

压力变送器常见问题分析

Frequently Seen Problems & Analysis of Pressure Transmitter

1. 加压变送器输出不变化，再加压变送器输出突然变化，泄压后变送器零位回不去。

产生此现象的原因有可能是压力传感器安装接口与使用设备螺纹连接的密封圈引起的，一般是因为密封圈规格的原因（太软或太厚），传感器拧紧时，密封圈被压缩到传感器引压口里面堵塞测压口，加压时压力介质无法正常通过，当压力很大时突然冲开密封圈，压力传感器受到压力而变化，而压力再次降低时，密封圈又回位堵住引压口，残存的压力释放不出，因此传感器零位又下不来。排除此原因的方法是将传感器正常卸下，直接察看零位是否正常，如果正常请更换符合标准的密封圈再试。

1. Transmitter output doesn't change with a pressure applied, and then suddenly changes with more pressure applied, after relief of pressure, it doesn't return to zero.

Possibly the problem arises from the transmitter's mounting connection and the utility equipment's threaded connection sealing ring, normally because of the specification of the sealing ring (too soft or too thick). When the transmitter is screwed in, the sealing ring is squeezed into the pressure guide hole and blocks it. When applying pressure, it can't enter in, when applying more pressure, the sealing ring is broken, the transmitter responds to the pressure variation, when the pressure goes down, the sealing ring blocks the pressure guide hole again, remaining pressure is trapped, so it doesn't return to zero. The solution is to remove the transmitter by normal means to observe if zero is in proper condition, if so please replace with a sealing ring conforming to standard and try again.

2. 变送器输出信号不稳

可能的原因

- A. 压力源本身是一个不稳定的压力
- B. 仪表或压力传感器受到外界较强的干扰
- C. 传感器接线不牢固
- D. 传感器本身振动剧烈
- E. 传感器的供电电压（24V.DC）不稳定
- F. 传感器故障
- G. 其他原因

2. Transmitter output is not stable

Possibilities:

- A. Pressure source is not stable
- B. Gauge or transmitter is subject to high external interference
- C. Transmitter is not firmly wired
- D. Transmitter vibrates
- E. Power supply (24V.DC) is not stable
- F. Transmitter is faulty
- G. Others

3. 变送器通电无输出

可能的原因：

- A. 接错线错误或接线不牢固（包括地线）（仪表和传感器都要检查）
- B. 导线本身断路或短路
- C. 电源无输出或电源不匹配
- D. 仪表损坏或仪表不匹配
- E. 传感器损坏

3. No output while electrified

Possibilities:

- A. Wrong wiring or unstable wiring (including earthing) (both gauge and transmitter should be checked.)
- B. Lead wire is open or short circuit
- C. No power output or power doesn't match
- D. Faulty gauge or gauge doesn't match
- E. Faulty transmitter

4. 变送器与指针式压力表对照偏差大

首先，出现偏差是正常的现象

其次，确认正常的偏差范围

确认正常误差范围的方法：

计算出压力表的误差值

例如：压力表量程为 30bar，精度 1.5%，最小刻度为 0.2bar

正常的误差为： $30\text{bar} \times 1.5\% + 0.2 \times 0.5$ （视觉误差）=0.55bar

压力变送器的误差值。

例如：压力传感器量程为 20bar，精度 0.5%，仪表精度为 0.2%，

正常的误差为： $20\text{bar} \times 0.5\% + 20\text{bar} \times 0.2\% = 0.18\text{bar}$

整体对照时出现的可能性误差范围应以大误差值的设备的误差范围为准，以上例来说，传感器与变送器偏差值在 0.55bar 内可视为正常。

如果偏差非常大，应使用高精度仪表（至少此仪表精度应高于压力表和传感器精度）进行参照。

4. Big difference between transmitter and pointer type pressure gauge

Firstly, it is normal to have difference

Secondly, determine normal difference range

Method to determine normal difference range

Figure our error of pressure gauge

For instance: range of pressure gauge is 30bar, accuracy 1.5%, minimum scale 0.2bar

Normal error is: $30\text{bar} \times 1.5\% + 0.2 \times 0.5$ (parallex) =0.55bar

Error of Pressure Transmitter

For instance: range of pressure sensor is 20bar, accuracy 0.5%, gauge accuracy is 0.2%,

Normal error is: $20\text{bar} \times 0.5\% + 20\text{bar} \times 0.2\% = 0.18\text{bar}$

Possible error range coming from complete comparison should be the error of the equipment that produces bigger error, applying to above instance, the error of sensor and transmitter within 0.55bar should be regarded as normal.

If difference is big, high accuracy gauge should be used (as least better accuracy than pressure gauge and sensor) for reference.

5. 压力上去，变送器输出上不去

1. 检查压力接口是否漏气或被堵；
2. 检查接线是否正确且接线可靠；
3. 检查供电电源是否可靠有效；
4. 检测变送器的零点是否有信号正常输出，且加压时变送器的输出是否有同等的变化；
5. 检查系统的连接后其他设备是否有问题和损坏；

5. Pressure goes up, transmitter s output doesn t go up

1. check if pressure connection is leaking or blocked;
2. check if wiring is correct and well grounded;
3. check if power supply is reliable and effective;
4. check if transmitter outputs a signal at zero, and if output changes when pressurize;
5. check if other equipment after the system s connection are faulty;



6. 测量介质对于压力传感器的重要性

选择一个合适的压力传感器，了解介质的特点尤为重要。

1. 介质的腐蚀性如何，导电性如何。根据介质的这些属性选用相应类型的传感器。
2. 介质温度范围如何：
一是介质的经常性的温度范围为多少，根据此信息选择补偿温度与其范围一致的传感器，
二是介质的最高温度范围，根据此信息选择使用温度范围一致的传感器。
3. 以上两点如果选择不正确，极有可能影响测量精度甚至损害传感器。

6. Importance of measuring medium to pressure transmitter

choose a suitable pressure transmitter, understanding features of medium is specially important

1. how are medium s corrosivity and conductivity. According to these features of medium, choose transmitter in related type.
2. how is medium s temperature range:
one is what medium s regular temperature is, according to this information, choose sensor with same temperature compensation,
the other is medium s maximum temperature range, according to this information, choose sensor with same operation temperature.
3. if above 2 points are chosen wrong, it is quite possible to falsify measuring accuracy or even damage sensor.

7. 压力传感器与压力变送器的区别

压力传感器通常专指是非标准 mV 信号输出的元件级产品，是压力变送器的核心元件，由于信号的非标准性，用户使用时需要进行压力标定和设计专门的信号处理电路；由于信号微弱，距离较长时需要增加放大器；

压力变送器从书面意义上也属于压力传感器，但是其输出信号为标准通用的信号，如 4~20mA，1~5V 等，可以远距离传送，并且可以与标准仪表配套。同时其压力值已经进行过标定，用户只需通过仪表的量程设定即可使用。

7. Difference between Pressure Sensor and Pressure Transmitter

Pressure transmitter normally refers to non-standard mV signal output element level product, it is the core element of pressure transmitter, because of non-standard nature of signal, when using, user should do pressure demarcation and design special signal process circuit; because signal is very low, it needs amplifier for long distance;

In written meaning, pressure transmitter belongs to pressure sensor, but its output signal is standard general signal, like 4~20mA, 1~5V etc, which can transmit over long distance, and can match other standard instruments. Meanwhile its pressure value has been demarcated, user can use it by only setting instrument ' s range.

8. 如何选择压力变送器？

1. 确定测量介质

看测量介质的腐蚀程度，根据腐蚀程度的大小选择相应的变送器，一般来说非强酸强碱均可以使用以不锈钢为隔离单元的变送器，否则只能选择专为防腐蚀设计的钛合金等特制化学密封产品。

其次还需了解测量介质的粘稠度，洁净程度，如果很粘稠（比如流动很迟缓）就需要选择硬性隔离单元的变送器

2. 确定测量范围和测量方式

一般选择测量范围时要考虑实际测量范围，过压测量范围，选择量程以最大测量范围为准，同时考虑过压测量范围的大小。

另外需要选择正确的测量方式，如果测量差压必须选择差压变送器（并配货相应的阀组为产品和设备的正常运行提供保障）

3. 确定精度范围，补偿温度范围，使用温度范围。

根据您需要测量的最低精度，一般选择略高于所要求最低精度的产品。

同时选择时还需考虑长期稳定性指标

所谓补偿温度范围即正常工作时测量介质的温度范围，使用温度范围即使用过程可能出现的最大温度范围，一般选择时略大于要求的温度范围

4. 确定压力接口，电气接口，机械尺寸等

5. 确定是否需要防爆，需要防电磁干扰，以及外壳防水的环境指标

8. How to choose pressure transmitter

1. decide measuring medium

Look at medium s corrosivity, choose correspondng transmitter according to corrosivity, normally transmitter with stainless steel isolation cell is enough for non strong acid strong alkali, otherwise special chemical seal product made in titanium alloy specially designed for corrosion-proof must be used. Secondly, need to know viscosity of measuring medium, cleanliness, in case of very viscous (e.g. very slow flow) transmitter of rigid isolation cell needs to be used.

2. decide measuring range and method

normally when choosing measuring range, need to consider actual measuring range, overpressure measuring range, choosing range should refer to the biggest measuring range, meanwhile consider volume of overpressure range. In addition, need to choose correct measuring method, if measuring pressure difference, need to use differential pressure transmitter (and equip with relevant manifold to maintain normal operation of the product and equipment)

3. decide accuracy range, compensation temperature range, using temperature range.

according to minimum accuracy, normally choose a bit higher accuracy

meanwhile when choosing, need to consider long term stability

compensation temperature range is that measuring medium s temperature range when working normally, using temperature range is the biggest temperature range when using, normally choose a little bigger temperature range than required.

4. decide pressure connection, electric connection, mechanical dimensions etc

5. decide if need explosion-proof, electro magnetic interference-proof, and ambient factor of waterproof of enclosure

