

# 2-Color Display Digital Pressure Switch

## Series ISE70/75/75H

**New**

- NPN/PNP open collector 2 outputs added.
- Cut-to-zero display function added.



### Rated Pressure

For General Fluids

**10 MPa** (ISE75) • **15 MPa** (ISE75H)

For Air

**1 MPa** (ISE70)

**Metal Body Type**  
(Die-cast aluminum)

2-color digital

IP67

ZSE  
ISE  
ZSP  
PS  
ISA  
PSE  
IS  
ISG  
ZSM

### 2-Color Display (Green/Red)

- Selectable from four patterns

	ON	OFF
①	Red	Green
②	Green	Red
③	Red	Red
④	Green	Green

### Easily identifiable abnormal readings

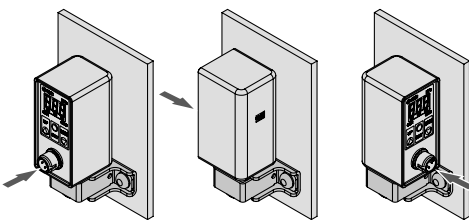


### M12 Connector

- Lead wire with M12 connector (5 m)
- Straight and right-angled connectors

### With Bracket

- User-selectable mounting orientation



- Withstand pressure: Rated pressure x 3
- Model with initial display settings of PSI is also available as standard.
- Port size  
Rc1/4, NPT1/4, G1/4 (ISO1179)

### Functions

- Anti-chattering
- Display calibration
- Zero-out
- Key lock
- Unit display switching (Fixed SI unit in Japan)

For Air	For General Fluids	
ISE70 (1 MPa)	ISE75 (10 MPa)	ISE75H (15 MPa)
Plain	Gray	Orange

# 2-Color Display Digital Pressure Switch For Air

## Series ISE70



### How to Order

1 MPa

ISE70 - 02 - 43 - M



#### Piping

02	Rc1/4
N02	NPT1/4
F02	G1/4 (ISO1179)

#### Output

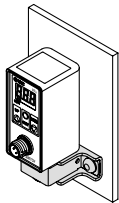
27	2 settings NPN open collector 2 outputs ((Pin no.: 2, 4)
43	Fixed setting: NPN open collector 1 output (Pin no.: 4) + PNP open collector 1 output (Pin no.: 2)
65	PNP open collector 1 output (Pin no.: 4)
67	2 settings PNP open collector 2 outputs (Pin no.: 2, 4)

#### Display unit

Nil	With unit display switching function
M	Fixed SI unit <sup>Note)</sup>
P	Pressure unit: psi (Initial value) With unit display switching function

Note) Fixed unit: MPa

#### Option 2

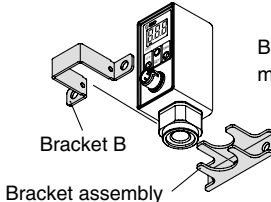
Nil	None
A	With bracket  Note) Mounting screws are not included.

#### Option 1

Nil	None
S	Lead wire with M12 connector (5 m), straight
L	Lead wire with M12 connector (5 m), right-angled

### Optional Part No.

When optional parts are required separately, use the following part numbers to place an order.

Option	Part no.	Note
Bracket	ZS-31-A	 <p>Bracket B and the bracket assembly make up one set. Note) Mounting screws are not included.</p>
Lead wire with M12 connector, straight	ZS-31-B	Lead wire length: 5 m
Lead wire with M12 connector, right-angled	ZS-31-C	Lead wire length: 5 m

## Specifications

Model	ISE70	
<b>Rated pressure range</b>	0 to 1 MPa	
<b>Set pressure range</b>	-0.1 to 1 MPa	
<b>Withstand pressure</b>	1.5 MPa	
<b>Set pressure resolution</b>	0.01 MPa	
<b>Applicable fluid</b>	Air, Non-corrosive gas, Non-flammable gas	
<b>Power supply voltage</b>	12 to 24 VDC±10%, Ripple (p-p) 10% or less (with power supply polarity protection)	
<b>Current consumption</b>	55 mA or less (at no load)	
<b>Switch output</b>	Output -27: 2 settings; NPN open collector 2 outputs (Pin no.: 2, 4) Output -43: Fixed setting; NPN open collector 1 output (Pin no.: 4) + PNP open collector 1 output (Pin no.: 2) <sup>Note 1)</sup> Output -65: PNP open collector 1 output (Pin no.: 4) Output -67: 2 settings; PNP open collector 2 outputs (Pin no.: 2, 4)	
<b>Max. load current</b>	80 mA	
<b>Max. applied voltage</b>	30 V (at NPN output)	
<b>Residual voltage</b>	1 V or less (with load current of 80 mA)	
<b>Response time</b>	2.5 ms (with anti-chattering function: 20 ms, 160 ms, 640 ms, 1000 ms, 2000 ms)	
<b>Short circuit protection</b>	With short circuit protection	
<b>Repeatability</b>	±0.5%F.S. or less	
<b>Hysteresis</b>	<b>Hysteresis mode</b>	
	<b>Window comparator mode</b>	Variable (0 or above)
<b>Display</b>	3-digit, 7-segment indicator, 2-color display (Red/Green) can be interlocked with the switch output, Sampling cycle: 5 times/1 s	
<b>Display accuracy</b>	2%F.S.±1 digit or less (at 25°C±3°C)	
<b>Indication light</b>	OUT1: Light up when output is turned ON. (Green) OUT2: Light up when output is turned ON. (Red: for output -27, -67)	
<b>Functions</b>	Anti-chattering function, Unit display switching function, Zero-out function, Key lock function	
<b>Environmental resistance</b>	<b>Enclosure</b>	IP67 <sup>Note 2)</sup>
	<b>Fluid temperature range</b>	0 to 50°C (with no freezing or condensation)
	<b>Operating temperature range</b>	Operating: 0 to 50°C, Stored: -10 to 60°C (with no freezing or condensation)
	<b>Operating humidity range</b>	Operating and stored: 35 to 85%RH (with no condensation)
	<b>Withstand voltage</b>	1000 VAC for 1 min. between live parts and case
	<b>Insulation resistance</b>	50 MΩ or more between live parts and case (at 500 VDC Mega)
	<b>Vibration resistance</b>	10 to 500 Hz, 1.5 mm or 98 m/s <sup>2</sup> amplitude in X, Y, Z directions for 2 hours each (De-energized)
	<b>Impact resistance</b>	980 m/s <sup>2</sup> in X, Y, Z directions 3 times each (De-energized)
<b>Temperature characteristics</b> (Based on 25°C: within operating temperature range)	±2%F.S. or less	
<b>Standards</b>	CE Marking, UL/CSA (UL508) compliance	
<b>Wetted parts material</b>	Fitting: C3604 (electroless nickel plated), Sensor port: PBT, Sensor pressure receiving area: Silicon, O-ring: NBR	
<b>Port size</b>	02: Rc1/4, N02: NPT1/4, F02: G1/4 (ISO1179) <sup>Note 3)</sup>	
<b>Lead wire</b>	Oilproof cable with M12 4-pin pre-wired connector, 4 cores, ø4, 5 m, Conductor O.D.: 0.72 mm, Insulator O.D.: 1.14 mm	
<b>Mass (Weight)</b>	190 g (excluding the lead wire with M12 4-pin pre-wired connector)	

Note 1) The NPN and PNP outputs function for a single set point.

Note 2) An FKM gasket is used for the product case seal. Refer to the back of page 727 for details.

Note 3) G1/4: Applicable to ISO1179-1

See the operating manual for information on how to set and on handling precautions. (Refer to SMC website.)

ZSE  
ISE

ZSP

PS

ISA

PSE

IS

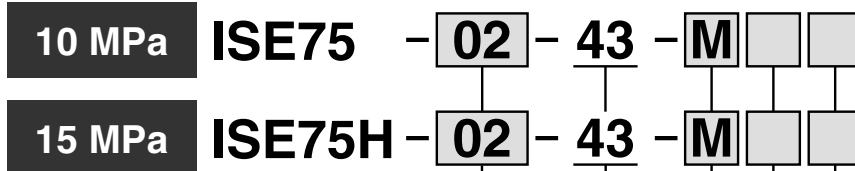
ISG

ZSM

# 2-Color Display Digital Pressure Switch For General Fluids

## Series **ISE75/75H**

### How to Order



#### Piping

<b>02</b>	Rc1/4
<b>N02</b>	NPT1/4
<b>F02</b>	G1/4 (ISO1179)

#### Output

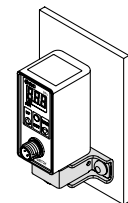
<b>27</b>	2 settings NPN open collector 2 outputs (Pin no.: 2, 4)
<b>43</b>	Fixed setting: NPN open collector 1 output (Pin no.: 4) + PNP open collector 1 output (Pin no.: 2)
<b>65</b>	PNP open collector 1 output (Pin no.: 4)
<b>67</b>	2 settings PNP open collector 2 outputs (Pin no.: 2, 4)

#### Display unit

<b>Nil</b>	With unit display switching function
<b>M</b>	Fixed SI unit <small>Note)</small>
<b>P</b>	Pressure unit: psi (Initial value) With unit display switching function

Note) Fixed unit: MPa

#### Option 2

<b>Nil</b>	None
<b>A</b>	With bracket 

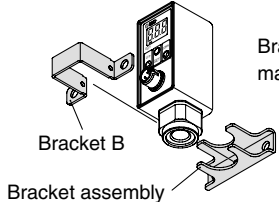
#### Option 1

<b>Nil</b>	None
<b>S</b>	Lead wire with M12 connector (5 m), straight
<b>L</b>	Lead wire with M12 connector (5 m), right-angled



### Optional Part No.

When optional parts are required separately, use the following part numbers to place an order.

Option	Part no.	Note
Bracket	<b>ZS-31-A</b>	 <p>Bracket B and the bracket assembly make up one set.</p>
Lead wire with M12 connector, straight	<b>ZS-31-B</b>	Lead wire length: 5 m
Lead wire with M12 connector, right-angled	<b>ZS-31-C</b>	Lead wire length: 5 m

# 2-Color Display Digital Pressure Switch *Series ISE75/75H*

For General Fluids

## Specifications

Model	ISE75	ISE75H
<b>Rated pressure range</b>	0 to 10 MPa	0 to 15 MPa
<b>Set pressure range</b>	0.4 to 10 MPa	0.5 to 15 MPa
<b>Withstand pressure</b>	30 MPa	45 MPa
<b>Set pressure resolution</b>	0.1 MPa	
<b>Applicable fluid</b>	Fluid or gas that will not corrode stainless steel 304, 430 and 630	
<b>Power supply voltage</b>	12 to 24 VDC±10%, Ripple (p-p) 10% or less (with power supply polarity protection)	
<b>Current consumption</b>	55 mA or less (at no load)	
<b>Switch output</b>	Output -27: 2 settings; NPN open collector 2 outputs (Pin no.: 2, 4) Output -43: Fixed setting; NPN open collector 1 output (Pin no.: 4) + PNP open collector 1 output (Pin no.: 2) <sup>Note 1)</sup> Output -65: PNP open collector 1 output (Pin no.: 4) Output -67: 2 settings; PNP open collector 2 outputs (Pin no.: 2, 4)	
<b>Max. load current</b>	80 mA	
<b>Max. applied voltage</b>	30 V (at NPN output)	
<b>Residual voltage</b>	1 V or less (with load current of 80 mA)	
<b>Response time</b>	2.5 ms (with anti-chattering function: 20 ms, 160 ms, 640 ms, 1000 ms, 2000 ms)	
<b>Short circuit protection</b>	With short circuit protection	
<b>Repeatability</b>	±0.5%F.S. or less	
<b>Hysteresis</b>	<b>Hysteresis mode</b>	Variable (0 or above)
	<b>Window comparator mode</b>	
<b>Display</b>	3-digit, 7-segment indicator, 2-color display (Red/Green) can be interlocked with the switch output, Sampling cycle: 5 times/1 s	
<b>Display accuracy</b>	2%F.S.±1 digit or less (at 25°C±3°C)	
<b>Indication light</b>	OUT1: Light up when output is turned ON. (Green) OUT2: Light up when output is turned ON. (Red: for output -27, -67)	
<b>Functions</b>	Anti-chattering function, Unit display switching function, Zero-out function, Key lock function	
<b>Environmental resistance</b>	<b>Enclosure</b>	IP67 <sup>Note 2)</sup>
	<b>Fluid temperature range</b>	-5 to 80°C (with no freezing or condensation)
	<b>Operating temperature range</b>	Operating: -5 to 50°C, Stored: -10 to 60°C (with no freezing or condensation)
	<b>Operating humidity range</b>	Operating and stored: 35 to 85%RH (with no condensation)
	<b>Withstand voltage</b>	250 VAC for 1 min. between live parts and case
	<b>Insulation resistance</b>	50 MΩ or more between live parts and case (at 50 VDC Mega)
	<b>Vibration resistance</b>	10 to 500 Hz, 1.5 mm or 98 m/s <sup>2</sup> amplitude in X, Y, Z directions for 2 hours each (De-energized)
	<b>Impact resistance</b>	980 m/s <sup>2</sup> in X, Y, Z directions 3 times each (De-energized)
<b>Temperature characteristics</b> (Based on 25°C: within operating temperature range)	±3%F.S. or less	
<b>Standards</b>	CE Marking, UL/CSA (UL508) compliance	
<b>Wetted parts material</b>	Pressure receiving area: Stainless steel 630, Fitting: Stainless steel 304 (port size Rc1/4) Pressure receiving area: Stainless steel 630, Fitting: Stainless steel 430 (port size NPT1/4, G1/4)	
<b>Port size</b>	02: Rc1/4, N02: NPT1/4, F02: G1/4 (ISO1179) <sup>Note 3)</sup>	
<b>Lead wire</b>	Oilproof cable with M12 4-pin pre-wired connector, 4 cores, ø4, 5 m, Conductor O.D.: 0.72 mm, Insulator O.D.: 1.14 mm	
<b>Mass (Weight)</b>	225 g (port size Rc1/4), 210 g (port size NPT1/4, G1/4) (excluding the lead wire with M12 4-pin pre-wired connector)	

Note 1) The NPN and PNP outputs function for a single set point.

Note 2) An FKM gasket is used for the product case seal. Refer to the back of page 727 for details.

Note 3) G1/4: Applicable to ISO1179-1

See the operating manual for information on how to set and on handling precautions.  
(Refer to SMC website.)

**ZSE**  
**ISE**  
**ZSP**  
**PS**  
**ISA**  
**PSE**  
**IS**  
**ISG**  
**ZSM**

# Series ISE70/75/75H

## Descriptions

### Indication light (Green)

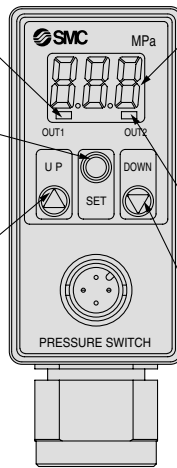
Displays the switch operation status. Lights up when OUT1 is turned ON.

### SET button

Use this button to switch the mode and set the set value.

### UP button

Use this button to change the mode or increase the ON/OFF set value. It also allows you to switch to the peak value display mode.



### LCD

Displays the current pressure condition, set mode and error code. The display mode can be selected from four options: fixed green single-color reading, fixed red single-color reading, green reading interlocked with output for switching to red reading, or red reading interlocked with output for switching to green reading.

### Indication light (Red)

Note)

Displays the switch operation status. Lights up when OUT2 is turned ON.

### DOWN button

Use this button to change the mode or decrease the ON/OFF set value. It also allows you to switch to the bottom value display mode.

Note) Output -27 and -67 only

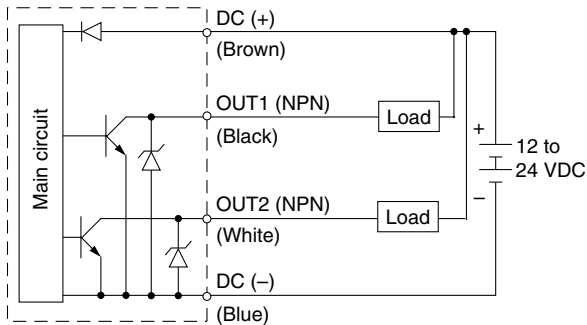
## Internal Circuits and Wiring Examples

### Output -27

2 settings

NPN open collector 2 outputs

Max. 30 V, 80 mA, Residual voltage 1 V or less



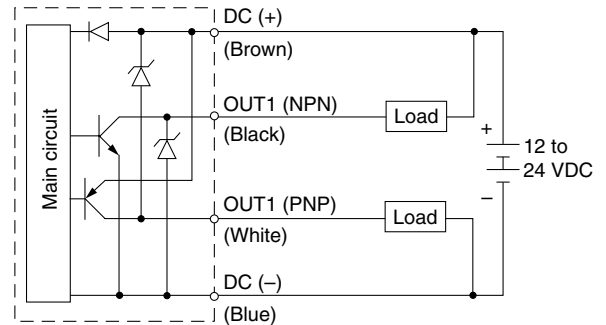
### Output -43

Fixed setting

NPN open collector 1 output + PNP open collector 1 output

(The pressure set point for switching the output signal is common to NPN and PNP.)

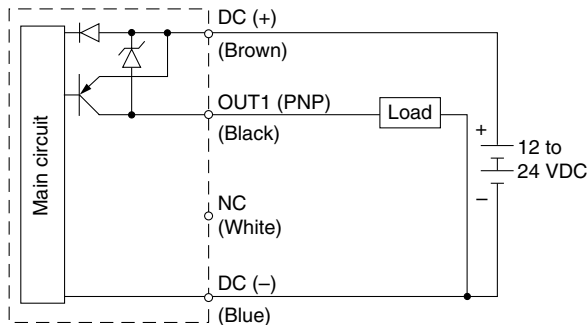
Max. 30 V (NPN only), 80 mA, Residual voltage 1 V or less



### Output -65

PNP open collector 1 output

Max. 80 mA

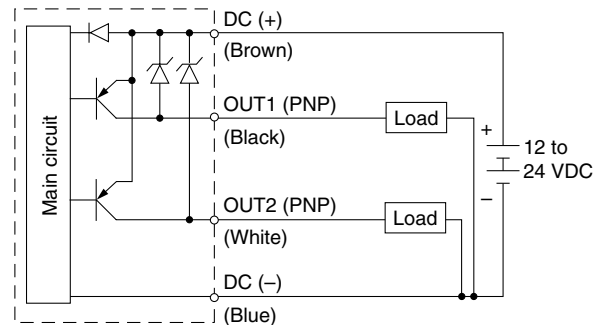


### Output -67

2 settings

PNP open collector 2 outputs

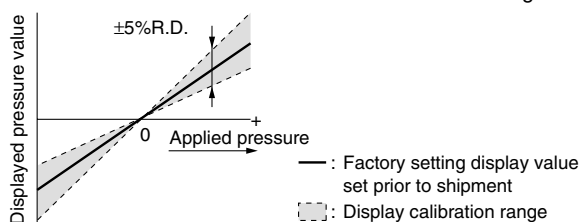
Max. 80 mA



## Functions

### Display calibration function

This function eliminates slight differences in the output values and allows uniformity in the numbers displayed. Displayed values of the pressure sensor can be calibrated to within  $\pm 5\%$  of their readings.



Note) When the display calibration function is used, the set pressure value may change  $\pm 1$  digit.

### Peak/Bottom hold function

This function constantly detects and updates the maximum and minimum pressure values and allows the unit to hold the display value.

### Key lock function

This function prevents incorrect operations such as changing the set value accidentally.

### Zero-out function

The measured pressure reading can be adjusted to zero. More specifically, the factory-set reading can be corrected to within  $\pm 7\%$  F.S.

### Unit display switching function

The reading unit can be selected.

Unit/Reading resolution	ISE70	ISE75/75H
MPa	0.01	0.1
kgf/cm <sup>2</sup>	0.1	1
bar	0.1	1
psi	1	1 (X10)

### Anti-chattering function

A large bore cylinder or ejector consumes a large amount of air in operation and may experience a temporary drop in the primary pressure. This function prevents detection of such temporary drops in primary pressure as abnormal pressure.

Response time selections: 20 ms, 160 ms, 640 ms, 1000 ms, 2000 ms

### Cut-to-zero display function

With the ISE75 series, users can enable or disable a function (cut-to-zero display function) that displays pressure values of 0.3 MPa or less as zero (0.4 MPa or less in the ISE75H series).

**Example pressure displays** (shading indicates changed displays)

**ISE75-□** (for 10 MPa)

Cut-to-zero display function "ON": 0 → **Displayed as 0** → 0.4 → 0.5 → 0.6 → ..... → 9.9 → 10.0

Cut-to-zero display function "OFF": 0 → 0.1 → 0.2 → 0.3 → 0.4 → 0.5 → 0.6 → ..... → 9.9 → 10.0

**ISE75H-□** (for 15 MPa)

Cut-to-zero display function "ON": 0 → **Displayed as 0** → 0.5 → 0.6 → ..... → 14.9 → 15.0

Cut-to-zero display function "OFF": 0 → 0.1 → 0.2 → 0.3 → 0.4 → 0.5 → 0.6 → ..... → 14.9 → 15.0

### Pressure Display Range

Series	Cut-to-zero display function "ON"	Cut-to-zero display function "OFF"
<b>ISE75</b>	0, 0.4 to 10.0 MPa	0 to 10.0 MPa
<b>ISE75H</b>	0, 0.5 to 15.0 MPa	0 to 15.0 MPa

\* The set pressure range does not change when the cut-to-zero display function is disabled.

### Error function

Take the following corrective solutions when error occurs.

Error description	LCD display	Description	Solution
Over-current error	OUT1	Load current of switch output exceeds 80 mA.	Shut off the power supply. After eliminating the output factor that caused the excess current, turn the power supply back on.
	Note 1) OUT2		
Residual pressure error	[Er3]	A pressure level greater than $\pm 7\%$ F.S. has been applied when it is cleared to zero. The switch will automatically return to measuring mode in three seconds, however. Due to individual product differences, the setting range varies by $\pm 1$ digit.	Bring the pressure back to atmospheric pressure and try using the zero-out function.
Applied pressure error	HHH	Supply pressure exceeds the maximum set pressure.	Bring the pressure back to within the set pressure range.
	LLL	Supply pressure is below the minimum set pressure.	
System error	[Er4]	Internal data error	Shut off the power supply. Turn the power supply back on.
	[Er6]	Internal data error	
	[Er7]	Internal data error	
	[Er8]	Internal data error	

\* If the switch will not recover to normal even after all of the above-mentioned solutions have been applied, consult SMC for investigation.

Note 1) Output -27 and -67 only.

ZSE  
ISE

ZSP

PS

ISA

PSE

IS

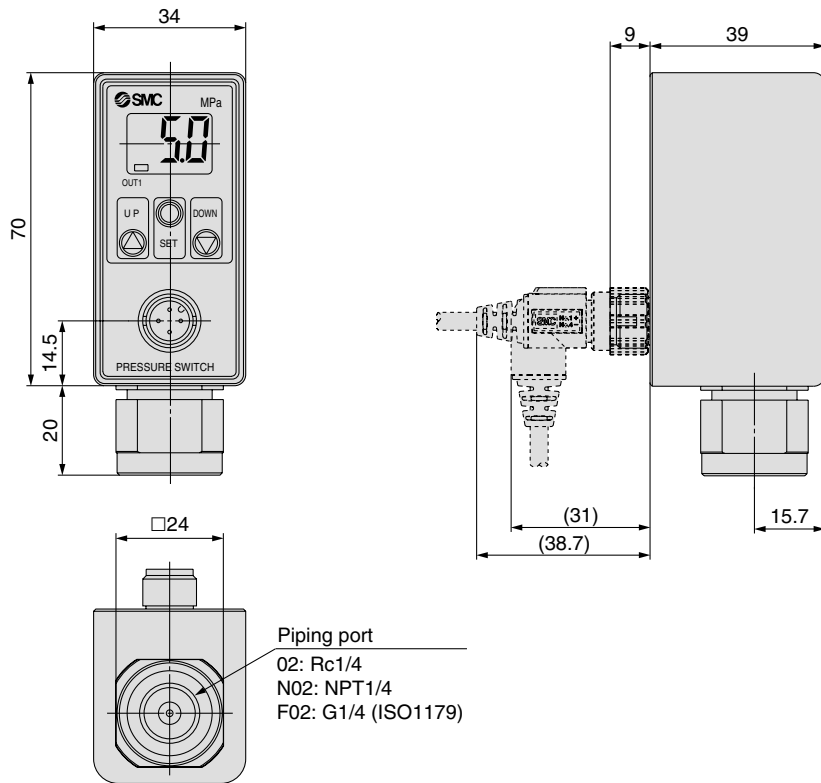
ISG

ZSM

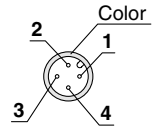
# Series ISE70/75/75H

## Dimensions

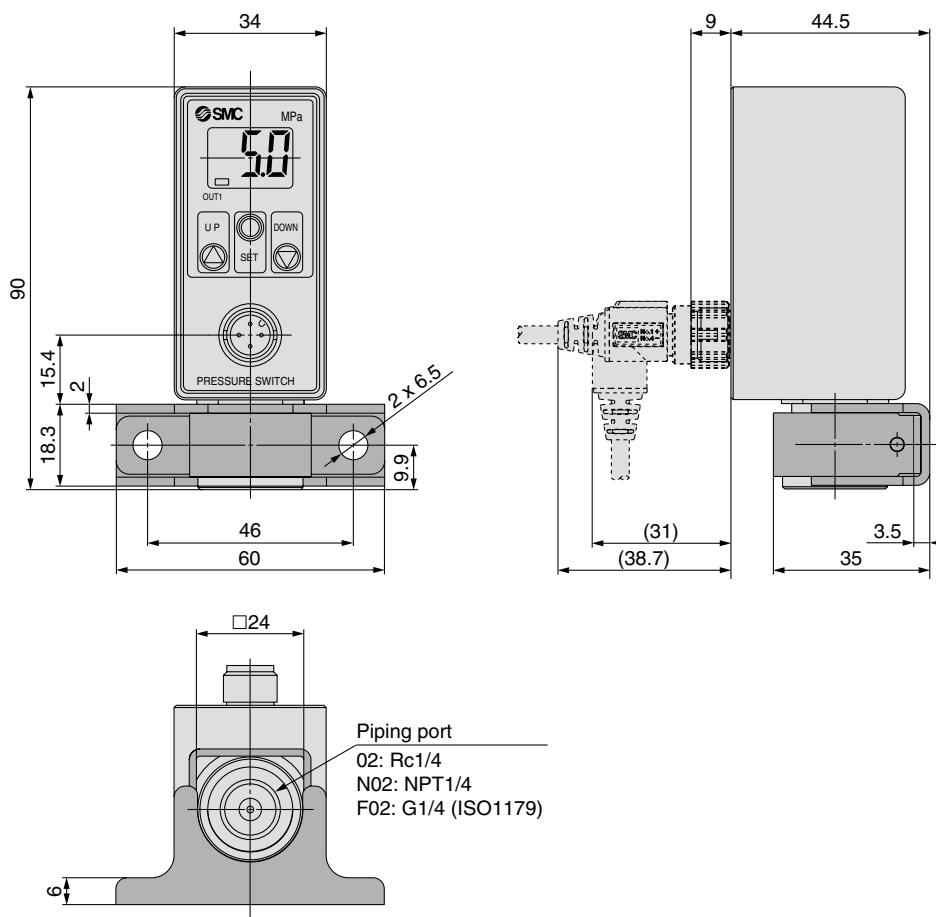
### ISE70/75/75H



Note) The connector faces down (toward the piping). Do not attempt to rotate the connector, as it is not rotatable.



### Bracket mount



### Connector pin assignments

Output -43  
(Color: Gray)

1	Brown	DC (+)
2	White	OUT1 (PNP)
3	Blue	DC (-)
4	Black	OUT1 (NPN)

Output -65  
(Color: Black)

1	Brown	DC (+)
2	White	NC
3	Blue	DC (-)
4	Black	OUT1 (PNP)

Output -27 and -67  
(Color: Gray)

1	Brown	DC (+)
2	White	OUT2 (NPN or PNP)
3	Blue	DC (-)
4	Black	OUT1 (NPN or PNP)





# Series ISE70/75/75H Specific Product Precautions 1

Be sure to read before handling. Refer to front matters 58 and 59 for Safety Instructions and pages 687 to 691 for Pressure Switch Precautions.

## Handling

### ⚠ Warning

1. Do not drop, bump, or apply excessive impacts (980 m/s<sup>2</sup>) while handling.

Although the body of the sensor may not be damaged, the internal parts of the sensor could be damaged and lead to a malfunction.

2. The tensile strength of the cord is 50 N.

Applying a greater pulling force on it can cause a malfunction. When handling, hold the body of the sensor—do not dangle it from the cord.

3. Do not exceed the screw-in torque of 40 N·m for the ISE70 and 80 N·m for the ISE75(H) when connecting the pipe to the switch.

Exceeding these values may cause the switch to malfunction.

4. Do not use pressure sensors with poisonous, corrosive and/or flammable gases or liquids.

5. When connecting the pipe to the switch, engage the wrench horizontally to the chamfered barrel of the fitting.

Be careful not to apply excessive force to the switch's main unit.

## Connection

### ⚠ Warning

1. Incorrect wiring can damage the switch and cause a malfunction or erroneous switch output.

2. Connections should be done while the power is turned off.

3. Wire separately from power lines and high voltage lines, avoiding wiring in the same conduit with these lines.

Malfunctions may occur due to noise from these other lines.

4. If a commercial switching regulator is used, make sure that the F.G. terminal is grounded.

## Operating Environment

### ⚠ Warning

1. Our pressure switches are CE marked; however, they are not equipped with surge protection against lightning.

Lightning surge countermeasures should be applied directly to system components as necessary.

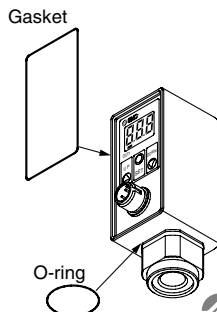
2. Our pressure switches do not have an explosion proof rating.

Never use in the presence of an explosive gas as this may cause a serious explosion.

### ⚠ Caution

1. Do not use in an environment with spattering liquid of oil or solvent.

This may cause the switch to malfunction due to corrosion and/or swelling in the seals (FKM).



## Pressure Source

### ⚠ Warning

1. Use of poisonous and deleterious substances, corrosive or combustible fluids

Do not use fluids such as poisonous and deleterious substances or corrosive gases. Also, note that the switch is not explosion-proof.

2. Applicable fluids

Do not use the switch for any corrosive or flammable gas or fluid (ISE70 series).

Do not use the switch for any fluid capable of corroding stainless steel 304, 430 and 630; or for any flammable gas or liquid (ISE75/75H series).

(For corrosiveness of fluids, consult with the manufacturer of the fluid.)

3. Withstand pressure

When liquid fluid is used, rapid pressure change can be generated such as water hammer and surge pressure when a valve is turned ON/OFF.

Install a dumper or an absorber or an accumulator as a countermeasure according to necessity. It may damage the pressure sensor or the switch if pressure over the proof pressure is applied even for a second.

## Mounting

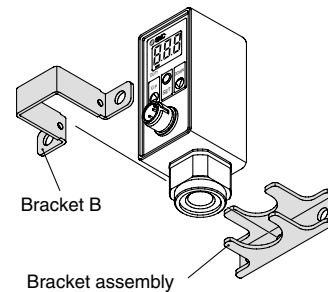
### ⚠ Caution

1. Connecting the pipe to the switch

When connecting the pipe to the switch, apply a torque of 13.6 N·m or greater for the ISE70 series and a torque of 25 N·m or greater for the ISE75/75H series.

2. Bracket-mounting the switch

Interlock the neck of the switch's piping port between the bracket assembly and bracket B. Using two M6 screws, mount the switch onto a wall. If the panel thickness is less than 5 mm, use nuts or other alternative means to increase the mounting strength.



Bracket B and the bracket assembly make up one set.

ZSE  
ISE

ZSP

PS

ISA

PSE

IS

ISG

ZSM



# Series ISE70/75/75H Specific Product Precautions 2

Be sure to read before handling. Refer to front matters 58 and 59 for Safety Instructions and pages 687 to 691 for Pressure Switch Precautions.

**Set Pressure Range and Rated Pressure Range**

## ⚠ Caution

### 1. Set the pressure to within the rated pressure range.

The set pressure range is the range of pressure that is possible in setting.

The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) on the switch.

Although it is possible to set a value outside the rated pressure range, the specifications will not be guaranteed even if the value stays within the set pressure range.

Switch		Pressure range						
		-100 kPa	0	0.4 MPa	0.5 MPa	1 MPa	10 MPa	15 MPa
For 1 MPa (For Air)	<b>ISE70</b>		0	1 MPa				
		-100 kPa (-0.1 MPa)	1 MPa					
For 10 MPa (For General Fluids)	<b>ISE75</b>		0	10 MPa				
			0.4 MPa	10 MPa				
For 15 MPa (For General Fluids)	<b>ISE75H</b>		0	15 MPa				
			0.5 MPa	15 MPa				

\* The ISE75(H) switch shows zero (0) when the pressure being applied goes below the lower limit of the set pressure range, when the cut-too-zero display function is selected.

Rated pressure range of switch  
 Set pressure range of switch