



Installation & Maintenance Manual
Digital Pressure Switch
Series ZSE40A/ZSE40AF/ISE40A



Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

| | |
|----------------|--|
| 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. |

This product is class A equipment that is intended for use in an industrial environment.

There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

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.**
Otherwise an injury can be caused.

Safety Instructions (Continued)

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.

NOTE

- The direct current power supply to be used should be UL approved as follows:
Circuit (of Class2) which is of maximum 30 Vrms (42.4 V peak) or less, with UL1310 Class2 power supply unit or UL1585 Class2 transformer.
- The Pressure switch is a approved product only if it has a mark on the body.

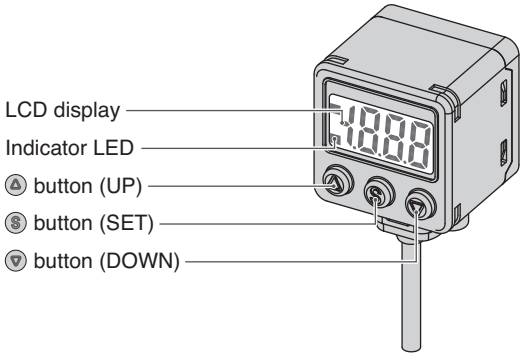
Model Indication and How to Order

Refer to the operation manual or catalogue on the SMC website (URL <http://www.smcworld.com>).

Summary of Product parts

Indicator LED (Orange LED): Displays the switch output condition.
LCD display: Displays the current status of pressure, setting mode and error code.
Four display modes can be selected: display always in red or green, or display changing from green to red, or red to green, according to the output status.

- ⬆ button (UP): Selects the mode or increases the ON/OFF set value.
Press this button to change to the peak display mode.
- ⬇ button (DOWN): Selects the mode or decreases the ON/OFF set value.
Press this button to change to the bottom display mode.
- Ⓢ button (SET): Press this button to change to either mode and to set a value.



Installation

Mounting

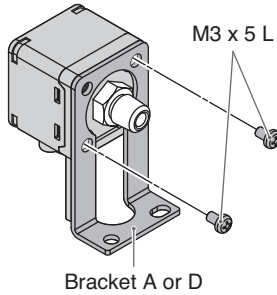
- Mount the optional bracket and panel mount adapter to the Pressure switch.
- When the Pressure switch is to be mounted in a place where water and dust splashes occur, insert a tube (O.D ϕ 4 mm, I.D ϕ 2.5 mm) into the atmospheric vent port of the Pressure switch. (Refer to "Tube attachment")

Mounting with bracket

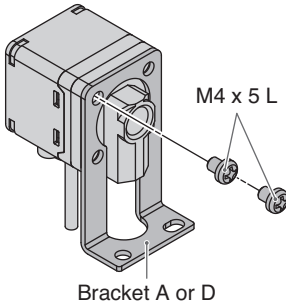
- Fix the bracket to the Pressure switch with the set screws M3 x 5 L (2 pcs.) or M4 x 5 L (2 pcs.) supplied.
- The required tightening torque is 0.5 to 0.7 Nm for the M3 set screws and 1.4 to 1.6 Nm for the M4 set screws.

Bracket A or D (Model: ZS-24-A/ZS-24-D)

[01/N01 type]

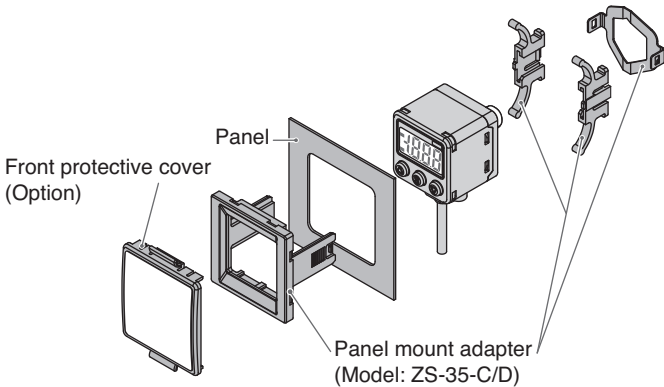


[W1/WF1 type]



Mounting with panel mount adapter

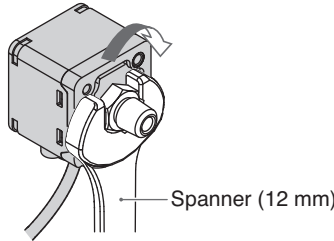
- Panel mount adapter (Model: ZS-35-C/ZS-35-D)
- Panel mount adapter + Front protective cover (Model: ZS-35-F/ZS-35-G)
- *: Products with M8 (3 pin) connector cannot be panel mounted.



Piping

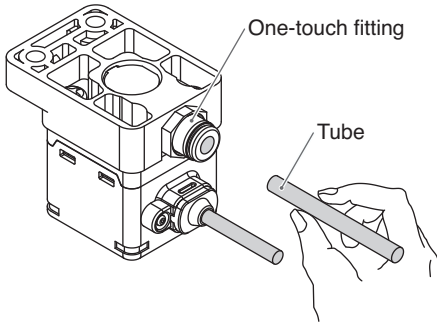
Connection using screw type piping

- Connect suitable piping to the port.
- Hold the hexagon part of the pressure port and fix. The required tightening torque is 7 to 9 Nm.
When using an M5 female fitting confirm the fitting specification.



Connection using One-touch fitting

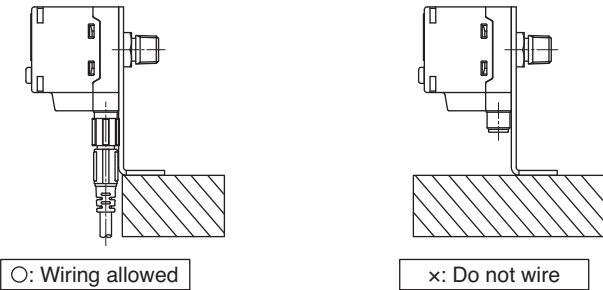
1. Cut the tube end perpendicular.
2. Hold the tube and insert it into the One-touch fitting slowly until it bottoms out.



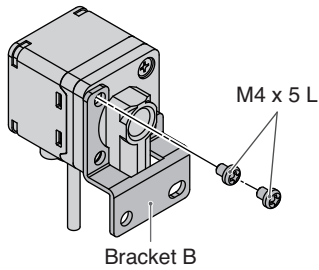
- Allow sufficient tube length to prevent twist and tensile or moment loads from being applied to the fitting or tube.
- When using a tube manufactured by a company other than SMC, check that its outside diameter tolerance satisfies the following values:
 - 1) Nylon tube: \pm 0.1 mm maximum
 - 2) Soft nylon tube: \pm 0.1 mm maximum
 - 3) Polyurethane tube: +0.15 mm/-0.2 mm maximum

Note

For products with M8 (3 pin) connector, reserve a space for the lead wire and connector.



Bracket B (Model: ZS-24-B)

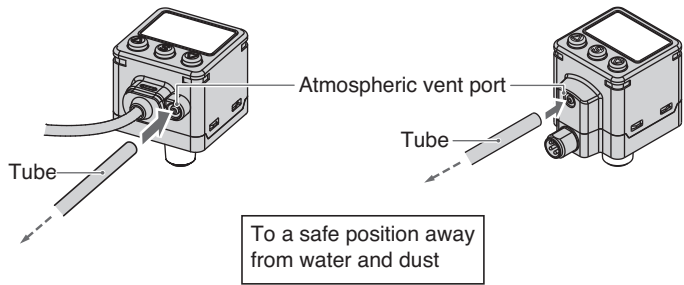


Installation (Continued)

Tube attachment

•When the Pressure switch is used in a place where water and dust splashes may occur, insert a tube into the atmospheric vent port, and route the other end of the tube to a safe place away from water and dust. refer to the figure below)

※: Insert the tube into the atmospheric vent port until it bottoms out.
※: SMC TU0425 (polyurethane, O.D φ4, I.D φ2.5) is a suitable tubing.



Internal Circuit and Wiring

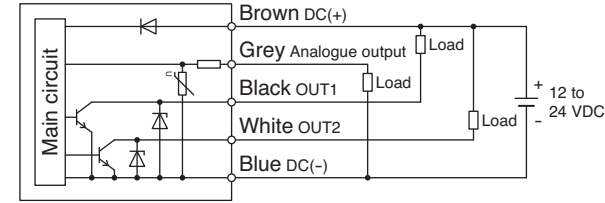
Internal circuit and wiring example

Z/ISE40A(F)-□-□-□□□

• Output specification

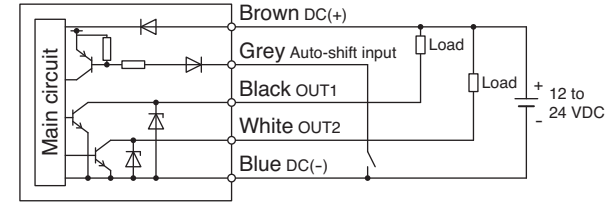
-S/-R

(Analogue output mode)
Switch output
NPN open collector output type-2 output
Max. 28 V, 80 mA
Residual voltage 1 V or less
R: Analogue output 1 to 5 V
Output impedance 1 kΩ
S: Analogue output 4 to 20 mA
Max. load impedance
Power supply voltage12 V: 300 Ω
Power supply voltage 24 V: 600 Ω
Min. load impedance 50 Ω



-S/-R

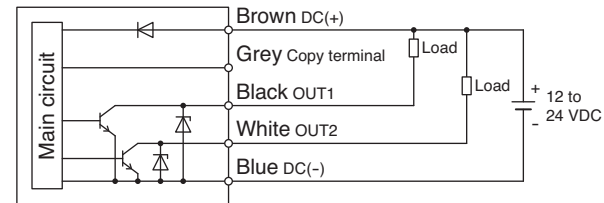
(Auto-shift input mode)
With auto-shift switch output
NPN open collector output type-2 output
Max. 28 V, 80 mA
Residual voltage 1 V or less



Internal Circuit and Wiring (Continued)

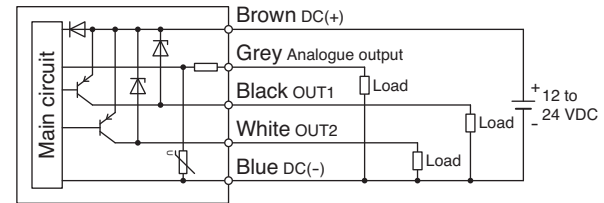
-X

(Copy function switch output)
NPN open collector output type-2 output
Max. 28 V, 80 mA
Residual voltage 1 V or less



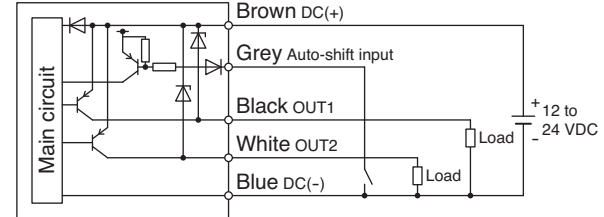
-V/-T

(Analogue output mode)
Switch output
PNP open collector output type-2 output
Max. 80 mA
Residual voltage 1 V or less
T: Analogue output 1 to 5 V
Output impedance 1 kΩ
V: Analogue output 4 to 20 mA
Max. load impedance
Power supply voltage 12 V: 300 Ω
Power supply voltage 24 V: 600 Ω
Min. load impedance 50 Ω



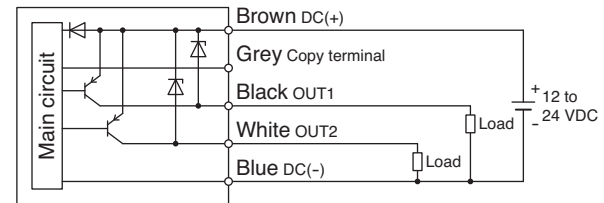
-V/-T

(Auto-shift input mode)
With auto-shift switch output
PNP open collector output type-2 output
Max. 80 mA
Residual voltage 1 V or less



-Y

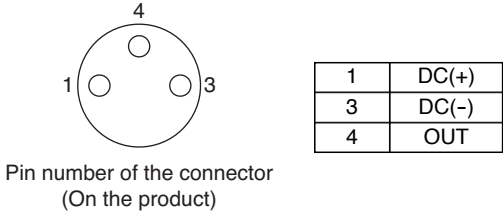
(Copy function switch output)
PNP open collector output type-2 output
Max. 28 V, 80 mA
Residual voltage 1 V or less



M8 (3 pin) connector

•Wiring of connector

•Connections should only be made with the power supply turned off.
•Tighten the connector by hand.
•Use separate routes for the pressure sensor wiring and any power or high voltage wiring. Otherwise, malfunction may result due to noise.



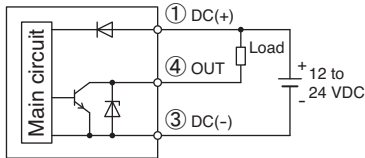
Internal circuit and wiring example

Z/ISE40A-□-□-□L□□

• Output specification

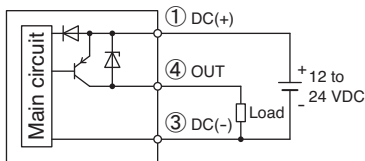
-N

NPN open collector output type
Max. 28 V, 80 mA
Residual voltage 1 V or less



-P

PNP open collector output type
Max. 80 mA
Residual voltage 1 V or less



The lead wire with M8 (3 pin) connector is available as follows.

| Part number | Cable length |
|-------------|---------------------------------------|
| V100-49-1-1 | 300 mm (with connector at one end) |
| V100-49-1-2 | 500 mm (with connector at one end) |
| V100-49-1-3 | 1000 mm (with connector at one end) |
| V100-49-1-4 | 2000 mm (with connector at one end) |
| V100-49-1-7 | 5000 mm (with connector at one end) |
| PCA-1557772 | 3000 mm (with connector at both ends) |

Setting

Pressure Setting

Setting the ON and OFF values of the Pressure switch.

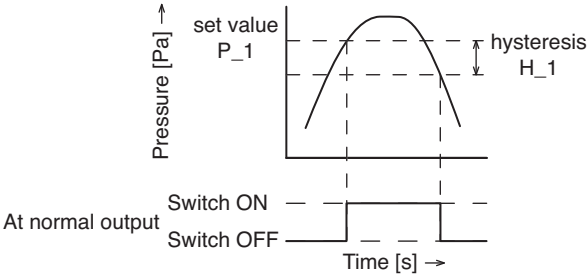
Operation

When the pressure exceeds a set value, the Pressure switch will be turned ON.

When the pressure falls below the set value by the amount of hysteresis or more, the Pressure switch will be turned OFF.

The default setting of the output set value is the central value between the atmospheric pressure and the upper limit of the rated pressure range.

If this condition, shown below, is acceptable, then keep these settings.



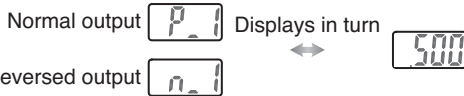
<How to operate>

•Hysteresis mode

1, Press the [P] button once in measurement mode.



2, [P_1] or [n_1] and set value are displayed in turn.



3, Press the [▲] or [▼] button to change the set value.

The [▲] button is to increase and the [▼] button is for decrease.

•Press the [▲] button once to increase by one digit, and press it continuously to keep increasing the set value.



•Press the [▼] button once to decrease by one digit, and press it continuously to keep increasing the set value.



4, Press the [P] button to finish the setting of OUT1.

For models with 2 outputs, [P_2] or [n_2] will be displayed. Set as above.

•Window comparator mode

The Pressure switch operates within a set pressure range (from P1L to P1H) during window comparator mode. Set P1L (switch lower limit) and P1H (switch upper limit) with the setting procedure above. When reversed output is selected, [n1L] and [n1H] are displayed.

Zero clear of Display

The display is reset to zero when the [▲] and [▼] buttons are pressed simultaneously for 1 second.

For the first operation, always perform zero clear with no pressure applied.

Setting (Continued)

Default setting
At the time of shipment, the following settings are provided.
If this condition is acceptable, then keep these settings.
To change setting, enter function selection mode.

•[F 0] Unit selection function

| Symbol | Model | Default setting |
|----------|-----------|-----------------|
| Nil or M | ISE40A | MPa |
| | ZSE40A(F) | kPa |
| P | ISE40A | psi |
| | ZSE40A(F) | |

•[F 1] Setting of OUT1

| Item | Description | Default setting |
|------------------|--|---|
| Output mode | Select hysteresis mode window comparator mode or OFF mode. | Hysteresis mode |
| Reversed output | Select reversed output. | Normal output |
| Pressure setting | Set the ON or OFF value of the switch output. | ISE40A: 0.500 MPa ZSE40A: -50.7 kPa ZSE40AF: 50.0 kPa |
| Hysteresis | Set the hysteresis to prevent chattering. | ISE40A: 0.050 MPa ZSE40A: 5.1 kPa ZSE40AF: 5.0 kPa |
| Display colour | Select the display colour. | ON: Green OFF: Red |

•[F 2] Setting of OUT2

Same setting as for [F 1] OUT1.
At the output mode, the error detection mode can also be selected.
The display colour is linked to the setting of OUT1, and can not be set for OUT2.

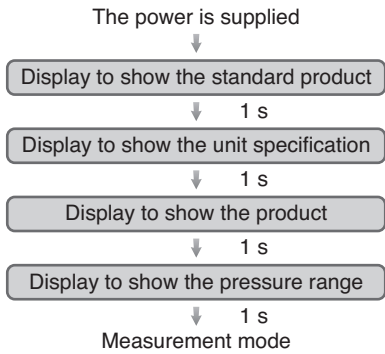
•Other parameter settings

| Item | Default setting |
|---|-----------------|
| [F 3] Response time | 2.5 ms |
| [F 4] Auto-preset function | Manual |
| [F 5] Setting of analogue output / auto-shift input | Analogue output |
| [F 6] Fine adjustment of display value | 0% |
| [F11] Display resolution | 1000-split |
| [F80] Power saving mode | OFF |
| [F81] Security code | OFF |
| [F90] Setting of all functions | OFF |
| [F97] Copy function | OFF |
| [F98] Check of output | Normal |
| [F99] Reset to the default setting | OFF |



To set each function, refer to the operation manual on SMC website
(URL <http://www.smcworld.com>).

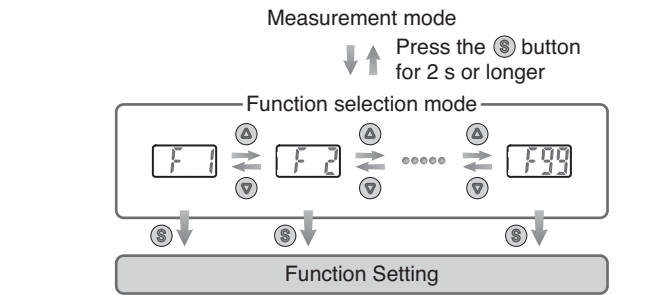
Measurement mode

The measurement mode is the condition where the pressure is detected and displayed, and the switch function is operating.
This is the basic mode, and other modes should be selected for setting changes and other function settings.



Function selection mode

In measurement mode, press the  button for 2 seconds or longer to display [F 0]. Select to display the function to be changed, [F□□]. Press the  button for 2 seconds or longer in function selection mode to return to measurement mode.



※: Some functions are not available depending on part number. All functions are displayed with [F□□] followed by the function description. If a function is not available, the function is displayed as [--].
To set each function in detail, refer to the operation manual on the website.

Other Functions

- Peak/Bottom hold value display
- Zero clear
- Key lock

To set each function, refer to the operation manual on the SMC website
(URL <http://www.smcworld.com>).





Maintenance



How to reset the product after 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 whole installation before operating the product.
If the installation is using accurate control, wait until the product has warmed up (approximately 10 to 15 minutes).

Error Indication

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

| Error Name | Error Display | Error Type | Troubleshooting Method |
|-------------------------|---|--|---|
| Over current Error |  | The switch output load current is more than 80 mA. | Turn the power off and remove the cause of the over current. Then turn the power on. |
| Residual Pressure Error |  | During zero clear operation, pressure above ±7%F.S. (±3.5%F.S. for compound pressure) has been applied. After 1 second, the mode will return to measurement mode. The zero clear range can vary ±1%F.S. with individual product differences. | Perform zero clear operation again after restoring the applied pressure to an atmospheric pressure condition. |
| Pressurizing Error |  | Pressure has exceeded the upper limit of the set pressure range. | Reset applied pressure to a level within the set pressure range. |
| |  | Pressure has exceeded the lower limit of the set pressure range. | |

| Error Name | Error Display | Error Type | Troubleshooting Method |
|------------------|---|--|---|
| Auto-shift Error |  | The measured pressure at auto-shift input exceeds the set pressure range. ※: After 1 s, measurement mode returns automatically. | Auto-shift input is invalid. Check the connected equipment and machine. |
| System Error |  | Displayed in the case of an internal data error. | Turn the power off and turn it on again. If resetting fails, an investigation by SMC Corporation will be required. |

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

Troubleshooting

Refer to the operation manual on the SMC website
(URL <http://www.smcworld.com>).

Specifications

Refer to the operation manual or catalogue on the SMC website
(URL <http://www.smcworld.com>).

Outline with Dimensions (in mm)

Refer to the operation manual or catalogue on the SMC website
(URL <http://www.smcworld.com>).

Contacts

| | | | |
|------------|-------------------|----------------|-------------------|
| AUSTRIA | (43) 2262 62280-0 | LATVIA | (371) 781 77 00 |
| BELGIUM | (32) 3 355 1464 | LITHUANIA | (370) 5 264 8126 |
| BULGARIA | (359) 2 974 4492 | NETHERLANDS | (31) 20 531 8888 |
| CZECH REP. | (420) 541 424 611 | NORWAY | (47) 67 12 90 20 |
| DENMARK | (45) 7025 2900 | POLAND | (48) 22 211 9600 |
| ESTONIA | (372) 651 0370 | PORTUGAL | (351) 21 471 1880 |
| FINLAND | (358) 207 513513 | ROMANIA | (40) 21 320 5111 |
| FRANCE | (33) 1 6476 1000 | SLOVAKIA | (421) 2 444 56725 |
| GERMANY | (49) 6103 4020 | SLOVENIA | (386) 73 885 412 |
| GREECE | (30) 210 271 7265 | SPAIN | (34) 945 184 100 |
| HUNGARY | (36) 23 511 390 | SWEDEN | (46) 8 603 1200 |
| IRELAND | (353) 1 403 9000 | SWITZERLAND | (41) 52 396 3131 |
| ITALY | (39) 02 92711 | UNITED KINGDOM | (44) 1908 563888 |

SMC Corporation

URL <http://www.smcworld.com> (Global) <http://www.smceu.com> (Europe)
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