Safety Precautions

Always read this section before use.
Refer to page 328 for general precautions for using valves.

Pilot operated 3, 4-port valve MN3E00/MN4E00/MN3E0/MN4E0 Series

Design & selection

1. Self reset

⚠WARNING

■ The self reset is available for the valve block solenoid position class.

There are two different self reset types: "differential pressure return" and "differential pressure spring return." For both types, the main valve returns to the original position (self-resets) when it is turned off under normal pressures. However, if the supply pressure is zero in the ON state,

• The "differential pressure return" holds the current position, and
• The "differential pressure spring return" will return to the original position with spring force.

Select the type based on the interlock specifications of the device in use.

Main valve hold/return states

Valve			Source pressure down when ON	→ Source pressure return	Power supply shutdown when ON
N3E00 N3E0	1/11	3-port valve single N.C./N.O. self reset (differential pressure spring return)	OFF (origin) movement	ON movement	OFF (origin) movement
	2/21	3-port valve double N.C./N.O. self hold	ON position holding		ON position holding
	66/67/76/77	Dual 3-port valve integrated N.C./N.O. self reset (differential pressure return)	ON position holding		OFF (origin) movement
	66S/67S/76S/77S	Dual 3-port valve integrated N.C./N.O. self reset (differential pressure spring return)	OFF (origin) movement	ON movement	OFF (origin) movement
N4E00 N4E0	1	4-port valve 2-position single solenoid self reset (differential pressure spring return)	OFF (origin) movement	ON movement	OFF (origin) movement
	2	4-port valve 2-position double self hold	ON position holding		ON position holding
	3/4/5 (N4E0 only)	4-port valve 3-position	OFF (origin) movement	ON movement	OFF (origin) movement

2. Check valve

⚠WARNING

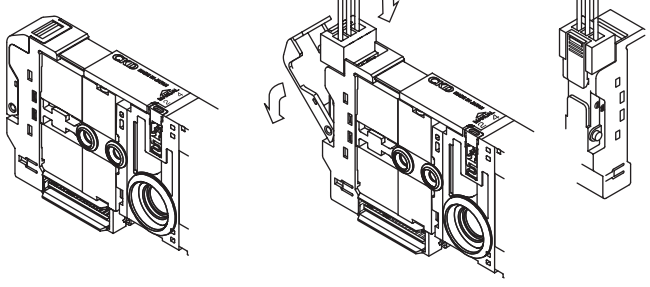
■ The check valve blocks the back pressure from adjacent air devices, etc. However, the structure does not allow the pressure seal to be held continuously, so do not use for other than the back pressure block.

3. Built-in individual power supply function (AUX)

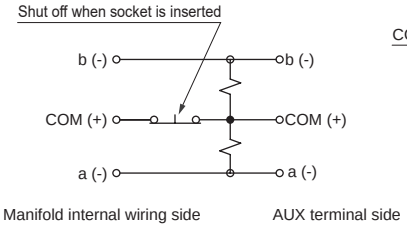
⚠WARNING

■ The polarity of the reduced wiring side and individual power supply side is **the positive common**.
Proper operation will not occur if the polarity is incorrect.
Use a different power supply for the reduced wiring side from the individual power input side.
If the same power supply is used, the reduced wiring side's wiring will not be cut off, resulting in incorrect operations.

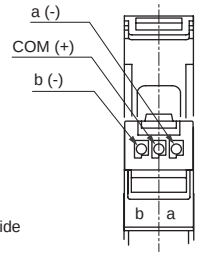
■ Inputting individual power
Open the wiring cover, and connect power input socket (N4E0-SOCKET-S/D).



When the power input socket is connected, the valve's internal wiring will be temporarily separated from the reduced wiring in the manifold, so power can be supplied from an external source.



Outline of AUX terminal polarity and internal circuit



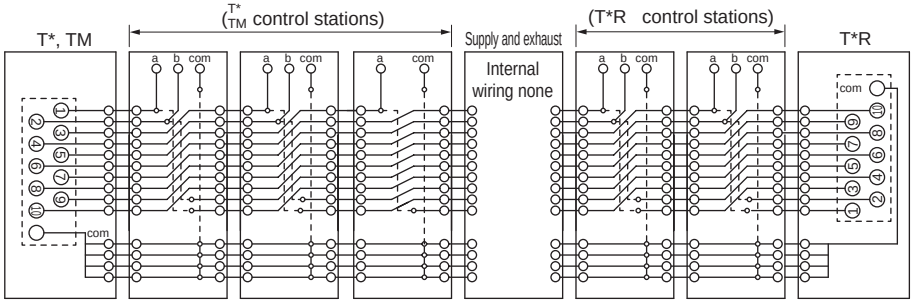
Valve block upper socket insertion diagram

Design & selection

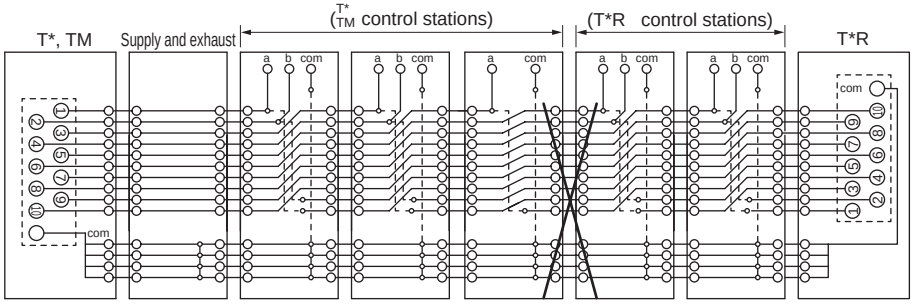
4. Wiring block mix

⚠WARNING

■ When using the mixed wiring block specifications by using T*R (right side specifications) for the wiring block, short-circuiting of the signal wires between the wiring blocks must be prevented. If left and right signals are connected, unintentional valve block operation will occur and equipment may be damaged.
Lay out the supply/exhaust block N4E0-Q*-C (specifications without internal wiring) between the valve supplied power from the left side and the right side.



Example of incorrect layout The left and right wirings interfere at the center.



5. Surge suppressor

⚠CAUTION

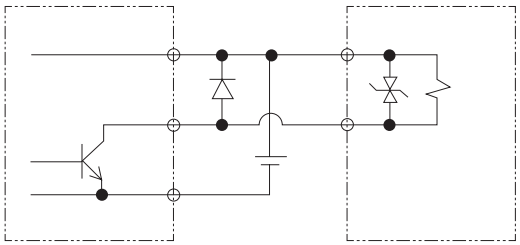
■ The surge suppressor attached to the solenoid valve is intended to protect the output contacts for the solenoid valve drive. There is no significant protection for the other peripheral devices, and devices could be damaged or could malfunction due to a surge. As well, surges generated by other devices may be absorbed and cause damage such as burning. Note the following points.

(1) The surge suppressor functions to limit solenoid valve surge voltage, which can reach several hundred volts, to a low voltage level that the output contact can withstand. Depending on the output circuit used, this may be insufficient and could result in damage or malfunction. Check whether the surge suppressor can be used within the surge voltage limit of the solenoid valve in use, the output device's withstand pressure and circuit structure, and by the degree of return delay time.
When necessary, provide other surge countermeasures. The inverse voltage surge generated when OFF can be suppressed to the following levels.

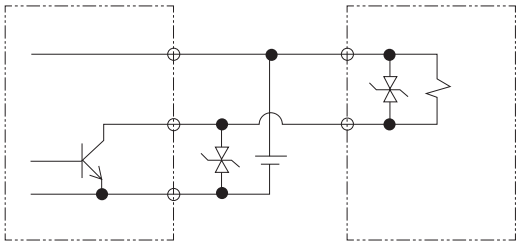
Voltage specification	Reverse voltage value when power turned OFF
12 VDC	Approx. 27 V
24 VDC	Approx. 47 V

(2) When using the NPN output unit, the voltage given in the left table and a surge voltage equivalent to the power supply voltage could be applied on the output transistor. Install the contact protection circuits in this case.

[Example of output transistor protective circuit mounting 1]



[Example of output transistor protective circuit mounting 2]



(3) When solenoid valves are connected in parallel with other components or solenoid valves, inverse voltage is applied to these components and/or solenoid valves when the solenoid valve is turned OFF. Even in the case of a solenoid valve with 24 VDC surge suppressor, a surge voltage may reach negative tens of volts for same models. This inverse polarity voltage may cause damage or malfunctions to other components connected in parallel. Avoid parallel connection of devices susceptible to inverse polarity voltages, e.g., LED indicator lamp. When driving several solenoid valves in parallel, the surge from other solenoid valves may enter the surge suppressor of one solenoid valve, and it may burn depending on the current value. When driving several solenoid valves with surge suppressors in parallel, surge current could concentrate at the surge suppressor with the lowest limit voltage and cause similar burning. Due to the variations in surge suppressor limit voltage that exist even among solenoid valves of the same model No., in the worst case the surge suppressor may burn out. Avoid driving several solenoid valves in parallel.

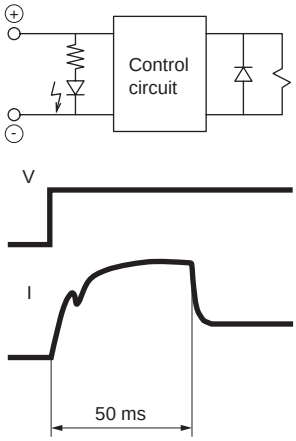
(4) The surge suppressor incorporated in the solenoid valve will often be short-circuited if it is damaged by overvoltage or overcurrent from other solenoid valves. Where there is a failed surge suppressor, if a large current flows when the output is ON, in the worst case scenario, the output circuit or solenoid valve could be damaged or ignited. Do not continue energizing in a state of failure. Additionally, to prevent large currents from continuing to flow, connect an overcurrent protection circuit to the power supply and drive circuit, or use a power supply with overcurrent protection.

6. Low heat/energy saving circuit

⚠CAUTION

■ Do not use this valve in an environment where the vibration and impact exceed specifications. The valve could malfunction.

With the type with low heat, energy-saving circuit, the control circuit is built into the valve block. The current value when the coil is sucked and held is lowered with this structure. Only plus common polarity is used.



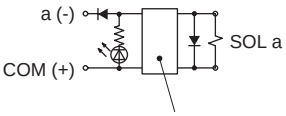
Individual specifications for low heat, energy saving circuit

Descriptions			Content	
			N4E00	N4E0
Energizing current A	Starting	24 VDC	0.017	0.025
		12 VDC	0.033	0.050
	Holding	24 VDC	0.009	0.013
		12 VDC	0.018	0.025
Power consumption W	Starting	24 VDC	0.4	0.6
		12 VDC		
	Holding	24 VDC	0.22	0.3
		12 VDC		

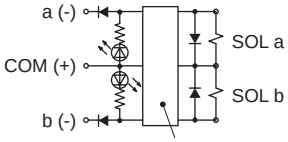
7. Polarity

⚠CAUTION

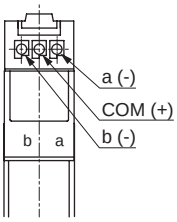
■ For the low heat, energy-saving circuit, connection is restricted to the positive common. Note the connection polarity. For details on surge suppressor, refer also to "5. Surge suppressor" on page 413.



Single, energy saving circuit integrated



Double, energy saving circuit integrated



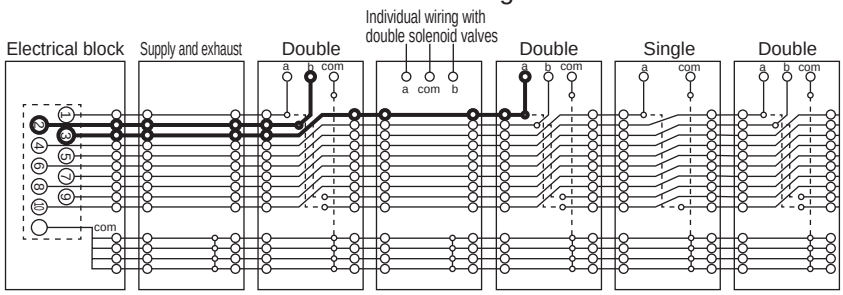
Upper view of valve block

■ The valve cannot be kept energized if instantaneous power outage of 30 ms or less occurs on the power source driving the solenoid valve. If instantaneous power outage of 30 ms or less occurs on the power source driving the solenoid valve due to a disturbance, cut the power off for 50 ms or longer to turn the solenoid valve on again.

8. Wiring in manifold when using with reduced wiring

⚠CAUTION

■ The internal circuit of the individual wiring valve block is completely separated from the reduced wiring electric circuit in the manifold. Even if the individual wiring valve block is inserted between the reduced wiring valve blocks, the pin layout on the electrical block side will not change.



The pin layout on the electrical block side eliminates the individual wiring in order from the first station, and shifts the blocks in order.

Mounting, Installation & adjustment

1. Manual operating device

⚠WARNING

■ The 4E Series is a pilot operated solenoid valve. The main valve does not switch over even if the manual override is operated unless air is supplied to the port P (port PA for external pilot).

■ Manual override protective cover is provided as standard. Since the manual override protective cover is closed when shipped, the manual override is protected and cannot be seen when delivered. Open the protective cover to operate the manual override. Note that the protective cover cannot be closed unless the locking manual override is released.

■ Manual override is used for both non-locking and locking. The lock is engaged by pressing down and turning the manual override. Press down first to lock. If it is turned without being pressed down, it could be damaged or air could leak.

2. External pilot piping port

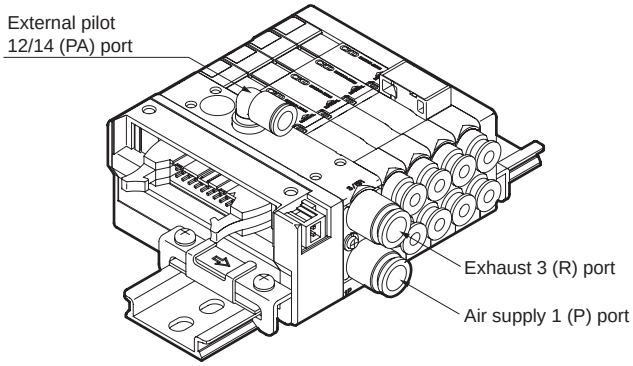
⚠CAUTION

■ The external pilot has a separate pilot air supply. The ø 6 push-in fitting is used to supply pilot air. Check that the piping connection is correct. Malfunction occurs if the piping connection is incorrect.

Port indication

Applications		Indication (ISO standards)
Pilot air	Pilot air supply port	12/14

* A/B ports and the R port cannot be pressurized.

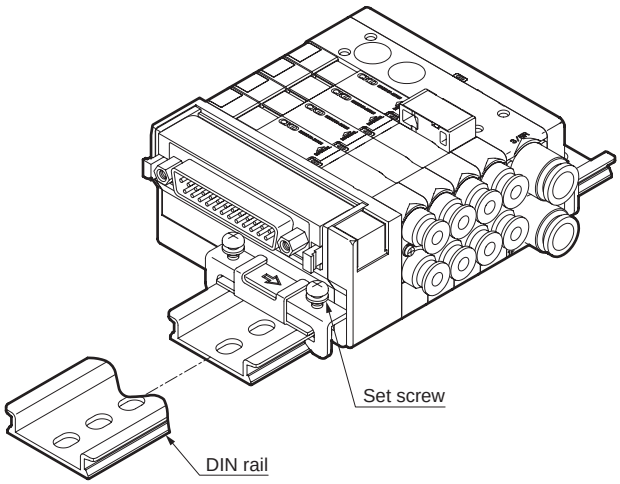


The external pilot air supply port is the ø 6 push-in fitting on the top of the supply/exhaust block.

3. How to install manifold

⚠CAUTION

■ The 4E Series is dedicated for mounting on the DIN rail. The manifold could drop off or be damaged if not installed correctly. If the manifold weighs more than 1 kg or if it is used in an environment with vibration or impact, secure the DIN rail onto the surface at 50 to 100 mm intervals. Be sure to check the mounting before starting operation. Use the specifications to calculate the weight. Also calculate the weight of the other devices installed. (Refer to pages 345 and 361 for weight.)



4. Lead wire connection

■ The following lead wire is used in the socket of individual wiring valve blocks and type with individual power supply function (AUX) of 4E Series.

Conductor size	Outer diameter of insulator
AWG#26	1.32

When you wire the installed manifold, check that tension is not applied to the lead wire.

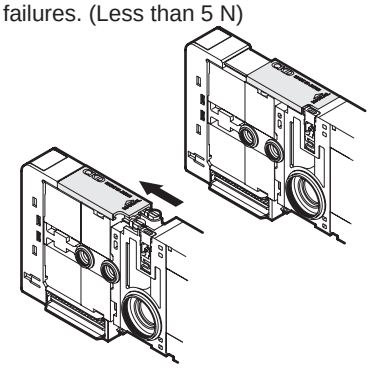
Use & maintenance

1. Manual override

⚠WARNING

■ Opening and closing the manual protective cover

Do not apply excessive force onto the manual protective cover when you open or close it. Excessive external force may cause failures. (Less than 5 N)

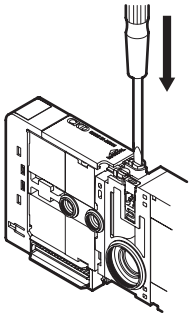


Slide type

■ How to operate manual override

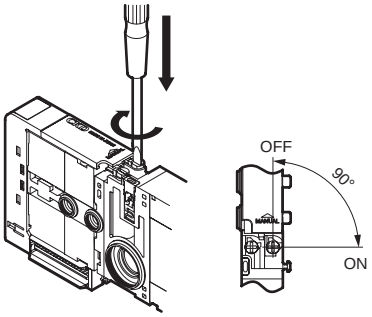
(1) Push & non-locking operation

Push in the direction of the arrow until it stops.
The manual operating device is unlocked when released.



(2) Push & locking operation

Turn it 90 degrees in the direction indicated by an arrow while pressing it. The manual function is not canceled even when it is released.



WARNING

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

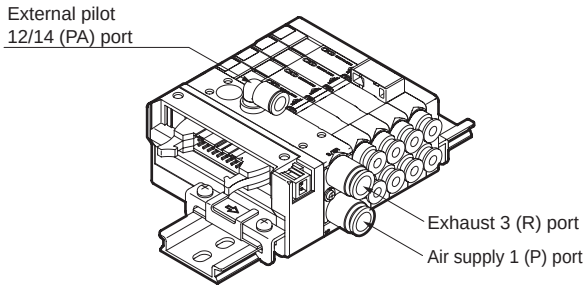
2. External pilot piping port

⚠CAUTION

■ Note supply pressure for dual 3-port valve integrated.

The valving element of dual 3-port valve integrated is operated with the main (P port) supply pressure.

- Check that the main pressure (P port) is not higher than the pilot pressure (PA port).
- Check that the main pressure (P port) does not drop below 0.2 MPa.

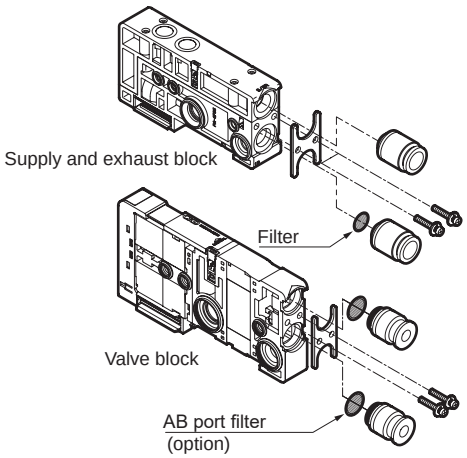


3. Port filter

⚠CAUTION

■ The port filter prevents foreign matters from entering it, to prevent potential manifold problems (mesh hole ø 0.3 mm). This does not improve the quality of compressed air. Read "Warnings and Precautions" in Introduction, before you mount, install, and adjust it. Do not take off the port filter or push it in by force. The filter may be deformed leading to a problem.

If contaminants and foreign materials are found on the filter surface, blow lightly, or remove them by tweezers, etc.



4. Pneumatic pressure source

⚠CAUTION

■ As this product is non-lubrication, adding oil may cause the grease which is initially sealed in to leak out. This may prevent the product from working at its maximum performance.