MPM489

Operation Manual

MICROSENSOR

Contents

Our company reserves the modification right for this operation manual due to renovation of production technology and craftwork. If some information is changed, no more notice will be edited.

Please pay attention to the latest version.

Our company also reserves the right of final explanation for this manual.

Version: V1.0

Thanks for your using products from MICROSENSOR. MPM489 Pressure Transmitter is one of precise instruments. We suggest you to read this manual carefully before use.

1 Introduction

MPM489 pressure transmitter is new pressure transmitter developed by our company. A pressure sensor with 316L isolated diaphragm is mounted with the high-performance signal processing circuit in the stainless steel housing. The Sensor is automatically tested by computer and compensated zero and temperature in wide range by laser trimming system. The digital circuit processes the sensor signal into standard output signal.

The pressure port of MPM489 is male port with waterline seal construction, electric connection is plug or cable connection. The compact construction and standard signal output provide you conveniently and stably.

The product is suitable widely for pressure measurement of petroleum, chemi-industry, metallurgy, electric power, light industry, cottoncracy, building material, hydrogeology and other country economic fields.

2 Specifications

Pressure Range: -1bar…0mbar ~ 100mbar…1000bar

Overpressure: ≤2 times FS or 1100bar (Min. value is valid)

Pressure Type:Gauge, Absolute or Sealed

Accuracy: ≤±0.25%FS ≤±0.5%FS ≤±1%FS

Note: The precision of products is related to the range of measurement, and the precision of products in different range is different.

Long-term Stability:≤±0.3%FS/year

Zero Temperature Drift: ≤0.05%FS/℃ (≤100kPa), ≤0.03%FS/℃(> 100kPa)

FS Temperature Drift: ≤0.05%FS/℃ (≤100kPa), ≤0.03%FS/℃(> 100kPa)

Power Supply:11V~28V DC(intrinsic safe version supplied through safe barrier), 3.3V/5V DC

Signal Output:4mA~20mA DC (2-wire 11V~28V DC Power Supply)

0/1V~5V/10V DC (3-wire 11V~28V DC Power Supply)

0.5V~2.5/4.5VDC (3-wire 3.3V/5V DC Power Supply)

Compensation Temperature Range: 0℃~50℃

Operation Temperature:

-30℃~80℃ (4-pin Plug, M12x1 Plug）

-20℃~70℃（Cable type, cable material: PE, PVC）

-20℃~80℃（Cable type, cable material: PUR）

-30℃~60℃（Intrinsic safety , 4-pin Plug）

-20℃~60℃（Intrinsic safety ,cable）

-20℃~60℃（Exd）

Storage Temperature:-40℃~120℃,-20℃~85℃（cable type）

Resistance:≤（U-11）/0.02Ω（2-wire）; ≥10kΩ（3-wire）

Pressure Port:M20×1.5 Male with Waterline Seal

Intrinsic safe version mark:ExiaIICT6Ga(only for 2-wire);

ExiaIICT4Ga(ATEX)

EC-Type Examination Certificate Number: Presafe 17 ATEX 11284X

Intrinsically safe coefficient:

Ui=28VDC Ii=93mADC Li=0mH Ci=0.042uF Pi=0.65W

ATEX:

Ui=28VDC Ii=115mADC Li=0mH Ci=0.055uF Pi=0.66W (2-wire)

Ui=26VDC Ii=140mADC Li=0mH Ci=0.055uF Pi=0.66W (3-wire)

Housing Protection: Plug Connection：IP65

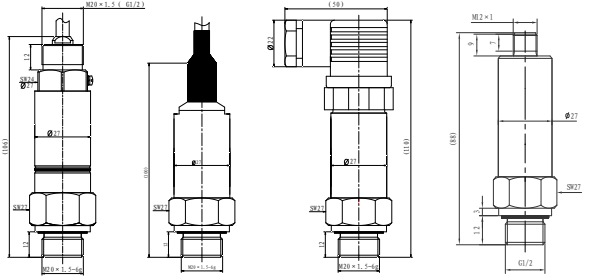
Cable Connection：IP65

3 Outline Construction and Installation

Unit:mm

3.1 Construction and Mounting

Dimension see Fig. 1



Exd Cable 4-pin Plug M12x1 Plug

Fig. 1

3.2 Installation

3.2.1 Check before Installation

a) The measuring pressure is in the measurement range;

b) The measuring medium is compatible with construction;

c) The measuring medium would not jam the pressure-leading hole.

3.2.2 Installation Method

Usually the transmitter should be mounted vertically up to the horizontal direction. If the condition is unavailable, the allowed max. mount slope angle from transmitter to the horizontal direction is 30 degree. It is not recommended to mount the transmitter invertedly.

Take the pressure port M20×1.5 male with water line sealing of MPM489 pressure transmitter as an example, it can be directly installed on the measuring pipe joint. In order to facilitate the installation and maintenance, should be install shut-off valve between the connector and the pipeline (see Figure 2).

Caution: do not poke the pressure-leading hole with metal wire or something hard; and do not press the diaphragm with finger or something sharp to protect the diaphragm.

The recommended method is to see Fig.2.

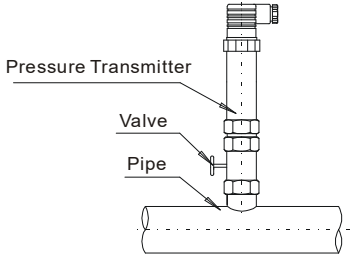


Fig. 2

4 Electric Connection

4.1 The transmitter is connected with the outside circuit through plug or special cable.

The pin arrangements of socket are to see Fig. 3, and pin definitions are as follows:

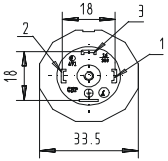


Fig. 3

Pin	2-wire	3-wire
1	+V	+V
2	OV/+OUT	GND
3	Null	+OUT

The electric definitions of cable are as follow:

Cable	2-wire	3-wire
Red	+V	+V
Black	OV/+OUT	GND
White	Null	+OUT

(Note: The tube in the center of the cable can not be blocked or water inf low, and it must be connected to the atmosphere, to ensure the protecti on of the product and the accuracy of the output measurement.)

The electric definitions of M12x1 Plug are as follow

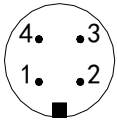


Fig. 4

Pin	2-wire	3-wire
1	+V	+V
2	Null	GND
3	OV/+OUT	+OUT

4.2 Plug connection Operation Method：

a) If the plug has been connected with transmitter, loose the central bolt on the top of plug with little screwdriver and pull out the plug from transmitter.

（**caution：** do not take out the socket on the transmitter to protect it）

b) To disconnect the plug, please take out the central bolt on the top of plug, then turn the plug to the bottom and insert a little flat screwdriver into a corner signed “Lift” or arrow and give a force. The plug core will be disconnected with housing.

c) To connect the cable, put the cable through the cable jack and

connect the wires with terminals on the plug core correctly (the connection terminals are signed with clear numbers). Please choose Φ4.5mm~7mm shield cable and connect the cable reliably to prevent short circuit.

d) Pull the cable slightly and push the plug core into housing (a rattling sound could be listened), then screw down the cable-fixed nut.

e) To remove the cable, loose the cable-fixed nut to relax the cable, and operate as Item2 to disconnect the plug. Take out the cable from terminals with little screwdriver and pull out the cable from cable-fixed nut, then renew the connection between plug core, plug and socket.

Caution: renew the rectangle-ring to the pre-mounting situation in order tomaintain the protection class when connect plug and socket.

4.3 Ex-proof Transmitter's Electric Connection

4.3.1 Intrinsic Safe EX transmitter electric connection

a) The installation of intrinsic safe transmitter should comply with GB3836.15-2000, Part 15 of Electric Equipment Used in Explosive Gas environment in and Regulations for Electric Installation in Dangerous Environment (expect coal mine) ;

b) When ex-proof products used in "0" Zone, transformer which supplies power to safe barrier should comply with Regulations of GB3836.4-2010;

c) Intrinsic safe version transmitter is used for explosive gas environment, please connect transmitter with safe barrier to establish intrinsic safe ex-proof system;

d) Safe barrier should comply with intrinsic safe ex-proof parameter, and owning Ex-proof Qualified Certificate;

Safe barrier and power should be put in safe area; intrinsic safe version transmitter should be put in dangerous area. Please see Fig.5 and Fig.6:

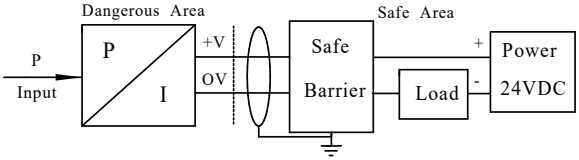


Fig. 5

ExiaIICT6Ga [Exia]IIC

Transmitter ex-proof parameter: Safe barrier ex-proof parameter:

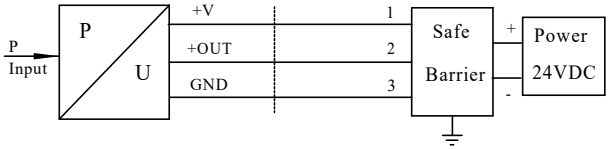
U_i=28VDC I_i=93/115mADC(ATEX) U_o=28VDC

L_i=0mH C_i=0.042/0.055μF(ATEX) I_o=93/115mA DC (ATEX)

P_i=0.65/0.66W(ATEX) P_o=0.65/0.66W(ATEX)

ATEX(3-wire):

Dangerous Area Safe Area



Transmitter ex-proof parameter: Safe barrier ex-proof parameter:

Fig. 6

Ui=26VDC Ii=140mADC Uo=26VDC Io=140mADC

Li=0mH Ci=0.055μF Pi=0.66W Po=0.66W

Please pay attention that the max. available distributing capacitance for connected cable between transmitter and safe barrier is $C_p = C_o – C_i$, the max. available distributing inductance is $L_p = L_o – L_i$.

Safe barrier could be purchased by user freely. As long as the safe barrier comply with the above requirement and owns Qualified Certificate, it can be used with transmitter together.

Please install and operate safe barrier as operation manual indicates.

4.3.2 Explosion proof explosion-proof transmitter

a) There should be ExdIICT6 sign on the transmitter explosion proof name board; Explosive mixture used at the place should be in accordance with corresponding level stipulated.

b) Transmitter installation should meet the requirement as below:

1) The cap must be tightened, and there are at least 6 joggles. Do not damage the thread.

2) The explosion proof's construction and components of Exd

version's transmitter are examined seriously before out of factory, so do not scratch the joint surface, make it rough and all the explosion proof components can not be provided by yourself when using them. If they are damaged, please order them from the factory timely.

3) Please lead the cable to a safety area to divide the cable core for connection. Do not divide the cable core for connection midway.

5 Unpacking、Components and Storage

5.1 Unpacking

a) Be sure the package is completed, and the package should be put as the sign "UP".

b) Be sure unpacking carefully, and prevent damaging instruments or accessories. Pay attention to the housing jacket and rubber bushing of transmitter cable.

5.2 Enclosed

The transmitter should be enclosed when out of factory:

MPM489 Pressure Transmitter	1
Special Plug	1 (due to the order)
Production Manual	1
Production Qualification Certificate	1

5.3 Storage

The transmitter should be stored in dry ventilate room, ambient

temperature -40℃~120℃/-20℃~85℃(cable type)and the relative humidity≤85%, no corrosive substance in the room.

6 Operation、Maintenance and Responsibility

6.1 Operation

The user could operate the transmitter without any adjustment. Be sure the installation and electric connection are correct.

The transmitter could work at once as soon as the power is supplied. But the signal output will be more stable after 30 minutes.

6.2 Maintenance

MPM489 Piezo-resistive pressure transmitter is the compact measurement device, please pay attention to the following items in the operation:

a) If the pressure-leading hole is jammed or the diaphragm is dirty, please clean them with impregnant which is compatible with transmitter construction material. Do not poke pressure-leading hole with hard object or brush diaphragm.

b) Other cable in the transmitter is for our company's adjustments, do not connect it at will to protect the transmitter.

c) The transmitter and the external circuit connect through the speci al plug seat, When the installation of electrical connection is comp leted, be sure to tighten the socket nut and cable fastening nut to ensure that the transmitter protection level.

d) Transmitter and external circuit connect through cable, the transmitter's cable has a vent pipe, is used to make the gauge pressure sensor back pressure chamber connect to the atmosphere. When Installation and use of the transmitter, must ensure that the tube can not be blocked or water inflow, and it must be connected to the atmosphere, to ensure the protection of the product and the accuracy of the output measurement.Otherwise it will cause damage to the transmitter.

7 Responsibility

Within one year from the delivery date, we shall repair or replace the instrument with any quality fault caused by material parts or our manufacturing technique free of charge. For non-quality malfunction during user's operation, we are in charge of repair. But the material cost and the shuttle transportation fees should be borne by users

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