3051P Pressure Transmitter

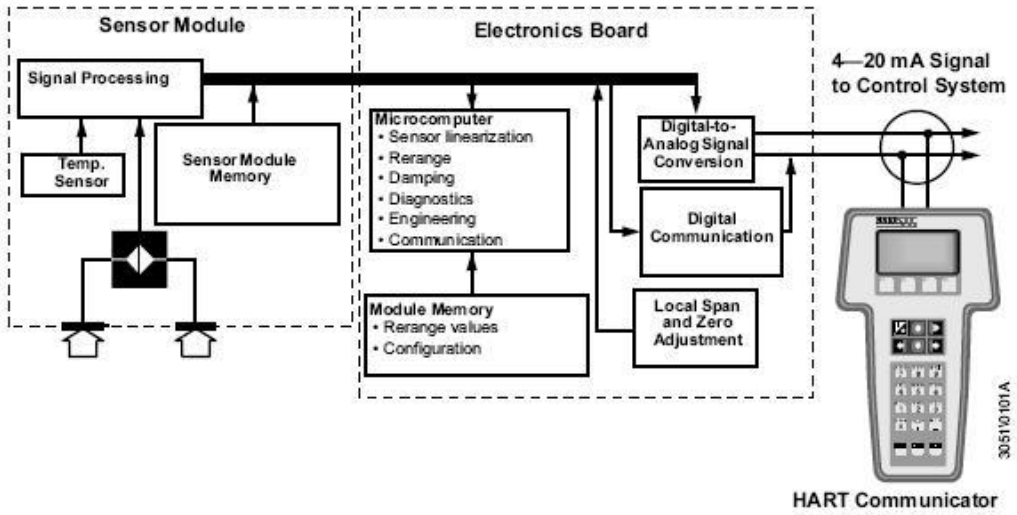
DESCRIPTION

3051P Pressure Transmitter pressure transmitter provides a kind of reliable measuring way. It is used for measuring pressure, level, density of liquid, gas or steam and convert the value of above into current signal output or digital protocol output. The pressures are directly applied to the isolating diaphragm that provide isolation and resistance against process fluid corrosion. Being microprocessor based, the electronic circuit is extremely versatile and accurate. Combined with the sensor precision, it provides the high accuracy and range ability. Transmitter performance is improved by continuous monitoring of the sensor temperature and corresponding corrections. A local display permits easy reading and writing of data.

3051 Pressure Transmitter design is offered for Differential Pressure (DP), Gage Pressure (GP) and Absolute Pressure (AP) measurements.3051 utilizes capacitance sensor or monocrystalline silicon pressure sensor for pressure measuring. This product can accurately measure flow, vacuum degree, liquid level and density etc.. The major components of the 3051 are the sensor module and the electronics housing. The sensor module contains the oil filled sensor system (isolating diaphragms, oil fill system, and sensor) and the sensor electronics. The sensor electronics are installed within the sensor module and include a temperature sensor (RTD), a memory module, and the capacitance to digital signal converter (C/D converter). The electrical signals from the sensor module are transmitted to the output electronics in the electronics housing. The electronics housing contains the output electronics board (microprocessor, memory module, digital to analog signal converter or D/A converter), the local zero and span buttons, and the terminal block.

3051P Pressure Transmitter is applied to the isolating diaphragms, the oil deflects the center diaphragm, which then changes the capacitance. This capacitance signal is then changed to a digital signal in the C/D converter. The microprocessor then takes the signals from the RTD and C/D converter calculates the correct output of the transmitter. This signal is then sent to the D/A converter, which converts the signal back to an analog signal and superimposes the HART signal on the 4-20mA output.

Figure 1-1. Block diagram of operation



FEATURES

2-wire mode, 4～20mA analog output, HART® protocol.

Complete varieties, high accuracy, and good stability.

Isolation ex-proof housing structure, strong resistance to frequency conversion interference.

High static pressure, high over pressure protection.

APPLICATIONS

Process control fields for the industries of petroleum, chemical industry, metallurgy, electricity, food, paper making, medicine, machine manufacturing, scientific experiment and military

SPECIFICATIONS

Measuring object: liquid, gas and steam
Measuring range: 0~0.1kPa to 0~40MPa
Output signal: 4~20mA DC (+HART protocol)
Power supply: 15~45V DC
Range and zero point: adjustable
Humidity: relative humidity 5~95%
Precision: 0.25%FS, 0.1%FS, 0.075%FS
Temperature drift:
±1kPa：±0.5%FS； ±6kPa：±0.3%FS； Other ranges：±0.25%FS
(Standard ranges, -20～70℃)
Ambient temperature -30℃～80℃; with LCD gauge -30℃～70℃
Medium temp. -40℃～125℃
Storage temp. -20℃～70℃
Insulation resistance ≥200MΩ/250VDC
Ex-proof grade: Exd IIC T6
Converter housing: Low copper cast aluminum alloy with Polyurethane paint
Fill Fluid: Silicon / Fluorine Oil

Protection Class: IP65

Maximum positive shift is 500% of minimum adjusting span; maximum negative shift is 600% of minimum adjusting span.

Static pressure: 4, 10, 25, 32Mpa

Electrical connection: M20×1.5 (Female), NPT1/2 (Female)

Pressure connection: M20×1.5 with welded pipe, NPT1/4 (Female), NPT1/2, NPT1/2 (Female), G1/2 with welded pipe, G1/4, 3-valve manifold set M20×1.5 with welded pipe (304/316 options), 3-valve manifold set NPT1/4 (Female) (304/316 options)

Weight: 3.5kg (not including accessories)

Material:

Flange/Adaptor: Stainless Steel

Drains/Vents: Stainless Steel

Diagrams: Stainless Steel 316/Monel /Haste alloy C/ Tantalum

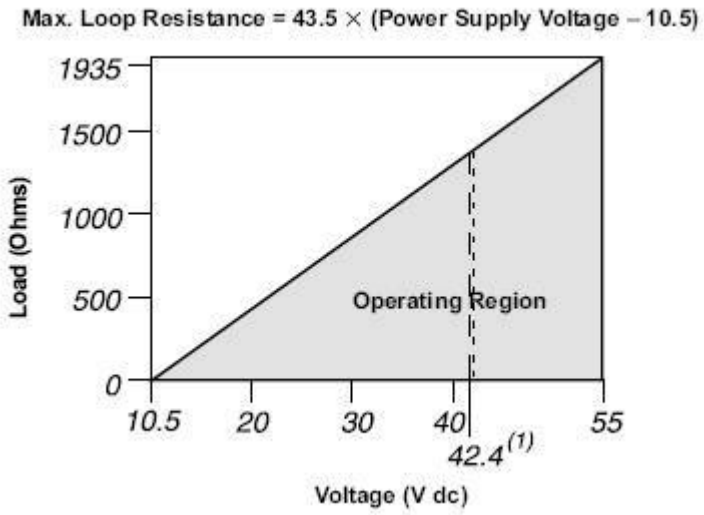
Filling liquid: Silicon oil

Wetted O-Ring: Viton/ Buna-N

Seal O-Ring: Viton/ Buna-N

Bolts & Nuts: Carton Steel/Stainless Steel

POWER SUPPLY LOAD LIMITATIONS, 4–20 MA TRANSMITTERS

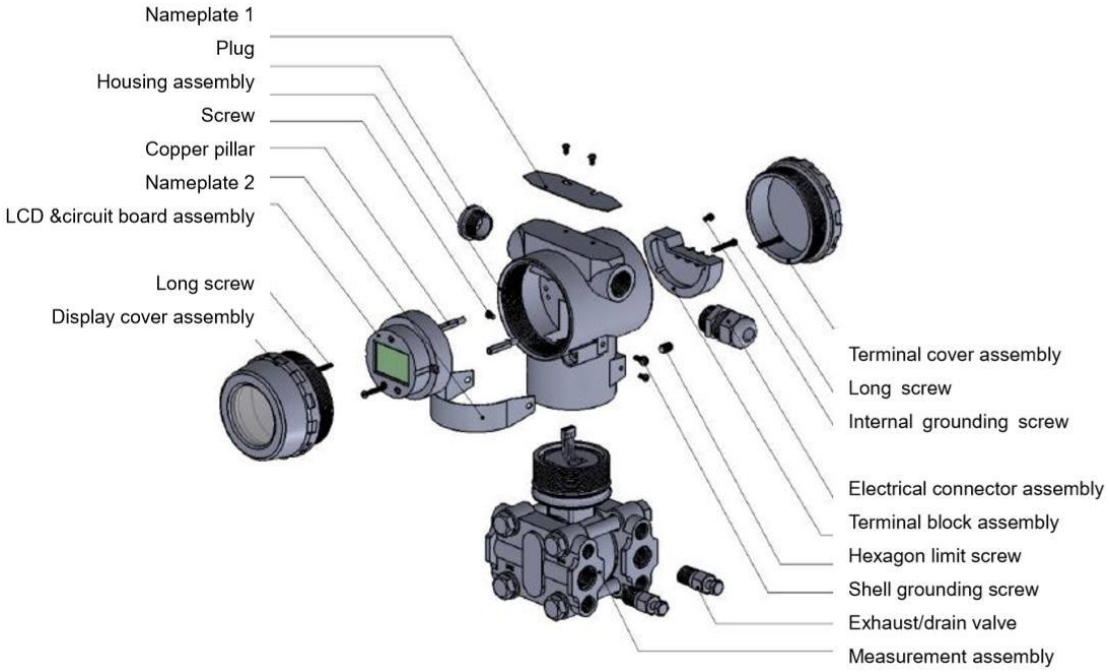


ORDERING CODES

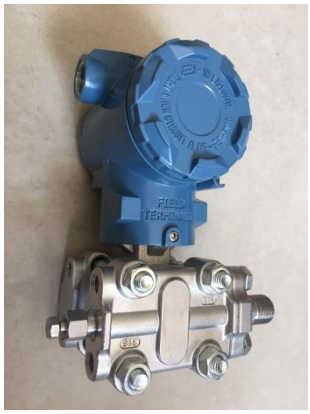
3051P	Pressure Transmitter	
-	Housing type	H1：Normal (BLUE) H2：GRAY H3：WHITE H4：GREEN H5：STAINLESS STEEL
-	Signal Output	E：4-20mA 2-wires S：4-20mA 2-wires+ HART
-()	Pressure Range	e.g. (0-10bar) or (0-1MPa) etc.

-	Wet Part Material	-S4: 304 Stainless Steel -S6: 316 Stainless Steel
-M	Material of Diaphragm	1：316 2：Tantalum 3：Hastelloy C 4：PTFE lined 0: specified (Please Mention)
-D	Display	1：Without 2：LCD
-E	Ex-proof	1：Nope 2：Ex-proof
-	Connection	C1: M20×1.5 with welded pipe C2: NPT1/2(F) Oval flange C3: G1/2 with welded pipe C4: G1/4 C5: NPT1/2 TVC1: 3-valves manifold M20 with welded pipe (304/316 options)
-	Mounting Bracket	B1: Pipe installation bending bracket B2: Plane installation bending bracket B3: Pipe installation flat bracket
-S	Static Pressure	1: Static pressure 4MPa 2: Static pressure 10MPa 3: Static pressure 25MPa 4: Static pressure 40MPa

STRUCTURE



NORMAL (BLUE) HOUSING TYPE OF WM1351P



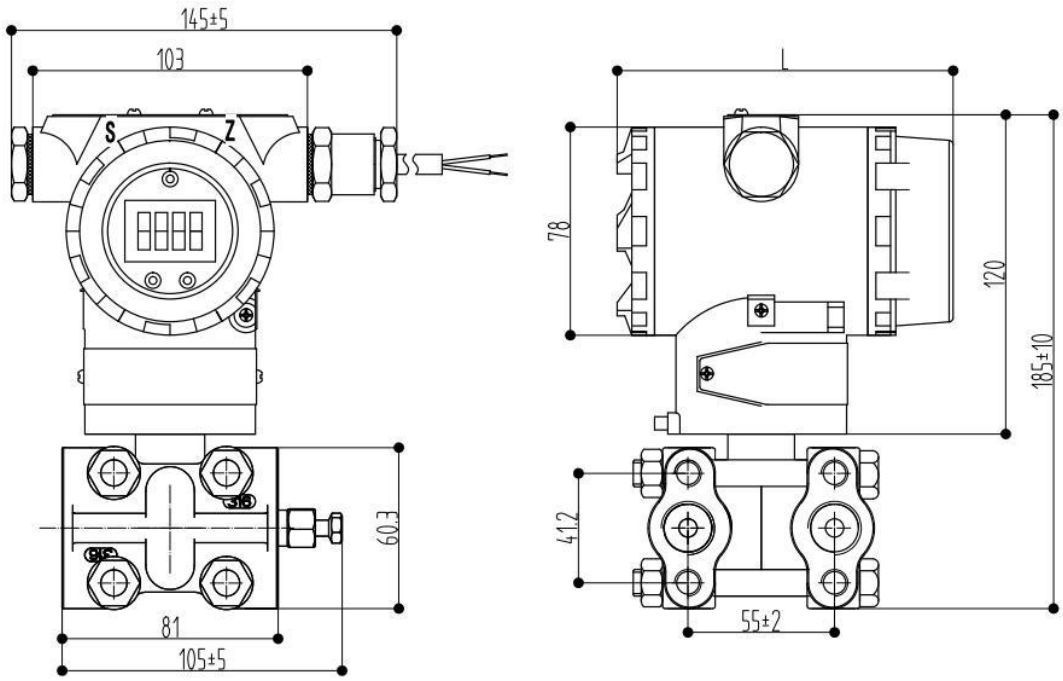
GRAY HOUSING TYPE OF WM1351P

WHITE HOUSING TYPE OF WM1351P

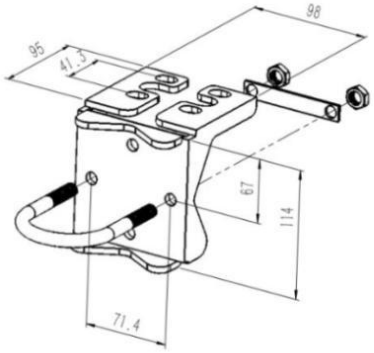
GREEN HOUSING TYPE OF WM1351P

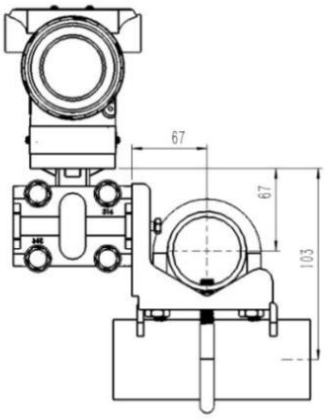
STAINLESS STEEL HOUSING TYPE OF 3051P

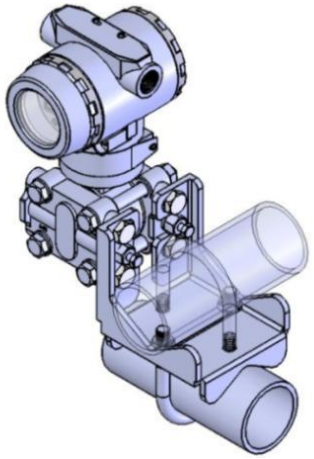
DIMENSION

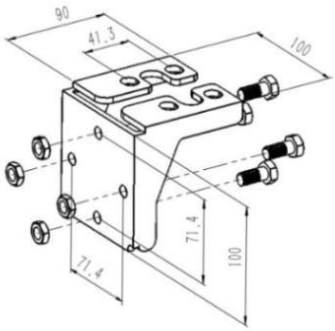


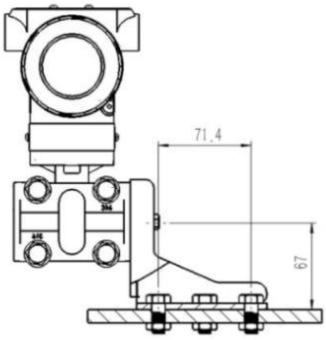
INSTALLATION SUGGESTION

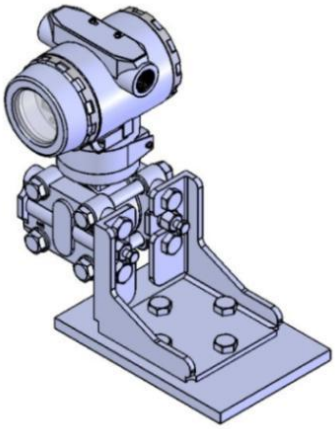


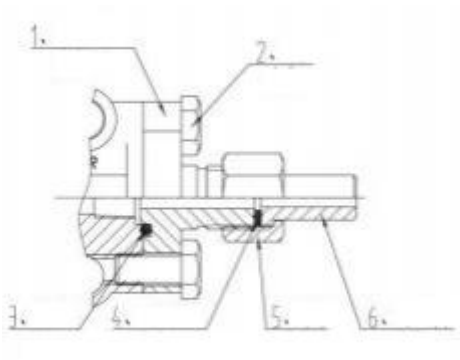
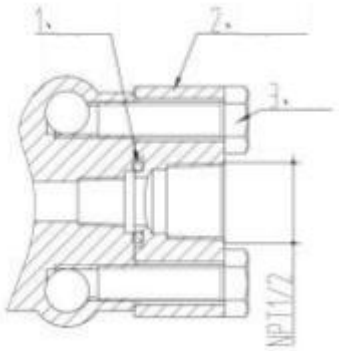


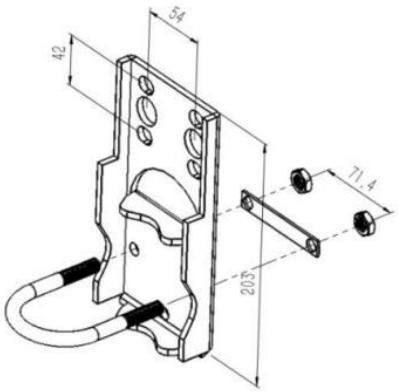


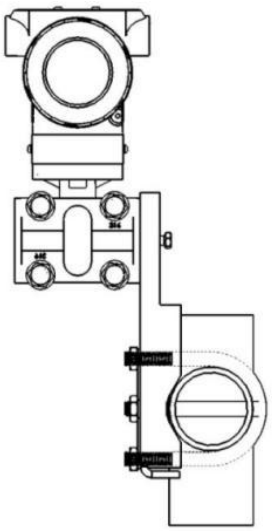


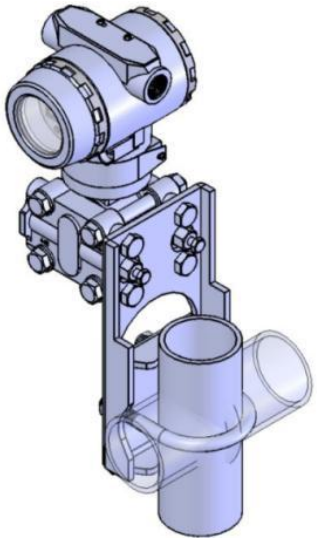




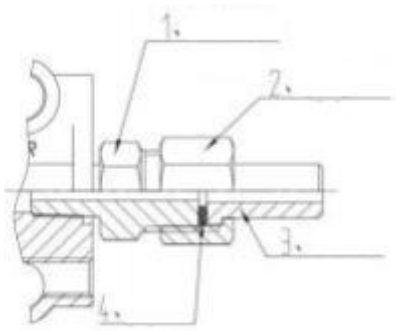
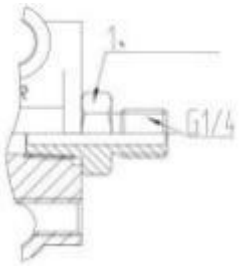
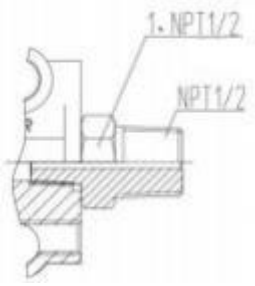
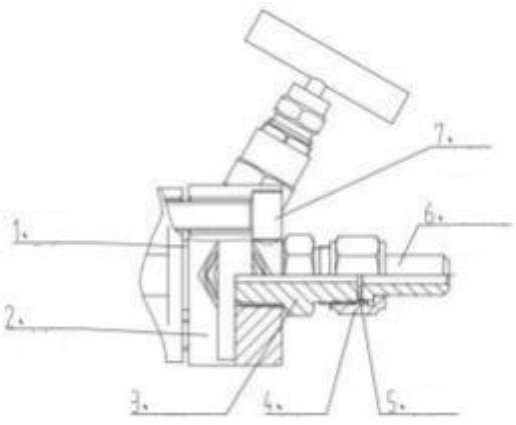
C1: **M20×1.5 with** **welded pipe**		Name	Qty.
		1. T shape connector	2
		2. M10×20 bolt	4
		3. O-ring	2
		4. PTFE gasket	2
		5. M20 nut	2
		6. Φ14×4 pressure welded pipe	2
C2: **NPT1/2(F)** **Oval flange**		Name	Qty.
		1. O-ring	2
		2. Waist shape flange	2
		3. M10×35 bolt	4
		-	-
		-	-
		-	-



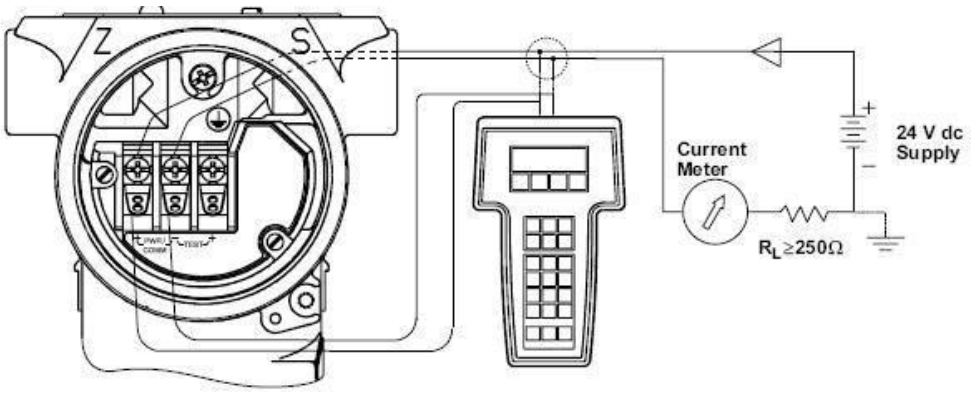




CONNECTION

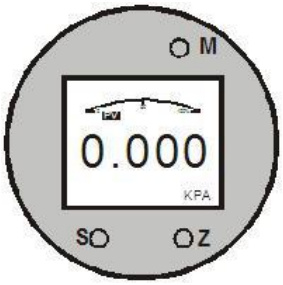
C3：G1/2 with welded pipe		Name	Qty.
		1. NPT1/4 to G1/2 adaptor	2
		2. G1/2 nut	2
		3. Φ14×4 pressure welded pipe	2
		4. PTFE gasket	2
		-	-
		-	-
C4：G1/4		Name	Qty.
		1. NPT1/4 to G1/4 adaptor	2
		-	-
		-	-
		-	-
C5：NPT1/2		Name	Qty.
		1. NPT1/4 to NPT1/2 adaptor	2
		-	-
		-	-
		-	-
TVC1：3-valves manifold M20 with welded pipe (304/316 options)		Name	Qty.
		1. PTFE gasket	2
		2. tri-valve set	1
		3. M20×1.5 connector	2
		4. M20×1.5 nut	2
		5. PTFE gasket	2
		6. Φ14×4 pressure welded pipe	2
		7. M10×35 bolt	4

WIRING



Connect the bench equipment as shown in Figure, and turn on the HART-based communicator by pressing the ON/OFF key. The communicator will search for a HART-compatible device and will indicate when the connection is made. If the communicator fails to connect, it will indicate that no device was found.

BREIF OPERATION OF PRESSURE TRANSMITTER DIGITAL DISPLAY METER



1. HART operator may be connected to the circuit （4-20mA） for monitoring the pressure transmitter or setting operations (see HART operator manual).
2. The use instruction for the button on the transmitter's LCD display:

Zero and Span Shift

Zero Shift: Simultaneously presses down the S key and the Z key (left side is the S key, right side is the Z key) for 6 seconds, display shows "Hart" which indicate that zero and the range adjustment has been activated. Presses down the Z key for 5 seconds, the character of "Hart" vanish. Zero shift finished and the state of activation is withdrawal.

Span Shift: Simultaneously presses down the S key and the Z key (left side is the S key, right side is the Z key) for 6 seconds, display shows "Hart" which indicates that zero and the range adjustment has been activated. Confirming the right pressure corresponding to 20mA, then presses down the S key for 6 seconds, the character "Hart" vanishes, span shift finished at that time and the state of activation is withdrawal.

Note: After entering the state of activation, if not want to make the adjustment, simultaneously presses down the S key and the Z key. After loosening the key, the character of "Hart" on the display vanishes and the state of activation is withdrawal. (Switching on the power again can achieve the same result)

Parameter settings

Press the S key for 6 seconds, the display shows "PASS", then press Z key and the display shows the value. Flicker bit is the modified bit. Press the Z key to add one to the bit. Press Z key for 4 seconds the cursor shift. First operating in the way as above to modify the value into 160, then press S key to enter the next parameter of the adjustment process. The meaning of each parameter is as follows:

Character	Value	Meaning
	XXXXX	Password，the value is 160

BDSH	XXXX.X	Span shift corresponding to 20mA
BDSL	XXXX.X	Zero shift corresponding to 20mA
TRAN	XXXXX	Transmitting function，=0: Linear output，=1: Evolution output
UNIT	XXXXX	Unit on display，0=KPa，1=KPa，2=KPa，3=KPa，4=KPa，6=Psi，7=bar，8=KPa，9=KPa，11=Pa，12=Kpa， 13=Kpa，15=MPa，16=mA，17=%，18=S，19=m3，20=t/h
DAMP	XXXX.X	Damping time, The maximum value is 30 seconds
PREL	XXXXX	*Low-point fine-tuning: Adjusting the volume to the current process input values. Pressing Z key then modifying the fine-tune low point pressure. Do not press the Z key if not want to make adjustment. Pressing the S key directly to the next parameter*
PREH	XXXXX	*High-point fine-tuning: Adjusting the volume to the current process input values. Pressing Z key then modifying the fine-tune high point pressure. Do not press the Z key if not want to make adjustment. Pressing the S key directly to the next parameter*
INIT	yes/no	Hart Three-points linearization and fine-tuning data initialization

Note: Please be cautious when operating the parameters in italics. Ensure the pressure imposed by the device to be accurate.