Air Catch Sensor
Series ISA2

Detection distance
0.01 to 0.5 mm

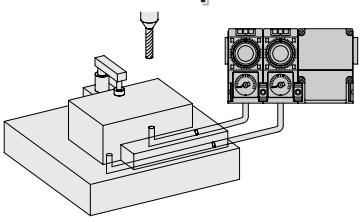
Repetition accuracy
0.01 mm or less

Model	Detection distance	Detection accuracy Note)
ISA2-G	0.01 to 0.25 mm	±0.01 mm or less
ISA2-H	0.03 to 0.5 mm	

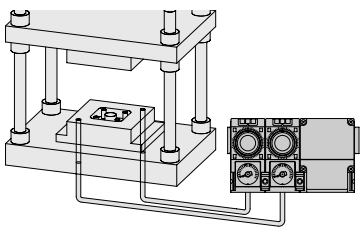
Note) Detection distance: 0.01 to 0.15 mm (ISA2-G), 0.03 to 0.15 mm (ISA2-H)
Supply pressure: At supply pressure 100 to 200 kPa

2 Port Solenoid Valve with Manual Lock is newly added.

To check the workpiece position on the reference plane



Position check of metal mold

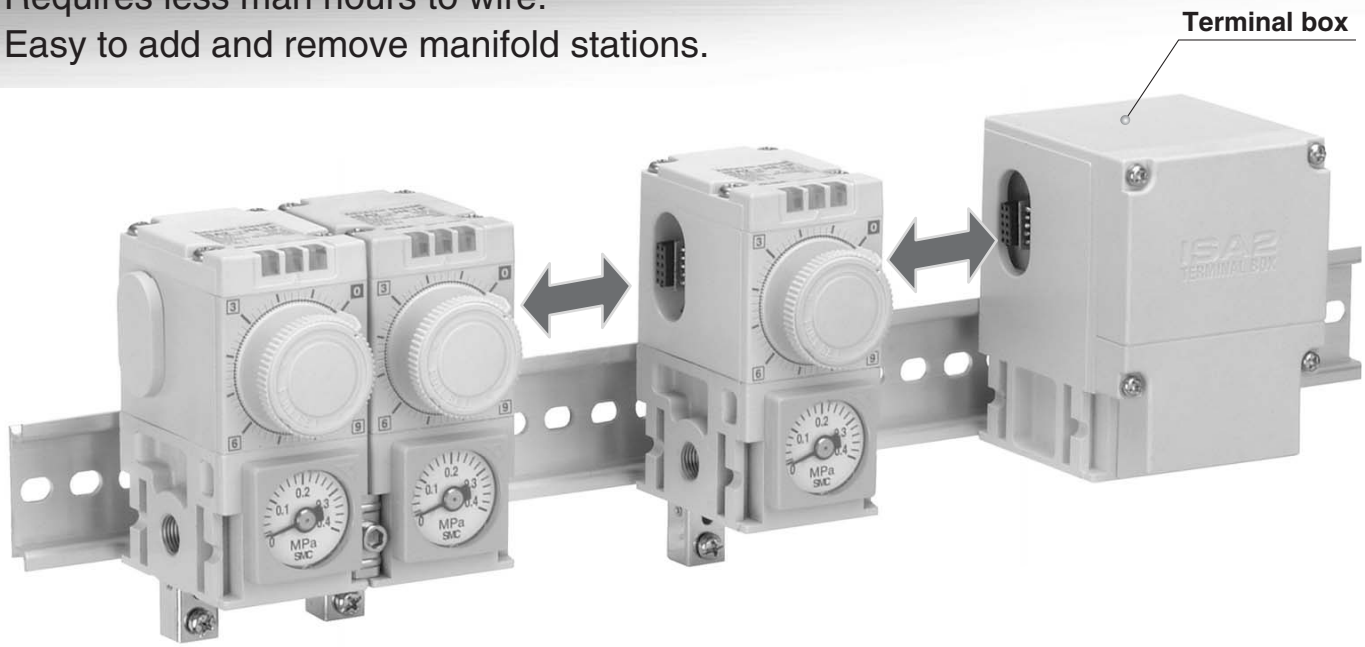


Stable detection of 0.01 to 0.5 mm clearance

Due to the pneumatic bridge circuit and semiconductor pressure sensor, the non-contact type sensor is hardly affected by fluctuations in the supply pressure.

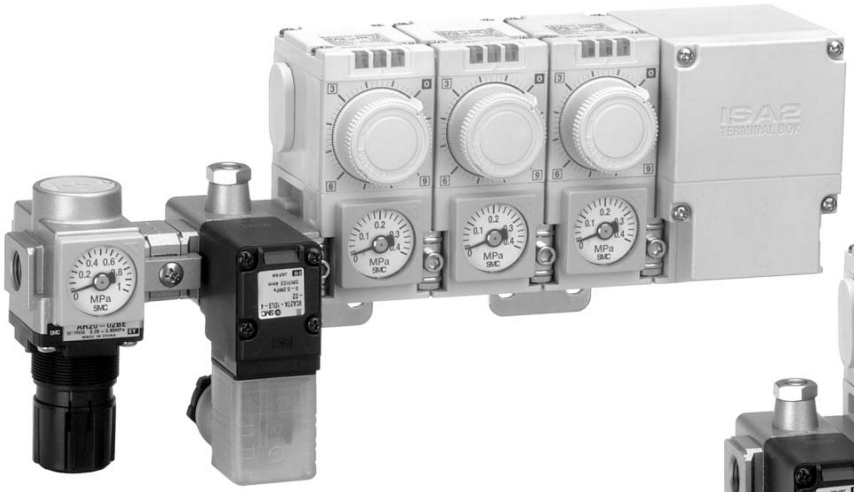
Plug connectors (Centralized wiring)

Requires less man hours to wire.
Easy to add and remove manifold stations.



Modular construction

Requires less man hours to wire.

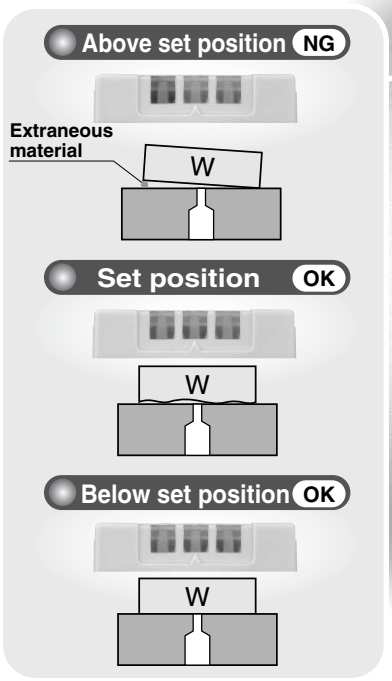


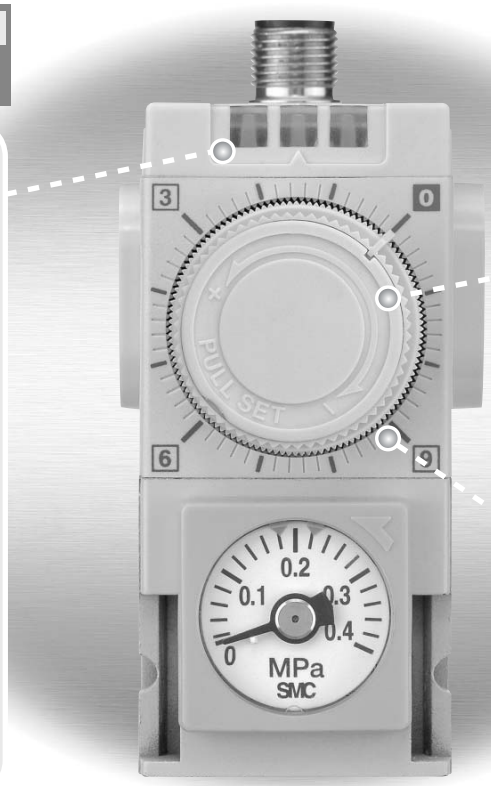
With regulator + 2 port solenoid valve

With 2 port solenoid valve

Optimum position is known at a glance.

LED level meter





Easy-to-operate **large dial**

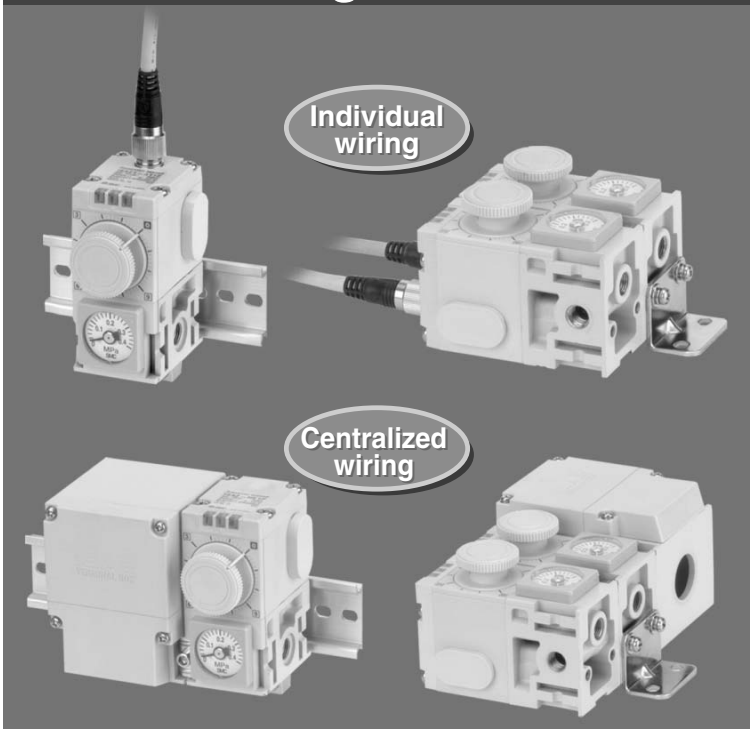
Scale provides guidelines for set position.

Minimum operating pressure 30 kPa (ISA2-G)

Energy consumption can be reduced compared with the conventional models (Conventional models: 50 kPa)

Position of supply port: Either right side or left side is available.

2 wiring methods



Variations

Model	ISA2-G	ISA2-H
Operating pressure range	30 to 200 kPa	50 to 200 kPa
Detection distance	0.01 to 0.25 mm	0.03 to 0.5 mm
Output type	NPN open connector, PNP open collector	
Electrical entry	Lead wire with connector (Individual wiring) Terminal box (Centralized wiring)	
Mounting	DIN rail, Bracket	
Number of manifold stations	1 to 6 stations	
Port size	Rc, NPT, G 1/8	
Enclosure	IP66 (IP65 for solenoid valve. Regulator and pressure gauge are open type.)	

Air Catch Sensor
Series ISA2

How to Order

Manifold

Without control unit IISA2 N **PL** – **3** **B**

With control unit IISA2 **C** **SL** – **3** **B** **1** **D** **E2**

Control unit

C	With regulator + 2 port solenoid valve
V	With 2 port solenoid valve

Electrical entry and supply port position

SR	Centralized wiring with supply port on the right
SL	Centralized wiring with supply port on the left
PR	Individual wiring with supply port on the right
PL	Individual wiring with supply port on the left

Note) The supply port position is the one when the switch is viewed from the front.

Stations

1	1 station
2	2 stations
3	3 stations
4	4 stations
5	5 stations
6	6 stations

Option

Nil	Without bracket
B	With bracket
D	With mounting bracket for DIN rail

Note) DIN rail must be ordered separately. (Refer to the page 16-8-18.)

Voltage of 2 port solenoid valve

1	100 VAC
2	200 VAC
3	110 VAC
4	220 VAC
5	24 VDC
6	12 VDC
36	230 VAC

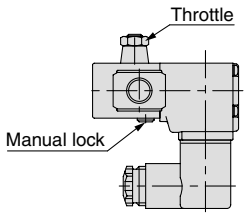
Pressure gauge of regulator Note 1)

A*	Without pressure gauge Note 2)		
E2	MPa single notation	0.2 MPa	Square embedded pressure gauge
Z2*	PSI single notation		
E4	MPa single notation	0.4 MPa	
Z4*	PSI single notation		
G2	MPa single notation	0.2 MPa	Round pressure gauge
P2*	MPa-PSI double notation		
G4	MPa single notation	0.4 MPa	
P4*	MPa-PSI double notation		

Note 1) Due to new Japanese weight and measurement legislation, PSI notation type cannot be sold or used in Japan.
Note 2) The pressure gauge port is Rc 1/8.
* Manufactured upon receipt of order.

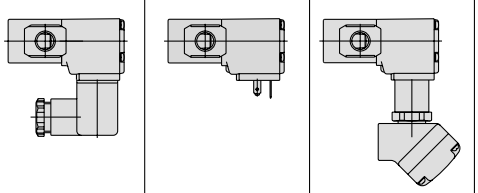
Throttle/Manual lock of 2 port solenoid valve

Nil	Without throttle, without manual lock
C	With throttle, without manual lock
W	Without throttle, with manual lock
M	With throttle, with manual lock



Electrical entry of 2 port solenoid valve

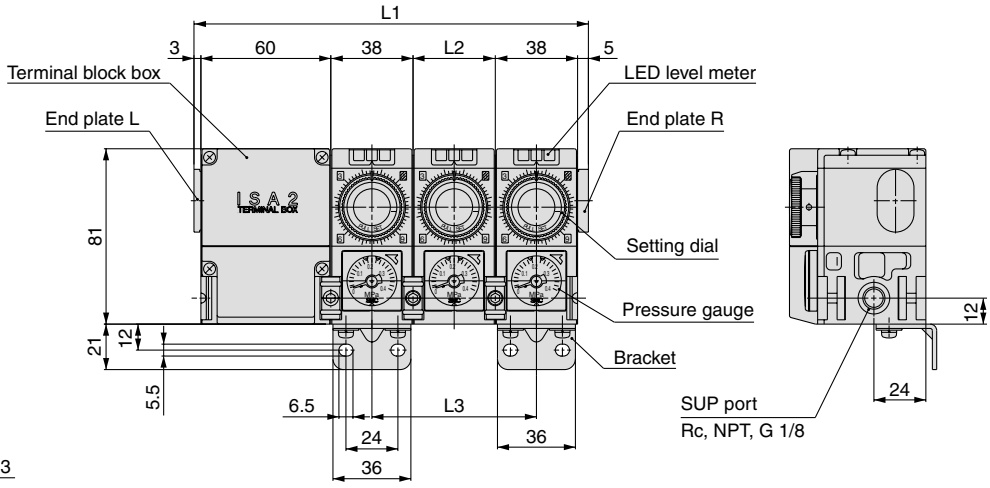
D : DIN connector **DL:** DIN connector (With indicator light)	**D0:** DIN connector (Without connector)	**T** : Conduit terminal **TL:** Conduit terminal (With indicator light)

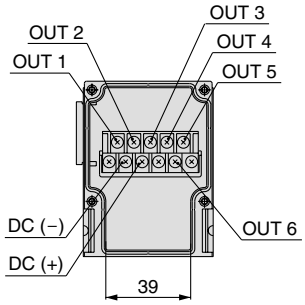


Dimensions: Centralized Wiring Type

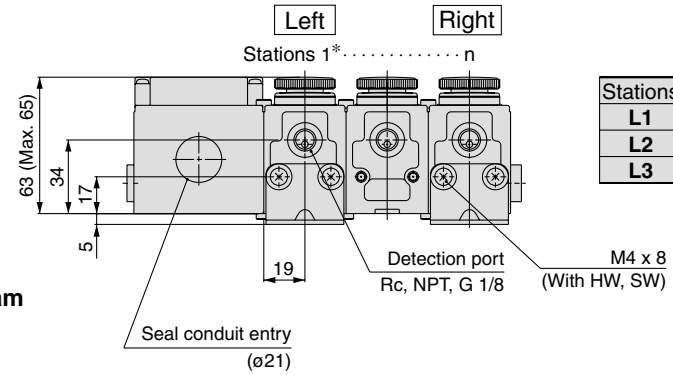
∗ When the SUP port is on the left, the stations are sequentially numbered from the side of the terminal block box.

With bracket





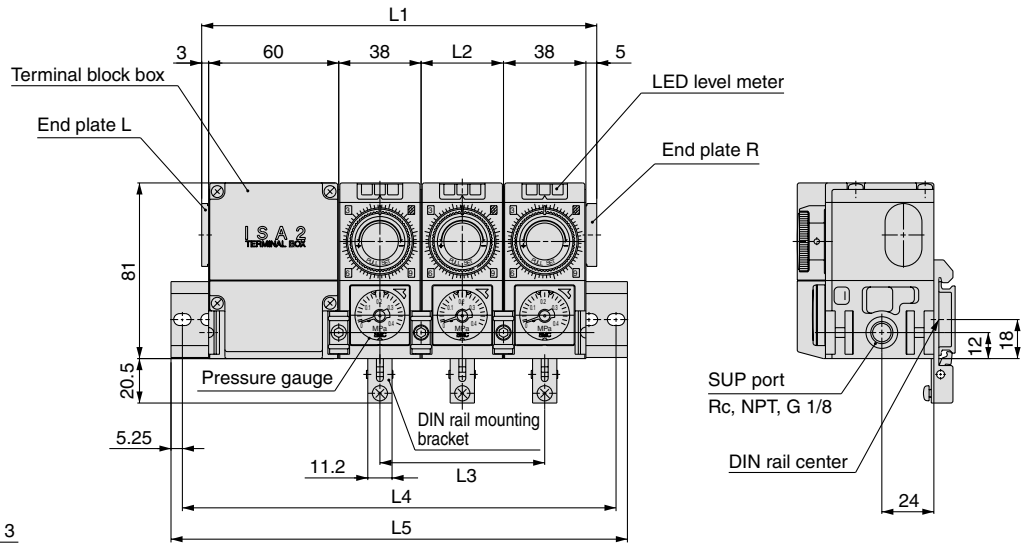
Terminal block box wiring diagram

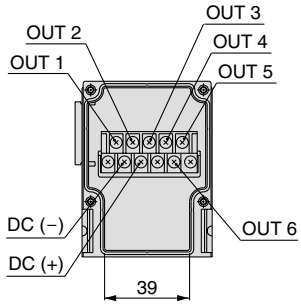


Stations	1	2	3	4	5	6
L1	106	144	182	220	258	296
L2	—	—	38	76	114	152
L3	—	38	76	114	152	190

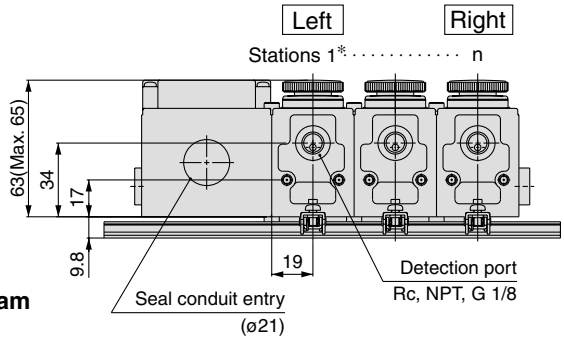
For the bracket attachment position, refer to page 16-8-16.

With DIN rail





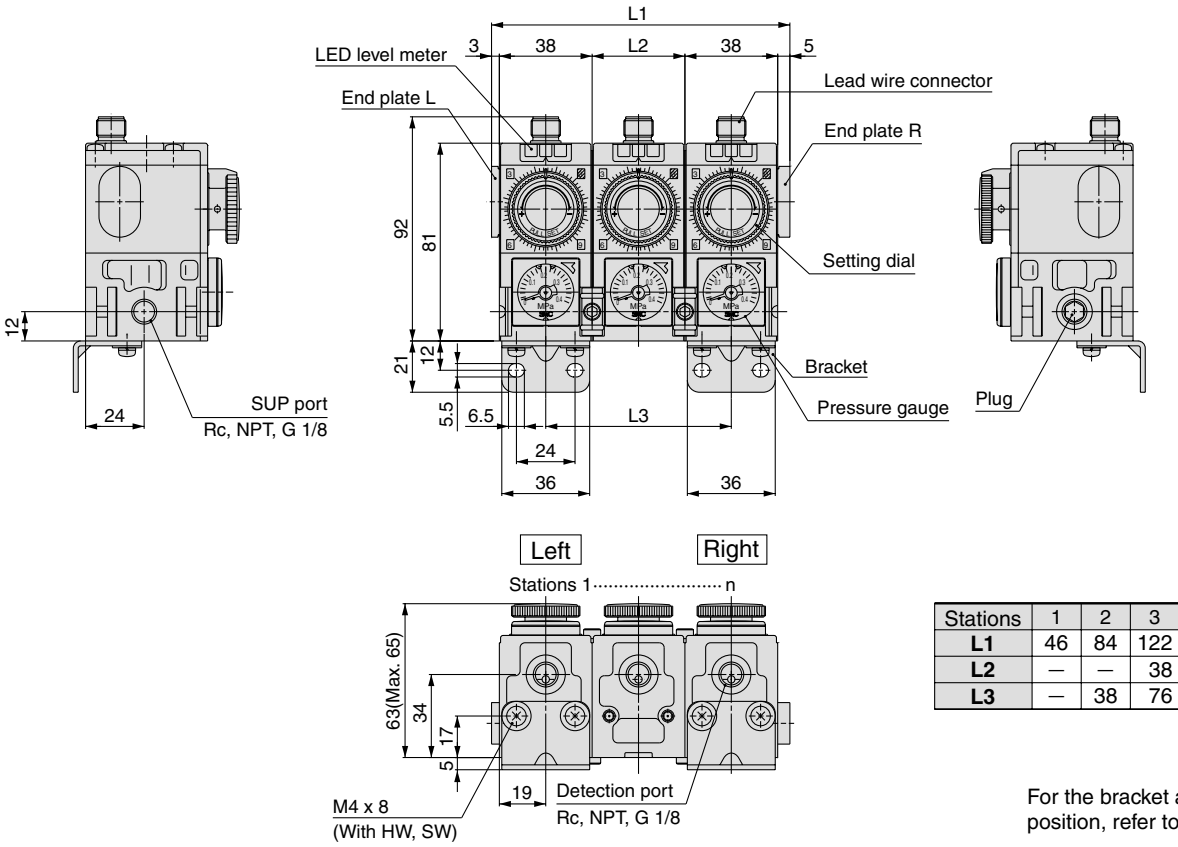
Terminal block box wiring diagram



Stations	1	2	3	4	5	6
L1	106	144	182	220	258	296
L2	—	—	38	76	114	152
L3	—	38	76	114	152	190
L4	120	162.5	200	237.5	275	312.5
L5	135.5	173	210.5	248	285.5	323

Dimensions: Individual Wiring Type

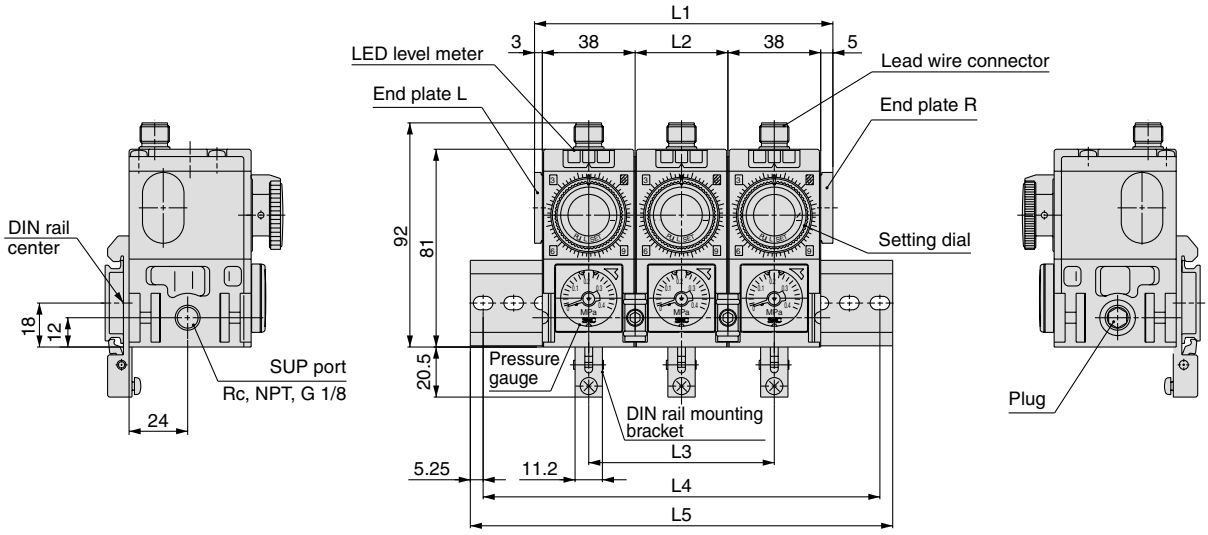
With bracket



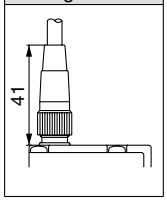
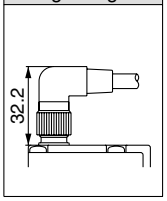
Stations	1	2	3	4	5	6
L1	46	84	122	160	198	236
L2	—	—	38	76	114	152
L3	—	38	76	114	152	190

For the bracket attachment position, refer to page 16-8-16.

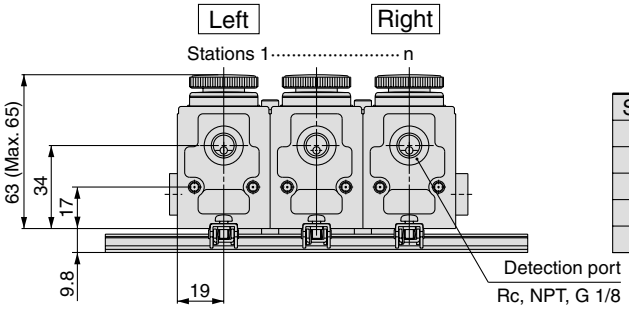
With DIN rail



Electrical entry dimensions

Straight union	Right angle
	

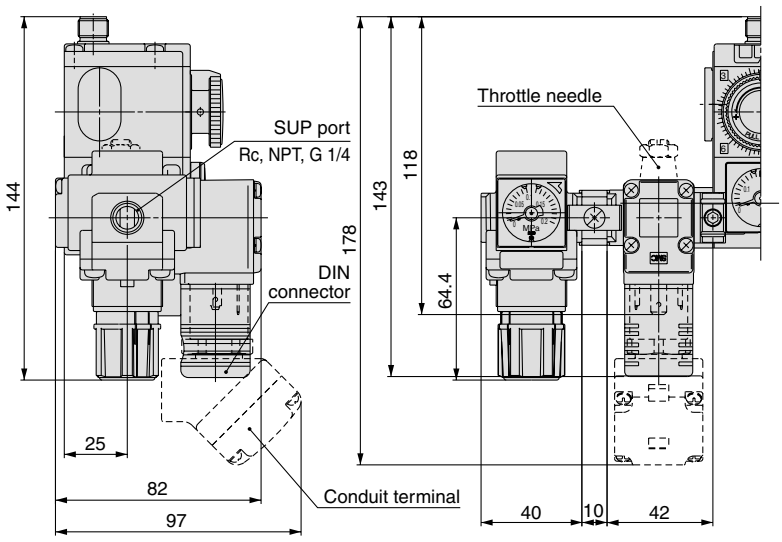
The direction of a right angle connector cannot be changed.



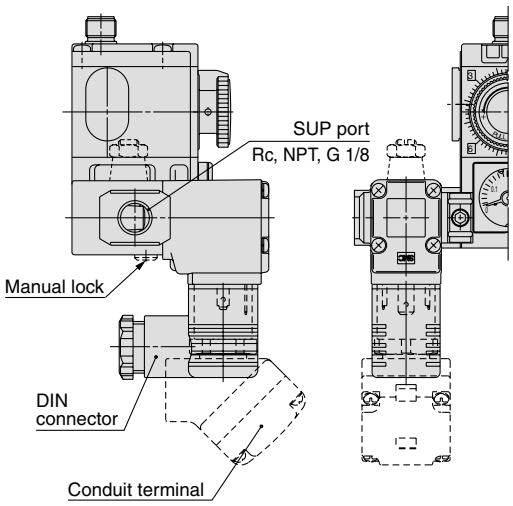
Stations	1	2	3	4	5	6
L1	46	84	122	160	198	236
L2	—	—	38	76	114	152
L3	—	38	76	114	152	190
L4	62.5	120	162.5	200	237.5	275
L5	73	135.5	173	210.5	248	285.5

Dimensions: With Control Unit

SUP port on the left

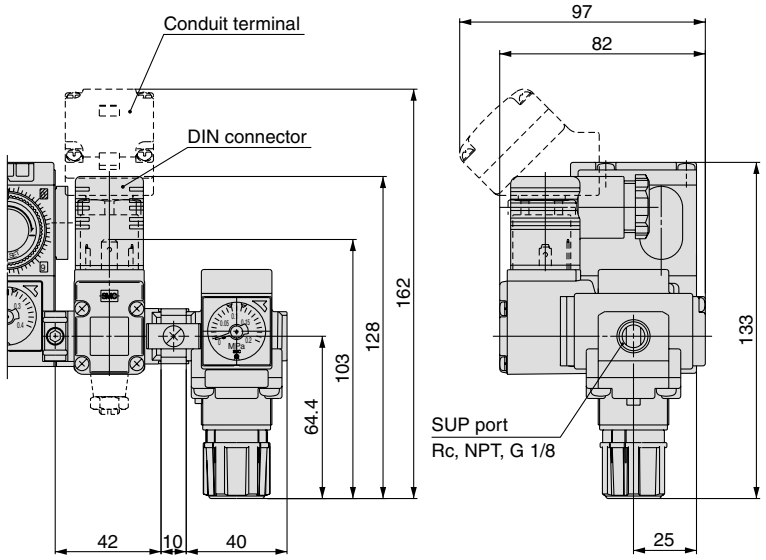


With regulator + 2 port solenoid valve

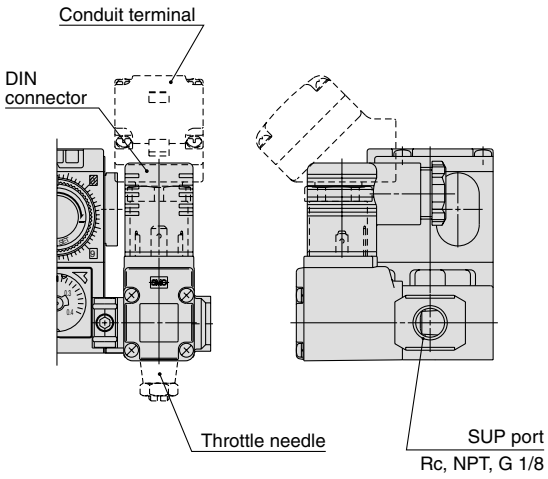


With 2 port solenoid valve

SUP port on the right



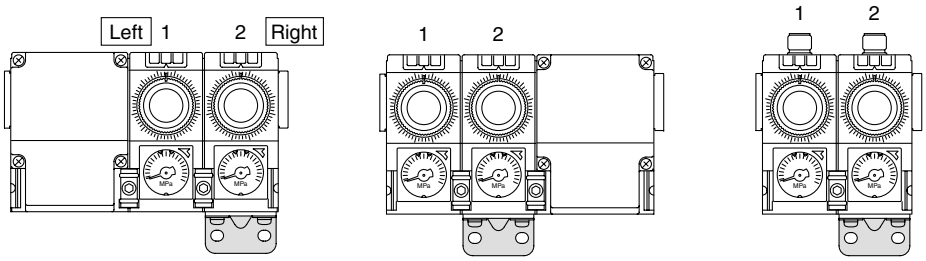
With regulator + 2 port solenoid valve



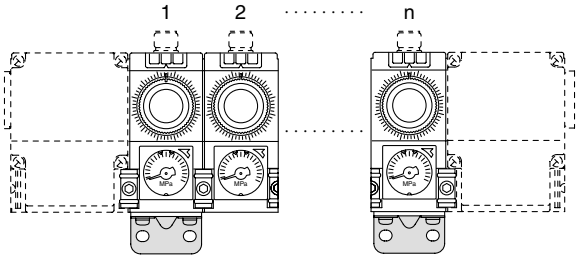
With 2 port solenoid valve

Bracket Mounting Position

With 2 stations, the bracket is mounted on the second sensor from the left.

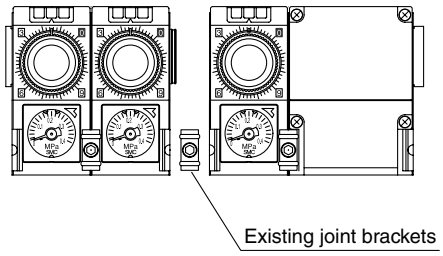


With n stations, the bracket is mounted on the first and "n" th sensor from the left.



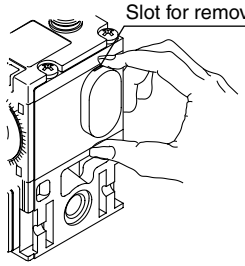
Addition of Manifold Stations

1. Disassembly



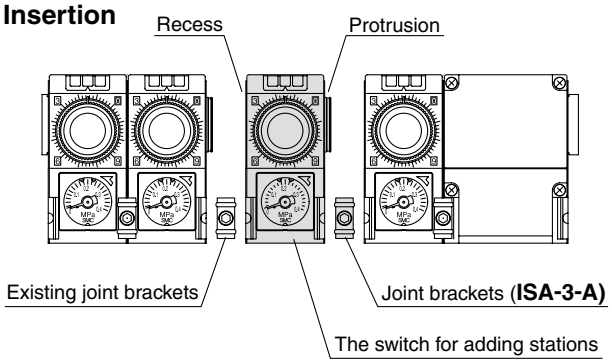
1. Loosen the screws and remove the 2 mounting brackets on the front and back side.
2. Disassemble the switch carefully so that the O-ring on the SUP port will not be detached.

End plate removal



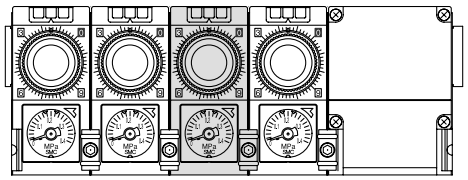
Hook the fingers on the top and bottom removal grooves to pull out the plate.
It can be removed by pulling horizontally.

2. Insertion



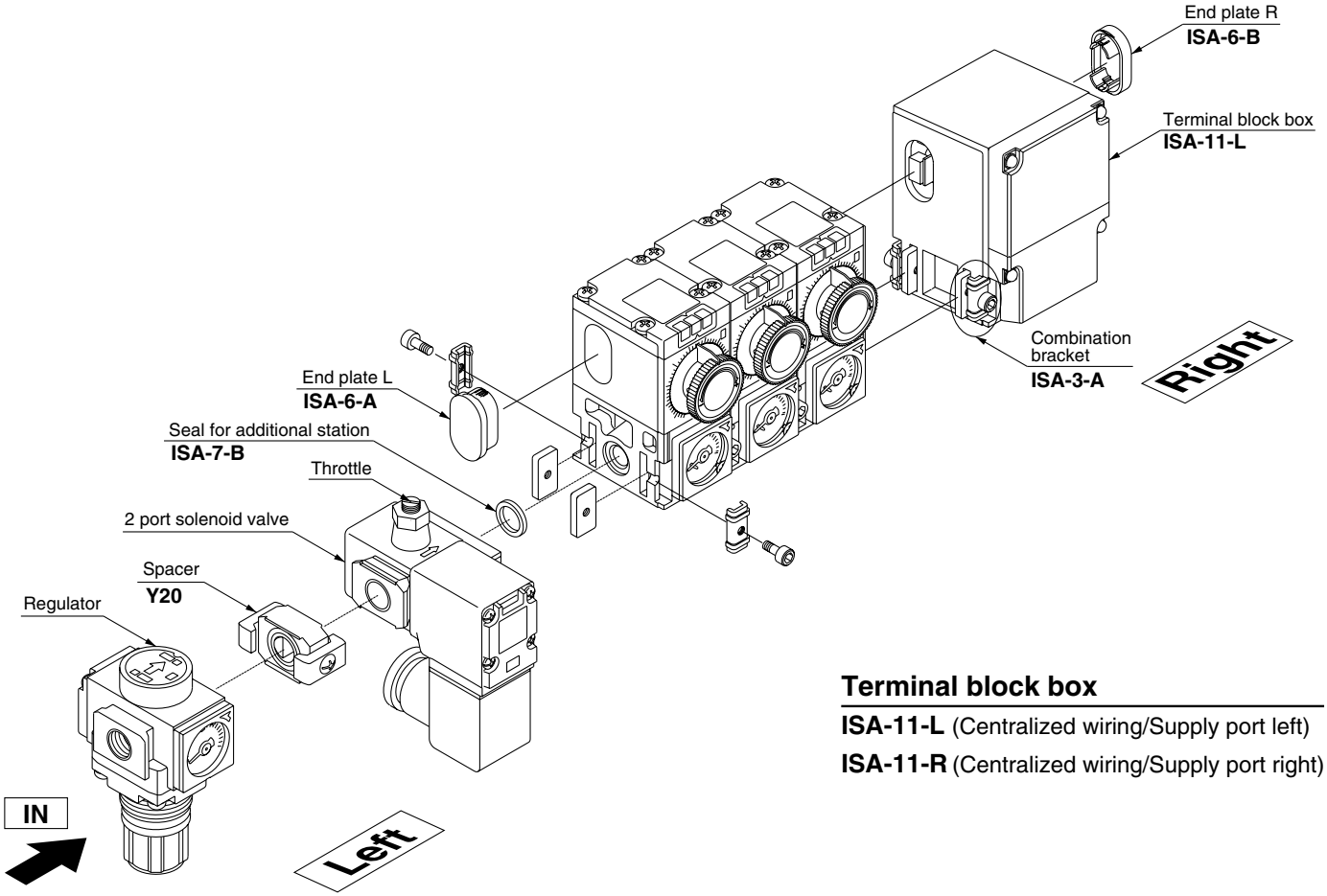
1. Fit seal for additional station (**ISA-7-B**) to the recess of the SUP port of the additional switch.
2. Fit the protrusion of the additional switch into the existing switch.
3. Mount joint brackets (**ISA-3-A**) at 2 positions.
Note) Perform temporary tightening of screws.
4. Confirm that the recess of the SUP port of the existing switch has seal for additional station attached.
5. Fit the protrusion of the existing switch into the recess of the additional switch.
6. Mount the existing joint bracket.
Note) Perform temporary tightening of screws.

3. Assembly



1. Tighten the joint brackets with the prescribed tightening torque of 1.2 N·m.
2. Arrange pneumatic piping and confirm that there is no air leakage from new joints.

Parts List



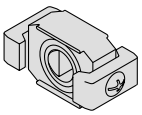
Terminal block box

ISA-11-L (Centralized wiring/Supply port left)

ISA-11-R (Centralized wiring/Supply port right)

Spacer

Y20



Seal for additional station

ISA-7-B

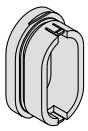
When 2 air catch sensors are connected or when a 2 port solenoid valve is connected to the left:

ISA-7-A

When a 2 port solenoid valve is connected to the right:

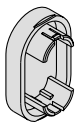
End plate L

ISA-6-A



End plate R

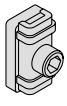
ISA-6-B



Joint bracket

ISA-3-A

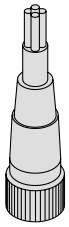
A pair consists 1 set.



Lead wire with connector (Individual wiring type)

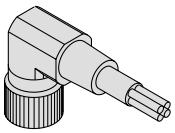
ISA-8-A

Straight, 5 m



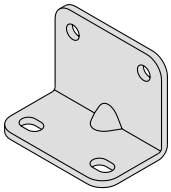
ISA-8-B

Right angle, 5 m



Bracket

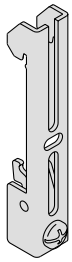
ISA-4-A



With mounting screw 2 pcs.

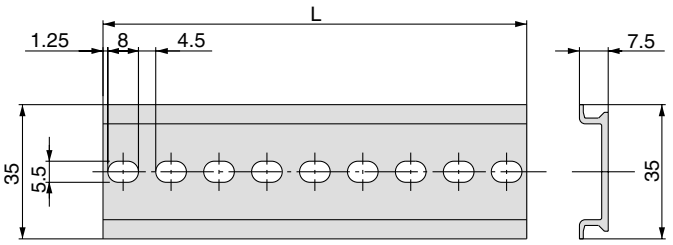
DIN rail mounting bracket

ISA-9-A



DIN Rail

ISA-5-□



Part no.	L	Applicable models	
		Individual wiring type	Centralized wiring type
ISA-5-1	73.0	IISA2□P□-1	—
ISA-5-2	135.5	IISA2□P□-2	IISA2□S□-1
ISA-5-3	173.0	IISA2□P□-3	IISA2□S□-2
ISA-5-4	210.5	IISA2□P□-4	IISA2□S□-3
ISA-5-5	248.0	IISA2□P□-5	IISA2□S□-4
ISA-5-6	285.5	IISA2□P□-6	IISA2□S□-5
ISA-5-7	323.0	—	IISA2□S□-6

Pressure Gauge for Air Catch Sensor

Square embedded pressure gauge

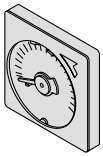
GC3 – □ 4 AS

Notation specifications

Nil	MPa single notation
P	PSI single notation

Maximum pressure indication

2	0.2 MPa
4	0.4 MPa



Round pressure gauge

G36 – □ 4 – □ 01

Notation specifications

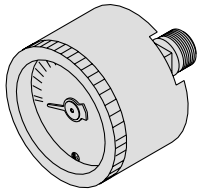
Nil	MPa single notation
P Note)	MPa-PSI double notation

Maximum pressure indication

2	0.2 MPa
4	0.4 MPa

Connection thread

Nil	R 1/8
P	NPT 1/8



Note) For double notation of MPa and PSI, add "-X30" at the end of part number.
Example) G36-P4-01-X30

Regulator

AR 20 – □ 02 E – 1 □

Thread type

Nil	Rc
N	NPT
F	G

Option (The shape of pressure gauge) Note 2)

Nil	None
E	Square embedded pressure gauge (With limit indicator)
G Note 1)	Round pressure gauge (With limit indicator)

Note 1) The pressure gauge port is Rc 1/8. The pressure gauge is included in the package (not assembled).
Note 2) Order individually when 0.4 MPa gauge is required.

Option specification

Nil	None
N	Non-relieving
R	Flow direction: Right to left
Z Note 1)	Unit representations on the label and pressure gauge are PSI and °F

When specifying more than one option, enter symbols first in numerical, then in alphabetical orders.

Note 1) Compatible with thread type NPT. Under the New Measurement Law, this type is only sold outside Japan. (The SI unit is used inside Japan.) In all cases, with the exception of NPT, add "-X2025" at the end of the order number. Example) AR20-02E-1-X2025

Standard Specifications

Model			AR20
Port size			1/4
Fluid			Air
Proof pressure			1.5 MPa
Maximum operating pressure			1.0 MPa
Set pressure range			0.02 to 0.2 MPa
Gauge port size Note 1)			1/8
Relief pressure			Set pressure + 0.05 MPa {at relief flow of 0.1 ℓ/min(ANR)}
Ambient and fluid temperature			−5 to 60°C (No condensation)
Construction			Relieving type
Weight (kg)			0.29
Pressure gauge	0.2 MPa	Round Note 2)	G36-2-□01
		Square embedded Note 3)	GC3-2AS

Note 1) The type with square embedded pressure gauge does not have connection.
Note 2) The "□" in the part number of the round pressure gauge indicates the type of connection threads, no symbol for R and N for NPT. Contact SMC for supply of the connection thread type NPT and the pressure gauge of PSI unit representation.
Note 3) With an O-ring (1 pc.) and mounting screws (2 pcs.).

2 Port Solenoid Valve

VCA27A – 5 DL S – 4 – 02 – Q

Voltage

1	100 VAC
2	200 VAC
3	110 VAC
4	220 VAC
5	24 VDC
6	12 VDC
36	230 VAC

Port size

02	Rc 1/4
02N	NPT 1/4
02F	G 1/4

CE marked

Throttle

Nil	Without throttle and manual lock
S	With throttle
B	With manual lock
K	With manual lock and throttle

Electrical entry

D	DIN connector
DL	DIN connector (With light)
D0	DIN connector (Without connector)
T	Conduit terminal
TL	Conduit terminal (With light)

Standard Specifications

Valve specifications	Valve type			Direct operation poppet
	Fluid			Air, Inert gas
	Withstand pressure MPa			2.0
	Body material			Al
	Seal material			HNBR
	Ambient temperature °C			−20 to 60
	Fluid temperature °C			−10 to 60 (No freezing)
	Enclosure			Dustproof and jetproof (Equivalent to IP65)
	Atmosphere			Environment with no corrosive or explosive gas
	Valve leakage cm³/min (ANR)			0.2 or less
	Mounting orientation			Free
	Vibration resistance/Impact resistance m/s² Note 2)			30/150 or less
Coil specifications	Rated voltage			24/12 VDC, 100/110/200/220 VAC (50/60 Hz)
	Allowable voltage fluctuation			±10% rated voltage
	Type of coil insulation			B type
	Power consumption	DC		VCA2: 6.5 W
	Apparent power	Note 1) AC	50 Hz	VCA2: 7.5 VA
			60 Hz	

Note 1) Since the AC specifications include a rectifying device, there is no difference between the apparent power required for starting and holding.
Note 2) Vibration resistance: No malfunction resulted in a one-sweep test in a 10 to 300 Hz range in the axial and right angle directions of the main valve and armature, for both energized and de-energized states.
Shock resistance: No malfunction resulted in an impact test using a drop impact tester. The test was performed in the axial and right angle directions of the main valve and armature, for both energized and de-energized states.

Series ISA2
Specific Product Precautions 1
Be sure to read before handling.

Air Catch Sensor *Series ISA2*

Operating Environment

⚠ Warning

1. **Do not use in an environment where vibration or impact occurs. Use a bracket in an environment with vibration exceeding 30 m/s².**
2. **The enclosure of the switch conforms to IP66 and that for the solenoid valve to IP65. The pressure gauge and the regulator have open constructions. Take proper protection measures in an environment where water splashes, oil or spatters from welding may adhere to the product.**
3. **Since steel piping lacking flexibility is easily affected by moment loads or propagation of vibration, employ flexible tubing, etc., to prevent interactions of such factors.**
4. **Although CE accredited, this air catch sensor is not equipped with surge protection against lightning. Necessary counter-measures for possible lightning surge should be fitted to system components as required.**
5. **Do not operate in locations having an atmosphere of flammable, explosive or corrosive gases, which can result in fire, explosion or corrosion. The air catch sensor does not have an explosion proof rating.**

⚠ Caution

1. **When an air catch sensor is contained in a box, provide an air outlet to constantly keep the atmospheric pressure inside the box.**
   Internal pressure rises will hinder normal air discharge and may lead to possible malfunction.
2. **The air outlet is provided on the setting dial section of the air catch sensor. Do not turn off air supply to the switch if water or cutting oil splashes around the setting dial.**

Mounting

⚠ Caution

1. **If the detection nozzle is exposed to splashes of water or cutting oil, do not allow backflow from the detection nozzle to the switch body. Install the switch body at a position higher than the detection nozzle wherever possible.**

Piping

⚠ Caution

1. Piping equipment

In the piping between the switch body and the detection nozzle, do not use equipment or fittings that can possibly cause leakage or serve as resistance.

Do not use One-touch fittings in an environment where the air catch sensor is exposed to water or other liquid.

Pressure Source

⚠ Caution

1. Supply air

Since the orifice of the air catch sensor is small, prevent foreign matter from entering the equipment. For this purpose, use supply air that is dry and filtered 5 mm or better.

2. Operating pressure

Since the product adopts a semiconductor pressure sensor, keep the operating pressure not larger than 0.2 MPa.

2 Port Solenoid Valve *Series VCA*

Precautions on Design

⚠ Warning

1. Energized continuously

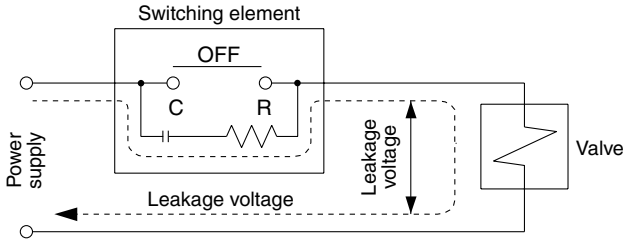
Please consult with SMC if the product is to be energized continuously for long periods of time.

Selection

⚠ Caution

1. Leakage voltage

Take special precautions if a resistor is used in parallel with the switching element or a C-R element (for surge voltage protection) is used for protection of the switching element. The valve may fail to turn off due to leakage current flowing through the resistor or C-R element.



AC coil
10% or less rated voltage

DC coil
2% or less rated voltage

Mounting

⚠ Warning

1. **Do not use the air catch sensor if the leakage amount increases or the equipment does not operate properly.**
   After installation, connect compressed air and electricity and conduct an appropriate functionality inspection to confirm that the air catch sensor is installed properly.
2. **Do not apply external force to the coil.**
   Apply a wrench to the exterior surface of the piping joint at the time of tightening.
3. **Do not use heat insulators, etc. to keep the temperature at the coil assembly.**
   Do not use a tape heater for freeze prevention except on the piping and body. If may cause the coil to burn.

Series ISA2
Specific Product Precautions 2
Be sure to read before handling.

2 Port Solenoid Valve *Series* VCA

Disassembly and Assembly

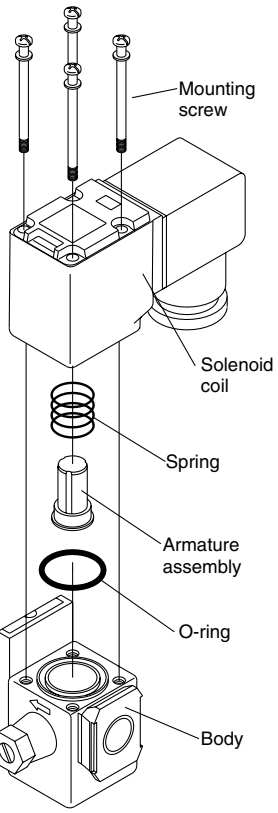
⚠ Caution

• Before the product is disassembled, shut off the power and pressure supply and exhaust the residual pressure.

• Disassembly procedure
1. Remove the top mounting screws.
2. Remove the solenoid coil, spring and armature assembly.
3. If there is any foreign matter adhering on the surface, take appropriate measures to clear it off such as an air blow or washing with neutral detergent.

• Assembly procedure
Reverse the above procedure to assemble the product.
In case the electrical entry is changed, also change the mounting orientation of the solenoid coil before assembly.

Note 1) Tighten the 4 mounting screws by each pair of corners on a diagonal line at the proper tightening torque shown below.



Proper Tightening Torque N·m

VCA27	0.4 to 0.5

Wiring

⚠ Caution

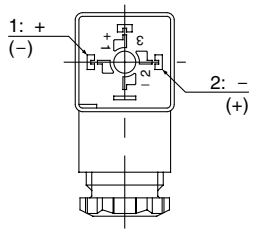
1. Use electrical wires with a conductive sectional area of 0.5 to 1.25 mm². Make sure that no excessive force is applied to the wires.
2. Adopt an electrical circuit which will not cause chattering at the contact.
3. The voltage variation must stay within the –10% to +10% range of the rated voltage. In case importance is attached to response characteristics due to use of a DC power source, keep the variation within the –5% to +5% range. The voltage drop is the value at the lead wire to which the coil is connected.

Wiring

⚠ Caution

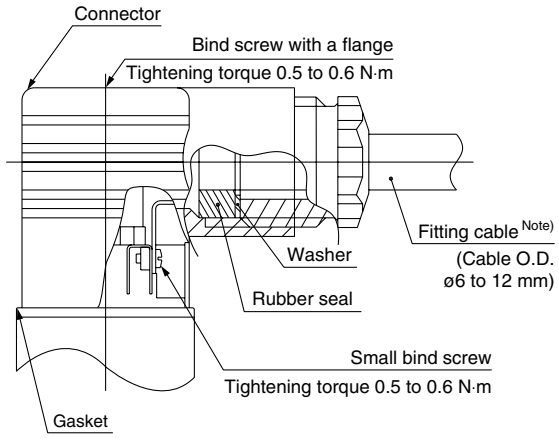
DIN connector (B type only)

The internal wiring of the DIN connector is illustrated below. Connect each terminal to the power supply.



Terminal no.	1	2
DIN terminal	+ (–)	– (+)

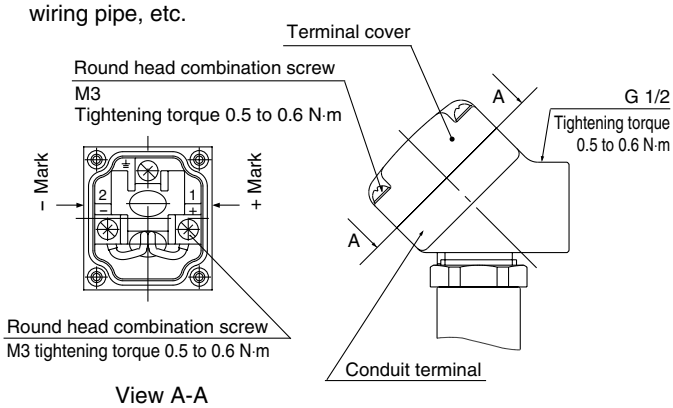
∗ No polarity.
• A cabtire cable with an O.D. ø6 to 12 mm is applicable.
• Tighten each part with an appropriate tightening torque shown below.



Note) With a cable O.D. ø9 to 12 mm, hollow the rubber sealing before use.

Conduit terminal

In case of a conduit terminal, refer to the marks below for wiring.
• Tighten each part with an appropriate tightening torque shown below.
• Seal the piping part (G 1/2) securely with a dedicated electric wiring pipe, etc.



View A-A
(Internal connection diagram)

Specific Product Precautions 3

Be sure to read before handling.

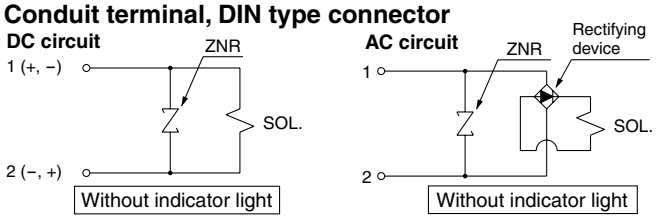
2 Port Solenoid Valve *Series VCA*

Electric Circuit

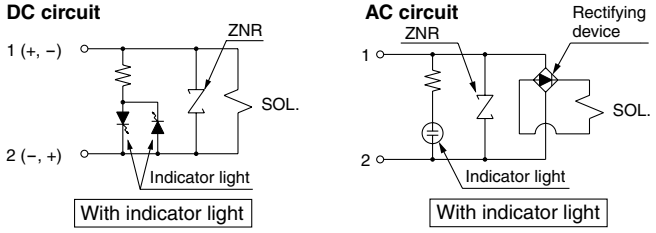
⚠ Caution

In case of series VC (B type coil)

Conduit terminal, DIN type connector



Conduit terminal, DIN type connector



Maintenance

⚠ Warning

1. Low-frequency operation

Perform valve switching at least every 30 days to prevent malfunction. Also, conduct a periodic inspection at intervals of approximately 6 months to use the product in its best condition.

Manual Operation

⚠ Warning

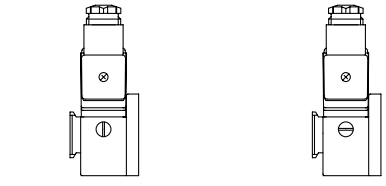
How to operate manually

Locking type (tool required)

To open valve: Rotate to the right by 90° using a flat head screwdriver. It will still hold open even when the driver removed.

To close valve: Rotate to the left by 90° to achieve the former closed position.

Electrical operations should be undertaken when the valve is closed.



Valve closed (vertical slit) Valve open (horizontal slit)

Regulator *Series AR*

Mounting and Adjustment

⚠ Warning

1. The adjustment knob must be handled manually. Use of tools may cause damage to the product.

2. Check the inlet and outlet pressure indications on the pressure gauge while setting. If the knob is turned to excess, it may cause internal parts to fracture.

3. Since products for 0.02 to 0.2 MPa settings come with a pressure gauge for 0.2 MPa, do not apply pressure exceeding 0.2 MPa. It may cause damage to the pressure gauge.

⚠ Caution

1. Unlock the knob before pressure adjustment and lock it again when the adjustment is over.
Incorrect procedure may cause damage to the knob or lead to the outlet pressure fluctuation.
- Pull the adjustment knob to release the lock. An orange colored line is provided at the bottom of the adjustment handle for visual checking.
- Push the pressure regulation knob to engage the lock. If it does not lock easily, turn the knob slightly clockwise or counterclockwise until the orange colored line goes out of sight.

2. When the product is installed, leave a space of 60 mm on the side of the valve guide (opposite to the knob) for maintenance and inspection.