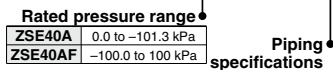
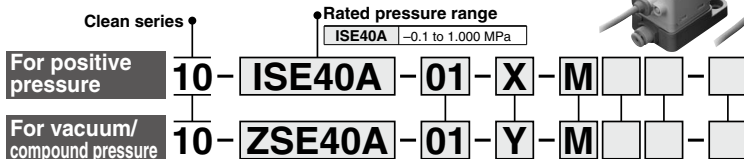
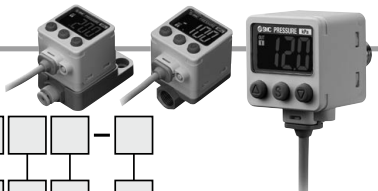


# Series 10-ZSE40A(F)/10-ISE40A

## How to Order



		R1/8, NPT1/8
<b>01</b>	R1/8 (With M5 female thread)	M5 x 0.8
<b>N01</b>	NPT1/8 (With M5 female thread)	M5 x 0.8
<b>W1</b>	Rc1/8	Rc1/8, G1/8
<b>WF1*</b>	G1/8	Rc1/8, G1/8
<b>M5*</b>	M5 x 0.8 (Female thread)	M5 x 0.8
<b>C4*</b>	ø4 One-touch fitting	ø4, ø6 one-touch fitting
<b>C6*</b>	ø6 One-touch fitting	ø4, ø6 one-touch fitting

\* Made to Order

### Combination of piping specifications with option 1 and part numbers of options

Description	Symbol	Part no.	Piping						
			01	N01	W1	WF1	M5	C4	C6
Bracket A	<b>A</b>	10-ZS-24-A	○	○	○	○	×	×	×
Bracket B	<b>B</b>	10-ZS-24-B	×	×	×	×	×	×	×
Bracket D	<b>D</b>	10-ZS-24-D	○	○	○	○	×	×	×
Panel mount adapter	<b>E</b>	10-ZS-35-C	×	×	×	×	×	○	○
		10-ZS-35-D	×	×	×	×	×	○	○
Panel mount adapter + Front protective cover	<b>F</b>	10-ZS-35-F	×	×	×	×	×	×	×
		10-ZS-35-G	×	×	×	×	×	○	○

### Output specifications

<b>R</b>	NPN open collector 2 outputs + Analog voltage/Auto-shift switching
<b>T</b>	PNP open collector 2 outputs + Analog voltage/Auto-shift switching
<b>S</b>	NPN open collector 2 outputs + Analog current/Auto-shift switching
<b>V</b>	PNP open collector 2 outputs + Analog current/Auto-shift switching
<b>X</b>	NPN open collector 2 outputs + Copy function
<b>Y</b>	PNP open collector 2 outputs + Copy function

### Options/Part No.

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

Part no.	Option
10-ZS-24-A	Bracket A With 2 mounting screws each of M3 x 5L, M4 x 5L
10-ZS-24-B	Bracket B With 2 mounting screws M4 x 5L
10-ZS-24-D	Bracket D With 2 mounting screws each of M3 x 5L, M4 x 5L
10-ZS-35-C	Panel mount adapter (Piping: For 01/N01)
10-ZS-35-D	Panel mount adapter (Piping: For W1/WF1/M5/C4/C6)
10-ZS-35-F	Panel mount adapter + Front protective cover (Piping: For 01/N01)
10-ZS-35-G	Panel mount adapter + Front protective cover (Piping: For W1/WF1/M5/C4/C6)

### Unit specifications

<b>Nil</b>	With unit switching function (Note 1)
<b>M</b>	Fixed SI unit (Note 2)
<b>P</b>	With unit switching function (Note 1) (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:  
For vacuum/compound pressure: kPa  
For positive pressure: MPa

### Option 2

Symbol	Calibration certificate
<b>Nil</b>	—
<b>K</b>	○

### Made to Order

Symbol	Specifications/Description
<b>X501</b>	Lead wire length 3 m

Refer to page 1339 for details.

### Option 1\*

<b>Nil</b>	None	
<b>A</b>	Bracket A	
<b>B</b>	Bracket B	
<b>D</b>	Bracket D	
<b>E</b>	Panel mount adapter	W1/WF1/M5/C4/C6
<b>F</b>	Panel mount adapter + Front protective cover	W1/WF1/M5/C4/C6

\* Some options are unavailable depending on the piping specifications. Refer to "Combination of piping specifications with option 1 and part numbers of options".

## ⚠ Caution

This product is 10-ZSE40A(F)/ISE40A series blown with air and double packed in a Class M3.5 (ISO Class 5) clean room.  
1323

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

**Specifications**

Model		10-ZSE40A (Vacuum pressure)	10-ZSE40AF (Compound pressure)	10-ISE40A (Positive pressure)	
<b>Rated pressure range</b>		0.0 to -101.3 kPa	-100.0 to 100.0 kPa	-0.100 to 1.000 MPa	
<b>Display/Set pressure range</b>		10.0 to -105.0 kPa	-105.0 to 105.0 kPa	-0.105 to 1.050 MPa	
<b>Withstand pressure</b>		500 kPa	500 kPa	1.5 MPa	
<b>Display/Smallest settable increment</b>		0.1 kPa	0.1 kPa	0.001 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>		45 mA or less			
<b>Switch output</b>		NPN or PNP open collector 2 outputs (Selectable)			
<b>Maximum load current</b>		80 mA			
<b>Maximum applied voltage</b>		28 V (at NPN output)			
<b>Residual voltage</b>		1 V or less			
<b>Response time</b>		2.5 ms (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)			
<b>Short circuit protection</b>		Yes			
<b>Repeat accuracy</b>		±0.2% F.S. ±1 digit			
<b>Hysteresis</b>	<b>Hysteresis mode</b>	Variable (0 or above) <sup>Note 1)</sup>			
	<b>Window comparator mode</b>				
<b>Analog output</b>	<sup>Note 2)</sup> <b>Voltage output</b>	<b>Output voltage (Rated pressure range)</b>	1 to 5 V ±2.5% F.S.	0.6 to 5 V ±2.5% F.S.	
		<b>Linearity</b>	±1% F.S. or less		
		<b>Output impedance</b>	Approx. 1 kΩ		
	<sup>Note 3)</sup> <b>Current output</b>	<b>Output current (Rated pressure range)</b>	4 to 20 mA ±2.5% F.S.	2.4 to 20 mA ±2.5% F.S.	
		<b>Linearity</b>	±1% F.S. or less		
		<b>Load impedance</b>	Maximum load impedance: 300 Ω (Power supply voltage 12 V) 600 Ω (Power supply voltage 24 V) Minimum load impedance: 50 Ω		
<b>Auto-shift input</b>		Non-voltage input (Reed or Solid state), Low level: 0.4 V or less, 5 ms or longer input			
<b>Display</b>		3 1/2-digit, 7-segment, 2-color LCD (Red/Green)			
<b>Display accuracy</b>		±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)			
<b>Indicator light</b>		Lights up when output is turned ON. OUT1, OUT2: Orange			
<b>Environment resistance</b>	<b>Enclosure</b>	IP65			
	<b>Operating temperature range</b>	Operating: -5 to 50°C, Stored: -10 to 60°C (No freezing or condensation)			
	<b>Operating humidity range</b>	Operating/Stored: 35 to 85% RH (No condensation)			
	<b>Withstand voltage</b>	1000 VAC for 1 minute between live parts and case			
<b>Insulation resistance</b>		50 MΩ or more between live parts and case (at 500 VDC Mega)			
<b>Temperature characteristics</b>		±2% F.S. (Based on 25°C)			
<b>Lead wire</b>		Oilproof heavy-duty vinyl cable ø3.5, 2 m Conductor area: 0.15 mm <sup>2</sup> (AWG26) Insulator O.D.: 0.95 mm			
<b>Standards</b>		CE UL/CSA (E216656) RoHS			
<b>Cleanliness class (ISO class)</b>		Class 4			

Note 1) If the applied voltage fluctuates around the set-value, the hysteresis must be set to a value more than the fluctuating width, otherwise chattering will occur.  
 Note 2) When the analog voltage output is selected, the analog current output cannot be selected.  
 Note 3) When the analog current output is selected, the analog voltage output cannot be selected.

**Piping Specifications**

Model		O1	N01	W1	WF1	M5	C4	C6
<b>Port size</b>		R1/8 (With M5 female thread)	NPT1/8 (With M5 female thread)	Rc1/8	G1/8	M5 x 0.8 female thread	ø4 One-touch fitting	ø6 One-touch fitting
<b>Wetted parts material</b>	<b>Sensor pressure receiving area</b>	Silicon						
	<b>Piping port</b>	C3602 (Electroless nickel plated) O-ring: HNBR		ZDC2 O-ring: HNBR		ZDC2, POM, Stainless steel 304, C3604 (Electroless nickel plated) O-ring: HNBR		
<b>Weight</b>		78 g	79 g	97 g	104 g	101 g		

### 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.

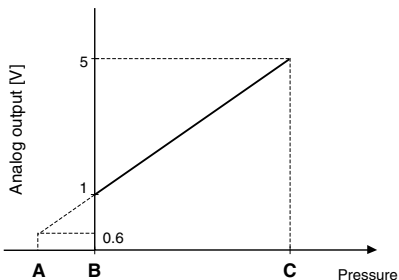
Although it is possible to set a value outside the rated pressure range, the specifications will not be guaranteed even if the value stays within the set pressure range.

Switch	Pressure range				
	-100 kPa	0	100 kPa	500 kPa	1 MPa
For vacuum pressure <b>10-ZSE40A</b>	-101.3 kPa	0			
	-105 kPa	10 kPa			
For compound pressure <b>10-ZSE40AF</b>	-100 kPa	100 kPa			
	-105 kPa	105 kPa			
For positive pressure <b>10-ISE40A</b>	-100 kPa				1 MPa
	-105 kPa (-0.105 MPa)				1.05 MPa

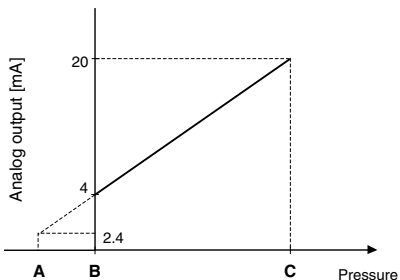
Rated pressure range of switch  
 Set pressure range of switch

### Analog Output

**Voltage output**



**Current output**

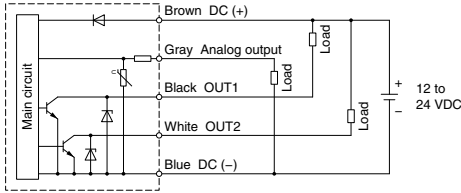


Range	Rated pressure range	A	B	C
For vacuum pressure	0.0 to -101.3 kPa	10.1 kPa	0	-101.3 kPa
For compound pressure	-100.0 to 100.0 kPa	—	-100.0 kPa	100.0 kPa
For positive pressure	-0.100 to 1.000 MPa	-0.100 MPa	0	1.000 MPa

**Internal Circuit and Wiring Example**

**-R, -S**

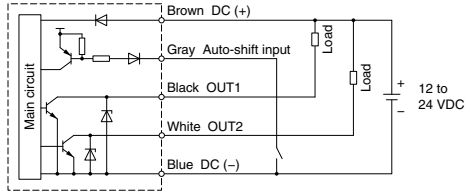
**R: NPN (2 outputs) + Analog voltage output**  
**S: NPN (2 outputs) + Analog current output**



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

**-R/-S**

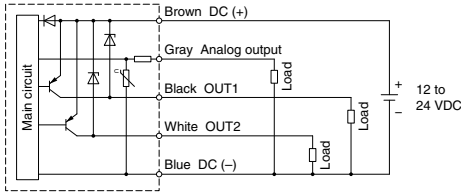
**NPN (2 outputs) + Auto-shift input**



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

**-T, -V**

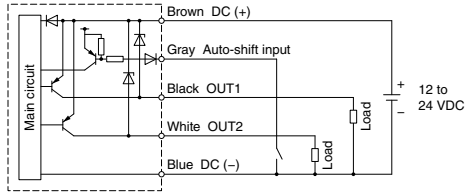
**T: PNP (2 outputs) + Analog voltage output**  
**V: PNP (2 outputs) + Analog current output**



Max. 80 mA  
Residual voltage 1 V or less

**-T/-V**

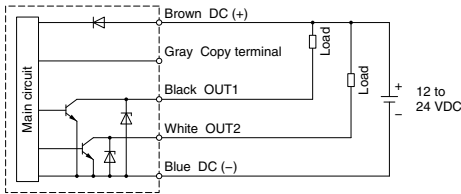
**PNP (2 outputs) + Auto-shift input**



Max. 80 mA  
Residual voltage 1 V or less

**-X**

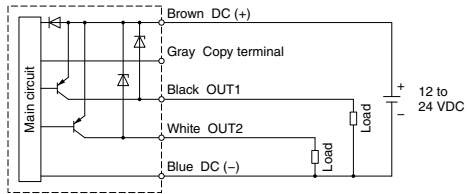
**NPN (2 outputs) + Copy function**



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

**-Y**

**PNP (2 outputs) + Copy function**



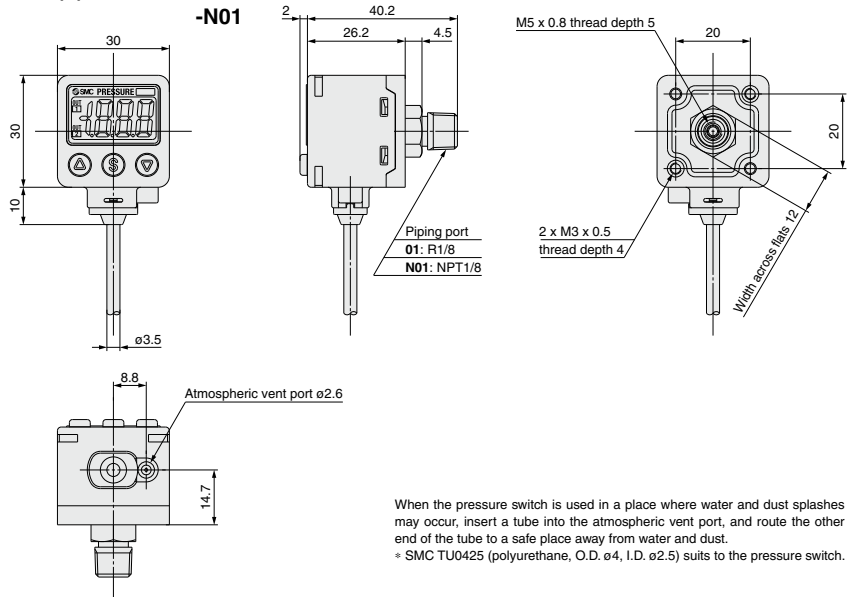
Max. 80 mA  
Residual voltage 1 V or less

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 High Precision Digital Pressure Switch 10-ZSE40A(F)/10-ISE40A

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

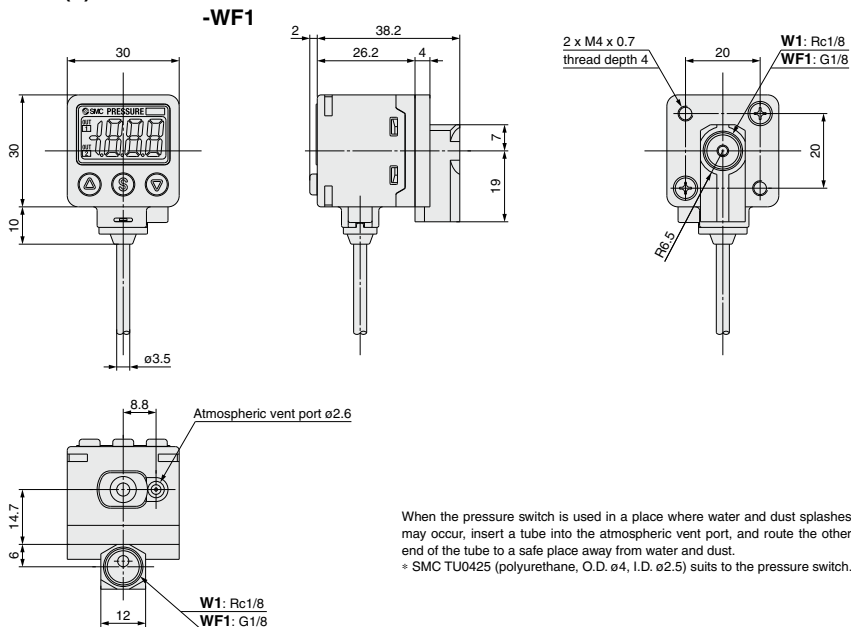
### 10-ZSE40A(F)/10-ISE40A-01



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.

### 10-ZSE40A(F)/10-ISE40A-W1

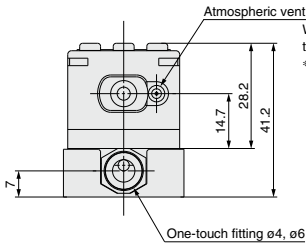
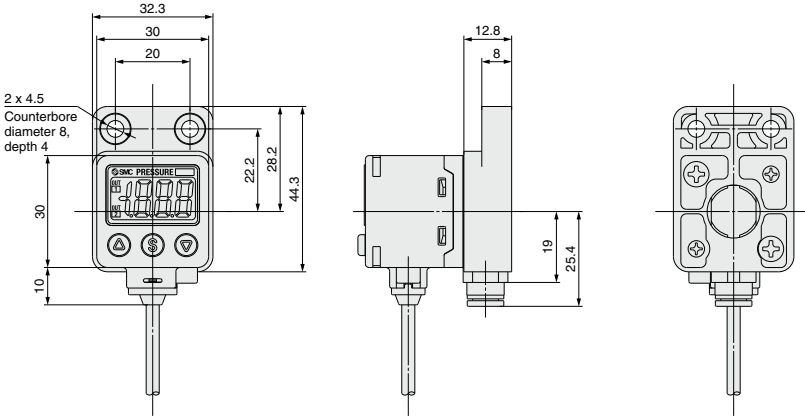


When the pressure switch is used in a place where water and dust splashes may occur, insert a tube into the atmospheric vent port, and route the other end of the tube to a safe place away from water and dust.

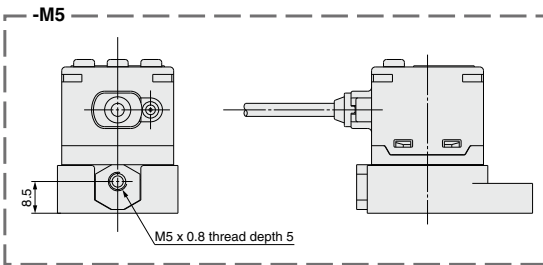
\* SMC TU0425 (polyurethane, O.D. ø4, I.D. ø2.5) suits to the pressure switch.

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

**10-ZSE40A(F)/10-ISE40A-C4**



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.

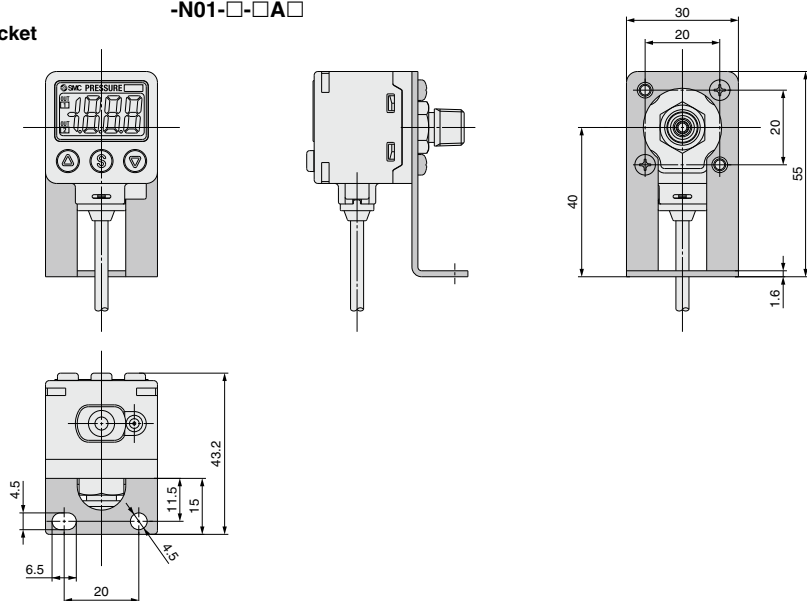


Directional Control Valves
Air Cylinders
Rotary Actuators
Air Grippers
Air Preparation Equipment
Modular F. R.
Pressure Control Equipment
Fittings & Tubing
Flow Control Equipment
Pressure Switches/ Pressure Sensors

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

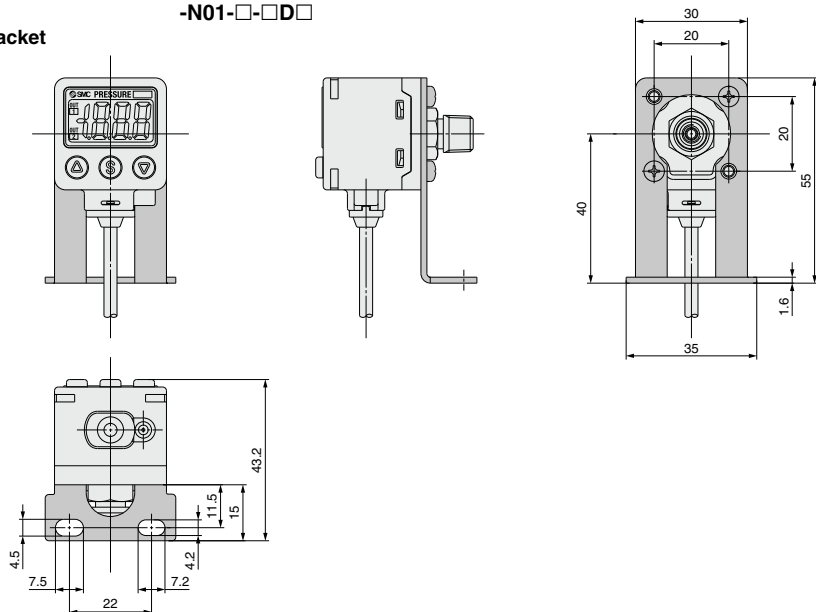
**10-ZSE40A(F)/10-ISE40A-01-□-□A□**  
**-N01-□-□A□**

With bracket



**10-ZSE40A(F)/10-ISE40A-01-□-□D□**  
**-N01-□-□D□**

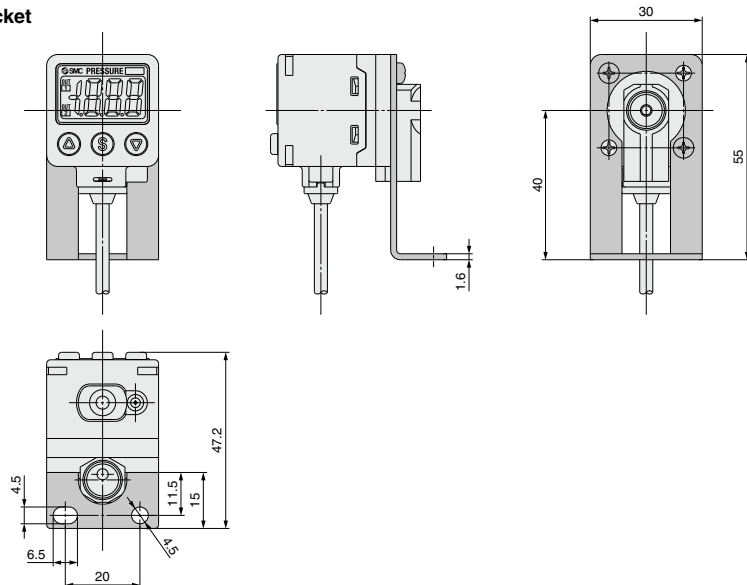
With bracket



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

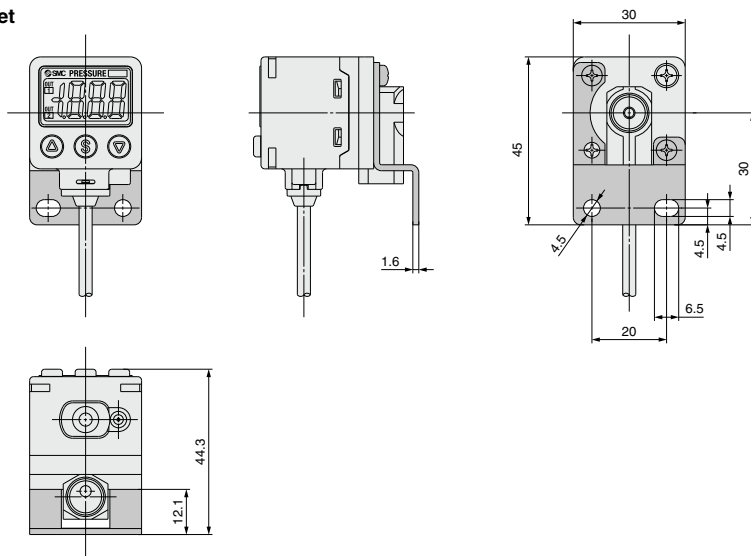
10-ZSE40A(F)/10-ISE40A-W1-□-□A□  
-WF1-□-□A□

With bracket



10-ZSE40A(F)/10-ISE40A-W1-□-□B□  
-WF1-□-□B□

With bracket



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

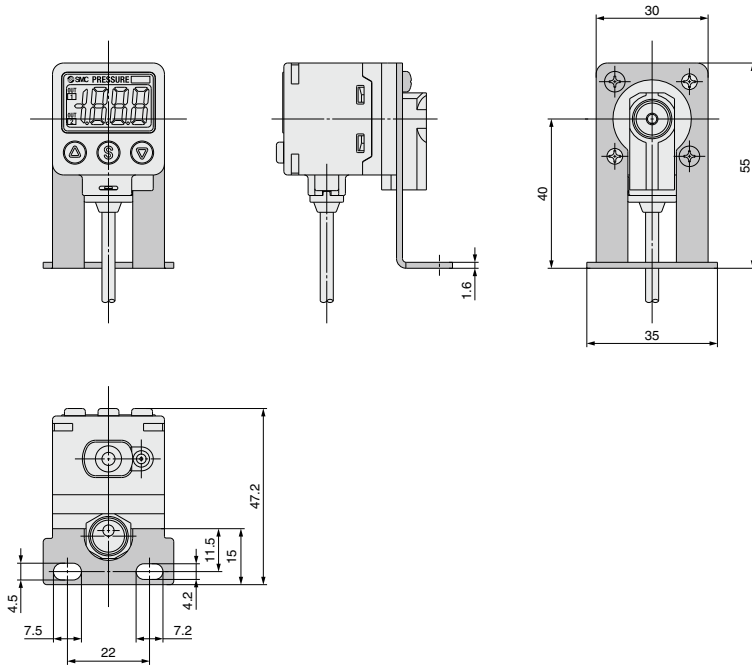


2-Color Display High Precision Digital Pressure Switch 10-ZSE40A(F)/10-ISE40A

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

10-ZSE40A(F)/10-ISE40A-W1-□-□D□  
-WF1-□-□D□

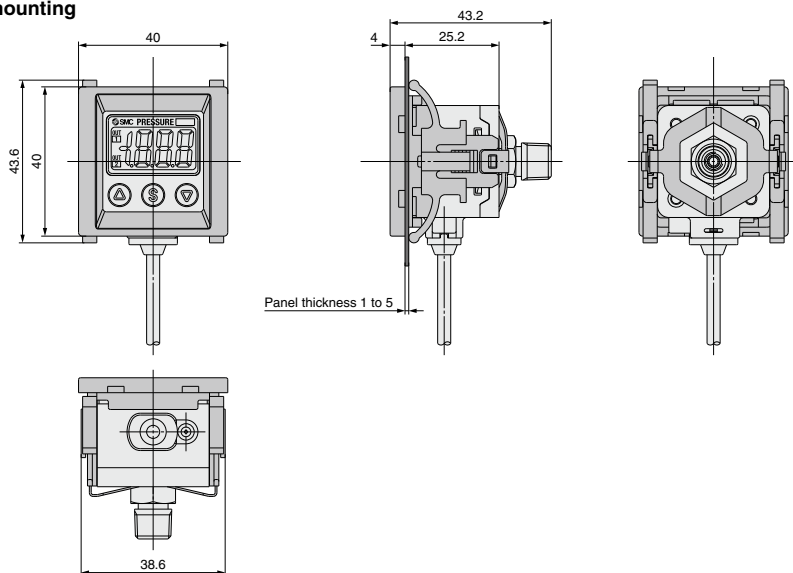
With bracket



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

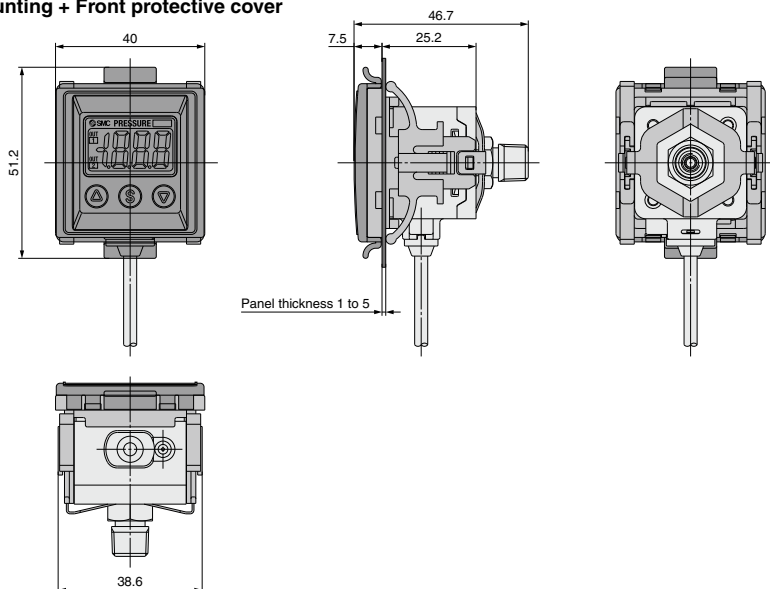
10-ZSE40A(F)/10-ISE40A-01-□-□E□  
A-N01-□-□E□

**Panel mounting**



10-ZSE40A(F)/10-ISE40A-01-□-□F□  
-N01-□-□F□

**Panel mounting + Front protective cover**



Directional Control Valves

Air Cylinders

Rotary Actuators

Air Grippers

Air Preparation Equipment

Modular F. R.

Pressure Control Equipment

Fittings & Tubing

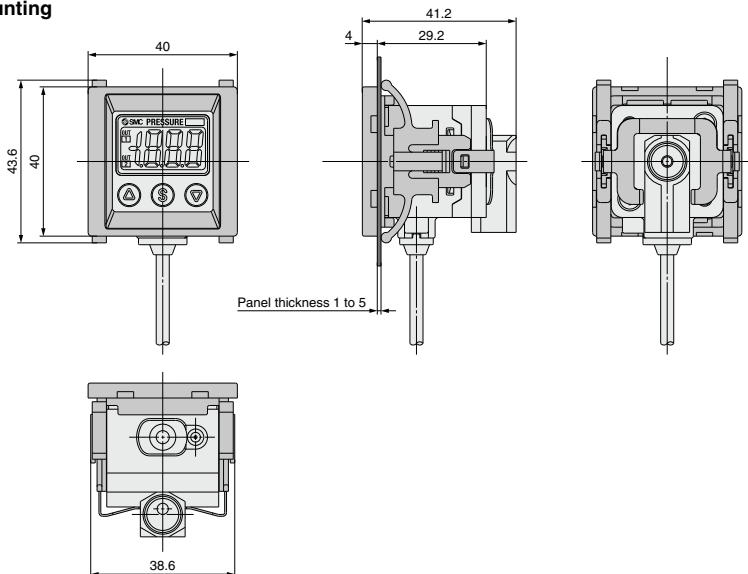
Flow Control Equipment

Pressure Switches/ Pressure Sensors

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

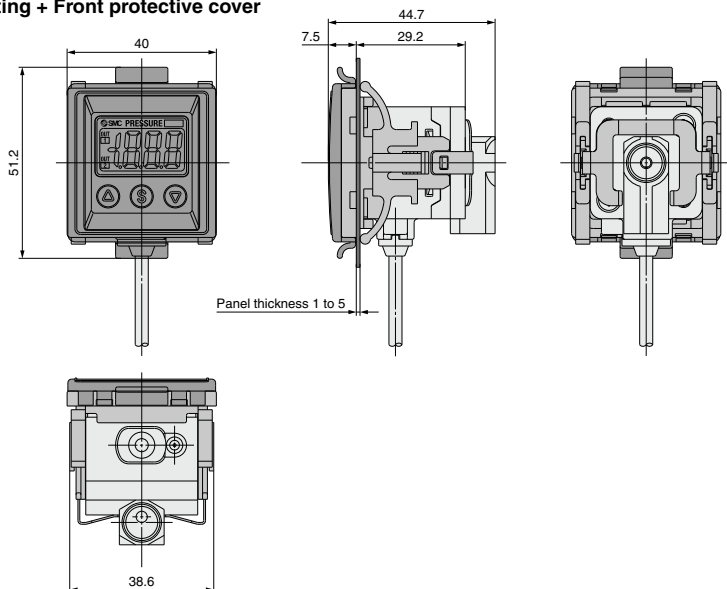
**10-ZSE40A(F)/10-ISE40A-W1-□-□E□**  
**-WF1-□-□E□**

**Panel mounting**



**10-ZSE40A(F)/10-ISE40A-W1-□-□F□**  
**-WF1-□-□F□**

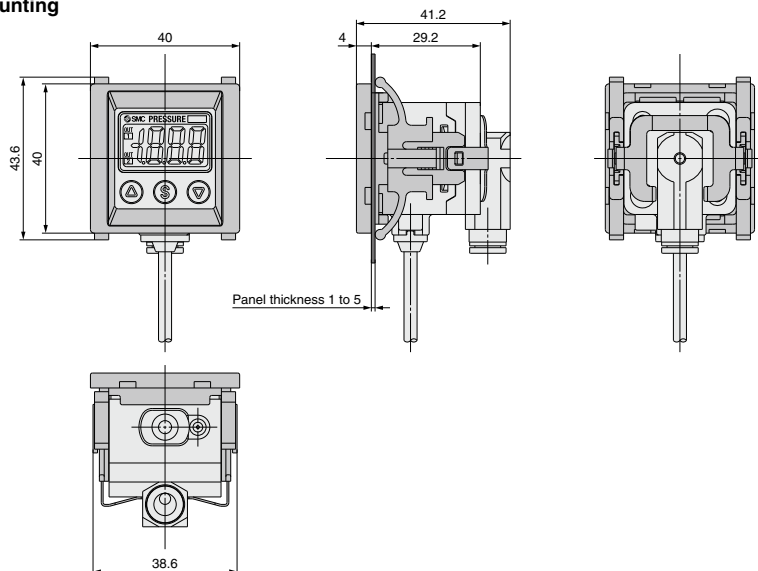
**Panel mounting + Front protective cover**



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

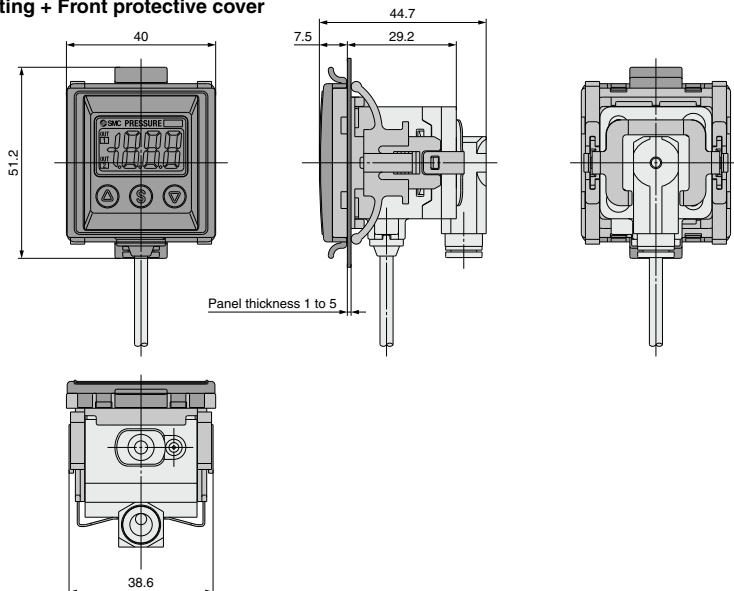
10-ZSE40A(F)/10-ISE40A-C4-□E□  
-C6-□E□

**Panel mounting**



10-ZSE40A(F)/10-ISE40A-C4-□F□  
-C6-□F□

**Panel mounting + Front protective cover**



Directional Control Valves

Air Cylinders

Rotary Actuators

Air Grippers

Air Preparation Equipment

Modular F. R.

Pressure Control Equipment

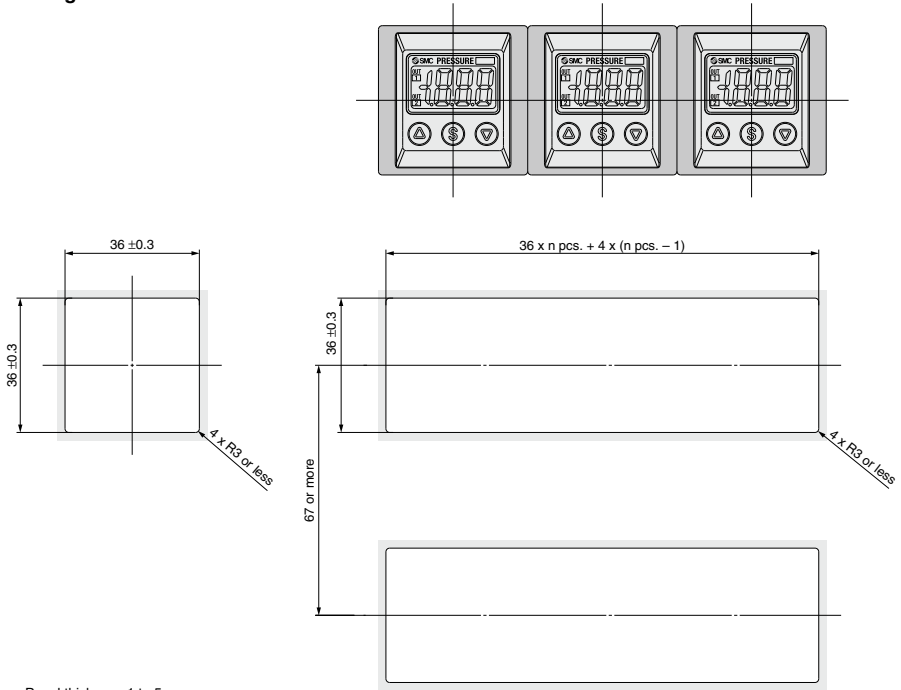
Fittings & Tubing

Flow Control Equipment

Pressure Switches/ Pressure Sensors

## Dimensions

### Panel fitting dimensions



Note) This is the minimum value for the piping method O1 or N01.  
Take the piping material and tubing into account for design. When the corner is to have radius, it must be R3 or less.

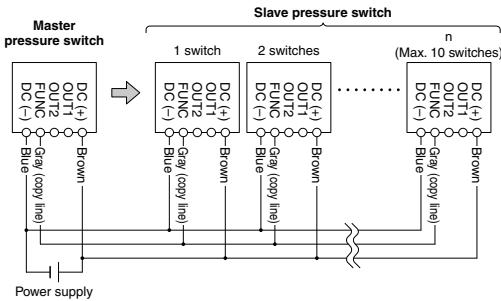
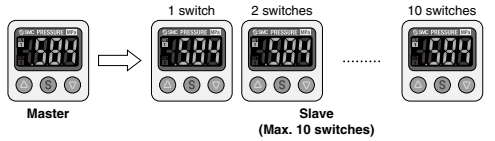
The **F** in ( ) shows the function code number. Refer to the Operation Manual for the details of operation procedures and function codes.


## Function Details

### A Copy function (F97)

The settings of the master pressure switch can be copied to the slave pressure switches. This can reduce the labor for setting and prevent the entry of incorrect set-values.

**The set-value can be copied to up to 10 switches simultaneously.**  
(Maximum communication distance 4 m)

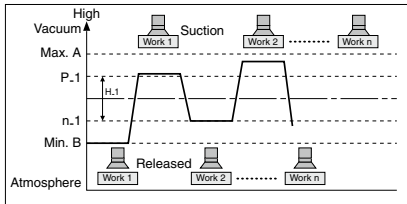


- 1) Wire as shown in the left figure.
- 2) Select the slave switch which is to be the master, and change it into a master using the buttons. (In the default setting, all switches are set as slaves.)
- 3) Press the  button of the master switch to start copying.

### B Auto-preset function (F4)

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 work piece several times.

#### Suction Verification

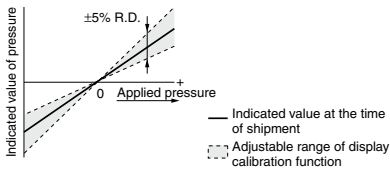


#### Formula for Obtaining the Set-Value

P <sub>1</sub> or P <sub>2</sub>	H <sub>1</sub> or H <sub>2</sub>
$P_{1 (P_2)} = A - (A-B)/4$	$H_{1 (H_2)} = (A-B)/2$
$n_{1 (n_2)} = B + (A-B)/4$	

### C Display calibration function (F6)



Fine adjustment of the indicated value of the pressure sensor 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 display calibration 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   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-clear 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. The indicated value can be adjusted within  $\pm 7\%$  F.S. of the pressure when ex-factory. (ZSE40AF (for compound pressure)  $\pm 3.5\%$  F.S.)

## Function Details

### G Error indication function

Error name	Error code	Description	Remedy
Overcurrent error	Er1	Load current of switch output (OUT1) exceeds 80 mA.	Turn the power off and remove the output factor for the overcurrent. Then, turn the power on.
	Er2	Load current of switch output (OUT2) exceeds 80 mA.	
Residual pressure error	Er3	During zero-clear operation, pressure over $\pm 7\%$ F.S. is applied. (10-ZSE40AF (compound) $\pm 3.5\%$ F.S.) After 1 second, the mode will reset to measurement mode. $\pm 1\%$ F.S. of the zero-clear range varies between individual products.	Perform zero-clear operation again after restoring the applied pressure to an atmospheric pressure condition.
Applied pressure error	HHH	Supply pressure exceeds the maximum set pressure.	Reset applied pressure to a level within the set pressure range.
	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 about 1 second, the switch returns to the measuring mode.	The controller does not respond to the auto-shift signal. Check the equipment and machinery for this point.
System error	Er0	Internal data error	Turn the power off and turn it on again. If the failure cannot be solved, ask SMC for repair.
	Er4		
	Er6		
	Er7		
	Er8		
	Er9		

If the above remedy cannot recover the operation, ask SMC for repair.

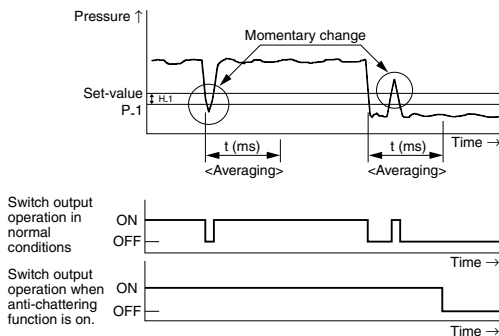
### H Anti-chattering function (F3)

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.

Display unit	Pa		CF	bAr	PSI	inH	mmH
	kPa	MPa*	kg/cm <sup>2</sup>	bar	psi	inHg	mmHg
Smallest settable increment							
<b>10-ZSE40A</b> (vacuum pressure)	0.1	0.001	0.001	0.001	0.01	0.1	1
<b>10-ZSE40AF</b> (compound pressure)	0.1	0.001	0.001	0.001	0.02	0.1	1
<b>10-ISE40A</b> (positive pressure)	1	0.001	0.01	0.01	0.1		

\* The 10-ZSE40A (vacuum pressure) and 10-ZSE40AF (compound pressure) will have different setting and display resolution when the unit is set to MPa.

The F□ in ( ) shows the function code number. Refer to the Operation Manual for the details of operation procedures and function codes.

**J Power-saving mode (F80)**

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.)

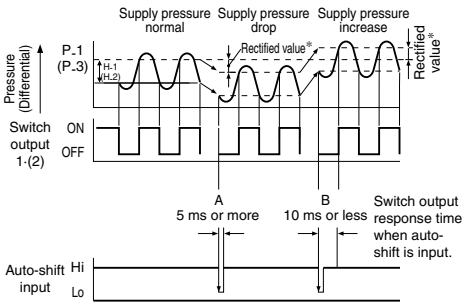
**K Secret code setting (F81)**

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

**L Auto-shift function (F5)**

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, "000" will be displayed for about 1 second, and the pressure value at that point will be saved as a rectified value "□.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	-105.0 to 105.0 kPa	-210 to 210 kPa
Vacuum pressure	10.0 to -105.0 kPa	115.0 to -115.0 kPa
Positive pressure	-0.105 to 1.050 MPa	-1.155 to 1.155 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.

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



# Series 10-ZSE40A(F)/10-ISE40A 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 1323 for standard specifications.

10-ZSE40A(F)/10-ISE40A -  -  -  - X501

Piping specification\*

Output specification\*

Option\*