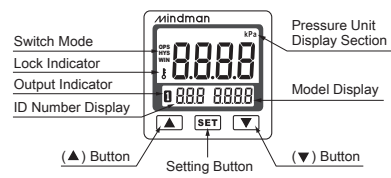


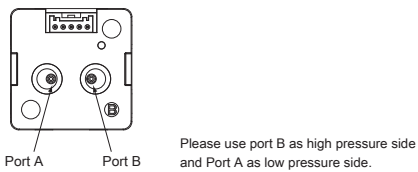
For your safety, please read the following before use.

- 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 0.3mm<sup>2</sup> 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.

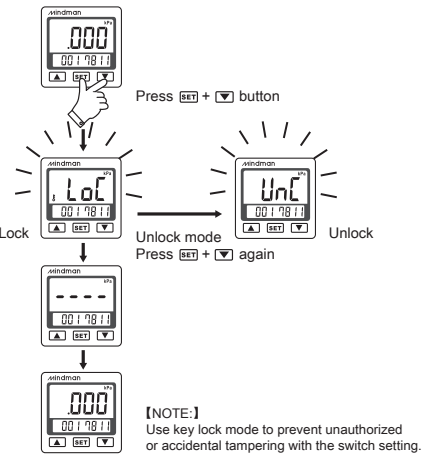
A. PANEL DESCRIPTION



B. CONNECTOR SIDE DESCRIPTION



J. KEY LOCK / UNLOCK MODE



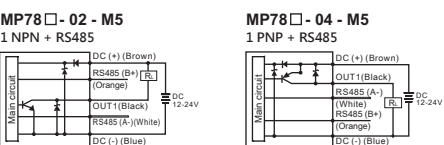
K. ORDERING INFORMATION

MP7810-02-M5

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

- Optional Parts**
- MP-A20 : Mounting bracket
  - MP-A21 : Mounting bracket
  - MP-B2 : Panel adapter
  - MP-C2 : Panel adapter + Front protective lid

L. OUTPUT CIRCUIT WIRING DIAGRAMS



C. ADJUSTMENT METHOD

Press **SET** button to begin : (Pressing **UP** or **DOWN** buttons within 3 sec., it will display  $\varepsilon n d$ .)

**Press 1 time (Setting 1)** : OUT Setting. Wait for 3 sec. **OUT** setting value .550. Press **SET** button. Use **UP** or **DOWN** button to change. Press **SET** button. **End**.

**Press 2 times (Setting 2)** : OUT Operating mode setting. Wait for 3 sec. **OUT** hysteresis mode. Please refer to the item "D Figure 1". Press **SET** button. Use **UP** or **DOWN** button to select. Press **SET** button. **End**.

**Press 3 times (Setting 3)** : Base port setting. Wait for 3 sec. Setting of base port. Press **SET** button. Use **UP** or **DOWN** button to select. Press **SET** button. **End**.

**Press 4 times (Setting 4)** : Display refresh and response time setting. Wait for 3 sec. Display refresh time (sec.). Press **SET** button. Use **UP** or **DOWN** button to change. Press **SET** button. **End**.

**Press 5 times (Setting 5)** : Max., min. and the difference between max. and min. settings. Wait for 3 sec. Max., Min. Function selection. Press **SET** button. Use **UP** or **DOWN** button to select. Press **SET** button. **End**.

**Press 6 times (Setting 6)** : Power-save mode. Wait for 3 sec. Power-save mode. Press **SET** button. Use **UP** or **DOWN** button to select. Press **SET** button. **End**.

**Press 7 times (Setting 7)** : Modbus RTU setting. Wait for 3 sec. Modbus RTU setting. Press **SET** button. Use **UP** or **DOWN** button to change ID number range : 0 ~ 255. Press **SET** button. Use **UP** or **DOWN** button to change Baud rate. Press **SET** button. Use **UP** or **DOWN** button to change Transmission format. Press **SET** button. **End**.

**Press 8 times (Setting 8)** : Unit setting. Wait for 3 sec. Unit setting. Press **SET** button. Use **UP** or **DOWN** button to select. Press **SET** button. **End**.

**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 )

D. OPERATION CHART

**1. Hysteresis mode**

**Positive** Differential pressure. Graph showing pressure over time with hysteresis. Labels: H, ON, OFF, time.

**Vacuum** Differential pressure. Graph showing pressure over time with hysteresis. Labels: H, ON, OFF, time.

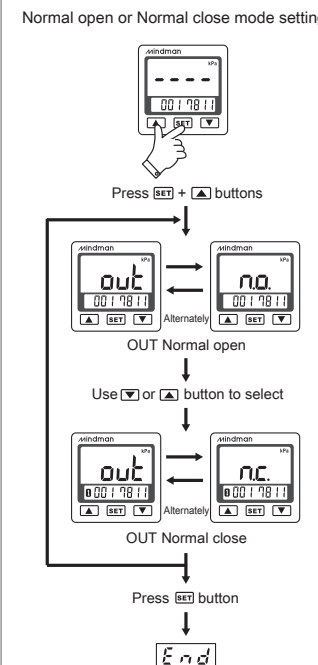
Set the sensor ON point "H" and hysteresis "h". (Notice: Please set "h" value equal or higher than 2 to avoid "Error")  
 H: Sensor ON  
 H-h: Sensor OFF

**2. Window comparator mode**

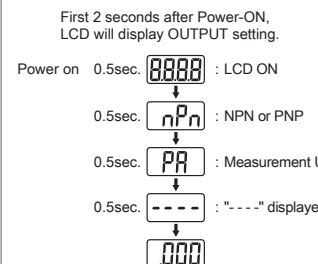
**Window comparator mode** Differential pressure. Graph showing pressure over time with window comparator. Labels: b, a, ON, OFF, time.

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.)

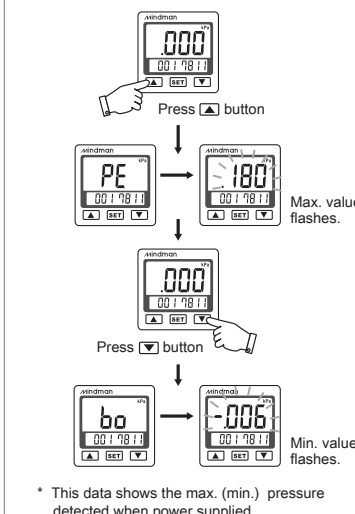
E. CHANGE OUTPUT TYPE



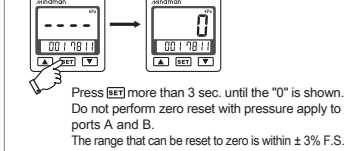
F. INITIAL DISPLAY



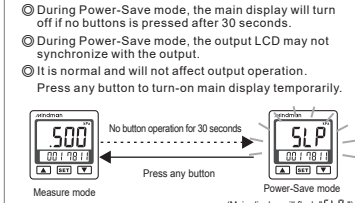
G. THE MAX. & MIN. DISPLAY MODE



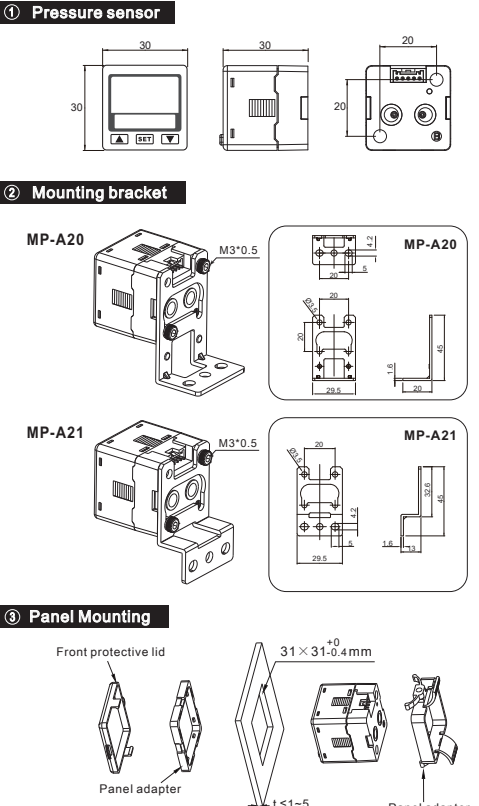
H. ZERO POINT SETTING



I. POWER-SAVE MODE



M. DIMENSIONS / OPTIONAL PARTS DIMENSIONS



N. 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 <MP7800>)**

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 <MP7800>)**

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 (01H)	Read (03H)	Function Code (0002H)	Data Number (0001H)	CRC CheckSum (25CAH)
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**8 Example : ID Number setting response Computer / PLC transmit data format (Master)**

ID Number (01H)	Write (06H)	Function Code (0000H)	Data (0001H)	CRC CheckSum (480AH)
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**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 $\varepsilon u r$ (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

O. SPECIFICATIONS

TYPE	MP7810-□	MP7811-□	MP7812-□	MP7815-□
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	0.001	0.01	0.01
	mmAq: 1	0.1	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	Adjustable			
Response time	≤ 2.0ms (chattering-proof function: 32ms, 128ms, 1024ms selectable)			
Output short circuit protection	Yes			
Display	4 digital, 7 segment LCD display ( White ) ( Sampling rate : 0.1 ~ 3 sec select )			
Indicator accuracy	±2% F.S. ±1 digit (ambient temperature: 25±3°C)			
Switch on indicator	White indicator 1 : OUT1			
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~150Hz~10Hz scan for 1 minute, two hours each direction of X, Y and Z Shock: 100m/s <sup>2</sup> (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: Ø4 Oil-resistance cable ( PVC ) - 26 AWG ( 0.15 mm <sup>2</sup> ) - 5 cores Weight: Approx. 75g (with 2 meter lead wire)			

P. ERROR CODE INSTRUCTION

Error code	Error Type	Error Condition	Troubleshooting
$\varepsilon \varepsilon$	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.
$\varepsilon r r$	Zero point setting error	During zero point setting, ambient pressure is over ±3% F.S.	Change input pressure to ambient pressure and perform zero reset again.
$\varepsilon r i$	System error	Internal error	Turn power off, and then restart. If error condition remains, please return to factory for inspection.
$\varepsilon \varepsilon \varepsilon$	Applied pressure error	Supply pressure is exceed the upper limit of pressure setting.	
$\varepsilon \varepsilon \varepsilon$	Applied pressure error	Supply pressure is exceed the lower limit of pressure setting.	Adjust the pressure within setting pressure range.