

INSTRUCTION MANUAL PNEUMATIC VALVE 4KA4, 4KB4 M4KA4, M4KB4

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

SAFETY PRECAUTIONS

When designing and manufacturing a device using CKD products, the manufacturer is obligated to manufacture a safe product by confirming safety of the system comprising the following items:

- · Device mechanism
- · Pneumatic or water control circuit
- · Electric control that controls the above

It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.

Observe warnings and precautions to ensure device safety.

Check that device safety is ensured, and manufacture a safe device.



WARNING

- 1. This product is designed and manufactured as a general industrial machine part. It must be handled by someone having sufficient knowledge and experience.
- 2. Use this product within its specifications.

This product cannot be used beyond its specifications. Additionally, the product must not be modified or machined.

This product is intended for use in general industrial devices and parts. Use beyond such conditions is not considered. Consult with CKD for details when using the product beyond the unique specification range, outdoors, or in the following conditions or environments. In any case, measures for safety shall be provided when the vavle malfunctions.

- ① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
- ② Use for applications where life or assets could be adversely affected, and special safety measures are required.
- 3. Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO4414, JIS B 8370 (pneumatic system rules)

JFPS2008 (principles for pneumatic cylinder selection and use)

Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, standards and regulations, etc.

- 4. Do not handle, pipe, or remove devices before confirming safety.
 - ① Inspect and service the machine and devices after confirming safety of the entire system related to this product.
 - ② Note that there may be hot or charged sections even after operation is stopped.
 - When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Release any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
 - ④ When starting or restarting a machine or device that incorporates pneumatic components, make sure that system safety, such as pop-out prevention measures, is secured.

- 5. Observe warnings and cautions on the pages below to prevent accidents.
- ■The safety cautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.



Failure to pay attention to DANGER notices may cause a situ-

ation that results in a fatality or serious injury and that requires urgent addressing

WARNING: Failure to pay attention to WARNING notices may result in a fatality or serious injury.

CAUTION: Failure to pay attention to CATION notices may result in injury

or damage to equipment or facilities.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

Precautions with regard to guarantee

Guarantee period

The guarantee period of our product shall be one (1) year after it is delivered to the place specified by the customer.

Guarantee coverage

If any failure for which CKD CORPORATION is recognized to be responsible occurs within the above warranty period, a substitute or necessary replacement parts shall be provided free of charge, or the product shall be repaired free of charge at the plant of CKD CORPORATION.

However, the guarantee excludes following cases:

- ① Defects resulting from operation under conditions beyond those stated in the catalogue or specifications.
- ② Failure resulting from malfunction of the equipment and/or machine manufactured by other companies.
- ③ Failure resulting from wrong use of the product.
- Failure resulting from modification or repairing that CKD CORPORATION is not involved in.
- 5 Failure resulting from causes that could not be foreseen by the technology available at the time of deliv-
- Failure resulting from disaster that CKD is not responsible of.

Guarantee stated here covers only the delivered products. Any other damage resulting from failure of the delivered products is not covered by this guarantee.

Confirmation of product compatibility

Our customer shall be responsible of confirming compatibility of our product used in our customer's system, machinery or device.

UNPACKING (Section 3)



Bags containing solenoid valves should be opened only when you are ready to connect the valves to the pipes immediately afterward.

If bags are opened before the valves are ready to be connected to the pipes, the entry of foreign matter from the piping ports could cause the solenoid valves to fail or malfunction.

INSTALLATION (Section 4)



If you have to use the product under conditions that are different from the specified conditions or if you intend to use the product for a special application, be sure to consult us about the product specifications before using the product.

ENVIRONMENT (Section 4.1)



- a) In a dusty environment, foreign matter may enter even through the exhaust port.
 - The movement of the exhaust valve causes a respiratory action at the exhaust valve, which may cause inhalation of foreign matter near the exhaust port. This potential situation would be worse if the exhaust port is facing upward. Attach a silencer to the exhaust port or have the exhaust port face downward.
- b) Keep the solenoid valve system dry. Take care to avoid direct contact with dripping water or splashes of cutting oil.
 - If the solenoid valve system is wet by a direct contact with water or cutting oil, an electrical leak or burnt sole noid coils may result. Protect the solenoid valve system by using a cover or by installing it inside a paneled casing. If the cylinder rod is splashed with cutting oil, the oil may penetrate through the cylinder into the secondary side piping of the solenoid valve. This must be prevented to avoid malfunctions. Consult us for preventive measures.
- c) The coils will produce heat.
 - Particularly if the solenoid valve system is installed in a control board or if the solenoid coils need to be energized for a long time, consider providing sufficient ventilation to release the heat. The coils can get very hot.
- d) Do not use the solenoid valve system in an atmosphere that includes a corrosive gas or solvent vapors.
 - Do not use the solenoid valve system in an atmosphere that includes a corrosive gas such as the sulfur dioxide gas or in an atmosphere that includes solvent vapors.
- e) Vibrations and shocks
 - Do not subject the solenoid valve system to vibrations 50m/s² or stronger or shocks 300m/s² or stronger.



- f) Avoid using the solenoid valve system in a humid environment because the humidity is likely to cause condensation with a change in the temperature.
- g) Do not use the normal type solenoid valves for an application that requires conformity with explosion-proof specifications. Choose explosion-proof solenoid valves instead.
- h) The packing and gaskets may deteriorate sooner than usual if used in an atmosphere with a higher than normal density of ozone (for example, the atmosphere near a beach or in an area with frequent thunderstorms).
 - Consult us for the packing and gaskets to be used in an atmosphere with a higher ozone density.

INSTALLATION (Section 4.2)



- WARNING: When installing a solelloid valve alle, hold it in position by means of the pipes connected to it. When installing a solenoid valve unit, never attempt to
 - Mount the solenoid valve by applying the mounting screws and/or mounting plate to the solenoid valve.

CAUTION:

- a) Observe the recommended tightening torque when connecting pipes.
 - Observing the recommended tightening torque prevents air leakage and damage to the screw threads. To prevent damage to the screw threads, first use your hand to lightly tighten the screw and then use a tool to tighten the screw to the recommended torque.
- b) Make sure that the pipes will not be disconnected at the joints by mechanical movements, vibrations or tension.
 - If the exhaust piping of the pneumatic circuit is disconnected, the actuator speed control is disabled.
 - If the above happens to a chuck holding mechanism, the chuck will open. The inadvertent opening of the chuck may cause a serious accident.
- c) When supplying the compressed air for the first time after completing the piping, be sure to check every joint in the piping for air leakage.
- d) When supplying the compressed air for the first time after completing the piping, increase the air pressure gradually but never introduce a highly-pressurized air suddenly.
 - A sudden introduction of a highly-pressurized air may disconnect pipes at joints and/or cause the tubes to jump around, any of which may cause an injury.
- e) Do not decrease the inside diameter of the piping from any of the solenoid valve exhaust ports to a diameter less than the exhaust pipe connecting port size.
 - Normal operation of the actuator depends on the smoothness of the exhaust flow. With a manifold system, a restriction to the exhaust flow may prevent normal operation of other solenoid valves.
- f) Removal of foreign matter
 - Rust and other foreign matter in the pneumatic circuit may cause a malfunction or leakage from the valve seat. Insert a filter (maximum allowable particle size $5\,\mu$ m or less) immediately upstream of the solenoid valve.
- g) Air supply
 - Do not restrict the flow of air through the air supply piping. With a manifold system with multiple stations, a drop in the air supply pressure may cause trouble through a delay in the operation timing.

WIRING (Section 4.4)

/!\ WARNING :

Before wiring, read the instruction manual carefully and understand the instructions.

 A person who wires needs to have knowledge for safely performing such operation based on the understanding about the mechanisms and operating principles of solenoid valves.



Before supplying the power, check the power supply voltage and the current type (AC or DC).

MANUAL OPERATING DEVICE (Section 5.2)



- a) Once the manual operating device has been operated, always return it to its origin (initial position), and then start the operation of the device.
- b) Before using the manual override, make sure that nobody is present near the cylinder to be activated.

AIR QUALITY (Section 5.3)

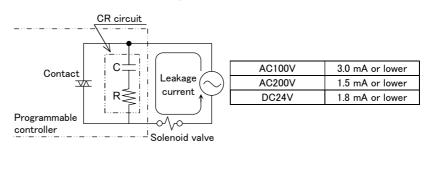


- a) Do not supply anything other than compressed air.
- b) Supply clean compressed air without any mixture of corrosive gas.

- a) Compressed air usually contains a large amount of drain, oxidized oil, tar, foreign matter, and rust from the piping. Filter out those elements in the supplied air because they may cause a malfunction and decrease service life. In addition, clean the exhaust before it is released to the air to minimize pollution.
- b) Once you have lubricated a pre-lubricated valve, the valve is no longer capable of running without being lubricated from the outside. Do not leave the valve without lubrication but keep it lubricated.
- c) Do not use spindle oil or machine oil. They may induce expansion of the rubber parts, which may cause a malfunction.

CAUTION:

- a) Check for the presence of any current leak from the external control device because it may cause an erroneous valve operation.
 - When a programmable controller or a similar control device is used, a current leak may prevent the normal returning of the valve when the solenoid is de-energized.
- b) Restriction on current leak
 - When controlling solenoid valves using a programmable controller or a similar control device, make sure that the current leak in the programmable controller output is equal to or less than the level shown in the table below. A current leak larger than the allowable level may cause an erroneous valve operation.



PERIODIC INSPECTION (Section 6.1)



- Before providing a maintenance service, cut the power and the supply of compressed air and confirm the absence of residual pressure.
 - The above is required to ensure safety.



Regularly perform the daily and periodic inspections to correctly maintain product performance.

If the product is not correctly maintained, product performance may deteriorate dramatically, resulting in a shorter service life, fractures of components, and malfunctions.

DISASSEMBLING AND REASSEMBLING (Section 6.2)



- Before disassembling and reassembling solenoid valves, read the instruction manual carefully and understand the instructions.
 - A person who disassembles and reassembles a solenoid valve system needs to have a knowledge for safely performing such operation based on the understanding about the mechanisms and operating principles of solenoid valves.
 - Personnel involved in this step must have passed the Pneumatic Pressure Skill Test Class 2 or higher.

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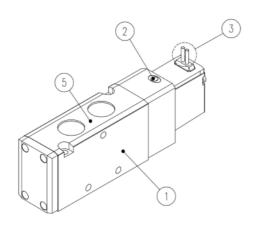
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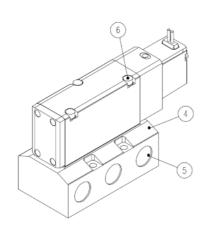


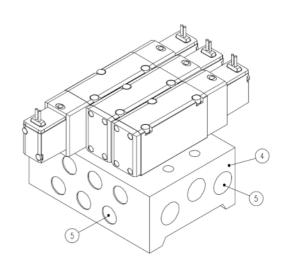
PART NAME AND DESCRIPTION



Direct piping unit







Subplate piping unit

Subplate piping manifold

No.	Part Name	explanation
1	Valve unit	There are direct pipng and sub plate piping
	Manual operating device	It uses in case of manual operation. There are a non lock and a lock formula
3	Wire connection	It connections to the electric circuit
4	Sub plate	It is a block for the piping
(5)	Piping Port	Port P is the supply port ; port R is the exhaust port ; port A and B is the Output port
6	Mounting screw	There are two every individual valve and it fixes the valve unit on the Various base.

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2. INTERNATIONAL SYSTEM OF UNITS (SI)

In this manual, values are expressed using the International System of Units (SI).

Use the table below to convert them into values expressed in conventional units.

Table of conversion between SI units and conventional units

(The values printed in Bolds fonts are values given in the International System of Units (SI)):

Example (converting a pressure value):

 $1 \text{kgf/cm}^2 \rightarrow 0.0980665 \text{MPa} \quad 1 \text{MPa} \rightarrow 1.01972 \times 10 \text{kgf/cm}^2$

• Force

N	dyn	kgf
1	$1 imes10^{5}$	1.01972×10^{-1}
1×10 ⁻⁵	1	1.01972×10^{-6}
9.80665	9.80665×10^{5}	1

• Stress

Pa or N/m²	MPa or N/mm²	kgf/mm ²	kgf/cm ²
1	1×10 ⁻⁶	1.01972×10^{-7}	1.01972×10^{-5}
1×10^6	1	1.01972×10^{-1}	1.01972×10
9.80665×10^{6}	9.80665	1	$1 imes10^{2}$
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1

Note: 1Pa=1N/m², 1MPa=1N/mm²

• Pressure

Pa	kPa	MPa	bar	kgf/cm ²	atm	mmH_2O	mmHg or Torr
1	1×10 ⁻³	1×10 ⁻⁶	1×10 ⁻⁵	1.01972×10^{-5}	9.86923×10^{-6}	1.01972×10^{-1}	7.50062×10^{-3}
1×10^3	1	1×10 ⁻³	1×10 ⁻²	1.01972×10^{-2}	9.86923×10^{-3}	1.01972×10^{2}	7.50062
1×10^6	1×10^3	1	1×10	1.01972×10	9.86923	1.01972×10^{5}	7.50062×10^{3}
$1 imes10^5$	1×10^2	1×10 ⁻¹	1	1.01972	9.86923×10^{-1}	1.01972×10^{4}	7.50062×10^{2}
9.80665×10^{4}	9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1	9.67841×10^{-1}	1×10^4	7.35559×10^{2}
1.01325×10^{5}	1.01325×10^{2}	1.01325×10^{-1}	1.01325	1.01323	1	1.03323×10^{4}	7.60000×10^{2}
9.80665	9.80665×10^{-3}	9.80665×10^{-6}	9.80665×10^{-5}	1×10 ⁻⁴	9.67841×10^{-5}	1	7.35559×10^{-2}
1.33322×10^{2}	1.33322×10^{-1}	1.33322×10^{-4}	1.33322×10^{-3}	1.35951×10^{-3}	1.31579×10^{-3}	1.35951×10	1

Note: 1Pa=1N/m²



3. UNPACKING



Bags containing solenoid valves should be opened only when you are ready to connect the valves to the pipes immediately afterward.

- If bags are opened before the valves are ready to be connected to the pipes, the entry of foreign matter from the piping ports could cause the solenoid valves to fail or malfunction.
- a) Check the model number imprinted on the product to make sure that the product you received is exactly the product you ordered.
- b) Check the exterior of the product for any damage.
- c) Before using the product, read the supplied documentation.

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4. INSTALLATION



If you have to use the product under conditions that are different from the specified conditions or if you intend to use the product for a special application, be sure to consult us about the product specifications before using the product.

4.1 Environment



- a) In a dusty environment, foreign matter may enter even through the exhaust port.
 - The movement of the exhaust valve causes a respiratory action at the exhaust valve, which may cause inhalation of foreign matter near the exhaust port. This potential situation would be worse if the exhaust port is facing upward. Attach a silencer to the exhaust port or have the exhaust port face downward.
- b) Keep the solenoid valve system dry. Take care to avoid direct contact with dripping water or splashes of cutting oil.
 - If the solenoid valve system is wet by a direct contact with water or cutting oil, an electrical leak or burnt solenoid coils may result. Protect the solenoid valve system by using a cover or by installing it inside a paneled casing. If the cylinder rod is splashed with cutting oil, the oil may penetrate through the cylinder into the secondary side piping of the solenoid valve. This must be prevented to avoid malfunctions. Consult us for preventive measures.
- c) The coils will produce heat.
 - Particularly if the solenoid valve system is installed in a control board or if the solenoid coils need to be energized for a long time, consider providing sufficient ventilation to release the heat. The coils can get very hot.
- d) Do not use the solenoid valve system in an atmosphere that includes a corrosive gas or solvent vapors.
 - Do not use the solenoid valve system in an atmosphere that includes a corrosive gas such as the sulfur dioxide gas or in an atmosphere that includes solvent vapors.
- e) Vibrations and shocks
 - Do not subject the solenoid valve system to vibrations 50m/s^2 or stronger or shocks 300m/s^2 or stronger.
- f) Avoid using the solenoid valve system in a humid environment because the humidity is likely to cause condensation with a change in the temperature.



CAUTION:

- g) Do not use the normal type solenoid valves for an application that requires conformity with explosion-proof specifications. Choose explosion-proof solenoid valves instead.
- h) The packing and gaskets may deteriorate sooner than usual if used in an atmosphere with a higher than normal density of ozone (for example, the atmosphere near a beach or in an area with frequent thunderstorms).
 - Consult us for the packing and gaskets to be used in an atmosphere with a higher ozone density.

4.2 Installation

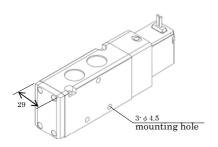


- When installing a solenoid valve unit, never attempt to hold it in position by means of the pipes connected to it.
 - Mount the solenoid valve by applying the mounting screws and/or mounting plate to the solenoid valve.
- 4.2.1 A work space for installation, removal, wiring, and piping operations should be provided around the installed solenoid valve system.

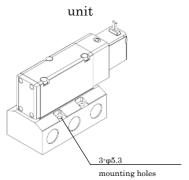
4.2.2 Direct mounting

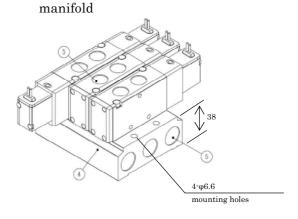
Direct piping Type
 Use three or four through holes

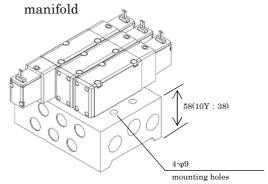
unit



2) Sub plate piping Type
Use three or four mounting holes









4.3 Piping



- a) Observe the recommended tightening torque when connecting pipes.
 - Observing the recommended tightening torque prevents air leakage and damage to the screw threads. To prevent damage to the screw threads, first use your hand to lightly tighten the screw and then use a tool to tighten the screw to the recommended torque.
- b) Make sure that the pipes will not be disconnected at the joints by mechanical movements, vibrations or tension.
 - If the exhaust piping of the pneumatic circuit is disconnected, the actuator speed control is disabled.
 - If the above happens to a chuck holding mechanism, the chuck will open. The inadvertent opening of the chuck may cause a serious accident.
- c) When supplying the compressed air for the first time after completing the piping, be sure to check every joint in the piping for air leakage.
- d) When supplying the compressed air for the first time after completing the piping, increase the air pressure gradually but never introduce a highly-pressurized air suddenly.
 - A sudden introduction of a highly-pressurized air may disconnect pipes at joints and/or cause the tubes to jump around, any of which may cause an injury.
- e) Do not decrease the inside diameter of the piping from any of the solenoid valve exhaust ports to a diameter less than the exhaust pipe connecting port size.
 - Normal operation of the actuator depends on the smoothness of the exhaust flow. With a manifold system, a restriction to the exhaust flow may prevent normal operation of other solenoid valves.
- f) Removal of foreign matter
 - Rust and other foreign matter in the pneumatic circuit may cause a malfunction or leakage from the valve seat. Insert a filter (maximum allowable particle size $5\,\mu$ m or less) immediately upstream of the solenoid valve.
- g) Air supply
 - Do not restrict the flow of air through the air supply piping. With a manifold system with multiple stations, a drop in the air supply pressure may cause trouble through a delay in the operation timing

Approproate torque

Joint screw	Approproate torque N·m
Rc3/8	13~15
Rc1/2	16~18

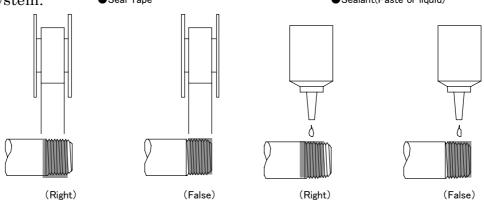


4.3.1 Sealant

Refrain applying sealant or seal tape approx.two pitches of thread from the tip of pipe to avoid some of the sealing substances from falling into piping system.

•Seal Tape

•Sealant(Paste or liquid)



When winding the fluororesin seal tape on the screw part, wind the seal tape two or three times where one or two screw threads remain at the top end of the screw, and then push the tape by tip of the nail to make the tape tightly in contact with the screw. When using the liquid sealant, apply a proper amount of sealant where one or two screw threads remain at the top end of the screw.

At this time, do not apply the sealant to the female screw parts of the machine.

4.3.2 Flushing

Before connecting pipes, flush the interiors of the tubes, solenoid valves, and connected devices to remove foreign matter.

4.3.3 Blow circuit

Do not open the cylinder port circuit to the air because a drop in the air supply pressure may cause a malfunction. Select the external pilot type design instead of the internal pilot type design.

4.3.4 Exhaust port

Minimize the restriction to the flow of the exhaust air because such restriction may cause a delay in the cylinder response. If such a delay happens, the speed needs to be adjusted between the cylinder and solenoid valve.

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4.3.5 Pipe connections

(1) Tubes to be used

For use with solenoid valves with one-touch joints, select tubes of the type specified by us:

Soft nylon tubes (F-1500 Series) Urethane tubes (U-9500 Series) New urethane (NU Series)

- (2) For installation at a site that has spatters in the air, select incombustible tubes or metal pipes.
- (3) For a piping used for both hydraulic and pneumatic controls, select a hydraulic hose.

When combining a spiral tube with a standard one-touch joint, fix the tube origin using a hose band. Otherwise the rotation of the tube will decrease the efficiency of the clamping.

For use in a high-temperature atmosphere, select fastener joints instead of one-touch joints.

(4) When selecting from tubes commercially available, carefully study the accuracy of the outside diameter as well as the wall thickness and the hardness. The hardness of an urethane tube should be 93° C or more (as measured by a rubber hardness meter).

With a tube that does not have a sufficient accuracy of the outside diameter or the specified hardness, a decrease in the chucking force may cause disconnection or difficulty in inserting.

Tube dimensions

Outside diameter	Inside diameter mm		
mm	Soft nylon	Urethane	New ure- thance
φ 10	φ 7.2	ϕ 6.5	φ 7.5
φ 12	φ 8.9	φ8	φ9

Outside diameter allowance

 Soft nylon
 ϕ 10, ϕ 12
 \pm 0.1mm

 Urethane
 ϕ 10, ϕ 12
 + 0.1mm

 New urethance
 ϕ 10, ϕ 12
 + 0.1mm

 -0.15mm
 + 0.15mm

(5) Minimum bending radius of tubes

Observe the minimum bending radius of tubes. Neglecting the minimum bending radius may cause disconnection or leaks.

	Minimum bending radius mm		
Tube bore	Soft nylon	Urethane	New ure- thance
φ 10	40	40	30
φ 12	55	50	36

(6) Cutting a tube

To cut a tube, use a tube cutter to cut the tube perpendicularly to the length of the tube. Inserting an obliquely cut end of a tube may cause air leakage.



(7) Tube connections

Do not bend a tube immediately at where it is connected to the joint but lead it out straight from the end of the joint for a length equal to or greater than the outside diameter of the tube. The tension applied sideways through the tube should not exceed 40N.

(8) Blank plug to be used

For use with a solenoid valve with a one-touch joint, select the blank plug specified by us: Blank plug GWP□-B Series

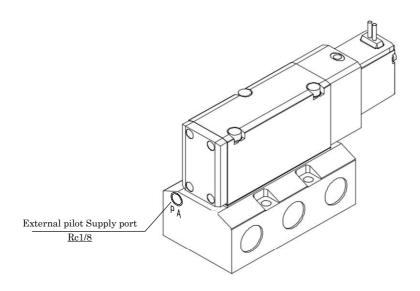
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4.3.6 External pilot (K) piping port

Pilot air is individual supply in the external pilot (K) type. Supply port is Rc1/8, so pay attention to piping connecting position not to mistake. If it isn't correctly piped, it causes the malfunction.

unit



4.4 Wiring

An electrical shock hazard exists during wiring, or disassembly of the DIN terminal box. Turn OFF the power completely before starting such work.

CAUTION: Before supplying the power, check the power supply voltage and the current type (AC or DC).



- 1) Caution for wiring
 - (1) When using the small terminal box and water-proof is required, use cab-tire cords ϕ 4.5 to ϕ 7 in outer diameter (water-resistance is improved, but not for outdoor use).
 - (2) The connector type (C, C1, C2, C3, D, D1, D2, D3) should be used in a place with little dust and not directly exposed to water and oil.
 - (3) For the electrical circuit, use a switching circuit free of chattering.
 - (4) The electrical circuit should have fuses.
 - (5) Be sure that the operation voltage is within 10% of the rated voltage.

2) Wire connection

Name	Grommet (standard)	Small terminal box	Small terminal box with indicator light	Small terminal box with surge suppressor and indicator light
Option code	No code	В	L	LS
ape	Lead wire 300mm (20/0.18)	180°	180°	180
Circuit	0		(~)° AC (~)° (±)° DC (∓)°	(~)° Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z

Name	Plug-in connector C type with lead wire	Plug-in connector C type without lead wire	Plug-in connector C type with lead wire, surge suppressor and indicator light	Plug-in connector C type without leadwire, surge suppressor and indicator light
Option code	C	C1	C2	СЗ
Shape	Lead wire 300mm (11/0.16)		Lead wire 300mm (11/0.16)	
Circuit	o		$(\sim)\circ -$ AC $(\sim)\circ -$ $(\pm)\circ -$ DC $(\mp)\circ -$	Red Black

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ame	Plug-in connector D type with lead wire	Plug-in connector D type without lead wire	Plug-in connector D type with lead wire, surge suppressor and indicator light	Plug-in connector D type without leadwire, surge suppressor and indicator light
Option code	D	D1	D2	D3
Shape	Lead wire 300mm (11/0.16)		Lead wire 300mm (11/0.16)	
Circuit			(~)o− AC (~)o− (±)o− DC (∓)o−	

Name	Surge suppre	ssor attached
Option code	5	S
Shape	DC(only grommet lead wire)	AC,DC(other than grommet lead wire type)
Circuit	The surge suppressor has polarity (+) Red (-) Black	(~) Z Z Z Z Z Z Z Z Z

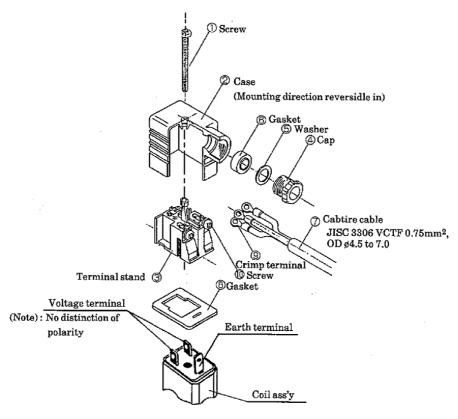


3) Connection to terminal box

Comply with the procedure (1) \sim (3) referring to the illustration below.

- 1) Insert Cabtire cable 7 through Cap 4, Washer 5 and Gasket 6 then Case 2.
- 2) When crimping terminals are to be used, process the ends of Cabtire cable 7 per illustrated with appropriate length then Crimp terminal 9 on the tip of wire.
- 3) By removing Screw® from Terminal stand③, insert Screw® through Crimp terminal⑨(When the terminal is Y-type, insert it underneath the washer of loosened Screw®), then tighten Screw®.

(Note): Tightening torque Screw ①50~60N·cm Cap ④250~375 N·cm



Remarks

- a. Wiring is able to be accomplished with bare wire tip without any terminal. Insert the wire tip underneath the washer of loosening Screw®, then tighten Screw®.
- b. Possible to reverse the port direction of case②. By removing Terminal stand③ from Case②, turn Terminal stand③ to the reverse direction and push back Terminal stand③ into Case②. Necessarilly take care of wiring condition when already wired before this remounting Terminal stand③.
- c. Serviceable ranges of crimp terminal metals by each manufacturer are as listed below.

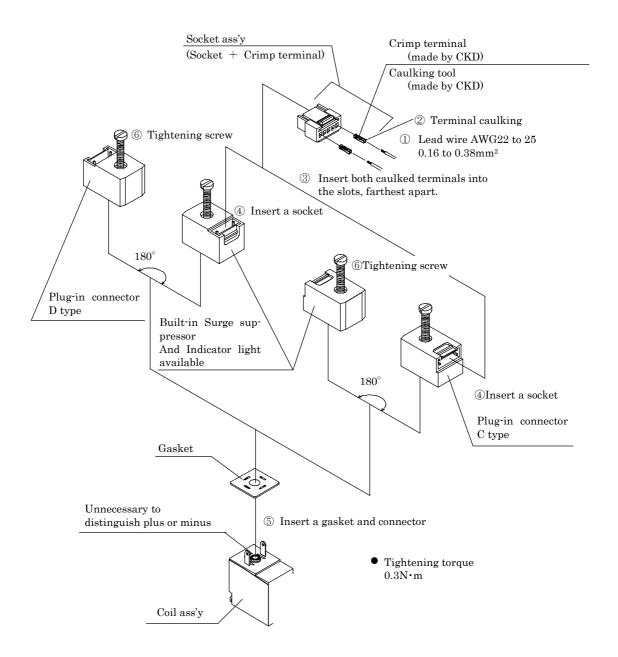
Nichfu Terminal Industries		Fuji Terminal Industries		Nippon Terminal Industries	
O terminal	Y terminal	O terminal Y terminal		O terminal	Y terminal
0.3 - 3 1.25 - 3 1.25 - 3S	0.3 - 3 1.25Y - 3 1.25Y - 3.5	1.25 - 3	1.25 - YAS3 1.25 - YAS3.5	0.5 - 3 1.25 - 3	1.25 - B3A 1.25 - C3A

In the case of using the other marker's ones, please choose equivalent ones.

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4) Wiring of the C-type, D-type connectors
Wire the terminal box by following ① to ⑥ in the illustration.





5. OPERATING RECOMMENDATION

5.1 Function

1) 4KA series

• 4KA410

No signal current (Illustrated)

$$P \rightarrow A$$

 $B \rightarrow R2$ (R1 port is closed.)

When actuated

$$P \rightarrow B$$

 $A \rightarrow R1$ (R2 port is closed.)

PR is an exhaust port of the pilot pressure line.



When Sol "a" is actuated (Illustrated)

$$P \rightarrow A$$

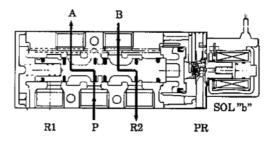
 $B \rightarrow R2$ (R1 port is closed.)

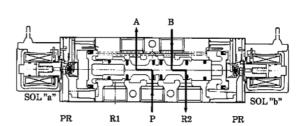
When Sol "b" is actuated

$$P \rightarrow B$$

A \rightarrow R1 (R2 port is closed.)

New position of the spool is held where it is even after the solenoid is deactuated.





• 4KA430, 4KA440, 4KA450

No signal current to 4KA430 (Illustrated)

$$P \cdot A \cdot B \cdot R1 \cdot R2$$
 are closed.

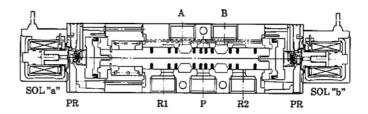
No signal current to 4KA440

P (Closed.)

$$A \rightarrow R1$$

$$B \rightarrow R2$$

No signal current to 4KA450



$$P \rightarrow A \cdot B$$

When either Sol "a" or Sol "b" is actuated, it functions as same as that of 4KA420.



2) 4KBseries

● 4KB410

No signal current (Illustrated)

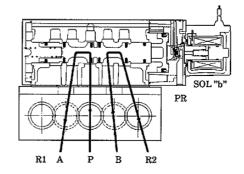
$$P \rightarrow A$$

$$B \rightarrow R2$$
 (R1 port is closed.)

When actuated

$$P \rightarrow B$$

$$A \quad \rightarrow \quad R$$



● 4KB420

When Sol "a" is actuated (Illustrated)

$$P \rightarrow A$$

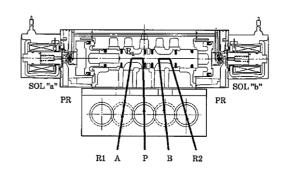
$$B \rightarrow R$$

When Sol "b" is actuated

$$P \rightarrow B$$

$$A \rightarrow R$$

New position of the spool is held where it is even after the solenoid is deactuated.



• 4KB430, 4KB440, 4KB450

No signal current to 4KB430 (Illustrated)

No signal current to 4K440

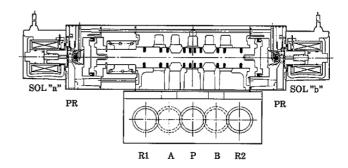
P (Closed.)

$$A \cdot B \rightarrow R$$

No signal current to 4KA450

$$P \rightarrow A \cdot B$$

R (Closed.)



When either Sol "a" or Sol "b" is actuated, it functions as same as that of 4KB420.



5.2 Manual Operating Device



a) After using the manual override, be sure to reset the manual override to the original (OFF) position before resuming the operation of the device.

After a non-lock type operation (push and release), be sure to check that the manual override is automatically reset. After a lock-type operation (push and lock), be sure to release the lock to turn the manual override OFF.

b) Before using the manual override, make sure that nobody is present near the cylinder to be activated.

Name	Non-lock type manual operating device	Lock type manual operating device		
Option code	No code	M1		
hape	Keeps on activation during the time this button is pushed.	Activates when set to ON; normally return to OFF position.		

1) Manual operating device

As this is a pilot solenoid valve, the spool will not be switched by operating the manual override without an air supply to the P port.

2) Non-lock type manual operating device

Push in the manual axis all the way. With the 3-position single solenoid, the valve is energized while the axis is being pressed and it returns to the original state when released. With the 2-position double solenoid, however, the A (B) side is energized when the manual axis on that side is pushed in; the spool retains the situation even when the axis is released. To return to the original state, push the manual axis on the B (A) side.

3) Lock type manual operating device

Turn it 90 degrees (clockwise only) with your finger or a screwdriver, and the valve is energized and locked. Do not turn it further after the valved is locked to prevent damage to the device.

Be sure to unlock it before the regular operation.

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5.3 Air Quality



- a) Do not supply anything other than compressed air.
- b) Supply clean compressed air without any mixture of corrosive gas.

riangle Caution :

- a) Compressed air usually contains a large amount of drain, oxidized oil, tar, foreign matter, and rust from the piping. Filter out those elements in the supplied air because they may cause a malfunction and decrease service life. In addition, clean the exhaust before it is released to the air to minimize pollution.
- b) Once you have lubricated a pre-lubricated valve, the valve is no longer capable of running without being lubricated from the outside. Do not leave the valve without lubrication but keep it lubricated.
- c) Do not use spindle oil or machine oil. They may induce expansion of the rubber parts, which may cause a malfunction.

5.3.1 Lubrication

The 4KA4, 4KB4 Series solenoid valve systems use pre-lubricated valves that usually do not require lubrication from the outside. If you have to lubricate a valve, use Type 1 turbine oil (ISO-VG32) without additives.

Excessive lubrication and extremely low pressure may cause a longer response time. The response time in the catalogue assumes no lubrication from the outside and the air supply pressure of 0.5 MPa.

5.3.2 Ultra-dry compressed air

The use of ultra-dry compressed air will cause splashing of the lubrication oil and result in a shorter service life.

5.3.3 Drain

- (1) The drain is produced by a drop of temperature in pneumatic piping and devices.
- (2) The drain may enter and instantaneously block a passage inside a pneumatic device and cause a malfunction.
- (3) The drain accelerates the production of rust, which may cause the failure of pneumatic devices.
- (4) The drain may wash away the lubrication oil, causing a malfunction from the lack of lubrication.



5.3.4 Foreign matter in the compressed air

- 1) Supply clean compressed air that does not include oxidized oil, tar, carbon, or other foreign matter from the air compressor.
- (1) If oxidized oil, tar, carbon, or the like enters a pneumatic device and sticks to its components, an increase in the resistance at sliding portions may cause a malfunction.
- (2) If oxidized oil, tar, carbon, or the like is mixed with the supplied lubrication oil, wear of the sliding components of the pneumatic device may be accelerated.
- 2) Supply clean compressed air that does not include solid foreign matter.
- (1) Solid foreign matter in the compressed air may cause wear of the sliding components of the pneumatic device or stick to such components and cause hydraulic lock.

5.3.5 Cleaning the supplied air

Compressed air usually contains a large amount of drain (water, oxidized oil, tar, and foreign matter). Remove these elements and clean the supplied air because they may cause a failure of the air compressor. For example, remove the humidity using an after-cooler dryer and remove the tar using a tar filter.

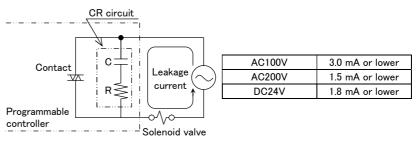
[SM-215164-A/2]



5.4 Electric Circuits



- a) Check for the presence of any current leak from the external control device because it may cause an erroneous valve operation.
 - When a programmable controller or a similar control device is used, a current leak may prevent the normal returning of the valve when the solenoid is de-energized.
- b) Restriction on current leak
 - When controlling solenoid valves using a programmable controller or a similar control device, make sure that the current leak in the programmable controller output is equal to or less than the level shown in the table below. A current leak larger than the allowable level may cause an erroneous valve operation.



- (1) With a double solenoid type valve system, energize the solenoid for at least 0.1 second even for an instantaneous valve operation. If the target valve can be affected by a back pressure induced by another solenoid valve, it is recommendable to energize the solenoid as long as the cylinder is making an action.
- (2) If solenoids are energized for a prolonged period of time, the surface temperature of the manifold will rise. Through this increase in the temperature should not be regarded as abnormal, provide a suitable means of ventilation or heat release.

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6. MAINTENANCE

6.1 Periodic Inspection

<u>∕!</u> WARNING:

Before providing a maintenance service, cut the power and the supply of compressed air and confirm the absence of residual pressure.

• The above is required to ensure safety.

Regularly perform the daily and periodic inspections to correctly maintain product performance.

- If the product is not correctly maintained, product performance may deteriorate dramatically, resulting in a shorter service life, fractures of components, and malfunctions.
- 1) To use the solenoid valve system under optimum conditions, perform a periodic inspection once or twice a year.
- 2) Check the screws for loosening and the joints in the piping for integrity of the sealing.

Regularly remove the drain from the air filters.

(1) Checking the compressed air supply pressure:

Is the supply pressure at the specified level?

Does the pressure gauge indicate the specified pressure when the system is operating?

(2) Checking the air filters:

Is the drain normally discharged?

Is the amount of dirt attached to the bowl and element at a normal level?

(3) Checking joints in the piping for the leakage of compressed air:

Are the pipes normally connected at joints, especially at the movable parts?

(4) Checking the operation of solenoid valves:

Is not there any delay in the operation? Is the exhaust flow normal?

(5) Checking the operation of pneumatic actuators:

Is the operation smooth?

Does the actuator stop normally at the end of the stroke?

Is the coupling with the load normal?

(6) Checking the lubricator:

Is the amount of oil adjusted properly?

(7) Checking the lubrication oil:

Is the supplied lubrication oil of the type specified by the manufacturer?

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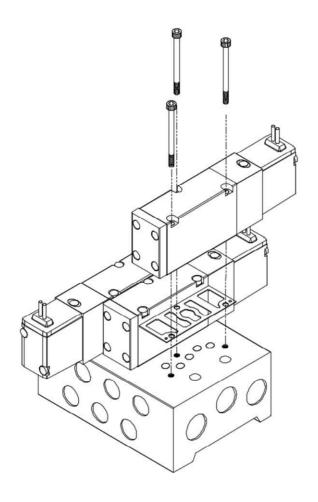
6.2 Disassembling and Reassembling



- Before disassembling and reassembling solenoid valves,
 read the instruction manual carefully and understand the instructions.
 - A person who disassembles and reassembles a solenoid valve system needs to have a knowledge for safely performing such operation based on the understanding about the mechanisms and operating principles of solenoid valves.

6.2.1 Solenoid valve mounting and detaching

When replacing the solenoid valve, pay special attention so that no gaskets are fallen down. Additionally, carefully check the orientation of the gasket and the solenoid valve.

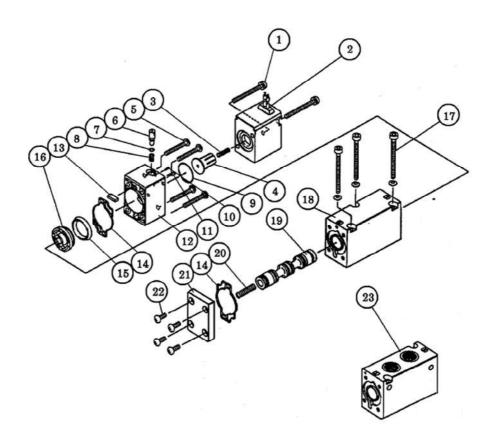


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6.2.2 Disassembling drawing and parts list

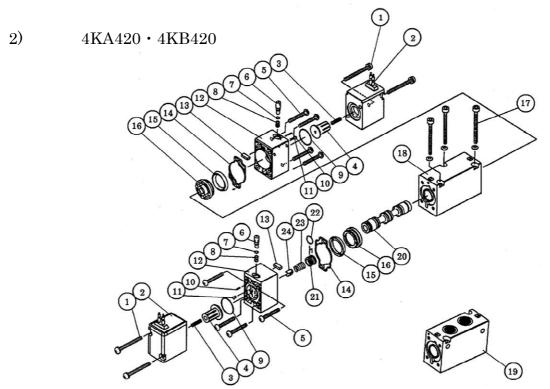
1) 4KA410·4KB410



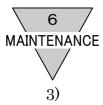
Item No.	Parts name	Material	Qty	Remarks
1)	Machine screws for mounting switch	Steel	2	M3×31
2	Grommet coil ass'y	-	1	
3	Spring	Stainless steel	1	
4	Plunger	Stainless steel	1	
5	Machine screw	Steel	2	M3×26
6	Manually operation button	Resin	1	
7	Oring	Nitrile rubber	1	
8	Spring	Stainless steel	1	
9	Oring	Nitrile rubber	1	
10	Parallel pin	Stainless steel	1	
(1)	Manually pushing up pin	Resin	1	
12	Pilot valve seat	Resin	1	
13	Filter	Resin	1	
14)	Gasket	Nitrile rubber	2	
(15)	Piston packing	Nitrile rubber	1	
16	Piston	Resin	1	
17)	Socket headed bolt	Steel	3	M4×45
18	Body	Aluminum alloy die casting	1	4KB4
19	Spool Ass'y		1	
20	Spring	Stainless steel	1	
21)	Cap	Resin	1	
22	Machine screw	Steel	4	M3×8
23	Body	Aluminum alloy die casting	1	4KA4

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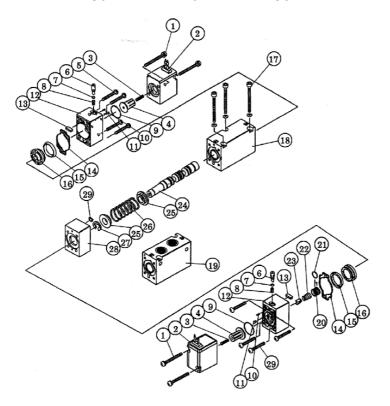




Item No.	Parts name	Material	Qty	Remarks
1	Machine screws for mounting switch	Steel	4	M3×31
2	Grommet coil ass'y	-	2	
3	Spring	Stainless steel	2	
4	Plunger	Stainless steel	2	
(5)	Machine screw	Steel	4	M3×26
6	Manually operation button	Resin	2	
7	O ring	Nitrile rubber	2	
8	Spring	Stainless steel	2	
9	O ring	Nitrile rubber	2	
10	Parallel pin	Stainless steel	2	
(1)	Manually pushing up pin	Resin	2	
12	Pilot valve seat	Resin	2	
13	Filter	Resin	2	
14)	Gasket	Nitrile rubber	2	
15	Piston packing	Nitrile rubber	2	
16	Piston	Resin	2	
17)	Socket headed bolt	Steel	3	$M4 \times 45$
18	Body	Aluminum alloy die casting	1	4KB4
19	Body	Aluminum alloy die casting	1	4KA4
20	Spool Ass'y		1	
21)	Bottom seat	Brass	2	
22	O ring	Nitrile rubber	2	
23	Spring	Stainless steel	2	
24	Valve seat	Nitrile rubber	2	



4KA/B430 • 4KA/B440 • 4KA/B450



Item No.	Parts name	Material	Qty	Remarks
1	Machine screws for mounting switch	Steel	4	M3×31
2	Grommet coil ass'y	-	2	
3	Spring	Stainless steel	2	
4	Plunger	Stainless steel	2	
(5)	Machine screw	Steel	2	M3×26
6	Manually operation button	Resin	2	
7	O ring	Nitrile rubber	2	
8	Spring	Stainless steel	2	
9	O ring	Nitrile rubber	2	
10	Parallel pin	Nitrile rubber	2	
(1)	Manually pushing up pin	Resin	2	
12	Pilot valve seat	Resin	2	
13	Filter	Resin	2	
14)	Gasket	Nitrile rubber	2	
15	Piston packing	Nitrile rubber	2	
16	Piston	Resin	2	
17)	Socket headed bolt	Steel	3	M4×45
18	Body	Aluminum alloy die casting	1	4KB4
19	Body	Aluminum alloy die casting	1	4KA4
20	Bottom seat	Brass	2	
21)	Oring	Nitrile rubber	2	
22	Spring	Stainless steel	2	
23	Valve seat	Nitrile rubber	2	
24)	Spool Ass'y		1	
25	Spring retainer	Resin	2	
26	Spring	Stainless steel	1	
27)	E shape snap ring	Stainless steel	1	
28	Body block		1	
29	Machine screw	Steel	2	

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7. TROUBLE SHOOTING

Motion troubles	Suspected cause	Remedies		
	No electric signals	Turn on the power		
Does not actuate	Damage to signal wiring system	Repair the control circuit		
Boos not actuate	Excessive fluctuating range of current or voltage	Reaffirm the power capacity. (within $\pm 10\%$ of voltage fluctuation)		
	Excessive leaking current	Correct control circuit and / or set a bleed circuit		
	Chattering	Inspect switching system and / or tighten each loosen terminal screw		
	Voltage deviates than specified on the name plate	Rectify the voltage to meet the specification		
	Damaged or short circuited coil	Replace the coil		
	Erroneous shut off pressure source	Turn on the power source		
	Insufficient pressure	Reset the pressure reducer valve or install a pressure raising valve		
	Insufficient flow of fluid	Rectify the size of pipe or install a surge tank		
Malfunctions	Pressure supplied through exhaust port	Change the piping to an external pilot system		
Wanunctions	Erroneous piping, erroneous omitting some piping	Rectify the piping system		
	Speed control valve completely closed by error	Reset the needle valve		
	A port B port is directly released to an open air	Install pipe joints to A and B ports with diameter equal to or smaller than that of to P port joint $ \\$		
	Valve is frozen	Add remedies of avoiding freezing (Heating system or dehumidifying system etc.)		
	Delayed return of a plunger (Excessive oil, existence of far)	Check the quality of the lubricant (Turbine oil type1, ISO VG 32 or equivalent) Rectify the quantity of lubricant drip Install a tar removing filter		
	Clogged-up exhausting port with dust	Install a cover or silencer and clean it regularly		
High actuating pressure	Bulged or decomposed packings	Check the quality of the lubricant (Turbine oil type1, ISO VG 32 or equivalent) Relocate the valves away from splashing area of cutting coolant Keep organic chemicals away from valves.		
is required	Release of A and / or B port to an open air directly	Check the piping. Apply more grease.		
	Foreign particles cut into packing lips	Remove the foreign particle away from the packing		
	Delayed response when multiple blocks are	Install Sup. (P) piping to P ports on both sides of manifold block		
Malfunctions when manifold is used	used	Connect Exh. (R) piping to R ports on both sides of manifold block so as to exhaust to an open air through		
	Adjacent cylinder pops out (3-way, single acting cylinder)	Rewire to have the solenoid valve in question is actuated prior to others sequentially. Install a locking system to the cylinder		



8. PRODUCT SPECIFICATIONS AND HOW TO ORDER

8.1 Product Specifications

1) Specifications

	Model code		4KA410 2-pos. Single	4KA420 2-pos. Double	4KA430 3pos. All ports blocked	4KA440 3-pos. Load ports open to exhaust ports	4KA450 3-pos. Load ports open to supply ports		
JIS Syı	mbol		A B b	a A B b	A B b	A B	A B		
Item			R1 P R2	R1 P R2	R1 P R2	R1 P R2	R1 P R2		
Workin	ng fluid			Compressed air					
Valve t	ype and operation			Pilot o	operated soft spoo	l valve			
Min. w	orking pressure	MPa	0.15	0.10	0.20				
Max. w	Max. working pressure		0.70						
Proof p	ressure	MPa	1.05						
	Supply port	P	D-2/9 (O-ti: 110 110						
Port	Cylinder ports	A•B		Rc3/8 (Option: ϕ 10, ϕ 12 push-in joint)					
size	Exhaust ports	R1•R2	Rc3/8						
Flow c	haracteristics C(S ce) dm ³	onic con- (s·bar)	9.8 8.2		11	8.4			
Ambient temperature (Note 1) °C		$^{\circ}$	-5 to 50 (No freezing)						
Fluid to	Fluid temperature °C		5 to 50						
Respon	Response time ms		30 or less 60 or less						
Lubrication		Not required (Use turbine oil type 1, ISO VG32 when required)							
Protection structure		Dust-proof							
Manual operation device		Non-locking type (Option : Locking type)							
Weight	;	g	325 435 505						

Electrical specifications					
Rated voltage	(V)	AC100V (50 / 60Hz)	AC200V (50 / 60Hz)	DC24V	
Starting current	(A)	0.046 / 0.042		0.075	
Holding current	(A)	0.023 / 0.021	0.014 / 0.011	0.075	
Power consumption (with indicator light)	(W)	1.6 / 1.3 (1.8 / 1.5)		1.8 (2.0)	
Temperature rise	(℃)	30			
Voltage fluctuation		±10%			
Thermal class	B(molded coil)				
Electrical connections		Grommet with lead wire (Option : Small terminal box, Plug-in connectors)			
Surge suppressor		Option			
Indicator		Option (with indicator light)			

- Above-mentioned response time is the figure on the non-lubricated at 0.5 MPa, and depends on the pressure and quality of lubricant.
- In case of use, consult separately of the continous energizing.

Note 1) Ambient temperature is the room temperature while component is stored or assembled system is standing still and it differs from that of running media in operation.

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Model code Item		M4KA4	
Manifol	ld structure	Manifold integrated	
Applica	ble solenoid valve	4KA4 series	
Nos. of	station	2 to 12 stations	
Manifol	ld type	Common supply, common exhaust	
Electric	cal connections	Grommet with lead wire (Option : Small terminal box, Plug-in connectors)	
Supply port P		Side (Rc1/2)	
Port Size Cylinder ports A·B		Top (Rc3/8) (Option : Top ϕ 10, ϕ 12 push-in joint)	
Size	Exhaust ports R1·R2	Side (Rc1/2)	



Model co	de		4KB410 2-pos. Single	4KB420 2-pos. Double	4KB430 3pos. All ports blocked	4KB440 3-pos. Load ports open to exhaust ports	4KB450 3-pos. Load ports open to supply ports
JIS Sym	bol		A B b	a AB b	a A B b	a A B b	AB b
Item			P R	P R	P R	P R	P R
Working	fluid				Compressed air		
Valve typ	pe and operation			Pilot o	operated soft spoo	l valve	
Min. wor	rking pressure	MPa	0.15	0.10		0.20	
Max. wo	rking pressure	MPa	0.70				
Proof pr	essure	MPa	1.05				
	Supply port	P		Rc3/8 , Rc1/2 (Option : φ 10, φ 12 push-in joint)			
Port	Cylinder ports	$A \cdot B$		100/8 , 101/2	(Οριιοπ · φ 10, φ 12	z pusii iii joiiit/	
size	Exhaust ports	R1 • R2			Re3/8,Re1/2		
Flow ch	aracteristics C(So	onic con- ((s•bar)	12 11 13 10			10	
Ambient temperature (Note 1) °C			-5 to 50 (No freezing)				
Fluid temperature °C			5 to 50				
Response time ms		30 or less 60 or less					
Lubrication			Not required (Use turbine oil type 1, ISO VG32 when required)				
Protection structure			Dust-proof				
Manual operating device			Non-locking type (Option : Locking type)				
Weight		g	555	655		730	

Electrical specifications					
Rated voltage	(V)	AC100V (50 / 60Hz)	AC200V (50 / 60Hz)	DC24V	
Starting current	(A)	0.046 / 0.042		0.075	
Holding current	(A)	0.023 / 0.021	0.014 / 0.011	0.075	
Power consumption (with indicator light)	(W)	1.6 / 1.3 (1.8 / 1.5) 1.8 (2		1.8 (2.0)	
Temperature rise	(℃)	30			
Voltage fluctuation range			$\pm 10\%$		
Thermal class			B(molded coil)		
Electrical connections		Grommet with lead wire (Option: Small terminal box, Plug-in connectors)			
Surge suppressor Option					
Indicator Option (with indicator light)			ıt)		

- Above-mentioned response time is the figure on the non-lubricated at 0.5 MPa, and depends on the
 pressure and quality of lubricant.
- Pressure is converted as $1MPa=10.1972kgf/cm^2 = 10.2kgf/cm^2$
- In case of use, consult separately of the continous energizing.

Note 1)Ambient temperature is the room temperature while component is stored or assembled system is standing sM4KA2till and it differs from that of running media in operation

Note 2) When using low pressure (0.15MPa or less) lower than minimum working pressure, please use following external pilot. The working pressure range is 0 to 0.7 MPa when the external pilot (option symbol:K) is selected. Set the pilot pressure between 0.2 and 0.7 MPa.

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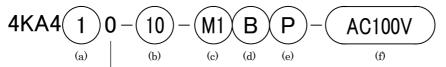


Model	Model code		MIVD		
Item	Item		M4KB4		
Manifo	old system		Manifold integrated		
Applica	able solenoid valve		4KB4 series		
Nos. of	Nos. of station		$2\sim 12$ stations		
Manifo	Manifold type		Common supply, common exhaust		
Electri	Electrical connections		Grommet with lead wire (Option : Small terminal box, Plug-in connectors)		
	Supply port	P	Side (Rc1/2)		
Port	Cylinder ports	A•B	Side (Rc3/8,Rc1/2) (Option : Side ϕ 10, ϕ 12 push-in joint, Rear Rc3/8)		
size	Exhaust ports	R1•R2	Side (Rc1/2)		



8.2 How to Order

1) 4KA4



Operator type Solenoid valve

(a) Position/Operator type		(b) Port size			(c) Manual operation device	
Code	Description	Code	P· A · B ports	R1 · R2 ports	Code	Description
1	2-pos. single operator	10	Rc3/8		No code	Non-lock type manual operating device
2	2-pos. double operator	GS10	φ8 push-in joint	Rc3/8	M1	Lock type manual operating device
3	3-pos. all ports blocked	GS12	φ 10 push-in joint			
4	3-pos. load ports open to exhaust ports		GS10 and GS12 are assembled by screwing push-in joints, GWS10·10 or GWS12·10 to		-	
5	3-pos. load ports open to supply ports	P· A · B ports				

No option

With mounting plate $Surge\ suppressor\ attached$

(Only grommet with lead wire)

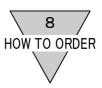
(d) Elec	tric connection		(e) Other	options
Code	Description	Lead wire	Code	
No code	Grommet with lead wire	300mm	No code	No opt
В	Small terminal box	No option	P	With n
L	Small terminal box, with indicator light	No option	S	Surge (Only
LS	Small terminal box, with surge suppressor and indicator light	No option		
С		300mm		(f) Volt
C00		500mm		Cod
C01	Plug-in connector C type	1000mm		AC10
C02	Flug-in connector C type	2000mm		AC20
C03		3000mm		DC2
C1		No option		AC2
C2		300mm		AC11
C20		500mm		AC11
C21	Plug-in connector C type	1000mm		AC12
C22	with surge suppressor and indicator light	2000mm		AC22
C23	9	3000mm		DC1
С3		No option		
D		300mm		
D00		500mm		
D01	Plug-in connector D type	1000mm	Mount	ing plat
D02	Flug-in connector D type	2000mm		attached
D03		3000mm	-	on conne
D1		No option		item (e specifyir
D2		300mm		suppress
D20		500mm	_	C100 an
D21	Plug-in connector D type	1000mm	and A0	C220V (6
D22	with surge suppressor and indicator light	2000mm		
D23		3000mm		
D3		No option		

(f) Voltage		
Code	Descripti	on
AC100V	AC100V 50/60Hz	
AC200V	AC200V 50/60Hz	Standard
DC24V	DC24V	
AC24V	AC24V 50/60Hz	
AC110V	AC110V 50/60Hz	
AC115V	AC115V 50/60Hz	Ontion
AC120V	AC120V 50/60Hz	Option
AC220V	AC220V 50/60Hz	
DC12V	DC12V	

Description

- Mounting plate is attached with the 4KA410 type only.
- When attached surge suppressor is DC24V or less, suppression connector type (diode) is provided.
- In the item (e), "Other options" enter in the order of PS when specifying both P: with fitting plate and S: with surge suppressor.
- The AC100 and 200V coil can be used for AC110V (60Hz) and AC220V (60Hz), respectively.

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NOTE: Following options are available as a custom order.

·Ozone-proof specifications

Available in ozone-proof specifications by adding -P11 to the end of model number.

Model number: ***-Voltage-P11

·Coolant proof specifications

Selectable with option symbol A. Model number: ***-A-Voltage

•Copper and PTFE free (Copper and PTFE materials are not used for flow path)
Available in copper and PTFE free by adding -P6 to the end of model number.

Model number: ***-Voltage-P6



2) M4KA4% Solenoid valve for manifold 4KA4В **AC100V** * Gasket, mounting screws are attached Manifold **AC100V** (g)

Operator type Solenoid valve

(a) Position/Operator type		(b) Port size			(c) Manual operation device	
Code	Description	Code	A·B ports	P·R1·R2 ports	Code	Description
1	2-pos. single operator	10	Rc3/8		No code	Non-lock type manual operating device
2	2-pos. double operator	GS10	ϕ 10 push-in joint	Rc1/2	M1	Lock type manual operating device
3	3-pos. all ports blocked	GS12	ϕ 12 push-in joint			_
4	3-pos. load ports open to exhaust ports	l	GS10 and GS12 are assembled by screwin		•	
5	3-pos. load ports open to supply ports	push-in joints, GWS10-10 or GWS12-10 to A·B ports				
8	2/3 position mixed manifold					

(d) Elect	tric connection		(e) Other	options
Code	Description	Lead wire	Code	
No code	Grommet with lead wire	300mm	No code	No option
В	Small terminal box	No option		Surge supp
\mathbf{L}	Small terminal box, with indicator light	No option	S	(Only gron
LS	Small terminal box, with surge suppressor and indica- tor light	No option		(f) No. of st
С		300mm		Co
C00		500mm]	2
C01	Plug-in connector C type	1000mm)
C02	Flug-in connector C type	2000mm		1:
C03		3000mm]	
C1		No option		
C2		300mm		(g) Voltage
C20		500mm		Code
C21	Plug-in connector C type	1000mm		AC100V
C22	with surge suppressor and indica- tor light	2000mm		AC200V
C23	tor light	3000mm]	DC24V
С3		No option		AC24V
D		300mm		AC110V
D00		500mm]	AC115V
D01	Plug-in connector D type	1000mm		AC120V
D02	Flug-in connector D type	2000mm		AC220V
D03		3000mm		DC12V
D1		No option	• Wh	nen attach
D2		300mm		24V or
D20		500mm	nec	ctor type (
D21	Plug-in connector D type	1000mm		The AC10
D22	with surge suppressor and indica- tor light	2000mm	use	d for <i>A</i> 220V (60H
D23	- V-2	3000mm	AC2	44UV (0UI
D3		No option	1	

(f) No. of stations	
Code	Description
2	2 stations
}	}
12	12 stations

Description

Surge suppressor attached

(Only grommet with lead wire)

(g) Voltage		
Code	Description	
AC100V	AC100V 50/60Hz	
AC200V	AC200V 50/60Hz	Standard
DC24V	DC24V	
AC24V	AC24V 50/60Hz	
AC110V	AC110V 50/60Hz	
AC115V	AC115V 50/60Hz	
AC120V	AC120V 50/60Hz	Option
AC220V	AC220V 50/60Hz	
DC12V	DC12V	

- When attached surge suppressor is DC24V or less, suppression connector type (diode) is provided.

 The AC100 and 200V coil can be used for AC110V (60Hz) and AC220V (60Hz), respectively.

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NOTE: Following options are available as a custom order.

·Ozone-proof specifications

Available in ozone-proof specifications by adding -P11 to the end of model number.

Model number: ***-Voltage-P11

·Coolant proof specifications

Selectable with option symbol A. Model number: **X-A-Voltage

·Copper and PTFE free (Copper and PTFE materials are not used for flow path)

Available in copper and PTFE free by adding -P6 to the end of model number.

Model number: ***-Voltage-P6

Example of same model Manifold

M4KA410-10-5-AC100V

Indicates 4KA4 manifold, 2-position single solenoid, A · B ports Rc3/8 top porting, 5 stations, 100 V AC 50/60 Hz.

Example of mixed manifold

• Method of coding the contents of combination:

Indicate the number of the function-wise solenoid valves (simplex) after the normal Model No. indication when selecting the mixed manifold (code 8 in -).

After the Model No., clearly indicate the code of the required function (see Table below) and the arrangement no. (carry out numbering up to the specified no. of stations, with the left side station as no. 1) as shown below

Code	Function
S1	2-pos. single operator
S2	2-pos. double operator
S3	3-pos. all ports blocked
S4	3-pos. load ports open to exhaust ports
S5	3-pos. load ports open to supply ports
MP	Masking plate

1	2-position single (S1)
2	2-position single (S1)
3	2-position single (S1)
4	2-position double (S2)
5	2-position double (S2)
6	2-position double (S2)
7	2-position single (S1)
8	2-position single (S1)
9	2-position single (S1)

The method of indicating the manifold combination in the Model No. Indicating method for the above arrangements, with port size Rc3/8 top porting and voltage 100 V AC is as follows.

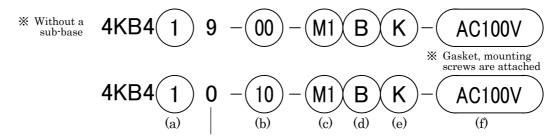
Model example —							
M4KA480-10-9-AC100V-	6	3	0	0	0	0	Enter the number.
'	S1	S2	S3	S4	S5	MP	If not in use, enter zero.
							(S1=1 to 3, 7 to 9, S2=4 to 6)

When using more than 10 valves of the same Model No. in the mixed manifold, specify the nos. of valves by using codes (alphabet)

Number of valves	10	11	12	13	14	15	16	17	18	19	20
Code (alphabet letters)	A	В	C	D	E	F	G	Н	I	J	K



3) 4KB4



Operator type solenoid valve

(a) Op	(a) Operator type		size	(c) Manual operating device		
Code	Description	Code	P·A·B·R1·R2 ports	Code	Description	
1	2-pos. single operator	10	Rc3/8	No code	Non-lock type manual operating device	
2	2-pos. double operator	15	Rc1/2	M1	Lock type manual operating device	
3	3-pos. all ports blocked					
4	3-pos. load ports open to exhaust ports					
5	3-pos. load ports open to supply ports					

(d) Elec	tric connection		(e) Other	options			
Code	Description	Lead wire	Code		Description		
No code	Grommet with lead wire	300mm	No code	No option			
В	Small terminal box	No option	K	External pil	lot		
L	Small terminal box, with indicator light	No option	s		ressor attached met with lead wire)		
LS	Small terminal box, with surge suppressor and indicator light	No option					
С		300mm		(f) Voltage			
C00		500mm		Code	Descri		
C01	Dlanda and the Change	1000mm		AC100V	AC100V 50/60Hz		
C02	Plug-in connector C type	2000mm		AC200V	AC200V 50/60Hz		
C03		3000mm		DC24V	DC24V		
C1		No option		AC24V	AC24V 50/60Hz		
C2		300mm		AC110V	AC110V 50/60Hz		
C20		500mm		AC115V	AC115V 50/60Hz		
C21	Plug-in connector C type with surge suppressor and indicator	1000mm		AC120V	AC120V 50/60Hz		
C22	light	2000mm		AC220V	AC220V 50/60Hz		
C23		3000mm		DC12V	DC12V		
СЗ		No option					
D		300mm					
D00		500mm					
D01	Plug-in connector D type	1000mm			CKD about vacuur		
D02	Trug in connector D type	2000mm	_	lot (K).			
D03		3000mm			arge suppressor is DO or type (diode) is prov		
D1		No option	_		Other options" enter		
D2		300mm			both K External P		
D20	DI : L D.	500mm	sur	ge suppressor.			
D21	Plug-in connector D type with surge suppressor and indicator	1000mm			00V coil can be used		
D22	light	2000mm	and	AC220V (60E	Iz), respectively.		
D23		3000mm					
D3		No option					

(f) Voltage		
Code	Descripti	on
AC100V	AC100V 50/60Hz	
AC200V	AC200V 50/60Hz	Standard
DC24V	DC24V	
AC24V	AC24V 50/60Hz	
AC110V	AC110V 50/60Hz	
AC115V	AC115V 50/60Hz	Option
AC120V	AC120V 50/60Hz	Option
AC220V	AC220V 50/60Hz	
DC12V	DC12V	

out vacuuming of external

ressor is DC24V or less, supiode) is provided.

tions" enter in the order of KS External Pilot and S: with

can be used for AC110V (60Hz) ctively.

NOTE: Following options are available as a custom order.

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·Ozone-proof specifications

Available in ozone-proof specifications by adding -P11 to the end of model number.

Model number: ***-Voltage-P11

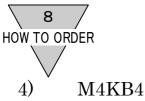
 ${\boldsymbol{\cdot}} \operatorname{Coolant} \operatorname{proof} \operatorname{specifications}$

Selectable with option symbol A. Model number: ***-A-Voltage

•Copper and PTFE free (Copper and PTFE materials are not used for flow path)

Available in copper and PTFE free by adding -P6 to the end of model number.

Model number: ***-Voltage-P6



X Solenoid valve for manifold

Manifold

XB 4					
4KB4(1) 9	00 -	M1	<u>s</u> —	——(AC100V	
M4KB4(1) (-(10)-	M1 B	(s) – (s)	2)-(AC100V	$\overline{}$
(a)	(b)	(c) (d)	(e) (e)	(g)	

Operator type Solenoid valve

(a) Operator type		(b) Port	size		(c) Manual operating device		
Code	Description	Code	A · B ports	P·R1·R2 ports	Code	Description	
1	2-pos. single operator	10	Rc3/8		No code	Non-lock type manual operating device	
2	2-pos. double operator	15	Rc1/2		M1	Lock type manual operating device	
3	3-pos. all ports blocked	10Y	Rc3/8(Back)	Rc1/2			
4	3-pos. load ports open to exhaust ports	H10	φ 10 push-in joint				
5	3-pos.load ports open to supply ports	H12	φ 12 push-in joint				
8	2/3 position mixed manifold				= '		

Description

Surge suppressor attached (Only grommet with lead

No option

(d) Ele	ctric connection		(e) Other	options
Code	Description	Lead wire	Code	
No code	Grommet with lead wire	300mm	No code	No optio
В	Small terminal box	No option		Surge s
L	Small terminal box, with indicator light	No option	S	(Only g wire)
LS	Small terminal box, with surge suppressor and indicator light	No option		
С		300mm		(g) Vol
C00		500mm		Cod
C01	Dluggin composton C type	1000mm		AC10
C02	Plug-in connector C type	2000mm		AC20
C03		3000mm		DC2
C1		No option		AC2
C2		300mm		AC11
C20		500mm		AC11
C21	Plug-in connector C type with surge suppressor and	1000mm		AC12
C22	with surge suppressor and indicator light	2000mm		AC22
C23	maioator ngm	3000mm		DC1
СЗ		No option		,
D		300mm		
D00		500mm		
D01	Plug-in connector D type	1000mm		When attac
D02	Flug-in connector D type	2000mm		type (diode
D03		3000mm		Γhe AC100
D1		No option	((60Hz), res
D2		300mm		
D20		500mm		
D21	Plug-in connector D type with surge suppressor and	1000mm		
D22	with surge suppressor and indicator light	2000mm		
D23		3000mm		
D3		No option		

(g) Voltage		
Code	Description	on
AC100V	AC100V 50/60Hz	
AC200V	AC200V 50/60Hz	Standard
DC24V	DC24V	
AC24V	AC24V 50/60Hz	
AC110V	AC110V 50/60Hz	
AC115V	AC115V 50/60Hz	Ontion
AC120V	AC120V 50/60Hz	Option
AC220V	AC220V 50/60Hz	
DC12V	DC12V	

(f) No. of stations

Description

2 stations

12 stations

Code

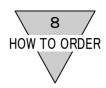
12

- When attached surge suppressor is DC24V or less, suppression connector type (diode) is provided.
- The AC100 and 200V coil can be used for AC110V (60Hz) and AC220V (60Hz), respectively.

NOTE: Following options are available as a custom order.

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[·]Ozone-proof specifications



Available in ozone-proof specifications by adding -P11 to the end of model number.

Model number: ***-Voltage-P11

·Coolant proof specifications

 $Selectable\ with\ option\ symbol\ A.\quad Model\ number:\ \&\&-A-Number\ of\ stations-Voltage$

·Copper and PTFE free (Copper and PTFE materials are not used for flow path)

Available in copper and PTFE free by adding -P6 to the end of model number.

Model number: ***-Voltage-P6

Example of same model Manifold

M4KB410-10-9-AC100V

Indicates 4KB4 manifold, 2-position single solenoid, A · B ports Rc3/8 side porting, 9 stations, 100 V AC 50/60 Hz.

Example of mixed manifold

• Method of coding the contents of combination:

Indicate the number of the function-wise solenoid valves (simplex) after the normal Model No. indication when selecting the mixed manifold (code 8 in -).

After the Model No., clearly indicate the code of the required function (see Table below) and the arrangement no. (carry out numbering up to the specified no. of stations, with the left side station as no. 1) as shown below

Code	Function
S1	2-pos. single operator
S2	2-pos. double operator
S3	3-pos. all ports blocked
S4	3-pos. load ports open to exhaust ports
S5	3-pos. load ports open to supply ports
MP	Masking plate

1	2-position single (S1)
2	2-position single (S1)
3	2-position single (S1)
4	2-position double (S2)
5	2-position double (S2)
6	2-position double (S2)
7	2-position single (S1)
8	2-position single (S1)
9	2-position single (S1)

The method of indicating the manifold combination in the Model No. Indicating method for the above arrangements, with port size Rc3/8 top porting and voltage 100 V AC is as follows.

Model example							1
M4KA480-10-9-AC100V-	6	3	0	0	0	0	Enter the number.
	S1	S2	S3	S4	S5	MP	If not in use, enter zero.
	L						(S1=1 to 3, 7 to 9, S2=4 to 6)

When using more than 10 valves of the same Model No. in the mixed manifold, specify the nos. of valves by using codes (alphabet)

Number of valves	10	11	12	13	14	15	16	17	18	19	20
Code (alphabet letters)	A	В	C	D	E	F	G	Н	I	J	K

8. 3 Consumable parts



1) Spool assembly

Function	Model example
4KA410	
4KB410	4K9-140
4KA420	4K9-140
4KB420	
4KA430	4K9-141
4KB430	4K9-141
4KA440	4K9-142
4KB440	413 142
4KA450	4K9-143
4KB450	413 143

2) Piston assembly

Function	Model example
4KA410, 4KB410	4K9-144
4KA420, 4KB420	4K9-144
4KA430, 4KB430	
4KA440, 4KB440	4K9-145
4KA450, 4KB450	

3) Coil assembly

Function	Model example
All model common	4K3 - Electrical connection option -COIL - Voltage

4) Sub plate kit (Individual)

Function	Model example			
4KB4	4KB410- Port size - SUB- BASE- KIT			
4KB4 ※ -K	4KB410-Port size -K- SUB- BASE- KIT			

5) Sub plate kit (Manifold)

Function	Model example				
M4KA4	M4KA410-10-Nos.of station - SUB- BASE- KIT				
M4KB4	M4KB410- Port size - Nos.of station - SUB- BASE- KIT				

6) Gasket kit

Function	Model example				
M4KA4	M4KA410- GASKET- KIT				
4KB4·M4KB4	M4KB410- GASKET- KIT				