

General Instructions

These instructions provide information for installation, process connection, electrical connection, configuration, operation and maintenance of the 1800DP Differential Pressure Transmitter.



NOTE: If you suspect that a product is defective, contact the factory or the SOR® Representative in your area for a return material authorization number (RMA). This product should only be installed by trained and competent personnel. Product specifications and important information provided on the device nameplate should be carefully reviewed before installation.

Design and specifications are subject to change without notice.

For latest revision, go to sorinc.com

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Installation



The HI and LO side process connections have different over pressure ratings. Ensure the process piping is connected to the correct side or damage to the device may occur. There is an H and L marked in the center between the two process connections designating each side.

- 1 The process connections can be threaded onto fittings within an adequately supported process piping system. The LO side may be vented to atmospheric pressure.
- 2 Use two open end wrenches when connecting a process piping system to the pressure ports: One wrench to hold the hex flats on the pressure port, the other to tighten the process pipe or tube fittings.
- 3 Process connection pipe or tubing may be rigid or flexible.
- 4 If ordered with the PK, PL, or PM accessory, ensure the device is securely fastened to the mounting bracket.

Electrical Connections

Ensure that wiring and installation conform to all applicable local and national electrical codes.

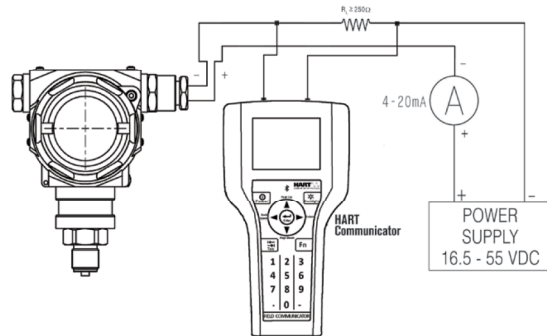
- 1 Remove the housing rear cover.
- 2 Pass wiring through the conduit fitting.
- 3 Connect the positive power supply lead to the terminal marked “+”.
- 4 Connect the negative power supply lead to the terminal marked “-”.

For 4-20mA output

- Terminals marked “A” and “B” are not used.
- Go to Step 5.

For 4-20mA with HART

- Connect a 250 ohm resistor in series between the negative power supply and the terminal marked “-”.
- Connect the HART communicator as shown in diagram here.
- Go to Step 5.



For 1-5V output

- Connect Signal+ to the terminal marked “S+”.
- Connect Signal- to the terminal marked “S-”.
- Go to Step 5.

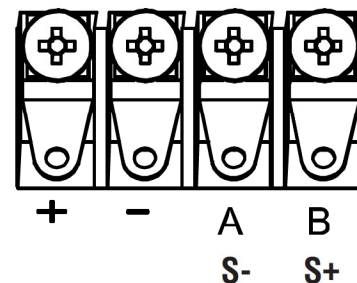
For Modbus output

- Connect Signal+ to the terminal marked “A”.
- Connect Signal- to the terminal marked “B”.
- Go to Step 5.

- 5 Replace the housing rear cover.
- 6 All housings must be properly “sealed” at the conduit connection to maintain the NEMA classification.
- 7 Apply power to the device. Reference supply voltages are listed below.

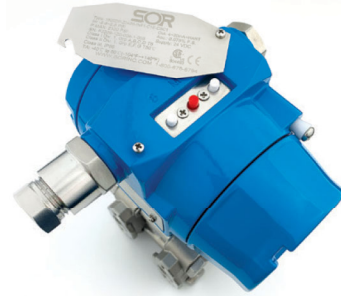
Reference Supply Voltages

4-20mA: 12-30VDC
4-20mA & HART: 16.5-55VDC with 250 Ω load
4-20mA Intrinsically Safe: 12-30VDC
1-5VDC Low Power: 9-32VDC
Modbus: 5-32VDC



Configuration with Push-Buttons

All 1800 Series Pressure Transmitters include external push-buttons to configure the device; these push-buttons are located beneath the top nameplate. To access, loosen the bottom-left nameplate screw until the nameplate can be rotated upward exposing the external push-buttons. If ordered with an LCD Display, the device will also include internal push-buttons beneath the housing front cover. Configuration commands are the same for both the internal and external push-buttons.



From left to right the buttons are labeled (S), (M), (Z)



When installed in a hazardous area only the external push-buttons should be used to configure the device.



The following three commands configure the device based on the pressure currently being applied to the sensor.

Zero Pressure Setting

- 1 Make sure there is no pressure being applied to the sensor.
- 2 Press and hold (S) and (Z) simultaneously for at least five seconds.
- 3 Once the display reads “PV = 0” the zero pressure has been successfully set.
- 4 Release (S) and (Z) at the same time.

Note: *The zero pressure must be set after installation because it is influenced by the mounting position. Three weeks after installation, the zero pressure should be set again to ensure the best accuracy.*

4mA Pressure Setting

- 1 Apply the desired pressure to the sensor that corresponds to a 4mA output signal.
- 2 Press and hold (Z) and (M) simultaneously for at least five seconds.
- 3 Once the display reads “4mA OK” the 4mA pressure has been successfully set.
- 4 Release (Z) and (M) at the same time.

20mA Pressure Setting

- 1 Apply the desired pressure to the sensor that corresponds to a 20mA output signal.
- 2 Press and hold (S) and (M) simultaneously for at least five seconds.
- 3 Once the display reads “20mA OK” the 20mA pressure has been successfully set.
- 4 Release (S) and (M) at the same time.

Measuring and Menu Interfaces

The device starts by displaying the Measuring Interface. The measuring interface can be changed via the Display Mode setting. In all three display modes there will be a bar on the left side of the display that changes height and follows the spanned current range.

Pressing (M) once enters the Menu Interface which allows 8 different device settings to be manually configured via the push-buttons. The 8 setting menus follow the same order listed below. If the device is left in a setting menu it will return to the Measuring Interface after 30 seconds.

Note: If any setting value is changed, (M) must be pressed to confirm the changes or the setting will revert to the original value.

Within each setting menu there is a label displayed below the setting value. The tables below each setting menu list the menu label and available setting values.

Measuring Interface

- 1 Press (M) to enter Menu Interface

Menu Interface

1 Configure Display Mode

- a. Press (M) to skip and proceed to next setting menu

To change setting value

- a. Press (Z) to enter setting menu
- b. Press (S) to change the setting value
- c. Press (M) to confirm the setting value change and proceed to next setting menu

Menu Label	Setting Values	Value Details
DISP	PV	Process Variable
	mA	Current
	%	Percentage (follows spanned current range)

② Configure Unit of Measure

- a. Press (M) to skip and proceed to next setting menu

To change setting value

- a. Press (Z) to enter setting menu
- b. Press (S) to change to next setting value
- c. Press (Z) to change to previous setting value
- d. Press (M) to confirm the setting value change and proceed to next setting menu

Menu Label	Setting Values		
U	kPa	inH2O**	kg/cm2
	MPa	ftH2O	Pa
	bar	inHg	ATM
	psi	mHg	mm*
	mmHg	TORR	m*
	mmH2O	mbar	
	mH2O	g/cm2	

*Unit of measure is for a specific application only and not recommended for general use.

**inH2O @ 4°C on HART communicator.

③ Configure 4mA Pressure Value

- a. Press (M) to skip and proceed to next setting menu

To change setting value

- a. Press (Z) once to enter setting menu. It will start with the last digit.
- b. Press (S) to change the setting value of digit
- c. Press (Z) to move one digit to the left
- d. Press (M) to confirm the setting value change and proceed to next setting menu

Menu Label	Setting Values	Value Details
LRV	-19999 to +99999	Lower Range Value

④ Configure 20mA Pressure Value

- a. Press (M) to skip and proceed to next setting menu

To change setting value

- a. Press (Z) once to enter setting menu. It will start with the last digit.
- b. Press (S) to change the setting value of digit
- c. Press (Z) to move one digit to the left
- d. Press (M) to confirm the setting value change and proceed to next setting menu

Menu Label	Setting Values	Value Details
URV	-19999 to +99999	Upper Range Value

⑤ Configure Damping Time

- a. Press (M) to skip and proceed to next setting menu

To change setting value

- a. Press (Z) once to enter setting menu. It will start with the last digit.
- b. Press (S) to change the setting value of digit
- c. Press (Z) to move one digit to the left
- d. Press (M) to confirm the setting value change and proceed to next setting menu

Menu Label	Setting Values	Value Details
DAMP	0 to 100	Seconds

⑥ Configure Output Signal Type

- a. Press (M) to skip and proceed to next setting menu

To change setting value

- a. Press (Z) to enter setting menu
- b. Press (S) to change the setting value
- c. Press (M) to confirm the setting value change and proceed to next setting menu

Menu Label	Setting Values	Value Details
mA	LINER	Linear
	√	Square Root

7 Configure Fault Alarm Signal

- a. Press (M) to skip and proceed to next setting menu

To change setting value

- a. Press (Z) to enter setting menu
- b. Press (S) to change the setting value
- c. Press (M) to confirm the setting value change and proceed to next setting menu

Menu Label	Setting Values	Value Details
ALARM	NO	None
	H	20.8mA
	L	3.8mA

8 Configure Fixed Output Current

- a. Press (M) to exit Menu Interface and return to Measuring Interface

To change setting value

- a. Press (Z) to enter setting menu
- b. Press (S) to change the setting value
- c. Press (Z) to apply the selected fixed output current
- d. Press (M) once finished to return to Measuring Interface

Menu Label	Setting Values	
FIX\C	NO (None)	12.0000 mA
	3.8000 mA	16.0000 mA
	4.0000 mA	20.0000 mA
	8.0000 mA	20.8000 mA

Factory Settings and Reset

Setting	Menu Label	Factory Setting Value
Display Mode	DISP	PV (Primary Variable)
Unit of Measure	U	kPa or MPa (Sensor Dependent)
4mA Pressure Value	LRV	Lower Range Value (Sensor Dependent)
20mA Pressure Value	URV	Upper Range Value (Sensor Dependent)
Damping Time	DAMP	0 Seconds
Output Signal Type	mA	LINER (Linear)
Fault Alarm Signal	ALARM	NO (None)
Fixed Output Current	FIXC	NO (None)

There are two methods to reset the device to factory settings using the push-buttons.

Method 1

- 1 The device must be powered on and displaying the Measuring Interface.
- 2 Press (S) and hold for at least five seconds.
- 3 Once the display reads “RECOVERY” release (S) and press (Z) for at least two seconds.
- 4 Once the display reads “OK” release (Z) and the device will begin resetting.
- 5 The display reads “LOADING” while it is in the process of resetting.
- 6 After the display returns to the Measuring Interface the factory reset is complete.

Method 2

- 1 The device must be powered off before proceeding.
- 2 Press and hold (Z) while simultaneously powering the device on.
- 3 Continue holding (Z) until the display reads “OK”.
- 4 Release (Z) and the device will begin resetting.
- 5 The display reads “LOADING” while it is in the process of resetting.
- 6 After the display returns to the Measuring Interface the factory reset is complete.

ATEX and IECEx Marking Details



ATEX Marking

II 1 G
Ex ia IIC T4 Ga
(-20°C ≤ Ta ≤ +60°C)

IECEx Marking

Ex ia IIC T4 Ga
(-20°C ≤ Ta ≤ +60°C)

Parameters

Ui = 28V
Ii = 93mA
Pi = 0.65W
Li = 0mH
Ci = 0μF



II 2 GD
Ex db IIC T6 Gb
Ex tb IIIC T80°C Db
(-20°C ≤ Ta ≤ +60°C)

Ex db IIC T6 Gb
Ex tb IIIC T80°C Db
(-20°C ≤ Ta ≤ +60°C)

Certificate Number: IECEx NEP 18.0008X

Standards: IEC 60079-0:2011 Ed 6, IEC 60079-1:2014-06 Ed 7, IEC 60079-11:2011 Ed 6 and IEC 60079-31:2013, Ed 2

Specific Conditions for Use

- When equipment is installed in a Zone 0 hazardous area, user shall avoid an ignition hazard due to impact or friction.
- Contact the original manufacturer for information on the dimensions of the flameproof joints.

Certificate Number: CML 19ATEX1078X

Standards: EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-11:2012 and EN 60079-31:2014

Specific Conditions for Use

- When the equipment is installed in a Zone 0 hazardous area, the end user shall protect the equipment from ignition hazards in the form of impact or friction.
- The flameproof joints shall not be repaired. Contact the original manufacturer for information on the dimensions of the flameproof joints.
- The intrinsically safe version of the equipment does not satisfy 500 V test of IEC 60079-11 CL 6.3.13. and shall be supplied by an isolated barrier which is suitable with the internal parameter of the equipment: Ui = 28V, Ii = 93mA, Pi = 0.65W, Li ≈ 0mH, Ci = 0μF
- The user shall ensure that the surface temperature of the sensor connector shall never exceed +60°C.

Maintenance

The 1800 Series Pressure Transmitters contain no user serviceable parts and cannot be repaired on site. Disassembly of the instrument by unauthorized persons will invalidate the warranty.

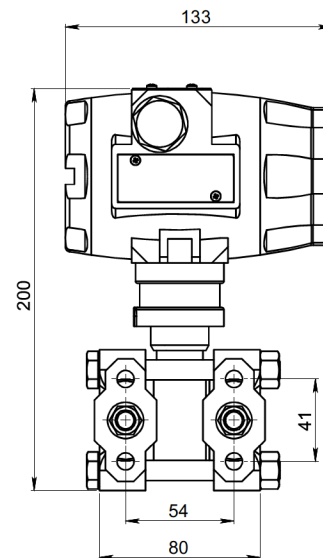
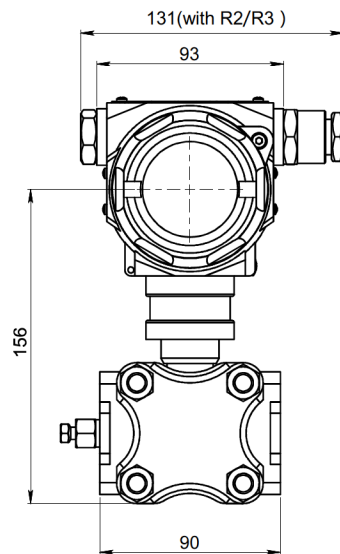
- If there is a risk of debris accumulating in the pressure port, it should be cleaned.
- Care and caution must be taken when cleaning the pressure port to prevent damage to the diaphragm.
- It is recommended that the device's Zero Pressure Setting be configured each year.

Dimensions

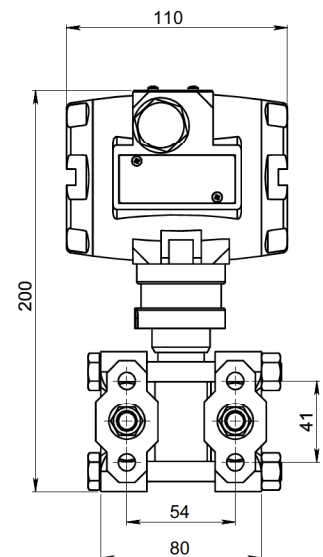
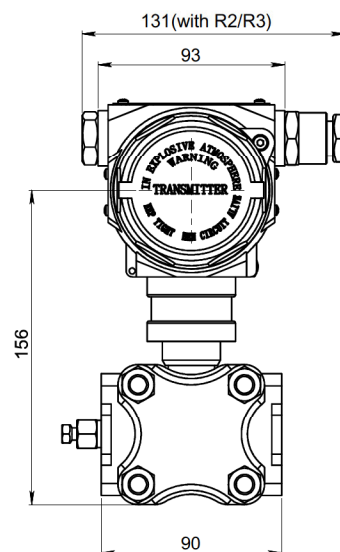
Model 1800DP (Differential)

Dimensions = mm

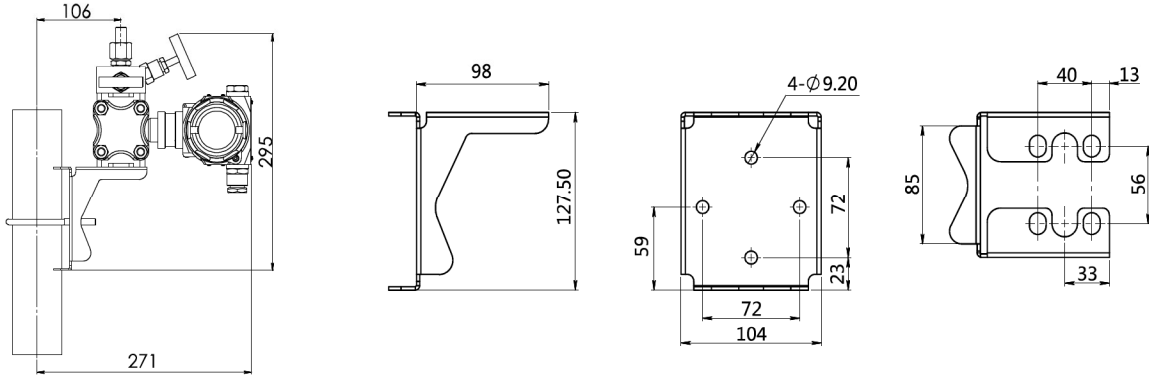
**With Integral
LCD Display**
(option IN)



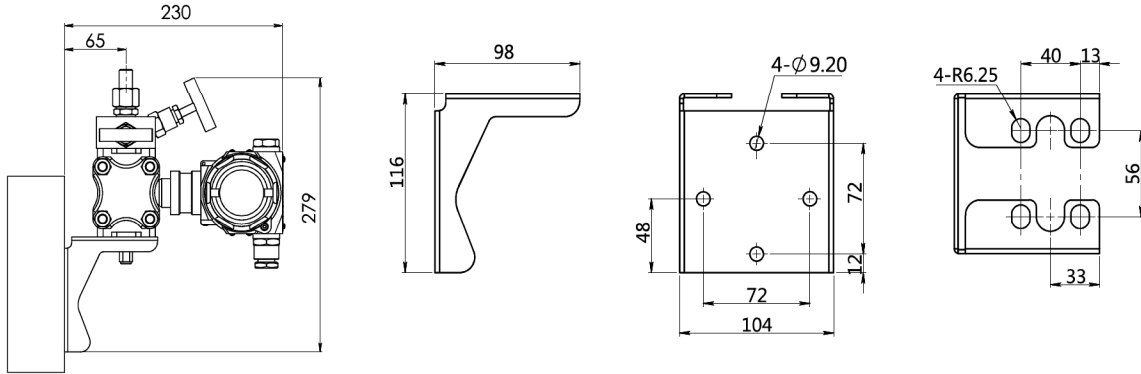
**Without
Display**
(option 00)



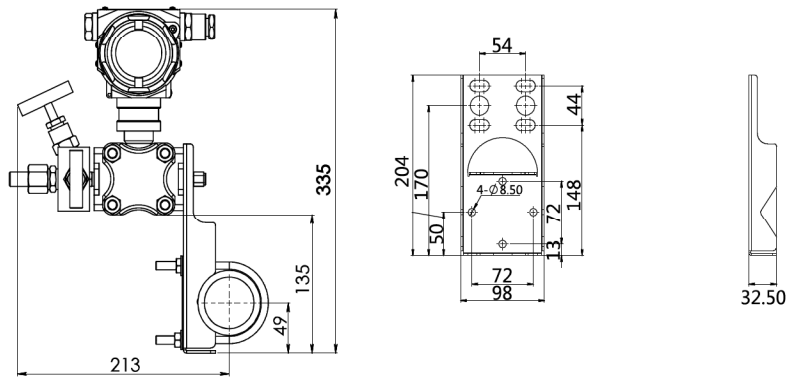
PK
Pipe Mounting Kit (Carbon Steel Bent Bracket for 2" Pipe)



PL
Plate Mounting Kit (Carbon Steel Bent Bracket)



PM
Plate Mounting Kit (Carbon Steel Flat Bracket for 2" Pipe)

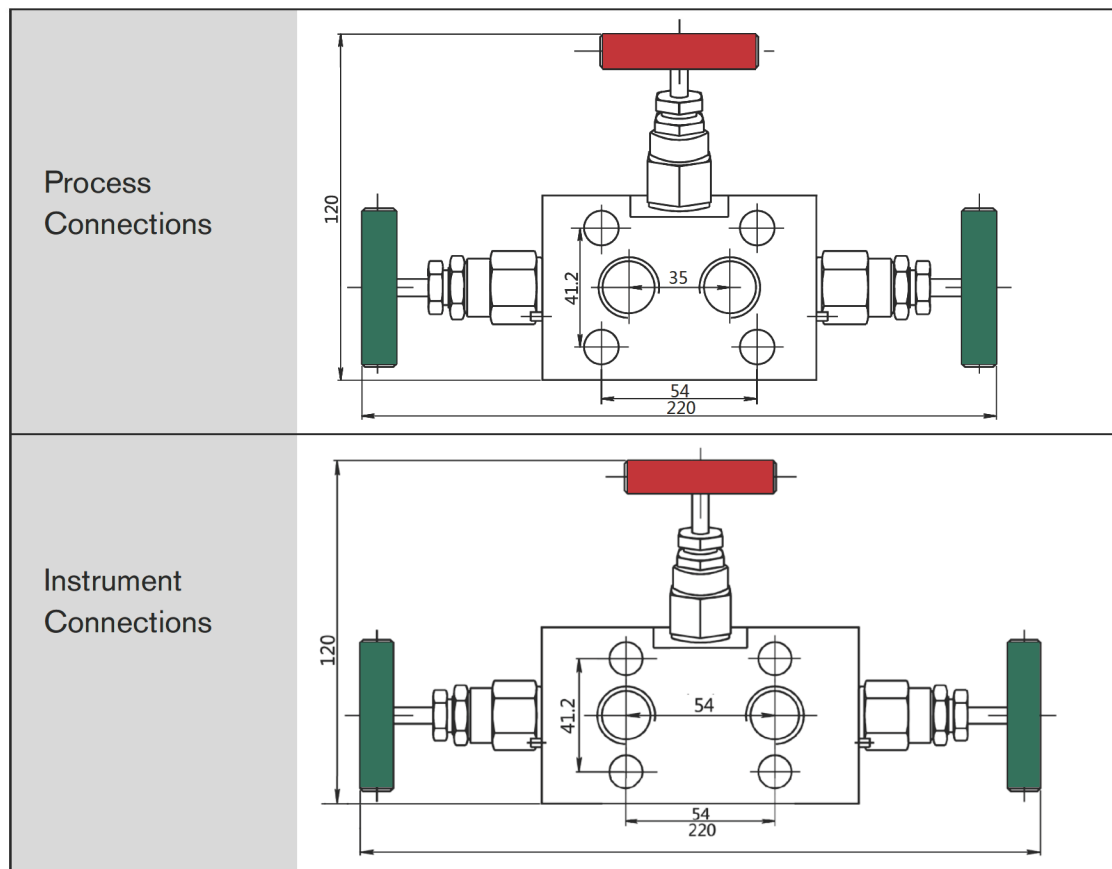
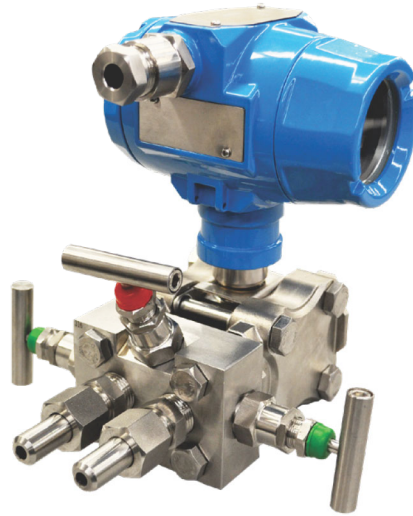
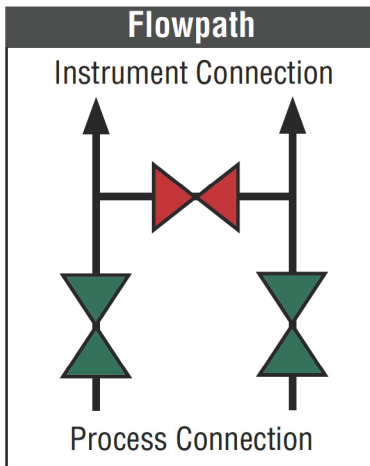


Manifolds

Each 3-valve and 5-valve manifold comes with 4 bolts used to connect the manifold directly against the differential pressure transmitter. All 3-valve and 5-valve manifolds are provided with tubing adapters for the process connections.

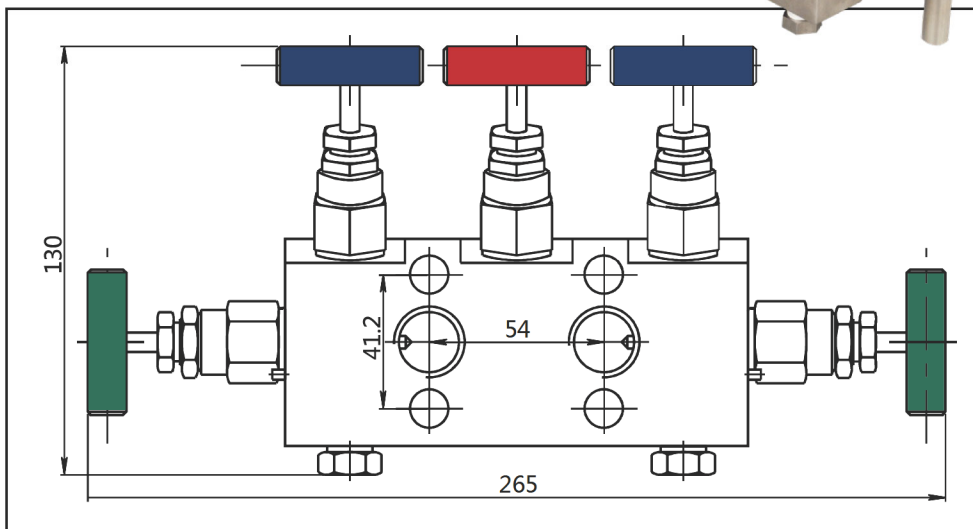
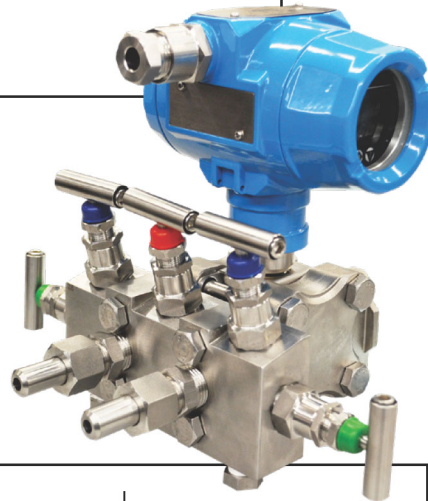
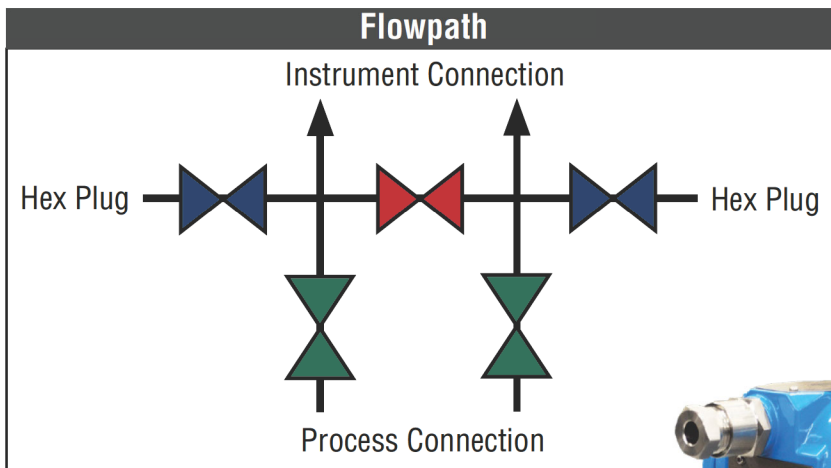
If ordered with a 3 or 5-valve manifold, please refer to the following dimensional drawing and flowpath diagram.

3-Valve Manifold



(Dimensions = mm)

5-Valve Manifold



(Dimensions = mm)



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