

2-Color Display Digital Pressure Switch For General Fluids



Series 10-ZSE80/10-ISE80



How to Order

Clean Series

Rated pressure range

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

Made to Order
Refer to Table 1 below.

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

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

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.

Piping

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

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

Option 3

Symbol	Operating manual ^{Note 1)}	Calibration certificate
Nil	● (Booklet)	—
Y	—	—
K	● (Booklet)	●
T	—	●

Note) All texts in both English and Japanese

Option 1

Nil	With unit display ^{Note 1)} switching function
M	Fixed SI unit ^{Note 2)}
P	Initial value psi

Note 1) Under the New Measurement Law, sales of switches with the unit switching function have not been allowed for use in Japan.
Note 2) Fixed unit 10-ISE80H: MPa
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 ^{Note)} 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

Note) Rear ported only

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 12 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 10-ZSE80/ISE80 series blown with air and double packed in a Class M3.5 (ISO Class 5) clean room.

2-Color Display Digital Pressure Switch *Series 10-ZSE80/10-ISE80*

For General Fluids

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		
Indication/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					
Applicable fluid		Fluids do not corrode stainless steel 630 and 304					
Port size		R1/4, NPT1/4, G1/4*, URJ1/4, TSJ1/4, Rc1/8 Piping direction: Rear/Bottom					
Power supply voltage		12 to 24 VDC ±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		±0.2% F.S. ±1 digit					
Hysteresis		Hysteresis mode					
		Window comparator mode Variable (0 or above)					
Analog output		Voltage output		Output voltage (Rated pressure range) 1 to 5 V ±2.5% F.S.		0.6 to 5 V ±2.5% F.S.	0.8 to 5 V ±2.5% F.S.
				Linearity ±1% F.S. or less			
				Output impedance Approx. 1 kΩ			
		Current output		Output current (Rated pressure range) 4 to 20 mA ±2.5% F.S.		2.4 to 20 mA ±2.5% F.S.	3.2 to 20 mA ±2.5% F.S.
				Linearity ±1% F.S. or less			
				Load impedance Maximum load impedance: 300 Ω (Power supply voltage 12 V) 600 Ω (Power supply voltage 24 V) Minimum load impedance: 50 Ω			
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		±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)					
Indicator light		Lights up when output is turned ON. OUT1, OUT2: Orange					
Function		Anti-chattering, Zero-out, Key lock function, Auto-preset, Auto-shift, Unit display switching, Power-saving mode					
Environment resistance		Enclosure IP65					
		Operating temperature range Operating: 0 to 50°C, Stored: -10 to 60°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 MΩ or more between live parts and case (at 50 VDC Mega)					
Temperature characteristics		±3% F.S. (Based on 25°C, within operating temperature range)					
Lead wire		Oilproof heavy-duty vinyl cable, 3 cores (N.P) ø3.5, 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 marking, UL/CSA, RoHS compliance					

* G1/4 is available for rear ported only.

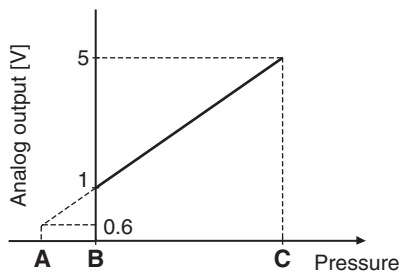
Piping Specifications

Model	O2	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		

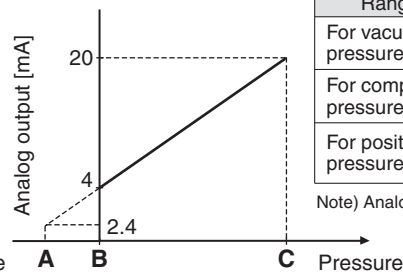
Series 10-ZSE80/10-ISE80

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 ^{Note)}	0	2.00 MPa

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

Descriptions

Output (OUT1) display (Orange)

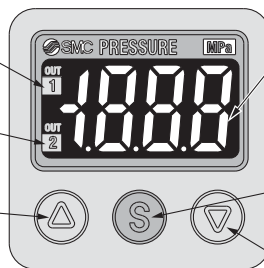
Lights up when OUT1 is turned ON.

Output (OUT2) display (Orange)

Lights up when OUT2 is turned ON.

△ button

Use this button to select the mode or increase the ON/OFF set-value.
It is also used for switching to the peak display mode.



LCD

Displays the current pressure, set mode, selected display unit, and error code. Always use red or green display; or switch between green and red according to the output. Four different display settings are available.

SET button

Use this button to change the mode or confirm the set-value.

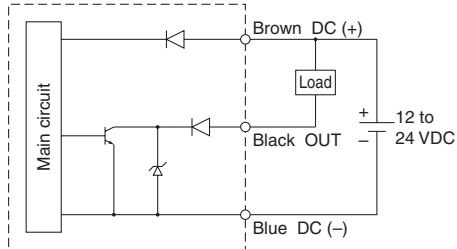
▽ button

Use this button to select the mode or decrease the ON/OFF set-value.
It is also used for switching to the bottom display mode.

2-Color Display Digital Pressure Switch Series 10-ZSE80/10-ISE80

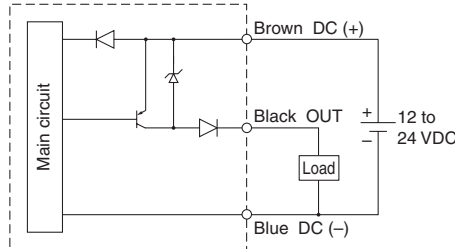
Internal Circuits and Wiring Examples

-N NPN (1 output)



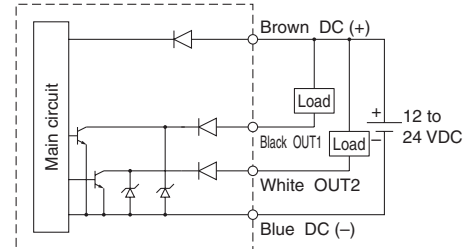
Max. 28V, 80 mA
Residual voltage 1 V or less

-P PNP (1 output)



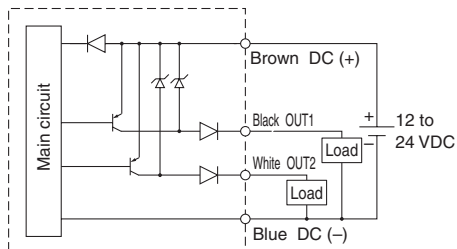
Max. 80 mA
Residual voltage 1 V or less

-A NPN (2 outputs)



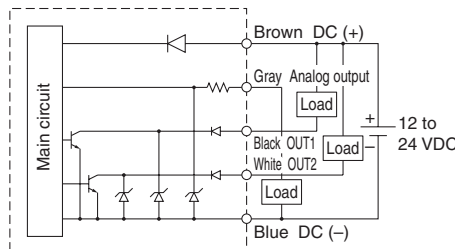
Max. 28V, 80 mA
Residual voltage 1 V or less

-B PNP (2 outputs)



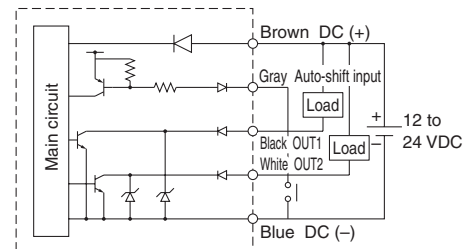
Max. 80 mA
Residual voltage 1 V or less

-R NPN (2 outputs) + Analog voltage output



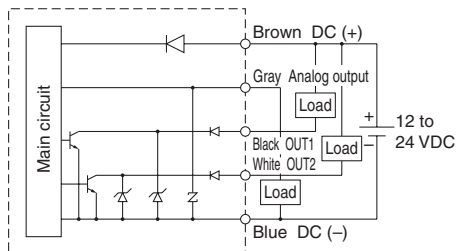
Max. 28V, 80 mA
Residual voltage 1 V or less

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



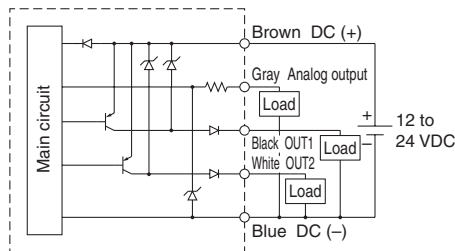
Max. 28V, 80 mA
Residual voltage 1 V or less

-S NPN (2 outputs) + Analog current output



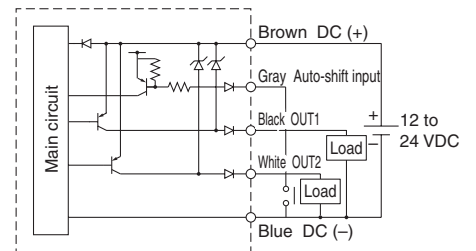
Max. 28V, 80 mA
Residual voltage 1 V or less

-T PNP (2 outputs) + Analog voltage output



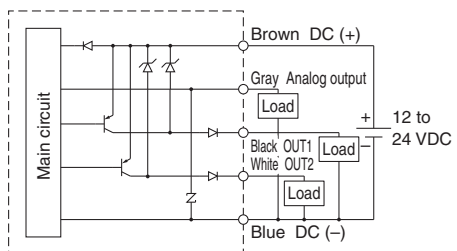
Max. 80 mA
Residual voltage 1 V or less

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



Max. 80 mA
Residual voltage 1 V or less

-V PNP (2 outputs) + Analog current output



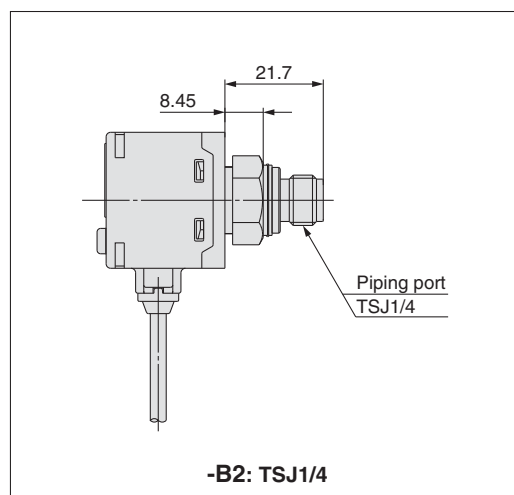
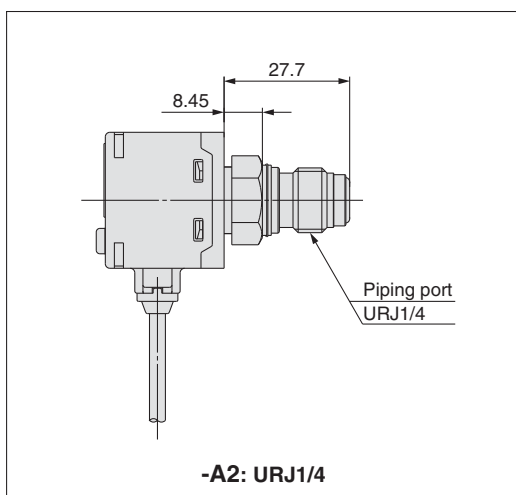
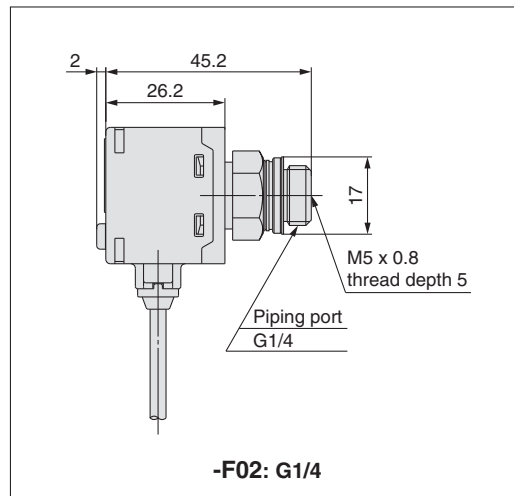
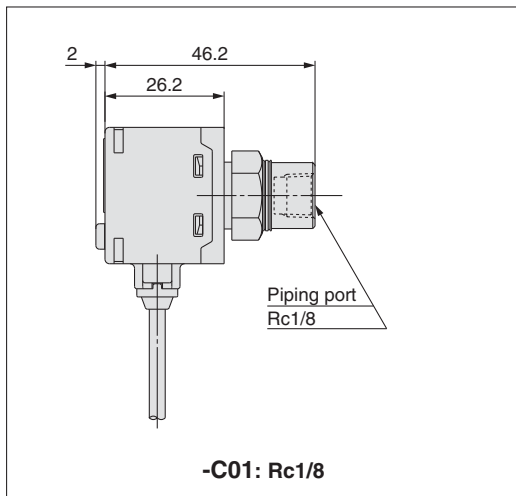
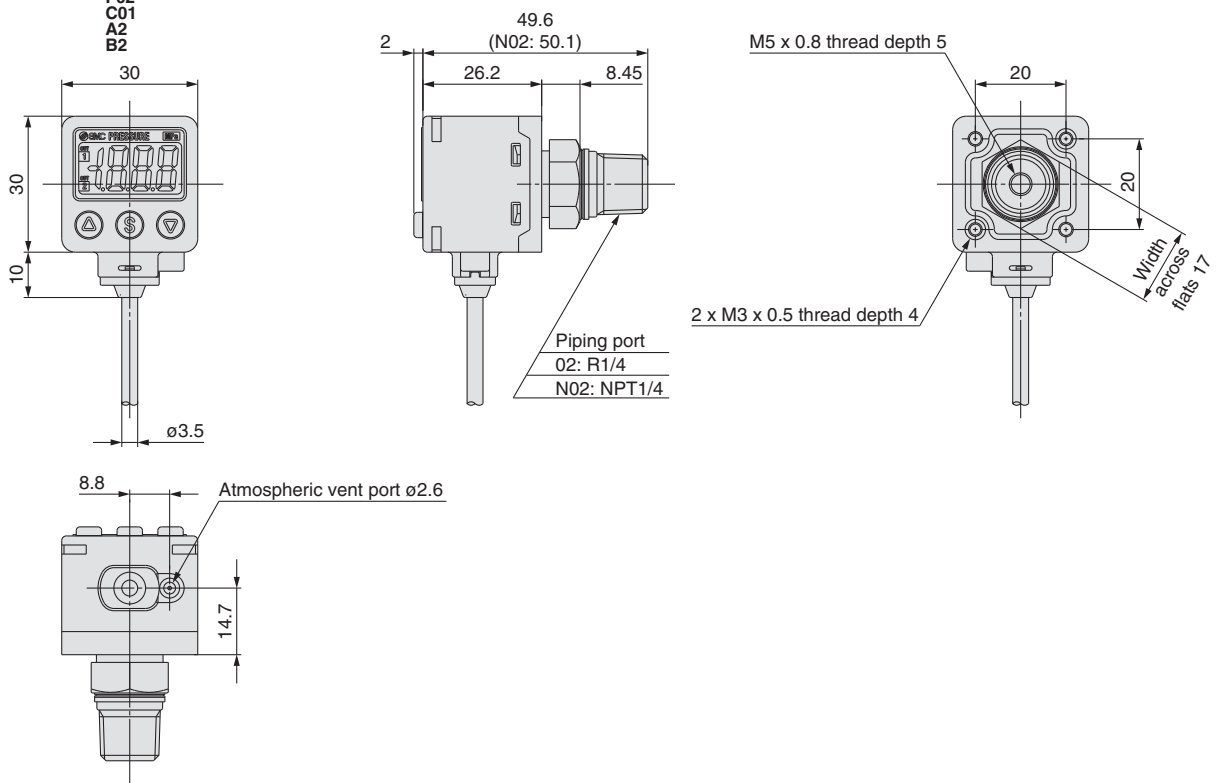
Max. 80 mA
Residual voltage 1 V or less

Series 10-ZSE80/10-ISE80

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

10-ZSE/10-ISE80

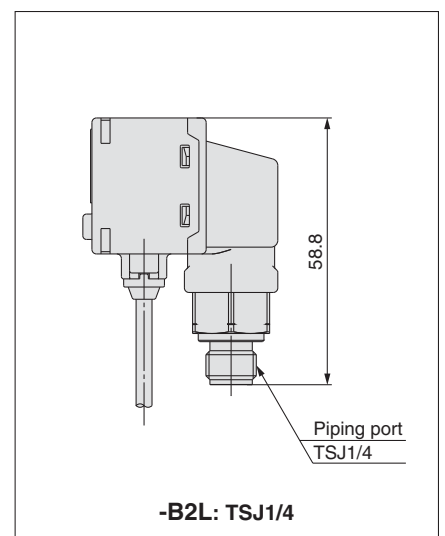
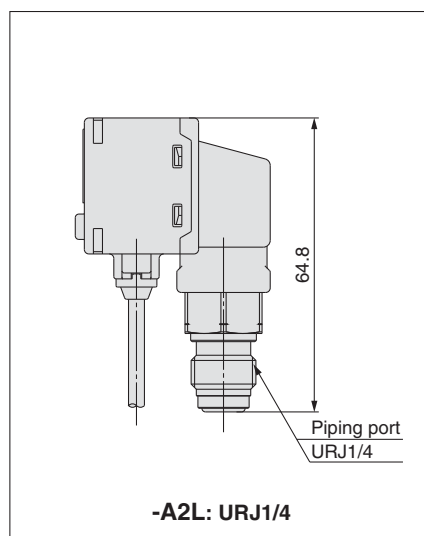
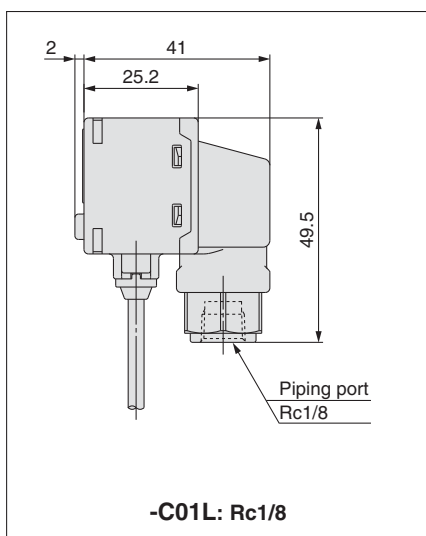
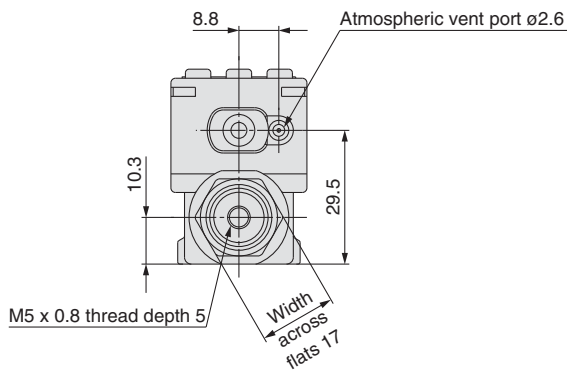
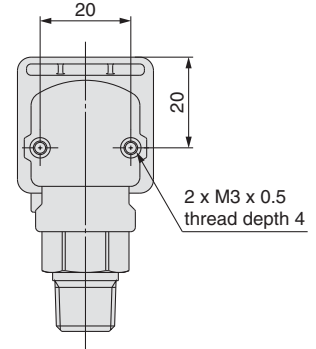
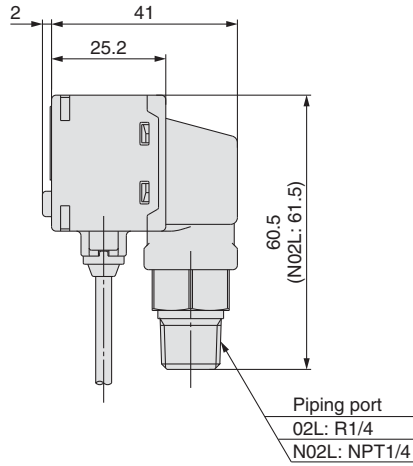
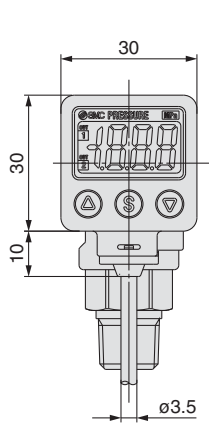
02
-N02
F02
C01
A2
B2



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

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

10-ZSE/10-ISE80 - 02L
 -N02L
 C01L
 A2L
 B2L

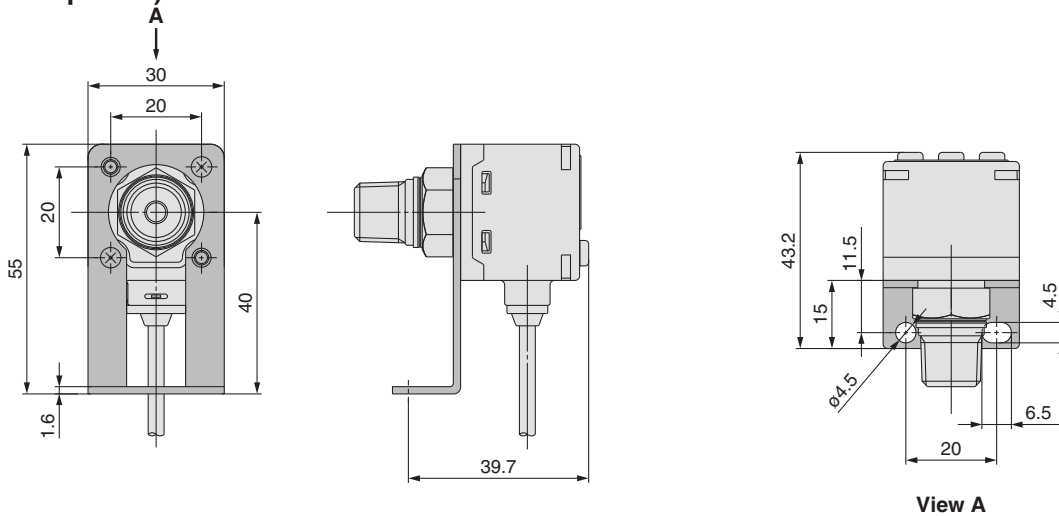


Series 10-ZSE80/10-ISE80

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

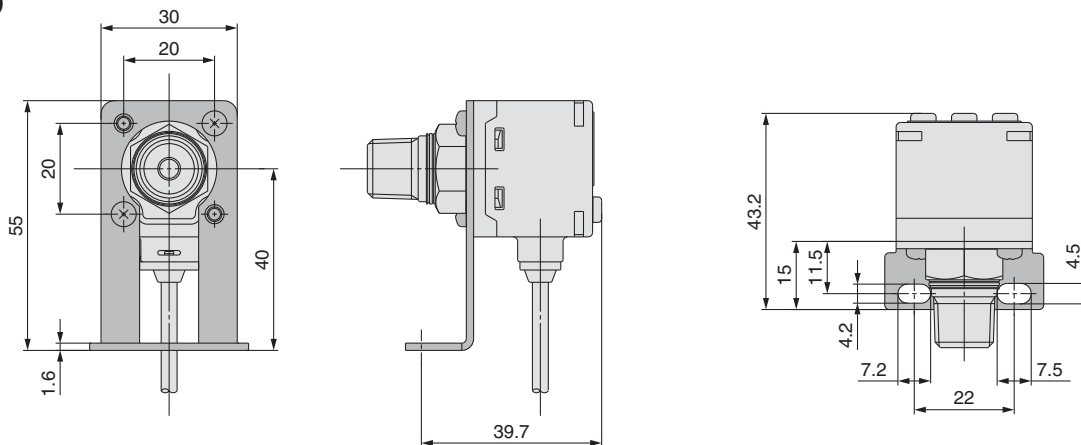
With bracket (Rear ported)

• 10-ZS-24-A

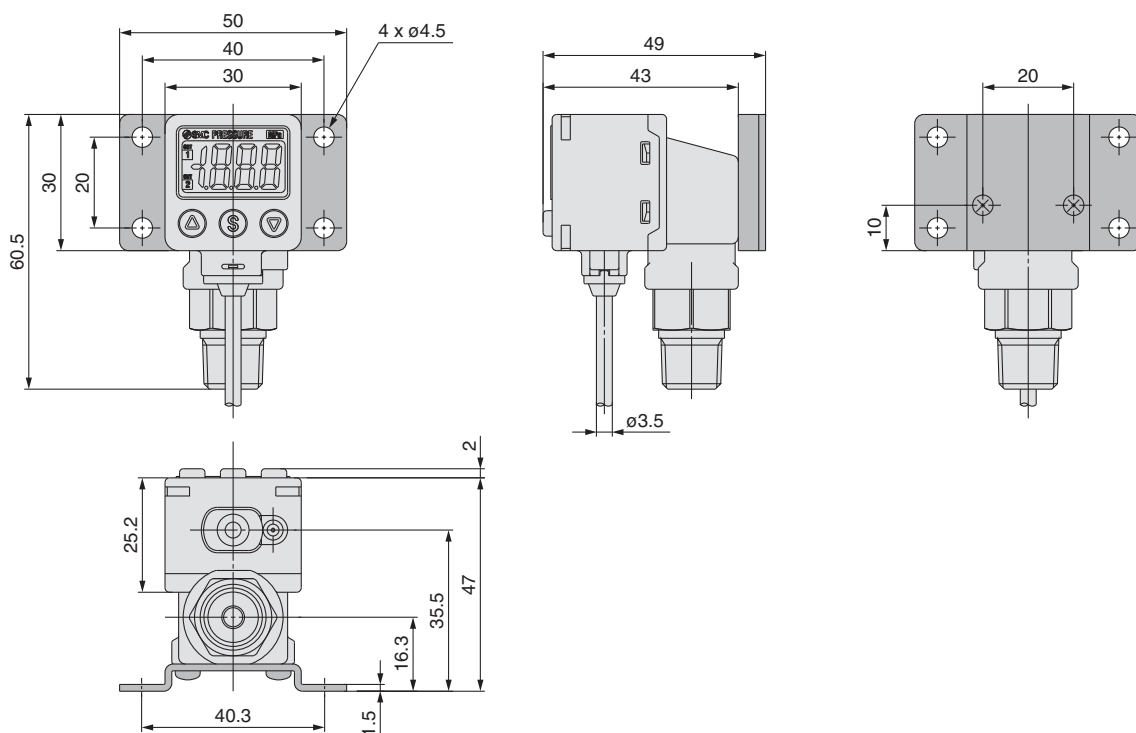


With bracket (Rear ported)

• 10-ZS-24-D



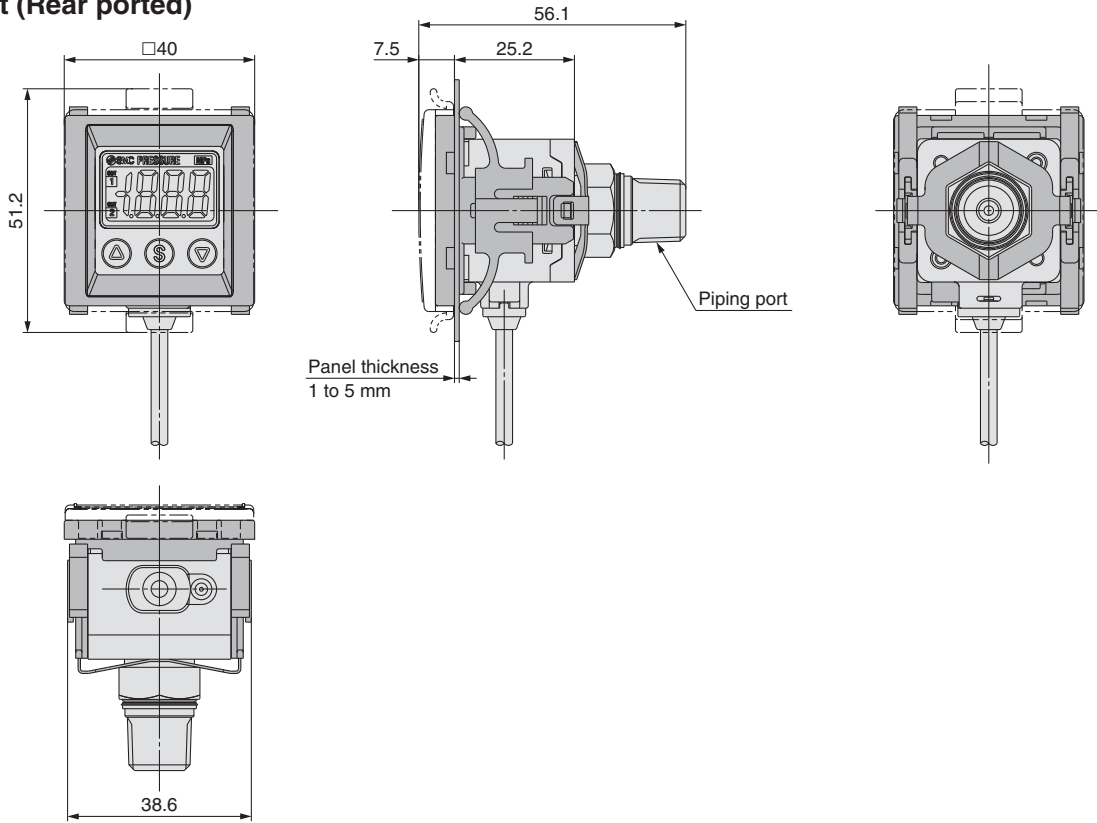
With bracket (Bottom ported)



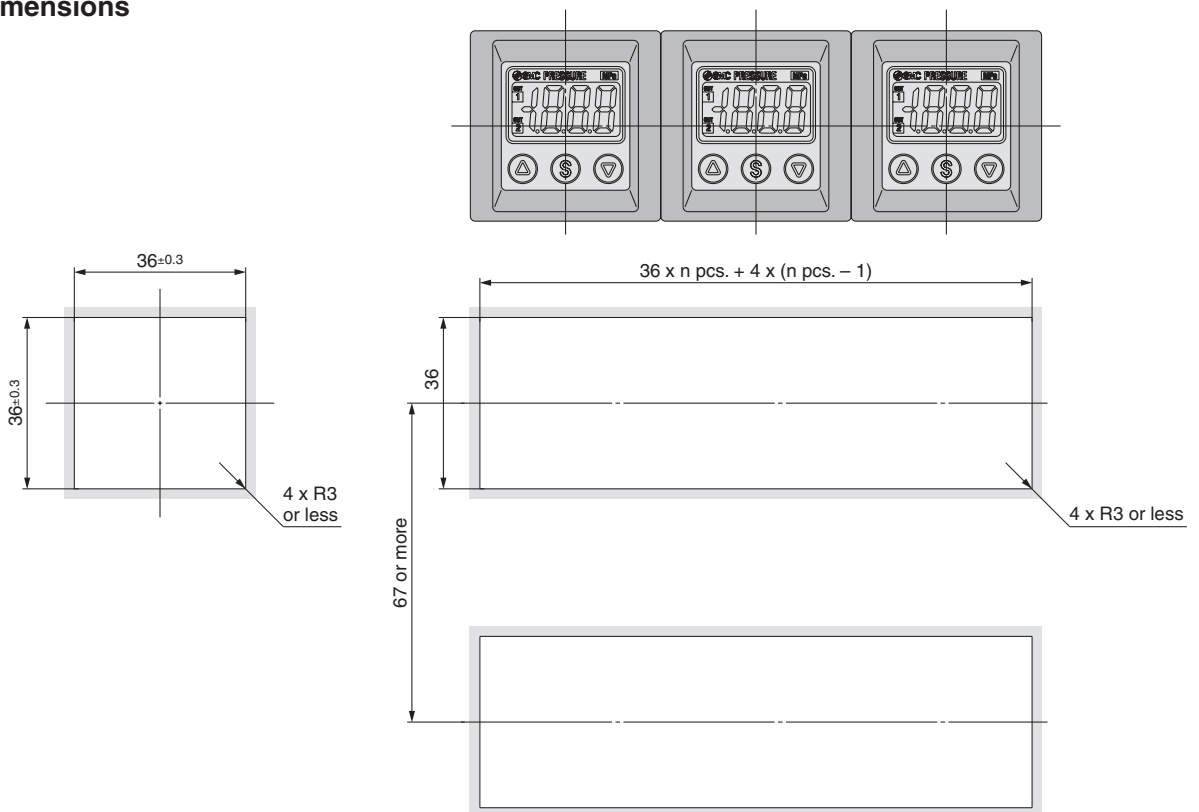
2-Color Display Digital Pressure Switch For General Fluids *Series 10-ZSE80/10-ISE80*

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

Panel mount (Rear ported)



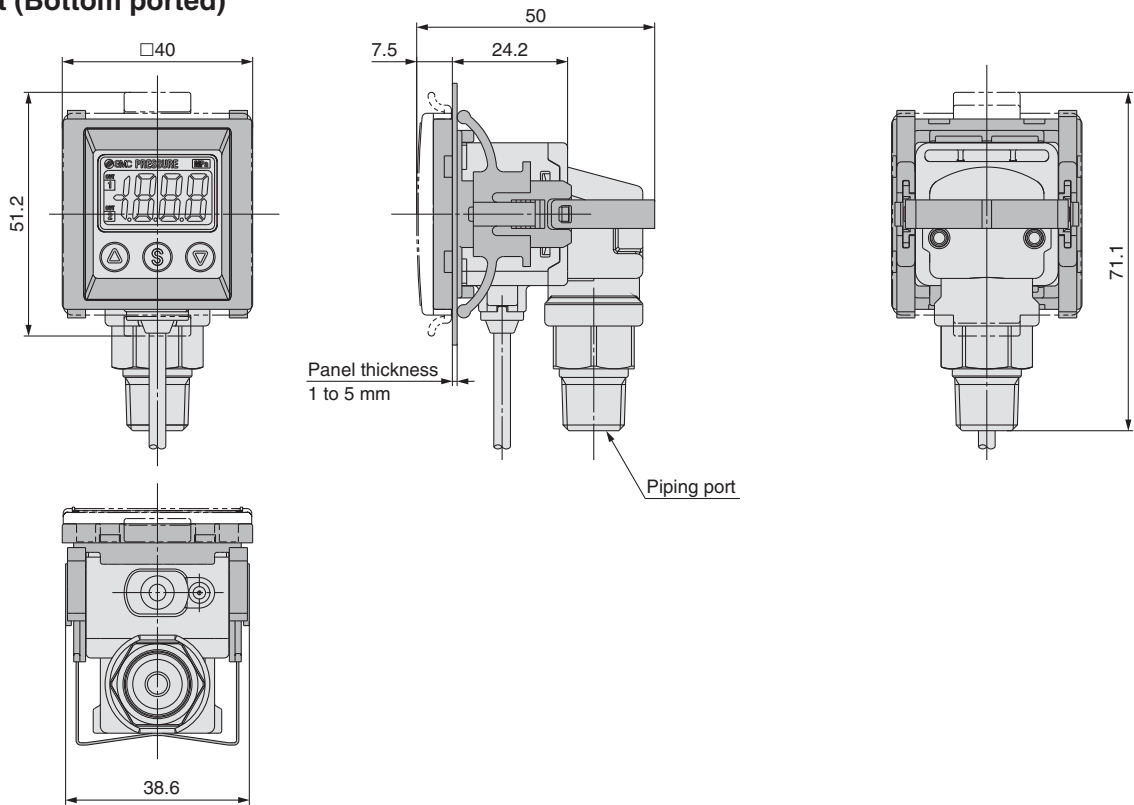
Panel-cut dimensions



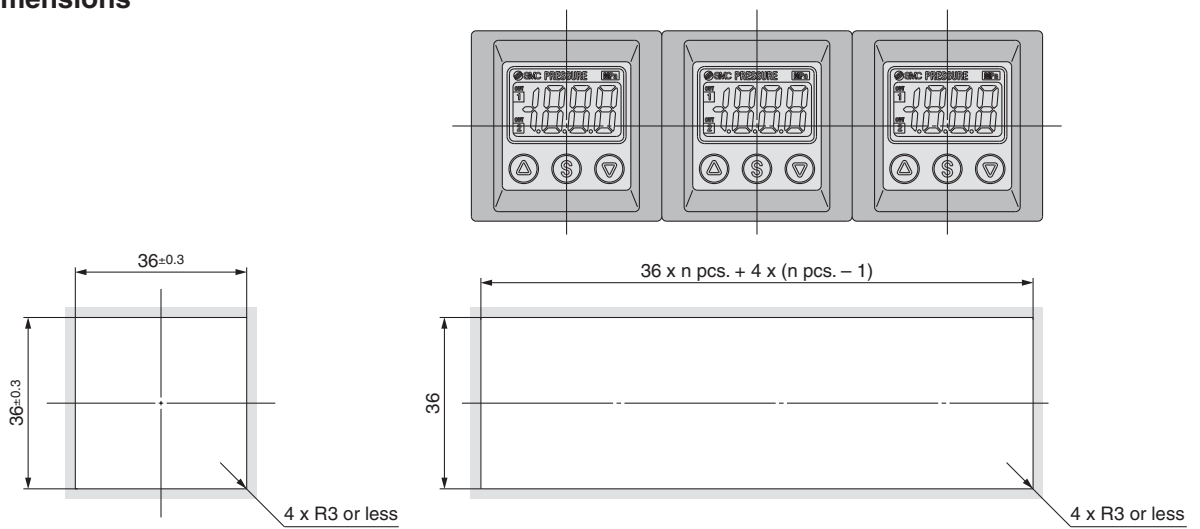
Series 10-ZSE80/10-ISE80

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

Panel mount (Bottom ported)



Panel-cut dimensions



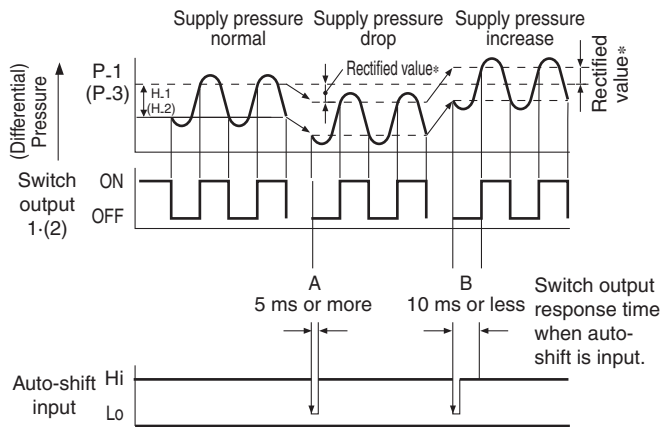
□ in brackets stand for the function codes. Refer to the operating manual for how to operate and function codes in detail.

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 ^{Note)} 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

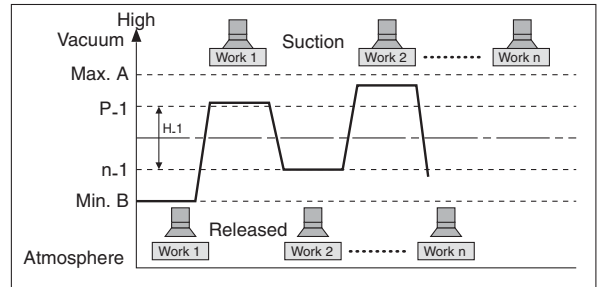
Auto-shift zero

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

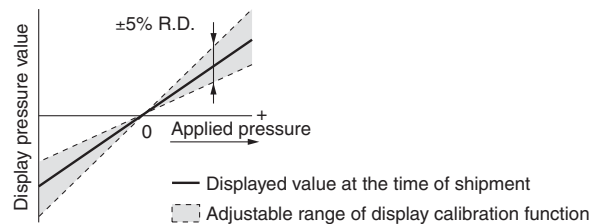


Formula for Obtaining the Set-Value

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 ± 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 ▲ ▼ 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 ± 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	QR	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

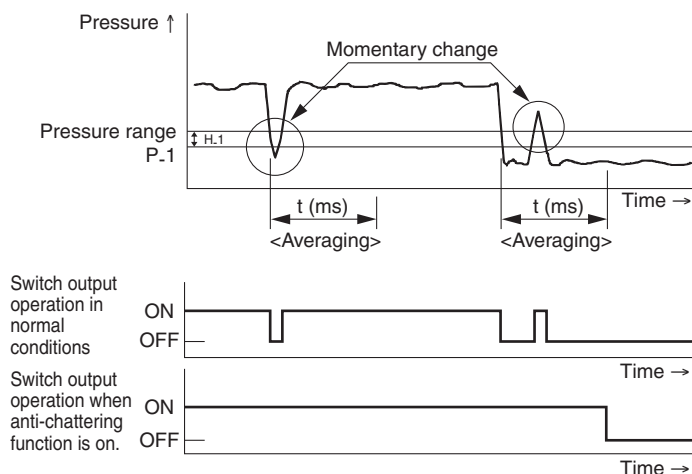
H Anti-chattering function (F3)

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 Unit display switching function (F0)

Display units can be switched with this function.

Pressure range	Applicable pressure sensor	For compound pressure	For vacuum pressure	For positive pressure	
		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	1
	MPa	0.001	0.001	0.001	0.001
GF	kg/cm ²	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
inH	inHg	0.1	0.1	—	—
mmH	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.



Lead wire length 3 m

Symbol
-X501

It has a lead wire extended to 3 meters.

How to Order



* Refer to How to Order on page 1 for standard specifications.

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

Piping*

Output*

Option*