

Vacuum switch 3-colour digital display M8

1 Manufacturer

Piab AB
P.O. Box 146
SE-18212 DANDERYD
SWEDEN

1.1 Identification Label

Each unit is identified by a label with identification information. For any communication with Piab AB or service centers always refer to the label information.

1.2 Model Numbers

Model number : P43V-04-F3-QD
Item number : 0212040

2 Safety Instructions

2.1 General Safety

**Warning !**
Vacuum force

**Warning !**
Exhaust


**Warning !**
Unrestricted exhaust

The correct use of pneumatic equipment within a system is the responsibility of the system designer or the person who determines its technical specifications.


The use of safety guards is recommended to minimize the risk of injury to persons; pay close attention to the fact that compressed air may lead to explosion of closed containers, and vacuum may lead to the implosion of closed containers.
In the event that, contrary to indications, dusts, oil mists, fumes, etc. are suctioned, these will be mixed with the discharge air of the vacuum generator and expelled via the discharge conduit; use suitable, approved air filters to avoid possible intoxications.


Ensure that the components are properly secured; regularly check that connections are in good working order, as high cycles or vibrations may cause them to loosen.

2.2 Safe Usage


**Warning !**

- Do not use compressed air pressure or electrical voltage outside the specification due to risk of ejected objects and/or damage of product and/or application failure.
- Do not install or operate your product if it is damaged during transport, handling or use. Damage may result in bursting and cause injury or property damage.
- Do not use corrosive or flammable gas or liquid with this product.
- Do not drop, hit or allow excessive shock. Even if switch body appears undamaged, internal components may be broken and can cause malfunction.
- Turn power off before connecting wiring. Wrong wiring or short circuit will damage and/or cause malfunction.
- Do not use in environment containing steam or oil vapor.
- This product is not explosion-proof rated. Do not use in atmosphere containing flammable or explosive gases.
- Wiring for pressure sensor should avoid power source line and high voltage line. If use in the same circuit, noise may cause malfunction.

Wear eye protection

Wear ear protection

■ 2.2.1 Assembly and Maintenance

**Warning !**

Compressed air may be dangerous if used by unskilled personnel. Assembling, using and maintaining the product should solely be carried out by experienced and specially trained personnel. Prior to assembly and disassembly of the components, cut off voltage and pressure and discharge residual pressure. Install and maintain the components only after thoroughly reading and understanding this manual.


■ 2.2.2 Intended Use

- For professional use only.
- The safety instructions shall be followed.
- The product is used to sense pressure in vacuum systems.
- The product shall be used in environments within the product's specifications and certifications.
- The product shall be installed in accordance to installation instructions.


■ 2.2.3 Misuse

- Do not install or use the product if it is damaged.
- Do not use compressed air pressure or electrical voltage outside the specification (operation voltage ± 10%).
- Do not use the equipment as a stand-alone unit to fulfill international lifting standards.
- Do not use compressed air pressure or electrical voltage outside the specification.

2.3 Compliance

**European Directives, CE**

Electromagnetic Compatibility (EMC)
Standard reference:
EN/(IEC) 61000-6-2:2005 EN/(IEC) 61000-6-4:2007+A1
RoHS2 Directive (2011/65/EU)

**UK Legislation, UKCA**

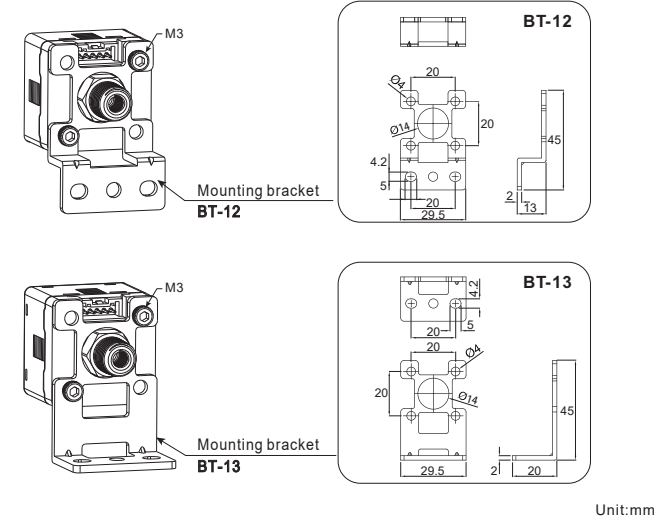
Electromagnetic Compatibility (EMC)
Standard reference:
BS EN/(IEC) 61000-6-2:2005 BS EN/(IEC) 61000-6- 4:2007+A1
UK Legislation-The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

3 Installation

3.1 Unpacking

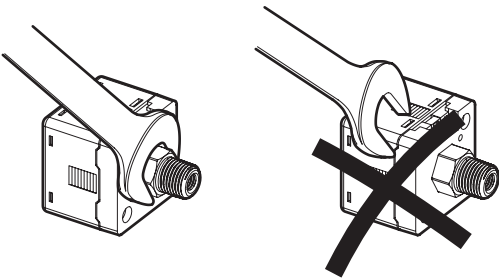
When unpacking check that the product is complete and undamaged. The manual should be stored for future reference.

3.2 Mounting



⚠ Caution !

- When mounting, always use the wrench on the metallic area near the pressure port. Never apply a wrench to the plastic body, it will damage the sensor.
- Over tightening may cause damages to the port thread, mounting bracket and pressure sensor. Under tightening may result loosen or leakage.
- Apply pressure and power after installation and make necessary adjustments and inspect any possible signs of leakage to ensure proper installation.



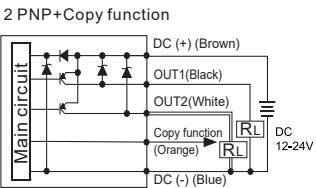
4 Specifications

4.1 Specifications

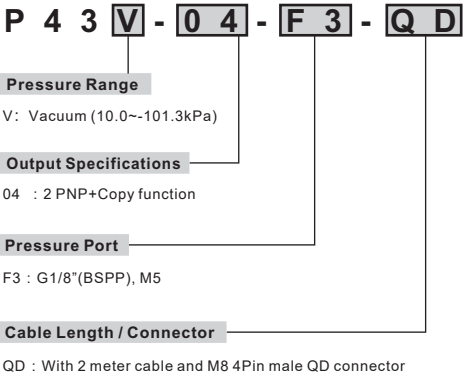
MODEL		P43V-04-F3-QD (Vacuum)
Rated pressure range		0.0 ~ -101.3 kPa
Set pressure range		10.0 ~ -101.3 kPa
Withstand pressure		300 kPa
Fluid		Filtered air, Non-corrosive / Non-flammable gas
Set pressure resolution	kPa	0.1
	kgf/cm ²	0.001
	bar	0.001
	psi	0.01
	inHg	0.1
	mmHg	1
Power supply voltage		12 to 24V DC ±10%, Ripple (P-P) 10% or less
Current consumption		≤ 40mA (With no load)
Switch output		PNP: open collector 2 outputs Max. load current: 125mA Max. supply voltage: 24V DC Residual voltage: ≤ 1.5V
Repeatability(Switch output)		±0.2% F.S. ±1 digit
Hysteresis	One point set mode	Adjustable (*1)
	Hysteresis mode	
	Window comparator mode	
Response time		≤ 2.5ms (chattering-proof function: 25ms, 100ms, 250ms, 500ms, 1000ms and 1500ms selections)
Output short circuit protection		Yes
Display		3 ½ digital, 7 segment LCD display (Red / Green / Orange) (Sampling rate : 5 times / sec.)
Indicator accuracy		±2% F.S. ±1 digit (ambient temperature: 25 ±3°C)
Switch on indicator		Orange Indicator 1 : OUT1 & Orange Indicator 2 : OUT2
Environment	Enclosure	IP 40
	Ambient temp. Range	Operation: 0 ~ 50°C, Storage:- 10 ~ 60°C (No condensation or freezing)
	Ambient humidity range	Operation/Storage: 35 ~ 85% RH (No condensation)
	Withstand voltage	1000V AC in 1-min (between case and lead wire)
	Insulation resistance	50MΩ (at 500V DC, between case and lead wire)
	Vibration	Total amplitude 1.5mm or 10G, 10Hz-55Hz-10Hz scan for 1 minute, two hours each direction of X, Y and Z
	Shock	100m/s ² (10G), 3 times each in direction of X, Y and Z
	Temperature characteristic	±2.5% F.S. of detected pressure (25°C) at temp. Range of 0~50°C
Port size		F3: G1/8" (BSPP), M5
Lead wire		Ø4 Oil-resistance cable (PVC) - 26 AWG (0.15 mm ²) - 5 cores
Weight		Approx. 80g (With 2 meter cable and M8 4Pin male QD connector)

*1.Hysteresis value is adjustable within 1 ~ 8 digits for one point set mode and window comparator mode.

4.2 Output Circuit Wiring Diagrams



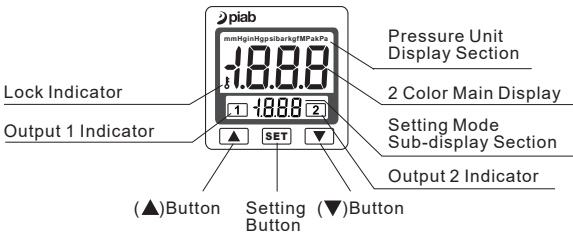
4.3 Ordering Information



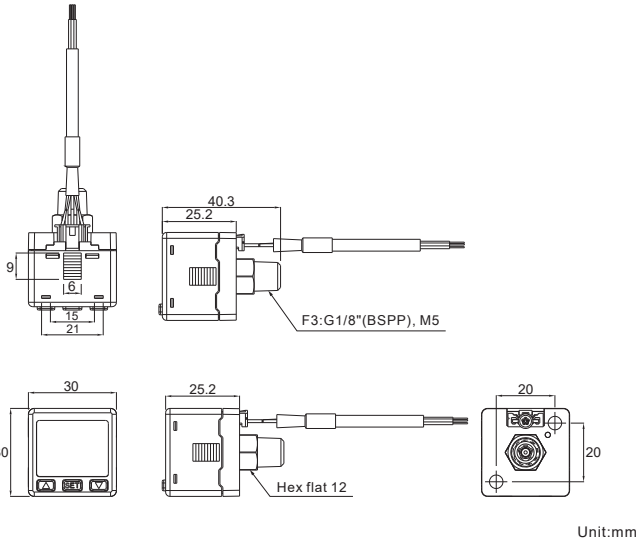
Optional Parts

BT-12 : Mounting bracket
BT-13 : Mounting bracket

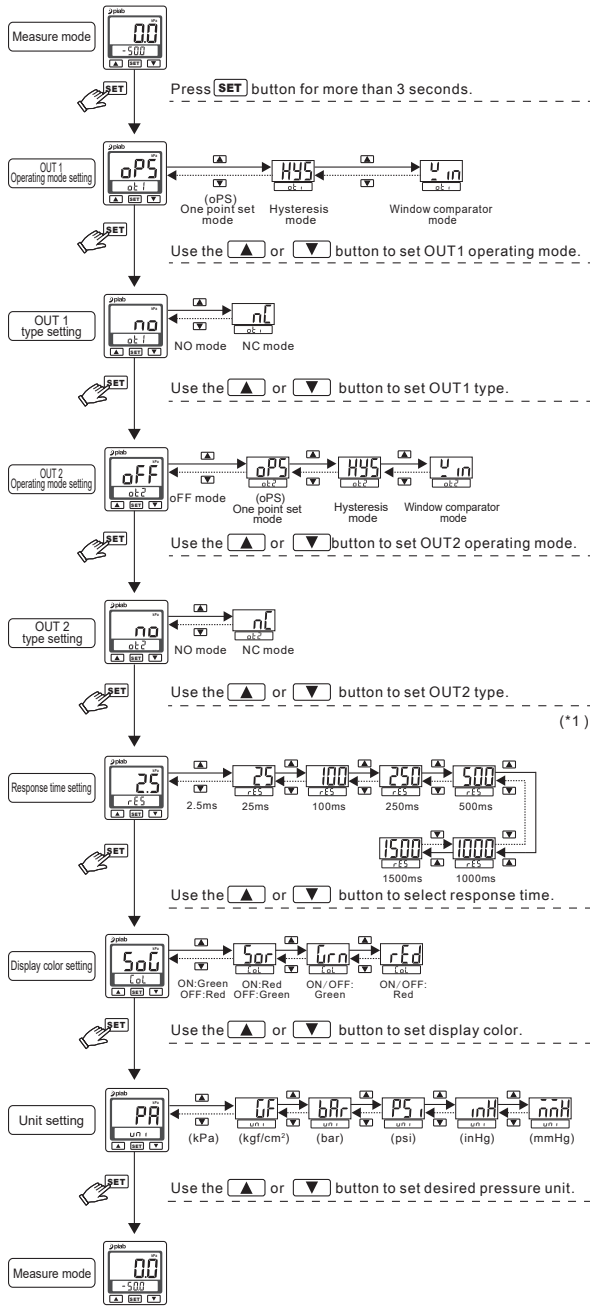
4.4 Panel Description



4.5 Dimensions



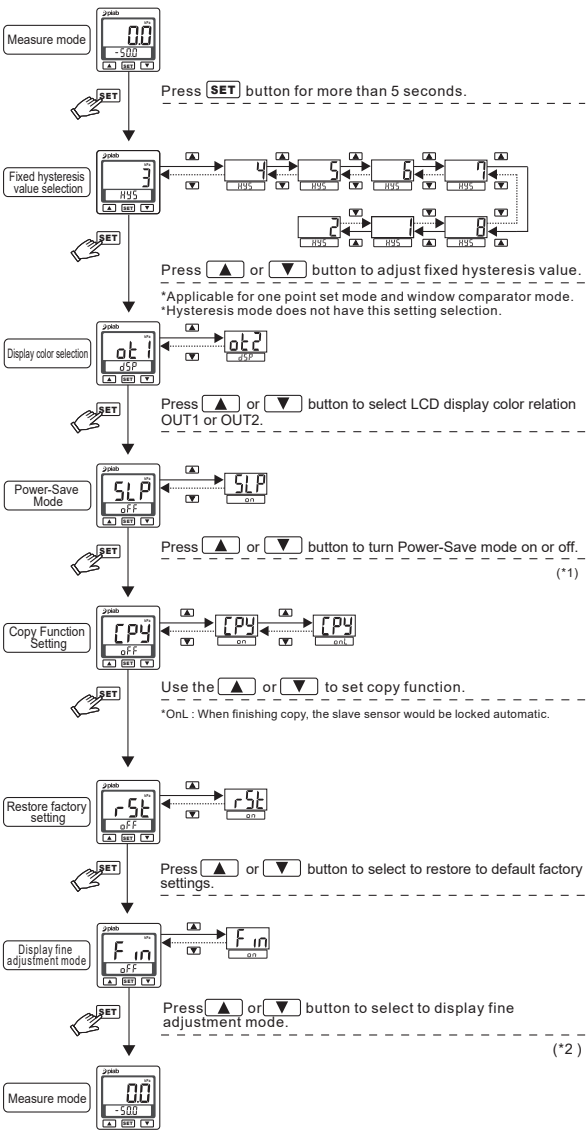
4.6 Initial Setting Mode



【 NOTE : 】

*1. This setting mode will not display when output 2 is set to oFF.

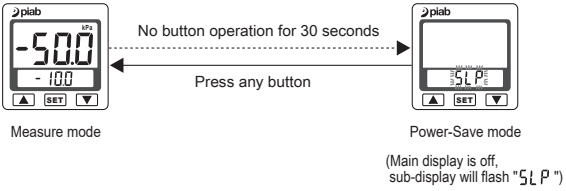
4.7 Advance Setting Mode



【NOTE :】
*1. When setting is "on", the power-save mode is active. Please refer to the item "4.8" in detailed.
*2. When setting is "on", the display fine adjustment mode is active. Please refer to the item "4.15" in detailed.

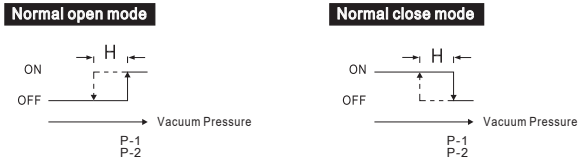
4.8 Power-Save Mode

- During Power-Save mode, the main display will turned off if no buttons is pressed after 30 seconds.
- During Power-Save mode, the output LCD may not be synchronize with the output. It is normal and will not affect output operation.
- Press any button to turn-on main display temporarily.

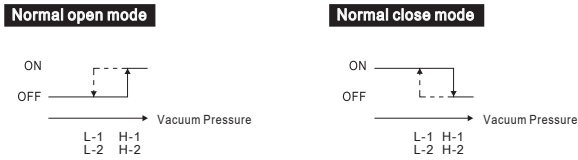


4.9 Output Type

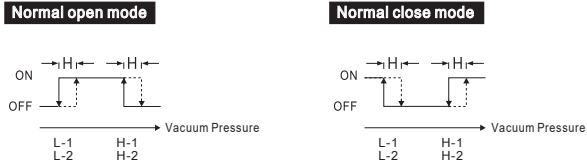
(1) One point set mode:



(2) Hysteresis mode:



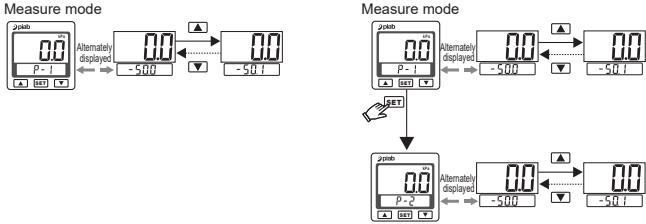
(3) Window comparator mode:



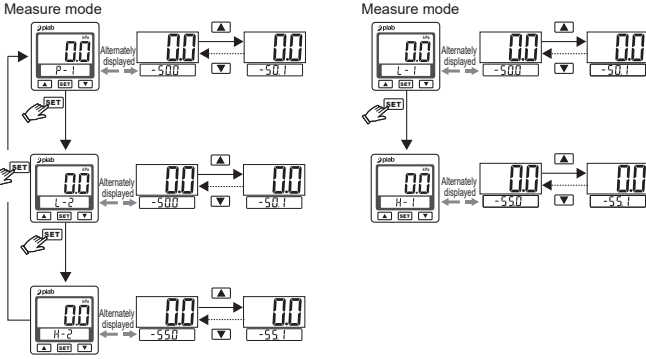
【NOTE :】
*1. In case hysteresis is set at less than or equal to 2 digits, switch output may chatter if input pressure fluctuates near the set point.
*2. When using window comparator mode, the difference between two set points must be greater than the fixed hysteresis, otherwise will cause the switch output to malfunction.

4.10 Pressure Setting Mode

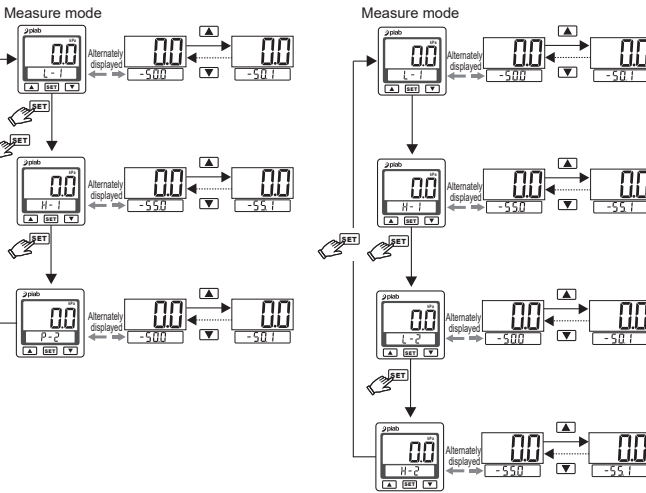
- Setting Condition 1 :
OUT 1 mode setting :
"oP5 " (One point set mode)
OUT 2 mode setting :
"oFF " (Not used)
- Setting Condition 2 :
OUT 1 mode setting :
"oP5 " (One point set mode)
OUT 2 mode setting :
"oP5 " (One point set mode)



- Setting Condition 3 :
OUT 1 mode setting :
"oP5 " (One point set mode)
OUT 2 mode setting :
"HYS " (Hysteresis mode)
"u in " (Window comparator mode)
- Setting Condition 4 :
OUT 1 mode setting :
"HYS " (Hysteresis mode)
"u in " (Window comparator mode)
OUT 2 mode setting :
"oFF " (Not used)



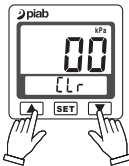
- Setting Condition 5 :
OUT 1 mode setting :
"HYS " (Hysteresis mode)
"u in " (Window comparator mode)
OUT 2 mode setting :
"oP5 " (One point set mode)
- Setting Condition 6 :
OUT 1 mode setting :
"HYS " (Hysteresis mode)
"u in " (Window comparator mode)
OUT 2 mode setting :
"HYS " (Hysteresis mode)
"u in " (Window comparator mode)



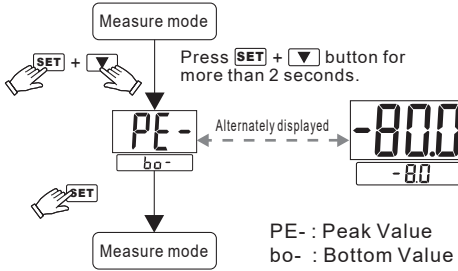
【NOTE :】
Do not disconnect power when the sub-display and setting value is flashing alternately; otherwise the system cannot store the values.

4.11 Zero Point Setting

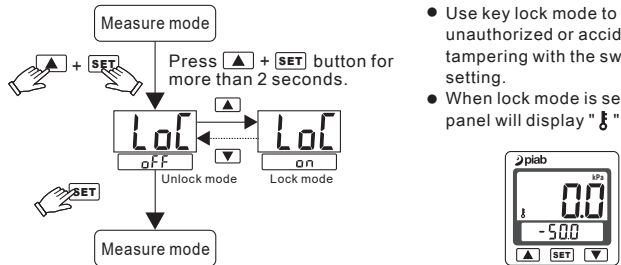
Press the **▲** + **▼** button at the same time until the "00" is shown.
Release the button to end zero setting.



4.12 Peak / Bottom Hold Function



4.13 Key Lock / Unlock Mode

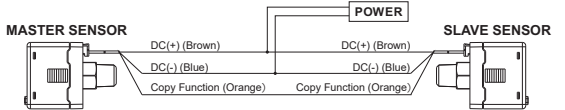


4.14 Copy Function Setting

- Copy function setting can use the master sensor to copy the pressure value to the slave sensors.
- Before copying, please confirm the model of pressure sensor. The function cannot use in difference mode.
- The copy function only can be one-to-one.

【SETTING STEP】

- Please set the copy function to **on** or **onL** to be on copy condition by master sensor. Please refer the copy setting of (H) advance setting mode.
- Turn power off to both sensor.
- Refer the connection way with the master and slave sensor as followings.



- Turn on power at same time. (* 1)
- Wait 5 sec., when finishing to convey the data, the master sensor display (alternately display) the slave sensor display (alternately display)
- When convey the data failed, (Master) sensor displays (Slave) sensor displays (* 2)
- Turn off power and remove the wire connection. If no remove the wire connection, the sensor would be broken.

★If require to copy another slave sensor, please repeat the step ③ to ⑤ .

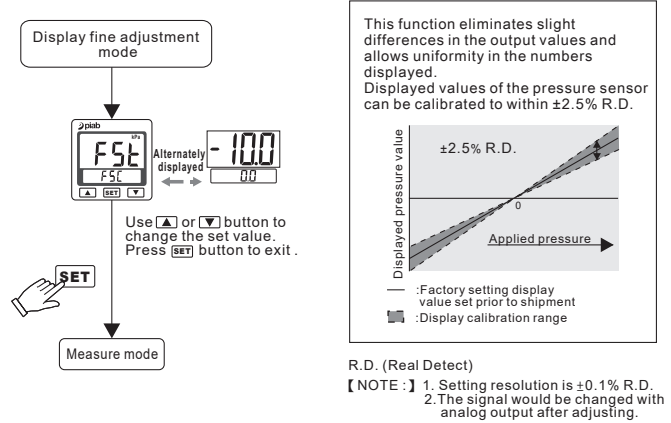
【NOTE】

- *1. If turn on power is not synchronization, the data cannot be copied.
- *2. When the data conveys failed, please check the wire connection. Then repeat the step ③ to ⑤ .

How to cancel the copy mode :

When the master sensor display (display reciprocal), Please **▼** button to leave the copy mode.

4.15 Fine Adjustment Mode



4.16 Error Code Instruction

Error Type	Error code	Error Condition	Troubleshooting
Excess load current error	out1	Output 1 load current is more than 125 mA	Turn power off and check the cause of overload current or lower the current load under 125 mA, then restart.
	out2	Output 2 load current is more than 125 mA	
Residual pressure error	Er3	During zero reset, ambient pressure is over ±3% F.S.	Change input pressure to ambient pressure and perform zero reset again.
Applied pressure error	H H H	Supply pressure exceeds the upper limit of pressure setting.	Adjust the pressure within operating pressure range.
	L L L	Supply pressure exceeds the lower limit of pressure setting.	
System error	Er4	Internal system error	Turn power off, and then restart. If error condition remains, please return to factory for inspection.
	Er5	Internal system error	
	Er6	Internal data error	
	Er7	Internal data error	
Copy data error	Er8	Please check the model no. and wire connection. Restart to turn on power if no return to normal condition, please return to factory for inspection.	

5 Service and Maintenance

The Sensor do not require any regular service.

6 Spare Parts

Spare parts : Cable M8 4-pin
Item number : 0212075

7 Recycling and Disposal



The ways of handling recycling and disposals vary from country to country, and therefore this process needs to be in full compliance with each national regulation.

If possible, disassemble the product into its various components. Batteries, electrical and electronic equipment should be handed over to an authorized body for disposal, as well as the metal parts. All other parts can either be recycled or assorted as waste.