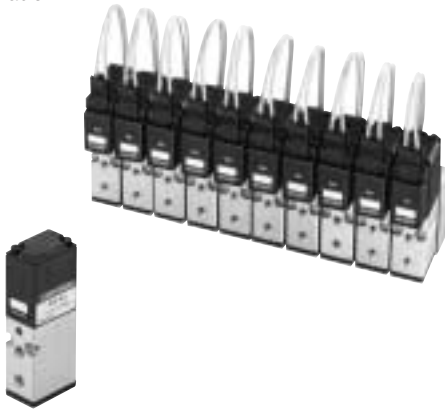




CAD drawing data catalog  
is available.



# KOGANEI

## VALVES GENERAL CATALOG

# SOLENOID VALVES 030 SERIES INDEX

SOLENOID VALVES 030 SERIES

|                                       |    |
|---------------------------------------|----|
| Features                              | 87 |
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| Made to Order                         | 97 |
| Handling Instructions and Precautions | 99 |



**Caution**

Before use, be sure to read the "Safety Precautions" on p. 31.

## Reliability & Versatile Application

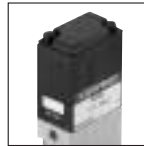
# SOLENOID VALVES 030 SERIES

This dynamic series uses advanced technology to solve the issue of a lighter and more compact unit with larger flow rate, while at the same time reducing power consumption.

It also offers a variety of options, Rc 1/8 specification, and manifolds for up to 20 units, to provide expandability in response to advanced levels of requirements.

### A Full-Choice System in Response to High Performance and Versatility

From the standard specification with emphasis on space savings and cost performance, all the way to the high-spec units for FA use, this advanced solenoid valve series offers a wide range of configurations that build on a base of highly reliable basic functions to incorporate a rich variety of options, made to order products, and additional parts.



This powerful solenoid, while rated for low current levels (example: 36mA at starting for an AC100V unit), uses a varistor for AC and a flywheel diode for DC as the standard. A reliable surge suppression design.



Achieves a flow rate at this size of 29  $\ell$  /min [1.02ft.<sup>3</sup>/min.] (ANR)—at a supply pressure of 0.5MPa [73psi.]. Its ability to cover everything from single units and direct piping to multi-unit manifolds in flexibly expandable and rational configurations is one of its best features.



Plug connectors (optional) offer easy and reliable attaching and removing. Two types are available, straight and L, and both are equipped with LED indicators for easy confirmation of operations.



This solenoid valve includes a built-in interface unit for microcomputer and logic output signal enabling direct control of the solenoid valve. This made to order product is compatible with the FA era.



DIN connectors and 1000mm [39in.] or 3000mm [118in.] lead wires are also available as made to order equipment.



A non-locking type manual override for easy maintenance and adjustment is standard equipment. A locking protruding type manual override for fingertip operation (optional) is also available.



### Single Unit Valves Assembled Directly to T, F, and F01 Type Manifolds

Mounting valves are identical to the single unit valves, and enable economical and immediate response to system upgrades and changes in numbers of units. For systems of up to 10 units with the 2-, 3-port, use the compact T type. For combination mounting with 2-, 3-, 5-port and up to 10 units, use the F type, and for 11 or more units, use the F01 type with connection ports of Rc1/8 specification, for a truly rational, detailed choice of systems.



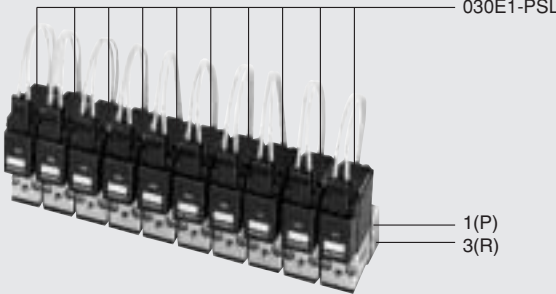
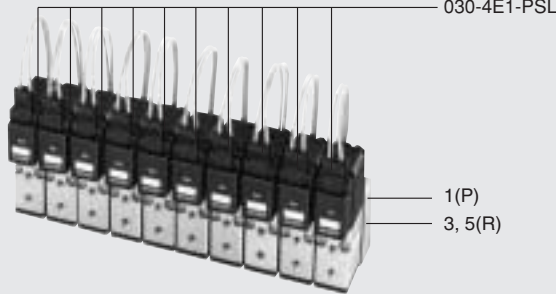
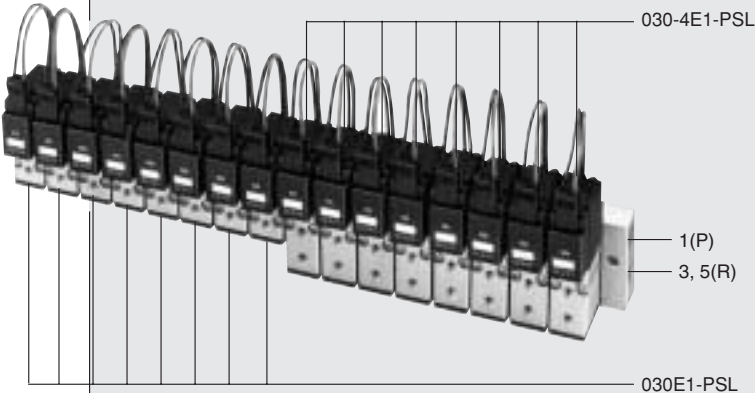
A plug connector with a pre-wired common terminal is available as made to order, eliminating the need for tedious common terminal wiring even on multi-unit manifolds. The result is a neatly wired multi-unit, high density solenoid valve system.

Single unit

|               | Direct acting solenoid valve  | Pilot type solenoid valve   |
|---------------|---|---|
|               | 2-, 3-port  | 5-port  |
| Direct piping | <p>Normally closed (NC)</p>  <p><b>030E1</b></p> | <p>2-position</p>  <p><b>030-4E1</b></p> |

SOLENOID VALVES 030 SERIES

Manifold

| Small sized manifold for 2-, 3-port valves  | Manifold for combination mounting of 2-, 3-, 5-port valves  |
|---|---|
| <p><b>YM□T</b>—T type (1(P), 3(R)) manifold</p>  <p>030E1-PSL</p> <p>1(P)<br/>3(R)</p> | <p><b>YM□F</b>—F type (1(P), 3, 5(R)) manifold</p>  <p>030-4E1-PSL</p> <p>1(P)<br/>3, 5(R)</p>                      |
|   | <p><b>YM□F01</b>—F01 type (1(P), 3, 5(R)) manifold</p>  <p>030-4E1-PSL</p> <p>1(P)<br/>3, 5(R)</p> <p>030E1-PSL</p> |

# SOLENOID VALVES

## 030 SERIES

### Basic Models and Valve Functions

| Item                | Basic model<br>Direct piping,<br>T, F, F01 type manifolds | 030E1 | 030-4E1         |
|---------------------|---|-------|-----------------|
| Number of positions | 2 positions   |       |                 |
| Number of ports     | 2, 3 ports  |       | 5 ports         |
| Valve function      | Normally closed (NC)                                      |       | Single solenoid |

Remark: For optional specifications and order codes, see p.91 ~ 92.

### Specifications

| Item   | Basic model<br>Direct piping,<br>T, F, F01 type manifolds | 030E1                                      | 030-4E1   |
|--|---|--|---|
| Media  | Air   |  |   |
| Operation type                                     | Direct acting type  |  | Internal pilot type   |
| Effective area (Cv)                                | mm <sup>2</sup>   | 1(P)→2(A) 0.6{0.03}<br>2(A)→3(R) 0.8{0.04} | 1(P)→4(A), 2(B) 0.6{0.03}<br>4(A)→5(R1), 2(B)→3(R2) 0.8{0.04} |
| Port size <small>Note</small>                      | M5×0.8  |  |   |
| Lubrication  | Not required  |  |   |
| Operating pressure range                           | MPa{kgf/cm <sup>2</sup> } [psi.]                          | 0~0.7 {0~7.1} [0~102]                      | 0.15~0.7 {1.5~7.1} [22~102]                                   |
| Proof pressure                                     | MPa{kgf/cm <sup>2</sup> } [psi.]                          | 1.05 {10.7} [152]                          |   |
| Response time                                      | ms  | DC12V, DC24V                               | 10/25 or below  |
|  |   | ON/OFF                                     | AC100V, AC200V  |
| Maximum operating frequency                        | Hz  | 5  |   |
| Operating temperature range (atmosphere and media) | °C [°F]   | 5~50 [41~122]                              |   |
| Shock resistance                                   | m/s <sup>2</sup> {G}                                      | 117.7 {12.0}                               |   |
| Mounting direction                                 | Any   |  |   |

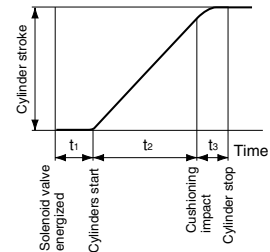
Note: For details, see the port size on p.90.

### Solenoid Specifications

| Item                                    | Rated voltage                                     |   |   |   |  |
|---|---|---|---|---|--|
|   | DC12V   | DC24V   | AC100V  | AC200V  |  |
| Type                                    | Flywheel diode incorporated for surge suppression |   | Shading type                                  |   |  |
| Operating voltage range                 | V   | 10.8~13.2<br>(12±10%)   | 21.6~26.4<br>(24±10%)                         | 90~132<br>(100 <sup>+32</sup> / <sub>-10</sub> %) | 180~264<br>(200 <sup>+32</sup> / <sub>-10</sub> %) |
| Current (when rated voltage is applied) | Frequency   | Hz  | —   | 50  | 60   |
|   | Starting  | mA (r.m.s.)   | —   | 36  | 32   |
|   | Energizing  | mA (r.m.s.)   | 130 (1.6W)<br>[140 (1.7W) with LED indicator] | 65 (1.6W)<br>[75 (1.8W) with LED indicator]       | 24   |
| Maximum allowable leakage current       | mA  | 8   | 4   | 4   | 2  |
| Insulation resistance                   | MΩ  | Over 100  |   |   |  |
| Wiring type and lead wire length        | Standard  | Grommet type: 300mm [11.8in.]   |   |   |  |
|   | Optional  | Plug connector type: 300mm [11.8in.]<br>Note: See made to order on p.97~98. |   |   |  |
| Color of lead wire                      | Brown (+)<br>Black (-)                            | Red (+)<br>Black (-)  | Yellow  | White   |  |
| Color of LED indicator                  | Red   |   | Yellow  | Green   |  |
| Surge suppression (as standard)         | Flywheel diode                                    |   | Varistor                                      |   |  |

### Cylinder Operating Speed

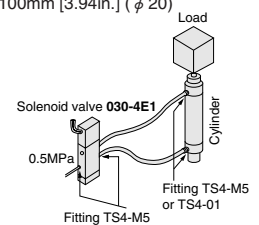
#### How to obtain cylinder speed



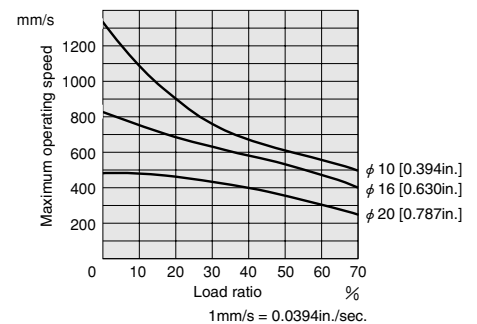
To obtain the time required for the cylinder to complete 1 stroke, add the cylinder's delay time  $t_1$  (time between energizing of the solenoid valve and actual starting of the cylinder), to the cylinder's max. speed operating time  $t_2$ . When a cushion is used, add the cushioning time  $t_3$ , to the above calculations. The standard cushioning time  $t_3$  is approximately 0.2 seconds.

#### Measurement conditions

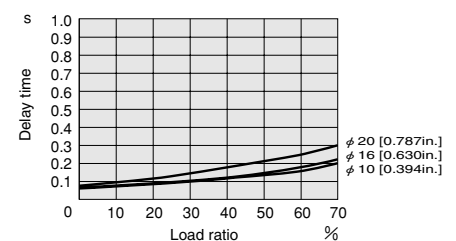
- Air pressure: 0.5MPa {5.1kgf/cm<sup>2</sup>} [73psi.]
- Piping inner diameter and length:  
φ 2.5 [0.1in.]×1000mm [39in.]
- Fitting:  
Quick fitting  
Valve side: TS4-M5  
Cylinder side: TS4-M5 (φ 10, φ 16)  
TS4-01 (φ 20)
- Load ratio =  $\frac{\text{Load}}{\text{Cylinder theoretical thrust}}$  (%)
- Cylinder stroke: 60mm [2.36in.] (φ 10, φ 16)  
100mm [3.94in.] (φ 20)



#### Maximum operating speed

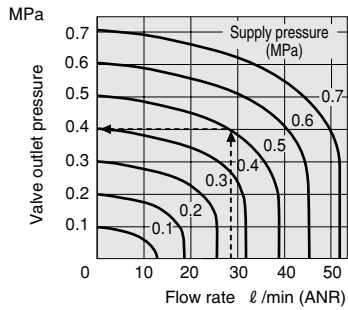


#### Delay time



Note: Delay time changes depending on the valve construction, the volume of the cylinder and piping.

## Flow Rate



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

### How to read the graph

When the supply pressure is 0.5MPa [73psi.] and flow rate is 29 l/min [1.02ft.<sup>3</sup>/min.] (ANR), the valve outlet pressure becomes 0.4 MPa [58psi.].

## Solenoid Valve Port Size

| Basic model | Port         | Port specification | Port size |
|-------------|--------------|--------------------|-----------|
| 030E1       | 1(P)         | Female thread      | M5×0.8    |
|             | 2(A)         |                    |           |
|             | 3(R)         | —                  | φ 1.8     |
| 030-4E1     | 1(P)         | Female thread      | M5×0.8    |
|             | 4(A), 2(B)   |                    |           |
|             | 3(R2), 5(R1) | —                  | φ 1.8     |

## Manifold Port Size

| Manifold model | Port       | Location of piping ports | Port size |
|----------------|------------|--------------------------|-----------|
| YM□T           | 1(P)       | Manifold                 | M5×0.8    |
|                | 2(A)       | Valve                    |           |
|                | 3(R)       | Manifold                 | M6×1      |
| YM□F           | 1(P)       | Manifold                 | M5×0.8    |
|                | 4(A), 2(B) | Valve                    |           |
|                | 3, 5(R)    | Manifold                 | M6×1      |
| YM□F01         | 1(P)       | Manifold                 | Rc1/8     |
|                | 4(A), 2(B) | Valve                    | M5×0.8    |
|                | 3, 5(R)    | Manifold                 | Rc1/8     |

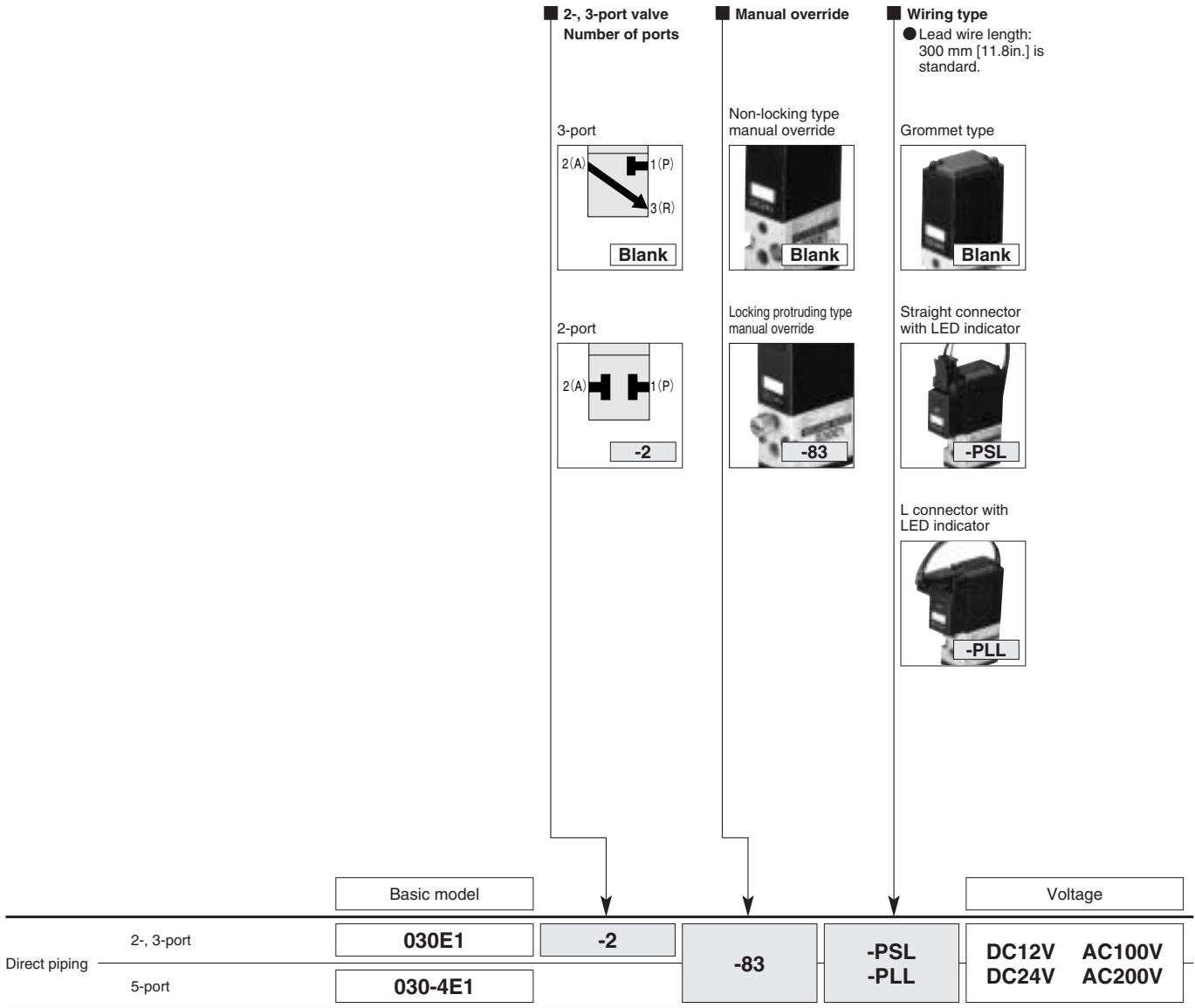
## Solenoid Valve Mass g [oz.]

| Basic model | Mass      |
|-------------|-----------|
| 030E1       | 57 [2.01] |
| 030-4E1     | 71 [2.50] |

## Manifold Mass g [oz.]

| Manifold model | Mass calculation of each unit (n=number of units) | Block-off plate |
|----------------|---|-----------------|
| YM□T           | (11×n)−1 [(0.39×n)−0.04]                          | 3 [0.11]        |
| YM□F           | (20.5×n)−1 [(0.72×n)−0.04]                        |                 |
| YM□F01         | (20×n)+23 [(0.71×n)+0.81]                         |                 |

# 030 Series Solenoid Valve Order Codes



●When ordering the non-ion specification, enter -NCU after the basic model code.

## Additional Parts

Muffler



KM-06

●For manifold only

Mounting base



030-21

Block-off plate



●YM|F|-BP

YM—For YM

F—For F type manifold

T—For T type manifold

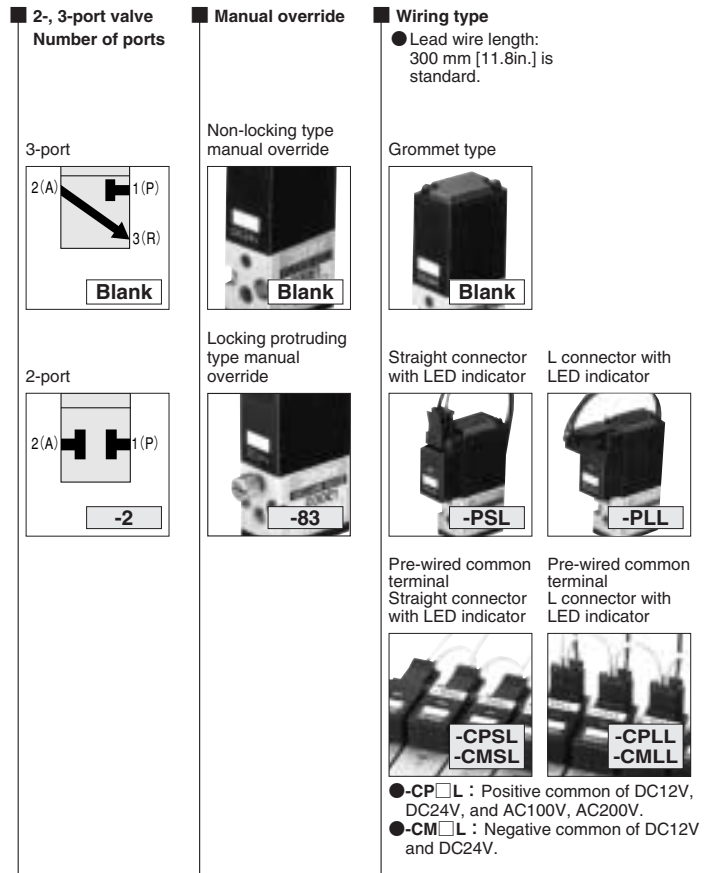
F—For F type manifold

(For F01 type manifold)

T—For T type manifold

F—For F type manifold







(For F01 type manifold)



|  | Manifold model<br>Number of units | Station                           | Basic model    |           |            | Voltage       |
|--|-----------------------------------|-----------------------------------|----------------|-----------|------------|---------------|
| Manifold for 2-, 3-port valves                             | <b>YM</b>                         | <b>T</b>                          | <b>030E1</b>   | <b>-2</b> | <b>-83</b> | <b>DC12V</b>  |
| Manifold for combination mounting of 2-, 3-, 5-port valves | <b>2</b><br>⋮<br><b>20</b>        | <b>F</b>                          | <b>030E1</b>   | <b>-2</b> | <b>-83</b> | <b>DC24V</b>  |
|  |                                   | <b>F01</b>                        | <b>030-4E1</b> |           |            | <b>AC100V</b> |
|  |                                   | <b>stn.1</b><br>⋮<br><b>stn.n</b> |                |           |            | <b>AC200V</b> |

- For 11 or more stations, use **F01** only.
- Valve mounting location from the left-hand side when facing the 4(A), 2(B) ports.
- Specify the valve type for each station.
- Enter **-BP** when closing a station with a block-off plate without mounting a valve.
- When ordering the non-ion specification, enter **-NCU** after the basic model code.
- Pre-wired common terminal for AC100V and AC200V is either **-CPSL** or **-CPLL**.

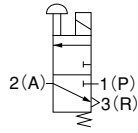
**Made to Order** For details, see p.97~98.

|   |  |   |   |  |   |
|---|--|---|---|--|---|
| <p>Straight connector with LED indicator</p>  <p><b>-PSLN</b></p> <ul style="list-style-type: none"> <li>● Without lead wire</li> <li>● Connector and contacts included</li> </ul> | <p>L connector with LED indicator</p>  <p><b>-PLLN</b></p> <ul style="list-style-type: none"> <li>● Without lead wire</li> <li>● Connector and contacts included</li> </ul> | <p>Lead wire length</p>  <p><b>-1L</b><br/><b>-3L</b></p> <ul style="list-style-type: none"> <li>● For plug connector</li> <li>Length <b>-1L</b> : 1000 [39in.]</li> <li><b>-3L</b> : 3000 [118in.]</li> </ul> | <p>DIN connector</p>  <p><b>-39</b></p> <ul style="list-style-type: none"> <li>● Cannot be used with <b>-L</b>.</li> </ul> | <p>LED indicator with built-in varistor</p>  <p><b>-L</b></p> <ul style="list-style-type: none"> <li>● Cannot be used with <b>-39</b>.</li> </ul> | <p>Built-in interface unit</p>  <p><b>-FA</b></p> <ul style="list-style-type: none"> <li>● Can be directly controlled by output from micro computer or other logic devices.</li> <li>● With LED indicator</li> </ul> |
|---|--|---|---|--|---|

# Operating Principles and Symbols

## 3-port

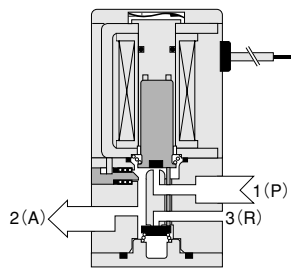
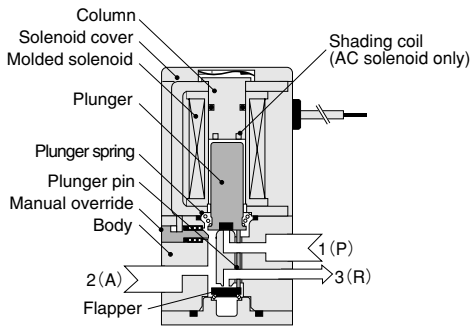
Normally closed (NC)



**030E1**

De-energized

Energized



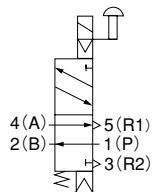
## Major Parts and Materials

|          | Parts           | Materials                   |
|----------|-----------------|-----------------------------|
| Valve    | Body            | Aluminum alloy (anodized)   |
|          | O-ring          | Synthetic rubber            |
|          | Flapper         | Synthetic rubber            |
|          | Diaphragm       | Synthetic rubber (urethane) |
|          | Plunger         | Magnetic stainless steel    |
|          | Column          | Stainless steel             |
|          | Spring          | Stainless steel             |
|          | Mounting base   | Mild steel (zinc plated)    |
| Manifold | Body            | Aluminum alloy (anodized)   |
|          | Block-off plate | Mild steel (zinc plated)    |
|          | Bracket         | Mild steel (nickel plated)  |
|          | Seal            | Synthetic rubber            |

Remark: Materials that generate copper ions are not used for the non-ion specification.

## 5-port, 2-position

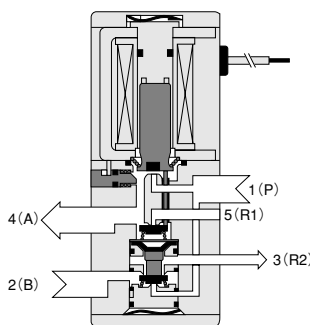
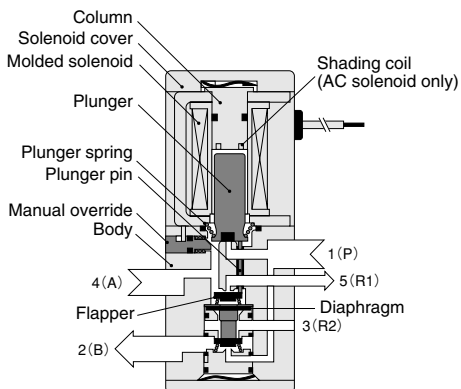
Single solenoid



**030-4E1**

De-energized

Energized



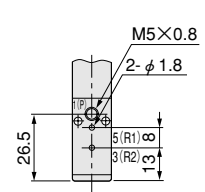
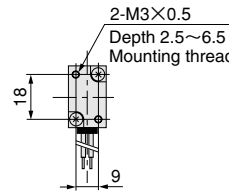
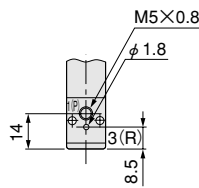
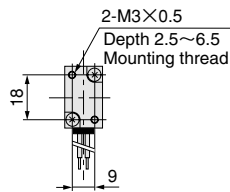
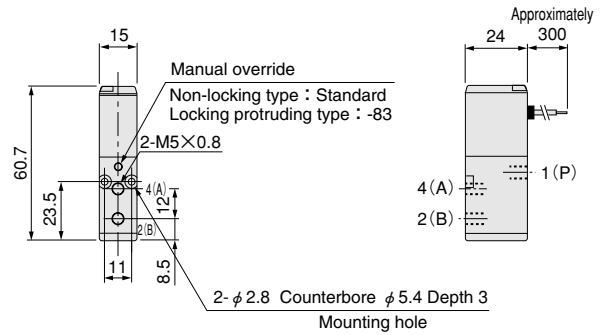
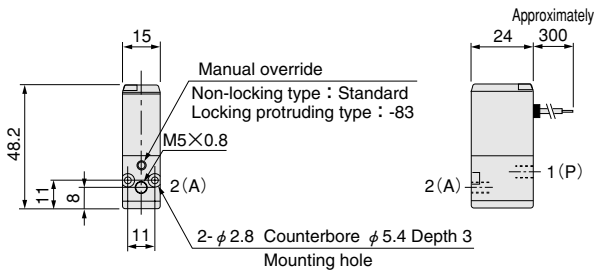


# Dimensions of Solenoid Valve (mm)

## 030E1



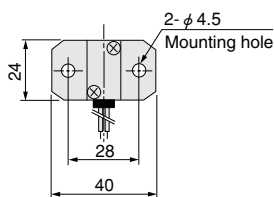
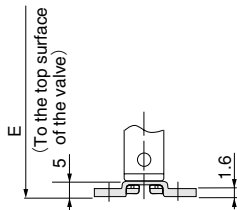
## 030-4E1



※ The lead wire direction is to the opposite side from the manual override and A, B port.

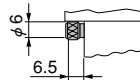
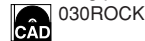
### Additional Parts (To be ordered separately)

- Mounting base : 030-21

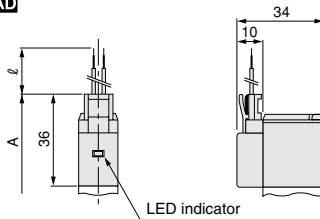


### Options

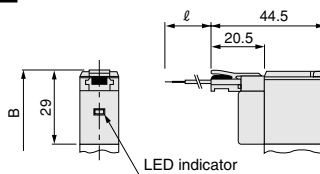
- Locking protruding type manual override : -83



- Solenoid with straight connector : -PSL



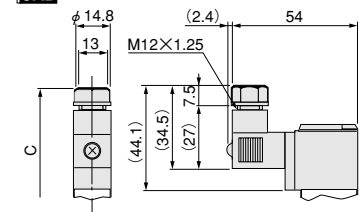
- Solenoid with L connector : -PLL



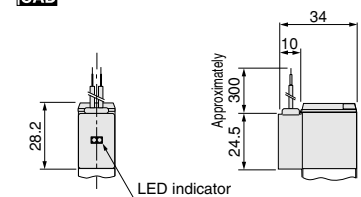
※ The lead wire direction is to the side with the manual override and 4(A), 2(B) port.

### Made to Order

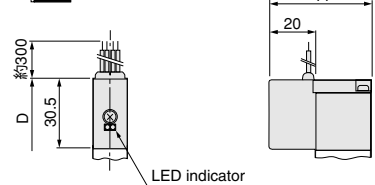
- Solenoid with DIN connector : -39



- Solenoid with LED indicator : -L



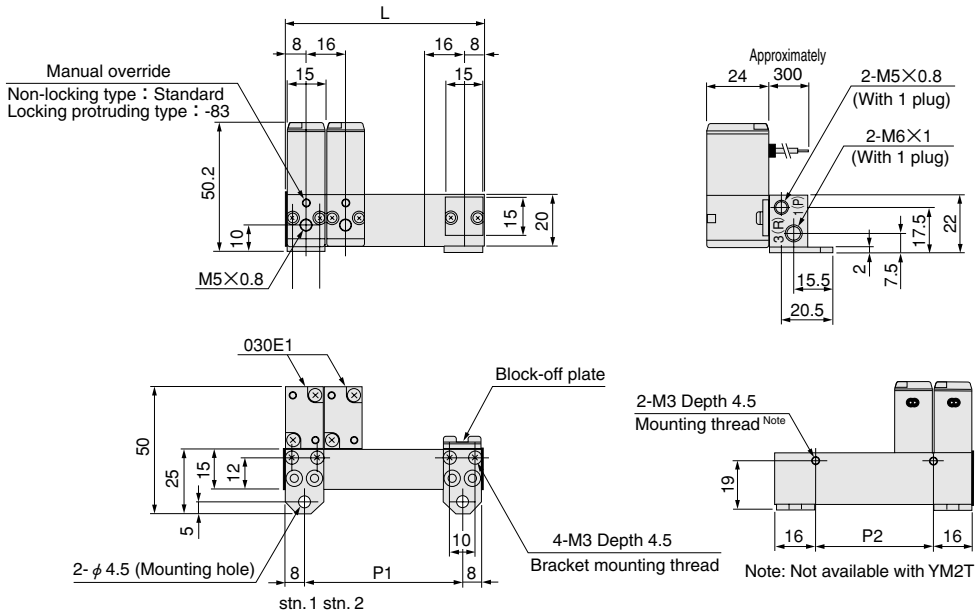
- Built-in interface unit : -FA



| Model   | Code | A    | B    | C    | D    | E    | ℓ (Lead wire length)                | Remarks                                |
|---------|------|------|------|------|------|------|-------------------------------------|--|
| 030E1   |      | 56   | 49   | 64.1 | 50.5 | 53.2 | -PSL, -PLL: 300                     | Overall length to the end of the valve |
| 030-4E1 |      | 68.5 | 61.5 | 76.6 | 63   | 65.7 | Made to order: -1L: 1000, -3L: 3000 |  |

# Dimensions of Manifold for 2-, 3-port valves (mm)

YM□T

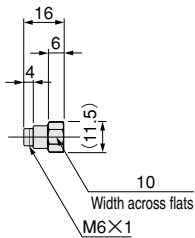


## Unit dimensions

| Model | L   | P1  | P2  |
|-------|-----|-----|-----|
| YM2T  | 32  | 16  | —   |
| YM3T  | 48  | 32  | 16  |
| YM4T  | 64  | 48  | 32  |
| YM5T  | 80  | 64  | 48  |
| YM6T  | 96  | 80  | 64  |
| YM7T  | 112 | 96  | 80  |
| YM8T  | 128 | 112 | 96  |
| YM9T  | 144 | 128 | 112 |
| YM10T | 160 | 144 | 128 |

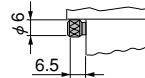
## Additional Parts (To be ordered separately)

- Muffler : **KM-06** 030MUFF  
For manifold only

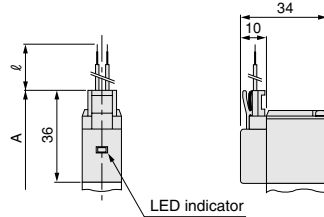


## Options

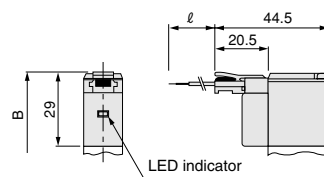
- Locking protruding type manual override : **-83**  
 030ROCK



- Solenoid with straight connector : **-PSL**  
 030SOL



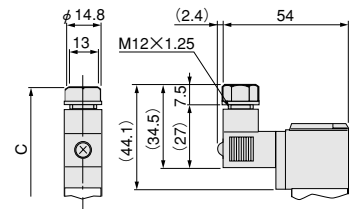
- Solenoid with L connector : **-PLL**  
 030SOL



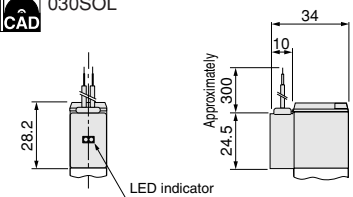
※ The lead wire direction is to the side with the manual override and 4(A), 2(B) port.

## Made to Order

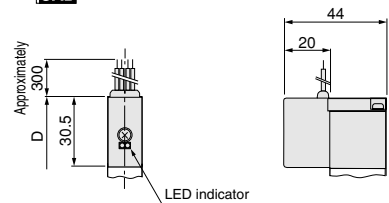
- Solenoid with DIN connector : **-39**  
 030SOL



- Solenoid with LED indicator : **-L**  
 030SOL



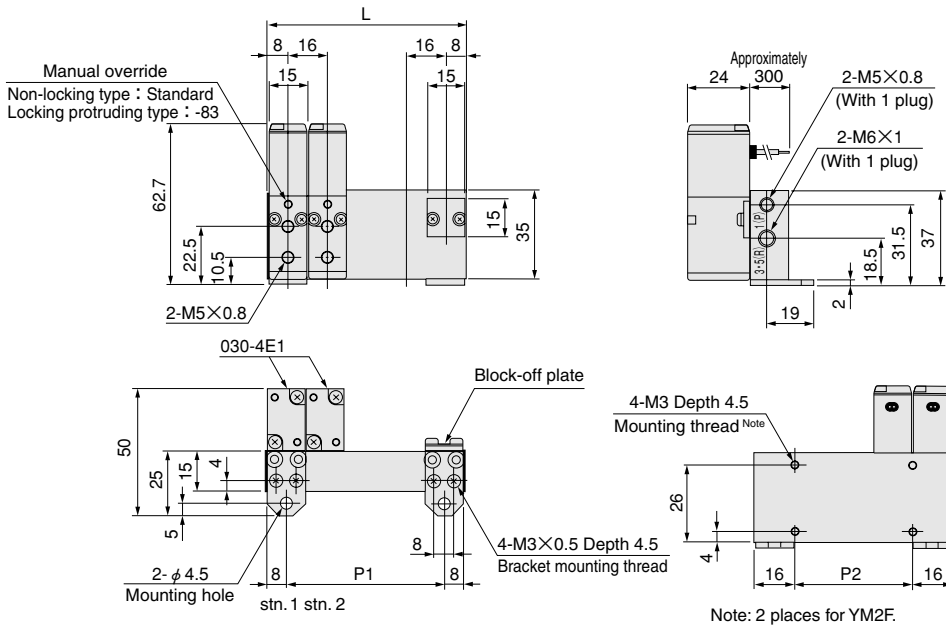
- Built-in interface unit : **-FA**  
 030SOL



| Model | Code    | A    | B    | C    | D    | ℓ (lead wire length)                                   | Remarks                                |
|-------|---------|------|------|------|------|--|--|
|       | 030E1   | 56   | 49   | 64.1 | 50.5 | -PSL, -PLL: 300<br>Made to order: -1L: 1000, -3L: 3000 | Overall length to the end of the valve |
|       | 030-4E1 | 68.5 | 61.5 | 76.6 | 63   |  |  |

# Manifold for combination mounting of 2-, 3-, 5-port valves (mm)

YM□F

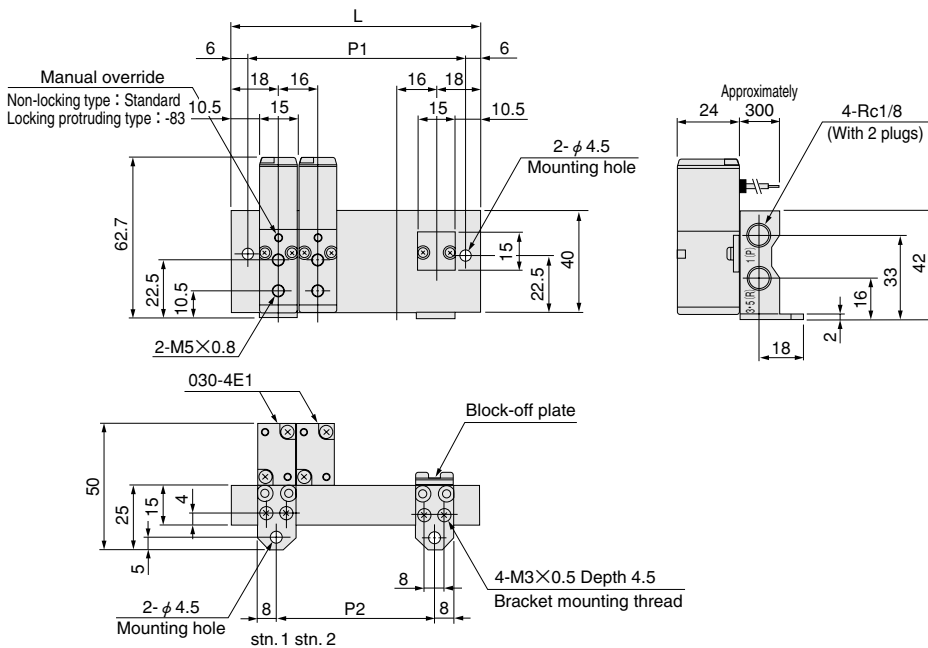


## Unit dimensions

| Model | L   | P1  | P2  |
|-------|-----|-----|-----|
| YM2F  | 32  | 16  | —   |
| YM3F  | 48  | 32  | 16  |
| YM4F  | 64  | 48  | 32  |
| YM5F  | 80  | 64  | 48  |
| YM6F  | 96  | 80  | 64  |
| YM7F  | 112 | 96  | 80  |
| YM8F  | 128 | 112 | 96  |
| YM9F  | 144 | 128 | 112 |
| YM10F | 160 | 144 | 128 |

SOLENOID VALVES 030 SERIES

YM□F01



## Unit dimensions

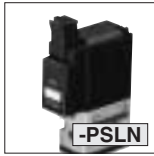
| Model   | L   | P1  | P2  |
|---------|-----|-----|-----|
| YM2F01  | 52  | 40  | 16  |
| YM3F01  | 68  | 56  | 32  |
| YM4F01  | 84  | 72  | 48  |
| YM5F01  | 100 | 88  | 64  |
| YM6F01  | 116 | 104 | 80  |
| YM7F01  | 132 | 120 | 96  |
| YM8F01  | 148 | 136 | 112 |
| YM9F01  | 164 | 152 | 128 |
| YM10F01 | 180 | 168 | 144 |
| YM11F01 | 196 | 184 | 160 |
| YM12F01 | 212 | 200 | 176 |
| YM13F01 | 228 | 216 | 192 |
| YM14F01 | 244 | 232 | 208 |
| YM15F01 | 260 | 248 | 224 |
| YM16F01 | 276 | 264 | 240 |
| YM17F01 | 292 | 280 | 256 |
| YM18F01 | 308 | 296 | 272 |
| YM19F01 | 324 | 312 | 288 |
| YM20F01 | 340 | 328 | 304 |

## Made to Order

The 030 series Solenoid Valves include a variety of made to order solenoids for application in a broader range of control and wiring types.

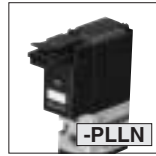
### Plug connector

Straight connector with LED indicator



- Without lead wire
- Connector and contacts included

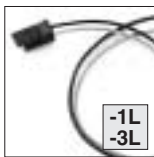
L connector with LED indicator



- Without lead wire
- Connector and contacts included

- When ordering, enter **-PSLN** or **-PSLL** in place of the normal option code for the wiring type.

Lead wire length



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

- For lead wire length, **-1L** is 1000mm [39in.] and **-3L** is 3000mm [118in.].  
When ordering, enter **-1L** or **-3L** following the wiring type option code.

### DIN connector



A compact connector that is highly resistant to dust and water splashes.

Employs a self-stripping method that eliminates the need for de-sheathing the lead wire.

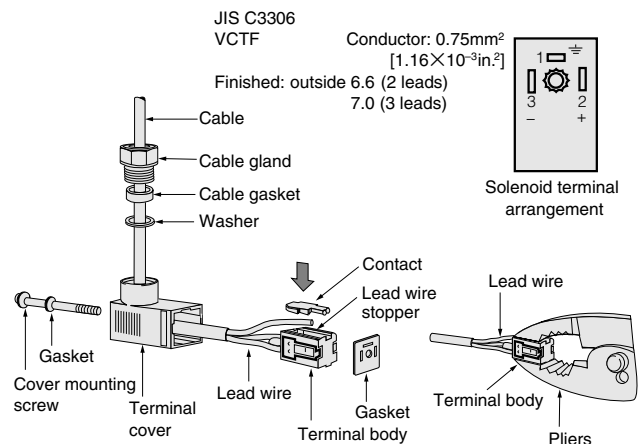
- When ordering, enter **-39** in place of the normal option code for the wiring type.
- A varistor for surge suppression is also equipped.  
(For the AC100V and AC200V only. For the DC12V and DC24V, a flywheel diode for surge suppression is installed as standard equipment.)
- LED indicator is not available.

### Wiring instructions

#### ● Solenoid with DIN connector

When de-sheathing (only the outer sheath of the cable), pay attention to the lead wire direction. The cover will be easily mounted when the lead wire on the outer side of the terminal cover is set about 8mm longer than the inner side.

Without stripping off the sheath, insert the lead wire until it contacts the lead wire stopper on the terminal body, and then place the contact from the upper side. Then use pliers to press the lead wire further to ensure that the contacts are firmly touching the core wire.



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

### LED indicator



The LED indicator for confirmation of operation is also available without a plug connector. This creates a clean monoblock look with a compact cover.

- When ordering, enter **-L** in place of the normal option code for the wiring type.
- A varistor for surge suppression is also equipped.  
(For the AC100V and AC200V only. For the DC12V and DC24V, a flywheel diode for surge suppression is installed as standard equipment.)

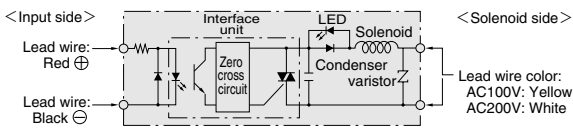
## Built-in interface unit



Includes an interface unit with photo transistor. Can be directly controlled by a microcomputer and logic chip, and is equipped with full electric noise countermeasures and LED indicators.

- When ordering, enter **-FA** in place of the normal option code for the wiring type.
- Cannot be ordered in combination with any other solenoid option.
- Rated voltages for the solenoid are AC100V and AC200V only.

## Block diagram



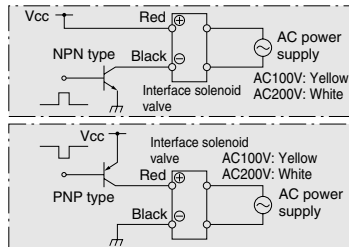
The interface unit is a triac with photo coupler. Applying DC5V to the input terminals when AC power is applied on the solenoid side causes the LED inside the unit to light up, turns on the triac, and energizes the solenoid. At this time, a LED indicator turns on.

When the input side voltage reaches 0V, the LED inside the unit shuts off, the triac is turned off, and the solenoid is de-energized. At this time, the LED indicator is turned off.

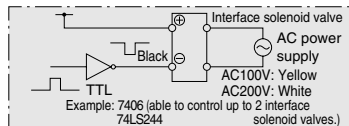
With a built-in zero-cross circuit, the zero-cross voltage is used to turn the power on, and the zero-cross current to turn it off.

## Example of control circuits

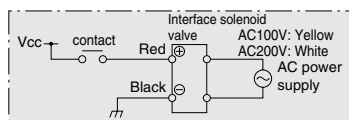
### 1. Control by transistor



### 2. Control by TTL, IC

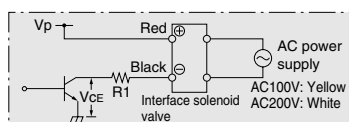


### 3. Control by relay contact



### 4. When input is not a DC5V power supply

Install resistance to the outside to drop the input voltage to 4~6V.



$$R1 = \frac{Vp - 5 - V_{CE}}{18 \times 10^{-3}} [\Omega]$$

Example

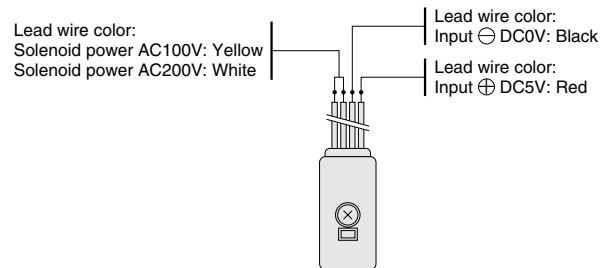
| Vp [V] | R1         |
|--------|------------|
| 12     | 390 Ω 1/4W |
| 24     | 1.0K Ω 1W  |

In the case of  $V_{CE}=0$  [V]

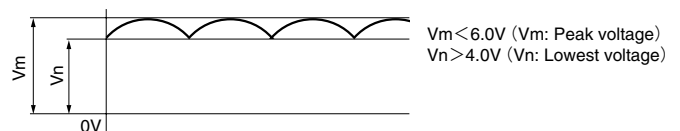
## Electrical Specifications for Solenoid Valve with Built-in Interface Unit

| Item                             |   | Specifications   |  |   |     |     |
|----------------------------------|---|--|--|---|-----|-----|
| Input side                       | Rated voltage                           | DC V   | 5  |   |     |     |
|                                  | Voltage range                           | DC V   | 4~6  |   |     |     |
|                                  | Current (when 5V DC is applied)         | mA   | 18   |   |     |     |
|                                  | Operating voltage                       | DC V   | 4 or below                                       |   |     |     |
|                                  | Return voltage                          | DC V   | 0.8 or over                                      |   |     |     |
|                                  | Color of lead wire                      |  | Red (+), Black (-)                               |   |     |     |
| Solenoid side                    | Rated voltage                           | AC V   | 100  | 200   |     |     |
|                                  | Type                                    |  | Shading type                                     |   |     |     |
|                                  | Operating voltage range                 | AC V   | 90~125<br>(100 <sup>+25%</sup> <sub>-10%</sub> ) | 180~250<br>(200 <sup>+25%</sup> <sub>-10%</sub> ) |     |     |
|                                  | Current (when rated voltage is applied) | Frequency Hz   | 50   | 60  | 50  | 60  |
|                                  |   | Starting mA (r.m.s.)   | 36   | 32  | 18  | 16  |
|                                  |   | Energizing mA (r.m.s.)   | 24   | 20  | 12  | 10  |
|                                  | Leakage current                         | Frequency Hz   | 50   | 60  | 50  | 60  |
|                                  |   | Current mA (r.m.s.)  | 0.3  | 0.4   | 0.6 | 0.8 |
|                                  | Surge suppression (as standard)         |  | Built-in varistor at solenoid side               |   |     |     |
|                                  | Color of lead wire                      |  | Yellow   | White   |     |     |
|                                  | Color of LED indicator (as standard)    |  | Yellow   | Green   |     |     |
| Dielectric voltage               |   | Min. AC1500V on input side and solenoid side                               |  |   |     |     |
| Insulation resistance            | MΩ                                      | Between input side and solenoid side, and between whole terminals and body |  | Over 100  |     |     |
| Zero-cross function              |   | Available  |  |   |     |     |
| Wiring type and lead wire length |   | Grommet type: 300mm [11.8in.]  |  |   |     |     |

## Wiring instructions



1. Separate the input side and solenoid side lead wires by color. Never apply AC power/6VDC or more to the input side.
2. Ensure that voltage ripple on the input side remains within the range shown below:



3. Even when a wrong polarity is applied to the input side, a built-in diode for protection against reverse polarity eliminates any worry about short circuiting. The valve will not operate, however.
4. A varistor and condenser are built-in to the solenoid power supply side, for protection circuit against external surge voltages. As a result, there is a 0.3mA leakage current in AC100V, and a 0.6mA leakage current in AC200V.
5. The operation and return times of the interface unit are 10ms or less with a 50Hz AC power supply, and 8ms or less with a 60Hz AC power supply.

# Handling Instructions and Precautions

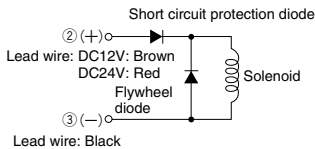


## Solenoid

### Internal circuit

#### ● DC12V, DC24V

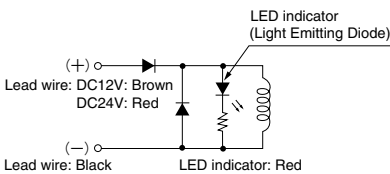
#### Standard solenoid (Surge suppression)



② and ③ are for with DIN connector (order code: -39).

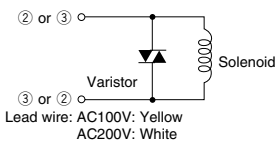
#### Solenoid with LED indicator (Surge suppression)

Order code: -PSL, -PLL



#### ● AC100V, AC200V

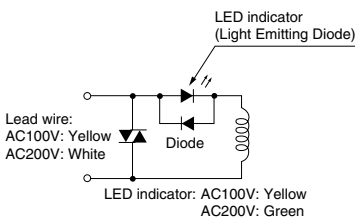
#### Standard solenoid (Surge suppression)



② and ③ are for with DIN connector (order code: -39).

#### 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 allowable leakage current, consult us.

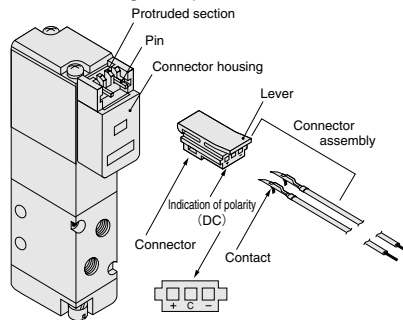


## Plug connector

### 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.

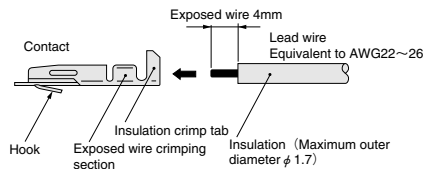
To remove the connector, squeeze the lever along with the connector, lift the lever claw up from the protruded section of the connector housing, and pull it out.



※ 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 at this time to avoid catching the insulation on the exposed wire crimping section.

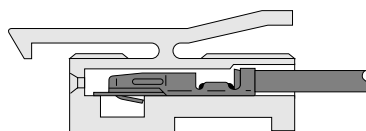


- Cautions:**
1. Do not pull hard on the lead wire.
  2. Always use a dedicated tool for crimping of connecting lead wire and contact.  
Contact: Model 702062-2M  
Manufactured by Sumiko Tech, Inc.  
Crimping tool: Model F1-702062  
Manufactured by Sumiko Tech, Inc.

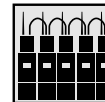
### Attaching and removing contact and connector

Insert the contact with a 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.



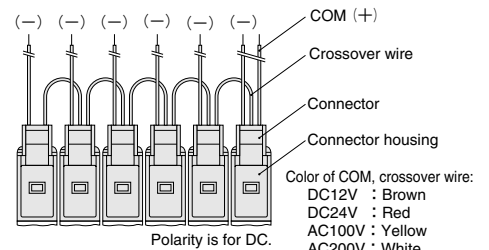
- Cautions:**
1. Do not pull hard on the lead wire. It could result in defective contacts, breaking wires, etc.
  2. If the pin is bent, use a small screwdriver, etc. to gently straighten out the pin, and then complete the connection to the plug connector.



## Common terminal pre-wired plug connector

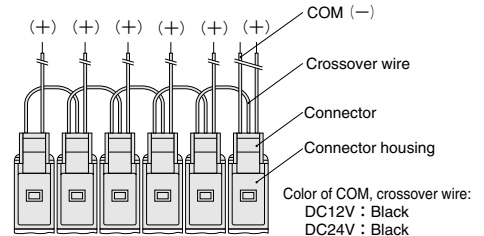
### 1. Pre-wired common terminal at DC positive side or AC.

Order code With straight connector: -CPSL  
With L connector: -CPLL



### 2. Pre-wired common terminal at DC negative side

Order code With straight connector: -CMSL  
With L connector: -CMLL



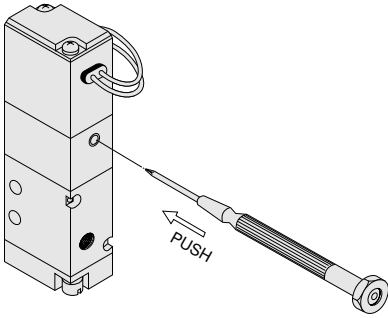
- Cautions:**
1. The diagrams show the straight connector configuration. While the connector's orientation is different in the case of the L connector, in every case the first COM lead wire comes from the last station's mounted valve.
  2. Since the COM terminal is connected to a crossover terminal inside the connector housing, the connector cannot be switched between a positive common and a negative common by changing the connectors.



## Manual override

### Non-locking type

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



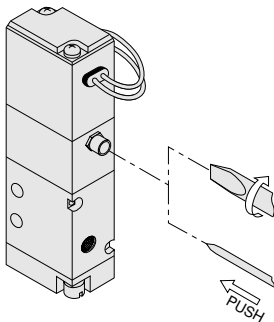
※ Illustration shows the 110 series.

### 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.



※ Illustration shows the 110 series.

- Cautions:**
1. In the pilot type solenoid valve, 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 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. Do not turn the adjusting knob more than needed. It could result in defective operation.

### Mounting base 030-21

When installing a mounting base to the valve, always use the provided screws. The recommended tightening torque for the screws is  $49\text{N} \cdot \text{cm}$   $\{5\text{kgf} \cdot \text{cm}\}$   $[4.3\text{in} \cdot \text{lbf}]$ .

### Mounting valves on manifold

When mounting valves on manifold, apply the recommended tightening torque of  $39.2\text{N} \cdot \text{cm}$   $\{4\text{kgf} \cdot \text{cm}\}$   $[3.5\text{in} \cdot \text{lbf}]$  for the valve mounting screws.

