

Digital Pressure Switch Operation Manual



ZSE3/ISE3(L)

Thank you for purchasing an SMC ZSE3/ISE3(L) Series Digital Pressure Switch. Please read this manual carefully before operating the product and make sure you understand its capabilities and limitations. Please keep this manual handy for future reference.

To obtain more detailed information about operating this product, please refer to the SMC website (URL <http://www.smcworld.com>) or contact SMC directly.

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage.

These instructions indicate the level of potential hazard with the labels of "Caution", "Warning" or "Danger". They are all important notes for safety and must be followed in addition to International standards (ISO/IEC) and other safety regulations.

- Caution:** CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
- Warning:** WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
- Danger:** DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Operator

- ◆ This operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment. Only those persons are allowed to perform assembly, operation and maintenance.
- ◆ Read and understand this operation manual carefully before assembling, operating or providing maintenance to the product.

Safety Instructions

Warning

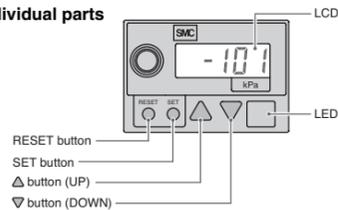
- Do not disassemble, modify (including changing the printed circuit board) or repair. An injury or failure can result.
- Do not operate the product outside of the specifications. Do not use for flammable or harmful fluids. Fire, malfunction, or damage to the product can result. Verify the specifications before use.
- Do not operate in an atmosphere containing flammable or explosive gases. Fire or an explosion can result. This product is not designed to be explosion proof.
- Do not use the product in a place where static electricity is a problem. Otherwise it can cause failure or malfunction of the system.
- If using the product in an interlocking circuit:
 - Provide a double interlocking system, for example a mechanical system
 - Check the product regularly for proper operation
 Otherwise malfunction can result, causing an accident.
- The following instructions must be followed during maintenance:
 - Turn off the power supply
 - Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance work
 Otherwise an injury can result.

Caution

- Do not touch the terminals and connectors while the power is on. Otherwise electric shock, malfunction or damage to the product can result.
- After maintenance is complete, perform appropriate functional inspections and leak tests. Stop operation if the equipment does not function properly or there is a leakage of fluid. When leakage occurs from parts other than the piping, the product might be faulty. Disconnect the power supply and stop the fluid supply. Do not apply fluid under leaking conditions. Safety cannot be assured in the case of unexpected malfunction.

Summary of Product parts

Names of individual parts

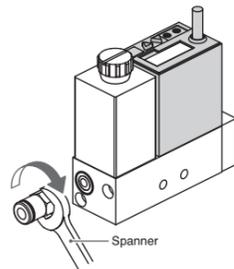


- RESET button: Resets after an error or to zero clear the display.
- SET button: Press this button to change to another mode and to set a value.
- LCD: Displays pressure value, setting mode, and error code.
- LED: The green LED is ON when output OUT1 is ON. The red LED is ON when output OUT2 is ON. When both OUT1 and OUT2 are ON, both the green and red LEDs will be ON. When an error occurs, the red LED flashes.
- ▲ button (UP): Selects the peak display mode or increases the ON/OFF set value.
- ▼ button (DOWN): Selects the bottom display mode or decreases the ON/OFF set value.

Mounting and Installation

Piping

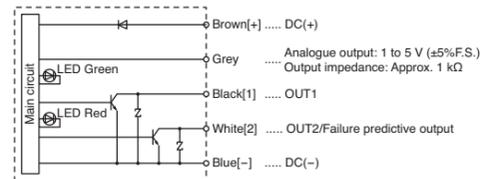
- Piping connection
 - Connect the piping to the pressure switch with a plug or fitting.
 - The tightening torque of the piping port must be 8.8 Nm or less.



Wiring

Connection

- Connections should only be made with the power supply turned off.
- Incorrect wiring will lead to digital pressure switch breakdown, failure or malfunction. So be sure to confirm the wire colour and terminal number before wiring.



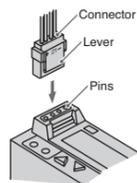
※ The symbol shown in [] indicates the pin assignment of the connector.

Refer to the product catalogue or SMC website (URL <http://www.smcworld.com>) for more information about wiring.

Connector

Connecting / Disconnecting

- When mounting the connector, insert it straight into the socket, holding the lever and connector body, and push the connector until the lever hooks into the housing, and locks.
- When removing the connector, press down the lever to release the hook from the housing and pull the connector straight out.



Pressure Setting

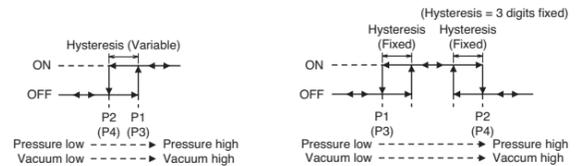
2-output type

1. **Set value input mode**
Press the "SET" button to display "P1-20" *1. The output OUT1(1) set value input mode is selected.
*1: The set value of P1 is -20
2. **OUT1(1) set value input**
Pressing the ▲ button increases the set value. Pressing the ▼ button decreases the set value. Press the "SET" button to set the value and select the output OUT1(2) set value input mode. The set value of P2 is displayed.
3. **OUT1(2) set value input**
Pressing the ▲ button increases the set value. Pressing the ▼ button decreases the set value. Press the "SET" button to set the value and select the output OUT1(1) set value input mode. The set value of P3 is displayed.
4. **OUT2(1) set value input**
Pressing the ▲ button increases the set value. Pressing the ▼ button decreases the set value. Press the "SET" button to set the value and select the output OUT2(2) set value input mode. The set value of P4 is displayed.
5. **OUT2(2) set value input**
Pressing the ▲ button increases the set value. Pressing the ▼ button decreases the set value. Press the "SET" button to set the value and exit this mode.

*: P1: Set value for OUT1(1) P2: Set value for OUT1(2)
P3: Set value for OUT2(1) P4: Set value for OUT2(2)

Output method

- Hysteresis mode (P1 ≥ P2, P3 ≥ P4) ● Window comparator mode (P1 < P2, P3 < P4)



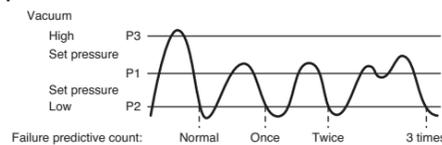
*: Hysteresis mode (same as for positive pressure use) When the value of hysteresis is set to 2 digits or less, the switching output might chatter due to fluctuation of the input pressure around its set point.
* Window comparator mode (same as for positive pressure use) since the hysteresis will be 3 digits, separate P1 from P2 (in case of 2-output type, same as for P3 and P4) by 7 digits or more.
*: 1 digit is the minimum pressure display unit.

1-output type with the failure predictive function

1. **Set value input mode**
Press the "SET" button to display "P1-50" *1. The output OUT1(1) set value input mode is selected.
*1: The set value of P1 is -50
2. **OUT1(1) set value input**
Pressing the ▲ button increases the set value. Pressing the ▼ button decreases the set value. Press the "SET" button to set the value and select the output OUT1(2) set value input mode. The set value of P2 is displayed.
3. **OUT1(2) set value input**
Pressing the ▲ button increases the set value. Pressing the ▼ button decreases the set value. Press the "SET" button to set the value and select the failure predictive pressure set value input mode. The failure predictive set value is displayed.
4. **Failure predictive pressure set value input**
Pressing the ▲ button increases the set value. Pressing the ▼ button decreases the set value. Press the "SET" button to set the value and select the failure predictive count set value input mode. The failure predictive count set value is displayed.
5. **Failure predictive count set value input**
Pressing the ▲ button increases the set value. Pressing the ▼ button decreases the set value. Press the "SET" button to set the value and exit this mode.

*: P1: Set value for OUT1(1) P2: Set value for OUT1(2)
P3: Set value for failure predictive pressure EC: Set value for failure predictive count

Failure predictive function



The failure predictive detection counter is incremented when the switch is turned on then is turned off, without the pressure (exceeding P1) not reaching the failure predictive pressure (P3).

The failure predictive detection output is energized when the set failure predictive counter (EC) is incremented consecutively. When the switch is turned ON and the pressure (exceeding P1) exceeds the failure predictive pressure (P3), the failure predictive counter is reset. (This example shows a case in the hysteresis mode.)

Other Settings

- **Peak hold mode**
Pressing the ▲ button when pressure is displayed enables the upper limit peak value (value with a high degree of vacuum) to be held. In this case, "H" is displayed on the LCD. To reset holding, press the ▲ button again.
- **Bottom hold mode**
Pressing the ▼ button when pressure is displayed enables the lower limit peak value (value with low vacuum) to be held. In this case "d" is displayed on the LCD. To reset holding, press the ▼ button again.
- **Reset function**
Pressing the RESET button causes the following
 1. Measurement mode
 - Zero clear
 - Clearing the peak hold mode or bottom hold mode
 - Clearing the failure predictive function internal counter
 - Resetting the failure predictive output
 2. Upon error occurrence
 - The data set in the setting mode is retained as is and the state when the power supply was turned on is restored (System reset is triggered).
 - In case of a data error, the setting mode is selected. When you finish setting, the state when the power supply was turned on is restored. (System reset is triggered).
 *: In the set value input mode, the reset function does not work.

Maintenance

How to reset the product after a power cut or forcible de-energizing
The setting of the product will be retained as it was before a power cut or de-energizing. The output condition is also basically recovered to that before a power cut or de-energizing, but may change depending on the operating environment. Therefore, check the safety of the whole installation before operating the product. If the installation is using accurate control, wait until the product has warmed up (approximately 20 to 30 minutes).

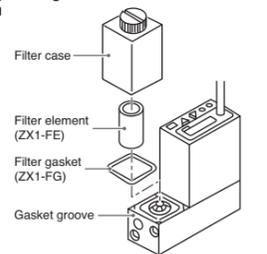
Replacement of elements

If element clogging causes deterioration of the adsorption force or slows the response time, stop operation and replace the element.

Filter element part no.: ZX1-FE

Confirm that a filter gasket is seated in the groove before reassembling the parts.

Filter gasket part no.: ZX1-FG



Filter cases

- The case is made of polycarbonate. Therefore, do not use 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 (alkalinal).
- Do not use the product in direct sunlight.

Troubleshooting

Error indication

This function is to display error location and content when a problem or an error occurs.

Error display	Error type	Troubleshooting method
E1 dE	The set data has changed unexpectedly.	Press the RESET button and set all data again.
E2 CE1	Load on OUT1 has a short-circuit or an overcurrent has occurred.	Turn off the power supply and replace the load connected to OUT1 (black wire).
E2 CE2	Load on OUT2 has a short-circuit or an overcurrent has occurred.	Turn off the power supply and replace the load connected to OUT2 (white wire).
E3 PE	Pressure exceeding 0.5 MPa has been applied. (In case of positive pressure, pressure exceeding the rated pressure has been applied.)	Reduce the pressure to 0.5 MPa or less. (In case of positive pressure, reduce the pressure to the rated pressure or less.)
E4 HP	Compared with the ambient pressure, ±0.07 MPa (in case of 1 MPa use) or ±7 kPa or more (in case of vacuum use or 100 kPa use) has been applied during zero clear.	After adjusting the pressure to the ambient pressure, perform RESET operation.

If the error can not be reset after the above measures are taken, then please contact SMC.

Refer to the SMC website (URL <http://www.smcworld.com>) for more information about troubleshooting.

Specifications Outline with Dimensions (in mm)

Refer to the product catalogue or SMC website (URL <http://www.smcworld.com>) for more information about the product specifications and outline dimensions.

SMC Corporation URL <http://www.smcworld.com>

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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