CKD

SM-P00045-A/2

INSTRUCTION MANUAL

BLOCK MANIFOLD

MN3Q0, MT3Q0 SERIES

- 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.

CKD Corporation

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.
③ 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.

 DANGER : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.

 WARNING : When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

 CAUTION : When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

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.
④ 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 delivery.
⑥ 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 (Chapter 3.)

WARNING : 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.
- Foreign matter may go into the inside of a solenoid valve by the direction of an exhaust port, which may cause inhalation of foreign matter near the exhaust port. 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.

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.
- The coil temperature may be raised with the ambient temperature and/or energization time, thus pay sufficient attention when touching the valves.

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) Vibration resistance and shock resistance
- 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.

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).

i) There is no resistance to surges caused by overvoltage from switching and lightning transients(CE Marking :IEC61000-4-5). Please take measures against surges on the equipment side.

INSTALLATION (Section 4.2)

⚠ WARNING :

a) 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.

b) Tighten the screws with proper torque. If the assembly or tightening is not conducted properly, it may cause some air leakage, falling-off of products, screw damaging or deform of DIN rail.

⚠ CAUTION :

If the manifold weights more than 1 kg, or when using in an environment with vibration or shock, fix the DIN rail onto the surface at 50 to 100mm spacing.

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 5 μm 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 : Be sure to turn off the power, before conducting any wiring operations. Also, do not touch or make the wet hands close to the terminal areas while they are energized. It may result in electric shock.

CAUTION :
a) Confirm the used voltage and polarities securely, when wiring.
b) The voltage drop may be caused with the simultaneous energization and/or cable length. Confirm the voltage drop on the solenoid valve is with in 10% of its rated voltage.
c) Connect this product with the output unit. In case the product is connected with the input unit, it may result in serious trouble(s), not only on these apparatus but also on the peripheral equipments.

Check valve (Section 5.1)

WARNING : The exhaust check valve blocks the back pressure from adjacent air device, etc. However, the structure does not allow the pressure seal to be held continuously, so do not use for purposes other than the back pressure block.

MANUAL OVERRIDE (Section 5.2)

WARNING : When conducting manual operations, make sure that there are no people near the moving cylinder.

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) Basically the product is designed as oilless specifications, however if you prefer to supply oil, use the class 1 turbine oil (additive-free) ISO VG32.
c) Do not use spindle oil or machine oil. They may induce expansion of the rubber parts, which may cause a malfunction.

ELECTRIC CIRCUITS (Section 5.4)

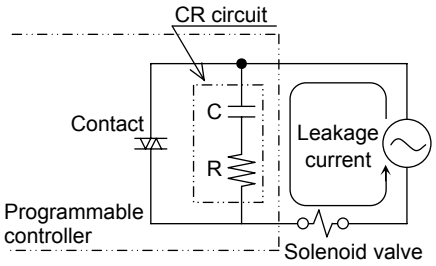
CAUTION :

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



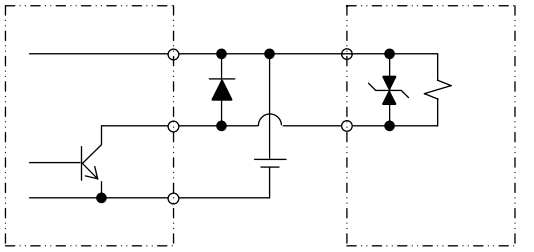
24VDC	1.8 mA or lower

a) The surge suppressor limits the surge voltage generating from the solenoid valve, which reaches several hundred volts, to a low voltage level bearable for output contacts. This function may be insufficient for some output circuits and the voltage may cause breakage or malfunction. Check the surge voltage limitation level of the solenoid valve in your circuit, the dielectric voltage and circuit configuration of the output devices and the delay for recovery to check for serviceability. If necessary, install another measures against surges. The MN3Q0 and MT3Q0 Series solenoid valves equipped with a surge suppressor suppress the terminal-to-terminal reverse voltage surge generating upon shutoff, to the level shown in the table below.

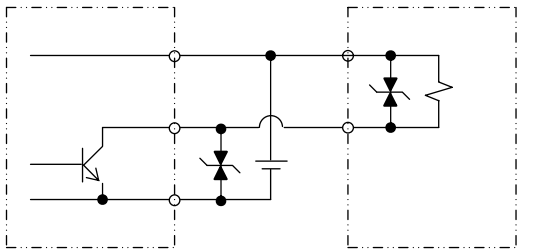
In case of 24VDC	About 47V

b) If the output unit is of an NPN type, the output transistor is susceptible to the sum of the voltage specified in the table above and the source voltage. Install a contact protection circuit.

<Example 1 of output transistor protection circuit>



<Example 2 of output transistor protection circuit>



PERIODIC INSPECTION (Section 6.1)

⚠ 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.

⚠ 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.

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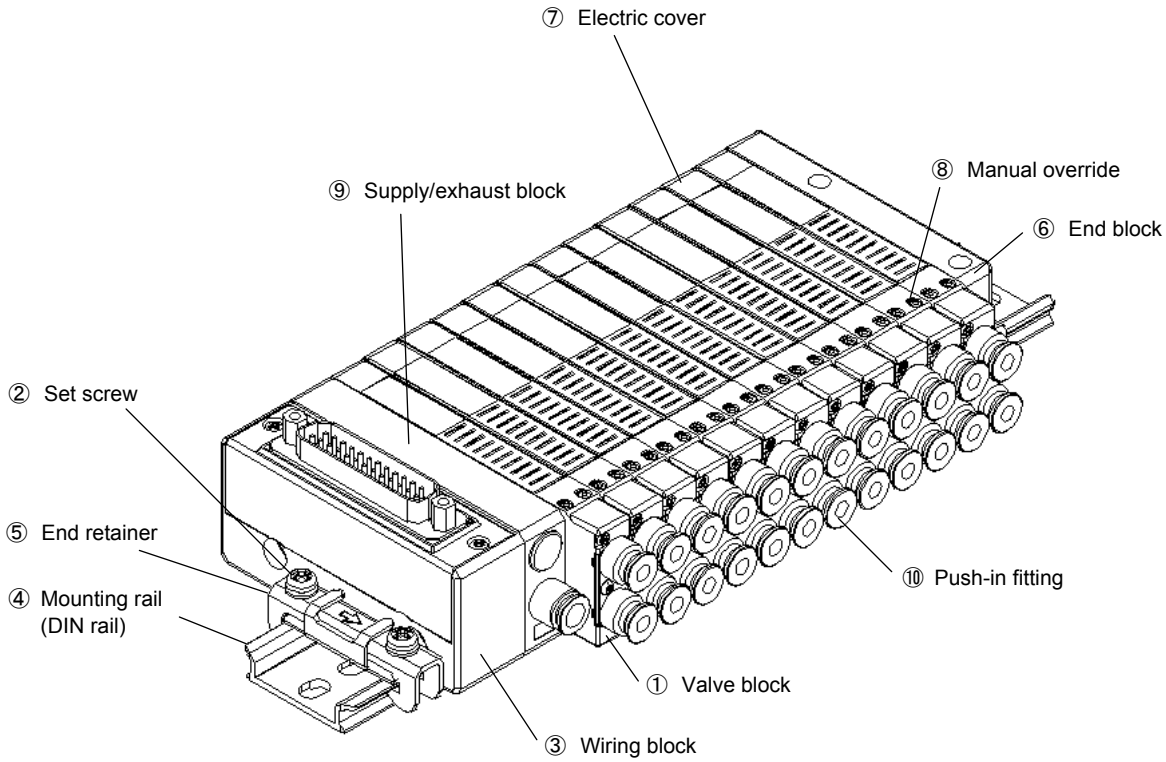
Block Manifold
MN3Q0, MT3Q0 Series
Manual No. SM-P00045-A

Created 2011.11.30
Revised 2013.05.09

1. PRODUCT



① Valve block

② Set screw
There are two screw for wiring block and end block, securing the entire manifold to the DIN rail.

③ Wiring block
The block has a built-in printed circuit board.

④ Mounting rail (DIN rail)

⑤ End retainer
It is temporarily fixed to the wiring block and the end block.

⑥ End block
Located opposite the wiring block, the end block secures the entire manifold to the DIN rail. It has a function of common supply/exhaust flow plugging.

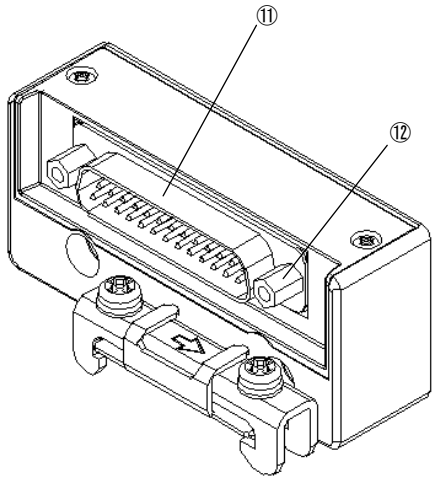
⑦ Electric cover
The electricity indicator lamp comes on inside the cover when the solenoid is energized. The “a” solenoid and the “b” solenoid are red and green, respectively, when they are lighted.

⑧ Manual override

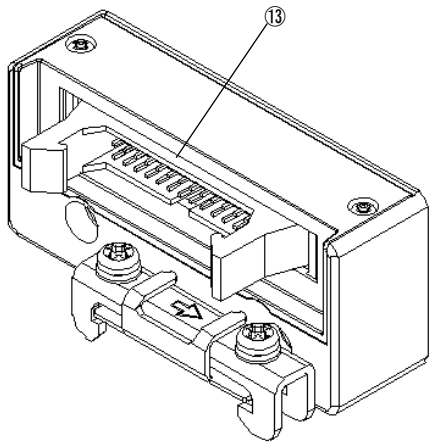
⑨ Supply/exhaust block

⑩ Push-in fitting
The joint is a replaceable cartridge push-in type.

● D sub-connector type (T30*, T30*R)



● Flat cable type (T5*, T5*R)



⑪ D-sub 25-pin connector
Control terminals of the manifold solenoid valve are integrated.

⑫ Lock screw (M2.6)
The screw is used to secure the connectors.

⑬ Flat cable connector
Control terminals of the manifold solenoid valve are integrated.

Note: For details of manifold configuration, refer to page 46 and the following pages.

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 like 1P and 3R.

Application	ISO	JIS
Supply port	1	P
Output port	2	(A) (Note 1)
Exhaust port	3	R

Note 1: The output ports of this solenoid valve are indicated "2a" for a side and "2b" for b side.

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/cm^2 → **0.980665MPa** **1MPa** → 1.01972×10kgf/cm^2

● 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/m^2	MPa or /mm^2	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	1×10^{2}
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1

Note: 1Pa=1N/m^2, 1MPa=1N/mm^2

● 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}
1×10^{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

Note: 1Pa=1N/m^2

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

⚠ WARNING : 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.
- Foreign matter may go into the inside of a solenoid valve by the direction of an exhaust port, which may cause inhalation of foreign matter near the exhaust port. 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.

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) Vibration resistance and shock resistance
- 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.

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).

i) There is no resistance to surges caused by overvoltage from switching and lightning transients(CE Marking :IEC61000-4-5). Please take measures against surges on the equipment side.

4.2 Installation

⚠ WARNING :

a) 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.

b) Tighten the screws with proper torque. If the assembly or tightening is not conducted properly, it may cause some air leakage, falling-off of products, screw damaging or deform of DIN rail.

⚠ CAUTION : If the manifold weights more than 1 kg, or when using in an environment with vibration or shock, fix the DIN rail onto the surface at 50 to 100mm spacing.

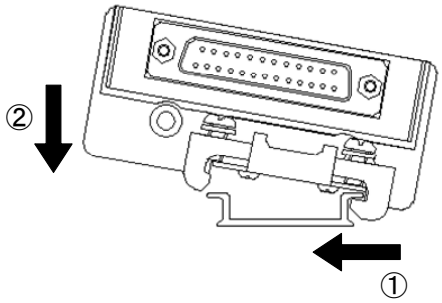
4.2.1 A work space for installation, removal, wiring, and piping operations should be provided around the installed solenoid valve system.

4.2.2 Installation using

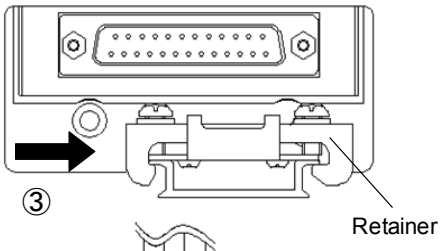
Note, however, that if the system is not properly mounted it may fall and break the manifold. If the manifold is to be used in an environment where it can be subjected to vibrations and shocks, secure the DIN rail to the mounting surface by applying screws at intervals of 50 to 100mm, and check that it is securely mounted before using the manifold.

● DIN rail mounting (MN3Q0 Series)

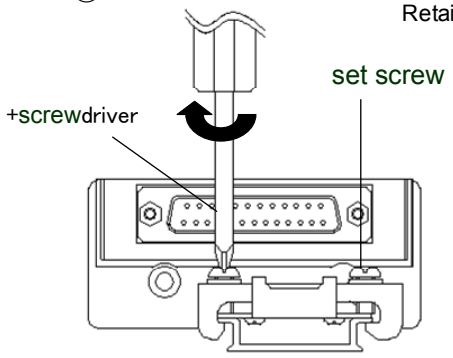
1. Set the jaw of the retainer on DIN rail in the order of ① and ②.



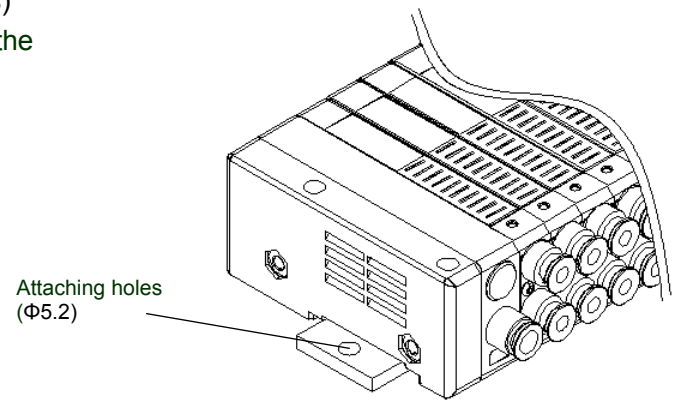
2. Push the retainer in ③ direction.



3. Hold it down so there is no gap between the blocks and tighten the DIN rail set screw.
(Tightening torque 1.4±0.2N·m)



● Direct mounting (MT3Q0 Series)
Tighten these screws through the attaching holes (2 locations).



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 5 μ m or less) immediately upstream of the solenoid valve.

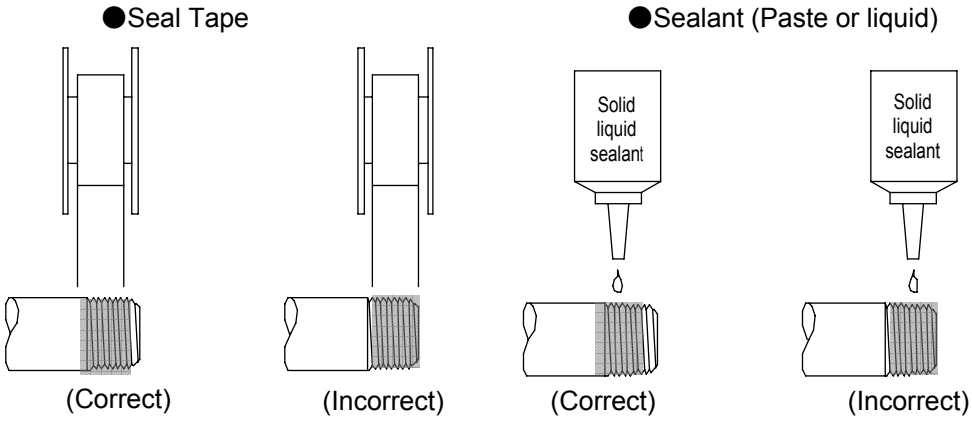
g) Air supply
- Do not restrict the flow of air through the air supply piping. With a manifold system with multiple stations, a drop in the air supply pressure may cause trouble through a delay in the operation timing.

Tightening torque

Joint screw	Tightening torque N·m
M3	0.3 to 0.6
M5	1.0 to 1.5
Rc1/8	3 to 5

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 M3, M5 joint

M3 and M5 joints are sealed using a gasket (Model No. for the gasket only: FGS). Do not retighten the joint 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 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.

4.3.5 Pipe connections

(1) Tubes to be used

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

Soft nylon tubes (F-1500 Series)

Urethane tubes (U-9500 Series)

Note: For Ø1.8 push-in fitting (C18), use UP-9402 (urethane).

(2) For installation at a site that has spatters in the air, select incombustible tubes or metal pipes.

(3) When combining a spiral tube with a standard push-in fitting, 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 fitting.

(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 mm	Inside diameter mm	
	Nylon	Urethane
φ1.8	-	φ1.2
φ3	-	φ2
φ4	φ2.5	φ2
φ6	φ4	φ4
φ8	φ5.7	φ5
φ10	φ7.2	φ6.5

Outside diameter allowance

Soft or hard nylon	±0.1mm
Urethane φ1.8, φ3	±0.1mm
Urethane φ4, φ6	+0.1mm -0.15mm
Urethane φ8, φ10	+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	Urethane
φ1.8	-	4
φ3	-	8
φ4	10	10
φ6	20	20
φ8	30	30
φ10	40	40

(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 (about 5N for C18, CL18 and CLL18).

(8) Blank plug to be used

For use with a solenoid valve with push in fitting, select the blank plug specified by us:

Blank plug	(PG-P2-B)	: Ø1.8 push-in fitting
	(N4E00-JOINT-PP3MW)	: Ø3 push-in fitting
	(GWP4-B)	: Ø4 push-in fitting

4.4 Wiring

⚠ WARNING : Be sure to turn off the power, before conducting any wiring operations. Also, do not touch or make the wet hands close to the terminal areas while they are energized. It may result in electric shock.

⚠ CAUTION :

a) Confirm the used voltage and polarities securely, when wiring.

b) The voltage drop may be caused with the simultaneous energization and/or cable length. Confirm the voltage drop on the solenoid valve is with in 10% of its rated voltage.

c) Connect this product with the output unit. In case the product is connected with the input unit, it may result in serious trouble(s), not only on these apparatus but also on the peripheral equipments.

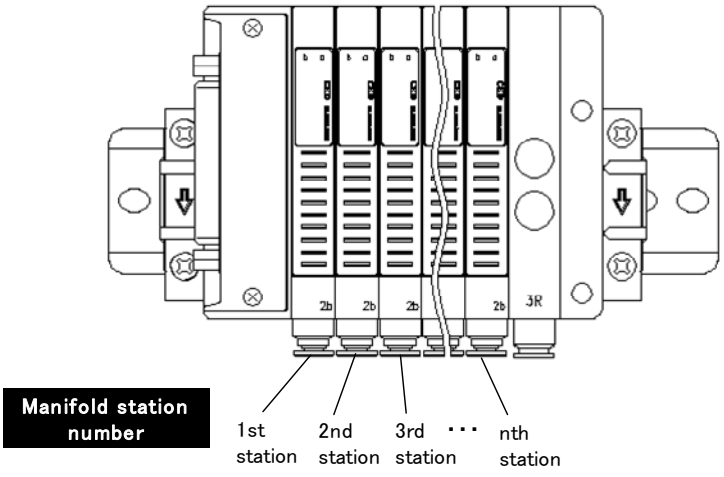
4.4.1 D sub-connector type: Wiring method T30*, T30*R

1) T30*, T30*R connector

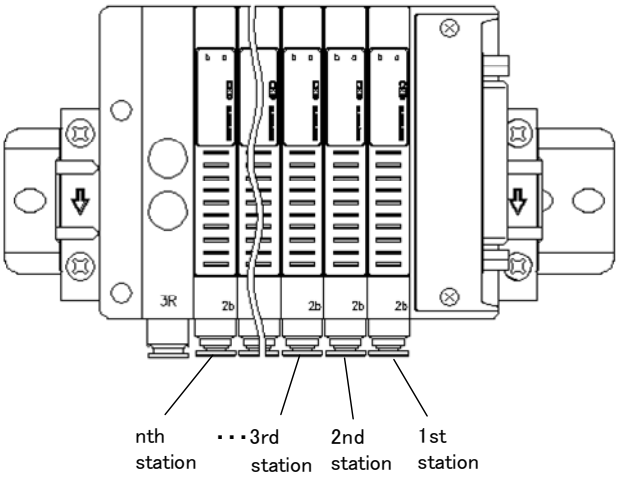
Connectors used for T30* and T30*R wiring method are generally called D sub-connectors. These are commonly used for FA and OA devices. The 25P type is the connector designated in RS232-C Standards that apply to personal computer communication functions.

The manifold stations are counted as station 1, station 2, station 3 and so forth starting from the wiring block side. However, it is counted from the other direction for the T30* and T30*R.

Wiring block L type



Wiring block R type



2) Cautions for connector type T30*, T30*R

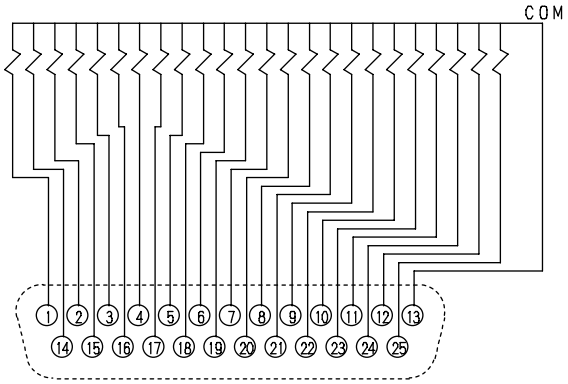
(1) Signal arrays of the PLC output unit must match signal arrays of the valve side.

(2) The working power is 24VDC dedicated.

(3) The voltage could drop due to simultaneous energizing or the cable length. Confirm that the voltage drop for the solenoid is within 10% of the rated voltage.

(4) The PLUS-COMMON is the standard for this solenoid valve. If you need a MINUS-COMMON product, select the model number for MINUS-COMMON valve.

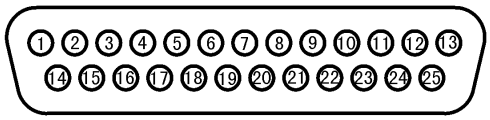
Internal circuit



3) Wiring method

Note: The numbers in the valve, 1a, 1b, 2a, 2b, and so forth indicate the 1st station 2nd station. The alphabetic characters a and b indicate the a side solenoid and the b side solenoid.

Connector pin No.

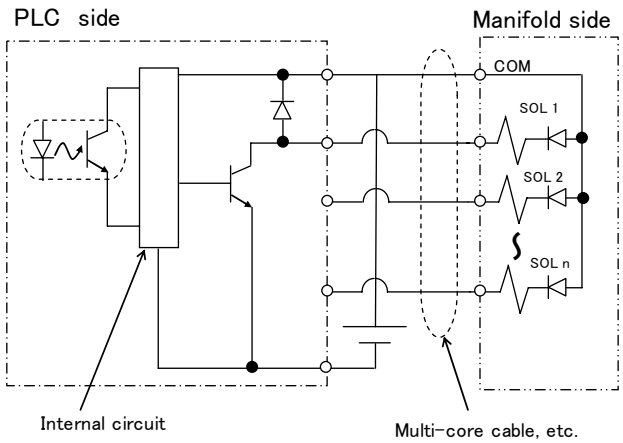


Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve No.	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	COM
Pin No.	14	15	16	17	18	19	20	21	22	23	24	25	
Valve No.	1b	2b	3b	4b	5b	6b	7b	8b	9b	10b	11b	12b	

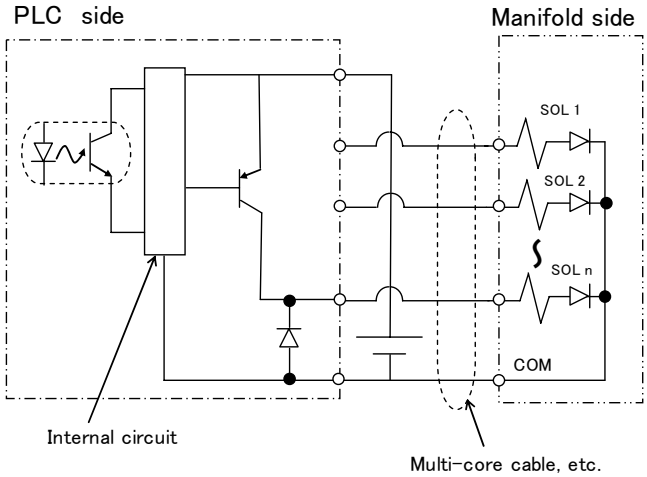
4) Connection to PLC

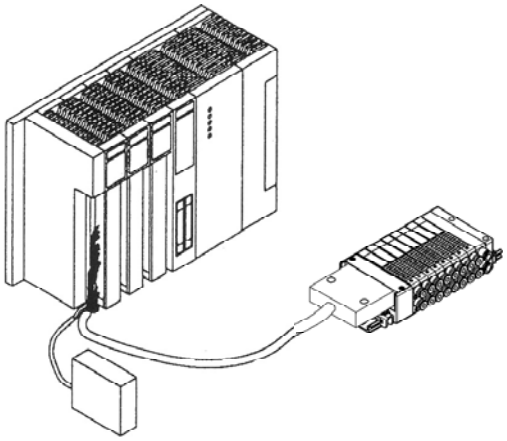
This solenoid valves have polarity. Select the model numbers according to DC output unit, NPN output and PNP output of PLC. Make the wirings as shown on the below illustration.

DC output unit (NPN output)



DC output unit (PNP output)





5) Cable production

We recommend the following for the valve side in the production of the connection cable.

Name	Model	Manufacturer
D sub-connector socket solder type	HDBB-25S	Hirose Electric Co., Ltd.
D sub-connector socket solder type	JAZ25S	Nippon Atchaku Tanshi
D sub-connector socket crimp type	CDB-25S	Hirose Electric Co., Ltd.
D sub-connector socket crimp type	JAC-25S	Nippon Atchaku Tanshi
Plug case (for the solder type) (with M2.6 screw)	HDB-CTF	Hirose Electric Co., Ltd.
Plastic cover with M2.6 screw	JCB-25M	Nippon Atchaku Tanshi

Avoid the use of the press-connect type as much as possible as it has small electric capacity and the fine core wire of the able causes large voltage drop.

6) CKD cable specifications

(CKD cables of the following models can be used)

Model N4T — CABLE — D 0 ☐ — ☐

(Note 1) (Note 2)

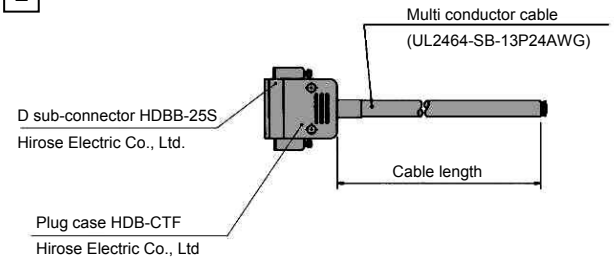
Note 1: User side connection method

0	Only cut
1	With round crimp terminal for M3.5 screw

Note 2: Cable length (L)

1	1m
3	3m
5	5m

● N4T- CABLE- D00- L

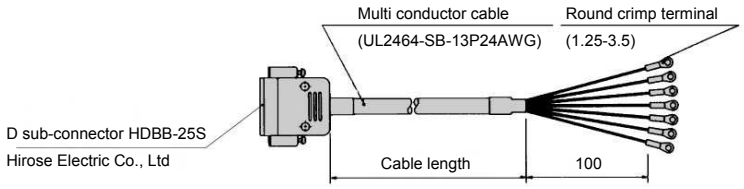


Correspondence of D sub-connector terminal No. and conductor

D sub-connector terminal No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Conductor I.D.	Insulator color	Orange	Orange	Yellow	Yellow	Green	Green	Gray	Gray	White	White	Orange	Orange	Yellow	Yellow	Green
	Type of mark	1 point										2 points				
	Mark color	Black	Red	Black	Red	Black	Red	Black	Red	Black	Red	Black	Red	Black	Red	Black

D sub-connector terminal No.		16	17	18	19	20	21	22	23	24	25
Conductor I.D.	Insulator color	Green	Gray	Gray	White	White	Orange	Orange	Yellow	Yellow	Green
	Type of mark	2 points					3 points				
	Mark color	Red	Black	Red	Black	Red	Black	Red	Black	Red	Black

● N4T- CABLE- D01- L



Correspondence of D sub-connector terminal No. and conductor

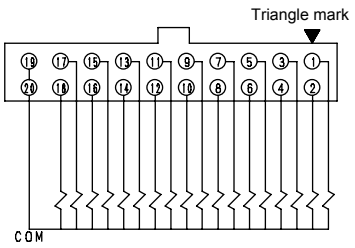
D sub-connector terminal No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Conductor I.D.	Insulator color	Orange	Orange	Yellow	Yellow	Green	Green	Gray	Gray	White	White	Orange	Orange	Yellow	Yellow	Green
	Type of mark	1 point										2 points				
	Mark color	Black	Red	Black	Red	Black	Red	Black	Red	Black	Red	Black	Red	Black	Red	Black
Mark tube No.		1	2	3	4	5	6	7	8	9	10	Cut off	Cut off	13	14	15

D sub-connector terminal No.		16	17	18	19	20	21	22	23	24	25
Conductor I.D.	Insulator color	Green	Gray	Gray	White	White	Orange	Orange	Yellow	Yellow	Green
	Type of mark	2 points					3 points				
	Mark color	Red	Black	Red	Black	Red	Black	Red	Black	Red	Black
Mark tube No.		16	17	18	19	20	21	22	23	24	25

4.4.2 Flat cable connector type: Wiring method T51*, T51*R

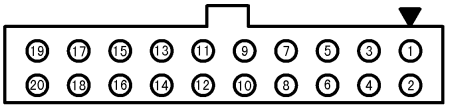
1) T51*, T51*R connector
The connector used for T51* and T51*R wiring method complies with MIL Standards (MIL-C-83503). Wiring is simplified by flat cable pressure welding. Pin no. is assigned differently based on the PLC maker, but the function assignment is the same. Layout using connectors and the triangular mark (▼) shown below as a reference. The ▼ mark is the reference for both the plug and socket.

2) Cautions for connector type T51*, T51*R
(1) The PLC output unit's signal array and valve signal array must match.
(2) Power source is 24 VDC dedicated.
(3) T51* and T51*R type is driven by a common output unit.
(4) Do not connect this manifold to the input unit as major faults could occur in this device and in peripherals. Connect this manifold to the output unit.
(5) The voltage could drop due to simultaneous energizing or the cable length. Confirm that the voltage drop for the solenoid is within 10% of the rated voltage.
(6) The PLUS-COMMON is the standard for this solenoid valve.
If you need a MINUS-COMMON product, select the model number for MINUS-COMMON valve.



3) Wiring method
Note: The numbers in the valve, 1a, 1b, 2a, 2b, and so forth indicate the 1st station 2nd station. The alphabetic characters a and b indicate the a side solenoid and the b side solenoid.

Connector pin No.

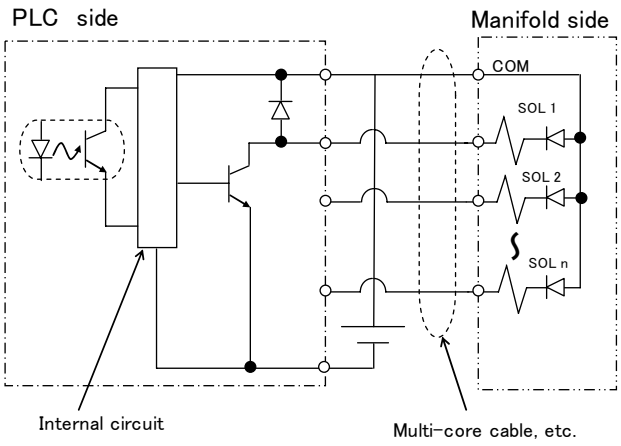


Pin No.	19	17	15	13	11	9	7	5	3	1
Valve No.	COM	9a	8a	7a	6a	5a	4a	3a	2a	1a
Pin No.	20	18	16	14	12	10	8	6	4	2
Valve No.	COM	9b	8b	7b	6b	5b	4b	3b	2b	1b

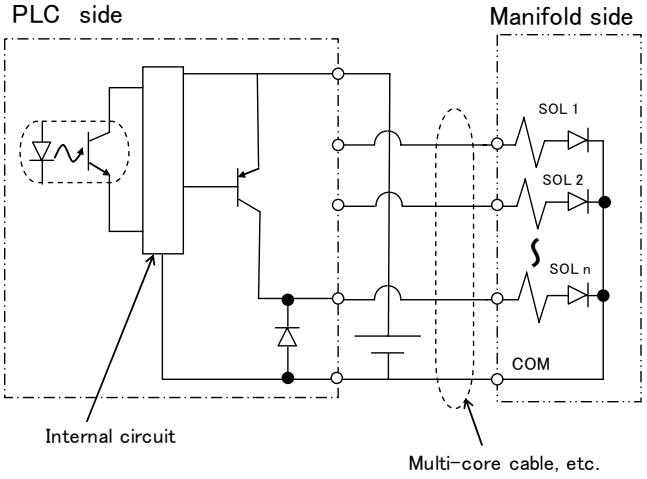
4) Connection to PLC

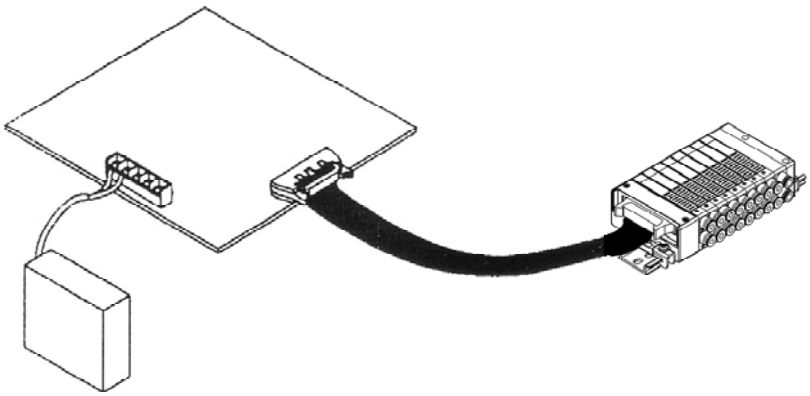
This solenoid valves have polarity. Select the model numbers according to DC output unit, NPN output and PNP output of PLC. Make the wirings as shown on the below illustration.

DC output unit (NPN output)



DC output unit (PNP output)

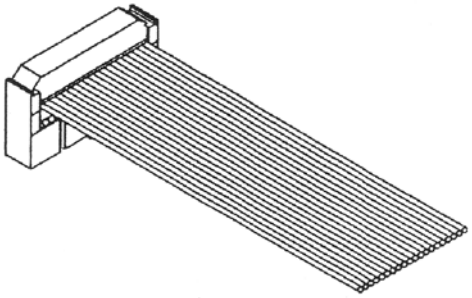




5) Cable production

To produce a connecting cable, we recommend the following equipment for the valve side. Make a correct selection and connection of the cable according to the catalog data sheet. The equipment shown here all complies with the MIL standard (MIL-C-83503); thus, there are many others that can be also used for connection, but their locking mechanism may not be suitable.

If so, secure the lock lever with a hand.



- Socket — XG4M-2030 (OMRON Corporation)
- Strain relief — XG4T-2004(OMRON Corporation)
- Discrete-wire crimp socket — XG5M-2032-N (OMRON Corporation)
- Discrete-wire crimp socket — XG5M-2035-N (OMRON Corporation)
- Socket for discrete-wire crimp style connector — XG5N-201 (OMRON Corporation)
- Contact for discrete-wire crimp style connector — XG5W-0231,0232 (OMRON Corporation)

6) The system uses flat cables or slender multi-conductor cables.

As these cables have fine core wires, it should be checked that they have enough mechanical strength and electric capacity.

- Make sure to make a rounded corner (R) when bending the flat cable.
- The cable has large electric resistance (AWG28, approx. 0.22Ω/m).
  Pay special attention to voltage drop along the cable.
  If 16 solenoid valves are energized, voltage drop of approx. 0.1 V/m arises in the case of 24 VDC.

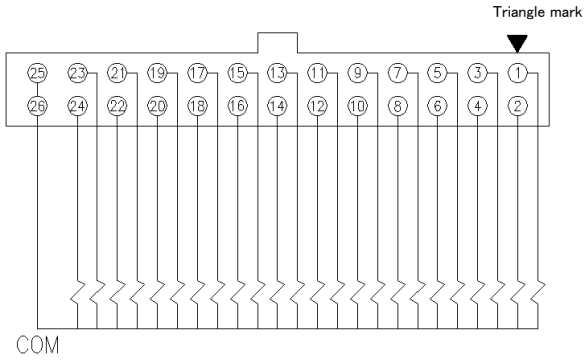
4.4.3 Flat cable connector type: Wiring method T53*, T53*R

1) T53*, T53*R connector

The connector used for T53* and T53*R wiring method complies with MIL Standards (MIL-C-83503). Wiring is simplified by flat cable pressure welding. Pin no. is assigned differently based on the PLC maker, but the function assignment is the same. Layout using connectors and the triangular mark (▼) shown below as a reference. The ▼ mark is the reference for both the plug and socket.

2) Cautions for connector type T53*, T53*R

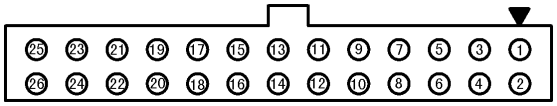
(1) The PLC output unit's signal array and valve signal array must match.
(2) Power source is 24 VDC dedicated.
(3) T53* and T53*R type is driven by a common output unit.
(4) Do not connect this manifold to the input unit as major faults could occur in this device and in peripherals. Connect this manifold to the output unit.
(5) The voltage could drop due to simultaneous energizing or the cable length. Confirm that the voltage drop for the solenoid is within 10% of the rated voltage.
(6) The PLUS-COMMON is the standard for this solenoid valve. If you need a MINUS-COMMON product, select the model number for MINUS-COMMON valve.



3) Wiring method

Note: The numbers in the valve, 1a, 1b, 2a, 2b, and so forth indicate the 1st station 2nd station. The alphabetic characters a and b indicate the a side solenoid and the b side solenoid.

Connector pin No.

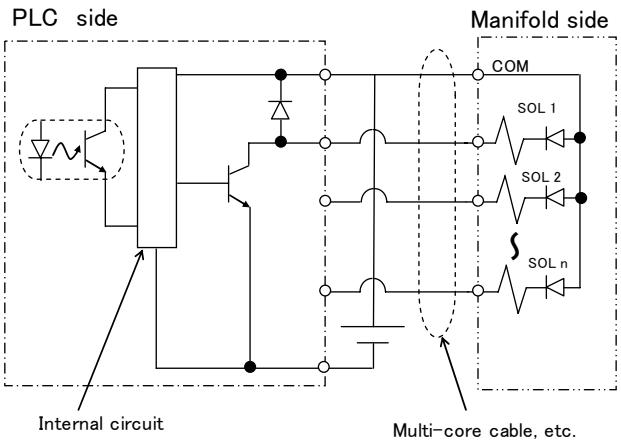


Pin No.	25	23	21	19	17	15	13	11	9	7	5	3	1
Valve No.	COM	12a	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a
Pin No.	26	24	22	20	18	16	14	12	10	8	6	4	2
Valve No	COM	12b	11b	10b	9b	8b	7b	6b	5b	4b	3b	2b	1b

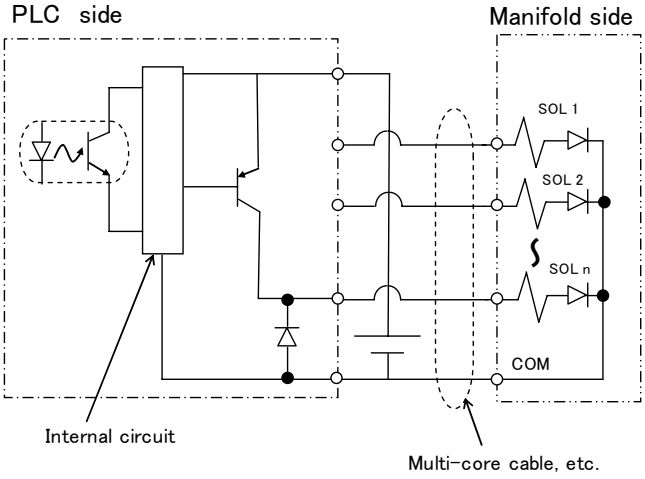
4) Connection to PLC

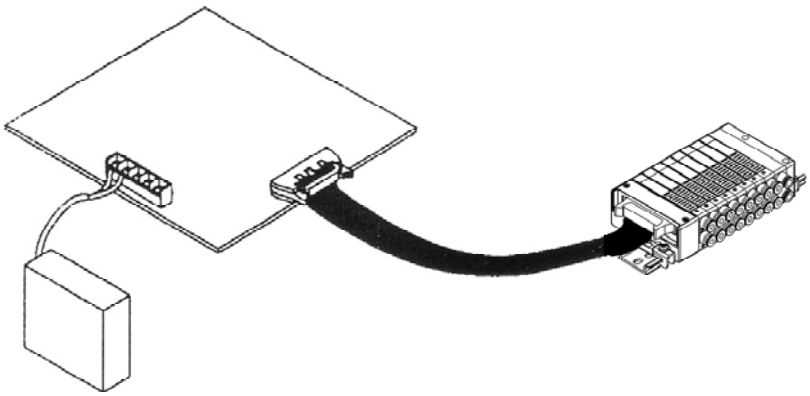
This solenoid valves have polarity. Select the model numbers according to DC output unit, NPN output and PNP output of PLC. Make the wirings as shown on the below illustration.

DC output unit (NPN output)



DC output unit (PNP output)

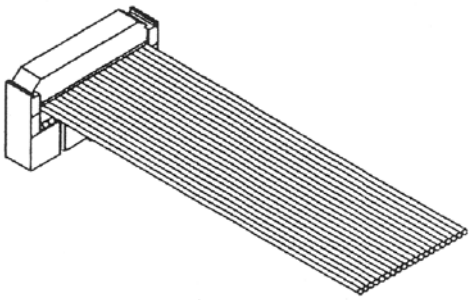




5) Cable production

To produce a connecting cable, we recommend the following equipment for the valve side. Make a correct selection and connection of the cable according to the catalog data sheet. The equipment shown here all complies with the MIL standard (MIL-C-83503); thus, there are many others that can be also used for connection, but their locking mechanism may not be suitable.

If so, secure the lock lever with a hand.



- Socket XG4M-2630 (OMRON Corporation)
- Strain relief XG4T-2604(OMRON Corporation)
- Discrete-wire crimp socket XG5M-2632-N (OMRON Corporation)
- Discrete-wire crimp socket XG5M-2635-N (OMRON Corporation)
- Socket for discrete-wire crimp style connector XG5N-261 (OMRON Corporation)
- Contact for discrete-wire crimp style connector XG5W-0231,0232 (OMRON Corporation)

6) The system uses flat cables or slender multi-conductor cables.

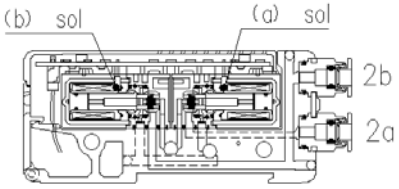
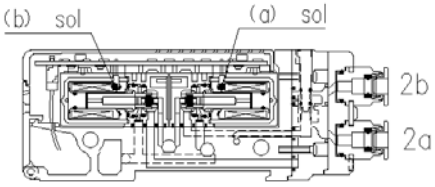
As these cables have fine core wires, it should be checked that they have enough mechanical strength and electric capacity.

- Make sure to make a rounded corner (R) when bending the flat cable.
- The cable has large electric resistance (AWG28, approx. 0.22Ω/m).
  Pay special attention to voltage drop along the cable.
  If 16 solenoid valves are energized, voltage drop of approx. 0.1 V/m arises in the case of 24 VDC.
- Use a wire of AWG24 or AWG22, when energizing 20 or more pieces of solenoid valves at the identical timing (when the starting currents are generated simultaneously).

5. OPERATING RECOMMENDATION

5.1 Operation

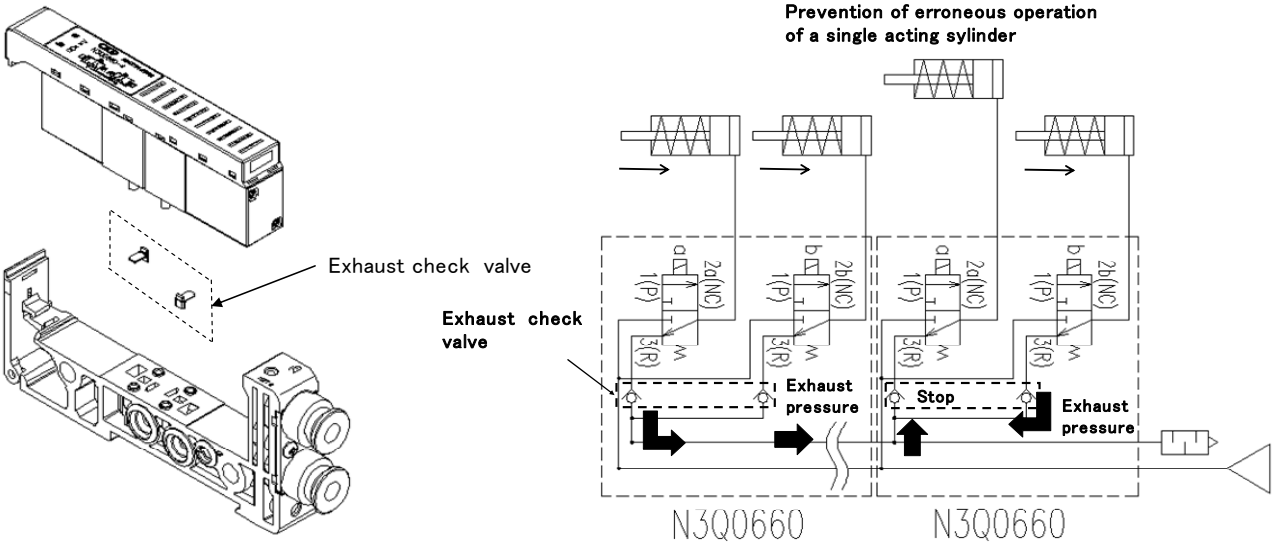
1) Valve Operation

	Operation				Drawing
	(a) sol ON	Power OFF		(b) sol ON	
Direct-acting 3-port NC valve Double mounting					w/o manual override (Standard type) 
N3Q0660	1→2a	2a→3	2b→3	1→2b	w/ manual override 

2) Check valve

WARNING : The exhaust check valve blocks the back pressure from adjacent air device, etc. However, the structure does not allow the pressure seal to be held continuously, so do not use for purposes other than the back pressure block.

MN3Q0 series valve block is equipped with the exhaust check valve. This valve prevents connected cylinder malfunctioning caused by exhaust pressure intrusion.

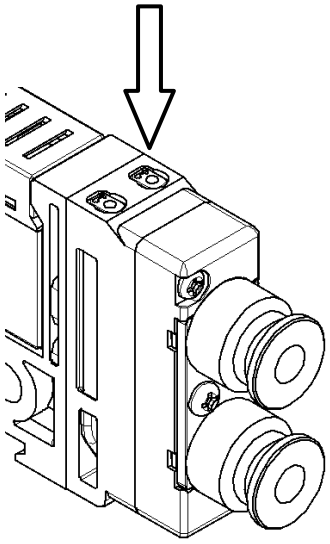


5.2 Manual override

WARNING:	When conducting manual operations, make sure that there are no people near the moving cylinder.

5.2.1 How to operate manual override

Press the manual override straight in the arrow direction until it stops. The manual function will be released, if it's not pressed.



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) Basically the product is designed as oilless specifications, however if you prefer to supply oil, use the class 1 turbine oil (additive-free) ISO VG32.
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 MN3Q0 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 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.

5.3.3 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.

5.3.4 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.

5.4 Electric circuits

5.4.1 About Electric circuits

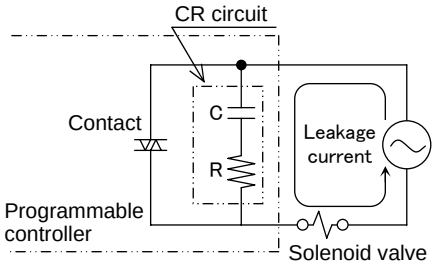
CAUTION:

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.



24VDC	1.8mA or lower

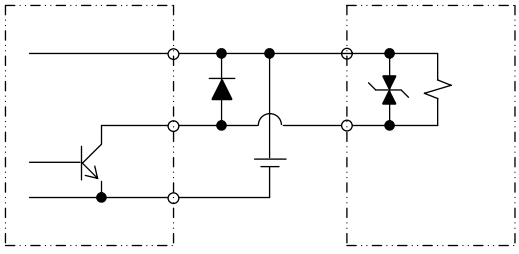
CAUTION:

a) The surge suppressor limits the surge voltage generating from the solenoid valve, which reaches several hundred volts, to a low voltage level bearable for output contacts. This function may be insufficient for some output circuits and the voltage may cause breakage or malfunction. Check the surge voltage limitation level of the solenoid valve in your circuit, the dielectric voltage and circuit configuration of the output devices and the delay for recovery to check for serviceability. If necessary, install another measures against surges. The MN3Q0 and MT3Q0 Series solenoid valves equipped with a surge suppressor suppress the terminal-to-terminal reverse voltage surge generating upon shutoff, to the level shown in the table below.

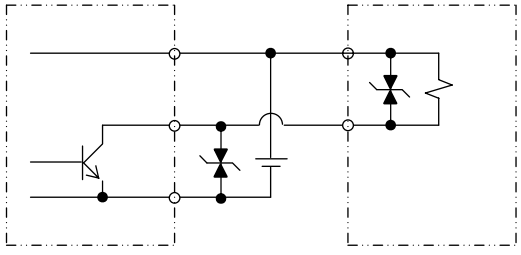
In case of 24VDC	About 47V

b) If the output unit is of an NPN type, the output transistor is susceptible to the sum of the voltage specified in the table above and the source voltage. Install a contact protection circuit.

<Example 1 of output transistor protection circuit>



<Example 2 of output transistor protection circuit>

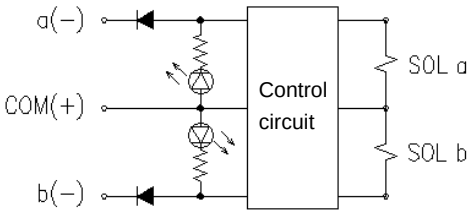


If solenoids are energized for a prolonged period of time, the surface temperature of the manifold will rise. Through this increase in the temperature should not be regarded as abnormal, provide a suitable means of ventilation or heat release.

5.4.2 Electrical specifications

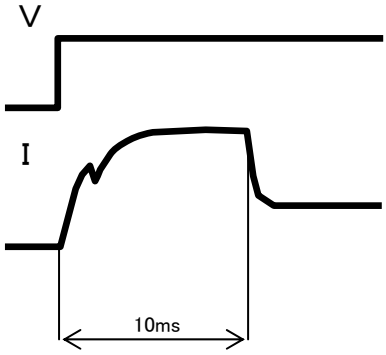
1) In the environment such that more vibration and impulse than specified are applied, be sure to avoid using this type; otherwise, it may lead to valve malfunctioning.
MN3Q0 Series is such that the current control circuit is built in the valve block, which is constructed so that the current value is reduced when coil adsorption is maintained.

Ex) Plus common



Item		Description
Starting current	A	0.092
Holding current	A	0.025
Power consumption	W	0.6 (Note)

Note: 2.2W for 10ms after start.



6. MAINTENANCE

6.1 Periodic Inspection

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.

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:
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?

6.2 How to disassemble and assemble

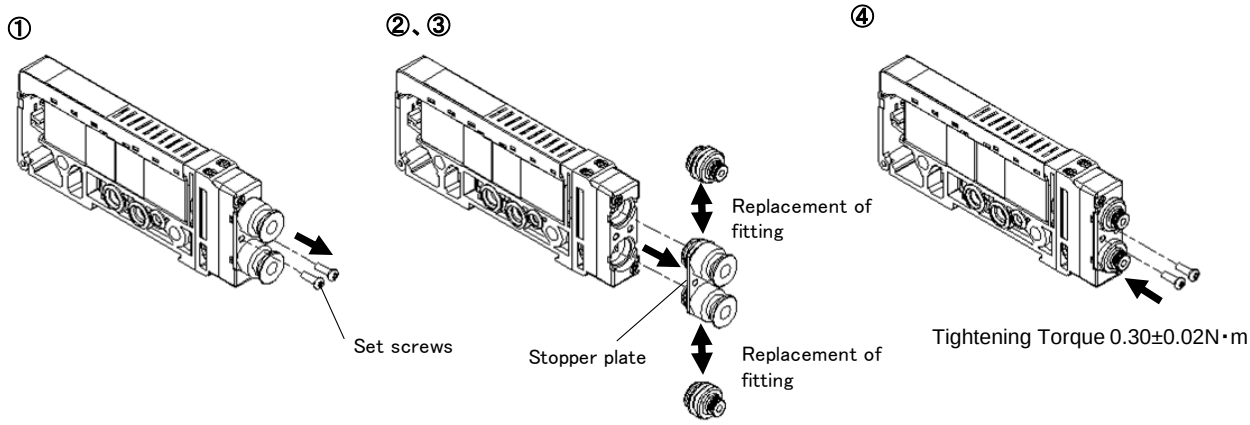
⚠ **WARNING: [Be sure to turn power OFF and release pressure before increasing or decreasing the manifolds.]**

In the following steps, the operation procedures of valve block alteration, the valve block replacement due to its lifetime, etc. and/or addition of Supply/exhaust blocks are indicated.
Turn OFF power and stop the air pressure source before starting the disassembly work.
Also, where disassembling and reassembling works, etc. were conducted, air leakage and malfunctioning may result unless the interlocking between the connectors, and the wiring & end block screw are tightened satisfactorily. In case of DIN rail mounting, confirm the blocks are securely fixed on DIN rail, before supplying the air. CKD recommends using identification marking when disconnecting the output port piping.
The signal input wiring from the wiring block are connected to the valve blocks a, b in the predetermined sequence. In replacing the block, re-check for wiring connection. Also pay sufficient attention not to catch the cables on any other areas.

6.2.1 Replacement of push in fitting

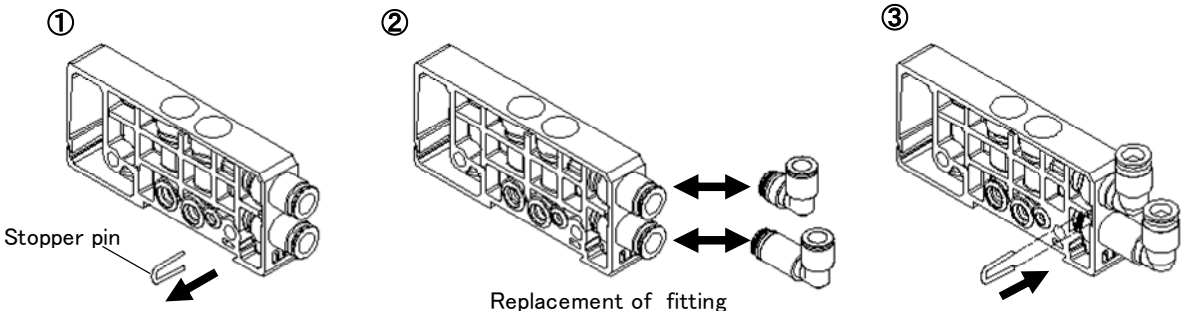
In case of valve block

① Remove the set screw.
② Pull the stopper plate and fitting out together.
③ Align the replacement fitting groove with the stopper plate, and temporarily assemble.
④ Assemble the stopper plate with the fitting, and tighten the set screw. Pull on the fitting to confirm that it is properly installed.



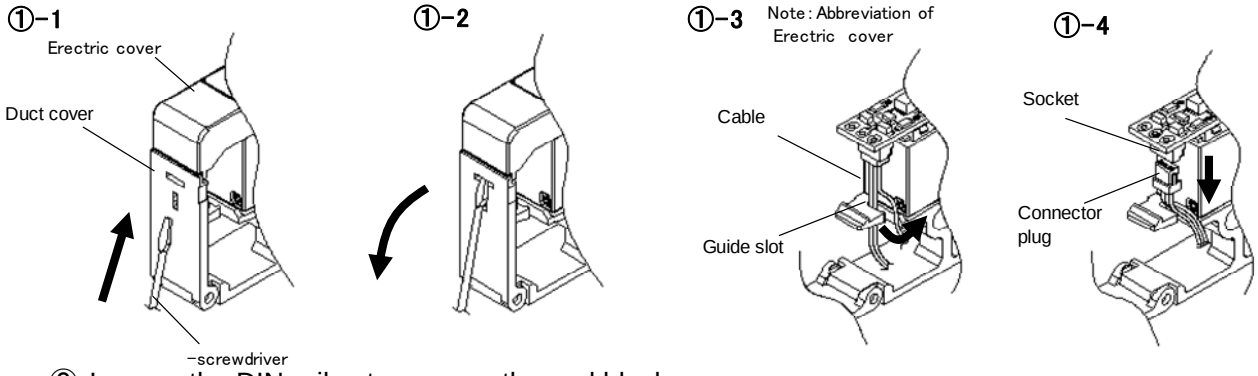
In case of Supply/exhaust block

① Extract the stopper pin using a tool with slender tip.
② Replace the fitting. (A filter is built-in on P port. Pay attention on its dropping off.)
③ Assemble the stopper pin for fitting and fix the fitting. Pull on the fitting to confirm that it is properly installed.

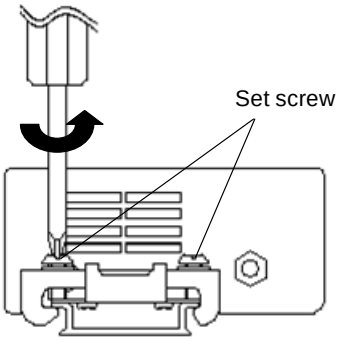


6.2.2 Replacement of valve block (In case of DIN rail mounting)

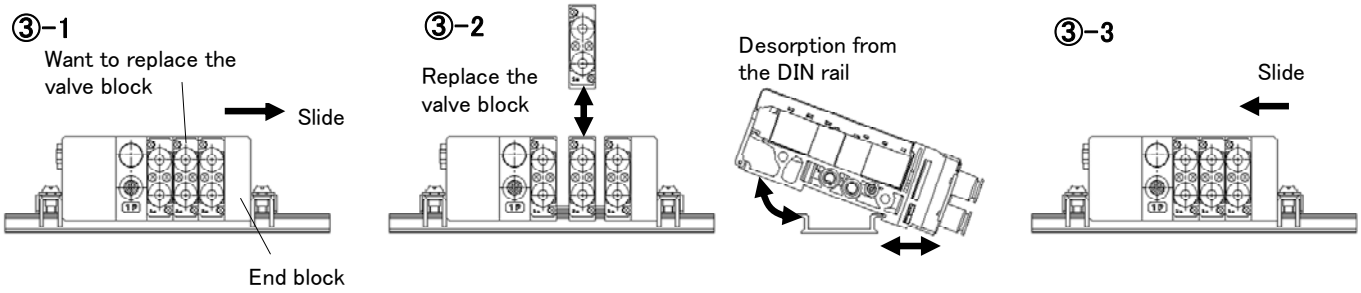
① Open the duct cover of the valve block which you wish to replace. Shift the cable being held in the guide slot then extract the connector plug being inserted to the socket on the substrate in the arrow direction.



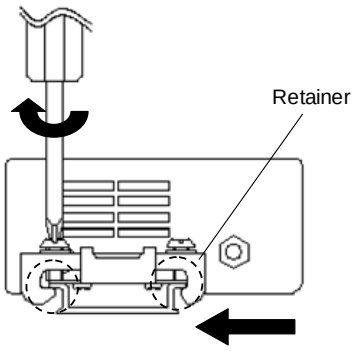
② Loosen the DIN rail set screw on the end block.



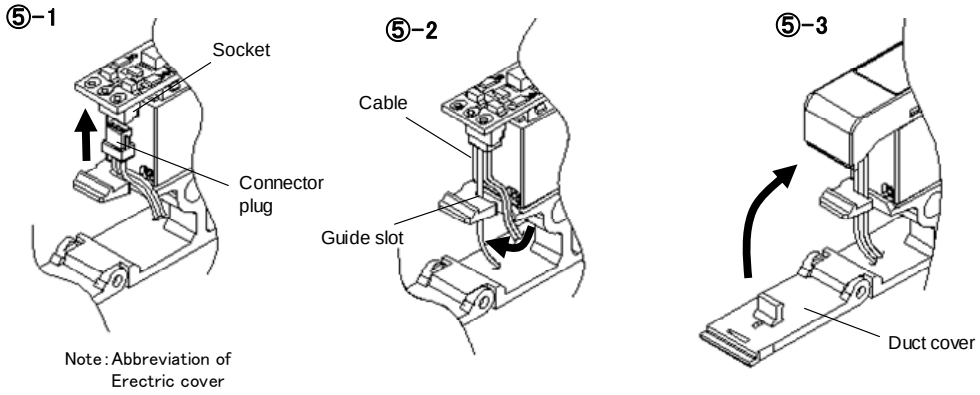
③ Slide the block to the end block side, and provide a space of 10mm on each side of the block to be replaced. Replace with a new block. Slide all of the blocks to the wiring block side so that there are no spaces between the blocks.



④ Confirm that the end block's retainer claw is caught on both sides of the DIN rail, and then the set screw with a screwdriver. Appropriate tightening torque is 1.4±0.2 N·m.



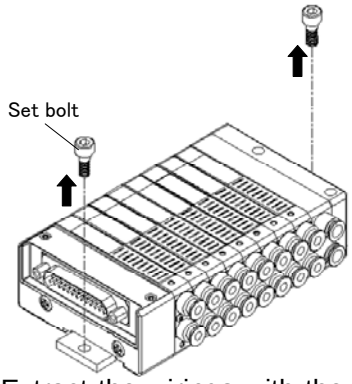
⑤ Insert the connector plug into the socket on the substrate. Run the cables through the guide slot one by one then close the duct cover.



Note : Abbreviation of Erectric cover

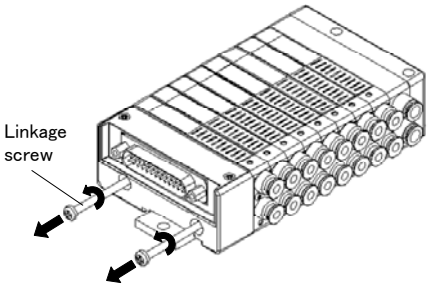
6.2.3 Replacement of valve block (In case of Direct mounting)

① Loosen the set bolt then remove the manifold.



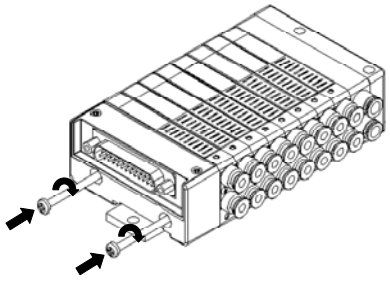
② Extract the wirings with the same manner as the procedure ① described in 6.2.2; Replacement of valve block.

③ Loosen the linkage screw on the wiring block. (The manifold is fixed with the linkage screw on the wiring block side and the hexagon nut on the end block side. Pay sufficient attention not to lose the hexagon nut when removing it.)

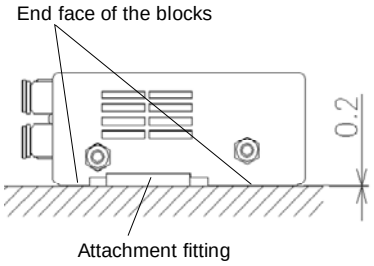


④ Replace the valve block according to the procedure ③ described in 6.2.2; Replacement of valve block.

⑤ Tighten the linkage screws to fix the manifold.



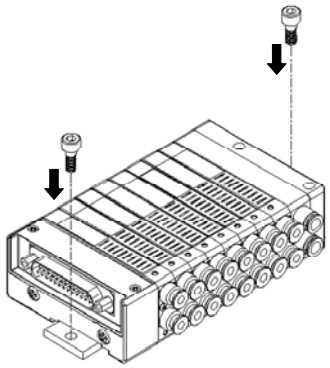
Tightening Torque 0.9±0.05N・m



Some gap (0.2mm) may be generated between the attachment fitting and the block, thus tighten them so the end face of the blocks are aligned

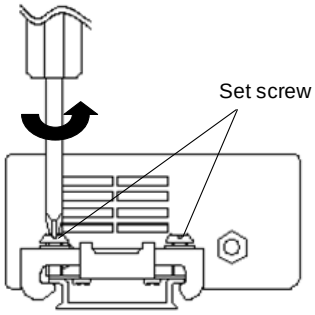
⑥ Conduct the wiring operations with the same manner as the procedure ⑤ described in 6.2.2; Replacement of valve block.

⑦ Tighten the fixing bolt on the manifold.

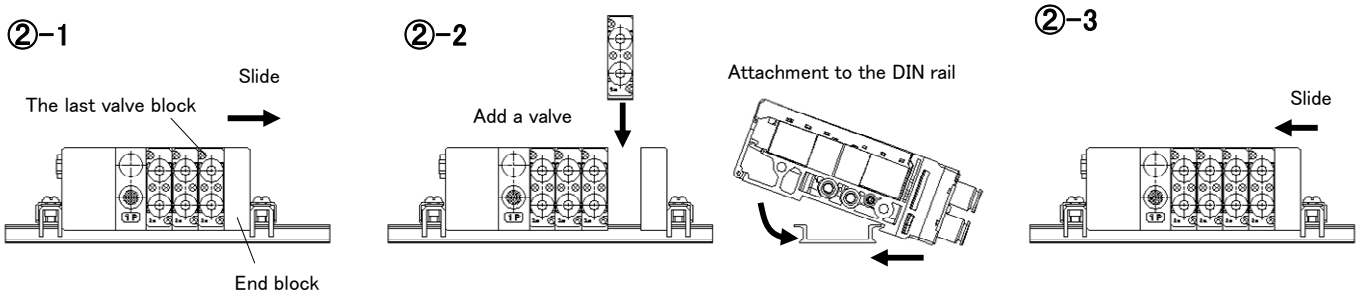


6.2.4 Addition of valve block (Only DIN rail mounting)

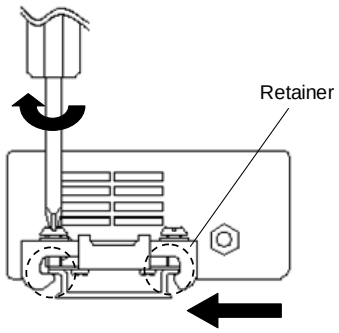
① Loosen the DIN rail set screw on the end block.



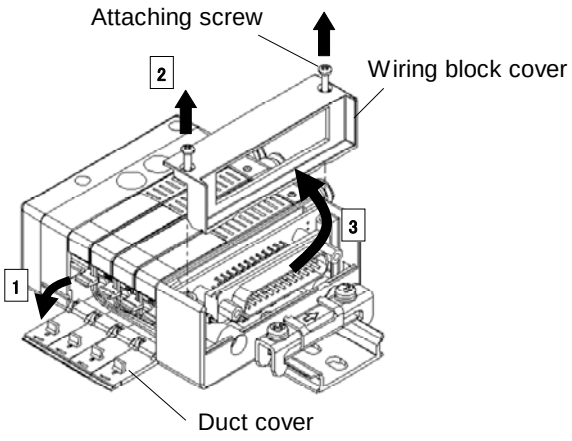
② Slide the end block to secure an approximately 20mm of space between the last valve block and the end block. Add a valve block and place it between the last valve block and the end block.



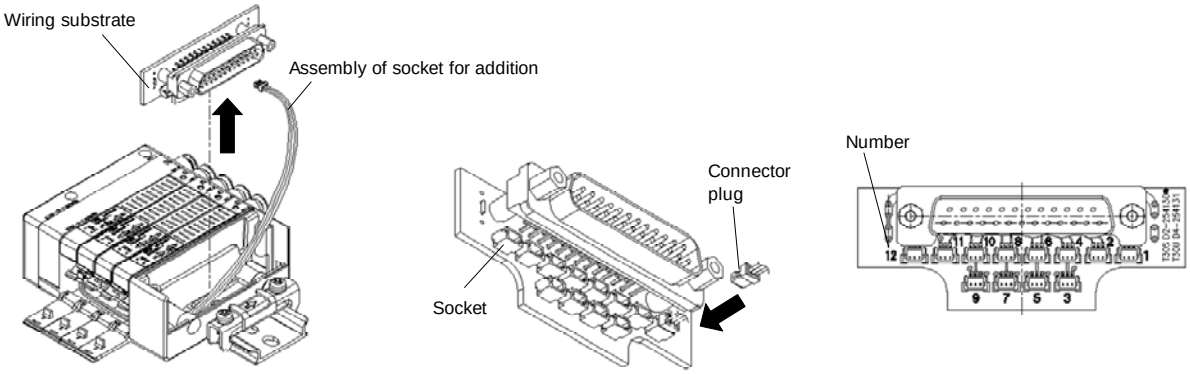
③ Confirm that the end block's retainer claw is caught on both sides of the DIN rail, and then the set screw with a screwdriver. Appropriate tightening torque is 1.4±0.2 N·m.



④ Open all the duct cover of valve blocks. Loosen the attaching screw of wiring block cover and remove the cover.

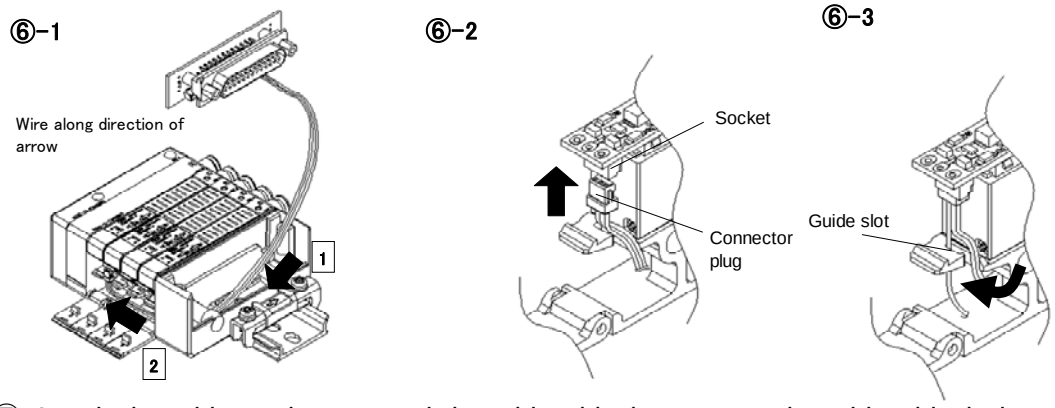


⑤ Take out the wiring substrate stored inside the wiring block, align the direction of connector plug of assembly of socket for addition with the socket of number corresponding with the sequential number then attach them.

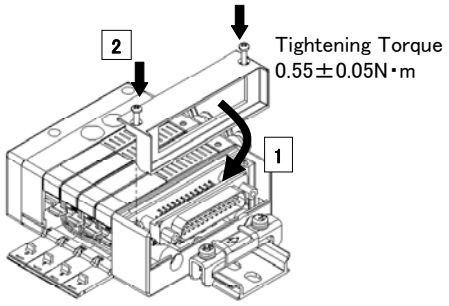


Attachment of socket assembly for addition
There is no directionality of the wiring substrate side or valve block side on the socket assembly for addition.

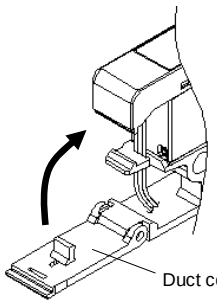
⑥ Run the connector plug wiring through the duct inside the wiring block and valve block then connect plug with the socket on the increased valve block. Afterward, run each cable through the guide slot.



⑦ Attach the wiring substrate and the wiring block cover on the wiring block then tighten the screws. At this time, pay sufficient attention not to catch the cables on any other areas.



⑧ Close the duct cover.



6.2.5 Replacement and addition method of Supply/exhaust block

Conduct the operation with the same manner as the replacement and addition of valve block described on 6.2.2 through 6.2.4.

7. TROUBLESHOOTING

TROUBLESHOOTING

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)
	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. ・Replace the valve block.
	Foreign particles cut into packing lips	Replace the valve block
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 valve block
	Erroneous shut off pressure source	Turn on the power source
	Abnormal pressure	Reset the pressure reducer 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
	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

8. PRODUCT SPECIFICATIONS AND HOW TO ORDER

8.1 Product Specifications

1) Main specifications at valve

Item		Descriptions
Manifold method		Block manifold
Air supply and exhaust method		Common supply, Common exhaust (integrated exhaust check valve)
Working fluid		Compressed air
Valve type and operation		Direct-acting poppet valve
Max. working pressure MPa		0.6
Min. working pressure MPa		0.2
Proof pressure MPa		0.9
Effective cross-sectional area (Note 1) mm^2		0.55
Response time (Note 2) ms		5 or less
Port size	2a, 2b Port	φ1.8, φ3, φ4 push-in fitting, M5
	1(P), 3(R) Port	φ6 push-in fitting
Ambient temperature ℃		5 to 50
Fluid temperature ℃		5 to 50
Manual override		w/o Manual override, Non-locking manual override
Lubrication		Not required
Degree of protection		IP40 equivalent
Vibration resistance m/s^2		50 or less
Shock resistance m/s^2		300 or less
Atmosphere		Not suitable for use in areas containing corrosive gas

Note 1: Effective cross-sectional area S and sonic conductance C are converted as S≒5.0×C.

Note 2: Response time is the value, when supply pressure 0.5MPa and oil-free.

2) Electrical specifications

Item	Descriptions
Rated voltage DCV	24
Voltage fluctuation range	±10%
Starting current A	0.092
Holding current A	0.025
Power consumption (Note 3) W	0.6
Thermal class	B
Indicator etc.	LED, w/Surge suppressor

Note 3: 2.2W for 10ms after start.

3) Weight

i) DIN rail mounting (MN3Q0) [g]

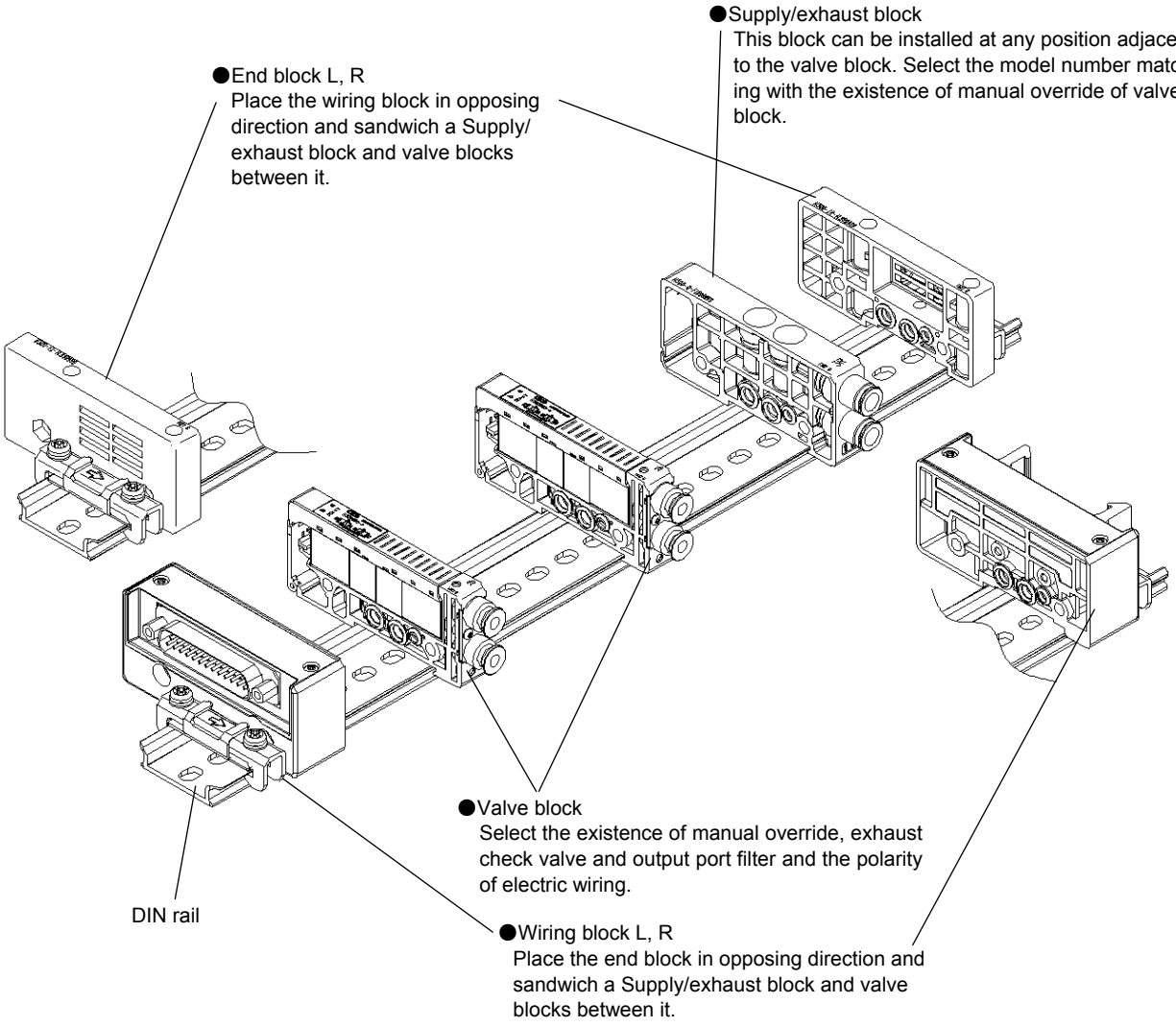
Wiring block	Wiring connection	T30		T30U		T51, T53		T51U, T53U
	N3Q0-T*	66		68		60		61
	N3Q0-T*R							
Supply/ exhaust block	Port size	6		6L, 6D		6X		6LX, 6DX
	N3Q0-Q-*	31		39		28		30
	N3Q0-QU-*							
Valve block	Port size	C18	CL18	C3	CL3	C4	CL4	M5
	N3Q0660-*	45	49	45	52	47	53	42
	N3Q0660-M-*	50	54	50	57	52	58	48
End block	Option	E		EX				
	N3Q0-*L	40		40				
	N3Q0-*R							
DIN rail		0.19g/mm						

ii) Direct mounting (MT3Q0) [g]

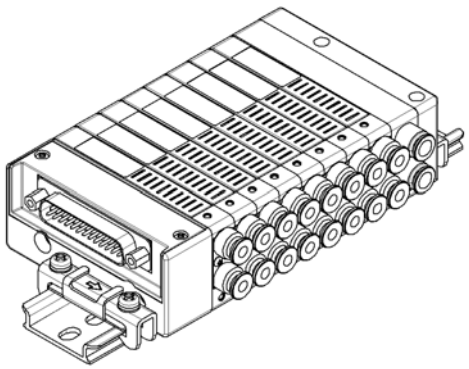
Wiring block	Wiring connection	T30		T30U		T51, T53		T51U, T53U
	N3Q0-T*	54		56		48		50
	N3Q0-T*R							
Supply/ exhaust block	Port size	6		6L, 6D		6X		6LX, 6DX
	N3Q0-Q-*	31		39		28		30
	N3Q0-QU-*							
Valve block	Port size	C18	CL18	C3	CL3	C4	CL4	M5
	N3Q0660-*	45	49	45	52	47	53	42
	N3Q0660-M-*	50	54	50	57	52	58	48
End block	Option	E		EX				
	N3Q0-*L	28		29				
	N3Q0-*R							
Fittings for Direct mounting		4 station	8 station	12 station				
		14	21	27				

8.2 How to Order

1) Block manifold: Block configurations

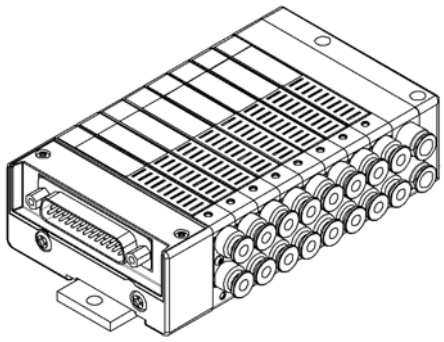


MN3Q0



DIN rail installation

MT3Q0



Direct installation

2) Manifold

MN3Q0, MT3Q0

D sub-connector, flat cable connector

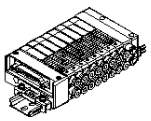
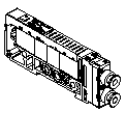
●Discrete valve block

N 3Q0660 — C4 — M F — 3

●Block manifold

M N 3Q0660 — C4 — M T53 F — 5 — 3

(a) Direct-acting 3-port NC valve Double mounting (b) (c) (d) (e) (f) (g)

Symbol	Descriptions	Type: Block manifold	Type: Discrete valve block
			
(a) Mounting method			
N	DIN rail mounting	●	
T	Direct mounting (limited to 4,8,12 stations) (Note 1)	●	
(b) Port size			
C18	φ1.8 push-in fitting - Side (Compatible tube UP-9402, EH-5802)	●	●
CL18	φ1.8 push-in fitting - Up (Compatible tube UP-9402, EH-5802)	●	●
CD18	φ1.8 push-in fitting - Down (Compatible tube UP-9402, EH-5802)	●	●
C3	φ3 push-in fitting - Side	●	●
CL3	φ3 push-in fitting - Up	●	●
CD3	φ3 push-in fitting - Down	●	●
C4	φ4 push-in fitting - Side	●	●
CL4	φ4 push-in fitting - Up	●	●
CD4	φ4 push-in fitting - Down	●	●
M5	M5 female thread (w/ non-rotating)	●	●
CX	Mixed push-in fitting	●	
(c) Manual override			(Note 2)
Blank	w/o Manual override	●	●
M	Non-locking manual override (Note 3)	●	●
(d) Wiring method			(Note 4)
T30	25-pin D sub-connector Horizontal type left specification (lock screw: M2.6) 12 stations	●	
T30R	25-pin D sub-connector Horizontal type right specification (lock screw: M2.6) 12 stations	●	
T30U	25-pin D sub-connector Upturned type left specification (lock screw: M2.6) 12 stations	●	
T30UR	25-pin D sub-connector Upturned type right specification (lock screw: M2.6) 12 stations	●	
T51	20-pin flat cable connector Horizontal type left specification 9 stations	●	
T51R	20-pin flat cable connector Horizontal type right specification 9 stations	●	
T51U	20-pin flat cable connector Upturned type left specification 9 stations	●	
T51UR	20-pin flat cable connector Upturned type right specification 9 stations	●	
T53	26-pin flat cable connector Horizontal type left specification 12 stations	●	
T53R	26-pin flat cable connector Horizontal type right specification 12 stations	●	
T53U	26-pin flat cable connector Upturned type left specification 12 stations	●	
T53UR	26-pin flat cable connector Upturned type right specification 12 stations	●	
TX	Wiring block mix (Note 5)	●	
Blank	Reduced wiring valve block		●

MN3Q0, MT3Q0

D sub-connector, flat cable connector

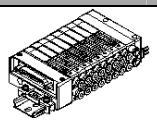
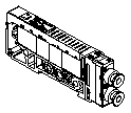
●Discrete valve block

N 3Q0660 — C4 — M　　F ——— 3

●Block manifold

M N 3Q0660 — C4 — M T53 F — 5 — 3

(a) Direct-acting 3-port NC valve Double mounting (b) (c) (d) (e) (f) (g)

Symbol	Descriptions		Type: Block manifold	Type: Discrete valve block
				
(e) Option				
Blank	None		●	●
P	Minus common	(Note 6)	●	●
N	w/o Exhaust check valve		●	●
F	Integrated output port filter	(Note 7)	●	●
(f) Station number				
1	1 station		●	
to	to			
24	24 stations	(Note 8)		
(g) Voltage				
3	24 VDC		●	●

Note 1: Valve blocks are only compatible with 4, 8, and 12 stations. The supply/exhaust block is station 1. Not compatible with wiring block mix TX.

Note 2: With and without manual override types cannot be mixed.

Note 3: On the manifold equipped with a manual override, in case the followings are selected as a combination; the piping locations on supply/exhaust block as ‘Blank (output port side)’ and the port size as ‘6 (straight type)’, the silencer (SLW-H6) could not be attached.

Note 4: The D sub-connector and flat cable connector do not rotate, so please select according to the specifications.

Note 5: The manifold specifications assign one on each side, left and right. On the in supply/exhaust block, the atmospheric release type could not be selected.

Note 6: The standard type is plus common. Please select based on the specifications of the output device (e.g. PLC).

Note 7: A filter to prevent the entry of foreign matter is integrated into the P-port of the supply/exhaust block.

Note 8: Depends on wiring method used.

3) Piping section

Supply/exhaust block

●This block can be installed at any position adjacent to the valve block.

N3Q0-Q − (U) (6) (X) − (M)

Model no. (a) (b) (c) (d)

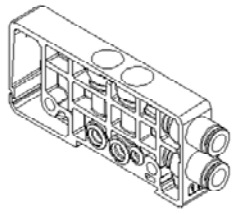
(a) Piping locations		(b) Port size		(c) Exhaust		(d) Manual override (Note 3)	
Blank	Output port side (Note 1)	6	φ6 push-in fitting (straight type)	Blank	Common exhaust	Blank	w/o Manual override
U	Top side	6L	φ6 push-in fitting (elbow type)	X	Atmospheric release(Note 2) (exhaust through end block)	M	w/ Manual override
		6D	φ6 push-in fitting (down-facing elbow type)				

Note 1: The silencer (SLW-H6) cannot be assembled in manifolds with manual overrides with a selected port size 6.

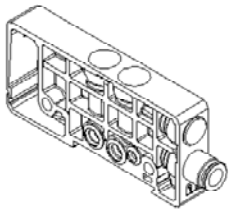
Note 2: In the case of a dual-side wiring TX, the atmospheric release type cannot be selected. Also, in the case of an atmospheric release type supply/exhaust block, please select atmospheric release end blocks.

Note 3: Select it according to the existence of manual override on the valve block.

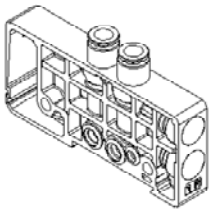
●N3Q0-Q-6-*



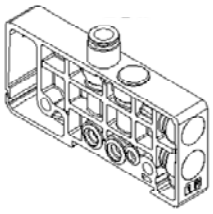
●N3Q0-Q-6X-*



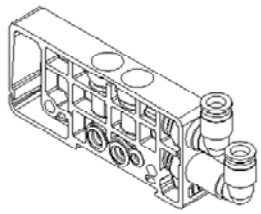
●N3Q0-Q-U6-*



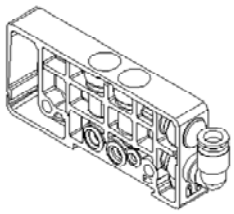
●N3Q0-Q-U6X-*



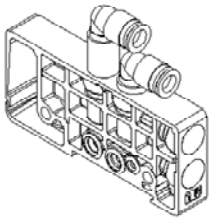
●N3Q0-Q-6L-*



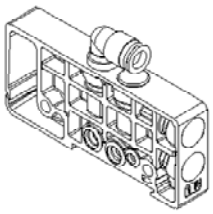
●N3Q0-Q-6LX-*



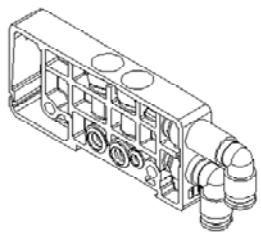
●N3Q0-Q-U6L-*



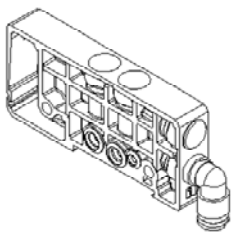
●N3Q0-Q-U6LX-*



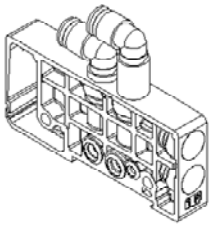
●N3Q0-Q-6D-*



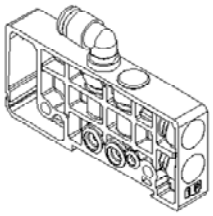
●N3Q0-Q-6DX-*



●N3Q0-Q-U6D-*



●N3Q0-Q-U6DX-*



4) End block

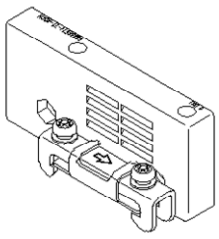
●Installed on the right or left when the piping port is facing forward.

N3Q0 – (EX) (L) – (T)

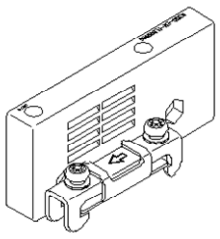
Model no. (a) (b) (c)

Symbol	Descriptions
(a) type	
E	Common exhaust
EX	Atmospheric release (w/ silencer)
(b) Installation position	
L	Left-side mounting
R	Right-side mounting
(c) Mounting method	
Blank	DIN rail mounting
T	Direct mounting (w/ attachment fitting)

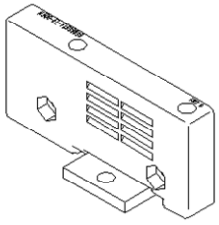
●N3Q0－E∗L



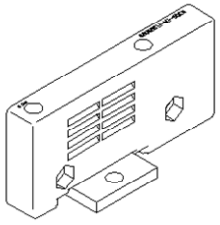
●N3Q0－E∗R



●N3Q0－E∗L－T



●N3Q0－E∗R－T

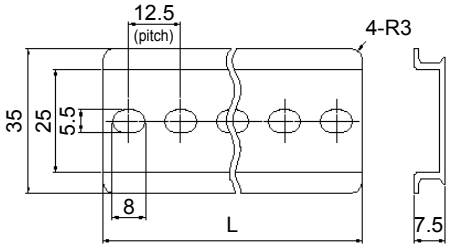


5) Related products

●Mounting rail

N4G-BAA (length) Note: Enter the value of integral multiple of 12.5 for the length.

Ex. If the length is 112.5, enter N4G-BAA112.5.



●Assembly of socket for addition

Purchase the part together, at the time of valve block addition.

N3Q0-RELAY-SOCKET- (1)

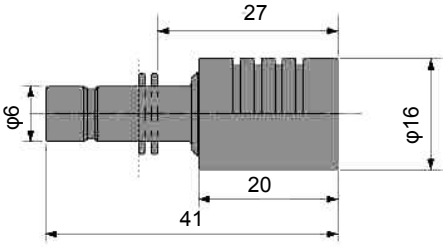
(a)

(a) Cable length	(Note 1)
1	1 to 3 stations
2	4 to 8 stations
3	9 stations or more

Note 1: Sequential number from the wiring block to the corresponding block. Count the block (including the supply/exhaust block) and select the number from the left.

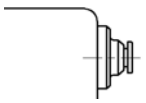
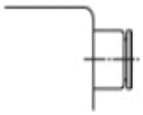
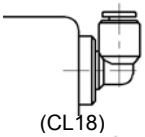
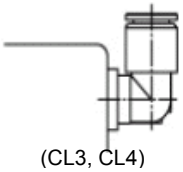
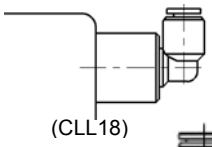
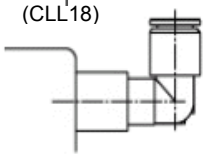
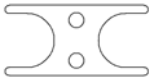
●Silencer (attachment)

SLW-H6

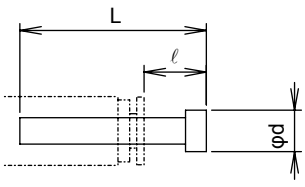


●Push-in cartridge fitting for valve block

N3Q0-JOINT – (C4)

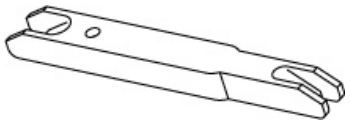
Symbol	Descriptions		
C18	Φ1.8 fiber tube Push-in cartridge fitting	 (C18)	 (C18)
C3	Φ3 for tube Push-in cartridge fitting	 (C3, C4)	 (C3, C4)
C4	Φ4 for tube Push-in cartridge fitting		
CL18	Φ1.8 fiber tube short L type Push-in cartridge fitting	 (CL18)	 (CL18)
CL3	Φ3 for tube short L type Push-in cartridge fitting	 (CL3, CL4)	 (CL3, CL4)
CL4	Φ4 for tube short L type Push-in cartridge fitting		
CLL18	Φ1.8 fiber tube long L type Push-in cartridge fitting	 (CLL18)	 (CLL18)
CLL3	Φ3 for tube long L type Push-in cartridge fitting	 (CLL3, CLL4)	 (CLL3, CLL4)
CLL4	Φ4 for tube long L type Push-in cartridge fitting		
CP	Fitting fixing plate (machine screw attached for end plate mount)		
CM5	M5 cartridge fitting (fitting non-rotating plate for M5 for fixing: CMP is necessary)		
CMP	Fitting non-rotating plate for M5 (machine screw attached for end plate mount)		

●Blanking plug (attachment)



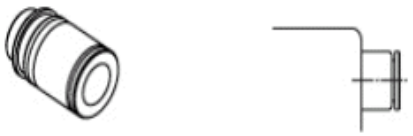
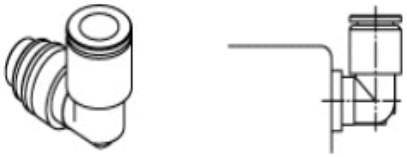
Model no.	Port size	L	ℓ	d
PG-P2-B	1.8	20	13	5
N4E00-JOINT-PP3MW	3	22	12.7	4
GWP4-B	4	27	19	6

●Push-in fitting tube remover
N4E0-EOT18-4 (φ1.8, φ3, φ4)



●Push-in cartridge fitting for Supply/exhaust block

N3Q0-Q-JOINT－(8)

Symbol	Descriptions
6	Φ6 for tube Push-in cartridge fitting 
6L	Φ6 for tube short L type Push-in cartridge fitting 
6LL	Φ6 for tube long L type Push-in cartridge fitting 
CMP	Plug cartridge 
P	Stopper pin