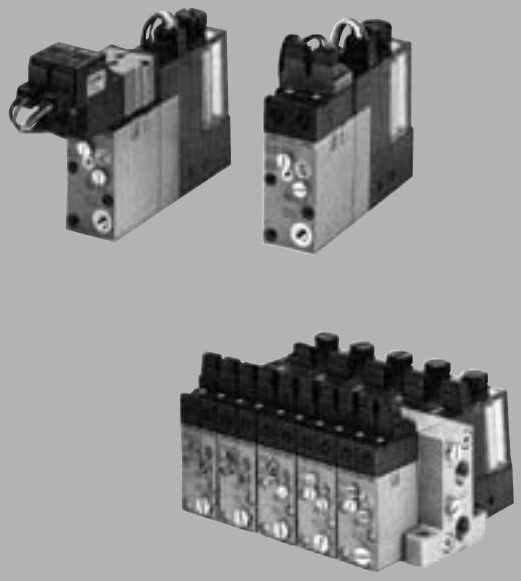
LCD Readout Digital Pressure Switch

Series ZSE3 (For Vacuum)/ISE3 (For Positive Pressure)

For General Pneumatics

Easy pressure setting with the digital display

Can be integrated with a vacuum unit, Series ZX



Built-in failure prediction output function

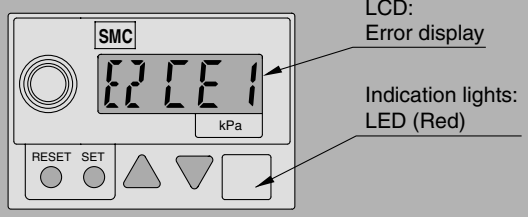
When system performance declines due to filter element clogging, worn vacuum pads, piping leakage, etc., the switch can detect and indicate an oncoming problem before failure occurs.

Two independent outputs

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

Self-diagnostic function

- **Excessive current**
- **Excessive pressure**
- **Data error**



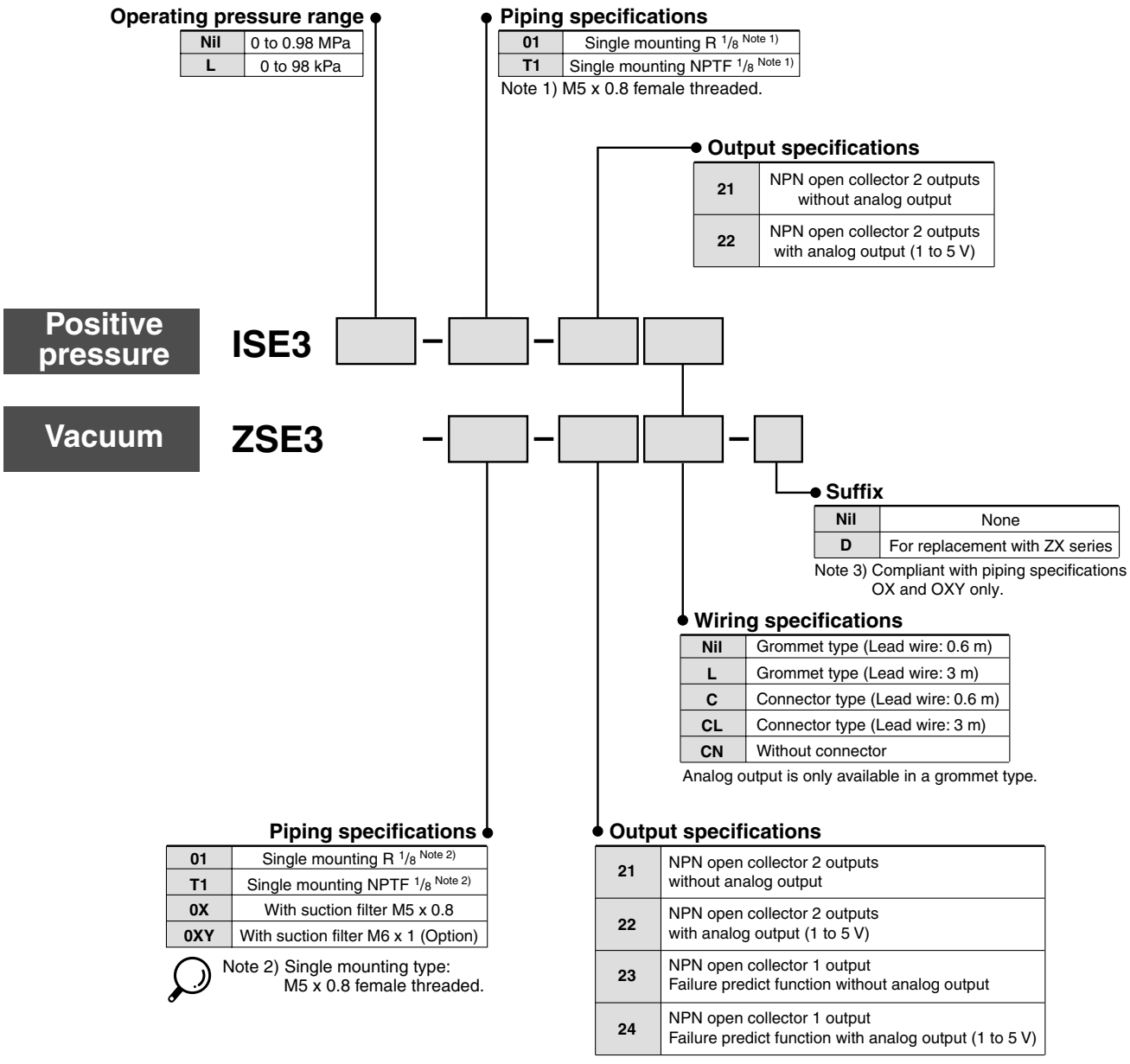
Calibration data

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

Suction filter comes as standard

LCD Readout Digital Pressure Switch
Series ZSE3/ISE3

How to Order



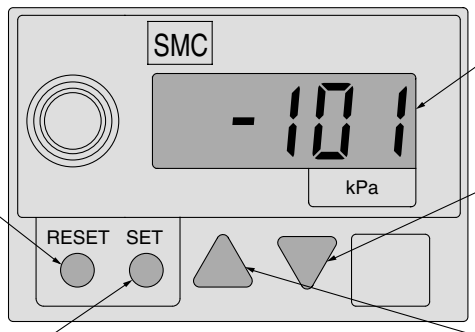
Specifications

Model		Vacuum **ZSE3**	Positive pressure 100 kPa **ISE3L**	Positive pressure 1 MPa **ISE3**
Operating pressure range		0 to –101 kPa	0 to 98 kPa	0 to 0.98 MPa
Max. operating pressure		200 kPa (1)		1 MPa
Min. display unit	**kPa**	1	1	—
	MPa	—	—	0.01
Indicator light (2)		N: When Green LED (OUT1) or Red (OUT2) turns on		
Frequency response		200 Hz		
Hysteresis (3)	**Hysteresis mode**	Adjustable (Variable from 0)		
	Window comparator mode	Fixed (3 digits)		

Fluid		Air, Non-corrosive gases
Temperature characteristics		±3% F.S. or less
Repeatability		±1% F.S. or less
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)
Switch output		NPN open collector 30 V 80 mA or less
Current consumption		25 mA or less
Error display		Red light blinks. Display the error code on LCD.
Pressure indication		3 1/2 digits (5 mm-size numerals)
Self-diagnostic function		Overcurrent, Overpressure, Data error Pressure during 0 clear
Operating temperature range		0 to 60°C (No dewing)
Noise resistance		1000 Vp-p, Pulse width 1 μs, Rise time 1 ns
Withstand voltage		1000 VAC in 50/60 Hz for 1 minute between live parts and case
Insulation resistance		2 MΩ or more (at 500 VDC by megameter) betweeen live parts and case
Vibration resistance		10 to 500 Hz Pulse width 1.5 mm or acceleration 98 m/s² (at the smaller vibration) to X, Y, Z direction (2 hours) (De-energized)
Impact resistance		980 m/s² to X, Y, Z direction (3 times for each direction)
Lead wire	**Connector type**	Heat-resistant vinyl electric wire, 4-wire, Cross section: 0.31 mm², Insulator O.D.: 1.55 mm
	Grommet type	Oil-resistant vinyl cabtire code -21, -23: 4 cores, ø3.5, Cross section: 0.14 mm2, Insulator O.D.: 1.0 mm -22, -24: 5 cores, ø3.5, Cross section: 0.15 mm2, Insulator O.D.: 1.0 mm
Mass		40 g (including 0.6 m-long lead wire)
Port size		R 1/8, M5 x 0.8, NPTF 1/8, M5 x 0.8 ZX ejector mounted type: M5 x 0.8 / R 1/8, M5 x 0.8 NPTF 1/8, M5 x 0.8
Enclosure		IP40
Standard		Compliant with CE marking

Note 1) • Instant pressure supply of 0.5 MPa has no influence on the switch.
Note 2) • ZSE3-□-$\frac{23}{24}$: Failure predictive output is Red.
Note 3) • Window comparator mode:
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.)

Description



LCD
Displays present pressure.
Displays each mode.
Displays error code.

DOWN button
Decreases the ON/OFF set point value.
Used for switch to peak mode low.

RESET button
This clears the unit when an abnormality occurs.
Displays "0".

UP button
Increases the ON/OFF set point value.
Changed to peak mode high.

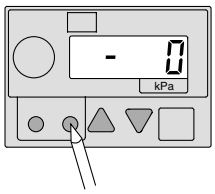
SET button
Switches to the setting mode.

Calibration Procedure

Pressure Setting

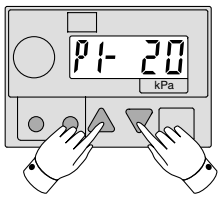
● 2 output type

1. Input mode for set point value



Press the "SET" button.

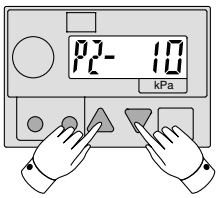
2. Input set point value for OUT1 (1)



▲ button: Increases set point value
▼ button: Decreases set point value
(Refer to the Table 1.)

Press the "SET" button.

3. Input set point value for OUT1 (2)

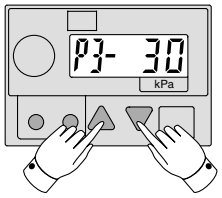


▲ button: Increases set point value
▼ button: Decreases set point value

Press the "SET" button.

P1: Setting of OUT1
P2: Setting of OUT1
P3: Setting of OUT2
P4: Setting of OUT2

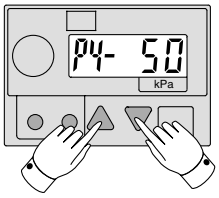
4. Input set point value for OUT2 (1)



▲ button: Increases set point value
▼ button: Decreases set point value

Press the "SET" button.

5. Input set point value for OUT2 (2)



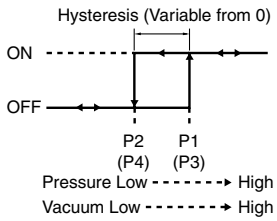
▲ button: Increases set point value
▼ button: Decreases set point value

SET

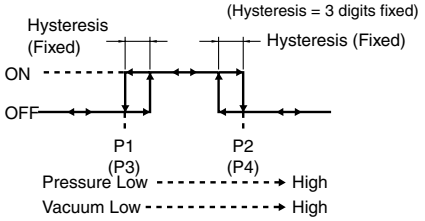
Press the "SET" button to complete the setting.

Table 1 Output type

Hysteresis mode (P1 ≥ P2, P3 ≥ P4)



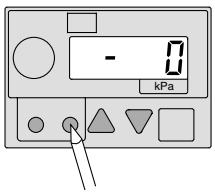
Window comparator mode (P1< P2, P3< P4)



Note) • Window comparator mode (one for positive pressure is same) Hysteresis is 3 digit, so set P1 and P2 (also P3 and P4) at least 7 digit.
∗ 1 digit is the minimum setting pressure unit.

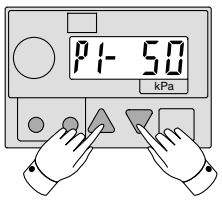
● 1 output type with failure prediction function

1. Input mode for set point value



Press the "SET" button.

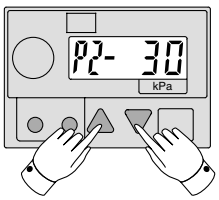
2. Input set point value for OUT1 (1)



▲ button: Increases set point value
▼ button: Decreases set point value

Press the "SET" button.

3. Input set point value for OUT1 (2)

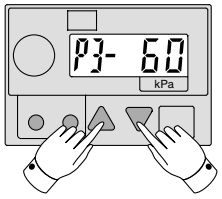


▲ button: Increases set point value
▼ button: Decreases set point value

Press the "SET" button.

P1: setting of OUT1
P2: setting of OUT2
P3: setting of failure prediction pressure
EC: Number of failure prediction

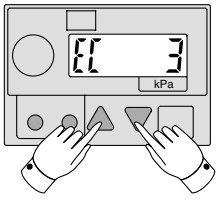
4. Calibration of failure predictive pressure



▲ button: Increases set point value
▼ button: Decreases set point value
(Refer to the Table 2.)

Press the "SET" button.

5. Calibration of number of failure prediction occurrences

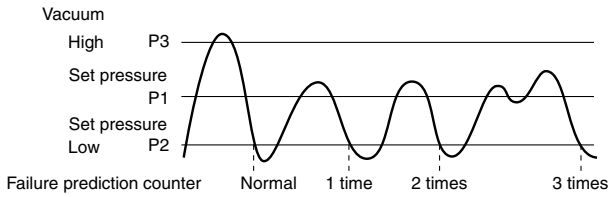


▲ button: Increases set point value
▼ button: Decreases set point value
Occurrence number: 1 to 16 times (0 is not available for prediction.)

SET

Press the "SET" button to complete the setting.

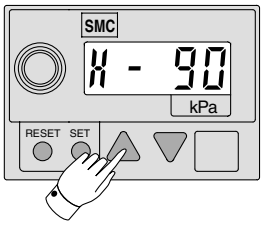
Table 2 Failure prediction



Failure prediction will register when switches turn OFF without reaching the pressure of (P3) after switch turns ON (over P1). Output of failure detection occurs when failure prediction is counted continuously within certain preset levels.
The count of failure prediction is reset when switch turns ON (over P1) and pressure exceeds the failure prediction set pressure (P3). (Example of hysteresis mode.)

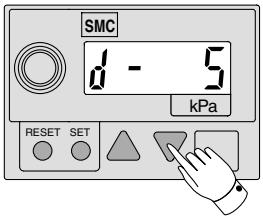
Other Functions

● Peak mode high



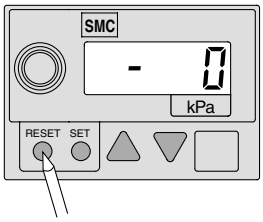
To display the high peak pressure (highest degree of vacuum), press the ▲ button during normal operation.
The LCD displays "H". To return back to the normal operation, press the ▲ button again.

● Peak mode low



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

● Reset function



A RESET operation leads to the following results.
1) Reset will cause the following during normal operation:
   • Peak high is cleared. Peak low is cleared.
   • Failure prediction counter is cleared.
   • Failure predictive output is reset.
2) Reset will cause the following when an error has occurred:
   • Data set in setting mode will remain stored and will return to the same state as when the power is applied.
   (All calibration data has retained.)
   • In the case of data error, reset the setup mode and then switch will assume normal operation.
   (All calibration data has retained.)

Note) Reset Function does not work during setup mode.

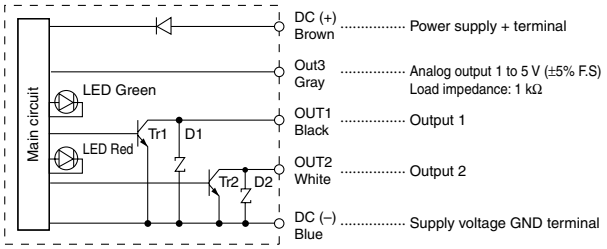
Error Correction

Take the following corrective solutions when errors occur.

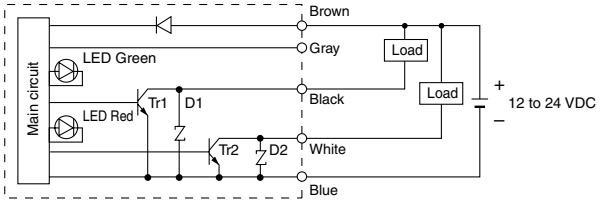
Display	Description	Solution
E1 dE	Set data was changed by accident, reason unknown.	Perform the RESET operation, and reset all data again.
E2 CE1	OUT1 is short-circuited. Overcurrent is being applied to the load.	Turn off the power and replace the load connected with OUT1 (Black wire).
E2 CE2	OUT 2 is short-circuited. Overcurrent is being applied to the load.	Turn off the power and replace the load connected with OUT2 (White wire).
E3 PE	Pressure exceeding 0.5 MPa is being applied. (The pressure over rated pressure is being applied in case of positive pressure.)	Reset the supply pressure less than 0.5 MPa. (Reduce the supply pressure to below rated pressure in case of rated voltage.)
E4 HP	When performing zero clear, compared with the atmospheric pressure, pressure of more than ±0.07 MPa for 1 MPa and ±7 kPa for vacuum is being applied.	Apply atmospheric pressure and then reset the switch.

Internal Circuit and Wiring Example

Circuit and connection



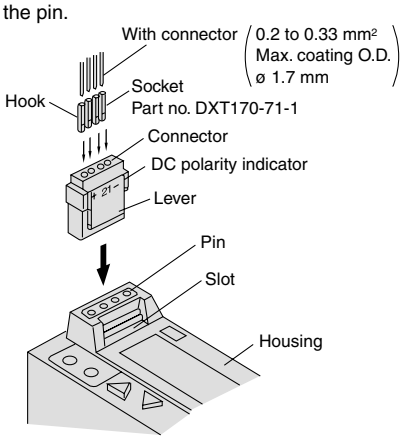
Regular connection



How to Use Connector

1. Attaching and detaching connectors

- When assembling the connector to the switch housing, push the connector straight onto the pins until that lever locks into the housing slot.
- When removing the connector from the switch housing, push the leverdown to unlock it from the slot and then withdraw the connector straight off of the pin.



2. Crimping of lead wires and socket

Strip 3.2 to 3.7 mm of the lead wire end, insert each stripped wire into a socket and crimp contact it using special crimping tool. Be careful that the outer insulation of the lead wires does not interfere with socket contact part. (Crimping tool: DXT170-75-1)

3. Attaching and detaching lead wires with sockets

• Attaching

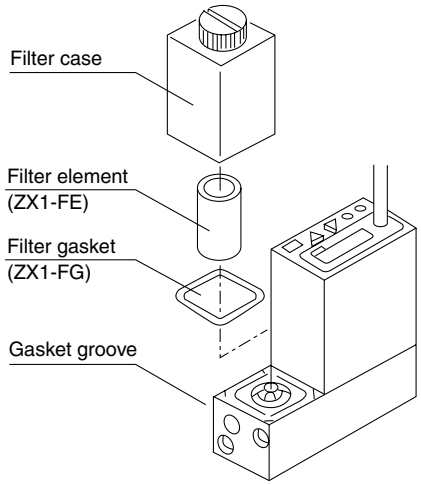
Push the socket into the square holes of the connector (with +, 1, 2, – indication), and continue to push the sockets all the way in until they lock by hooking into the seats in the connector. (When they are pushed in their hooks open and they are locked automatically.) Then confirm that they are locked by pulling lightly on the lead wires.

• Detaching

To detach a socket from connector, pull out lead wire while pressing the socket's hook with a stick having a thin tip (about. 1 mm). If the socket will be used again, first spread the hook outward.

How to Replace Filter Element

Replace the filter element when clogging causes deterioration of the adsorption force or slow response time.
(Element part number: ZX1-FE)
Confirm that the filter gasket is seated in the groove and then reassemble the parts. (Filter gasket part no.: ZX1-FG)



● Regarding the filter case

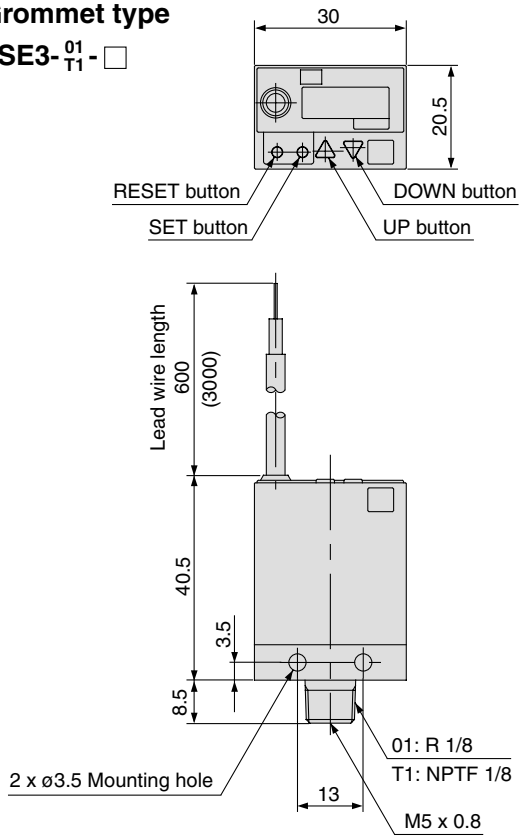
⚠Caution

1. The case is made of polycarbonate. Therefore, do not operate it in an environment that is exposed to chemicals such as thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, or water-soluble cutting oil (alkalinic).
2. Operate it away from direct sunlight.

Dimensions/Switch Only

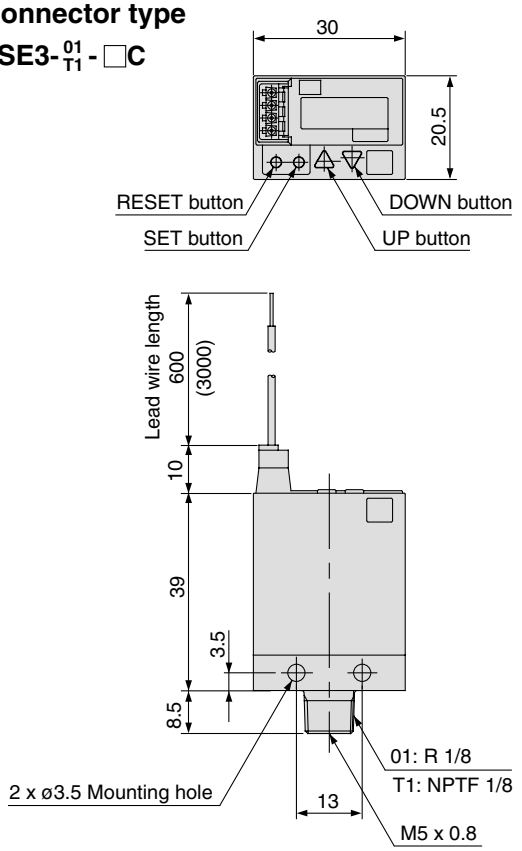
Grommet type

IZSE3-01T1-□



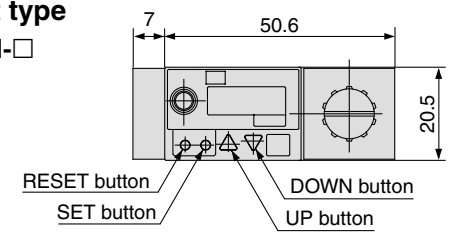
Connector type

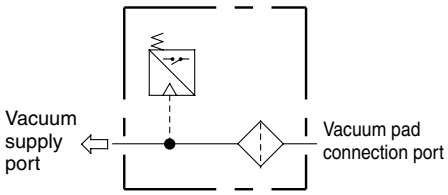
IZSE3-01T1-□C



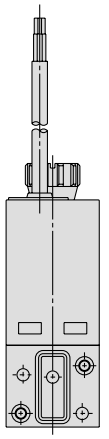
Grommet type

ZSE3-0X□-□

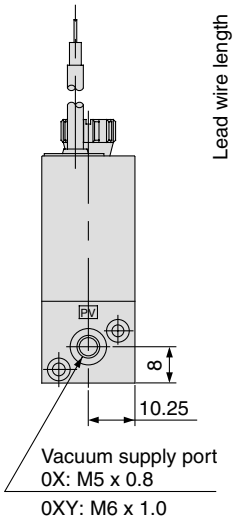


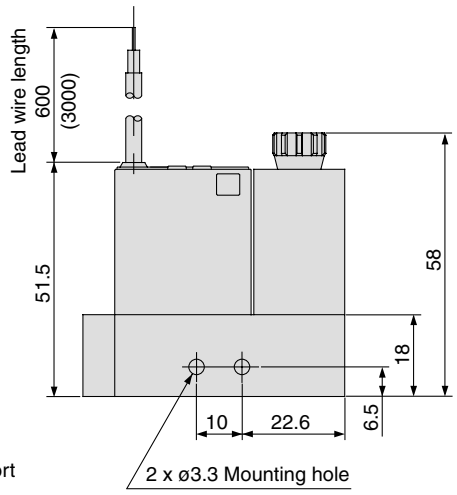


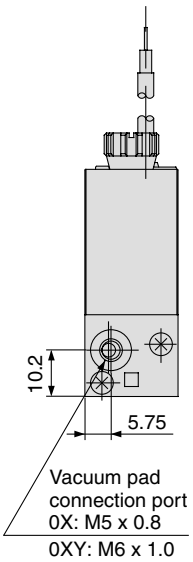
Pneumatic circuit



ZSE3-0X□-□-D

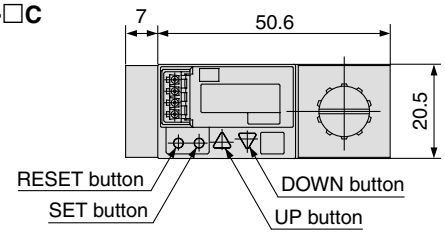


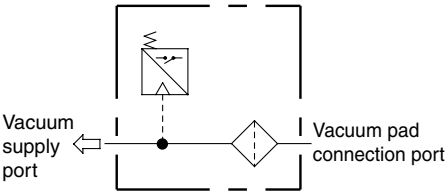




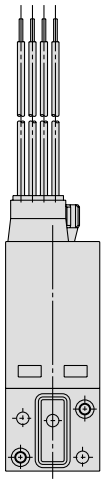
Connector type

ZSE3-0X□-□C





Pneumatic circuit



ZSE3-0X□-□C-D