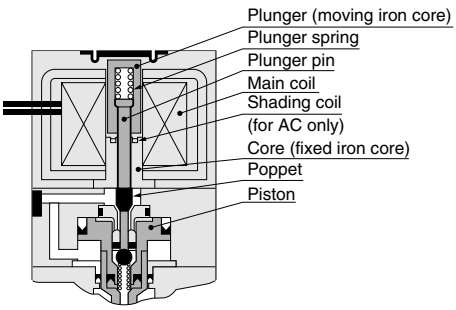
# Solenoid Valves 300 Series

The series of optimum valves for operating mid-sized cylinders.
The 3-position solenoid valve required for intermediate stopping of air cylinders, and other series configurations for many different applications, are available. It is possible to provide a wide range of performance compatible with the required ability and grade of systems and devices.

## AC Solenoid (Shading Coil Type) Features




The shading coil type embeds a copper ring in its core (fixed iron core), and serves to suppress the attraction force pulsation caused by alternating current.
This is the same principle as the “flywheel diode type” with commutator, to suppress the attraction force pulsation.
The shading coil type has:

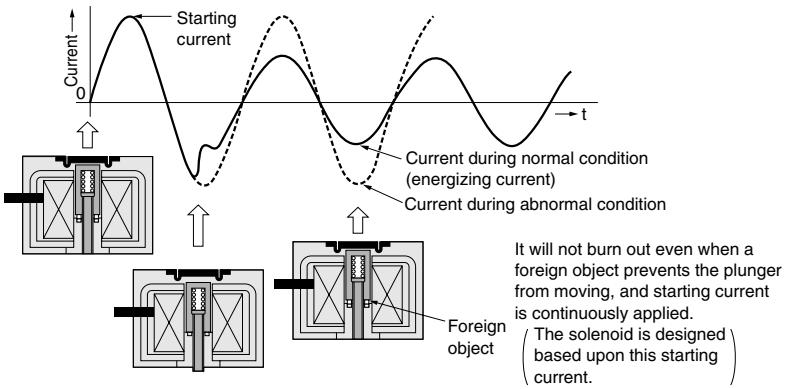
●Good response ●A simple structure ●No wiring polarity, and other features.

However, it has the following disadvantages, which cause a reduction in reliability:

●Burning damage may occur ●A humming noise may be generated ●The shading coil may slip out

Koganei’s newly developed shading coil type is a highly reliable method that has solved the above disadvantages, and we confidently recommend it.

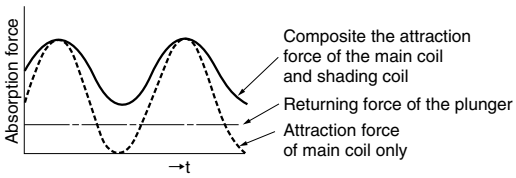
### Current waveforms during normal operation and abnormal operation




It will not burn out even when a foreign object prevents the plunger from moving, and starting current is continuously applied.
(The solenoid is designed based upon this starting current.)

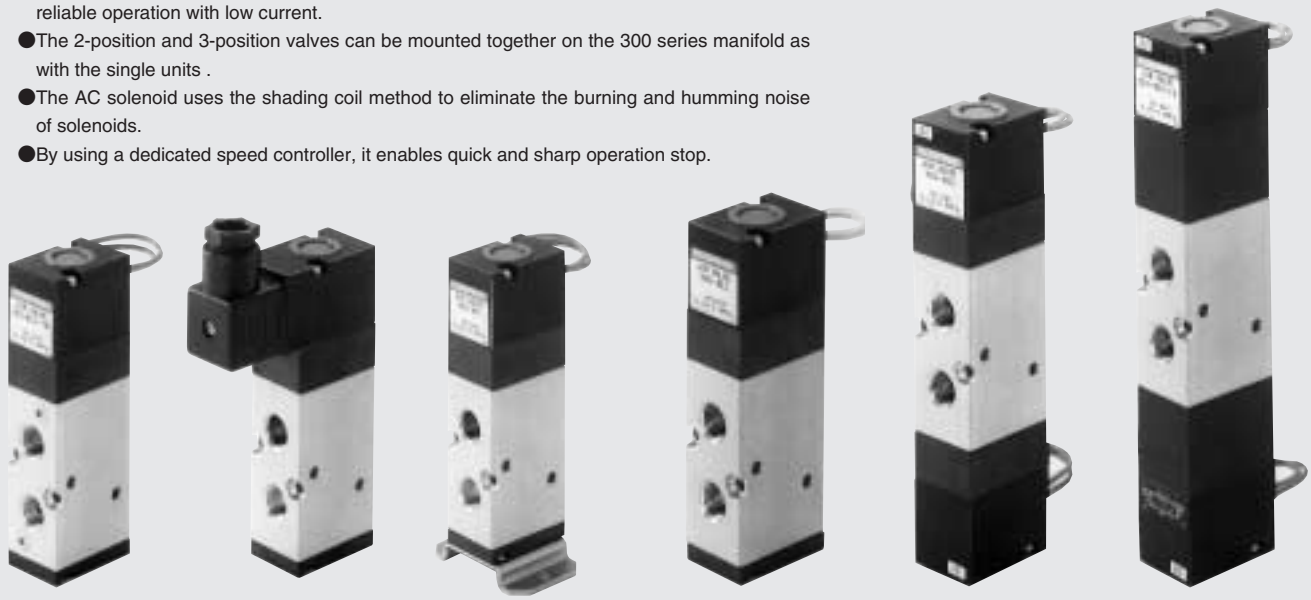
### Shading coil function

Magnetic flux generated by the main coil inducing voltage to the shading coil, and the different phase magnetic flux generated by the electric current, work to suppress the pulse caused by AC power.




# Standard type

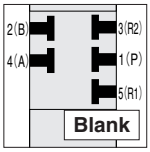
●The product range includes internal pilot type 2-position and 3-position valves offering reliable operation with low current.
●The 2-position and 3-position valves can be mounted together on the 300 series manifold as with the single units .
●The AC solenoid uses the shading coil method to eliminate the burning and humming noise of solenoids.
●By using a dedicated speed controller, it enables quick and sharp operation stop.



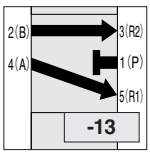
## Solenoid Valve, Air Piloted Valve Order Codes (Standard Type, Low Current Type)

**3-position valve**
**Valve function**

Closed center




Exhaust center

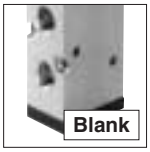



**Port size**

**Blank**: Rc1/4
**-03**: Rc3/8
(3 ( R2), 5 ( R1) ports: Rc1/4)

**Mounting base**

Without mounting base




With mounting base


For single solenoid only

**Speed controller**

Without speed controller


With speed controller


**Indicator**

Without indicator


With indicator

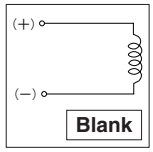

**Wiring type**

Grommet type

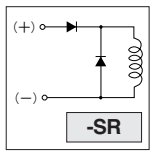

With terminal


**Flywheel diode**

Without flywheel diode




With flywheel diode




| | | Basic model | | -03 | -21 | -70 | -IN | -T | -SR | Voltage |
|---|---|---|---|---|---|---|---|---|---|---|
| For F, U, L type manifolds | Single solenoid | 300-4E1 | | -03 | -21 | -70 | -IN | -T | | AC100V AC200V DC24V |
| | 2-position double solenoid | 300-4E2 | | | | | | | | |
| | 3-position double solenoid | 303-4E2 | -13 | | | | | | | |
| For A type manifold | Single solenoid | A300-4E1 | | | | | -IN | -T | | AC100V AC200V DC24V |
| | 2-position double solenoid | A300-4E2 | | | | | | | | |
| | 3-position double solenoid | A303-4E2 | -13 | | | | | | | |
| For W type manifold | Single solenoid | W300-4E1 | | | | | -IN | | | AC100V AC200V DC24V |
| | 2-position double solenoid | W300-4E2 | | | | | | | | |
| For F, U, L type manifolds (low current type) | Single solenoid | 300-4LE1 | | -03 | -21 | -70 | -IN | -T | -SR | DC24V |
| | 2-position double solenoid | 300-4LE2 | | | | | | | | |
| | 3-position double solenoid | 303-4LE2 | -13 | | | | | | | |
| | Single solenoid | A300-4LE1 | | | | | | | | |
| | 2-position double solenoid | A300-4LE2 | | | | | | | | |
| | 3-position double solenoid | A303-4LE2 | -13 | | | | | | | |
| Direct piping air piloted valve (made to order) | Single pilot | 300-4A | | -03 | -21 | -70 | -IN | | | |
| | Double pilot | 300-4A2 | | | | | | | | |
| Base piping air piloted valve (made to order) | Single pilot | A300-4A | | | | | | | | |
| | Double pilot | A300-4A2 | | | | | | | | |

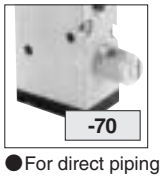
● Solenoid with flywheel diode is surge suppression type solenoid.

## Options

Mounting base


● For direct piping
● Not available for double solenoid

Speed controller



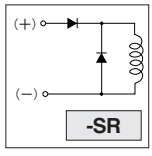

● For direct piping

Indicator

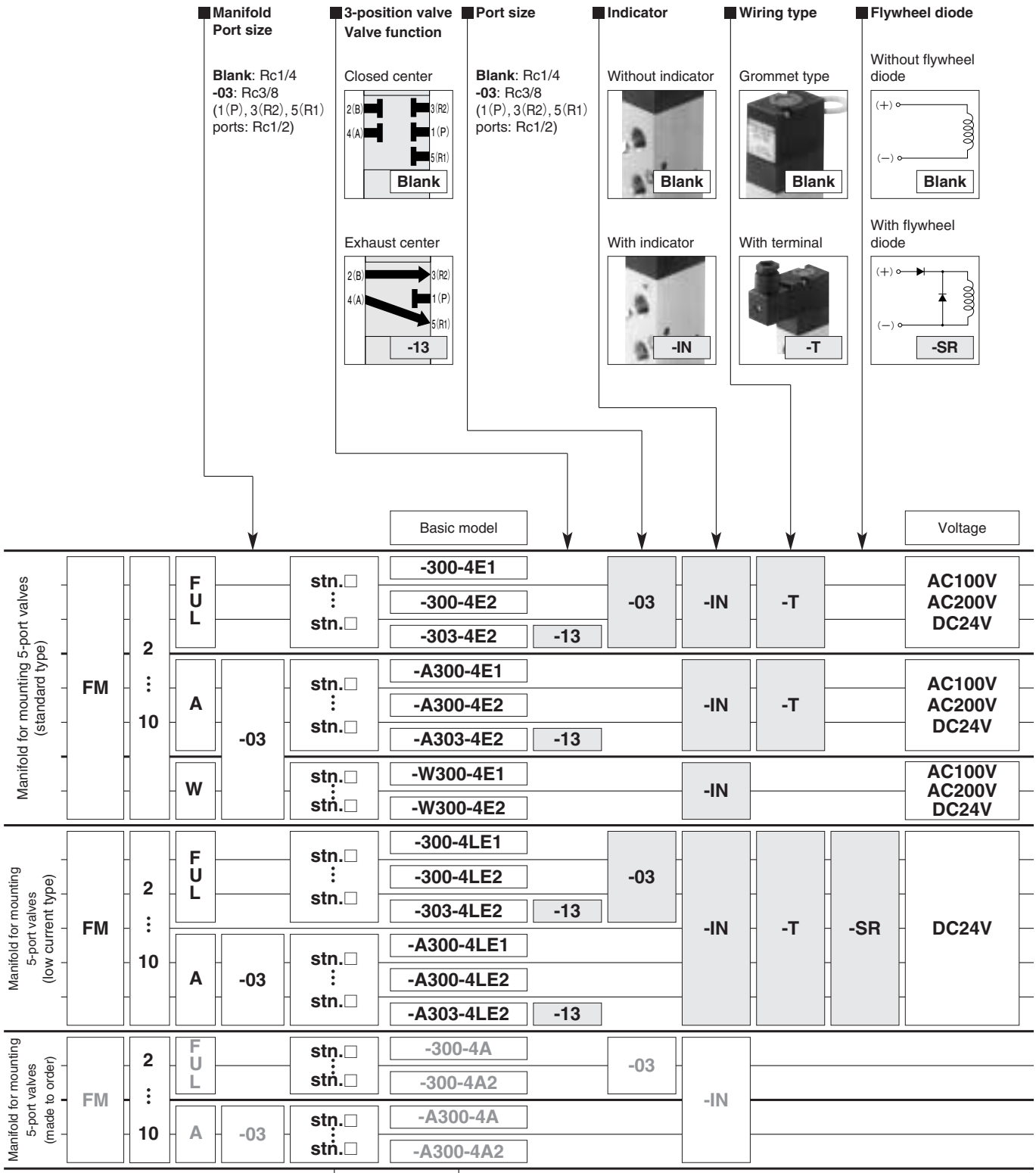

Wiring type


● With terminal

Flywheel diode



## Manifold Order Codes




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

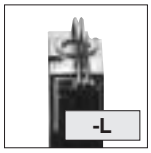
●Specify the valve type for each station.
●Enter **-BP** when closing a station with a block-off plate without mounting a valve.

## Made to Order

Air piloted valves 300 series

●5-port, 2-position
●Single pilot
●Double pilot

Grommet type with LED indicator



## Air piloted valves 300 series

●The optimum air valves for master valves or pilot valves for all-pneumatic control.

## Basic Models and Valve Functions

| Item \ Basic model | 300-4A | 300-4A2 |
|---|---|---|
| | A300-4A | A300-4A2 |
| Number of positions | 2 | |
| Number of ports | 5 | |
| Valve function | Single pilot | Double pilot |

Remark: For optional specifications and order codes, see p.711.

## Specifications

| Item \ Basic model | | 300-4A | 300-4A2 |
|---|---|---|---|
| | | A300-4A | A300-4A2 |
| Media | | Air | |
| Effective area〔Cv〕Note 1 mm² | | 25〔1.39〕 | |
| Port size Note 2 | Main | Rc1/4 or Rc3/8（3(R2), 5(R1) ports: Rc1/4） | |
| | Pilot | Rc1/8 | |
| Lubrication | | Not required | |
| Operating pressure range MPa {kgf/cm²} [psi.] | Main | 0.1～0.9 {1.0～9.2} [15～131] | |
| | Pilot | See the table “Minimum Pilot Pressure” | |
| Proof pressure MPa {kgf/cm²} [psi.] | | 1.35 {13.8} [196] | |
| Operating temperature range (atmosphere and media) °C[°F] | | 5～50 [41～122] | |
| Shock resistance m/s² {G} | Lateral direction | 1373.0 {140.0} | |
| | Vertical direction | — | |
| Mounting direction | | Any | |

Notes: 1. For details, see the effective area.
2. For details, see the port size.

## Effective Area〔Cv〕

mm²

| Basic model | Standard (Single valve unit) |
|---|---|
| **300-4A**<br>**300-4A2** | 25〔1.39〕 |
| **A300-4A**<br>**A300-4A2** | 25〔1.39〕 |

## Air piloted Valve Connection Port

| Basic model | | Port size |
|---|---|---|
| **300-4A** | Main | Rc1/4, Rc3/8 (3(R2), 5(R1) ports: Rc1/4) |
| | Pilot | Rc1/8 |
| **300-4A2** | Main | Rc1/4, Rc3/8 (3(R2), 5(R1) ports: Rc1/4) |
| | Pilot | Rc1/8 |

## Manifold Connection Port Size

| Manifold model | Port | Location of piping connection | Port size |
|---|---|---|---|
| **FM□A** | 1(P),4(A),2(B),3(R2),5(R1) | Manifold | Rc1/4, Rc3/8 |
| **FM□F** | 1(P), 3(R2), 5(R1) | Manifold | Rc1/4, Rc3/8 |
| | 4(A), 2(B) | Valve | Rc1/4 |
| **FM□U**<br>**FM□L** | 1(P) | Manifold | Rc1/4, Rc3/8 |
| | 4(A),2(B),3(R2),5(R1) | Valve | Rc1/4 |
| **FM□W** | 1(P),4(A),2(B),3(R2),5(R1) | Manifold | Rc1/4, Rc3/8 |

## Air piloted Valve Mass

g [oz.]

| Basic model | Mass |
|---|---|
| **300-4A** | 200 [7.05] |
| **300-4A2** | 240 [8.47] |

## Manifold Mass

g [oz.]

| Manifold model | Mass calculation of each unit (n=Number of units) | Block-off plate |
|---|---|---|
| **300FM□A** | (180×n)+200 [(6.35×n)+7.05] | 45 [1.59] |
| **300FM□F** | (190×n)+200 [(6.70×n)+7.05] | 45 [1.59] |
| **300FM□U**<br>**300FM□L** | (40×n)+200 [(1.41×n)+7.05] | 15 [0.53] |

## Minimum Pilot Pressure

MPa {kgf/cm²} [psi.]

| Model \ Main pressure | 0.1 {1.0} [15] | 0.3 {3.1} [44] | 0.5 {5.1} [73] | 0.7 {7.1} [102] | 0.9 {9.2} [131] |
|---|---|---|---|---|---|
| **300-4A** | 0.15 {1.5} [22] | 0.2 {2.0} [29] | 0.25 {2.5} [36] | 0.33 {3.4} [48] | 0.4 {4.1} [58] |
| **300-4A2** | 0.1 {1.0} [15] | 0.12 {1.2} [17] | | | 0.15 {1.5} [22] |

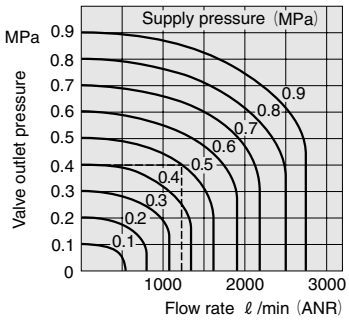
## Time Required for Switching

s

| Valve model | Switching valve | Operation | Pilot line length ℓ m [ft.] | | | | |
|---|---|---|---|---|---|---|---|
| | | | 2 [6.6] | 6 [19.7] | 10 [32.8] | 50 [164] | 100 [328] |
| **300-4A** | 3-port valve (125P) | ON | 0.06 | 0.10 | 0.17 | 1.00 | 2.20 |
| | | OFF | 0.08 | 0.19 | 0.33 | 2.65 | 6.00 |
| **300-4A2** | 4-port valve (125-4E1) | ON | 0.06 | 0.12 | 0.20 | 1.20 | 2.80 |
| | | OFF | | | | | |
| | 3-port valves (125P) | ON | 0.04 | 0.07 | 0.09 | 0.60 | 1.30 |
| | | OFF | | | | | |

Measurement conditions Air pressure (both main and pilot): 0.5MPa [73psi.]
Tube inner diameter: 4mm [0.16in.]

## Flow Rate




1MPa=145psi. 1 ℓ /min.=0.0353ft³/min.

### How to read the graph

When the supply pressure is 0.5MPa [73psi.] and the flow rate is 1250 ℓ /min [44.1ft³/min.] (ANR), the valve outlet pressure becomes 0.4MPa [58psi.].

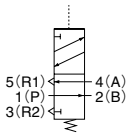
## Major Parts and Materials

| Parts | Materials |
|---|---|
| Body | Aluminum alloy (anodized) |
| Stem | |
| Stem spring | Stainless steel |
| Lip seal | Synthetic rubber |
| Seal | |
| O-ring | |
| Insert | Aluminum alloy (anodized) |
| Base | Mild steel (zinc plated) |

## Operating Principles and Symbols

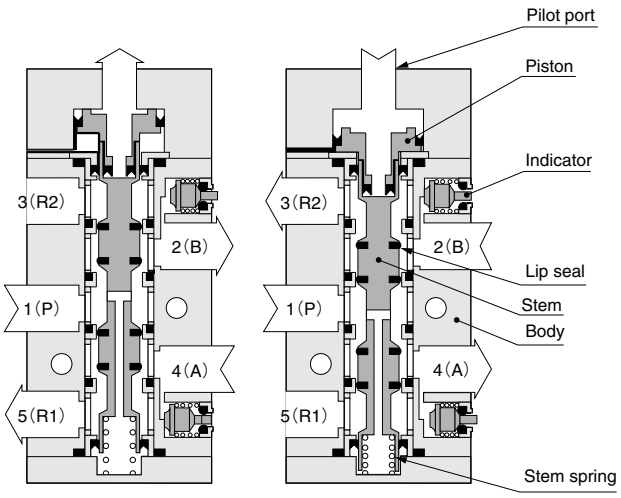
### 5-port, 2-position

**Single pilot**



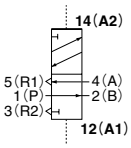

**300-4A**

**Normal condition** **Actuated condition**



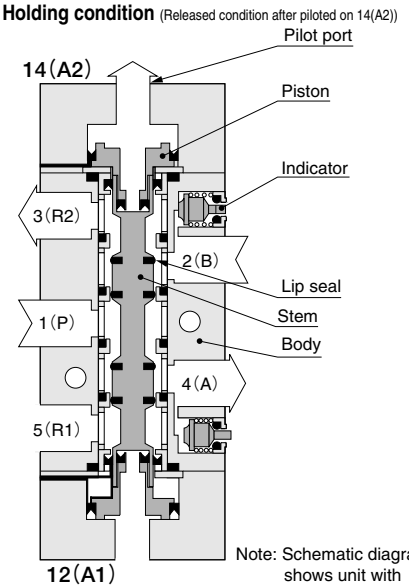

Note: Schematic diagram shows unit with indicator.

**Double pilot**




**300-4A2**

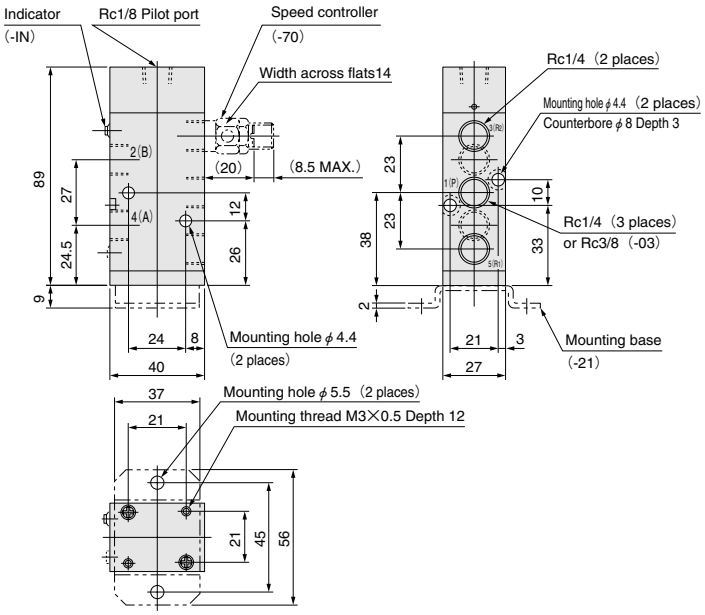
**Holding condition** (Released condition after piloted on 14(A2))



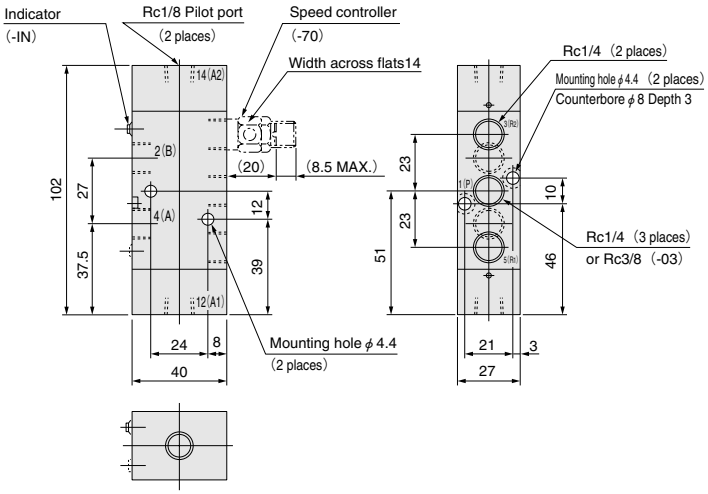

Note: Schematic diagram shows unit with indicator.

## Dimensions of Air Piloted Valve (mm)

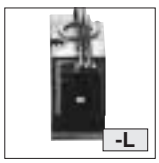
### 300-4A




### 300-4A2



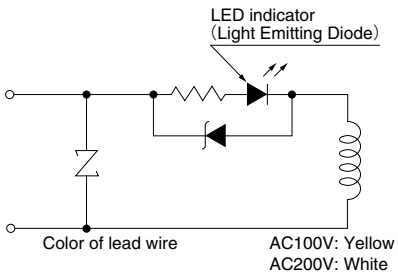

## LED indicator




Integrated LED indicator for confirmation of operation in the compact cover offers a clear monoblock look.

●When ordering, enter **-L** before the voltage code.

### AC100V AC200V




Color of LED indicator AC100V: Yellow
AC200V: Green

### DC24V