



Installation and Maintenance Manual

Series PSE Pressure Sensors and Remote Controller

For future reference, please keep this manual in a safe place

This manual should be read in conjunction with the current sensor catalogue

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO4414 (Note1), JIS B 8370 (Note2) and other safety practices.

Note 1: ISO 4414: Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems.
Note 2: JIS B 8370: Pneumatic system axiom.

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.

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.

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 component until safety is confirmed.

- 1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
- 2) When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
- 3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Bleed air into the system gradually to create back-pressure, i.e. incorporate a soft-start valve).

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) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, 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.

CAUTION

Ensure that the air supply system is filtered to 5 micron.

PSE510 sensor specifications (Fig 1)

Model	PSE510-□	PSE511-□	PSE512-□
Operating pressure range	0~1MPa	-101kPa~0	0~100kPa
Max operating pressure	1MPa	200kPa	
Fluid	Air/non corrosive gases		
Output specification	Analog (1~5V load impedance ≥10kΩ)		
Supply voltage	12~24VDC (ripple 10% max.)		
Current consumption	10mA or less		
Operating temperature range	0~50°C (no dewing)		
Temperature characteristic (25°C standard)	±1%F.S. or less		
Repeatability	±1.5%F.S. or less		
Dielectric strength	Between external terminals and housing 1000VAC, 50/60Hz for 1 min		
Insulation resistance	Between external terminals and housing 2MΩ (500VDC by megameter)		
Vibration resistance	10~500Hz pulse width: 1.5mm or acceleration 10G (choose the smaller vibration) to X,Y,Z direction (2 hours)		
Impact resistance	100G to X,Y,Z direction (3 times for each direction)		
Enclosure	IP40		

Process connection (Fig 1)

Model	R06	M5	01	T01
Material	Resin housing: PBT	Resin housing: PBT Fitting: SUS303	Resin housing: PBT Fitting: C3604BD (Electroless nickel plated)	Resin housing: PBT Fitting: C3604BD (Electroless nickel plated)
Lead wire	Oil proof vinyl insulation, ø2.55 0.15mm ² x3 wire 3000mm			
Port size	ø6 reducer	M5x0.8	R (PT) 1/8, M5x0.8	NPTF1/8, M5x0.8
Weight (excluding lead wire)	Approx. 7g	Approx. 10g		Approx. 12g

Installation

CAUTION

Ensure all air and power supplies are isolated before commencing installation.

WARNING

DO NOT INSTALL THESE SENSORS IN EXPLOSIVE ATMOSPHERES
If these sensors are exposed to water or oil droplets, ensure that the sensors are protected.
The front plate of the PSE100 meets IP66 rating. However, if the panel mount adapter is used and the instrument is not correctly seated water can enter.
Handle the sensor by its housing. Do not apply excessive pulling force to the cable.
PSE510. NOT FOR USE WITH CORROSIVE GASSES
PSE520. NOT FOR USE WITH CORROSIVE FLUID
PSE520. DO NOT APPLY VOLTAGE GREATER THAN 250V AC

Excessive pressure or force to the housing of the sensor may cause a change to the pressure reading or output signal.

Do not run the sensor cable together with heavy duty power cables as the 'noise interference' may cause the unit to malfunction.
PSE520. Cut the shield wire if it is not being used.

PSE100. Connect FG to ground when using switching power supply as a power source.

PSE100. Calibration data is stored on EEPROM - No loss of information due to loss of supply voltage.
Every input signal needs to be longer than 10ms to be recognised by the PSE.

Time delay for POWER ON RESET OF CONTROLLER IS 0.5 SECONDS.
Be aware that the output circuit is not active immediately after the power is connected.

Torque on terminal screws should be 5/8kgf.

When mounting the sensor use a 12mm spanner and tighten the sensor by the fitting.

DO NOT under any circumstances apply force to the resin housing to tighten the sensor.

PSE510 internal wiring circuit

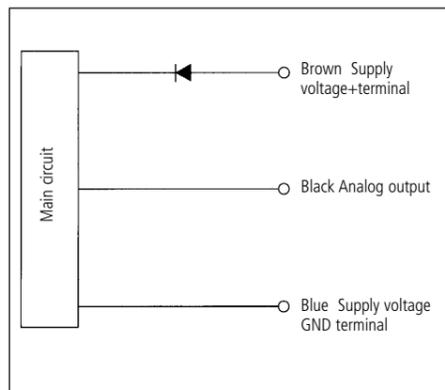


Fig 1

PSE520 internal wiring circuit

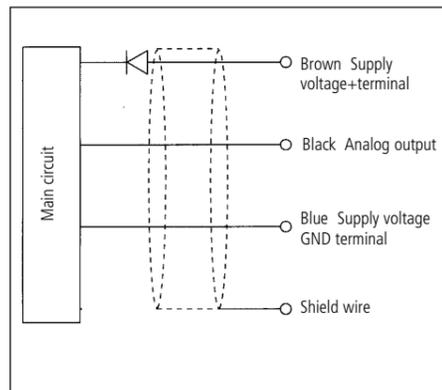


Fig 2

PSE520 sensor specifications (Fig 2)

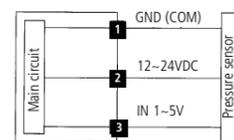
Model	PSE520-01	PSE520-02	PSE520-T01	PSE520-T02
Operating pressure range	0~1MPa			
Max. operating pressure	2MPa			
Fluid	Fluid, non corrosive to SUS304, SUS630			
Output specification	Analog (1~5V load impedance ≥10kΩ)			
Supply voltage	12~24VDC (ripple 10% max.)			
Current consumption	15mA or less			
Operating temperature range	-10~70°C (no dew or frost formation)			
Temperature characteristic (25°C standard)	±1%F.S. or less			
Repeatability	±3%F.S. or less			
Dielectric strength	Between GND terminal and housing 250VAC for 1 min			
Insulation resistance	Between external terminals and housing 100MΩ (50VDC by megameter)			
Vibration resistance	10~55Hz pulse width: 1.5mm to X,Y,Z direction (2 hours)			
Impact resistance	30G (11ms or less) to X,Y,Z direction (3 times for each direction)			
Enclosure	IP65			
Material	Housing: SUS304, Fitting: SUS304			
	Pressure sensor area: Diaphragm: SUS630			
Lead wire	Special elastic polyvinyl chloride ø6 0.34mm ² 3 wire (red, black, white) 3000mm			
Port size	R (PT) 1/8, M5x0.8	R (PT) 1/4, M5x0.8	NPTF1/8, M5x0.8	NPTF1/4, M5x0.8
Weight	Approx. 220g			

PSE100 controller specifications (Fig 3,4,5, 6)

Model	PSE100-□	PSE101-□
Output specifications	NPN open collector 30V 80mA max.	PNP open collector 80mA max.
Number of outputs	2Chx2 outputs	
Supply voltage	12~24VDC (ripple 10% max.)	
Current consumption	250mA or less	
Pressure display range	-99.9~10kPa (for vacuum), -10~100kPa (for low pressure) -0.1~1MPa (for high pressure)	
Display resolution	0.1kPa (for vacuum, low pressure), 1kPa (for high pressure)	
Display unit	kPa, mmHg, kgf/cm ² , bar, InHg	
	For vacuum pressure and low pressure	kPa, MPa, kgf/cm ² , bar
	For high pressure	
Hysteresis	Hysteresis mode: Variable Window comparator mode: Fix (2% F.S.)	
Display specifications	4 figuresx2, 7 segment LED display, sampling cycle 4 times/second	
Operating indication	Light at ON Switch output 1: Green Switch output 2: Red	
Error indication	Error display at 7 segment LED	
Self diagnostic function	Excess pressure, excess current, no sensor connection, data error (available each display function)	
Additional function	Auto preset: Possible to set adsorption confirmation by pressing button only. Auto shift: Possible to zero clear by input terminal	
Frequency response	100Hz (10ms)	
Operating pressure range	0~50°C (no dewing)	
Temperature characteristic (25°C standard)	±0.3%F.S. or less	
Repeatability	±0.5%F.S. or less	
Noise resistance	500Vp-p Pulse width 1 μs Standing 1ns	
Dielectric strength	Between external terminal and case 1000VAC, 50/60Hz for 1 min.	
Insulation resistance	Between external terminal and 2MΩ (500VDC by megameter)	
Vibration resistance	10~50Hz Width: 1.5mm or acceleration 10G (choose the smaller vibration) to X,Y,Z direction (2 hours)	
Impact resistance	100G to X,Y,Z direction (3 times for each direction)	
Enclosure	Panel mounting type: IP66 (used gasket at panel manual part only) wall mounting, DIN rail type: IP40	
Mounting	A: Panel mounting B: Wall mounting, DIN rail	
Weight	A: Approx. 90g B: Approx. 110g	
Supply voltage	Same as power supply	
Voltage input	1~5V (input impedance: 100kΩ)	
Current input	4~20mA (input impedance: 250Ω)	

PSE100 Sensor connection

Voltage input type



Current input type

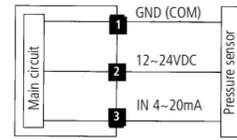


Fig 3

PSE100 Switch functions

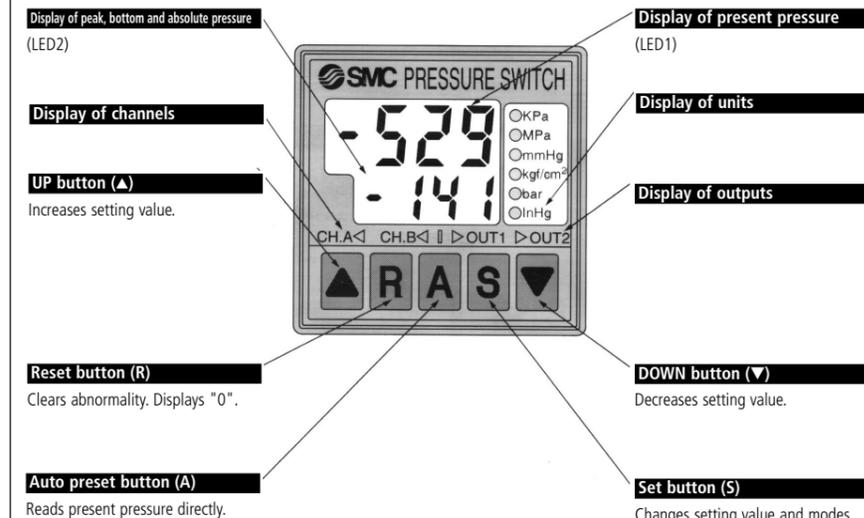


Fig 4

PSE100 connection diagram

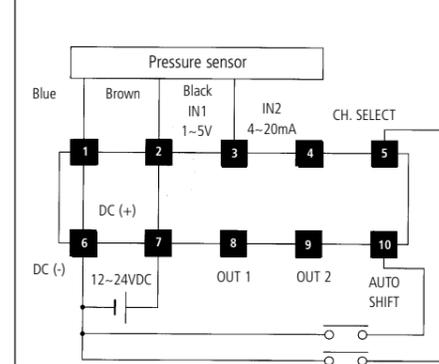
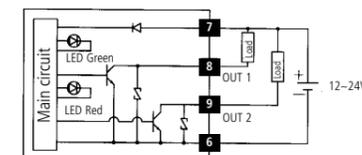


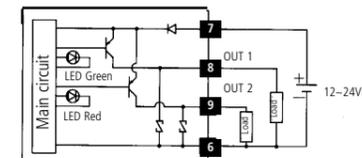
Fig 5

PSE100 Input/output circuit diagram

NPN output circuit diagram



PNP output circuit diagram



Input circuit diagram (autosift, channel selection)

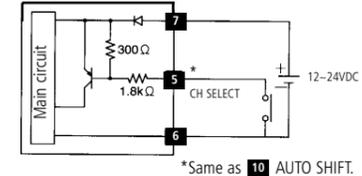


Fig 6

Fig 6 (Cont)

How to use the autosift function

Connect the autosift terminal 10 to ground 6. This forces the unit to accept a new zero point - the display will indicate "0". After disconnecting the autosift terminal from ground, the display will indicate relative pressure based on the new zero point.

Note: To invoke the autosift function the autosift terminal has to be connected to ground for at least 10 msec. LED1 will display "0" during connection to ground.

How to select channel

When CH.SELECT terminal 5 is open, channel A is selected. When it is connected with ground 6 channel B is selected.

Note: There is a 10 msec time delay from making contact and the actual selection of the channel.

PSE100 Calibration and set up (Fig 7,8,9)

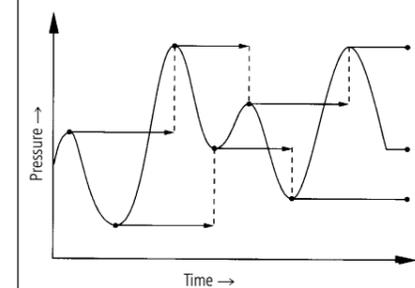
For Method of Calibration see reverse

1 Sensor types and min display unit

Display unit	kPa	MPa	mmHg	kgf/cm ²	bar	InHg
Sensor type						
PSE511 (-100kPa)	-0.1	-	-1	-0.001	-0.001	-0.1
PSE512 (100kPa)	0.1	-	1	0.001	0.001	0.1
PSE510,520 (1MPa)	1	0.001	-	0.01	0.01	-

2 LED2 display

LED2 (green) display indicates the following 3 mode options.



- 1 Peak hold mode (L2_P)
Hold the display till next peak value.
- 2 Absolute pressure display mode (L2_A)
Display based on atmospheric pressure.
- 3 Bottom hold mode (L2_b)
Hold the display till next bottom value.

Fig 7

3 Output type

One output type can be selected out of 4 types according to output modes and relation of each setting value.
Two separate outputs, OUT1 and OUT2 can be set per channel and two channels, A and B can be selected from outside.

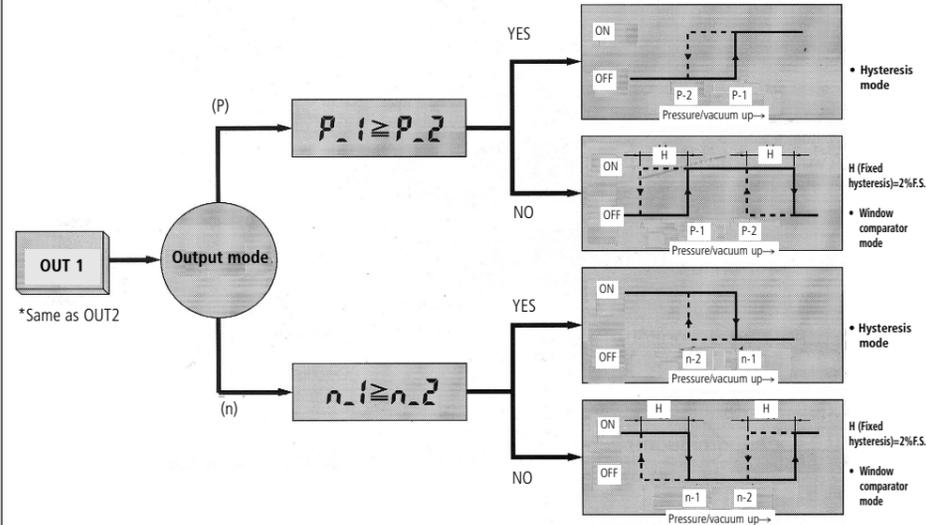
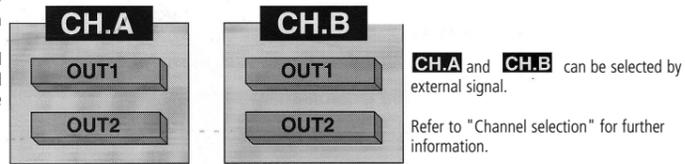


Fig 8

Procedure of Calibration

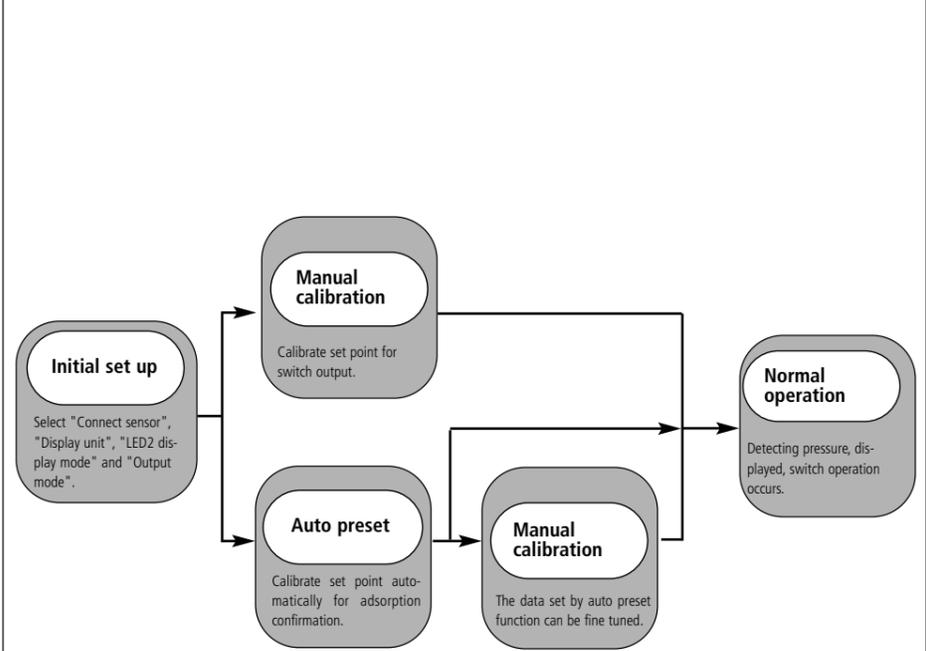


Fig 9

PSE100 Initial set up and calibration

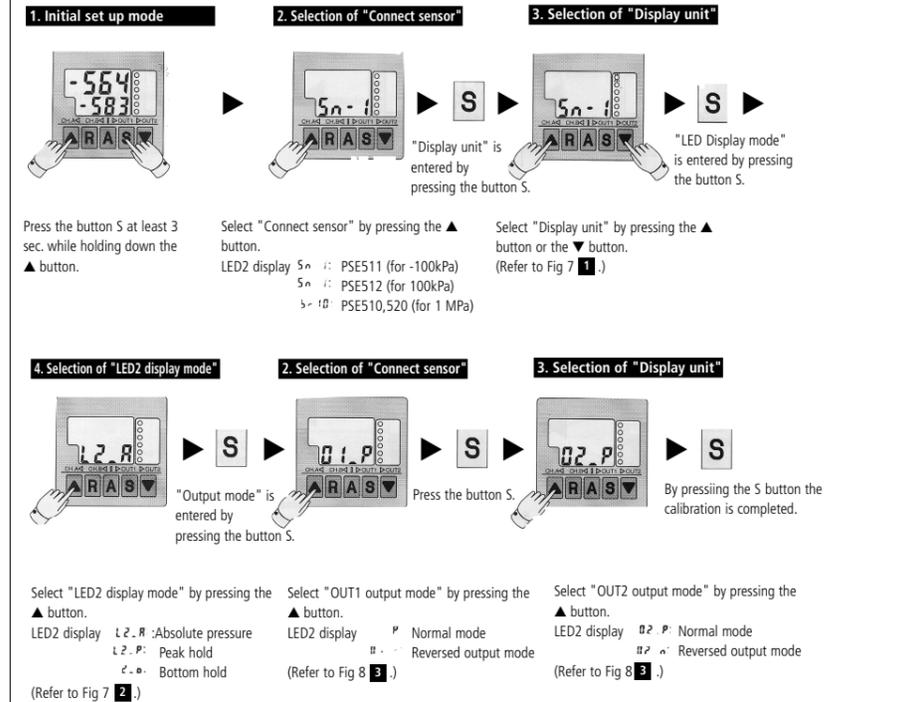


Fig 10

Manual calibration

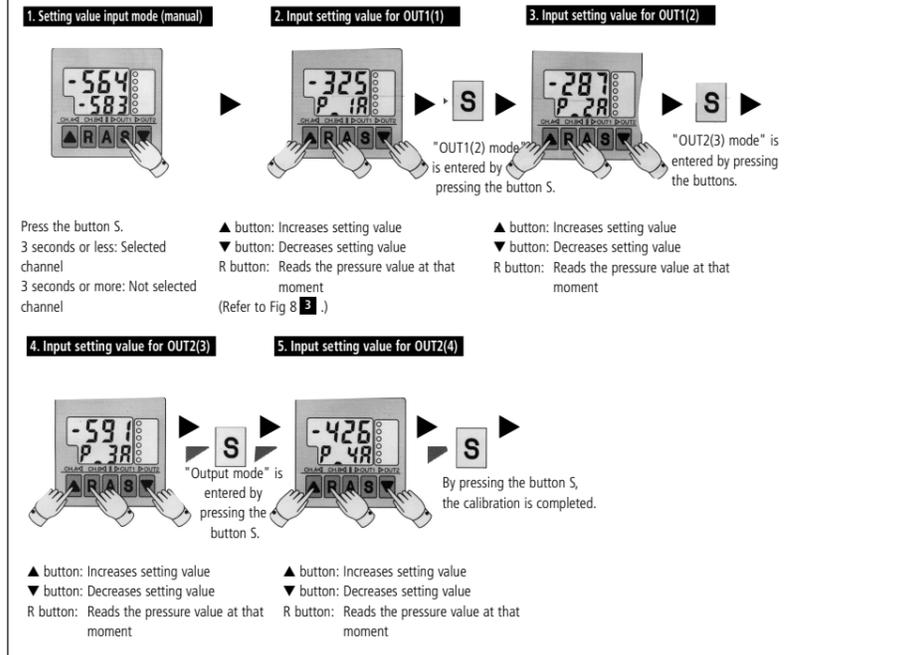


Fig 11

PSE100 Additional functions

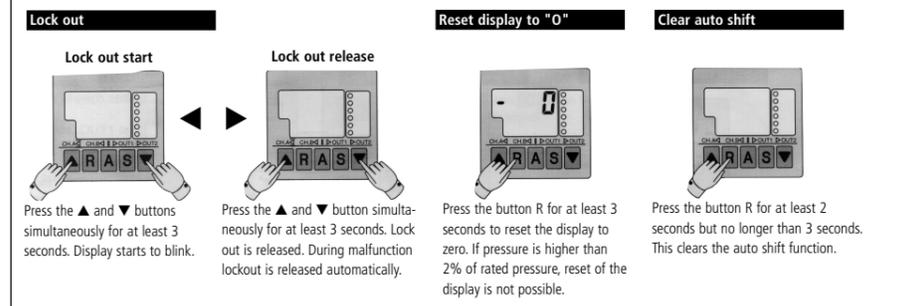


Fig 13

Auto preset

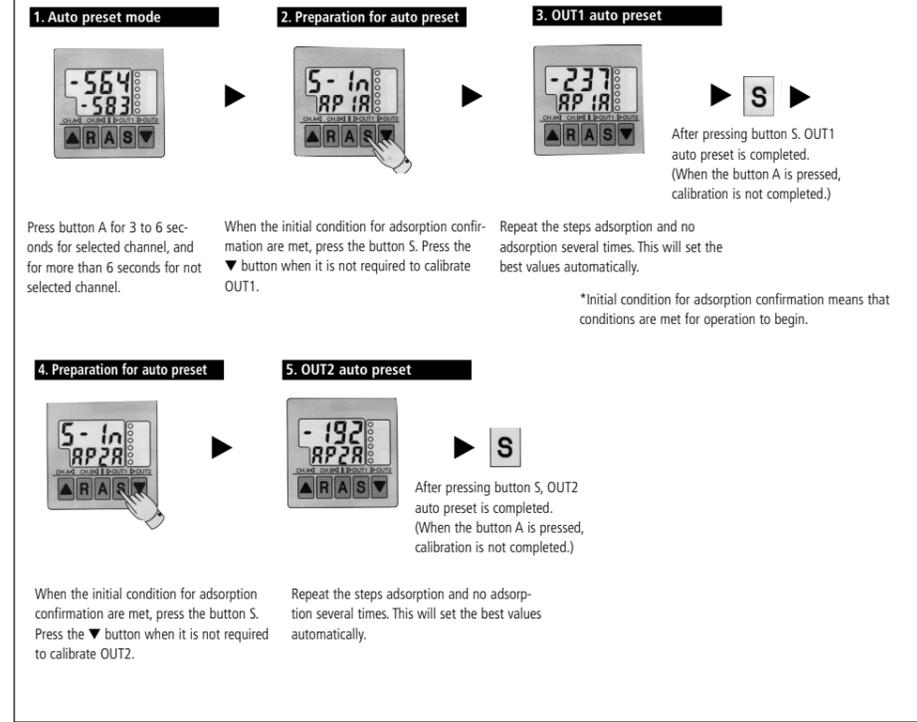


Fig 12

PSE100 Error codes

Display	Error message	Corrective action
-FFF	Sensor is not connected	Connect sensor
FFFF	Operating pressure over max. limit	Lower operating pressure
Err 1	Calibration data lost	Contact SMC
Err 2 OU-1	Current draw on Output 1 too high (>120mA)	Check load and/or wiring for Output1
Err 2 OU-2	Current draw on Output 2 too high (>120mA)	Check load and/or wiring for Output 2
Err 2 OU-R	Current draw on Output 1 and 2 is too high (>120mA)	Check load and/or wiring for Output 1 and 2
- - - -	Pressure is 2% above rated pressure during 0 clear	Apply atmospheric pressure then do 0 clear

Maintenance

Ensure air and electrical supplies are isolated before commencing any maintenance work.

When removing/replacing the PSE100 for maintenance please adhere to the following procedure.

For Panel Mounted options (as illustrated)

Panel mount

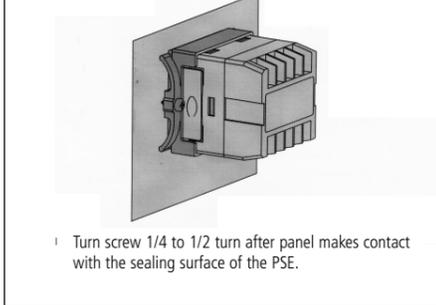


Fig 14

For DIN rail mounted options (as illustrated)

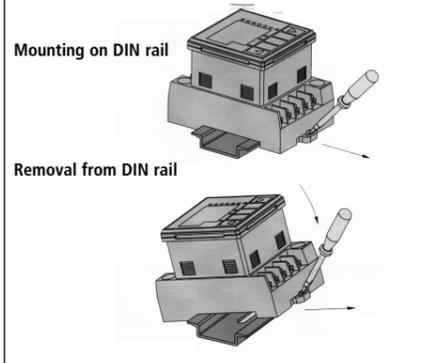


Fig 15

For additional information please contact your local SMC Office, see details below.

When you enquire about the product, please contact the following SMC Corporation:			
ENGLAND	Phone 01908-563888	GERMANY	Phone 6103-402-0
ITALY	Phone 02-92711	FRANCE	Phone 1-64-76-10-00
HOLLAND	Phone 020-6255525	SWEDEN	Phone 08-7088590
SWITZERLAND	Phone 052-34-0022	AUSTRIA	Phone 02262-62-280
SPAIN	Phone 945-290600	IRELAND	Phone 01-4501822
GREECE	Phone 01-3426076	DENMARK	Phone 8738-0800
FINLAND	Phone 358-0-6750033	NORWAY	Phone 67-13-4080
BELGIUM	Phone 03-234-14-44	POLAND	Phone 48-22-6131847
TURKEY	Phone 212-2211512		