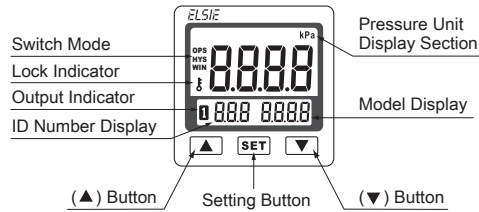


For your safety, please read the following before using.

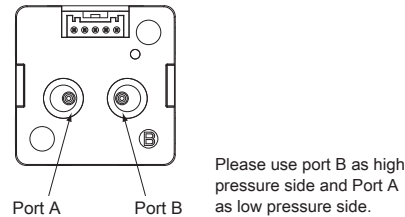
- Do not use corrosive or flammable gas or liquid with this product.
- Please use within the specification. Do not apply with alternating current(AC100V), etc. which may damage or cause malfunction.
- Please use within the rating pressure range. The pressure difference between port A and B can not exceed withstand pressure or permanent damage to the pressure sensing diaphragm may occur.
- Do not use the wrench on the plastic body while connecting the sensor connector or pressure port.
- Do not insert metal or sharp objects into the pressure port.
With IP40 compliance, please protect the sensor against dust and water splash.
- Do not route wires and cables together with power or high voltage cable. If use in the same circuit, noise may cause malfunction.
- If cable is longer than 100 meters and 0.3mm² cable, please use shielded wire as the output wire.
- To prevent product damage due to short circuit, MUST do RS485 line connection BEFORE power line connection.



A. PANEL DESCRIPTION



B. CONNECTOR SIDE DESCRIPTION



C. ORDERING INFORMATION

E P 7 8 1 0 - 0 2 - M 5

Pressure Range

- 10 : -10.00~10.00 kPa
- 11 : -1.000~1.000 kPa
- 12 : -2.00~2.00 kPa
- 15 : -5.00~5.00 kPa

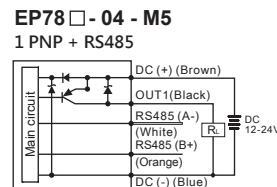
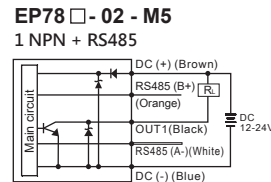
Output Specifications

- 02 : 1 NPN output + RS485
- 04 : 1 PNP output + RS485

Optional Parts

- BT-20 : Mounting bracket
- BT-21 : Mounting bracket
- PA-C : Panel adapter
- PA-D : Panel adapter + Front protective lid

D. OUTPUT CIRCUIT WIRING DIAGRAMS

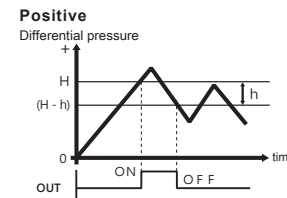


E. SPECIFICATIONS

TYPE	EP7810-□	EP7811-□	EP7812-□	EP7815-□
Rated pressure range	-10.00~10.00 kPa	-1.000~1.000 kPa	-2.00~2.00 kPa	-5.00~5.00 kPa
Setting pressure range	-10.00~10.00 kPa	-1.000~1.000 kPa	-2.00~2.00 kPa	-5.00~5.00 kPa
Withstand pressure	30 kPa	3 kPa	6 kPa	15 kPa
Fluid	Filtered air, Non-corrosive / Non-flammable gas			
Set pressure resolution	kPa	0.01	0.01	0.01
	mmAq	1	0.1	1
Power supply voltage	12 to 24V DC ±10%, Ripple (P-P) 10% or less			
Current consumption	≤ 40mA (With no load)			
Switch output	NPN: open collector 1 output Max. load current : 125mA Max. supply voltage: 30V DC Residual voltage : ≤ 1.5V		PNP: open collector 1 output Max. load current : 125mA Max. supply voltage: 24V DC Residual voltage : ≤ 1.5V	
	Repeatability (Switch output) ±0.5% F.S. ±1 digit			
Hysteresis	Hysteresis mode		Adjustable	
	Window comparator mode			
Response time	≤ 2.0ms (chattering-proof function: 32ms, 128ms, 1024ms selectable)			
Output short circuit protection	Yes			
7 segment LCD display	One color(White) (Sampling rate: 0.1~3 sec select)			
Indicator accuracy	±2% F.S. ±1 digit (ambient temperature: 25 ±3°C)			
Switch ON Indicator	White (1 Indicator) OUT			
Environment	Enclosure	IP40		
	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-150Hz-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	±3% F.S. of detected pressure (25°C) at temp. Range of 0 ~ 50°C			
Port size	M5			
Lead wire	Oil-resistance cable(0.15mm ²)			
Weight	Approx. 75g (with 2 meter lead wire)			

F. OPERATION CHART

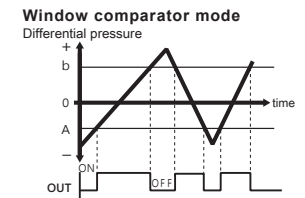
1. Hysteresis mode



Set the sensor ON point "H" and hysteresis "h".
(Notice: Please set "h" value equal or higher than 2 to avoid "Error")

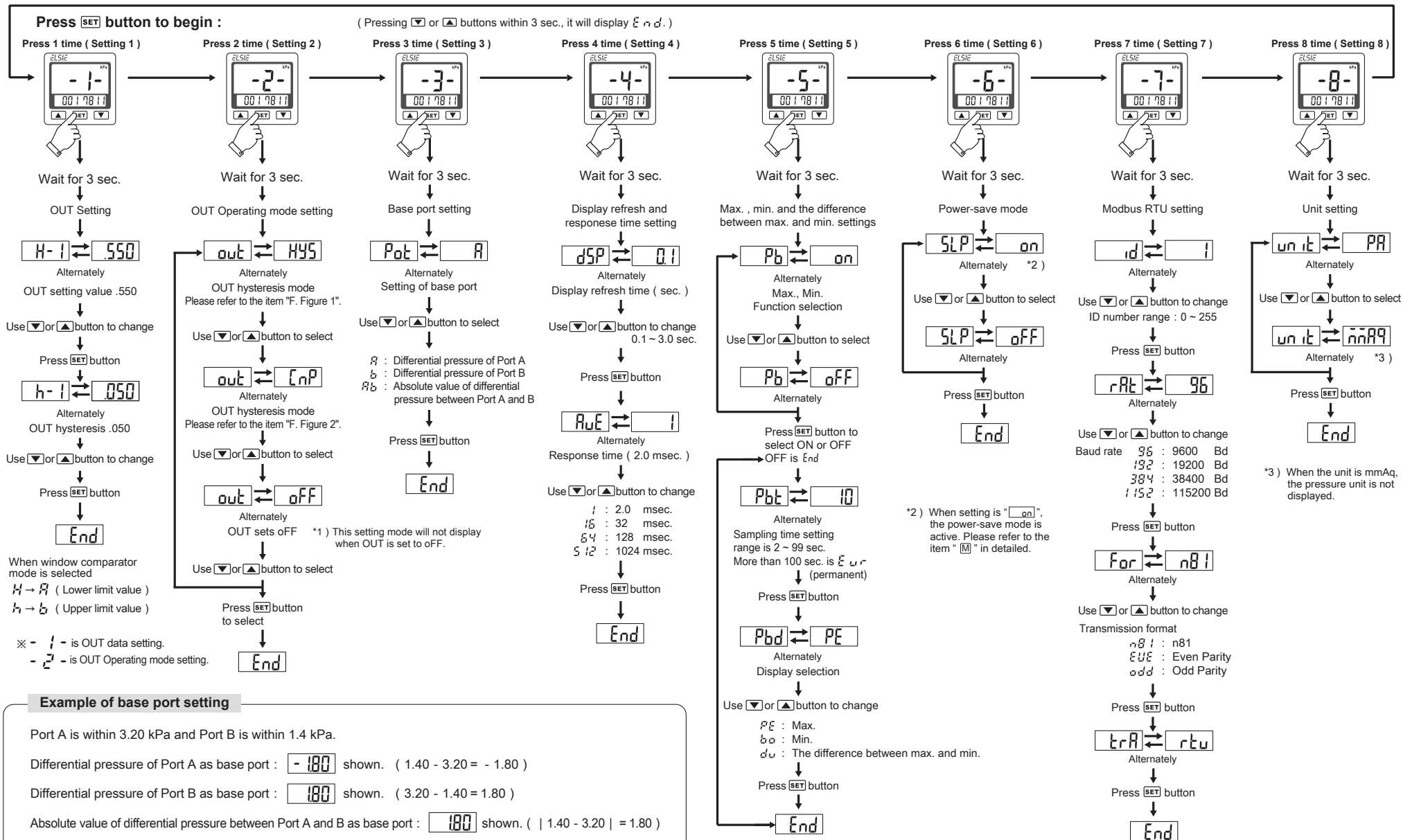
H: Sensor ON
H-h: Sensor OFF

2. Window comparator mode



A is lower limit value of window comparator mode.
b is upper limit value of window comparator mode.
(It can not be set A > b.)

G. Adjustment method



Example of base port setting

Port A is within 3.20 kPa and Port B is within 1.4 kPa.

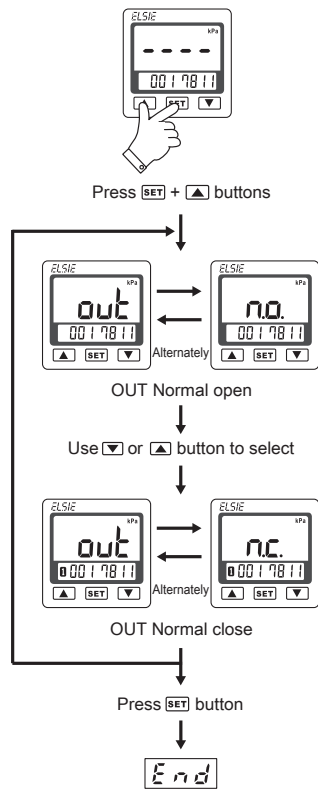
Differential pressure of Port A as base port : $- 1.80$ shown. ($1.40 - 3.20 = - 1.80$)

Differential pressure of Port B as base port : 1.80 shown. ($3.20 - 1.40 = 1.80$)

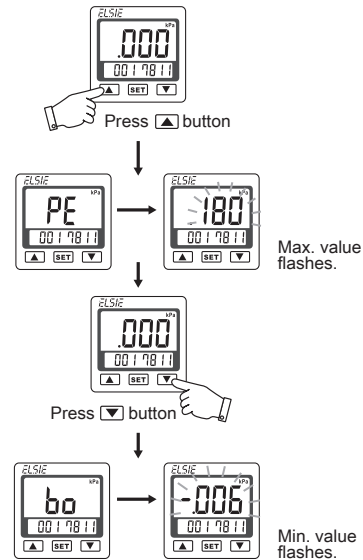
Absolute value of differential pressure between Port A and B as base port : 1.80 shown. ($| 1.40 - 3.20 | = 1.80$)

E. CHANGE OUTPUT TYPE

Normal open or Normal close mode setting:

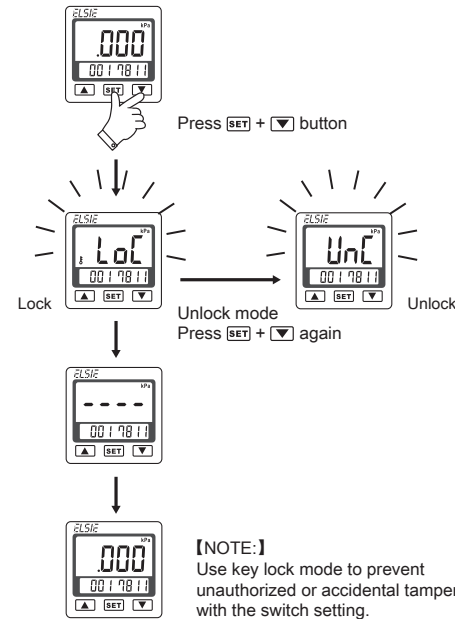


I. THE MAX. & MIN. DISPLAY MODE



* This data shows the max. (min.) pressure detected when power supplied.

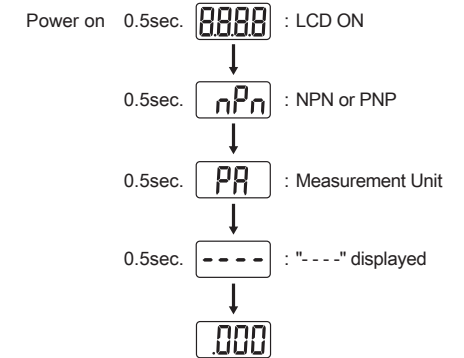
J. KEY LOCK / UNLOCK MODE



[NOTE:]
Use key lock mode to prevent unauthorized or accidental tampering with the switch setting.

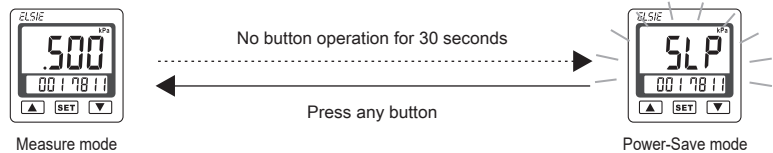
K. INITIAL DISPLAY

First 2 seconds after Power-ON, LCD will display OUTPUT setting.



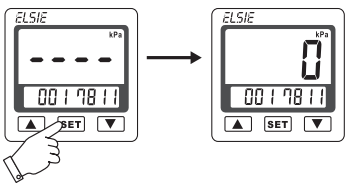
M. POWER-SAVE MODE

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



(Main display will flash "SLP")

L. ZERO POINT SETTING



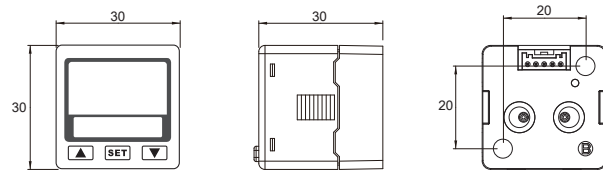
Do not perform zero reset with pressure apply to ports A and B.
The range that can be reset to zero is within $\pm 3\%$ F.S.

N. ERROR CODE INSTRUCTION

Error code	Error Type	Error Condition	Troubleshooting
EE1	OUT excess load current error	Load current is more than 125mA	Turn power off and check the cause of overload current or lower the current load under 125mA, then restart.
E-r-	Zero point setting error	During zero point setting, ambient pressure is over $\pm 3\%$ F.S.	Change input pressure to ambient pressure and perform zero reset again.
E-r1	System error	Internal error	Turn power off, and then restart. If error condition remains, please return to factory for inspection.
FFF	Applied pressure error	Supply pressure is exceed the upper limit of pressure setting.	Adjust the pressure within setting pressure range.
-FF	Applied pressure error	Supply pressure is exceed the lower limit of pressure setting.	

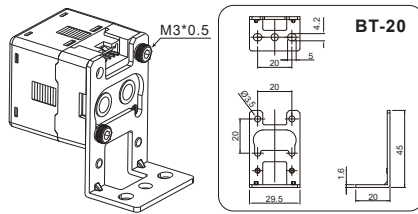
O. DIMENSIONS / OPTIONAL PARTS DIMENSIONS

① Pressure sensor

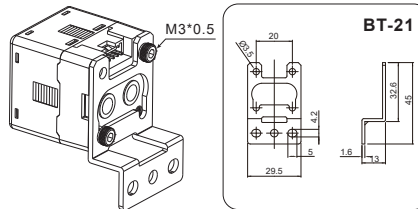


② Mounting bracket

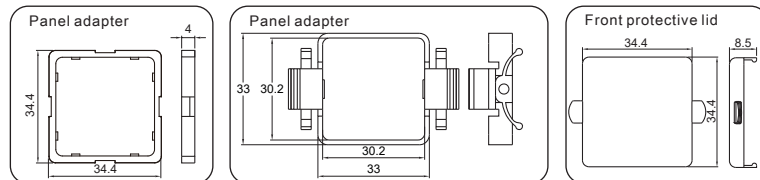
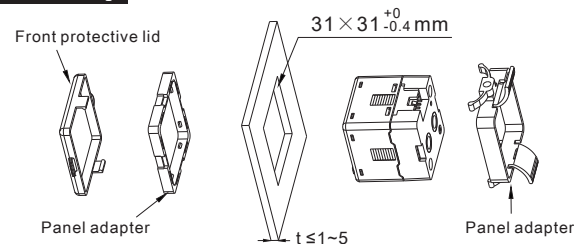
BT-20



BT-21



③ Panel Mounting



Unit:mm

P. COMMUNICATION PROTOCOL (Modbus RTU)

① Computer / PLC transmit data format (Master)

ID Number	Read	Function Code	Data Number	CRC CheckSum
1 Byte	1 Byte	2 Byte	2 Byte	2 Byte

② Pressure sensor response data format (Slave <EP7800>)

ID Number	Read	Data Number	Data	CRC CheckSum
1 Byte	1 Byte	1 Byte	2N Byte (*)	2 Byte

③ Computer / PLC transmit data format (Master)

ID Number	Write	Function Code	Data	CRC CheckSum
1 Byte	1 Byte	2 Byte	2 Byte	2 Byte

④ Pressure sensor response data format (Slave <EP7800>)

ID Number	Write	Function Code	Data	CRC CheckSum
1 Byte	1 Byte	2 Byte	2 Byte	2 Byte

⑤ Pressure sensor response data format (Error)

ID Number	Write	Error Code	CRC CheckSum
1 Byte	1 Byte	1 Byte	2 Byte

⑥ Read / Write Code

Read / Write Code	Description
03H	Read pressure sensor data Range 1~4 data Number, 2~8 Bytes
06H	Write pressure sensor data

⑦ Example : Read pressure sensor value Computer / PLC transmit data format (Master)

ID Number	Read	Function Code	Data Number	CRC CheckSum
(01H)	(03H)	(0002H)	(0001H)	(25CAH)

Pressure sensor response data format

ID Number	Read	Data Number	Data	CRC CheckSum
(01H)	(03H)	(02H)	(0001H)	(7984H)

⑧ Example : ID Number setting response Computer / PLC transmit data format (Master)

ID Number	Write	Function Code	Data	CRC CheckSum
(01H)	(06H)	(0000H)	(0001H)	(480AH)

Pressure sensor response data format

ID Number	Write	Function Code	Data	CRC CheckSum
(01H)	(06H)	(0000H)	(0001H)	(480AH)

Example : ID Number setting response error

ID Number	Write	Function Code	Data	CRC CheckSum
(01H)	(06H)	(0000H)	(01FFH)	(C81AH)

Pressure sensor response error (Example : setting data is over)

ID Number	Write	Error Code	CRC CheckSum
(01H)	(86H)	(03H)	(0261H)

(When the pressure sensor is abnormal, MSB will be set to 1, so the command code is 86H)

⑨ Function Code :

Function Code	Item	Description	Operation
0000H	ID Number setting	Range: 0 ~ 255	Read / Write
0001H	Pressure type	0: 7811 ; 1: 7812 ; 2: 7815 ; 3: 7810	Read
0002H	Pressure value	Pressure value	Read
0003H	Unit	0: kPa ; 1: mmAq	Read / Write
0004H	Decimal dot	Range: 0 ~ 3 digit	Read
0005H	Switch operation mode	0: HYS ; 1: CnP ; 2: OFF	Read / Write
0006H	Switch operation type	0: NO ; 1: NC	Read / Write
0007H	Setting value H-1 or A-1	H-1 or A-1 (Range: According to pressure type and unit)	Read / Write
0008H	Setting value h-1 or b-1	h-1 or b-1 (Range: According to pressure type and unit)	Read / Write
0009H	Switch state	0: OFF ; 1: ON	Read
000AH	Response time	0: 2.0ms ; 1: 32ms ; 2: 64ms ; 3: 1024ms	Read / Write
000BH	Power-save mode	0: OFF ; 1: ON	Read / Write
000CH	Baud rate setting	0: 9600 ; 1: 19200 ; 2: 38400 ; 3: 115200	Read / Write
000DH	Transmission format setting	0: N.8.1 ; 1: E.8.1 ; 2: O.8.1	Read / Write
000EH	Communications protocol	0: RTU	Read / Write
000FH	Reset to the default setting	Write: 0 or 1	Read / Write
0010H	Key lock function	0: OFF ; 1: ON	Read / Write
0011H	Switch type	0: NPN ; 1: PNP	Read
0012H	Display refresh time	Range: 0.1 ~ 3.0 s 1: 0.1s ; 2: 0.2s 30: 3.0s	Read / Write
0013H	Zero reset	If ambient pressure is over ±3% F.S., error code shows 03H	Write
0014H	Base port setting	0: A port ; 1: B port ; 2: AB port	Read / Write
0015H	Max. value reading	Display PE	Read
0016H	Min. value reading	Display bo	Read
0017H	Function setting of Max., min. and the difference between max. and min.	0: OFF ; 1: ON	Read / Write
0018H	Sampling time setting of Max., min. and the difference between max. and min.	Range: 2 ~ 99 sec. More than 100 sec. is EUr (permanent)	Read / Write
0019H	Display setting of Max., min. and the difference between max. and min.	0: PE ; 1: bo ; 2: du	Read / Write

⑩ Error Code Description :

Error Code	Description
01H	Read / Write error
02H	Function code error
03H	Illegal data or over setting value