

# Series 10-ZSE80/10-ISE80

## How to Order



**Clean series**

**For positive pressure** 10-ISE80-02-□-N-M-□-□-□

**For vacuum/compound pressure** 10-ZSE80-02-□-N-M-□-□-□

**Rated pressure range**

80	-0.1 to 1 MPa
80H	-0.1 to 2 MPa

**Made to Order**  
Refer to Table 1 below.

**Rated pressure range**

80	0 to -101 kPa
80F	-100 to 100 kPa

**Piping direction**

Nil Rear ported

L\* Bottom ported

\* Piping specification "F2" (G 1/4) is not available.

**Option 1**

Nil	With unit switching function <sup>Note 1)</sup>
M	Fixed SI unit <sup>Note 2)</sup>
P	Initial value psi

Note 1) Under the New Measurement Law, sales of switches with the unit switching function are not allowed for use in Japan.  
Note 2) Fixed unit 10-ISE80H: MPa, kPa  
Others : MPa, kPa

**Option 2**

Nil	None
A	With bracket Rear ported 10-ZS-24-A Bottom ported 10-ZS-35-A
B	With bracket <sup>Note)</sup> 10-ZS-24-D
C	Panel mount Rear ported 10-ZS-35-C Bottom ported 10-ZS-35-B
D	Panel mount + Front protection cover Rear ported 10-ZS-35-F Bottom ported 10-ZS-35-E

**Option 3**

Symbol	Operating manual	Calibration certificate
Nil	● (Booklet)	—
Y	—	—
K	● (Booklet)	●
T	—	●

Note) All texts in both English and Japanese

**Piping**

02	R1/4 (M5 female thread)
N02	NPT1/4 (M5 female thread)
F02*	G1/4 (M5 female thread)
C01	Rc1/8
A2	URJ1/4
B2	TSJ1/4

\* Piping direction "L" (bottom ported) is not available.

**Input/Output**

N	NPN open collector 1 output
P	PNP open collector 1 output
A	NPN open collector 2 outputs
B	PNP open collector 2 outputs
R	NPN open collector 2 outputs + Analog voltage output/Auto-shift switching
T	PNP open collector 2 outputs + Analog voltage output/Auto-shift switching
S	NPN open collector 2 outputs + Analog current output/Auto-shift switching
V	PNP open collector 2 outputs + Analog current output/Auto-shift switching

**Table 1 Made to Order**

Symbol	Specifications
-X501	Lead wire length 3 m

Note) Refer to page 1351 for detail.

**Option**

Option	Piping direction	Part no.
Bracket	Rear ported	10-ZS-24-A
	Rear ported	10-ZS-24-D
	Bottom ported	10-ZS-35-A
Panel mount	Rear ported	10-ZS-35-C
	Bottom ported	10-ZS-35-B
Panel mount + Front protection cover	Rear ported	10-ZS-35-F
	Bottom ported	10-ZS-35-E

### Caution

This product is the 10-ZSE80/SE80 series blown with air and double packed in a Class M3.5 (ISO Class 5) clean room.

Note) Rear ported only

Directional Control Valves

Air Cylinders

Rotary Actuators

Air Grippers

Air Preparation Equipment

Modular F. R.

Pressure Control Equipment

Fittings & Tubing

Flow Control Equipment

Pressure Switches/Pressure Sensors

## 2-Color Display Digital Pressure Switch For General Fluids **10-ZSE80/10-ISE80**

Refer to the SMC website for Pressure Switches Precautions (M-E03-3) and Specific Product Precautions (Operation Manual).

### Specifications

Model	10-ZSE80 (Vacuum pressure)	10-ZSE80F (Compound pressure)	10-ISE80 (Positive pressure)	10-ISE80H (Positive pressure)	
Rated pressure range	0.0 to -101.0 kPa	-100.0 to 100.0 kPa	-0.100 to 1.000 MPa	-0.100 to 2.00 MPa	
Display/Set pressure range	10.0 to -111.1 kPa	-110.0 to 110.0 kPa	-0.105 to 1.100 MPa	-0.105 to 2.20 MPa	
Withstand pressure	500 kPa		2 MPa	4 MPa	
Wetted parts material	Pressure sensor: Stainless steel 630, Fitting: Stainless steel 304				
Display/Smallest settable increment	0.1 kPa	0.1 kPa	0.001 MPa	0.001 MPa (to 1.999) 0.01 MPa (2.00 to)	
Applicable fluid	Fluids do not corrode stainless steel 630 and 304				
Power supply voltage	12 to 24 VDC $\pm 10\%$ , Ripple (p-p) 10% or less (with power supply polarity protection)				
Current consumption	45 mA or less				
Switch output	NPN 1 output, NPN 2 outputs, PNP 1 output, PNP 2 outputs				
	Maximum load current	80 mA			
	Maximum load voltage	28 V (at NPN output)			
	Residual voltage	1 V or less (with load current of 80 mA)			
	Response time	2.5 ms (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)			
	Short circuit protection	Yes			
Repeatability	$\pm 0.2\%$ F.S. $\pm 1$ digit				
Hysteresis	Hysteresis mode	Variable (0 or above)			
	Window comparator mode				
Analog output	Voltage output	Output voltage (Rated pressure range)	1 to 5 V $\pm 2.5\%$ F.S.	0.6 to 5 V $\pm 2.5\%$ F.S.	0.8 to 5 V $\pm 2.5\%$ F.S.
		Linearity	$\pm 1\%$ F.S. or less		
		Output impedance	Approx. 1 k $\Omega$		
	Current output	Output current (Rated pressure range)	4 to 20 mA $\pm 2.5\%$ F.S.	2.4 to 20 mA $\pm 2.5\%$ F.S.	3.2 to 20 mA $\pm 2.5\%$ F.S.
		Linearity	$\pm 1\%$ F.S. or less		
	Load impedance	Maximum load impedance: 300 $\Omega$ (Power supply voltage 12 V) 600 $\Omega$ (Power supply voltage 24 V) Minimum load impedance: 50 $\Omega$			
Auto-shift input	Non-voltage input (Reed or Solid state), Low level: 0.4 V or less, 5 ms or longer input				
Display	3 1/2-digit, 7-segment, 2-color LCD (Red/Green)				
Display accuracy	$\pm 2\%$ F.S. $\pm 1$ digit (Ambient temperature of 25 $\pm 3^\circ\text{C}$ )				
Indicator light	Lights up when output is turned ON. OUT1, OUT2: Orange				
Environment resistance	Enclosure	IP65			
	Operating temperature range	Operating: 0 to 50 $^\circ\text{C}$ , Stored: -10 to 60 $^\circ\text{C}$ (No freezing or condensation)			
	Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)			
	Withstand voltage	250 VAC for 1 minute between live parts and case			
	Insulation resistance	2 M $\Omega$ or more between live parts and case (at 50 VDC Mega)			
Temperature characteristics	$\pm 3\%$ F.S. (Based on 25 $^\circ\text{C}$ , within operating temperature range)				
Lead wire	Oilproof heavy-duty vinyl cable, 3 cores (N.P) $\phi 3.5$ , 2 m 4 cores (A.B) Conductor area: 0.15 mm $^2$ (AWG26) 5 cores (R.T.S.V) Insulator O.D.: 0.95 mm				
Standards	CE UL/CSA (E216656) RoHS				
Cleanliness class (ISO class)	Class 4				

### Piping Specifications

Model	02	N02	F02	C01	A2	B2
Port size	R1/4	NPT1/4	G1/4	Rc1/8	URJ1/4	TSJ1/4
Weight (Bottom ported)	117 g	118 g	—	114 g	120 g	111 g
Weight (Rear ported)	89 g	90 g	86 g	86 g	92 g	83 g
Leakage	1 x 10 $^{-5}$ Pa·m $^3$ /s			1 x 10 $^{-10}$ Pa·m $^3$ /s		

### Set Pressure Range and Rated Pressure Range

**Set the pressure 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.

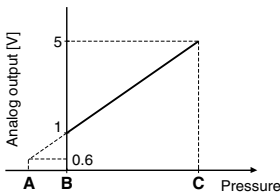
Although it is possible to set a value outside the rated pressure range, the specifications will not be guaranteed even if the value stays within the set pressure range.

Switch		Pressure range				
		-100 kPa	0	100 kPa	1 MPa	2 MPa
For vacuum pressure	<b>10-ZSE80</b>	-101 kPa	0			
		-111 kPa		10 kPa		
For compound pressure	<b>10-ZSE80F</b>	-100 kPa		100 kPa		
		-110 kPa		110 kPa		
For positive pressure	<b>10-ISE80</b>	-0.1 MPa			1 MPa	
		-0.105 MPa			1.1 MPa	
	<b>10-ISE80H</b>	-0.1 MPa				2 MPa
		-0.105 MPa				2.2 MPa

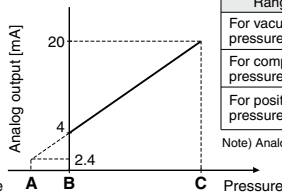
Rated pressure range of switch  
 Set pressure range of switch

### Analog Output

**Voltage output**



**Current output**



Range	Rated pressure range	A	B	C
For vacuum pressure	0.0 to -101.0 kPa	10.1 kPa	0	-101.0 kPa
For compound pressure	-100.0 to 100.0 kPa	—	-100.0 kPa	100.0 kPa
For positive pressure	-0.100 to 1.000 MPa	-0.100 MPa	0	1.000 MPa
	-0.100 to 2.00 MPa	-0.100 MPa <sup>(Note)</sup>	0	2.00 MPa

(Note) Analog output is 0.8 [V] or 3.2 [mA] at the pressure A.

Directional Control Valves

Air Cylinders

Rotary Actuators

Air Grippers

Air Preparation Equipment

Modular F. R.

Pressure Control Equipment

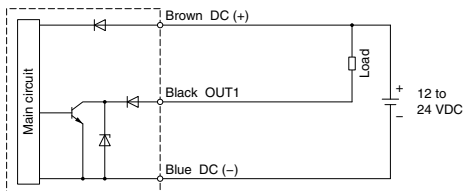
Fittings & Tubing

Flow Control Equipment

Pressure Switches/ Pressure Sensors

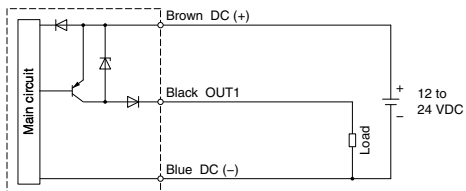
**Internal Circuit and Wiring Example**

**-N**  
NPN (1 outputs)



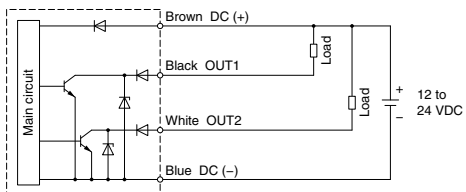
Max. 28 V, 80 mA  
Residual voltage 1 V or less

**-P**  
PNP (1 outputs)



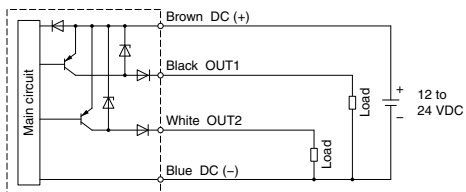
Max. 80 mA  
Residual voltage 1 V or less

**-A**  
NPN (2 outputs)



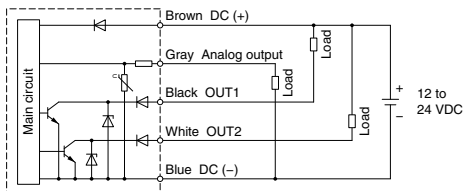
Max. 28 V, 80 mA  
Residual voltage 1 V or less

**-B**  
PNP (2 outputs)



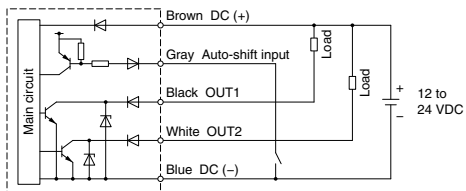
Max. 80 mA  
Residual voltage 1 V or less

**-R, -S**  
R: NPN (2 outputs) + Analog voltage output  
S: NPN (2 outputs) + Analog current output



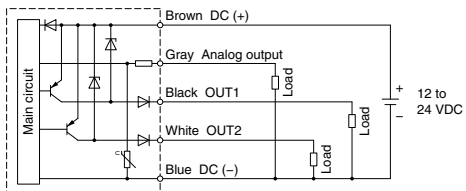
Max. 28 V, 80 mA  
Residual voltage 1 V or less

**-R/-S**  
NPN (2 outputs) + Auto-shift input



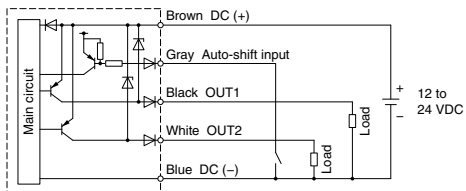
Max. 28 V, 80 mA  
Residual voltage 1 V or less

**-T, -V**  
T: PNP (2 outputs) + Analog voltage output  
V: PNP (2 outputs) + Analog current output



Max. 80 mA  
Residual voltage 1 V or less

**-T/-V**  
PNP (2 outputs) + Auto-shift input

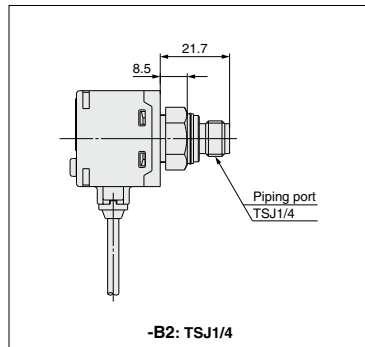
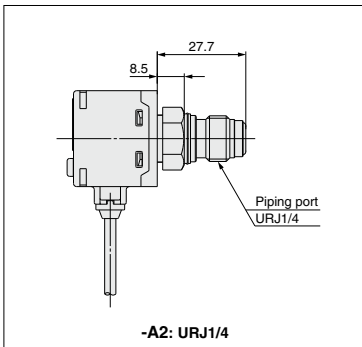
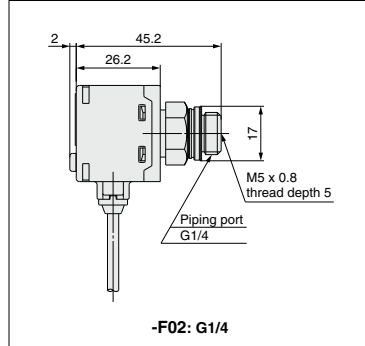
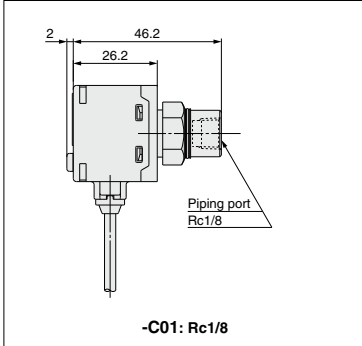
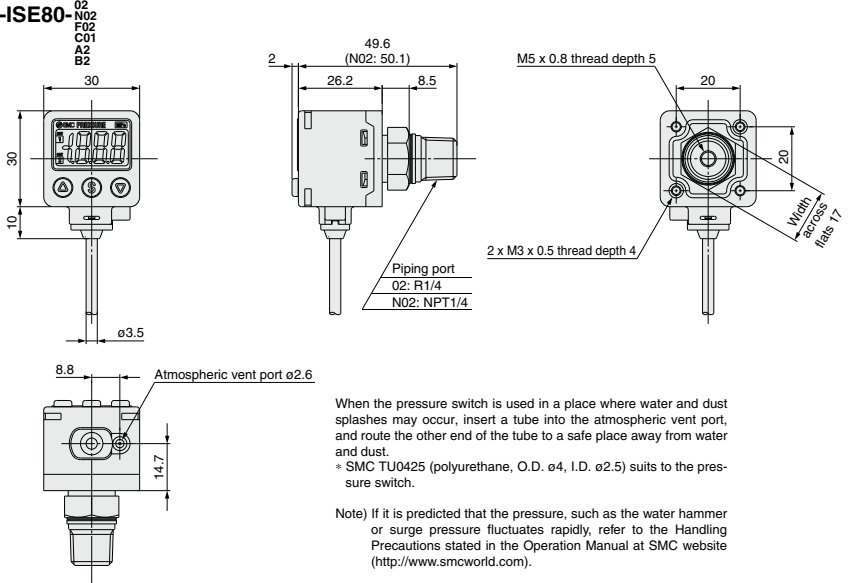


Max. 80 mA  
Residual voltage 1 V or less

## 2-Color Display Digital Pressure Switch For General Fluids **10-ZSE80/10-ISE80**

**Dimensions** (For details about lead wires, refer to the product specifications.)

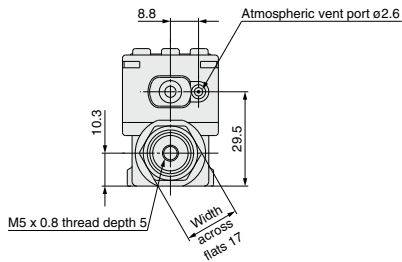
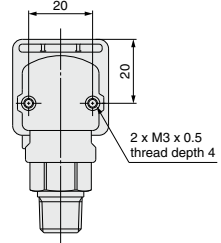
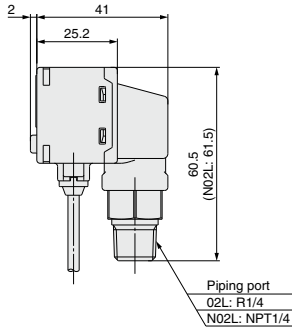
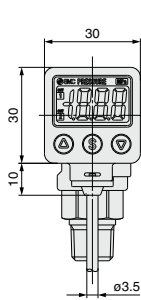
### 10-ZSE80/10-ISE80-02



Directional Control Valves  
 Air Cylinders  
 Rotary Actuators  
 Air Grippers  
 Air Preparation Equipment  
 Modular F. R.  
 Pressure Control Equipment  
 Fittings & Tubing  
 Flow Control Equipment  
 Pressure Switches/ Pressure Sensors

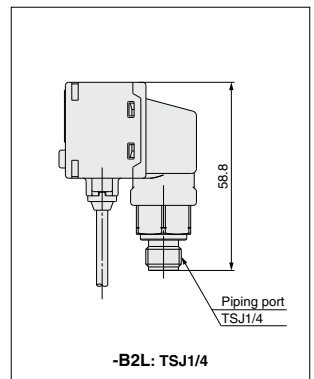
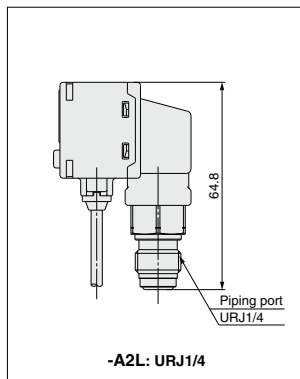
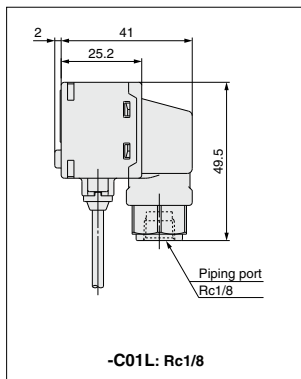
**Dimensions** (For details about lead wires, refer to the product specifications.)

**10-ZSE80/10-ISE80** 02L  
N02L  
C01L  
A2L  
B2L



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.

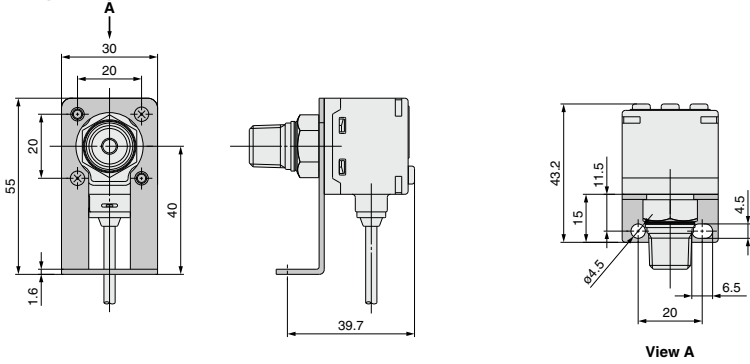
Note) If it is predicted that the pressure, such as the water hammer or surge pressure fluctuates rapidly, refer to the Handling Precautions stated in the Operation Manual at SMC website (<http://www.smcworld.com>).



**Dimensions** (For details about lead wires, refer to the product specifications.)

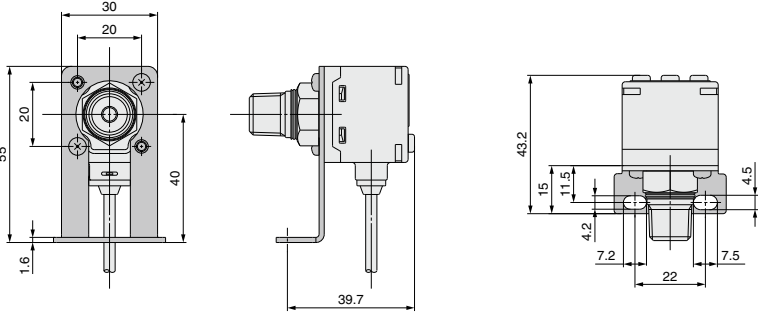
**With bracket (Rear ported)**

- 10-ZS-24-A

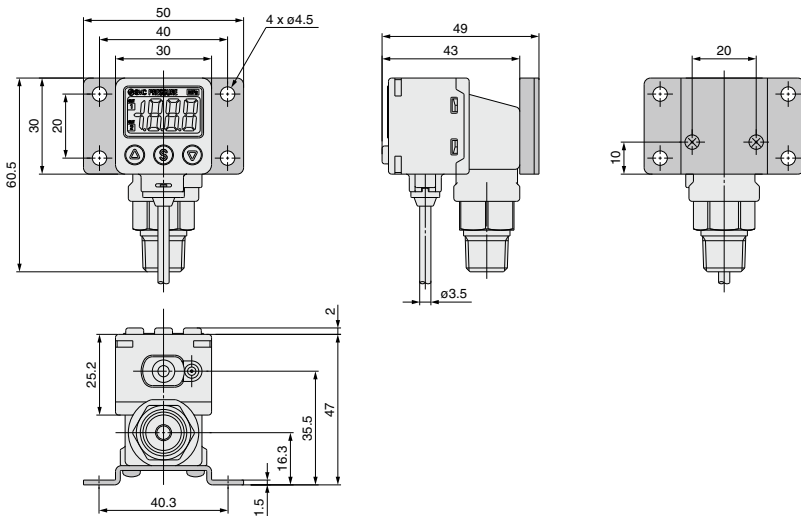


**With bracket (Rear ported)**

- 10-ZS-24-D



**With bracket (Bottom ported)**



Directional Control Valves

Air Cylinders

Rotary Actuators

Air Grippers

Air Preparation Equipment

Modular F. R.

Pressure Control Equipment

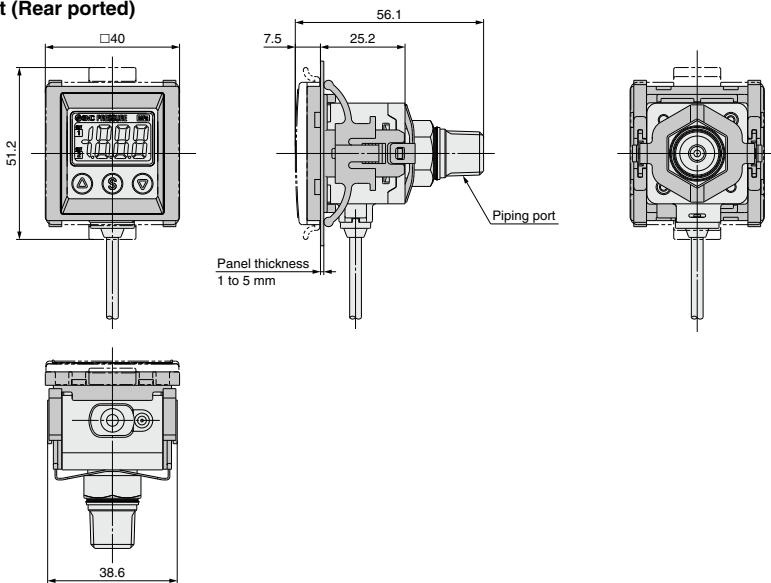
Fittings & Tubing

Flow Control Equipment

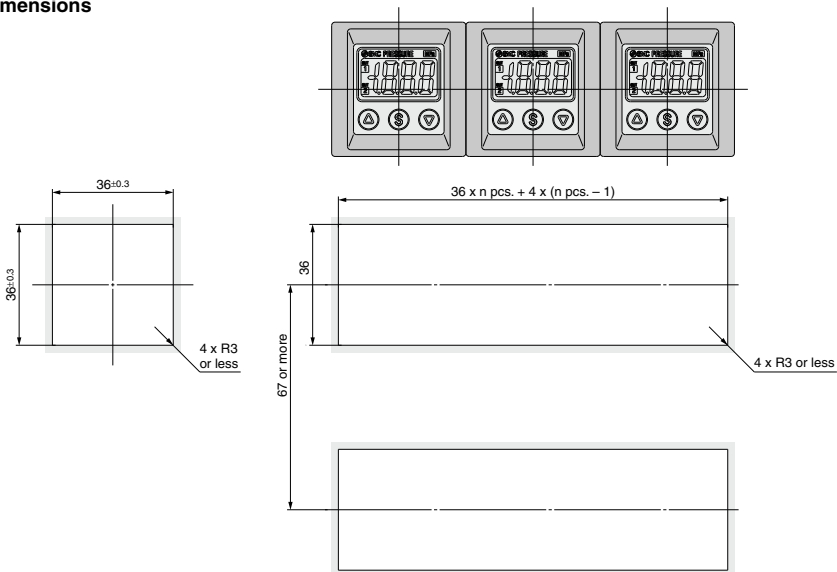
Pressure Switches/ Pressure Sensors

**Dimensions** (For details about lead wires, refer to the product specifications.)

**Panel mount (Rear ported)**



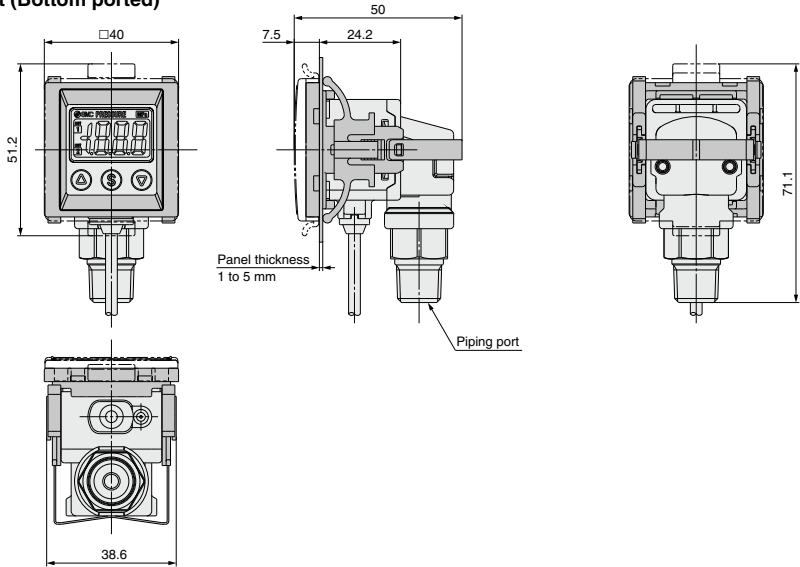
**Panel-cut dimensions**



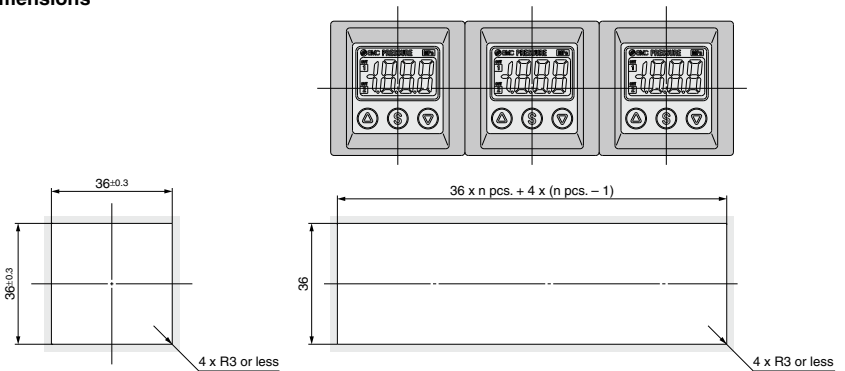


**Dimensions** (For details about lead wires, refer to the product specifications.)

**Panel mount (Bottom ported)**



**Panel-cut dimensions**



- Directional Control Valves
- Air Cylinders
- Rotary Actuators
- Air Grippers
- Air Preparation Equipment
- Modular F. R.
- Pressure Control Equipment
- Fittings & Tubing
- Flow Control Equipment
- Pressure Switches/ Pressure Sensors

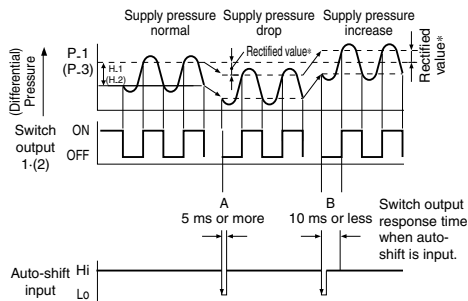
□ in brackets stand for the function codes. Refer to the operating manual for how to operate and function codes in detail.

## Function Details

### A Auto-shift function (F4)

When there are large fluctuations in the supply pressure, the switch may fail to operate correctly. The auto-shift function compensates such supply pressure fluctuations. It measures the pressure at the time of auto-shift signal input and uses it as the reference pressure to correct the set-value on the switch.

#### Set-value correction by auto-shift function



\* Rectified value

When the auto-shift is selected, "ooo" will be displayed for approximately 1 second, and the pressure value at that point will be saved as a rectified value "C\_5". Based on the saved rectified values, the set-value<sup>(Note)</sup> of "P\_1", "H\_1", "P\_2", and "H\_2" will likewise be rectified.

Note) When an output is reversed, "n\_1", "H\_1", "n\_2", "H\_2" will be rectified.

#### Possible Set Range for Auto-Shift Input

	Regulating pressure range	Possible set range
Compound pressure	-110.0 to 110.0 kPa	-220 to 220 kPa
Vacuum pressure	10.0 to -111.0 kPa	121.0 to -121.0 kPa
Positive pressure	-0.105 to 1.100 MPa	-1.205 to 1.205 MPa
	-0.105 to 2.20 MPa	-2.31 to 2.31 MPa

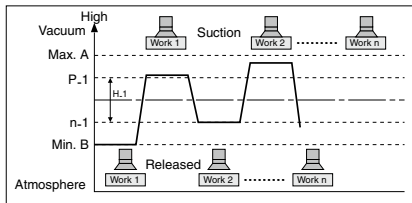
#### Auto-shift zero

The basic function of auto-shift zero is the same as the function for auto-shift. Also, it corrects values on the display, based on a pressure value of 0, when the auto-shift is selected.

### B Auto-preset function (F8)

Auto-preset function, when selected in the initial setting, calculates and stores the set-value from the measured pressure. The optimum set-value is determined automatically by repeating vacuum and break with the target workpiece several times.

#### Suction Verification

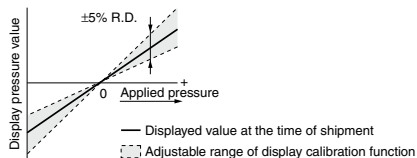


#### Formula for Obtaining the Set-Value

P_1 or P_2	H_1 or H_2
$P_1 (P_2) = A - (A-B)/4$	$H_1 (H_2) = (A-B)/2$
$n_1 (n_2) = B + (A-B)/4$	

### C Precision indicator setting function (F7)

Fine adjustment of the indicated value can be made within the range of  $\pm 5\%$  of the read value. The scattering of the indicated value can be eliminated.



Note) When the precision indicator setting function is used, the set pressure value may change  $\pm 1$  digit.

### D Peak and bottom display function

This function constantly detects and updates the maximum (minimum) value and allows to hold the maximum (minimum) pressure value.

When the  $\odot$   $\ominus$  buttons are simultaneously pressed for 1 second or longer, while "holding", the hold value will be reset.

### E Key lock function

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

### F Zero-out function

This function clears and resets the zero value on the display of measured pressure.

For the pressure switch with analog output, the analog output shifts according to the indication. A displayed value can be adjusted within  $\pm 10\%$  F.S. of the pressure when ex-factory.

## Function Details

### G Error indication function

Error name	Error code	Description
Overcurrent error	Er1	Load current of switch output (OUT1) exceeds 80 mA.
	Er2	Load current of switch output (OUT2) exceeds 80 mA.
Residual pressure error	Er3	It is still applied with pressure that is $\pm 10\%$ over the atmospheric pressure and the upper limit of the rated pressure range when it is cleared to zero. * After displaying the error code for 1 second, the switch automatically returns to the measuring mode. Due to individual product differences, the setting range varies $\pm 1$ digits.
Applied pressure error	HHH	Supply pressure exceeds the maximum set pressure.
	LLL	Supply pressure is below the minimum set pressure.
Auto-shift error	or	The value measured at the time of auto-shift input is outside the set pressure range. * After displaying the error code for one second, the switch returns to the measuring mode.
System error	Er0	Internal data error
	Er4	Internal data error
	Er7	Internal data error

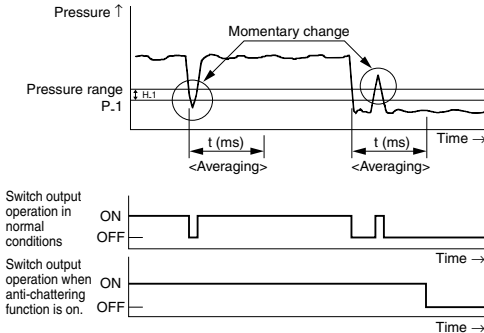
### H Anti-chattering function (F3)

A large bore cylinder or ejector consumes a large volume of air in operation and may experience a temporary drop in the supply pressure. This function prevents detection of such temporary drops in the supply pressure as an error.

Available response time settings
20 ms, 100 ms, 500 ms, 1000 ms, 2000 ms

<Principle>

This function averages pressure values measured during the response time set by the user and then compares the average pressure value with the pressure set point value to output the result on the switch.



### I Display unit switching function (F0)

Display units can be switched with this function.

Pressure range	For compound pressure	For vacuum pressure	For positive pressure		
Applicable pressure sensor	10-ZSE80F	10-ZSE80	10-ISE80	10-ISE80H*	
Set pressure range	-110 to 110 kPa	10 to -111 kPa	-0.1 to 1.1 MPa	-0.1 to 2.2 MPa	
Pa	kPa	0.1	0.1	1	
	MPa	0.001	0.001	0.001	0.001
Gf	kgf/cm <sup>2</sup>	0.001	0.001	0.01	0.01
bAr	bar	0.001	0.001	0.01	0.01
PSI	psi	0.02	0.02	0.1	1
inHg	inHg	0.1	0.1	—	—
mmHg	mmHg	1	1	—	—

\* 10-ISE80H: Does not indicate the last digit when the pressure is 2.000 MPa or higher.

### J Power-saving mode (F9)



The numerical value disappears and the decimal points blink.

Power-saving mode can be selected.

It shifts to the power-saving mode without button operation for 30 seconds. It is set to the normal mode (Power-saving mode is OFF.) when ex-factory. (Decimal points and operation indicator light (only when the switch output is turned ON.) blink in the power-saving mode.)

### K Secret code setting (F10)



Input an arbitrary three-digit value.

\* The set-value can be confirmed when the key is locked.

It can be set whether code number input is required or not when key is locked. It is set to input no code number when ex-factory.

# Series 10-ZSE80/10-ISE80

## Made to Order

Please contact SMC for detailed dimensions, specifications, and lead times.



Symbol

Lead wire length 3 m

**-X501**

It has a lead wire extended to 3 meters.

### How to Order

\* Refer to How to Order on page 1340 for standard specifications.

10-ZSE80(F)/10-ISE80(H) -  -  -  - X501

Piping\* ↓

Output\* ↓

Option\* ↓