CAT.No.5117E

KONAN®

Download CAD drawings and PDF catalog data from the following website

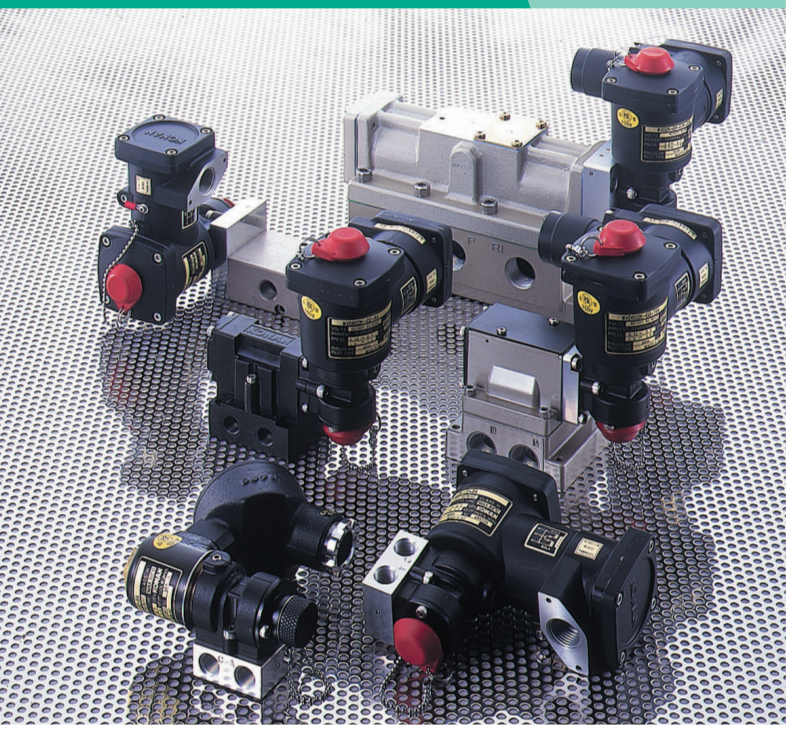
URL=http://www.konan-em.com/

3/4/5 Port・For pnematic control

Explosion-proof / Compact explosion-proof
For hydrogen / Intrinsic safety solenoid valves

Explosion-proof and drip-proof solenoid valves lineup

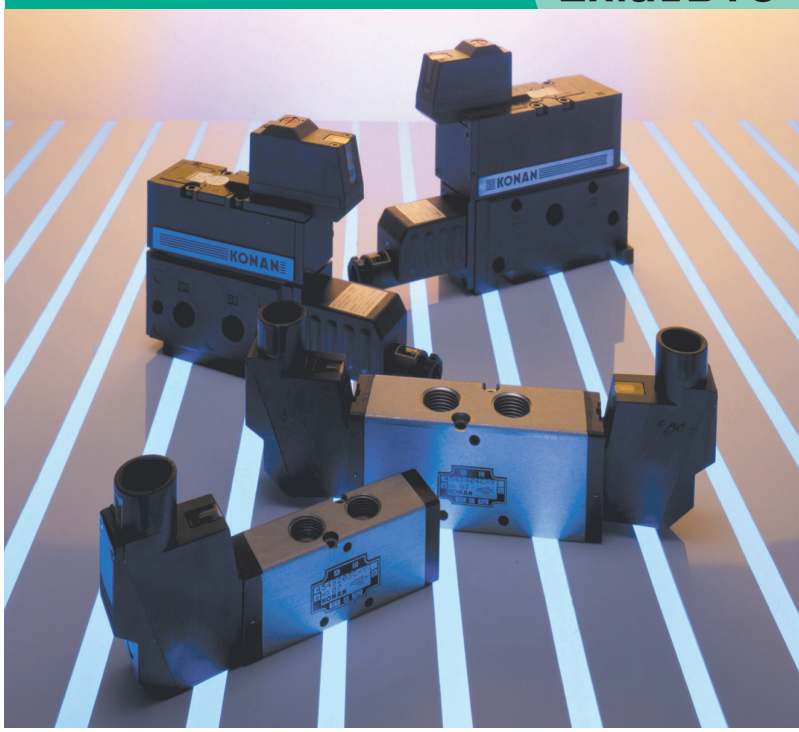
Explosion-proof solenoid valves — d2G4 ExdⅡBT4



Compact explosion-proof solenoid valves — d2G4 ExdⅡBT4

Explosion-proof solenoid valves for hydrogen — d3aG4

Intrinsic safety solenoid valves — i2G4 ExiaⅡBT5



KONAN ELECTRIC CO.,LTD.

Variety of explosion-proof / drip-proof

<table>
<tr><th>Application</th><th colspan="3">Proof types</th></tr>
<tr><td rowspan="4">For general pnematic control
Listed in this catalog.</td><td rowspan="3">Flame-proof enclosure construction</td><td rowspan="2">Explosion-proof construction standard for electric equipment</td><td>d2G4</td></tr>
<tr><td>d3aG4
(Explosion-proof for hydrogen)</td></tr>
<tr><td>Technical standards conforming to the international standards</td><td>Exd Ⅱ BT4</td></tr>
<tr><td>Intrinsic safety construction</td><td>Explosion-proof construction standard for electric equipment</td><td>i2G4</td></tr>
<tr><td colspan="3">Drip-proof</td></tr>
<tr><td rowspan="4">For Fluid Control</td><td rowspan="3">Flame-proof enclosure construction</td><td rowspan="2">Explosion-proof construction standard for electric equipment</td><td>d2G4</td></tr>
<tr><td>d3aG4
(Explosion-proof for hydrogen)</td></tr>
<tr><td>Technical standards conforming to the international standards</td><td>Exd Ⅱ BT4</td></tr>
<tr><td colspan="3">NEMA4 drip-proof : Conforms to JIS C 0920 (protection class:5/jet-proof) and IEC 144 (protection class:IP55)</td></tr>
<tr><td colspan="3">NEMA4,7 explosion-proof, drip-proof :
Conforms to JIS C 0920 (protection class:5/jet-proof) and IEC 144 (protection class:IP65)</td></tr>
</table>

For pnematic control

3/4/5 Port Explosion-proof
4/5 Port For hydrogen
5 Port Compact explosion-proof
5 Port Intrinsic safety

Feature	Port	Wire connection system	Verifying nation For China	Verifying nation For Korea	Page
Magnet-latched (Double-acting) For general use (Single-acting)	3 Port	Conduit tube system			Page A-7
		Pressure-resistant packing system			
	4 Port	Conduit tube system			Page A-11
		Pressure-resistant packing system			
	5 Port	Conduit tube system			Page A-17
		Pressure-resistant packing system			
Compact explosion-proof	5 Port	Conduit tube system			Page B-3
		Pressure-resistant packing system			
For general use	4 Port	Conduit tube system			Page C-3
	5 Port	Pressure-resistant packing system			Page C-7
For general use (single acting)	4 Port	Conduit tube system	●	●	Page A-11
		Pressure-resistant packing system	●	●	
	5 Port	Conduit tube system	●	●	Page A-17
		Pressure-resistant packing system	●	●	
Compact explosion-proof	5 Port	Conduit tube system		●	Page B-3
		Pressure-resistant packing system		●	
For general use	5 Port	Pressure-resistant packing system			Page D-9
		Pressure-resistant packing system			
Magnet-latched (Double-acting) For general use (Single-acting)	3 Port	Pressure-resistant packing system			Page A-7
	4 Port				Page A-11
	5 Port				Page A-17
Direct-acting	2 Port	Conduit tube system			For solenoid valve for various fluid、refer to Cat.No.7110W “MAGFLOW series”.
		Pressure-resistant packing system			
Pilot-acting	2 Port	Conduit tube system			
		Pressure-resistant packing system			
Pilot-acting (0 differential pressure operation)	2 Port	Conduit tube system			
		Pressure-resistant packing system			
Direct-acting	3 Port	Conduit tube system			
		Pressure-resistant packing system			
Pilot-acting	4 Port	Conduit tube system			
		Pressure-resistant packing system			
Direct-acting	2 Port	Pressure-resistant packing system			
Pilot-acting					
Pilot-acting (0 differential pressure operation)					
Pilot-acting	3 Port				
Pilot-acting	4 Port				
Direct-acting	2 Port	Conduit tube system	○	○	
		Pressure-resistant packing system	○	○	
Pilot-acting	2 Port	Conduit tube system	○	○	
		Pressure-resistant packing system	○	○	
Pilot-acting (0 differential pressure operation)	2 Port	Conduit tube system	○	○	
		Pressure-resistant packing system	○	○	
Pilot-acting	4 Port	Conduit tube system	○	○	
		Pressure-resistant packing system	○	○	
Pilot-acting (0 differential pressure operation)	2 Port	Conduit tube system			
Direct-acting	2 Port				
Pilot-acting					
Pilot-acting (0 differential pressure operation)					
Direct-acting	3 Port				
Pilot-acting	4 Port				

General Handling Instructions and Precautions

Please read the following general handling instructions and precautions carefully before ordering solenoid valves.

Safety Precautions

References:
JIS B9702:
Safety of machinery- principles of risk assessment
JIS B8370:
Pneumatic fluid power -general rules relating to systems

⚠ Warning Following information is based on a risk assessment for Konan products. Each section provides information essential for safe operation of the products and prevention of risk and damage that may affect operators. Please read carefully.

1.Selection of solenoid valves

Solenoid valves are used to activate actuators by switching air flow in a pneumatic system with electrical signals.
In order to ensure safe system operation it is significant to select appropriate valve type. Therefore the entire pneumatic system designer should determine the solenoid valve taking into consideration the required operation, performance, and countermeasure to system failure.

2.Solenoid valve installation

As pneumatic components are operated with compressed air, sudden blowout, unintended operation by residual air inside actuators (bursting out of a cylinder etc.), and other risks should be taken into account. A sufficiently trained person should be responsible for installation and maintenance of a solenoid valve.
(Konan provides training for operation and maintenance of pneumatic components. Feel free to contact our sales personnel for details.)
This series of solenoid valves is explosion-proof type.
For actual handling of the valves, personnel with sufficient knowledge about explosion-proof wiring should be responsible.

3.Maintenance of solenoid valves

Make sure before maintenance of solenoid valves that the pneumatic system is in a safe position or the system is mechanically fixed.
Compressed air remains as energy even after shut off of air supply. Close the air supply line and exhaust air inside the pneumatic circuit at the same time.
For disassembly of the valves personnel with sufficient knowledge should be responsible.

4.Solenoid valve installation site

For use of solenoid valves under following conditions sufficient safety measure should be taken. Consult us for details.
1) Operating conditions are not within the specified range.
2) Significant risks for users, properties, or environment are anticipated.
Eg: Use for nuclear power plants, vehicles, medical components, etc.

Users Instructions

⚠ Caution 1.Transport of solenoid valves

1) A solenoid valve is supplied in a package. Do not treat the package roughly to prevent valve deformation and other damage that may result in valve operational failure.
2) Plastic plugs are attached to the valve connection ports to prevent dusts and rusts from entering the valve during transport or storage before installation. Do not remove the plugs until immediately before piping.

⚠ Caution 2.Storage

1) Installation site
Transport a valve to the specified site just before installation. If the valve is to be stored at the installation site, keep it packed and protect from wind, rain, and dusts.
2) Storage
If a valve is to be stored for more than 1 year, keep it packed. Long-term storage may result in sticking of packings. In such case conduct pre-conditioning operation of the valve before regular use.
After a long period of storage, aging, constriction, or deformation of packings would be a concern. Consult us for use of the valves after long period of storage.

⚠ Caution 3.Surrounding environment

1) Vibration/shock
Solenoid valve is a complex component. Exposure of the valve to excessive shock or vibration may cause operational failure, loosening of clamps, or early wearing of spool packings. Make sure at installation of the valve that the valve is not in line with the direction susceptible to vibration/shock.
2) Surrounding environment
Environment surrounding a valve should be considered carefully. Avoid places where the valve is exposed to rain and wind, salt air, corrosive gas, chemical fluids, seawater, steam, etc.
3) Ambient temperature
Sufficient care should be taken for ambient temperature as well as fluid temperature. Even if a valve is installed in a cool place, when heated air inside a cylinder under high temperature environment is exhausted through the valve, it may cause deterioration of packings or valve operational failure due to thermal expansion of the internal components.

⚠ Caution 4.Piping

1) Disposal of drains
For use of a valve at lower limit of working pressure, care should be taken for lubrication, disposal of drains, and supply air volume. (Inlet port should be as large as possible. If possible install an air tank in front of the valve.)
2) Compressed air
Air supplied to a valve should be filtrated by air filter with nominal filtration range of no more than 40μm to avoid excessive drain or oil. Contaminated air may cause deterioration of packings and other components, which leads to extremely short life of the valve or early operational failure.In the case of intrinsic safety solenoid valves,use

air filters less than 5μm.

3) Piping
Do not remove plastic plugs attached to the valve connection ports until immediately before piping in order to prevent dusts and rusts from entering the valve during transport or storage before installation. For steel tube piping make sure to use galvanized pipe.

4) Pipe narrowing
Do not narrow part of valve inlet ports. Especially when vinyl or other resinous tube is used for piping and air flow path at the tube joint is extremely narrow, air flow rate decreases and thus operational failure may occur. Sufficient care should also be taken when using copper tube joint and rubber hose joint.

5) Pipe length
If cylinder speed is adjusted by reducing air exhausted from a 5-port solenoid valve, confirm the limit of the air reduction. If pipe volume between the solenoid valve and the cylinder is large, favorable speed control cannot be achieved. Make sure that the pipe volume / cylinder volume is not more than 0.1.

6) Pipe cleaning
After piping is completed, clean the pipe by air flushing. Use clean air for fluid, as dusts and drain in the fluid cause significant harm to the valve function and shorten the valve life.

7) Piping connection
Make sure to perform correct piping connection.
P: Air supply port
A, B: Connection port to operation machinery
R1, R2: Air exhaust port
R1 and R2 ports are air exhaust ports. As pneumatic solenoid valves make significant noise at air exhaustion, use silencer or other means to absorb noise.
Konan provides silencers that meet various types of solenoid valves as well as silencers incorporating throttle valve.

8) Pipe screwing
When a pipe or a nipple is screwed to a solenoid valve, up to 4 or 5 threads should be screwed for 6A to 25A (Rc1/8 – 1) port size. Any forceful screwing beyond this may result in cracking of the valve body or leakage/malfunction. Care should also be taken for contamination with fragments of sealing materials. In the case of direct piping type, make sure not screwing up mounting screw too tight at valve installation.

9) Piping of manifold type solenoid valves
Manifold type solenoid valves should be operated by sequence control of individual valves in principle. If 2 or more valves are operated simultaneously, inlet supply pressure drops or supply pressure volume to loading components decreases. Up to 3 units can be operated simultaneously. Inlet port and exhaust port are at both end of manifold base to enable piping from either direction. Seal unnecessary ports with plugs. For accomplishment of accurate operation piping at both end of manifold base (2 sites) is recommended.

⚠ Caution 5.Lubrication

Explosion-proof pneumatic solenoid valves can be used without lubrication. If lubricating oil is to be used, care should be taken for the oil quality. Packings incorporated in the valves can contribute to stable valve operation only with quality mineral oil. Inappropriate lubricating oil deteriorates sealing quality. Especially use of spindle oil often causes expansion of packings. Also make sure to select oil that does not emulsify with drain. JIS K 2213 (ISO VG32 or VG46) type turbine oil is recommended for lubricating oil.
After lubrication do not use the valve without lubrication or the valve life may become extremely short.

⚠ Caution 6.Wiring

1) Applied voltage
Check the valve nameplate and apply specified rated voltage. Use of the valve with inappropriate voltage may result in coil damage or valve operational failure. Use the valve after checking if voltage fluctuation is within allowable range. If the valve is used with voltage not within the specified range, solenoid burnout and other failure may occur. The allowable voltage range means that instant valve operation can be performed without problem within the range, not that the valve can be continuously operated within the range.

2) Shrouding structure
Based on the Constructional Requirements, terminal box cover is shrouding structure incapable of being opened without special tools. (The special tool for opening the cover is supplied with the product.)

3) Explosion-proof wiring
i) Conduit tube type
Use thick steel conduit and screw 5 or more threads at the screw joint. As the explosion-proof performance depends on the screwing precision, care should be taken for conduit installation. Elbow, flexible, or union joints to be used should also be explosion-proof type.
Konan conduit type screw is G1/2.
ii) Pressure-resistant packing type
Use pressure-resistant packing type connector when performing cable wiring. (Approved pressure-resistant packing type connector should be used. Use the connector attached to the solenoid valve.)

⚠ Warning 7.Maintenance

1) Maintenance should be performed in accordance with the maintenance manual.
Do not repair solenoid valves. If repair is necessary, please contact us.

2) Follow the below steps when uninstalling a solenoid valve.
i) Shut off supply pressure.
ii) Exhaust residual pressure inside pneumatic circuit.
Compressed air remains as energy even after shut off of air supply. Exhaust pressure inside the pneumatic circuit using residual pressure exhaust valve, relief function of a regulator, or drain cock of an air filter.
iii) Shut down power source.
Not only disconnect the solenoid valve side terminal but also turn off the power source.
iv) Uninstall the valve.

3) Operation frequency
Explosion-proof pneumatic solenoid valves are soft seal spool type solenoid valve series using squeeze packings. According to the JIS standard, minimal operation frequency of this type of valve is specified as once in 30 days.
For safety maintenance should therefore be performed once in 30 days.

4) Push button
If a push button of a solenoid valve is pushed, the valve coil is energized. Care should be taken so that a third party does not push the button without discretion.

List of representative types of overseas authentication, explosion-proof solenoid valves

4-Port

Verifying nation	Housing	Model type
Japan	Conduit tube	MVS80/MVS81 MVD80/MVD81
	Pressure-resistant packing	
China	Conduit tube	MVS80/MVS81 MVD8
	Pressure-resistant packing	
Korea	Conduit tube	
	Pressure-resistant packing	

Housing (Exd Ⅱ BT4)	Body size	Port size	Cable size	Rated voltage	Verifying nation
3E	− 02 − 03	−□□□		−□□□□□	
2E			−□□		
3E	− 02 − 03	−□□□		−□□□□□	− C
2E			−□□		
3E	− 02 − 03	−□□□		−□□□□□	− H
2E			−□□		

5-Port

Verifying nation	Housing	Model type	Body size
Japan	Conduit tube	MVS2F/MVD2F MVPCF/MVPE/MVPOF	− 03
	Pressure-resistant packing		
	Conduit tube	MVS2N/MVD2N MVPCN/MVPEN/MVPON	− 08
	Pressure-resistant packing		
China	Conduit tube	MVS2F MVPCF/MVPE/MVPOF	− 03
	Pressure-resistant packing		
	Conduit tube	MVS2N MVPCN/MVPEN/MVPON	− 08
	Pressure-resistant packing		
Korea	Conduit tube	MVS2F MVPCF/MVPE/MVPOF	− 03
	Pressure-resistant packing		
	Conduit tube	MVS2N MVPCN/MVPEN/MVPON	− 08
	Pressure-resistant packing		

Housing (Exd Ⅱ BT4)	Port size	Cable size	Rated voltage	Verifying nation
1E	−□□□		−□□□□□	
2E		−□□		
1E				
2E		−□□		
1E			−□□□□□	− C
2E		−□□		
1E				
2E		−□□		
1E			−□□□□□	− H
2E		−□□		
1E				
2E		−□□		

− E

Straight piping type

Verifying nation	Housing	Model type	Body size	Port size
Japan	Conduit tube	453S 453D	20 40	□
	Pressure-resistant packing			
China	Conduit tube	453S		
	Pressure-resistant packing			
Korea	Conduit tube			
	Pressure-resistant packing			

C

− E

Housing (Exd Ⅱ BT4)	Cable size	Rated voltage	Verifying nation
1E		−□□□□□	
2E	−□□		
1E			
2E	−□□	−□□□□□	− C
1E			
2E	−□□		
1E		−□□□□□	− H
2E	−□□		

Compact explosion-proof solenoid valves

Verifying nation	Housing	Model type	Body size	Port size
Japan	Conduit tube	4N4S 4N4D	10	□
	Pressure-resistant packing			
Korea	Conduit tube			
	Pressure-resistant packing			
Japan	Conduit tube	454S 454D	10 20	□
	Pressure-resistant packing			
Korea	Conduit tube			
	Pressure-resistant packing			

K

Proof (Exd Ⅱ BT4)	Orifice size	Rated voltage	Option
− P	01	− H□	□□
	□□		
− H	01		
	□□		
E	− E01	− H□	−□□
	− E□□		
H	− E01		
	− E□□		

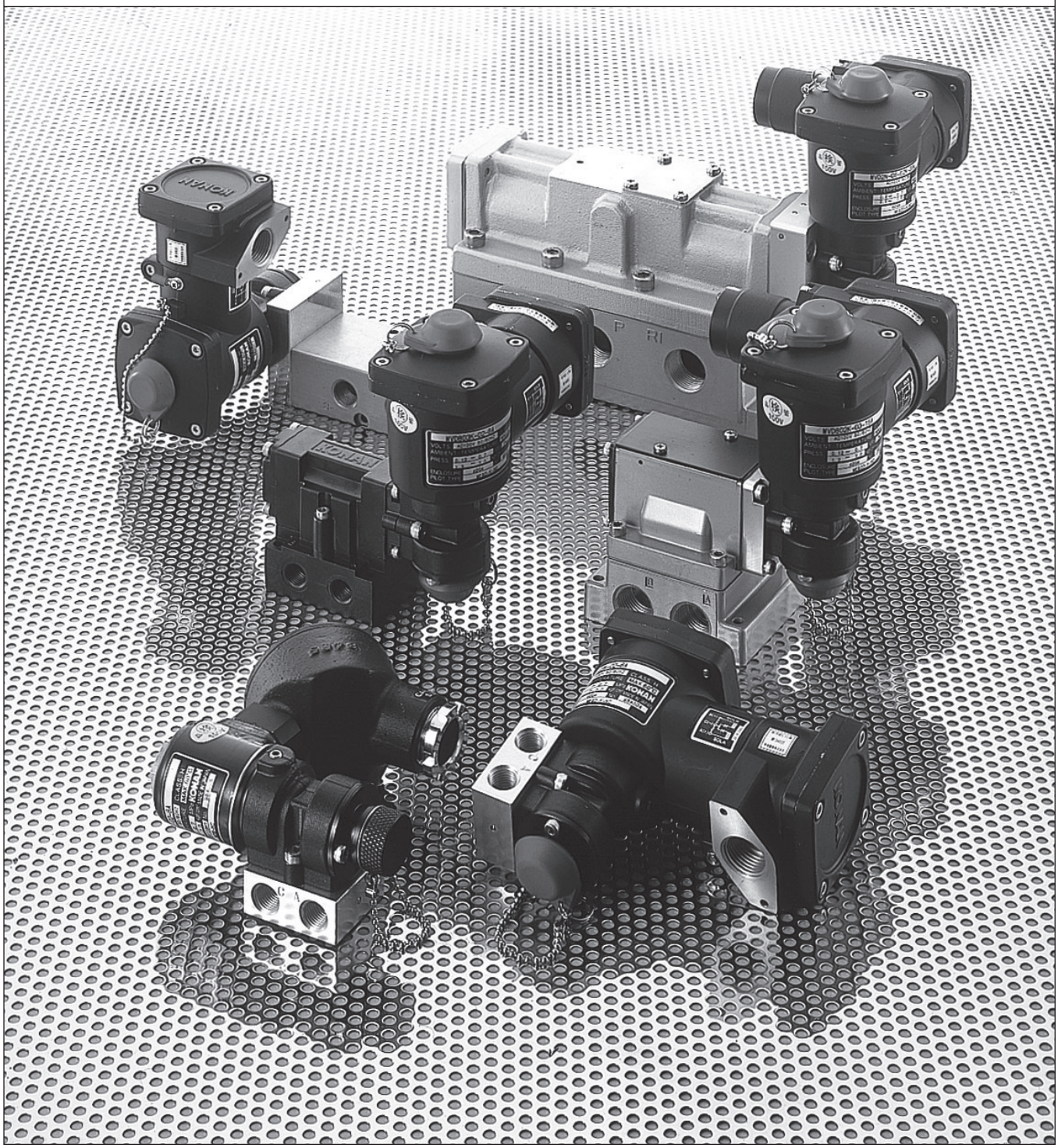
d2G4
Explosion-proof construction standard for electric equipment

ExdⅡBT4
Technical standards conforming to the international standards

Explosion-proof and drip-proof solenoid valve lineup vol.1

For pnematic control

3/4/5 Port Explosion-proof solenoid valve



Vol.1 Explosion-proof solenoid valves

d2G4
Exd Ⅱ BT4

Explosion-proof construction standard for electric equipment

Technical standards conforming to the international standards

Ultra-Compact Solenoid Valves whitch Utilize Advanced Watertight and Explosion-Proof Technology

1

- For the prevention of mis-operation, a standardized cover cap is provided on the terminal unit.

2

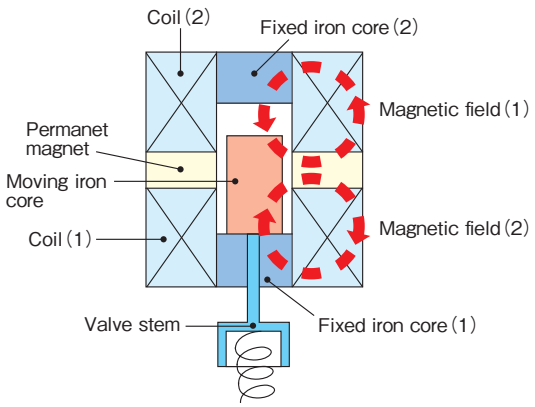
- The enlarged wiring space of the terminal block permits 270℃ rotation by single bolt operation in the same way as for solenoid housing,thus significantly facilitating the explosion-proof electrical work to be carried out with extreme care.

3

- The solenoid housing may rotated by 360 ℃ ,thus permitting the cable outlet to be installed optionally in 3-dimensional direction.
- The installation work can be performed readily by the use of the use of a single bolt.

4

- The use of a magnet-latched solenoid allows two coils to be housed within a single casing,thus reducing the number of cable outlets to one.
- The moving iron core attracted and retained to the fixed iron core (1) by the magnetic field (1) of the permanent magnet is freed from the magnetic field (1) and attracted to the fixed iron core (2) when the coil (2) is energized. The moving iron core is retained by the magnetic field (2) even when the coil is de-energized.
- When the coil (1) is energized,the moving iron is freed by the magnetic field (2) and attracted to the fixed iron core. The moving iron core is retained by the magnetic field (1) even when the coil is de-energized.



5

- simple,easy-handling,water-proof,pressure-resistant packing type cable gland is provided as a standard component.

6

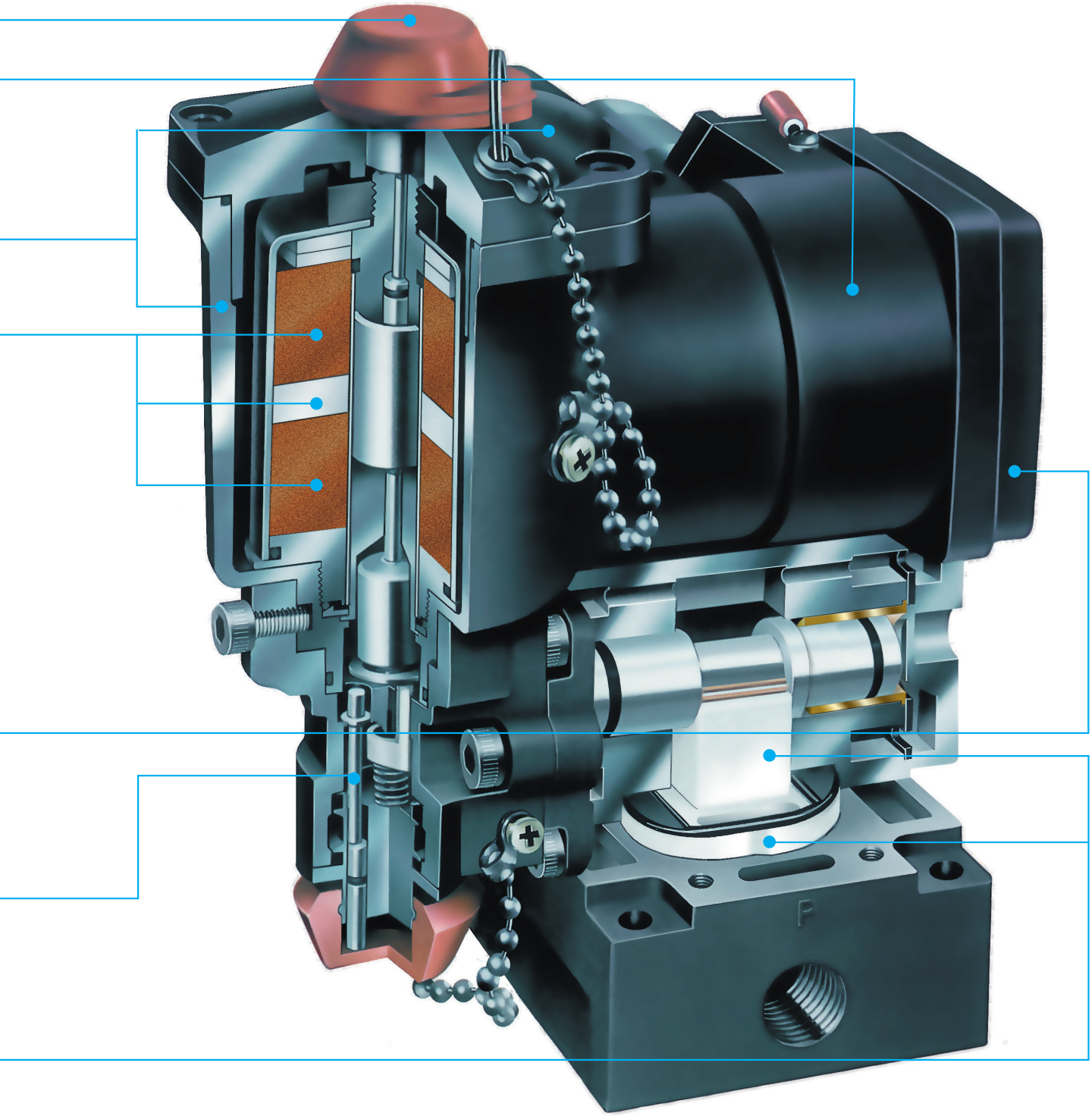
- Simple push-button operation permits direct manual control of the moving iron core. The manual operation is practicable irrespective of energization or de-energization.
- To take full advantage of the features of the magnet-lached solenoid,manual locking is effected by the magnetic circuit of permaned magnet.

(Vibration resistance and impact resistance of the manually-operated lock are not less than 3G and 7G respectively.)

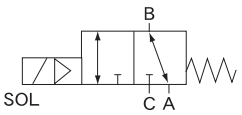
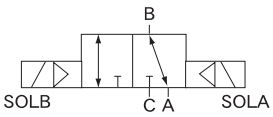
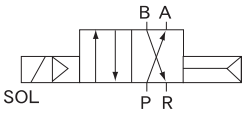
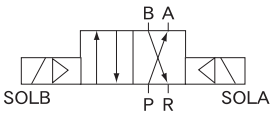
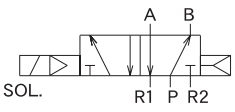
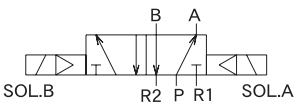
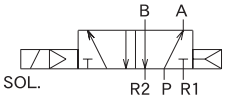
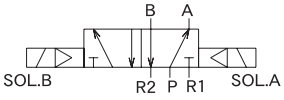
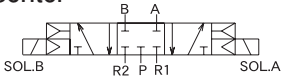
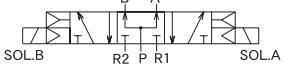
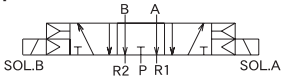
7

- An innovative lubrication-free slide selector applied with high-hardness ceramics is incorporated,thus providing a semi-permanet durability and the most suitable application for high/low frequency operations.

The main models of Konan's double acting explosion-proof solenoid valve are applied Konan's newly-developed magnet-latched solenoid. Furthermore,the innovative 4-port solenoid valve is mounted with a slide-type ceramic valve disc excellent in durability.



Model List 〔Explosion-proof solenoid valves〕

	Type & Composition of Valve	Port size Rc 1/4	Rc 3/8	Rc 1/2	Rc 3/4	Rc 1	Type of Flow Path in Valve
3 Port	Popet valve system Direct acting type **Direct piping type** Pilot solenoid valve + Subplate	●	—	—	—	—	● Return  ● Hold 
		(For large port size, consult separately.)					
4 Port	Ceramic slide valve system Pilot type **Gasket connection type** Pilot solenoid valve + Valve body+subplate	●	●	●	—	—	● Return  ● Hold 
5 Port	Spool valve system Pilot type **Straight piping type** Pilot solenoid valve + Valve body	●	●	●	—	—	● Return  ● Hold 
		(For large port size, consult separately.)					
	Spool valve system Pilot type **Gasket connection type** Pilot solenoid valve + Valve body+subplate	●	●	●	03 Type		● Return  ● Hold  ● Closed center  ● Center open to pressure  ● Center open to exhaust 
			08 Type		●	●	

To meet diversified customer needs,Konan's drip-proof and explosion-proof sorenoid valves are available in a variety of types as shown in the following list. Especially, the double-acting solenoid valve equipped with a newly-developped magnet-lached solenoid has been made compact enough in shape to eliminate its conventional image,such as reduction in number of cable outlets to one.

Among the explosion-proof and drip-proof solenoid valves,various kinds of manifold type combined with models given in the following list are also manufactured. For details, consult separately.

Type of Construction for Explosion-proof and Drip-proof

INDEX

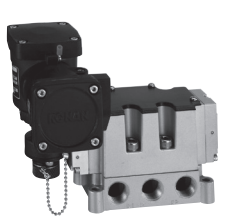
Flame-proof enclosure construction
: d2G4
Exd Ⅱ BT4

■ Conduit tube system

Drip-proof
protection class : IP66

■ Pressure-resistant packing system

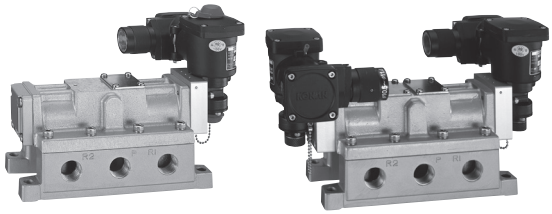
Drip-proof
protection class : IP66
Can be used outdoors



Drip-proof

Drip-proof
protection class :
Equivalent to IP54

Return. Hold



3-Position Type

Besides the solenoid valves given in the above list , explosion-proof solenoid valves for use with various kinds of fluid such as air, gas, oil, steam, chemical solutions, etc. are available.
For details, refer to No.7110W catalogue.

Cautions for use

1

Lubrication of the solenoid valve main body is not needed, but when lubrication of other devices is needed, use JISK2213 additive turbine oil ISO VG32 or VG46.

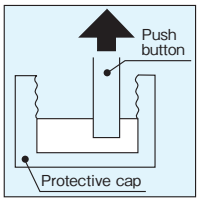
2

When operating two or more solenoid valves of manifold type simultaneously, note that that the P port (supply) pressure may be lowered, or that the flow rate to the load device may decline. For obtaining a more secure operation, the both-end P and R port piping is recommended.

3

Operation of manual push button (pilot solenoid valve)

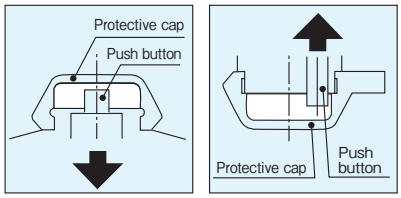
● In case of single solenoid



1) Remove the aluminum protective cap (screw-in type), and manipulate (push up) the push button.
2) Note that that the standard type is not locked.
※ If lock mechanism is needed, specify when ordering the product.

● In case of Magnet-latched type

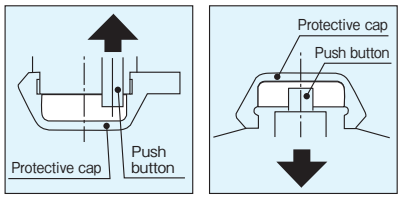
A) Remove the rubber-made protective cap (red), and manipulate the push button.



SOL. A side SOL. B side

● SOL. A side ——— Push down.
● SOL. B side ——— Push up.

<Caution> Solenoid valve type: Only in case of MVD311K-02, MVD312K-02, and MVD313K-02, the solenoid valves SOL. A and SOL.B are as shown below.



SOL. A side SOL. B side

Solenoid valve types : In case of MVD311K-02, MVD312K-02, and MVD313K-02

● SOL. A side ——— Push up.
● SOL. B side ——— Push down.

B) Note that that the solenoid of Magnet-latched type is not provided with locking mechanism.

※ In any case, be sure to put on the protective cap after use of the manual push button.

4

If leaving it behind without use for 1 year or longer, check it before use.

MVS300K/MVD300K Series

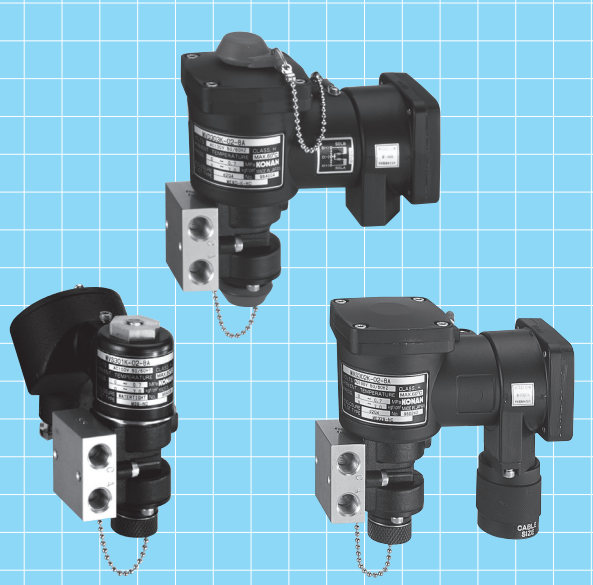
3-Port Solenoid Valves

Explosion-proof, Drip-proof

Poppet valve system, Direct acting type

Direct piping type Rc1/4

Return / Hold



Specifications

			Return	Hold	Return	Hold
Type	Drip-proof type		MVS301K − 02	MVD301K − 02	MVS311K − 02	MVD311K − 02
	Explosion-proof type	Pressure-resistant packing	MVS302K − 02	MVD302K − 02	MVS312K − 02	MVD312K − 02
		Conduit tube	MVS303K − 02	MVD303K − 02	MVS313K − 02	MVD313K − 02
Port size (Rc)			1/4			
Effective sectional area (CV value)			1㎟ (0.05)		4㎟ (0.2)	
Operating pressure			0 ～ 0.7MPa		0 ～ 0.1MPa	
Pressure resistance			1.05MPa			
Operating temperature			− 20 ～ 60℃			
Operating frequency			1 cycle / s max.			
Operation (response) time			0.05s max.			
Solenoid	Rated voltage		Refer to Model Code			
	Voltage fluctuation tolerance		− 15%～ 10% of rated voltage			
	Temperature rise		80 deg max.	65 deg max.	80 deg max.	65 deg max.
	Insulation class		JIS C 4003 Class H			
	Insulation resistance		10MΩ min.			
	Rated current		Refer to Rated current data on page A-37			
	Explosion-proof standard		Flame-proof enclosure construction d2G4			
Mass			Approx. 1.2kg			

● At the operating temperature of 5℃ or below, use extreme care for protection against frosting by removing the water contained in the fluid for use.

■ Return・explosion-proof verification approval No.

No. T47926

■ Hold・explosion-proof verification approval No.

No. T34655

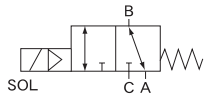
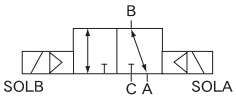
Model Code

When ordering,specify the model as follows:

MV ① 3 ② ③ –02– 8A– ④ – ⑤

- ① Type of fow path
- ② Kind of operating Pressure
- ③ Type of housing
- ④ Applicable cable size
- ⑤ Rated voltage

① Type of flow path

Type of valve		JIS symbol	Designation
2 position	Return		S
	Hold (Magnet-latched system)		D

● This valve is commonly used from normally-closed and normally-open positions

② Kind of operating pressure

Operating pressure	Effective sectional area	Designation
0～0.7MPa	1㎟	0
0～0.1MPa	4㎟ (Large flow type)	1

③ Type of housing

Type of housing (Wire connection system)		Designation
Explosion-proof type	Pressure resistant packing system	2K※
	Conduit tube system	3K
Drip-proof type		1K※

※ In the case of pressure resistant packing system, drip-proof type please enter the ④applicable cable size.
In the case of conduit tube system, no need to fill out the ④applicable cable size.

④ Applicable cable size (when housing is 1K※ or 2K※)

Wire size φd ※	Applicable cable size	Designation
φ8.5	φ7.5～8.4	No.8
φ9.5	φ8.5～9.4	No.9
φ10.5	φ9.5～10.4	No.10
φ11.5	φ10.5～11.4	No.11
φ12.5	φ11.5～12.4	No.12
φ13.5	φ12.5～13.4	No.13

※ For size φd, refer to page A-33 from A-36

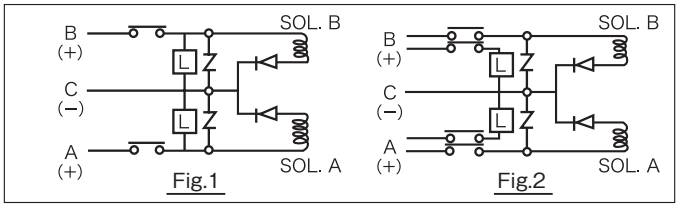
⑤ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz	AC100
AC110V 50/60Hz	AC110
AC115V 50/60Hz	AC115
AC120V 50/60Hz	AC120
AC125V 50/60Hz	AC125※
AC200V 50/60Hz	AC200
AC220V 50/60Hz	AC220
DC 24V	DC 24V
DC 48V	DC 48V
DC100V	DC100V
DC110V	DC110V
DC120V	DC120V
DC125V	DC125V

Precautions in operation circuit design

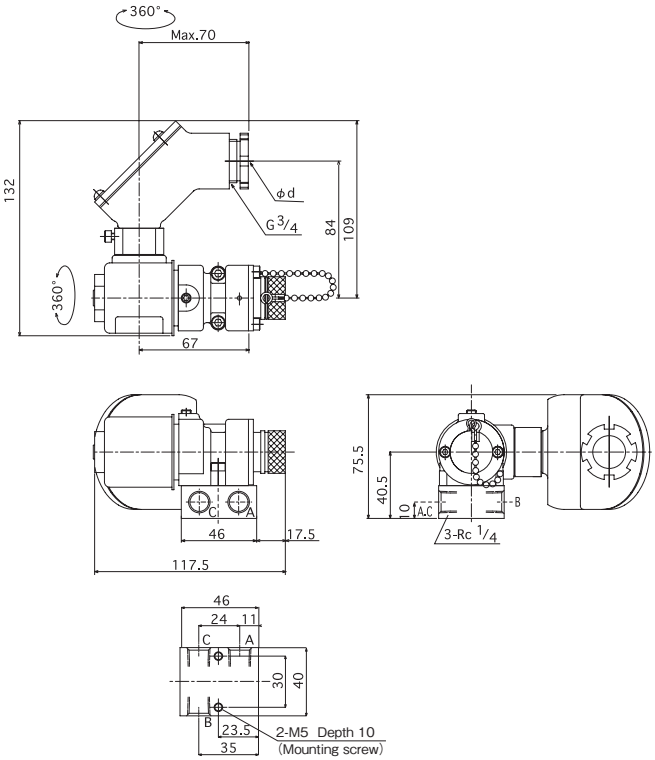
< Cause of magnet-latched system >

If the load L such as relay, lamp or the like is connected in parallel with coil as shown in Fig.1, a voltage induced in SOL B when SOL A is ON (or in SOL A when SOL B is ON) may lead malfunction of the load L.
To prevent this, individual contacts should be provided as shown in Fig.2.

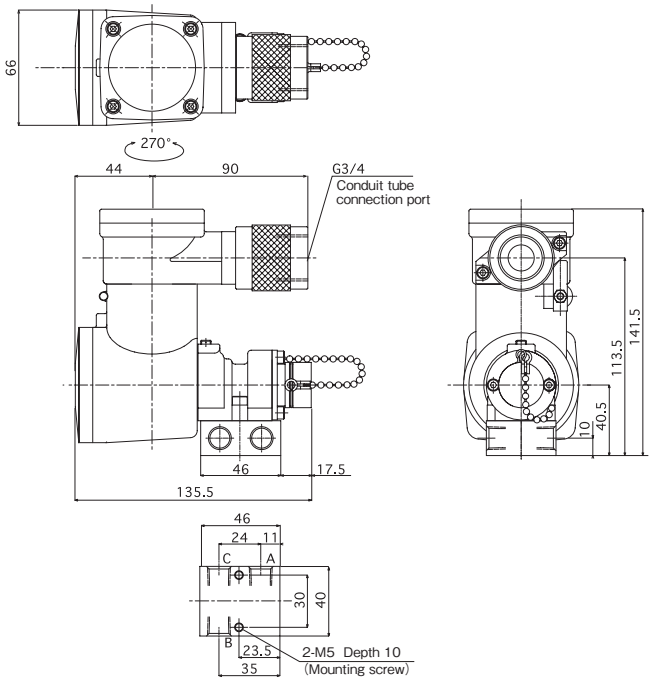


Outside Dimensions

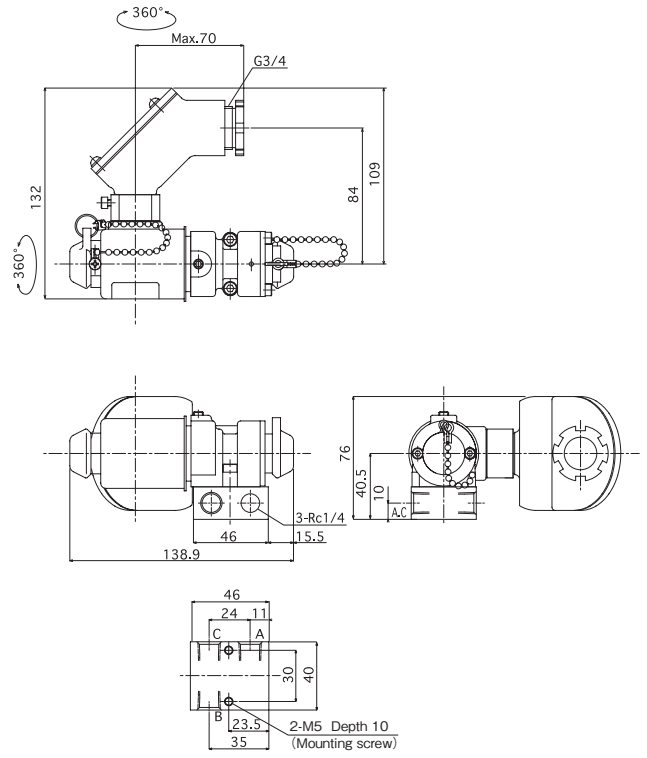
MVS301K-02 MVS311K-02 (Return)



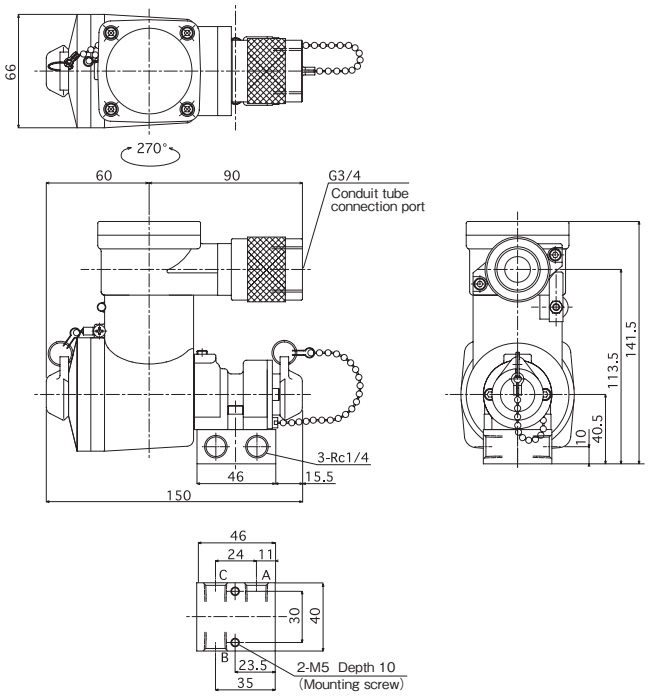
MVS302K-02 MVS312K-02 (Return)



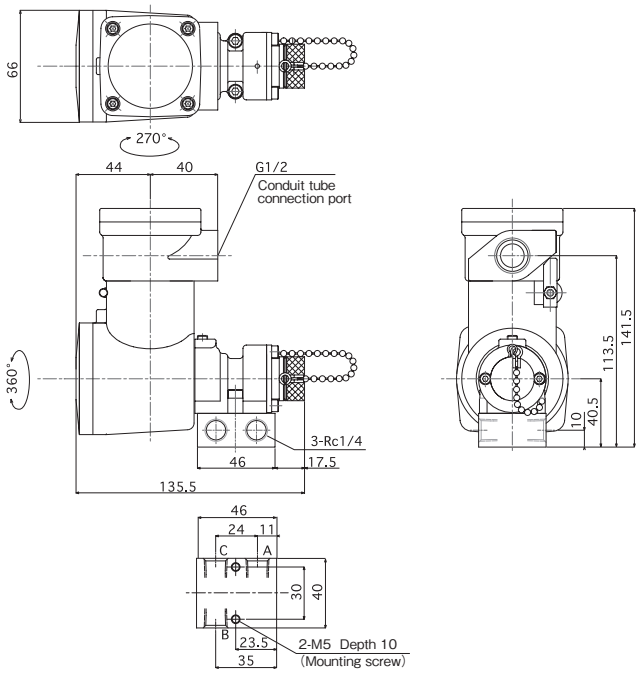
MVD301K-02 MVD311K-02 (Hold)



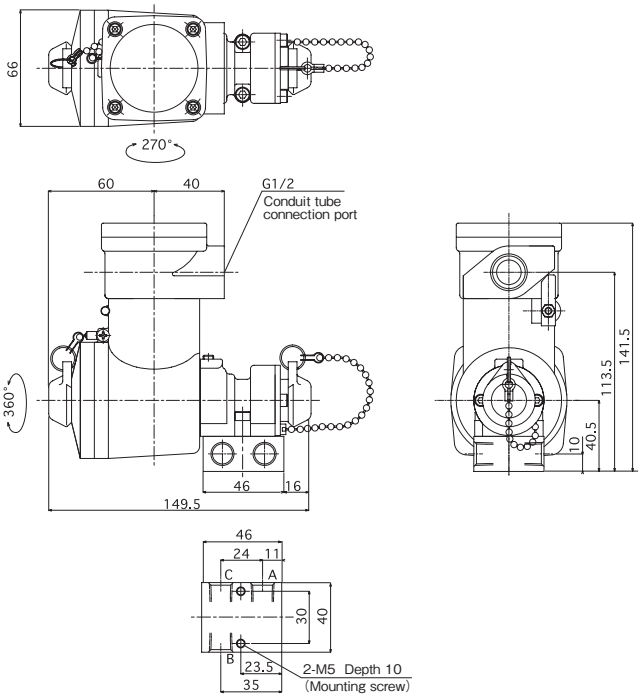
MVD302K-02 MVD312K-02 (Hold)



MVS303K-02
MVS313K-02 (Return)



MVD303K-02
MVD313K-02 (Hold)



MVS800K/MVD800K Series

4-Port Solenoid Valves

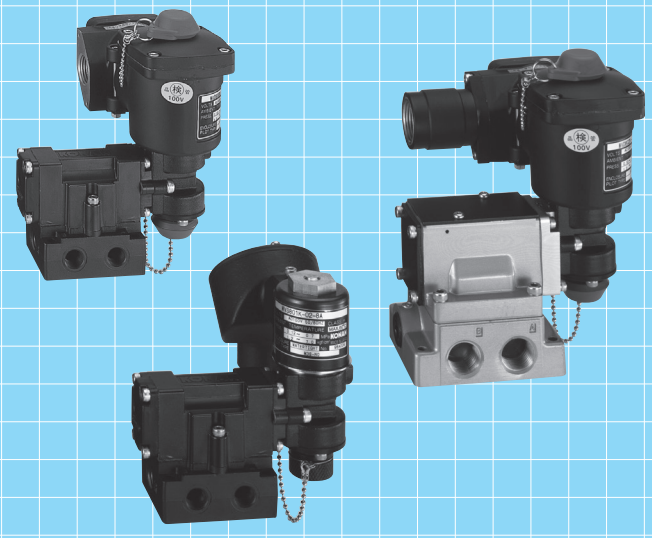
Explosion-proof, Drip-proof

Ceramic slide valve system, Pilot type

Gasket connection type Rc1/4・3/8・1/2

Return / Hold

This valve can be used as a 3-port valve by closing one of OUT ports (plug).



Specifications

			Return				Hold			
Type	Drip-proof type		MVS811K − 02		MVS801K − 03		MVD811K − 02		MVD801K − 03	
	Explosion-proof type	Pressure-resistant packing	MVS812K − 02 MVS812E − 02		MVS802K − 03 MVS802E − 03		MVD812K − 02 MVD812E − 02		MVD802K − 03 MVD802E − 03	
		Conduit tube	MVS813K − 02 MVS813E − 02		MVS803K − 03 MVS803E − 03		MVD813K − 02 MVD813E − 02		MVD803K − 03 MVD803E − 03	
Port size (Rc)			1/4	3/8	3/8	1/2	1/4	3/8	3/8	1/2
Effective sectional area (CV value)			16㎟ (0.9)	18㎟ (1.0)	55㎟ (3.0)	60㎟ (3.3)	16㎟ (0.9)	18㎟ (1.0)	55㎟ (3.0)	60㎟ (3.3)
Operating pressure			0.12 ～ 0.7MPa							
Pressure resistance			1.05MPa							
Operating temperature			− 20 ～ 60℃							
Operating frequency			1 cycle / s max. / 1 cycle / 6 months min.							
Operation (response) time			0.1s max.							
Solenoid	Rated voltage		Refer to Model Code							
	Voltage fluctuation tolerance		− 15%～ 10% of rated voltage							
	Temperature rise		80 deg max.				65 deg max.			
	Insulation class		JIS C 4003 Class H							
	Insulation resistance		10MΩ min.							
	Rated current		Refer to Rated current data on page A-37							
	Explosion-proof standard		Flame-proof enclosure construction d2G4 / Exd Ⅱ BT4							
Mass			Approx. 2.0kg							

● At the operating temperature of 5℃ or below, use extreme care for protection against frosting by removing the water contained in the fluid for use.

■ d2G4・Return・explosion-proof verification approval No.

No. T47926

■ Exd Ⅱ BT4・Return・explosion-proof verification approval No.

No. TC16744

■ d2G4・Hold・explosion-proof verification approval No.

No. T34655

■ Exd Ⅱ BT4・Hold・explosion-proof verification approval No.

No. TC15045

Model Code

When ordering,specify the model as follows:

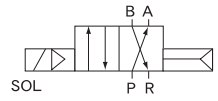
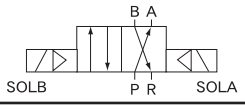
MV ① 81 ② – 02 – ③ – ⑤ – ⑥ – ⑦

- ① Type of fow path
- ② Type of housing
- ③ Port size
- ⑤ Applicable cable size
- ⑥ Rated voltage
- ⑦ Explosion-proof verifying nation

MV ① 80 ② – 03 – ④ – ⑤ – ⑥ – ⑦

- ① Type of fow path
- ② Type of housing
- ④ Port size
- ⑤ Applicable cable size
- ⑥ Rated voltage
- ⑦ Explosion-proof verifying nation

① Type of flow path

Type of valve		JIS symbol	Designation
2 position	Return		S
	Hold (Magnet-latched system)		D

② Type of housing

Type of housing (Wire connection system)		Designation
JIS explosion-proof d2G4	Pressure resistant packing system	2K※
	Conduit tube system	3K
Explosion-proof for hydrogen d3aG4	Please refer to page C-3 of explosion-proof for hydrogen.	
EX. Explosion-proof Exd Ⅱ BT4	Pressure resistant packing system	2E※
	Conduit tube system	3E
Drip-proof type		1K※

※ In the case of pressure resistant packing system, drip-proof type please enter the ⑤applicable cable size.
In the case of conduit tube system, no need to fill out the ⑤applicable cable size.

③ Port size

Port size	Designation
Rc1/4	8A
Rc3/8	10A

④ Port size

Port size	Designation
Rc3/8	10A
Rc1/2	15A

⑤ Applicable cable size (when housing is 1K※ or 2K※ or 2E※)

Wire size φd ※	Applicable cable size	Designation
φ8.5	φ7.5 ~ 8.4	No.8
φ9.5	φ8.5 ~ 9.4	No.9
φ10.5	φ9.5 ~ 10.4	No.10
φ11.5	φ10.5 ~ 11.4	No.11
φ12.5	φ11.5 ~ 12.4	No.12
φ13.5	φ12.5 ~ 13.4	No.13

※ For size φd , refer to page A-33 from A-36

⑥ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz	AC100
AC110V 50/60Hz	AC110
AC115V 50/60Hz	AC115
AC120V 50/60Hz	AC120
AC125V 50/60Hz	AC125※
AC200V 50/60Hz	AC200
AC220V 50/60Hz	AC220
DC 24V	DC 24V
DC 48V	DC 48V
DC100V	DC100V
DC110V	DC110V
DC120V	DC120V
DC125V	DC125V

※ In Ex. Explosion-proof type return valve, AC125 is not applicable.
※ When ordering, specify the frequency 50 Hz or 60 Hz.

⑦ Explosion-proof verifying nation

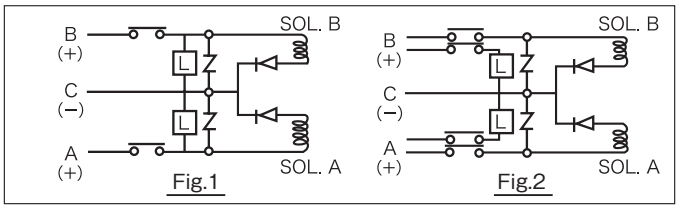
Verifying nation	Designation
Japan	No entry
China	C※
Korea	H※

※ In case of ②housing 2E or 3E only.
※ In case of hold type of explosion-proof for China or explosion-proof for Korea, only MVD8-02-E1E-C/ MVD8-02-E2E-C/ MVD8-03-E1E-C/ MVD8-03E2E-C are available.Consult separately.

Precautions in operation circuit design

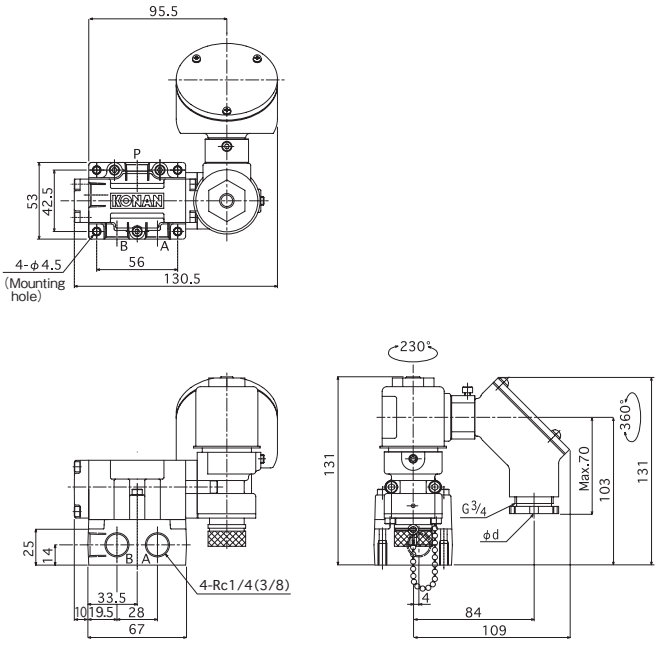
< Cause of magnet-latched system >

If the load L such as relay, lamp or the like is connected in parallel with coil as shown in Fig.1, a voltage induced in SOL B when SOL A is ON (or in SOL A when SOL B is ON) may lead malfunction of the load L.
To prevent this, individual contacts should be provided as shown in Fig.2.

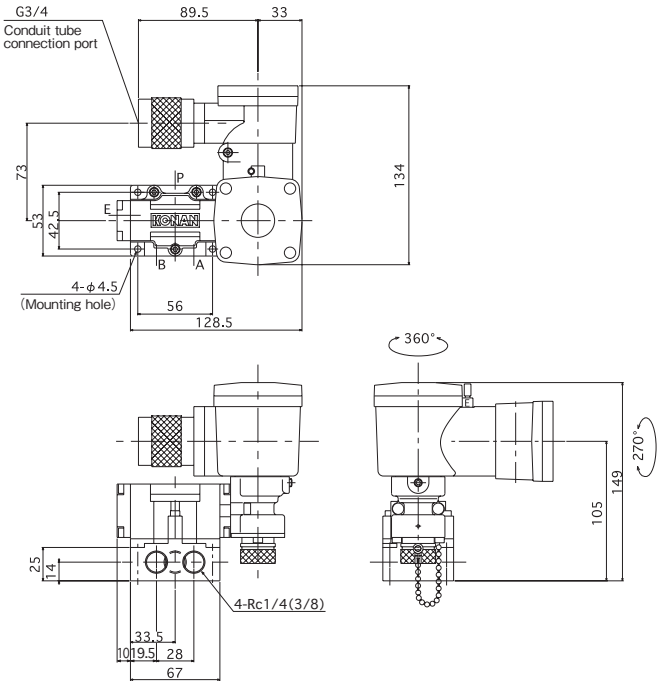


Outside Dimensions

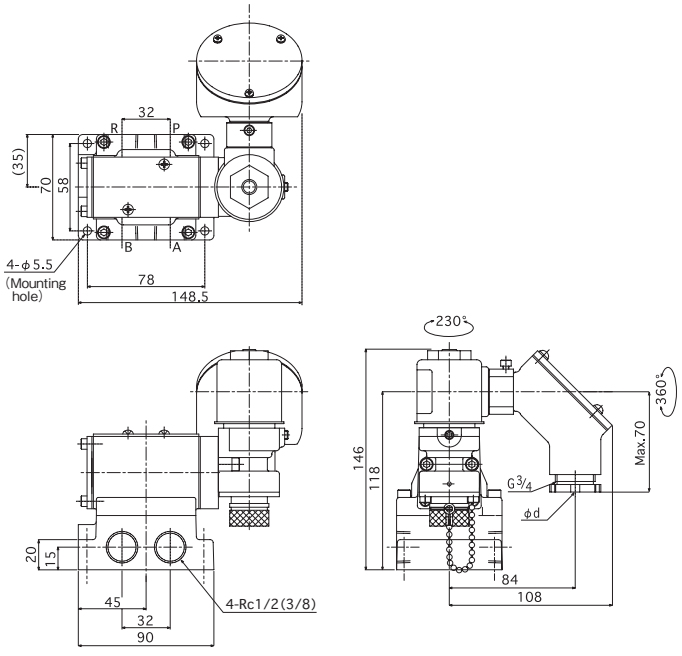
MVS811K-02 (Return)



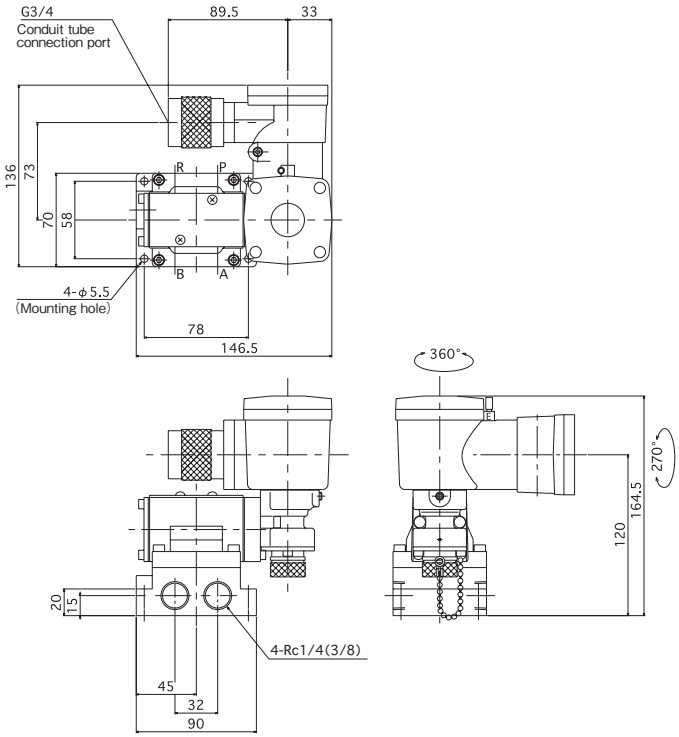
MVS812K-02 MVS812E-02 (Return)



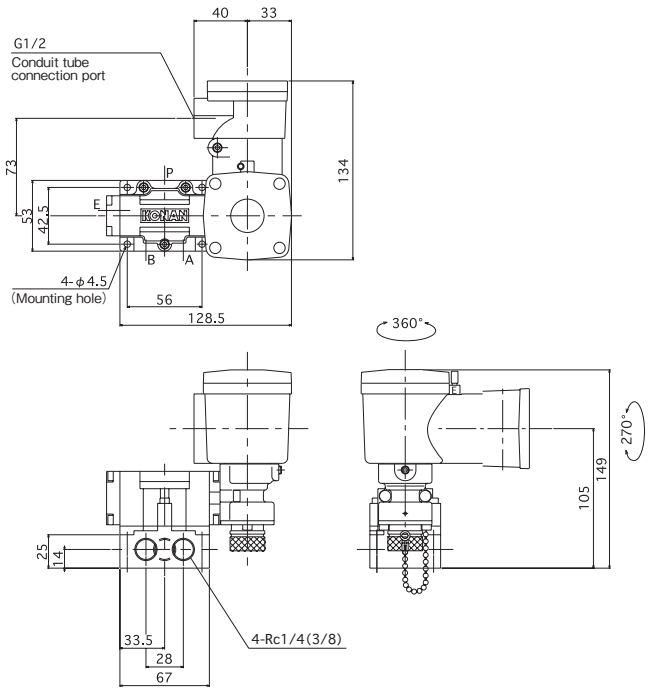
MVS801K-03 (Return)



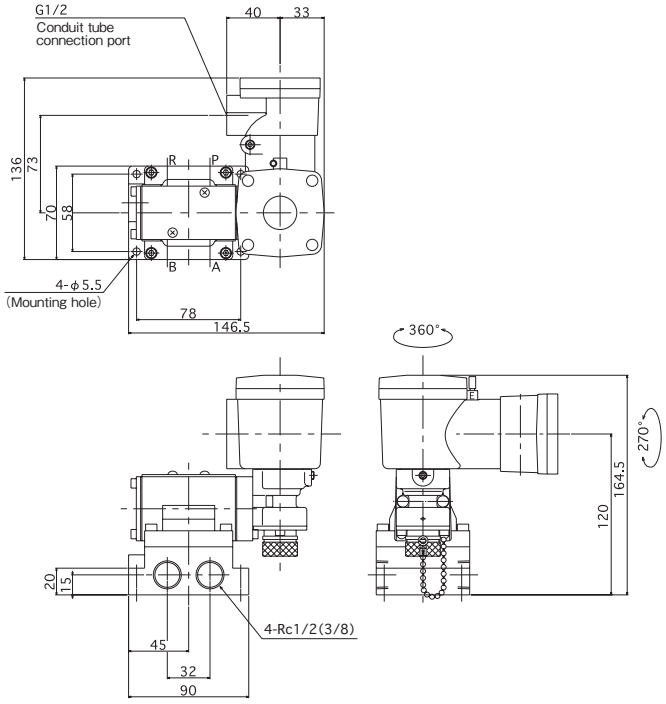
MVS802K-03 MVS802E-03 (Return)



MVS813K-02
MVS813E-02 (Return)

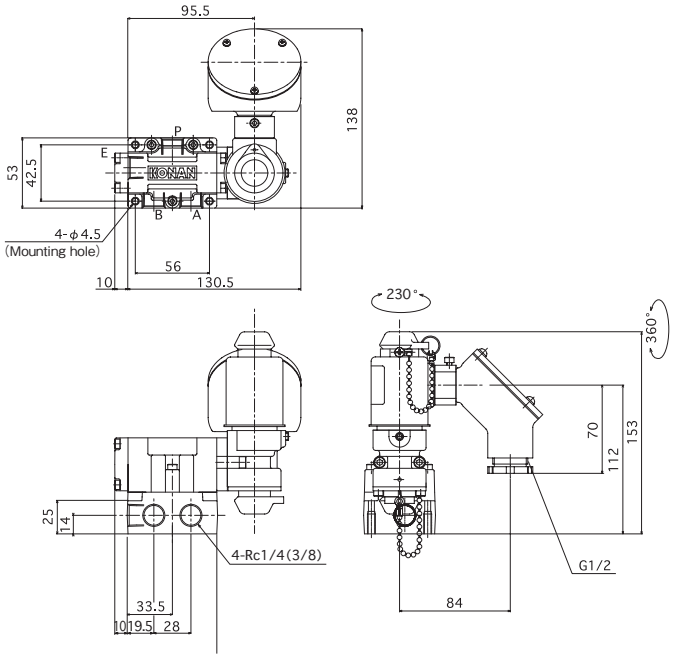


MVS803K-03
MVS803E-03 (Return)

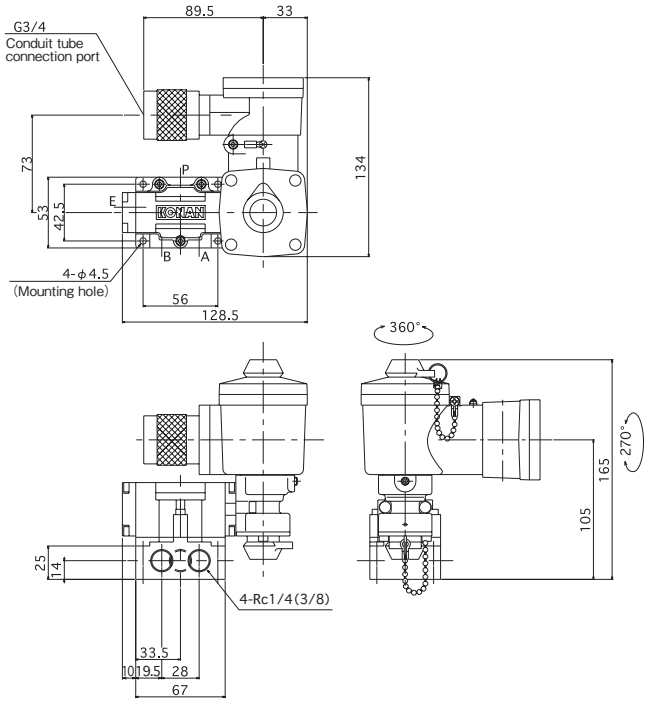


Outside Dimensions

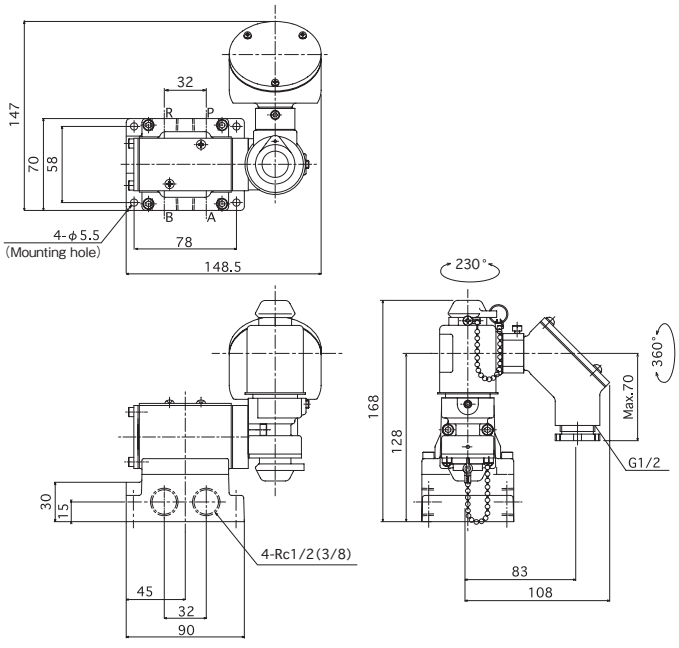
MVD811K-02（Hold）



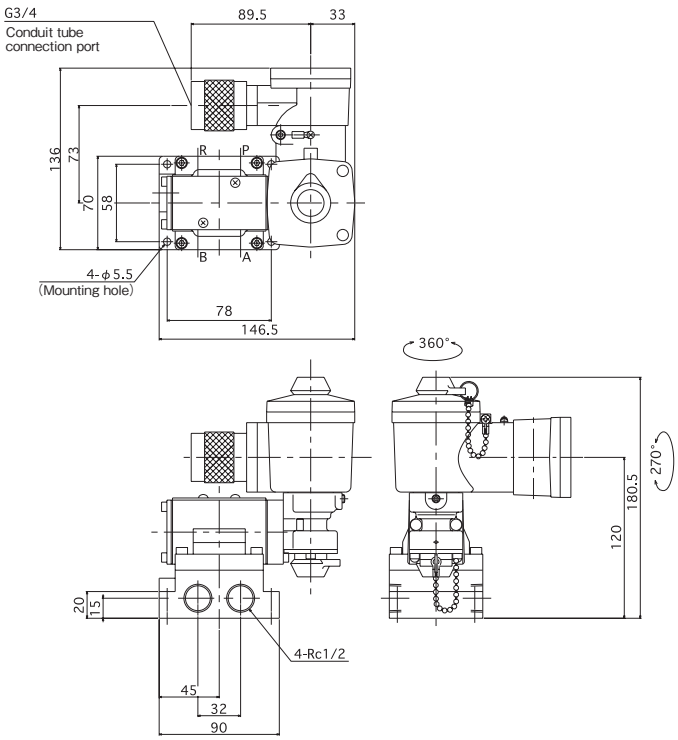
MVD812K-02
MVD812E-02 （Hold）



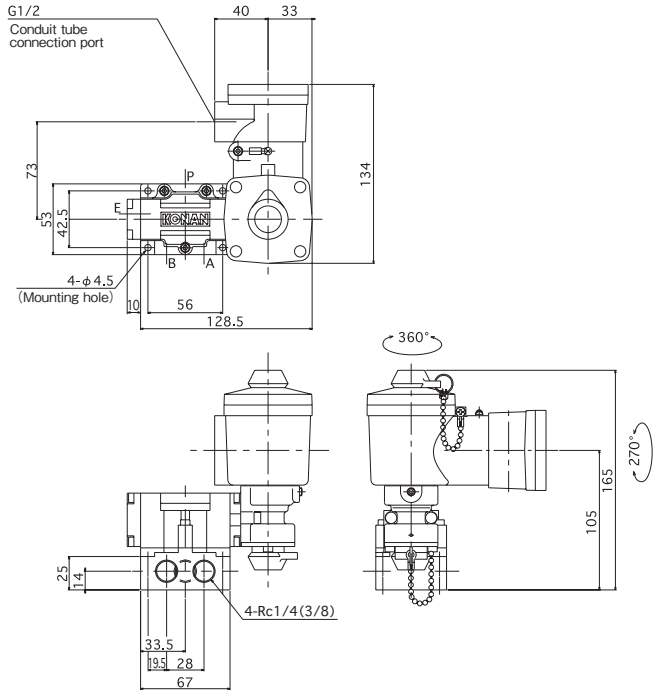
MVD801K-03（Hold）



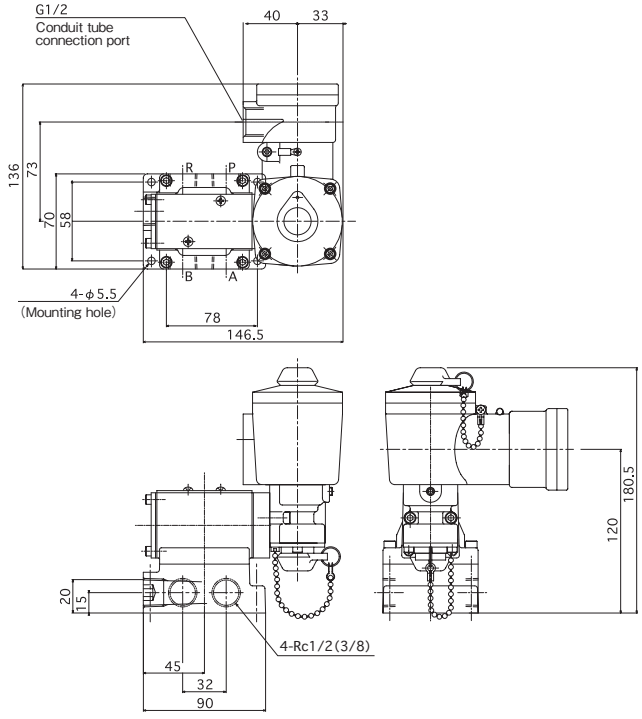
MVD802K-03
MVD802E-03 （Hold）



MVD813K-02
MVD813E-02 (Hold)



MVD803K-03
MVD803E-03 (Hold)



453S/453D Series

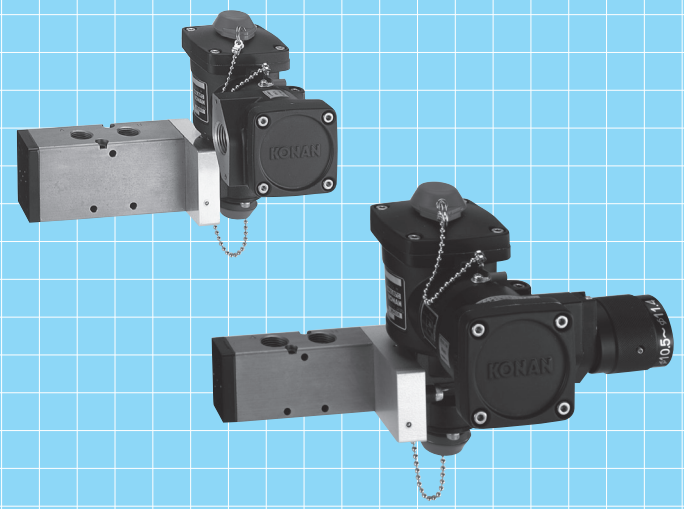
5-Port Solenoid Valves

Explosion-proof

Spool valve system, Pilot type

Direct piping type Rc1/4・3/8・1/2

Return / Hold



Specifications

			Return		Hold		Return		Hold	
Type	Explosion-proof type	Pressure-resistant packing	453S202C-E2K 453S202C-E2E	453S203C-E2K 453S203C-E2E	453D202C-E2K 453D202C-E2E	453D203C-E2K 453D203C-E2E	453S403C-E2K 453S403C-E2E	453S404C-E2K 453S404C-E2E	453D403C-E2K 453D403C-E2E	453D404C-E2K 453D404C-E2E
		Conduit tube	453S202C-E1K 453S202C-E1E	453S203C-E1K 453S203C-E1E	453D202C-E1K 453D202C-E1E	453D203C-E1K 453D203C-E1E	453S403C-E1K 453S403C-E1E	453S404C-E1K 453S404C-E1E	453D403C-E1K 453D403C-E1E	453D404C-E1K 453D404C-E1E
Port size (Rc)			1/4	3/8	1/4	3/8	3/8	1/2	3/8	1/2
Effective sectional area (CV value)			22㎟ (1.2)				40㎟ (2.2)			
Operating pressure			0.2 ~ 0.7MPa							
Pressure resistance			1.05MPa							
Operating temperature			− 5 ~ 50℃							
Operating frequency			1 cycle / s max. / 1 cycle / 6 months min.							
Operation (response) time			0.05 s max.							
Solenoid	Rated voltage		Refer to Model Code							
	Voltage fluctuation tolerance		− 15%~ 10% of rated voltage							
	Temperature rise		80 deg max.		65 deg max.		80 deg max.		65 deg max..	
	Insulation class		JIS C 4003 Class H							
	Insulation resistance		10MΩ min.							
	Rated current		Refer to Rated current data on page A-37							
	Explosion-proof standard		Flame-proof enclosure construction d2G4 / Exd Ⅱ BT4							
Mass			Approx. 1.7kg		Approx. 1.8kg		Approx. 2.0kg		Approx. 2.1kg	

● At the operating temperature of 5℃ or below, use extreme care for protection against frosting by removing the water contained in the fluid for use.

■ d2G4・Return・explosion-proof verification approval No.

No. T47926

■ Exd Ⅱ BT4・Return・explosion-proof verification approval No.

No. TC16744

■ d2G4・Hold・explosion-proof verification approval No.

No. T34655

■ Exd Ⅱ BT4・Hold・explosion-proof verification approval No.

No. TC15045

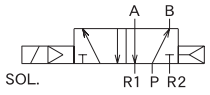
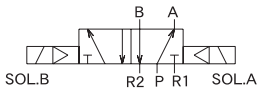
Model Code

When ordering,specify the model as follows:

453 ❶ ❷ C-E ❸ - ❹ - ❺ - ❻

- ❶ Type of fow path
- ❷ Type of body, port size
- ❸ Type of housing
- ❹ Applicable cable size
- ❺ Rated voltage
- ❻ Explosion-proof verifying nation

❶ Type of flow path

Type of valve		JIS symbol	Designation
2 position	Return		S
	Hold (Magnet-latched system)		D

❹ Applicable cable size (when housing is 2K※ or 2E※)

Wire size φd ※	Applicable cable size	Designation
φ 8.5	φ 7.5 ~ 8.4	No.8
φ 9.5	φ 8.5 ~ 9.4	No.9
φ 10.5	φ 9.5 ~ 10.4	No.10
φ 11.5	φ 10.5 ~ 11.4	No.11
φ 12.5	φ 11.5 ~ 12.4	No.12
φ 13.5	φ 12.5 ~ 13.4	No.13

※ For size φ d , refer to page A-33 from A-36

❷ Type of body, port size

Type of body	Port size	Designation
B20	Rc1/4	202
	Rc3/8	203
B40	Rc3/8	403
	Rc1/2	404

❺ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz	AC100
AC110V 50/60Hz	AC110
AC115V 50/60Hz	AC115
AC120V 50/60Hz	AC120
AC125V 50/60Hz	AC125 ※
AC200V 50/60Hz	AC200
AC220V 50/60Hz	AC220
DC 24V	DC 24V
DC 48V	DC 48V
DC100V	DC100V
DC110V	DC110V
DC120V	DC120V
DC125V	DC125V

※ In Ex. Explosion-proof type return valve, AC125 is not applicable.
※ When ordering, specify the frequency 50 Hz or 60 Hz.

❸ Type of housing

Type of housing (Wire connection system)		Designation
JIS explosion-proof d2G4	Pressure resistant packing system	2K※
	Conduit tube system	1K
Explosion-proof for hydrogen d3aG4	Please refer to page C-3 of explosion-proof for hydrogen.	
EX. Explosion-proof Exd Ⅱ BT4	Pressure resistant packing system	2E※
	Conduit tube system	1E

※ In the case of pressure resistant packing system, drip-proof type please enter the ❹applicable cable size.
In the case of conduit tube system, no need to fill out the ❹applicable cable size.

❻ Explosion-proof verifying nation

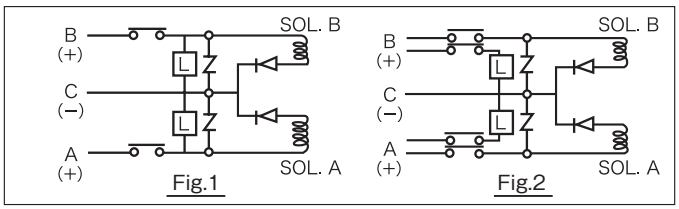
Verifying nation	Designation
Japan	No entry
China	C※
Korea	H※

※ In case of ❶return and ❸housing 1E or 2E only.

Precautions in operation circuit design

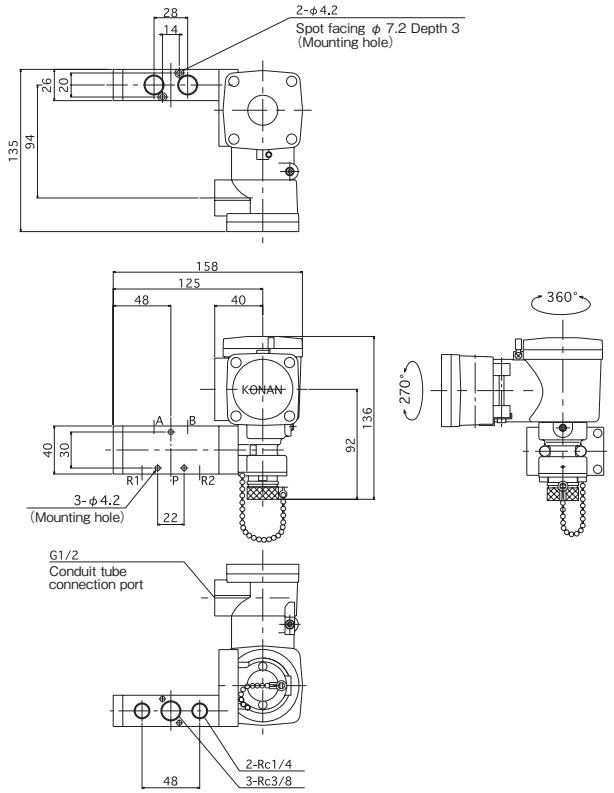
< Cause of magnet-latched system >

If the load L such as relay, lamp or the like is connected in parallel with coil as shown in Fig.1, a voltage induced in SOL B when SOL A is ON (or in SOL A when SOL B is ON) may lead malfunction of the load L.
To prevent this, individual contacts should be provided as shown in Fig.2.

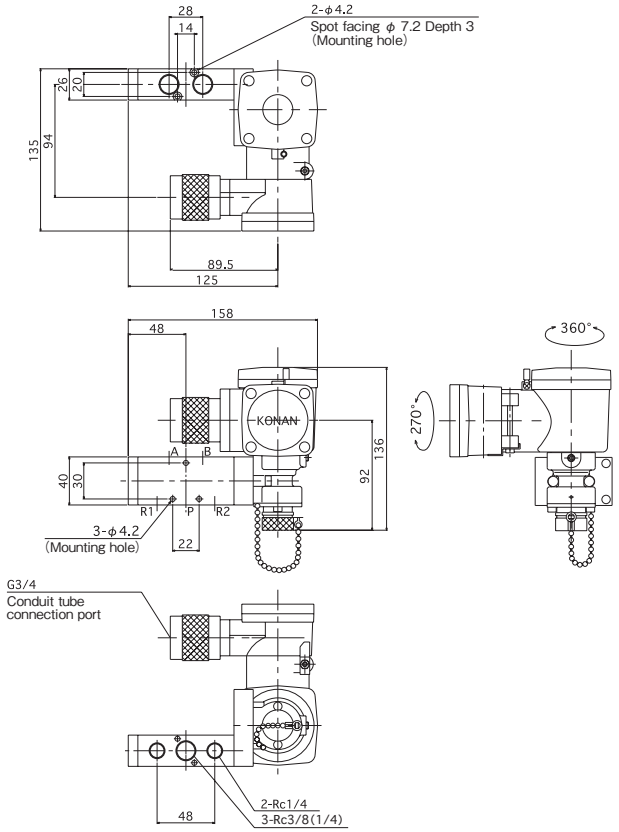


Outside Dimensions

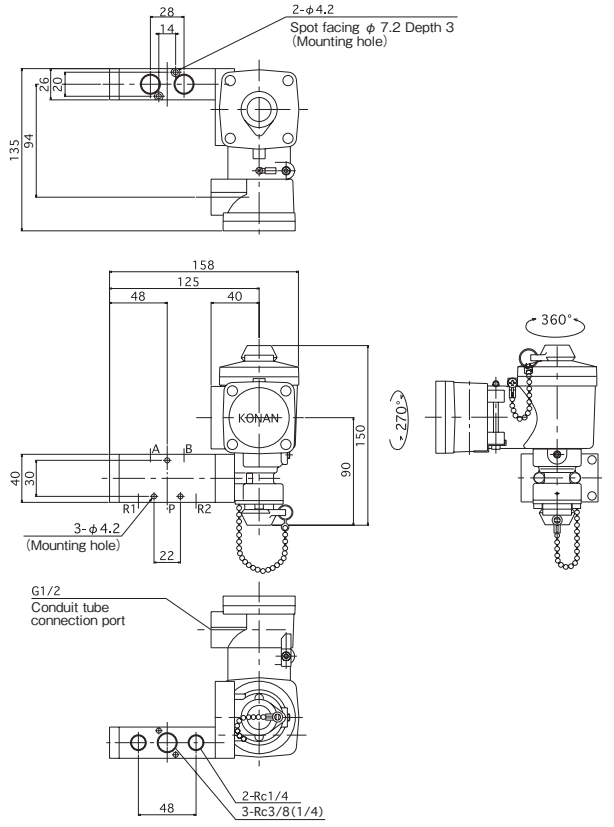
453S202・203C-E1K
453S202・203C-E1E (Return)



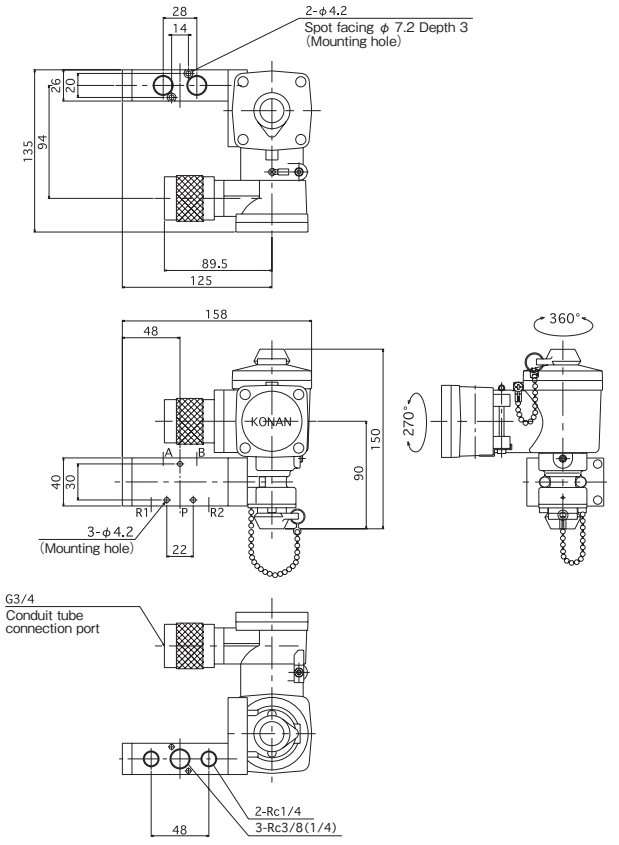
453S202・203C-E2K
453S202・203C-E2E (Return)



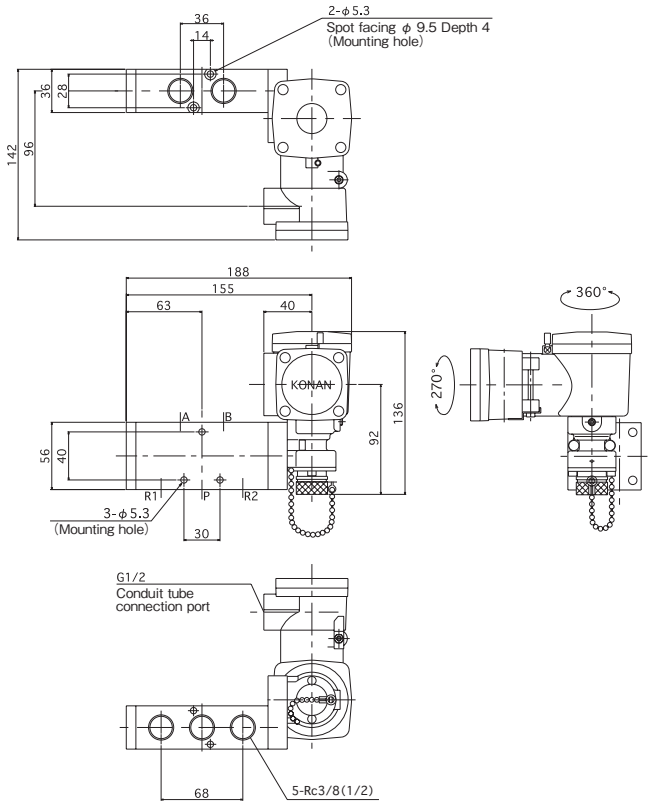
453D202・203C-E1K
453D202・203C-E1E (Hold)



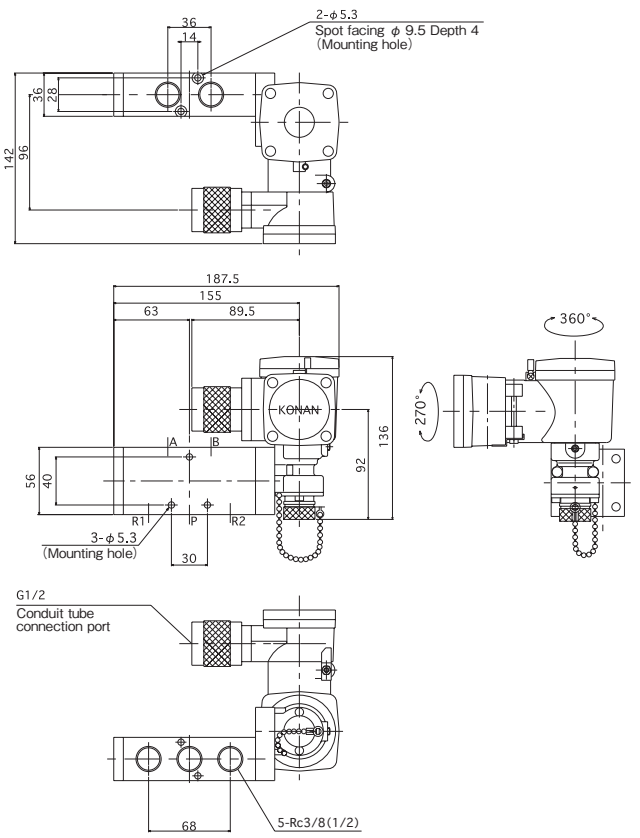
453D202・203C-E2K
453D202・203C-E2E (Hold)



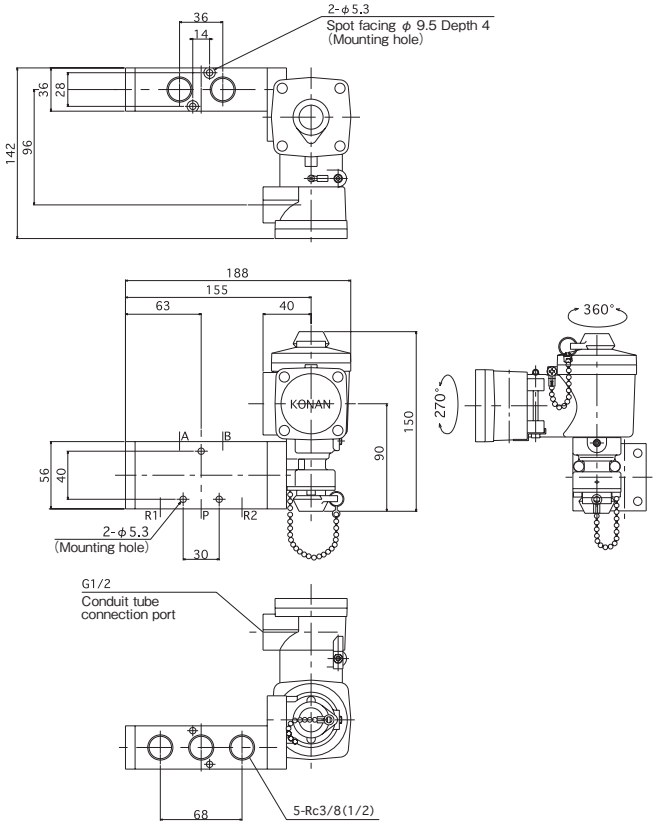
453S403・404C-E1K
453S403・404C-E1E (Return)



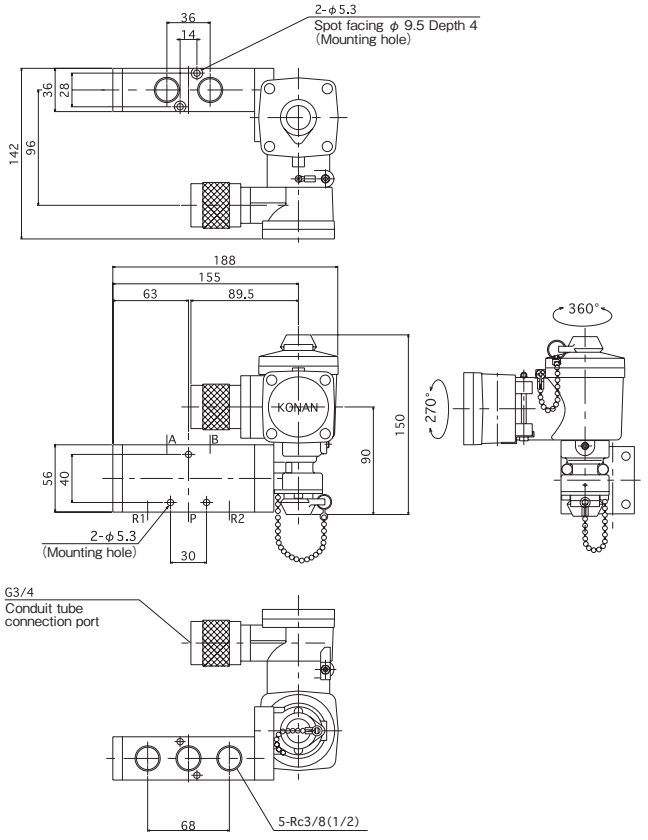
453S403・404C-E2K
453S403・404C-E2E (Return)



453D403・404C-E1K
453D403・404C-E1E (Hold)



453D403・404C-E2K
453D403・404C-E2E (Hold)



MVS2F/MVD2F・MVS2N/MVD2N Series

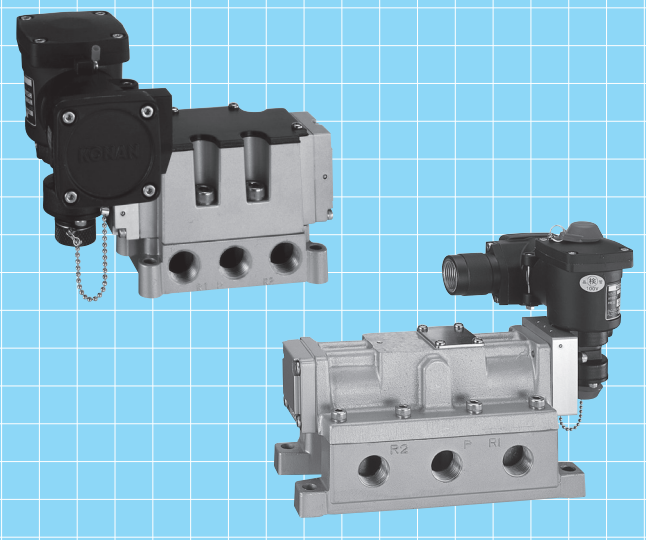
5-Port Solenoid Valves

Explosion-proof, Drip-proof

Spool valve system, Pilot type

Gasket connection type Rc1/4・3/8・1/2・3/4・1

Return / Hold



Specifications

			Return	Hold	Return	Hold
Type	Drip-proof type		MVS2F-03-E3K	MVD2F-03-E3K	MVS2N-08-E3K	MVD2N-08-E3K
	Explosion-proof type	Pressure-resistant packing	MVS2F-03-E2K MVS2F-03-E2E	MVD2F-03-E2K MVD2F-03-E2E	MVS2N-08-E2K MVS2N-08-E2E	MVD2N-08-E2K MVD2N-08-E2E
		Conduit tube	MVS2F-03-E1K MVS2F-03-E1E	MVD2F-03-E1K MVD2F-03-E1E	MVS2N-08-E1K MVS2N-08-E1E	MVD2N-08-E1K MVD2N-08-E1E
Port size (Rc)			1/4・3/8・1/2		3/4・1	
Effective sectional area (CV value)			40㎟ (2.2)・55㎟ (3.0)・70㎟ (3.8)		175㎟ (9.5)・185㎟ (10.0)	
Operating pressure			0.2 ～ 0.7MPa		0.12 ～ 0.7MPa	
Pressure resistance			1.05MPa			
Operating temperature			− 5 ～ 60℃		− 20 ～ 50℃	
Operating frequency			1 cycle / s max. / 1 cycle / 6 months min.			
Operation (response) time			0.1 s max.		0.3 s max.	
Solenoid	Rated voltage		Refer to Model Code			
	Voltage fluctuation tolerance		− 15%～ 10% of rated voltage			
	Temperature rise		80 deg max.	65 deg max.	80 deg max.	65 deg max.
	Insulation class		JIS C 4003 Class H			
	Insulation resistance		10MΩ min.			
	Rated current		Refer to Rated current data on page A-37			
	Explosion-proof standard		Flame-proof enclosure construction d2G4 / Exd Ⅱ BT4			
Mass			Approx. 3.0kg		Approx. 5.0kg	

● At the operating temperature of 5℃ or below, use extreme care for protection against frosting by removing the water contained in the fluid for use.

■ d2G4・Return・explosion-proof verification approval No.

No. T47926

■ Exd Ⅱ BT4・Return・explosion-proof verification approval No.

No. TC16744

■ d2G4・Hold・explosion-proof verification approval No.

No. T34655

■ Exd Ⅱ BT4・Hold・explosion-proof verification approval No.

No. TC15045

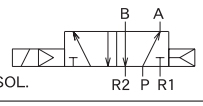
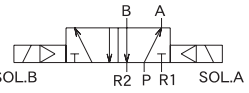
Model Code

When ordering,specify the model as follows:

MV ❶ – ❷ – E ❸ – ❹ – ❺ – ❻ – ❼ – ❽

- ❶ Type of fow path
- ❷ Type of body
- ❸ Type of housing
- ❹ Pilot pressure supply system
- ❺ Port size
- ❻ Applicable cable size
- ❼ Rated voltage
- ❽ Explosion-proof verifying nation

❶ Type of flow path

Type of valve		JIS symbol	Type of body	Designation
2 position	Return		03	S2F
			08	S2N
	Hold (Magnet-latched system)		03	D2F
			08	D2N

❷ Type of body

Type of body	Port size	Designation
03	Rc1/4	03
	Rc3/8	
	Rc1/2	
08	Rc3/4	08
	Rc1	

❸ Type of housing

Type of housing (Wire connection system)		Designation
JIS explosion-proof d2G4	Pressure resistant packing system	2K※
	Conduit tube system	1K
EX. Explosion-proof Exd Ⅱ BT4	Pressure resistant packing system	2E※
	Conduit tube system	1E
Drip-proof type		3K

※ In the case of pressure resistant packing system, drip-proof type please enter the ❻applicable cable size.
In the case of conduit tube system, no need to fill out the ❻applicable cable size.

❹ Pilot pressure supply system

Type	Designation
Internal pilot type (Standard)	No entry
Separate pilot supply type	P

❺ Port size

Port size	Type of body	Designation
Rc1/4	03	8A
Rc3/8		10A
Rc1/2		15A
Rc3/4	08	20A
Rc1		25A

❻ Applicable cable size (when housing is 2K※ or 3K※ or 2E※)

Wire size φd ※	Applicable cable size	Designation
φ8.5	φ7.5 ~ 8.4	No.8
φ9.5	φ8.5 ~ 9.4	No.9
φ10.5	φ9.5 ~ 10.4	No.10
φ11.5	φ10.5 ~ 11.4	No.11
φ12.5	φ11.5 ~ 12.4	No.12
φ13.5	φ12.5 ~ 13.4	No.13

※ For size φd , refer to page A-33 from A-36

❼ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz	AC100
AC110V 50/60Hz	AC110
AC115V 50/60Hz	AC115
AC120V 50/60Hz	AC120
AC125V 50/60Hz	AC125※
AC200V 50/60Hz	AC200
AC220V 50/60Hz	AC220
DC 24V	DC 24V
DC 48V	DC 48V
DC100V	DC100V
DC110V	DC110V
DC120V	DC120V
DC125V	DC125V

※ In Ex. Explosion-proof type return valve, AC125 is not applicable.
※ When ordering, specify hte frequency 50 Hz or 60 Hz.

❽ Explosion-proof verifying nation

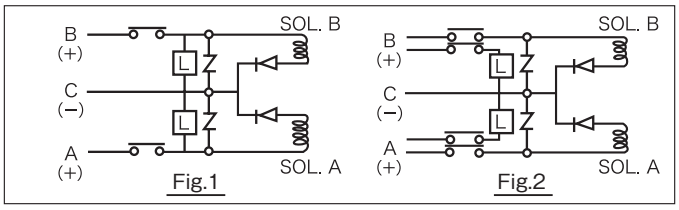
Verifying nation	Designation
Japan	No entry
China	C※
Korea	H※

※ In case of ❶return and ❸housing 1E or 2E only.

Precautions in operation circuit design

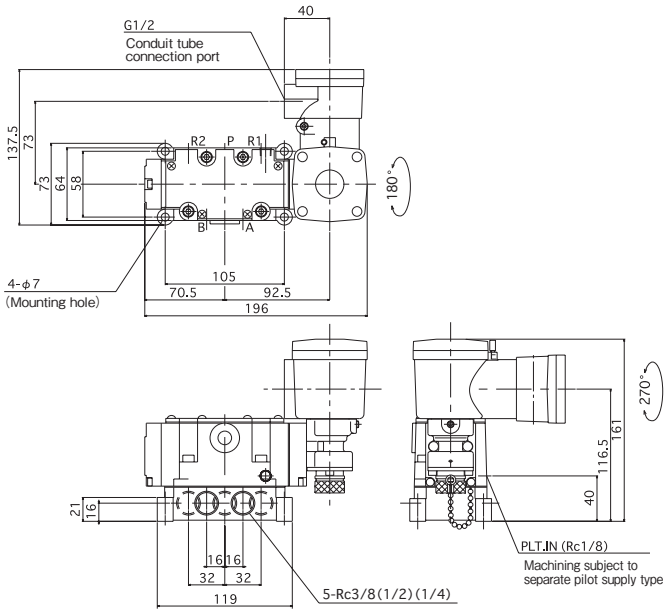
< Cause of magnet-latched system >

If the load L such as relay, lamp or the like is connected in parallel with coil as shown in Fig.1, a voltage induced in SOL B when SOL A is ON (or in SOL A when SOL B is ON) may lead malfunction of the load L.
To prevent this, individual contacts should be provided as shown in Fig.2.

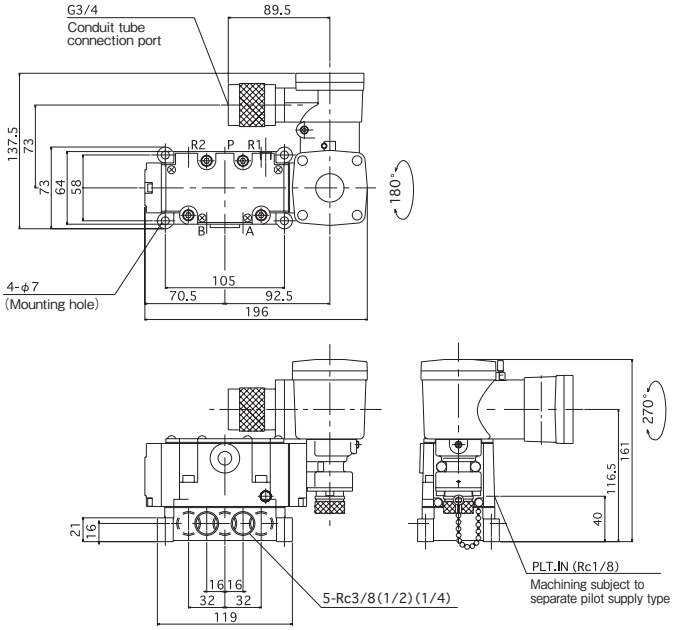


Outside Dimensions

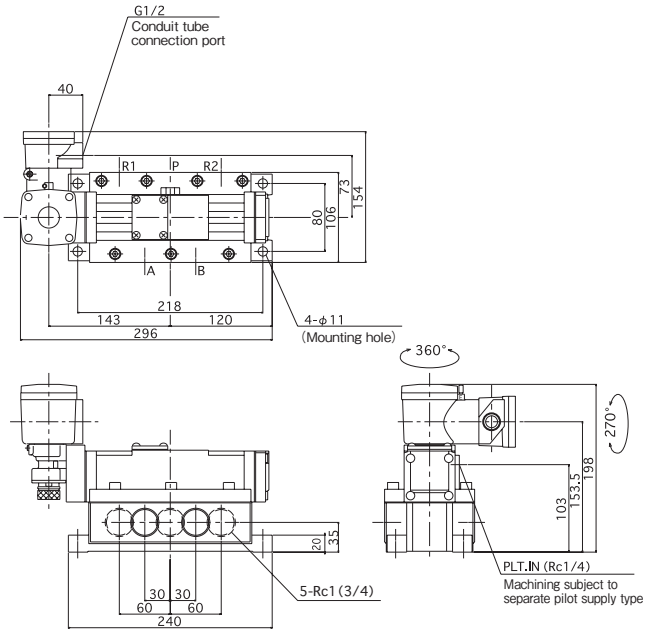
MVS2F-03-E1K
MVS2F-03-E1E (Return)



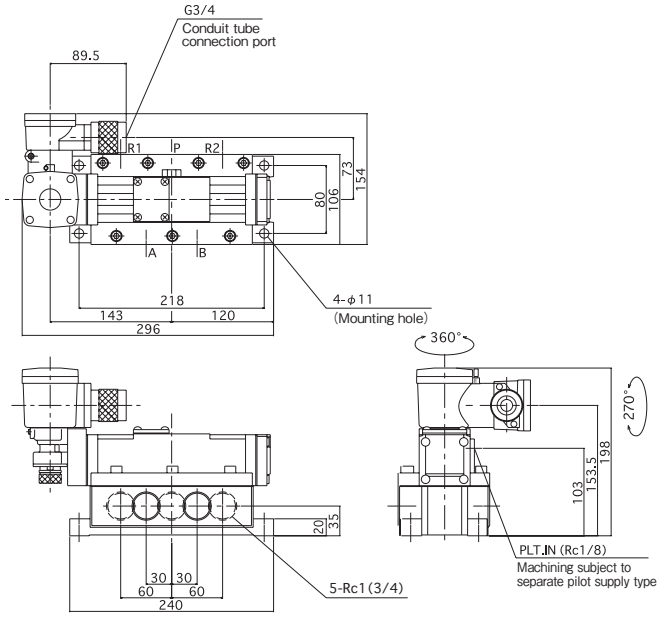
MVS2F-03-E2K (Return)



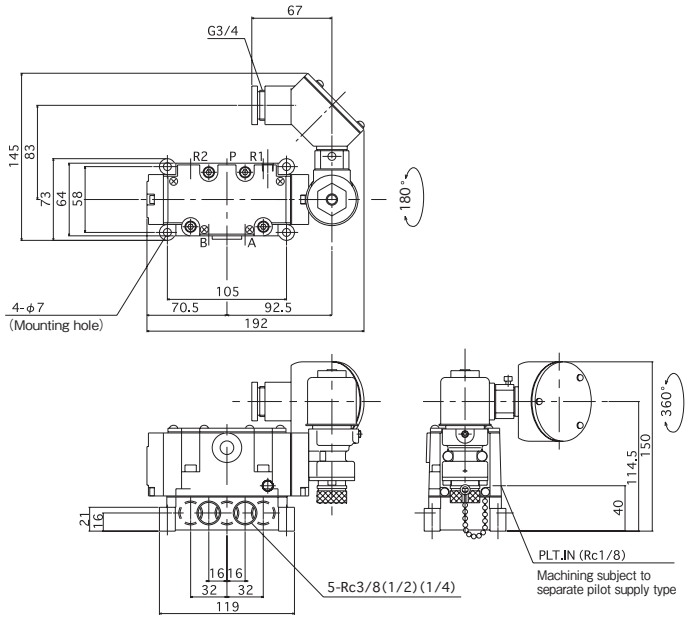
MVS2N-08-E1K
MVS2N-08-E1E (Return)



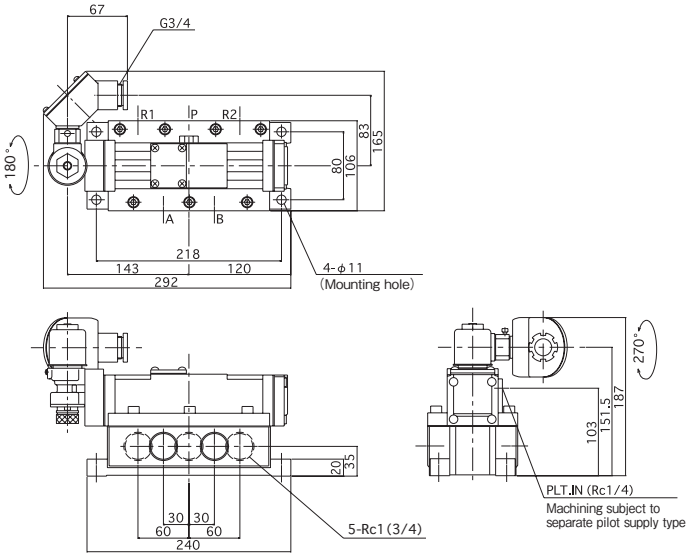
MVS2N-08-E2K (Return)



MVS2F-03-E3K
MVS2F-03-E3E (Return)

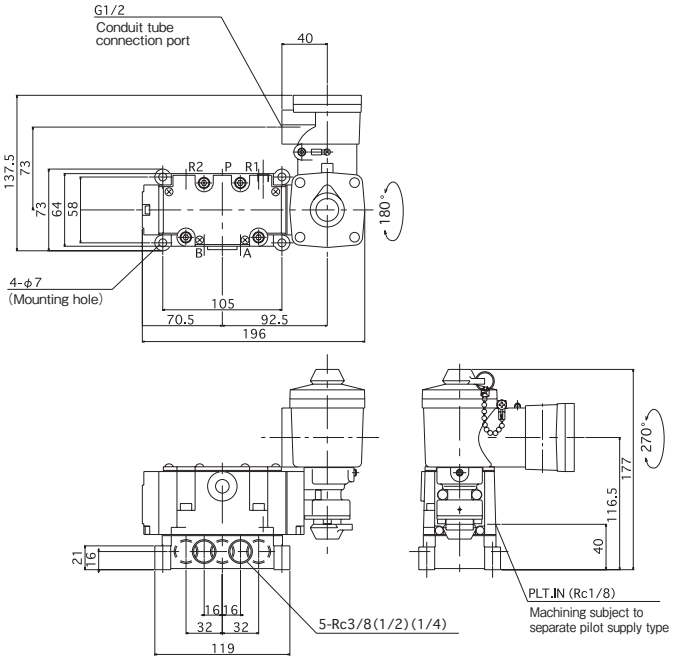


MVS2N-08-E3K
MVS2N-08-E3E (Return)

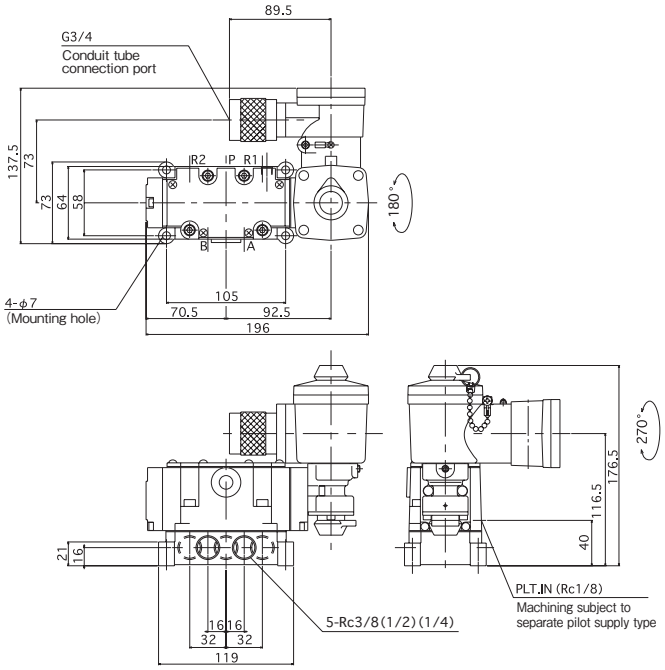


Outside Dimensions

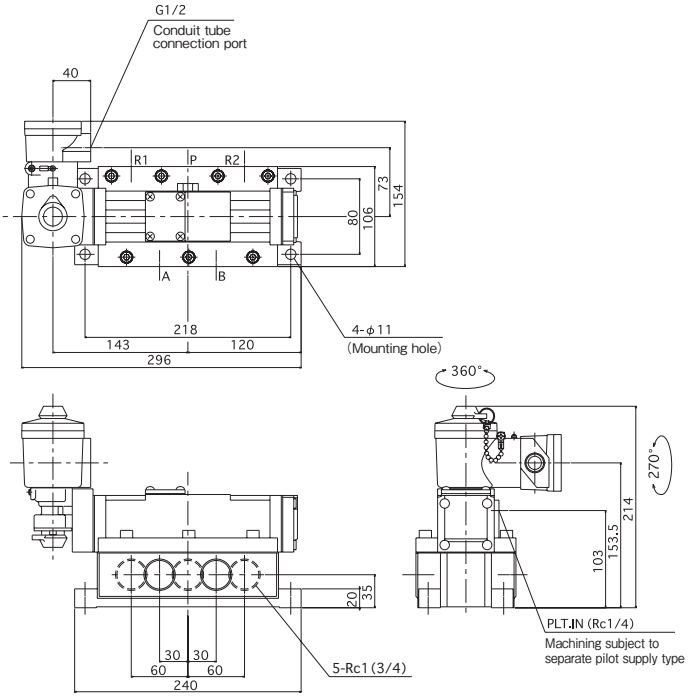
MVD2F-03-E1K
MVD2F-03-E1E (Hold)



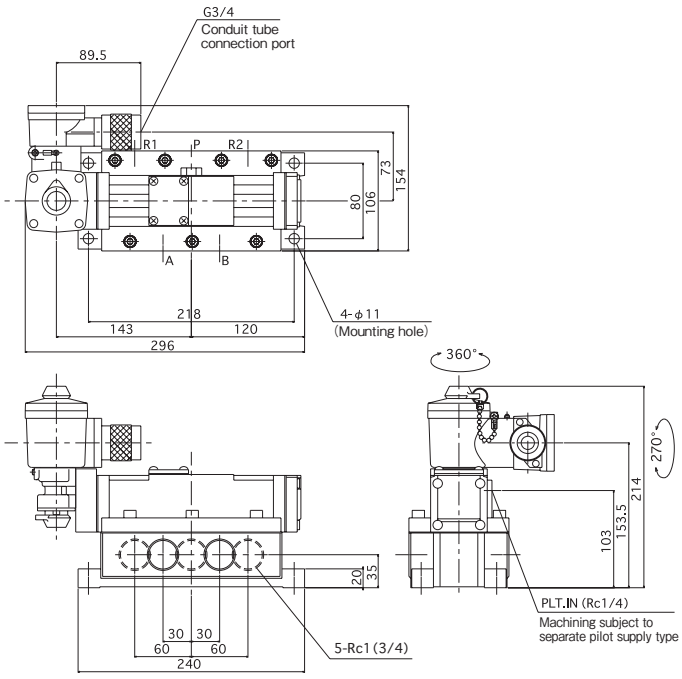
MVD2F-03-E2K (Hold)



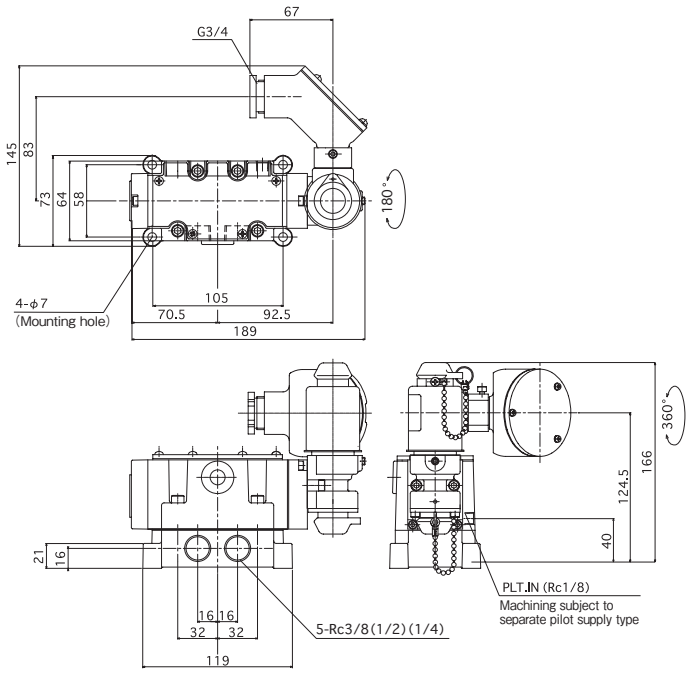
MVD2N-08-E1K
MVD2N-08-E1E (Hold)



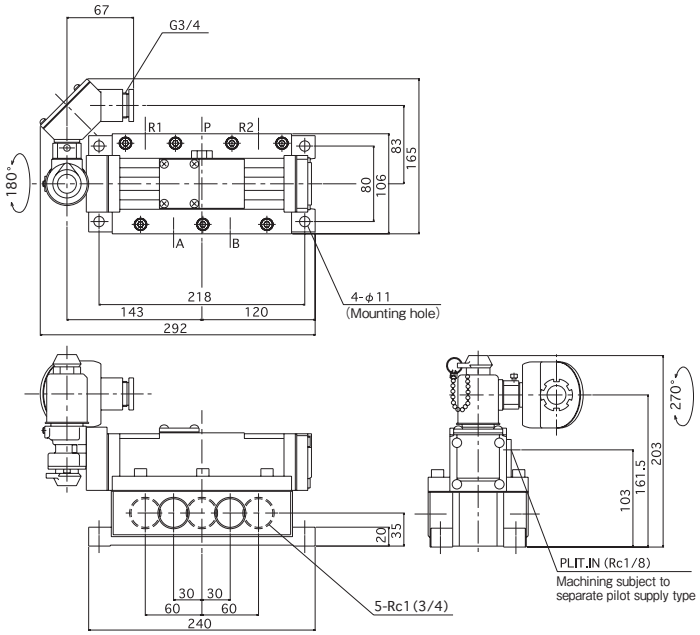
MVD2N-08-E2K (Hold)



MVD2F-03-E3K
MVD2F-03-E3E (Hold)



MVD2N-08-E3K
MVD2N-08-E3E (Hold)



MVPCF/EF/OF・MVPCN/EN/ON Series

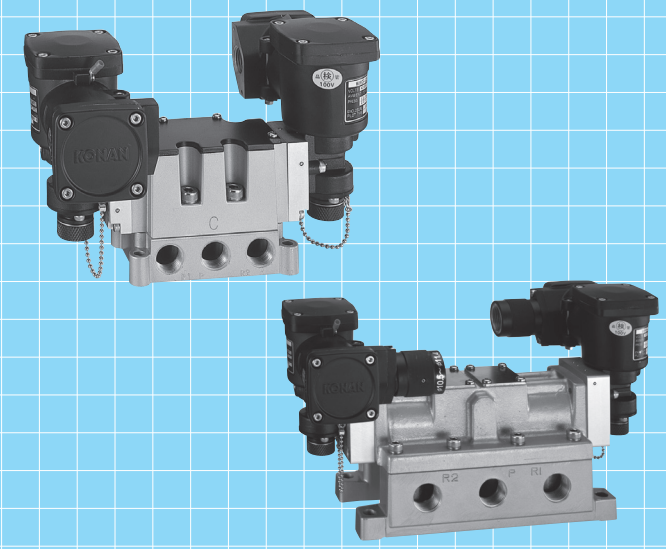
5-Port Solenoid Valves

Explosion-proof, Drip-proof

Spool valve system, Pilot type

Gasket connection type Rc1/4・3/8・1/2・3/4・1

3 positions〔Closed center / Pressure center / Exhaust center〕



Specifications

			Closed center	Pressure center	Exhaust center	Closed center	Pressure center	Exhaust center
Type	Drip-proof type		MVPCF-03-E3K	MVPEF-03-E3K	MVPOF-03-E3K	MVPCN-08-E3K	MVPEN-08-E3K	MVPON-08-E3K
	Explosion-proof type	Pressure-resistant packing	MVPCF-03-E2K MVPCF-03-E2E	MVPEF-03-E2K MVPEF-03-E2E	MVPOF-03-E2K MVPOF-03-E2E	MVPCN-08-E2K MVPCN-08-E2E	MVPEN-08-E2K MVPEN-08-E2E	MVPON-08-E2K MVPON-08-E2E
		Conduit tube	MVPCF-03-E1K MVPCF-03-E1E	MVPEF-03-E1K MVPEF-03-E1E	MVPOF-03-E1K MVPOF-03-E1E	MVPCN-08-E1K MVPCN-08-E1E	MVPEN-08-E1K MVPEN-08-E1E	MVPON-08-E1K MVPON-08-E1E
Port size (Rc)			1/4・3/8・1/2			3/4・1		
Effective sectional area (CV value)			40㎟ (2.2)・55㎟ (3.0)・70㎟ (3.8)			175㎟ (9.5)・185㎟ (10.0)		
Operating pressure			0.2 ～ 0.7MPa			0.12 ～ 0.7MPa		
Pressure resistance			1.05MPa					
Operating temperature			− 5 ～ 60℃			− 20 ～ 50℃		
Operating frequency			1 cycle / s max. / 1 cycle / 6 months min.					
Operation (response) time			0.1 s max.			0.5 s max.		
Solenoid	Rated voltage		Refer to Model Code					
	Voltage fluctuation tolerance		− 15%～ 10% of rated voltage					
	Temperature rise		80 deg max.					
	Insulation class		JIS C 4003 Class H					
	Insulation resistance		10MΩ min.					
	Rated current		Refer to Rated current data on page A-37					
	Explosion-proof standard		Flame-proof enclosure construction d2G4 / Exd Ⅱ BT4					
Mass			Approx. 3.5kg			Approx. 5.5kg		

● At the operating temperature of 5℃ or below, use extreme care for protection against frosting by removing the water contained in the fluid for use.

■ d2G4・explosion-proof verification approval No.

No. T47926

■ Exd Ⅱ BT4・explosion-proof verification approval No.

No. TC16744

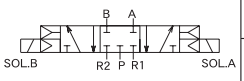
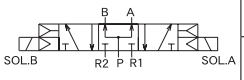
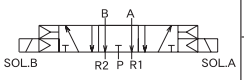
Model Code

When ordering,specify the model as follows:

MVP ❶ – ❷ – E ❸ – ❹ – ❺ – ❻ – ❼ – ❽

- ❶ Type of fow path
- ❷ Type of body
- ❸ Type of housing
- ❹ Pilot pressure supply system
- ❺ Port size
- ❻ Applicable cable size
- ❼ Rated voltage
- ❽ Explosion-proof verifying nation

❶ Type of flow path

Type of valve		JIS symbol	Type of body	Designation
3 position	Closed center		03	CF
			08	CN
	Pressure center		03	EF
			08	EN
	Exhaust center		03	OF
			08	ON

❷ Type of body

Type of body	Port size	Designation
03	Rc1/4	03
	Rc3/8	
	Rc1/2	
08	Rc3/4	08
	Rc1	

❸ Type of housing

Type of housing (Wire connection system)		Designation
JIS explosion-proof d2G4	Pressure resistant packing system	2K※
	Conduit tube system	1K
EX. Explosion-proof Exd Ⅱ BT4	Pressure resistant packing system	2E※
	Conduit tube system	1E
Drip-proof type		3K

※ In the case of pressure resistant packing system, drip-proof type please enter the ❻applicable cable size.
In the case of conduit tube system, no need to fill out the ❻applicable cable size.

❹ Pilot pressure supply system

Type	Designation
Internal pilot type (Standard)	No entry
Separate pilot supply type	P

❺ Port size

Port size	Type of body	Designation
Rc1/4	03	8A
Rc3/8		10A
Rc1/2		15A
Rc3/4	08	20A
Rc1		25A

❻ Applicable cable size (when housing is 2K※ or 3K※ or 2E※)

Wire size φd ※	Applicable cable size	Designation
φ8.5	φ7.5 ~ 8.4	No.8
φ9.5	φ8.5 ~ 9.4	No.9
φ10.5	φ9.5 ~ 10.4	No.10
φ11.5	φ10.5 ~ 11.4	No.11
φ12.5	φ11.5 ~ 12.4	No.12
φ13.5	φ12.5 ~ 13.4	No.13

※ For size φd, refer to page A-33 from A-36

❼ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz	AC100
AC110V 50/60Hz	AC110
AC115V 50/60Hz	AC115
AC120V 50/60Hz	AC120
AC125V 50/60Hz	AC125※
AC200V 50/60Hz	AC200
AC220V 50/60Hz	AC220
DC 24V	DC 24V
DC 48V	DC 48V
DC100V	DC100V
DC110V	DC110V
DC120V	DC120V
DC125V	DC125V

※ In Ex. Explosion-proof type return valve, AC125 is not applicable.
※ When ordering, specify the frequency 50 Hz or 60 Hz.

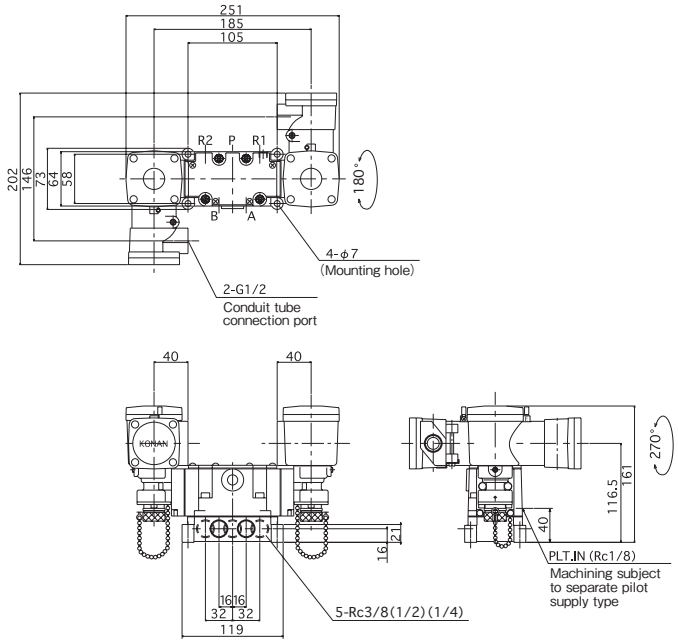
❽ Explosion-proof verifying nation

Verifying nation	Designation
Japan	No entry
China	C※
Korea	H※

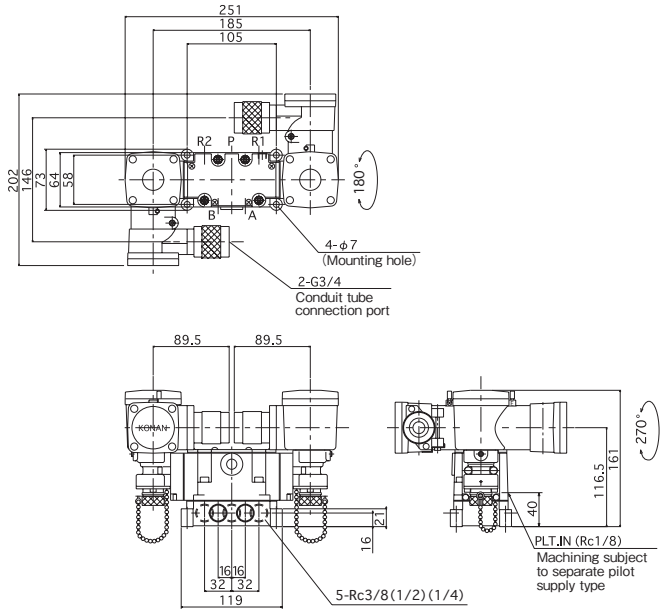
※ In case of ❸housing 1E or 2E only.

Outside Dimensions

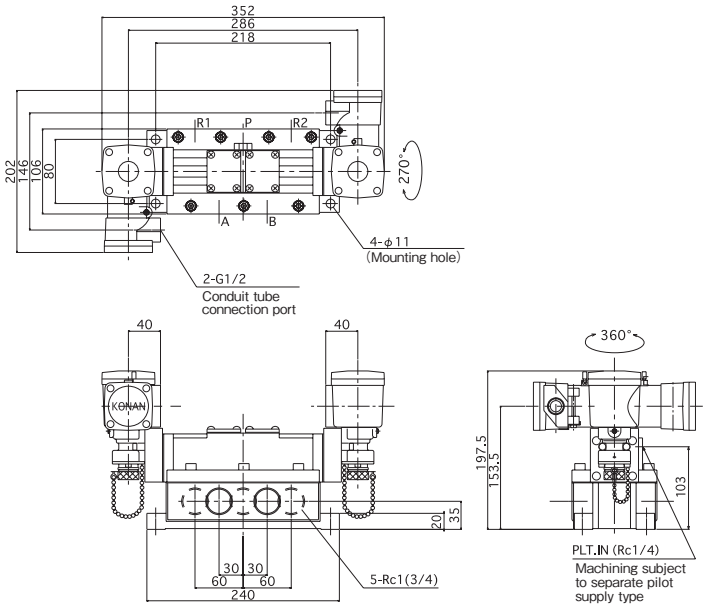
MVPCF-03-E1K・MVPCF-03-E1E
MVPEF-03-E1K・MVPEF-03-E1E (3 Position)
MVPOF-03-E1K・MVPOF-03-E1E



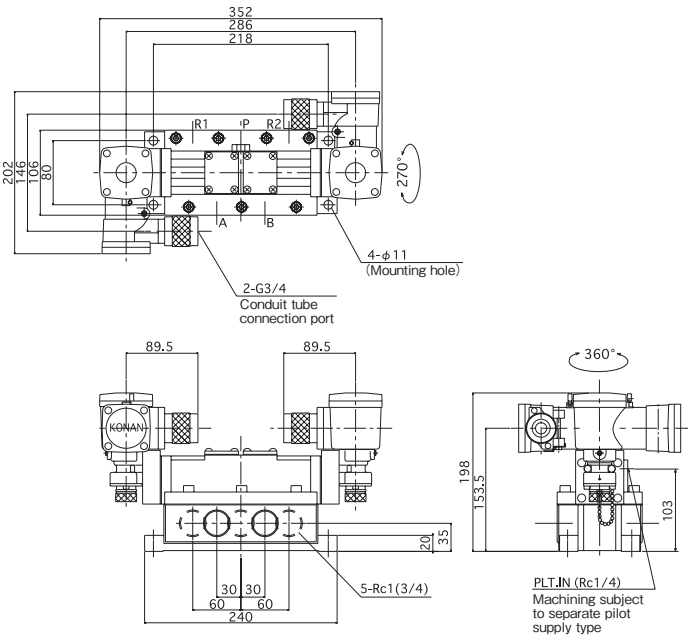
MVPCF-03-E2K・MVPCF-03-E2E
MVPEF-03-E2K・MVPEF-03-E2E (3 Position)
MVPOF-03-E2K・MVPOF-03-E2E



MVPCN-08-E1K・MVPCN-08-E1E
MVPEN-08-E1K・MVPEN-08-E1E (3 Position)
MVPON-08-E1K・MVPON-08-E1E

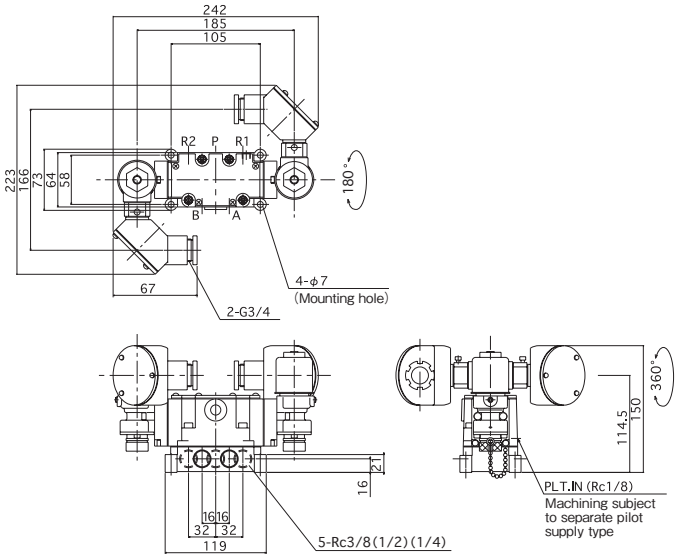


MVPCN-08-E2K・MVPCN-08-E2E
MVPEN-08-E2K・MVPEN-08-E2E (3 Position)
MVPON-08-E2K・MVPON-08-E2E

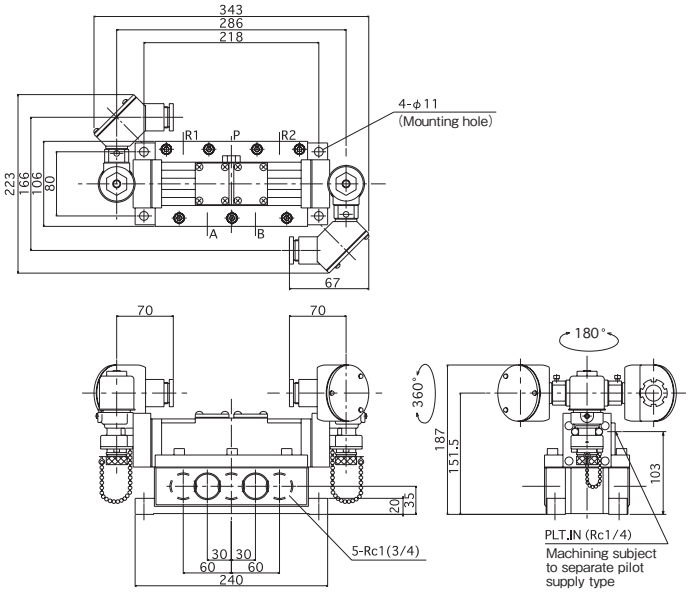


Note) Each of closed center, pressure center and exhaust center is designed to the same outside dimensions.

MVPCF-03-E3K
MVPEF-03-E3K (3 Position)
MVPOF-03-E3K



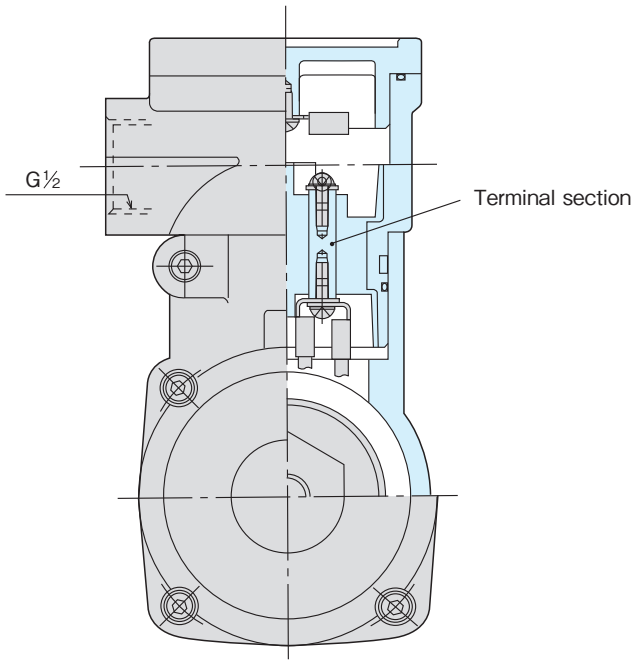
MVPCN-08-E3K
MVPEN-08-E3K (3 Position)
MVPON-08-E3K

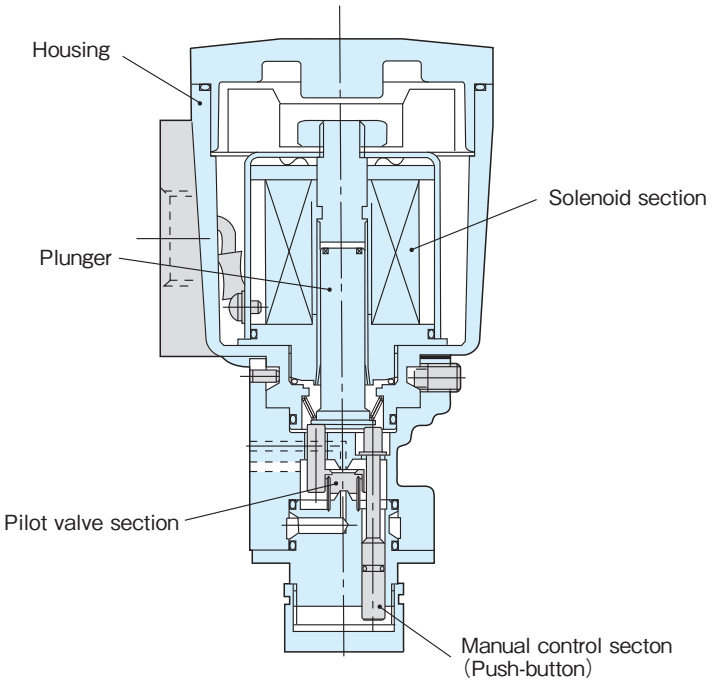


Type of proofness and construction 1

■ ME3S・ME33S

Composition and Construction





Verification approval No.
No. T47926

Applicable Model

<ME3S>

3-Port
- MVS303K-02

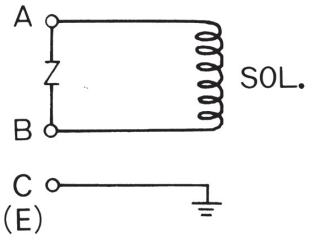
4-Port
- MVS813K-02
- MVS803K-03

5-Port
- 453S202C-E1K
- 453S203C-E1K
- 453S403C-E1K
- 453S404C-E1K
- MVS2F-03-E1K
- MVS2N-08-E1K
- MVPCF-03-E1K
- MVPEF-03-E1K
- MVPOF-03-E1K
- MVPCN-08-E1K
- MVPEN-08-E1K
- MVPON-08-E1K

<ME33S>

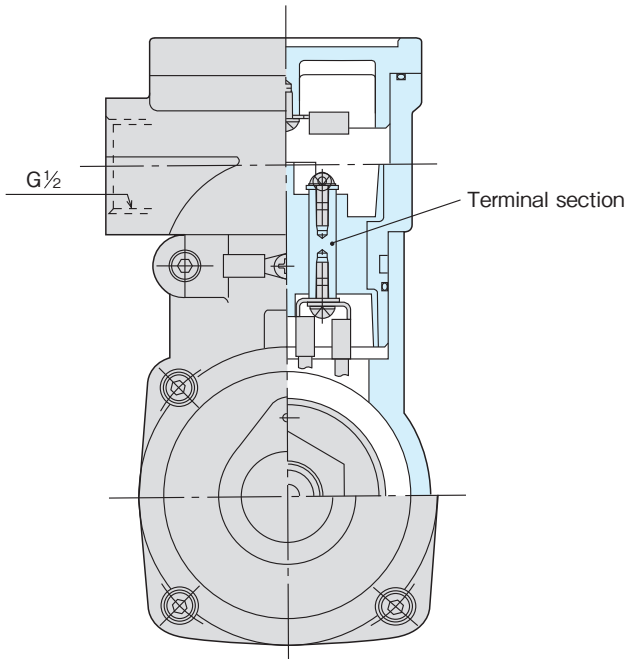
3-Port
- MVS313K-02

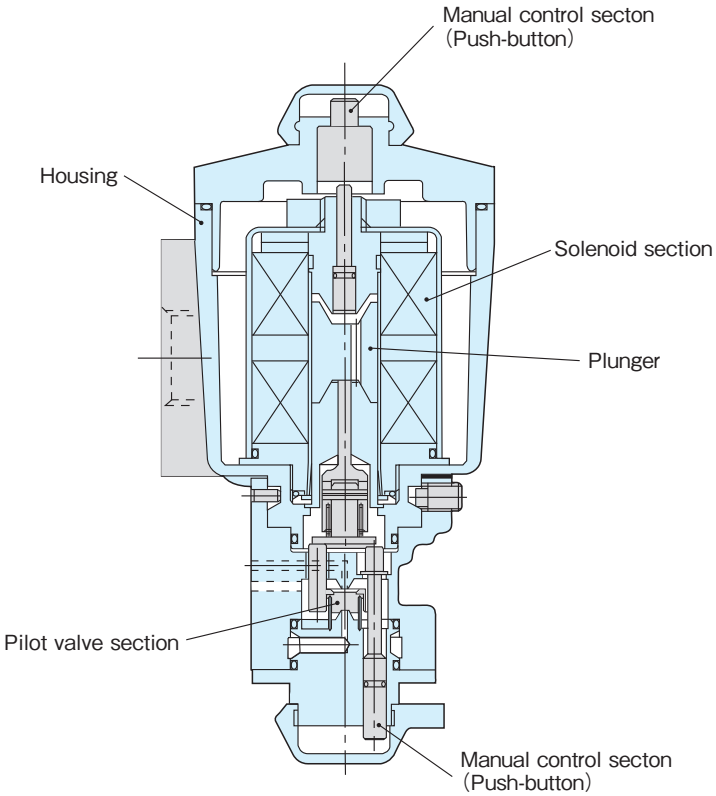
Wire connection diagram



■ ME9D-K・ME99D-K

Composition and Construction





Verification approval No.
No. T34655

Applicable Model

<ME9D-K>

3-Port
- MVD303K-02

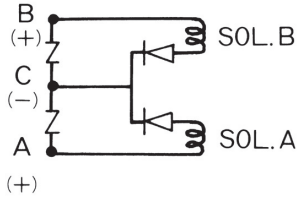
4-Port
- MVD813K-02
- MVD803K-03

5-Port
- 453D202C-E1K
- 453D203C-E1K
- 453D403C-E1K
- 453D404C-E1K
- MVD2F-03-E1K
- MVD2N-08-E1K

<ME99D-K>

3-Port
- MVD313K-02

Wire connection diagram

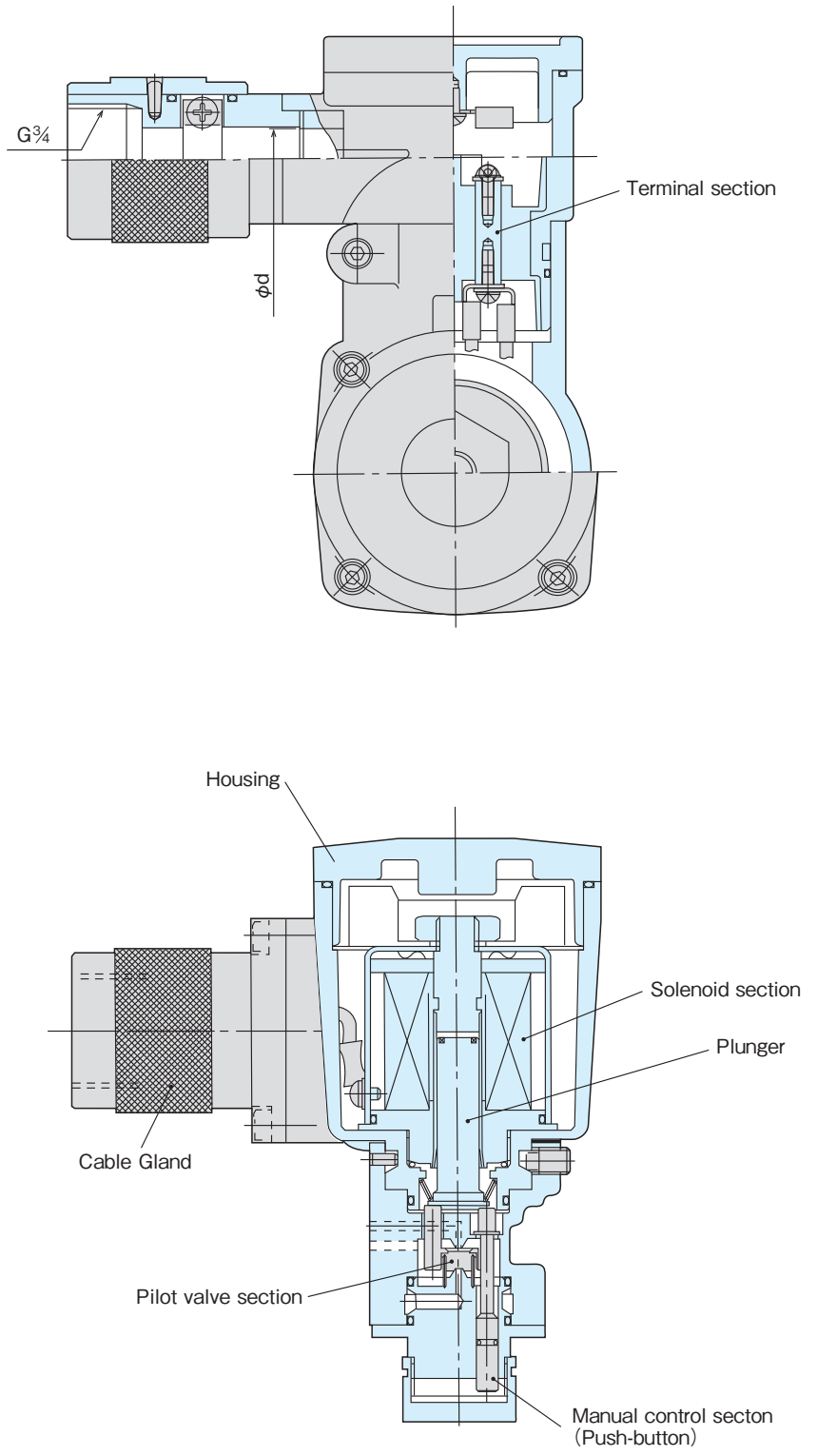


( ) shows DC polarity.

Type of proofness and construction 2

■ ME32S・ME332S

Composition and Construction



Verification approval No.
No. T47926

Applicable Model

<ME32S>

3-Port
- MVS302K-02

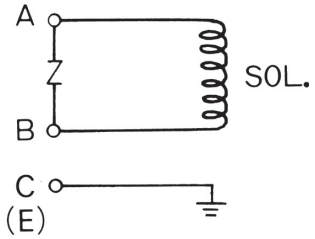
4-Port
- MVS812K-02
- MVS802K-03

5-Port
- 453S202C-E2K
- 453S203C-E2K
- 453S403C-E2K
- 453S404C-E2K
- MVS2F-03-E2K
- MVS2N-08-E2K
- MVPCF-03-E2K
- MVPEF-03-E2K
- MVPOF-03-E2K
- MVPCN-08-E2K
- MVPEN-08-E2K
- MVPON-08-E2K

<ME332S>

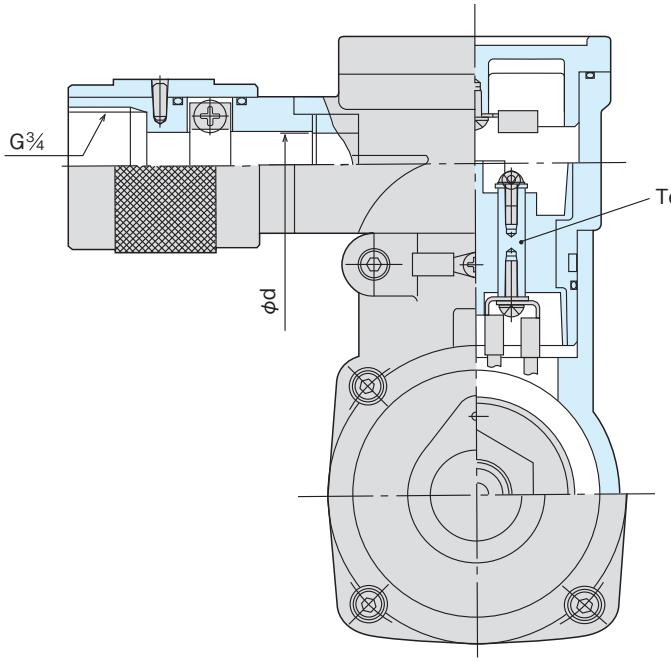
3-Port
- MVS312K-02

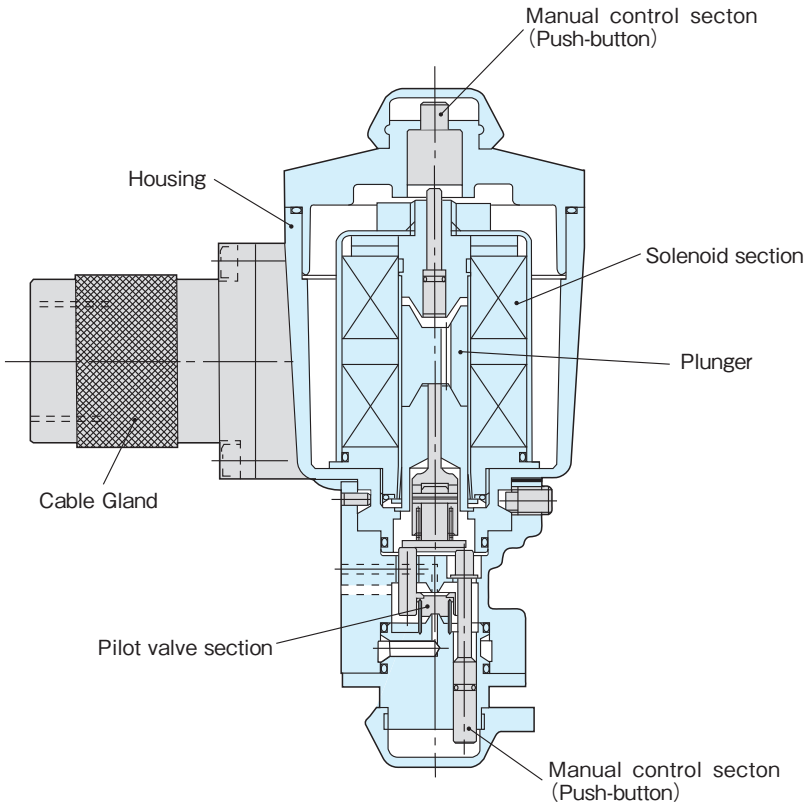
Wire connection diagram



■ ME92D-K・ME992D-K

Composition and Construction





Verification approval No.
No. T34655

Applicable Model

<ME92D-K>

3-Port
- MVD302K-02

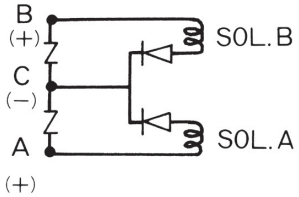
4-Port
- MVD812K-02
- MVD802K-03

5-Port
- 453D202C-E2K
- 453D203C-E2K
- 453D403C-E2K
- 453D404C-E2K
- MVD2F-03-E2K
- MVD2N-08-E2K

<ME992D-K>

3-Port
- MVD312K-02

Wire connection diagram

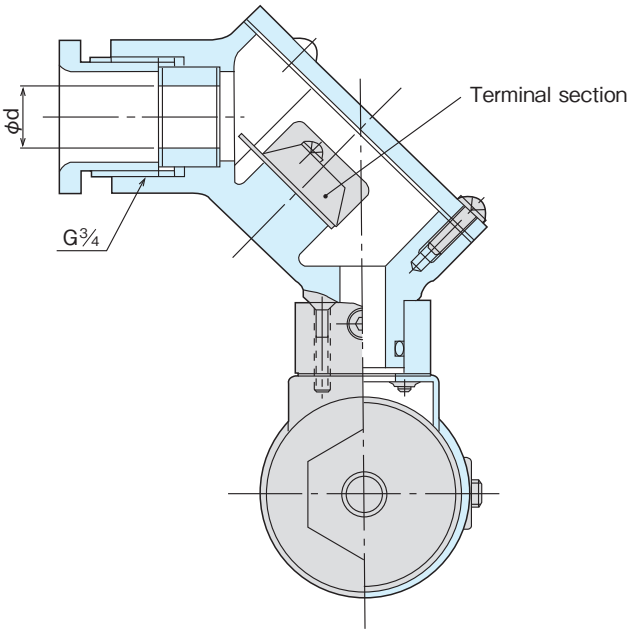


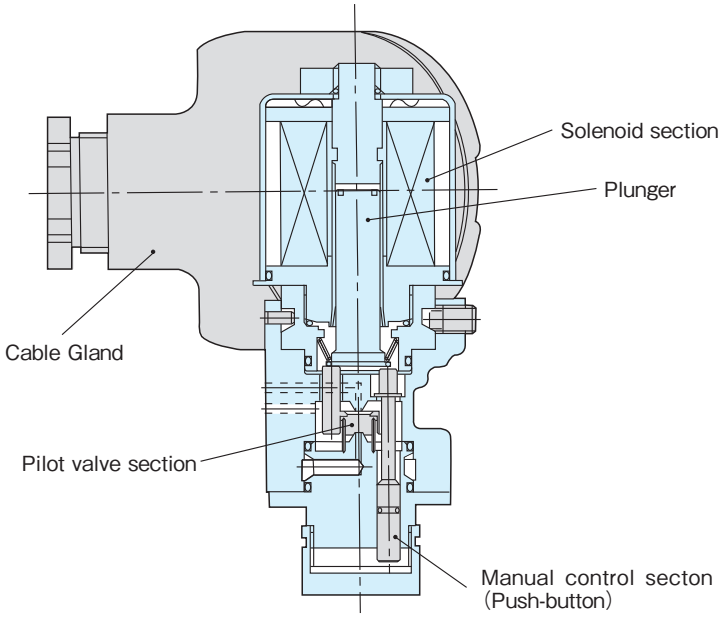
( ) shows DC polarity.

Type of proofness and construction 3

■ M3S・M33S

Composition and Construction





Applicable Model

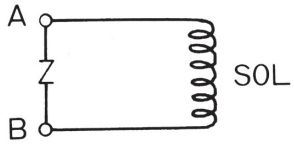
<M3S>

3-Port	● MVS301K-02
4-Port	● MVS811K-02 ● MVS801K-03
5-Port	● MVS2F-03-E3K ● MVS2N-08-E3K ● MVPCF-03-E3K ● MVPEF-03-E3K ● MVPOF-03-E3K ● MVPCN-08-E3K ● MVPEN-08-E3K ● MVPON-08-E3K

<M33S>

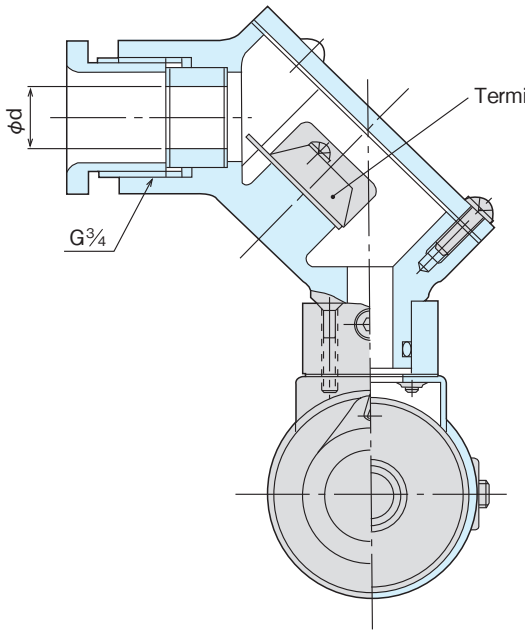
3-Port	● MVS311K-02

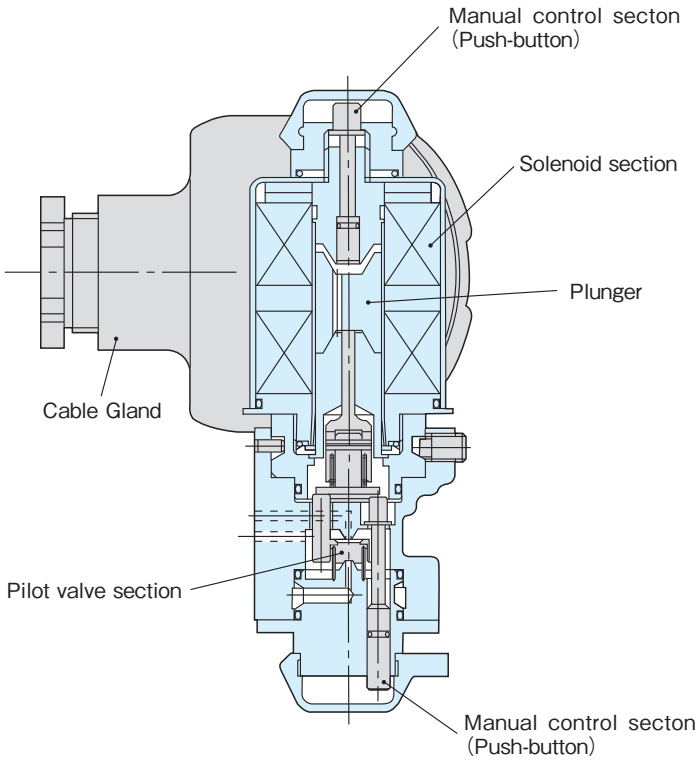
Wire connection diagram



■ M9D-K・M99D-K

Composition and Construction





Applicable Model

<M9D-K>

3-Port
- MVD301K-02

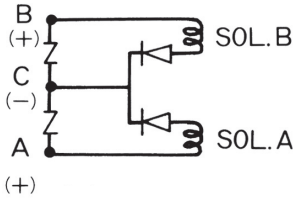
4-Port
- MVD811K-02
- MVD801K-03

5-Port
- MVD2F-03-E3K
- MVD2N-08-E3K

<M99D-K>

3-Port
- MVD311K-02

Wire connection diagram



( ) shows DC polarity.

Rated current data

● Type of valve : Return type and 3-port valves (Single solenoid) In case of EX. explosion-proof,consult separately.

Rated voltage	Rated current (mA)	
AC100V 50/60Hz	159	106
AC110V 50/60Hz	116	82
AC115V 50/60Hz	129	86
AC120V 50/60Hz	115	80
AC125V 50/60Hz	128	82
AC200V 50/60Hz	78	51
AC220V 50/60Hz	68	45
DC 24V	192	
DC 48V	95	
DC100V	49	
DC110V	50	
DC120V	45	
DC125V	46	

● The above amperage table, left shows 50Hz AC and right shows 60Hz AC.

● Type of valve : Hold type (Magnet-latched type)

Rated voltage	Rated current (mA)	
AC100V 50/60Hz	55	50
AC110V 50/60Hz	60	55
AC115V 50/60Hz	47	43
AC120V 50/60Hz	50	45
AC125V 50/60Hz	52	47
AC200V 50/60Hz	26	24
AC220V 50/60Hz	30	26
DC 24V	210	
DC 48V	105	
DC100V	55	
DC110V	60	
DC120V	40	
DC125V	42	

● The above amperage table, left shows 50Hz AC and right shows 60Hz AC.

d2G4
Explosion-proof construction standard for electric equipment

ExdⅡBT4
Technical standards conforming to the international standards

Explosion-proof solenoid valve lineup

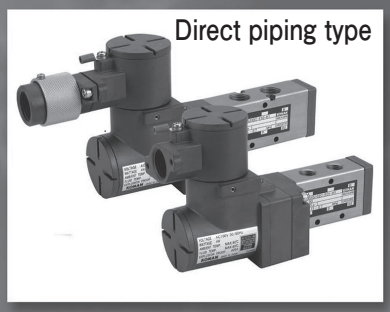
vol.2

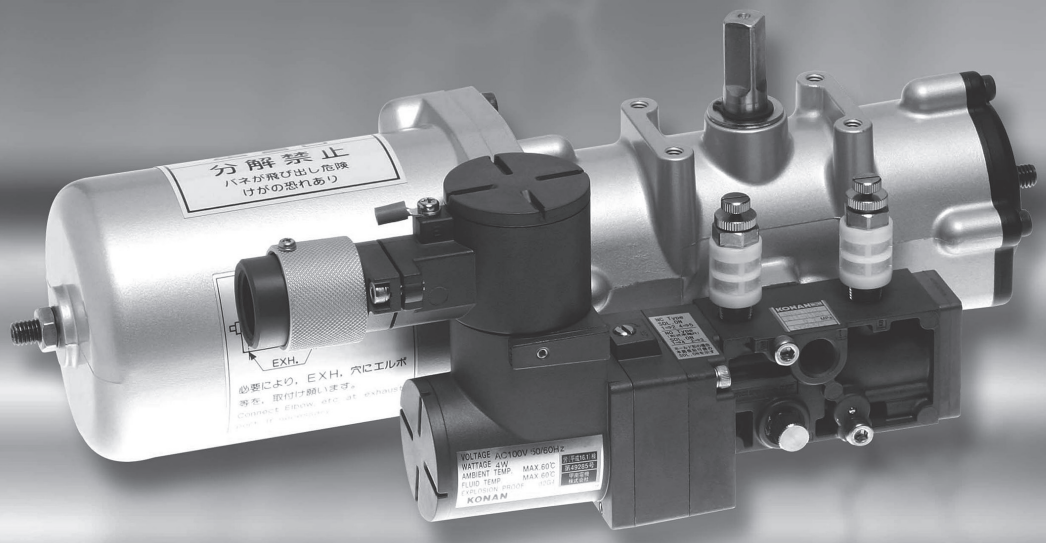
For pnematic control

5 Port

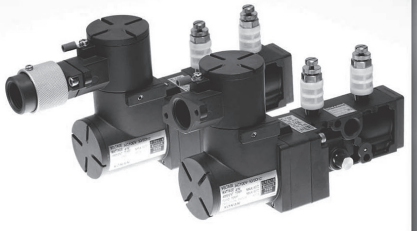
Compact explosion proof solenoid valve

Direct piping type





NAMUR standard model



Model List〔Compact explosion-proof solenoid valves〕

Pilot valve

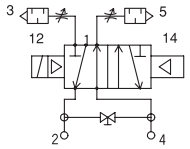
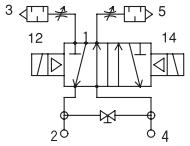
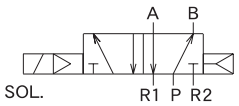
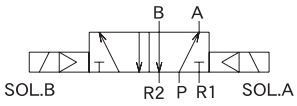
- This is a poppet structure few in sliding parts.
  A stable operation free from sticking phenomenon for a long time is promised.
- A push button (manual operation mechanism) capable of locking is equipped as standard.

Main valve

- In spite of small size, a large flow rate is realized by the main valve. A simple spool valve using an I-type ring in a narrow main body is disposed rationally.
- Connection interface of the main body is available in two types. The actuator can be mounted or mounted in a most suited manner.

(1) NAMUR standard model
This is a five-port solenoid valve for rotary actuator operation adopting the mounting interface specified in NAMUR standard.
(2) Direct piping type
This is a five-port solenoid valve for connecting to the actuator by piping connection. Single installation at a remote position, or coupling type by manifold structure may be realized.

5 Port

Type & Composition of Valve	Port size						Type of Flow Path in Valve
	Rc 1/8	1/8 NPT	Rc 1/4	1/4 NPT	Rc 3/8	3/8 NPT	
Spool valve system Pilot type NAMUR standard model Pilot solenoid valve + Valve disk	—	—	●	●	—	—	● Return  ● Hold 
Spool valve system Pilot type direct piping type Pilot solenoid valve + Valve disk	●	●	●	●	●	●	● Return  ● Hold 

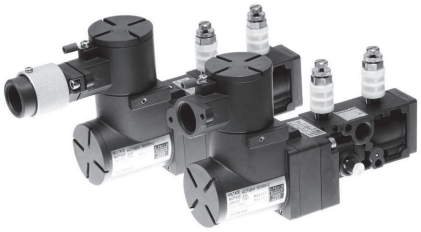
Explosion-proof housing (terminal box)

- In spite of compact shape, the effective layout of the terminal contributes to ease of wiring work.
- In case of explosion-proof construction standard for electric equipment
  The cover of the terminal box is opened or closed by using a special tool. It cannot be opened by general tools. (The special cover opening tool is attached to the product.)

- In case of EX. Explosion-proof
  The cover of the terminal box is opened or closed by using a spanner or the like.
- During power supply, do not open or close the cover of the terminal box.

Type of Construction for Explosion-proof and Drip-pro

INDEX



Flame-proof enclosure construction
: d2G4
Exd Ⅱ BT4

■ Conduit tube system

Drip-proof
protection class : IP66

■ Pressure-resistant packing system

Drip-proof
protection class : IP66

Can be used outdoors

4N4 Series

5-Port Solenoid Valves

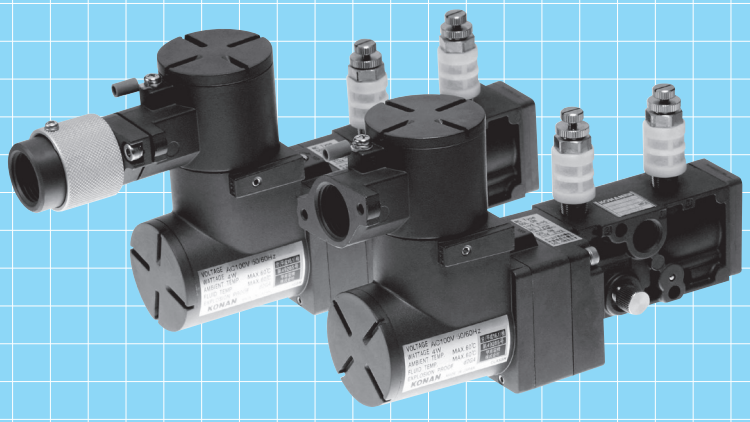
Explosion-proof

Spool valve system, Pilot type

NAMUR standard compliant type Rc1/4,1/4NPT

Return / Hold

This is a five-port solenoid valve for changeover of operation of rotary actuator. A by-pass valve is built in the valve main body, and a speed controller for adjusting the exhaust amount is included in the standard equipment.



Specifications

Model code	Return	4N4S102K	4N4S10BK
	Hold	4N4D102K	4N4D10BK
Port size		Rc1/4	1/4NPT
Applicable fluid		Compressed air	
Operating pressure		0.15 ～ 0.7MPa	
Ambient temperature	Structural standard	− 5 ～ 60℃	
	Exd Ⅱ BT4	− 5 ～ 40℃	
Fluid temperature		− 5 to 60° C (between − 5 and 5° C, remove the moisture in the working fluid, and be careful not to allow freezing.)	
Operating frequency		2 cycle / s max. / 1 cycle / 6 months min.	
Lubricated		Unnecessary	
Mass		Return : 0.8kg Hold : 1.4kg	
Valve section	Effective sectional area	10㎟ (only in solenoid valve main body excluding silencer provided with throttle valve)	
	Operation (response) time	0.05s max.	
	Allowable air leakage	Below a specified value in JIS B8375 − 1993	
	Pressure resistance	1.2MPa	
Solenoid section	Flame-proof enclosure construction	Flame-proof enclosure construction d2G4 and Exd Ⅱ BT4	
	Rating	Continuous	
	Voltage fluctuation tolerance	− 15%～ 10%	
	Apparent power (AC)	Energized 7.5 VA (50 Hz), 5.5 VA (60 Hz) or less Starting 3 times or less of excitation electric power.	
	Power consumption (DC)	4 W or less	
	Insulation class	JIS C 4003 Class H	
	Temperature rise (resistance method)	60° C or less (at rating)	
	Insulation resistance	10 M Ω or less (DC 500 V megger)	
	withstand voltage	AC1500V / min.	
Accessory		Mounting bolts, Packing and Silencer with throttle valves.	

※ The type in brackets [ ] refers to the piping thread of NPT.

■ d2G4・Explosion-proof verification approval No.

No. T49285

■ Exd Ⅱ BT4・Explosion-proof verification approval No.

No. TC13728

■ Exd Ⅱ BT4・Explosion-proof verification approval No. (For Korea)

13 − AV4BO − 0493

Model Code

When ordering,specify the model as follows:

4N4 ① ② K – ③ ④ – H ⑤ ⑥ – ⑦

- ① Type of fow path
- ② Port size
- ③ Explosion-proof standard
- ④ Wiringl eading-in method (applicable cable size)
- ⑤ Rated voltage
- ⑥ Type of option
- ⑦ Solenoid valve working state

① Type of fow path

Type of valve	Designation
Return	S
Hold	D

② Port size

Port size	Designation
Rc1/4	102
1/4NPT	10B

③ Explosion-proof standard

Standard		Designation
Structural standard	d2G4	E
EX. Explosion-proof	Exd Ⅱ BT4	P
Explosion-proof for Korea	Exd Ⅱ BT4	H

④ Wiring leading-in method (applicable cable size)

Wiring leading-in method		Designation
Conduit tube system (G 1/2)		01
Pressure resistant packing system (applicable cable size)	φ7.5 ~ 8.4	08
	φ8.5 ~ 9.4	09
	φ9.5 ~ 10.4	10
	φ10.5 ~ 11.4	11
	φ11.5 ~ 12.0	12

⑤ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz,AC110V 60Hz	1
(AC110V 50Hz,AC120V 60Hz)	2
AC200V 50/60Hz,AC220V 60Hz	3
(AC220V 50Hz,AC240V 60Hz)	4
(DC12V)	8
DC24V	5
(DC48V)	6
DC100V	7
(DC110V)	9
(DC125V)	A

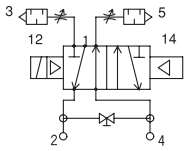
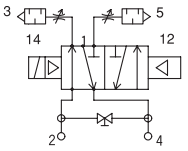
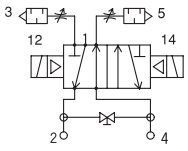
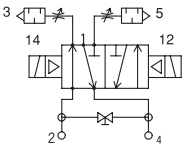
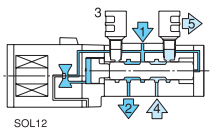
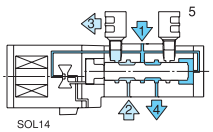
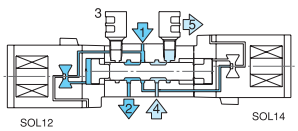
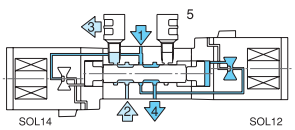
● ( ) denotes semi-standard voltage.

⑥ Type of option

Type of option	Designation
With surge absorber	BZ
Not needed	B0

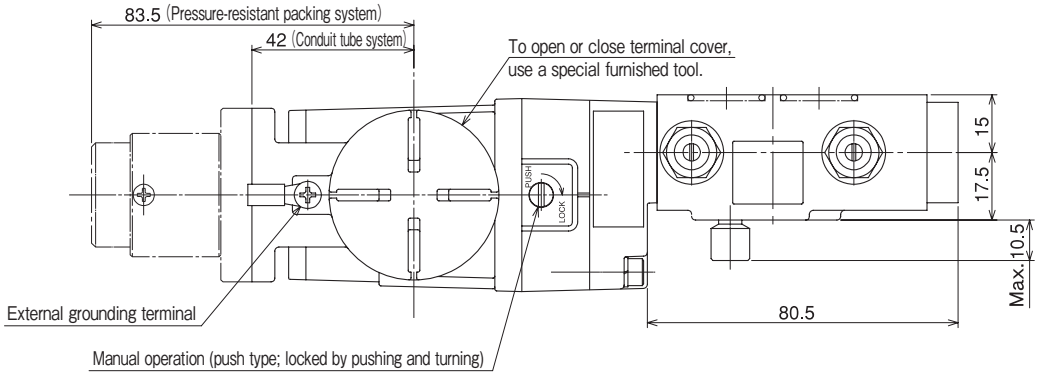
⑦ Solenoid valve working state

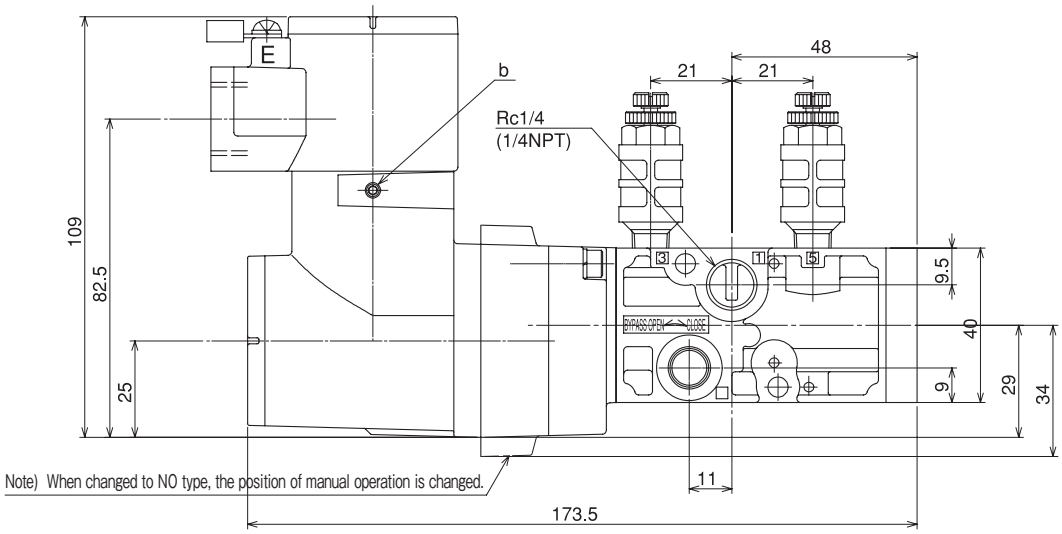
Solenoid valve working state	Designation
Normally closed before shipment	No entry
Normally open before shipment	R

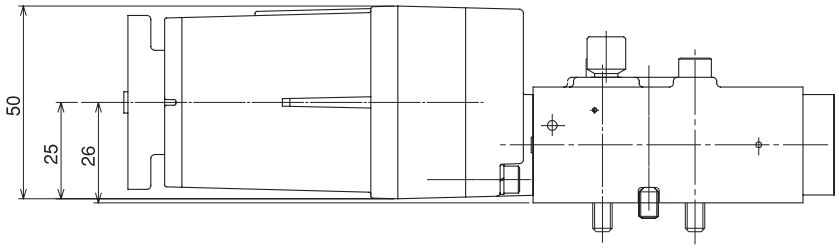
	Return type		Hold type	
	NC type	NO type	NC type	NO type
Indication by the NAMUR standard				
Operation	SOL Energized 	SOL Energized 	SOL12 Energized 	SOL14 Energized 
Remarks	1 Port Pressurization 2・4 Port OUT 3・5 Port Exhaust			
	SOL Energized 1→2 4→5 SOL De-Energized 1→4 2→3	SOL Energized 1→4 2→3 SOL De-Energized 1→2 4→5	SOL12 Energized 1→2 4→5 SOL14 De-Energized 1→4 2→3	SOL14 Energized 1→4 2→3 SOL12 De-Energized 1→2 4→5

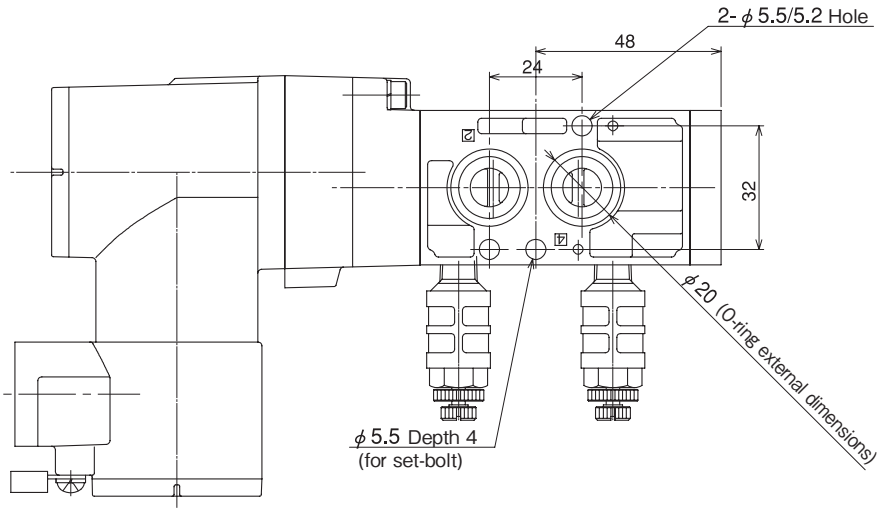
Outside Dimensions

4N4S102 (B) K-E (structural standard・NAMUR standard compliant type・Return type)





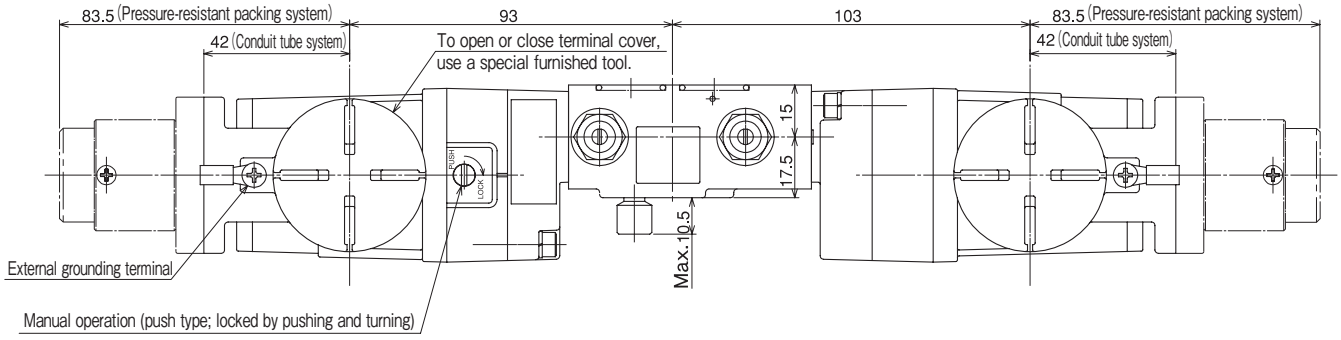


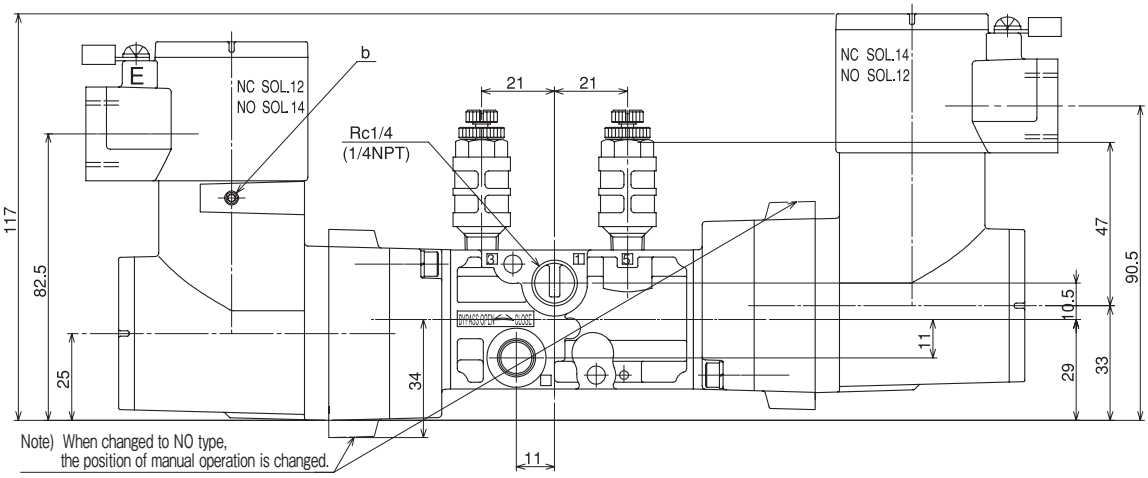


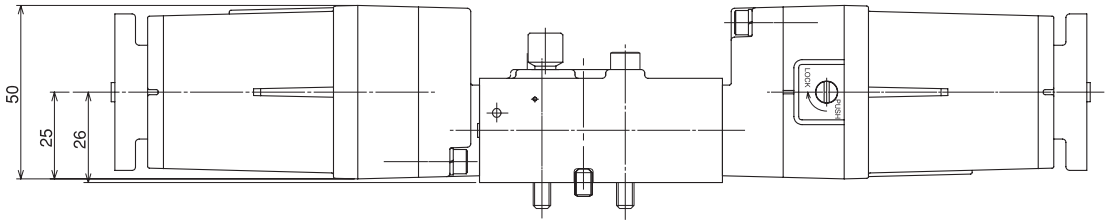
(Request separately for Ex. Explosion-proof external dimension drawings.)

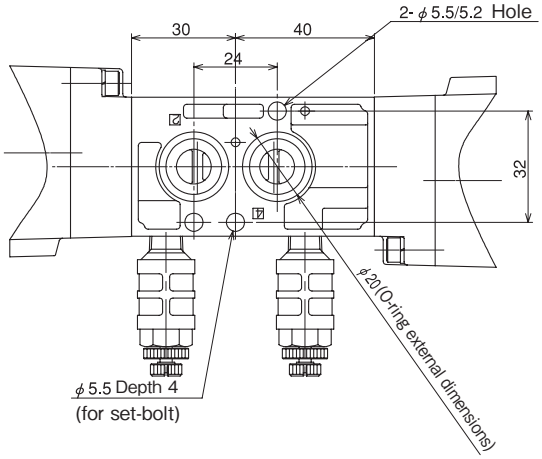
Outside Dimensions

4N4D102 (B) K-E (structural standard・NAMUR standard compliant type・Hold type)









(Request separately for Ex. Explosion-proof external dimension drawings.)

454 Series

5-Port Solenoid Valves

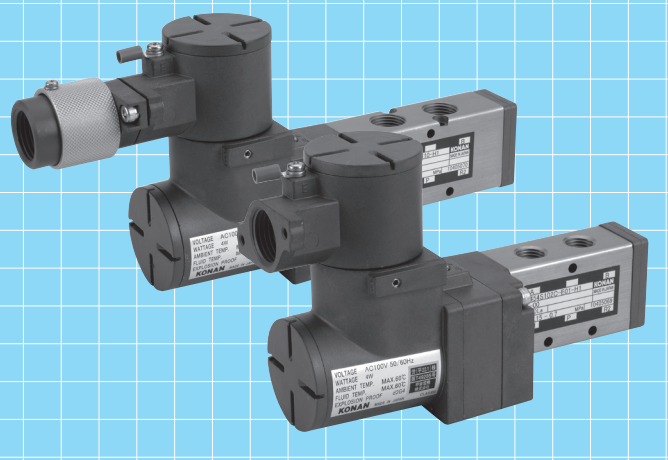
Explosion-proof

Spool valve system, Pilot type

Direct piping type Rc1/8,1/4,1/8NPT,1/4NPT

Return / Hold

By effective layout of terminal box, ease of piping works is assured in this compact type pressure-proof explosion-proof direct piping type solenoid valve.



仕様

Model code	Return	454S101C	454S10AC	454S102C	454S10BC	454S202C	454S20BC	454S203C	454S20CC
	Hold	454D101C	454D10AC	454D102C	454D10BC	454D202C	454D20BC	454D203C	454D20CC
Port size		Rc1/8	1/8NPT	Rc1/4	1/4NPT	Rc1/4	1/4NPT	Rc3/8	3/8NPT
Applicable fluid		Compressed air							
Operating pressure		0.15 ～ 0.7MPa							
Ambient temperature	Structural standard	− 5 ～ 60℃							
	Exd Ⅱ BT4	− 5 ～ 40℃							
Fluid temperature		− 5 to 60° C (between − 5 and 5° C, remove the moisture in the working fluid, and be careful not to allow freezing.)							
Operating frequency		2 cycle / s max. / 1 cycle / 6 months min.							
Lubricated		Unnecessary (oilless enclosed)							
Mass		Return : 0.85kg Hold : 1.55kg				Return : 0.9kg Hold : 1.6kg			
Valve section	Effective sectional area	10㎟				22㎟			
	Operation (response) time	0.05s max.							
	Allowable air leakage	Below a specified value in JIS B8375 − 1993							
	Pressure resistance	1.2MPa							
Solenoid section	Flame-proof enclosure construction	Flame-proof enclosure construction d2G4 and Exd Ⅱ BT4							
	Rating	Continuous							
	Voltage fluctuation tolerance	− 15%～ 10%							
	Apparent power (AC)	Energized 7.5 VA (50 Hz), 5.5 VA (60 Hz) or less Starting 3 times or less of excitation electric power.							
	Power consumption (DC)	4 W or less							
	Insulation class	JIS C 4003 Class H							
	Temperature rise (resistance method)	60° C or less (at rating)							
	Insulation resistance	10 M Ω or less (DC 500 V megger)							
	withstand voltage	AC1500V / min.							

※ The type in brackets [ ] refers to the piping thread of NPT.

■ d2G4・Explosion-proof verification approval No.

No. T49285

■ Exd Ⅱ BT4・Explosion-proof verification approval No.

No. TC13728

■ Exd Ⅱ BT4・Explosion-proof verification approval No. (For Korea)

13 − AV4BO − 0493

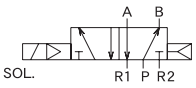
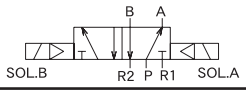
Model Code

When ordering,specify the model as follows:

454 ① ② ③ – E ④ – H ⑤ – ⑥

- ① Type of fow path
- ② Type of body and Port size
- ③ Explosion-proof standard
- ④ Wiring leading-in method (applicable cable size)
- ⑤ Rated voltage
- ⑥ Type of option

① Type of flow path

Type of valve	JIS symbol	Designation
Return		S
Hold		D

② Type of body and Port size

Type of body	Port size	Designation
B10	Rc1/8	101
	Rc1/4	102
	1/8NPT	10A
	1/4NPT	10B
B20	Rc1/4	202
	Rc3/8	203
	1/4NPT	20B
	3/8NPT	20C

③ Explosion-proof standard

Standard		Designation
Structural standard	d2G4	C
EX. Explosion-proof	Exd Ⅱ BT4	E
Explosion-proof for Korea	Exd Ⅱ BT4	H

④ Wiring leading-in method (applicable cable size)

Wiring leading-in method		Designation
Conduit tube system (G 1／2)		01
Pressure resistant packing system (applicable cable size)	φ7.5 ～ 8.4	08
	φ8.5 ～ 9.4	09
	φ9.5 ～ 10.4	10
	φ10.5 ～ 11.4	11
	φ11.5 ～ 12.0	12

⑤ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz,AC110V 60Hz	1
(AC110V 50Hz,AC120V 60Hz)	2
AC200V 50/60Hz,AC220V 60Hz	3
(AC220V 50Hz,AC240V 60Hz)	4
(DC12V)	8
DC24V	5
(DC48V)	6
DC100V	7
(DC110V)	9
(DC125V)	A

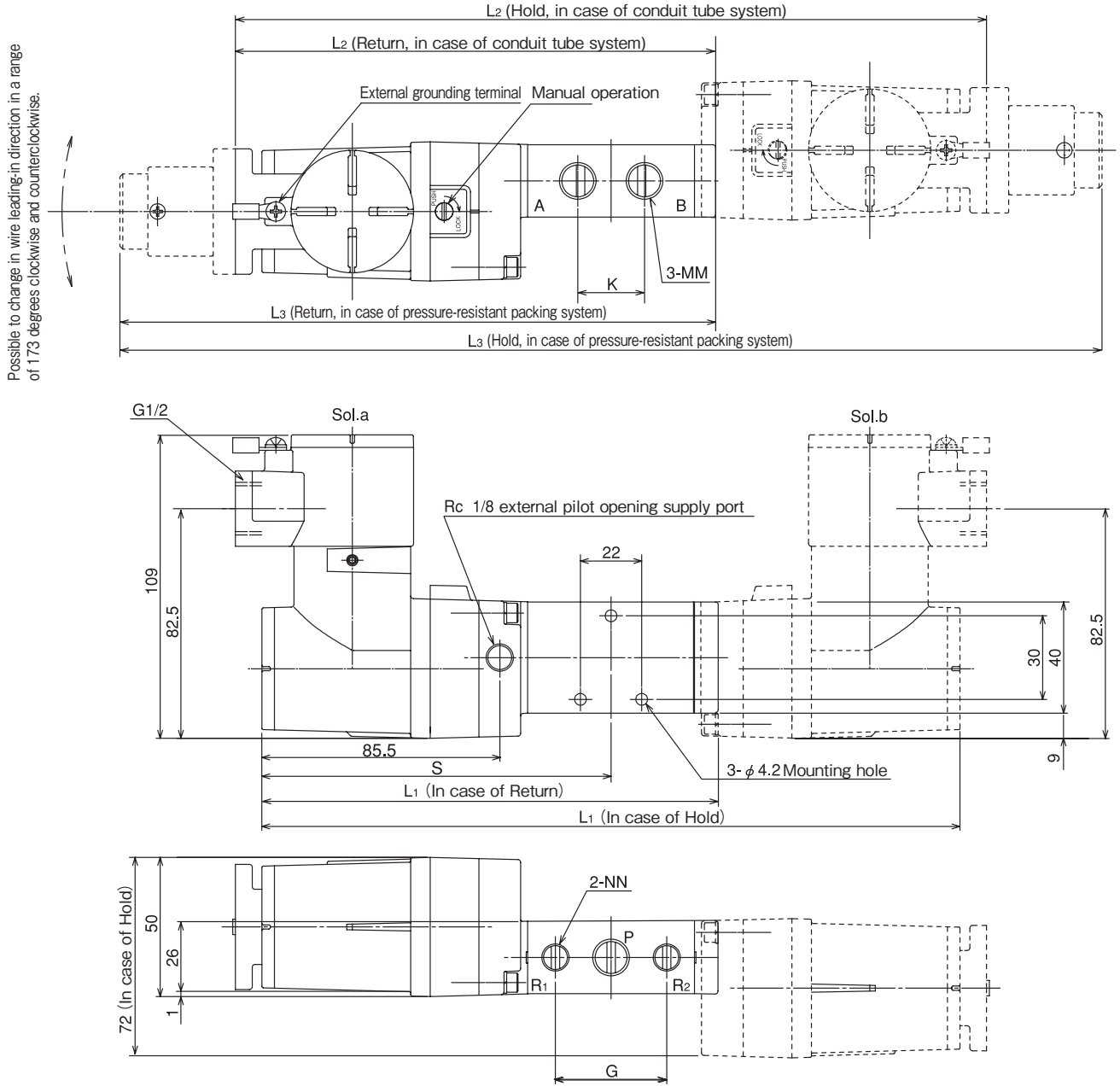
● ( ) denotes semi-standard voltage.

⑥ Type of option

Type of option	Designation
With surge absorber	Z0
External pilot type	P0
External pilot type and with surge absorber	PZ
Not needed	00

Outside Dimensions

454S (D) series (Direct piping type・Return type)



Model code	L1	L2	L3	S	G	K	MM	NN
454S101C	163.5	173	214.5	125.5	40	24	Rc1/8	Rc1/8
454S102C							Rc1/4	
454S10AC							1/8NPT	1/8NPT
454S10BC							1/4NPT	
454S202C	183.5	193	234.5	135.5	48	28	Rc1/4	Rc1/4
454S203C							Rc3/8	
454S20BC							1/4NPT	1/4NPT
454S20CC							3/8NPT	
454D101C	251	270	353	125.5	40	24	Rc1/8	Rc1/8
454D102C							Rc1/4	
454D10AC							1/8NPT	1/8NPT
454D10BC							1/4NPT	
454D202C	271	290	373	135.5	48	28	Rc1/4	Rc1/4
454D203C							Rc3/8	
454D20BC							1/4NPT	1/4NPT
454D20CC							3/8NPT	

(Request separately for Ex. Explosion-proof external dimension drawings.)

Model Code

When ordering,specify the model as follows:

454S ① ② – E ③ – H ④ – D ⑤ – ⑥

- ① Port size
- ② Explosion-proof standard
- ③ Wiring leading-in method (applicable cable size)
- ④ Rated voltage
- ⑤ No. of valve
- ⑥ Type of option

● Only return, type of short overall length

① Port size

Port size	Designation
Rc1/4	202
Rc3/8	203

② Explosion-proof standard

Standard		Designation
Structural standard	d2G4	C
EX. Explosion-proof	Exd Ⅱ BT4	E
Explosion-proof for Korea	Exd Ⅱ BT4	H

③ Wiring leading-in method (applicable cable size)

Wiring leading-in method		Designation
Conduit tube system (G 1/2)		01
Pressure resistant packing system (applicable cable size)	φ7.5 ~ 8.4	08
	φ8.5 ~ 9.4	09
	φ9.5 ~ 10.4	10
	φ10.5 ~ 11.4	11
	φ11.5 ~ 12.0	12

④ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz,AC110V 60Hz	1
(AC110V 50Hz,AC120V 60Hz)	2
AC200V 50/60Hz,AC220V 60Hz	3
(AC220V 50Hz,AC240V 60Hz)	4
(DC12V)	8
DC24V	5
(DC48V)	6
DC100V	7
(DC110V)	9
(DC125V)	A

● ( ) denotes semi-standard voltage.

⑤ No. of valve

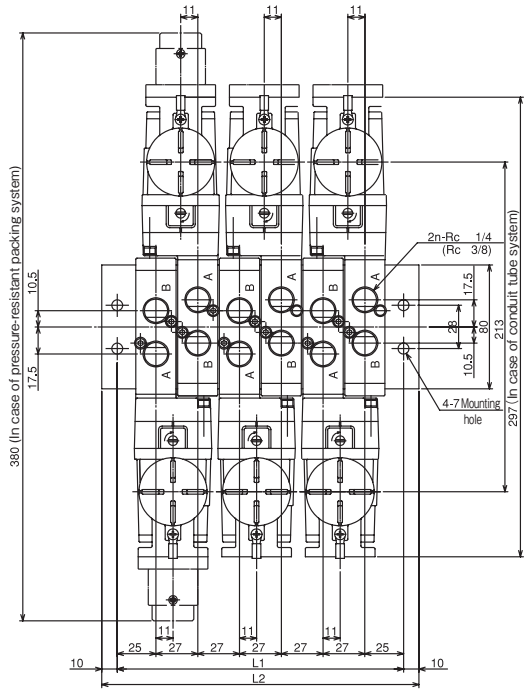
No. of valve	Designation
2	02
3	03
⋮	⋮
9	09
10	10

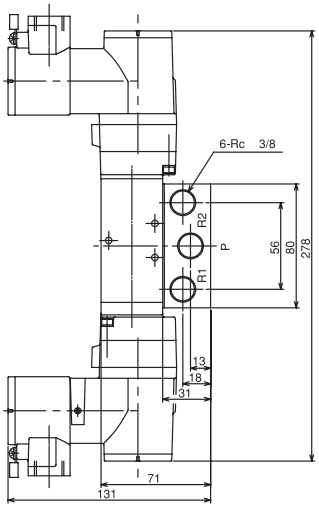
⑥ Type of option

Type of option	Designation
With surge absorber	Z0
Not needed	00

Outside Dimensions

454S series・Return type・Manifold-type 5-port solenoid valve

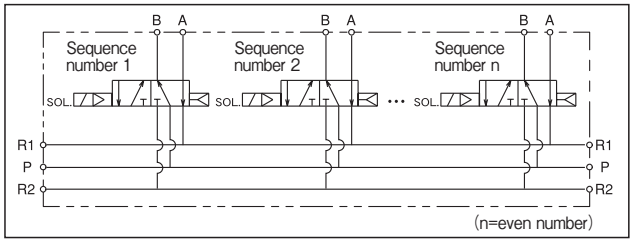




■ Dimension Table

No. of valve (n)	2	3	4	5	6	7	8	9	10
L1	77	104	131	158	185	212	239	266	293
L2	97	124	151	179	205	232	259	286	313
Mass (kg)	2.4	3.5	4.5	5.6	6.6	7.6	8.7	9.7	10.7

■ JIS simbol



Model Code

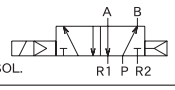
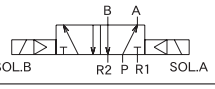
When ordering,specify the model as follows:

454 ① ② ③ – E ④ – H ⑤ – K ⑥ – ⑦

- ① Type of fow path
- ② Port size
- ③ Explosion-proof verifying nation
- ④ Wiring leading-in method (applicable cable size)
- ⑤ Rated voltage
- ⑥ No. of valve
- ⑦ Type of option

● Standard type

① Type of fow path

Type of valve	JIS symbol	Designation
Return		S
Hold		D
In case of compound-type		Z

② Port size

Port size	Designation
Rc1/4	202
Rc3/8	203

③ Explosion-proof standard

Standard		Designation
Structural standard	d2G4	C
EX. Explosion-proof	Exd Ⅱ BT4	E
Explosion-proof for Korea	Exd Ⅱ BT4	H

④ Wiring leading-in method (applicable cable size)

Wiring leading-in method		Designation
Conduit tube system (G 1／2)		01
Pressure resistant packing system (applicable cable size)	φ7.5 ~ 8.4	08
	φ8.5 ~ 9.4	09
	φ9.5 ~ 10.4	10
	φ10.5 ~ 11.4	11
	φ11.5 ~ 12.0	12

⑤ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz,AC110V 60Hz	1
(AC110V 50Hz,AC120V 60Hz)	2
AC200V 50/60Hz,AC220V 60Hz	3
(AC220V 50Hz,AC240V 60Hz)	4
(DC12V)	8
DC24V	5
(DC48V)	6
DC100V	7
(DC110V)	9
(DC125V)	A

● ( ) denotes semi-standard voltage.

⑥ No. of valve

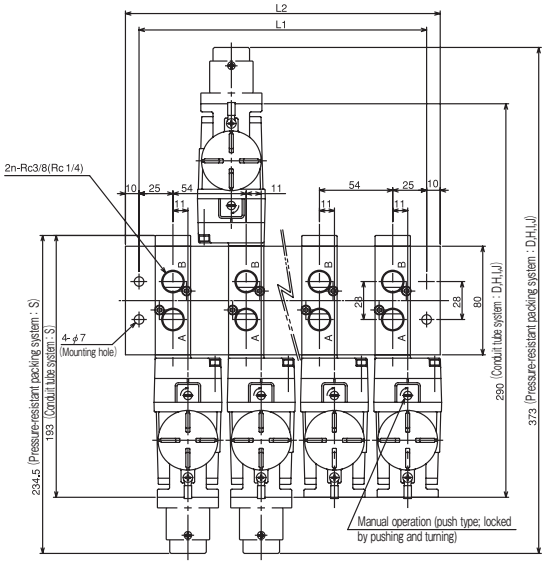
No. of valve	Designation
2	02
3	03
⋮	⋮
9	09
10	10

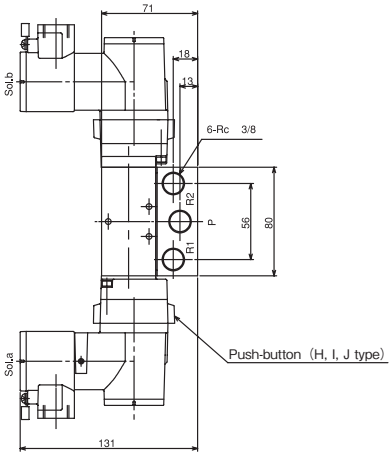
⑦ Type of option

Type of option	Designation
With surge absorber	Z0
Not needed	00

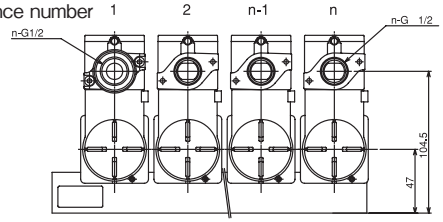
Outside Dimensions

454S (D) series・Compound-type 5 port solenoid valve





Sequence number 1 2 n-1 n

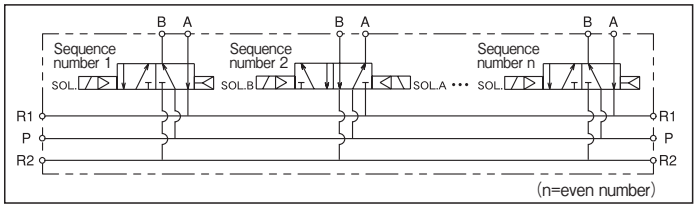


(Request separately for Ex. Explosion-proof external dimension drawings.)

■ Dimension Table

No. of valve (n)	2	3	4	5	6	7	8	9	10
L1	104	158	212	266	320	374	428	482	536
L2	124	178	232	286	340	394	448	502	556

■ JIS simbol



Model Code

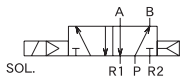
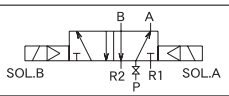
When ordering,specify the model as follows:

454 ① ② ③ – E ④ – H ⑤ – D ⑥ – ⑦ SV

- ① Type of fow path
- ② Port size
- ③ Explosion-proof verifying nation
- ④ Wiring leading-in method (applicable cable size)
- ⑤ Rated voltage
- ⑥ No. of valve
- ⑦ Type of option

● Stop valve is provided in P-port supply line.

① Type of fow path

Type of valve	JIS symbol	Designation
Return		S
Hold		D
In case of mixing ream-type		Z

② Port size

Port size	Designation
Rc1/4	202
Rc3/8	203

③ Explosion-proof standard

Standard		Designation
Structural standard	d2G4	C
EX. Explosion-proof	Exd Ⅱ BT4	E
Explosion-proof for Korea	Exd Ⅱ BT4	H

④ Wiring leading-in method (applicable cable size)

Wiring leading-in method		Designation
Conduit tube system (G 1/2)		01
Pressure resistant packing system (applicable cable size)	φ7.5 ~ 8.4	08
	φ8.5 ~ 9.4	09
	φ9.5 ~ 10.4	10
	φ10.5 ~ 11.4	11
	φ11.5 ~ 12.0	12

⑤ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz,AC110V 60Hz	1
(AC110V 50Hz,AC120V 60Hz)	2
AC200V 50/60Hz,AC220V 60Hz	3
(AC220V 50Hz,AC240V 60Hz)	4
(DC12V)	8
DC24V	5
(DC48V)	6
DC100V	7
(DC110V)	9
(DC125V)	A

● ( ) denotes semi-standard voltage.

⑥ No. of valve

No. of valve	Designation
2	02
3	03
⋮	⋮
9	09
10	10

● In case of 00, only item ① is supplied.

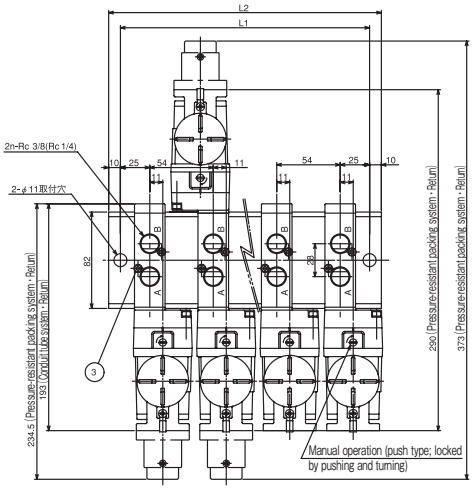
⑦ Type of option

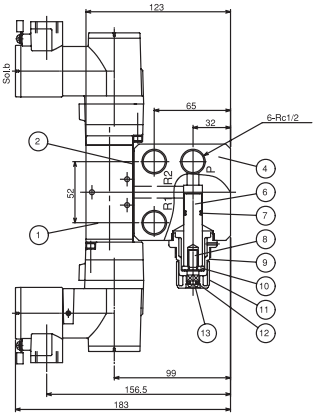
Type of option	Designation
With surge absorber	Z0
With surge absorbe + Pilot Direction "B"	ZB
Not needed	00
With surge absorbe + Pilot Direction "B"	0B

● Option of pilot direction is applicable in return type only.

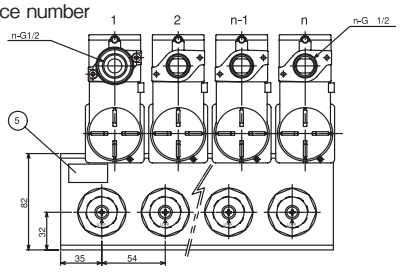
Outside Dimensions

454S (D) series・Compound-type 5 port solenoid valve with P-port stop valve





Sequence number

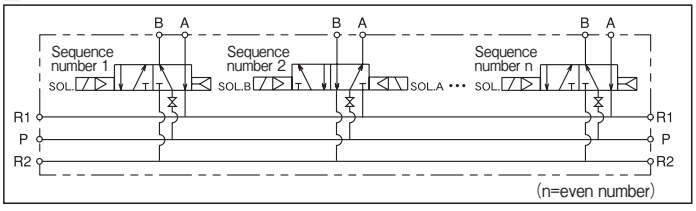


(Request separately for Ex. Explosion-proof external dimension drawings.)

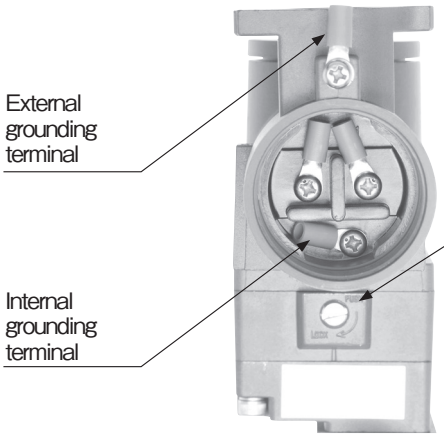
■ Dimension Table

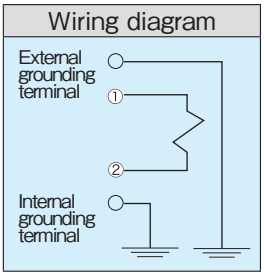
No. of valve (n)	2	3	4	5	6	7	8	9	10
L1	104	158	212	266	320	374	428	482	536
L2	124	178	232	286	340	394	448	502	556

■ JIS simbol



1 5-port solenoid valve wiring procedure



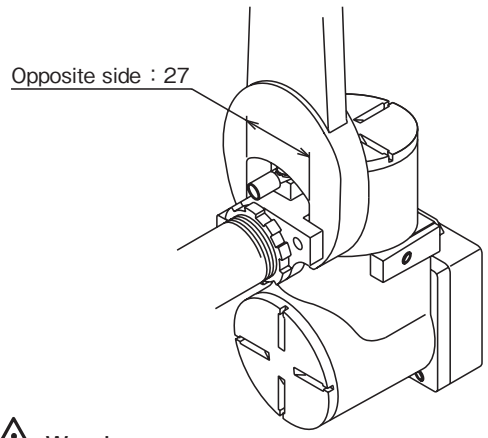


2 5-port explosion-proof type solenoid valve wiring procedure

Leading-in method of external conductor to terminal box

Conduit tube system

Using threaded thick steel conduit tube specified in JIS C8305 (Steel conduit tube), bond by five threads or more in complete thread parallel pipe threads (JIS B0202).
For detail of the piping procedure, refer to "Factory explosion-proof electric facility guide for users" (Gas explosion-proof 1994). In case of possibly exposed to corrosive gas or invasion of water or moisture through threaded parts, apply liquid gasket, or other non-curable waterproof or rust preventive material to threaded parts, and then bind the threads.

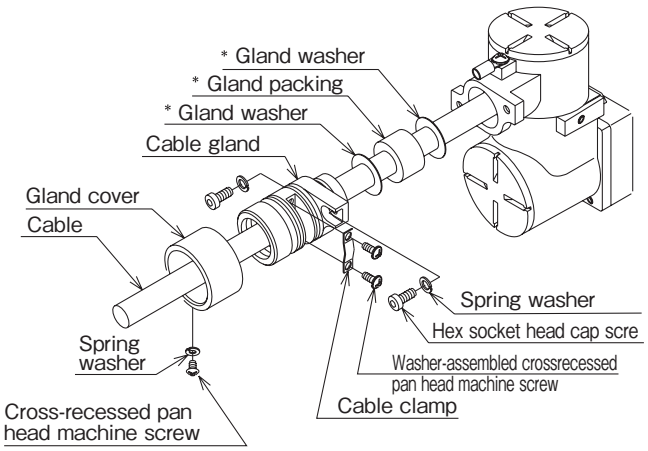


Warning

When connecting thick steel conduit tube or thick steel conduit tube and others, as shown in the drawing, apply a spanner, so that excessive force may not be applied to the terminal box. If excessive force is applied, the explosion-proof performance may be destroyed.

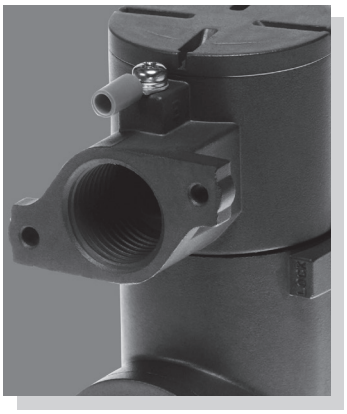
Pressure-resistant packing system

According to the drawing, connect the cables by pressure-proof packing type. Note that the dimension varies with the cable size in the * asterisked parts.



[Assembling procedure]
① Pass the cable in the sequence of gland washer, gland packing, gland washer, cable gland, and gland cover.
② Fit the cable clamp to the cable gland, and fix the cable.
③ Tighten two hex socket head cap screw uniformly, with care not to tighten unevenly, and connect the cable gland to the terminal box.
④ Insert the cable cover into the cable gland, fit the cross-recessed pan head machine screw, and fix the cable cover.

Conduit tube system ▶
(Bore : G1/2)



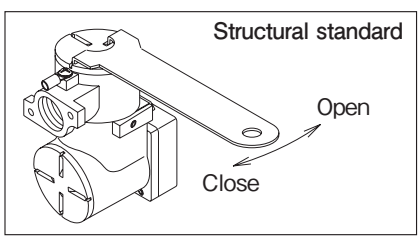
Pressure-resistant packing system ▶
(Applicable cable size : φ 7.5 ~ 12.0)

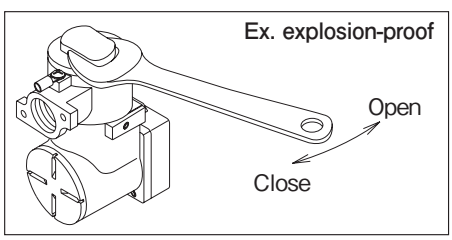
Electrical connection

Crimp and connect by using furnished crimped terminal (V2-M4 manufactured by Japan Solderless Terminal Co.) and specified YKT-1614 (manufactured by the same). Use conduits in a size of 1.04 to 2.63 ㎟.

Electrical connection

Structural standard :
The cover of the terminal box is built in a locking system to be opened or closed by a special tool. When opening or closing, use the special tool furnished to the product, and fit the end of the tool tightly to the groove of the cover, and turn in the opening or closing direction as shown in the drawing.
Ex. explosion-proof:
The cover of the terminal box can be opened or closed by spanner or the like.





Warning

Before opening or closing the terminal box or when detaching or attaching the electrical terminals, be sure to turn off the power source in advance.

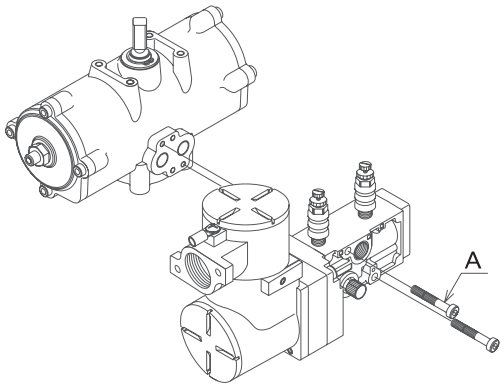
- When connecting wires outdoors or in a place where water may intrude, take protective measures properly to prevent rainwater or the like intruding into the terminal box.

3 Operation changing method of return type solenoid valve (S)

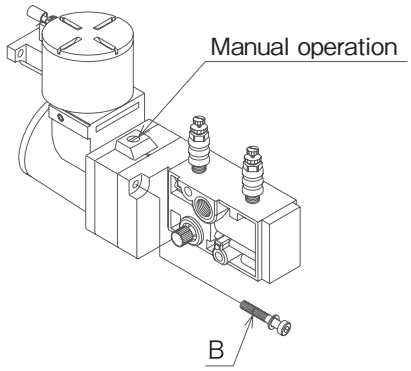
When the return type solenoid valve (S) is mounted on the double-acting type (D) actuator, the standard is "left rotation by solenoid energizing," but reverse operation of "right rotation by solenoid energizing" is possible in the following procedure.

Operation changing method of 5-port explosion-proof type solenoid valve

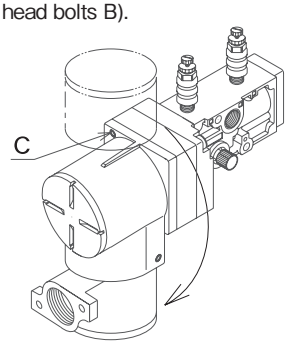
1 Dismount the solenoid valve from the actuator or the mounting surface (remove two socket head bolts A).



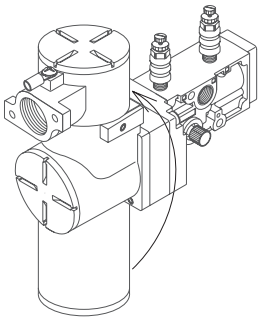
2 Dismount the pilot solenoid valve from the solenoid valve main body (remove two socket head bolts B).



3 Rotate the dismounted pilot solenoid valve by 180 degrees, and mount again on the main body (attach two socket head bolts B).



4 Loosen set-screw C (5 to 6 turns), and rotate the terminal box by 180 degrees, and tighten the set-screw and fix the terminal box, and mount the solenoid valve on the actuator or the like in the reverse manner of step 1.



(Note) When the manual operation is at the upper side, energized causes 1 → 2
When the manual operation is at the lower side, energized causes 1 → 4.

d3aG4
Explosion-proof construction standard for electric equipment

Explosion-proof solenoid valve lineup

vol.3

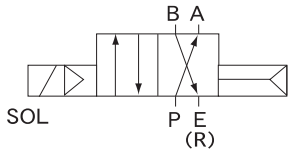
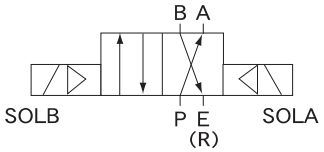
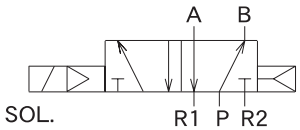
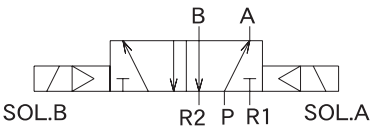
For pneumatic control

4/5 Port Explosion-proof solenoid valves for hydrogen

Model List 〔Explosion-proof sorenoid valves for hydrogen〕

High safety and high reliability guaranteed.

1. **Usable at explosion class 3a level.**
2. **The housing of the electromagnetic unit is equal in size to the conventional d2G4 type.**
3. **Surge absorber is included in standard equipment as measures against surge.**

	Type & Composition of Valve	Port size Rc 1/8	Rc 1/4	Rc 3/8	Rc 1/2	Type of Flow Path in Valve
4 Port	Ceramic slide valve system Pilot type Gasket connection type Pilot solenoid valve + Valve disk+subplate	—	●	●	●	● Return  ● Hold 
5 Port	Spool valve system Pilot type Direct piping type Pilot solenoid valve + Valve disk	●	●	●	—	● Return  ● Hold 

Explosion-proof solenoid valves for hydrogen of KONAN

Type of Construction for Explosion-proof

Flame-proof enclosure construction

: d3aG4

■ Pressure-resistant packing system

INDEX

MVS800K/MVD800K Series

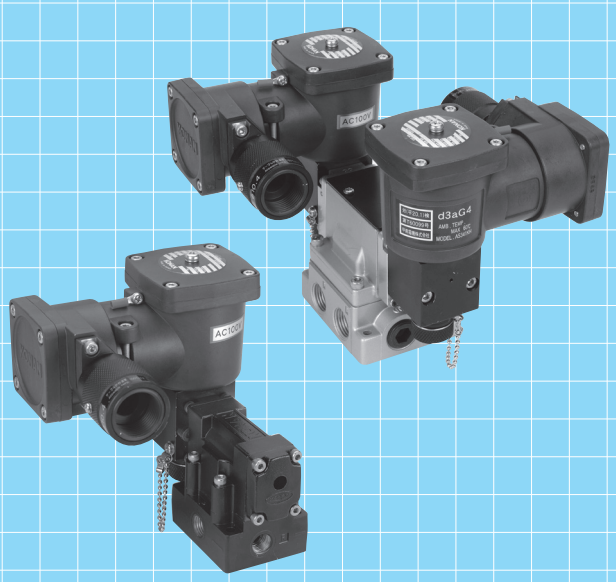
4-Port Solenoid Valves

Explosion-proof

Ceramic slide valve system, Pilot type

Gasket connection type Rc1/4・3/8・1/2

Return / Hold



Specifications

Type of valve		Return				Hold			
Type	Pressure-resistant packing	MVS812H－02		MVS802H－03		MVD8－02－E2H		MVD8－03－E2H	
Port size (Rc)		1/4	3/8	3/8	1/2	1/4	3/8	3/8	1/2
Effective sectional area (CV value)		16㎟ (0.9)	18㎟ (1.0)	55㎟ (3.0)	60㎟ (3.3)	16㎟ (0.9)	18㎟ (1.0)	55㎟ (3.0)	60㎟ (3.3)
Operating pressure		0.12～0.7MPa							
Pressure resistance		1.05MPa							
Operating temperature		－10～60℃							
Operating frequency		1 cycle / s max. / 1 cycle / 6 months min.							
Operation (response) time		0.1s max.							
Solenoid	Rated voltage	Refer to Model Code							
	Voltage fluctuation tolerance	－15%～10% of rated voltage							
	Temperature rise	80 deg max.							
	Insulation class	JIS C 4003 Class H							
	Insulation resistance	10MΩ min.							
	Rated current	Refer to Rated current data on page C-11							
	Explosion-proof standard	Flame-proof enclosure construction d3aG4							
Mass		Approx. 2.0kg							

● At the operating temperature of 5℃ or below, use extreme care for protection against frosting by removing the water contained in the fluid for use.

■ Explosion-proof verification approval No.

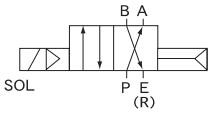
No. T60099

Model Code

When ordering,specify the model as follows:

〔1〕 Type of valve passage: 2 positions, return.

JIS symbol



MVS812H – 02 – ① – ③ – ④

- ① Port size
- ③ Applicable cable size
- ④ Rated voltage

MVS802H – 03 – ② – ③ – ④

- ② Port size
- ③ Applicable cable size
- ④ Rated voltage

① Port size

Port size	Designation
Rc1/4	8A
Rc3/8	10A

② Port size

Port size	Designation
Rc3/8	10A
Rc1/2	15A

③ Applicable cable size

Wire size φ d ※	Applicable cable size	Designation
φ 8.5	φ7.5 ~ 8.4	No.8
φ 9.5	φ8.5 ~ 9.4	No.9
φ 10.5	φ9.5 ~ 10.4	No.10
φ 11.5	φ10.5 ~ 11.4	No.11
φ 12.5	φ11.5 ~ 12.4	No.12
φ 13.5	φ12.5 ~ 13.4	No.13

※ For size φ d , refer to page A-33 from A-36

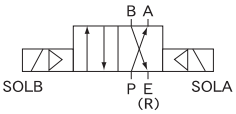
④ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz	AC100
AC110V 50/60Hz	AC110
AC115V 50/60Hz	AC115
AC120V 60Hz	AC120 ※
AC125V 50/60Hz	AC125
AC200V 50/60Hz	AC200
AC220V 50/60Hz	AC220
DC 24V	DC 24V
DC 48V	DC 48V
DC100V	DC100V
DC110V	DC110V
DC120V	DC120V
DC125V	DC125V

※ When ordering, specify either applicable frequency 50 Hz or 60 Hz.

〔2〕 Type of valve passage: 2 positions, hold.

JIS symbol



MVD8 – ① – E2H – ② – ③ – ④

- ① Type of body
- ② Port size
- ③ Applicable cable size
- ④ Rated voltage

① Type of body

Type of body	Port size	Designation
02	Rc1/4 , Rc3/8	02
03	Rc3/8 , Rc1/2	03

② Port size

Port size	Type of body	Designation
Rc1/4	02	8A
Rc3/8	02,03	10A
Rc1/2	03	15A

③ Applicable cable size

Wire size φ d ※	Applicable cable size	Designation
φ 8.5	φ7.5 ~ 8.4	No.8
φ 9.5	φ8.5 ~ 9.4	No.9
φ 10.5	φ9.5 ~ 10.4	No.10
φ 11.5	φ10.5 ~ 11.4	No.11
φ 12.5	φ11.5 ~ 12.4	No.12
φ 13.5	φ12.5 ~ 13.4	No.13

※ For size φ d , refer to page A-33 from A-36

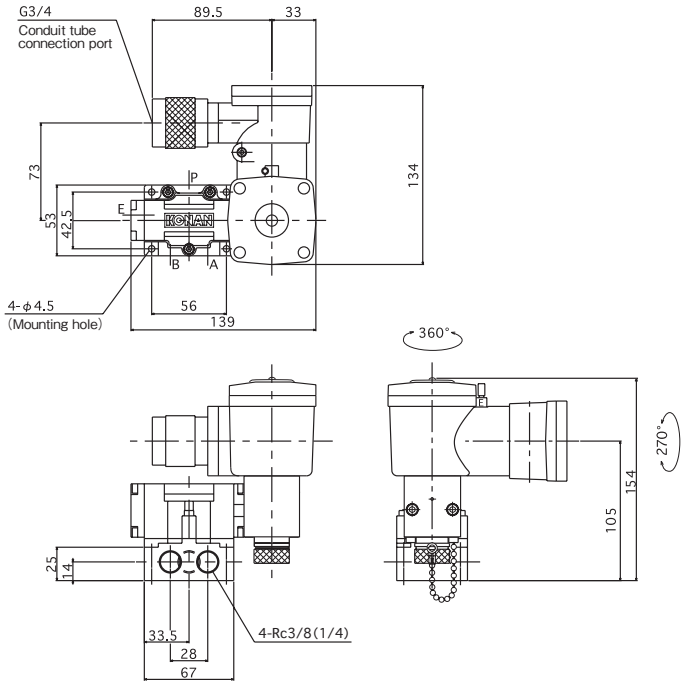
④ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz	AC100
AC110V 50/60Hz	AC110
AC115V 50/60Hz	AC115
AC120V 60Hz	AC120 ※
AC125V 50/60Hz	AC125
AC200V 50/60Hz	AC200
AC220V 50/60Hz	AC220
DC 24V	DC 24V
DC 48V	DC 48V
DC100V	DC100V
DC110V	DC110V
DC120V	DC120V
DC125V	DC125V

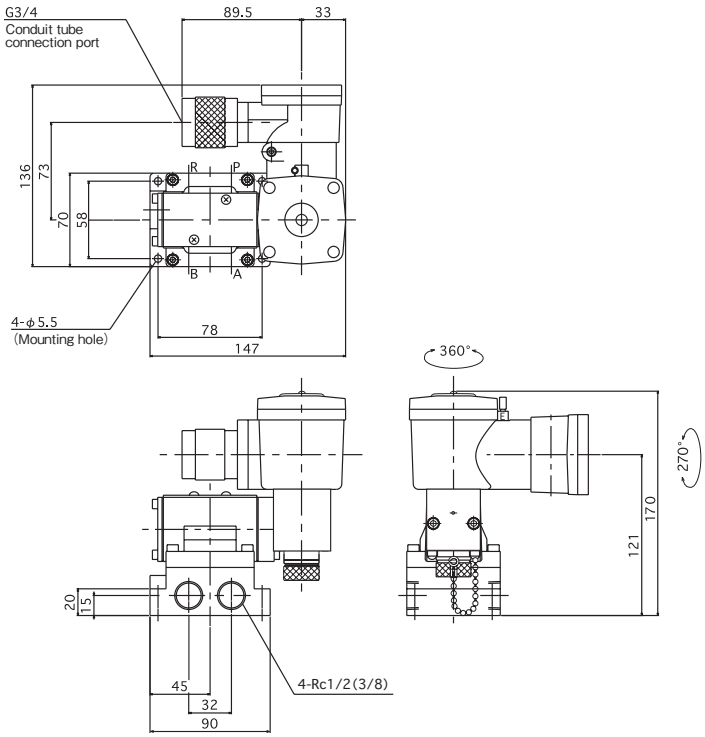
※ When ordering, specify either applicable frequency 50 Hz or 60 Hz.

Outside Dimensions

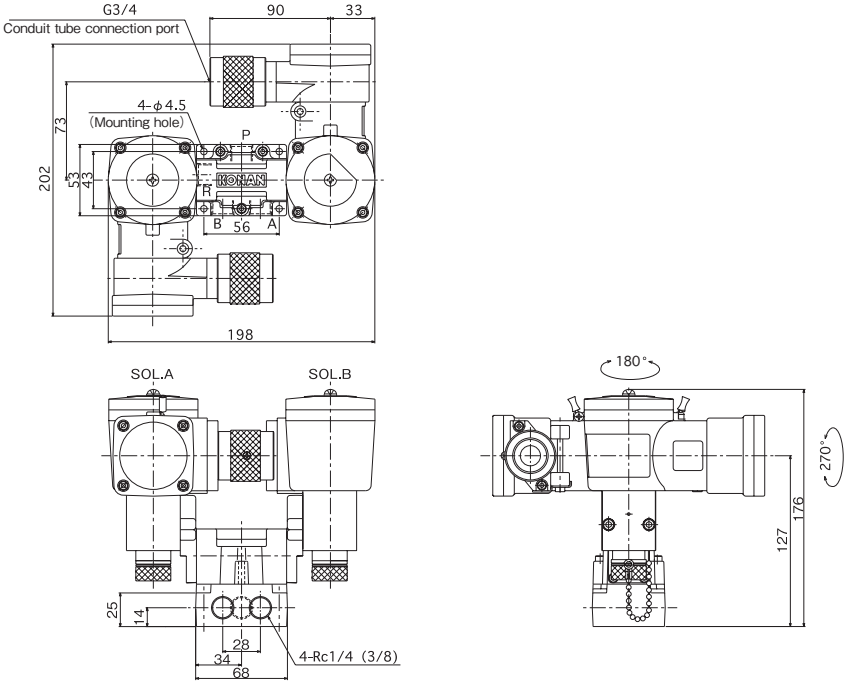
MVS812H-02 (Return)



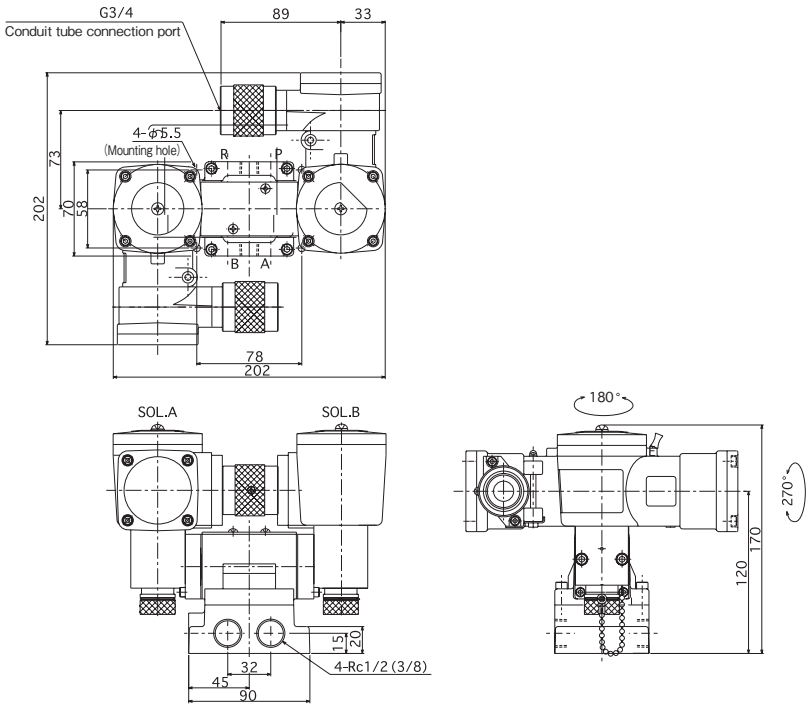
MVS802H-03 (Return)



MVD8-02-E2H（Hold）



MVD8-03-E2H（Hold）



453S/453D Series

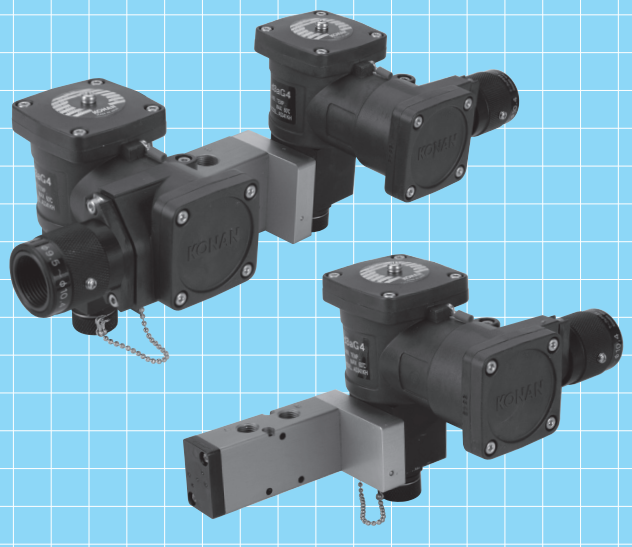
5-Port Solenoid Valves

Explosion-proof

Spool valve system, Pilot type

Direct piping type Rc1/4・3/8・1/2

Return / Hold



Specifications

Type of valve		Return			Hold		
Type		453S101C-E2H	453S202C-E2H	453S403C-E2H	453D101C-E2H	453D202C-E2H	453D403C-E2H
		453S102C-E2H	453S203C-E2H	453S404C-E2H	453D102C-E2H	453D203C-E2H	453D404C-E2H
Port size (Rc)		1/8	1/4	3/8	1/8	1/4	3/8
		1/4	3/8	1/2	1/4	3/8	1/2
Effective sectional area (CV value)		10㎟ (0.5)	22㎟ (1.2)	40㎟ (2.2)	10㎟ (0.5)	22㎟ (1.2)	40㎟ (2.2)
Operating pressure		0.2 ~ 0.7MPa					
Pressure resistance		1.05MPa					
Operating temperature		− 5 ~ 50℃					
Operating frequency		1 cycle / s max. / 1 cycle / 6 months min.					
Operation (response) time		0.05 s max.					
Solenoid	Rated voltage	Refer to Model Code					
	Voltage fluctuation tolerance	− 15%~ 10% of rated voltage					
	Temperature rise	61.4 deg max.					
	Insulation class	JIS C 4003 Class H					
	Insulation resistance	10MΩ min.					
	Rated current	Refer to Rated current data on page C-11					
	Explosion-proof standard	Flame-proof enclosure construction d3aG4					
Mass		Approx.1.7kg		Approx.2.0kg	Approx.3.0kg		Approx.3.5kg

● At the operating temperature of 5℃ or below, use extreme care for protection against frosting by removing the water contained in the fluid for use.

■ Explosion-proof verification approval No.

No. T60099

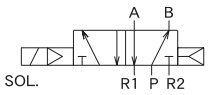
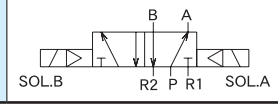
Model Code

When ordering,specify the model as follows:

453 ① ② C – E2H – ③ – ④

- ① Type of fow path
- ② Type of body, port size
- ③ Applicable cable size
- ④ Rated voltage

① Type of flow path

Type of valve		JIS symbol	Designation
2 position	Return		S
	Hold		D

② Type of body, port size

Type of body	Port size	Designation
B10	Rc1/8	101
	Rc1/4	102
B20	Rc1/4	202
	Rc3/8	203
B40	Rc3/8	403
	Rc1/2	404

③ Applicable cable size

Wire size φd ※	Applicable cable size	Designation
φ8.5	φ7.5 ~ 8.4	No.8
φ9.5	φ8.5 ~ 9.4	No.9
φ10.5	φ9.5 ~ 10.4	No.10
φ11.5	φ10.5 ~ 11.4	No.11
φ12.5	φ11.5 ~ 12.4	No.12
φ13.5	φ12.5 ~ 13.4	No.13

※ For size φ d , refer to page A-33 from A-36

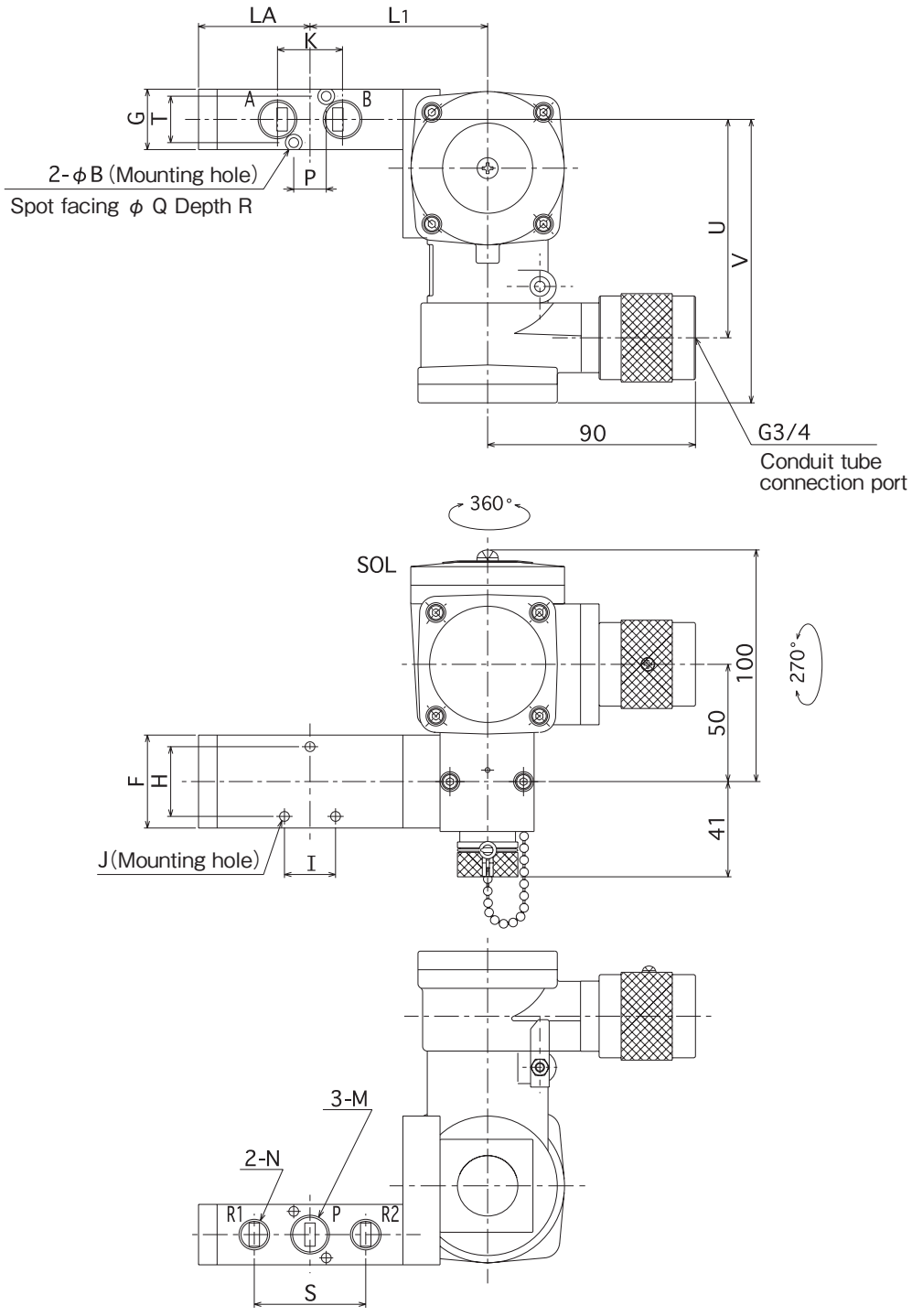
④ Rated voltage

Rated voltage	Designation
AC100V 50/60Hz	AC100
AC110V 50/60Hz	AC110
AC115V 50/60Hz	AC115
AC120V 60Hz	AC120 ※
AC125V 50/60Hz	AC125
AC200V 50/60Hz	AC200
AC220V 50/60Hz	AC220
DC 24V	DC 24V
DC 48V	DC 48V
DC100V	DC100V
DC110V	DC110V
DC120V	DC120V
DC125V	DC125V

※ When ordering, specify either applicable frequency 50 Hz or 60 Hz.

Outside Dimensions

453S101C-E2H • 453S102C-E2H
453S202C-E2H • 453S203C-E2H
453S403C-E2H • 453S404C-E2H (Return)

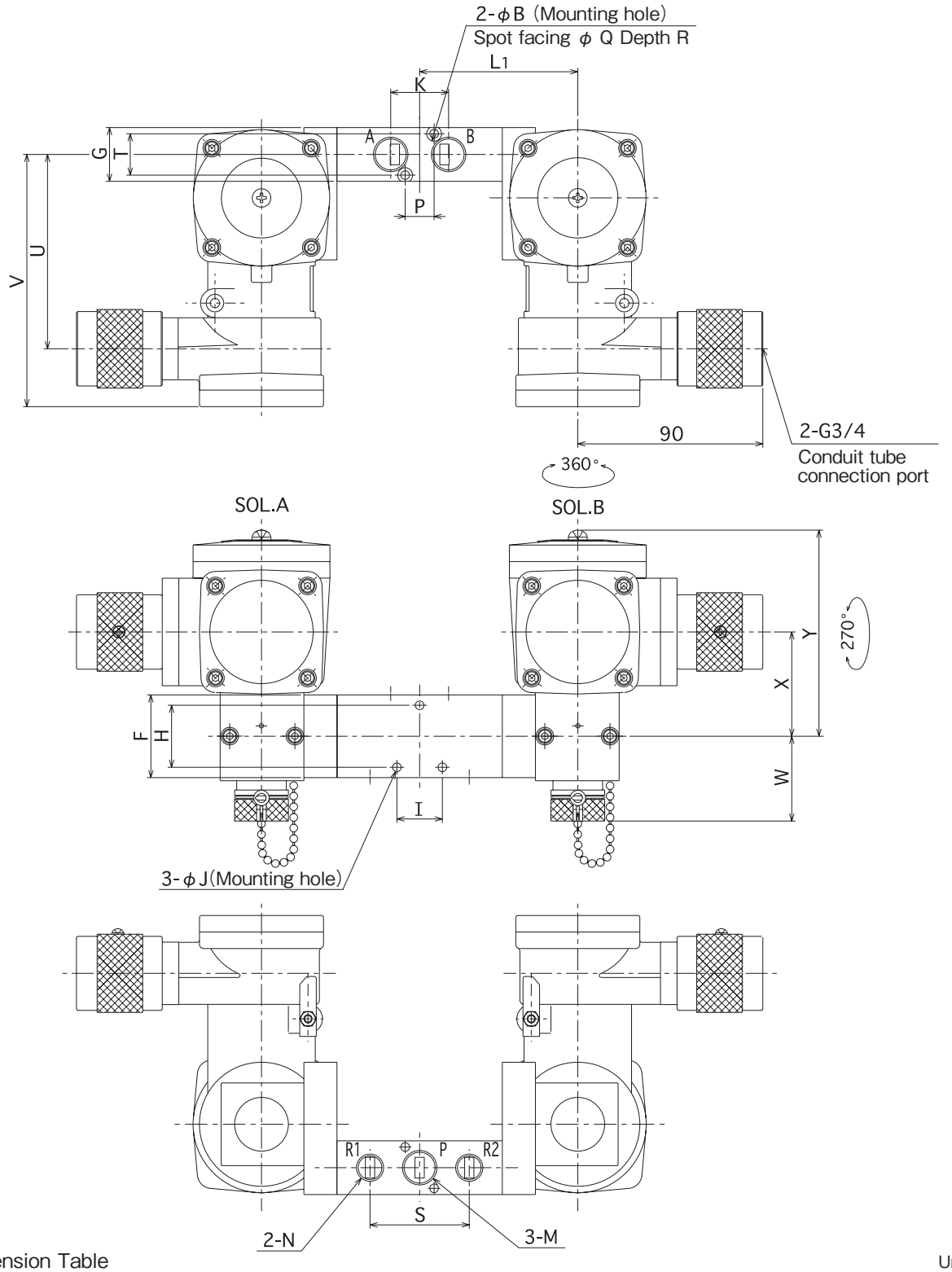


■ Dimension Table

Unit : mm

Sign / Type code	M (Rc)	N (Rc)	LA	L1	F	G	H	I	K	S	B	Q	R	P	T	U	V
453S101C-E2H	1/8	1/8	38	67	40	26	30	22	24	40	4.2	7.2	3	14	20	94	122
453S102C-E2H	1/4																
453S202C-E2H	1/4	1/4	48	77					28	48							
453S203C-E2H	3/8																
453S403C-E2H	3/8	3/8	63	92	56	36	40	30	36	68	5.3	9.5	4		28	96	124
453S404C-E2H	1/2	1/2															

453D101C-E2H • 453D102C-E2H
453D202C-E2H • 453D203C-E2H
453D403C-E2H • 453D404C-E2H (Hold)



■ Dimension Table

Unit : mm

Type code \ Sign	M (Rc)	N (Rc)	F	G	H	I	K	S	B	Q	R	P	T	U	V	W	X	Y	L1	J
453D101C-E2H	1/8	1/8	40	26	30	22	24	40	4.2	7.2	3	14	20	94	122	41	50	100	66.5	4.2
453D102C-E2H	1/4																			
453D202C-E2H	1/4	1/4					28	48								42	53	102	76.5	4.2
453D203C-E2H	3/8																			
453D403C-E2H	3/8	3/8	56	36	40	30	36	68	5.3	9.5	4		28	96	124	32	59	109	92	5.3
453D404C-E2H	1/2	1/2																		

Rated current data

Rated voltage	Rated current (mA)	
AC100V 50/60Hz	192	127
AC110V 50/60Hz	183	159
AC115V 50/60Hz	146	124
AC120V 60Hz		146
AC200V 50/60Hz	96	62
AC220V 50/60Hz	91	80
DC 24V	303	
DC 48V	154	
DC100V	75	
DC110V	55	
DC120V	59	
DC125V	60	

● The above amperage table, left shows 50Hz AC and right shows 60Hz AC.

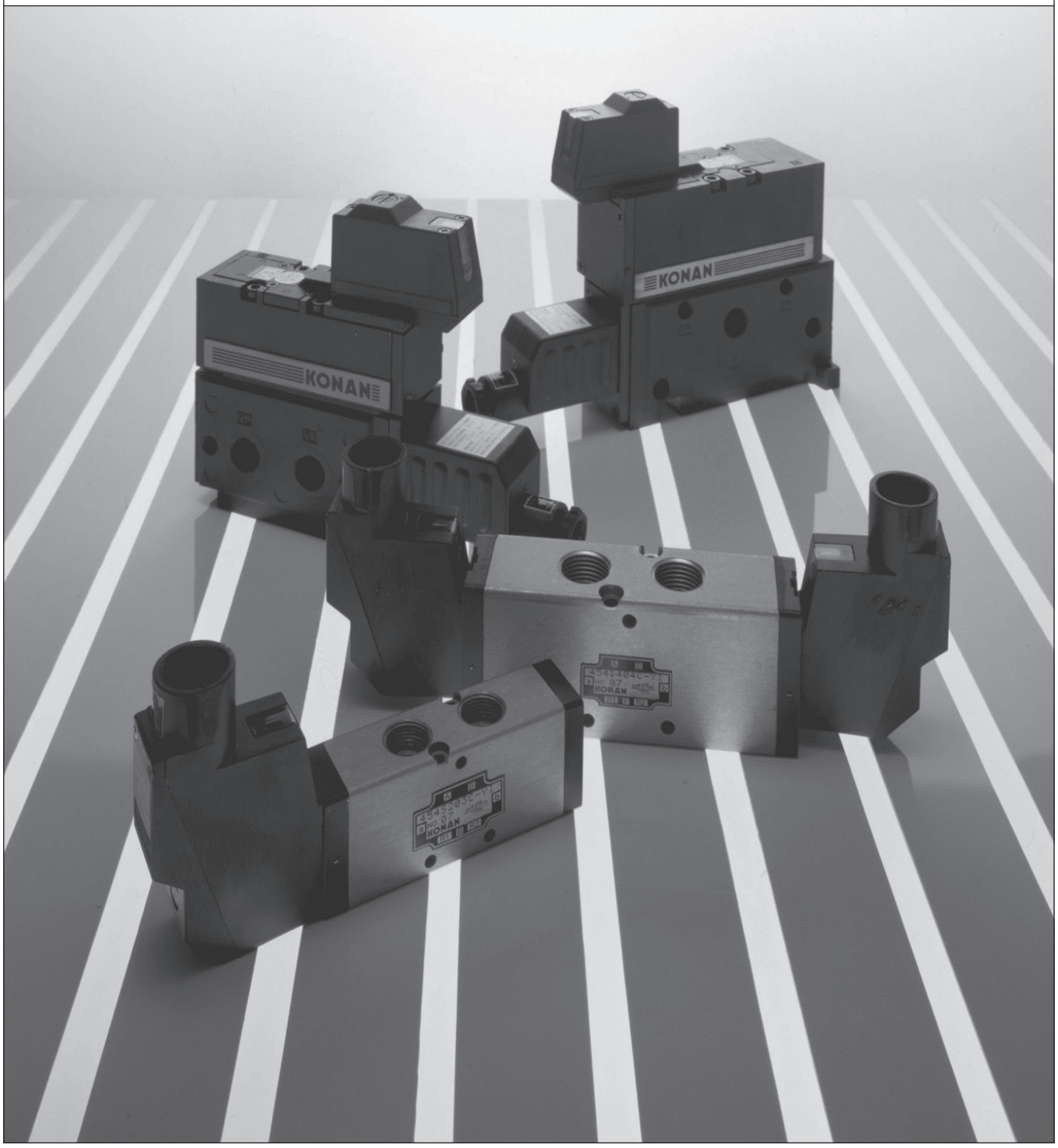
d2G4
Explosion-proof construction standard for electric equipment
ExdⅡBT4
Technical standards conforming to the international standards

Explosion-proof solenoid valve lineup

vol.4

For pnematic control

5 Port Intrinsic safety solenoid valves



Model List 〔Intrinsic safety solenoid valves 〕

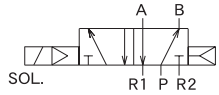
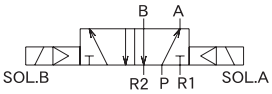
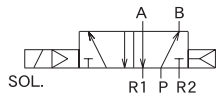
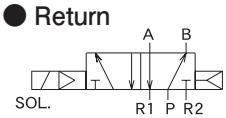
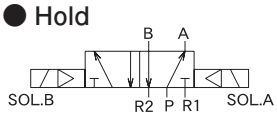
i2G4
Exia Ⅱ BT5

Explosion-proof construction standard for electric equipment

Technical standards conforming to the international standards

Compatible to two explosion-proof standards.
Intrinsic safety solenoid valve of KONAN.

	Type of Construction for Explosion-proof
Barrier	Intrinsic safety construction : i2G4 Intrinsic safety construction : Exia Ⅱ BX
	Intrinsic safety construction : Exia Ⅱ C

		Type & Composition of Valve	Port size Rc1/4	Port size Rc3/8	Port size Rc1/2	Type of Flow Path in Valve
Solenoid valve	5 Port	Spool valve system Pilot type **Direct piping type** Pilot solenoid valve + Valve body	●	●	●	● Return  ● Hold 
		Spool valve system Pilot type **Gasket connection type** Pilot solenoid valve + Valve body+subplate	●	●	●	● Return 
Manifold type		Spool valve system Pilot type **Direct piping type** Pilot solenoid valve + Valve body	●	●	●	● Return  ● Hold 

i2G4/Exia Ⅱ BT5

- This is the intrinsic safety construction usable at the same explosion class, and same degree of ignition as the d2G4 or Exd Ⅱ BT5 (Flame-proof enclosure construction).
- Applicable to all explosive gases and dangerous places, except for hydrogen, acetylene, and carbon disulfide.

Substantial cost saving in wiring works

- Not requiring expensive wiring devices or complicated works conventionally needed for Explosion-proof enclosure construction.
- Highly reliable explosion-proof performance is realized at low wiring work cost as in the ordinary control line.

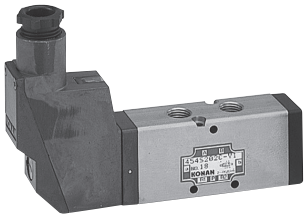
Power consumption: 0.4 W

- The solenoid valve installed in a dangerous place consumes very low electric power of only 0.4 W, while satisfying the intrinsic safety explosion-proof level.
- This is a 5-port pneumatic solenoid valve of high reliability, based on our New MAGSTAR series.
- An excellent space factor is obtained by using the manifold type solenoid valvs.

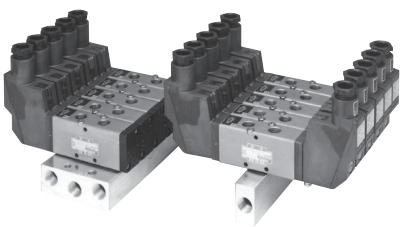
INDEX



Type of Construction for Explosion-proof



intrinsic safety construction
: i2G4/Exia Ⅱ BT5



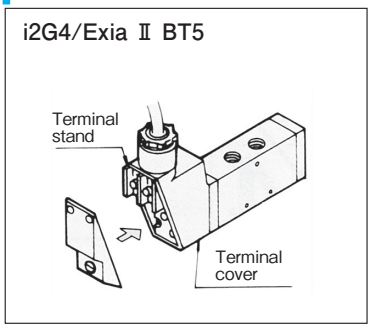
Cautions for use

1 In both solenoid valve and explosion-proof barrier, strictly observe the conditions of use specified in the specification column of each manufacturer.

2 Solenoid valve wiring method

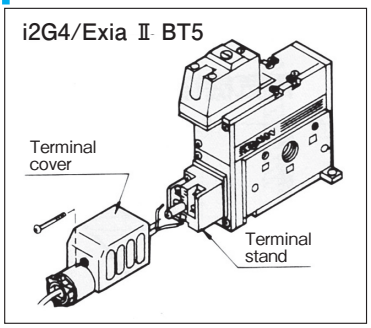
454S/D series

i2G4/Exia Ⅱ BT5



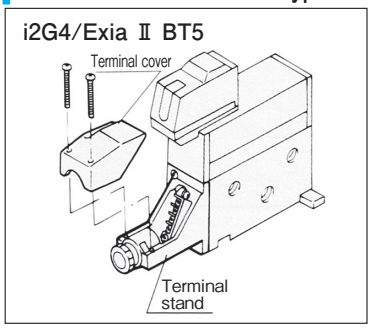
414S/416S series

i2G4/Exia Ⅱ BT5



414S/416S series ZA type

i2G4/Exia Ⅱ BT5



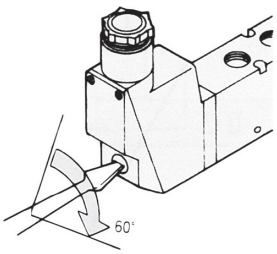
● When connecting wires to the solenoid valve, be careful not to mistake the polarity.

3 Push-button (manual operation mechanism)

● By pushing the push-button (red), the solenoid valve is actuated, and when released, it is returned to the original state.
● When locking the push-button, use the blade of a screwdriver or the like, and turn the push-button to the right, and it will be locked. When turned to the left, it will be unlocked.
● When the push-button is locked, after operation, turn to the right to unlock.
(If turned while pushing the push-button, the same action takes place, and there is no problem.)

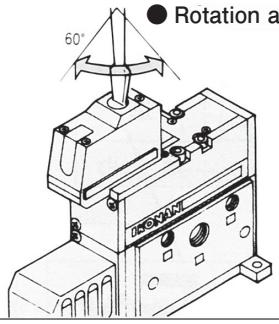
454S/D series

● Rotation angle is 60 ℃



414S/416S series

● Rotation angle is 60 ℃



4 In principle, use the solenoid valve without lubrication. For working fluid, use fresh air, and do not mix with deteriorated compressor oil or the like.

5 At the inlet side (P-port) upstream of the solenoid valve, install an air filter (filtration degree: 5 μ or less), and remove dust and drain.

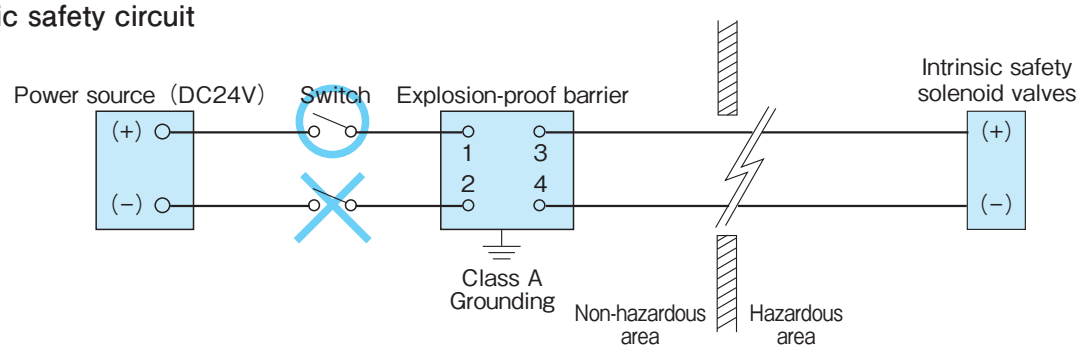
6 If leaving it behind without use for 1 year or longer, check it before use.

Installation of Intrinsic safety solenoid valves

1.Hazardous area non-hazardous area

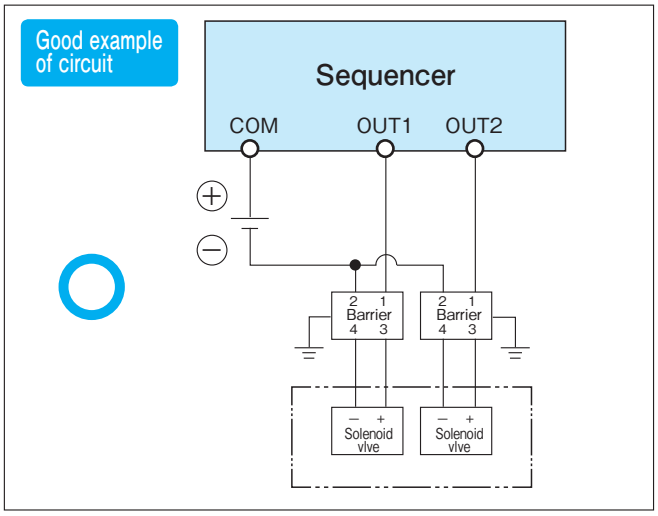
To install the Intrinsic safety solenoid valves, as shown in the drawing below, place the switch and the explosion-proof barrier in non-hazardous area, and place only the solenoid valve in hazardous area.

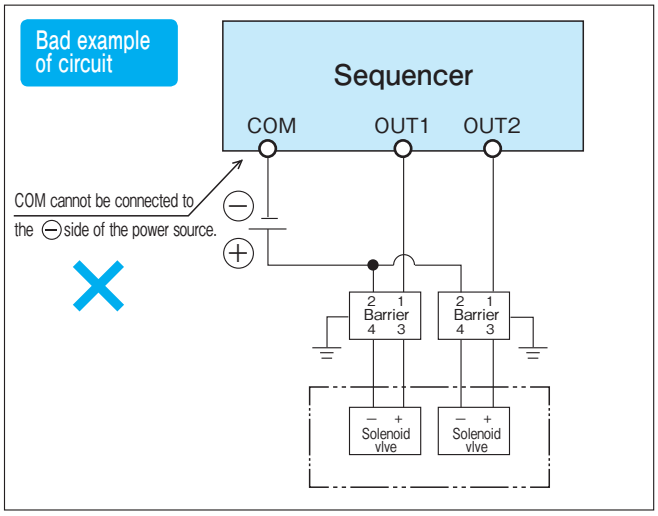
■ Intrinsic safety circuit



Caution

In the above intrinsic safety circuit, install the switch or the contact to be placed in non-hazardous area always at the (+) side of the power source. If installed at the (-) side, depending on the circumstances, the solenoid valve may malfunction. In particular, when controlled by the sequencer or the like, it cannot be used if the common side of the sequencer output circuit is connected to the minus side of the power source.





2. Combination of explosion-proof solenoid valves and explosion-proof barrier

The explosion-proof barrier should be always used in the intrinsic safety construction. In combination with the solenoid valve, use one explosion-proof barrier alone for one solenoid valve.

Caution

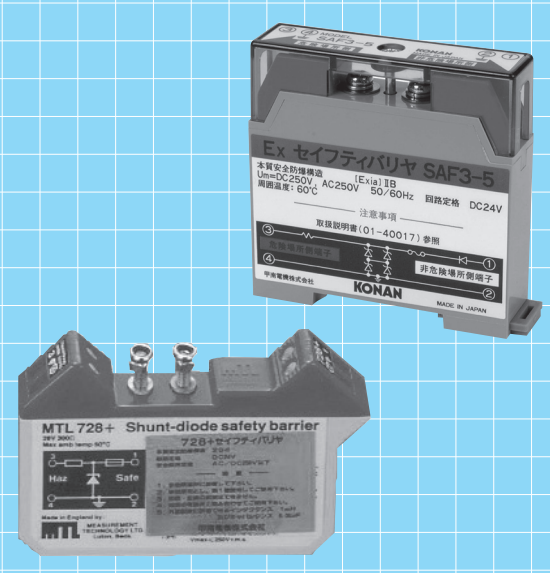
In case of the hold type solenoid valve (double solenoid),
it must be noted that two explosion-proof barriers are needed.

SAF3-5（Exia Ⅱ BT5）• MTL728＋（i2G4）

Explosion-proof barrier (safety barrier)

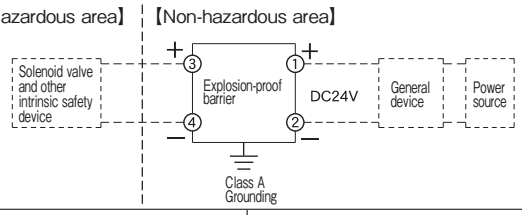
Intrinsic safety construction

The intrinsic safety explosion-proof barrier is a one-channel explosion-proof device of shunt diode type for direct-current use, for passing electrical signals in both directions without short-circuiting, while limiting the energy transmission to the level not to ignite the explosive atmosphere.



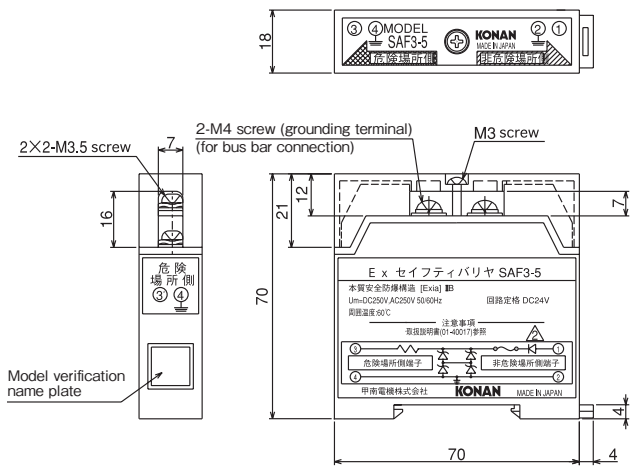
1. Applicable to class 0 hazardous area.
2. Only by connecting in series to the transmission circuit, the line and the device in the hazardous area can be protected from accidents in non-hazardous area.
3. The conventional wiring system can be used in the hazardous area.
4. The intrinsic safety of control operation signal can be realized easily and at low cost.
5. SAF3-5 safety barrier is provided with a protective circuit at the input side, and if connected in wrong polarity by mistake, the circuit will not be broken.
6. SAF3-5 safety barrier is designed in wiring and connection system by crimped terminal.
7. Explosion-proof standard: If selecting an solenoid valve of i2G4, use the explosion-proof barrier of MTL728+.
8. Explosion-proof standard: If selecting an solenoid valve of Exia II BT5, use the explosion-proof barrier in combination with the SAF3-5, SAF100-5, or the barrier satisfying the condition specified in page D-6 [When selecting other explosion-proof barriers].

Specifications

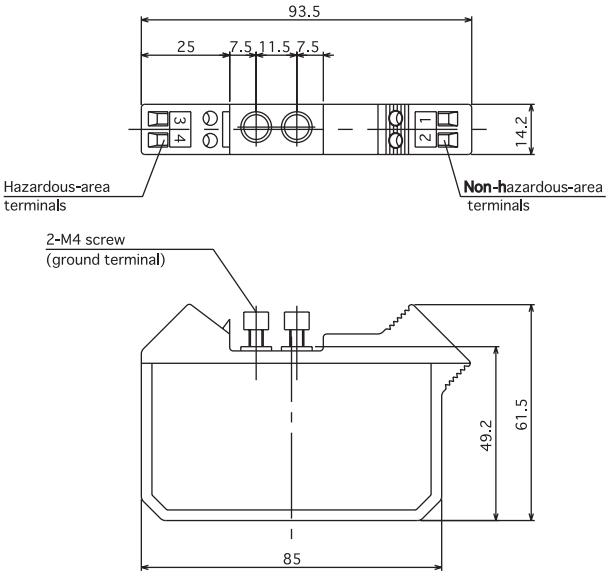
Type code	SAF3-5	MTL728+
Explosion-proof structure	Intrinsic safety construction（Exia Ⅱ B）	Intrinsic safety construction（i2G4）
Rated voltage	DC24V ± 5%	—
Max. operating voltage	—	DC25.5V
Max. allowable voltage	—	DC26.6V
Safety holding rating	AC/DC 250V	
Fuse rating	50mA	
ambient temperature	− 20 ～ 60℃	− 10 ～ 60℃
Basic circuit diagram		
Option	● DIN rail for mounting ● Earth busbar ● Others	● Consult separately.
Conditions of use	(1) Install at non-hazardous area side. (2) Ground independently, and use in class A grounding. (3) The parts and the wiring cannot be changed. (4) Use in combination with specified solenoid valve.	
	(5) Allowable in external wiring, inductance : 10 mH ・capacitance : 0.5 μF.	(5) Allowable in external wiring, inductance : 1 mH, capacitance: 0.05 μF.
Remarks	—	Manufactured by Measurement Technology Ltd. (MTL), Great Britain. (MEASUREMENT TECHNOLOGY LTD.)

Outside Dimensions

SAF3-5



MTL728＋



Caution

1. Safety holding rating

- Devices (power switch and others) connected to the explosion-proof barrier in the non-hazardous area should be free from parts composing voltage wires exceeding 250 V (RMS) or 250 V (DC) in the ground potential in usual time or in the event of accident, or parts supplied from such voltage wires.
- If power is supplied from the main bus, isolation from the main bus is required by means of double winding transformer, and the primary winding should be protected by a fuse having a conforming interrupting capacity (rating).

2. Inductance and capacitance of external wiring

- The wiring length (between barrier and solenoid valve) is limited by the inductance and capacitance of the wiring. General parameters are as follows.

	SAF3-5	MTL728＋
In case of capacitance: 100 pF/m Maximum wiring length to stay below the capacitance allowable in external wiring	5000m	500m
In case of inductance : 25 μH Ω / DC resistance : 40 Ω /km Maximum wiring length to stay below the inductance allowable in external wiring in both directions	5000m	500m

3. General handling of explosion-proof barrier

- Refer to the general handling cautions of Intrinsic safety solenoid valves and explosion-proof barrier mentioned in page D-4.

【When selecting other explosion-proof barriers】

KONAN Intrinsic safety solenoid valves [454], [414], and [416] series are approved by the device verification of intrinsic safety explosion-proof of solenoid valve own body. They can be used also in combination with the barrier satisfying the following conditions. (Also possible to combine with the insulation barrier not requiring class A grounding.)

* However, limited only to barriers approved by device verification as a single body, and satisfying the following conditions.

＜ Safety holding rating ＞

Intrinsic safety circuit max. voltage : 29.4 V or less
Intrinsic safety circuit max. current : 93.8 mA or less
Intrinsic safety circuit max. power : 0.689 W or less

＜ Performance division and group ＞

Performance division : ia
Group: ⅡB or ⅡC

＜ Relation between intrinsic safety circuit allowable inductance (Lo) and capacitance (Co), and intrinsic safety circuit external wiring inductance (Lw) and capacitance Cw) ＞

Intrinsic safety circuit allowable inductance : Lo ≧ Li ＋ Lw （mH）
Intrinsic safety circuit allowable capacitance : Co ≧ Ci ＋ Cw （μ F）

SAF100-5 (Exia Ⅱ C)

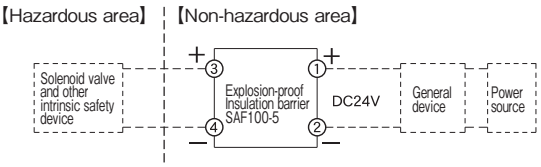
Explosion-proof Insulation barrier (safety barrier)

Intrinsic safety construction

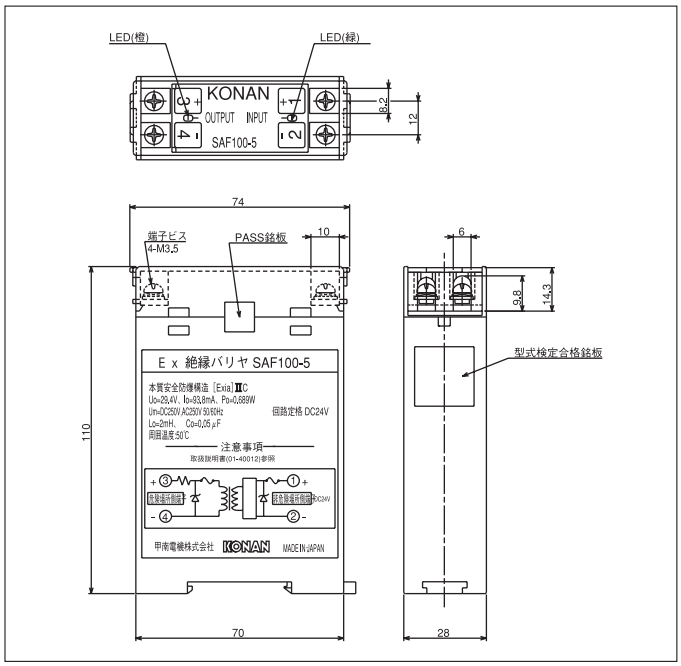
The intrinsic safety explosion-proof barrier is a one-channel explosion-proof device of Zener diode type for direct-current use, for passing electrical signals in both directions without short-circuiting, while limiting the energy transmission to a degree not igniting the explosive atmosphere.

1. Applicable to class 0 dangerous zone.
2. No grounding is required between the input and the output are insulated.
3. Only by connecting in series to the transmission circuit, the line and the device in the hazardous area can protected from accidents in non-hazardous area.
4. The conventional wiring system can be used in the hazardous area.
5. The intrinsic safety of control operation signal can be realized easily and at low cost.
6. Wiring and connection system realized by crimped terminal.
7. The input side is provided with a protective circuit, and is not broken if connected in wrong polarity by mistake.
8. The presence or absence of input and output can be confirmed by lighting of LED.

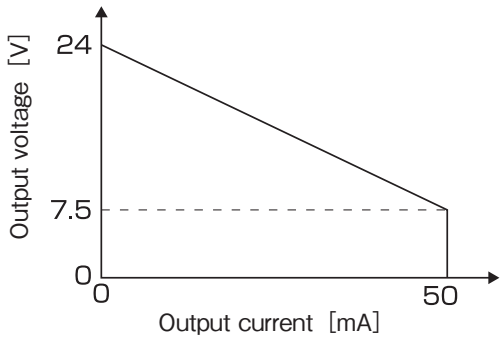
Specifications

Type code	SAF100-5
Explosion-proof structure	Intrinsic safety construction (Exia Ⅱ C)
Operating voltage	DC24V ± 10%
Intrinsic safety circuit max.	DC29.4V
Intrinsic safety circuit max. current	93.8mA
Intrinsic safety circuit max. power:	0.689W
ambient temperature	− 20 ～ 50℃
Basic circuit diagram	● Grounding not required. 
Conditions of use	● DIN rail for mounting ● Others
Remarks	(1) Install at non-hazardous area side. (2) The parts and the wiring cannot be changed. (3) Use in combination with specified solenoid valve. μF (4) Allowable in external wiring, inductance: 2 mH, capacitance: 0.05 μF.

Outside Dimensions



Output characteristic graph



Caution

1. Safety holding rating

- Devices (power switch and others) connected to the explosion-proof barrier in the non-hazardous area should be free from parts composing voltage wires exceeding 250 V (RMS) or 250 V (DC) in the ground potential in usual time or in the event of accident, or parts supplied from such voltage wires.
- If power is supplied from the main bus, isolation from the main bus is required by means of double winding transformer, and the primary winding should be protected by a fuse having a conforming interrupting capacity (rating).

2. Inductance and capacitance of external wiring

- The wiring length (between barrier and solenoid valve) is limited by the inductance and capacitance of the wiring. General parameters are as follows.

○ Supposing the capacitance: 100 pF/m, the maximum length is 500 m.
○ Supposing the inductance: 25 μH Ω , the resistance value is 80 Ω approximately.
When the DC resistance value is 40 Ω /km, it is 80 Ω or less in both directions. The maximum length is 1000 m.

3. General handling of explosion-proof barrier

- Refer to the general handling cautions of Intrinsic safety solenoid valves and explosion-proof barrier mentioned in page D-4.

【When selecting other explosion-proof barriers】

KONAN Intrinsic safety solenoid valves [454], [414], and [416] series are approved by the device verification of intrinsic safety explosion-proof of solenoid valve own body. They can be used also in combination with the barrier satisfying the following conditions. (Also possible to combine with the insulation barrier not requiring class A grounding.)
* However, limited only to barriers approved by device verification as a single body, and satisfying the following conditions.

< Safety holding rating >

Intrinsic safety circuit max. voltage : 29.4 V or less
Intrinsic safety circuit max. current : 93.8 mA or less
Intrinsic safety circuit max. power : 0.689 W or less

< Performance division and group >

Performance division : ia
Group: ⅡB or ⅡC

< Relation between intrinsic safety circuit allowable inductance (Lo) and capacitance (Co), and intrinsic safety circuit external wiring inductance (Lw) and capacitance Cw) >

Intrinsic safety circuit allowable inductance : Lo ≧ Li + Lw (mH)
Intrinsic safety circuit allowable capacitance : Co ≧ Ci + Cw (μ F)

454S/454D Series (i2G4/Exia Ⅱ BT5)

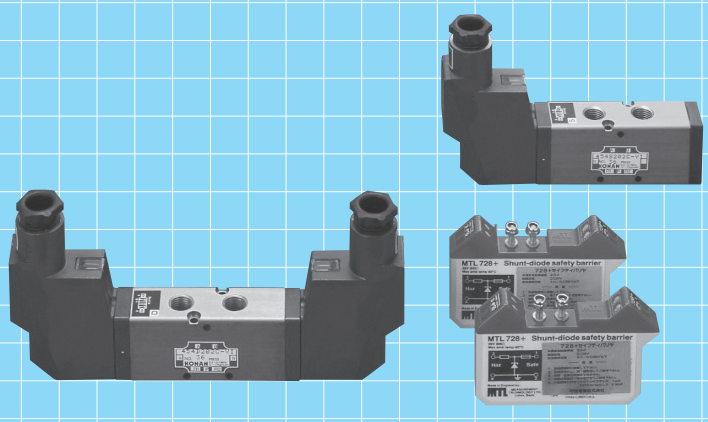
5-Port Solenoid Valves

Intrinsic safety construction

Spool valve system, Pilot type

Direct piping type Rc1/4・3/8・1/2

Return / Hold



Specifications

		Return			Hold		
Type		454S20 □□		454S40 □□	454D20 □□		454D40 □□
Port size (Rc)		1/4	3/8	1/2	1/4	3/8	1/2
Effective sectional area (㎟)		22		40	22		40
Operating pressure		0.2 ～ 0.7MPa					
Pressure resistance		1.05MPa					
Operating temperature		− 5 ～ 50℃					
Operating frequency		1 cycle / s max.					
Operation (response) time		0.11 s max.		0.11 s max.	0.11 s max.		0.11 s max.
Solenoid	Rated voltage	DC12V・34mA − (Intrinsic safety Circuit Rating)					
	Temperature rise	12 deg max.					
	Insulation class	JIS C 4003 Class B					
	Insulation resistance	10MΩ min. (DC500V)					
	Power consumption	0.4W					
	Explosion-proof standard	Intrinsic safety construction : i2G4 / Exia Ⅱ BT5					
Mass (kg)		Approx. 0.4		Approx.0.7	Approx.0.5		Approx.0.9
Explosion-proof verification approval No.		When combined with other explosion-proof barriers satisfying the conditions mentioned in page D-6,D-8: No. TC14813 When combined with safety barrier, MTL728+: No. T42155					
Use conditions		(1) Use in combination with specified safety barrier. ● If selecting a solenoid valve of Exia II BT5, use the explosion-proof barrier in combination with the SAF3-5 or the barrier satisfying the condition specified in page D-6,D-8 [When selecting other explosion-proof barriers]. ● If selecting i2G4 explosion-proof standard part, use the safety barrier in combination with MTL728+. (2) The parts and the wiring cannot be changed. (3) In combination with one electromagnetic valve, use one explosion-proof barrier alone.					

※ If the ambient temperature is less than 5℃ , remove the moisture in the working fluid, and be careful not to allow freezing.
※ Consult our company if exchanging the solenoid valve (F/G type) used in combination with the specified barrier SAF1-5/SAF2-5 of former type.

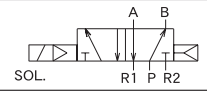
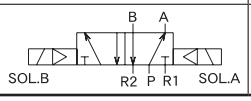
Model Code

When ordering,specify the model as follows:

454 ① ② ③ – Yi

- ① Type of fow path
- ② Type of body, port size
- ③ Types of barriers to be combined

① Type of flow path

Type of valve	JIS symbol	Designation
Return		S
Hold		D

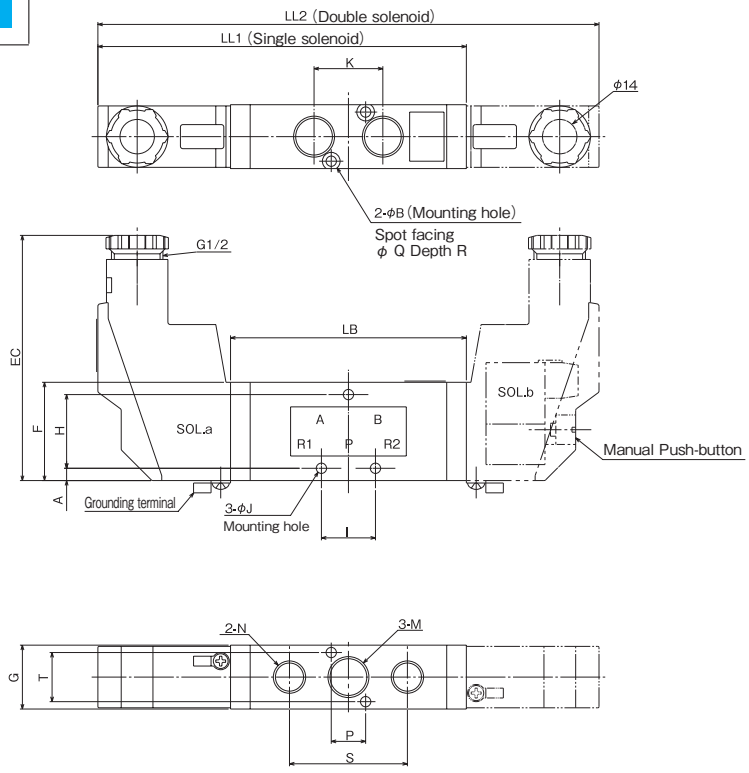
② Type of body, port size

Type of body	Port size	Designation
B20	Rc1/4	202
	Rc3/8	203
B40	Rc3/8	403
	Rc1/2	404

③ Types of barriers to be combined

Explosion-proof standard	Barrier form	Designation
Exia Ⅱ BT5	Combination with barrier satisfying the conditions in page D-6 [When selecting other explosion-proof barriers].	M
i2G4	MTL728 +	C

Outside Dimensions



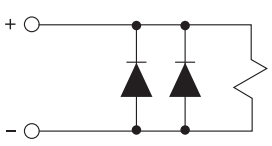
■ Dimension Table

Unit : mm

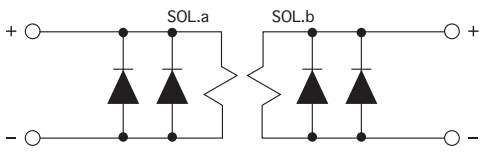
Type code \ Sign	M (Rc)	N (Rc)	LB	LL1	LL4	EC	F	G	H	I	J	K	S	B	Q	R	P	A	T
454S202 □ -Yi	1/4	1/4	96	150	–	100	40	26	30	22	4.2	28	48	4.2	7.2	3	14	5	20
454S203 □ -Yi	3/8																		
454D202 □ -Yi	1/4			–	204														
454D203 □ -Yi	3/8																		
454S403 □ -Yi	3/8	3/8	126	180	–	107	56	36	40	30	5.3	36	68	5.3	9.5	4	14	8	28
454S404 □ -Yi	1/2	1/2																	
454D403 □ -Yi	3/8	3/8		–	234														
454D404 □ -Yi	1/2	1/2																	

Wire connection diagram

Return



Hold



- Connect in correct polarity.
- Do not apply megger test between terminals.

414S/416S Series (i2G4/Exia Ⅱ BT5)

5-Port Solenoid Valves

Intrinsic safety construction

Spool valve system
Ceramic slide valve system
— Pilot type

Gasket connection type Rc1/4・3/8・1/2

Return

Specifications

[5-port, sub-plate type]

		Return							
Type		414S30 □□		414S60 □□		416S30 □□		416S60 □□	
Port size (Rc)		1/4	3/8		1/2	1/4	3/8		1/2
Effective sectional area (㎟)		25	30	51	60	24	28	51	60
Operating pressure		0.2 ～ 0.7MPa				0.12 ～ 0.7MPa			
Pressure resistance		1.05MPa							
Operating temperature		− 5 ～ 50℃				− 10 ～ 60℃			
Operating frequency		1 cycle / s max.							
Operation (response) time		0.14 s max.		0.16 s max.		0.14 s max.		0.16 s max.	
Solenoid	Rated voltage	DC12V・34mA − (Intrinsic safety Circuit Rating)							
	Temperature rise	12 deg max.							
	Insulation class	JIS C 4003 Class B							
	Insulation resistance	10MΩ min. (DC500V)							
	Power consumption	0.4W							
	Explosion-proof standard	Intrinsic safety construction : i2G4 / Exia Ⅱ BT5							
Mass (kg)		Approx.1.3		Approx.2.2		Approx.1.3		Approx.2.2	
Explosion-proof verification approval No.		When combined with other explosion-proof barriers satisfying the conditions mentioned in page D-8: No. TC14814 When combined with safety barrier, MTL728+: No. T42154							
Use conditions		(1) Use in combination with specified safety barrier. ● If selecting a solenoid valve of Exia II BT5, use the explosion-proof barrier in combination with the SAF3-5 or the barrier satisfying the condition specified in page D-6 [When selecting other explosion-proof barriers]. ● If selecting i2G4 explosion-proof standard part, use the safety barrier in combination with MTL728+. (2) The parts and the wiring cannot be changed. (3) In combination with one electromagnetic valve, use one explosion-proof barrier alone.							

※ If the ambient temperature is less than 5℃ , remove the moisture in the working fluid, and be careful not to allow freezing.
※ Consult our company if exchanging the solenoid valve (F/G type) used in combination with the specified barrier SAF1-5/SAF2-5 of former type.

Model Code

When ordering,specify the model as follows:

41 ① S ② ③ – Yi

- ① Type of main valve
- ② Type of body, port size
- ③ Types of barriers to be combined

① Type of main valve

Type of main valve	Designation
Spool valve system	4
Ceramic slide valve system	6

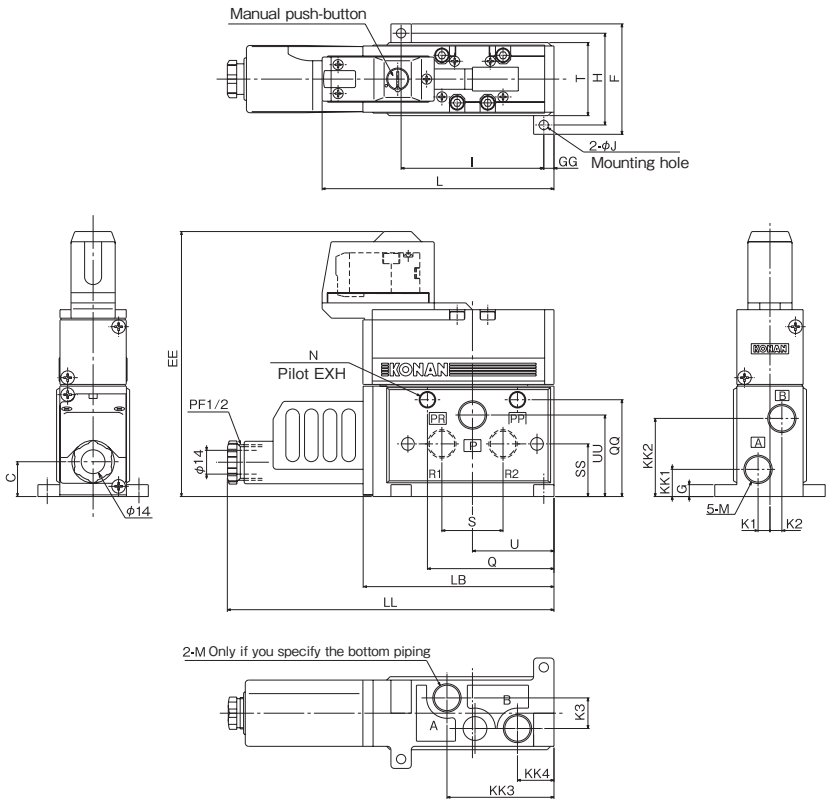
② Type of body, port size

Type of body	Port size	Designation
B30	Rc1/4	302
	Rc3/8	303
B60	Rc3/8	603
	Rc1/2	604

③ Types of barriers to be combined

Explosion-proof standard	Barrier form	Designation
Exia Ⅱ BT5	Combination with barrier satisfying the conditions in page D-6 [When selecting other explosion-proof barriers].	M
i2G4	MTL728 +	C

Outside Dimensions

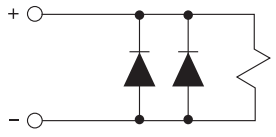


■ Dimension Table

Unit : mm

Type code \ Sign	M (Rc)	N (Rc)	L	LB	LL	EE	F	G	GG	H	I	J	K1	K2	KK1	KK2	Q	QQ	S	SS	U	UU	T	C
41 □ S302 □ -Yi	1/4	1/8	137	115	195	156	65	7	6	54	84	5.5	7	7	16	46	74.5	56	36	31	48	48	43	20.5
41 □ S303 □ -Yi	3/8																							
41 □ S603 □ -Yi	3/8		167	145	225	174	78	12	10	67	100		8	14	17	49	104	61	48	30	70	47	56	24.5
41 □ S604 □ -Yi	1/2																							

Wire connection diagram



- Connect in correct polarity.
- Do not apply megger test between terminals.

414S/416S Series (Exia Ⅱ BT5)

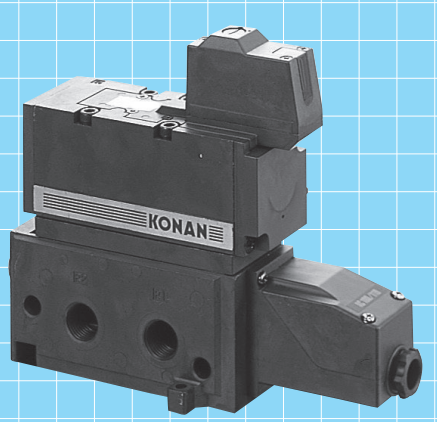
5-Port Solenoid Valves

Intrinsic safety construction

Spool valve system
Ceramic slide valve system — Pilot type

Gasket connection type Rc1/4・3/8・1/2

Return



Specifications

[5-port, sub-plate type]

		Return							
Type		414S30□M		414S60□M		416S30□M		416S60□M	
Port size (Rc)		1/4	3/8		1/2	1/4	3/8		1/2
Effective sectional area (㎟)		25	30	51	60	24	28	51	60
Operating pressure		0.2 ～ 0.7MPa				0.12 ～ 0.7MPa			
Pressure resistance		1.05MPa							
Operating temperature		− 5 ～ 50℃				− 10 ～ 60℃			
Operating frequency		1 cycle / s max.							
Operation (response) time		0.14 s max.		0.16 s max.		0.14 s max.		0.16 s max.	
Solenoid	Rated voltage	DC12V・34mA − (Intrinsic safety Circuit Rating)							
	Temperature rise	12 deg max.							
	Insulation class	JIS C 4003 Class B							
	Insulation resistance	10MΩ min. (DC500V)							
	Power consumption	0.4W							
	Explosion-proof standard	Intrinsic safety construction : iExia Ⅱ BT5							
Mass (kg)		Approx.1.3		Approx.2.2		Approx.1.3		Approx.2.2	
Explosion-proof verification approval No.		When combined with other explosion-proof barriers satisfying the conditions mentioned in page D-6: No. TC14814							
Use conditions		(1) Use the explosion-proof barrier in combination with the SAF3-5 or the barrier satisfying the condition specified in page D-6 [When selecting other explosion-proof barriers]. (2) The parts and the wiring cannot be changed. (3) In combination with one electromagnetic valve, use one explosion-proof barrier alone.							

※ If the ambient temperature is less than 5℃ , remove the moisture in the working fluid, and be careful not to allow freezing.

Model Code

When ordering,specify the model as follows:

41 ① S ② M – YAi

① Type of main valve

② Type of body, port size

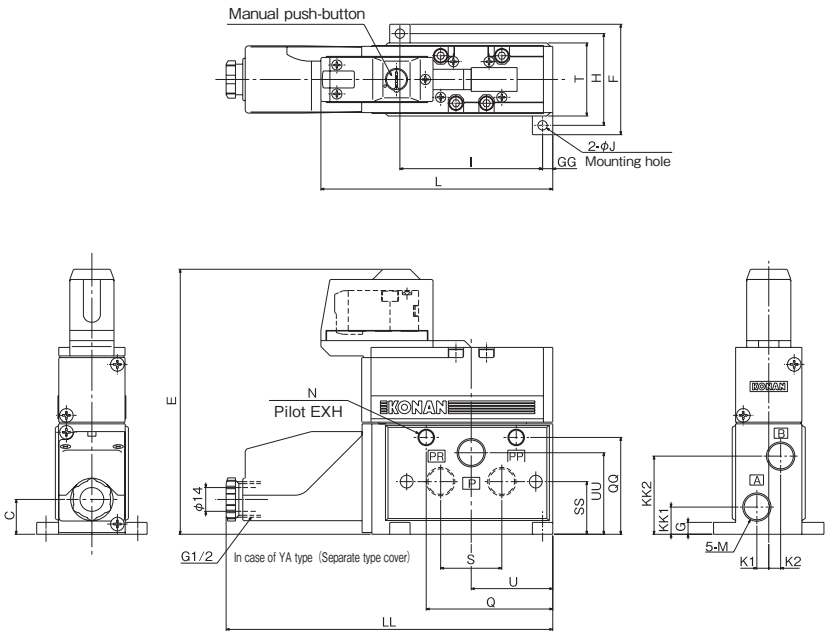
① Type of main valve

Type of main valve	Designation
Spool valve system	4
Ceramic slide valve system	6

② Type of body, port size

Type of body	Port size	Designation
B30	Rc1/4	302
	Rc3/8	303
B60	Rc3/8	603
	Rc1/2	604

Outside Dimensions

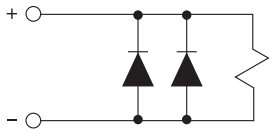


■ Dimension Table

Unit : mm

Type code \ Sign	M (Rc)	N (Rc)	L	L2	LL	E	F	G	GG	H	I	J	K1	K2	KK1	KK2	Q	QQ	S	SS	U	UU	T	C
41 □ S302M-YAi	1/4	1/8	137	154	195	156	65	7	6	54	84	5.5	7	7	16	46	74.5	56	36	31	48	48	43	20.5
41 □ S303M-YAi	3/8																							
41 □ S603M-YAi	3/8		167	176	225	174	78		10	67	100		8	14	17	49	104	61	48	30	70	47	56	24.5
41 □ S604M-YAi	1/2																							

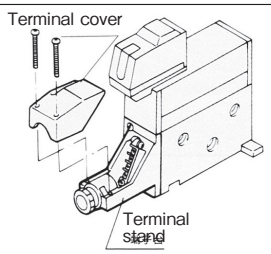
Wire connection diagram



- Connect in correct polarity.
- Do not apply megger test between terminals.

ZA terminal block

- KONAN's original wiring system resistant to vibration. Optimum wiring method for wiring by using external wiring, or wiring requiring a long lead wire.
- The standard equipment includes a rigid terminal cover made of aluminum die-casting.



454S/454D Series

5-Port Solenoid Valves

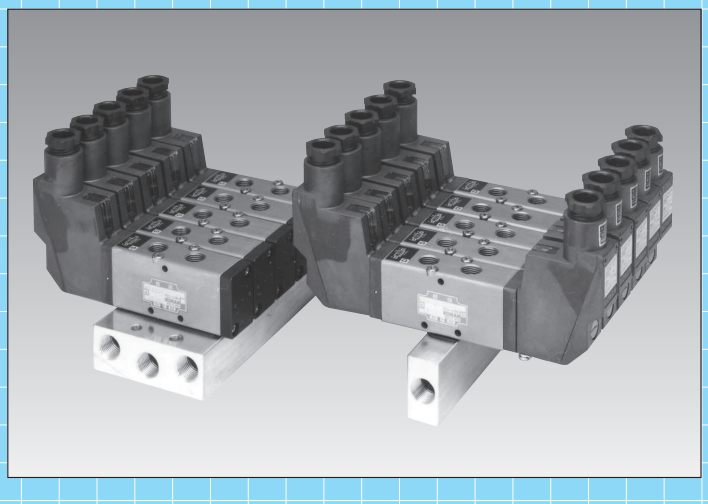
Intrinsic safety construction

Manifold Type

i2G4/Exia Ⅱ BT5

Spool valve system, Pilot type

Return / Hold

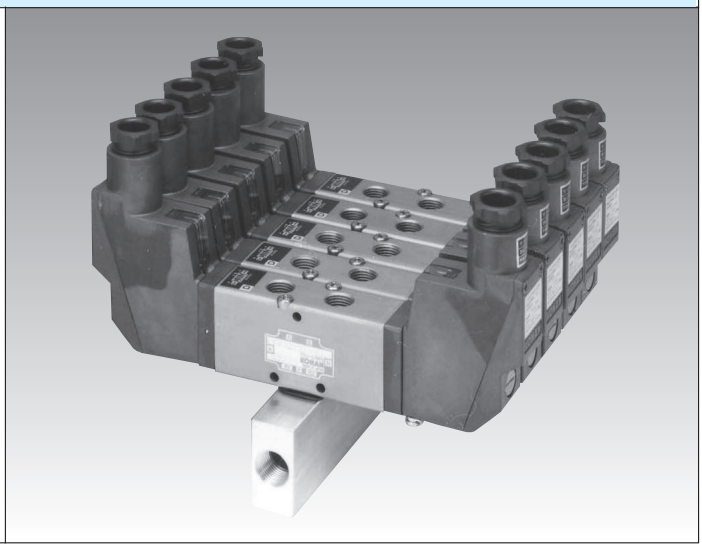


Individual exhausting : C

This is the quick mounting manifold type solenoid valve in which R1 and R2 (exhaust) ports can be individually taken out together with the solenoid valve. This type is optimum in case when to control connected load (air cylinder)'s speed with the exhaust valve (exhaust throttling valve).

Applicable types of the main body

B20,B40

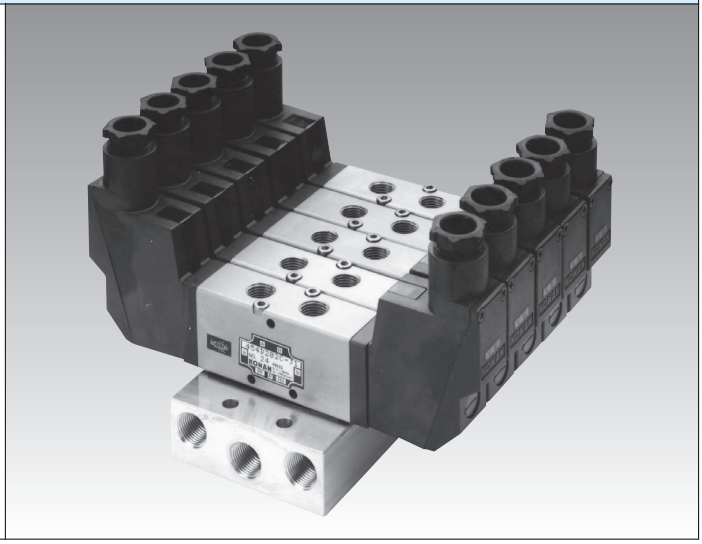


Concentrated exhaust : D

This is the quick mounting manifold type solenoid valve in which R1 and R2 (exhaust) ports of the mounted solenoid valves are made common.
Making exhaust ports common and collective facilitates line control.

Applicable types of the main body

B20,B40



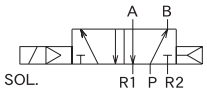
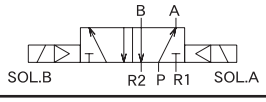
Model Code

When ordering,specify the model as follows:

454 ❶ ❷ ❸ – Yi – ❹ ❺

- ❶ Type of fow path
- ❷ Type of body, port size
- ❸ Types of barriers to be combined
- ❹ Type of manifold
- ❺ No. of valve

❶ Type of flow path

Type of valve	JIS symbol	Designation
Return		S
Hold		D

● We can manufacture mixed manifolds of both S: return and D: hold type. Enquire when ordering.

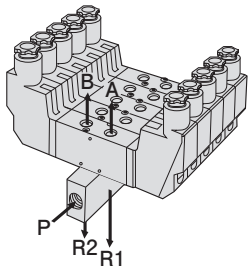
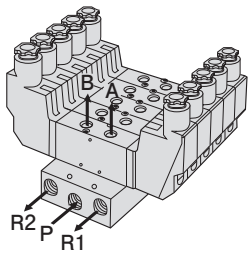
❷ Type of body, port size

Type of body	Port size	Designation
B20	Rc1/4	202
	Rc3/8	203
B40	Rc3/8	403
	Rc1/2	404

❸ 組合せるバリヤの種類

Explosion-proof standard	Barrier form	Designation
Exia Ⅱ BT5	Combination with barrier satisfying the conditions in page D-6,D-8 [When selecting other explosion-proof barriers].	M
i2G4	MTL728 +	C

❹ Type of manifold

Type of manifold		Designation
Individual exhausting		C
Concentrated exhaust		D

❺ No. of valve

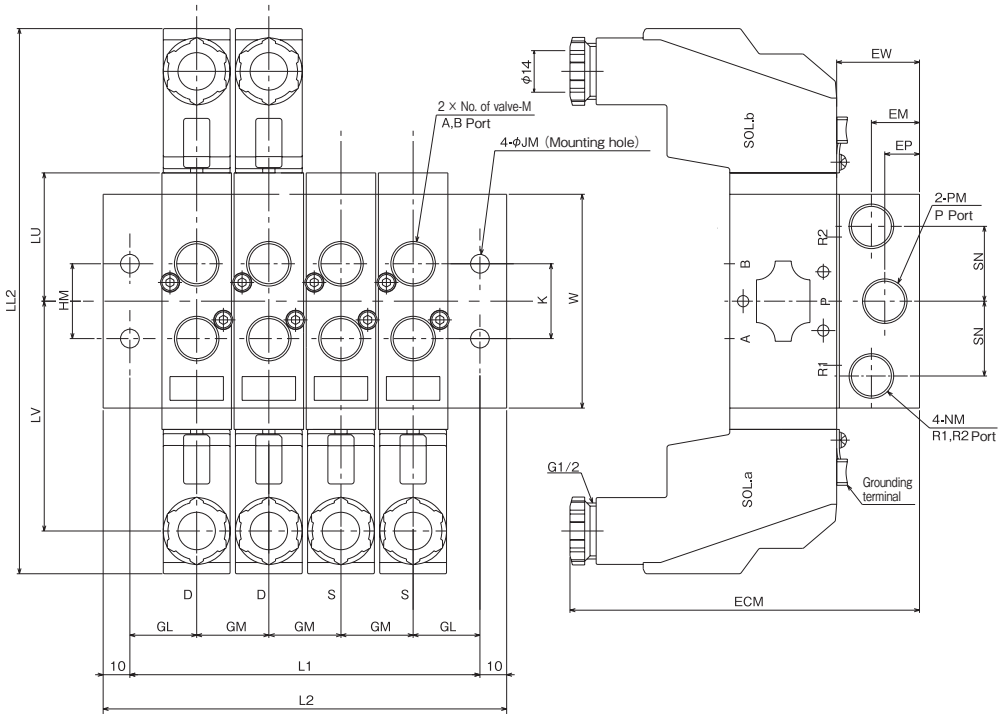
No. of valve	Designation
2	02
3	03
⋮	⋮
19	19
20	20
※ Spare solenoid valve Specify "00" when ordering the double acting solenoid valve main body <without coupling base> of spare parts or the like.	00

Explosion-proof verification approval No.	When combined with other explosion-proof barriers satisfying the conditions mentioned in page D-6, D-8: No. TC14813 When combined with safety barrier, MTL728+: No. T42155
Use conditions	(1) Use in combination with specified safety barrier. ● If selecting a solenoid valve of Exia II BT5, use the explosion-proof barrier in combination with the SAF3-5 or the barrier satisfying the condition specified in page D-6,D-8 [When selecting other explosion-proof barriers]. ● If selecting i2G4 explosion-proof standard part, use the safety barrier in combination with MTL728+. (2) The parts and the wiring cannot be changed. (3) In combination with one electromagnetic valve, use one explosion-proof barrier alone.

Outside Dimensions

■ Concentrated exhaust

454 □ 20 □□ – Yi – D □
454 □ 40 □□ – Yi – D □



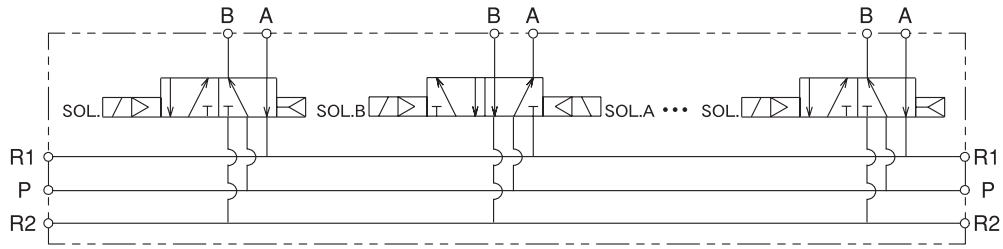
■ Dimension Table

Unit : mm

Type code \ No. of valve		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
454 □ 202 □ /203 □ -Yi-D □	L1	77	104	131	158	185	212	239	266	293	320	347	374	401	428	455	482	509	536	563
	L2	97	124	151	178	205	232	259	286	313	340	367	394	421	448	475	502	529	556	583
454 □ 403 □ /404 □ -Yi-D □	L1	97	134	171	208	245	282	319	356	393	430	467	504	541	578	615	652	689	726	763
	L2	117	154	191	228	265	302	339	376	413	450	487	524	561	598	635	672	709	746	783

Type code	M	NM	PM	LU	ECM	EN	EP	EW	GL	GM	HM	JM	K	LL2	LV	SN	W
454 □ 202 □ -Yi-D □	Rc1/4	Rc3/8	Rc3/8	48	130	18	13	30	25	27	28	7	28	204	86	28	80
454 □ 203 □ -Yi-D □	Rc3/8																
454 □ 403 □ -Yi-D □	Rc3/8	Rc1/2	Rc1/2	63	137	23	18	40	30	37	38	9	36	234	101	38	110
454 □ 404 □ -Yi-D □	Rc1/2																

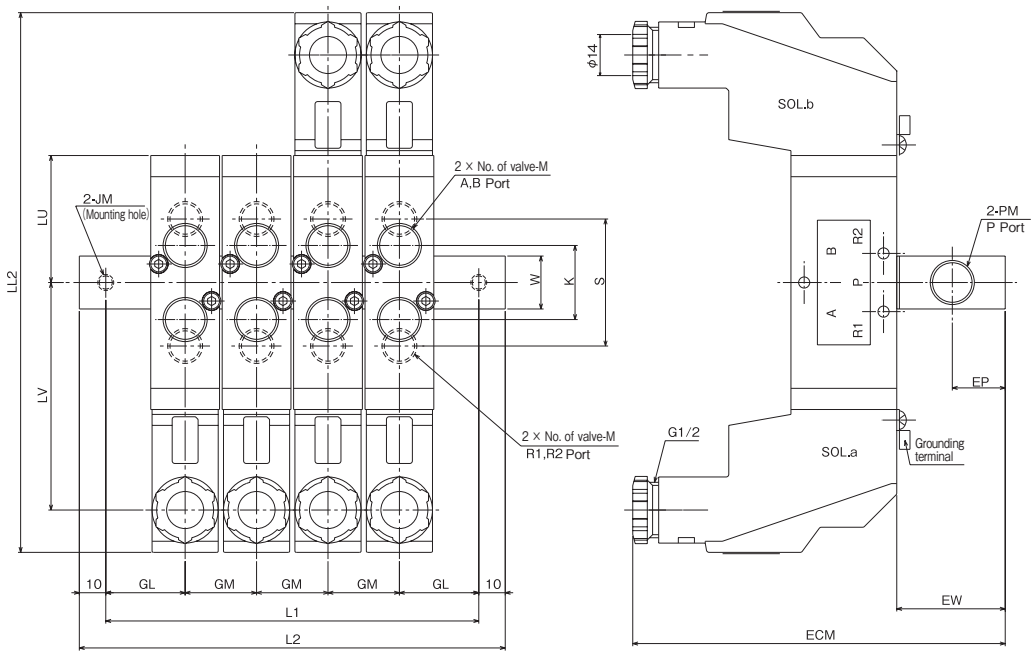
■ JIS symbol



Outside Dimensions

■ Individual exhausting

454 □ 20 □□ – Yi – C □
454 □ 40 □□ – Yi – C □



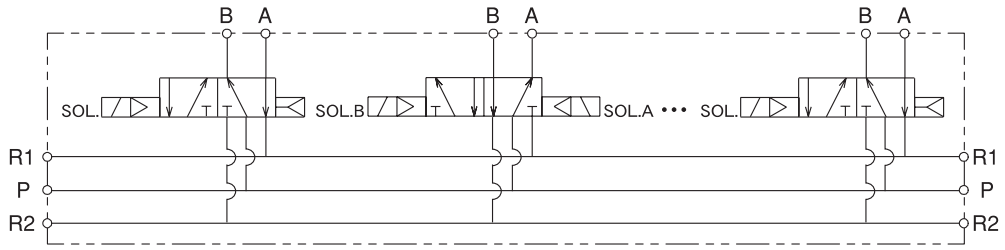
■ Dimension Table

Unit : mm

Type code \ No. of valve		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
454 □ 202 □ /203 □ -Yi-C □	L1	87	114	141	168	195	222	249	276	303	330	357	384	411	438	465	492	519	546	573
	L2	107	134	161	188	215	242	269	296	333	350	377	404	431	458	485	512	539	566	593
454 □ 403 □ /404 □ -Yi-C □	L1	117	154	191	228	265	302	339	376	413	450	487	524	561	598	638	672	709	746	783
	L2	137	174	201	248	285	322	359	396	433	470	507	544	581	618	655	692	729	766	803

Type code	M	NM	PM	LU	ECM	EP	EW	GL	GM	JM	K	LL2	LV	SN	W
454 □ 202 □ -Yi-C □	Rc1/4	Rc1/4	Rc3/8	48	140	20	40	30	27	M6 Depth 8	28	204	86	48	20
454 □ 203 □ -Yi-C □	Rc3/8														
454 □ 403 □ -Yi-C □	Rc3/8	Rc3/8	Rc1/2	63	147	25	50	40	37	M8 Depth 12	36	234	101	68	30
454 □ 404 □ -Yi-C □	Rc1/2	Rc1/2													

■ JIS symbol



What's d2G4 / Exd Ⅱ BT4?

For explosion-proof construction of electric equipment, the construction standards and technical standards, specifying 6 explosion-proof constructions each, are established according to the application, type of explosive gas used, or location of the equipment. Such specifications are expressed in codes such as "d2G4" and "Exd Ⅱ BT4." Each of the codes has the following meanings.

d2G4

Explosion-proof construction standard for electric equipment

d — Type of explosion-proof construction

d	Flame-proof enclosure construction
f	Pressurized apparatus construction
e	Increasedn safty construction
o	Oil-immersion construction
i	Intrinsic safty construction
s	Special type of protection construction

2 — Explosive class

1	Propane etc.
2	Ethylene etc.
3a	Hydrogen / Water gas
3b	Carbon disulfide
3c	Acetylene
3n	All

G4 — Ignition degree (ignition temperature)

G1	Over 450℃
G2	300 to 450℃
G3	200 to 300℃
G4	135 to 200℃
G5	100 to 135℃
G6	85 to 100℃

Exd Ⅱ BT4

Technical standards conforming to the international standards (Ex explosion-proof type)

Ex — Type of explosion-proof construction

d	Flame-proof enclosure construction
p	Pressurized apparatus construction
e	Increasedn safty construction
o	Oil-immersion construction
ia ib	Intrinsic safty construction
s	Special type of protection construction

d — Gas or steam type

ⅡA	Propane etc.
ⅡB	Ethylene etc.
ⅡC	All

ⅡB — Temperature class (surface max.temperature)

T1	450℃
T2	300℃
T3	200℃
T4	135℃
T5	100℃
T6	85℃

T4

Explosive gas classification according to explosive class and ignition degree (construction standard)

Explosion class \ Ignition degree		G1	G2	G3	G4	G5	G6
1		Acetone, Ammonia, Carbon monoxide, Ethane, Acetic acid, Ethyl acetate, Toluene, Propane, Benzene, Methanol, Methane	Ethanol, Isopentyl acetate, 1-butanol, Butane, Acetic anhydride	Gasoline, Hexane	Acetaldehyde, Ethyl ether		
2		Coal gas	Ethylene, Ethylene oxide				
3	a	Water gas, Hydrogen					
	b						
	c		Acetylene			Carbon disulfide	
	n	Water gas /Hydrogen/Carbon disulfide/Acetylene					

Note) ▭ gray marked are applicable range of d2G4.

Explosive gas classification according to gas or steam type and temperature class (Ex explosion-proof type)

Gas or steam type \ Temperature class	T1	T2	T3	T4	T5	T6
ⅡA	Acetone, Ammonia, Carbon monoxide, Ethane, Acetic acid, Ethyl acetate, Toluene, Propane, Benzene, Methanol, Methane	Ethanol, 1-butanol, Butane	Gasoline, Hexane	Acetaldehyde, Trimethylamine		
ⅡB	Acrylonitrile, Coke oven gas	Ethylene, Ethylene oxide	Dimethyl ether	Diethyl ether		
ⅡC	Hydrogen	Acetylene			Carbon disulfide	

Note) ▭ gray marked are applicable range of Exd Ⅱ BT4.

KONAN®

KONAN ELECTRIC CO.,LTD.

Tokyo Branch
Shiba-Sanesu-Wakamatsu Bldg.7-8, Shiba 4-chome, Minatoku, Tokyo 108-0014, Japan
Phone:+81-3-3454-1711 Fax:+81-3-3454-8699

Osaka Branch
Hankyu Terminal Bldg.1-4, Shibata 1-chome, Kitaku, Osaka 530-0012, Japan
Phone:+81-6-6373-6701 Fax:+81-6-6373-6740

Seibu Branch
Momiji Hiroshima Hikarimachi Bldg.12-20, Hikarimachi, 1-chome, Higashiku, Hiroshima, 732-0052, Japan
Phone:+81-82-568-0071 Fax:+81-82-568-0072

International Operation Division
4-97, Uedahigashimachi, Nishinomiya, Hyogo, 663-8133, Japan
Phone:+81-798-48-5931 Fax:+81-798-40-6659

URL=http://www.konan-em.com/

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001 RvA C024 MGMT.SYS.

Tohoku Office	Phone:+81-22-215-1195
Chiba Office	Phone:+81-43-305-1401
Nagoya Office	Phone:+81-52-581-6541
Kanazawa Office	Phone:+81-76-233-1411
Hiroshima Office	Phone:+81-82-568-0071
Takamatsu Office	Phone:+81-87-835-0411
Kitakyushu Office	Phone:+81-93-541-0281

Distributing Agent

2013.04
Please note that this catalog is subject to revision without notice.
2013.04-1版-1刷-K