

3-Color Display

Digital Gap Checker

New

New

F type 0.01 to 0.03 mm
Rated distance range (Displayable/Settable range: 0 to 60)

G type 0.02 to 0.15 mm
Rated distance range (Displayable/Settable range: 10 to 300)

H type 0.05 to 0.30 mm
Rated distance range (Displayable/Settable range: 30 to 500)



RoHS

Switches/
Sensors

ISA3

PFMB

LFE

Check at a glance if the workpiece is placed or not!

Main screen

ON: Placed

ON

Workpiece

OFF: Not placed

OFF

Workpiece

The clearance distance between the detection surface and the workpiece can be found intuitively!

Sub screen

Switch output/
Screen indication

OFF

OFF

...

OFF

00000

ON

00000

ON

00000

ON

00000

When the workpiece is away from the detection surface, the level meter will be away from the switch point value bar.

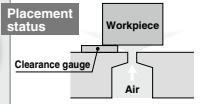
When the workpiece is seated on the detection surface, the level meter will reach the switch point value bar.

The number of level meter symbols changes depending on the clearance between the workpiece and the detection surface. A clearance which cannot actually be seen can be indicated on the display.

Simple Setting

Setting is possible while checking the displayed value!

3 steps



STEP1



Press the SET button.

STEP2



Press the UP or DOWN buttons to set the switch point value.

STEP3



Press the SET button to complete.

Snap shot function

Pressing the UP and DOWN buttons for a minimum of 1 second will make the switch point the same as the current displayed value!

Page 533

Energy Saving

Page 534

• Air consumption: **60%** reduction * For G type

Environmental Resistance

Page 533

• Improved drainage resistance: **10** times or more

* Compared with the ISA2 based on the SMC's specific testing condition (oil proof test).

• Easier maintenance

Series ISA3

Manifold

Page 535



With control unit

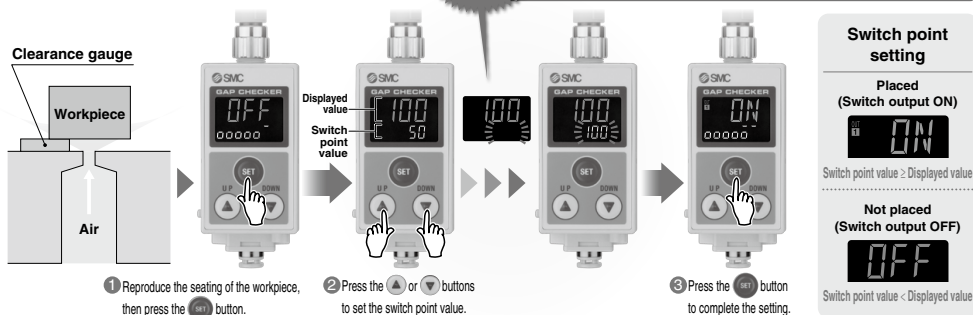


3 Step Setting (Switch Point Change Mode)

A simple operation to enter the switch point value (point at which the clearance reaches the switch point value)

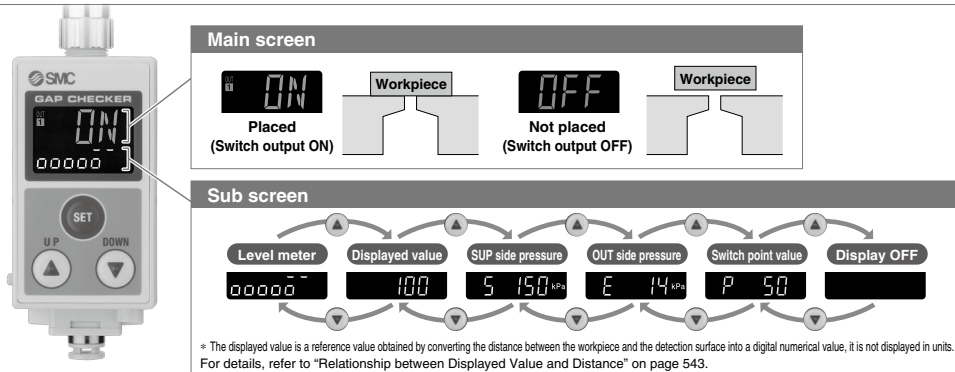
Snap shot function

Pressing the Δ and ∇ buttons for a minimum of 1 second, then releasing the buttons when the displayed switch point value disappears, will make the switch point the same as the current displayed value.



Features of the 2-Screen, 3-Color Digital Display

The seating condition can be checked at a glance. The sub screen display can be selected from 6 display options.



Improved Environmental Resistance

Easier maintenance

The internal orifice part can be removed for cleaning. It is not necessary to remove the piping or metal connection fitting for cleaning when the product is installed in the user's equipment.



* If the orifice is taken out, perform the switch point setting again.

Measures against drainage

Drainage resistance: 10 times or more

* Based on the SMC's specific testing condition (oil proof test).
* Compared with the ISA2.

Withstand pressure expanded 3 times*

Max.: 600 kPa

* Compared with the ISA2 with 0.2 MPa pressure gauge.

High pressure flushing is possible.

* The switch output will be OFF during flushing.

**Noise
reduction**
**Energy
saving**
**Measures
against clogging**
**Switches/
Sensors**
ISA3
PFMB
LFE

A Exhaust noise

**Noise
reduction**

Zero

The existing model (ISA2) needs to exhaust air from the exhaust port due to the bridge circuit. The ISA3 does not exhaust air from the product body.

This reduces noise considerably compared with the existing model.

B Air consumption

**Energy
saving**

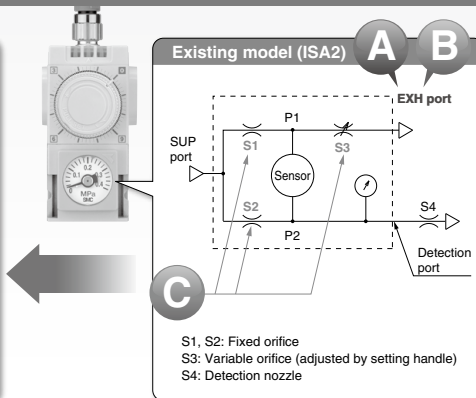
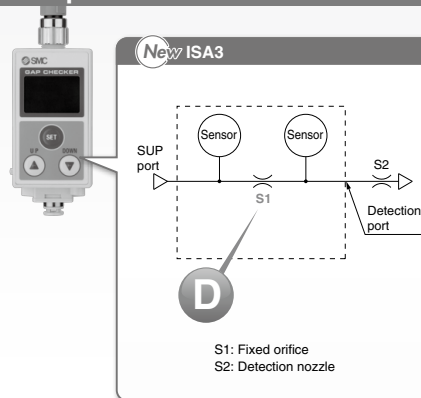
60% reduction*

The new detection principle eliminates air being exhausted from the product. This makes the flow consumption 0 L/min. when the workpiece is seated.

A much lower air consumption is required than the existing model.

* Conditions: Unseated for 5 seconds and seated for 20 seconds (For G type)

Comparison of detection circuit



C Number of orifices

**Measures
against clogging**

3 → 1

By reducing the number of internal orifices from 3 to 1, there is less possibility of variations in the output due to clogging.

By removing the setting handle for S3, variations in the detection distance are prevented.

D Orifice area ratio

**Measures
against clogging**

68% increase*

A larger orifice area provides less possibility of clogging.

Even if the orifice is clogged with foreign matter, the product construction enables cleaning with the internal orifice removed.

* Except F type

INDEX

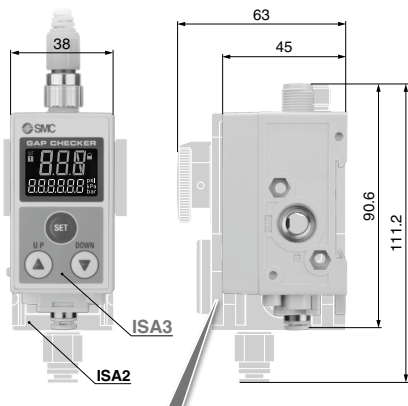
Series ISA3

● Compact & Lightweight

Volume: **40%** reduction

Weight: **55%** reduction

(Comparison between the ISA3-GC and the existing model ISA2 with One-touch fitting)



Smooth front surface without projections

● Keylock Function

A key LED turns ON when the product is locked and the button operation is disabled to prevent unintentional changes to set values.



● Piping Variations

Piping specification:
C type



Piping specification:
F type



● Mounting

Bracket

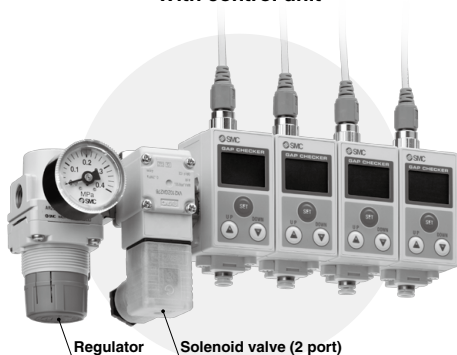


DIN rail



● Manifold

With control unit



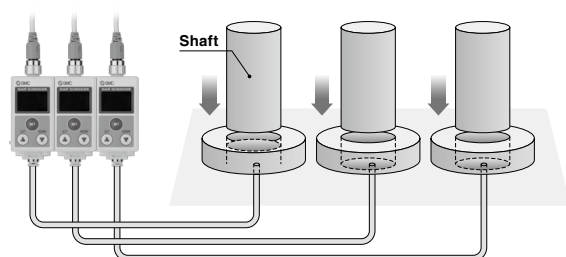
Without control unit



* Bracket mounting only

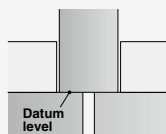
Application Examples

Confirmation of the datum level for press fitting of a shaft



ON: Placed

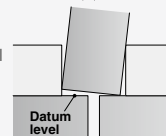
ON



Datum level

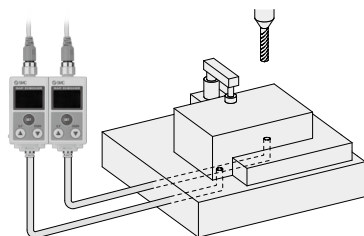
OFF: Not placed

OFF

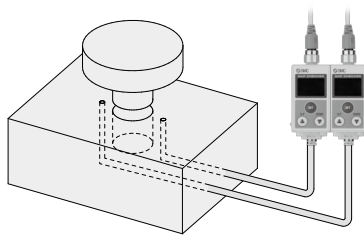


Datum level

Confirmation of close contact with the datum level for machining



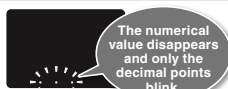
Confirmation of close contact with the workpiece for machining



Main Functions

Display OFF mode

Display OFF mode can be selected. The display can be turned OFF to reduce power consumption.



The numerical value disappears and only the decimal points blink.

Display color

The color of the main display can be set to change depending upon the output activity. The display color change makes visual identification of the output ON/OFF easier.

When ON: Green When OFF: Orange

When ON: Orange When OFF: Green

Normally: Orange

Normally: Green

Unit conversion

The pressure unit displayed on the sub screen can be changed.

Display unit	kPa	bar	psi
Minimum setting unit	1	0.01	0.1

Security code

By activating the security code, the key lock cannot be released without entering a security code.



Security code:
Input an arbitrary 3-digit value.

Displayed value compensation

The displayed value can be corrected within $\pm 20\%$ R.D. of the displayed value at the time of shipment.

Forced output

The output can be fixed to an on/off state when starting the system or during maintenance. This enables confirmation of the wiring and prevents system errors due to unexpected output.

Zero-clear of pressure display

The pressure value displayed on the sub screen can be cleared to zero.

3-Color Display Digital Gap Checker Series ISA3



How to Order

Without control unit

ISA3-GCN-M2

With control unit

ISA3-GCN-M2B-L1

Rated distance range*

F	0.01 to 0.03 mm
G	0.02 to 0.15 mm
H	0.05 to 0.30 mm

Piping specifications

	Supply side	Detection side
C	Rc1/8	ø4 One-touch fitting ^{*1}
		ø6 One-touch fitting ^{*2}
F	G1/8 ^{*3}	G1/8 ^{*3}

*1: When "F" is selected for the rated distance range.

*2: When "G" or "H" is selected for the rated distance range.

*3: Conforming to ISO1179-1

Output specifications

N	NPN output
P	PNP output

Unit specifications of pressure value

Nil	With unit conversion function (Note 1)
M	Fixed SI unit (Note 2)

Note 1) Under the New Measurement Law, sales of switches with the unit switching function have not been allowed for use in Japan.

Note 2) Unit: kPa, MPa

Stations

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

Option 1 (Cable)

Nil	Straight ^{*4}
L	Right angle ^{*4}
N	None

*4: At the factory, the options are not attached to the product, but packed together with it for shipment.

Option 2 (Bracket)

Nil	None (DIN rail mounting) ^{*5}
B	With bracket ^{*4} ^{*6}

*5: Order DIN rail separately.

*6: About the number of brackets, 1 station: 1 piece is packed, 2 stations or more: 2 pieces are packed.

Control unit

L1	<p>With control unit Regulator^{*7} AR20-□02G-1-A + Solenoid valve (2 port type) VX210ZZ2AX276</p> <p>The supply port is available only on the left side.</p>
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*7: When the piping specification is option C, the supply port for the regulator is Rc1/4.

When the piping specification is option F, the supply port for the regulator is G1/4 (according to ISO16030).

Option 2 (Bracket)

B	With bracket ^{*8}
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*8: The bracket for control unit is shipped mounted on the product.

Bracket mounting position

2 stations

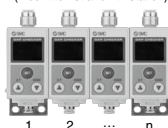
(Mount to 1st and 2nd station)



1 2

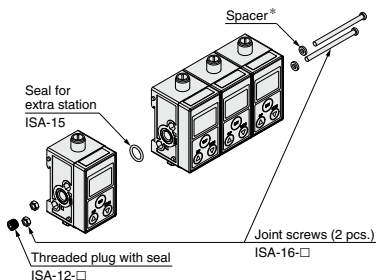
n stations

(Mount to 1st and nth station)



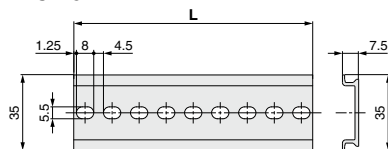
1 2 ... n

Parts List



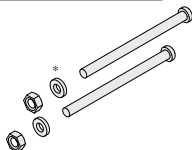
* Spacers are included for 4 and 6 stations.

■ DIN rail ISA-5-□



■ Joint screws (2 screws, 2 spacers, 2 nuts)

Stations	Part no.
2	ISA-16-2
3	ISA-16-3
4*	ISA-16-4
5	ISA-16-5
6*	ISA-16-6



■ Seal for extra station ISA-15

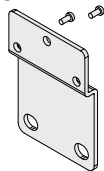


■ Threaded plug with seal ISA-12-□

Piping	Part no.
Rc1/8	ISA-12-A
G1/8	ISA-12-C



■ Bracket ISA-14



With 3 tapping
screws (3 x 8)

■ Cable with connector ZS-31-B ZS-31-C

Straight 5 m

Right angle 5 m



Stations	Part no.	L
1	ISA-5-1	73.0
2	ISA-5-2	135.5
3	ISA-5-3	173.0
4	ISA-5-4	210.5
5	ISA-5-5	248.0
6	ISA-5-6	285.5

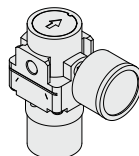
Parts List (Control Unit)

■ Regulator AR20-□02G-1-A

● Piping specifications

NII	Rc1/4
F	G1/4 *

*: Conforming to ISO16030



Refer to **the WEB catalog** or the
Best Pneumatics No. 5 for details.

■ Solenoid valve (2 port type) VX210 Z Z2A X276

● Specifications

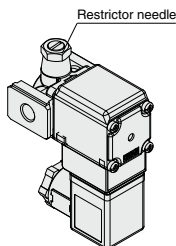
Symbol	Specifications
X276	· With restrictor · IN, OUT ports: No thread machining

● Voltage/Electrical entry

Symbol	Voltage	Electrical entry
Z2A	24 VDC	DIN terminal with light (With surge voltage suppressor)

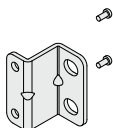
● Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
Z	Al	1/8	ø4



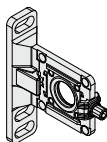
For specifications other than X276,
refer to **the WEB catalog** or the
Best Pneumatics No. 7.

■ Bracket (For with control unit) ISA-17



With 2 tapping screws (3 x 8)

■ Spacer with bracket Y200T-A

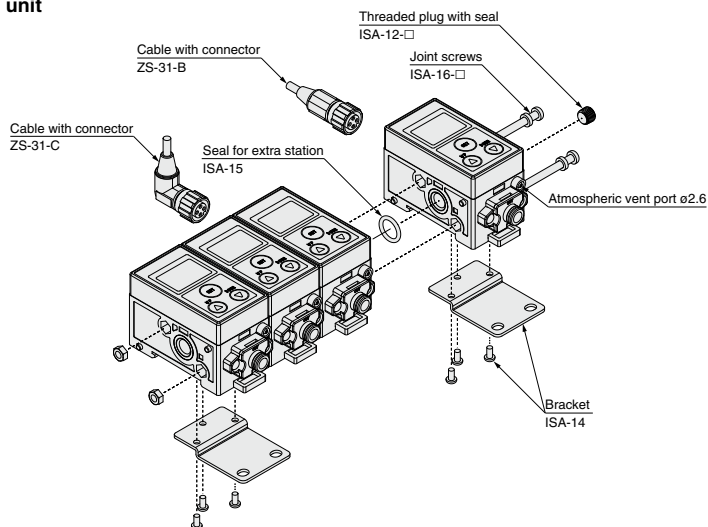


■ Modular adapter E210-U01

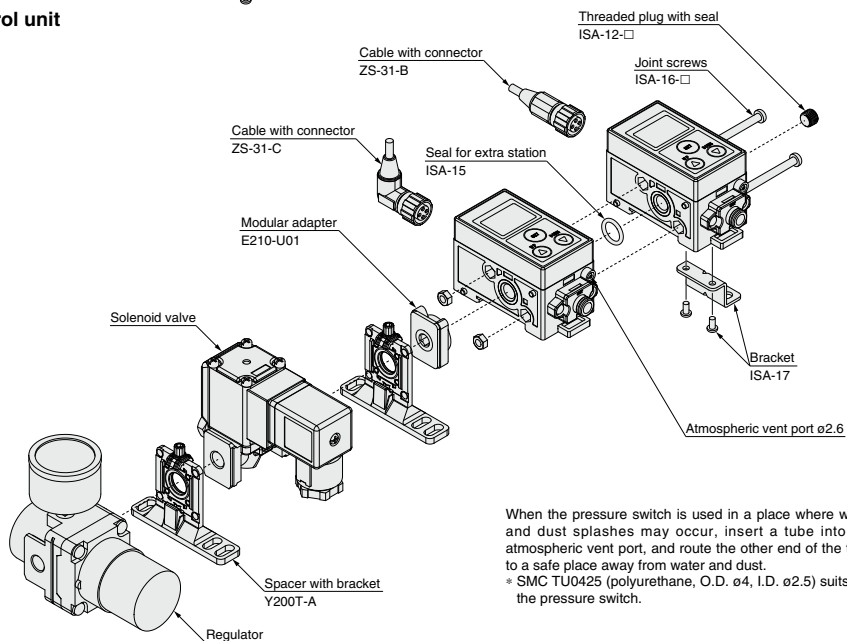


Parts Structure

Without control unit



With control unit



When the pressure switch is used in a place where water and dust splashes may occur, insert a tube into the atmospheric vent port, and route the other end of the tube to a safe place away from water and dust.
 * SMC TU0425 (polyurethane, O.D. ø4, I.D. ø2.5) suits to the pressure switch.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Specifications

For the Common Precautions for the Gap Checker, refer to "Handling Precautions for SMC Products."
For the Specific Product Precautions, refer to the Operation Manual at SMC website.

Model		ISA3-F	ISA3-G	ISA3-H
Applicable fluid		Dry air (Filtered through a 5 µm filter)		
Rated distance range		0.01 to 0.03 mm	0.02 to 0.15 mm	0.05 to 0.30 mm
Displayable/Settable range (Distance reference) *1		0 to 60 *4	10 to 300 *4	30 to 500 *4
Minimum display unit (Distance reference) *1		1		
Rated pressure range		100 to 200 kPa		
Displayable range (Pressure value) *2		-20 to 220 kPa		
Withstand pressure		600 kPa		
Detection nozzle		ø1.5 *3		
Consumption flow rate		5 L/min or less	12 L/min or less	22 L/min or less
Power supply voltage		24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)		
Current consumption		25 mA or less		
Switch output		1 output (NPN or PNP)		
	Maximum load current	10 mA		
	Maximum applied voltage	26.4 V		
	Residual voltage	1 V or less (at 10 mA)		
	Short circuit protection	Provided		
Repeatability		0.005 mm	0.010 mm	0.020 mm
Temperature characteristics (Reference: 25°C)		0.010 mm	0.015 mm	0.030 mm
Hysteresis		0 to variable (Default: 3)	0 to variable (Default: 20)	
Display		2-screen display, LCD Main screen: 3-digit, 7-segment 2-color (Orange/Green) Sub screen: 6-digit, 7-segment 1-color (White)		
Environment		IP67 equivalent		
		Operating: 0 to 50°C, Stored: -20 to 70°C (No condensation or freezing)		
		Operating/stored: 35 to 85% RH (No condensation)		
		1000 VAC or more (in 50/60 Hz) for 1 minute between terminals and housing		
		2 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing		
Piping specifications	For piping type C	Supply port	Rc1/8	
		Detection port	ø4 One-touch fitting	

*1: For details, refer to "Relationship between Displayed Value and Distance" on page 543.

*2: The pressure value will be indicated on the sub screen.

*3: For details of the detection nozzle, refer to the figures on page 543.

*4: If hysteresis is set to 3 (Default setting), "Displayable/Settable range of F type" is limited to 57. If hysteresis is set to 20 (Default setting), "Displayable/Settable range of G type" is limited to 280 and "Displayable/Settable range of H type" is limited to 480.

Rated Distance Range and Displayable/Settable Range

⚠ Caution

The displayed value is a reference value obtained by converting the distance between the workpiece and the detection surface into a digital numerical value, it is not displayed in units.

For details, refer to "Relationship between Displayed Value and Distance" on page 543.

Rated distance range: Distance within which the product meets the specifications.

Displayable/Settable range: It is possible to display or set values, but it is not guaranteed to meet the specifications.

Model	Distance					
	0 mm	0.02 mm	0.05 mm	0.15 mm	0.30 mm	0.50 mm
ISA3-F type						
ISA3-G type						
ISA3-H type						

Rated distance range

Displayable/Settable range

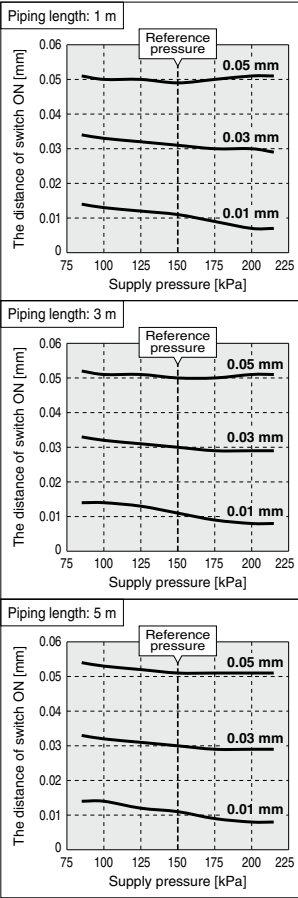
Supply Pressure Dependence Characteristics

The distance for the product to turn ON varies depending on the supply pressure.
The graphs below show the variation of the distance for the product to turn ON, for 3 types of gap, by changing the supply pressure (± 50 kPa) when the product is set to turn ON at 150 kPa supply pressure.

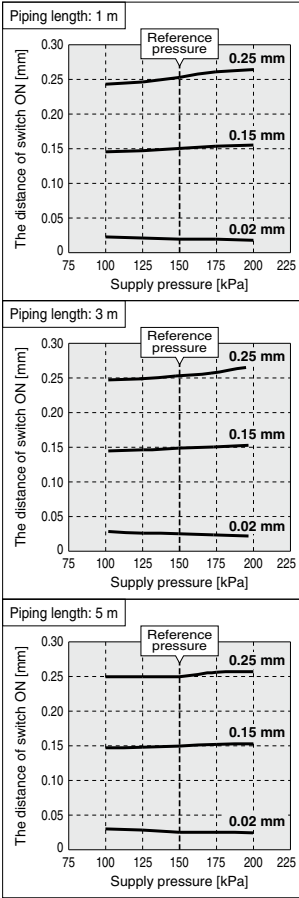
Test conditions	Detection nozzle: $\varnothing 1.5$ Piping: F type $\varnothing 4 \times \varnothing 2.5$ tube/G, H type $\varnothing 6 \times \varnothing 4$ tube Reference pressure: 150 kPa
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* Use within the rated pressure range (100 kPa to 200 kPa).
It will be impossible to measure the gap when the operating pressure is less than 80 kPa or more than 220 kPa. And the output will be OFF.
(Refer to "Relationship between Supply Pressure and Display" on page 546.)

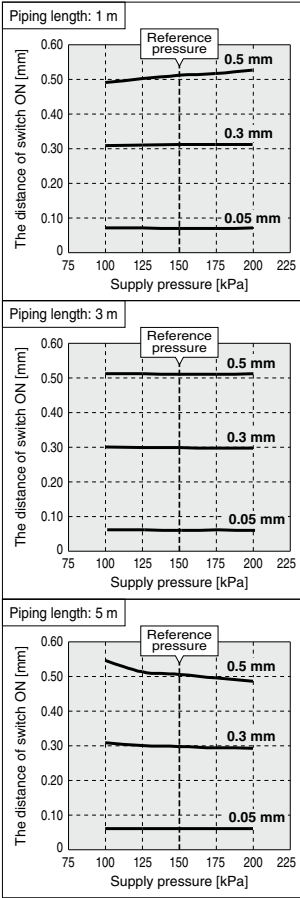
ISA3-F



ISA3-G



ISA3-H



Response Time

Response time is the elapsed time between the pressure supply and the turning ON of the switch output.

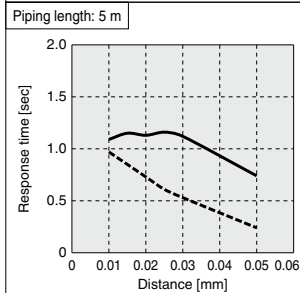
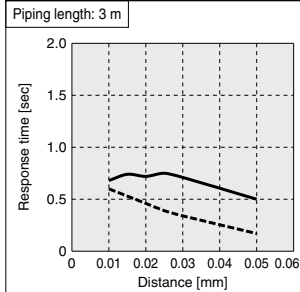
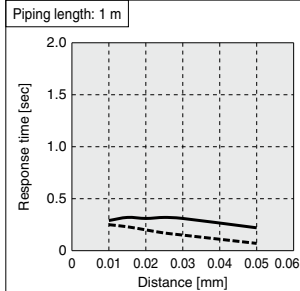
The response time varies depending on the piping length from the OUT port to the detection nozzle, and the seating condition of the workpiece. The graphs below show the response time when the workpiece is approached at 90% distance and 0% distance (close contact). (*: The switch point is 100% distance.)

(Example: When the switch point is set to 0.1 mm, the response time when the workpiece is at 0.09 mm and 0 mm are measured.)

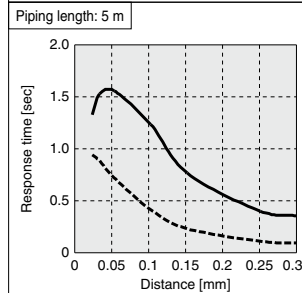
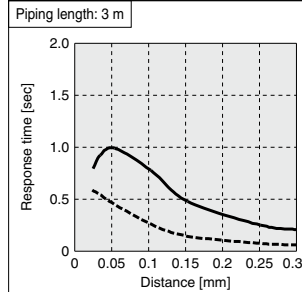
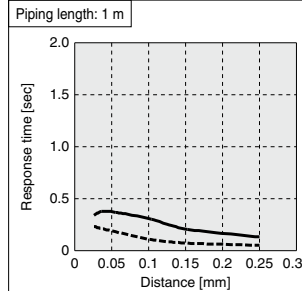
Test conditions	Detection nozzle: $\phi 1.5$ Piping: F type $\phi 4 \times \phi 2.5$ tube/G, H type $\phi 6 \times \phi 4$ tube Supply pressure: 200 kPa
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— Response time when the workpiece is set at 90% distance
--- Response time for close contact of workpiece

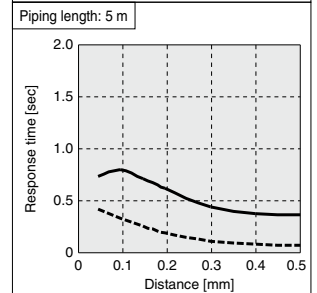
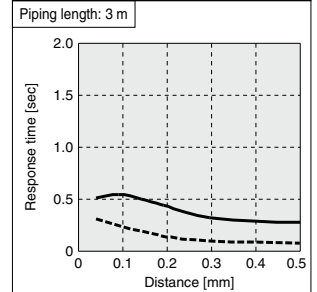
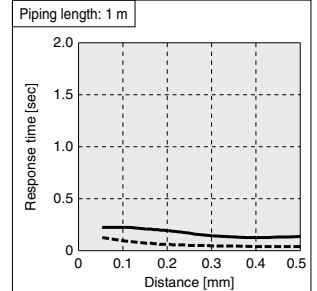
ISA3-F



ISA3-G



ISA3-H

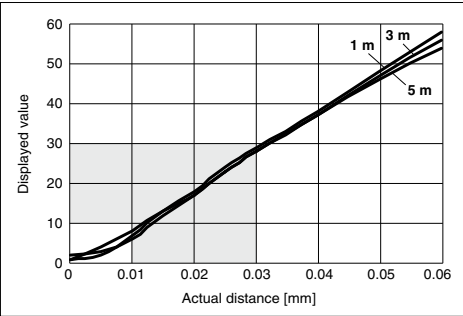


Relationship between Displayed Value and Distance

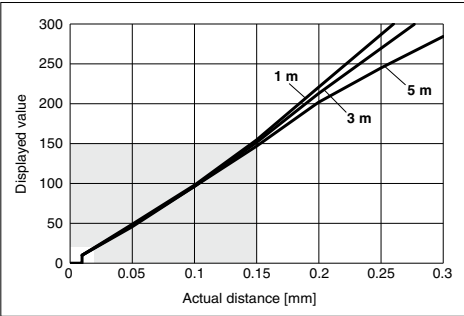
The graphs below show the relationship between the displayed value and distance. * The data shown below are for reference. They change depending on the individual product differences, machining dimensions of the nozzle, etc.

Test conditions	Detection nozzle: $\varnothing 1.5$
	Detection nozzle piping: F type $\varnothing 4 \times \varnothing 2.5$ tube 1 m, 3 m, 5 m/G, H type $\varnothing 6 \times \varnothing 4$ tube 1 m, 3 m, 5 m
	Supply pressure: 200 kPa

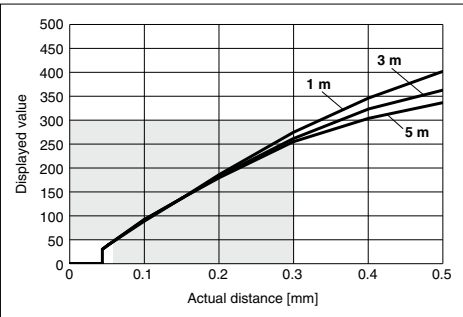
ISA3-F



ISA3-G



ISA3-H



Nozzle Shape

The nozzle shape must be similar to Figure 1.
Do not chamfer the nozzle as shown in Figure 2, as the characteristics will be affected.

Fig.1: Recommended nozzle shape

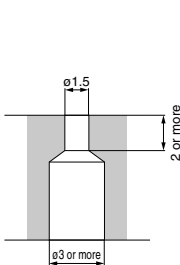
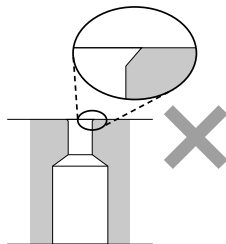
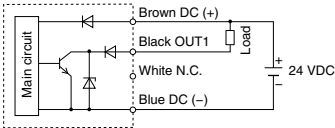


Fig.2: Unsuitable nozzle shape

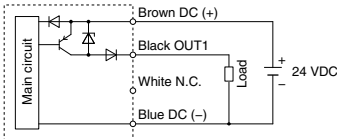


Internal Circuit and Wiring Example

ISA3-□□N NPN (1 output)



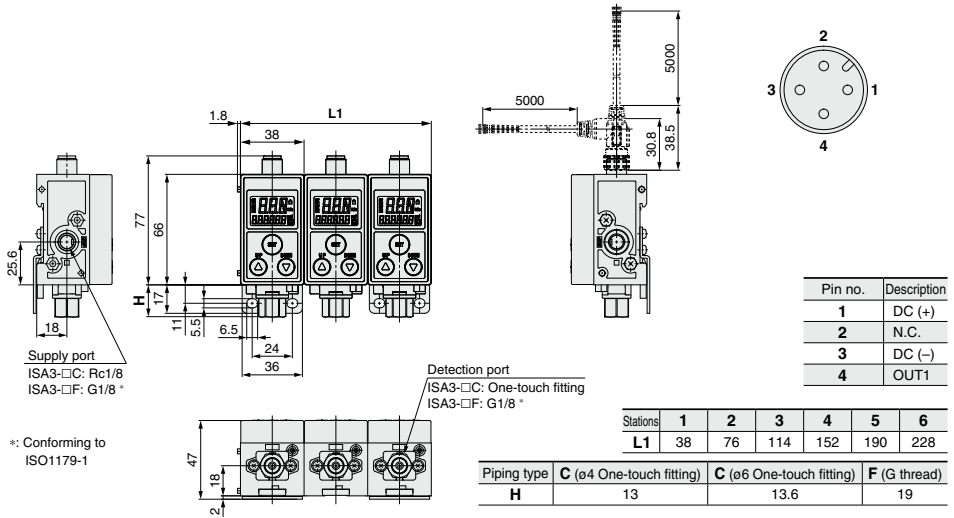
ISA3-□□P PNP (1 output)



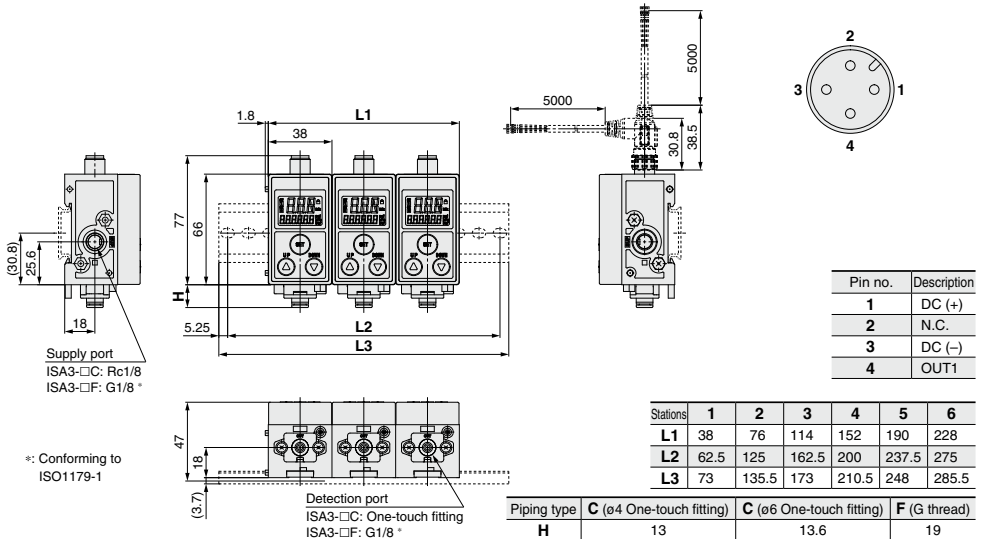
* Refer to the **WEB catalog** or the Best Pneumatics No. 7 for wiring details of the VX2 series (2 port solenoid valve).

Dimensions

ISA3-□□ (Bracket mounting)

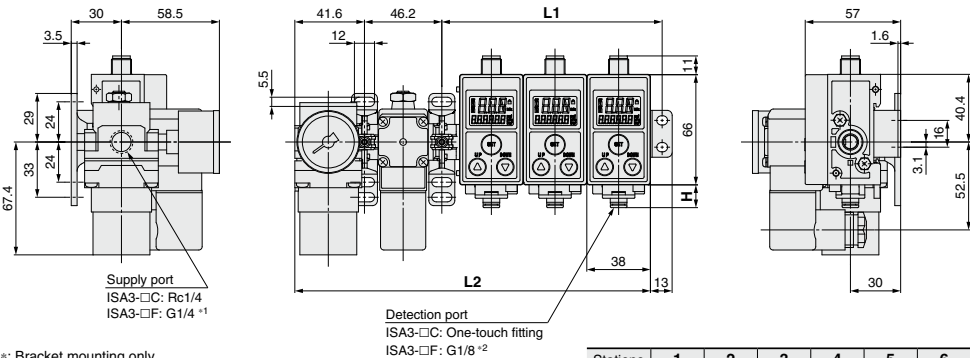


ISA3-□□ (DIN rail mounting)



Dimensions

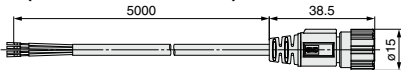
ISA3-□□□-□□□B-L1 (With control unit)



※1: Bracket mounting only
※1: Conforming to ISO16030
※2: Conforming to ISO1179-1

Stations	1	2	3	4	5	6
L1	55.6	93.6	131.6	169.6	207.6	245.6
L2	136.4	174.4	212.4	250.4	288.4	326.4
Piping type	C (ø4 One-touch fitting)		C (ø6 One-touch fitting)		F (G thread)	
H	13		13.6		19	

ZS-31-B (Cable with connector)



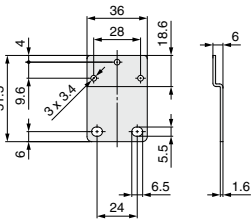
ZS-31-C (Cable with connector)



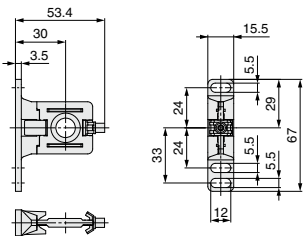
Connector pin no.

Pin no.	Lead wire color	Description
1	Brown	DC (+)
2	White	N.C.
3	Blue	DC (-)
4	Black	OUT1

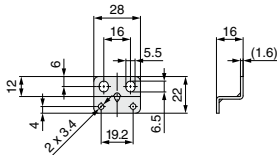
ISA-14 (Bracket for without control unit)



Y200T-A (Spacer with bracket)



ISA-17 (Bracket for with control unit)



Error Indication

Main screen	Name	Description	Measures
---	Supply pressure error	Displayed when supply pressure is not in the range 80 kPa to 220 kPa. Measurement is not possible.	Supply rated pressure (100 kPa to 200 kPa). The product will return to measurement mode automatically.
---	Outside of the displayable range (Switch point change mode)	The workpiece is outside the displayable range.	Move the workpiece closer to the detection nozzle.
Er 1	OUT1 over current error	The switch output (OUT1) load current has exceeded 80 mA.	Turn the power OFF and remove the cause of the over current. Then turn the power ON again.
Er 3	Zero clear error	Zero clear was not performed at atmospheric pressure. (Pressure outside of ± 14 kPa was supplied present.)	Perform zero clear at atmospheric pressure.
Er 0	System error	An internal data error has occurred.	Turn the power OFF and turn it ON again.
Er 4 to Er 9			
Sub screen	Name	Description	Measures
HHH	Supply pressure error (When [SUP side pressure value display] is set to the sub screen)	Pressure exceeding 220 kPa is supplied.	Keep the supply pressure within the displayable range of -20 kPa to 220 kPa.
LLL		Vacuum pressure (less than -20 kPa) is supplied.	

Relationship between Supply Pressure and Display

