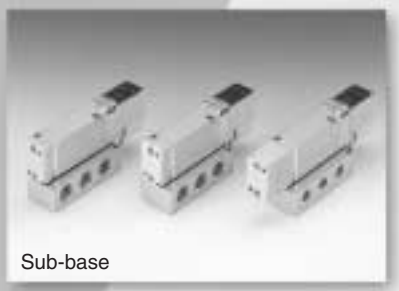
We have achieved the "High Flow Rate" and space Operation" and "Environmental Resistance" needed in

Solenoid Valves PA Series

This highly reliable 5-port, 2- or 3-position valve can serve as a key valve for mid-sized actuators.


Single unit


Sub-base

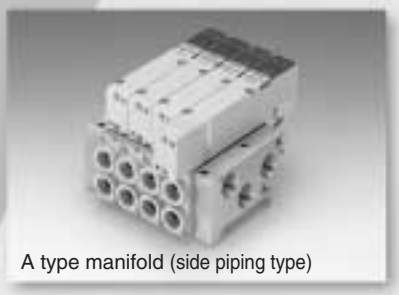
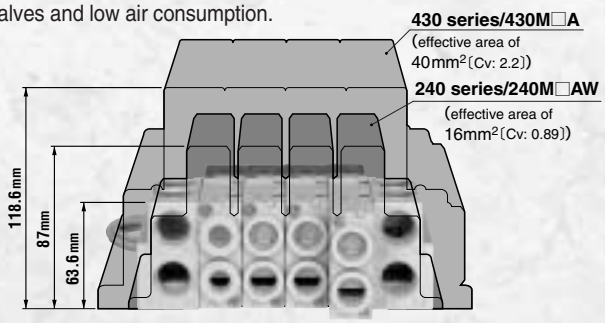

A type manifold (side piping type)


Photo shows F type manifold.

Space Saving with Large Flow Rate

- While attaining large flow rates by an effective area of 36mm² (Cv: 2.0), the valve achieves excellent space saving with a compact width of just 23.8mm [0.937in.].
- Valve selection from either a **25**mm² (Cv: 1.4) or a **36**mm² (Cv: 2.0) effective area with the same outer dimensions offers a choice of valves and low air consumption.



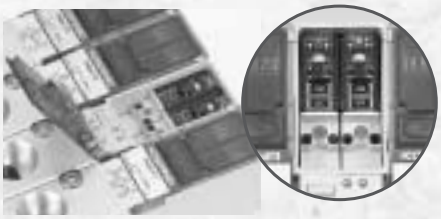
PB series/PBM□P (effective area of 25/36mm² (Cv: 1.4/2.0))

Low Power Consumption

- Achieves power consumption of just **1W** (DC24V) while maintaining a large flow rate.
- DC 24V coil specification uses bridge diodes for the internal circuit, enabling wiring connections without observing polarity like AC coils.

High Performance and Flexible Adaptability

- 2-position double solenoid valves can be switched to single solenoid valves.※1
- External pilot type can be changed to internal pilot type※2 (PB series only).
- A compact and highly reliable solenoid valve is used as a pilot valve. Easy replacement is possible by opening the valve body cover.



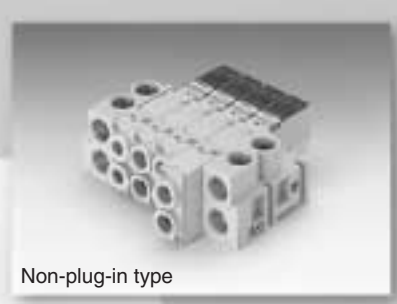
※1: Single solenoid valves cannot be switched to double solenoid valves.
※2: Internal pilot type cannot be switched to external pilot type.

saving "Compact Body" size, as well as the "Ease of mid sized valves.

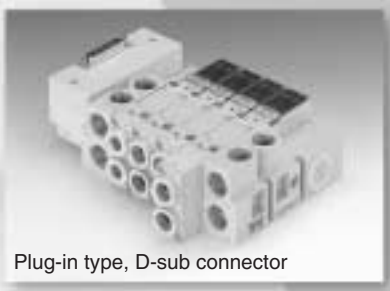
Solenoid Valves PB Series

Achieves new generation "easy operation" and "high performance" in an integrated valve with a manifold.

Photo shows plug-in with cable type manifold.



Non-plug-in type



Plug-in type, D-sub connector

Serial transmission type

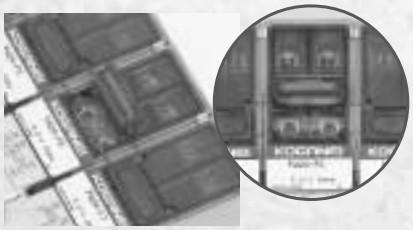
Compatible with a Wide Range of Application Environments

- Environmental protection rating **IP65** equivalent (dust ingress and water jet resistant) is available as an option.
- Maximum **1MPa** {10.2kgf/cm^2} [145psi.] pressure air.
- Stainless steel screws are used for high resistance to corrosion.[Note] Standard screws are compatible with NCU (non-ion) specification.

Note: Nickel plated screws are used in a few sections, such as on the terminal block.

Improved Safety and Reliability

- Non-neutral construction eliminates unstable operation upon valve position switching.
- Manual override is located under a protective cover, preventing the possibility of erroneous operation.

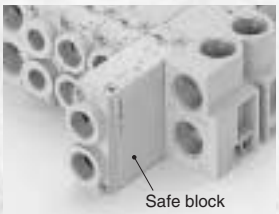


Wide Range of Wiring Types and Options

- The PB series plug-in type offers a wide choice of wiring selections as an option, e.g., D-sub connector, terminal box and serial transmission types, which are compatible with the serial transmission systems of various companies, to suit the customer's applications.

- Safe Block

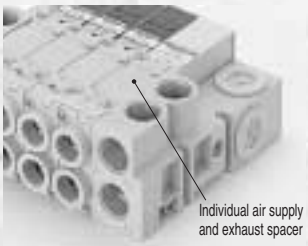
  When used in combination with a 3-position exhaust center valve on the same manifold, the safe block can ensure cylinder intermediate stop and hold its position for long periods without being affected by air leaks between the spool and valve body.



Safe block

- Individual air supply and exhaust spacer

  Completely blocks 1 valve on the manifold from the other valves, and then performs air supply and exhaust separately for each valve.



Individual air supply and exhaust spacer

Solenoid Valves PA, PB Series Product Range

PA Series

Instructions, Precautions p.665
Specifications p.671

Single Valve Unit

Direct piping

Base piping

Wiring specifications

DIN connector

Grommet type straight connector

Grommet type L connector

Cabtyre cable

Can be used with either direct piping or sub-base piping.
For wiring specifications, choose from among 4 types.

Order Code p.676
Dimensions p.678

A type Manifold (side piping type)

The side piping type manifold offers superior cost performance and easy maintenance.
For the manifold outlet type, select from either the ported manifold type or piping block type.

Order Code p.675
Dimensions p.682

Wiring specification
As with the single valve units, select from among 4 types.

Ported manifold type

Piping block type

B type Manifold (bottom piping type)

The bottom piping type manifold offers superior cost performance and easy maintenance.
For the manifold outlet type, select from either the ported manifold type or piping block type.

Order Code p.675
Dimensions p.682

Wiring specification
As with the single valve units, select from among 4 types.

Ported manifold type

Piping block type

F type Manifold (direct piping type)

The direct piping type manifold offers superior cost performance.
Achieves completely compact size and greatly reduced weight.

Order Code p.675
Dimensions p.681

Wiring specification
As with the single valve units, select from among 4 types.

Supply and exhaust port (Rc3/8)

Supply and exhaust block (Rc1/2)

PB Series

(Dedicated valves for manifolds)

The PB series piping blocks allow selection or switching from either the front surface or top surface piping for all models.

Instructions, Precautions p.665 | Specifications p.685 | Serial Transmission Specifications p.695

Non-Plug-In Type

The individual wiring type manifold achieves a perfectly thin and compact unit. Choose from among 4 types of wiring specifications.

Order Code p.689 | Dimensions p.698

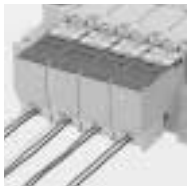
Front surface piping

Top surface piping

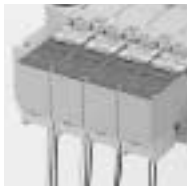
Wiring specifications

DIN connector

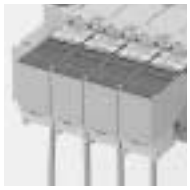
Grommet type straight connector



Grommet type L connector



Cabtyre cable



Plug-In Type

The labor saving wiring type manifold achieves a perfectly thin and compact unit. Choose from among 5 types of wiring specifications. In addition, the D-sub connector orientation can be changed to either the top surface or side surface.

Order Code p.689 | Dimensions p.699

Front surface piping

Top surface piping

Wiring Specifications

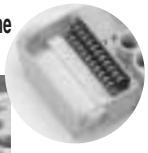
Top surface cable outlet at the left (right)

Side surface cable outlet at the left (right)

D-sub connector on top surface at the left (right) mounting

D-sub connector on side surface at the left (right) mounting

Terminal block box at the left (right) mounting



Choose either left or right for the plug-in type wiring specifications. Specify the selection when placing an order.

Serial Transmission Type

Compatible with the serial transmission systems of many different companies.
Select either left or right side mounting positions of the serial transmission block. Moreover, either the front or top surface can be selected for piping.

Order Code p.689 | Dimensions p.701

- **For Mitsubishi Electric MELSECNET/MINI-S3**
- **For Mitsubishi Electric MELSEC I/O LINK**
- **For Mitsubishi Electric CC-Link**
- **For OMRON SYSBUS Wire System**
- **For OMRON B7A Link Terminal**
- **For OMRON CompoBus/S**
- **For UNI-WIRE® System**
- **For KOYO ELECTRONICS INDUSTRIES SA Bus**
- **For SUNX S-LINK**
- **For Fuji Electric FA Components & Systems T Link Mini**
- **For KEYENCE KZ-R**
- **For OPCN-1 (former JPCN-1)**
- **For DeviceNet (CompoBus/D)**

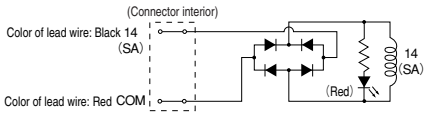
For details, see p.695～697.

Solenoid

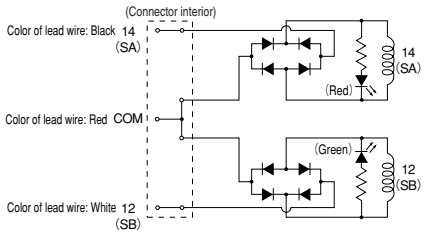
Internal circuit

●DC24V

●Single solenoid



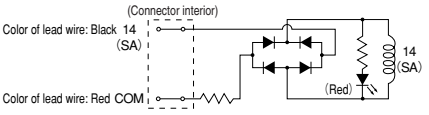
●Double solenoid



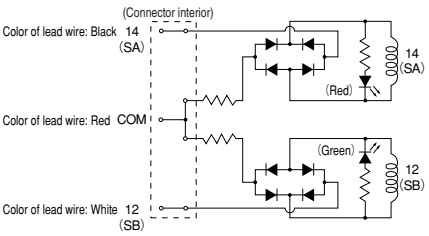
Note:Since there is no polarity, the valve can be used for either +COM or −COM.

●AC100V, 200V

●Single solenoid



●Double solenoid



Cautions: 1. Do not apply megger between the pins.
2. Leakage current inside the circuit could result in failure of the solenoid valve to return, or in other erratic operation. Always use it within the range of the allowable leakage current in electrical specifications listed on p.671, 685. If circuit conditions, etc. cause the current leakage to exceed the allowable leakage current, consult us.
3. For double solenoid valves, avoid energizing both solenoids simultaneously.

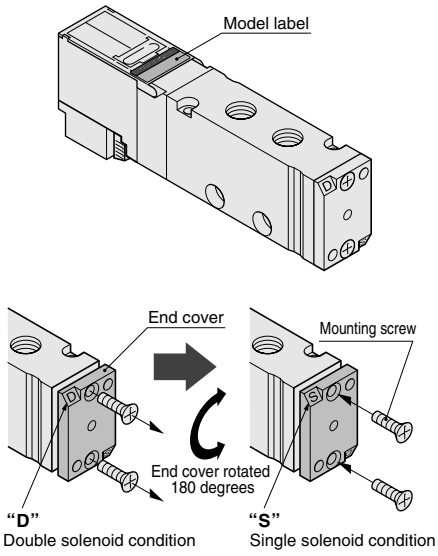
Method for Switching from Double to Single

●For the PA series

Rotate the end covers on the PA□F6 and PA□A6 models (2-position double solenoid valves) 180 degrees to use them as single solenoid valves (this change is not possible on 3-position valves). Note that the PA□F5 and PA□A5 models (2-position single solenoid valves) are designed specifically for use as single solenoid valves, and cannot be used as double solenoid valves.

Switching from double solenoid valves (at shipping) to single solenoid valves

As shown in the illustration below, a **"D"** marked on the end cover on the model label surface side means that the unit is set for a double solenoid function. To convert to the single solenoid valve function, use a Phillips screwdriver to remove the end cover, rotate it 180 degrees, and set the mark to **"S."** The recommended tightening torque for the end cover mounting screw is as shown below.



Recommended tightening torque for mounting screws: 88.3N·cm {9.0kgf·cm} [7.8in·lbf]

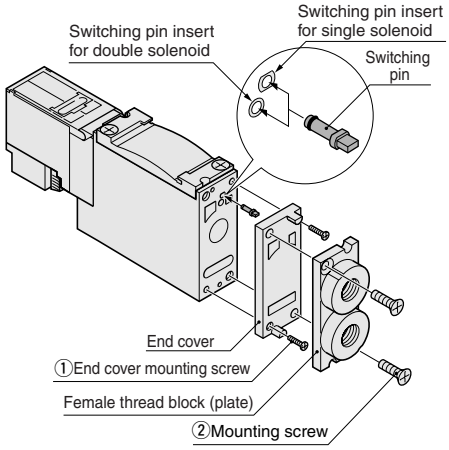
Cautions: 1. Do not remove the end cover except when switching between single and double solenoids.
2. When mounting the end cover, confirm that the gasket is attached before proceeding with the mounting.

●For the PB series

Change the switching pin on the PB□C6 model (2-position double solenoid valve) to use as a single solenoid valve (this change is not possible on the 3-position valve).
Note that the PB□C5 model (2-position single solenoid valve) is designed specifically for use as a single solenoid valve, and cannot be used as a double solenoid valve.

Switching from double solenoid valves (at shipping) to single solenoid valves

As shown in the illustration below, use a Phillips screwdriver to remove the female thread block or plate of the unit's front surface output port 4(A) and 2(B), then remove the end cover, remove the switching pin from the lower level hole and insert it in the upper level hole, to convert to the single solenoid function. The recommended mounting screw tightening torque for the end cover and the female thread block or plate are as shown below.



Recommended tightening torques for mounting screws
① End cover mounting screw : 39.2N·cm {4.0kgf·cm} [3.5in·lbf]
② Mounting screw : 137.3N·cm {14.0kgf·cm} [12.2in·lbf]

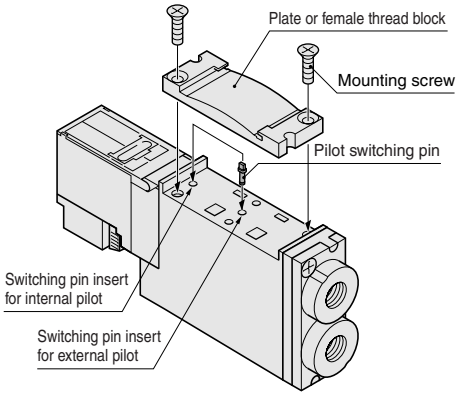
Cautions: 1. Do not remove the end cover except when switching between the single and double solenoids.
2. When mounting the end cover and the female thread block or plate, confirm that the gasket is attached before proceeding with the mounting.

Pilot air switching method (PB series only)

Change the switching pins on the PB□G and PB□V models (external pilot positive pressure valves and vacuum valves) to use as an internal pilot positive pressure valve. Note that the PB□ model (internal pilot valve) is for internal pilot use only, and cannot be used as an external pilot positive pressure or vacuum valve.

Switching from double solenoid valves (at shipping) to single solenoid valves

As shown in the illustration below, use a Phillips screwdriver to remove the female thread block or plate of the unit's top surface side outlet port 4(A) and 2(B), and then remove the switching pin from its position (lower level) for the external pilot specification and insert it in the position (upper level) for the internal pilot specification, to convert to the internal pilot specification. The recommended mounting screw tightening torque for the female thread block or plate is as shown below.



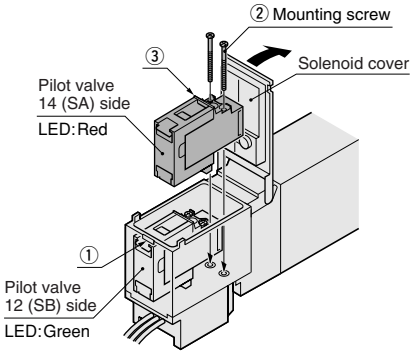
Recommended tightening torque for mounting screws: 137.3N·cm {14.0kgf·cm} [12.2in·lbf]

Caution: When mounting the female thread block or plate, confirm that the gasket is attached before proceeding with the mounting.

Pilot valve replacement

●Removal

Hand-open the solenoid cover at ① and use a small screwdriver to remove the mounting screws ② mounting the pilot valve in place. Use pliers to hold and pull out the pilot valve's flange ③, and then remove the pilot valve.



Caution: The maximum height of the cover when open is 48mm [1.89in.] from the top surface. Ensure enough space for maintenance, etc.

●Installation

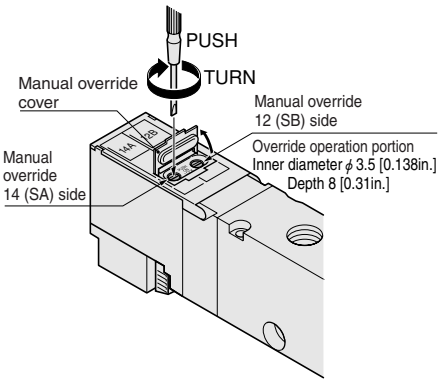
Confirm the installation of the pilot valve gasket, and then firmly tighten the mounting screws to the recommended torque below. Lastly, firmly close the solenoid cover.

Recommended tightening torque for mounting screws: 14.7N·cm {1.5kgf·cm} [1.3in·lbf]

Manual override

●Manual override (for both locking and non-locking types)

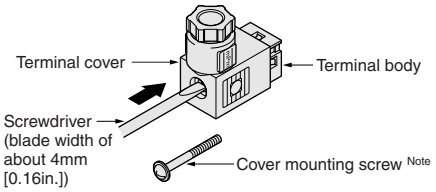
To lock the manual override, use a small screwdriver to open the manual override cover. In that position, press it all the way down and turn it 90 degrees in the clockwise direction to lock. When in the lock position, turning the manual override 90 degrees in the counterclockwise direction releases a spring on the manual override, returns it to the normal position, and releases the lock. When the manual override is not turned, this type acts just like the non-locking type.



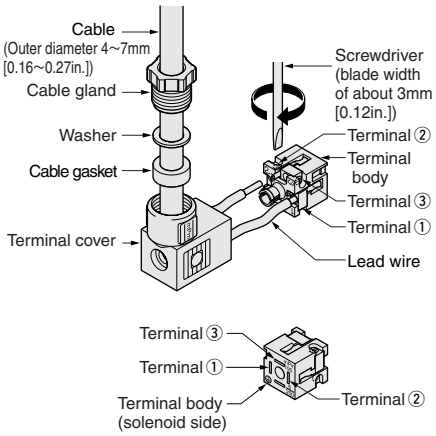
Cautions:
1. The PA/PB series valves are pilot type solenoid valves. As a result, the manual override cannot switch the main valve without air supplied from the 1(P) or X(P2) port.
2. Always release the lock of the manual overrides before commencing normal operation.
3. Do not attempt to operate the manual override with a pin or other object having an extremely fine tip. It could damage the manual override button.
4. Caution should be exercised to avoid rotating the manual override too far. It could damage the button.
5. If operating the solenoid valve's manual override for maintenance, etc., check before restarting operations that the solenoid valve's manual override has returned to the normal position, and that the main valve is in the required position for switching.
6. The maximum height of the cover when open is 8.4mm [0.331in.] from the top surface of the cover.

Wiring instructions

Remove the cover mounting screw and lift the terminal cover off from the solenoid valve.
Use a screwdriver, etc. to press hard against the head of the terminal body from the mounting hole of the terminal cover, and remove the terminal body.
Pass a cable gland, washer, and cable gasket over the cable, insert it via the wiring outlet of the terminal cover, and connect lead wires to the terminal body (screwdriver blade width of about 3mm [0.12in.]).



Note: The appropriate tightening torque for the cover mounting screw is 29.4N·cm {3kgf·cm} [2.6in·lbf].



〈Terminal internal wiring connections〉

Terminal No.	Internal wiring connections
①	SOL.14 (SA) side
②	SOL.12 (SB) side
③	COM.
⏚	Ground

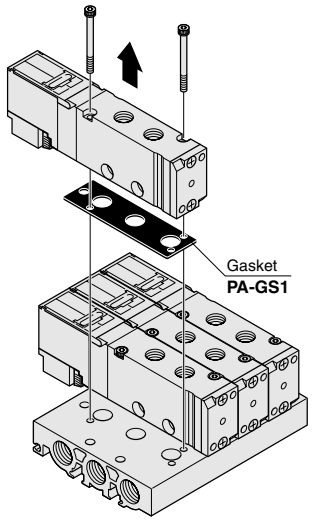
Caution: Because the cable has no polarity, it can be used for either +COM or −COM.

Manifold

Valve mounting and removal

●For PA series

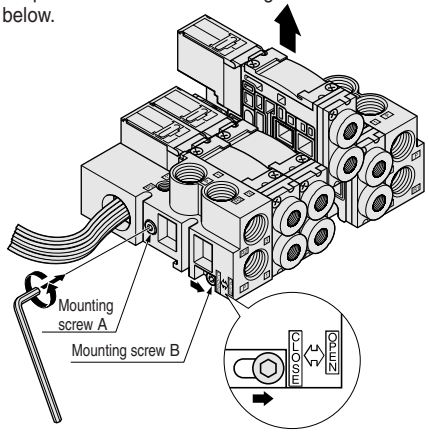
When removing the valve body from a sub-base or manifold, loosen the valve mounting screws (2 places), and lift in the direction of the arrow (see illustration below). To mount, follow the above procedure in reverse. The recommended tightening torque for the valve mounting screws is as shown below.



Recommended tightening torque for mounting screws:
176.5N・cm {18.0kgf・cm} [15.6in・lbf]

●For PB series

When removing the valve, use a hexagonal bar wrench to loosen the valve mounting screws A and B by 2～4 rotations. Move the mounting screw B (which includes screws on both sides, and a tie rod) in the direction of the arrow, move the valve until a gap of about 1mm opens up on each side of the valve, and then lift the valve in the direction of the large arrow. Be careful when loosening the mounting screws A and B, since the valve could fall at that time, for example, in an upside down manifold mounting. To assemble, follow the above procedure in reverse. The recommended tightening torque for the valve mounting screws is shown below.



Recommended tightening torque for mounting screws:
411.9N・cm {42.0kgf・cm} [36.5in・lbf]

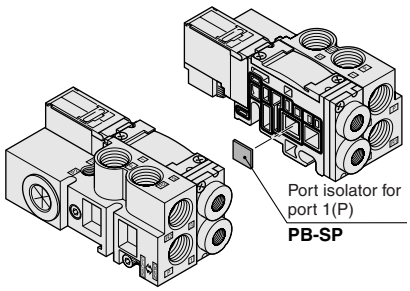
Caution: Although the flow path for the PA and PB double solenoid specifications (F6, A6, C6) is set to the 1(P)→ 2(B) at shipping from the factory, conditions during shipping could cause the stem to move and the position to shift. When applying air to the system for the first time, confirm that it is safely set by running a preliminary check on switching, using electricity or manually. Beware that air could suddenly blow out from the OUT port.

Port isolator (**PB** series settings only)

Installation of a port isolator at port 1(P) between the stations of a split-type manifold isolates the air path between the station where the port isolator is installed and a station with a smaller stn. No.

●Port isolator for port 1(P) (Type: PB-SP)

Can supply 2 different types of pressure.

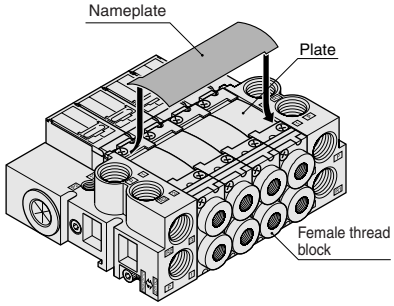


Caution: For later installing of other port isolators, the manifold must be disassembled and then reassembled. See the disassembly diagram on p.669.

Nameplate

The nameplate is attached to the other side from that of the female thread block. For attaching or removing, flex it so that it fits the grooves on the upper and lower side of the plate, as shown in the illustration.

Since the nameplate can be attached to either the top surface or front surface, make a careful selection to conform with the valve piping specifications that require combinations on the front and top surface piping.

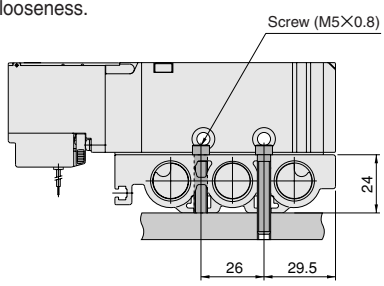


Manifold installation methods

●Installing the PA series F type manifold (PAM□F)

1. Installation using a top-surface bolt

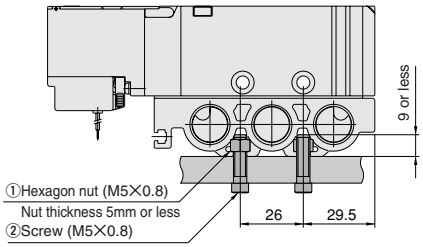
Use a bolt to tighten from the top of the manifold. Care must be exercised when mounting to use a sufficiently long screw, and mount it with particular attention for the tightening torque. In addition, use a washer if necessary to prevent looseness.



2. Installation using a bottom-surface nut

①Insert a hexagon nut into the manifold's T groove.

②Use a screw to tighten from the bottom of the mounting plate. Ensure that a suitable length screw is used, and mount it with particular attention for the tightening torque. In addition, use a washer if necessary to prevent looseness.



3. Installation using a DIN rail

Insert into the grooves in the sequence of ① and ② below.

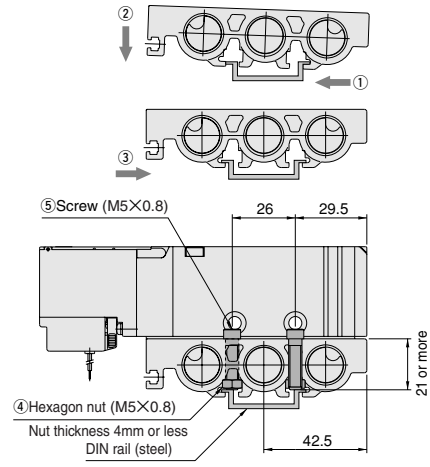
Push in the direction of ③, and align with the center of the DIN rail.

④Insert a hexagon nut into the manifold's T groove.

⑤Use a screw to tighten from the top of the manifold.

Always use a steel DIN rail. Do not use an aluminum rail, as it would not be sufficiently strong, causing deflection to loose products or dents in the rail that could lead to defects.

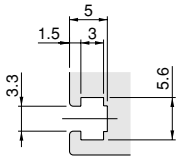
Ensure that a suitable length screw is used, and mount it with particular attention for the tightening torque. In addition, use a double nut, etc., on the top surface of the manifold if necessary for the prevention of looseness.



Recommended tightening torque for mounting screws:
284.4N・cm {29.0kgf・cm} [25.2in・lbf]

●Precaution for installation of PA series manifolds (PAM□F, PAM□A, PAM□B)

While the manifold has an M3 groove, be aware that this groove is not for use in manifold installation. Use this groove when binding lead wires, as a space for securing bands of binding wires.



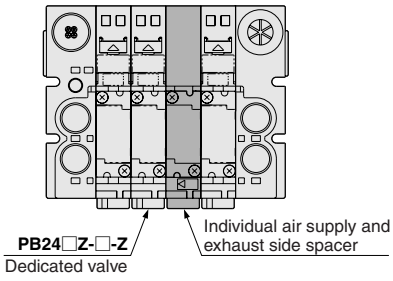
Dimensions of M3 nut groove
(cannot be used for securing the manifold in place)

Piping

Individual air supply and exhaust spacer

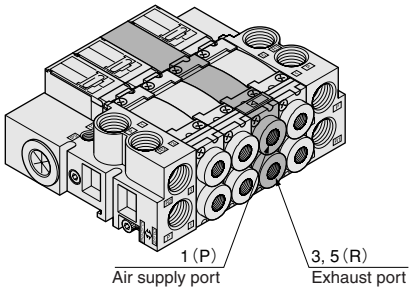
(Available in **PB** series only)

Use an individual air supply and exhaust spacer when individually supplying and exhausting air for a certain 1 station on the same manifold. Installation of the individual air supply and exhaust spacer allows control from the spacer installation position of the air supply and exhaust to the next smaller stn. number valve. Note that a dedicated valve (**PB24□Z-□-Z**) is required when using this spacer, and take particular caution on product selection.

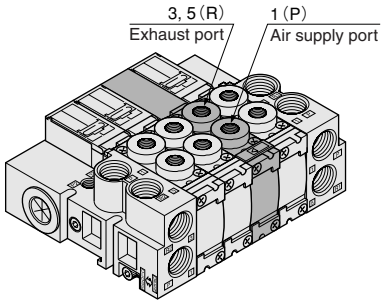


●Port position for air supply and exhaust (individual air supply and exhaust spacer)

1. For front surface piping



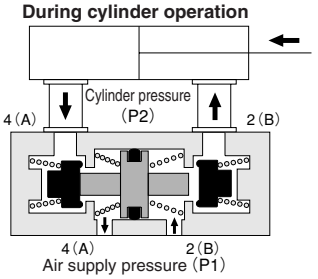
2. For top surface piping



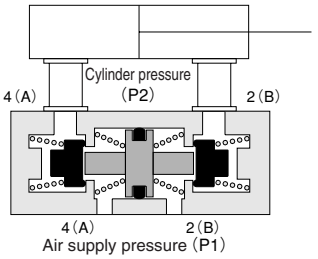
Safe block

When used in combination with a 3-position exhaust center valve on the same manifold, the safe block can ensure cylinder intermediate stop and hold its position for long periods without being affected by air leaks between the spool and valve body. In addition, when used in combination with a 2-position valve, the safe block can be used to prevent falls at the end of cylinder stroke when residual pressure on the supply side is exhausted.

During cylinder operation



During check valve operation

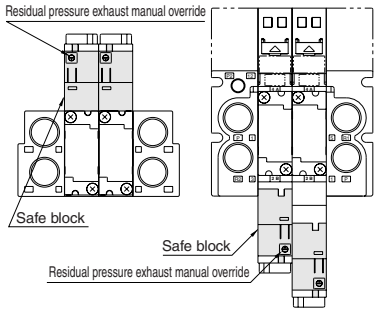


Cautions: 1. Set the cylinder load so that the pressure on the cylinder side 2(B) and 4(A) ports is less than double the supply side pressure and also does not exceed the allowable pressure range.

2. When exhausting residual pressure on the cylinder side, use a small screwdriver, etc., to push the residual pressure exhaust manual override, as shown in the diagram below. Caution should be exercised to guard against the possibility of workpieces falling or moving when the residual pressure is exhausted.

3. When a safe block is used in combination with a 3-position closed center valve or pressure center valve, it does not ensure a cylinder's intermediate stop and position holding, but prevents workpieces from falling.

For top surface piping **For front surface piping**



4. To lock the residual pressure exhaust manual override, push the manual override all the way down and rotate it 90 degrees in the clockwise direction. When in the locked state, rotate the manual override 90 degrees in the counter-clockwise direction; a spring returns the manual override to its normal position, and the lock is released. When the manual override is not turned, this type acts just like the non-locking type.

5. Always release the lock of the manual override before commencing normal operation.

6. Do not attempt to operate the manual override with a pin or other object having an extremely fine tip. It could damage the manual override button.

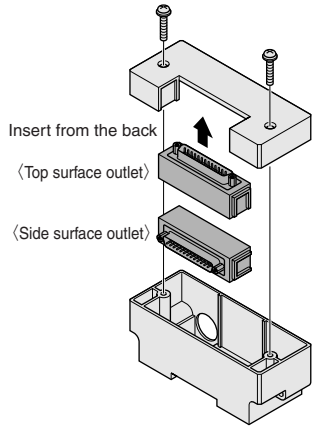
7. Caution should be exercised to avoid rotating the manual override too far. It could damage the button.

8. When the residual pressure exhaust manual override is operated for maintenance, etc., ensure that the manual override has returned to its normal position before restarting operations.

Wiring

D-sub connector

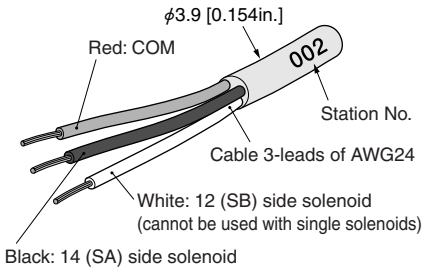
The D-sub connector can change the wiring outlet orientation between the top surface and side surface.



Recommended tightening torque for mounting screws: 58.8N·cm {6.0kgf·cm} [5.2in·lbf]

Cable specification

In the case of cable specification, the shape of the cable ends is shown in the diagram below.



Because the cable has no polarity, it can be used for either +COM or −COM.

1. Single solenoid (C5 type)

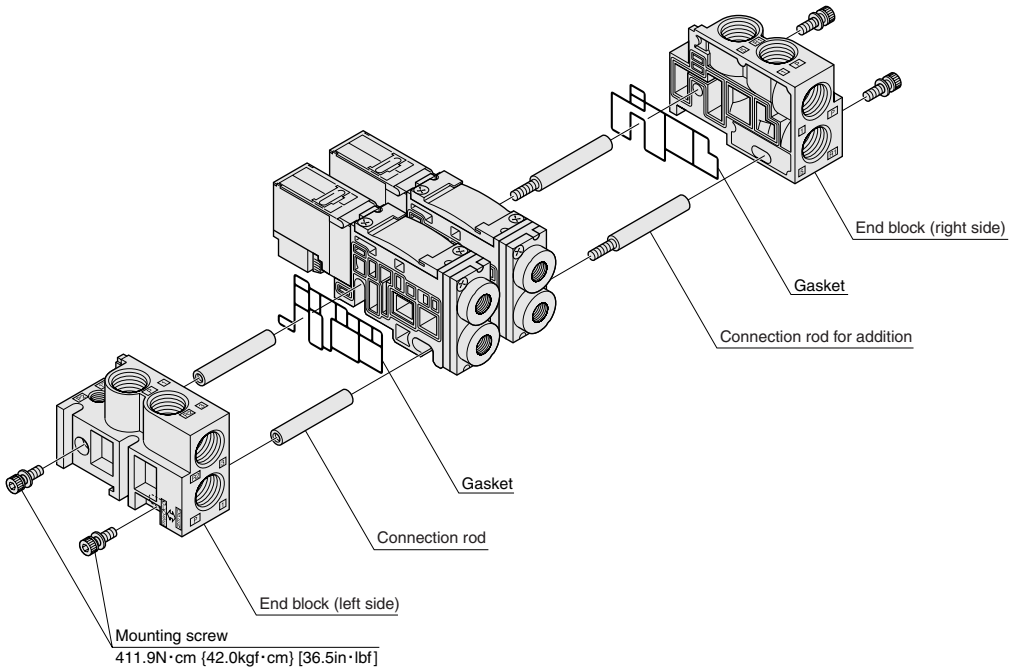
Connection polarity		Color of lead wire	Circuit diagram
Positive common	Negative common		
−	+	Black	SA
+	−	Red	COM

2. Double solenoid (C6,C7,C8,C9 type)

Connection polarity		Color of lead wire	Circuit diagram
Positive common	Negative common		
−	+	Black	SA
+	−	Red	COM
−	+	White	SB

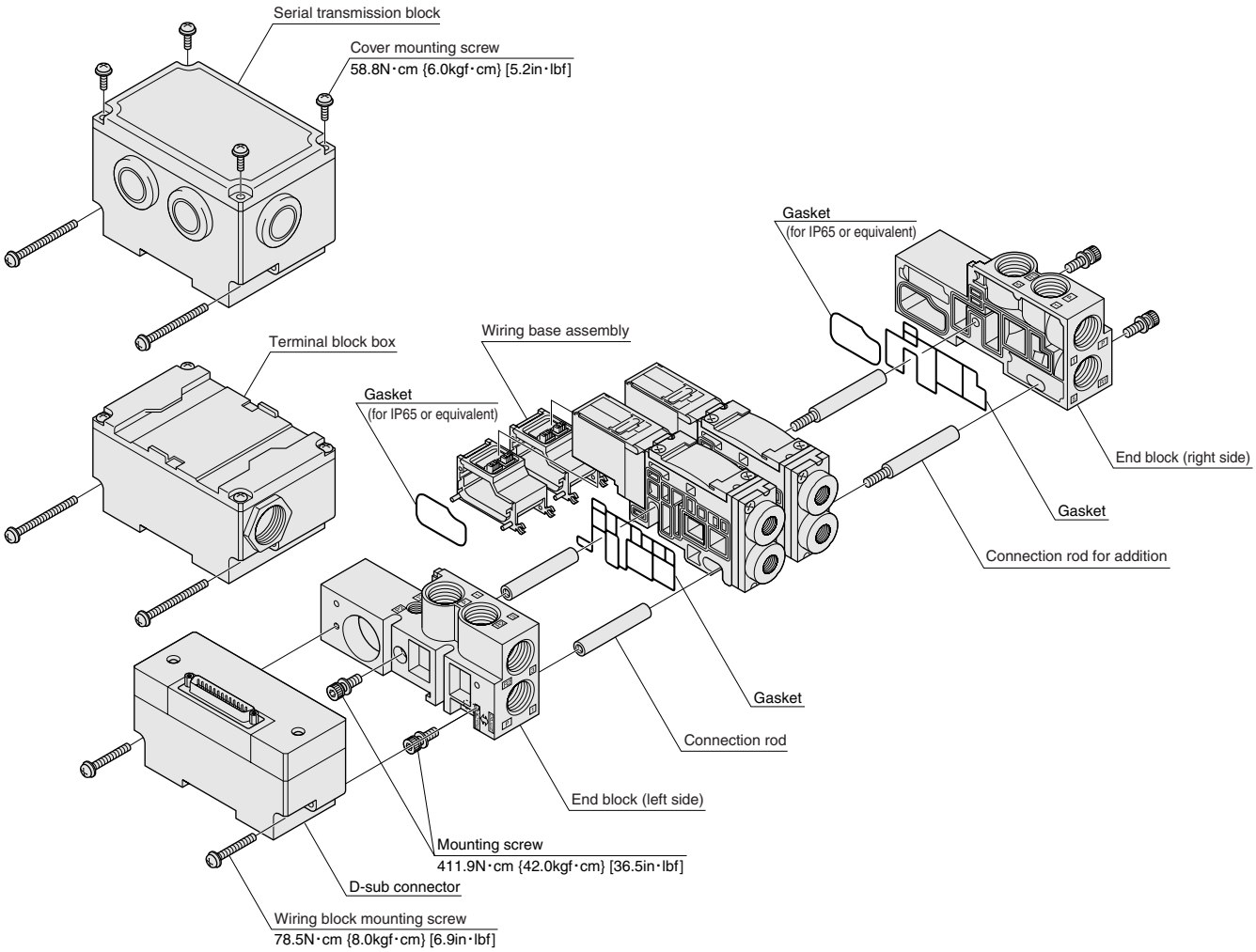
Solenoid Valves PB Series Disassembly Diagram

●Non-plug-in type



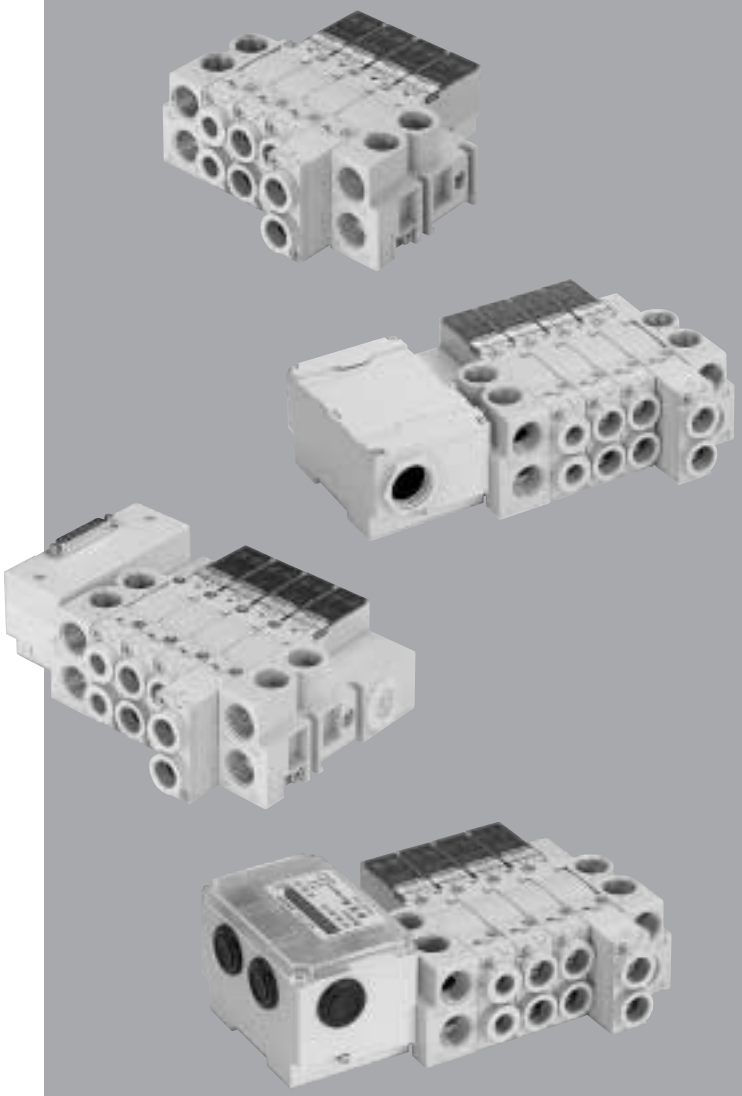
※Wiring-related parts are omitted.

●Plug-in type



※Wiring-related parts are omitted.

Solenoid Valves
PB Series



Specifications

Basic models and valve functions

Item \ Basic model	PB24□C5	PB24□C6	PB24□C7 PB24□C8 PB24□C9
Number of positions	2 positions		3 positions
Number of ports	5		
Valve function	Single solenoid	Double solenoid Note	Closed center, Exhaust center, Pressure center

Remark: For the specifications and order codes, see p.689～692.
Note: 2-position double solenoid valve can be switched to a single solenoid valve. For details, see p.665.

Specifications

Item \ Basic model		PB24□C5	PB24□C6	PB24□C7 PB24□C8 PB24□C9	PB24□C5G	PB24□C6G	PB24□C7G PB24□C8G PB24□C9G	PB24□C5V	PB24□C6V	PB24□C7V
Media		Air								
Operation type		Internal pilot type			External pilot type (for positive pressure)			External pilot type (for vacuum)		
Effective area〔Cv〕Note1	mm²	25〔1.4〕, 36〔2.0〕								
Port size Note2		Rc1/4, 3/8								
Lubrication		Not required								
Operating pressure range	Main valve	0.2～1.0MPa {2～10.2kgf/cm²} [29～145psi.]			0～1.0MPa {0～10.2kgf/cm²} [0～145psi.]			0.2MPa～−100kPa {2kgf/cm²～−750.1mmHg} [29psi.～−29.53in.Hg]		
	External pilot	——			0.2～1.0MPa {2～10.2kgf/cm²}Note3 [29～145psi.]			0.2～0.5MPa {2～5.1kgf/cm²}Note7 [29～73psi.]		
Proof pressure Note4	MPa {kgf/cm²} [psi.]	1.5 {15.3} [218]								
Response time Note5 ON/OFF	ms	40/25	25/25	35/45	40/25	25/25	35/45	40/25	25/25	35/45
Maximum operating frequency	Hz	5								
Minimum time to energize for self holding Note6	ms	——	50	——	——	50	——	——	50	——
Operating temperature range (Atmosphere or media)	°C [°F]	5～50 [41～122]								
Shock resistance	m/s² {G}	1373 {140.0} (Pilot valve axial direction) 294.2 {30.0}		294.2 {30.0}	1373 {140.0} (Pilot valve axial direction) 294.2 {30.0}		294.2 {30.0}	1373 {140.0} (Pilot valve axial direction) 294.2 {30.0}		294.2 {30.0}
Mounting direction		Any								
Environmental protection		IP65 or equivalent (optional) available								

Notes: 1. For details, see the effective area on p.686.
2. For details, see the port size on p.686.
3. When the main valve is 0.2～1.0MPa [29～145psi.], set the external pilot pressure to the same pressure as the main valve or larger, and at 1.0MPa [145psi.] or smaller.
4. The proof pressure is the pressure at which no damage, rupture, or external leaking can occur when maintained for 1 minute; it is not supposed to be used continuously.
5. The value when air pressure is at 0.5MPa [73psi.]. The 3-position shows the value when the valve is switched from the neutral position.
A maximum of 5ms should be added to the response time for AC specifications, depending on the timing of the switching phase.
6. For a double solenoid
7. The recommended value. Can be used up to a maximum of 1.0MPa [145psi.].

Solenoid Specifications

Item \ Rated voltage		DC24V Note	AC100V Note		AC200V Note	
Operating voltage range	V	21.6～26.4 (24±10%)	90～110 (100±10%)		180～220 (200±10%)	
Rated frequency	Hz	——	50	60	50	60
Current (when rated voltage is applied)	mA (r.m.s)	42	11		6.5	
Power consumption		1.0W	1.1VA		1.3VA	
Allowable leakage current	mA	2.0	1.0		1.0	
Insulation resistance	MΩ	Over 100 (value at DC500V megger)				
Wiring type and lead wire length	mm [in.]	Grommet type, cabtyre cable (300 [11.8], 1000 [39], 3000 [118]), and DIN connectors				
Color of lead wire		Red (COM), Black (14SA side), White (12SB side)				
Color of LED indicator		Red (14SA side), Green (12SB side)				
Surge suppression (Standard equipment)		Bridge diode				

Notes: 1. Since AC-coils already have built-in bridge diodes, the starting current value is virtually identical to the energizing current value.
2. For long continuous energizing in AC-coils, consult us.
3. For both AC- and DC-coils, provide heat radiation measures to ensure that the ambient temperature (when used in a control box, the temperature inside the box) always remains within the specified temperature range.

Effective Area〔Cv〕

mm²

Basic model	Valve port size		
	-□1(Rc1/8)	-□2(Rc1/4)	-□3(Rc3/8)
PB24HC5 **PB24HC6**	22〔1.2〕	32〔1.8〕	36〔2.0〕
PB24HC7	22〔1.2〕	28〔1.6〕	32〔1.8〕
PB24HC8	22〔1.2〕	28〔1.6〕	1(P)→4(A),2(B) 32〔1.8〕 4(A),2(B)→5(R1),3(R2) 36〔2.0〕
PB24HC9	22〔1.2〕	28〔1.6〕	1(P)→4(A),2(B) 36〔2.0〕 4(A),2(B)→5(R1),3(R2) 32〔1.8〕
PB24C5, PB24C6 **PB24C7, PB24C8** **PB24C9**	18〔1.0〕	22〔1.2〕	25〔1.4〕

Notes: 1. Caution should be exercised that the effective area is reduced by about 10% when using a front-surface piping block.
2. In the case of 2 or more valve units, the effective area could be reduced by about 5%, depending on the flow path.

Port Size

1(P)	4(A), 2(B)			3(R2), 5(R1)	X(P2)
	-□1	-□2	-□3		
Rc1/2	Rc1/8	Rc1/4	Rc3/8	Rc1/2	Rc1/8

Safe Block Specifications

Basic model	Effective area〔Cv〕 mm²	Response time (ON/OFF) ms
PB24□-H	22〔1.2〕	40/40

Mass

●Non-plug-in type manifold

g [oz.]

Basic mass						Additional mass with options (mass per 1 unit)				
Mass calculation of each unit (n=number of units)					Additional mass					
①Valve model Note1		②Port size				Safe block	Block-off plate	Individual air supply and exhaust spacer		
PB24□C5 **PB24□C6**	**PB24□C7** **PB24□C8** **PB24□C9**	-□1 (Rc1/8)	-□2 (Rc1/4)	-□3 (Rc3/8)	450 [15.87]	-H	PB-BPN	-Z (Rc1/8)	-Z (Rc1/4)	-Z (Rc3/8)
268 [9.45]	310 [10.93]	61 [2.15]	55 [1.94]	46 [1.62]		82 [2.89]	152 [5.36]	180 [6.35]	176 [6.21]	168 [5.93]
(①+②)×n										

Calculation example: **PBM5N**
stn.1～5 PB24C5-T3-39-H-D4
(268+12+46)×5+450+(82×5)=2490g [87.83oz.]

Notes: 1. For the wiring specification of DIN connector (-39), add 12g [0.42oz.], and add 3g [0.11oz.] for the cabtyre cable (-G3).
2. The wiring specifications assume a lead wire length of 300mm [11.8in.].
3. Plug R1/8: 3g [0.11oz.], R1/2: 21g [0.74oz.]

●Plug-in type and serial transmission type manifold

g [oz.]

Basic mass (n=number of units)										Additional mass with options (mass per 1 unit)				
Mass calculation of each unit					Additional mass									
①Valve model		②Port size			Wiring specification									
PB24□C5 **PB24□C6**	**PB24□C7** **PB24□C8** **PB24□C9**	-□1 (Rc1/8)	-□2 (Rc1/4)	-□3 (Rc3/8)	Cable Note -U□ -E□	Terminal block box -T□	D-sub -D□	Serial transmission S	Safe block -H	Block-off plate PB-BP□	Individual air supply and exhaust side spacer -Z (Rc1/8)	 -Z (Rc1/4)	 -Z (Rc3/8)
270 [9.52]	312 [11.01]	61 [2.15]	55 [1.94]	46 [1.62]	(15×n)+585 [(0.53×n)+20.63]	880 [31.04]	765 [26.98]	960 [33.86]	82 [2.89]	157 [5.54]	180 [6.35]	176 [6.21]	168 [5.93]
(①+②)×n														

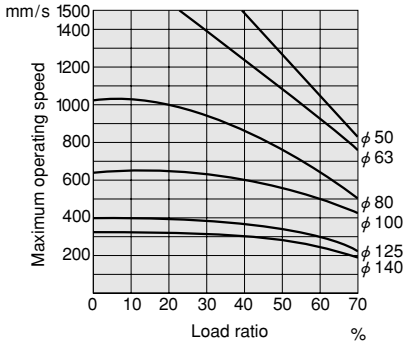
Calculation example: **PBM5P-TL**
stn.1～5 PB24HC5-T3-B-D4
(270+46)×5+880=2460g [86.77oz.]

Notes: 1. The cable specifications assume a cable length of 700mm [27.6in.].
2. Plug R1/8: 3g [0.11oz.], R1/2: 21g [0.74oz.]

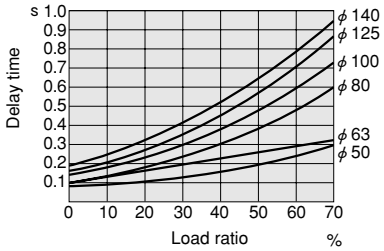
Cylinder Operating Speed

PB24HC5-□3

Maximum operating speed

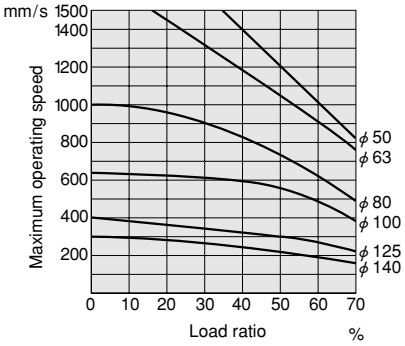


Delay time

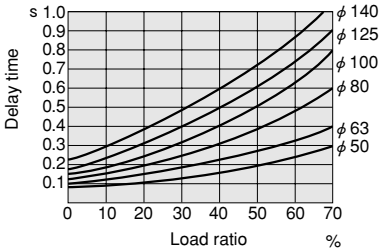


PB24C5-□3

Maximum operating speed

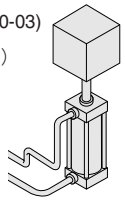


Delay time



Measurement conditions

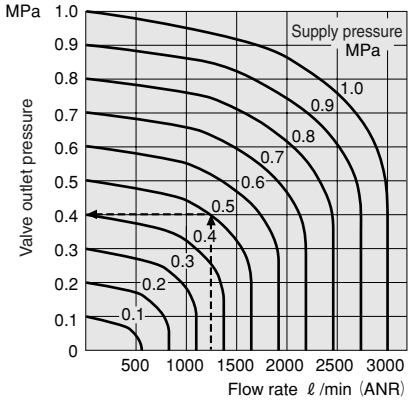
- Air pressure: 0.5MPa {5.1kgf/cm²} [73psi.]
- Piping inner diameter and length: φ7.5×1000mm [39in.]
- Fitting: Quick fitting (Model: NTS10-03)
- Load ratio = $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$ (%)
- Cylinder stroke: 300mm [11.8in.]



1mm/s = 0.0394in./sec.

Flow Rate

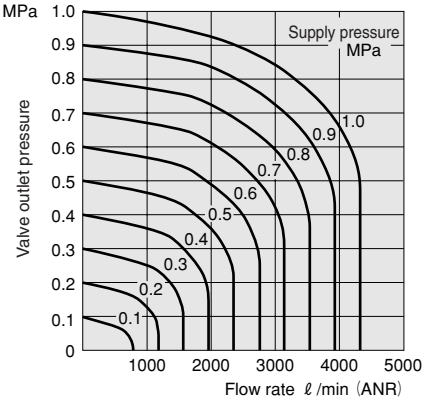
PB24□



How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 1220 ℓ/min [43.1ft³/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.]

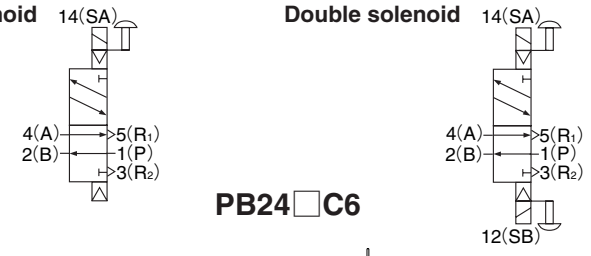
PB24H□



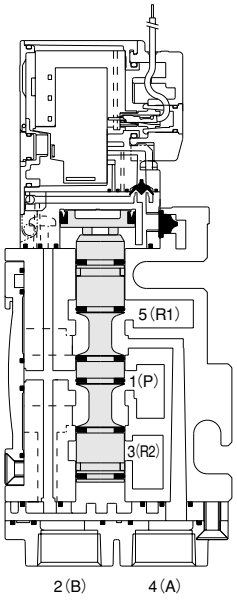
1MPa = 145psi.
1 ℓ/min = 0.0353ft³/min.

5-port, 2-position

Single solenoid **Double solenoid**

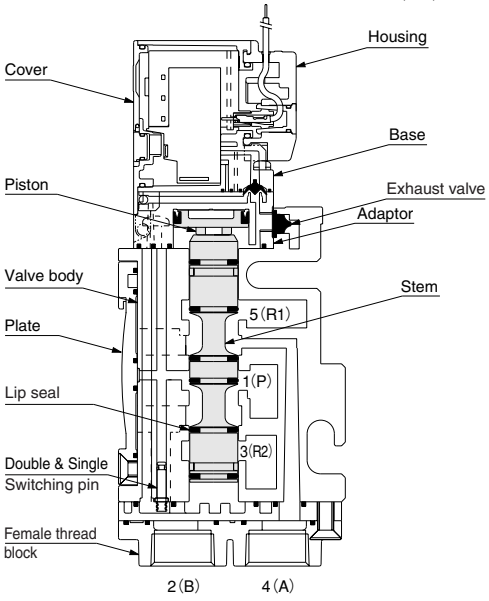


PB24□C5



〔De-energized〕

PB24□C6



〔De-energizing condition after energizing solenoid 12 (SB)〕

Major parts and materials

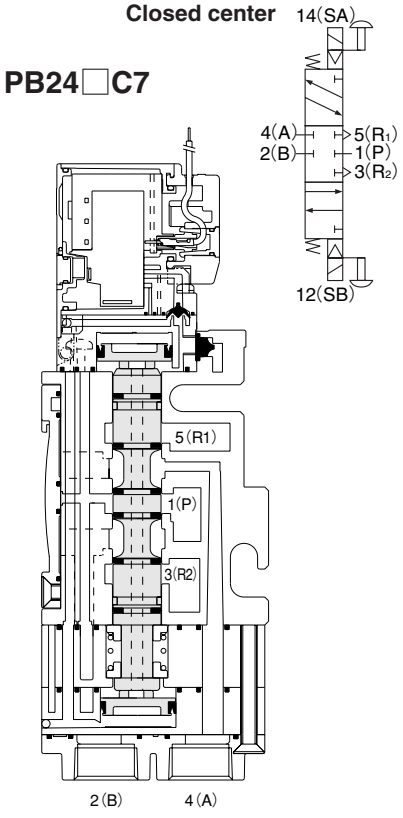
Parts	Materials
Body	Aluminum die-casting
Stem	Aluminum alloy
Cover	Plastic
Base	
Housing	
Adaptor	
Switching pin	
Lip seal	Synthetic rubber
Piston	Plastic
Exhaust valve	Synthetic rubber

5-port, 3-position

〔Both solenoid 14 (SA) and 12 (SB) are de-energized.〕

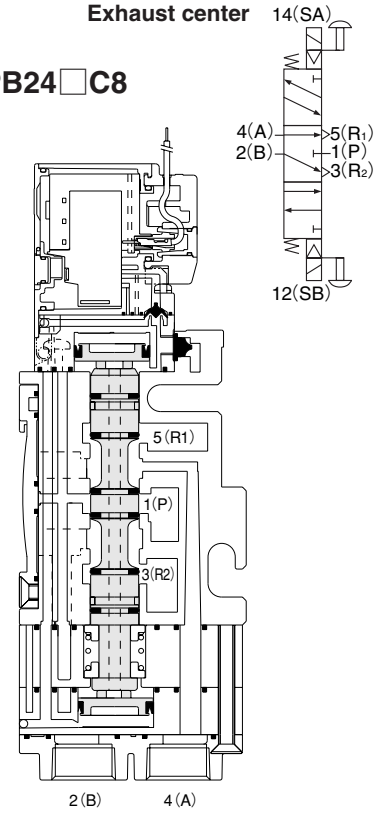
Closed center

PB24□C7



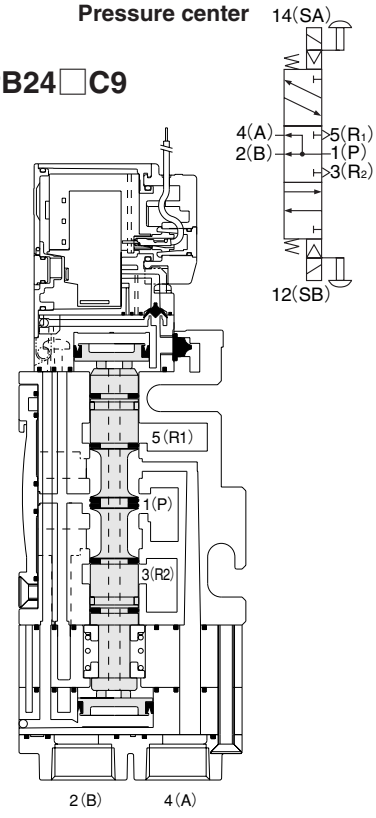
Exhaust center

PB24□C8



Pressure center

PB24□C9



PB Series Manifold Order Codes

	Model	❶ Number of units	❷ Manifold type	❸ Wiring specification	❹ Transmission block specification	❺ Wiring position (transmission block)	❻ Environmental protection	❼ Mounted valve
	Manifold model							Mounted valve
Non-plug-in type	PBM	1 ⋮ 16	N					stn.1 ⋮ stn.□
Plug-in type			P	-UL -DUL -TL -UR -DUR -TR -EL -DEL -ER -DER			Blank -P	
Serial transmission type			S		-01 -41 -81 -02 -42 -A1 -11 -51 -A2 -21 -52 -B1 -31 -61 -C1 -32 -71 -D1	Blank -R	Blank -P	

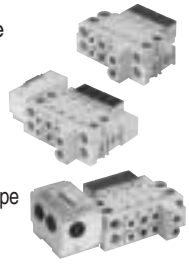
❶ Number of units

- **1** 1 unit
- **2** 2 units
- ⋮
- **16** 16 units

Note: The maximum number of units that can be controlled varies according to the number of solenoids. For details, see p.693. When used with an individual air supply and exhaust spacer, the number of valve units and the number of individual air supply/exhaust spacers determines the total number of units. For details, see the order code examples on p.691.

❷ Manifold type

- **N** Non-plug-in type
- **P** Plug-in type
- **S** Serial transmission type



❸ Wiring specification ※Plug-in type only

- **-UL** Cable outlet at top surface on left (maximum of 12 units)
- **-UR** Cable outlet at top surface on right (maximum of 12 units)
- **-EL** Cable outlet at side surface on left
- **-ER** Cable outlet at side surface on right
- **-DUL** D-sub connector at top surface on left side mounting Note
- **-DUR** D-sub connector at top surface on right side mounting Note
- **-DEL** D-sub connector at side surface on left side mounting Note
- **-DER** D-sub connector at side surface on right side mounting Note
- **-TL** Terminal block box on left side mounting Note
- **-TR** Terminal block box on right side mounting Note

Note: For pin (terminal) locations, see p.693.

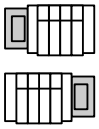
❹ Transmission block specification ※Serial transmission type only

- **-01** For UNI-WIRE System (16 outputs)
- **-02** For UNI-WIRE System (8 outputs)
- **-11** For Mitsubishi Electric MELSECNET/MINI-S3
- **-21** For OMRON SYSBUS Wire System
- **-31** For OMRON B7A Link Terminal (Standard)
- **-32** For OMRON B7A Link Terminal (High speed)
- **-41** For KOYO ELECTRONICS INDUSTRIES SA Bus (16 outputs)
- **-42** For KOYO ELECTRONICS INDUSTRIES SA Bus (8 outputs)
- **-51** For SUNX S-LINK (16 outputs)
- **-52** For SUNX S-LINK (8 outputs)
- **-61** For Mitsubishi Electric MELSEC I/O LINK
- **-71** For Fuji Electric FA Components & Systems T Link Mini
- **-81** For KEYENCE KZ-R
- **-A1** For OMRON CompoBus/S (16 outputs)
- **-A2** For OMRON CompoBus/S (8 outputs)
- **-B1** For Mitsubishi Electric CC-Link
- **-C1** For OPCN-1 (former JPCN-1)
- **-D1** For DeviceNet (CompoBus/D)

Note: For details, see p.695～697.

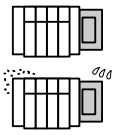
❺ Wiring position ※Serial transmission type only

- **Blank** Left-side mounting
- **-R** Right-side mounting



❻ Environmental protection ※Plug-in type/Serial transmission type

- **Blank** Standard
- **-P** IP 65 or equivalent Note



Note: Plug-in type can be set for terminal block box specifications only. The non-plug-in type is compatible with IP65 or equivalent as standard. Both types require selection of **-P** for the valve side.

❼ Mounted valve

※See next page.

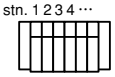
stn.1 PB24□□-□-□-□·····

stn.2 PB24□□-□-□-□·····

⋮

Note: For the stn. number, enter the valve specifications for the required stations, numbering them 1,2,... from the left, as viewed with the solenoid on top.

stn. 1 2 3 4 ···



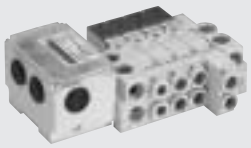
※For the block-off plate, see p.691.

Manifold Order Code Example

●Serial transmission type, 4 units, DC24V

PBM4S-B1-P

stn.1 PB24C5-T2-B-P-D4
stn.2 PB24C5-D-T3-B-P-D4
stn.3 PB24C6-T3-B-P-D4
stn.4 PB24C7-T3-B-P-D4



PB Series Mounted Valve Order Codes

(cannot be used as a single valve unit)

	❶ Model	❷ Valve specification	❸ Operation type	❹ Number of ports	❺ Piping specification	❻ Wiring specification	❼ Wiring connection specification	❽ Lead wire length	❾ Safe block	❿ Individual air supply and exhaust spacer	⓫ Port isolator	⓬ Environmental protection	⓭ Voltage
●Non-plug-in type	PB24 PB24H	C5 C6 C7 C8 C9	Blank G V Z GZ VZ	Blank -31 -32 -33	-T1 -T2 -T3 -U1 -U2 -U3	-39 -G1 -G2 -G3		Blank -1L -3L	Blank -H	Blank -Z	Blank -SP	Blank -P	-D4 -A1 -A2
●Plug-in type (cable specification)							Blank -D	Blank -1L -3L					
●Plug-in type (D-sub connector, terminal block box) ●Serial transmission type						-B	Blank -D						

●Various types of block-off plates are available as options. For details, see p.691.

❶ Model

PB24 Standard type (Effective area 25mm² 〔Cv: 1.4〕)

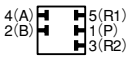
PB24H Large flow rate type (Effective area 36mm² 〔Cv: 2.0〕)

❷ Valve specification

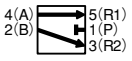
C5 5-port single solenoid

C6 5-port double solenoid

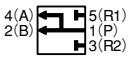
C7 5-port 3-position closed center



C8 5-port 3-position exhaust center Note



C9 5-port 3-position pressure center Note



Note: Not available for vacuum (V)

❸ Operation type

Blank Internal pilot type

G External pilot type (for positive pressure)

V External pilot type (for vacuum)

Z Internal pilot type with individual air supply and exhaust spacer Note

GZ External pilot type with individual air supply and exhaust spacer (for positive pressure) Note

VZ External pilot type with individual air supply and exhaust spacer (for vacuum) Note

Note: Dedicated valves for use with individual air supply and exhaust spacers.
For details, see the order code examples on p.691.

❹ Number of ports

Blank Standard (5-port valve)

-31 3-port valve (Rc1/8) Note

-32 3-port valve (Rc1/4) Note

-33 3-port valve (Rc3/8) Note

Note: When the 5-port valve is used as a 3-port valve, plugs are supplied.

❺ Piping specification

-T1 Front surface piping Rc1/8

-T2 Front surface piping Rc1/4

-T3 Front surface piping Rc3/8

-U1 Top surface piping Rc1/8

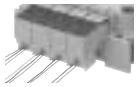
-U2 Top surface piping Rc1/4

-U3 Top surface piping Rc3/8

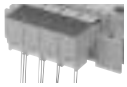
❻ Wiring specification ※No cable specification entry

-39 DIN connector

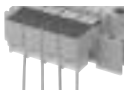
-G1 Grommet type straight connector



-G2 Grommet type L connector



-G3 Cabtyre cable



-B Always enter **-B** for D-sub connector, terminal block box and serial transmission types.

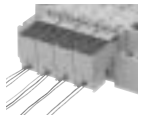
❼ Wiring connection spec. ※Plug-in type/serial transmission type

Blank Packed wiring: Wiring connection with each mounted valve.

-D Double wiring: Provides wiring connections for a double solenoid even when the specification is for a single solenoid.

❽ Lead wire length ※Except DIN-type connector

Blank Lead wire 300mm [11.8in.] (700mm [27.6in.])



-1L Lead wire 1000mm [39in.] (1500mm [59in.])

-3L Lead wire 3000mm [118in.] (3000mm [118in.])

Note: Not available in wiring specification -39. The figures within parentheses ( ) are for plug-in type cable specification. The cable length shows the distance from each valve.

❾ Safe block

Blank Without safe block

-H With safe block Note

Note: Cannot be used with external pilot types (for positive pressure and for vacuum).

❿ Individual air supply and exhaust spacer

Blank Without individual air supply and exhaust spacer

-Z With individual air supply and exhaust spacer Note

Note: Always enter **-Z** when selecting dedicated valves for the manifolds.
For details, see the order code examples on p.691.

⓫ Port isolator

Blank Without port isolator

-SP With port isolator for P port

Note: Port isolator can be mounted in only 1 location (1 station) in the manifold. Port isolator is installed between the specified station and the station to its immediate left (the smaller stn. no.) at shipping.

⓬ Environmental protection

Blank Standard

-P IP65 or equivalent Note

Note: The DIN connector (-39) is compatible with IP65 or equivalent as standard. In the case where the IP65 or equivalent is used, select **-P** for both the manifold order code and the valve order code.

⓭ Voltage

-D4 DC24V

-A1 AC100V Note

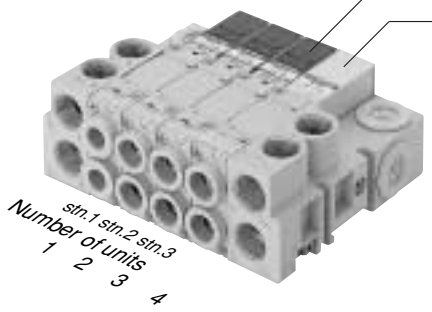
-A2 AC200V Note

Note: Not available in serial transmission type.

Order code examples when using the individual air supply and exhaust spacer

Not functional as an individual air supply and exhaust spacer alone. It works when used in combination with the dedicated valve (**PB24 □Z**). Since the spacer is added as part of the total number of valve units, take consideration of the maximum number of units allowed in the manifold. In the mounting case at right, the station configuration is stn.1～stn.3., but the number of units in the manifold is counted as 4 units. For the air supply and exhaust port positions, see p.668.

〈**Mounting example**〉



PB24C6Z-T3-Z-D4 (Dedicated valve)

Individual air supply and exhaust spacer

Note: Occupies 1 station space on the right side of the dedicated valve.

Order Code Example
●Plug-in type cable specification
4 units DC24V
PBM4P-EL
stn.1 PB24C5-T2-D4
stn.2 PB24C5-T3-D4
stn.3 PB24C6Z-T3-Z-D4

PB Series Manifold Options Order Codes

Block-off plate

PB-BP ❶ ❷ ❸

❶Specification

N	Non-plug-in type
M	For D-sub connector, terminal block box, serial transmission type
K	Cable specification (700mm [27.6in.])
K1	Cable specification (1500mm [59in.])
K3	Cable specification (3000mm [118in.])

❷Wiring connection specification Note

S	Single wiring
D	Double wiring

(Note: Except non-plug-in type)

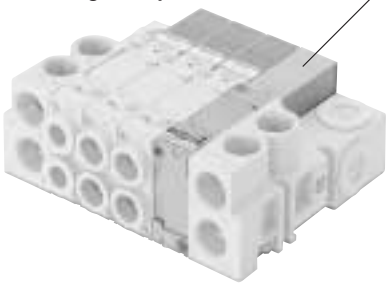
❸Environmental protection Note

Blank	Standard
-P	IP65 or equivalent

(Note: Non-plug-in type is compatible with IP65 or equivalent as standard)

When valves are expected to be installed in the future, use these as mounted on a manifold.
Note that this configuration is different from the conventional plate type block-off plates, and it is the block shape.
For instructions for mounting and removal, see the valve mounting and removal on p.667.

〈**Mounting example**〉



PB-BP□□
Block-off plate

Order Code Example
●Plug-in type cable specification
4 units DC24V
PBM4P-EL
stn.1 PB24C5-T2-D4
stn.2 PB24C5-T3-D4
stn.3 PB24C6-T3-D4
stn.4 PB-BPKD

When used in combination with individual air supply and exhaust spacer

PB-BP ❶ ❷ -Z ❸ ❹ ❺

❶Specification

N	Non-plug-in type
M	For D-sub connector, terminal block box, serial transmission type
K	Cable specification (700mm [27.6in.])
K1	Cable specification (1500mm [59in.])
K3	Cable specification (3000mm [118in.])

❷Wiring connection specification Note

S	Single wiring
D	Double wiring

(Note: Except non-plug-in type)

❸Piping direction

T	Front surface piping
U	Top surface piping

❹Piping size

1	Rc1/8
2	Rc1/4
3	Rc3/8

❺Environmental protection Note

Blank	Standard
-P	IP65 or equivalent

(Note: Non-plug-in type is compatible with IP65 or equivalent as standard)

Additional Parts Order Codes for PB Series

Replacement of pilot valve

Pilot valves are available as replacements. The valves for 14 (SA) and 12 (SB) are distinguished from the LED color. The 14 (SA) LED is red, and the 12 (SB) LED is green. Select the required type (a gasket and 2 mounting screws are supplied).

PB	**-D4**	14 (SA) pilot valve, DC24V
	-A1	14 (SA) pilot valve, AC100V
	-A2	14 (SA) pilot valve, AC200V
	-D4B	12 (SB) pilot valve, DC24V
	-A1B	12 (SB) pilot valve, AC100V
	-A2B	12 (SB) pilot valve, AC200V

Port isolator

Only 1 port isolator can be used on the same manifold.

PB -SP Port isolator for P port

Plate

PB -P Plate
〈with 1 gasket〉

Block-off plate (single unit)

PB-BP ❶

❶Environmental protection Note

Blank	Standard
-P	IP65 or equivalent

(Note: Non-plug-in type is compatible with IP65 or equivalent as standard)

PB Series Additional Parts Order Codes

Safe block (single part)

Can be mounted on the same valve station.

PB-H ❶ ❷
(with 2 mounting screws) Note

❶Piping direction
- **T** Front surface piping
- **U** Top surface piping

❷Valve specification
- **2** 2-position
- **3** 3-position

(Notes: 1. Mounting screw length will vary according to the specification.
2. Piping block is not included.)

Individual air supply and exhaust spacer (single part)

Cannot function as an individual air supply and exhaust spacer alone. It functions only when used in combination with the special dedicated valve (**PB24□Z**). Since the spacer requires additional 1 station from the existing units, pay attention to the maximum number of units allowed on the manifold.

PB-Z ❶ ❷ ❸

❶Piping direction
- **T** Front surface piping
- **U** Top surface piping

❷Piping size
- **1** Rc1/8
- **2** Rc1/4
- **3** Rc3/8

❸Environmental protection Note
- **Blank** Standard
- **-P** IP65 or equivalent

(Note: Available only for the terminal block box and serial transmission type. The non-plug-in type is compatible with IP65 or equivalent as standard.)

End block set

PB ❶ ❷

❶Specification

- **-EN** End block for non-plug-in type (one set of left and right)

- **-EK** End block for cable specification (one set of left and right)

- **-ETL** End block for left-side mounting of D-sub connector, terminal block box and serial transmission (one set of left and right)

- **-ETR** End block for right-side mounting of D-sub connector, terminal block box and serial transmission (one set of left and right)

❷Environmental protection Note
- **Blank** Standard
- **-P** IP65 or equivalent

(Note: Available only for the terminal block box and serial transmission type. The non-plug-in type is compatible with IP65 or equivalent as standard.)

Piping block (single part)

PB
- **-B1** Piping block Rc1/8
- **-B2** Piping block Rc1/4
- **-B3** Piping block Rc3/8
  (with 1 gasket)

Dustproof conduit cap (IP67)

PB
- **-FS1** Dustproof conduit cap (G1/2) for serial transmission block
  Applicable cable outer diameter
  ϕ8.5 [0.335in.]~ϕ12.5 [0.492in.]

- **-FT2** Dustproof conduit cap (G3/4) for terminal block
  Applicable cable outer diameter
  ϕ16.5 [0.650in.]~ϕ18.5 [0.728in.]

Wiring block (single part)

PB ❶ ❷ ❸

❶Specification
- **-TL** For left-side mounting of terminal block box
- **-TR** For right-side mounting of terminal block box

- **-DL** For left-side mounting of D-sub connector
- **-DR** For right-side mounting of D-sub connector

❷Total number of coils used (enter only for D-sub connector)
- **-01**
- ⋮
- **-20**

❸Environmental protection Note
- **Blank** Standard
- **-P** IP65 or equivalent (Note: Available in -TL and -TR only)

Cable assembly

For details, see p.697.

PB
- **-K1L** Cable assembly length for D-sub Cable 1500mm [59in.]
- **-K3L** Cable assembly length for D-sub Cable 3000mm [118in.]
- **-K5L** Cable assembly length for D-sub Cable 5000mm [197in.]

Wiring base assembly

Use this when adding plug-in type or serial transmission type valves. Includes a plug-in base and relating lead wires and cables.

PB-V ❶ ❷ ❸

❶Wiring specification
- **T1** For adding to 8 units or less of terminal block box or serial transmission type
- **T2** For adding to 9 units or more of terminal block box or serial transmission type
- **D1** For adding to 8 units or less of D-sub connector specification
- **D2** For adding to 9 units or more of D-sub connector specification
- **K1** For adding cable specification (700mm [27.6in.])
- **K2** For adding cable specification (1500mm [59in.])
- **K3** For adding cable specification (3000mm [118in.])

❷Wiring connection specification
- **Blank** Single wiring
- **D** Double wiring

❸Environmental protection Note
- **Blank** Standard
- **-P** IP65 or equivalent (Note: Available in -T1 and -T2 only)

Serial transmission block (single part)

YS4 ❶ ❷ ❸

❶Transmission block specifications
- **01** For UNI-WIRE System (16 outputs)
- **02** For UNI-WIRE System (8 outputs)
- **11** For Mitsubishi Electric MELSECNET/MINI-S3
- **21** For OMRON SYSBUS Wire System
- **31** For OMRON B7A Link Terminal (Standard)
- **32** For OMRON B7A Link Terminal (High speed)
- **41** For KOYO ELECTRONICS INDUSTRIES SA Bus (16 outputs)
- **42** For KOYO ELECTRONICS INDUSTRIES SA Bus (8 outputs)
- **51** For SUNX S-LINK (16 outputs)
- **52** For SUNX S-LINK (8 outputs)
- **61** For Mitsubishi Electric MELSEC I/O LINK
- **71** For Fuji Electric FA Components & Systems T Link Mini
- **81** For KEYENCE KZ-R
- **A1** For OMRON CompoBus/S (16 outputs)
- **A2** For OMRON CompoBus/S (8 outputs)
- **B1** For Mitsubishi Electric CC-Link
- **C1** For OPCN-1 (former JPCN-1)
- **D1** For DeviceNet (CompoBus/D)

❷Mounting position
- **L** Left-side mounting
- **R** Right-side mounting

❸Environmental protection
- **Blank** Standard
- **-P** IP65 or equivalent

Connection rod

Use when adding or subtracting valve units.
Example: To add 2 valve units, enter **PB-RZ-02**. To subtract 2 units from the 6-unit manifold, enter **PB-RS-04**, and replace the connection rods for 6 units with the one for 4 units.

PB ❶ ❷

❶Parts content
- **-RZ** Connection rod for expansion
- **-RS** Connection rod

❷Number of unit
- **-01**
- ⋮
- **-16**

Valve-side nameplate

A plastic sheet used for sticking seals to, or placing paper on, and showing the name of the valve function. For mounting, insert it so that it fits into the upper and lower grooves.

PB-M ❶ Nameplate (valve side)
40 [1.57]×(Pitch 24 [0.94]×No. of units) mm [in.]
Transparent

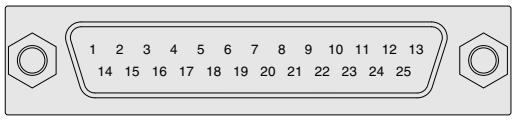
❶Number of units
- **-01**
- ⋮
- **-16**

Nameplate for terminal block box

PB-MT Nameplate (for terminal block box) 71×83mm [2.80×3.27in.]
Transparent

PB Series Plug-In Type Pin (Terminal) Locations by Wiring Specification (Top View)

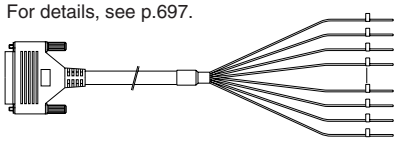
●D-sub connector JIS-specified pin locations (maximum number of control pins: 20)



1～10, 14～23: Control pins
24, 25: COM pins (shorted within the wiring block)

Cautions: 1. Since the DC24V specification has no polarity, it can be used for either positive common or negative common.
2. For the mounting screw, use M2.6.

●A dedicated cable assembly is available.
For details, see p.697.

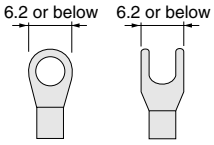


●Terminal block box (21 terminals, M3 screw) (maximum number of control pins: 20)

1	3	5	7	9	11	13	15	17	19	COM
2	4	6	8	10	12	14	16	18	20	

1～20 : Control terminals
COM : Common terminal

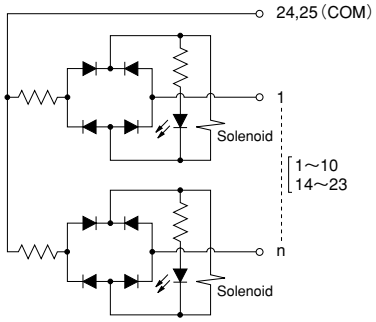
Cautions: 1. Set the tightening torque for the terminal screw (M3) at 49.0N·cm {5.0kgf·cm} [4.3in·lbf] or less.
2. Use crimping terminals of 6.2mm [0.244in.] or less for both the round terminal and the Y-shaped terminal.



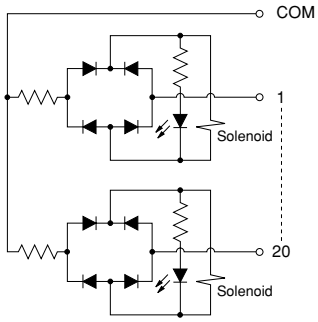
※ For the relationship between the pin No. (terminal No.) and the corresponding solenoids, see p.694.

Detailed Diagrams for Wiring Systems

●D-sub connector



●Terminal block box



At-a-glance Guide for Maximum Number of Control Solenoids in Plug-in Type & Serial Transmission Type Manifolds

This is an at-a-glance guide for the maximum number of control solenoids by wiring specifications for the plug-in and serial transmission types.
When ordering a manifold, ensure that the number of solenoid valves does not exceed the maximum number of control solenoids in the table below.

Cautions: 1. For the cable outlet on top surface types, the maximum number of the units for the valve and block-off plate is 12 units, due to the cable bending space.
2. The individual air supply and exhaust spacer occupies 1 unit space. Ensure that the total number of units does not exceed 16 units.

Wiring specification & transmission block specification	Maximum number of control solenoids
-U□ : Cable top surface outlet type	24
-E□ : Cable side surface outlet type	32
-D□□ : D-sub connector (25P)	20
-T□ : Terminal block box (21 terminals)	20
-01 : For UNI-WIRE System (16 outputs)	16
-02 : For UNI-WIRE System (8 outputs)	8
-11 : For Mitsubishi Electric MELSECNET/MINI-S3	16
-21 : For OMRON SYSBUS Wire System	16
-31 : For OMRON B7A Link Terminal (Standard)	16
-32 : For OMRON B7A Link Terminal (High speed)	16
-41 : For KOYO ELECTRONICS INDUSTRIES SA Bus (16 outputs)	16
-42 : For KOYO ELECTRONICS INDUSTRIES SA Bus (8 outputs)	8
-51 : For SUNX S-LINK (16 outputs)	16
-52 : For SUNX S-LINK (8 outputs)	8
-61 : For Mitsubishi Electric MELSEC I/O LINK	16
-71 : For Fuji Electric FA Components & Systems T Link Mini	16
-81 : For KEYENCE KZ-R	16
-A1 : For OMRON CompoBus/S (16 outputs)	16
-A2 : For OMRON CompoBus/S (8 outputs)	8
-B1 : For Mitsubishi Electric CC-Link	16
-C1 : For OPCN-1 (former JPCN-1)	16
-D1 : For DeviceNet (CompoBus/D)	16

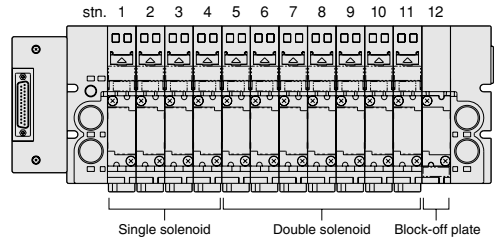
Pin No. (Terminal No.) and Corresponding Solenoids (for plug-in type)

The examples below are for reference in showing the relationships between the pin No. (terminal No.) and the corresponding solenoids for the plug-in type manifold. All the examples of show cases in which maximum controlled solenoids are used.

●D-sub connector (25 pins)

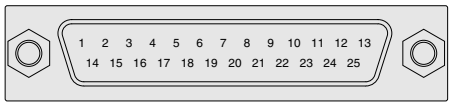
［Wiring specification D-sub connector (maximum number of control pins: 20)］

Example 1 **PBM12P-DUL** **stn.1～4 PB24C5-T2-B-D4**
stn.5～11 PB24C6-T2-B-D4
stn.12 PB-BPMD



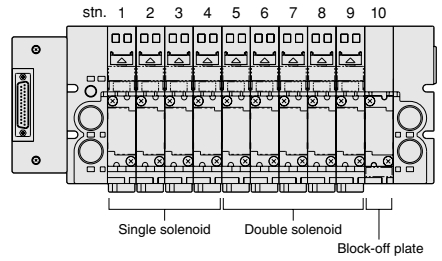
Number of unit: 12
Wiring specification: **-DUL**
Wiring connection specification:
Blank (packed wiring)

(Top View)



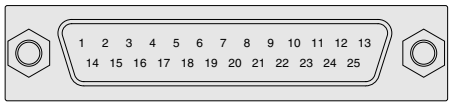
Pin no.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve no.	1A	2A	3A	4A	5A	5B	6A	6B	7A	7B			
Pin no.	14	15	16	17	18	19	20	21	22	23	24	25	
Valve no.	8A	8B	9A	9B	10A	10B	11A	11B	12A	12B	COM	COM	

Example 2 **PBM10P-DUL** **stn.1～4 PB24C5-T2-B-D-D4**
stn.5～9 PB24C6-T2-B-D4
stn.10 PB-BPMD



Number of unit: 10
Wiring specification: **-DUL**
Wiring connection specification:
When all single solenoids are specified as **-D (**double wiring)

(Top View)

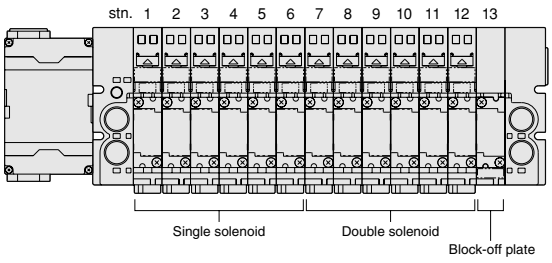


Pin no.	1	2	3	4	5	6	7	8	9	10	11	12	13
Valve no.	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			
Pin no.	14	15	16	17	18	19	20	21	22	23	24	25	
Valve no.	6A	6B	7A	7B	8A	8B	9A	9B	10A	10B	COM	COM	

●Terminal block box (21 terminals with M3 screw)

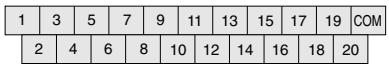
［Wiring specification terminal block box (maximum number of control pins: 20)］

Example 1 **PBM13P-TL** **stn.1～6 PB24C5-T2-B-D4**
stn.7～12 PB24C6-T2-B-D4
stn.13 PB-BPMD



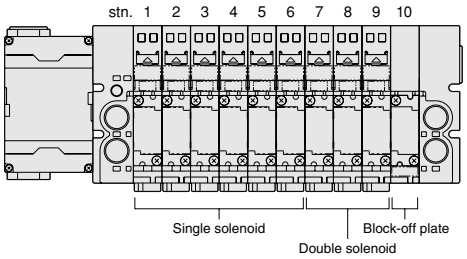
Number of unit: 13
Wiring specification: **-TL**
Wiring connection specification:
Blank (packed wiring)

(Top View)



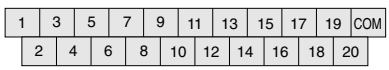
Pin no.	1	3	5	7	9	11	13	15	17	19	COM
Valve no.	1A	3A	5A	7A	8A	9A	10A	11A	12A	13A	COM
Pin no.	2	4	6	8	10	12	14	16	18	20	
Valve no.	2A	4A	6A	7B	8B	9B	10B	11B	12B	13B	

Example 2 **PBM10P-TL** **stn.1～6 PB24C5-T2-B-D-D4**
stn.7～9 PB24C6-T2-B-D4
stn.10 PB-BPMD



Number of unit: 10
Wiring specification: **-TL**
Wiring connection specification:
When all single solenoids are specified as **-D (**double wiring)

(Top View)



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

Notes: 1. The valve No.1A, 1B, 2A, 2B··· numerals show the stn. numbers in order, while the letters A and B show the A and B sides of the solenoid.
2. The stn. numbers are counted from the left, 1, 2···, with the solenoid on top and the valve in front.
3. When selecting the wiring connection specification **-D** for the single solenoid, the wiring base side of the specified station becomes a double solenoid wiring connection.

Serial Transmission Manifold, Specifications

General Specifications

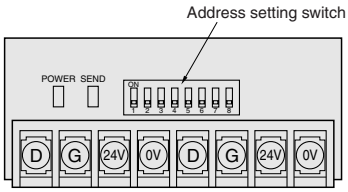
Voltage	DC24V ±10%
Operating temperature range	5～50°C [41～122°F]
Vibration resistance	49.0m/s² {5.0G} (Conforms to JIS C 0911)
Shock resistance	98.1m/s² {10.0G} (Conforms to JIS C0912)

●For details of specifications, see the user's manuals (see below).

Serial Transmission Block, Terminal Block (LED) Names

●For UNI-WIRE® System

Transmission block specification: **-01** (16 outputs), **-02** (8 outputs)



LED indicator

Indicator	Description
POWER	•Lights up when power is turned on •Flashes during voltage drops or when over current (a short circuit)
SEND	•Flashes during normal transmission •Lights up or shuts off during faulty transmission

Remarks

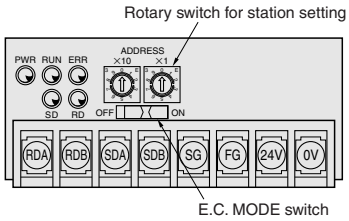
※The UNI-WIRE® System is a serial parallel transmission system developed jointly by NKE and KURODA PRECISION INDUSTRIES. For details of the UNI-WIRE System, see the NKE or KURODA PRECISION INDUSTRIES catalog, user's manual, etc.

●Number of outputs per block
16 solenoids (transmission block specification: **-01**)
8 solenoids (transmission block specification: **-02**)

●Related materials: User's manual, document No.
HV017

●For Mitsubishi Electric MELSECNET/MINI-S3

Transmission block specification: **-11**



LED indicator

Indicator	Description
PWR	•Lights up when power is turned on
RUN	•Lights up for normal data communication with master station
SD	•Flashes during sending data
RD	•Flashes during receiving data
ERR	•Lights up when data receiving error occurs, shuts off for normal communication

Remarks

●Master station: MELSEC-A series
AJ71PT32-S3, AJ71T32-S3, A2CCPU/A2CJCPU, A1SJ71PT32-S3, link sub-stations up to a maximum of 64 stations, and link I/O numbers up to a maximum of 512.

※For details, see the Mitsubishi Electric's sequencer MELSEC-A series catalog, user's manual, etc.

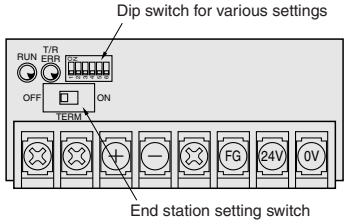
●Number of outputs per block
Maximum of 16 solenoids

※Since the block is equivalent to 2 stations, if sub-stations are entirely composed of the blocks, the maximum becomes 32 units.

●Related materials: User's manual, document No.
HV018

●For OMRON SYSBUS Wire System

Transmission block specification: **-21**



LED indicator

Indicator	Description
RUN	•Lights up when transmission is normal, and the PC is in operations mode or monitor mode
T/R ERR	•Flashes during normal transmission •Lights up during standby or faulty transmission •Shuts off during faults (during watchdog timer fault)

Remarks

●Master station unit: SYSMAC-C (CV) series
C200H-RM201, C500-RM201

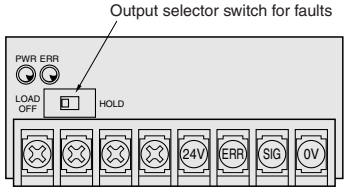
※For details, see the OMRON's programmable controller SYSMAC C(CV) series catalog, user's manual, etc.

●Number of outputs per block
Maximum of 16 solenoids

●Related materials: User's manual, document No.
HV019

●For OMRON B7A Link Terminal

Transmission block specification: **-31** (standard type), **-32** (high speed type)



LED indicator

Indicator	Description
PWR	•Lights up when power is turned on
ERR	•Lights up during faulty transmission

Remarks

●Connection method: 1 to 1

(Transmission block spec.)	Standard type (**-31**)	High speed type (**-32**)
Transmission delay time	Max.31ms	Max.5ms
Transmission distance	Max.500m	Max.100m

※For details of the B7A Link Terminal, see the OMRON catalog, user's manual, etc.

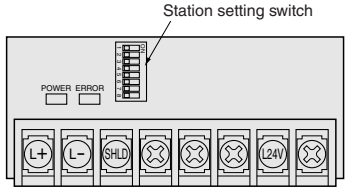
●Number of outputs per block
Maximum of 16 solenoids

●Error output specifications
Output mode: NPN open collector
Rated load voltage: DC24V
Output current: Sink current MAX. 40mA

●Related materials: User's manual, document No.
HV020

●For KOYO ELECTRONICS INDUSTRIES SA Bus

Transmission block specification: **-41** (16 outputs), **-42** (8 outputs)



LED indicator

Indicator	Description
POWER	•Lights up when power is turned on
ERROR	•Lights up during faulty transmission or other faults

Remarks

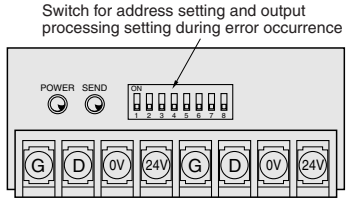
※For details of the SA Bus system, see the KOYO ELECTRONICS INDUSTRIES catalog, user's manual, etc.

●Number of outputs per block
16 solenoids (transmission block specification: **-41**)
8 solenoids (transmission block specification: **-42**)

●Related materials: User's manual, document No.
HV021

●For SUNX S-LINK

Transmission block specification: **-51** (16 outputs), **-52** (8 outputs)



LED indicator

Indicator	Description
POWER	•Lights up when power is turned on
SEND	•Flashes during normal transmission •Lights up or shuts off during faulty transmission

Remarks

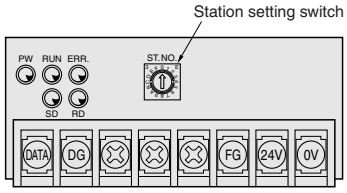
※For details of the S-LINK System, see the SUNX catalog, user's manual, etc.

●Number of outputs per block
16 solenoids (transmission block specification: **-51**)
8 solenoids (transmission block specification: **-52**)

●Related materials: User's manual, document No.
HV022

●For Mitsubishi Electric MELSEC I/O LINK

Transmission block specification: **-61**



LED indicator

Indicator	Description
PW	•Lights up when power is turned on
RUN	•Lights up when receiving data transmitted from master unit is normal
SD	•Lights up during sending data to master unit
RD	•Lights up during receiving data from master unit
ERR.	•Lights up when faulty data transmitted from master unit

Remarks

●16 remote I/O unit connection stations, for a maximum of 128 inputs/outputs

※For details, see Mitsubishi Electric's sequencer catalog, user's manual, etc.

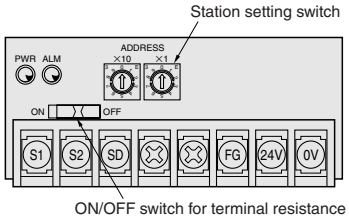
●Number of outputs per block
Maximum of 16 solenoids

※Since the block is equivalent to 4 stations, if sub-stations are entirely composed of the blocks, a maximum of 4 units can be connected to 1 master unit.

●Related materials: User's manual, document No. **HV023**

●For Fuji Electric FA Components & Systems T Link Mini

Transmission block specification: **-71**



LED indicator

Indicator	Description
PWR	•Lights up when power is turned on
ALM	•Lights up during faulty transmission

Remarks

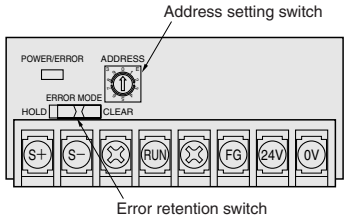
※For details of the T Link Mini, see the Fuji Electric FA Components & Systems catalog, user's manual, etc.

●Number of outputs per block
Maximum of 16 solenoids

●Related materials: User's manual, document No. **HV024**

●For KEYENCE KZ-R

Transmission block specification: **-81**



LED indicator

Indicator	Description
POWER/ ERROR	•Green: Lights up for normal communications state •Orange: Lights up when communications state is poor (can also light up when address settings are incorrect) •Red: Lights up during faulty operation, or when transmission is cut off

Remarks

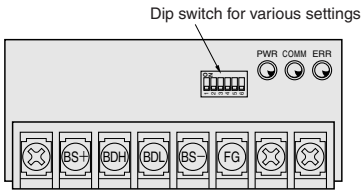
※For details of the KZ-R, see the KEYENCE catalog, user's manual, etc.

●Number of outputs per block
Maximum of 16 solenoids

●Related materials: User's manual, document No. **HV025**

●For OMRON CompoBus/S

Transmission block specification: **-A1** (16 outputs), **-A2** (8 outputs)



LED indicator

Indicator	State	Color	Description
PWR	Lights up	Green	•During power supply
	Shuts off		•Power not supplied
COMM	Lights up	Yellow	•During normal communication
	Shuts off		•Communication fault, or standby
ERR	Lights up	Red	•Communication fault occurred
	Shuts off		•During normal communication, or standby

Remarks

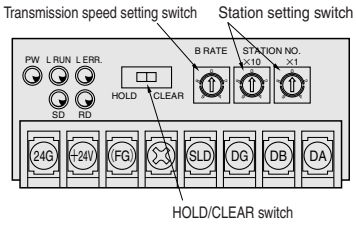
※For details about CompoBus/S, see the Omron catalog, user's manual, etc.

● Number of outputs per block
16 solenoids (transmission block specification: **-A1**)
8 solenoids (transmission block specification: **-A2**)

● Related materials: User's manual, document No. **HV026**

●For Mitsubishi Electric CC-Link

Transmission block specification: **-B1**



LED indicator

Indicator	Description
PW	•Lights up when power is turned on
L RUN	•Lights up when normal data is received from master station
SD	•Lights up during sending data
RD	•Lights up during receiving data
L ERR.	•Lights up during transmission errors, and shuts off when time is over Lights up during station number setting error or transmission speed setting error

Remarks

※For details of the CC-Link, see the Mitsubishi Electric catalog, user's manual, etc.

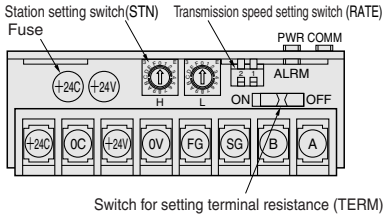
● Number of outputs per block
16 solenoids (transmission block specification: **-B1**)

※Since the block occupies 1 station, if the block is entirely composed of remote I/O stations, a maximum of 64 units can connect to 1 master station.

● Related materials: User's manual, document No. **HV027**

●For OPCN-1 (former JPCN-1)

Transmission block specification: **-C1**



LED indicator

Indicator	State	Color	Description
PWR	Lights up	Green	•Normal power
	Shuts off		•Abnormal power
COMM	Lights up	Green	•Normal communications
	Shuts off		•Communication fault
ALRM	Lights up	Red	•Communication fault or setting fault
	Shuts off		•Normal

Remarks

※For details of the OPCN-1, see JIS3511: 1999 (JEM-F3008: 1999) Programmable Controller Field Network Standard (level 1).

● Specifications
Compatibility class: TYPE-S52U
Communication function: Initial setting service, input/output service, reset service
Transmission speed (transmission distance is a reference value): 125kbps (1km), 250kbps (800m), 500kbps (480m), 1Mbps (240m)
Number of outputs: 16 points/1 unit
Station setting: 01H～7FH (Number of connecting stations can reach to a maximum of 31 slave units for 1 master station)

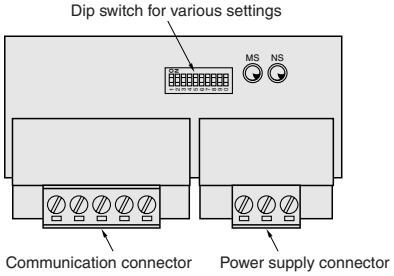
● Related materials: User's manual, document **No. HV028**

■ For specifications and handling details, see the above-listed user's manuals (document Nos. **HV017**～**HV029**).

Serial Transmission Block, Terminal Block (LED) Names

●For DeviceNet (OMRON CompoBus/D)

Transmission block specification: **-D1**



LED indicator

Indicator	State	Color	Description
MS	Lights up	Green	•Normal state
	Flashing		•No setting state
	Lights up	Red	•Serious breakdown
	Flashing		•Minor breakdown
	Shuts off	—	•No power supply
NS	Lights up	Green	•Communication connection completed
	Flashing		•No communication connection
	Lights up	Red	•Serious communication fault
	Flashing		•Minor communication fault
	Shuts off	—	•No power supply

Remarks

※Conforms to DeviceNet (CompoBus/D)

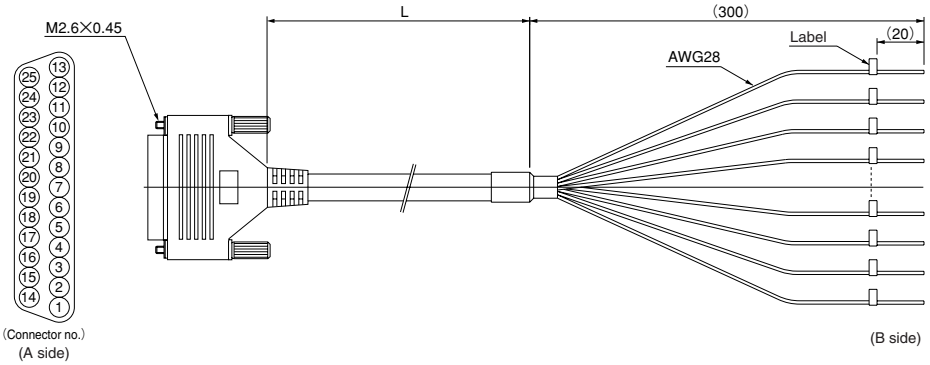
●Number of outputs per block
Maximum of 16 solenoids

●Related materials: User's Manual, Document **No.HV029**

Cable Assembly

●Cable assembly for D-sub

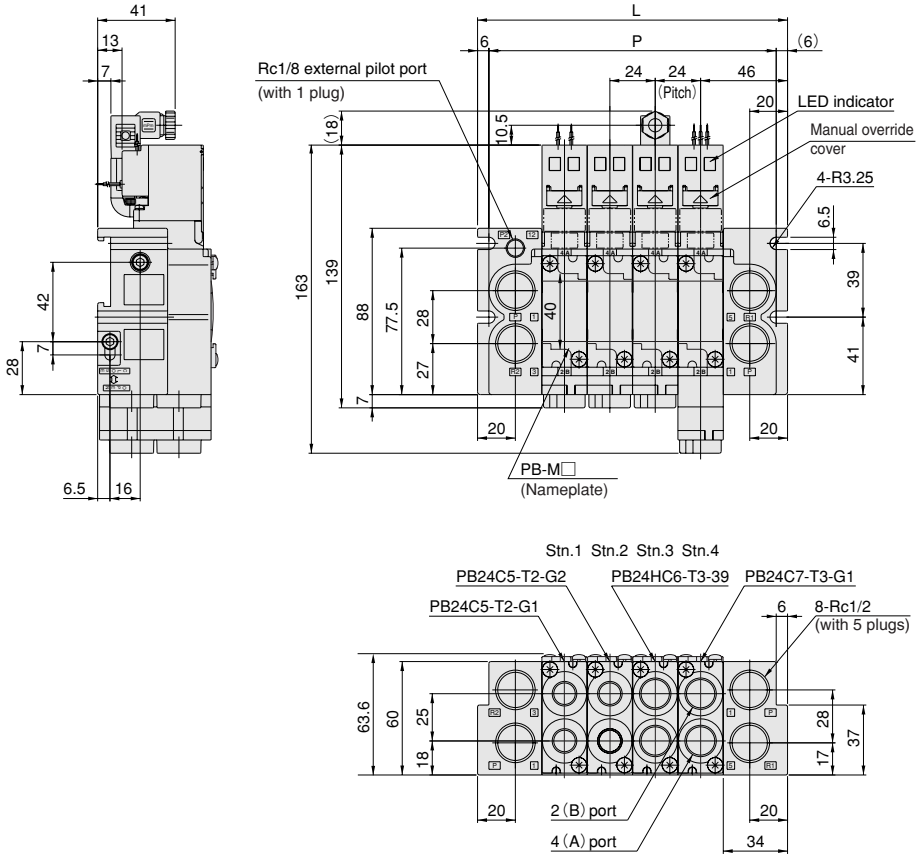
PB-K1L (Cable length L: 1500mm [59in.])
PB-K3L (Cable length L: 3000mm [118in.])
PB-K5L (Cable length L: 5000mm [197in.])



A side	Connector No.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕
B side	Label No.	1	2	3	4	5	6	7	8	9	10				11	12	13	14	15	16	17	18	19	20	COM	COM

PBM□N

Front surface piping

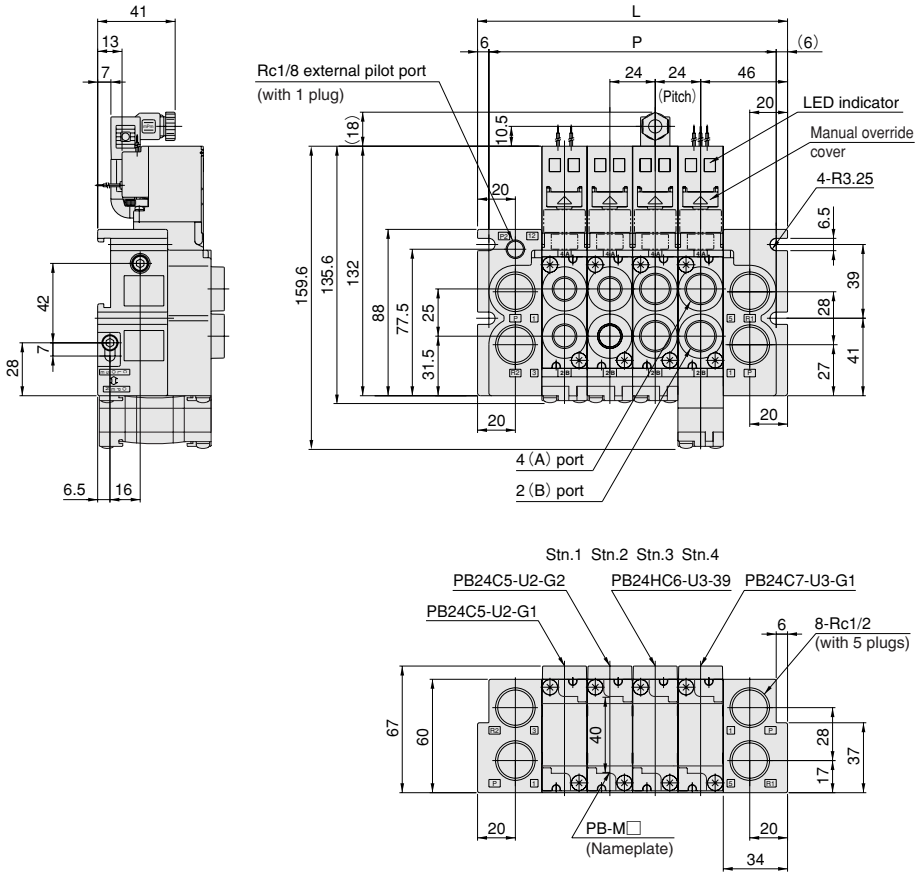


Unit Dimensions

Number of units	L	P
1	92	80
2	116	104
3	140	128
4	164	152
5	188	176
6	212	200
7	236	224
8	260	248
9	284	272
10	308	296
11	332	320
12	356	344
13	380	368
14	404	392
15	428	416
16	452	440

PBM□N

Top surface piping

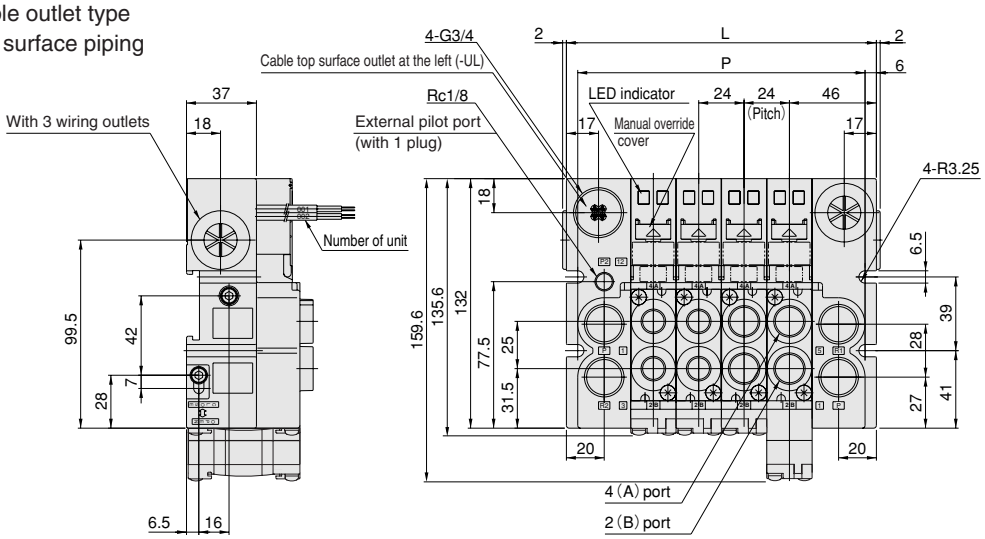


Unit Dimensions

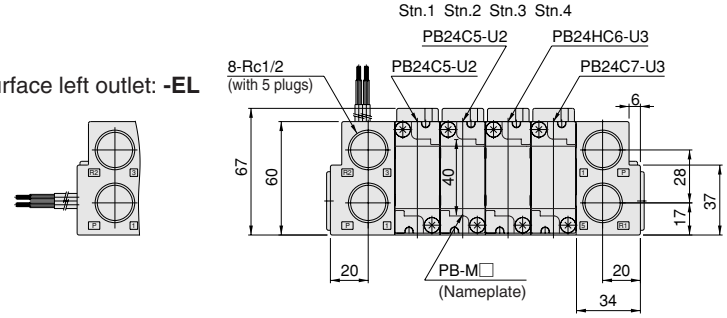
Number of units	L	P
1	92	80
2	116	104
3	140	128
4	164	152
5	188	176
6	212	200
7	236	224
8	260	248
9	284	272
10	308	296
11	332	320
12	356	344
13	380	368
14	404	392
15	428	416
16	452	440

PBM□P-UL

Cable outlet type
Top surface piping



●Side surface left outlet: **-EL**



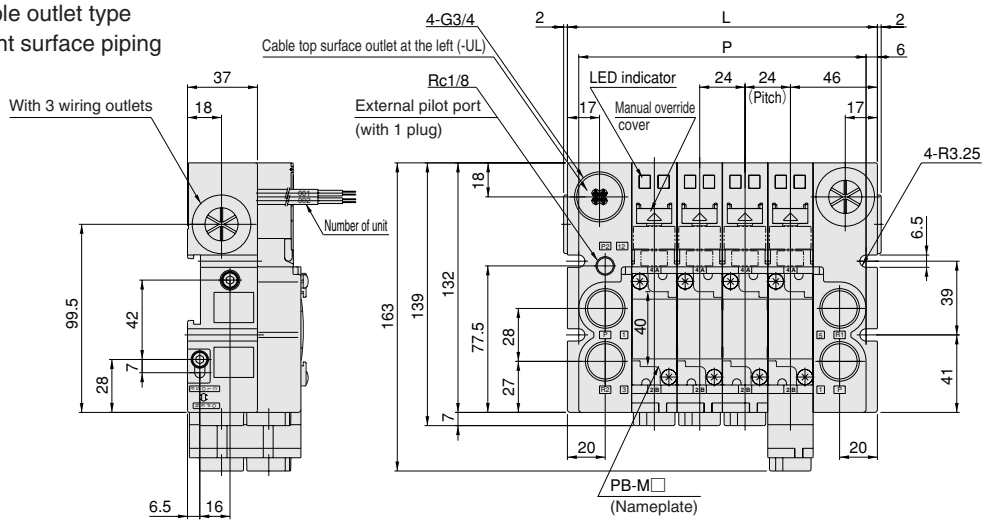
Unit Dimensions

Number of units	L	P
1	92	80
2	116	104
3	140	128
4	164	152
5	188	176
6	212	200
7	236	224
8	260	248
9	284	272
10	308	296
11	332	320
12	356	344
13	380	368
14	404	392
15	428	416
16	452	440

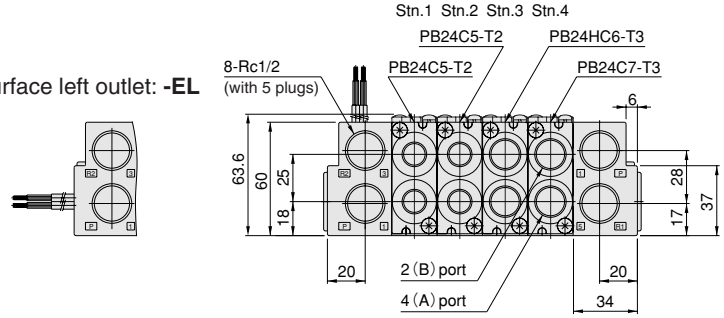
Note: Cable top surface outlets accommodates maximum of 12 units.

PBM□P-UL

Cable outlet type
Front surface piping



●Side surface left outlet: **-EL**



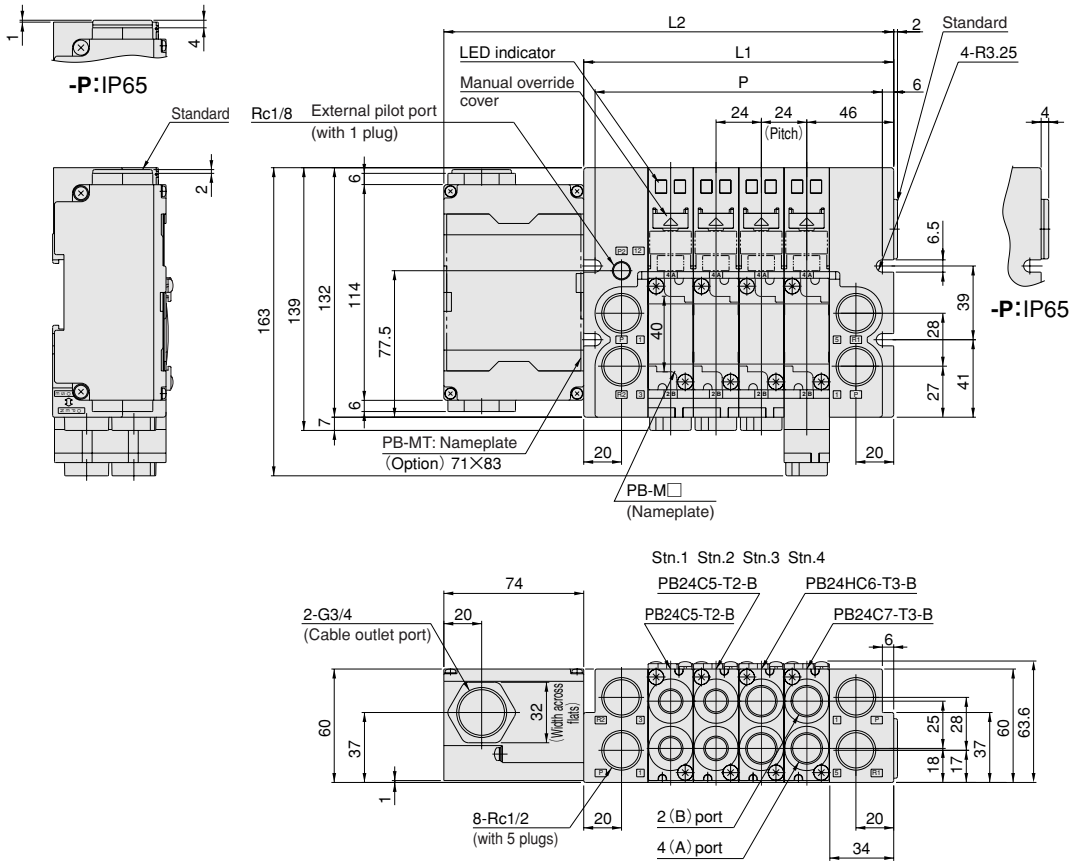
Unit Dimensions

Number of units	L	P
1	92	80
2	116	104
3	140	128
4	164	152
5	188	176
6	212	200
7	236	224
8	260	248
9	284	272
10	308	296
11	332	320
12	356	344
13	380	368
14	404	392
15	428	416
16	452	440

Note: Cable top surface outlets accommodates maximum of 12 units.

PBM□P-TL

Terminal block box
Front surface piping

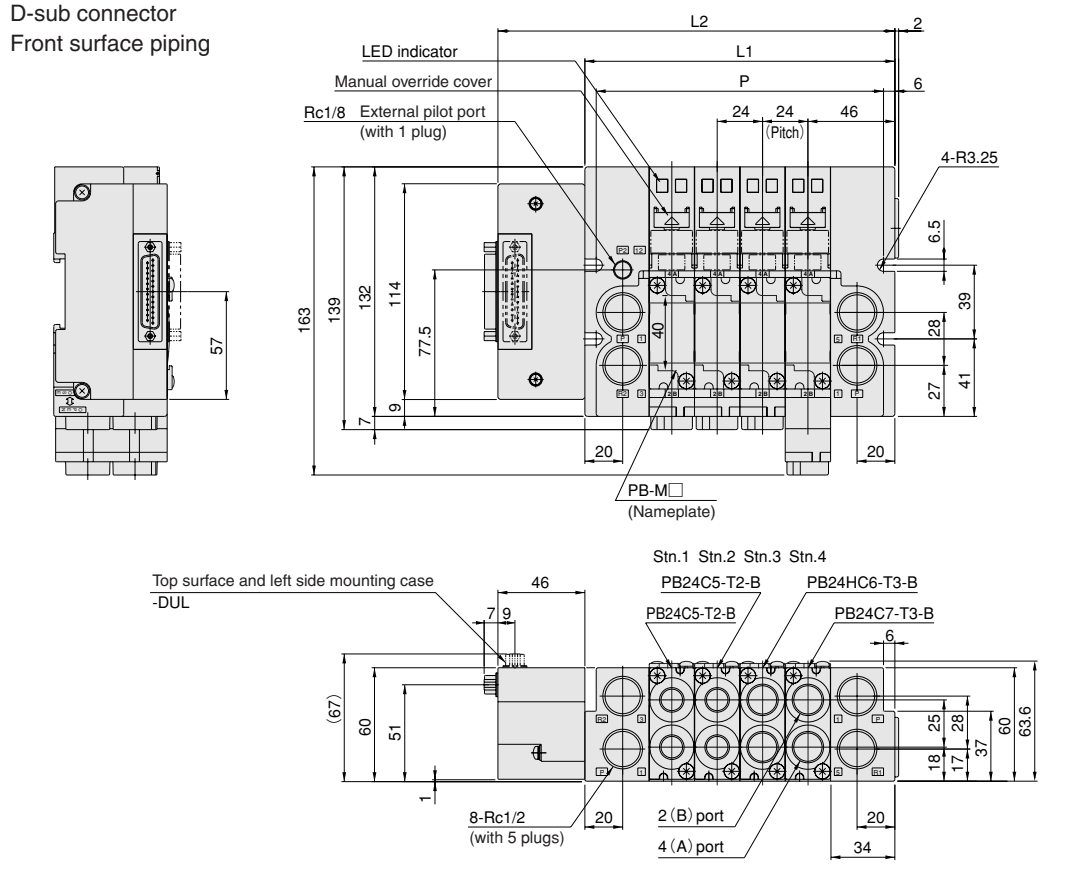


Unit Dimensions

Number of units	L1	L2	P
1	92	166	80
2	116	190	104
3	140	214	128
4	164	238	152
5	188	262	176
6	212	286	200
7	236	310	224
8	260	334	248
9	284	358	272
10	308	382	296
11	332	406	320
12	356	430	344
13	380	454	368
14	404	478	392
15	428	502	416
16	452	526	440

PBM□P-DEL

D-sub connector
Front surface piping

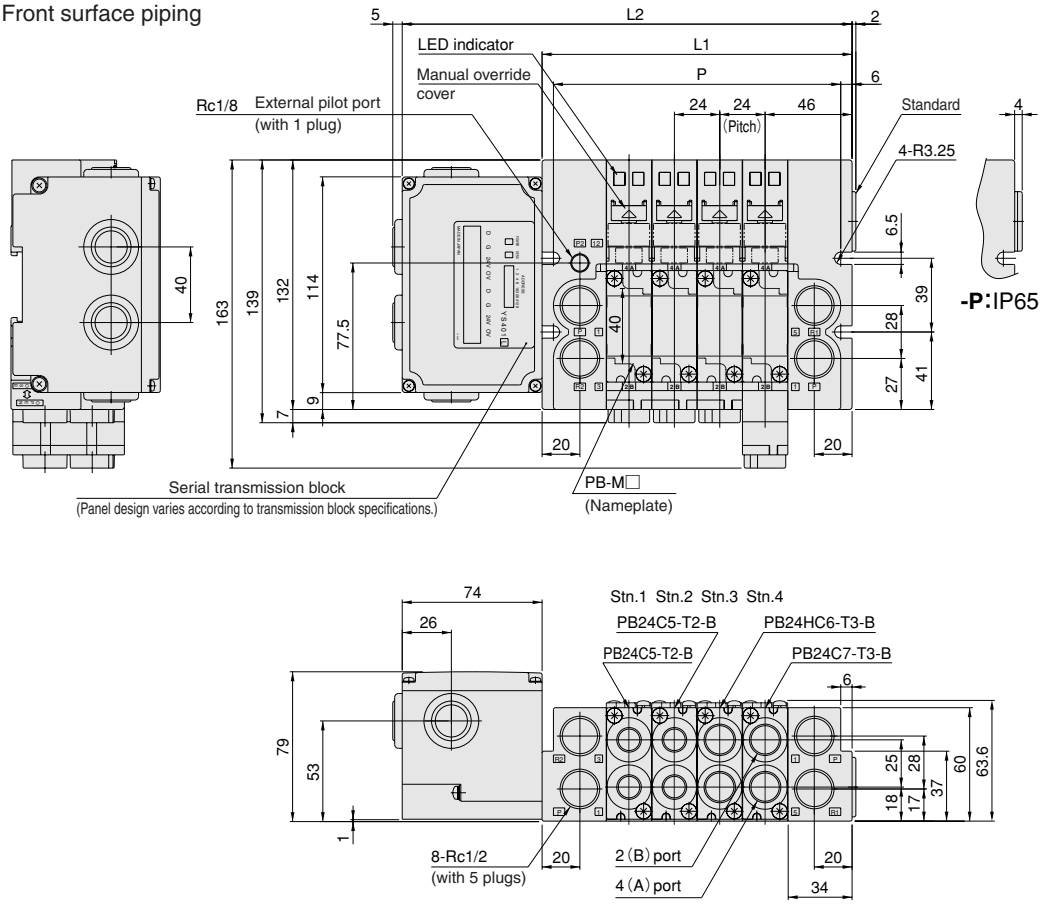


Unit Dimensions

Number of units	L1	L2	P
1	92	138	80
2	116	162	104
3	140	186	128
4	164	210	152
5	188	234	176
6	212	258	200
7	236	282	224
8	260	306	248
9	284	330	272
10	308	354	296
11	332	378	320
12	356	402	344
13	380	426	368
14	404	450	392
15	428	474	416
16	452	498	440

PBM□S

Front surface piping



Unit Dimensions

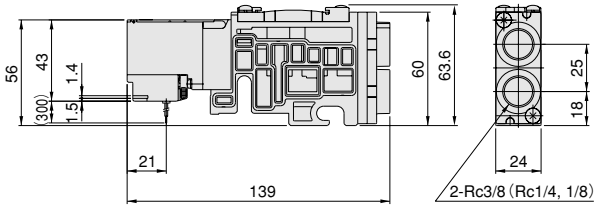
Number of units	L1	L2	P
1	92	166	80
2	116	190	104
3	140	214	128
4	164	238	152
5	188	262	176
6	212	286	200
7	236	310	224
8	260	334	248
9	284	358	272
10	308	382	296
11	332	406	320
12	356	430	344
13	380	454	368
14	404	478	392
15	428	502	416
16	452	526	440

Remark: Diagrams show the wiring specification grommet type L connector: **-G2**.

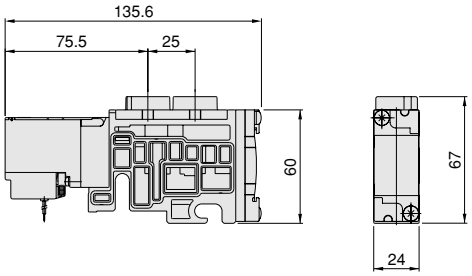
5-port, 2-position

PB24□C5
PB24□C6

●Piping specification: Front surface piping（**-T**□）



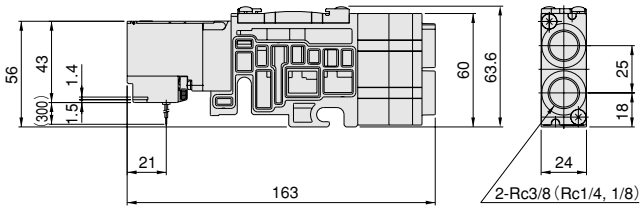
●Piping specification: Top surface piping（**-U**□）



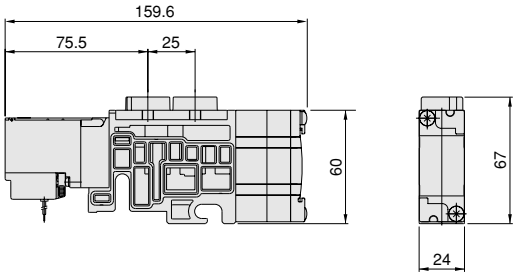
5-port, 3-position

PB24□C7
PB24□C8
PB24□C9

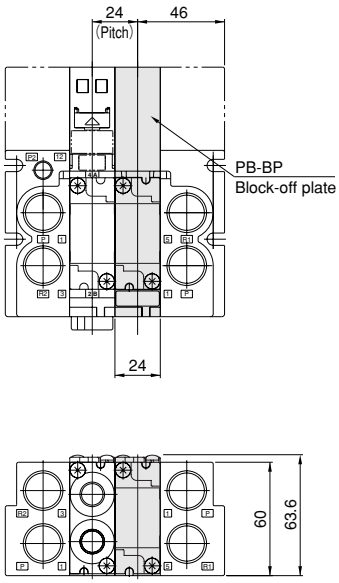
●Piping specification: Front surface piping（**-T**□）



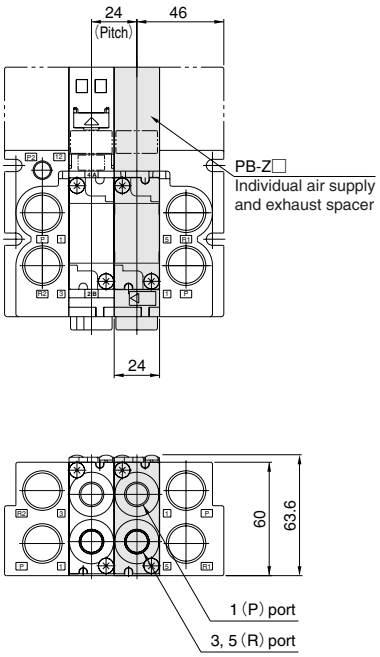
●Piping specification: Top surface piping（**-U**□）



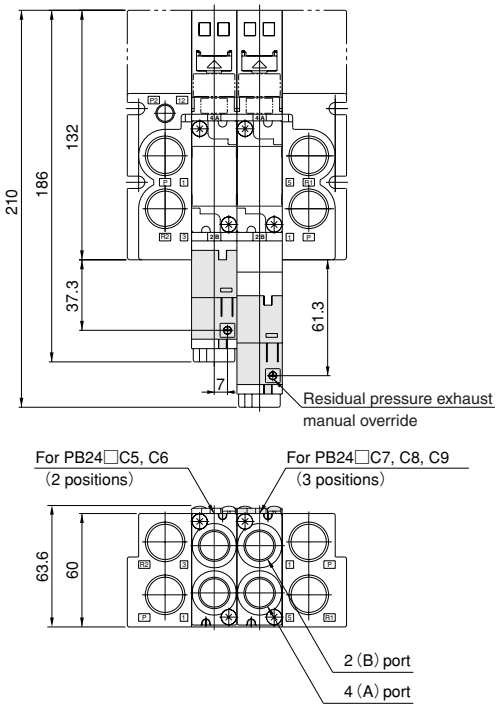
●**Block-off plate**（**PB-BP□**）



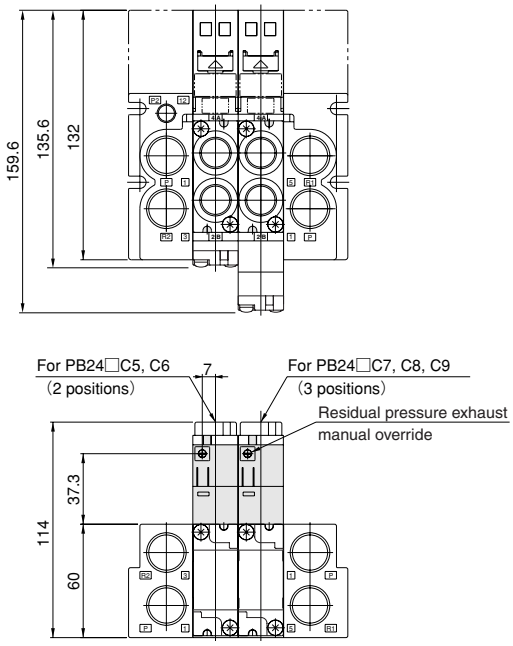
●Individual air supply and exhaust spacer（**PB-Z□**）



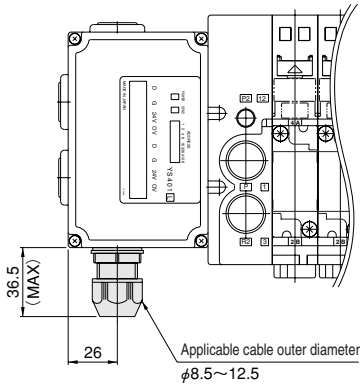
●Safe block　Piping specification: Front surface piping（**-T□**）



●Safe block　Piping specification: Top surface piping（**-U□**）



●Dustproof conduit cap: For serial transmission（**-FS1**）



●Dustproof conduit cap: For terminal block box（**-FT2**）