Confirm at a glance if a workpiece is placed or not!

### Main screen

<table>
<thead>
<tr>
<th>ON: Placed</th>
<th>OFF: Not placed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece</td>
<td>Workpiece</td>
</tr>
</tbody>
</table>

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

### Sub screen

- **Large gap**
  - Workpiece
  - Switch output
  - Level meter
  - Detection surface
  - Detection nozzle
  - Air

- **Small gap**
  - Workpiece
  - Switch output
  - Level meter

The number of level meter symbols changes depending on the clearance between the workpiece and the detection surface. Even clearances which cannot be visually confirmed are indicated on the display.

### Simple Setting

3 steps

**STEP 1**

Press the button.

**STEP 2**

Press the or button to set the switch point value.

**STEP 3**

Press the button to complete.

### Energy Saving

- Air consumption: **60% reduction**
- For the G type

### Environmental Resistance

- Improved drainage resistance: **increased by 10 times or more**
  - Compared with the ISA2 based on SMC’s specific testing conditions (Oil proof test)
- Easier maintenance

### ISA3 Series
3-Step Setting (Switch Point Change Mode)

Simple setting of the switch point value (point at which the clearance reaches the switch point value)

1. For setting purposes, place a workpiece then press the button.
2. Press the or button to set the switch point value.
3. Press the button to complete the setting.

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

The seating condition can be checked at a glance. The sub screen can display 1 of 6 display options.

Main screen

- Placed (Switch output ON)
- Not placed (Switch output OFF)

Sub screen

- Level meter
- Displayed value
- SUP side pressure
- OUT side pressure
- Switch point value
- Display OFF

* 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 the Relationship Between Displayed Value and Distance on page 14.

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 even when the product is installed in the user’s equipment.

Measures against drainage

Drainage resistance: increased by 10 times or more

- Based on SMC’s specific testing conditions (Oil proof test)
- Compared with the ISA2

Max.: 600 kPa

- 1 Compared with the ISA2 with a 0.2 MPa pressure gauge

High-pressure flushing

- The switch output will be OFF during flushing.

* Once the orifice has been removed, the switch point will need to be set again.
A Exhaust noise: Zero

The current model (ISA2) needs to exhaust air from the exhaust port due to its bridge circuit. However, the ISA3 does not exhaust air from the product body. This reduces noise considerably compared with the current model.

B Air consumption: 60% reduction

The new detection principle eliminates the need for air to be exhausted from the product. This makes the flow consumption 0 L/min when a workpiece is seated. The result is a great reduction in air consumption compared with the current model.

\*1 Conditions: Unseated for 5 seconds and seated for 20 seconds (For the G type)

C Number of orifices: 3 → 1

By reducing the number of internal orifices from 3 to 1, there is less possibility of fluctuations in the output due to clogging. By removing the setting dial for S3, fluctuations in the detection distance can be prevented.

D Orifice area ratio: 68% increase

A larger orifice area lowers the possibility of clogging. However, even if the orifice does become clogged with foreign matter, the product construction allows for the internal orifice to be removed for cleaning.

\*1 Excludes the F type
2 Outputs Type

1. Outlet pressure, 2. Gap size, or 3. Supply pressure can be selected for OUT2.

![Diagram of 3 outputs type]

1. Monitoring of the Outlet Pressure

OUT2 detection of rising pressure when a workpiece is not placed that signifies nozzle clogging.

- **ON** OUT1 OFF
- **ON** OUT2 OFF

Unnecessary outputs can be reduced by setting the response time.

Displacement of outlet pressure

OUT2 set range (Window comparator)

<table>
<thead>
<tr>
<th>Workpiece Status</th>
<th>Outlet Pressure Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placed</td>
<td>1 s or more (Can be set)</td>
</tr>
<tr>
<td>Not placed</td>
<td>When the nozzle is clogged, the pressure rises when a workpiece is not placed.</td>
</tr>
</tbody>
</table>

Only nozzle clogging can be detected by the window comparator mode and setting the response time.

2. Monitoring of the Gap Size

Can discern between 2 different types of workpiece

Can detect the difference between raw material workpieces and defective workpieces via the gap size.

- **ON** OUT1 OFF
- **ON** OUT2 OFF

Detection of rated pressure range via OUT2

<table>
<thead>
<tr>
<th>Pressure Range</th>
<th>OUT2 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 kPa</td>
<td>ON</td>
</tr>
<tr>
<td>200 kPa</td>
<td>OFF</td>
</tr>
</tbody>
</table>

3. Monitoring of the Supply Pressure

Detection of rated pressure range via OUT2

<table>
<thead>
<tr>
<th>Pressure Range</th>
<th>OUT2 Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 kPa</td>
<td>ON</td>
</tr>
<tr>
<td>200 kPa</td>
<td>OFF</td>
</tr>
</tbody>
</table>
**Compact & Lightweight**

- **Volume:** 40% reduction
- **Weight:** 55% reduction

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

**Space Saving & Reduced Wiring Labor (Centralized Lead Wire)**

- **Installation space:** 30 mm reduction

Requires less wiring labor

- Current model: Cable processing and crimping work including Y-terminals and round terminals are required for the number of stations of the gap checker.
- ISA3: Wiring can be performed without tools with the M12 connector. A 5 m lead wire supports wiring to the junction terminal block.

Terminal block box

- ISA3
- ISA2

Junction terminal block

- ISA3
- ISA2

PLC

- ISA3
- ISA2
Keylock Function

A key LED turns ON when the product is locked and 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

Centralized lead wire

Supply port: Left side

Supply port: Right side

Supply port

Centralized lead wire

* The electrical entry of the centralized lead wire for the M12 connector is on the right side. When using a right-sided supply port, arrange the centralized lead wire so that it does not interfere with the control unit.
Application Examples

Confirmation of the reference plane for the press fitting of shafts

Confirmation of close contact with the reference plane 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.

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.

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

Security code
When the security code is activated, the code needs to be entered before the product can be operated.

Displayed value compensation
The displayed value can be corrected within ±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 the confirmation of the wiring and prevents system errors due to unexpected output.

Zero-clear of pressure value
The pressure value displayed on the sub screen can be cleared to zero.
3-Color Display Digital Gap Checker ISA3 Series

How to Order (Without Control Unit) ........................................... p. 9
How to Order (With Control Unit) .............................................. p. 10
Specifications ........................................................................ p. 11
Supply Pressure Dependence Characteristics .................... p. 12
Response Time ......................................................................... p. 13
Relationship Between Displayed Value and Distance ........ p. 14
Nozzle Shape ........................................................................ p. 14
Internal Circuits and Wiring Examples ............................... p. 14
Construction Diagram .......................................................... p. 15, 16
Parts List .............................................................................. p. 17, 18
Dimensions ........................................................................... p. 19 to 21
Error Indication ..................................................................... p. 22
Relationship Between Supply Pressure and Display .......... p. 22
3-Color Display Digital Gap Checker
Without Control Unit
ISA3 Series

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
- C Rc1/8
- F G1/8

Detection side
- 1/8 One-touch fitting 

Output specifications
- N NPN 1 output
- P PNP 1 output
- A* NPN 2 outputs
- B* PNP 2 outputs

- 2 switch outputs type
  - OUT1: Gap size detection
  - OUT2: Gap size, outlet pressure, supply pressure detection

Unit specifications of pressure value
- Nil
- With unit conversion function *10
- Fixed SI unit *11

- 12 switch outputs type
  - OUT1: Gap size detection
  - OUT2: Gap size, outlet pressure, supply pressure detection

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

Option 1 (Cable)
- Nil
- Straight *5 *6
- Right angle *5 *6
- L
- N None

- 4 Cannot be selected for 1 station
  One set is provided per manifold.
  A centralized lead wire is provided with M12 connectors for the number of stations.
  Refer to page 21 for details.
- 5 At the factory, the options are not attached to the product, but packed together with it for shipment.
- 6 Cables are provided for the number of stations.
- 7 The centralized lead wire cannot be selected with the 2 outputs type.

Option 2 (Bracket)
- Nil (DIN rail mounting) *8
- With bracket *5 *9

Bracket mounting position
- 2 stations
  (Mount to 1st and 2nd stations)
- n stations
  (Mount to 1st and nth stations)

*10 Under the New Measurement Act, digital gap checkers with the unit conversion function are not permitted for use in Japan.
*11 Unit: kPa

How to Order
ISA3 - GCN - M2
**How to Order**

**ISA3 Series**

**Supply Side Detection Side**

<table>
<thead>
<tr>
<th>Rated distance range</th>
<th>G</th>
<th>C</th>
<th>N</th>
<th>M</th>
<th>2</th>
<th>B</th>
<th>L</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>0.01 to 0.03 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>0.02 to 0.15 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>0.05 to 0.30 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Output specifications**

- **N**: NPN 1 output
- **P**: PNP 1 output
- **A**: NPN 2 outputs
- **B**: PNP 2 outputs

**With 2 switch outputs type**

- OUT1: Gap size detection
- OUT2: Gap size, outlet pressure, supply pressure detection (Select from the above.)

**Unit specifications of pressure value**

- **Nil**: With unit conversion function
- **M**: Fixed SI unit
- **+13**: Under the New Measurement Act, digital gap checkers with the unit conversion function are not permitted for use in Japan.

**Option 1 (Cable)**

- **G1/8**: One-touch fitting
- **G1/4**: One-touch fitting

- **+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 ISO 1179-1

**Piping specifications**

- **Straight**
- **Right angle**
- **None**

- **+4**: Cannot be selected for 1 station
- **+5**: One set is provided per manifold. A centralized lead wire is provided with M12 connectors for the number of stations. Refer to page 21 for details.
- **+6**: At the factory, the options are not attached to the product, but packed together with it for shipment.
- **+7**: Cables are provided for the number of stations.
- **+8**: The centralized lead wire cannot be selected with the 2 outputs type.

**Option 2 (Bracket)**

- **+8**: The bracket for control unit is shipped mounted on the product.
# ISA3 Series

## Specifications

### Applicable Fluid
- **Dry air** (Filtered through a 5 μm filter)

### Rated Distance Range
- **ISA3-F type**: 0.01 to 0.03 mm
- **ISA3-G type**: 0.02 to 0.15 mm
- **ISA3-H type**: 0.05 to 0.30 mm

### Displayable/Settable Range (Distance reference)
- **ISA3-F type**: 0 to 60 μm
- **ISA3-G type**: 10 to 300 μm
- **ISA3-H type**: 30 to 500 μm

### Minimum Display Resolution (Distance reference)
- **ISA3-F type**: 1 μm
- **ISA3-G type**: 1 μm
- **ISA3-H type**: 5 μm

### Rated Pressure Range
- **ISA3-F type**: 100 to 200 kPa
- **ISA3-G type**: −20 to 220 kPa
- **ISA3-H type**: 50 to 300 kPa

### Set Pressure Range
- **ISA3-F type**: −20 to 220 kPa
- **ISA3-G type**: 10 to 300 kPa
- **ISA3-H type**: 30 to 500 kPa

### Minimum Display/Setting Resolution (Distance reference)
- **ISA3-F type**: 1 μm
- **ISA3-G type**: 1 μm
- **ISA3-H type**: 5 μm

### Rated Pressure Range
- **ISA3-F type**: 0 to 200 kPa
- **ISA3-G type**: 0 to 600 kPa
- **ISA3-H type**: 0 to 200 kPa

### Displayable Range (Pressure Value)
- **ISA3-F type**: −20 to 220 kPa
- **ISA3-G type**: 10 to 300 kPa
- **ISA3-H type**: 30 to 500 kPa

### Repeatability
- **ISA3-F type**: ±0.5% F.S. or ±1 digit
- **ISA3-G type**: ±0.5% F.S. or ±1 digit
- **ISA3-H type**: ±0.5% F.S. or ±1 digit

### Temperature Characteristics (Reference: 25°C)
- **ISA3-F type**: ±0.5% F.S. or ±1 digit
- **ISA3-G type**: ±0.5% F.S. or ±1 digit
- **ISA3-H type**: ±0.5% F.S. or ±1 digit

### Hysteresis
- **ISA3-F type**: 0 to variable
- **ISA3-G type**: 0 to variable
- **ISA3-H type**: 0 to variable

### Power Supply Voltage
- 24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)

### Switch Output
- **ISA3-F type**: 1 output (NPN or PNP), 2 outputs (NPN or PNP)
- **ISA3-G type**: 1 output (NPN or PNP), 2 outputs (NPN or PNP)
- **ISA3-H type**: 1 output (NPN or PNP), 2 outputs (NPN or PNP)

### Window Comparator Mode
- **ISA3-F type**: Withstand pressure
- **ISA3-G type**: Withstand pressure
- **ISA3-H type**: Withstand pressure

### Withstand Pressure
- **ISA3-F type**: 600 kPa
- **ISA3-G type**: 600 kPa
- **ISA3-H type**: 600 kPa

### Consumption Flow Rate
- **ISA3-F type**: 2 L/min or less
- **ISA3-G type**: 12 L/min or less
- **ISA3-H type**: 22 L/min or less

### Minimum Display Resolution (Distance reference)
- **ISA3-F type**: 1 μm
- **ISA3-G type**: 1 μm
- **ISA3-H type**: 5 μm

### Display
- **ISA3-F type**: 2-screen display, LCD
- **ISA3-G type**: 2-screen display, LCD
- **ISA3-H type**: 2-screen display, LCD

### Environmental Resistance
- **ISA3-F type**: IP67 equivalent
- **ISA3-G type**: IP67 equivalent
- **ISA3-H type**: IP67 equivalent

### Enclosure
- **ISA3-F type**: IP67 equivalent
- **ISA3-G type**: IP67 equivalent
- **ISA3-H type**: IP67 equivalent

### Operating Temperature Range
- **ISA3-F type**: Operating: 0 to 50°C, Stored: −20 to 70°C (No condensation or freezing)
- **ISA3-G type**: Operating: 0 to 50°C, Stored: −20 to 70°C (No condensation or freezing)
- **ISA3-H type**: Operating: 0 to 50°C, Stored: −20 to 70°C (No condensation or freezing)

### Operating Humidity Range
- ** ISA3-F type**: Operating: 35 to 85% RH, Stored: 35 to 85% RH (No condensation or freezing)
- ** ISA3-G type**: Operating: 35 to 85% RH, Stored: 35 to 85% RH (No condensation or freezing)
- ** ISA3-H type**: Operating: 35 to 85% RH, Stored: 35 to 85% RH (No condensation or freezing)

### Insulation Resistance
- **ISA3-F type**: 2 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing
- **ISA3-G type**: 2 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing
- **ISA3-H type**: 2 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing

### Piping Specifications
- **ISA3-F type**: G1/8 (Compliant with ISO 1179-1)
- **ISA3-G type**: G1/8 (Compliant with ISO 1179-1)
- **ISA3-H type**: G1/8 (Compliant with ISO 1179-1)

### Lead Wire with Connector
- **ISA3-F type**: M12 lead wire with 4 pin connector, 4 cores, ø4, 5 m
- **ISA3-G type**: M12 lead wire with 4 pin connector, 4 cores, ø4, 5 m
- **ISA3-H type**: M12 lead wire with 4 pin connector, 4 cores, ø4, 5 m

### Centralized Lead Wire
- **ISA3-F type**: M12 lead wire with 4 pin connector part, 4 cores, ø4, 5 m, Centralized lead wire part, 2 to 3 stations: 5 cores, ø4, 5 m, 4 to 6 stations: 8 cores, ø6, 5 m
- **ISA3-G type**: M12 lead wire with 4 pin connector part, 4 cores, ø4, 5 m, Centralized lead wire part, 2 to 3 stations: 5 cores, ø4, 5 m, 4 to 6 stations: 8 cores, ø6, 5 m
- **ISA3-H type**: M12 lead wire with 4 pin connector part, 4 cores, ø4, 5 m, Centralized lead wire part, 2 to 3 stations: 5 cores, ø4, 5 m, 4 to 6 stations: 8 cores, ø6, 5 m

### Weight
- **ISA3-F type**: 113 g (Cable not included, One-touch fitting)
- **ISA3-G type**: 113 g (Cable not included, One-touch fitting)
- **ISA3-H type**: 113 g (Cable not included, One-touch fitting)

### Standards
- CE, RoHS compliant

---

### 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 the Relationship Between Displayed Value and Distance on page 14.

For gap checker precautions and specific product precautions, refer to the “Operation Manual” on the SMC website.

---

### Rated Distance Range and Displayable/Settable Range

<table>
<thead>
<tr>
<th>Model</th>
<th>ISA3-F</th>
<th>ISA3-G</th>
<th>ISA3-H</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.02 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.05 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.30 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.50 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance</th>
<th>Rated distance range</th>
<th>Displayable/Settable range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.02 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.05 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.30 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.50 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 For details, refer to the Relationship Between Displayed Value and Distance on page 14.

*2 If hysteresis is set to 57 (Default setting), the “Displayable/Settable range” of the F type is limited to 57. If hysteresis is set to 20 (Default setting), the G type is limited to 280 and the H type is limited to 480.

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

*4 For details on the detection nozzle, refer to the figures on page 14.

*5 Refers to when OUT2 is set to detect the distance

*6 Refers to when OUT2 is set to detect the pressure

*7 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value more than the fluctuating width, otherwise chattering will occur.

---

For gap checker precautions and specific product precautions, refer to the “Operation Manual” on the SMC website.
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.

<table>
<thead>
<tr>
<th>Test conditions</th>
<th>Detection nozzle: ø1.5</th>
<th>Piping: F type ø4 x ø2.5 tube/G, H type ø6 x ø4 tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference pressure</td>
<td>150 kPa</td>
<td></td>
</tr>
</tbody>
</table>

* 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 or equal to 80 kPa or more than 220 kPa. And the output will be OFF. (Refer to the Relationship Between Supply Pressure and Display on page 22.)

**Test conditions**
- Detection nozzle: ø1.5
- Piping: F type ø4 x ø2.5 tube/G, H type ø6 x ø4 tube
- Reference pressure: 150 kPa

**ISA3-F**
- Piping length: 1 m
- Supply pressure range: 75 to 225 kPa
- The distance of switch ON varies with supply pressure.

**ISA3-G**
- Piping length: 1 m
- Supply pressure range: 75 to 225 kPa
- The distance of switch ON varies with supply pressure.

**ISA3-H**
- Piping length: 1 m
- Supply pressure range: 75 to 225 kPa
- The distance of switch ON varies with supply pressure.
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.)

<table>
<thead>
<tr>
<th>Test conditions</th>
<th>Detection nozzle: ø1.5</th>
<th>Piping: F type ø4 x ø2.5 tube/G, H type ø6 x ø4 tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply pressure: 200 kPa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

 ISA3 Series

Test conditions | Response time when the workpiece is set at 90% distance | Response time for close contact of workpiece

ISA3-F
- Piping length: 1 m
- Response time vs. Distance

ISA3-G
- Piping length: 1 m
- Response time vs. Distance

ISA3-H
- Piping length: 1 m
- Response time vs. Distance

ISA3-F
- Piping length: 3 m
- Response time vs. Distance

ISA3-G
- Piping length: 3 m
- Response time vs. Distance

ISA3-H
- Piping length: 3 m
- Response time vs. Distance

ISA3-F
- Piping length: 5 m
- Response time vs. Distance

ISA3-G
- Piping length: 5 m
- Response time vs. Distance

ISA3-H
- Piping length: 5 m
- Response time vs. Distance
**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:** ø1.5
- **Detection nozzle piping:**
  - F type ø4 x ø2.5 tube 1 m, 3 m, 5 m/
  - G, H type ø6 x ø4 tube 1 m, 3 m, 5 m
- **Supply pressure:** 200 kPa

### ISA3-F

<table>
<thead>
<tr>
<th>Displayed value</th>
<th>Actual distance [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>0.01</td>
</tr>
<tr>
<td>50</td>
<td>0.02</td>
</tr>
<tr>
<td>40</td>
<td>0.03</td>
</tr>
<tr>
<td>30</td>
<td>0.04</td>
</tr>
<tr>
<td>20</td>
<td>0.05</td>
</tr>
<tr>
<td>10</td>
<td>0.06</td>
</tr>
</tbody>
</table>

### ISA3-G

<table>
<thead>
<tr>
<th>Displayed value</th>
<th>Actual distance [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>0.05</td>
</tr>
<tr>
<td>250</td>
<td>0.1</td>
</tr>
<tr>
<td>200</td>
<td>0.15</td>
</tr>
<tr>
<td>150</td>
<td>0.2</td>
</tr>
<tr>
<td>100</td>
<td>0.25</td>
</tr>
<tr>
<td>50</td>
<td>0.3</td>
</tr>
</tbody>
</table>

### ISA3-H

<table>
<thead>
<tr>
<th>Displayed value</th>
<th>Actual distance [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>0.1</td>
</tr>
<tr>
<td>450</td>
<td>0.2</td>
</tr>
<tr>
<td>400</td>
<td>0.3</td>
</tr>
<tr>
<td>350</td>
<td>0.4</td>
</tr>
<tr>
<td>300</td>
<td>0.5</td>
</tr>
</tbody>
</table>

* Values of 9 and under are displayed as "0."

### Nozzle Shape

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

**Fig. 1: Recommended nozzle shape**

**Fig. 2: Unsuitable nozzle shape**

### Internal Circuits and Wiring Examples

#### ISA3-[ ]N
- **NPN (1 output)**
- Brown DC (+)
- Black OUT1
- White N.C.
- Blue DC (–)
- 24 VDC

#### ISA3-[ ]P
- **PNP (1 output)**
- Brown DC (+)
- Black OUT1
- White N.C.
- Blue DC (–)
- 24 VDC

#### ISA3-[ ]A
- **NPN (2 outputs)**
- Brown DC (+)
- Black OUT1
- White OUT2
- Blue DC (–)
- 24 VDC

#### ISA3-[ ]B
- **PNP (2 outputs)**
- Brown DC (+)
- Black OUT1
- White OUT2
- Blue DC (–)
- 24 VDC

* Refer to the Web Catalog for wiring details of the VX2 series (2-port solenoid valve).
Construction Diagram

Without control unit

With control unit

Supply port: Left side
If there is a possibility that the atmospheric vent port of the gap checker will be exposed to water or dust, insert a tube into the atmospheric vent port and route the other end of the tube to a safe place away from water or dust.

* For tubing, please use the SMC TU0425 (polyurethane, O.D. ø4, I.D. ø2.5) for the gap checker.

**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.
Parts List

1 Joint screws
   2 screws,
   2 spacers, 2 nuts

Stations | Part no.
---|---
2 | ISA-16-2
3 | ISA-16-3
4 | ISA-16-4
4+1 | ISA-16-4
5 | ISA-16-5
6+1 | ISA-16-6

2 Seal for extra station
   ISA-15 1 pc.

3 Threaded plug with seal
   ISA-12-m 1 pc.

<table>
<thead>
<tr>
<th>Piping</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rc1/8</td>
<td>ISA-12-A</td>
</tr>
<tr>
<td>G1/8</td>
<td>ISA-12-C</td>
</tr>
</tbody>
</table>

*1 Spacers are included for 4 and 6 stations.

Bracket
ISA-14

With 3 tapping screws (3 x 8)

DIN rail
ISA-5-[1]

With 2 mounting screws (M3 x 16L)

Lead wire with connector
ZS-31-B Straight 5 m
ZS-31-C Right angle 5 m

Centralized lead wire
ISA-19-[2]
Parts List (Control Unit)

- **Regulator**
  AR20-02 G - 1 - B

- **Piping specifications**
  - Nil
  - F G1/4 \*1
  \*1 Conforming to ISO 16030

- **Flow direction**
  - Nil: Flow direction: Left → Right
  - R: Flow direction: Right → Left

- **Pressure gauge shape**
  - G: With round type pressure gauge
  - E: With square embedded type pressure gauge

For details, refer to the Web Catalog.

2-port solenoid valve

- **Symbol**
  - Z

- **Body material/Port size/Orifice diameter**
  - Symbol: Z
  - Body material: Aluminum
  - No thread machining (1/8)
  - Port size: Rc1/4
  - Orifice diameter: ø4
  \*1 Produced upon receipt of order

- **Voltage/Electrical entry**
  - Symbol: Z2A
  - 24 VDC
  - DIN terminal with light
  - Z2B \*2
  - 100 VAC
  - (With surge voltage suppressor)
  - Z2C \*2
  - 110 VAC
  \*2 Produced upon receipt of order
  When 100 VAC and 110 VAC are selected, the product without thread machining (symbol: Z) cannot be selected.

For specifications other than X276, refer to the Web Catalog.

- **Specifications**
  - Symbol: X276
  - With restrictor

- **Bracket (when control unit fitted)**
  - ISA-17
  - With 2 tapping screws (3 x 8)

- **Spacer with bracket**
  - Y200T-A

- **Modular adapter**
  - E210-U01

- **Spacer**
  - ISA-18
  - With O-ring
  \* When a 2-port solenoid valve is connected to the right
**ISA3 Series**

**Dimensions**

**ISA3-□□** (Bracket mounting)

Supply port
ISA3-LC: Rc1/8
ISA3-C/F: G1/8 [1]

Detection port
ISA3-LC: One-touch fitting
ISA3-C/F: G1/8 [1]

+1 Conforming to ISO 1179-1

When centralized lead wire is used

**ISA3-□□** (DIN rail mounting)

Supply port
ISA3-LC: Rc1/8
ISA3-C/F: G1/8 [1]

Detection port
ISA3-LC: One-touch fitting
ISA3-C/F: G1/8 [1]

+1 Conforming to ISO 1179-1

When centralized lead wire is used

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DC (+)</td>
</tr>
<tr>
<td>2</td>
<td>N.C.</td>
</tr>
<tr>
<td>3</td>
<td>DC (–)</td>
</tr>
<tr>
<td>4</td>
<td>OUT1</td>
</tr>
</tbody>
</table>

**Pin no.**

<table>
<thead>
<tr>
<th>Slates</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>38</td>
<td>76</td>
<td>114</td>
<td>152</td>
<td>190</td>
<td>228</td>
</tr>
</tbody>
</table>

**ISA3 Series**

Piping type

- C (ø4 One-touch fitting) C (ø6 One-touch fitting) F (G thread)

**ISA3 Series**

<table>
<thead>
<tr>
<th>Piping type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>13</td>
<td>13.6</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ISA3 Series**

Unit: mm

<table>
<thead>
<tr>
<th>Slates</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>38</td>
<td>76</td>
<td>114</td>
<td>152</td>
<td>190</td>
<td>228</td>
</tr>
<tr>
<td>L2</td>
<td>62.5</td>
<td>125</td>
<td>162.5</td>
<td>200</td>
<td>237.5</td>
<td>275</td>
</tr>
<tr>
<td>L3</td>
<td>73</td>
<td>135.5</td>
<td>173</td>
<td>210.5</td>
<td>248</td>
<td>285.5</td>
</tr>
</tbody>
</table>

**ISA3 Series**

Piping type

- C (ø4 One-touch fitting) C (ø6 One-touch fitting) F (G thread)

**ISA3 Series**

<table>
<thead>
<tr>
<th>Piping type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>13</td>
<td>13.6</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Dimensions**

**ISA3-□□□-□□□B-L1** (With control unit)

* Supply port: ISA3-C: Rc1/4, ISA3-F: G1/4

<table>
<thead>
<tr>
<th>Station</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>55.6</td>
<td>131.6</td>
</tr>
<tr>
<td>2</td>
<td>93.6</td>
<td>136.4</td>
</tr>
<tr>
<td>3</td>
<td>131.6</td>
<td>174.4</td>
</tr>
<tr>
<td>4</td>
<td>169.6</td>
<td>212.4</td>
</tr>
<tr>
<td>5</td>
<td>207.6</td>
<td>250.4</td>
</tr>
<tr>
<td>6</td>
<td>245.6</td>
<td>288.4</td>
</tr>
</tbody>
</table>

**ISA3-□□□-□□□B-R1**

* Supply port: ISA3-C: Rc1/4, ISA3-F: G1/4

**ISA3-□□□-□□□B-LN**

* Supply port: ISA3-C: Rc1/4, ISA3-F: G1/4

**ISA3-□□□-□□□B-RN**

* Supply port: ISA3-C: Rc1/4, ISA3-F: G1/4

**ISA3-□□□-□□□B-R2**

* Supply port: ISA3-C: One-touch fitting, ISA3-F: G1/8

![Dimensions Diagrams](image-url)

*1 Conforming to ISO 16030
*2 Conforming to ISO 1179-1
Bracket mounting only

Unit: mm
### ISA3 Series

#### Dimensions

**ZS-31-B (Cable with connector)**

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Lead wire color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>DC(+)</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>N.C.</td>
</tr>
</tbody>
</table>

**ZS-31-C (Cable with connector)**

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Lead wire color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Blue</td>
<td>DC(−)</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>OUT1</td>
</tr>
</tbody>
</table>

**ISA-19-□ (Centralized lead wire)**

<table>
<thead>
<tr>
<th>M12 connector no.</th>
<th>Pin no.</th>
<th>Description</th>
<th>Lead wire color (Output wire color)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>DC(+)</td>
<td>Brown1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>N.C.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>DC(−)</td>
<td>Blue1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>OUT1</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>DC(+)</td>
<td>Brown1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>N.C.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>DC(−)</td>
<td>Blue1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>OUT1</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>DC(+)</td>
<td>Brown1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>N.C.</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>DC(−)</td>
<td>Blue1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>OUT1</td>
<td>—</td>
</tr>
</tbody>
</table>

+1 Brown and blue are connected inside the product.

**ISA-14 (Bracket when control unit not fitted)**

**Y200T-A (Spacer with bracket)**

**ISA-17 (Bracket when control unit fitted)**

**ISA-20 (Bracket for centralized lead wire)**
Error Indication

<table>
<thead>
<tr>
<th>Main screen</th>
<th>Name</th>
<th>Description</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply pressure error</td>
<td>Displayed when supply pressure is outside the range of 80 kPa to 220 kPa. Measurement is not possible.</td>
<td>Supply rated pressure (100 kPa to 200 kPa). The product will return to measurement mode automatically.</td>
</tr>
<tr>
<td></td>
<td>Outside of the displayable</td>
<td>The workpiece is outside the displayable range.</td>
<td>Move the workpiece closer to the detection nozzle.</td>
</tr>
<tr>
<td></td>
<td>range (Switch point change mode)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er1</td>
<td>OUT1 over current error</td>
<td>The switch output (OUT1) load current has exceeded 80 mA.</td>
<td>Turn the power OFF and remove the cause of the over current. Then turn the power ON again.</td>
</tr>
<tr>
<td>Er3</td>
<td>Zero clear error</td>
<td>Zero clear was not performed at atmospheric pressure. (Pressure outside of ±14 kPa was supplied present.)</td>
<td>Perform zero clear at atmospheric pressure.</td>
</tr>
<tr>
<td>Er4 to Er9</td>
<td>System error</td>
<td>An internal data error has occurred.</td>
<td>Turn the power OFF and turn it ON again.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub screen</th>
<th>Name</th>
<th>Description</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply pressure error</td>
<td>Pressure exceeding 220 kPa is supplied.</td>
<td>Keep the supply pressure within the displayable range of −20 kPa to 220 kPa.</td>
</tr>
<tr>
<td></td>
<td>(When [SUP side pressure value display] is set to the sub screen)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHH</td>
<td>Supply pressure error</td>
<td>Vacuum pressure (less than or equal to −20 kPa) is supplied.</td>
<td></td>
</tr>
<tr>
<td>LLL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Relationship Between Supply Pressure and Display

Cannot be detected
Detection which satisfies the specifications is available.
Cannot be detected

Can be detected, but specifications are not satisfied
Can be detected, but specifications are not satisfied
Breakage may occur.

Main screen

[ - - - ] Range in which [ON/OFF] is displayed in the main screen [ - - - ]

Switch output is automatically turned OFF.
Switch output is normally output.
Switch output is automatically turned OFF.

Sub screen

[ LLL ] Range which can be displayed when [SUP side pressure value display] is set to the sub screen [ HHH ]

Pressure [kPa]

22
Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)¹, and other safety regulations.

Caution: Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning: Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

Danger: Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

   Use in an interlock circuit, which requires the provision of double interlock and experienced.

   Periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.
   The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

2. If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/
Compliance Requirements

The product is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.²)

   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

   2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

   3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

   4) Vacuum pads are excluded from this 1 year warranty.

   A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

   Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

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 ordered by the metrology (measurement) laws of each country.

Revision History

Edition B

- The F type (Rated distance range: 0.01 to 0.03 mm) has been added.

Edition C

- A centralized lead wire has been added.
- The AR-B regulator (control unit) has been added.
- The AC type 2-port solenoid valve (control unit) has been added.
- Number of pages has been increased from 16 to 24.

Edition D

- A 2 outputs type has been added.
- The AR-A regulator (control unit) has been deleted.

Edition E

- The AR-B regulator (control unit) has been added.
- The AC type 2-port solenoid valve (control unit) has been added.

²) Edition B

Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.