For General Pneumatics

LCD Readout

Digital Pressure Switch

Series ZSE3

(For vacuum)

ISE3

(For positive pressure)

Push-button calibration allows for precise and simple set up.

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

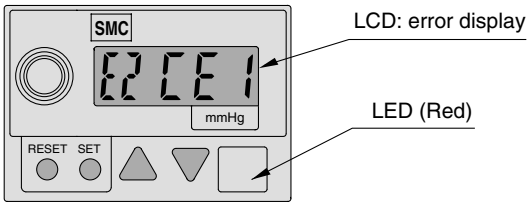
Allows the calibration of 2 different setpoints e.g. change of vacuum pad size requiring different setpoints, two different supply pressures requiring different pressure confirmation points.

Self-diagnostic function

■**Excessive current**

■**Excessive pressure**

■**Data error**



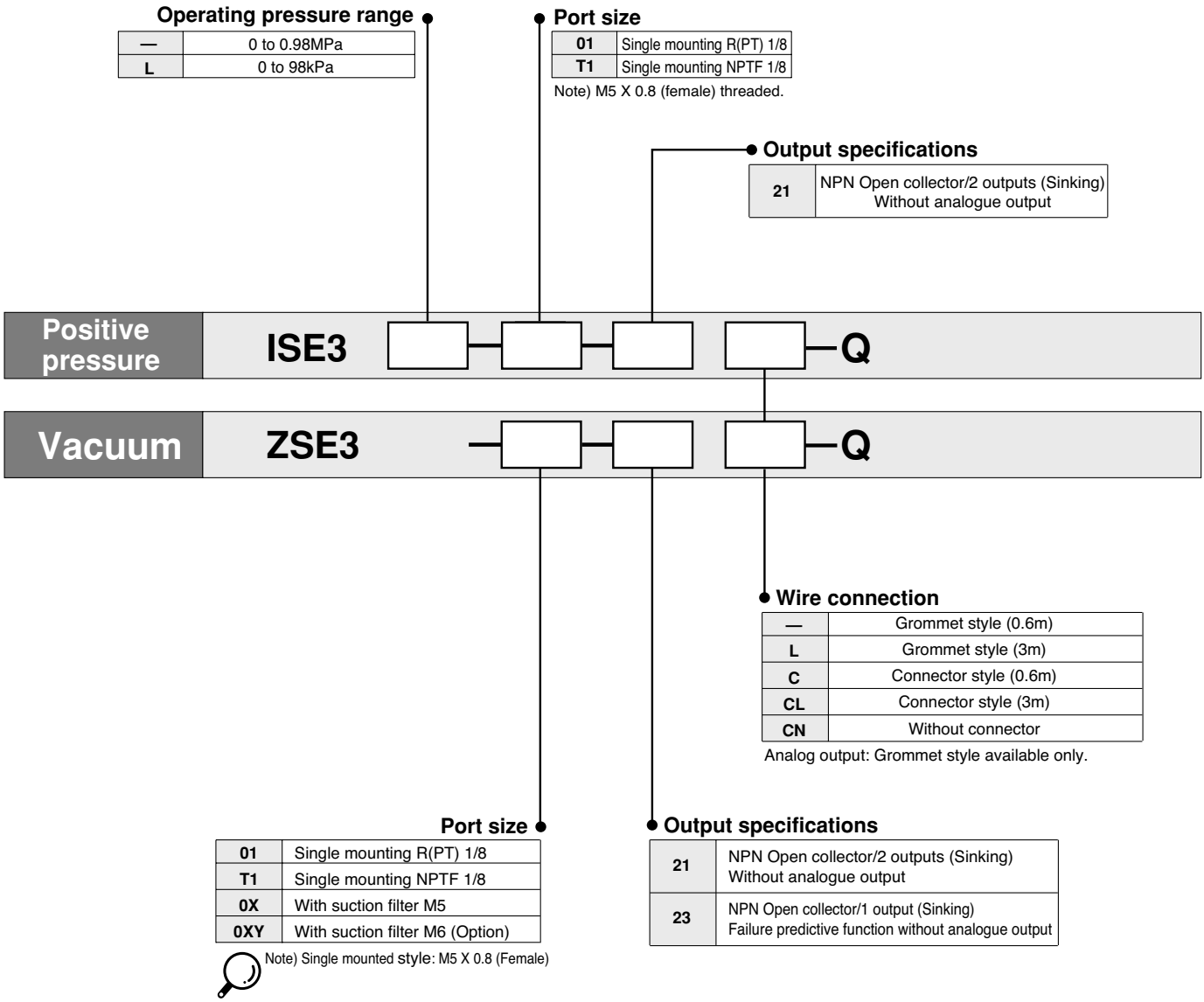
Calibration data

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.

Modular version can be integrated with ZX system

With suction filter

How to Order



⚠Caution

Be sure to read before handling. Refer to p.0-26 and 0-27 for Safety Instructions and common precautions on the products mentioned in this catalogue, and refer to p.3.0-7 to 3.0-9 for precautions on every series.

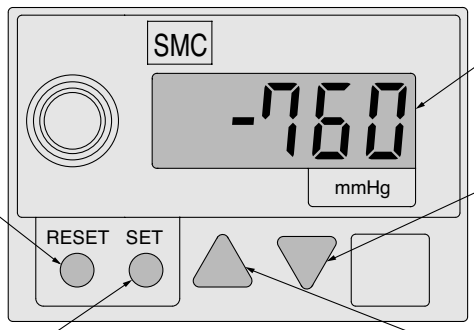
Specifications

Model		Vacuum ZSE3	Positive pressure 100kPa ISE3L	Positive pressure 1MPa ISE3
Operating pressure range		–101 to 0kPa	0 to 98kPa	0 to 0.98MPa
Max. pressure		200 kPa(1)		1MPa
Min. display unit	mmHg	5	—	—
	kgf/cm²	—	0.01	0.1
Indicator light		ON: When Green LED (OUT1) or Red (OUT2) turns on		
Frequency response(2)		200Hz		
Hysteresis(3)	Hysteresis mode	Adjustable (3 digits or more)		
	Window comparator mode	Fixed (3 digits)		

Fluid		Air, Non-corrosive gases
Temperature characteristics		±3% F.S. or less
Repeatability		±1% F.S. or less
Supply voltage		12 to 24 V DC (Ripple ±10% or less)
Output specification		NPN open collector 30v 80mA or less
Current consumption		25mA or less
Error display		Red light blinks. Display the error code on LCD.
Pressure display		3 1/2 digits (5mm-size numerals)
Self-diagnostic function		Over current, Over pressure, Data error Pressure during 0 clear
Operating temperature range		0 to 60° C (No condensation)
Noise resistance		1000Vp-p, Pulse width: 1μS, Standing: 1nS
Voltage resistance		Between external terminals and housing 1000 V AC, 50/60Hz for 1 min.
Insulation resistance		Between external terminals and housing 2MΩ (500V DC by megameter)
Vibration resistance		10 to 500Hz Pulse width 1.5mm or acceleration 98m/s² (at the smaller vibration) to X, Y, Z direction (2 hours)
Shock resistance		980m/s² to X, Y, Z direction (3 times for each direction)
Lead wire	Connector type	Heat-resistant vinyl electric wire ø1.55 0.31 mm² 4
	Grommet type	Oil-resistant vinyl cabtire code –21, –23: ø3.5 0.14mm² 4 core –22, –24: ø3.5 0.15mm² 5 core
Weight		40g (including 0.6m-long lead wire)
Port size		R(PT)1/8, M 5X0.8, NPTF1/8, M5 X 0.8 ZX ejector mounted type: M5 X 0.8 / R(PT)1/8, M5 NPTF1/8, M5
Protective construction		IP40

Note 1) ● Instant pressure supply of 0.5MPa has no influence on the switch.
Note 2) ● ZSE3-□-$\frac{23}{24}$: Failure predictive output is Red.
Note 3) ● Hysteresis mode:
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:
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 key
Decreases ON/OFF set point value.
Used for switch to peak mode low.

RESET Key
Clears anomaly.
Displays "0".

SET Key
Switches the mode.

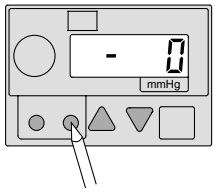
UP key
Increases ON/OFF set point value.
Changed to peak mode high.

Calibration Procedures

Calibration

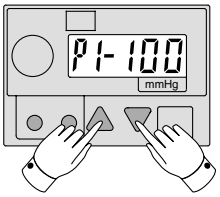
●2 output style

1. Calibration value input mode



Press the button "S".

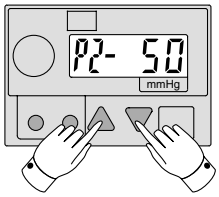
2. Input set point value for OUT1 (1)



▲Button: Increase set point value
▼Button: Decrease set point value
(Refer to the **Table 1** .)

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

3. Input set point value for OUT1 (2)

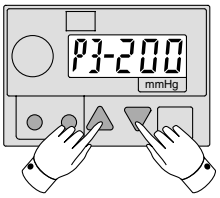


▲button: Increase set point value
▼button: Decrease set point value

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

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

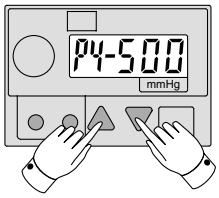
4. Input set point value for OUT2 (1)



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

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

5. Input set point value for OUT2 (2)



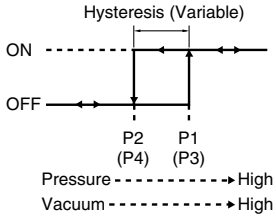
▲button: Increase set point value
▼button: Decrease set point value

SET

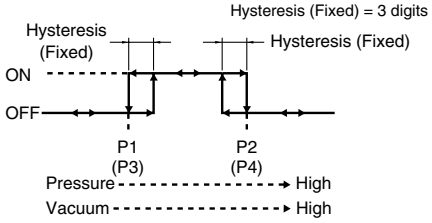
By pressing the button "S", the calibration is completed.

Table 1 Output mode

Hysteresis mode (P1≧P2, P3≧P4)



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



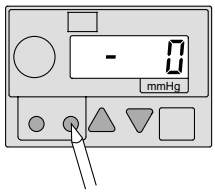
Note) ●Hysteresis mode
When P1 and P2 (also P3 and P4 for 2 output type) are the same or within 3 setting increments, hysteresis for set pressure P1 becomes increments.
●Window comparator mode
Hysteresis is 3 setting increments, so set P1 and P2 (also P3 and P4) at least 7 increments apart.

∗1 digit is the minimum setting pressure unit.
Pressure value is by 1 digit.

	Indication	Pressure value
ZSE3	5mmHg	0.67kPa
ISE3L	0.01kgf/cm^2	0.98kPa
ISE3	0.1kgf/cm^2	0.01MPa

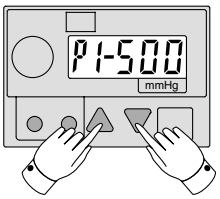
●1 output style with failure prediction function

1. Calibration value input mode



Press the button "S".

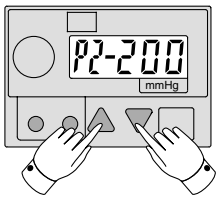
2. Input set point value for OUT (1)



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

"OUT 1(2) mode" is entered by pressing the button "S".

3. Input set point value for OUT1 (2)

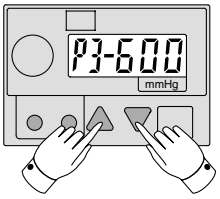


▲button: Increase set point value
▼button: Decrease set point value

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

P1: Calibration of OUT1
P2: Calibration of OUT2
P3: Calibration of Failure predictive pressure
EC: Number of Failure Prediction

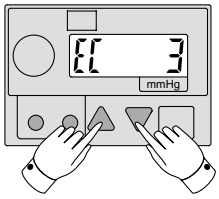
4. Calibration of Failure predictive pressure



▲button: Increase set point value
▼button: Decrease set point value
(Refer to the **Table 2** .)

"Failure prediction pressure value" is entered by pressing the button "S".

5. Calibration of number of Failure Prediction occurences

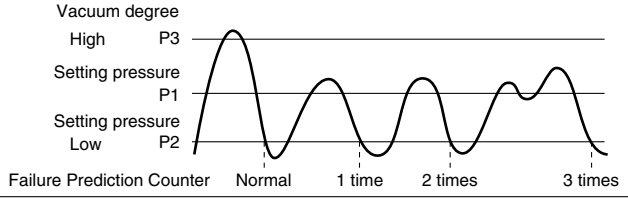


▲button: Increase set point value
▼button: Decrease set point value
Occurence number: 1 to 16 times (0 is not available for prediction.)

SET

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

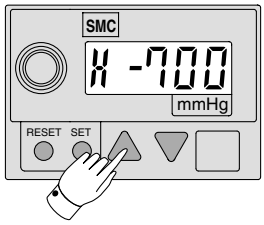
Table 2 Failure prediction



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 pre-set 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 window comparator mode.)

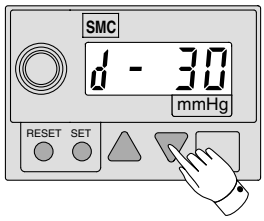
Other Functions

●Peak Mode High



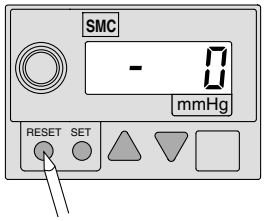
To display the high peak pressure (highest degree of vacuum), press the UP ▲ button during normal operation. The LCD displays "H". To return back to normal operation press the UP ▲ button again.

●Peak Mode Low



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

●Reset Function



The switch will reset by pressing the RESET button.

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 error has occured:
- 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. (All calibration data has retained)

Note) Reset Function does not work during setup mode.

Error Codes

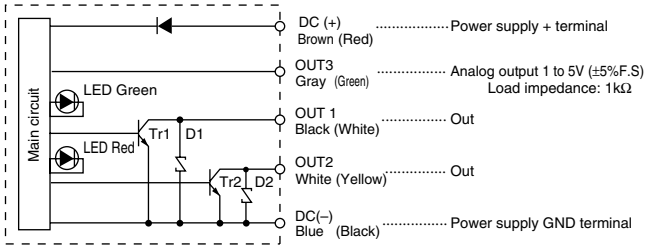
Error codes

Display	Cause	Solution
E1 dE	Calibration was changed by accident, reason unknown.	Push RESET to reset all the data.
E2 CE1	Output 1 could be shorted out. Exceeding current is supplied to load.	Turn off the power and verify the load connected output 1 (Black wire).
E2 CE2	Output 2 could be shorted out. Exceeding current is supplied to load.	Turn off the power and verify the load connected output 2 (White wire).
E3 PE	The supply pressure is exceeding 0.5MPa. (The supply pressure is exceeding the max. pressure rating.)	Reset the supply pressure less than 0.5MPa. (Reduce the supply pressure to below the max. pressure rating in case of rated voltage.)
E4 HP	Pressure is 2% above rated pressure during 0 clear.	Apply atmospheric pressure and then reset the switch.

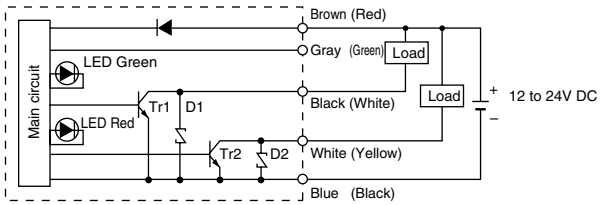
Internal Circuit and Wiring

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

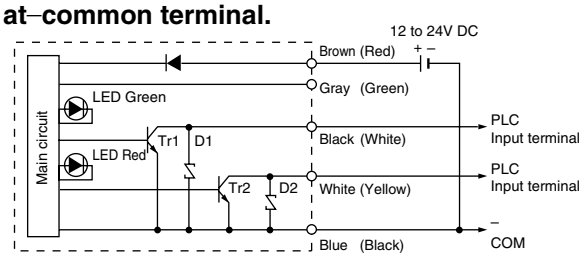
Circuit and Connection



Regular Connection



Connection with PLC at–common terminal.

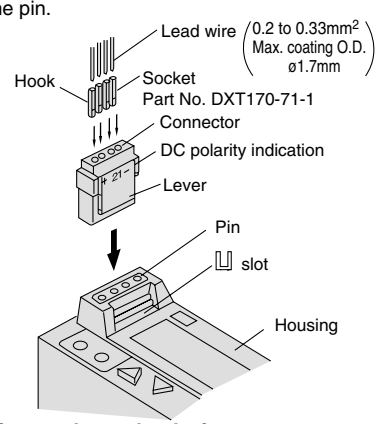


How to Use Connector

1 **Connection**

●When assembling the connector to the switch housing, push the connector straight onto the pins until thet 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 **Press bonding socket to lead wire**

Strip the end of the lead wire 3.2 to 3.7mm long. Place wire into socket taking care to prevent the lead wire insulation from entering the care wire pressure bonding area. Press bond using press bonding tool. (Press bonding tool: Part No. DXT170-75-1)

3 **Assembly of socket to connector**

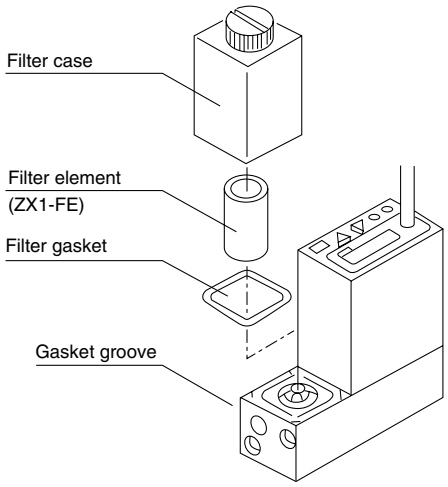
●Assembly: Push socket into hold in connector until the hook of the socket locks into the connector. (The socket hook will spring open inside the connector.) Gently pull lead wire back to confirm that socket is locked in position.

●Disassembly

When disassembling socket from connector, pull the hook on the socket down with a small dia. instrument(1mm). Pull socket out by means of the lead wire. If reusing the socket, widen the hook of the socket to its original position before re-assembling.

How to Replace Filter Element

Replace the filter element when clogging causes deterioration of the adsorption force or slow response time. Confirm that the filter gasket is seated in the groove and then reassemble the parts.



● Regarding the filter case

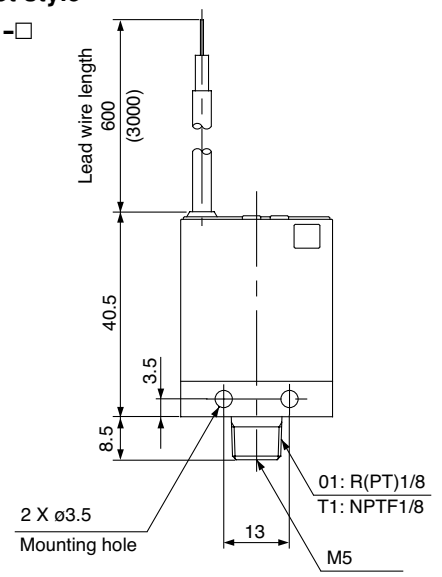
⚠Caution

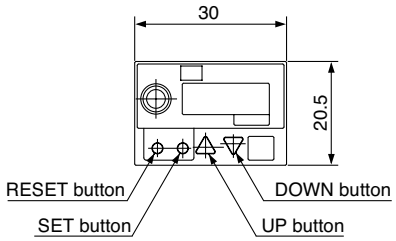
①The case is made of polycarbonate. Therefore, do not operate it in an environment that is exposed to chemicals such as thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, or water-soluble cutting oil (alkalinic).
②Operate it away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

Dimensions/Switch Only

Grommet style

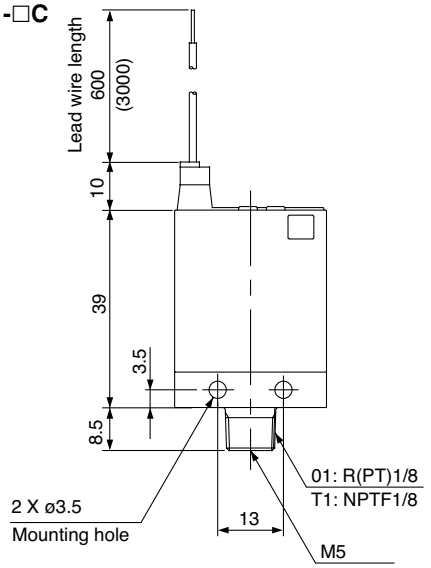
IZSE3-01/T1-□

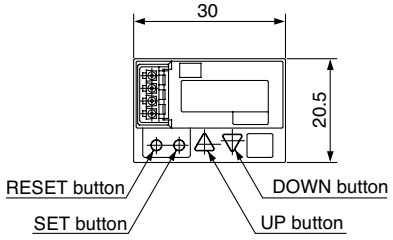




Connector style

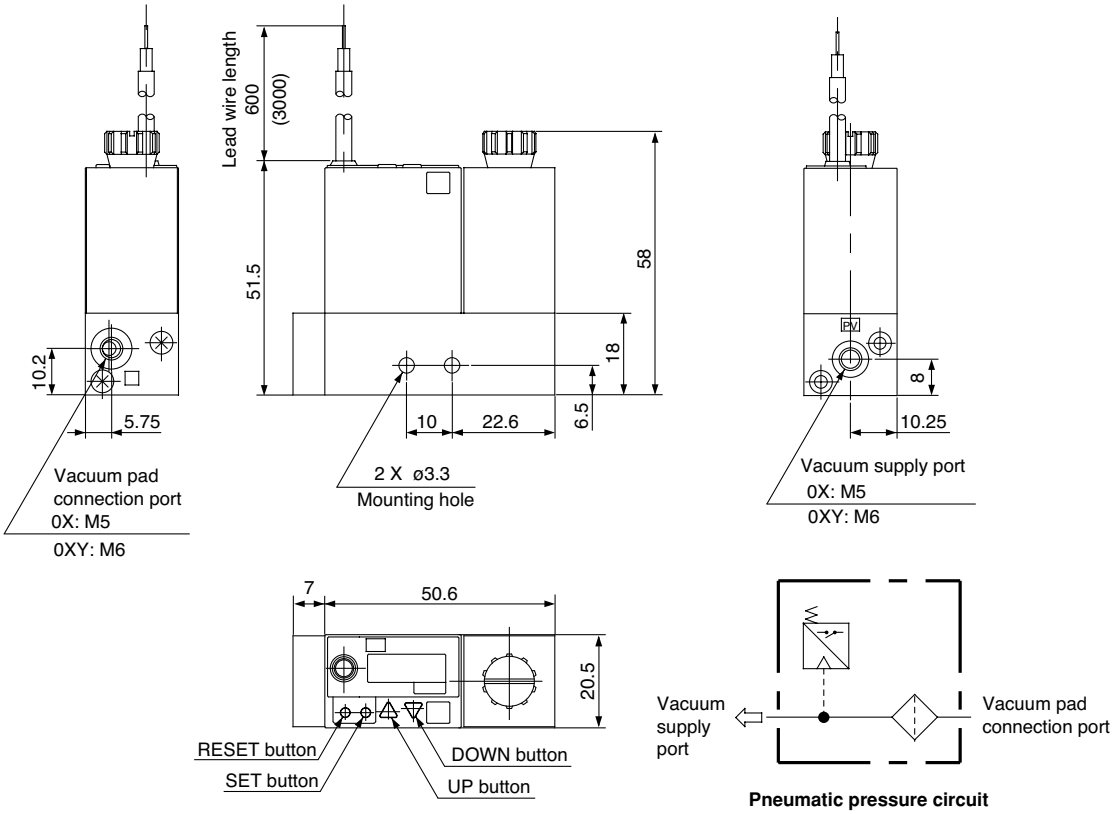
IZSE3-01/T1-□C





Grommet style

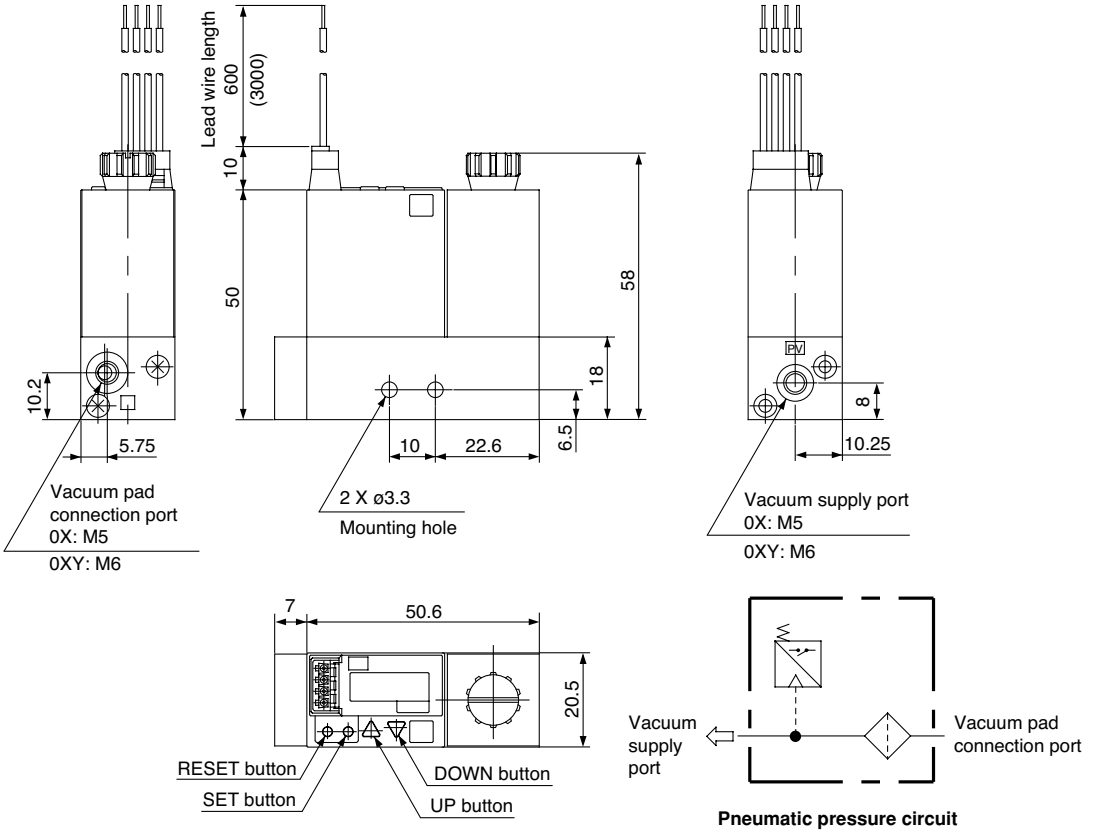
ZSE3-0X□-□



Pneumatic pressure circuit

Connector style

ZSE3-0X□-□C



Pneumatic pressure circuit