

With Backlight
Digital Pressure Switch

Series ZSE5B

(For vacuum)

ISE5B

(For positive pressure)

For General Purpose Fluids



For use in various fluid applications

- Hydraulic fluid ●Silicon oil ●Lubrication oil
- Dry air ●Carbon dioxide ●Ammonia
- Drain-containing air ●Argon ●Nitrogen gas
- Freon

Stainless steel diaphragm

SUS630 and SUS304 are used for wetted parts.

Leakage rate: 1 X 10⁻⁴ atm cc/s

The sensor section and fitting are electron beam welded. This switch can be used with liquids and gases.

Two independent outputs

Allows the calibration of 2 different setpoints, e.g. change of vacuum pad size requiring different setpoints, or two different supply pressures requiring different pressure confirmation points.

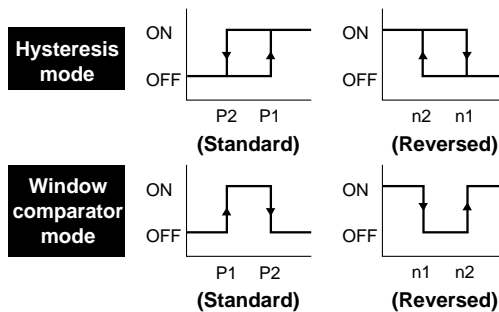
Choice of display units

Display units can be easily selected and changed, making these switches globally acceptable.

Vacuum mmHg ↔ kPa ↔ PSI ↔ kgf/cm² ↔ bar

Positive pressure MPa ↔ PSI ↔ kgf/cm² ↔ bar

Variety of switch output modes



Exact detection of atmospheric pressure (For vacuum)

Atmospheric pressure can be detected after vacuum release pressure is applied.

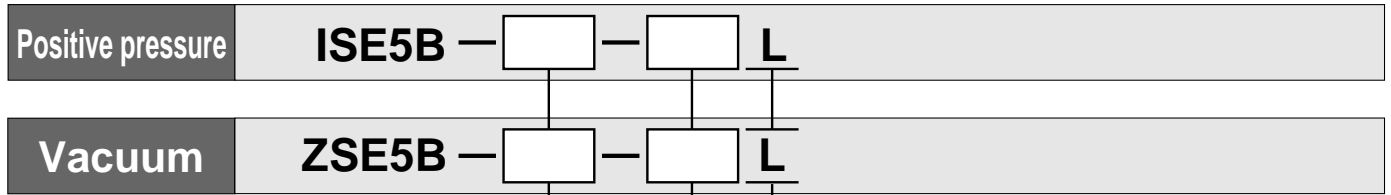
Calibration data

The calibration data is stored in an EEPROM. The EEPROM is rated to keep its memory for 100,000 hours (approx. 11 years) even without power supplied.

Panel mounting available

A special adaptor permits panel mounting.

How to Order



Port size

02	R(PT) 1/4
T2	NPTF 1/4

Note) M5 X 0.8 (Female) threaded.

Lead wire length

L	3m
----------	----

Output specifications

26	Analog output (1 to 5V)
27	NPN Open collector/2 outputs(Sinking)
67	PNP Open collector/2 outputs (Sourcing)

Panel mount adaptor No.

(Panel adaptor A + Panel adaptor B + Mounting bracket)

ZS-22-E

Panel adaptor A ZS-22-03

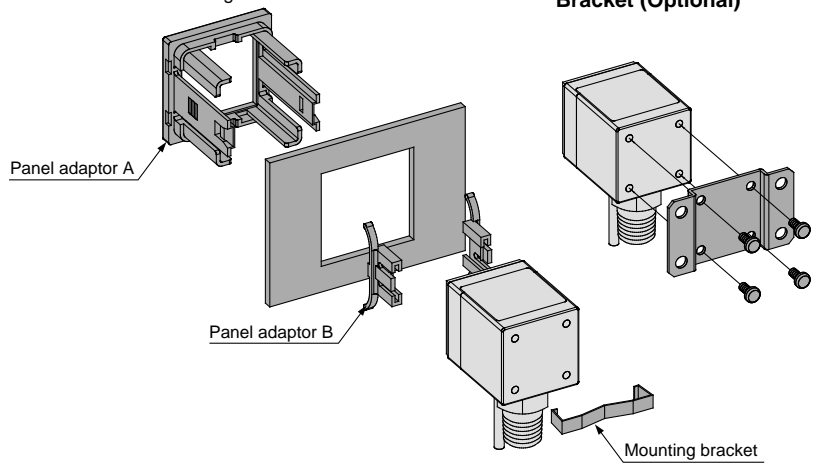
Panel adaptor B ZS-22-02

Mounting bracket ZS-22-03

ZS-22-D

(With four M3 mounting threads)

Bracket (Optional)



PSE

**ZSE4
ISE4**

**ZSE5
ISE5**

**ZSE6
ISE6**

**ZSE3
ISE3**

GS

PS

ISA

**ZSE1
ISE1**

**ZSE2
ISE2**

ZSP

IS

ZSM

PF

IF

ZSE5B/ISE5B

Specifications

Model		Vacuum ZSE5B	Positive pressure ISE5B
Operating pressure range		-100 to 100kPa	-0.1 to 1MPa
Max. pressure		200kPa	1.5MPa
Min. display unit	kPa	2	—
	MPa	—	0.01
	mmHg	10	—
	kgf/cm ²	0.02	0.1
	PSI	0.2	1
bar		0.02	0.1
Indicator light		ON: When Green LED(OUT1) or Red(OUT2) turns on	
Frequency response		200Hz (5ms)	
⁽¹⁾ Hysteresis	Hysteresis mode	Adjustable (2 digits or more)	Adjustable (3 digits or more)
	Window comparator mode	Fixed (2 digits)	Fixed (3 digits)
Fluid		Fluid that will not corrode SUS304 and SUS630	
Temperature characteristics		± 3% F. S. or less	
Repeatability		± 1% F. S. or less	
Supply voltage		12 to 24V DC (Ripple ± 10% or less)	
Output specification		NPN open collector 30V, 80mA or less PNP open collector 80mA or less	
Current consumption		45mA or less	
Error display		Red light blinks. Display the error code on LCD	
Pressure display		3 1/2 digits (10mm-size numerals)	
Self-diagnostic function		Over current ⁽²⁾ , Over pressure, Data error, Pressure during 0 clear	
Operating temperature range		0 to 50°C (No condensation)	
Noise resistance		500Vp-p, Pulse width: 1μS, Standing: 1nS	
Voltage resistance		Between external terminals and housing 250V AC, 50/60Hz for 1 min.	
Insulation resistance		Between external terminals and housing 2MΩ (50V DC by megameter)	
Vibration resistance		10 to 500Hz Pulse width 1.5mm or acceleration 98 m/s ² (at smaller vibrations) in X, Y, Z directions (2 hours)	
Shock resistance		980 m/s ² in X, Y, Z directions (3 times for each direction)	
Lead wire		Grommet oil-resistant vinyl cabtire code -26 ø3.4 0.2mm ² 3 core 3m -27, -67, ø3.5 0.14mm ² 4 core 3m	
Weight		126g (including 3m-long lead wire)	
Port size		02: R(PT) 1/4, M5 X 0.8 T2: NPTF1/4, M5 X 0.8	
Protective construction		IP40	



Note 1) ●Hysteresis mode:

ZSE: When the values of P1 and P2 are the same or when P1>P2 within 2 digits, the hysteresis will be automatically 2 digits for the set value of P1.

ISE: When the values of P1 and P2 are the same or when P1>P2 within 3 digits, the hysteresis will be automatically 3 digits for the set value of P1.

●Window comparator mode:

ZSE: The hysteresis is 2 digits, so separate P1 from P2 by 5 digits or more and set them.

ISE: The hysteresis is 3 digits, so separate P1 from P2 by 7 digits or more and set them.

*1 digit is the minimum pressure display unit. (See the table above.)

Note 2) ●Analog output has no overcurrent detection function.

Description

UP key

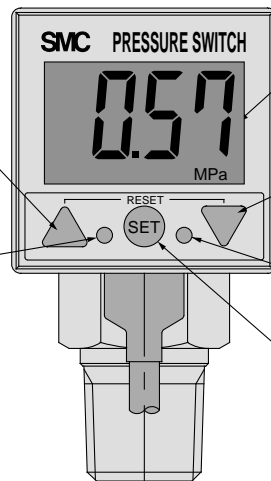
Increases ON/OFF set point value.
Switched to peak mode high.

LED (Green)

Displays OUT1 operation condition.

RESET key

Reset the switch by pressing the UP and DOWN buttons simultaneously.
Clears anomaly. Displays "0".



LCD

Displays present pressure.
Displays ON/OFF set point value.
Displays error code.
Displays unit.

DOWN key

Decreases ON/OFF set point value.
Used for switch to peak mode low,
unit change and output mode
change.

LED (Red)

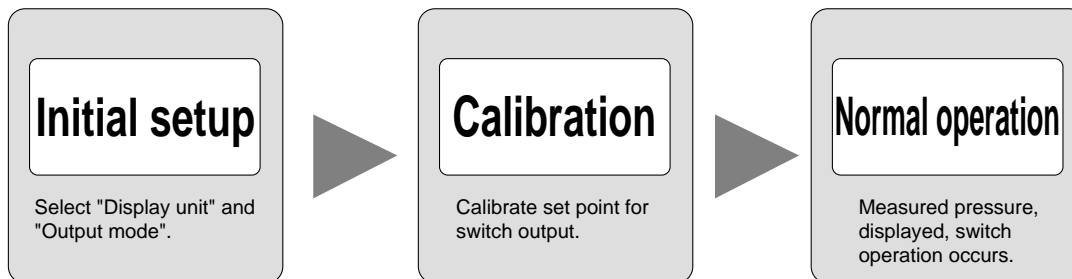
Displays OUT2 operation condition.
Blinks on and off when an error
occurs.

SET key

Changes the mode. Used for unit
change and output mode change
by pressing the button for at least
1 second.

Calibration Procedure

Procedure ----->



Initial setup

- 1. Initial setup mode**
- 2. Selection of "Display unit"**
- 3. Selection of "OUT1 output mode"**
- 4. Selection of "OUT2 output mode"**

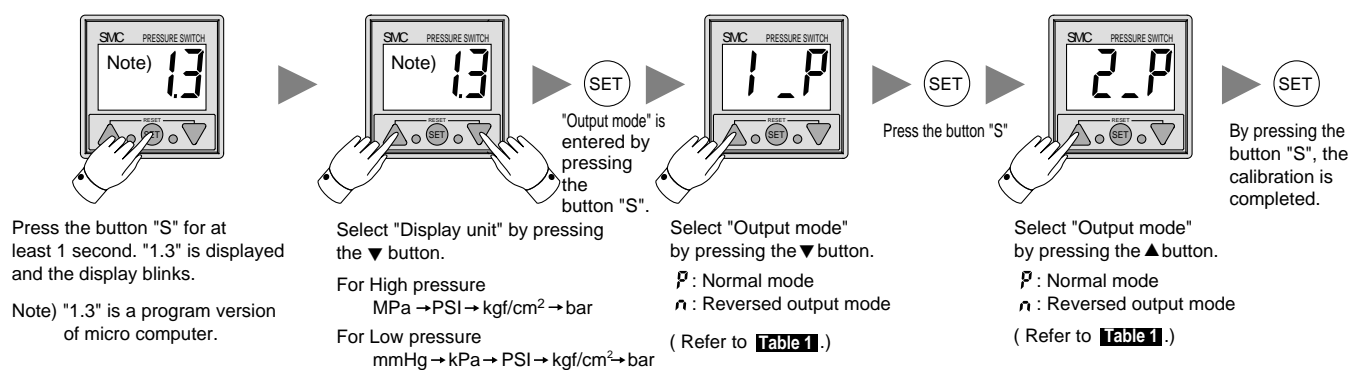
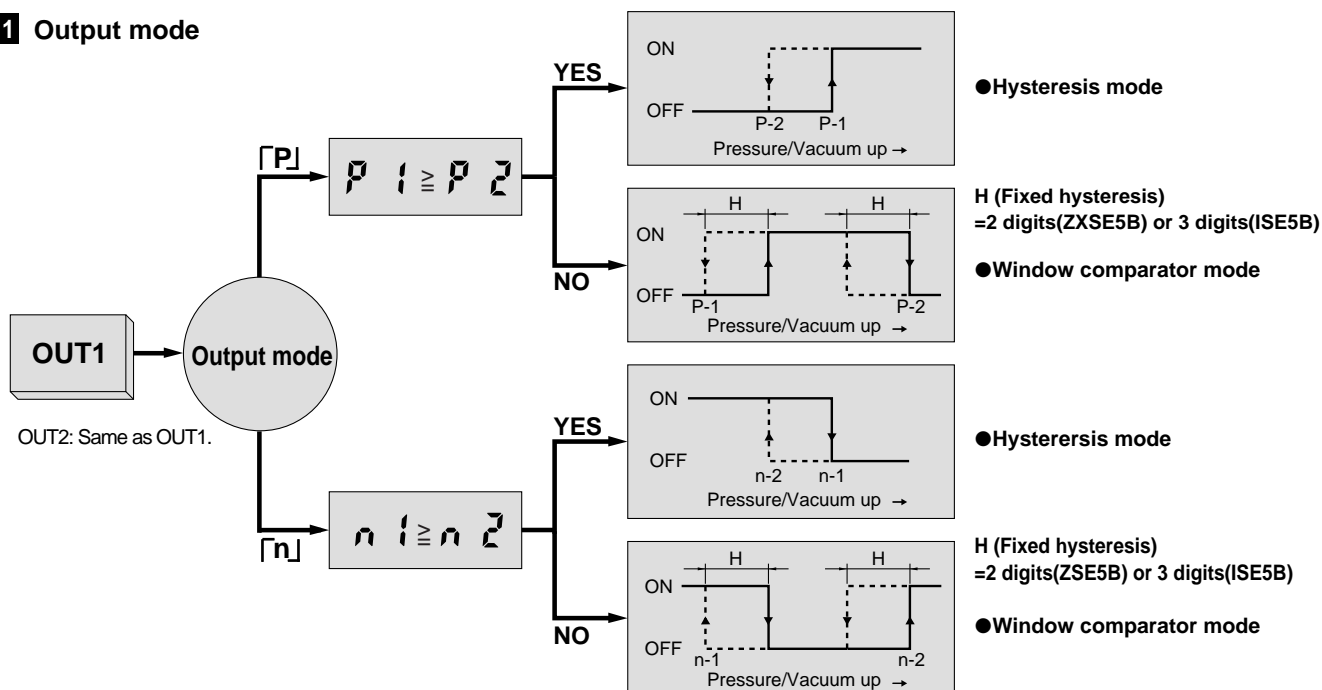


Table 1 Output mode



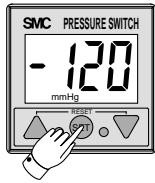
- PSE
- ZSE4 ISE4
- ZSE5 ISE5
- ZSE6 ISE6
- ZSE3 ISE3
- GS
- PS
- ISA
- ZSE1 ISE1
- ZSE2 ISE2
- ZSP
- IS
- ZSM
- PF
- IF

ZSE5B/ISE5B

Calibration Procedure

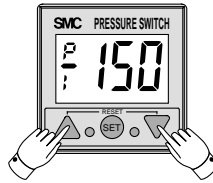
Calibration

1. Calibration value input mode



Press the button "S".

2. Input set point value for OUT1 (1)

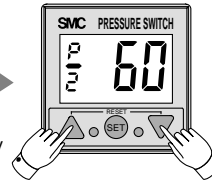


▲button: Increase set point value
▼button: Decrease set point value
Refer to the **Table 2** when using in vacuum.

SET

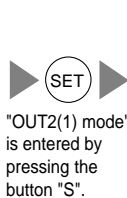
"OUT1(2) mode" is entered by pressing the button "S".

3. Input set point value for OUT1 (2)



▲button: Increase set point value
▼button: Decrease set point value

4. Input set point value for OUT2 (1)



"OUT2(1) mode" is entered by pressing the button "S".

▲button: Increase set point value
▼button: Decrease set point value

SET

"OUT2(2) mode" is entered by pressing the button "S".

5. Input set point value for OUT2 (2)



▲button: Increase set point value
▼button: Decrease set point value

SET

By pressing the button "S", the calibration is completed.

Table 2 Vacuum ZSE5 calibration.

The setting range for ZSE5 is -100kPa to 100kPa .

Take notice that the setting method is different from the positive pressure type.

1. Hysteresis mode

<Ex.> When switched at more than -50kPa and Hysteresis is 10kPa .

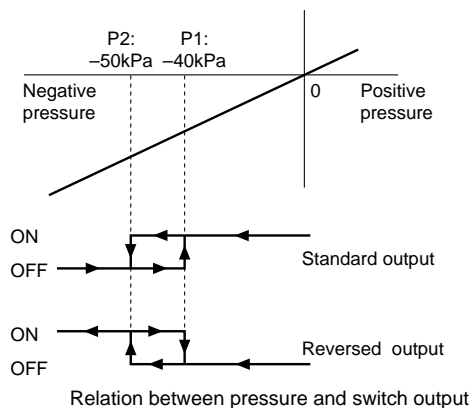
- Set P1 at -40kPa and P2 at -50kPa .

Note) Pressure must be $P1 > P2$.

Note) Set the hysteresis more than 2 digits.

* "Digit" is the minimum setting unit of the pressure.

1 digit 2kPa , 10mmHg ,
 0.02kgf/cm^2 ,
 0.2PSI ,
 0.02bar

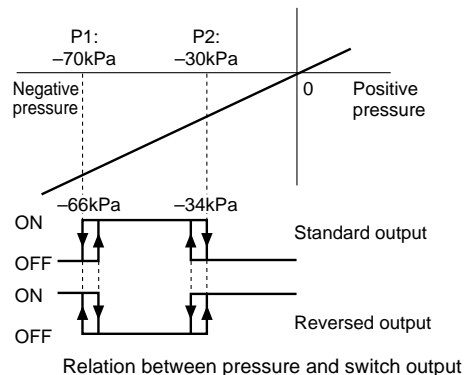


2. Window comparator mode

<Ex.> When switched at -30kPa to -70kPa .

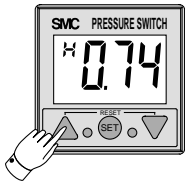
- Set P1 at -70kPa and P2 at -30kPa .

Note) Hysteresis is automatically set by 2 digits in case of window comparator mode.



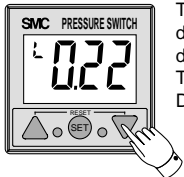
Other Functions

●Peak Mode High



To display the high peak pressure (highest degree of vacuum), press the UP button during normal operation. The LCD displays "H". To return back to normal operation press the UP button again.

●Peak Mode Low



To display the low peak pressure (lowest degree of vacuum), press the DOWN button during normal operation. The LCD displays "L". To return back normal operation, press the DOWN button again.

●Reset Function



Simultaneously pressing the UP and DOWN button will reset the switch.

1) Reset will cause the following during normal operation:

- Peak high is cleared.
- Peak low is cleared. Zero is reset.

2) Reset will cause the following when error has occurred:

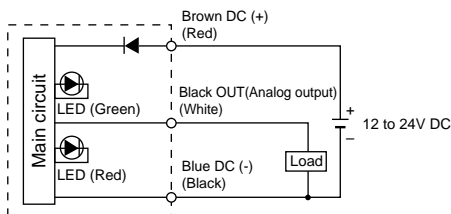
- Switch will assume normal operation (all calibration data has retained).
 - In case of data error, reset the setup mode and then switch will assume normal operation.
- Note) Reset Function does not work during setup mode.

Internal Circuit and Wiring

Lead wire colors inside () are those prior to conformity with IEC standards.

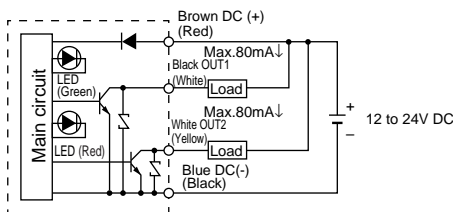
"-26" Analog Output Type

1 to 5V(±5%F.S.)
Load impedance : 1kΩ or more



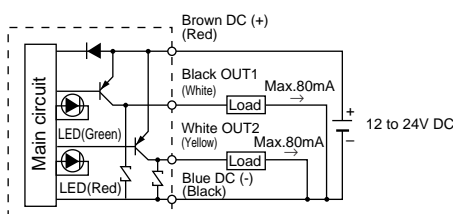
"-27" NPN Open Collector

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



"-67" PNP Open Collector

Max.80mA



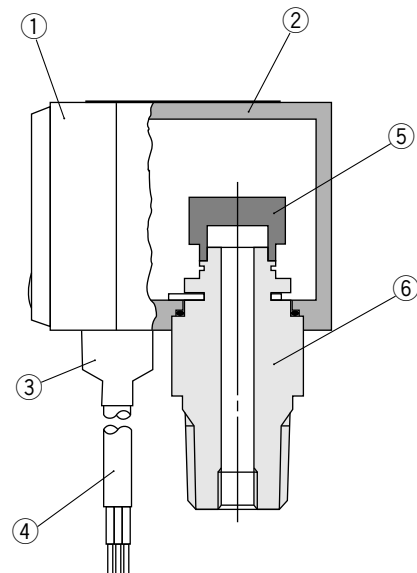
Error Codes

Error codes

Display	Cause	Solution
	Calibration was changed by accident, reason unknown.	Push Up and Down buttons to reset all the data.
	Output 1 output current is exceeding 80mA.	Turn off the power and verify the load connected output 1.
	Output 1 (Black wire) could be shorted out.	Verify that the output is not shorted out and then reset the switch.
	Output 2 output current is exceeding 80mA.	Turn off the power and verify the load connected output 2.
	Output 2 (White wire) could be shorted out.	Verify that the output is not shorted out and then reset the switch.
	Max. operating pressure has been exceeded for more than 2 seconds.1.5 x MAX. operating press.for pressure switch 0.5MPa for vacuum switch	Reduce the supply pressure to below the max. pressure rating and then reset the switch.
	Pressure is 2% above rated pressure during 0 clear.	Apply atmospheric pressure and then reset the switch.

Note 1) Do not apply to Analog output type.

Construction



Parts List

No.	Description	Materials
①	Indicator panel	Denatured PPO
②	Body	PBT
③	Seal	NBR
④	Lead wire	Vinyl chloride (Vinyl sheath)
⑤	Pressure sensor	SUS630
⑥	Fittings	SUS304

PSE

ZSE4
ISE4

ZSE5
ISE5

ZSE6
ISE6

ZSE3
ISE3

GS

PS

ISA

ZSE1
ISE1

ZSE2
ISE2

ZSP

IS□

ZSM

PF□

IF□

⚠ Precautions

Be sure to read before handling.

Refer to p.0-26 and 0-27 for Safety Instructions common precautions on the products mentioned in this catalog, and refer to p.3.0-7 to 3.0-9 for more detailed precautions on every series.

Wiring

⚠ Warning

① Voltage resistance

Voltage resistance between metal fitting and lead wire of the switch is 250V. Do not apply voltage potential in excess of 250V.

⚠ Caution

① When induction noise is expected to be generated from piping, ground the piping.

Pressure Source

⚠ Warning

① Quality of operating fluid

Section in contact with fluid are made of SUS630 (pressure sensor) and SUS304 (fitting). Use fluid that will not corrode these materials. The corrosion resistance of SUS630 and that of SUS304 are almost the same. For reference, fluid and gas that will not corrode SUS304 are shown below.

Dry air	○
Drain-contained air	○
Hydraulic fluid (JIS-K2213)	○
Silicon (JIS-K2213)	○
Lubrication (JIS-K6301)	○
Freon	○
Carbon dioxide	○
Ammonia	○
Nitrogen gas	○
Chlorine gas	○

Others

⚠ Caution

① Panel mounting

① Insert Adaptor A from the front of panel.

↓

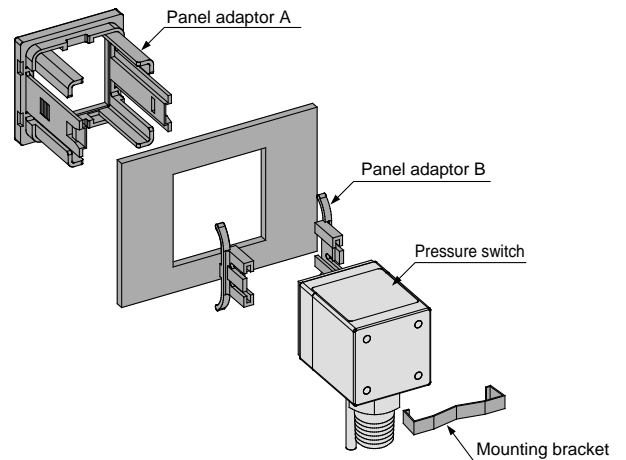
② Fix Adaptor A firmly with Adaptor B from the back of panel.

↓

③ Insert a pressure switch to Adaptor A from the back of panel.

↓

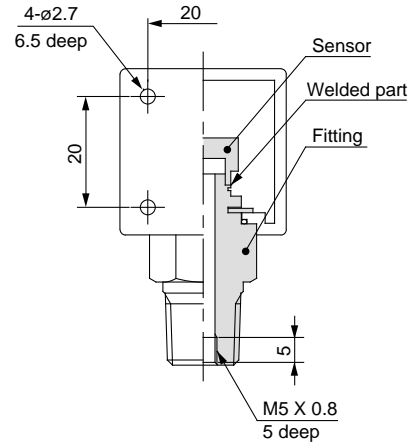
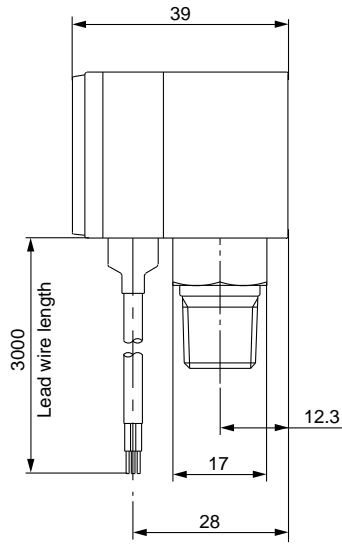
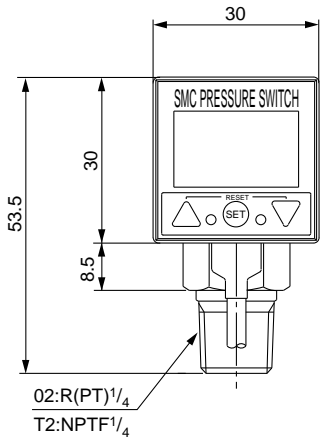
④ Fix the switch with a mounting bracket.



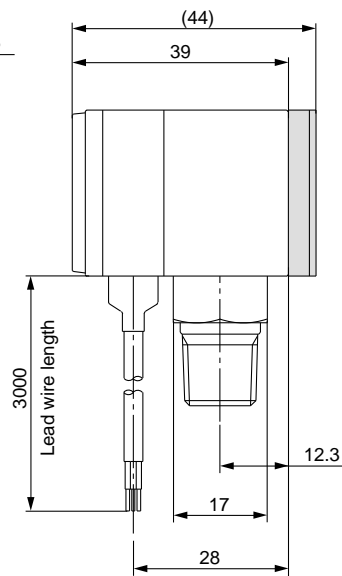
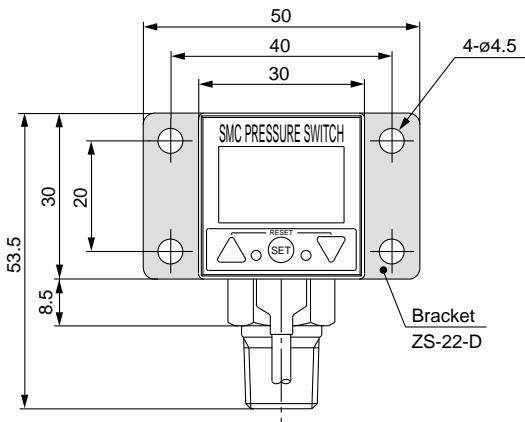
With Backlight Digital Pressure Switch **ZSE5B/ISE5B**

Dimensions

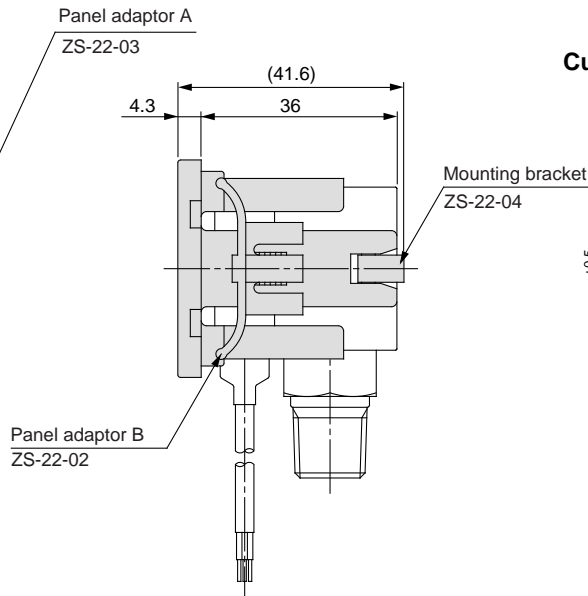
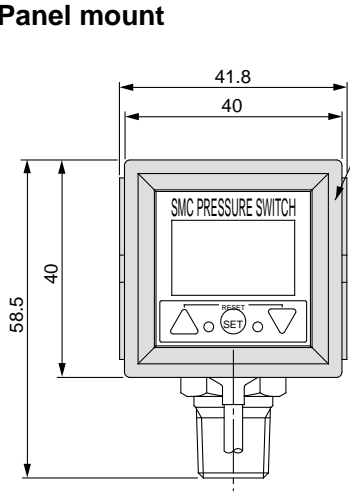
Standard



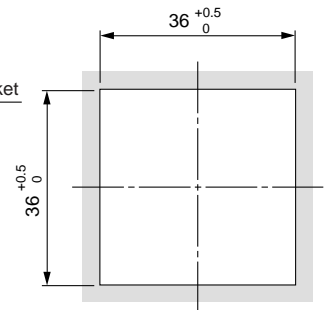
With bracket



Panel mount



Cutout dimensions for panel mount



PSE

ZSE4
ISE4

ZSE5
ISE5

ZSE6
ISE6

ZSE3
ISE3

GS

PS

ISA

ZSE1
ISE1

ZSE2
ISE2

ZSP

IS□

ZSM

PF□

IF□