High Precision, Digital Pressure Switch

Series ZSE40/ISE40

High precision/High resolution
Vacuum pressure  1/1000 (0.1kPa)
Compound pressure  1/2000 (0.1kPa)
Positive pressure  1/1000 (0.001MPa)
Anti-chattering function

Devices such as large bore cylinders and high-flow vacuum ejectors consume a large volume of air when they operate, and this may cause a momentary drop in the primary pressure. This function prevents such momentary pressure drops from being detected as abnormal pressures by allowing the response time selection to be changed.

(settable response times: τ)
- 2.5 ms (normal), 24 ms, 192 ms or 768 ms

The normal setting is selected when shipped from the factory.

(Operating principle)
The pressure values measured within the user-selected response time are averaged, and switch output (ON/OFF) is determined by comparing this averaged pressure value with the set pressure.

With auto shift function

Allows switch output unaffected by variations in primary pressure.

Auto shift function

Erroneous operation may occur if there is fluctuation in the primary pressure. The auto shift function compensates for pressure changes to ensure proper ON/OFF switch response during such fluctuations.

(Operating principle)

At the point when the primary pressure fluctuates, the set pressure value is compensated by setting the auto shift input (external input) to low (no-voltage) input, using the pressure measured at that point as a standard.

Compound pressure (ZSE40F)

Able to detect suction pressure (vacuum pressure) and release pressure (positive pressure) with a single pressure switch.

3 types of piping

Different piping methods are possible to accommodate the installation location.

High speed response: 2.5 ms or less

With anti-chattering function

Stable switch output is possible even with sudden

With auto shift function

Allows switch output unaffected by variations in primary pressure.

Auto shift function

Erroneous operation may occur if there is fluctuation in the primary pressure. The auto shift function compensates for pressure changes to ensure proper ON/OFF switch response during such fluctuations.

(Operating principle)

At the point when the primary pressure fluctuates, the set pressure value is compensated by setting the auto shift input (external input) to low (no-voltage) input, using the pressure measured at that point as a standard.

Compound pressure (ZSE40F)

Able to detect suction pressure (vacuum pressure) and release pressure (positive pressure) with a single pressure switch.

3 types of piping

Different piping methods are possible to accommodate the installation location.

Repeatability

±0.2% F.S. ±1 digit or less

IP65 compatible

Dusttight/Splash proof type
How to Order

For positive pressure
ISE40 01 22

For vacuum/compound pressure
ZSE40 01 22

Set pressure range

<table>
<thead>
<tr>
<th>Nil</th>
<th>10.0 to –101.3 kPa For vacuum pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>–100.0 to 100.0 kPa For compound pressure</td>
</tr>
</tbody>
</table>

Set pressure range

| Nil | –0.100 to 1.000 MPa For positive pressure |

Piping specifications

01: R 1/8 (With M5 female threads)
T1: NPT 1/8 (With M5 female threads)

W1: Rc 1/8
Reverse pressure two directions
Rc 1/8
Rc 1/8

+ C4: With ø4 One-touch fitting
+ C6: With ø6 One-touch fitting
Wall mount

+ M5: M5 x 0.8 (Female threads)
Wall mount

Input/output specifications

22 NPN open collector 2 outputs + analog output
30 NPN open collector 2 outputs + auto shift input
62 PNP open collector 2 outputs + analog output
70 PNP open collector 2 outputs + auto shift input

Option

<table>
<thead>
<tr>
<th>Nil</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bracket A (ZS-24-A)</td>
</tr>
<tr>
<td>B</td>
<td>Bracket B (ZS-24-B)</td>
</tr>
<tr>
<td>E</td>
<td>Panel mount (ZS-22-A)</td>
</tr>
<tr>
<td>F</td>
<td>Panel mount + Front protective cover (ZS-24-C)</td>
</tr>
</tbody>
</table>

Note
When equipped with auto shift function, the following ranges can be set.

<table>
<thead>
<tr>
<th>Set pressure range</th>
<th>Setting range</th>
</tr>
</thead>
<tbody>
<tr>
<td>–100.0 to 100.0 kPa</td>
<td>–100.0 to 100.0 kPa</td>
</tr>
<tr>
<td>10.0 to –101.3 kPa</td>
<td>–101.3 to 101.3 kPa</td>
</tr>
<tr>
<td>–0.1 to 1,000 MPa</td>
<td>–1,000 to 1,000 MPa</td>
</tr>
</tbody>
</table>

Lead wire length

<table>
<thead>
<tr>
<th>Nil</th>
<th>0.6 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>3 m</td>
</tr>
</tbody>
</table>
### Specifications

<table>
<thead>
<tr>
<th></th>
<th>ZSE40F (Compound pressure)</th>
<th>ZSE40 (Vacuum pressure)</th>
<th>ISE40 (Positive pressure)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated pressure range</strong></td>
<td>–100.0 to 100.0 kPa</td>
<td>0.0 to –101.3 kPa</td>
<td>0.000 to 1,000 MPa</td>
</tr>
<tr>
<td><strong>Operating pressure range</strong></td>
<td>–100.0 to 100.0 kPa</td>
<td>10.0 to –101.3 kPa</td>
<td>–0.100 to 1,000 MPa</td>
</tr>
<tr>
<td><strong>Withstand pressure</strong></td>
<td>500 kPa</td>
<td>1.5 MPa</td>
<td></td>
</tr>
<tr>
<td><strong>Set pressure resolution</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kPa</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPa²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kgf/cm²</td>
<td>0.001</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>bar</td>
<td>0.001</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>psi</td>
<td>0.02</td>
<td>0.01</td>
<td>0.1</td>
</tr>
<tr>
<td>mmHg</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>inHg</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Applicable fluid</strong></td>
<td>Air, Non-corrosive/Non-flammable gas</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power supply voltage</strong></td>
<td>12 to 24 VDC ±10%, Ripple (p-p) 10% or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current consumption</strong></td>
<td>55 mA or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Switch output</strong></td>
<td>NPN or PNP 2 outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. load current</td>
<td>80 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. applied voltage</td>
<td>30 VDC (With NPN output)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual voltage</td>
<td>1 V or less (With 80 mA load current)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>±0.2% F.S. ±1 digit or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hysteresis</strong></td>
<td>Variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hysteresis mode</strong></td>
<td>Fixed (3 digits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window comparator mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response time (With anti-chattering function)</strong></td>
<td>2.5 ms or less (With anti-chattering function; 24 ms, 192 ms and 768 ms selections)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Output short circuit protection</strong></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>3 1/2 digit LED display (Sampling cycle: 5 times/sec.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display accuracy</strong></td>
<td>±2% F.S. ±1 digit or less (at ambient temperature of 25°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Indicator light</strong></td>
<td>Green LED (OUT1: Lights when ON), Red LED (OUT2: Lights when ON)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Auto shift input</strong></td>
<td>Note 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental resistance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td>IP65</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>Operating: 0 to 50°C, Stored: –10 to 60°C (No condensation or freezing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient humidity range</strong></td>
<td>Operating: 35 to 85% RH (No condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Withstand voltage</strong></td>
<td>1000 VAC for 1 min. between lead wires and body</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insulation resistance</strong></td>
<td>50 MΩ or more (at 500 VDC) between lead wires and body</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vibration resistance</strong></td>
<td>10 to 500 Hz at the smaller of amplitude 1.5 mm or acceleration 88 m/s² (10 G) in X, Y, Z directions for 2 hrs. each (De-energized)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Impact resistance</strong></td>
<td>980 m/s² (100 G) in X, Y, Z directions 3 times each (De-energized)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Temperature characteristics</strong></td>
<td>In a temperature range of 0 to 50°C, ±2% F.S. or less of pressure measured at 25°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Port size</strong></td>
<td>01: R 1/8, M5 x 0.8, T1: NPT1/8, M5 x 0.8, W1: Rc 1/8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lead wire</strong></td>
<td>5-wire oil resistant heavy-duty cord (0.15 mm²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>01/1 T types approx. 60 g, 01/1 T types approx. 62 g (Each including 0.6 mm lead wires)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1) Equipped with unit switching function (Types without the unit switching function use SI units (kPa or MPa) only.)

Note 2) For ZSE40 (F)/ISE40 (F) with “psi” indication, this is 0.03 to 0.04 psi.

Note 3) For ZSE40 (F)/ISE40 (F) with “psi” indication, zero clear is in the range of ±0.01 psi.

### Example of Internal Circuit and Wiring

#### ZSE40(F)

**ISE40□-22(L)-(M)**

With analog output

12 to 24 VDC

#### ZSE40(F)

**ISE40□-62(L)-(M)**

With analog output

12 to 24 VDC

#### ZSE40(F)

**ISE40□-30(L)-(M)**

With auto shift input

12 to 24 VDC

#### ZSE40(F)

**ISE40□-70(L)-(M)**

With auto shift input

12 to 24 VDC
Description

3 1/2-digit LED
Displays present pressure.
Displays each mode.
Displays error mode.

LED (Green)
Displays OUT1 output condition
When it is ON, the LED is illuminated.

UP button
Switching of the mode and set value

LED (Red)
Displays OUT2 output condition.
When it is ON, the LED is illuminated.

DOWN button
Switches the mode and set value.

SET button
Switches to each mode and fixes the set value.

Calibration Procedures

Setting procedure

Initial setting
Set "Output mode", "Response time" and "Auto or Manual mode".

Manual pressure setting
Enter the set value of the pressure to perform switch output.

Auto preset
Automatically sets the pressure for the adsorption confirmation or supply pressure confirmation.

Zero clear
Adjusts the zero point of the atmospheric pressure.

Manual pressure setting
Allows fine-tuning of the data set automatically by auto preset.

Key lock mode
Mode is not switched, even if the button is pressed during operation.

Normal operation
Measured pressure is displayed and the switch operation begins.
Calibration Procedures

Initial Setting

1. Initial condition mode

Press the “SET” button for more than 2 seconds until "INo" is displayed. Release it when the display turns to "INc".

Unit mode: When using a product with a unit switching function, refer to the next page for unit-setting (for overseas).

2. Selection of output mode OUT1

Select the “output mode” for OUT1 by pressing either ▲ button or ▼ button.
- "INo" Normally open mode
- "INc" Normally closed mode

3. Selection of output mode OUT2

Select the “output mode” for OUT2 by pressing either ▲ button or ▼ button.
- "INo" Normally open mode
- "INc" Normally closed mode

4. Selection of response time

Select the response time by pressing either ▲ button or ▼ button.
- "25": 2.5 ms, "24": 24 ms, "192": 192 ms, "768": 768 ms

Select among them.

5. Setting Auto/Manual

Select “Auto preset mode” or “Manual set mode” by pressing either ▲ button or ▼ button.
- "Auto" Auto preset mode
- "Manual" Manual set mode

Manual Pressure Setting

Output mode differs by the pressure set value.

1. Manual set mode

Select the manual set mode in the initial condition mode and press the “SET” button until "P", "I", or "N", "I" is displayed.

▲ button: Increases set value
▼ button: Decreases set value
Displays the set values "P", "I", or "N", "I" alternately.

2. Input set point value for OUT1 (1)

3. Input set point value for OUT1 (2)

4. Input set point value for OUT2 (1)

5. Input set point value for OUT2 (2)

6. Display of setting auto shift

▲ button: Increases set value
▼ button: Decreases set value
Displays the set values "P", "I", or "N", "I" alternately.

"P", "I", or "N", "I" alternately.

"P" Only for ZSE40(F)/ISE40-□-3070(L)-M, displays the input mode "P", "I", and the compensation value alternately.
If auto shift input is not complete, zero is displayed.

Press the “SET” button to complete the setting.

16-2-20
Prepare the equipment for use under operating conditions.

When setting OUT1 is not required, press both the /L50303 button and /L50300 button simultaneously in this state to skip to "       ".

Select the Auto preset mode in the initial setting mode and press the "SET" button until "       " is displayed.

Auto Preset (For adsorption confirmation)

1. Auto preset mode

Select the Auto preset mode in the initial setting mode and press the "SET" button until "RP 1" is displayed.

2. Preparation for auto preset

Prepare the equipment for use under operating conditions. When setting OUT1 is not required, press both the ▲ button and ▼ button simultaneously in this state to skip to "RP 2".

3. Auto preset of OUT1

Repeat adsorption and non-adsorption release several times in this state. The optimal set value is determined automatically.

4. Preparation for auto preset

Supplies vacuum pressure, changing the condition of a workpiece by adsorption nozzle, etc. When setting OUT2 is not required, press both the ▲ button and ▼ button simultaneously in this state to skip to the measurement mode.

5. Auto preset of OUT2

Repeat adsorption and non-adsorption several times in this state. The optimum set value is determined automatically.
**Calibration Procedures**

**Auto Preset (In the case of confirming the supply pressure)**

1. **Auto preset mode**
   - Select the Auto preset mode in the initial setting mode and press the “SET” button until “AP1” is displayed.

2. **Preparation for auto preset**
   - Prepare the equipment for use under operating conditions. When setting OUT1 is not required, press both the ▲ button and ▼ button simultaneously in this state to skip to “AP2”.

3. **Auto preset of OUT1**
   - The pressure is read and the optimal set value is determined automatically.

4. **Preparation for auto preset**
   - Prepare the equipment for use under operating conditions of OUT2. When setting OUT2 is not required, press both the ▲ button and ▼ button simultaneously in this state to skip to the measurement mode.

5. **Auto preset of OUT2**
   - The pressure is read and the optimal set value is determined automatically.

**Other Functions**

- **Key lock mode**
  - Used to avoid a malfunction when buttons on the front part of the switch are pressed.

  **Initiate key lock**
  - Press the “SET” button for 4 seconds or longer. Release it when the display turns to “UnL”.

  **Release key lock**
  - Press the “SET” button for 4 seconds or longer. Release it when the display turns to “Loc”.

- **Peak mode**
  - Allows holding of the maximum pressure value on display under measurement.

  While displayed, pressing the ▲ button for 1 second or longer causes the peak mode to display and blink. Pressing the ▲ button once again for 1 second or longer reinitiates it. (Note: Displaying the peak and the bottom display is not distinguished.)

- **Bottom mode**
  - Allows holding of the minimum pressure value on display under measurement.

  While displayed, pressing the ▼ button for 1 second or longer causes the bottom mode to display and blink. Pressing the ▼ button once again for 1 second or longer reinitiates it. (Note: Displaying the peak and the bottom display is not distinguished.)

- **Zero clear**
  - Allows an adjust to zero on the display if the pressure to be measured is within a range of ±70 digits from the atmospheric pressure.

  Pressing the ▲ + ▼ buttons simultaneously with the supply pressure released to the atmosphere, causes it to reset to zero on the display and completes the zero clear operation. The function then returns to the measurement mode.
High Precision, Digital Pressure Switch  Series ZSE40/ISE40

Dimensions

ZSE40(F)/ISE40-01

- Atmospheric release port
- Lead wire length
- Width across flats
- For splash proof use (IP65), insert an air tube into the atmospheric release port.
  (Refer to “Precautions” on page 16-2-24 for details.)

ZSE40(F)/ISE40-W1

- Atmospheric release port
- 2-M4 x 0.7 thread depth 4
- For splash proof use (IP65), insert an air tube into the atmospheric release port.
  (Refer to “Precautions” on page 16-2-24 for details.)
**Caution**

1. Immediately after supplying power, there is drift of about ±0.5% F.S. When used with very low pressure, allow the unit to warm up for about 20 to 30 minutes.
2. Do not use in locations where there is splashing or spraying of oils and solvents.
3. When using a commercially available switching regulator, be sure to ground the FG terminal.
4. In locations where the switch is exposed to water and dust, etc., these may enter the switch from the atmospheric release port. Insert ø4 tubing (inside diameter ø2.5) into the atmospheric release port, and extend the other end to a safe area where water, etc., is not splashed or sprayed. Be sure that tubing is not bent and holes are not blocked, etc., or it will become impossible to make correct pressure measurements.

* For splash proof use (IP65), insert an air tube into the atmospheric release port. (Refer to “Precautions” for details.)

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**Precautions**
These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠️ Caution : Operator error could result in injury or equipment damage.

⚠️ Warning : Operator error could result in serious injury or loss of life.

⚠️ Danger : in extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.
Note 2) JIS B 8370: General Rules for Pneumatic Equipment

⚠️ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.
   Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.
   Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.
   1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
   2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
   3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:
   1. Conditions and environments beyond the given specifications, or if product is used outdoors.
   2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
   3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.
Common Precautions
Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Selection

⚠️ Warning
1. Confirm the specifications.
   Products represented in this catalog are designed for use in compressed air applications only (including vacuum), unless otherwise indicated.
   Do not use the product outside their design parameters.
   Please contact SMC when using the products in applications other than compressed air (including vacuum).

⚠️ Warning
1. Instruction manual
   Install the products and operate them only after reading the instruction manual carefully and understanding its contents.
   Also keep the manual where it can be referred to as necessary.
2. Securing the space for maintenance
   When installing the products, please allow access for maintenance.
3. Tightening torque
   When installing the products, please follow the listed torque specifications.

Mounting

⚠️ Warning
1. Instruction manual
   Install the products and operate them only after reading the instruction manual carefully and understanding its contents.
   Also keep the manual where it can be referred to as necessary.
2. Securing the space for maintenance
   When installing the products, please allow access for maintenance.
3. Tightening torque
   When installing the products, please follow the listed torque specifications.

Piping

⚠️ Caution
1. Before piping
   Make sure that all debris, cutting oil, dust, etc, are removed from the piping.
2. Wrapping of pipe tape
   When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping. Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

Air Supply

⚠️ Warning
1. Operating fluid
   Please consult with SMC when using the product in applications other than compressed air (including vacuum).
   Regarding products for general fluid, please ask SMC about applicable fluids.
2. Install an air dryer, aftercooler, etc.
   Excessive condensate in a compressed air system may cause valves and other pneumatic equipment to malfunction.
   Installation of an air dryer, after cooler etc. is recommended.
3. Drain flushing
   If condensate in the drain bowl is not emptied on a regular basis, the bowl will over flow and allow the condensate to enter the compressed air lines.
   If the drain bowl is difficult to check and remove, it is recommended that a drain bowl with the auto-drain option be installed.
   For compressed air quality, refer to “Air Preparation Equipment” catalog.

4. Use clean air
   If the compressed air supply is contaminated with chemicals, synthetic materials, corrosive gas, etc., it may lead to break down or malfunction.

Operating Environment

⚠️ Warning
1. Do not use in environments where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
2. Do not expose the product to direct sunlight for an extended period of time.
3. Do not use in a place subject to heavy vibrations and/or shocks.
4. Do not mount the product in locations where it is exposed to radiant heat.

Maintenance

⚠️ Warning
1. Maintenance procedures are outlined in the operation manual.
   Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.
2. Maintenance work
   If handled improperly, compressed air can be dangerous.
   Assembly, handling and repair of pneumatic systems should be performed by qualified personnel only.
3. Drain flushing
   Remove drainage from air filters regularly. (Refer to the specifications.)
4. Shut-down before maintenance
   Before attempting any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.
5. Start-up after maintenance and inspection
   Apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.
6. Do not make any modifications to be product.
   Do not take the product apart.

⚠️ Common Precautions
Be sure to read before handling.
For detailed precautions on every series, refer to main text.

⚠️ Warning
1. Before piping
   Make sure that all debris, cutting oil, dust, etc, are removed from the piping.
2. Wrapping of pipe tape
   When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping. Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

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1. Operating fluid
   Please consult with SMC when using the product in applications other than compressed air (including vacuum).
   Regarding products for general fluid, please ask SMC about applicable fluids.
2. Install an air dryer, aftercooler, etc.
   Excessive condensate in a compressed air system may cause valves and other pneumatic equipment to malfunction.
   Installation of an air dryer, after cooler etc. is recommended.
3. Drain flushing
   If condensate in the drain bowl is not emptied on a regular basis, the bowl will over flow and allow the condensate to enter the compressed air lines.
   If the drain bowl is difficult to check and remove, it is recommended that a drain bowl with the auto-drain option be installed.
   For compressed air quality, refer to “Air Preparation Equipment” catalog.

4. Use clean air
   If the compressed air supply is contaminated with chemicals, synthetic materials, corrosive gas, etc., it may lead to break down or malfunction.

⚠️ Warning
1. Do not use in environments where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
2. Do not expose the product to direct sunlight for an extended period of time.
3. Do not use in a place subject to heavy vibrations and/or shocks.
4. Do not mount the product in locations where it is exposed to radiant heat.

⚠️ Warning
1. Maintenance procedures are outlined in the operation manual.
   Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.
2. Maintenance work
   If handled improperly, compressed air can be dangerous.
   Assembly, handling and repair of pneumatic systems should be performed by qualified personnel only.
3. Drain flushing
   Remove drainage from air filters regularly. (Refer to the specifications.)
4. Shut-down before maintenance
   Before attempting any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.
5. Start-up after maintenance and inspection
   Apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.
6. Do not make any modifications to be product.
   Do not take the product apart.
Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers' expectations while also considering company's contribution in society.

Quality management system
ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.

Environmental management system
ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.
SMC products complying with EN/ISO, CSA/UL standards are supporting the CE mark.

The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied. It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU. Once "A manufacturer himself" declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

**CE Mark**
SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guidelines.

**As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation**
Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

**EC Directives and Pneumatic Components**

- **Machinery Directive**
The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

- **Electromagnetic Compatibility (EMC) Directive**
The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

- **Low Voltage Directive**
This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

- **Simple Pressure Vessels Directive**
This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.
national Standards

you to comply with EC directives and CSA/UL standards.

- **CSA Standards & UL Standards**
  UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.
  Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

- **TSSA (MCCR) Registration Products**
  TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch fall into the scope of TSSA regulation.

**Products conforming to CE Standard**

With CE symbol for simple visual recognition

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

http://www.smcworld.com
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SMC's Global Service Network

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