

KOGANEI

Air Valve

SOLENOID VALVES 010 SERIES

INSTRUCTION MANUAL Ver.1.0

Handling Instructions and Precautions

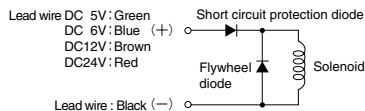


Solenoid

Internal circuit

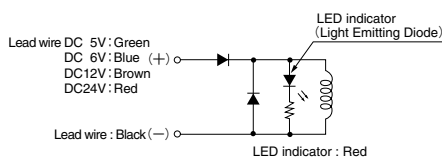
● DC5V, DC6V, DC12V, DC24V

Standard solenoid (Surge suppression)



Solenoid with LED indicator (Surge suppression)

Order code: -PSL, -PLL



- Cautions:**
1. Do not apply megger between the lead wires.
 2. The DC solenoid will not short circuit even if the wrong polarity is applied, but the valve will not operate.
 3. 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. If circuit conditions, etc. cause the leakage current to exceed the maximum allowable leakage current, consult us.

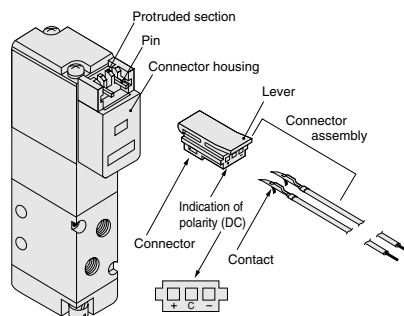


Plug connector

Attaching and removing plug connector

Use fingers to insert the connector into the pin, push it in until the lever claw latches onto the protruded section of the connector housing, and complete the connection.

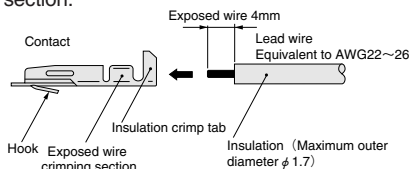
To remove the connector, squeeze the lever along with the connector, lift the lever claw up from the protruded section of the connector housing, and pull it out.



※ Illustration shows the 110 series.

Crimping of connecting lead wire and contact

To crimp lead wires into contacts, strip off 4mm [0.16in.] of the insulation from the end of the lead wire, insert it into the contact, and crimp it. Be sure to avoid catching the insulation on the exposed wire crimping section.

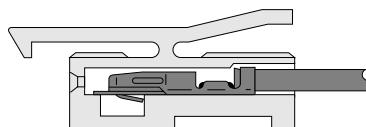


- Cautions:**
1. Do not pull hard on the lead wire.
 2. Always use a dedicated tool for crimping of connecting lead wire and contact.
Contact: Model 702062-2M
Manufactured by Sumiko Tech, Inc.
Crimping tool: Model F1-702062
Manufactured by Sumiko Tech, Inc.

Attaching and removing contact and connector

Insert the contact with lead wire into a plug connector □ hole until the contact hook latches on and is secured to the plug connector. Confirm that the lead wire cannot be easily pulled out.

To remove it, insert a tool with a fine tip (such as a small screwdriver) into the rectangular hole on the side of the plug connector to push up on the hook, and then pull out the lead wire.



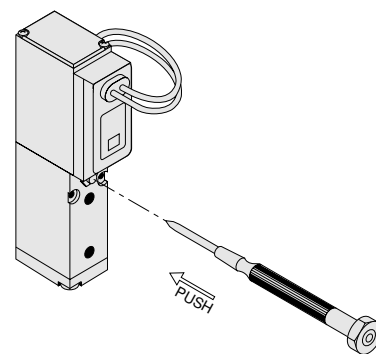
- Cautions:**
1. Do not pull hard on the lead wire. It could result in defective contacts, breaking wires, etc.
 2. If the pin is bent, use a small screwdriver, etc. to gently straighten out the pin, and then complete the connection to the plug connector.



Manual override

Non-locking type

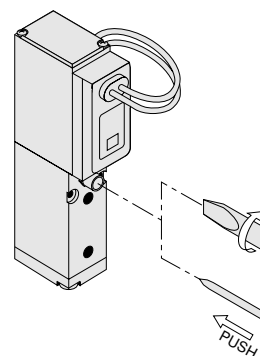
To operate the manual override, press it all the way down. The valve works the same as in an energized state as long as the manual override is pushed down, and returns to the rest position upon release.



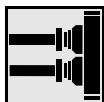
Locking protruding type

Use a small screwdriver to turn the adjusting knob several times in the clockwise direction, and lock the manual override in place. When locked, turning the adjusting knob several times in the counterclockwise direction releases a spring on the manual override, returns it to the original position, and releases the lock.

For the locking protruding type, when the adjusting knob is not turned, this type acts just like the non-locking type, the valve is energized as long as the manual override is pushed down, and it returns to the rest position upon release.



- Cautions:**
1. The 010 series valves are internal pilot type solenoid valves. As a result, the manual override cannot switch the main valve without air supplied from the 1(P) port.
 2. Always release the lock of the locking protruding type manual override 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. Do not turn the adjusting knob more than needed. It could result in defective operation.



Fittings

Recommended fittings

010-4E1

| Connection port | | 4(A), 2(B) port | 1(P) port |
|-------------------------|-------------------|--------------------------------|--------------------------------|
| Parts | | | |
| Quick fitting | | TS3-M3M TL3-M3M TLL3-M3M | TS3-M3M TL3-M3M TLL3-M3M |
| TAC fitting | For urethane tube | BF4BU-M3 BF3BU-M3 | BF4BU-M3 BF3BU-M3 |
| | For nylon tube | BF4-M3 BF3.2-M3 | BF4-M3 BF3.2-M3 |
| Muffler (for reference) | | — | — |

A010-4E1-25

| Connection port | | 4(A), 2(B) port | 1(P) port | 3, 5(R) port |
|-------------------------|--|--------------------------------|--------------------------------|--------------------------------|
| Parts | | | | |
| Quick fitting | | TS3-M3M TS4-M3M TSH4-M3M | TS3-M3M TS4-M3M TSH4-M3M | TS3-M3M TS4-M3M TSH4-M3M |
| Muffler (for reference) | | — | — | KM-03 |

SOLENOID VALVES

010 SERIES

Basic Models and Valve Functions

| Basic model | Direct piping, F type manifold | Sub-base piping, A type manifold |
|---------------------|--------------------------------|----------------------------------|
| Item | 010-4E1 | A010-4E1 ^{Note} |
| Number of positions | 2 positions | |
| Number of ports | 5 ports | |
| Valve function | Single solenoid | |

Remark: For optional specifications and order code, see p.65.

Note: **A010-4E1**, except one with a sub-base, is for A type manifolds only. It cannot be used as a single unit.

Specifications

| Basic model | Direct piping, F type manifold | Sub-base piping, A type manifold |
|--|---|-----------------------------------|
| Item | 010-4E1 | A010-4E1 |
| Media | Air | |
| Operation type | Internal pilot type | |
| Effective area [Cv] ^{Note1} mm ² | 1(P)→4(A) 0.2 [0.01] | 4(A)→5(R1), 2(B)→3(R2) 0.3 [0.02] |
| Port size ^{Note2} | M3×0.5 | |
| Lubrication | Not required | |
| Operating pressure range MPa {kgf/cm ² } [psi.] | 0.15~0.7 {1.5~7.1} [22~102] | |
| Proof pressure MPa {kgf/cm ² } [psi.] | 1.05 {10.7} [152] | |
| Response time ^{Note3} ms | DC5V, DC12V | 4/8 or below |
| ON/OFF | DC6V, DC24V | 4/8 or below |
| Maximum operating frequency Hz | 5 | |
| Minimum time to energize for self holding ms | — | |
| Operating temperature range (atmosphere and media) °C [°F] | 5~50 [41~122] | |
| Shock resistance m/s ² [G] | 1373.0 {140.0} (Axial direction 392.3 {40.0}) | |
| Mounting direction | Any | |

Notes: 1. For details, see the effective area on p.64.

2. For details, see the port size on p.64.

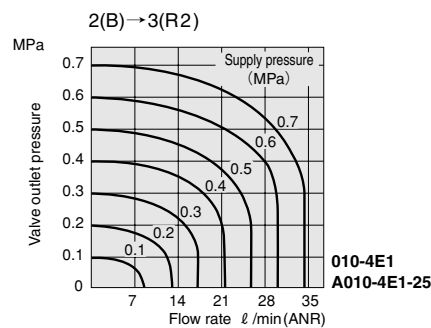
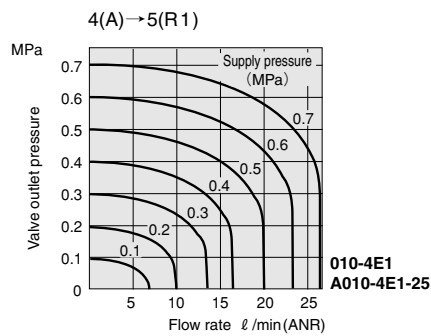
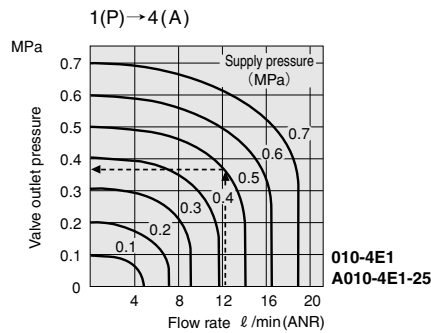
3. Values when air pressure is 0.5MPa {5.1kgf/cm²} [73psi.].

Solenoid Specifications

| Rated voltage | | DC5V | DC6V | DC12V | DC24V |
|--|----------|---|-----------------------|------------------------|----------------------|
| Item | | | | | |
| Type | | With built-in flywheel diodes for surge suppression | | | |
| Operating voltage range DC V | | 4.5~5.5 (5±10%) | 5.4~6.6 (6±10%) | 10.8~13.2 (12±10%) | 21.6~26.4 (24±10%) |
| Current (Power consumption when rated voltage is applied) mA (W) | | 246 (1.2) | 201 (1.2) | 103 (1.2) | 52 (1.2) |
| Maximum allowable leakage current mA | | 30 | 25 | 15 | 5 |
| Insulation resistance MΩ | | Over 100 | | | |
| Wiring type ^{Note} | Standard | Grommet type | | | |
| | Optional | Plug connector type | | | |
| Lead wire length ^{Note} | | 300 mm [11.8in.] | | | |
| Color of lead wire | | Green (+) Black (−) | Blue (+) Black (−) | Brown (+) Black (−) | Red (+) Black (−) |
| Color of LED indicator | | Red | | | |
| Surge suppression (as standard) | | Flywheel diode | | | |

Note: See made to order on p.65.

Flow Rate



1MPa = 145psi., 1 ℓ /min = 0.0353ft.³/min

How to read the graph (For 1(P)→4(A))

When the supply pressure is 0.5MPa [73psi.] and flow rate is 12 ℓ /min [0.42ft.³/min] (ANR), the valve outlet pressure becomes 0.36MPa [52psi.].

Effective Area [Cv]

mm²

| Basic model | Standard (Single valve) | Remarks |
|-------------|--|---|
| 010-4E1 | 1(P)→4(A) 0.2 [0.01] 4(A)→5(R1) 0.3 [0.02] 2(B)→3(R2) 0.4 [0.02] | <ul style="list-style-type: none"> For the case with quick fitting TSH4-M3M attached to the 1(P), 4(A), and 2(B) ports. Same values as for the case with quick fitting TSH4-M3M attached to the 4(A) port on F type manifold. |
| A010-4E1 | 1(P)→4(A) 0.2 [0.01] 4(A)→5(R1) 0.3 [0.02] 2(B)→3(R2) 0.4 [0.02] | <ul style="list-style-type: none"> For the case with quick fitting TSH4-M5M attached to the 1(P) port and quick fitting TSH4-M3M attached to the 4(A) port on A type manifold. |

Solenoid Valve Mass

g [oz.]

| Basic model | Mass |
|-------------|-----------------------|
| 010-4E1 | 20 [0.71] |
| A010-4E1 | 20 [0.71] (38 [1.34]) |

Remark: Figures in parentheses () are the mass with sub-base: -25.

Manifold Mass

g [oz.]

| Manifold model | Mass calculation of each unit (n=number of units) | Block-off plate |
|----------------|---|-----------------|
| 010MB□F | (8.5×n)+13 [(0.300×n)+0.46] | 3 [0.11] |
| 010MB□A | (13.5×n)+15 [(0.476×n)+0.53] | 3 [0.11] |

Solenoid Valve Port Size

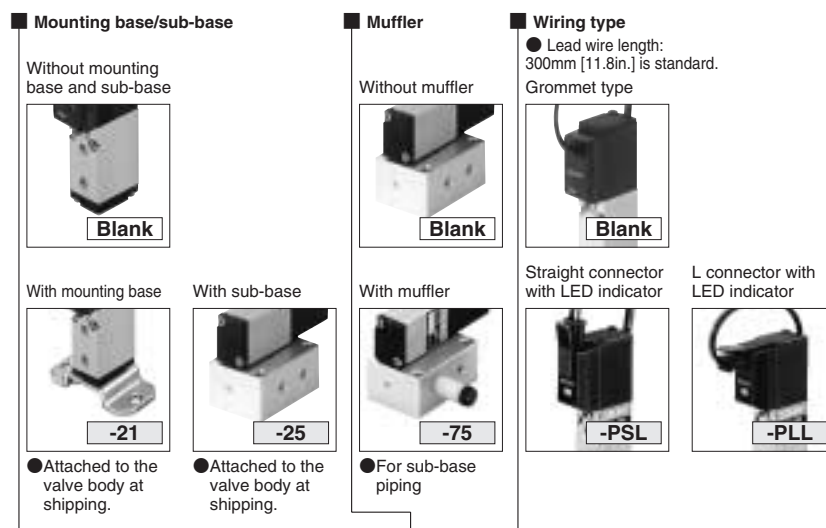
| Basic model | Port | Port specification | Port size |
|-------------------------|------------------|--------------------|-----------|
| 010-4E1 ^{Note} | 1(P), 4(A), 2(B) | Female thread | M3×0.5 |
| A010-4E1-25 | 1(P) | Female thread | M5×0.8 |
| | 4(A), 2(B) | Female thread | M3×0.5 |
| | 3, 5(R) | Female thread | M5×0.8 |

Note: The 3(R2) and 5(R1) ports are 1.2mm diameter holes, not to be used for connecting.

Manifold Port Size

| Manifold model | Port | Location of piping port | Port size |
|----------------|------------|-------------------------|-----------|
| 010MB□F | 1(P) | Manifold | M5×0.8 |
| | 4(A), 2(B) | Valve | M3×0.5 |
| | 3, 5(R) | Manifold | M5×0.8 |
| 010MB□A | 1(P) | Manifold | M5×0.8 |
| | 4(A), 2(B) | | M3×0.5 |
| | 3, 5(R) | | M5×0.8 |

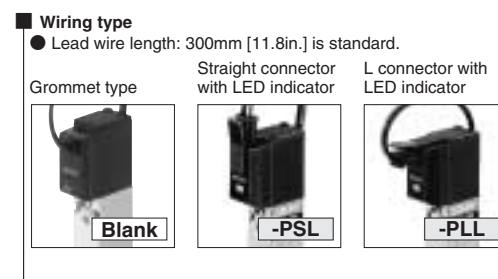
010 Series Solenoid Valve Order Code



Solenoid Valve Order Code

| | | Basic model | | | Voltage |
|-----------------|------------------------|---------------------------------|-----------------------|-------------|---------------------|
| Direct piping | 5-port single solenoid | 010-4E1 | -21 | -PSL | DC5V, DC6V |
| Sub-base piping | 5-port single solenoid | A010-4E1 ^{Note} | -25 -75 | -PLL | DC12V, DC24V |

Note : Cannot be used as a single unit.



Manifold Order Code

| Manifold model Number of units | | | Station | Basic model | | Voltage | |
|-----------------------------------|-------|----|---------|-------------------------------|-----------|--------------|----------------------------|
| 5-port single solenoid | 010MB | 2 | F | stn. <input type="checkbox"/> | -010-4E1 | -PSL -PLL | DC5V, DC6V DC12V, DC24V |
| | | ⋮ | | ⋮ | | | |
| | | 20 | A | stn. <input type="checkbox"/> | -A010-4E1 | | |

● Valve mounting location from the left-hand side when facing the 4(A), 2(B) ports. (□ : 1~20)

● Specify the valve type for each station.
● Enter **-BP** when closing a station with a block-off plate without mounting a valve.

Additional Parts (To be ordered separately)

Muffler



● For sub-base piping

Block-off plate



● **010 MB F -BP**
F—For F type manifold
A—For A type manifold
010—For 010M

Made to Order

Grommet type with LED indicator



Lead wire length

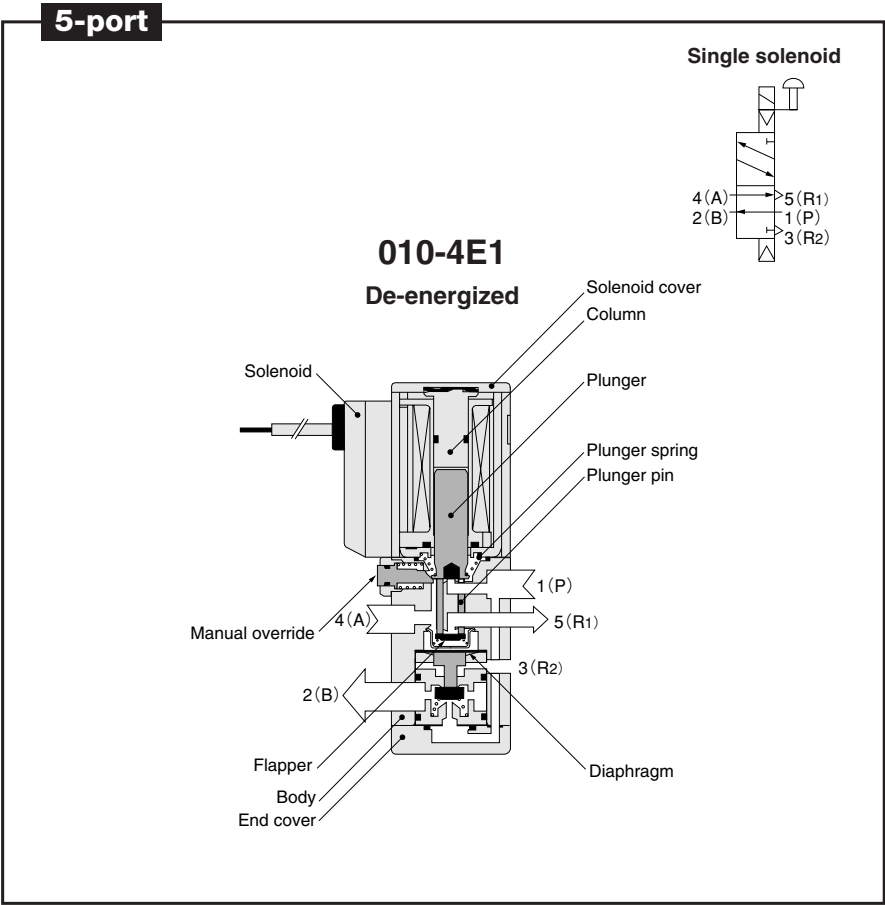


● For plug connector
● Length **-1L**: 1000 [39in.] (mm)
-3L: 3000 [118in.]

Locking protruding type manual override



● For **010-4E1**, **A010-4E1**



Major Parts and Materials

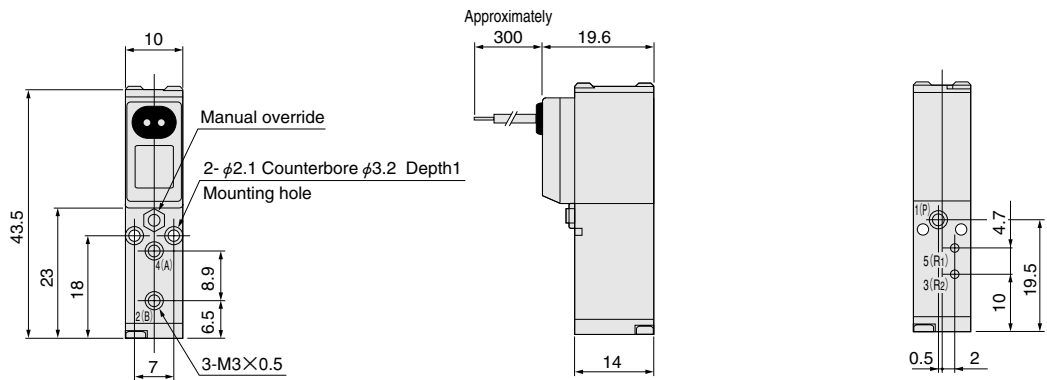
| Parts | | Materials |
|----------|-----------------|---------------------------|
| Valve | Body | Aluminum alloy (anodized) |
| | Stem | Aluminum alloy (anodized) |
| | Flapper | Synthetic rubber |
| | Mounting base | Steel (zinc plated) |
| | Sub-base | Aluminum alloy (anodized) |
| | Plunger | Magnetic stainless steel |
| Manifold | Column | steel |
| | Body | Aluminum alloy (anodized) |
| | Block-off plate | Steel (nickel plated) |
| | Seal | Synthetic rubber |

Dimensions of Solenoid Valve (mm)

010-4E1



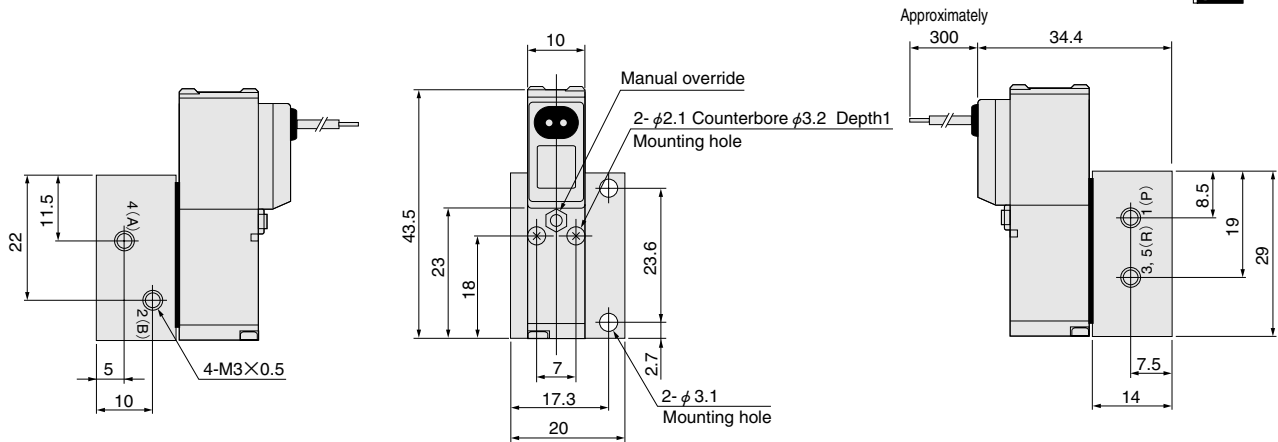
010-4E1



A010-4E1-25

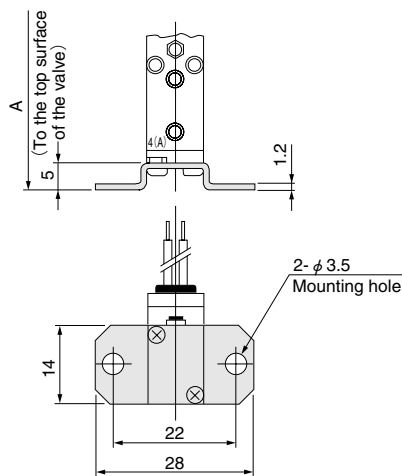


A010-4E1



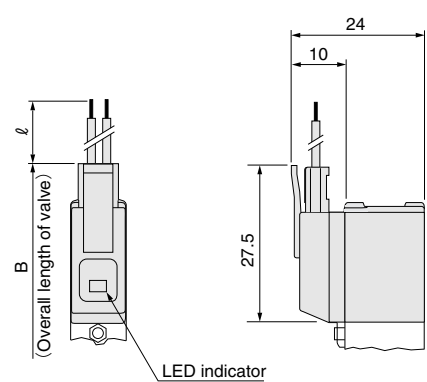
Options

● Mounting base: -21




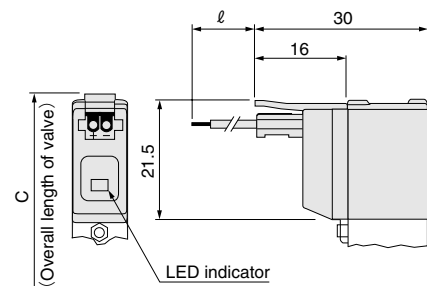
● Solenoid with straight connector: -PSL

 010-SOL




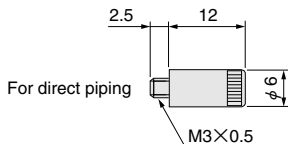
● Solenoid with L connector: -PLL

 010-SOL



● Muffler: -75
(Only for A010-4E1-25)


 010-MUFF

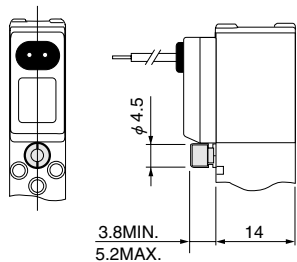


| | | mm | | | |
|---------|------|------|------|------|------|
| Model | Code | A | B | C | D |
| 010-4E1 | | 48.5 | 50.5 | 44.5 | 43.5 |

Made to Order

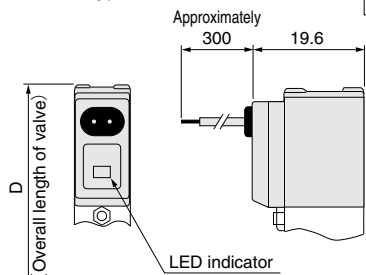
● Locking protruding type manual override: -83

 010-ROCK



● Grommet type with LED indicator: -L

 010-SOL



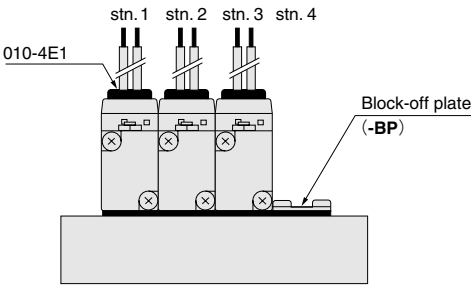
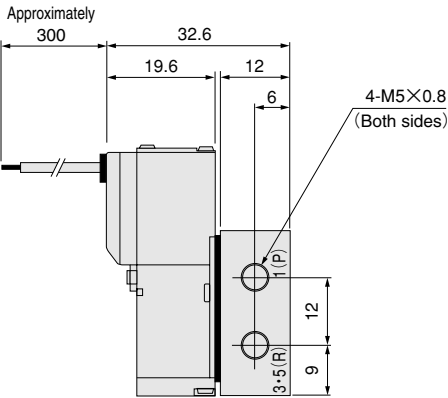
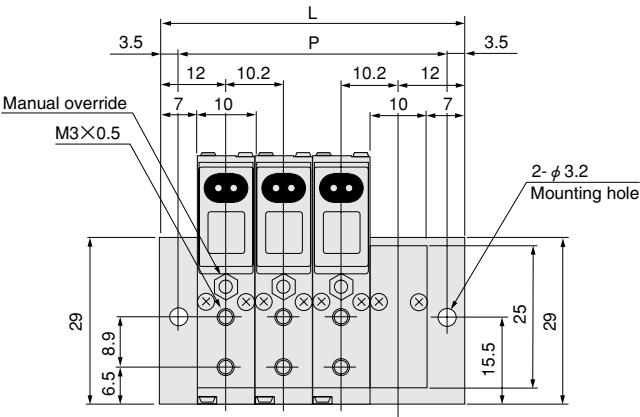
| | | mm | |
|----------------------------------|------|----------------------|--|
| Model | Code | ℓ (Lead wire length) | |
| -PSL, -PLL, -L (standard length) | | 300 | |
| Made to order | -1L | 1000 | |
| | -3L | 3000 | |

Dimensions of Manifold (mm)

010MB□F



010MBF



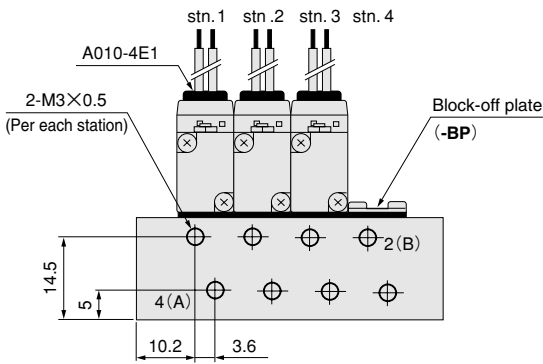
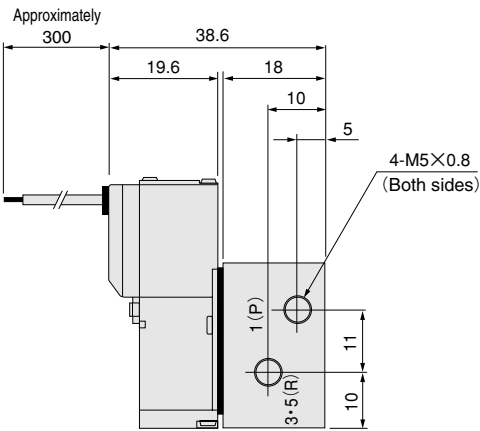
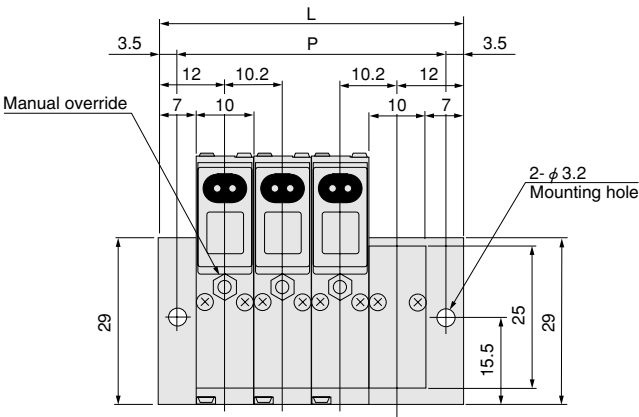
Unit dimensions

| Model | P | L | Model | P | L |
|---------|-------|-------|----------|-------|-------|
| 010MB2F | 27.2 | 34.2 | 010MB12F | 129.2 | 136.2 |
| 3F | 37.4 | 44.4 | 13F | 139.4 | 146.4 |
| 4F | 47.6 | 54.6 | 14F | 149.6 | 156.6 |
| 5F | 57.8 | 64.8 | 15F | 159.8 | 166.8 |
| 6F | 68.0 | 75.0 | 16F | 170.0 | 177.0 |
| 7F | 78.2 | 85.2 | 17F | 180.2 | 187.2 |
| 8F | 88.4 | 95.4 | 18F | 190.4 | 197.4 |
| 9F | 98.6 | 105.6 | 19F | 200.6 | 207.6 |
| 10F | 108.8 | 115.8 | 20F | 210.8 | 217.8 |
| 11F | 119.0 | 126.0 | — | — | — |

For wiring options and made to order, see p.68.

Dimensions of Manifold (mm)

010MB□A



Unit dimensions

| Model | P | L | Model | P | L |
|---------|-------|-------|----------|-------|-------|
| 010MB2A | 27.2 | 34.2 | 010MB12A | 129.2 | 136.2 |
| 3A | 37.4 | 44.4 | 13A | 139.4 | 146.4 |
| 4A | 47.6 | 54.6 | 14A | 149.6 | 156.6 |
| 5A | 57.8 | 64.8 | 15A | 159.8 | 166.8 |
| 6A | 68.0 | 75.0 | 16A | 170.0 | 177.0 |
| 7A | 78.2 | 85.2 | 17A | 180.2 | 187.2 |
| 8A | 88.4 | 95.4 | 18A | 190.4 | 197.4 |
| 9A | 98.6 | 105.6 | 19A | 200.6 | 207.6 |
| 10A | 108.8 | 115.8 | 20A | 210.8 | 217.8 |
| 11A | 119.0 | 126.0 | — | — | — |

For wiring options and made to order, see p.68.