MPM380 PIEZORESISTIVE PRESSURE TRANSDUCER

Content

Our company keeps the modification right for product technique and technics update. If anything is changed, we will not notice any more. Please pay attention to the lasted version.

Version: V10.02.1

1. Brief Introduction

MPM380 Piezoresistive Pressure Transducer is made by putting MPM280 piezo-resistive pressure sensor into stainless steel housing. The sensor is isolated oil-filled sensor. All the parts contacting with media are stainless steel, so that the sensor has good anti-corrosive capability and long-term stability. The sensor is compensated by laser trimming technique in wide temperature range. This makes the sensor with good zero, sensitivity, linearity and stability specifications, etc. The sensor is supplied by constant current power (≤2mA). The electric connection is cable connection or plug connection. The whole transducer is compact size, easy installation and reliable operation, and is widely used on process control and pressure/level measurement of petroleum, chemi-industry, metallurgy, spaceflight, aviation, electric power, textile, light industry and hydrology, ect.

MPM380 flush diaphragm transducer has G1/2 male pressure port with seal cushion. It is used for the places for fields like food and medicine which is easy to dirty.

MPM380T pressure transducer's diaphragm is Tantalum, and seal cushion is Viton. It is used for corrosive environment.

The product is manufactured according to P. R. China Manufacturing Measurement Instrument Permit Shaanzhi No.03000112.

2. Specification

（@ 1.5mADC）

Unit	kPa							MPa								
Range	20	35	70	100	200	350	700	1	2	3.5	7	10	20	35	70	100
Overpressure	1.5 x FS or 110MPa（min. value is valid）															
FS output	≥70mVDC（0~20kPa, ≥50mVDC）															

Accuracy（lin. + Hys. + Rep.）

Min.: ±0.1%FS

Typ.: ±0.25%FS

Max.: ±0.5%FS

Zero temp. coefficient: ≤±0.02%FS/℃(Typ.)　　≤±0.04%FS/℃(Max.)

FS temp. coefficient:: ≤±0.02%FS/℃(Typ.)　　≤±0.04%FS/℃(Max.)

Stability: ±0.3%FS（one year）

Temp. compensation range: 0℃~50℃

Operation temp. range: -10℃~80℃

Response（10%~90%）: ≤1ms

Insulation resistance: 100MΩ，100VDC

Protection: IP65（cable connection）/IP63（plug connection）

Power supply: ≤2.0mADC

Electric connection: cable 2m or 7-pin plug

Common mode voltage output: 50% input

Input impedance: 2kΩ~8kΩ

Output impedance: 3.5kΩ~6kΩ

Pressure port: M20 × 1.5 male with seal cushion or G1/2 male with seal cushion (flush diaphragm)

3. Operation Principle

The sensing component of MPM380 Piezoresistive Pressure Transducer is reliable solid piezo-resistive sensing die. A little silicon oil is filled between sensing die and diaphragm. The pressure acts on stainless steel diaphragm, and is transferred onto sensing die through silicon oil (see chart 1). The signal transformation between pressure and electrical is achieved through conductive silicon material. Due to the good relationship between voltage signal, which is output by Wheatstone Bridge, and the acted pressure. The pressure could be measured precisely.

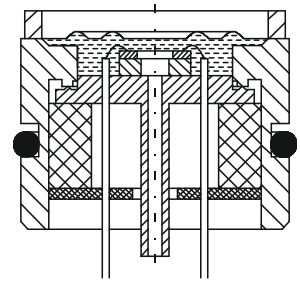


Chart 1

4. Construction and Dimension

4.1 Construction material

Sensor's construction material:

Housing: stainless steel 1Cr18Ni9Ti

Diaphragm: stainless steel 316L（Tantalum is optional）

O-ring and seal cushion: NBR （Viton is optional）

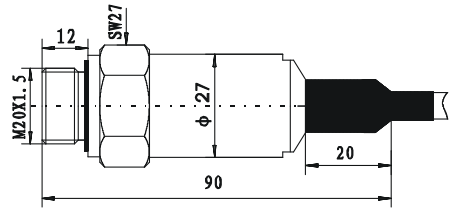
Rubber casing: NBR

Plug: Brass plating Nickle

Cable: φ7.2mm PVC cable

4.2 Construction and Dimension （mm）

Sensor outline and installation to see chart 2:



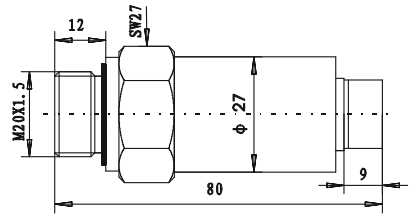


Chart 2

5. Unpacking, Enclosed and Storage

5.1 Unpacking

Pay attention before unpacking:

Please be sure the package is complete firstly, the package should be put as mark “UP”. If possible, please put the transducer in the room for some time, and then unpack.

5.2 Enclosed

MPM380 Piezoresistive Pressure Transducer	1
Plug（only for plug connection type）	1
Cable（only for cable type, mount on sensor）	2 meter or as ordered
Product Qualification Certificate	1
Operation Manual	1

5.3 Storage

The transducer should be stored in the dry and ventilated room (room temperature range -40℃~120℃, relative humidity no more than 85%. There should be no corrosive gas in the room.

6. Installation

6.1 Check before installation

Please notice before installation:

（1） Please be sure the pressure at measured point is less than sensor upper limited pressure range;

（2） Please be sure the measured media is compatible with construction material;

（3） Please be sure the measured media will not jam the pressure leading hole of the transducer.

6.2 Installation

Generally, the transducer is mounted vertical down. If the environment is limited, the max available slope angle between transducer and horizont is 30 angle.

Transducer with plug connection is not suitable for outdoor installation.

Please do not mount the transducer reversed.

MPM380 transducer’s pressure port is M20×1.5 male with NBR rubber seal cushion; flush diaphragm transducer’s pressure port is G1/2 male column tube with seal cushion, this could be mount on the flange connector directly. In order to easy installation and repair,

please mount cut-off valve between flange connector and the pipe.

Attention: Please be sure that do not poke or press the diaphragm with iron wire, steel pins and some hard or sharp objects to protect diaphragm.

The recommended installation to see chart 3:

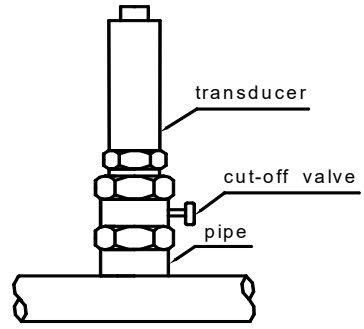


Chart 3

6.3 Electric Connection

6.3.1Circuity principle chart

The circuitry principle chart of transducer supplied by constant current to see chart 4:

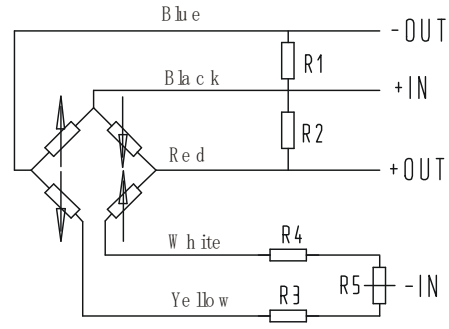


Chart 4

6.3.2 Electric connection method

The sensor is connected with outside circuit through 7-pin plug or cable.

Cable terminals and plug pins' definition:

Connection	Cable	Pins
+IN	Black	3
-IN	Yellow	5
-IN	White	1
+OUT	Red	2
-OUT	Blue	4

Notice: 1. temp. compensated resistances R1 or R2 and zero compensated resistances R3 or R4 have been calibrated and packed when the transducer is delivered.

2. Zero calibration could use 22Ω potentiometer. If zero is elevated, the user could

calibrate transducer exteriorly.

Pins to see chart 5:

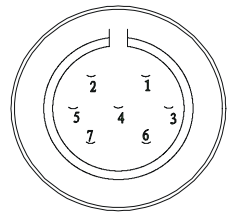


Chart 5

6.4 Plug Operation (transducer with plug connection)

YL14F plug is the enclosed component of MPM420 controlling pressure transmitter which is made by our company self. The plug has reliable connection and good protection. For easier operation and installation, please confirm LY14F plug operation:

1. Disconnect the plug from transducer socket:

The socket is fixed on transducer housing, connecting with plug by thread connection. If the user wants to disconnect plug, please firstly unscrew metal screw cap anticlockwise by fingers, then disconnect the plug.

2. Cable connection:

a. Clamp the screw cap with left middle finger and first finger, and fix plug core with thumb. Unscrew the black plastic screw cap anticlockwise with right hand, and then disconnect the plug. Please see chart 6:

Chart 6

b. Thrill cable through the plug from right to left as indication on chart 6. Weld wires to pins on the plug as item 6.3, then put on plastic casing and restore the plug.

3. Insert plug into the transducer socket:

a. please check the orientation marks on the plug and socket

There is a little wide and deep orientation groove on the core of plug YL14F (see chart 7), it is used for matching to the orientation protuberance (see chart 8) on the socket. Please pay attention that there are two little groove near the orientation groove on the plug core, they are technics groove for production, but not orientation groove.

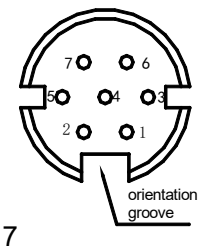


Chart 7

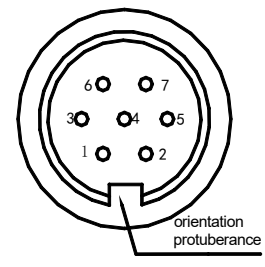


Chart 8

b. Match the orientation groove on the plug core to the protuberance on the socket lightly;

c. Screw the screw cap with fingers, then finish the whole connection.

Note:

1. When weld wires, please do not take too much Tin. Cover wires with plastic casing to prevent short.
2. Please use cable φ5~6mm to connect, this would make seal reliably. Please do not connect with 2 single wires to connect, for the vapor would go into the socket through the cable to cause short and corrode.

7. Calibration

We have checked the transducer according to product standard and user's requirements when it is delivered from our factory. The user could check as the following steps:

7.1 Zero output check

Install the transducer onto pressure gauge, the pressure is zero. Then do electric connection as item 6.3 and power on.

The available zero output error is 0±2mV.

7.2 FS output check

a. Calibrate pressure gauge, make the pressure on the gauge is the same as transducer FS pressure.

b. transducer FS output should confirm to regulated requirements.

c. If the user wants to check the output at other pressure point, please make the pressure on the gauge be equal with the measuring pressure.

7.3 Condition

Please fulfill the following conditions before check:

a. please be sure transducer's installation and electric connection confirm to this operation manual;

b. please be sure the accuracy of pressure gauge is higher min. 1~2 class to transducer;

c. please check the transducer at standard conditions.

8. Operation, Maintenance and Identification

8.1Operation

Please install the transducer as manual indicates, then operate.

Before operation, please be sure the installation and electric connection are correct.

Power on and operate.

The transducer will work once it is powered on, but the output signal will be more stable and reliable after 30 minutes.

8.2 Maintenance

Please pay attention to the following contents for everyday maintenance:

a. Please check the electric connection often, and make sure it is reliable.

b. Please do not poke or pressure the diaphragm with metal wire or sharp objects.

c. Please clean flush diaphragm with impregnant, and please do not peel off or knock off

the dirty violently.

8.3 Failure Identification

If the transducer has some failures like no output, output too low or too high, please power off firstly, and then check installation and wire connections. Please make sure the power supplied current is correct, and vented tube (gauge type) is unobstructed.

If the failure can not be solved, please contact with our company in time.

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