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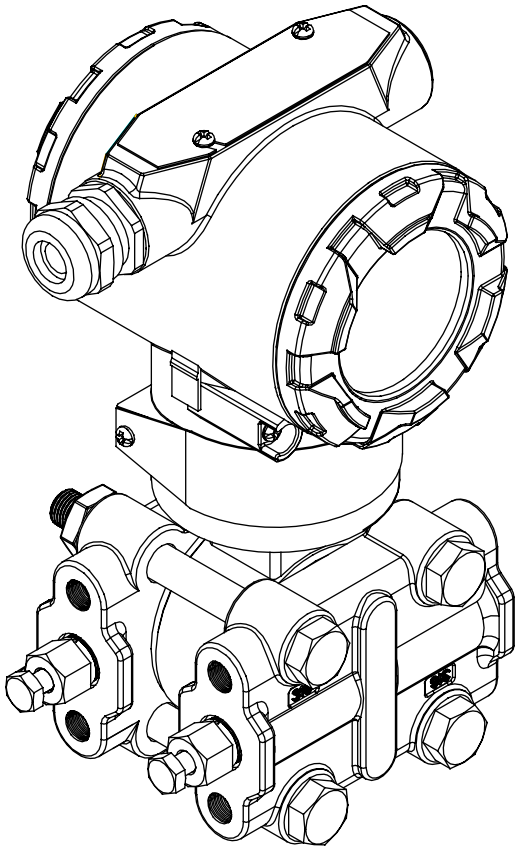
Smart Monocygstallina Silicon Transmiter
Operation Instruction



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Warranty Service Terms

Dear Customer:

Thank you for purchase our products, in order to make our services more satisfactory for you, please carefully read this ordinance and keep this warranty service card. The warranty card must be provided during the time of warranty.

Ⅰ.Warranty Instruction

1.The warranty period for this product is one year, depending on the warranty period issued on our website.

2.Please carefully consider when purchasing, if no quality problems, would not be returned.

Ⅱ.If it appeared following circumstances, whether within the warranty period, are not for free warranty:

1.Artificially caused by surface corrosion, cracks or concavo-convex, due to abnormal installation, using, maintenance.

2.The product out-of factory time is over the warranty period.

3.Repaired by an unauthorized service provider or technician or disassembled by the users.

Ⅲ.The company will retain the right to interpret and change the terms of this warranty service term.

8.Appendix Common pressure unit conversion table

	Pa (N/m^2)	Kgf/cm²	bar	mbar	atm
Pa	1	1.02×10^{-5}	1×10^{-5}	0.01	9.87×10^{-6}
Kgf/cm²	9.8×10^{4}	1	0.98	980.67	0.967
bar	1×10^{5}	1.02	1	1000	0.987
mbar	100	1.02×10^{-3}	0.001	1	9.87×10^{-4}
atm	101325	1.03	1.01	1013.25	1
torr	133.32	1.36×10^{-3}	1.33×10^{-3}	1.33	1.32×10^{-3}
inH_2O	249.09	2.54×10^{-3}	2.49×10^{-3}	2.49	2.46×10^{-3}
mmHg	133.32	1.36×10^{-3}	1.33×10^{-3}	1.33	1.32×10^{-3}
PSI	6895	7.03×10^{2}	6.90×10^{-2}	68.95	6.81×10^{-3}

	torr	inH_2O	mmHg	PSI (lb/in^2)
Pa	7.5×10^{-3}	4.01×10^{-3}	7.5×10^{-3}	1.45×10^{-4}
Kgf/cm²	735.56	393	735.56	14.2
bar	750.06	401	750.06	14.5
mbar	0.75	0.401	0.75	1.45×10^{-2}
atm	760	406	760	14.7
torr	1	0.535	1	1.93×10^{-2}
inH_2O	1.87	1	1.87	3.61×10^{-2}
mmHg	1	0.535	1	1.93×10^{-2}
PSI	51.715	27.6	51.715	1

Preface

I really appreciate your purchase of my company's 3051 series of monocrystalline silicon transmitter product. The instrucctions of the instrument can achieve various functions, wiring methods, setting methods, operation methods, troubleshooting methods by a detailed description.You need to read this instructions before the instrument into operation.You can perform specific operations after knowing the application methods.It can avoid unnecessary losses due to an error operation.

◆ Before using the instrument, please read this instruction carefully. You can install, operate and maintain the instrument under the premise of full understanding.Incorrect installation or operation may result in damage to the instrument or personal injury.

◆ The company promised to users, when the instrument supplier to be provided hardware and accessories in materials and manufacturing processes do not exist any defects.It begins on the date of purchase the instrument, one year warranty period , if we receives the user's notice of such defects, the Company will repair or replace a defective product free unconditionally.The company's products are all guaranteed lifetime maintenance.

◆ To comply with the principles of sustainable development,the company has the right to change the performance parameters described in this instruction under the condition of not informed in advance. The company has the right to amend or repeal this instruction under the condition of not informed in advance. The company must inform the user in advance,when modifying the instrument certain performance parameters may lead to serious accidents. The company will have a new version of the operating instructions or improved instructions for improved instrument.Please prevail in kind,there is a deviation between description and physical in the instruction.

◆ Prohibited any modification of the instrument!The company is not responsible for the accidents of transforming this product without authorization.

Contents

Dealing with the Fault of Transmitter Maintenance

7.1 Instrument Maintenance

7.1.1 Soft-maintenance

Smart transmitter is smart products.Parameter is open to the users.The users can according to the actual situation to adjust zero,set range,set up damping,even to calibrate.The soft fault caused by modified core parameter and confusion.At this time,please debug according to the previous section and make its restore normal work.

Please disconnect the shell cover,adjust with buttons,or directly use software debugging,when the actual situation needs to be zero.We shall refer to the above key operation instructions and software debugging method for adjustment.

7.1.2 Hard-software

We can't maintain the sensor components,main circuit board and the header on the spot. Hardware maintenance projects contain circuit connection examination,cleaning,replacement transmitter,amphenol connector examination.

◆ Flow sensor body examination

Pay attention to the following:

(1) Before the decomposition of sensor body,transmitter should be removed from the working point.

(2) It must be conducted an experiment for temperature,pressure cycle to guarantee the precision of transmitter after the repackaging.

(3) We can remove the pressure vessel by removing the bolts.

(4) Isolation diaphragm can be cleaned by soft cloth,mild cleaner and water

(5) The pressure vessel and joint should be installed in the ways of rotating and reversing for ease of installation.

◆ amphenol connector examination

We can unscrew back cover to see the amphenol connector .We can spin out two positioning screw and remove the amphenol connector cover.We will see the circuit board.We can check whether the wiring circuit connections are correct or not.It mainly focus on feedthru capacitor and testing diodes assembly.

7.2 Corrective Maintenance

We can identify the reasons of problem by the following steps under the transmitter fault condition.We can decide whether we need to tear open the transmitter to repair by the steps. We can diagnose and repair the three basic fault symptom by these data.We should deal with the easiest conditions at first.If you can't repair the transmitter,please contact our service center.

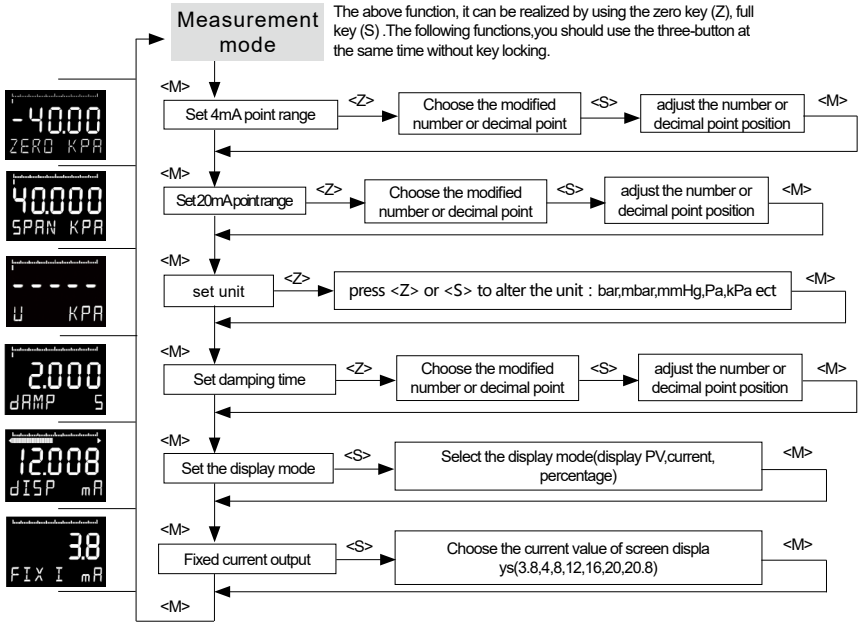
7.3 Display the Error Code

—— No currnent calibration

—— The error of sensor

—— Show out of range

6.1.3 Three-button Debugging Drawing



6.2 Remote software debugging

We can use computer to set of transmitter's function through smart instrument configuration, specific operation is as follows:

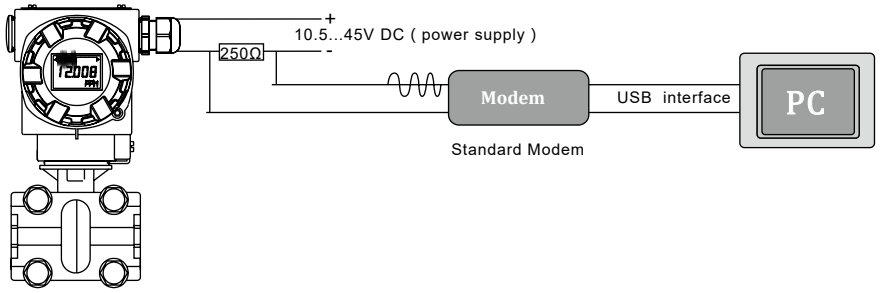
(1) plug in the transmitter power

(2) Communication cable end of communication module connect with computer serial port communication.We can also connect USB OTG line with the phone.

(3) Click on the run configuration software or DRS iphone APP (limited to the android mobile phone system)

(4) Related function menu,you can set the related function. Software debugging connection diagram

Software debugging connection diagram



Document Information

1.1 Document Function

Documents include all information about the life cycle of equipment in differnent stage:from product identification to the arrival of the acceptance and storage, the installation, electrical connection and debugging, and trouble removal, maintenance and abandoned.

1.2 Icon

Icon	Instruction
dangerous	dangerous ! warning icon for dangerous situation. negligence would result in serious or fatal injury to persons.
warning	warning ! warning icon for dangerous situation. negligence would result in serious or fatal injury to persons
careful	careful ! warning icon for dangerous situation. negligence would result in serious or fatal injury to person.
attention	attention operation affect message icon. It does not cause personal injury.

1.3Electrical Icon

Icon	Instruction	Icon	Instruction
	direct current		alternating current
	direct current and alternating current		ground connection operator think ground terminalhas been grounded through the grounding system.
	before the protective ground connection for subsequent electrical connection, you must ensure that this ground terminal has been grounded securely.		equipotential bonding You must connect to the factory's grounding s ystem: using equiptential bounding line and star-connected grounding system depend on national standards or company specifications.

Basic Safety Guidelines

2.1 Staff Requirements

Operators should install,debug,diagnose,maintain the instrument.

Operators must confirm to the following requirements.

◆ The trained qualified professional must be able to perform certain operations and tasks.

◆ By manufacurer/ operator authorization

◆ Operators should be familiar with alliance/National regulations

◆ Before starting operation,professionals must understand this instructions,files and documents,certifications in advance.

◆ Operators should confirm to instructions and basic requirements.

The operator must meet the following requirements :

◆ When operators have the task requirements, it should be directed and authored by Der Sensor Group company.

◆ Operators should confirm to requirements in operating instructions .

2.2 Error description

The manufacturer is not responsible for equipment damage,due to improper use, or for undesignated use.

To verify the measurement conditions :

The company is not responsible for helping you verify corrosion resisitance of wetted parts,when you need to measure special fluid and clean fluid.

2.3 Safe workplace

Operating equipment :

◆ Confirm to alliance/National regulations,people have on protective device.

◆ Please turn off power before wiring equipment.

2.4 Safe operation

The risk of injury !

▲ People aperate the equipment under the current technical conditions to ensure the safety.

▲ The operators are responsible for operating equipment under non- interference conditions

Refit equipment.

Prohibit unauthorized equipment modifications ,may result in unforeseen dangers:

▲ For a change, please contact our local sales center.

Repairment.

▲ ensure safety and reliability operation.

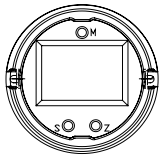
▲ allowable equipment.

▲ Only use the company's original spare parts and accessories.

Debugging

6.1 Local Three- button Debugging

6.1.1 Three-button Location Map



6.1.2 The Discription of Keys Function

(1) Key lock

Press the <Z> and <S> key for more than 5 seconds, you can unlock the LCD (LCD screen display : OPEN).

(2) PV value to zero

The transmitter is placed on the air directly , simultaneously press the <Z> and <S> key for 2 seconds after the key lock. Current PV value will be set to 0 (LCD screen display : PV=0) , and then press the <M> key to return to measurement mode.

Note that if the biases between current PV value and the value 0 exceeds 50% FS above, then PV value to zero is invalided. (LCD screen display : PVER)

(3) 4mA point active migration

Buttons to adjust to zero : Zero pressure applied to the transmitter, press the <Z> key for 2 seconds, the transmitter output 4.000mA current, complete to adjust to zero operation (LCD screen display: LSET)

(4) 20mA point active migration

Buttons to adjust to the full :Full point pressure is applied to the transmitter. Press the <S> key for 2 seconds, the transmitter output 20.000mA current, complete to adjust to zero operation (LCD screen display: HSET)

(5) Transmitter data recovery

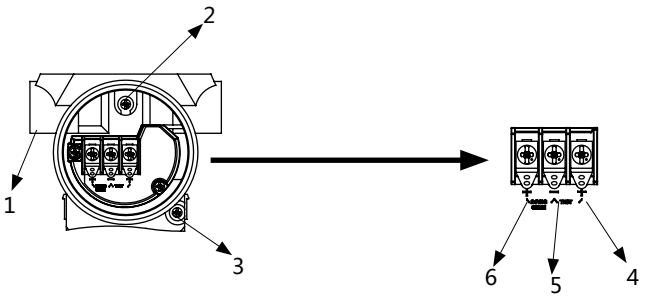
First press the Z button, the transmitter's power is turned on, continue to hold down the <Z> button for 5 seconds, if the LCD screen displays OK,the transmitter will return to the factory state data,then you can release the button.If the LCD displays FAIL, then the transmitter has not been backed up data, you can not recover the transmitter's data to the factory state.

Notes: The functions of above (2), (3), (4) are required for unlocking operation.

Connection

5.1Connection Device
warning
Risk of electric shock !
Operating voltage is above 35V DC: connector with dangerous voltage.
▲ Do not open the casing cover of electro-Instruments in a humid environment. warning:the error of connection has a bad effect on the electric appliance safety.
▲ Exist the risk of electric shock/or explosion in hazardous areas!
▲ When you use the measuring device in hazardous areas,you must confirm to the relevant national standards and regulations, as well as "Safety Guide" or "Installation / Control icon" to install.
▲ Built-in over-voltage protection unit equipment must be grounded.
▲ With reversed polarity, radio frequency interference (HF), overvoltage protection circuit peak.

5.2 Ways of Wiring
5.2.1 Wiring diagram



5.2.2 Cable Specifications
◆ The company recommends using shielded twisted pair
◆ The core cross sectional area of amphenol connector: 0.5...2.5mm²
◆ cable outer diameter: 5 ... 9mm

5.2.3 Shield/electrical potential
◆ When the both ends of shielding layer are grounded (connected to the control and equipment), you can obtain the best shielding effect, to prevent the impact of interference on the measurement. When there is a strong equalizing currents in the factory,shielding layer only connect to single-ended , it is recommended transmitter grounded.
◆ When it is used in dangerous areas ,you must confirm to applicable regulatory requirements.
Additional technical parameters and operating instructions as separate documents Exmanual is standard documentation for all explosion-proof (Ex) systems.

2.5 Danger Zone
When the equipment is used in hazardous areas, measures should be taken to eliminate the risk of personnel or equipment :
◆ Reference plate and check that the ordered equipment is allowed to use in the danger zone.
◆ You should confirm to the provisions of documents,documents belong to "Operation Instructions".

2.6 Safe Product
Measuring equipment based on practical experience in engineering design.It confirm to the most advanced and rigorous the safety requirements.It can use safety by factory acceptance test. Measuring equipment meet the general safety requirements and legal requirements and also confirm to the requirements of EC standard in EC equipment declaration of consistency at the same time.The company make sure that measuring equipment of EC marked confirm to this requirement.

2.7 Safe Function (selection)
You must confirm to the requirements of instructions,when you use equipment under overall security requirements .

Performance description of product

3.1 Features

(1) High accuracy

Monocrystalline silicon pressure transmitter can measure high accurately in the rated measuring range.The accuracy of standard calibration range: ±0.05% , The accuracy of standard calibration range: better than 0.1%. Positive and negative zero shift, without adjusting linearity .

(2) Excellent suitability of environment

The intelligent static pressure and temperature compensation protect transmitter from the effects of temperature, static pressure and overpressure, so that the consolidated measurement error will be kept to the minimum.

(3) Flexible range of compression

- Micro (0 ~ 6kPa)range ratio : 3:1
- Medium range ratio: 4:1
- Maximun range ratio: 4:1

(4) Excellent operability & convenient use

- Five-digit LCD with backlight
- Variety of display functions(Pa、kPa、MPa、%、psi)
- Quickly adjusted through built-in three buttons
- A variety of corrosion-resistant materials
- Comprehensive self-diagnosis function

3.2 Specifications

- Testing Fluid : liquid, gas, vapor
- Measuring range :

DR micro differential transmitter:

range/scope		kPa	inH_2O	mbar	mmH_2O
DR1	range	0.1~1	0.4~4	1~10	10~100
	scope	-1~1	-4~4	-10~10	-100~100
DR2	range	0.5~6	2~24	5~60	50~600
	scope	-6~6	-24~24	-60~60	-600~600

CR micro pressure transmitter:

range/scope		kPa	inH_2O	mbar	mmH_2O
CR1	range	0.1~1	0.4~4	1~10	10~100
	scope	0~1	0~4	0~10	0~100
CR2	range	0.5~6	2~24	5~60	50~600
	scope	0~6	0~24	0~60	0~600

this error, we should make a liquid fill the impulse tube of transmitter low pressure side in advance.we called this condition wet pressure connection.

(c) Reduce errors

Pressure pipe make the transmitter connect with process pipe .The pressure on pressure tappings transfer to the transmitter. In the progress of pressure transmission,it can cause the following error reasons:

- leakage;
- Wear loss (especially when using the detergent);
- There are gas in Liquid pipeline (errors caused by pressure head);
- Gas pipeline accumulating liquid (errors caused by pressure head);
- Density between both sides of the connecting pipe is different, due to the temperature differences (errors caused by pressure head).

(d) The methods of redecing error are as follows :

- Pressure pipe should be as short as possible.
- When measuring the liquid or steam,pressure pipe should be connected to the process pipe up wards and the degree of skewing should not be less than 1/12.
- When measuring the gas,the pressure pipe should be connected to the process pipe down and the degree of skewing should not be less than 1/12.
- The layout of a liquid pressure pipe should be avoided appearing high spot in the middle. The layout of a gas pressure pipe should be avoided appearing low spot in the middle.
- Two pressure pipes should keep the same tempersture.
- In order to avoid friction influence,the diameter of pressure pipe should be large enough.
- There is no gas in the fluid-filled pressure pipe.
- When using the spacer fluid,you should ensure that both sides of liquid in pressure pipe are the same.

◆ steam measuring:

When measuring the steam flow, you should make pressure tapping open in the side of process piping.you must make the transmitter mount below the pressure tapping, so the condensate can be filled in the impulse tube.

It should be noted: In the measurement of steam or other high temperature medium, the temperature should not exceed the transmitter's limit temperature .

When measured medium is steam, impulse tube should be filled with water to prevent steam directly contacting with transmitter. because during the transmitter working, the amount of change in volume is negligible. it is not necessary to install the condensation chamber.

Notes: Use a pressure vessel equipped with a relief valve transmitter, pressure tapping is opened in the side of process piping. Measured medium is a liquid,the relief valve should be installed above the transmitter to discharge gas in the measured medium. When measured medium is gas, the relief valve should be installed below the transmitter to discharge the accumulated liquid.

◆ Liquid Level Measurement: differential pressure transmitter is used to measure the liquid level.It is actually a hydrostatic head to measure the liquid column. This pressure is determined by the high and low of liquid leve,and its size is equal to the height of liquid multiplied by the proportion of the liquid above the mouth of the liquid, regardless of the volume or shape of the container.

(a) Liquid level measurement of opening containers

When measuring liquid level measurement of opening containers,you should make the transmitter mount near the bottom of the container. We can measure the pressure of its height. The liquid pressure of transmitter connected to the high pressure side.The low pressure side is used for opening the atmosphere. If the minimum level of the measured liquid is installed at the top of the transmitter's installation, the transmitter must be positive transfer.

(b) Liquid level measurement in closed container

In a closed container, the pressure of container above the liquid affect the measured pressure at the bottom of the container. Thus, the bottom of the pressure container is equal to the liquid level height multiplied by the specific gravity of the liquid plus the pressure of closed container. We should subtract the pressure of container from the bottom of the pressure container to measure the truly liquid level.A top of the container should be opened the pressure tapping, and connect it to the low pressure side of the transmitter.So that the pressure in the container can be acted on the high and low side of the transmitter at the same time. The results of differential pressure are proportional to which the product of the specific gravity of liquid and the liquid proportion

◆ Dry Pressure Connection

If the gas above the liquid is non-condensing, low-pressure side connecting pipe of transmitter will remain dry,we call this condition dry pressure connection.

We should ensure that the transmitter measuring range and methods of opening the container liquid level is the same.

◆ Wet Pressure Connection

If the gas above the liquid is condensating, impulse tube of transmitter low pressure side will gradually accumulate the liquid. It will cause the error of measurement. In order to eliminate

DP medium static pressure differential transmitter:

range/scope		kPa	inH_2O	mbar	mmH_2O
M1	range	0.5~10	2~40	5~100	50~1000
	scope	-10~10	-40~40	-100~100	-1000~1000
M2	range	1~20	4~80	10~200	100~2000
	scope	-20~20	-80~80	-200~200	-2000~2000
M3	range	1~40	4~160	10~400	100~4000
	scope	-40~40	-160~160	-400~400	-4000~4000
M4	range	1~100	4~400	10~1000	100~10000
	scope	-100~100	-400~400	-1000~1000	-10000~10000
M5	range	2~200	8~800	20~2000	200~20000
	scope	-200~200	-800~800	-2000~2000	-20000~20000
M6	range	5~500	20~2000	50~5000	500~50000
	scope	-500~500	-2000~2000	-5000~5000	-50000~50000

DX large range differential transmitter:

range/scope		MPa	inH_2O	mbar	mmH_2O
L1	range	0.02~2	0.08×10^3~8×10^3	0.2×10^3~20×10^3	2×10^3~200×10^3
	scope	-2~2	-8×10^3~8×10^3	-20×10^3~20×10^3	-200×10^3~200×10^3
L2	range	0.04~4	0.16×10^3~16×10^3	0.4×10^3~40×10^3	4×10^3~400×10^3
	scope	-4~4	-16×10^3~16×10^3	-40×10^3~40×10^3	-400×10^3~400×10^3
L3	range	0.1~10	0.4×10^3~40×10^3	1×10^3~100×10^3	10×10^3~1000×10^3
	scope	-10~10	-40×10^3~40×10^3	-100×10^3~100×10^3	-1000×10^3~1000×10^3

HP high static pressure differential transmitter:

range/scope		kPa	inH_2O	mbar	mmH_2O
HP1	range	0.5~10	2~40	5~100	50~1000
	scope	-10~10	-40~40	-100~100	-1000~1000
HP2	range	1~20	4~80	10~200	100~2000
	scope	-20~20	-80~80	-200~200	-2000~2000
HP3	range	1~40	4~160	10~400	100~4000
	scope	-40~40	-160~160	-400~400	-4000~4000
HP4	range	1~100	4~400	10~1000	100~10000
	scope	-100~100	-400~400	-1000~1000	-10000~10000
HP5	range	2~200	8~800	20~2000	200~20000
	scope	-200~200	-800~800	-2000~2000	-20000~20000
HP6	range	5~500	20~2000	50~5000	500~50000
	scope	-500~500	-2000~2000	-5000~5000	-50000~50000

DPS low static pressure transmitter:

range/scope		kPa	inH_2O	mbar	mmH_2O
S1	range	0.5~10	2~40	5~100	50~1000
	scope	-10~10	-40~40	-100~100	-1000~1000
S2	range	1~20	4~80	10~200	100~2000
	scope	-20~20	-80~80	-200~200	-2000~2000
S3	range	1~40	4~160	10~400	100~4000
	scope	-40~40	-160~160	-400~400	-4000~4000
S4	range	1~100	4~400	10~1000	100~10000
	scope	-100~100	-400~400	-1000~1000	-10000~10000
S5	range	2~200	8~800	20~2000	200~20000
	scope	-200~200	-800~800	-2000~2000	-20000~20000
S6	range	5~500	20~2000	50~5000	500~50000
	scope	-500~500	-2000~2000	-5000~5000	-50000~50000

CP pressure transmitter:

range/scope		kPa	inH_2O	mbar	mmH_2O
CP3	range	0.5~10	2~40	5~100	50~1000
	scope	0~10	0~40	0~100	0~1000
CP4	range	1~40	4~160	10~400	100~4000
	scope	0~40	0~160	0~400	0~4000
CP5	range	1~100	4~400	10~1000	100~1000
	scope	0~100	0~400	0~1000	0~10000
CP6	range	4~400	16~1600	10~4000	100~40000
	scope	0~400	0~1600	0~4000	0~40000
CP7	range	0.04×10^3 ~4×10^3	1.6×10^3 ~16×10^3	0.4×10^3 ~40×10^3	4×10^3 ~400×10^3
	scope	0~4×10^3	0~16×10^3	0~40×10^3	0~400×10^3
CP8	range	0.1×10^3 ~10×10^3	0.4×10^3 ~40×10^3	1×10^3 ~100×10^3	10×10^3 ~1000×10^3
	scope	0~10×10^3	0~40×10^3	0~100×10^3	0~1000×10^3
CP9	range	0.4×10^3 ~40×10^3	1.6×10^3 ~160×10^3	4×10^3 ~400×10^3	40×10^3 ~4000×10^3
	scope	0~40×10^3	0~160×10^3	0~400×10^3	0~4000×10^3

◆ Static pressure :

type	sensor cell	static pressure
DR micro differential transmitter	DR1 (1kPa)	1.5MPa
	DR2 (6kPa)	2MPa
DP medium static pressure differential transmitter	M1~M6	25MPa
DX large range differential transmitter	L1 (2MPa)	25MPa
	L2 (4MPa)	20MPa
	L3 (10MPa)	20MPa
HP high static pressure differential transmitter	HP1~HP6	40MPa
DP Slow static pressure transmitter	S1 (10kPa)	2MPa
	S2 (20kPa)	3.5MPa
	S3 (40kPa)	3.5MPa
	S4 (100kPa)	7MPa
	S5 (200kPa)	7MPa
	S2 (500kPa)	7MPa
CR micro pressure transmitter	CR1 (1kPa)	1.5MPa
	CR2 (6kPa)	2MPa
C P pressure transmitter	CP3 (10kPa)	2MPa
	CP4 (40kPa)	4MPa
	CP5 (100kPa)	4MPa
	CP6 (400kPa)	10MPa
	CP7 (4MPa)	20MPa
	CP8 (10MPa)	40MPa
	CP9 (40MPa)	60MPa

4.5 User Notice for Use Explosion-proof Transmitter

Smart Transmitter Explosion-proof products confirm to the standard for GB3836.1-2000 , GB3836.2-2000, GB3836.4-2000 by National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI). The explosion-proof product marks are ExdIICT6 and ExiaIICT6(excluding acetylene). Users should pay attention to the following matters,when using the product :

◆ Users use the transmitter shell to be grounded safety.

◆ Explosion-proof product using ambient temperature range from -20 ℃ to + 60 ℃ ;

◆ Flameproof enclosure products must confirm to the principle for "after turning off the power,opening the lid " when you use it in the field.

◆ When intrinsically safe product is used in the field during installation.You must connect intrinsically safe product with safety barrier LB987S,MTL787S, E787, etc, which is identified by explosion-proof inspection agency,then can constitute a safety explosion-proof system. In order to connect to other types of safety barriers , it must get approval of explosion-proof inspection agency.

◆ Connecting cable between the transmitter and safety barrier is two-core shielded cable (cable must have a cable sheath). Core wire cross-sectional area ≥ 0.5mm2, their shielding layer is single-grounded and insulation of product shell in a safe place. Cabling should be excluded the effects of electromagnetic interference as soon as possible , and cable distribution parameters controlled within 0.06μF / 1mH.

◆ Safety barrier shall be installed in a safe place, its installation, usage and maintenance must confirm to the safety barrier operstion instruction .

◆ Users could not change the product's electrical components and systems connection at will.

◆ Concerning product installation,usage and maintenance,We should confirm to the operation instruction, including GB3806.15-2000 "Electrical apparatus for explosive gas atmospheres---Part 15:Electrical installations in hazardous locations (except coal mine)" and GB50058-1992 "Electrical installations design code for explosive atmospheres and fire hazard"the relevant provisions.

◆ Flameproof enclosure products cable should confirm to φ8 ~ φ8.5mm.You should tighten the compression nut in the field,making seal ring and cable closely connection.

◆ The plug must be provided by our company.If there is a gap on products ,you can use the plug.

4.6 Ways of Measuring

◆ liquid measuring :

When measuring the liquid flow, you should make pressure tapping open in the side of process piping to avoid the precipitation of dross. At the same time you want to install the transmitter beside or below the pressure tapping, so that air bubbles discharged into the process piping.

◆ gas measuring :

When measuring the gas flow,you should make pressure tapping open in the top or side of the process piping. And the transmitter should be installed next to or above the process piping,so that the accumulation of liquid tends to flow into the process piping.

4.3 Installation Position

Transmitter correct position is related to the measured medium on the process piping. For the best installation,you should pay attention to consider the following conditions:

- You should prevent the transmitter from contacting with overheating and corrosive measured medium .
- To prevent the waste deposited in the pressure pipe.
- pressure pipe is as short as possible .
- liquid head in both sides of pressure pipe should be kept balance.
- pressure pipe should be installed in a small temperature fluctuations.
- prevent pressure pipe from crystallizing or freezing.

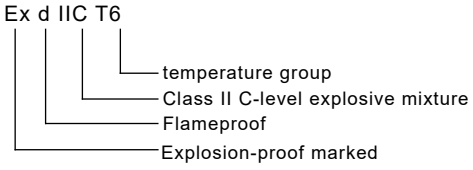
4.4 Installation of dangerous locations

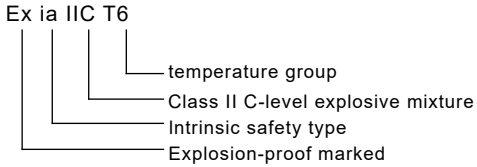
You must use smart explosion-proof transmitter in hazardous locations, smart explosion-proof transmitter is the extension products for smart transmitter . The working principle and basic structure of smart explosion-proof transmitter are similar to the amart transmitter.

Smart explosion-proof transmitter has two types ,including intrinsically safe and explosion-proof.Intrinsically safe and explosion-proof instrument should confirm to GB3836.1-2000 "Electrical apparatus for explosive gas atmospheres--General requirements".

Smart explosion-proof transmitter shell can withstand an explosion, internal explosion does not cause an explosive mixture explosion outside.The marked as d confirm to GB3836.2-2000 "electrical apparatus for explosive gas atmospheres "d" ". The grade for explosion-proof is ExdIICT6.

Smart intrinsically safe transmitter refers to :electrical systems can not ignite an explosive mixture by sparking and heating effect under normal operation or fault conditions.The marked ia conform to GB3836.4-2000 "electrical apparatus for explosive gas atmospheres---Intrinsic safety "i" ", The grade for explosion-proof is ExiaIICT6. Transmitter is supporting the use of associated equipment safety barrier installed in the control room, consisting of intrinsically safe explosion-proof systems.





Explosion-proof Structure:

electrical components and circuit boards of all explosion-proof smart transmitter are placed in the explosion-proof shell. Even if the instrument sparks explosions due to the instrument's fault , the transmitter shell have sufficient mechanical strength and explosion-proof performance.Not only it does not damage the flameproof shell, and can not make the mixture explosion outside the shell .

- Output Signal : DC4~20mA+ protocol
- Allowable Load Resistance : 0~600Ω (DC 24V)

  Note: when communicate with the handheld communicator, you need a standard (250Ω) load resistance.
- Power Supply :

general service	DC10.5~45V
instrinsic safety explosion-proof	DC10.5~26V

- Communication line condition: length of line: Max 2km

  (0.75~1.25mm^2 Control Instrument Cable ,exceeds 1 km :twisted pair cable)

  Load Resistance : 250~600Ω

  (DC 24V,include cable resistance)

  Load Capacity : under 0.55mF

  Load Inductance : under 3.3mH

  Spacing above power line : above 15cm

  (please avoid parallel wiring)
- Saturation Current : upper limit 20.8mA

  lower limit 3.8mA
- Alarm Current : upper limit 22.8mA

  lower limit 3.6mA

  (Mode can be set)
- Adjustment Function : The zero & full span point can be adjusted through the third-button from the top of the housing or be adjusted remotely through configuration software.
- Zero Shift : It can migrate within the maximum range from -20% to 20%.
- Output Methods : linear output

  square root output

  (It can be adjusted remotely through configuration software.)
- Environmental Temperature : -40~+85℃

  (when filling fluorine oil : -10~+60℃)
- Storage Temperature : -40~+90℃
- Weatherability : DIN40040GPC
- EMC Applicable Standard : EN1326-1 : 2006
- Square-root Output Precision :

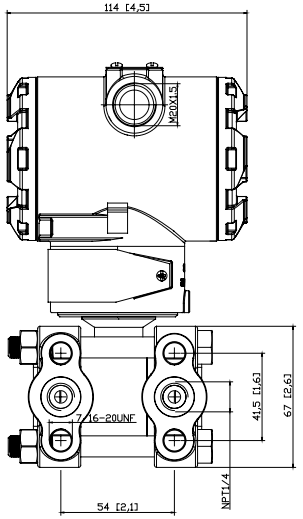
output	precision
≥50%	same as reference precision
50%~drop point	reference precision×50 square root output (%)

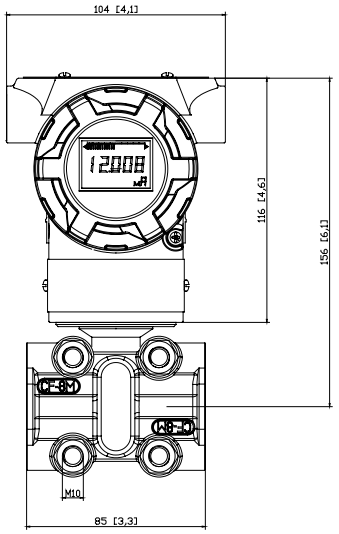
- Effect of Power supply : ±0.005% /1V
- Effect of Mounting position : The changes of mounting position in the direction parallel to the diaphragm will not cause zero- drift effects. If the changes between the mounting positionand the diaphragm is more than 90° ,which can be corrected through zeroing corrected within the range of 0.4KPa.

- Response time : 90ms
- Damp : The time constant can be adjusted from 0 to 99.9 seconds
- Filter constant : It can be adjusted within 0 ~ 160 uA
- Self-stabilization coefficient : It can be adjusted from 0 to 2%

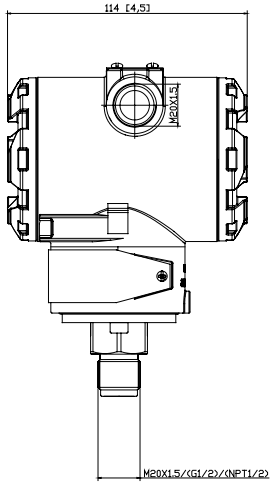
3.3 Dimensioned Drawing

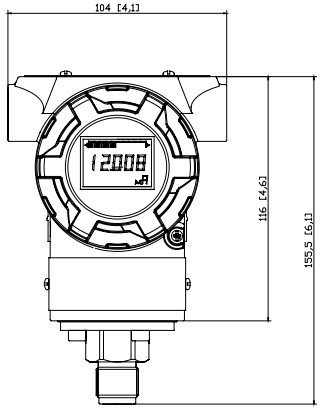
Differential Pressure Transmitter





Pressure Transmitter





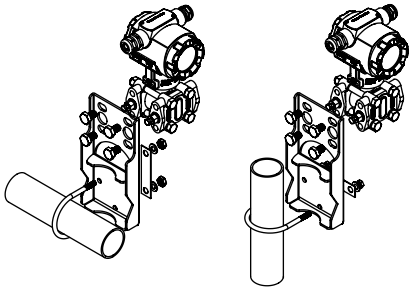
Installation

4.1 General Installation Guide

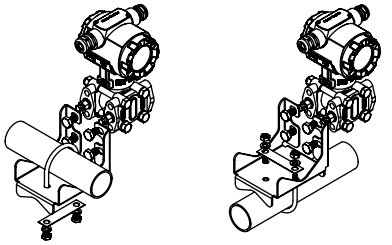
- Installation may cause measurement deviation.For example: when measuring the empty container,the measured value display is not 0. In this case you can adjust zero shift by a local third-button,or remote operation.
- General installation requirements to take pressure pipe, please refer to DIN 19210 standard "fluid measurement and differential pressure pipe of flow measurement devices" ,relevant national or international standards.Without interrupting the process, you can use a three-valve or five-valve to debug,install and maintain for instruments.
- When you mount pressure pipe outdoor,you should take adequate frost protection measures, such as: the pipes to heating.
- The inclining angle of pressure pipeline should be at least 10%.
- Do not use hard or sharp objects to clean or touch diaphragm seals.
- The maximum rotation angle of housing is 360° , to ensure that the display unit has the best readability.
- Field display can rotate 90 ° .
- The company provides instruction mounting bracket.

4.2 Field Installation

The company produces smart transmitters.It can be mounted on horizontal or vertical pipes by different mounting brackets . The following figure shows the different forms of installation (user selectable).Differential pressure transmitter



Installation diagram of tablet bracket



Installation diagram of right angle bracket

Pressure transmitter