3-Screen Display **Sensor Monitor**

PSE300AC Series

RoHS

How to Order

PSE3 0 0AC – AB – M –

Input specification

0	Voltage input
1	Current input

Output specification

AB	2 output type (NPN or PNP switching type)

Option (Power supply/Output lead wire)

Nil	Straight lead wire
L	Right angle lead wire
N	None

Unit specification

Nil	With unit selection function*1
M	SI unit only*2
P	With unit selection function (Initial value psi)*1

*1 Under the New Measurement Act, switches with a unit selection function are no longer allowed for use in Japan.
*2 Fixed unit: Pa, kPa, MPa

Options/Part Nos.

Description	Part no.	Note
Power supply/ output lead wire	ZS-31-B	Straight (5 m) 1 pc.
	ZS-31-C	Right angle (5 m) 1 pc.

* For details on the lead wire with M12 connector and the assembly type connector for connecting to the sensor, refer to page 147.

For pressure switch precautions and specific product precautions, refer to the "Operation Manual" on the SMC website. Click here for details.

Specifications

M12 Connector Type

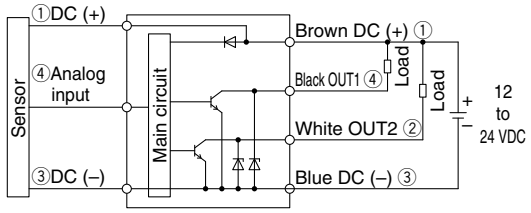
Series		PSE300AC								
Applicable SMC pressure sensor		PSE550	PSE531/PSE541 PSE561	PSE533/PSE543 PSE563/PSE573	PSE532	PSE564 PSE574	PSE530/PSE540 PSE560/PSE570	PSE575	PSE576	PSE577
Rated pressure range		0 to 2 kPa	0 to −101 kPa	−100 to 100 kPa	0 to 100 kPa	0 to 500 kPa	0 to 1 MPa	0 to 2 MPa	0 to 5 MPa	0 to 10 MPa
Display/Set pressure range		−0.2 to 2.1 kPa	10 to −105 kPa	−105 to 105 kPa	−10 to 105 kPa	−50 to 525 kPa	−0.105 to 1.05 MPa	−0.105 to 2.1 MPa	−0.1 to 5.25 MPa	−0.1 to 10.5 MPa
Display/Smallest settable increment		0.001 kPa	0.1 kPa	0.1 kPa	0.1 kPa	1 kPa	0.001 MPa	0.001 MPa	0.01 MPa	0.01 MPa
Electrical	**Power supply voltage**	12 to 24 VDC (±10%) with 10% voltage ripple or less								
	Current consumption	25 mA or less								
	Protection	Reverse connection protection								
Accuracy	**Display accuracy**	±0.5% F.S. ±Min. display unit (Ambient temperature of 25°C)								
	Repeatability	±0.1% F.S. ±Min. display unit (Ambient temperature of 25°C)								
	Temperature characteristics	±0.5% F.S. (Ambient temperature of 0 to 50°C, 25°C reference)								
Switch output	**Output type**	Select from NPN or PNP open collector output.								
	Output mode	Select from hysteresis mode, window comparator mode, error output or switch output OFF.								
	Switch operation	Select from normal output or reverse output.								
	Max. load current	20 mA								
	Max. applied voltage (NPN only)	30 VDC								
	Internal voltage drop (Residual voltage)	1 V or less (with load current of 20 mA)								
	Delay time *1	1 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)								
	Hysteresis	Variable from 0*2								
	Protection	Over current protection								
Sensor input	**Input type**	Voltage input: 1 to 5 VDC (Input impedance: 1 MΩ), Current input: 4 to 20 mA DC (Input impedance: 51 Ω)								
	Number of inputs	1 input								
	Connection method	M12-4 pin connector								
	Protection	Over voltage protection (up to a voltage of 26.4 VDC)								
Display	**Unit** *3	MPa, kPa, Pa, kgf/cm², bar, mbar, psi, inHg, mmHg, mmH₂O								
	Display type	LCD								
	Number of screens	3-screen display (Main screen, Sub screen x 2)								
	Display color	1) Main screen: Red/Green, 2) Sub screen: Orange								
	Number of display digits	1) Main screen: 4-digit (7-segment), 2) Sub screen: 4-digit (Upper 1-digit 11-segment, 7-segment for other)								
	Indicator light	Lights up when switch output is turned ON. OUT1/OUT2: Orange								
Digital filter *4		0, 10, 50, 100, 500, 1000, 5000 ms								
Environment	**Enclosure**	IP65								
	Withstand voltage	1000 VAC for 1 minute between terminals and housing								
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing								
	Operating temperature range	Operating: 0 to 50°C, Stored: −10 to 60°C (No freezing or condensation)								
	Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)								
Standards		CE (EMC directive/RoHS directive)								
Weight		55.4 g (without power supply or output lead wires)								

*1 Value without digital filter (at 0 ms)
*2 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value more than the amount of fluctuation, or chattering will occur.
*3 This setting is only available for models with the unit selection function. Only MPa, kPa, or Pa is available for models without this function.
*4 The response time indicates when the set value is 90% in relation to the step input.

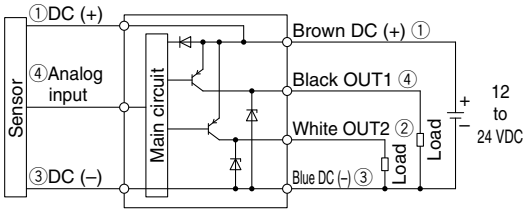
SMC

Internal Circuits and Wiring Examples

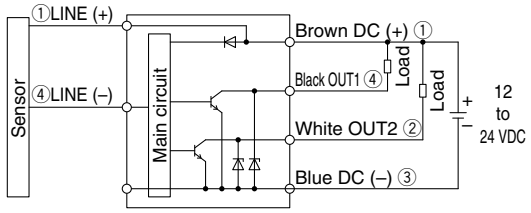
Setting of NPN open collector 2 outputs: Pressure sensor 3-wire type



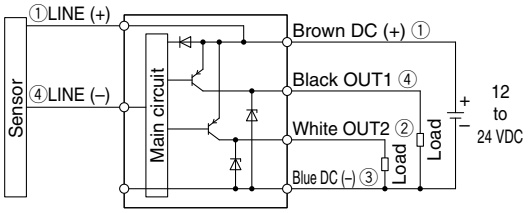
Setting of PNP open collector 2 outputs: Pressure sensor 3-wire type



Setting of NPN open collector 2 outputs: Pressure sensor 2-wire type



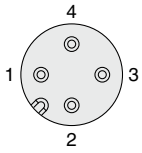
Setting of PNP open collector 2 outputs: Pressure sensor 2-wire type



* The output type can be changed in the function selection mode.
* Numbers in the figures show the connector pin layout.

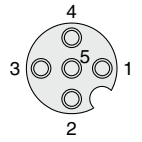
Dimensions

Power supply/Output connector pin no.

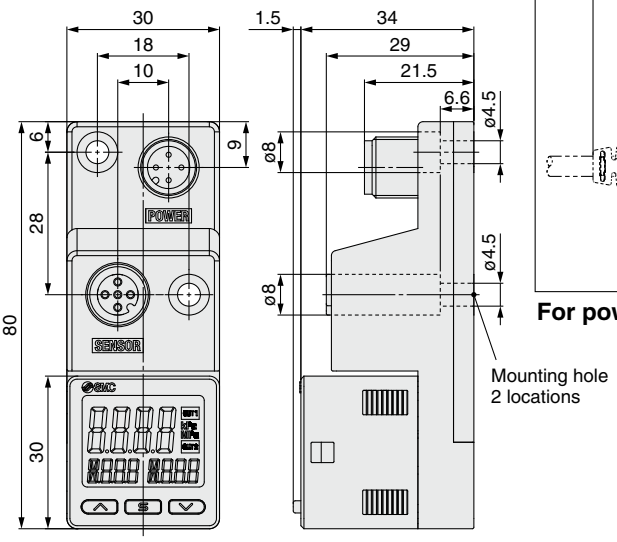


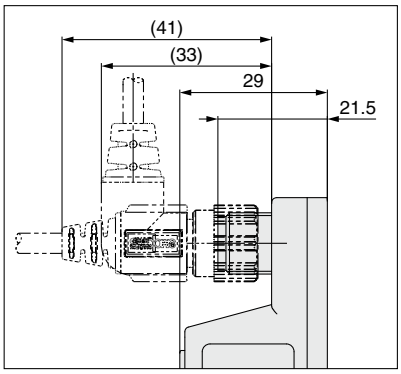
Pin no.	Description
1	DC (+)
2	OUT2
3	DC (–)
4	OUT1

Sensor connector pin no.



Pin no.	Description
1	DC (+)
2	N.C.
3	DC (–)
4	Sensor input (1 to 5 V, 4 to 20 mA)
5	N.C.

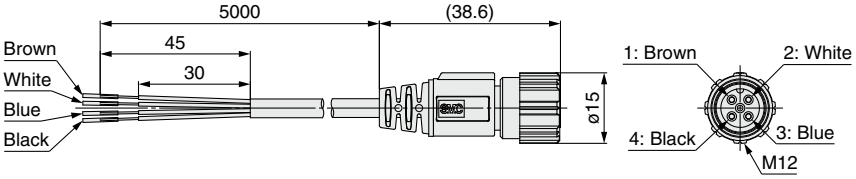




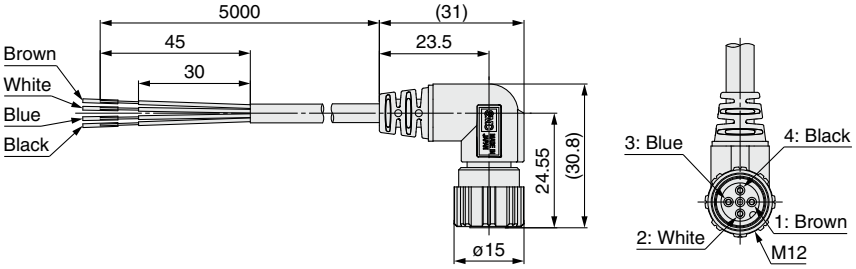
For power supply/output lead wire

Power supply/Output lead wire

ZS-31-B



ZS-31-C



Cable Specifications

Conductor	Nominal cross section	AWG23
	Outside diameter	0.72 mm
Insulator	Material	Cross-linked vinyl chloride
	Outside diameter	1.14 mm
	Number of cores	4
Sheath	Material	Oil resistant vinyl chloride
Finished outside diameter		ø4

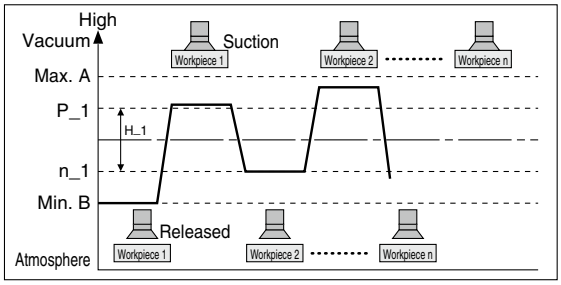
Pin no.	Lead wire color	Description
1	Brown	DC (+)
2	White	OUT2
3	Blue	DC (–)
4	Black	OUT1

Function Details

A Auto-preset function (F4)

The auto-preset function, when selected in the initial setting, calculates and stores the set value from the measured pressure. For example, if this function is used for suction verification, the optimum set value is determined automatically by repeating vacuum and break with the target workpiece several times.

Suction Verification

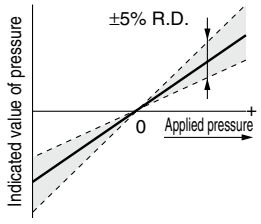


Formula for Obtaining the Set Value

P_1 or P_2	H_1 or H_2
P_1 (P_2) = A – (A-B)/4	H_1 (H_2) = |(A-B)/2|
n_1 (n_2) = B + (A-B)/4	

B Display value fine adjustment function (F6)

Fine adjustment of the indicated value of the pressure sensor can be made within the range of ±5% of the read value. (This eliminates wide variations of the indicated value.)



Note) When the display value fine adjustment function is used, the set pressure value may change ±1 digit.

C Peak/Bottom value indication function

This function constantly detects and updates the maximum (minimum) pressure when the power is supplied, and allows the holding of the maximum (minimum) pressure value.

The hold value can be maintained even if the power supply is cut. When the (S)(V) buttons are simultaneously pressed for 1 second or longer while "holding," the hold value will be reset.

D Keylock function

The keylock function prevents operation errors such as the accidental changing of setting values.

E Zero-clear function

This function clears and resets the zero value on the display of measured pressure.
The indicated value can be adjusted within ±7% F.S. of the pressure at the time of factory shipment. (±3.5% F.S. for compound pressure)

F Error indication function

This function displays error location and content when a problem or error has occurred.

Error name	Error code	Description	Action
Over current error	Er 1 oC1 / Er 2 oC2	Load current of 20 mA or more is applied to the switch output	Turn the power off and remove the cause of the over current. Then supply the power again.
Residual pressure error	Er 3 Zero	During zero-clear operation, pressure over ±7% F.S. (±3.5% F.S. for compound pressure) is present. Note that the mode is returned to measurement mode automatically 1 second later. The zero-clear range varies by ±1% F.S. due to the variation between individual products.	Use the zero-clear function again after restoring the applied pressure to atmospheric pressure.
Applied pressure error	HHH	Supply pressure exceeds the maximum set pressure	Reset the applied pressure to a level within the set pressure range.
	LLL	Supply pressure is below the minimum set pressure	
System error	Er 0 / Er 1 / Er 4 / Er 8 / Er 6 / Er 9	Internal data error	Turn off the power supply and then turn it on again. If the problem cannot be solved, please contact SMC.

If the error cannot be reset after the above measures are taken, or errors other than those above are displayed, please contact SMC.

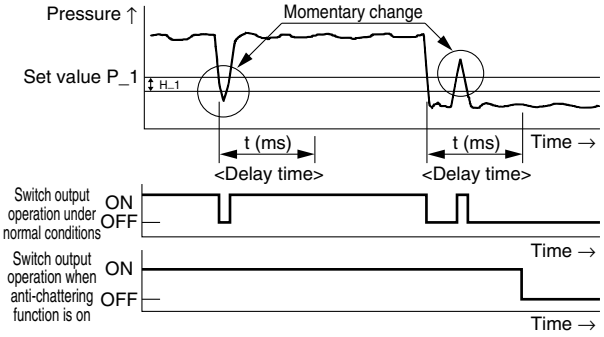
Function Details

G Anti-chattering function (Simple setting mode or F1)

A large bore cylinder or ejector consumes a large volume of air during operation and may experience a temporary drop in the supply pressure. This function prevents the detection of such temporary drops in the supply pressure as errors by changing the delay time setting.

Available delay time settings
1 ms or less, 20 ms, 100 ms, 500 ms, 1000 ms, 2000 ms, 5000 ms

<Principle>
This function averages pressure values measured during the response time set by the user and then compares the average pressure value with the pressure set point value to output the result on the switch.



H Unit selection function (F0)

Display units can be switched with this function.

Smallest settable increment \ Display unit		Rated pressure range	MPa	kPa	Pa	kgf/cm²	bar	mbar	psi	inHg	mmHg	mmH₂O
Applicable SMC pressure sensor	PSE550	0 to 2 kPa		0.001	1			0.01	0.001			0.1
	PSE531 PSE541 PSE561	0 to −101 kPa	0.001	0.1		0.001	0.001		0.01	0.1	1	
	PSE533 PSE543 PSE563 PSE573	−100 to 100 kPa	0.001	0.1		0.001	0.001		0.02	0.1	1	
	PSE532	0 to 100 kPa	0.001	0.1		0.001	0.001		0.01			
	PSE564 PSE574	0 to 500 kPa	0.001	1		0.01	0.01		0.1			
	PSE530 PSE540 PSE560 PSE570	0 to 1 MPa	0.001	1		0.01	0.01		0.1			
	PSE575	0 to 2 MPa	0.001	1		0.01	0.01		0.2			
	PSE576	0 to 5 MPa	0.01			0.1	0.1		1			
	PSE577	0 to 10 MPa	0.01			0.1	0.1		1			

∗1 The PSE5□1 (vacuum pressure), PSE5□2 (low pressure), and PSE5□3 (compound pressure) will have different setting and display resolution when the unit is set to MPa.

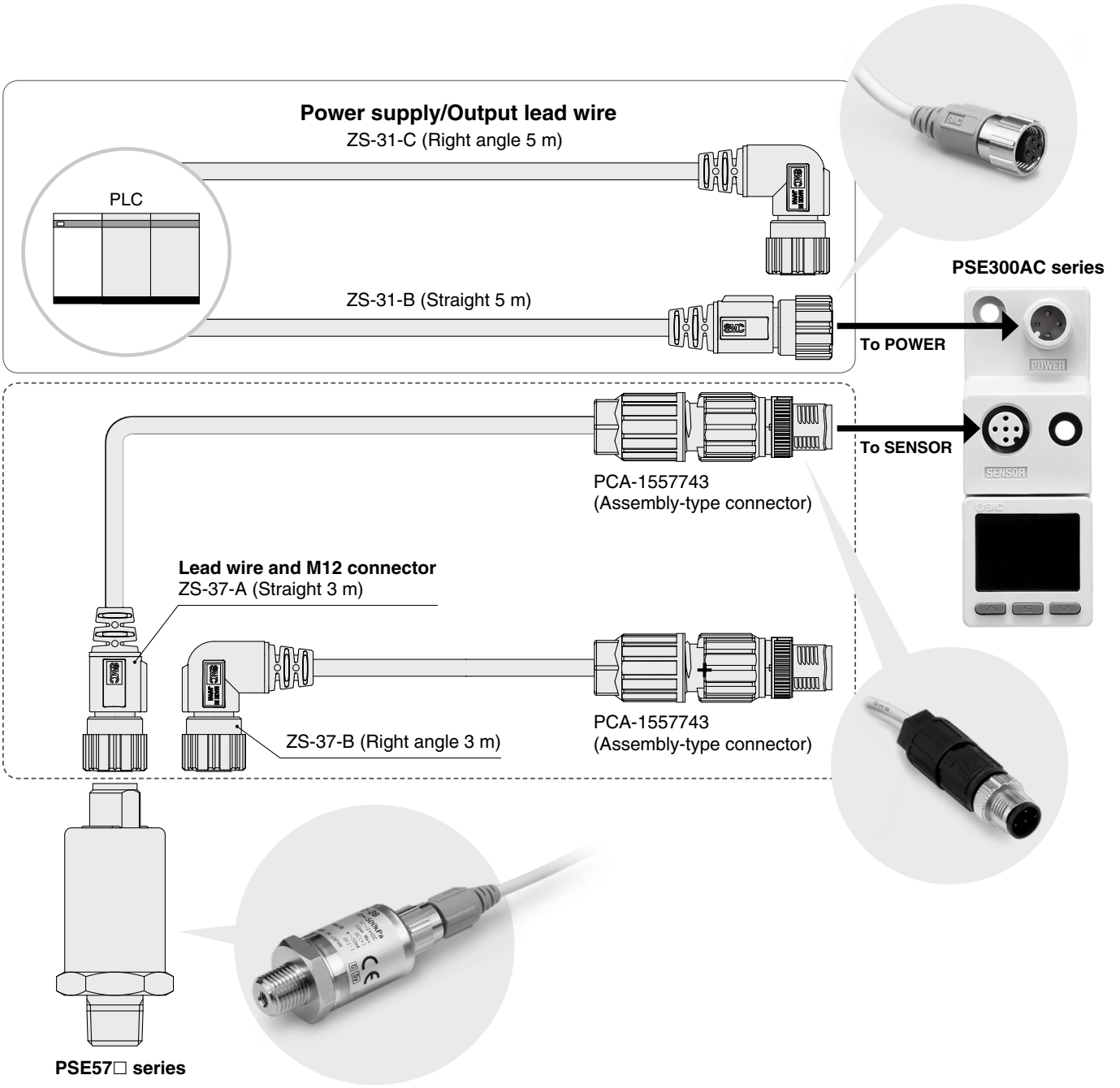
I Power-saving mode (F80)

Power-saving mode can be selected.
It shifts to power-saving mode automatically when there is no button operation for 30 seconds.
The product is set to normal mode (Power-saving mode is OFF) at the time factory shipment.
(When in power-saving mode, [ECo] will flash in the sub screen and the operation light will be ON (only when the switch is ON).)

J Setting of secret code (F81)

Users can select whether a secret code must be entered to release the key lock.
At the time of factory shipment, it is set so that a secret code is not required.

Options / Connection Examples



Lead wire and M12 connector + Assembly-type connector
Set part no.

ZS-37-A-X448	Straight 3 m	One lead wire with M12 connector and one assembly type connector are shipped together. (but not assembled)
ZS-37-B-X449	Right angle 3 m	

⚠ 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)*1), 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.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.