CKD

SM-P00023-A

INSTRUCTION MANUAL

BLOCK MANIFOLD

W4G4-SERIES

- **Individual sub base type**
- **Manifold type**

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

CKD Corporation

For Safety Use

Basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (ISO 4414 *1, JIS B 8370 *2) to use this product safely.

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, please examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, **read this operation manual carefully for proper operation.**

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ **DANGER** : Failure to paying attention to DANGER notices will cause an urgent situation that results in fatality or serious injury.

⚠ **WARNING** : Failure to paying attention to WARNING notices may result in fatality or serious injury.

⚠ **CAUTION** : Failure to paying attention to WARNING notices may result in injury or damage to equipment or facilities.

*1) ISO 4414 : Pneumatic fluid power ··· Recommendations for the application of equipment to transmission and control systems.

*2) JIS B 8370 : General rule for pneumatic systems

UNPACKING (Chapter 3.)

⚠ CAUTION : 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 (Chapter 4.)

⚠ CAUTION : 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.)

⚠ CAUTION :

a) In a dusty environment, foreign matter may enter even through the exhaust port.
- The movement of the solenoid valve causes a respiratory action at the exhaust port, which may cause inhalation of foreign matter around 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) Do not keep water or coolant dripping to the solenoid valve system constantly.
- In case that the solenoid valve system is used under the conditions with constant water splash, protect it by a cover or install it inside a enclosure.
- 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 such as the sulfur dioxide gas or 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) Do not use the normal type solenoid valves for an application that requires conformity with explosion-proof specifications. Choose explosion-proof solenoid valves instead.

INSTALLATION (Section 4.2.)

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

PIPING (Section 4.3.)

⚠ 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 5μm 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 : When carrying out electrical connections, please perform disassembling and assembling work after reading the Instruction Manual carefully and with full understanding of its contents.
- Your understanding of the structure of solenoid valve and its operation principle is required in order to secure the safety.

⚠ WARNING : If the lead wire is sandwiched between the back side of the terminal stand and the sub base, the isolation of the lead wire may be damaged, resulting in electric shock.

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

MANUAL OVERRIDE (Section 5.2.)

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

⚠ CAUTION : Do not press the manual override with a tool with a sharp end, otherwise the rubber cover could be broken.
(Use a Phillips screwdriver with tip size #2 or more.)

⚠ CAUTION : About manual override with an OFF function
The supply of pilot air while energized is compulsorily stopped. So, you can switch the main valve even while energized. Please pay your utmost careful attention when using the OFF function in case of 2-position single connection and three position ABR and PAB port connection, because the cylinder moves immediately.

AIR QUALITY (Section 5.3.)

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

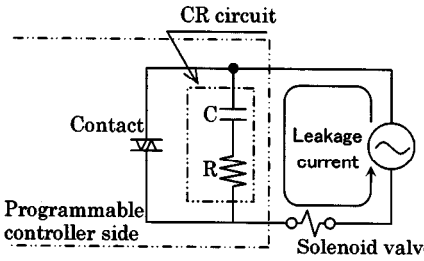
⚠ CAUTION :
a) Compressed air usually contains a large amount of drain, oxidized oil, tar, foreign matter, and rust from the piping. Filter out those elements in the supplied air because they may cause a malfunction and decrease service life. In addition, clean the exhaust before it is released to the 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. Keep it lubricated.
c) Do not use spindle oil or machine oil. They induce expansion of the rubber parts, which will cause malfunction.

ELECTRIC CIRCUITS (Section 5.4.)

⚠ CAUTION :

a) Check for the presence of any current leak from the external control device because it may cause malfunction.
- 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 malfunction.



AC100V	3.0 mA or less
DC12V	1.5 mA or less
DC24V	1.8 mA or less

PERIODIC INSPECTION (Section 6.1.)

⚠ WARNING : Before providing maintenance service, cut the power and the supply of compressed air and confirm the residual pressure is released. The above is required to ensure safety.

⚠ CAUTION : 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 ASSEMBLING (Section 6.2.)

⚠ WARNING : Before increase or decrease block of manifold, cut the power and the supply of compressed air.

⚠ WARNING : Please avoid disassembling and reassembling the solenoid valve, otherwise the sealing and drip proof performance may deform. Disassembled and Reassembled product by the customer will not be guaranteed.

ADDITIONAL INSTALLATION OF A VALVE UNIT TO A FEWER WIRING TYPE MANIFOLD (Section 6.3.)

⚠ WARNING : When disassembling or assembling the manifold, perform it after reading the Instruction Manual carefully and with full understanding of its contents.
- You are required to understand the structure of solenoid valve and its operation principle to secure the safety.
- A level of 2nd Class or more of Pneumatics Technology Certification is required.

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Manual No. SM-P00023-A

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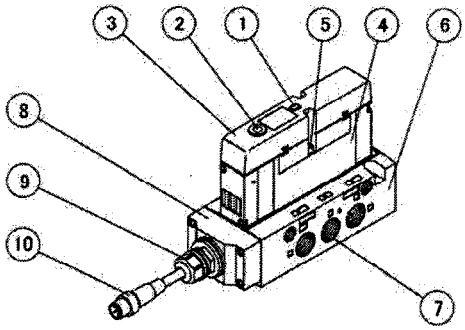
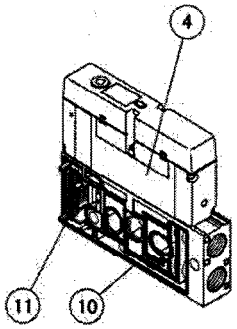
Prepared: August 30, 2006

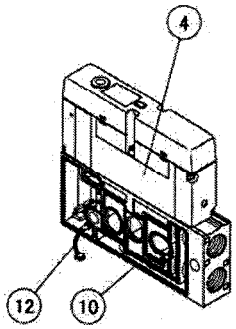
1 PRODUCT



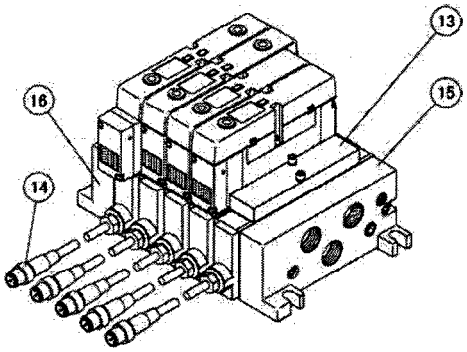
Individual sub base type



Valve block with a solenoid valve (DC)

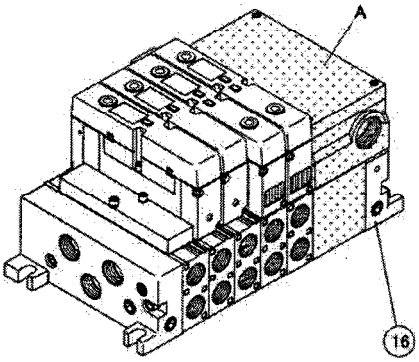


Valve block with a solenoid valve (AC)

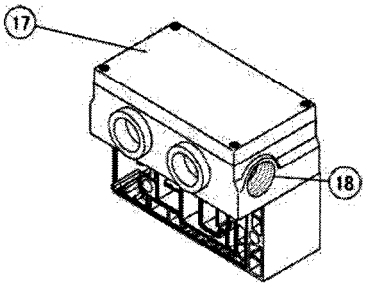


Individual wiring type manifold

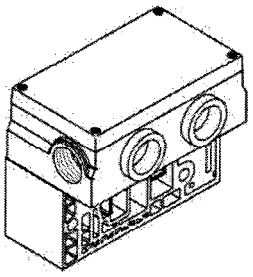
I/O connector with cable (M12)



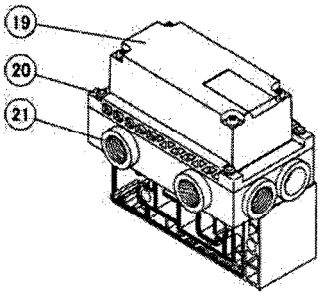
Fewer wiring type manifold



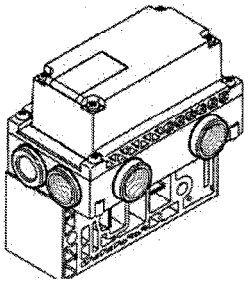
A-1 One end port type (T10) wiring block in left side



A-2 One end port type (T10) wiring block in right side



A-3 Serial transmission type (T6*1) wiring block in left side



A-4 Serial transmission type (T6*1) wiring block in right side

No.	Name	Description
①	Indicator light	When coil is energized, a display lamp indicating energized status turns on at the upper face. (a: Orange when ON b: Green when ON)
②	Manual override	Non-locked type
③	Cover	Parts for drip-proof
④	Individual valve	
⑤	Fixing screw for individual valve	2 screws are provided for each individual valve. Individual valve is fixed to each type of base by these screws.
⑥	Sub base	In case of an individual specification, assemble this sub base.
⑦	Piping port	1(P) is supply, 3(R2)/5(R1) is exhaust and 2(B)/4(A) is an output port respectively.
⑧	Terminal strip cover	Remove when connecting.
⑨	Cable clamp	After wiring, connect the cable clamp.
⑩	I/O connector with cable (for Individual sub base type)	M12 connector with a cable
⑪	Circuit board in duct	Wiring between the electric block and valve block.
⑫	MF cable assembly	Wiring between the electric block and valve block.
⑬	Valve block with a masking plate	A block composed of an assy. of masking plate and valve block
⑭	I/O connector with cable (for manifold)	M12 connector with a cable
⑮	End block L	A block used to connect to the supply and exhaust port. A type releasing the exhausted air into the atmosphere (X) is also available.
⑯	End block R	A block used to connect to the supply and exhaust port. A type releasing the exhausted air into the atmosphere (X) is also available.
⑰	Cover for electric components (Cover for one end port)	Remove when connecting.
⑱	Connection port of cable clamp	After wiring, connect the cable clamp.
⑲	Serial transmission unit block	Slave
⑳	S.T. unit block 2 (S.T. unit block assembly)	Remove when connecting.
㉑	Connection port of cable clamp	After wiring, connect the cable clamp.

2. INTERNATIONAL SYSTEM OF UNITS (SI) AND PORT INDICATION

2.1 Port Indication

Each piping port is marked with ISO and JIS conformable piping port indication codes.

Application	ISO	JIS
Supply port	1	P
Output port	4	A
Output port	2	B
Exhaust port	5	R1
Exhaust port	3	R2

- Installing position of the solenoid valve is free. The position of the 4(A) and 5(R1) ports for 4G series are in reverse with 2(B) and 3(R2) ports respectively, compared with the 4K series. To avoid malfunction, please confirm the port symbol before piping.

2.2 Conversion between International System of Units (SI) and Conventional Units

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):
1kgf/cm² → **0.980665Mpa** **1MPa** → 1.01972×10kgf/cm²

- **Force**

N	dyn	kgf
1	1×10^{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/mm²	kgf/cm²
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	1×10^{2}
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1

※: 1Pa=1N/m², 1MPa=1N/mm²

- **Pressure**

Pa	kPa	MPa	bar	kgf/cm²	atm	mmH2O	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}
1×10^{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

※: 1Pa=1N/m²

3. UNPACKING

⚠ CAUTION : 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.

4. INSTALLATION

⚠ CAUTION : 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

⚠ CAUTION :

a) In a dusty environment, foreign matter may enter even through the exhaust port.
- The movement of the solenoid valve causes a respiratory action at the exhaust port, which may cause inhalation of foreign matter around 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) Do not keep water or coolant dripping to the solenoid valve system constantly.
- In case that the solenoid valve system is used under the conditions with constant water splash, protect it by a cover or install it inside a enclosure.
- 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 such as the sulfur dioxide gas or 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) Do not use the normal type solenoid valves for an application that requires conformity with explosion-proof specifications. Choose explosion-proof solenoid valves instead.

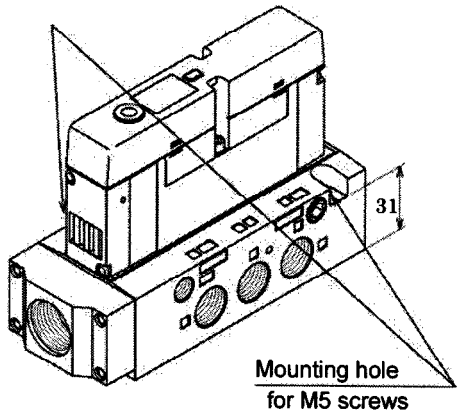
4.2 Installation

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

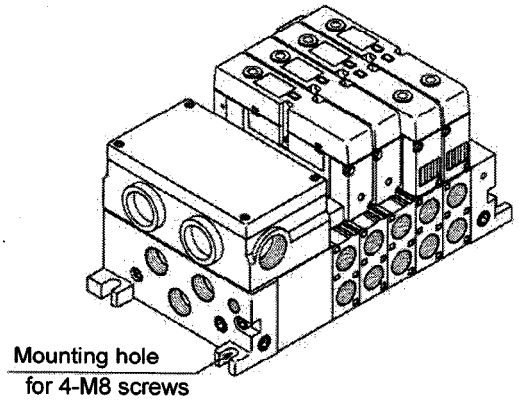
Please secure enough space around the solenoid valve for mounting, dismounting and piping work.

4.2.1 Mounting method

1) Individual sub base type
Use the two (2) drilled holes.



2) Manifold type
Use the four (4) holes for mounting.



4.3 Piping

⚠ 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 5μm or less) immediately upstream of the solenoid valve.

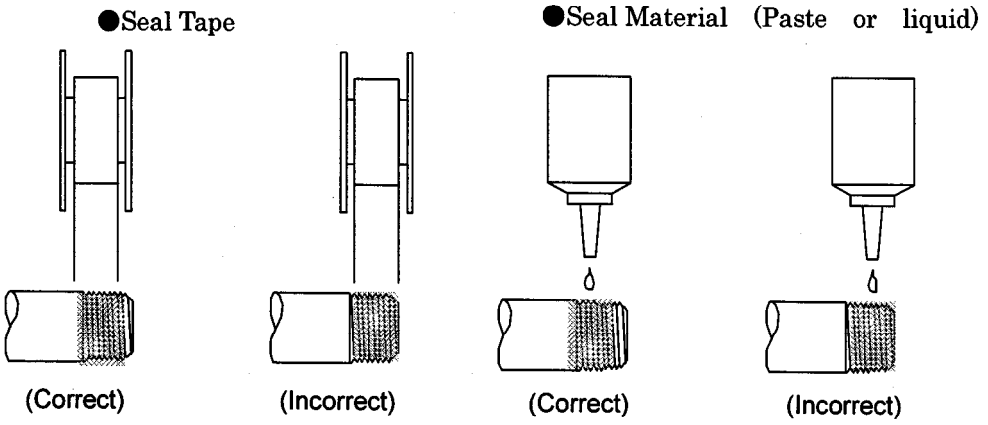
g) Air supply
- Do not restrict the flow of air through the air supply piping. With a manifold system with multiple stations, a drop in the air supply pressure may cause trouble through a delay in the operation timing.

Tightening torque

Joint screw	Tightening torque N·m
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18

4.3.1 Seal material

When using seal material, take care to avoid getting it in the pipes or overflowing on the exterior surface of the pipes.



When applying fluororesin sealing tape to the screw threads, wind the tape two or three times around the threads but leave the one or two threads at the pipe end uncovered. Firmly press the tape against the threads using the tip of your fingernail. When applying liquid type seal material, apply the material to all the threads except one or two threads at the pipe end and take care not to apply too much of it.

Never apply the seal material to the female threads in the device side piping port.

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 M5 screw fitting

An M5 screw fitting is sealed using a gasket (Model No. for the gasket only: FGS).Do not retighten the fitting screw when pressure is generated in the pneumatic circuit. Design and construct the piping system in such a way that the valves may be removed and reinstalled if a trouble should happen.

4.3.4 Blow circuit

Do not open the cylinder port circuit to the atmosphere because a drop in the air supply pressure may cause malfunction. Select the external pilot type design instead of the internal pilot type design. The lowest allowable pressure with the internal pilot type design is 0.2 MPa.

4.3.5 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.

4.3.6 Pipe connections

(1) Tubes to be used

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

Soft nylon tubes (F-1500 Series)
Urethane tubes (U-9500 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 push-in 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 push-in 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 a polyurethane tube should be 93° 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 mm	Inside diameter mm	
	Nylon	Polyurethane
φ4	φ2.5	φ2
φ6	φ4	φ4
φ8	φ5.7	φ5
φ10	φ7.2	φ6.5
φ12	φ8.9	φ8

Outside diameter allowance

Soft or hard nylon	±0.1mm
Polyurethane φ4, φ6	+0.1mm -0.15mm
Polyurethane φ8, φ10, φ12	+0.1mm -0.2mm

(5) Minimum bending radius of tubes

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

Tube bore	Minimum bending radius mm	
	Nylon	Polyurethane
φ4	10	10
φ6	20	20
φ8	30	30
φ10	40	40
φ12	55	50

(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 the tube immediately at the joint connection point. 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 push-in joint, select the blank plug specified by us:

Blank plug GWP□-B Series

4.3.7 External pilot (K) type piping port

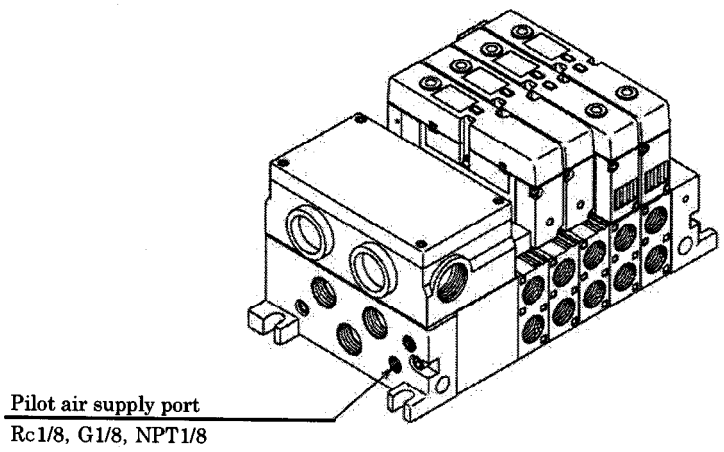
A different pilot air supply port will be provided for the external pilot (K) type. Erroneous piping can cause a malfunction.

Port display

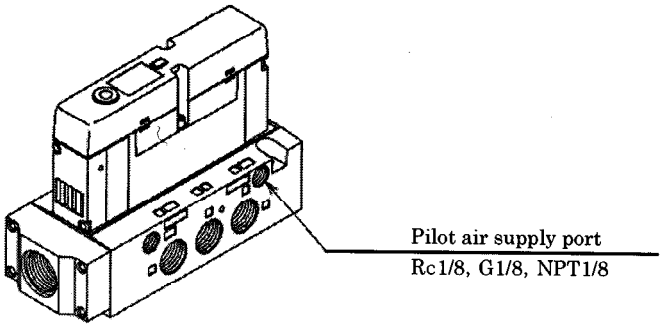
Usage		Display (ISO standards)
Pilot air	Supply port	12/14

- Manifold type

The pilot air supply ports are located on both sides of the end block.



- Individual sub base type



4.4 Wiring

⚠ **WARNING:**	When carrying out electric wiring, please perform disassembling and assembling work after reading the Instruction Manual carefully and with full understanding of its contents. • Your understanding of the structure of solenoid valve and its operation principle is required in order to secure the safety.

⚠ **WARNING:**	If the lead wire is sandwiched between the back side of the terminal stand and the sub base, the isolation of the lead wire may be damaged, resulting in electric shock.

⚠ **CAUTION:**	Before energizing, check the voltage of power source and whether AC or DC.

4.4.1 Individual sub base type

1) About the terminal strip (no mark):

(1) Remove the cover and terminal strip from sub base.

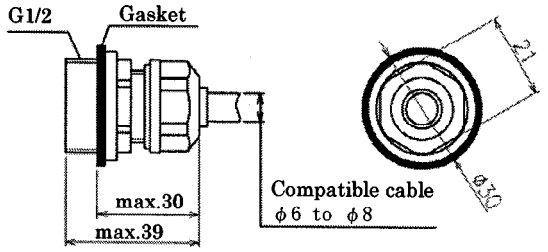
(2) Connect the wires to the terminal strip through the connection port of cable clamp, paying careful attention to avoid any improper wire connection. For connection, use Y-terminal or ring terminal. For crimp terminal, please use the terminal for M3 with width 6.2mm or less. If you connect the lead wire directly, improper operation of the solenoid valve may be caused due to disconnection, contact failure, etc.

(3) If IP65 performance is required, apply a protection by connecting a cable clamp, etc. to the cover. In such a case, please pay your careful attention to the tightening torque.

Parts kit for terminal strip type

- Cable clamp (with gasket)

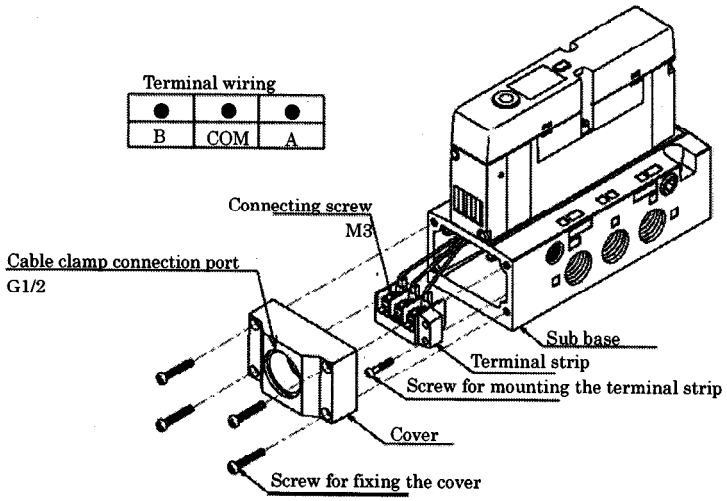
Model No.	Description
W4G-OA-W1608C1	Used for prevention of drips on the cable



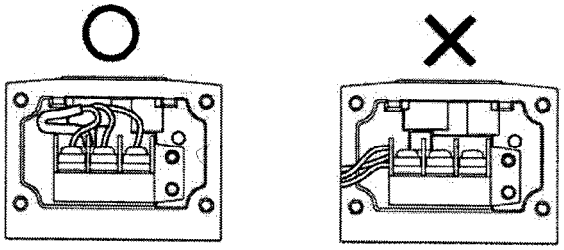
(Reference value)

Tightening torque of body	2.0 to 2.4N·m
Tightening torque of cable clamp	0.5 to 0.7N·m

(4) Proper tightening torque of connecting screw, screw for mounting the terminal strip and the screw for mounting the cover: 0.5～0.7N·m



Please make sure the lead wire is not caught up between the back side of the terminal strip and the sub base.



⚠ WARNING: If the lead wire is sandwiched between the back side of the terminal stand and the sub base, the isolation of the lead wire may be damaged, resulting in electric shock.

2) About I/O connector (R1)

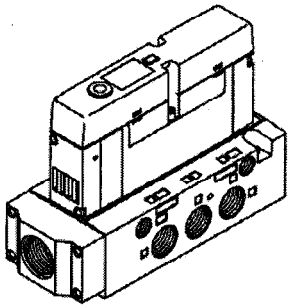
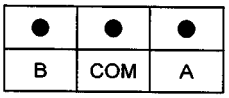
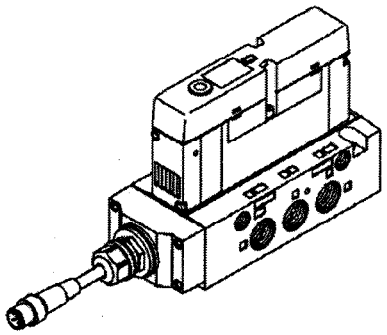
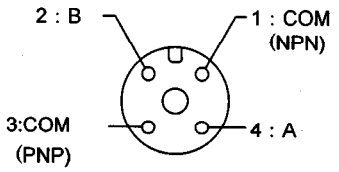
(1) The internal wiring has already been made at the factory.

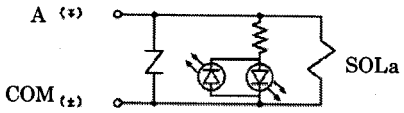
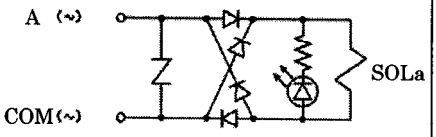
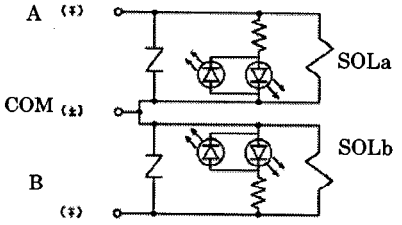
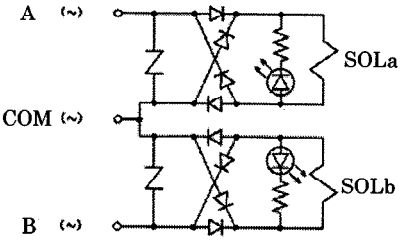
(2) Please connect a connection cable suitable to I/O connector. In such a case, please tighten the screw until the screw thread could not be seen. Pay your careful attention to the tightening torque (Proper tightening torque 0.39 to 0.49 N·m).

Example of connection cable of I/O connector type

Manufacturer's name	Model number
Omron Co., Ltd.	XS2W-D421-B81-T

3) Wiring

<table>
<tr><th>Name</th><th>Symbol</th><th colspan="2">Shape</th><th>Terminal wiring</th></tr>
<tr><td>Terminal strip</td><td>No mark</td><td colspan="2">  </td><td> 
</td></tr>
<tr><td>I/O connector</td><td>R1</td><td colspan="2">  </td><td> 

Model
VA-4DBX05KUG3-CKD276-PG7
(Correns Corporation)</td></tr>
<tr><td rowspan="3">Solenoid valve
Internal circuit diagram</td><td></td><td>DC</td><td colspan="2">AC</td></tr>
<tr><td>Single</td><td> 
</td><td colspan="2"> 
</td></tr>
<tr><td>Double</td><td> 
</td><td colspan="2"> 
</td></tr>
</table>

Notes: Please refer to Section 4.4.7 about Manifold with I/O connecter cable (R1).

4.4.2 One end port type: Wiring style T10

1) Points requiring your attention with one end port type (T10):

(1) Remove the cover for electric components when wiring. The proper tightening torque of the screws to fix the cover: 0.5 to 0.7N·m

(2) Lead the wire through the connection port of cable clamp.
(If IP65 performance is required, apply a protection by connecting a cable clamp, etc. to the cover. In such a case, please pay your careful attention to the tightening torque.)

(3) The internal common wiring for one end port type has already been made. So, please unify the power source of manifold.
In case of a PC output unit of independent contact point type, apply a common wiring at the contact point.

(4) In order to avoid any improper wiring, please make sure again that the number of the station is corresponding to the solenoid. Follow the wiring style 3).

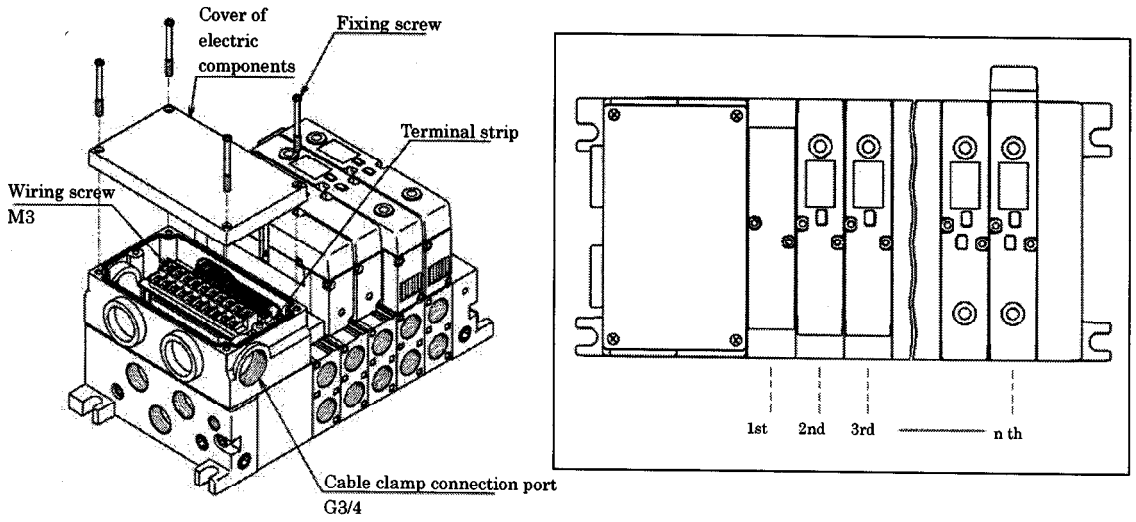
(5) If the number of solenoid exceeds 18, this cannot be supported, which please bear in your mind in advance.

(6) The number of the manifold station has been set in the order starting from left with the piping port facing front. (Refer to the sketch below.)

(7) Voltage drop may be caused when energized simultaneously or depending on the cable length. Please make sure that the voltage drop against solenoid valve is kept within 10% of rated voltage.

(8) For connection, use Y-terminal or ring terminal. For crimp terminal, please use the terminal for M3 with width 6.2mm or less. If you connect the lead wire directly, improper operation of the solenoid valve may be caused due to disconnection, contact failure, etc.

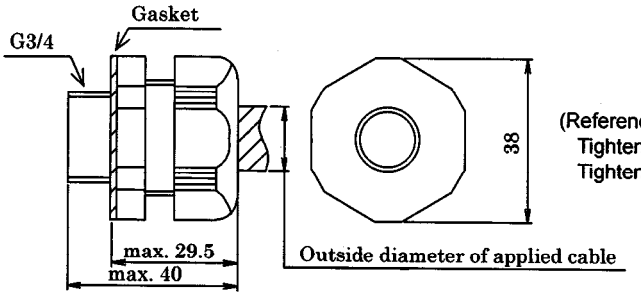
(9) Proper tightening torque of wiring screw: 0.5 to 0.7N·m



Parts kit for electric block T10

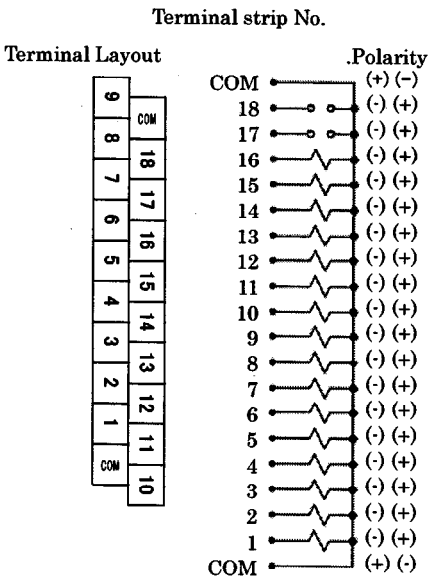
- Cable clamp

Model number	Outside diameter of applied cable	Description
W4G-SCL-18A	ϕ14.5 to 16.5	Used for prevention of drips on the cable
W4G-SCL-18B	ϕ16.5 to 18.5	



(Reference value)
Tightening torque of body 4 to 4.5N·m
Tightening torque of cable clamp 3 to 3.5N·m

2) Internal wire connection



3) Wiring style

The maximum number of manifold station varies depending on the model. Please check the specifications for each model.

Note) Valve No. 1a, 2a, 2b .... the numbers indicate the 1st station and 2nd station respectively, and alphabet (a) means the solenoid on a-side and (b) means the solenoid on b-side respectively.

Terminal strip No.

COM	18	17	16	15	14	13	12	11	10
9	8	7	6	5	4	3	2	1	COM

<Standard wiring>

- In case of a single solenoid valve

(Max. number of MF station: 16)

Terminal strip No.	COM	18	17	16	15	14	13	12	11	10
Valve No.	COM	(Empty)	(Empty)	16a	15a	14a	13a	12a	11a	10a
Terminal strip No.	9	8	7	6	5	4	3	2	1	COM
Valve No.	9a	8a	7a	6a	5a	4a	3a	2a	1a	COM

- In case of a double solenoid valve

(Max. number of MF station: 8)

Terminal strip No.	COM	18	17	16	15	14	13	12	11	10
Valve No.	COM	(Empty)	(Empty)	8b	8a	7b	7a	6b	6a	5b
Terminal strip No.	9	8	7	6	5	4	3	2	1	COM
Valve No.	5a	4b	4a	3b	3a	2b	2a	1b	1a	COM

- In case of a mixture (Mixed installation of single and double)

(Max. number of solenoid: 16)

Terminal strip No.	COM	18	17	16	15	14	13	12	11	10
Valve No.	COM	(Empty)	(Empty)	(Empty)	(Empty)	9b	9a	8b	8a	7b
Terminal strip No.	9	8	7	6	5	4	3	2	1	COM
Valve No.	7a	6a	5b	5a	4b	4a	3a	2a	1a	COM

<Double wiring>

- In case of a single solenoid valve

(Max. number of MF station: 8)

Terminal strip No.	COM	18	17	16	15	14	13	12	11	10
Valve No.	COM	(Empty)	(Empty)	(Empty)	8a	(Empty)	7a	(Empty)	6a	(Empty)
Terminal strip No.	9	8	7	6	5	4	3	2	1	COM
Valve No.	5a	(Empty)	4a	(Empty)	3a	(Empty)	2a	(Empty)	1a	COM

- In case of a double solenoid valve

(Max. number of MF station: 8)

Terminal strip No.	COM	18	17	16	15	14	13	12	11	10
Valve No.	COM	(Empty)	(Empty)	8b	8a	7b	7a	6b	6a	5b
Terminal strip No.	9	8	7	6	5	4	3	2	1	COM
Valve No.	5a	4b	4a	3b	3a	2b	2a	1b	1a	COM

- In case of a mixture (Mixed installation of single and double)

(Max. number of solenoid: 8)

Terminal strip No.	COM	18	17	16	15	14	13	12	11	10
Valve No.	COM	(Empty)	(Empty)	8b	8a	7b	7a	(Empty)	6a	5b
Terminal strip No.	9	8	7	6	5	4	3	2	1	COM
Valve No.	5a	4b	4a	(Empty)	3b	(Empty)	2a	(Empty)	1a	COM

4.4.7 Manifold with I/O connector cable (R1)

1) About I/O connector

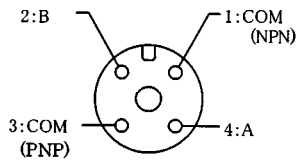
(1) The internal wiring has already been made at the factory.

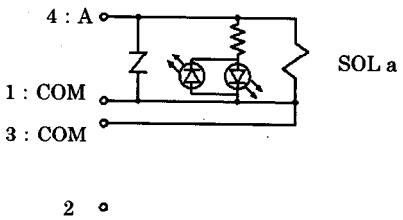
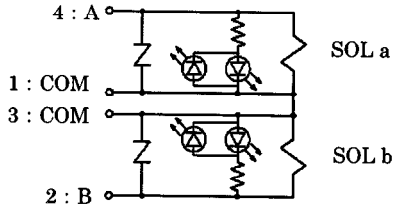
(2) Please connect a connection cable suitable to I/O connector. In such a case, please tighten the screw until the screw thread could not be seen. Pay your careful attention to the tightening torque(Proper tightening torque 0.39 to 0.49 N·m).

Example of connection cable of I/O connector type

Manufacturer's name	Model number
Omron Co., Ltd.	XS2W-D421-B81-T

2) Wiring

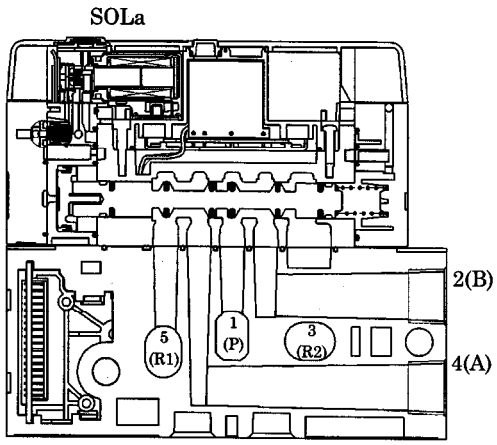
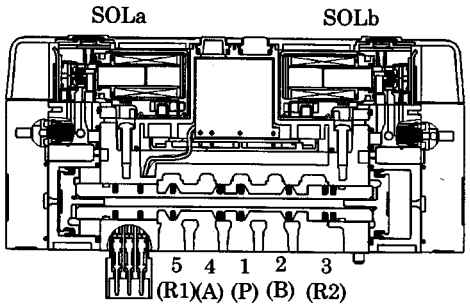
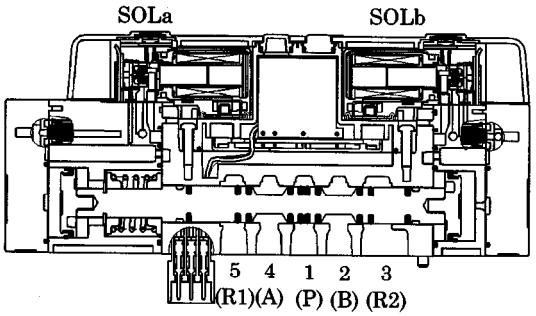
<table>
<tr><td colspan="2">Connector terminal wire
(viewed from connector side)</td><td> 

Model No, of applicable cable
VA-4DBX05KUG3-CKD276-PG7
(Correns Corporation)</td></tr>
<tr><td rowspan="2">Solenoid valve
Internal circuit diagram</td><td>Single</td><td> 
</td></tr>
<tr><td>Double</td><td> 
</td></tr>
</table>

5. OPERATING RECOMMENDATION

5.1 Operation

1) Valve operation

	Illustration of operation	Explanation of operation
NW4G※410 Single		When de-energized (shown on the illustration) 1(P) → 2(B) 4(A) → 5(R1) When energized 1(P) → 4(A) 2(B) → 3(R2)
NW4G※420 Double		SOLa When energized 1(P) → 4(A) 2(B) → 3(R2) SOLb When energized (Shown on the illustration) 1(P) → 2(B) 4(A) → 5(R1) The valve, once energized, retains its position even if the power supply is cut off.
NW4G※430 NW4G※440 NW4G※450 3-position		NW4G※430 When de-energized 1(P), 4(A), 2(B), 5(R1), 3(R2) close NW4G※440 When de-energized 1(P) close 4(A), 2(B) → 5(R1), 3(R2) NW4G※450 When de-energized 1(P) → 4(A), 2(B) 5(R1), 3(R2) close

5.2 Manual override

⚠ WARNING:

a) When you have operated the manual override for manual operation, do not restart the operation of the system without returning to the original position (initial position).

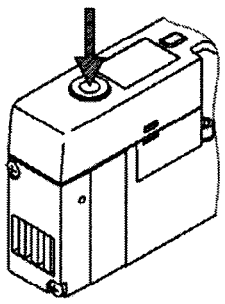
b) When starting manual operation, please always check carefully that nobody is moving around the cylinder to be operated.

(1) W4G Series is of a kind of pilot type solenoid valve. If you do not supply air to P-port, the main valve cannot be switched even if you operate the manual override.

5.2.1 How to operate the manual override

⚠ CAUTION: Do not press the manual override with a tool with a sharp end, otherwise the rubber cover could be broken.
(Use a Phillips screwdriver with tip size #2 or more.)

1) Unlock manual override (Standard)
Push in the direction as shown by an arrow in the sketch below until it stops. The lock of manual override is released when the button is released.

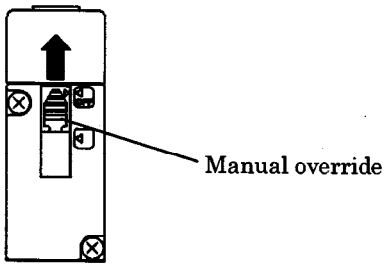


5.2.2 How to operate the manual override with an OFF function

⚠ CAUTION: About manual override with an OFF function
The supply of pilot air while energized is compulsorily stopped. So, you can switch the main valve even while energized.
Please pay your utmost careful attention when using the OFF function in case of 2-position single connection and three position ABR and PAB port connection, because the cylinder moves immediately.

1) When using the OFF function

Slide the lever to the arrow direction until it stops. Even if you stop pushing, the lock of manual override will not be released.



[Comparison table of output port position]

Position type			OFF function (manual operation on energized side)		Manual operation on de-energized side
			Non-operation	Operation	Operation
2-position	Single	a-side when sol energized	4 (A)	➡ 2 (B)	—
	Double	a-side when sol energized	4 (A)	4 (A) ➡	2 (B)
		b-side when sol energized	2 (B)	2 (B) ➡	4 (A)
3-position	All ports blocked	a-side when sol energized	4 (A)	4 (A) (blocked) ➡	2 (B)
		b-side when sol energized	2 (B)	2 (B) (blocked) ➡	4 (A)
	ABR port connection	a-side when sol energized	4 (A)	none (exhaust) ➡	2 (B)
		b-side when sol energized	2 (B)	none (exhaust) ➡	4 (A)
	PAB port connection	a-side when sol energized	4 (A)	4 (A)／2 (B) ➡	2 (B)
		b-side when sol energized	2 (B)	4 (A)／2 (B) ➡	4 (A)

2) Normal use

Return the switch to initial position before use.

5.3 Air Quality

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

⚠ 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. Keep it lubricated.
c) Do not use spindle oil or machine oil. They induce expansion of the rubber parts, which will cause malfunction.

5.3.1 Lubrication

The W4G4 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 or 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.

Please raise dew point above –20° C at absolute pressure 0.8 MPa.

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 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

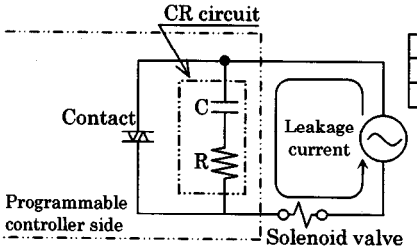
Compressed air usually contains a large amount of drain (water, oxidized oil, tar, and foreign matter). Remove these elements and clean the supplied air because they may cause malfunction of pneumatic devices. For example, remove the humidity using an after-cooler dryer and remove the tar using a tar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

5.4 Electric circuits

⚠ CAUTION :

a) Check for the presence of any current leak from the external control device because it may cause malfunction.
- 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 malfunction circuit.



AC100V	3.0 mA or less
DC12V	1.5 mA or less
DC24V	1.8 mA or

(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 recommended 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. Though this increase in the temperature should not be regarded as abnormal, provide a suitable means of ventilation or heat release.

About AC100V/110V specifications:

AC100V/110V specifications have a built-in full wave rectified bridge.
In case of using SSR for ON/OFF of the solenoid valve, return failure of solenoid valve may occur depending on its type.
Please be careful when selecting SSR.

6. MAINTENANCE

6.1 Periodic Inspection

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

⚠ CAUTION : 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:
Are 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 type of the supplied lubrication oil specified by the manufacturer ?

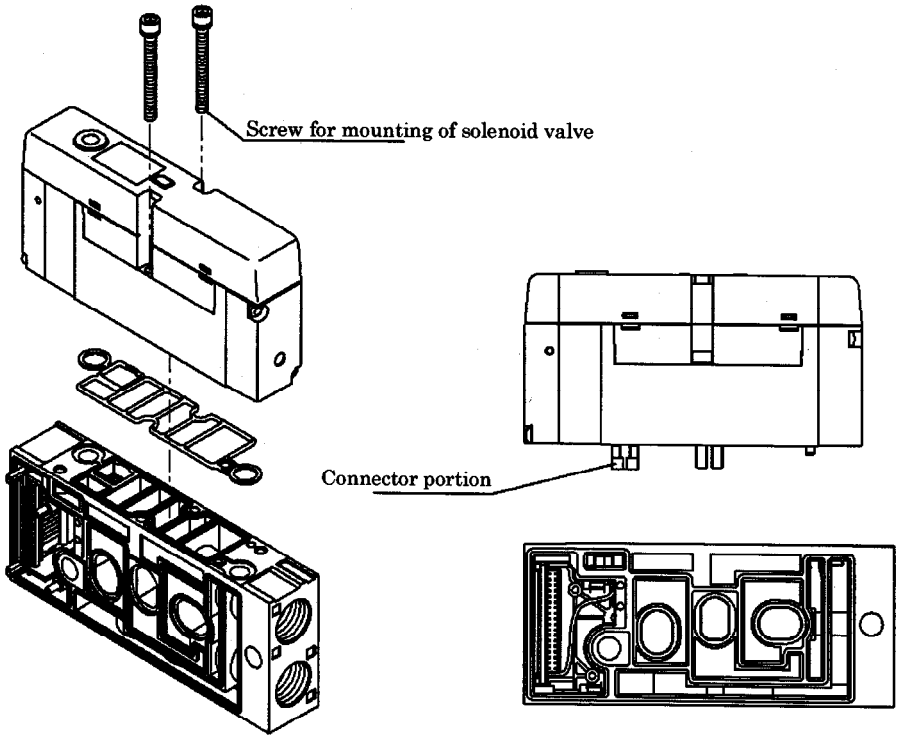
6.2 Disassembling and Reassembling

⚠ WARNING:	. Please avoid disassembling and reassembling the solenoid valve, otherwise the sealing and drip-proof performance may deform. Disassembled and Reassembled product by the customer will not be guaranteed.

6.2.1 When replacing the solenoid valve:

When replacing the solenoid valve, please pay your careful attention so that no gasket may fall apart.For fitting the solenoid valve, insert the connector portion on electric components side first, and perform the position adjustment of the main body).

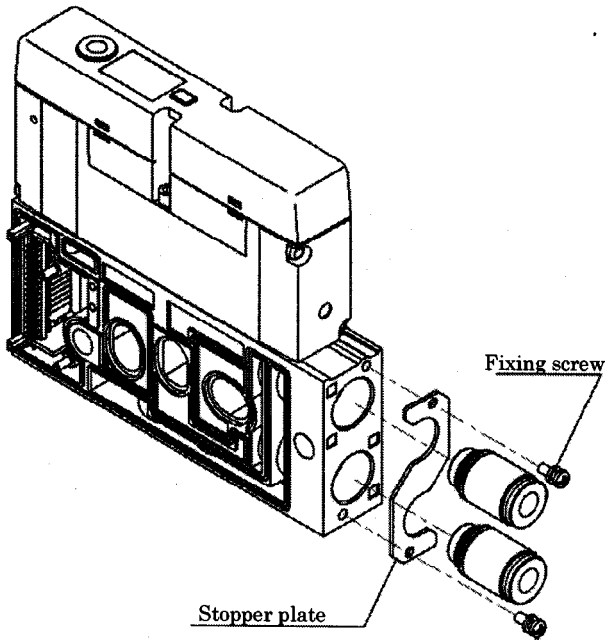
Proper tightening torque of the screw for mounting of solenoid valve: 2.4～2.6 N·m



6.2.2 How to replace the cartridge joint

When changing the size of push-in joint, please check its procedures first before replacing. If not fitted correctly, or in case of insufficient tightening of the fitting screws, it may cause an air leakage, to which please pay your careful attention.

1) Base piping (B) type
   (1) Remove the fixing screws.
   (2) Pull out the stopper plate and joint simultaneously.
   (3) Fit the grooves of replacing joint with the stopper plate and perform a temporary assembling.
   (4) Assemble the stopper plate and joint simultaneously and tighten the fixing screws. Check the fitting by pulling the joint.
   Proper tightening torque of the fixing screw: 0.55 to 0.65 N·m

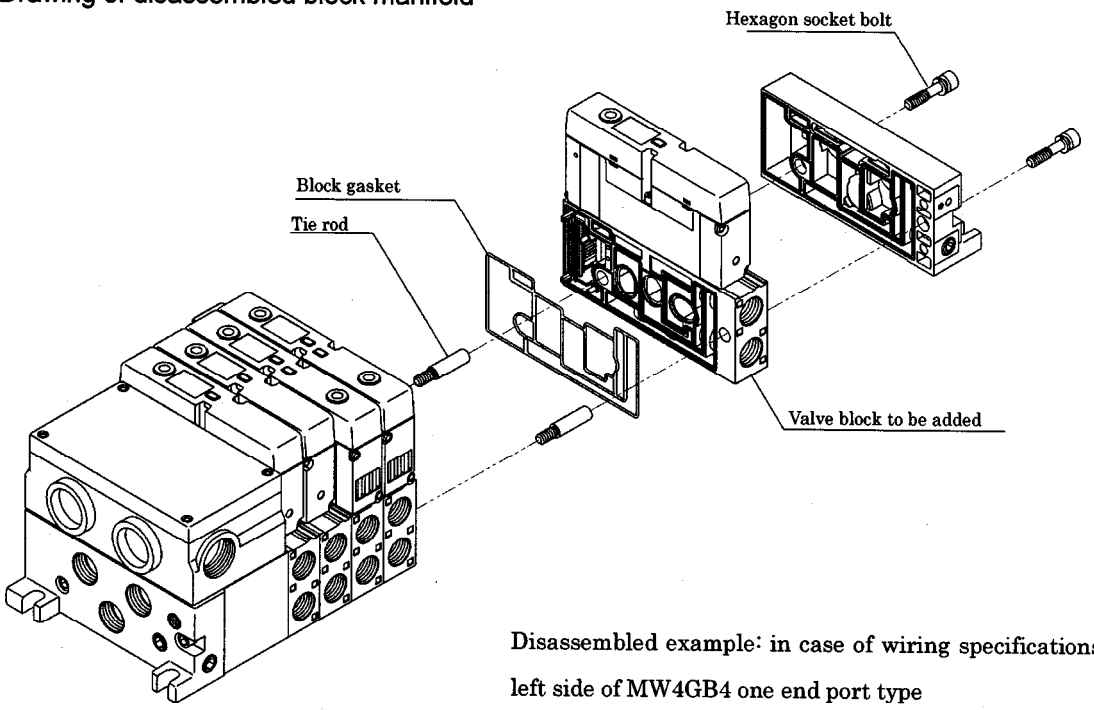


6.3 Additional installation of a valve unit to a fewer wiring type manifold.

⚠ WARNING: When disassembling or assembling the manifold, perform it after reading the Instruction Manual carefully and with full understanding of its contents.

- You are required to understand the structure of solenoid valve and its operation principle to secure the safety.
- A level of 2nd Class or more of Pneumatics Technology Certification is required.

6.3.1 Drawing of disassembled block manifold



Disassembled example: in case of wiring specifications on the left side of MW4GB4 one end port type

6.3.2 How to add the station of valve block

(1)Remove the hexagon socket bolts (2 bolts).

(2)Separate the blocks apart from each other located where you wish to add the station and pull out the tie rod.
In such a case, be careful so that the gasket may not fall apart.

(3)Connect the tie rod for additional station.

(4)Pass the valve block to be added through the tie rod and push it between the adjacent blocks without leaving any clearance and then connect.

(5)Connect the pulled out block in the same manner.

(6)Make sure that all blocks have been connected without leaving any clearance, and then tighten the hexagon socket bolts.
(Proper tightening torque: 7.0 to 8.0 N·m)

6.3.3. Wiring between the electric block and valve block (DC specifications)

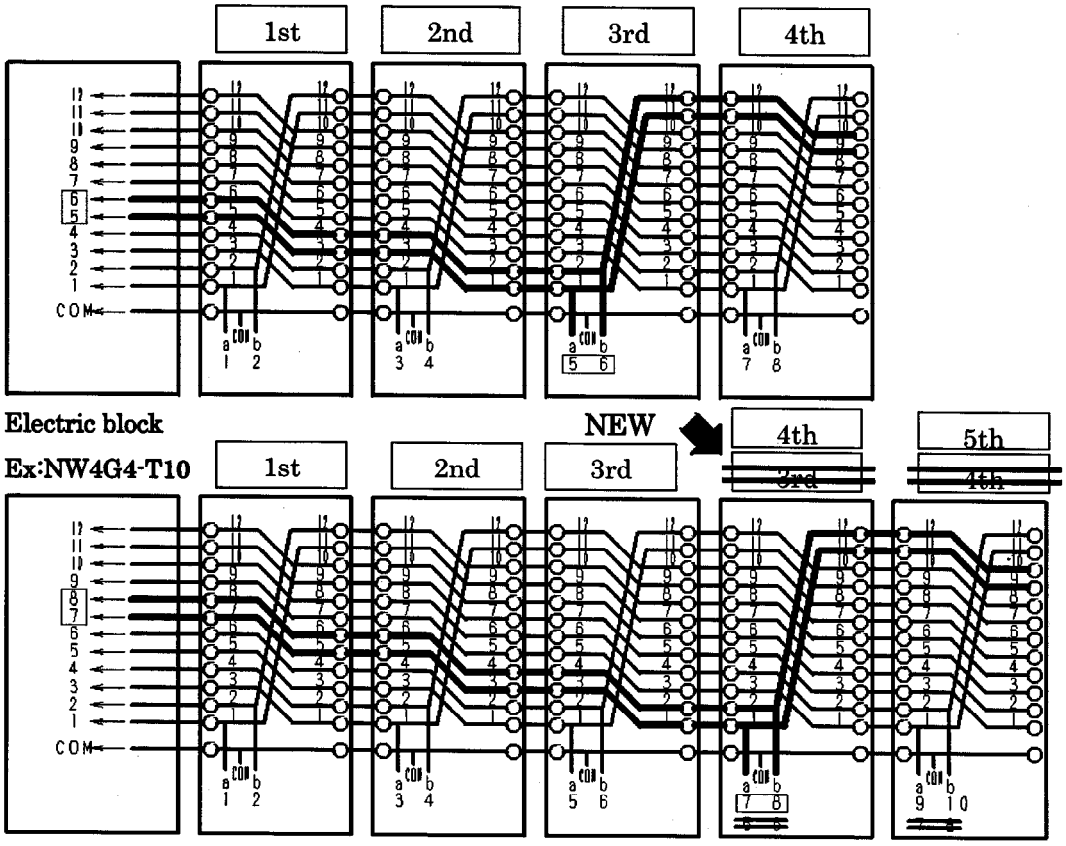
Component called exclusive wiring connector has been built-in in the valve block and supply/exhaust block, which gives a structure enabling to disassemble or assemble the block manifold and at the same time to carry out electrical wiring. No special wiring job is required when disassembling or assembling. Because there is a regularity between the connector pin number of electric block and wired valve, connect the wire between the valve and controlling system after checking "4.4 Wiring style". Pay your special attention when adding or reducing the station of valve block. The wiring circuit diagram for adding the station is shown below.

Example of wiring circuit

The diagram below shows the wiring circuit of MW4G4 only and is different from the actual specifications.

- Double wiring

When one station of valve block is added between the 2nd and 3rd stations, the output originally allocated to the terminal blocks No. 5 and No. 6 of electric block is allocated to the terminal strip No. 7 and No. 8 automatically after the output dislocates the position for the portion of 2-solenoid.



- Standard wiring

Same as the double wiring, output is allocated to the terminal strip numbers by dislocation, but with a different style of dislocation depending on the type of solenoid valve. Output is allocated by dislocating for 1-solenoid portion in case of 1 solenoid (2-position single operator) and 2-solenoid portion in case of 2 solenoids (2-position double operators/3-position).

6.3.4 Setting of No. of manifold station

No. of manifold station is set in ascending sequence from the left valve block, putting the pipe port forward.

In the case of AC specification, the wires are installed from each valve block to the electric board assembly in the wiring block via the cable assembly. When wiring, the above rule for setting No. of manifold station is applied.

In the case of DC specification, the wires are automatically installed by the duct board when each block is connected.

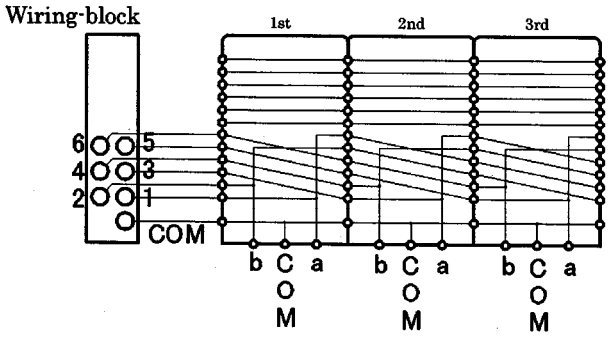
In the case of right wiring of DC specification, the part named "folding board" is additionally attached.

The wiring structure in the case of DC specification is shown below.

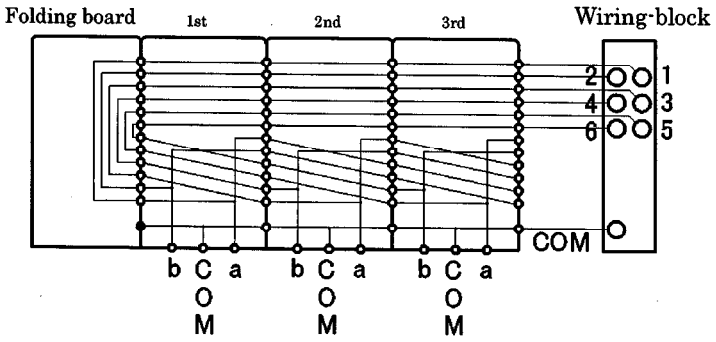
Wiring diagram

Simulated wiring diagram is illustrated in the diagram below. Actual specification is not the same.
The diagram shows an example where : 1st-3rd link = double solnoid

●Wiring-block in left side



●Wiring-block in right side



Parts kit

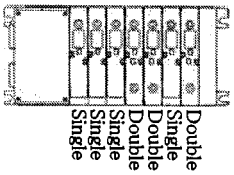
● Folding board

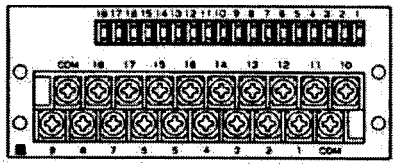
Model No.	Description
W4G4-CIRCUIT-BOARD-ED	Parts used for right wiring of reduced-wiring DC specification (In the case of the product is shipped as a manifold assembly, it is not necessary to arrange the folding board because it is already built in.)

6.3.5 Points for connecting the electric substrate connector

1) Points for connecting T10 electric substrate (standard wiring)

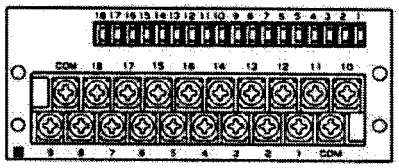
Due to the reduced wiring specifications (T10), the rules to be applied to the connector on the electric substrate and the valve are different. When wiring the connector, please check the connector number printed on the substrate. For mix wiring (mixed installation), the manifold structure in the sketch right is shown as an example.



	Assembly of electric substrate Carry out wiring in the order as shown by arrows.	Correspondence with valve
T10	 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1	Single only (Max. number of MF station: 16) Terminal block No. COM 18 17 16 15 14 13 12 11 10 Valve No. COM (Empty) (Empty) 16a 15a 14a 13a 12a 11a 10a Terminal block No. 9 8 7 6 5 4 3 2 1 COM Valve No. 9a 8a 7a 6a 5a 4a 3a 2a 1a COM Double only (Max. number of MF station: 8) Terminal block No. COM 18 17 16 15 14 13 12 11 10 Valve No. COM (Empty) (Empty) 8b 8a 7b 7a 6b 6a 5b Terminal block No. 9 8 7 6 5 4 3 2 1 COM Valve No. 5a 4b 4a 3b 3a 2b 2a 1b 1a COM Mix (Max. number of solenoid valve: 16) Terminal block No. COM 18 17 16 15 14 13 12 11 10 Valve No. COM (Empty) (Empty) (Empty) (Empty) (Empty) (Empty) (Empty) (Empty) 7b Terminal block No. 9 8 7 6 5 4 3 2 1 COM Valve No. 7a 6a 5b 5a 4b 4a 3a 2a 1a COM

2) Points for connecting T10 electric substrate (double wiring)

The double wiring specifications are corresponding to the double solenoid wiring, regardless the position type of the solenoid valve to be installed. In case of the standard wiring and double SOL of double wiring only, the wiring is the same.

	Assembly of electric substrate Carry out wiring in the order as shown by arrows.	Correspondence with valve
T10	 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1	Single only (Max. number of MF station: 8) Terminal block No. COM 18 17 16 15 14 13 12 11 10 Valve No. COM (Empty) (Empty) (Empty) 8a (Empty) 7a (Empty) 6a (Empty) Terminal block No. 9 8 7 6 5 4 3 2 1 COM Valve No. 5a (Empty) 4a (Empty) 3a (Empty) 2a (Empty) 1a COM Double only (Max. number of MF station: 8) Terminal block No. COM 18 17 16 15 14 13 12 11 10 Valve No. COM (Empty) (Empty) 8b 8a 7b 7a 6b 6a 5b Terminal block No. 9 8 7 6 5 4 3 2 1 COM Valve No. 5a 4b 4a 3b 3a 2b 2a 1b 1a COM Mix (Max. number of solenoid valve: 16) Terminal block No. COM 18 17 16 15 14 13 12 11 10 Valve No. COM (Empty) (Empty) (Empty) (Empty) 7b 7a (Empty) 6a 5b Terminal block No. 9 8 7 6 5 4 3 2 1 COM Valve No. 5a 4b 4a (Empty) 3b (Empty) 2a (Empty) 1a COM

7. TROUBLE SHOOTING

TROUBLE SHOOTING

Motion troubles	Suspected cause	Remedies
Does not actuate	No electric signals	Turn on the power
	Damage to signal wiring system	Repair the control circuit
	Excessive fluctuating range of current or voltage	Reaffirm the power capacity. (within ±10% of voltage fluctuation)
	The circuit is not wired correctly	Wire the circuit correctly
	All pilot exhaust port is closed	Rectify the piping system
Malfunctions	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
	Pressure supplied through exhaust port	Change the piping to an external pilot system
	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 atmosphere.	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 tar)	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 is required	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.
	Release of A and / or B port to an open atmosphere directly	Check the piping. Apply more grease.
	Foreign particles cut into packing lips	Remove the foreign particle away from the packing.

8. PRODUCT SPECIFICATIONS AND STYLE OF INDICATON OF THE MODEL NUMBER

8.1 Product specifications

1) Common specifications

Model number / Item		W4G4
Working fluid		Compressed air
Operation method		Pilot operated type
Valve structure		Soft spool valve
Min. working pressure MPa	2-position	0.2
	3-position	0.2
Max. working pressure MPa		1.0
Proof pressure MPa		1.5
Ambient temperature °C		-5~55 (No freezing)
Fluid temperature °C		5~55
Manual override		Non-locked type
Pilot exhaust method	Internal pilot	Individual exhaust of main valve/pilot valve
	External pilot	Individual exhaust of main valve/pilot valve
Lubrication Note 1		Not required
Protection structure Note 2		Dust-proof/Jet-proof (equivalent to IP65 enclosure)
Vibration/shock m/s^2		50 or less / 300 or less
Working atmosphere		Must not used in any corrosive gas environment

Note 1 : In case of lubrication, please use turbine oil 1st grade ISO VG32.
Excess lubrication or intermittent lubrication may cause unsteady operation.
Note 2 : This is based on the standard test method of IP65 (IEC60529 [IEC529: 1989-11])
Please check the sealing tightness in advance.
Ref: The pressure unit is indicated in MPa. Conversion rate: 1MPa = 10.1972kgf/cm^2

2) Electric specifications

Model No. / Item		W4G4
Rated voltage V	DC	12,24
	AC	100,110
Variation range of rated voltage		±10%
Holding current A	DC12V	0.100
	DC24V	0.050
	AC100V	0.024
	AC110V	0.024
Power consumption W	DC12V	0.6
	DC24V	0.6
Apparent power VA	AC100V	2.4
	AC110V	2.6
Heat-resistance class		B
Surge absorber		Standard
Indicator		Standard

3) Specifications for each model

Item			When ON	When OFF
Response time ms	2-position	Single	30	38
		Double	30	—
	3-position	ABR port connection	50	58

The response time is the value under supply pressure 0.5MPa and at 20°C without lubrication. This varies depending on the pressure and type of oil.

Item	Valve specifications		Position type		1(P)→4(A)/2(B)	4(A)/2(B)→3/5(R)
Sonic conductance $dm^3/(s \cdot bar)$	Individual unit	W4GB4	2-position		7.7	7.3
			3-position	All ports blocked	6.6	6.4
				ABR port connection	6.5	7.3
				PAB port connection	7.4	7.1
	Manifold	MW4GB4 series	2-position		7.4	7.9
			3-position	All ports blocked	6.4	7.1
				ABR port connection	6.4	8.3
				PAB port connection	7.1	7.4

- This is the value when the connecting port diameter of A/B ports are Rc3/8.

4) Weight

Weight is uneven by the product type, so below is reference valve.

Please refer for the detailed type turn along with the catalog.

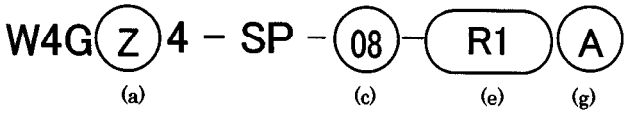
End block	Model	NW4G4-EL	NW4G4-EXL	NW4G4-ER	NW4G4-EXR	NW4G4-ELK	NW4G4-ERK
	Weight g	316	448	308	440	313	305
Solenoid valve	Model	W4GB419-00-M-□	W4GB429-00-M-□	W4GB439-00-M-□	W4GB449-00-M-□	W4GB459-00-M-□	
	Weight g	257	301	332	333	333	
	Model	W4GB419-00-M7-□	W4GB429-00-M7-□	W4GB439-00-M7-□	W4GB449-00-M7-□	W4GB459-00-M7-□	
	Weight g	257	301	332	333	333	
Descrete valve block	Model	NW4GB4-V-08-R1	NW4GB4-V-10-R1	NW4GB4-V-C□-R1	NW4GZ4-V-08-R1		
	Weight g	347	327	371	360		
	Model	NW4GB4-V2-08	NW4GB4-V2-10	NW4GB4-V2-C12	NW4GZ4-V2-08		
	Weight g	291	271	315	258		
	Model	NW4GB4-V2-08-1	NW4GB4-V2-10-1	NW4GB4-V2-C12-1	NW4GZ4-V2-08-1		
	Weight g	286	266	310	253		
Wiring block	Model	NW4G4-T10	NW4G4-T10R	NW4G4-T6□1	NW4G4-T6□1R		
	Weight g	550	542	710	702		
Parts related manifold	Model	W4G4-MP□ (Masking plate kit)	W4G4-TR-V1 (Tie rod for one station)	W4G4-TR-V2 (Tie rod for two stations)	Mounting screw for tie rod (2 pieces)	W4G-CIRCUIT-BOARD-ED (Added to wiring-block in the right side)	
	Weight g	88	16	36	16	4	
Individual sub base	Model	W4GB4-SP-08-R1	W4GB4-SP-10-R1	W4GB4-SP-08	W4GB4-SP-10		
	Weight g	544	498	490	444		
	Model	W4GZ4-SP-08-R1	W4GZ4-SP-10-R1	W4GZ4-SP-08	W4GZ4-SP-10		
	Weight g	573	543	519	489		
Others	Model	W4G4-P-10	W4G4-R-10	W4G-OA-W1608C1			
	Weight g	187	189	11			

8 HOW TO ORDER

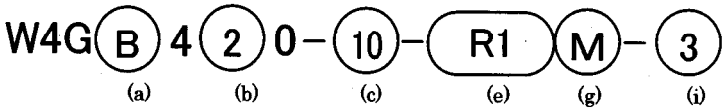
8.2 How to order

1) Individual sub base type -How to order

- Only sub base



- Individual sub base unit



(a) Direction of piping		(b) Position type		(c) Connecting port diam. Ref. table 1	
Symbol	Description	Symbol	Description	Symbol	Description
B	Sideways (Base piping)	1	2-position single	08	Rc1/4
Z	Bottom side (Base piping)	2	2-position double	10	Rc3/8
		3	3-position all ports blocked	08N	NPT1/4
		4	3-position ABR port connection	10N	NPT3/8
		5	3-position PAB port connection	08G	G1/4
				10G	G3/8

(e)Electric connection		(g) Option		(i)Voltage	
Symbol	Description	Symbol	Description	Symbol	Description
No mark	Terminal strip	M	Manual override of non-locked type	1	AC100V
R1	I/O connector cable (For DC 500mm)	M7	With OFF function of pilot air	3	DC24V
		K	External pilot	4	DC12V
		A	Coolant-proof	5	AC110V
		F	With built-in A/B port filter		

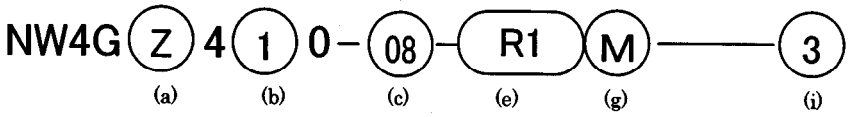
Table 1. (c) Connecting port diam.

	Symbol	W4GB4		W4GZ4		
		1(P) ,3/5(R)	12/14(PA), 84/86(PR)	1(P)	3/5(R)	12/14(PA), 84/86(PR)
4(A)/2(B) port	08	Rc1/4	Rc1/8	Rc1/4	Rc1/4	Rc1/8
	10	Rc3/8	Rc1/8	Rc3/8	Rc1/4	Rc1/8
	08N	NPT1/4	NPT1/8	NPT1/4	NPT1/4	NPT1/8
	10N	NPT3/8	NPT1/8	NPT3/8	NPT1/4	NPT1/8
	08G	G1/4	G1/8	G1/4	G1/4	G1/8
	10G	G3/8	G1/8	G3/8	G1/4	G1/8

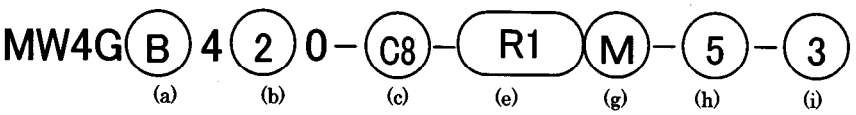
Confirm the catalogue in detail.

2) Individual wiring type manifold –How to order

• Individual valve block with solenoid valve



• Manifold



(a) Direction of piping		(b) Position type		(c) Connecting port diam. Ref. table 2	
Symbol	Description	Symbol	Description	Symbol	Description
B	Sideways (Base piping)	1	2-position single	08	Rc1/4
Z	Bottom side (Base piping)	2	2-position double	10	Rc3/8
		3	3-position all ports blocked	08N	NPT1/4
		4	3-position ABR port connection	10N	NPT3/8
		5	3-position PAB port connection	08G	G1/4
		8	Mix manifold	10G	G3/8
				C8	Push-in joint ϕ8
				C10	Push-in joint ϕ10
				C12	Push-in joint ϕ12

(e)Electrc connection		(g) Option		(h) No. of station		(i)Voltage	
Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
R1	I/O connector cable(For DC 500mm)	M	Manual override of non-locked type	1~16	No. of station	3	DC24V
		M7	With OFF function of pilot air			4	DC12V
		Z1	Supply spacer				
		Z3	Exhaust spacer				
		K	External pilot				
		A	Coolant-proof				
		F	With built-in A/B port filter				

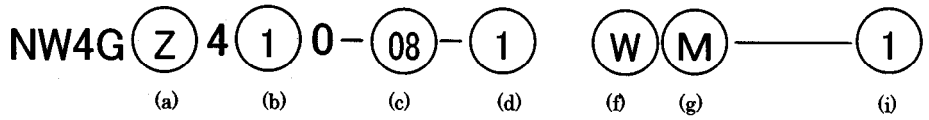
Table 2 (c) Connecting port diam.

	Symbol	MW4GB4		MW4GZ4	
		1(P), 3/5(R)	12/14(PA), 84/86(PR)	1(P), 3/5(R)	12/14(PA), 84/86(PR)
4(A)/2(B) port	08	Rc1/2	Rc1/8	Rc1/2	Rc1/8
	10	Rc1/2	Rc1/8		
	08N	NPT1/2	NPT1/8	NPT1/2	NPT1/8
	10N	NPT1/2	NPT1/8		
	08G	G1/2	G1/8	G1/2	G1/8
	10G	G1/2	G1/8		
	C8	Rc1/2	Rc1/8		
	C10	Rc1/2	Rc1/8		
	C12	Rc1/2	Rc1/8		

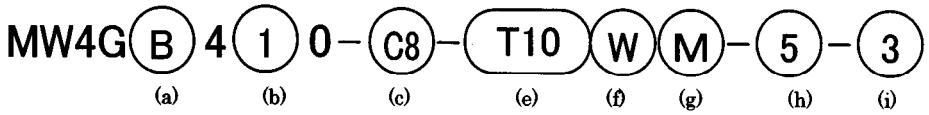
Confirm the catalogue in detail.

3) Fewer wiring type manifold -One end port type

·Individual valve block with solenoid valve



·Manifold



(a) Direction of piping		(b) Position type		(c) Connecting port diam. Ref. table 2		(d)Electric connection	
Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
B	Sideways (Base piping)	1	2-position single	08	Rc1/4	No mark	DC
Z	Bottom side (Base piping)	2	2-position double	10	Rc3/8	1	1 to 6 station for AC
		3	3-position all ports blocked	08N	NPT1/4	2	7 to 12 station for AC
		4	3-position ABR port connection	10N	NPT3/8	3	13 to 16 station for AC
		5	3-position PAB port connection	08G	G1/4		
		8	Mix manifold	10G	G3/8		
				C8	Push-in joint ϕ 8		
				C10	Push-in joint ϕ 10		
				C12	Push-in joint ϕ 12		

(e)Electrial connection		(f) Terminal/connector pin array		(g) Option		(h) No. of station		(i)Voltage	
Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
T10	Left	No mark	Standard wiring	M	Manual override of non-locked type	1~16	No. of station	1	AC100V
T10R	Right	W	Double wiring	M7	With OFF function of pilot air			3	DC24V
				Z1	Supply spacer			4	DC12V
				Z3	Exhaust spacer			5	AC110V
				K	External pilot				
				A	Coolant-proof				
				F	With built-in A/B port filter				

Note) Please select in advance a valve block with masking plate as a spare block, if any change in the specifications is expected in case of AC.

Confirm the catalogue in detail.

4) Fewer wiring type manifold –Serial transmission type

• Individual valve block with solenoid valve

NW4G(Z)4(1)0–(08)– (W)(M)———(3)

(a) (b) (c) (f) (g) (i)

• Manifold

MW4G(B)4(1)0–(10)–(T6D1)(W)(M)–(8)–(3)

(a) (b) (c) (e) (f) (g) (h) (i)

(a) Direction of piping		(b) Position type		(c) Connecting port diam. Ref. table 2		(e)Electric connection		
Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description	
B	Sideways (Base piping)	1	2-position single	08	Rc1/4	T6G1	Mitsubishi CC-Link 16points	Left
Z	Bottom side (Base piping)	2	2-position double	10	Rc3/8	T6G1R	Mitsubishi CC-Link 16points	Right
		3	3-position all ports blocked	08N	NPT1/4	T6J1	UNIWIRE H 16points	Left
		4	3-position ABR port connection	10N	NPT3/8	T6J1R	UNIWIRE H 16points	Right
		5	3-position PAB port connection	08G	G1/4	T6A1	UNWIRE 16points	Left
		8	Mix manifold	10G	G3/8	T6A1R	UNIWIRE 16oints	Right
				C8	Push-in joint φ8	T6D1	DeviceNet 16points	Left
				C10	Push-in joint φ10	T6D1R	DeviceNet 16points	Right
				C12	Push-in joint φ12	T6C1	CompoBus/s16points	Left
						T6C1R	CompoBus/s16points	Right

(f)Terminal/connector pin array		(g) Option		(h) No. of station		(i)Voltage	
Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
No mark	Standard wiring	M	Manual override of non-locked type	1~16	No. of station	3	DC24V
W	Double wiring	M7	With OFF function of pilot air				
		Z1	Supply spacer				
		Z3	Exhaust spacer				
		K	External pilot				
		A	Coolant-proof				
		F	With built-in A/B port filter				

Confirm the catalogue in detail.

8 HOW TO ORDER

8.3 Option

1) Explation of option

・With OFF function of pilot air : Symbol M7 Refer to section 5.2.3

The valve operation can be checked during maintenance without cutting off the power supply.

・External pilot : Symbol K

The main pressure is separated from the pilot pressure. Please select when the main pressure is lower than the minimum operating pressure of the solenoid valve.

・Coolant proof : Symbol A

Set it if the cutting oil flows in the valve.

1) The rubber material of the major section of the solenoid valve is changed to the fluorine-containing rubber.
2) The material of the case for serial transmission unit block is changed to nylon.

・With built-in A/B port filter : Symbol F

The filter prevents the cutting chips and pieces of tape from entering the valve.

・With supply spacer : Symbol Z1 Refer to section 8.5

This option symbol indicates a manifold assembly equipped with the supply spacer.
The supply port can be provided to each valve.
Use this option when supply air with different pressures depending on the valve.

・With exhaust spacer : Symbol Z3 Refer to section 8.5

This option symbol indicates a manifold assembly equipped with the exhaust spacer.
The exhaust port can be provided to each valve.
Use this option when there is a fear of malfunction due to backpressure.

・With Silencer box (Direct exhaust)

The exhaust port is provided at the top of the manifold end block for attaching the silencer.
The protruding dimension in the air supply/exhaust port unloading direction can be shorter than the case when the normal silencer is attached.
Select it among from the variations of the end block assembly in the manifold specification.

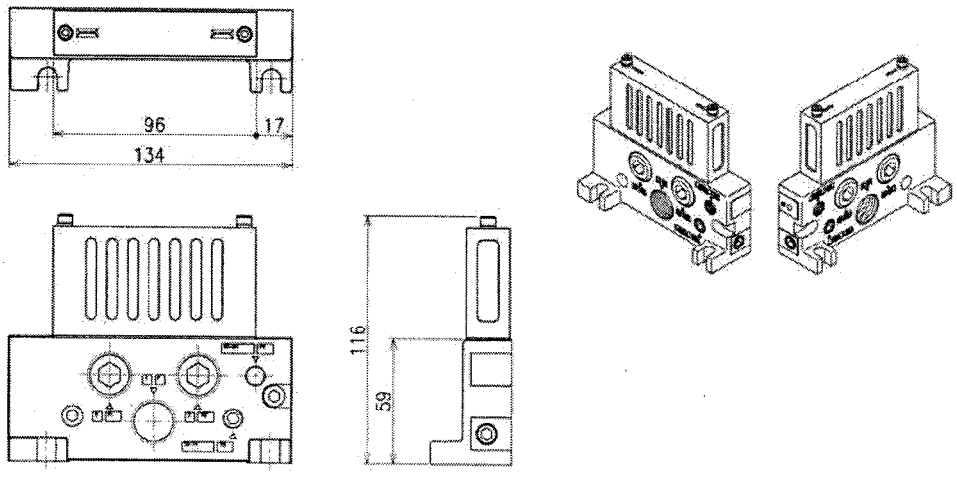
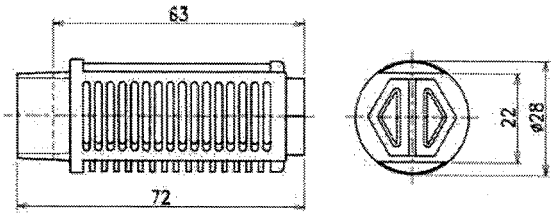


Figure shows NW4G4-EXL

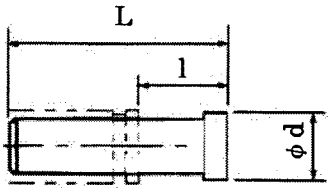
8.4 Accessories

1) Silencer



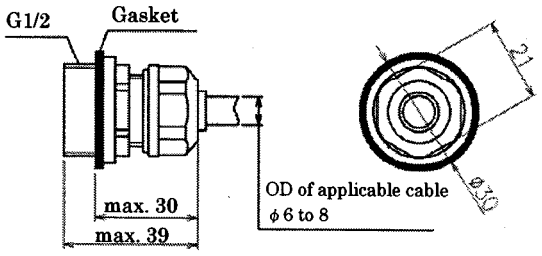
CKD Model: SLW-15A

2) Blank plug

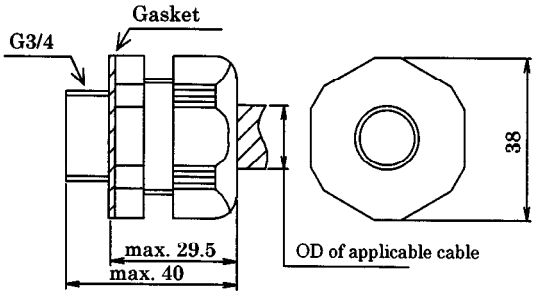


Model	D	L	l	d
GWP8-B	ϕ8	33	14	10
GWP10-B	ϕ10	40	18.5	12
GWP12-B	ϕ12	43	20	14

3) Cable cramp (with gasket)



W4G-OA-W1608C1



W4G-SCL-18A / 18B

Model	Type	Port size / OD of applicable cable	Tightening torque(Reference value)
W4G-OA-W1608C1	For individual sub base type For serial transmission type manifold	G1/2 / ϕ6 to 8	Main body: 2.0 to 2.4 N·m Cable cramp: 0.5 to 0.7 N·m
W4G-SCL-18A	For one end port type manifold	G3/4 / ϕ14.5 to 16.5	Main body: 4.0 to 4.5 N·m
W4G-SCL-18B	For one end port type manifold	G3/4 / ϕ16.5 to 18.5	Cable cramp: 3.0 to 3.5 N·m

8.5 Kit parts

1) Push-in joint of cartridge type kit

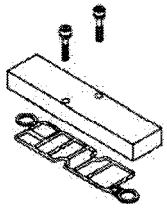
Parts name	Model No.	Description
8 dia. push in joint	4G4-JOINT-C8	Joint 1
10 dia. push in joint	4G4-JOINT-C10	Joint 1
12 dia. push in joint	4G4-JOINT-C12	Joint 1

2) Stopper plate kit

Model No.	Description
W4G4-JNT-STP-KIT	Plate 1、Mounting screws 2

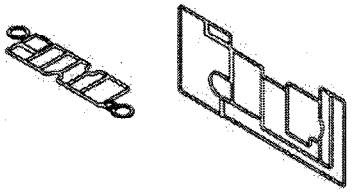
3) Masking plate kit

Model No.	Description
W4G4-MP	Plate 1, Gasket 1, Mounting screws 2



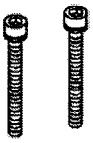
4) Gasket kit

Model No.	Description
W4G4-GASKET	Body gasket 1 (Between solenoid valve and valve block)
W4G4-BLK-GASKET	Block gasket 1 (Between blocks)



5) Mounting screw kit

Model No.	Description
W4G4-SET-SCREW	Mounting screws 10

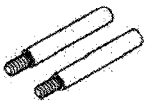


6) Circuit board kit

Model No.	Description
W4G4-CIRCUIT-BOARD-ED	Circuit board 1

7) Tie rod kit

Model No.	Description
W4G4-TR-V1	One pair of tie rod for one station (2 pcs)
W4G4-TR-V2	One pair of tie rod for two stations (2 pcs) (For one wiring block)

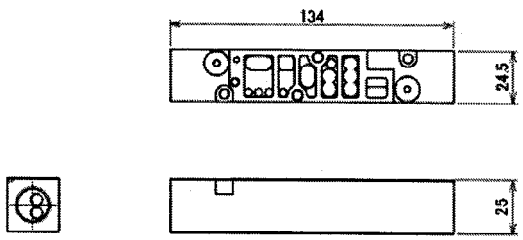


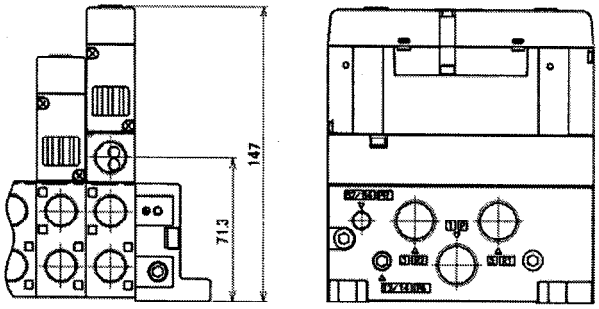
8) Partition plate kit

Model No.	Description
M4TB3-NC	Plate 1

9) Individual supply spacer

Dimension when attached

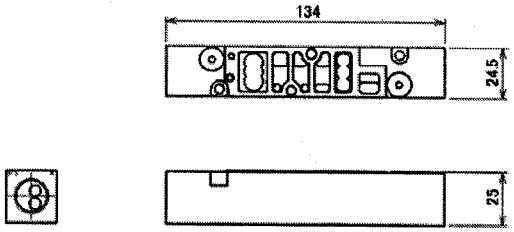


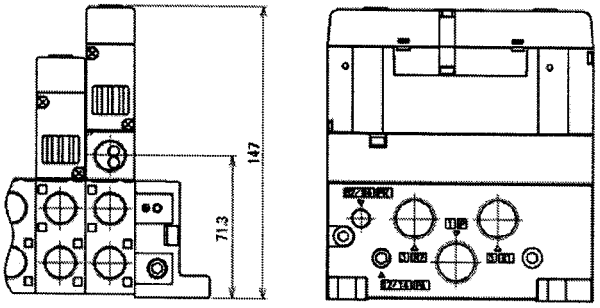


Model	Connecting port diam.	Description
W4G4-P-08	Rc1/4	Main block 1, Gasket 1, O rings 2, Mounting screws (short) 2, Mounting screws (long) 2
W4G4-P-08N	NPT1/4	
W4G4-P-08G	G1/4	
W4G4-P-10	Rc3/8	
W4G4-P-10N	NPT3/8	
W4G4-P-10G	G3/8	

10) Individual Exhaust spacer

Dimension when attached





Model	Connecting port diam.	Description
W4G4-R-08	Rc1/4	Main block 1, Gasket 1, O rings 2, Mounting screws (short) 2, Mounting screws (long) 2
W4G4-R-08N	NPT1/4	
W4G4-R-08G	G1/4	
W4G4-R-10	Rc3/8	
W4G4-R-10N	NPT3/8	
W4G4-R-10G	G3/8	