linear motion, to automation in industry and machinery.

The ExMax/RedMax series are constructed and approved, so that actuators can be used in potentially explosive areas of zones 1, 2, 21 and 22 – for all gases, mists, vapors and dust. To prevent confusion with other equipment, the color “yellow” is used to designate the ExMax series and the color “magenta” is used to designate the RedMax series.

In the standard version, the actuators are delivered in robust aluminum housings. Specially constructed stainless steel housings (AISI 316) are available for use in more aggressive environments.

The other dimensions are, excepting the torque bandwidth of 5 Nm to 100 Nm, limited to a shell housing of only two. This supports the design and reduces the variety of needed adaptations. For safety a spring return function of up to 50 Nm is available.

Sizes

Size S 210 x 95 x 80 mm
Size M 285 x 150 x 116 mm

Actuator	size S		size M	
Torque	without F	with F	without F	with F
5 Nm	~	~		
10 Nm	~	~		
15 Nm	~	~		
30 Nm	~			~
50 Nm			~	~
75 Nm			~	
100 Nm			~	

F = spring return function

The basic workings of the equipment guarantee that it has a wide variety of uses. With the whole concept of accessories – like a modular construction system – these can be expanded if required. During production the variability of each actuator is observed and the wide variety of adaptations is reduced.

Actuators offer above normal comfort and are distinguishly adaptable. Higher-grade brushless motors not only guarantee a long life span, but also the adjustability of running times and torques to suit the individual installation needs.

So we have also succeeded in creating explosion proof actuators with differing functions and parameterization, without affecting the explosion protection, without having to switch-off the supply voltage and without having to use additional special devices on site.

Such functions depend on the type of actuator being used, for example the alteration of running times, the alteration of torques, a self adapting actuator in relation to balancing the control signals on the traveling rotation angle, a Hand-Auto function or compulsion control and reverse operations.

With universal multi purpose power packs you also no longer need to think about which equipment you should choose and how to operate it. All actuators have an integral selfadjusting power supply ranging from 24 to 230 VAC/DC..

No more incorrect orders, no expensive stock keeping, no false connections!

ExMax – The name says it all!

ExMax

The brand name is already synonymous with specialization in "Ex"-plosion protection and "Max"-imum power!

ATEX approval for all gases, mists, vapors and dust, as well as verification in accordance with the highest safety standards, are an integral part of all ExMax equipment. With II2G EEx d ia IIC T6 approval for all gases, mists and vapors, with II2D IP66T85 approval the same applies for all dust. The equipment can be installed and operated in zones 1, 2, 21 and 22.

With IP65 protection as standard and integrated heater for use down to -40°C ambient temperature, it is also suitable for extreme uses – there is also the ExMax series, which is made from stainless steel AISI 316 (L), for aggressive environments.

A high-performing accessory such as upgradeable EEx-

Aluminium standard housing

auxilliary switches, EEx-e terminal boxes und different adaptation solutions for air dampers, linear valves und throttle valves/butterfly valves, increases the uses and areas of use.

Stainless steel housing AISI 316

RedMax – when its only zone 2 or 22!

The RedMax series was produced for Ex-areas (zone 2 and 22) and for industrial uses.

RedMax

"Magenta" is the set color representing the RedMax series and "Max" stands for maximum power density! The advantages are a favourable price without compromising on quality and a range of functions. With identical dimensions and the same connections as the ExMax, it is easier again when connecting it to valves and dampers – Consistency from explosion proof to industrial applications!

Technical Highlights

ExMax und RedMax represent a high tech and universal revolution. The equipment is very user friendly and is fitted with more extensive functions.

Universally and innovatively adaptable!

ExMax and RedMax equipment provides the utmost safety when installed in hazardous areas of zones 1, 2, 21 and 22, (RedMax zones 2 and 22) for all gases, mists, vapors and dust. Only the highest safety standards and certifications by current testing authorities guarantee the safety of your equipment and systems.

Your safety comes first!

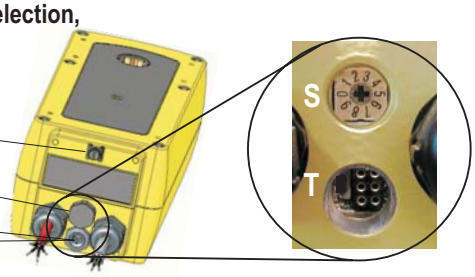
With the application program the possible applications increase exponentialy. From the linear bracket to the valve adaptation for different manufacturers and sizes, to adaptations for ball valves, throttle valves and metering valves, Schischek has the solution.
Accessories can also be used here, such as mounting brackets, travel stop screws, terminal box mountings, external EEx-e auxiliary switches and EEx-e terminal boxes.

Something to round up – for your comfort!

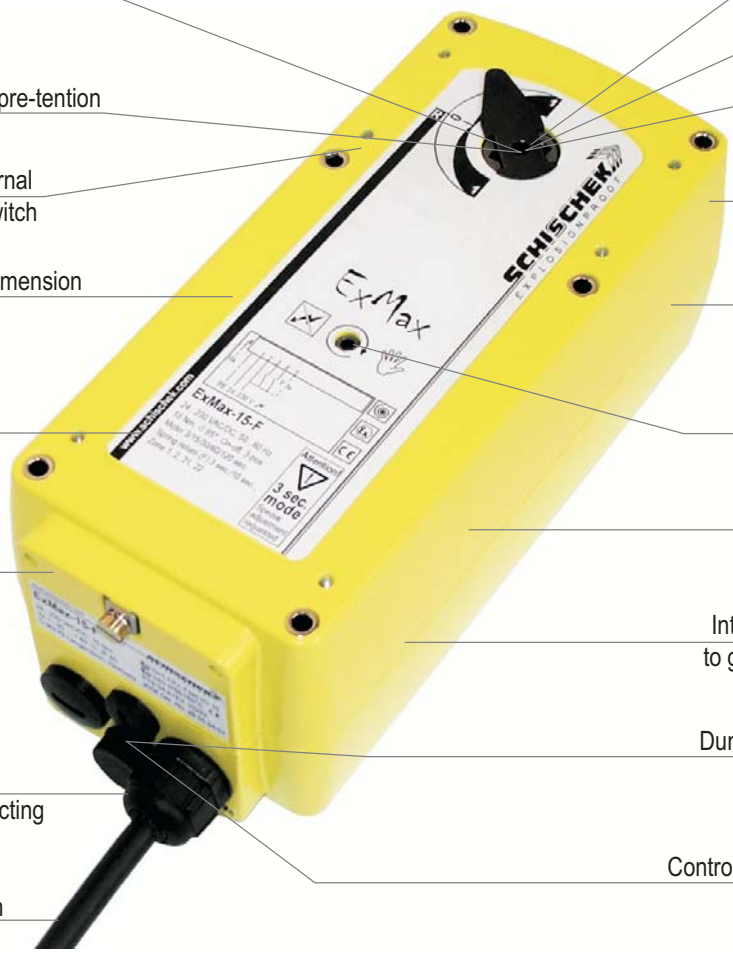
Easiest to service!

It is possible to select the parameters of the ExMax and RedMax actuators during operation. Therefore explosion protection is never impaired. It is not necessary to use any special tool, beside a screwdriver.

Switch - button - LED for parameter selection, behind dummy plug



Highlights



Double square shaft connection
12 x 12 mm (size S)
16 x 16 mm (size M)

95° angle of rotation incl. 5° pre-tention

Prepared for adaptable, external auxilliary switches type ExSwitch

Compact design and small dimension

Robust Aluminium housing
(Optional stainless steel)

IP 65 protection

Universal power supply unit
24 to 230 VAC/DC, auto selecting

Cable connection approx. 1m

100 % overload protected

100 % self locking

5 -10 - 15 - 30 Nm (S)
50 - 75 - 100 Nm (M)

Integral heater for use down to -40°C ambient temperature

Gear made of steel

manual override

Only 3,5 Kg of weight (size S)
Only 7 Kg of weight (size M)

Integral safety temperature limiter to guarantee temperature class T6

Dummy plug to hide control device

Control device for parameter selection switch, button, LED

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

ExMax and RedMax types

Basic equipment fo ExMax and RedMax actuators

- Universal power supply from 24 to 230 VAC/DC, auto selecting, frequency 50 to 60Hz
- On site adjustable motor running times, 5 levels in acc. to type
- On site adjustable spring return running times, 3 and 10/(20) sec./90° (only ...-F actuators)
- On site adjustable torque, in acc. to type, max. 2 levels
- Integral, heater for use at ambient temperaturs down to - 40°C
- Angle of rotation 95°, incl. 5° pre-tention
- Robust industrial aluminium housing, baked varnish, IP 65 protection
- Light weight and small dimension
- Direct coupled shaft connection, double squared, size S = 12x12 mm, size M = 16x16 mm
- Cable connection with 1 m cable length
- 100 % overload protected
- Dimension hxwxl: **Size S** = 80 x 95 x 210 mm, **Size M** = 116 x 150 x 286 mm

Special solutions

- Actuators with stainless steel housing (AISI 316)

Explosion proof	ExMax	RedMax
PTB-tested in acc. with	94/9/EG (ATEX)	94/9/EG (ATEX)
Use for gases in	zone 1 and 2	zone 2
Certification	II2G EEx d ia IIC T6	II3G EEx nC II T6
		II3(1)G EEx [ia] IIC
Use for dust in	zone 21 and 22	zone 22
Certification	II2D IP66 T80°C	II3D IP66 T80 °C

Rotary acuators, no spring return, 24 to 230 VAC/DC, 95° angle of rotation

ExMax	RedMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
ExMax - 5.10	RedMax -5.10	5 and 10 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	-	S
ExMax-15.30	RedMax-15.30	15 and 30 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	-	S
ExMax - 5.10 - S	RedMax -5.10 - S	5 and 10 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	2 x EPU*	S
ExMax-15.30 - S	RedMax-15.30 - S	15 and 30 Nm	3/15/30/60/120 sec.	-	On-off, 3-pos	-	2 x EPU*	S
ExMax-50.75	RedMax-50.75	50 and 75 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	-	M
ExMax -100	RedMax -100	100 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	-	M
ExMax-50.75 - S	RedMax-50.75 - S	50 and 75 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	2 x EPU*	M
ExMax -100 - S	RedMax -100 - S	100 Nm	60/90/120/180/240 sec.	-	On-off, 3-pos	-	2 x EPU*	M
ExMax -5.10 - Y	RedMax -5.10 - Y	5 and 10 Nm	7,5/15/30/60/120 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
ExMax-15.30 - Y	RedMax-15.30 - Y	15 and 30 Nm	7,5/15/30/60/120 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
ExMax-50.75 - Y	RedMax-50.75 - Y	50 and 75 Nm	60/90/120/180/240 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
ExMax -100 - Y	RedMax -100 - Y	100 Nm	60/90/120/180/240 sec.	-	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M

Rotary actuators with spring return, 24 to 230 VAC/DC, 95° angle of rotation

ExMax	RedMax	Torque	Motor running 90°	Spring return	Control mode	Feedback	Equipped	Size
ExMax - 5.10 - F	RedMax - 5.10 - F	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	-	S
ExMax - 15 - F	RedMax - 15 - F	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	-	S
ExMax - 5.10 - SF	RedMax - 5.10 - SF	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	2 x EPU*	S
ExMax - 15 - SF	RedMax - 15 - SF	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos	-	2 x EPU*	S
ExMax - 30 - F	RedMax - 30 - F	30 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos	-	-	M
ExMax - 50 - F	RedMax - 50 - F	50 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos	-	-	M
ExMax - 30 - SF	RedMax - 30 - SF	30 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos	-	2 x EPU*	M
ExMax - 50 - SF	RedMax - 50 - SF	50 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos	-	2 x EPU*	M
ExMax - 5.10 - YF	RedMax - 5.10 - YF	5 and 10 Nm	7,5/15/30/60/120 sec.	3 and 10 sec.	3-post, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
ExMax - 15 - YF	RedMax - 15 - YF	15 Nm	7,5/15/30/60/120 sec.	3 and 10 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	S
ExMax - 30 - YF	RedMax - 30 - YF	30 Nm	60/90/120/180/240 sec.	~ 20 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
ExMax - 50 - YF	RedMax - 50 - YF	50 Nm	60/90/120/180/240 sec.	~ 20 sec.	3-pos, 0...10V-, 4..20 mA	0...10V-, 4..20 mA	-	M
ExMax - 5.10 - BF	RedMax - 5.10 - BF	5 and 10 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos		EEx-i* + 2 x EPU*	S
ExMax - 15 - BF	RedMax - 15 - BF	15 Nm	3/15/30/60/120 sec.	3 and 10 sec.	On-off, 3-pos		EEx-i* + 2 x EPU*	S
ExMax - 30 - BF	RedMax - 30 - BF	30 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos		EEx-i* + 2 x EPU*	M
ExMax - 50 - BF	RedMax - 50 - BF	50 Nm	60/90/120/180/240 sec.	~ 20 sec.	On-off, 3-pos		EEx-i* + 2 x EPU*	M

*EPU = electrical, potential free contact. EEx-i (in this context) = intrinsically safe, available at the actuator, to connect a safety temperature limiter type FireSafe.

Advantages: cost effective - easy installation - compact - safe

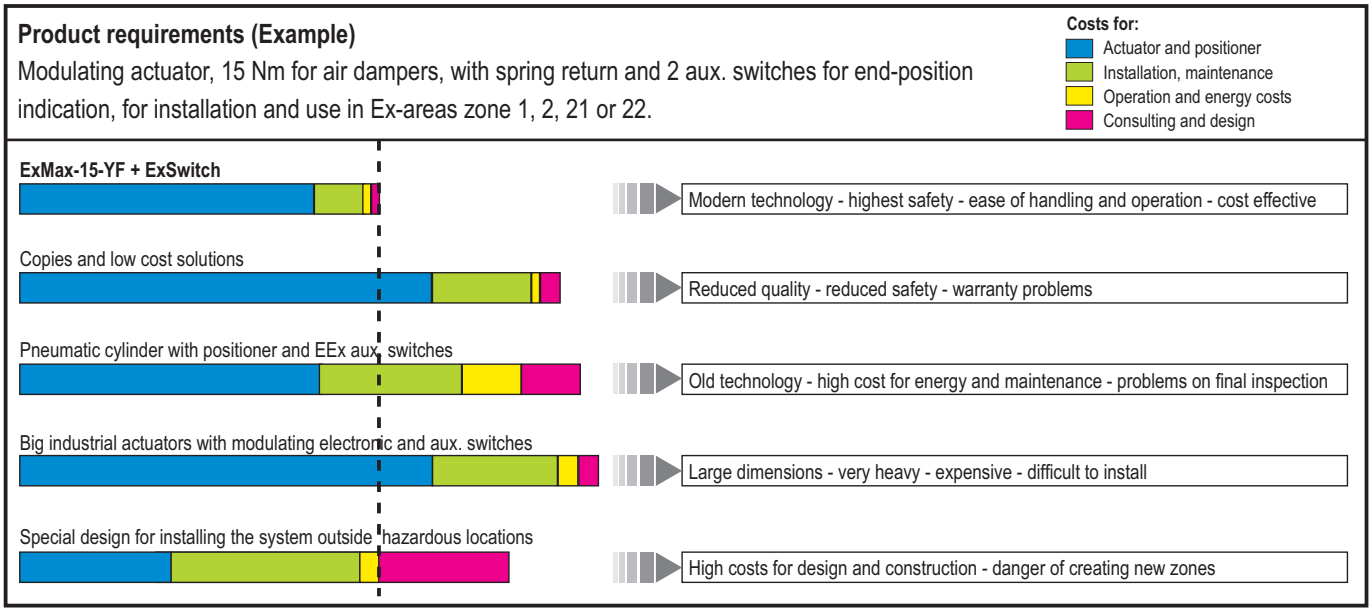
Advantages for you as:

	End user	Consultant, architect	Manufacturer	Controls company	Contractor	Installer	Authority	Maintenance
Highest protection class and highest safety	~	~	~	~	~	~	~	~
Installation in all kinds of gas, mixture, vapours and dust	~	~	~	~	~	~	~	~
Tested in acc. with ATEX 94/9/EG	~	~	~	~	~	~	~	~
PTB certificated (Physikalisch Technische Bundesanstalt)	~	~	~	~	~	~	~	~
Easy acceptance from authorities	~	~	~	~	~	~	~	~
Easy and quick mounting to dampers and armatures	~		~	~	~	~		~
Easy and quick wiring	~			~	~	~		~
Easy and quick commissioning	~		~	~	~	~		~
Maintenance free solution	~		~	~	~	~		~
Cost effective solution	~	~	~	~	~	~		~
Small dimension		~	~	~	~	~		~
Light weight (ideal for shipbuilding, offshore, ...)	~	~	~	~	~	~		~
Universal equipped, parameter selection on site	~		~	~	~	~		~
Well-shaped design for clean plants	~	~	~					
Compatible to all control systems	~	~	~	~	~	~		~
Directly connectable to analogue- and DDC-control systems		~	~	~	~	~		~
Easy adaptation with accessories conception		~	~	~	~	~		~
Cost effective in operation (no compressed air required)	~	~						
Electric supply guarantees long distance wiring	~	~	~	~	~	~		~
"One stop shopping" reduces time and cost	~	~	~	~	~	~		~
Schischek as supplier with 25 years experiance of explosion proof	~	~	~	~	~	~	~	~
Schischek as consultant saves costs in planning	~	~	~	~	~	~		~
Safety in engineering with high flexibility	~	~	~	~	~	~		
Low storage costs as a result of universal technology	~		~	~	~	~		~
No problem with freezing at low ambient temperatures	~	~	~	~	~	~		~

Direct comparison: "ExMax" Modulating actuator with spring return against competitors

Product requirements (Example)

Modulating actuator, 15 Nm for air dampers, with spring return and 2 aux. switches for end-position indication, for installation and use in Ex-areas zone 1, 2, 21 or 22.



Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Pneumatic was yesterday - today are ExMax and RedMax

In the past, despide the use of electronics for control engineering pneumatics have been frequently chosen for explosion protection. Even though classic control engineering and installation were determined by electronics for a long time, pneumatic components were frequently used in the Ex area.
This is, on the whole, costly, complicated, no longer "state of the art" and above all expensive!
The differences between electric and pneumatic solutions are considerable, depending on the type of equipment, the size of the equipment and environmental conditions.

The differences result from:

1. functions of the actuators used
2. extent of the components required
3. selections made during installation
4. selections made during operation and maintenance
5. energy use selection.

Point 1: Functions of the actuators used

In the case of certain On-off actuators, pneumatic cylinders are beneficial as well as good value. If auxiliary switches must be used in pneumatics for signalling at the end or in between, explosion proof switches would be required, which would result in a clear price increase. In this case the ExMax and RedMax series can be purchased for around the same price. With controlled actuators, in particular modulating actutators with or without a feedback signal, the ExMax and RedMax series are clearly more cost effective than the pneumatic solution! All the electronics are contained in the flameproof enclosure, and it is several hundred Euros cheaper per actuator in comparison with pneumatics!

Point 2: Extent of the components required

While no further components are necessary for electrical equipment in the Ex area besides an EEx-e terminal and a connection directly to the pannel, pneumatic cylinders, excepting the connecting solenoid valve, require additional pressure reducing valves und filters to protect the compressed air from pollution, oil and water. Two energy systems (electricity and air) are integrated into the panel. A compressor or central air conditioning is required as well as an additional compressor during maintenance and breakdown.

Point 3: Selections made during installation

ExMax und RedMax actuators are hooked up to the power supply – that's the way it is.
In pneumatic equipment, tubing must be used, which involve considerable work during installation. For equipment with higher requirements, these must be made out of stainless steel when necessary, which leads to increased material and installation costs. Also in the building of panels pneumatic systems are more expensive, due to the installation of a connected electric and air supply, as well as the increased need for space. In addition, increasing activation, processing of feedback signals or auxiliary switch signal processing, are carried through electric wiring using compressed air piping. These should be performed under "intrinsic safety", signifying a divided transfer from one, non-intrinsically safe circuit to another. In addition interfaces, which are frequently added, such as switching modules or transducers are placed in the pannel, which would otherwise require a lot of space. Choice of cabling and compliance with relevant regulations regarding intrinsically safe circuits is essential. During shipbuilding and on drilling platforms, the relevant weight and size disadvantages of pneumatics come into play.

Point 4: Selections made during operation and maintenance

ExMax and RedMax inductors are maintenance free in relation to operation. On the other hand, the maintenance and care of pneumatic installations is much more expensive. This applies not only to the maintenance of pneumatic cylinders but also above all to the tightness testing of the piping, as well as the maintenance of compressors. If contaminants get into the system, expensive renovation work must be carried out.

Point 5: Energy use selection

We all know that, "air" is one of the most expensive and uneconomical sources of energy. A continuous air supply requirement and low efficiency due to narrowness in the system, and the ever present need for compressors, make pneumatic installation an expensive affair. Therefore in the interest of cost reduction and the environment, new installations and modifications should lead more to an electrical solution.

Advantage/disadvantage - electric/pneumatic

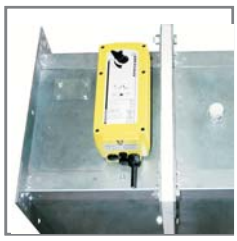
	ExMax, RedMax	Pneumatic
Advantages	~ Cost effective in planning, supply, installation, commissioning, maintenance and operation. ~ Low energy consumption ~ Compressor is not required ~ Tubing is not required ~ Air quality control is not required ~ No interface in the pannel required ~ Direct connectable to DDC systems ~ Modulating input/output signal integral ~ Aux. siwtches integral ~ A low range of components to install ~ 100% safety with ATEX certification ~ No problems with inspection ~ For all kind of gas, vapor, mist and dust	~ Has a long term market profile ~ High torque possible ~ On-off cylinder is cheaper if you do not consider the system
Disadvantages	~ An on-off electrical actuator seems to be more expensive than a single pneumatic cylinder if you do not consider the system ~ Less name recognition than pneumatic ~ Electric has to fight against prejudice	~ Expensive in planning, supply, installation, commissioning, maintenance and operation. ~ High energy consumption (electricity + air) ~ Compressor required ~ Tubing required ~ Air quality control required ~ Risk of freezing ~ Interface in the pannel required ~ 2 diff. supply systems required (Air/electricity) ~ Modulating input/output signal only with additional positioner (expensive) ~ Aux. EEx switches not integral ~ Many components to install ~ Problems with inspection without ATEX certificate ~ Young engineers are not familiar with pneumatics

Applications

Air dampers

Schischek actuators are optimally suited to the assembly of air dampers to be directly mounted on the damper shaft. In this case, either the standard squared shaft can be used for interlocking connections, or mounting brackets are available for use as an accessory for round damper shafts (max. 30 Nm).
Directional variations provide On-off, 3 pos and 0...10 V- or 4...20 mA.
For the application of fail safe operation all actuators are equipped with spring return function
5 Nm to 100 Nm is the right choice for all dampers!

Fire / smoke dampers



Fire / smoke dampers place especially technical requirements on actuators.
The Schischek's series of actuators are the best explosion proof actuators suited to this usage.
For fire / smoke dampers, inductors with intrinsically safe electric circuits are directly fitted with an EEx-i safety temperature limiter. Shut off times of approx. 3 sec. or approx. 10 (20) sec. guarantee a quick and safe shut off in the case of a fire. The actuators are connected via squared shaft.

VAV control

VAV control, pressure control and difference pressure control are needed in fume hoods as well as in clean room technology.
Schischek actuators fulfill a huge number of requirements with a running time of 3 to 120 seconds /90° quarter turn.
The small compact construction also facilitates fitting on small air dampers in hanging ceilings.

Ball valve

Ball valves and mixing valves are used more frequently as control or inlet valves, and are in certain cases a cheaper and more compact alternative to valves with linear motion.
With a range of between 5 and 100 Nm and flexible control modes, almost all on-off and modulating requirements are met.
Adaption uses accessory components, which are available from the Schischek range or which can be manufactured when required.

Linear valve

Modularity pays off.
The Schischek linear actuator produces valve strokes from 10 to 65 mm and a force from 500 to 5000 N. From a safety point of view, actutors with spring return are used. The fail safe direction can be determind and selected on - site through assembly of a symmetrically built actuator.
The running times are variable and adjustable on site due to the adaptability of the actuator.
The mechanical adaptations as well as the control mode are laid out in a way that guarantees they can be connected to all conventional systems.

Butterfly valve

High torques and fast running times are commonly required by shut-off dampers and butterfly valves. Schischek actuators provide these qualities. With a max. 100 Nm torque and a motor running time of 60 to 240 seconds/90° quarter turn, tight shut - of dampers can also actuated.
Actuators with spring return safety functions are also available. Linkage kits for commonly used butterfly valves are available on request. Others will be made availabe subject to demand and volume.

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Installation areas

Building automation

Building automation is another area where Ex actuators can be used. From air and fire / smoke dampers to ball valves and butterfly valves to linear motion valves, all requirements can be met.
Even VAV control, for example in the clean room technology belong in this range of application. Actuators are used in all areas of typical heating, air-conditioning and climate control.
Schischek has installed thousands of actuators in aforementioned plants and therefore possesses more extensive installation and product know-how. ExMax actuators can be used in all current control systems and can be suitably adapted to almost all current valves and air dampers by selection.

Industrial-chemical plants

Through the continuous replacement of pneumatic systems and equipment, historically used in industrial, chemical and pharmaceutical technology and installed by computer generated, electronic and electric systems, an increasing importance should be attached to electric actuators, which are used in potentially hazardous areas. The ExMax series is suitable for this and can replace pneumatics in almost all areas. Electric actuators clearly have the advantage in relation to cost and handling in the areas of installation, commissioning, operation, maintenance and safety. In addition energy requirements will be greatly reduced – air production and air treatment are expensive. Air production and air preparation are expensive!

Off-/onshore-shipbuilding

Energy creation, energy refinement, energy transport, energy distribution and energy use require electric, explosion proof actuator technology in many areas. From the drilling platform, which supplies gas or oil, to transportation by ship, to being carried through the whole continent by pipeline, to energy distribution plants and energy processing plants, ExMax actuators are used in all of these areas.
We not only have experience in actuators technology and control technology, but we also take particular environmental conditions into account. Extreme cold on drilling platforms, heat in the desert, an aggressive environment during delivery; with uses to -40°C and constructed from stainless steel, we also have the solution for difficult problem areas.

Spraying systems-silos

It is extremely important to adhere to explosion protection in spraying and drying technology. Even though an increasing amount of equipment is fitted with waterproof color and procedures, the uses for explosion proof equipment have grown in the past few years. The reasons lie in the use of potentially explosive materials, which are used in the automatic rinsing and purging of equipment, as well as in an increasing amount of equipment with powder coating, which demands the highest level of dust explosion protection.
The same applies for silos and other deposits, which must be on the alert for dust explosions.

Water treatment works

Recycling, energy recovery and improved water and air quality are indispensable constituents of modern environmental policy.
Potentially explosive gases are created during these processes, for example in the form of methane. The equipment is often roofed over and therefore operated with explosion protection in mind.
Air handling systems play as much a part in this equipment as atomization and process technology.

Hydrogen technologies

Hydrogen technology is an entirely new and very future orientated subject.
Hydrogen, which will be one of the most forced sources of energy in the future, will be used in the coming years in all areas of energy requirement. It is rich in energy, clean and emissions free and can be transported by similar means as petrol and diesel. High energy protection requirements must be followed during procurement, transport, distribution and use.
ExMax actuators play an important role in the practical use of the new energy source "hydrogen" and ensure that it can be dealt with safely and comfortably.

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

High-tech in actuator technology

The development of the ExMax and RedMax series is carried out using CAD-Technology, computer animation, simulation programs and rapid prototyping. However it was a long road from when the idea was first conceived, to when the series started. Fine tuning of our decades long explosion protection know-how, and our actuator know-how, along with the wishes of our customers and the possibilities of efficient, production methods, as well as more recent discoveries in new material technology, have resulted in the creation of a high-tech product, that's setting new standards worldwide.

Investment in expensive testing equipment, tools and production equipment has resulted in the creation of high quality but nevertheless very cost effective products for

Computer based testing systems

better safety and comfort in industrial plants, from an idea and design.

Functionality and parameter selection of the actuator on-site were the main targets, as well as the managing of the high mechanical load at 3 second-operation (motorized and with spring return). These general conditions employ, to a large extent, regulations on material and production safety. Furthermore all standards and regulations regarding explosion protection must be adhered to - to the highest safety standard!

ExMax und RedMax actuators are fitted with a universal power supply, ranging from 24 to 230 V AC and DC, which opens up whole new dimensions. As a result, not only are stock-keeping costs reduced for our customers but order mistakes and false connections are also avoidable.

Parameterization can also be implemented inside the Ex area and during operations, without additional electric devices. Therefore the time taken for installation and the introduction of new products can be greatly reduced. For this there are a number of technical features in the basic equipment, for example the high IP-protection (IP65), integrated, controlled heating (actuators can be used to -40°C) and the 100% overload protection of the actuator.

The testing equipment, specially designed for Schischek, was used in the frequent tests carried out during the production phase. Equipment endurance tests and longevity tests under different, often-extreme operating conditions, determine the materials that will be used and the production techniques.

Through the selection of materials Ex-protection standards and the large bandwidth of areas of application. The selected and in part newly developed material technology sets standards in the manufacturing process and production of more suitable tools; in particular, aluminum die casting, zinc die casting, injection molding and in the progression to the realisation of explosion protection already in this area, it was not only possible to produce more suitable materials, but also to design and manufacture the required production equipment, after passing tests and function tests.

Schischek carries out thorough control checks during the manufacture of actuators, from receipt of goods to shipment. A 100 % equipment check is already carried out during the incoming goods inspection in Ex protection relevant areas.

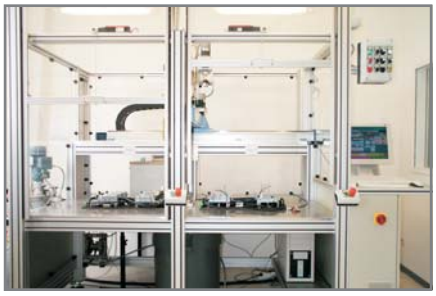
Modular product construction produces products in a modular assembly system, which allows decision at a later phase, which actuator type will be manufactured. This creates flexibility, while maintaining the highest level of quality.

In the production process itself, computerised integrated quality and function tests are carried out, so that possible faults can be identified and immediately corrected during production.

Only actuators that have been 100% tested are shipped!

Parallel to technological development, personal training and qualifications in product quality play a considerable role. It is important for our employees to identify with the product and the production process.

Quality, functionality und easy installation at a favorable price guarantees that you have chosen your product well.



Automatic moulding technology

Assamby lines

Computerised single test

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

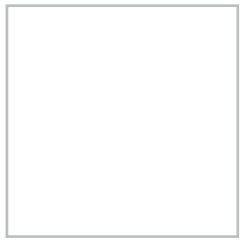
Product information
EEx-i transducer
EEx-i switching modules
EEx-i sensors















Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Sensors in intrinsic safe circuits

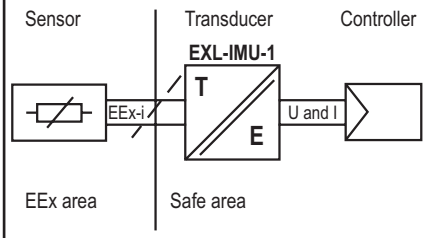
Intrinsic safety

The term "intrinsic safety" in relation to explosion protection means, the energy in a so called “intrinsically safe circuit" regarding current, tension, capacity, inductivity and general performance border on a defined mass and that the ignition of potentially explosive mediums is prevented. The means of protection on grounds of the relatively low applicable performances is mainly suitable for the upgrading of plant functions, such as for signalling. Electric equipment, which is certified for safety protection, should be placed in zones 0, 1, 2, 20, 21 and 22 according to equipment category and explosion group.

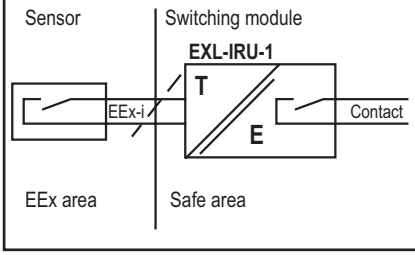
A typical use would be a combination between a passive, potential free sensor (Pt 100, Ni 1000, potentiometer, thermostat, switch contact, etc.) and a transducer or switching module. The sensor can then be installed within the potentially explosive area, the transducer/switching module in a safe area. Measuring transducers and switching modules are transferring signals frome the sensor from the Ex area into the safe area. Further signal work in the safe area should proceed as in a "normal area”. When choosing certain equipment you must ensure that it is certified and that the components are consistent, in accordance with guidelines and regulations on the installation of intrinsically safe components. This includes the laying of cables and the installation of equipment in the Ex-area.

For sensors that are going to be installed in zones 0, 20 and 21 additional written confirmation from an appointed inspection authority is required for the sensor to certify measuring transducers and switching modules.

Example:
Passive modulating sensor (resistance) inside the Ex area, transferring the signal into the safe area via EEx- i transducer type EXL-IMU-1, changing the resistance into 0..10 VDC and 4...20 mA



Example:
Passive binary sensor (contact) inside the EEx area, transferring the signal into the safe area via EEx- i switching module type EXL-IRU-1



Certification in acc. with ATEX 94/9/EG

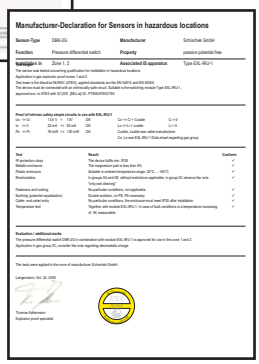
Certification of passive sensors

Since the implementation of guidelines in accordance with ATEX 94/9/EC on July 1 2003, it is also possible to certify passive, potential free sensors, which can be connected to an intrinsically safe circuit. For zones 1, 2, and 22 certification is available from the manufacturer or testing agency, for zone 0, 20 and 21 certification can be obtained from a current testing agency.

Schischek, an Ex protection specialist provides a whole range of modulating and binary sensors developed and certified in accordance with ATEX as a result of decades of experience in the development and sale of intrinsically safe equipment and sensors. Therefore in practice we enable our customers to easily and safely implement regular standards.

Schischek manufacturer's certification in accordance with ATEX does not only cover the testing of sensors, but also in particular the interaction between EEx-i sensors und EEx-i switching modules and transducers. According to sensor type these can be used in zones 1, 2 and/or 22. The use of sensors in different zones is dependant on IP protection; this includes casing materials and construction. Certification of Schischek transducers and switching modules is carried out by the PTB (Physikalisch Technischen Bundesanstalt in Braunschweig). The equipment is approved in accordance with the highest safety standards. This is applicable to all zones and within the zones for gases, mists, vapors and dust.


Physikalisch-Technische Bundesanstalt
PTB
EC-TYPE-EXAMINATION CERTIFICATE
(Translation)
PTB 03 ATEX 2092


Manufacturer-Declaration for Sensors in hazardous locations

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Intrinsically safe circuits

Intrinsically safe electric circuits

Intrinsically safe electric circuits are subject to clear guidelines during installation, commissioning and operation.

Therefore intrinsically safe and non-intrinsically safe circuits should be laid down separate from one another! When laying cable, for example the switchgear for field equipment, the cabels must be laid down in different cable conduits or a separator must be installed at the very least. In all cases the maximum value of the intrinsically safe electric circuit must be adhered to. This includes cable lengths, the characteristic value of the cable and high frequency injection interference (induction/capacity). The maximum specific values are displayed on the identification plate of the EEx-i equipment. Connecting intrinsically safe circuits to non-intrinsically safe circuits is not permitted. Connecting two different intrinsically safe electric circuits is permitted, however it must be calculated in all cases.

Labelling

Intrinsically safe electric circuits are recognisable as such. "light blue" is generally used as colour recognition. To prevent confusion with non-intrinsically safe circuits it is essential to be able to recognise them by their colour, for example cabels, cables, cable conduits, clamps, cable glands, terminal boxes etc.

Caution

It is essential to ensure that you do not confuse the blue cabels of the neutral conductor with the "light blue" cabels of an intrinsically safe circuit!

Distance

Distance stands for the minimum distance between naked, current-carrying areas of a circuit. The distance between intrinsically safe and non-intrinsically safe circuits must be ≥ 50 mm in all cases. There must be a distance of ≥ 6 mm between two different intrinsically safe circuits. These are minimum distance requirements and must never be breeched. In other words, for example, if required for small spaces (switchgears/terminal boxes), the distance between the components can be reduced by using selected isolation methods. In this case the distance requirements must be fulfilled.

Readings in EEx-i circuits

Particular in the areas of intrinsically safe electronic circuits only certified means of measurement should be used otherwise intrinsically safety is not guaranteed.

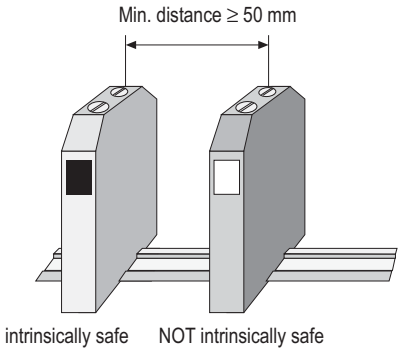
Switches and control systems

With assembling switches and control systems there must be a clear separation between intrinsically safe and non-intrinsically safe circuits. It is recommended that during the planning of switches and control systems, space is reserved for assembling an intrinsically safe circuit. This is also applicable when installing transducers and switchgears, for cable ducts and terminal boxes. cabels must be laid inside the switches and control systems, in such a way that a crossover with an intrinsically safe circuit does not occur.

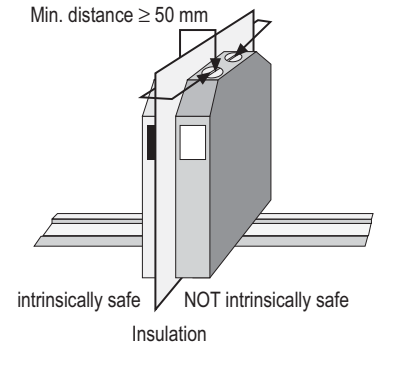
Large transformers, frequency rectifiers, large relays and other electric equipment that may influence intrinsically safe electric circuits by inductance or capacitance should be installed at a sufficiently large distance from an intrinsically safe electric circuit

Example: transducer

Example: terminals



Example: terminals



EEx-i transducer and modulating EEx-i sensors

EXL-IMU-1 Transducer

Transducers are so-called accessories with an intrinsically safe circuit for the connection of passive sensors. The transducer is approved for sensors, which can be installed in zones 0, 1, 2, 20, 21 and 22.

The installation of the transducer in safe areas (panels/control systems) should be carried out as normal. The sensor should be attached to the "light blue" terminals - the EEx-i circuit.

The large LCD display and control elements on the front are used for programming. It is programmable without additional tools.

Based on the logical programming, parameter selection and level selection can be carried out in a short period and can be changed at anytime as required. For breakdown and error recognition, as well as for limit recognition, a potential free contact is available. According to need and sensor type 2-, 3- and 4- cabel compensation can be used. Automatic cabel compensation is integrated into the 3- and 4- cabel. The 2- cabel can be adjusted at the touch of a button.

Highlights

PTB-tested in acc. with ATEX 94/9/EG
II(1)GD [EEx ia] IIC
Supply voltage 24 VAC/DC
Universal transducer for sensors:
- 2-3-4-cabel connection:
- Pt 100, Pt 500, Pt 1000 DIN
- Ni 100, Ni 200, Ni 500, Ni 1000 DIN
- LS-Ni (Siemens)
- KP 250 (Kieback & Peter)
- LF 20 (Honeywell)
- Resistance 0...1 KOhm and 0...10 KOhm
- Ring balance DFK-...

Large display for actual value indication and programming
Error contact
Easy programming
0...10 VDC and 4...20 mA output
DIN rail mounting
Dimension w x h x l 45 x 75 x 110 mm

EXL-IMU-1 for °C, ΔP, %rH

Modulating EEx-i sensors

Since July 1st 2003 Schischek has been manufacturing a variety of modulating sensors in acc. with ATEX 94/9/EC, connectable to the transducer type EXL-IMU-1. The sensors are passive and potential free and are guaranteed by manufacturer's certification for direct installation and operation in potentially hazardous areas. According to sensor type this can be carried out in zones 1, 2 and 22, by connecting to the aforementioned transducer type.

All sensors carry a manufacturers certification. The manufacturer's certification guarantees the explosion proof characteristics between the transducer and sensor, and therefore their safety. At the same time it will become easier to get the equipment approved by the appropriate authority.

The sensors can be used in an intrinsically safe circuit. The “light blue” cable should be laid separately from the non-intrinsically safe electric cabels. The cable entry point should lie directly above the light blue cable gland on the sensor.

One sensor can be connected to another transducer.

Highlights

Manufacturer certification in acc. with ATEX 94/9/EG
II2G EEx ia IIC T6 for gas, vapor, mist
(II3D IP65 T85°C for dust)
Sensors for:
- temperature
- humidity
- pressure
- differential pressure
- VAV
- set-point transmitter

Modulating sensors

ExSens	Function	Range	Sensor prinviple	Zone
TFR-2G	Room temperature	-30 ...+ 60 °C	Pt 100 DIN	1, 2
TFR-2G3D	Room temperature (IP65)	-50 ...+ 90 °C	Pt 100 DIN	1, 2, 22
TFK-2G3D	Duct temperature (IP65)	-30 ...+ 60 °C	Pt 100 DIN, 200 mm	1, 2, 22
TFT-2G3D	Probe temp. (IP65), tubing G1/2"Ms	-30 ...+150 °C	Pt 100 DIN, 100 mm	1, 2, 22
TFT-V4A-2G3D	Probe temp. (IP65), tubing G1/2" VA	-30 ...+150 °C	Pt 100 DIN, 100 mm	1, 2, 22
FFR-2G	Room humidity	30...100 % r.H.	0...1 kOhm	1, 2
FFK-2G	Duct humidity	30...100 % r.H.	0...1 kOhm	1, 2
TFFR-2G	Room combination humidity/temperature	30...100 % r.H. -10...+60°C	0...1 kOhm, Pt 100	1, 2
TFFK-2G	Duct combination humidity/temperature	30...100 % r.H. -20...+60°C	0...1 kOhm, Pt 100	1, 2
DFK-07-2G	Differential pressure	rP < 700 Pa	x..y Ohm	1, 2
DFK-17-2G	Differential pressure	rP < 1700 Pa	x..y Ohm	1, 2
VFK-07-2G	Volume control	0...15 m/s	x..y Ohm	1, 2
SGR-2G3D	Potentiometer (IP65)	Resistance	0...1 kOhm	1, 2, 22

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

EEx-i switching modules and binary EEx-i sensors

EXL-IRU-1 Switching module

Switching modules are so-called accessories with an intrinsically safe electric circuit for the connection of passive sensors.

The switching modules approved for sensors can be installed in zone 0, 1, 2, 20, 21 and 22.

The installation of switching modules in the safe area (panel/control system) should be carried out as normal.

The sensor should be attached to the "light blue" terminals- the EEx-i circuit.

The switching modules can be used with binary sensors, for example fan belt protection, frost protection, filter protection, thermostats, humidistats, etc.

Highlights

PTB-tested in acc. with ATEX 94/9/EG
II(1)GD [EEx ia] IIC
Supply voltage 24 VAC/DC
Universal switching module for:
- contacts
- Namur sensors
- PTC

LED indication
Integral time running relay
Time running relay from 30 to 120 sec.
DIN rail mounting
Dimension w x h x l 22,5 x 75 x 100 mm

EXL-IRU-1 for °C, ΔP, %rH

Binary EEx-i Sensors

Since July 1st 2003 Schischek has been manufacturing a range of binary sensors in acc. with ATEX 94/9/EC, connectable to the switching module type EXL-IRU-1.

The sensors are passive and potential free and are guaranteed by manufacturer's certification for direct installation and operation in potentially explosive areas.

According to sensor type, this can be carried out in zones 1, 2 and 22, by connecting to the aforementioned switching module type.

All sensors carry a manufacturer's certification. The manufacturer's certification guarantees the explosion proof characteristics between switching module and sensor, and therefore their safety. At the same time it will become easier to get the equipment approved by the appropriate authority.

The sensors can be used in an intrinsically safe circuit. The “light blue” cable should be separately installed from the non-intrinsically safe electric cabels. The cable entry point should lie directly above the light blue cable gland on the sensor.

One sensor can be connected to another switching module.

Highlights

Manufacturer certification in acc. with ATEX 94/9/EG
II2G EEx ia IIC T6 for gas, vapor, mist
(II3D IP65 T85°C for dust)
Sensors:
- thermostats
- hygrostats
- pressurestats
- belt protection
- frost protection
- differential pressure

Binary sensors

ExSens	Function	Range/Hysteresis	Sensor	Zone
TBR-2G	Room thermostat	0...+40 °C, 1 K	Contact, 2-pos	1, 2
TBR-2G3D	Room thermostat (IP65)	-30...+30 °C, 2-15 K	Contact, 2-pos	1, 2, 22
TBK-2G3D	Duct thermostat (IP65)	0...+60 °C, 2-20 K	Contact, 2-pos, L=190 mm	1, 2, 22
TBT-2G3D	Probe thermostat (IP65)	20...+90 °C, 2-20 K	Contact, 2-pos, L=120 mm	1, 2, 22
TBK-FR-2G	Frost protection thermostat	-10 ...+ 12 °C	Contact, 2-pos, capillary 6 m	1, 2
FBR-2G	Room humidistat	35...100 % r.H., ~ 4%r.H.	Contact, 2-pos	1, 2
FBK-2G	Duct humidistat	35...100 % r.H., ~ 4%r.H.	Contact, 2-pos	1, 2
DBK-2G	Diff. pressure sensor	20-300,50-500,100-1000 Pa	Contact, 2-pos	1, 2
DBK-2G3D	Diff. pressure sensor (IP65)	40-125,100-400,350-1400 Pa	Contact, 2-pos	1, 2, 22
WFBK-2G	Air paddle	2...8 m/s, paddle in V2A	Contact, 2-pos	1, 2
NBW-K-2G3D	Fan belt protection (IP65)	up to < 20.000 m³/h	Namur sensor + bracket	1, 2, 22
NBW-G-2G3D	Fan belt protection (IP65)	more than > 20.000 m³/h	Namur sensor + bracket	1, 2, 22
Accessories				

Malux

SCHISCHEK EXPLOSIONPROOF

World of EEx

Schischek Explosion proof

25 years of preservation of Life. Health. Basic values.

Product range "Explosion proof"

- EEx-d actuators for safety and fire / smoke dampers
- EEx-d actuators for air dampers and VAV systems
- EEx-d actuators for big and heavy duty dampers
- EEx-d actuators for linear valves
- EEx-d actuators for ball valves, throttle valves and mixing valves
- EEx-d actuators for ambient temperatures down to - 40°C
- EEx-i transducer for temperature, humidity and pressure
- EEx-i switching modules for temperature, humidity and pressure
- EEx-i sensors for temperature, humidity and pressure
- EEx-m magnets
- EEx-.. components

Malux Finland Oy, P.o.box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 57 45 700 • Fax: +358 (0)19 57 45 750
E-mail: info@malux.fi • Internet: www.malux.fi

Other products

Ex-light fittings
Ex-installation units
Ex-sockets and plugs
Ex-control switches and safety switches
Ex-alarm equipment
Ex-heating devices
Ex-telephones
Exi-components and equipment
Ex-actuators
Ex-motors
Tachogenerators and encoders
Emergency lighting
Underwater lighting
Outdoor lighting
Special lighting

Malux

P.O.Box 69, FIN-06151 PORVOO, FINLAND
phone: +358 (0)19 57 45 700, fax: 358 (0)19 57 45 750
e-mail: info@malux.fi, internet: www.malux.fi

Malux East Ltd, Pärnu mnt 160, 11317 TALLINN, ESTONIA
phone +372 6 142 143, fax +372 6 142 144, e-mail info@malux.ee