Flush diaphragm pressure/differential pressure transmitter quick installation manual

Safety precautions

⚠ Pressure sensor/ transmitter shall be installed by professional engineers, technicians and other qualified personnel, please read carefully the content and important information provided by this installation guide and label before installation.

⚠ Pressure sensor / transmitter is powered by an external power supply, the power supply should be in accordance with relevant standards stipulated by energy limitation circuit, and pay attention to the high-voltage that may exist in the circuit.

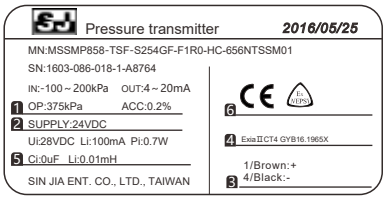
⚠ The maximum static pressure overload has been marked on the label, the maximum pressure value should be no more than the span of sensor.

⚠ Using pressure sensor/transmitter in dangerous situations, product installation, using and maintenance should comply with installation guide and relevant provisions of national standards.

⚠ Measuring diaphragm is located in the forefront of the process connection, touch or squeeze with hard objects may cause damage to the diaphragm.

⚠ Attention please! Disassemble the instruments under the condition of normal atmospheric pressure only.

Label



i Important information

1. Static pressure overload
2. Power supply
3. Signal outline type
4. Explosion proof mark
5. Intrinsic safety equipment parameters
6. Certificate

⚠ Please note! Exceeding static pressure overload will cause damage to the instruments, even lead to burst and casualties.

Product Usage

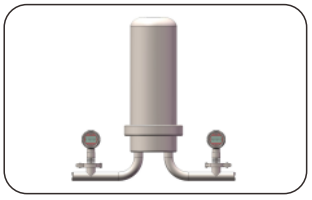
Pipe pressure measurement

Mounted directly on the pipe fittings, a cooling element should be used with pressure transmitter for high temperature medium.

Container pressure measurement

Pressure transmitter mounted on top of the container, to avoid the errors caused by contacting with the medium static pressure.

Differential pressure measurement system



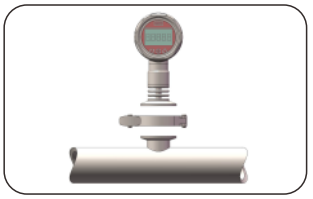
With two pressure transmitters to make up a DP measurement system, can measure the pressure value and calculate the differential pressure value.

Container level measurement

⚠ When using DP diaphragm system measurement, the static pressure is near to vacuum, differential pressure transmitters should be installed lower 1m than the high-pressure side pressure port.

Install pressure transmitter

Direct installation



Integrated pressure transmitter, installed directly with process connections.

Brackets installation

DP diaphragm systems. Install membrane systems with process connections directly and install differential pressure transmitter with optional brackets.

⚠ ■ The diaphragm seals system and pressure transmitter together form a closed calibrated system. Filling fluid through the diaphragm seals and the openings of pressure transmitters in the measuring system. The openings have been sealed. Please do not open..

■ Please do not remove the protection cap of the isolated diaphragm.

■ To prevent capillary from overbending (bending radius: ≥10mm), please make sure stress relieving completely of the capillary before the installation.

■ The static pressure of the liquid column in the capillary may result in zero shift. It can be corrected by the display at site.

In order to get more accurate measuring results and avoid instrument failure, Please note the following when mount capillary:

■ No vibration(avoid extra pressure fluctuation)

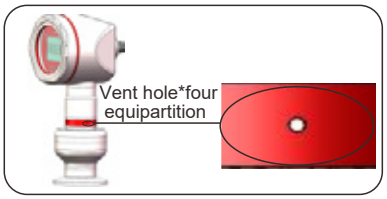
■ Do not mount around the heating pipes or cold pipes.

■ Should do heat preservation treatment to the capillary when ambient temperature is below or above the reference temperature.

■ Bending radius ≥ 100mm.

■ If diaphragm seals system at both sides are adopted, the two capillaries should be same in length and ambient temperature.

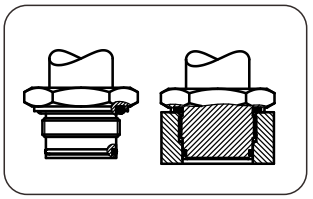
Gage vent



⚠ Please make sure the vent hole is connected with atmosphere when gauge pressure measuring

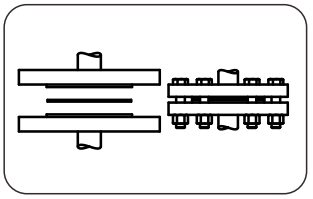
Process connection

Thread connection



⚠ Forbid welding base together with pressure transmitter! Note threaded screw length to avoid glitches scratch the diaphragm.

Flange connection



Select gaskets according to medium characters and temperature range, pay attention to balance each bolt lock.

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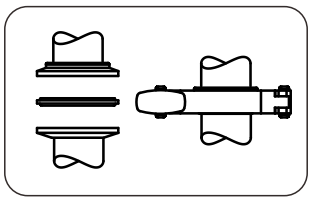
Tri-clamp connection

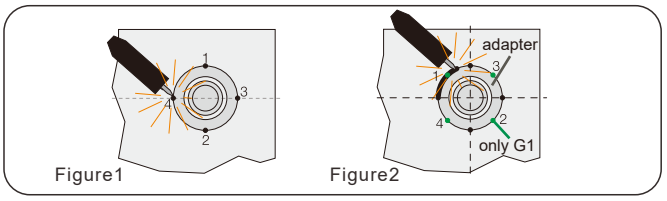


Choose gaskets which meet the hygienic standards, to avoid the measurement errors caused by excessive locking clamp gasket and diaphragm compression.

⚠ Hygienic pressure transmitter Tri-Clamp has been approved by 3-A certificate.

⚠ The gaskets of Tri-Clamp, filling fluid of diaphragm seals and all the wetted parts are in line with FDA standards.

Welding installation rules



Welding to pipes and containers, please comply with the detailed steps as following:

① Bore a hole in the pipe or housing wall with the outside diameter of the adapter(max. tolerance: 0.2 mm);

② Fix the adapter at four points with sufficient holding force(see figure 1), apply the fixing points at equal distance opposite each other! For G1", should fix the adapter at eight points (see figure 2)

③ Screw on welding adapters.

④ Apply the welding seams between the fixing points opposite each other (see figure 2)

⚠ Ensure sufficient intervals between the individual sections (cooling phases to avoid glowing through / warping of the adapter due to overheating).

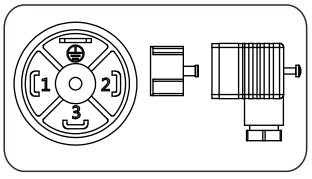
⚠ Please adopt welding adapter to ensure correct operation at measuring points.

⚠ Please note: Max mounting torque is 20Nm!

⚠ Please make sure the atmospheric connection side open.

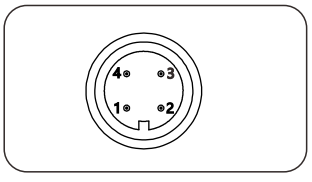
Electrical connection

DIN43650



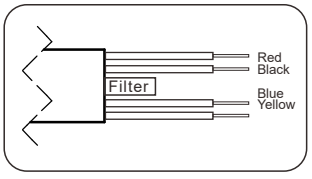
Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1	Power+	Power+	Power+	Power+
2	Power-	Power-	Power-	Power-
3	Key-z	Signal+	Signal+	A+
⏚			Signal-	B-

Aviation plug,(M12*1-4pins)



Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1	Power+	Power+	Power+	Power+
2			Signal-	B-
3	Key-z	Signal+	Signal+	A+
4	Power-	Power-	Power-	Power-

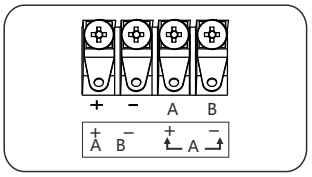
Cable outlet



Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
Red	Power+	Power+	Power+	Power+
Black	Power-	Power-	Power-	Power-
Blue	Key-z	Signal+	Signal+	A+
Yellow			Signal-	B-

⚠ The reference pressure of the gauge pressure transmitter is current atmospheric pressure. Please operate with care, prevent the filter from dropping off and keep it dry

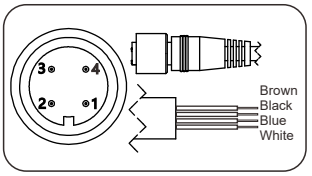
Module terminals-four terminals



Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
+	Power+	Power+	Power+	Power+
-	Power-	Power-	Power-	Power-
A		Signal+	Signal+	A+
B			Signal-	B-

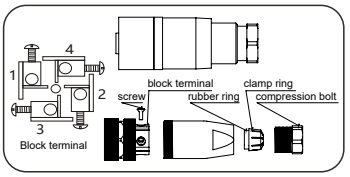
Electrical connection accessories

Aviation plug (with cable)



Label	Two wires	Three wires	Four wires	Modbus-RTU/RS485
1/Brown	Power+	Power+	Power+	Power+
2/White			Signal-	B-
3/Blue	Kye-z		Signal+	A+
4/Black	Power-	Power-	Power-	Power-

Aviation plug(without cable)



Lable	Two wires	Three wires	Four wires	Modbus-TRU/RS485
1	Power+	Power+	Power+	Power+
2			Signal-	B-
3	Key-z	Signal+	Signal+	A+
4	Power-	Power-	Power-	Power-

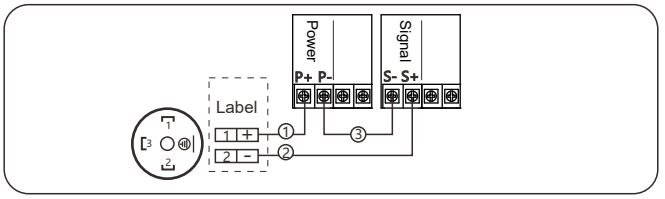
⚠ The electrical connection of hygienic pressure transmitter is aviation plug in general. Please refer to "two wires" in the wiring lists.

⚠ Key-z is modified zero pressure terminal, suitable for electrical connections DIN43650(D), aviation plug(H)

⚠ Please refer to the label for specific signal outline type.

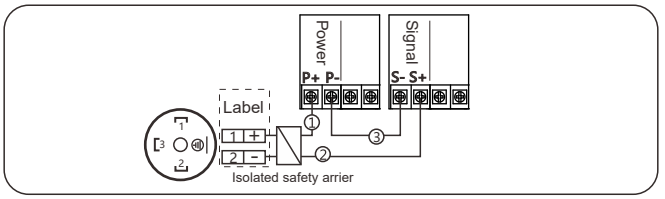
Signal connection

4-20mA two wire (DIN43650)



① Power+ is connected with transmitter terminal 1
② Signal+ is connected with transmitter terminal 2
③ Signal- is connected with power-

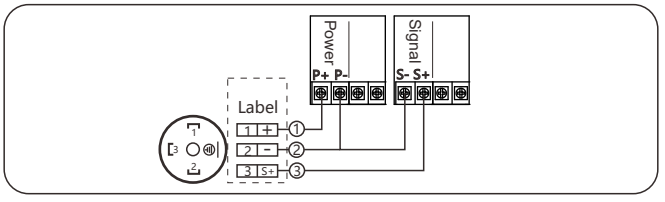
Intrinsic safety 4-20mA (DIN43650)



① Power+ is connected with transmitter terminal 1
② Signal+ is connected with transmitter terminal 2
③ Signal- is connected with power-

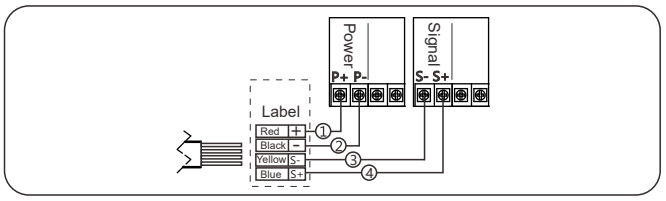
⚠ Please note that the wiring should refer to the installation information provided by the safety barrier manufacturer.

Three wire current/voltage signal(DIN43650)



①Power+ is connected with transmitter terminal 1
②Power- is connected with transmitter terminal 2 and signal-
③Signal- is connected with transmitter terminal 3

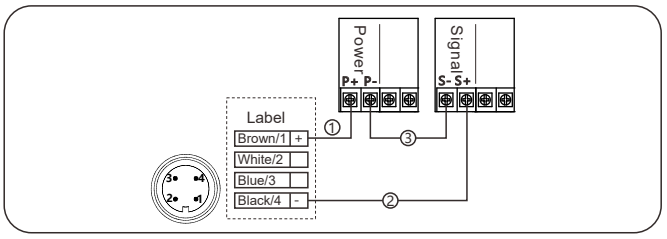
Four wire current/voltage/digital signal (Cable)



① Power+ is connected with red wire of the transmitter
② Power- is connected with black wire of the transmitter
③ Signal+ is connected with blue wire of the transmitter
④ Signal- is connected with yellow wire of the transmitter

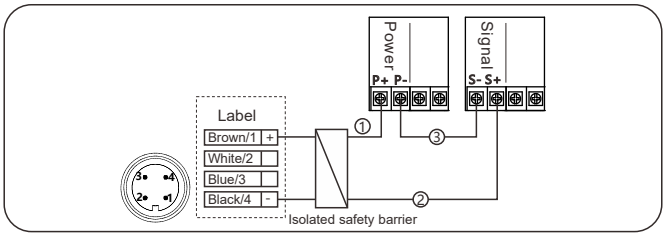
⚠ For Modbus-RTU/RS485, the wiring of positive power supply and negative power supply are same as above. "A+" is connected with blue wire of the transmitter, "B-" is connected with yellow wire of the transmitter.

Two wires 4-20mA (Aviation plug with cable)



① Power- is connected with transmitter terminal 1/brown
② Signal+ is connected with transmitter terminal 4/black
③ Signal- is connected with power-

Intrinsic safety 4-20mA (Aviation plug with cable)



① Power+ is connected with transmitter terminal 1/brown
② Signal+ is connected with transmitter terminal 4/black
③ Signal- is connected with power-

⚠ Please note that the wiring should refer to the installation information provided by the safety barrier manufacturer.

Power supply

Independent linear direct-current power supply is suggest to be adopted for the power supply of pressure transmitter, over large resistive load will result in a large pressure drop, so it requires to calculate the all-in resistance of signal cable, display and other record and display equipment, to ensure the voltage provided to the pressure transmitter accord with normal operating requirements.

- Standard current signal output: 12-30VDC,
- Current signal output with HART: 16.5-55VDC,
- Current signal output with intrinsic safety : 12-30VDC,
- ModBus-RTU/RS485 output: 5VDC/9-30VDC,
- 0.5-4.5VDC voltage output: 5VDC/6-15VDC.

Grounding

- Using cable with shielded twisted-pair signal has the best effect, to avoid ground loop, shielded layer adopts single-end grounded.
- Transient resistance built-in module only effect in the case of good grounding, metal shell and internal grounding terminals is used to the nearest grounded directly.

Cable protection system

Standard protection system

In order to avoid the liquid flowing along the cable, which will cause waterproof joint effusion or flow into terminal box, an U-shaped ring needs to configured between pull box and pressure transmitter as in the picture, and make the U-shaped bottom under the pressure transmitter. Considering the needs of maintenance and replace, enough cable length needs to reserve.

Flexible explosion-proof tube protection system

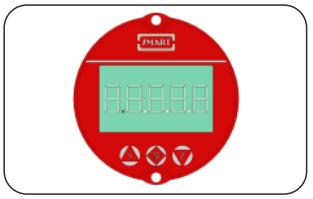
⚠ Using flame proof pressure transmitter in dangerous situations, need to use metal flexible explosion-proof tube to connect the signal cable into pull box and lead to the safety zone.

Intrinsic safety type

⚠ When choose intrinsic safety pressure transmitter, as the power, signal connection grounding and transient solutions are different provided by the intrinsic safety and isolated safety barrier suppliers, so connect the signal line should be paid attention to.

Field adjustment

⚠ Adjustment needs caution. not all types of pressure transmitters adjustment function.



Through LCD buttons, terminal box external buttons or software as HART protocol, it is convenient for range adjustment. For detailed operation, please reference instructions of display, HART protocol and so on.

Zero point adjustment

- Please make an adjustment after installation because the mounting position will affect zero setting.
- The vessel is absolutely empty (No pressure or medium on the measuring diaphragm, the vessel connect to the atmospheric air)
- Power connection please refer to "Keys operation manual-keyboard shortcuts-PV=0"
- Please set PV=0 after three weeks of installation to ensure the best accuracy
- Set PV=0 each year.

⚠ For products without buttons, please use key-z terminal to make zero point adjustment("3" pins/ "blue" wire). After power connection, please connect Key-z/ outlet cable with negative power terminal/ outplet cable, and disconnect after 5 seconds
⚠ Zero point adjustment is only avaible for gauge pressure transmitters and differential pressure transmitters

Full span adjustment

- Fill the vessel with medium (fill to the required level)
- The static pressure value should be within the minimum and the maximum pressure range.
- Power connection please refer to "Keys operation manual-keyboard shortcuts-full span adjustment"

Factory resets

- Please refer to "Keys operation manual-keyboard shortcuts-factory resets"

⚠ For products without buttons, please use key-z terminal("3" pin/ "blue" wire) to make factory resets. Before power connection, please connect Key-z/ outlet cable with negative power terminal/ outplet cable, and disconnect after powering 10 seconds

Maintenance

Requires no maintenance

External cleaning

Please notice the following when cleaning:

- Use washing agent which will not damage to the instruments
- Prevent the process diaphragm from mechanical damage, eg: the mechanical damage caused by sharp objects.
- Mechanical cleaning of metal diaphragm(technical and teference) is prohibited.
- Do not point the nozzles to the diaphragm directly when doing internal cleaning by pressure washer.

Transportation / storage

- Do not store at outside
- Keep dry and dust-free
- Do not expose to the corrosive medium
- Avoid solar radiation
- Avoid mechanical shock and vibration
- Storage temperature: -40~85□
- Maximum relative humidity:95%

EMC statement

- EMC equipment instructions 2014/30/EU.
- CE mark suggests the instruments are in line with EU standards
- Users need to ensure the whole equipment conform to all the applicable standards.

Retransport

- Keep clean of the pressure transmitter. Stay away from any dangerous medium!
- Please adopt proper package to avoid damage in transportation.

Exception handing

- Measurement signal is abnormal which should judge the process pressure is abnormal, measuring system error or influence of installation environment or abnormal in the pressure transmitter, then analyze the reason and take corresponding measures.

- No signal output, process pressure changes but no measurement corresponding change, or change does not correspond, it may be an abnormal pressure transmitter, it needs to check the power supply voltage, wiring, power consumption and load resistance whether they meet normal operating requirements. Also need to check if there is leaks and pressure impulse line blockage, shut-off valve not turned on, etc.

- Signal output error is too big or it exceeds the normal range, need to check the power supply voltage, power consumption and load resistance whether they meet normal operating requirements, the measuring range setting, if adjustment is correct. Also need to check if there is leaks and pressure impulse line blockage, shut-off valve not turned on, rapid temperature fluctuations, etc.

Filling fluid leakage determination

- In the state of no pressure, the output is normal. If add pressure continuously, no significant change in output. Also no damage to the circuit board. Under the condition that there are no pressure plugging or leakage, it can be concluded that the filling liquid has leaked.

Depot repair

Please finish the following steps before the depot repair:

- Removal of all the residues which would be harmful to human health, such as inflammable, poisonous, cancerigenic and radioactive substances.
- Warning! Do not return the instruments if can not ensure the dangerous residues are removed, eg: the dangerous residues permeate into cracks or spread to the plastic.

Discard disposal

- The instrument is not restrained of WEEE instruction 2002/96/EG and laws of relevant countries.
- Please pass the instrument to specialized recycling companies other than local recycling points.