

# ZSE40A(F)/ISE40A Series

The ZSE40A(F)/ISE40A series now features a new model: the ZSE20B(F)/ISE20B. Click [here](#) for details.

## How to Order [For M8 (3 pins) connector]



**Rated pressure range**  
**ISE40A** -0.1 to 1.000 MPa

For positive pressure

**ISE40A - 01 - N - M L**

For vacuum

**ZSE40A - 01 - N - M L**

**Rated pressure range**  
**ZSE40A** 0.0 to -101.3 kPa

**Piping specifications**

<b>01</b>	R1/8 (M5 female threaded)
<b>N01</b>	NPT1/8 (M5 female threaded)

**Output specifications**

<b>N</b>	NPN open collector 1 output
<b>P</b>	PNP open collector 1 output

**Unit specifications**

<b>Nil</b>	With unit display switching function <small>Note 1)</small>
<b>M</b>	Fixed SI unit <small>Note 2)</small>
<b>P</b>	With unit switching function (Initial value psi) <small>Note 1)</small>

Note 1) Under the New Measurement Law, Unit specifications sales of switches with the unit switching function are not allowed for use in Japan.



Note 2) Unit kPa, MPa

**Option 2**

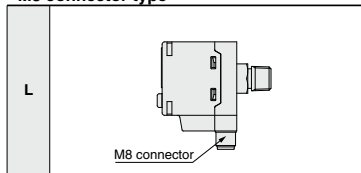
Symbol	Operation manual <small>Note)</small>	Calibration certificate <small>Note)</small>
<b>Nil</b>	●	—
<b>Y</b>	—	—
<b>K</b>	●	●
<b>T</b>	—	●

Note) All texts in both English and Japanese

**Option 1**

Nil	None
<b>A</b>	Bracket A 
<b>D</b>	Bracket D 

**M8 connector type\***



\* No lead wires are connected.

**Options 1/Part No.**

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

Part no.	Option
<b>ZS-24-A</b>	Bracket A Mounting screw M3 x 5L, M4 x 5L (2 pcs. for each)
<b>ZS-24-D</b>	Bracket D Mounting screw M3 x 5L, M4 x 5L (2 pcs. for each)

# 2-Color Display High-Precision Digital Pressure Switch **ZSE40A(F)/ISE40A Series**

Refer to pages 11 and 12 for Pressure Switch Precautions. For details about the Specific Product Precautions, refer to the Operation Manual on the SMC website, <http://www.smcworld.com> Click [here](#) for details.

## Specifications

Model	ZSE40A (vacuum pressure)	ZSE40AF (compound pressure)	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/Minimum unit setting</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 $\pm 10\%$ , 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 1 output or 2 outputs				
<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>	$\pm 0.2\%$ F.S. $\pm 1$ 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 $\pm 2.5\%$ F.S.	0.6 to 5 V $\pm 2.5\%$ F.S.	
		<b>Linearity</b>	$\pm 1\%$ F.S.		
		<b>Output impedance</b>	Approx. 1 k $\Omega$		
	<sup>Note 3)</sup> <b>Current output</b>	<b>Output current (Rated pressure range)</b>	4 to 20 mA $\pm 2.5\%$ F.S.	2.4 to 20 mA $\pm 2.5\%$ F.S.	
		<b>Linearity</b>	$\pm 1\%$ F.S.		
		<b>Load impedance</b>	Maximum load impedance: 300 $\Omega$ (Power supply voltage 12 V) 600 $\Omega$ (Power supply voltage 24 V) Minimum load impedance: 50 $\Omega$		
<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>	$\pm 2\%$ F.S. $\pm 1$ digit (Ambient temperature of 25 $\pm 3^\circ\text{C}$ )				
<b>Indicator light</b>	Lights up when output is turned ON. OUT1, OUT2: Orange				
<b>Environment</b>	<b>Enclosure</b>	IP65			
	<b>Operating temperature range</b> <sup>Note 4)</sup>	Operating: $-5$ to $50^\circ\text{C}$ , Stored: $-10$ to $60^\circ\text{C}$ (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 terminals and housing			
	<b>Insulation resistance</b>	50 M $\Omega$ or more (500 VDC measured via megohmmeter) between terminals and housing			
<b>Temperature characteristics</b>	$\pm 2\%$ F.S. ( $25^\circ\text{C}$ reference)				
<b>Lead wire</b>	Oilproof heavy-duty vinyl cable 5 cores $\phi 3.5$ , 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				

Note 1) If the applied pressure fluctuates around the set-value, the hysteresis must be set to a value more than the fluctuating width, otherwise chattering will occur.

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.

Note 4) UL temperature rating: The maximum ambient temperature is  $50^\circ\text{C}$ .

## Piping Specifications

Part no.	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	$\phi 4$ One-touch fitting	$\phi 6$ One-touch fitting
<b>Material of parts in contact with fluid</b>	<b>Sensor pressure receiving area</b>	Silicon					
	<b>Piping port</b>	C3602 (Electroless nickel plating) O-ring: HNBR		ZDC2 O-ring: HNBR		ZDC2, POM, Stainless steel 304, C3604 (Electroless nickel plating) O-ring: HNBR, NBR	
<b>Weight</b>		78 g	79 g	97 g		104 g	101 g
	<b>M8 connector</b>	45 g	46 g	-		-	

# ZSE40A(F)/ISE40A Series

## 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.

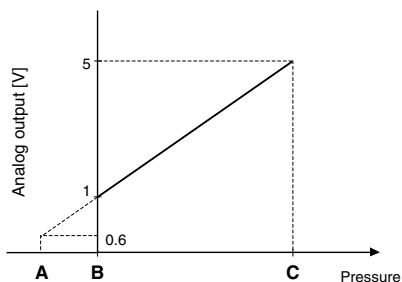
Although it is possible to set a value outside the rated pressure range, the specifications will not be guaranteed even if the value stays within the set pressure range.

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

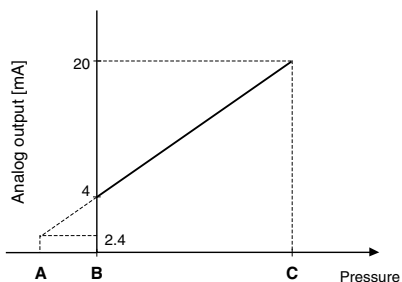
 Rated pressure range of switch  
 Set pressure range of switch

## Analog Output

### Voltage output



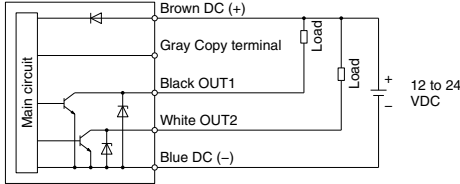
### Current output



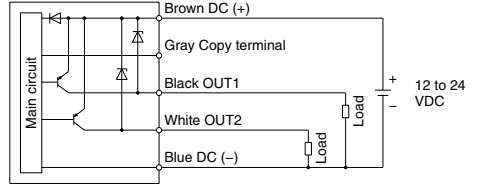
Range	Rated pressure range	A	B	C
For vacuum pressure	0.0 to -101.3 kPa	10.1 kPa	0	-101.3 kPa
For compound pressure	-100.0 to 100.0 kPa	—	-100.0 kPa	100.0 kPa
For positive pressure	-0.100 to 1.000 MPa	-0.100 MPa	0	1.000 MPa

**Internal Circuits and Wiring Examples**

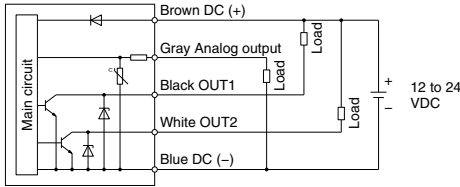
**-X  
NPN (2 outputs) + Copy function**



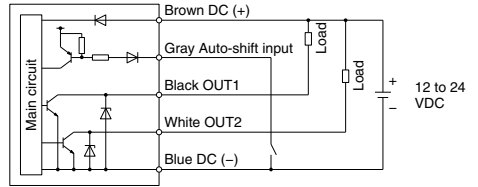
**-Y  
PNP (2 outputs) + Copy function**



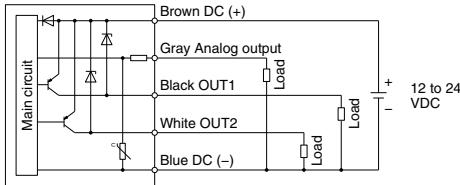
**-R/-S  
-R: NPN (2 outputs) + Analog voltage output  
-S: NPN (2 outputs) + Analog current output**



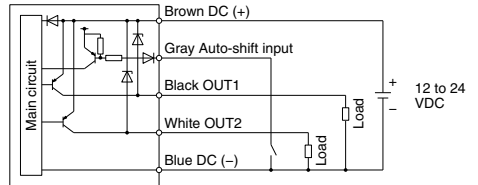
**-R/-S  
NPN (2 outputs) + Auto-shift input**



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

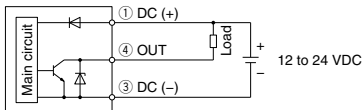


**-T/-V  
PNP (2 outputs) + Auto-shift input**

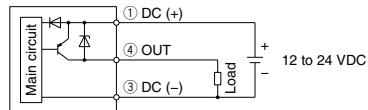


**For M8 connector, 3 pins**

**-N  
NPN (1 output)**



**-P  
PNP (1 output)**



ZSE20

ZSE30

ZSE40

ISE10

ISE70

ZSE80

ISE80

PS

ISA3

ISA2

ISE35

PSE

IS

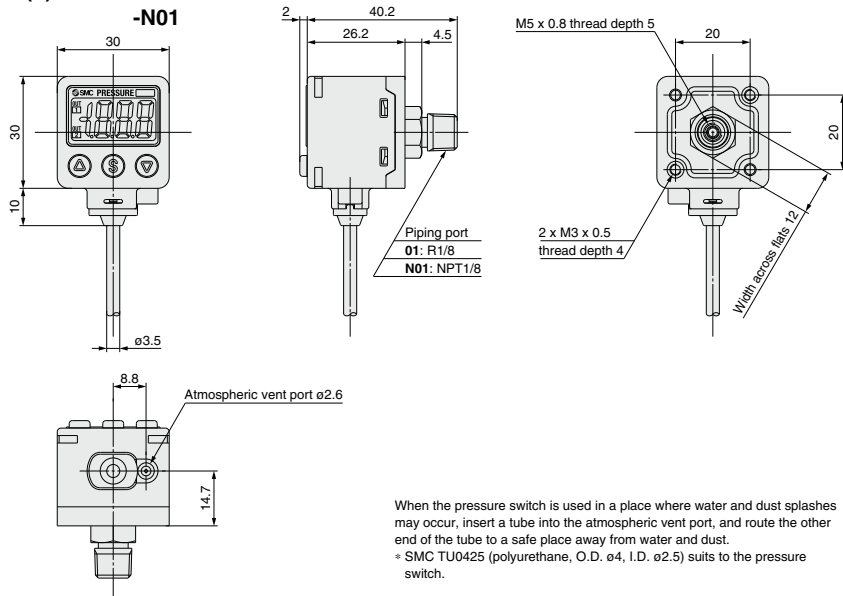
ISG

ZSM1

# ZSE40A(F)/ISE40A Series

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

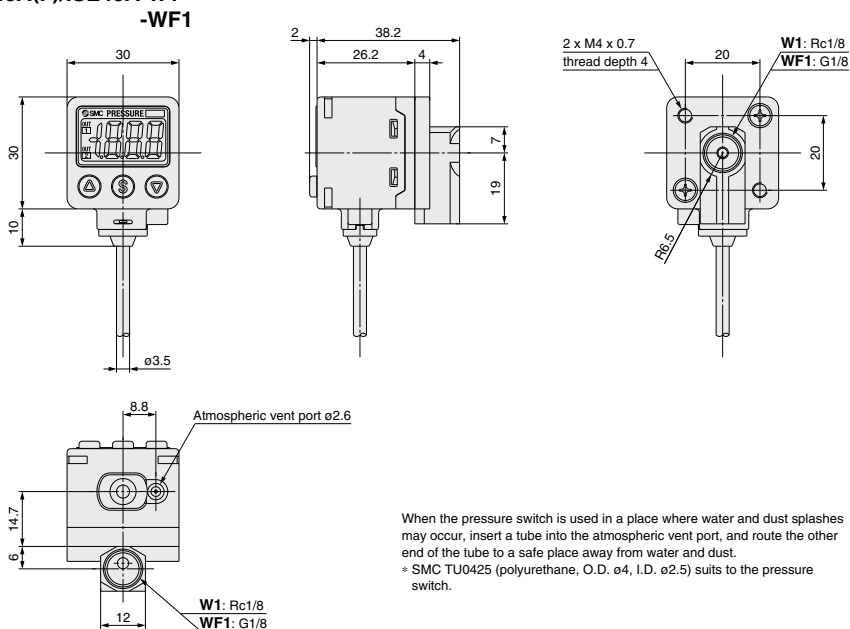
## ZSE40A(F)/ISE40A-01



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.

## ZSE40A(F)/ISE40A-W1



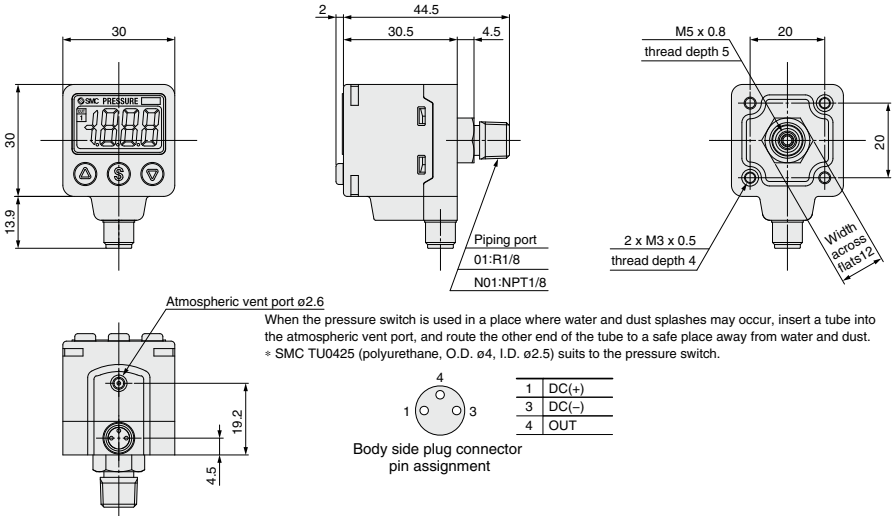
When the pressure switch is used in a place where water and dust splashes may occur, insert a tube into the atmospheric vent port, and route the other end of the tube to a safe place away from water and dust.

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

# 2-Color Display High-Precision Digital Pressure Switch **ZSE40A(F)/ISE40A Series**

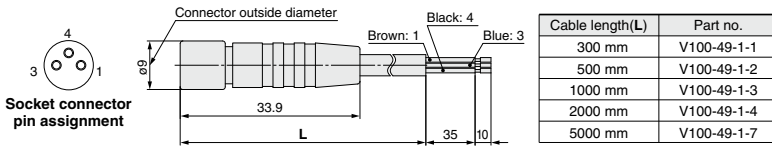
## Dimensions/For M8 (3-pin) connector

ZSE40A/ISE40A-01-□-□L  
-N01-□-□L

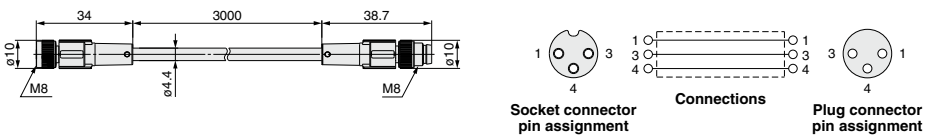


## M8 (3-pin) cable with connector

V100-49-1-□



## PCA-1557772

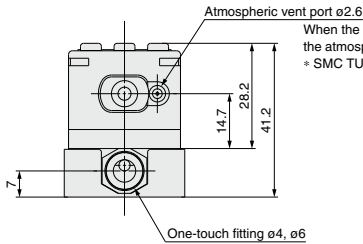
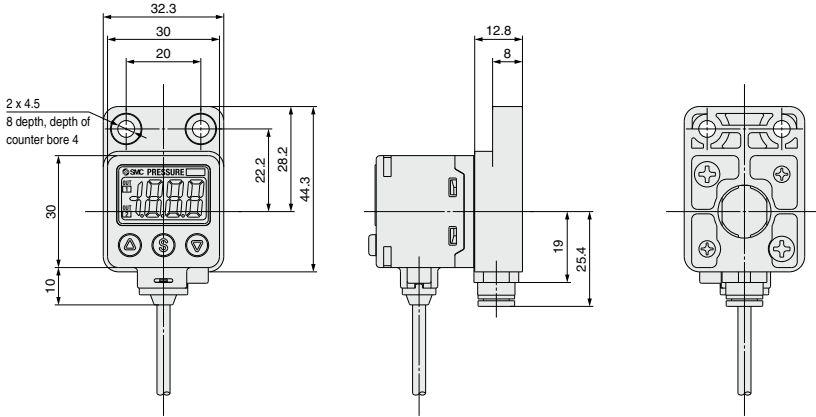


ZSE20  
ISE20  
ZSE30  
ISE30  
ZSE40  
ISE40  
ZSE10  
ISE10  
ISE70  
ZSE80  
ISE80  
PS  
ISA3  
ISA2  
ISE35  
PSE  
IS  
ISG  
ZSM1

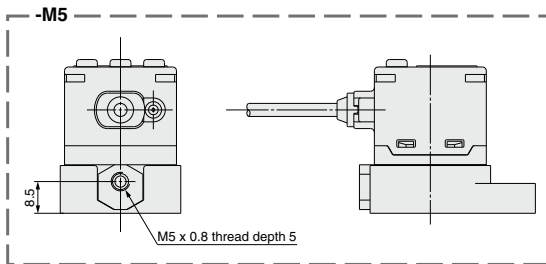
# ZSE40A(F)/ISE40A Series

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

## ZSE40A(F)/ISE40A-C4 -C6



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.  $\phi 4$ , I.D.  $\phi 2.5$ ) suits to the pressure switch.



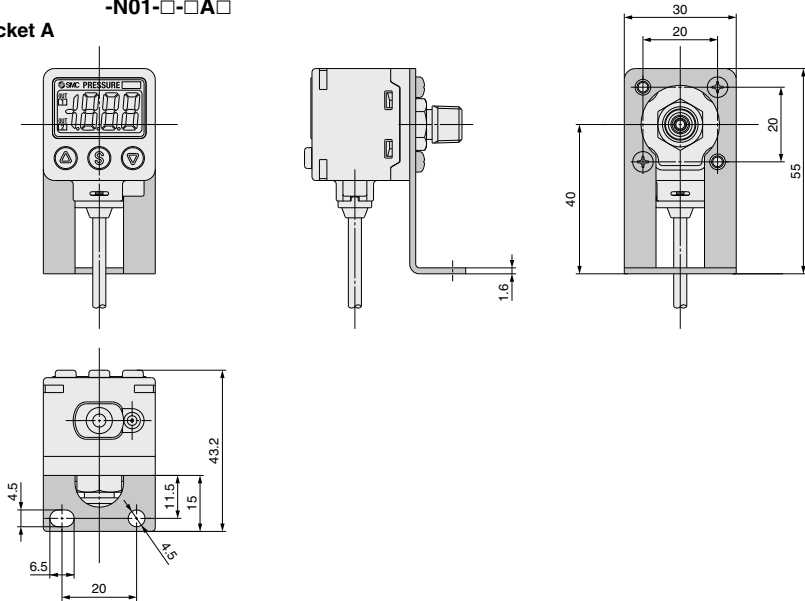
# 2-Color Display High-Precision Digital Pressure Switch **ZSE40A(F)/ISE40A Series**

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

**ZSE40A(F)/ISE40A-01-□-□A□**

**-N01-□-□A□**

With bracket A

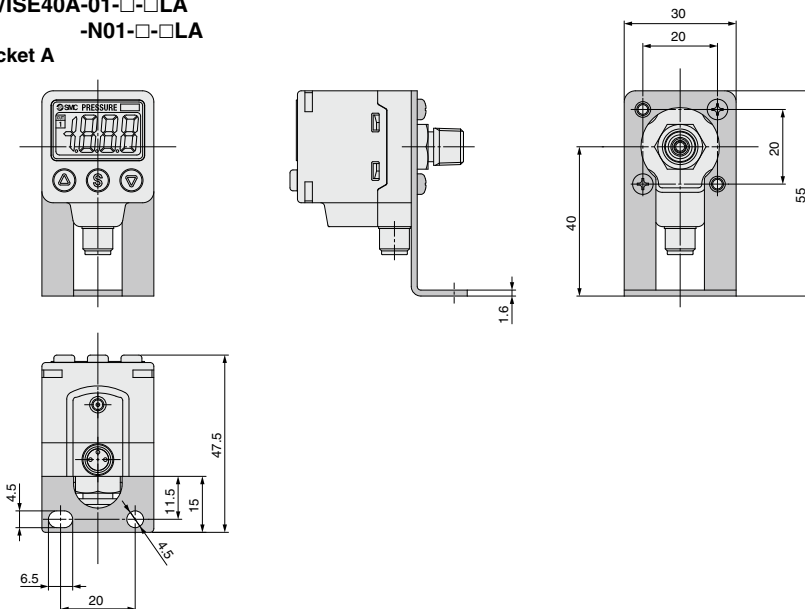


For M8 (3-pin) connector

**ZSE40A/ISE40A-01-□-□LA**

**-N01-□-□LA**

With bracket A



ZSE20
ISE20
ZSE30
ISE30
<b>ZSE40</b>
<b>ISE40</b>
ZSE10
ISE10
ISE70
ZSE80
ISE80
<b>PS</b>
<b>ISA3</b>
<b>ISA2</b>
ISE35
<b>PSE</b>
<b>IS</b>
<b>ISG</b>
<b>ZSM1</b>



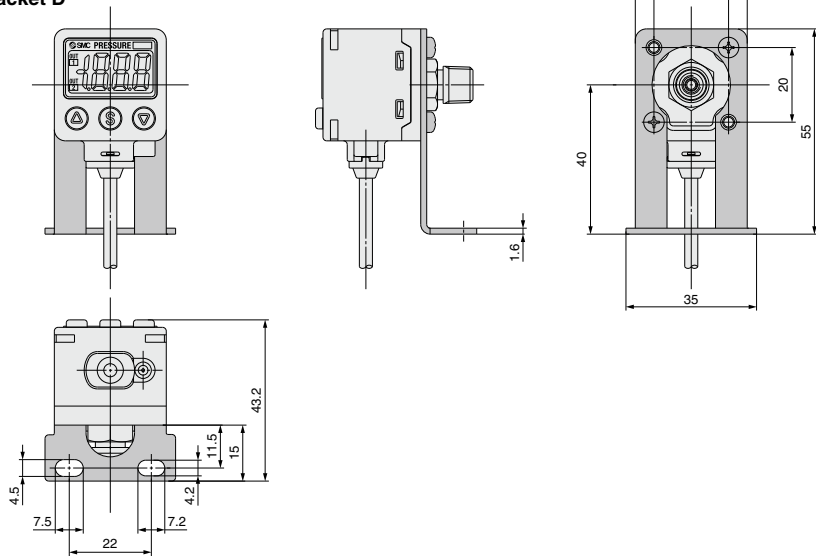
# ZSE40A(F)/ISE40A Series

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

ZSE40A(F)/ISE40A-01-□-□D□

-N01-□-□D□

With bracket D

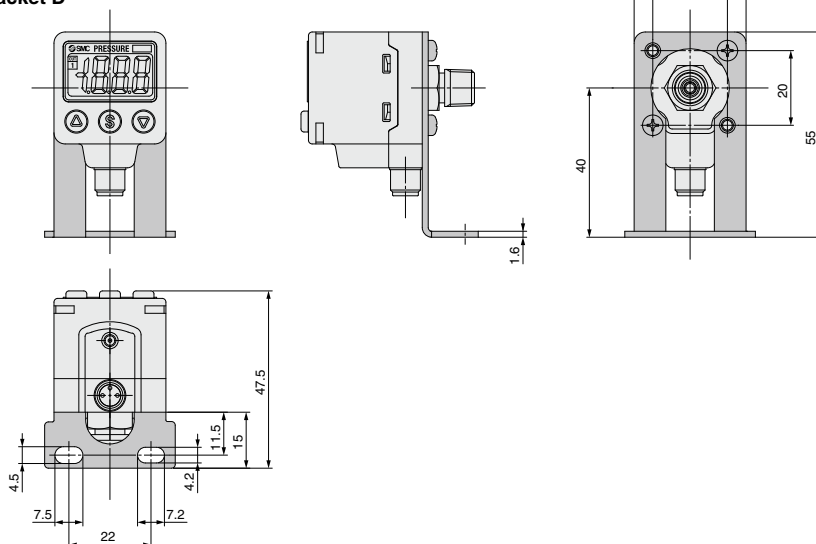


For M8 (3-pin) connector

ZSE40A/ISE40A-01-□-□LD

-N01-□-□LD

With bracket D

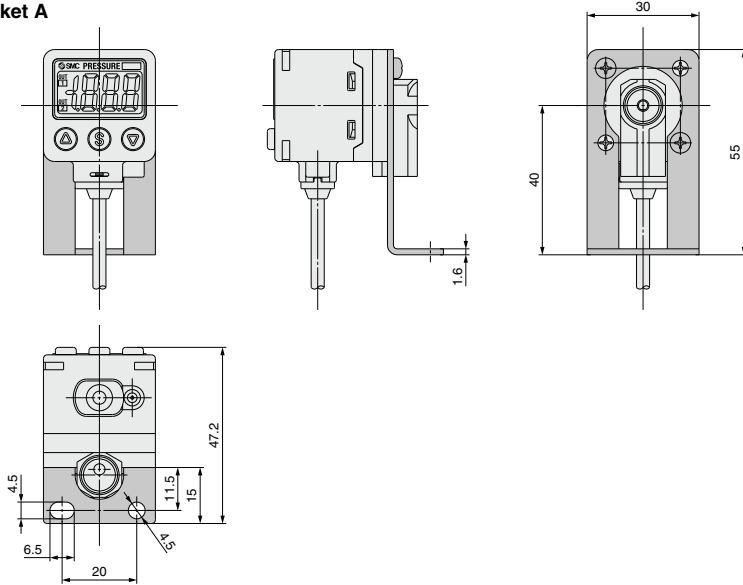


# 2-Color Display High-Precision Digital Pressure Switch **ZSE40A(F)/ISE40A Series**

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

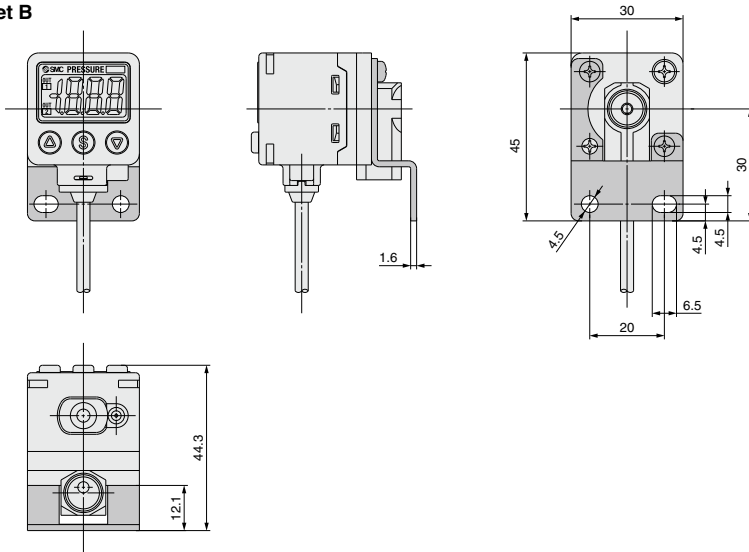
**ZSE40A(F)/ISE40A-W1-□-□A□**  
**-WF1-□-□A□**

With bracket A



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

With bracket B



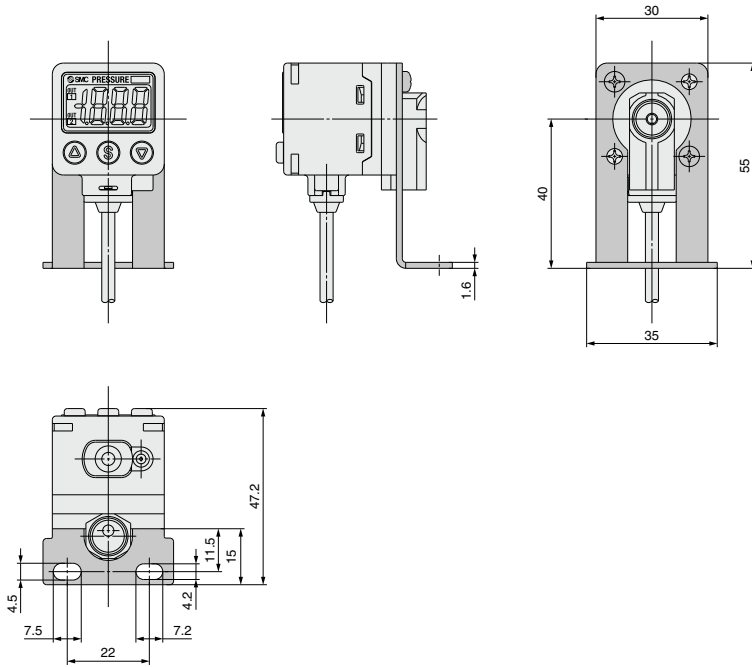
ZSE20
ISE20
ZSE30
ISE30
<b>ZSE40</b>
<b>ISE40</b>
ZSE70
ISE70
ZSE80
ISE80
<b>PS</b>
<b>ISA3</b>
<b>ISA2</b>
<b>ISE35</b>
<b>PSE</b>
<b>IS</b>
<b>ISG</b>
<b>ZSM1</b>

# ZSE40A(F)/ISE40A Series

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

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

With bracket D

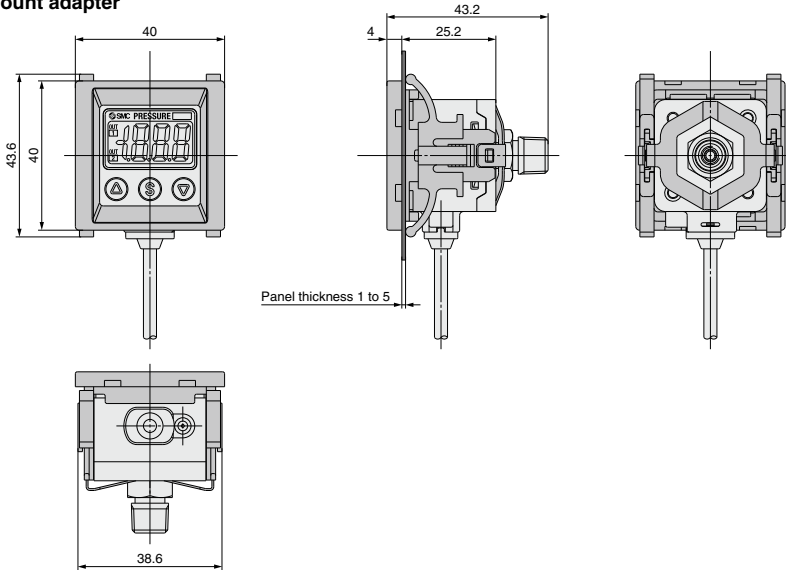


# 2-Color Display High-Precision Digital Pressure Switch **ZSE40A(F)/ISE40A Series**

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

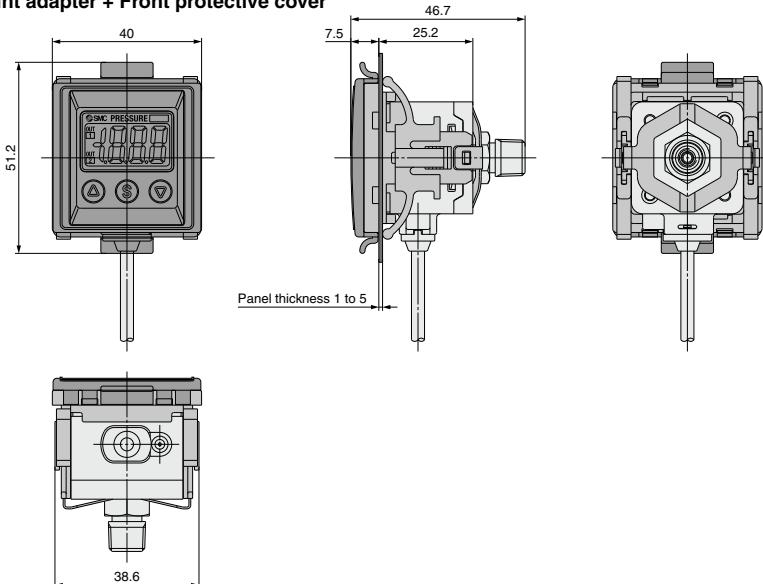
**ZSE40A(F)/ISE40A-01-□-□E□**  
**-N01-□-□E□**

**Panel mount adapter**



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

**Panel mount adapter + Front protective cover**



ZSE20
ISE20
ZSE30
ISE30
ZSE40
ISE40
ZSE10
ISE10
ISE70
ZSE80
ISE80
PS
ISA3
ISA2
ISE35
PSE
IS
ISG
ZSM1

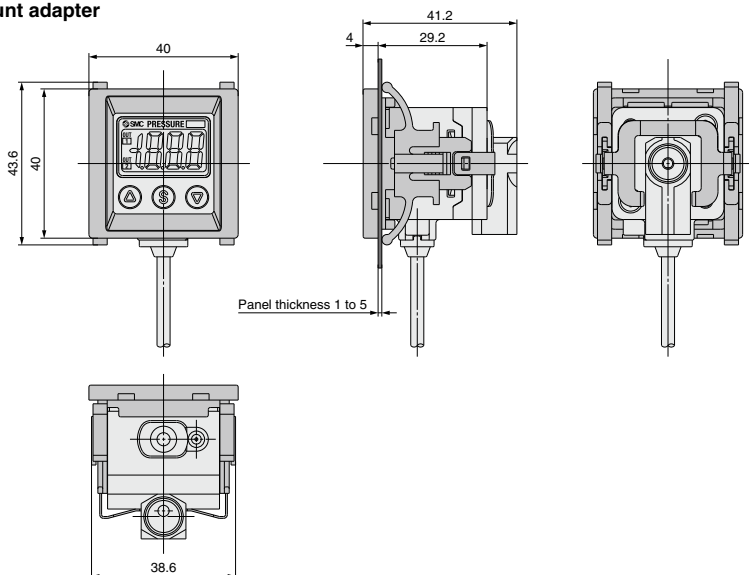
# ZSE40A(F)/ISE40A Series

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

ZSE40A(F)/ISE40A-W1-□-□E□

-WF1-□-□E□

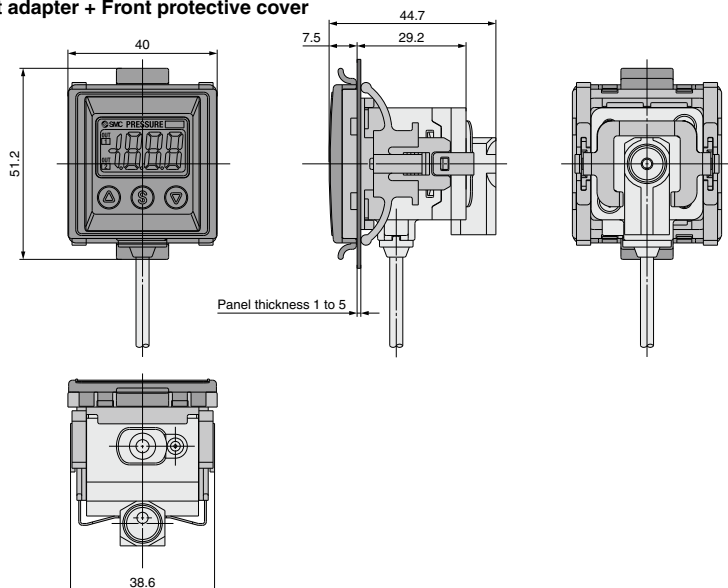
Panel mount adapter



ZSE40A(F)/ISE40A-W1-□-□F□

-WF1-□-□F□

Panel mount adapter + Front protective cover

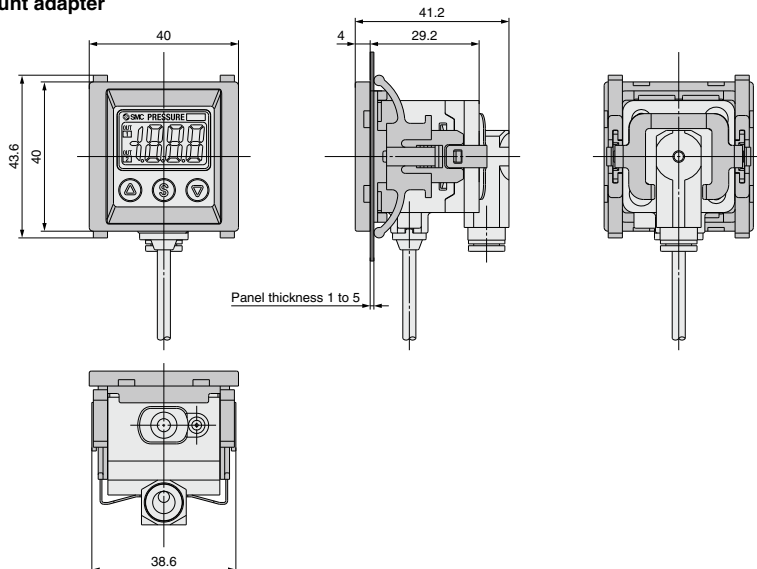


# 2-Color Display High-Precision Digital Pressure Switch **ZSE40A(F)/ISE40A Series**

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

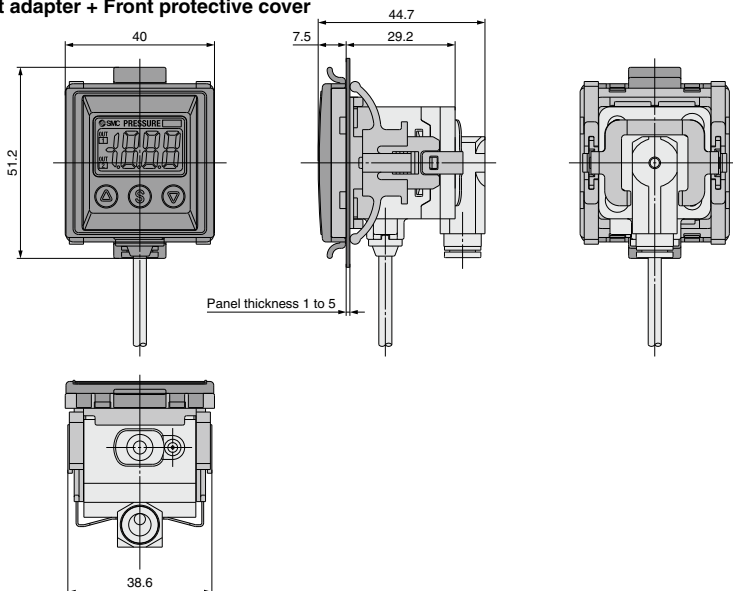
**ZSE40A(F)/ISE40A-C4-□E□**  
**-C6-□E□**

**Panel mount adapter**



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

**Panel mount adapter + Front protective cover**

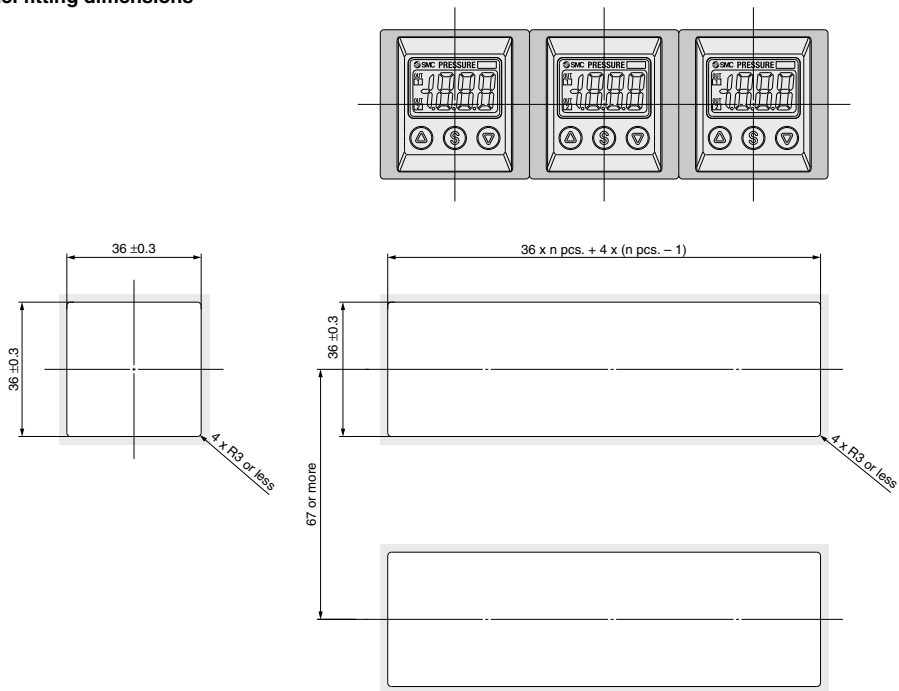


ZSE20
ISE20
ZSE30
ISE30
ZSE40
ISE40
ZSE10
ISE10
ISE70
ZSE80
ISE80
PS
ISA3
ISA2
ISE35
PSE
IS
ISG
ZSM1

# ZSE40A(F)/ISE40A Series

## 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.

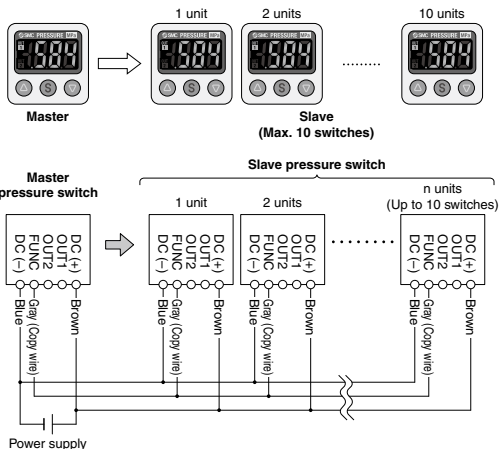
The **F□** in ( ) shows the function code number. Refer to the Operation Manual for the details of operation procedures and function codes. Click [here](#) for details.

## Function Details

### A Copy function (F97)

The settings of the master sensor can be copied to the slave sensors, reducing setting labor and minimizing risk of mistakes in setting.

**Can copy to up to 10 switches simultaneously.**  
(Maximum transmission distance 4 m)

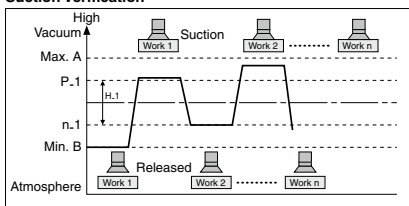


- 1) Wire as shown in the left figure.
- 2) Select the slave switch which is to be the master, and change it into a master using the buttons. (In the default setting, all switches are set as slaves.)
- 3) Press the button of the master switch to start copying.

### 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 workpiece several times.

#### Suction Verification

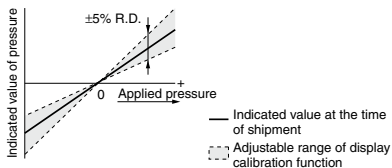


#### Formula for Obtaining the Set-Value

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 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/Bottom value indication

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 Keylock function

Prevents operation errors such as accidentally changing setting values.

### 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.)

ZSE20
ISE20
ZSE30
ISE30
ZSE40
ISE40
ZSE10
ISE10
ISE70
ZSE80
ISE80
PS
ISA3
ISA2
ISE35
PSE
IS
ISG
ZSM1



# ZSE40A(F)/ISE40A Series

## Function Details

### G Error indication function

Error name	Error code	Description	Action
Overcurrent error	Er1	Load current of 80 mA or more is applied to the switch output (OUT1).	Eliminate the cause of the over current by turning off the power supply, and then turn on it again.
	Er2	Load current of 80 mA or more is applied to the switch output (OUT2).	
Residual pressure error	Er3	During zero-clear operation, pressure over $\pm 7\%$ F.S. is applied. (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 off the power supply and then turn on it again. If the failure cannot be solved, please contact SMC for investigation.
	Er4		
	Er6		
	Er7		
	Er8		
	Er9		

If the failure cannot be solved after the above instructions are performed, please contact SMC for investigation.

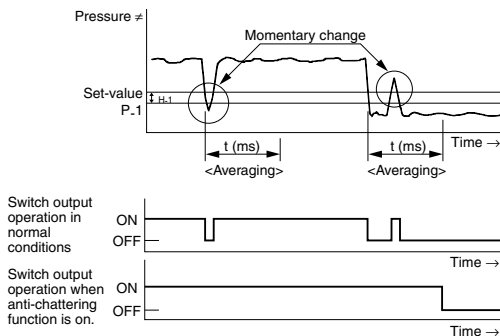
### H Anti-chattering function (F3)

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		GF	bRr	PSI	inH	mmHg
	kPa	MPa*	kgf/cm <sup>2</sup>	bar	psi	inHg	mmHg
Minimum unit setting	0.1	0.001	0.001	0.001	0.01	0.1	1
ZSE40A (vacuum pressure)	0.1	0.001	0.001	0.001	0.02	0.1	1
ZSE40AF (compound pressure)	0.1	0.001	0.001	0.001	0.02	0.1	1
ISE40A (positive pressure)	1	0.001	0.01	0.01	0.1		

\* The ZSE40A (vacuum pressure) and 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. Click [here](#) for details.

**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.)

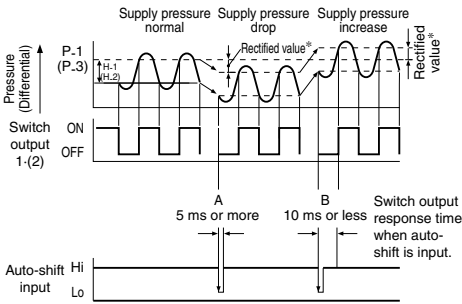
**K Setting of secret code (F81)**

Users can select whether a secret code must be entered to release key lock. At the time of shipment from the factory, it is set such that the secret code is not required.

**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.

**Settable Range for Auto-Shift Input**

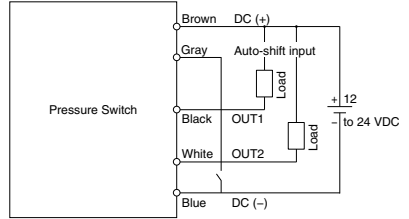
	Set pressure range	Settable range
Compound pressure	-105.0 to 105.0 kPa	-210 to 210 kPa
Vacuum pressure	10.0 to -105.0 kPa	115.0 to -115.0 kPa
Positive pressure	-0.105 to 1.050 MPa	-1.155 to 1.155 MPa

**Auto-shift zero**

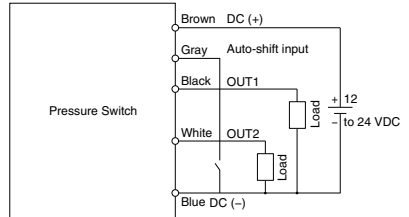
The basic function of auto-shift zero is the same as the function for auto-shift. Also, it corrects values on the display, based on a pressure value of "0", when the auto-shift is selected.

**Connection example of auto-shift function**

**Output specifications: -R/-S  
PNP (2 outputs) + Auto-shift input**



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



ZSE20
ISE20
ZSE30
ISE30
ZSE40
ISE40
ZSE10
ISE10
ISE70
ZSE80
ISE80
PS
ISA3
ISA2
ISE35
PSE
IS
ISG
ZSM1

# ZSE40A(F)/ISE40A Series Made to Order

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



## 1 Lead Wire Length 3 m

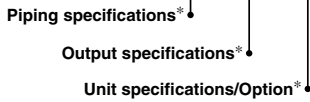
Symbol  
**-X501**

It has a lead wire extended to 3 meters.

### How to Order

\* Refer to "How to Order" on page 47 for standard specifications.

ZSE40A(F)/ISE40A - [ ] - [ ] - [ ] - X501



## 2 M12 4-pin Pre-wired Connector (Lead wire length 100 mm)

Symbol  
**-X531**

### How to Order

\* Refer to "How to Order" on page 47 for standard specifications.

ZSE40A(F)/ISE40A - [ ] - [ ] - [ ] - X531

