3051LT Flange Pressure (Differential Pressure) Transmitter

DESCRIPTION

3051LT Flange Pressure (Differential Pressure) Transmitter provides a kind of reliable measuring way. It is designed on the basis of 3051P(DP) and used for measuring pressure (or differential pressure), level, density of liquid, gas or steam and converts 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.

3051LT utilizes capacitance sensor technology for pressure measuring. The sensor module contains the oil filled sensor system (isolating diaphragms, oil fill system, sensor and mounting flange) 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.

For 3051LT design, the pressure is applied to the isolating diaphragm which is welded on the flange. Flat flange and insert flange are available. The sizes of the flange can be customized according to use´s requirements. The material of diaphragm can be optional for different kinds of corrosive liquid as well.

The design of 3051LT is for preventing survey medium from directly entering into the internal transmitter. The sensor receives the change of pressure by the diaphragm on the remoter flange which is connected with the transmitter through capillary filled with silicon oil. 3051LT is suitable for the following operation conditions:

1.   Mediums with high temperature should be isolated with transmitter.
2.   Measured mediums are severe corrosive to sensitive parts of transmitters.
3.   Suspending liquid or mediums with high viscosity.
4.   Measured mediums are crystallized due to change of environment or technological process.
5.   Strict purification of measuring head is needed for replacing measured mediums.
6.   Measuring head must be kept clean and sanitary.
7.   Seal pressure container measurement.

Figure 1-1. Block diagram of operation
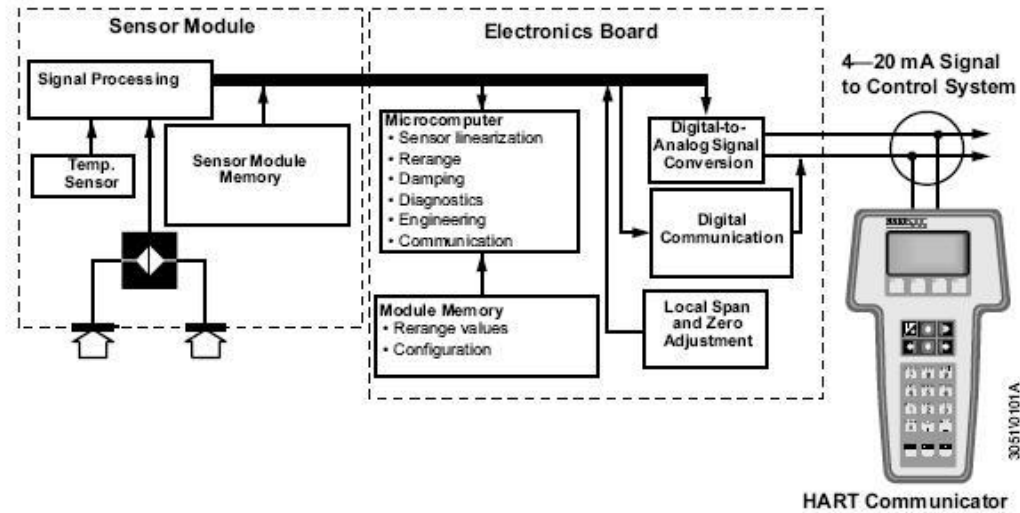
SPECIFICATIONS

Measuring object: liquid, gas and steam

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

Temp. drift：±0.5%FS (Standard ranges, -20～70℃)

Ambient temperature: -30℃～80℃; with LCD gauge -30℃～70℃

Medium temp.: -30℃～245℃

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

Process Connections: Flange, Clamp. (with or without capillary)

Protection Class: IP65

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

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

Material:

Flange/Adaptor: Stainless Steel
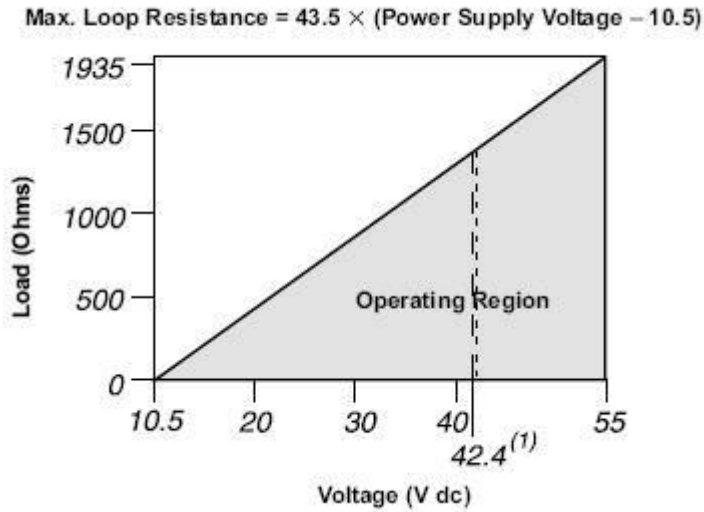
Drains/Vents: Stainless Steel

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

Max. Loop Resistance = 43.5 × (Power Supply Voltage − 10.5)

ORDERING CODES

| 3051LT	Pressure Transmitter	
-A	Installment Position	1: Side 2: Vertical
-F	Flange type	1: Flat 2: Insert
-H	Housing type	1：Normal (BLUE) 2：GRAY 3：WHITE 4：GREEN
-	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
-I	Installment type	1: flange 2: clamp 3: customer specified
-()	Size of installment	e.g. for A1, 2' 150# or DN50/PN16.; for A2, 1" or 1.5" etc.

| -C | capillary | 1: without
2: with capillary (please mention the length of capillary, e.g. 2m etc. |
| - | Mounting Bracket | B1: Pipe installation bending bracket
B2: Plane installation bending bracket
B3: Pipe installation flat bracket |

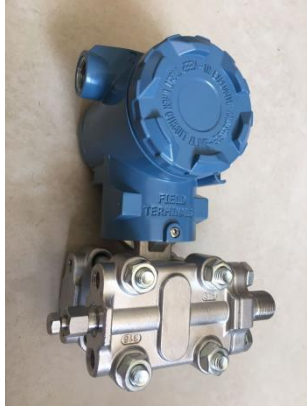**INSTALLMENT POSITION**

Side and Flat Flange:

Insert Flange:
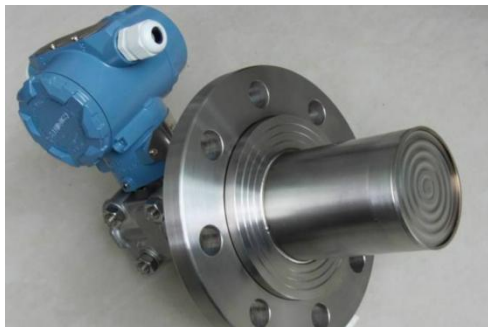
Vertical Position:

HOUSING TYPE
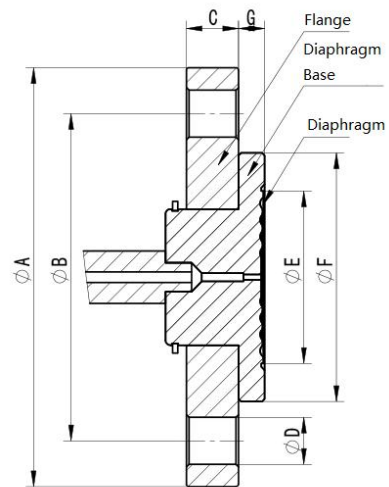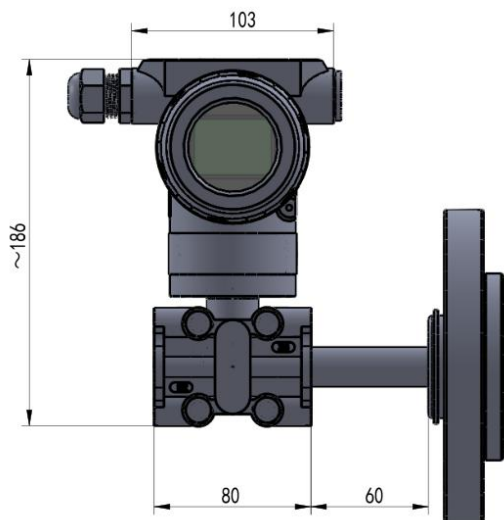

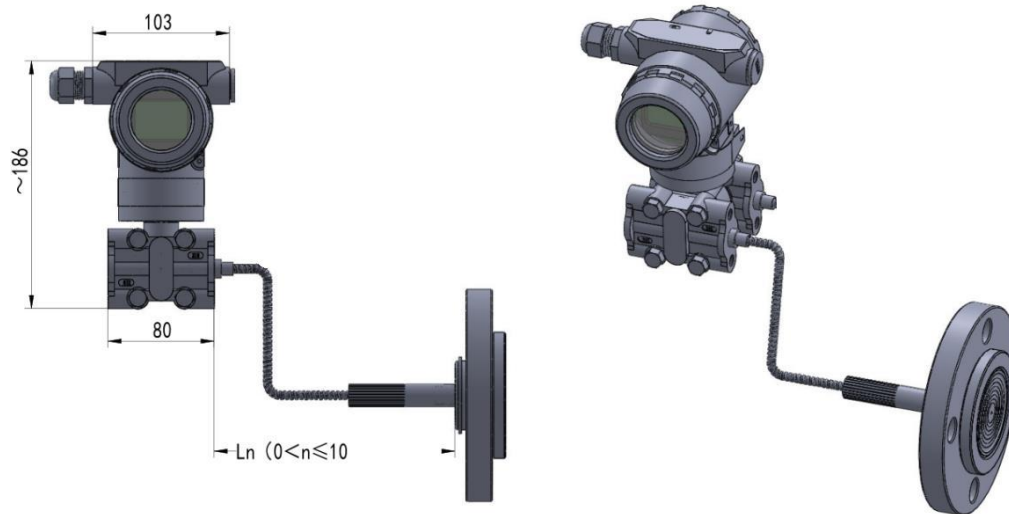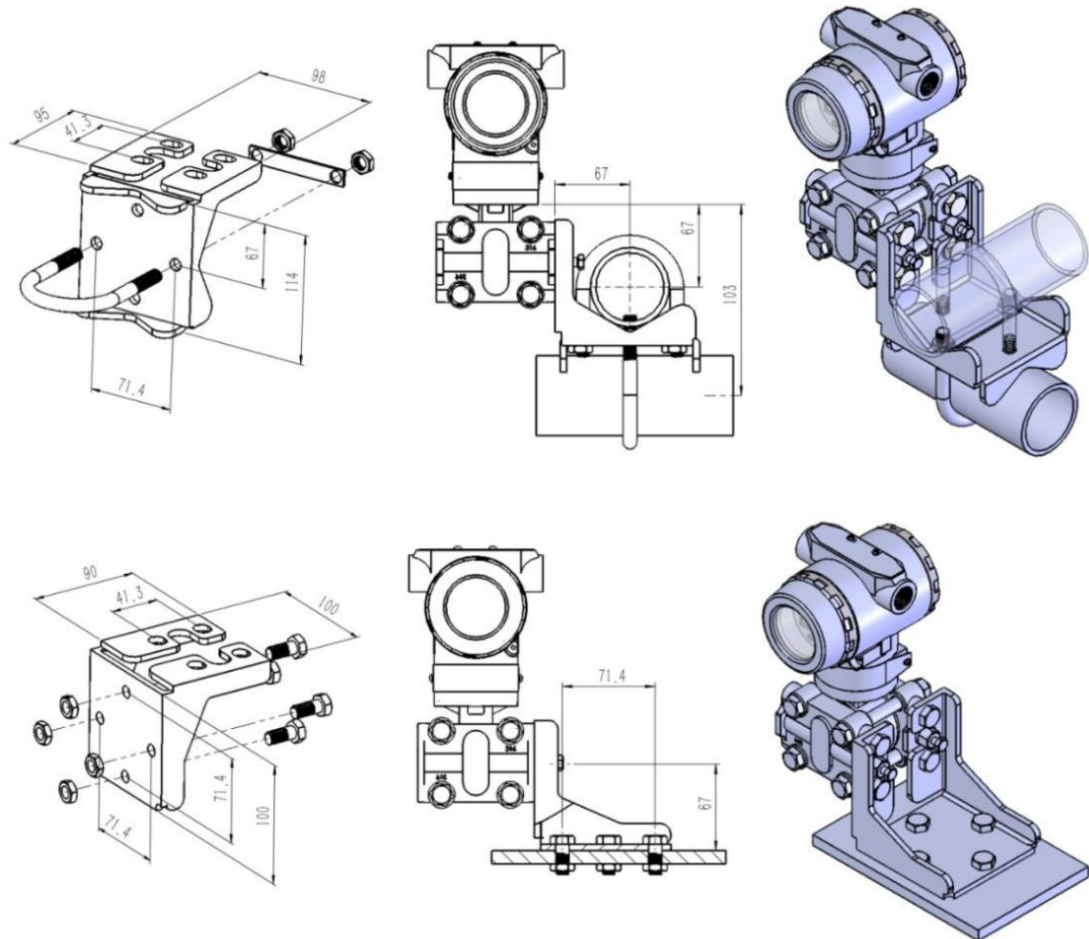Normal (Blue) Housing

Gray Housing

White Housing

Green Housing

DIMENSION

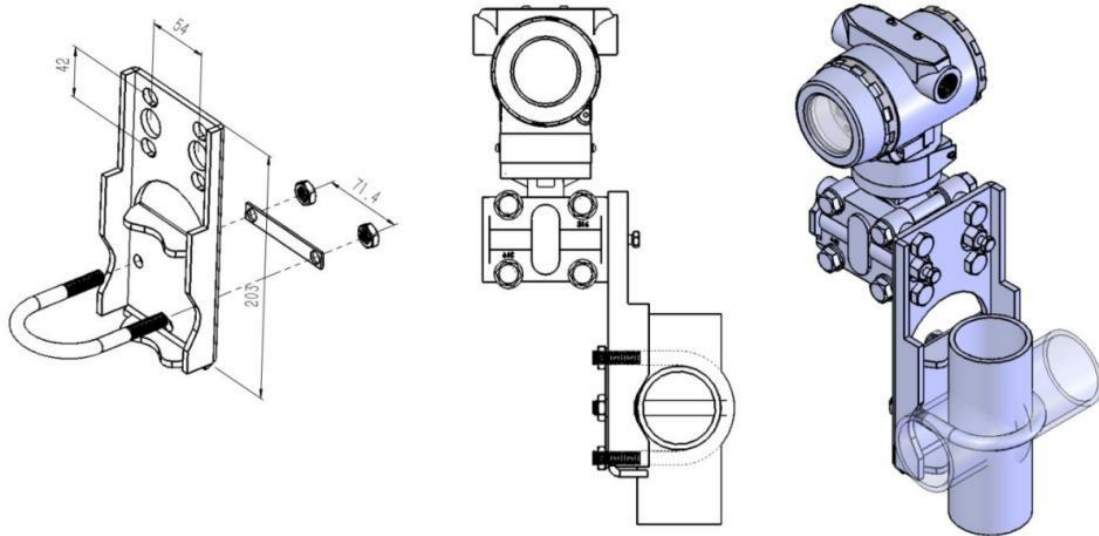### Without capillary (the length of capillary=0):

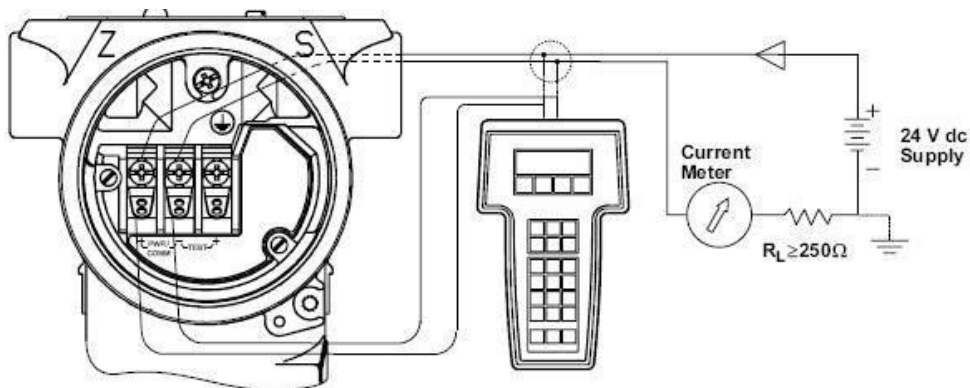**With capillary (the length of capillary=Ln)**

INSTALLATION SUGGESTION

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
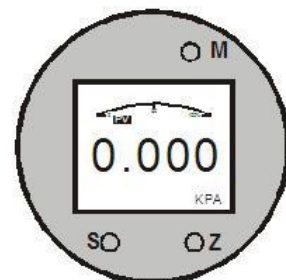
the range adjustment has been activated. Confirming the right pressure corresponding to 20mA, then presses down the S key for 6 seconds, the character "Hart" vanishes, span shift finished at that time and the state of activation is withdrawal.

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.