SOR

General Instructions

These instructions provide information for installation, process connection, electrical connection, configuration, operation, and maintenance of the 1800PT and 1800PR pressure transmitters. The 1800 Series Pressure Transmitters are offered with either a Conventional Gauge Pressure Transmitter (model **1800PT**) or a Piezoresistive Gauge Pressure Transmitter (model **1800PR**); the information contained in this document applies to either version.

1800PT Conventional Gauge 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.

1800PR Piezoresistive Gauge Pressure Transmitter

Design and specifications are subject to change without notice.

*For latest revision, go to **sorinc.com***

Table of Contents

Installation

Normally, line mounting provides adequate support for the instrument.

❶ The process connection is threaded onto a fitting within an adequately supported process piping system.

❷ Use two open end wrenches when connecting the pressure port to a process piping system: one wrench to hold the process fitting, the other at the hex flat to tighten the gauge pressure transmitter.

❸ Process connection pipe or tubing may be rigid or flexible.

❹ If ordered with the PK accessory, ensure the device is securely fastened to the pipe mounting bracket.

Electrical Connections

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

❶ Remove the housing rear cover.

❷ Pass wiring through the conduit fitting.

❸ Connect the positive power supply lead to the terminal marked "+".

❹ 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 ❺.

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 ❺.
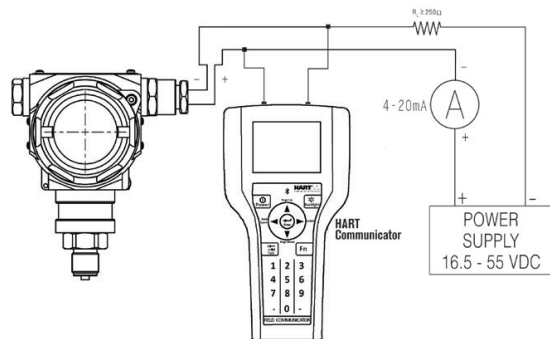
For 1-5V output

• Connect Signal+ to the terminal marked "S+".

• Connect Signal- to the terminal marked "S-".

• Go to Step ❺.

For Modbus output

• Connect Signal+ to the terminal marked "A".

• Connect Signal- to the terminal marked "B".

• Go to Step ❺.

❺ Replace the housing rear cover.

❻ All housings must be properly "sealed" at the conduit connection to maintain the NEMA classification.

❼ 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
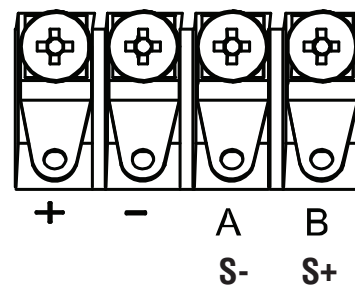
| Label	Two Wire (4-20mA)	Two Wire (4-20mA with HART)	Four Wire (1-5V)	Four Wire (Modbus)
+	Power+	Power+	Power+	Power+
-	Power-	Power- (250ohm resistor in series)	Power-	Power-
A	Not Used	Not Used	Not Used	Signal+
B	Not Used	Not Used	Not Used	Signal-
S+ (V units only)	Not Used	Not Used	Signal+	Not Used
S- (V units only)	Not Used	Not Used	Signal-	Not Used

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)

CAUTION *When installed in a hazardous area only the external push-buttons should be used to configure the device.*
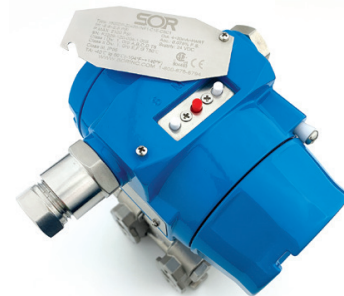
The following three commands configure the device based on the pressure currently being applied to the sensor.

Zero Pressure Setting
❶ Make sure there is no pressure being applied to the sensor.
❷ Press and hold (S) and (Z) simultaneously for at least five seconds.
❸ Once the display reads "PV = 0" the zero pressure has been successfully set.
❹ 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 / 1VDC Pressure Setting

❶ Apply the desired pressure to the sensor that corresponds to a 4mA / 1VDC output signal.

❷ Press and hold (Z) and (M) simultaneously for at least five seconds.

❸ Once the display reads "4mA OK" or "1V OK" the 4mA / 1VDC pressure has been successfully set.

❹ Release (Z) and (M) at the same time.

20mA / 5VDC Pressure setting

❶ Apply the desired pressure to the sensor that corresponds to a 20mA / 5VDC output signal.

❷ Press and hold (S) and (M) simultaneously for at least five seconds.

❸ Once the display reads "20mA OK" or "5V OK" the 20mA / 5VDC pressure has been successfully set.

❹ 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 twelve (4-20mA output) or thirteen (1-5VDC output) different device settings to be manually configured via the push-buttons. The device 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
❶ Press (M) to enter Menu Interface

Menu Interface
❶ **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 (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	Value Details
DISP	PV	Process Variable
	mA or V	Current or Voltage (menu label is output dependent)
	%	Percentage (follows spanned current range)

❷ **Configure PV 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		
	kPa	inH2O	kg/cm2
	MPa	ftH2O	Pa
	bar	inHg	ATM
U	psi	mHg	OSI
	mmHg	TORR	mm*
	mmH2O	mbar	m*
	mH2O	g/cm2	

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

❸ **Configure 4mA / 1VDC 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

❹ **Configure 20mA / 5VDC 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

❺ **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

❻ **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 (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	Value Details
mA or V*	LINER	Linear
	√	Square Root

*Menu Label is output dependent.

❼ 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 (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	Value Details
ALARM	NO	None
	H	20.8mA or 5.2VDC
	L	3.8mA or 0.95VDC

❽ Configure PV Offset

  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 the next setting menu

Note: If the PV Offset setting is accessed, pressing (M) will change to a screen with Menu Label "UNT ZOOM". The default value is 1.000. Do NOT change this value as it will apply a multiplier to the measured pressure; instead, press (M) to proceed to the next setting menu. The "UNT ZOOM" screen does not appear if the "PV OFFSET" menu is skipped.

Menu Label	Value Details
PV OFFSET	Range = |URL − LRL| $(-1.2 * Range) \le PV \text{ Offset} \le (1.2 * Range)$ When Measured Pressure < PV Offset And PV OFFSET > 0 Then Measured Pressure = PV Offset When Measured Pressure < 0 And PV Offset ≠ 0 Then Measured Pressure = 0

❾ Configure Poll Address
   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 the next setting menu

Menu Label	Setting Values	Value Details
POLL ADR	0	Broadcast Address
	1 to 15	Non-Broadcast Address (fixed analog output to 4mA)

❿ Configure Screen Backlight
Note: This screen only appears for units with the "V" 1-5VDC Low Power output.
   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 (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	Value Details
LIGHT	ON	Screen Backlight Enabled
	OFF	Screen Backlight Disabled

⓫ Configure SV
This setting enables SV (temperature) to appear on the Measuring Interface. When enabled, the display will alternate between the PV and SV values.
   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 (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	Value Details
SV	OFF	No SV value displayed on Measuring Interface
	°C	Display SV value in °C on Measuring Interface
	°F	Display SV value in °F on Measuring Interface
	K	Display SV value in K on Measuring Interface

Form 1807 (06.24) ©SOR Inc.

⑫ Configure Decimal Digits

This setting changes how many digits after the decimal point are displayed on the Measuring Interface.

> **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 (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	Value Details
DOT	NON	No Decimal Digits
	IN 1	1 Decimal Digit
	IN 2	2 Decimal Digits
	IN 3	3 Decimal Digits

⑬ Current/Voltage

> **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/voltage
> **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
FIX\V	NO (None)	3.00 V
	0.95 V	4.00 V
	1.00 V	5.00 V
	2.00 V	5.20 V

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 / 1VDC Pressure Value	LRV	Lower Range Value (Sensor Dependent)
20mA / 5VDC 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	FIX\C	NO (None)
PV Offset	PV OFFSET	0
Poll Address	POLL ADR	0
Backlight*	LIGHT	ON
SV	SV	OFF
Decimal Digits	DOT	IN 3
Fixed Output Current/Voltage	FIX\C FIX\V	NO (None)

*Backlight setting only appears for units with the "V" 1-5VDC Low Power output

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

Method 1
❶ The device must be powered on and displaying the Measuring Interface.
❷ Press (S) and hold for at least five seconds.
❸ Once the display reads "RECOVERY" release (S) and press (Z) for at least two seconds.
❹ Once the display reads "OK" release (Z) and the device will begin resetting.
❺ The display reads "LOADING" while it is in the process of resetting.
❻ After the display returns to the Measuring Interface the factory reset is complete.

Method 2
❶ The device must be powered off before proceeding.
❷ Press and hold (Z) while simultaneously powering the device on.
❸ Continue holding (Z) until the display reads "OK".
❹ Release (Z) and the device will begin resetting.
❺ The display reads "LOADING" while it is in the process of resetting.
❻ After the display returns to the Measuring Interface the factory reset is complete.

Form 1807 (06.24) ©SOR Inc.

ATEX and IECEx Marking Details

	ATEX Marking	**IECEx Marking**	**Parameters**
Ex	II 1 G Ex ia IIC T4 Ga (-20°C ≤ Ta ≤ +60°C)	Ex ia IIC T4 Ga (-20°C ≤ Ta ≤ +60°C)	Ui = 28V Ii = 93mA Pi = 0.65W Li = 0mH Ci = 0μF
Ex	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.
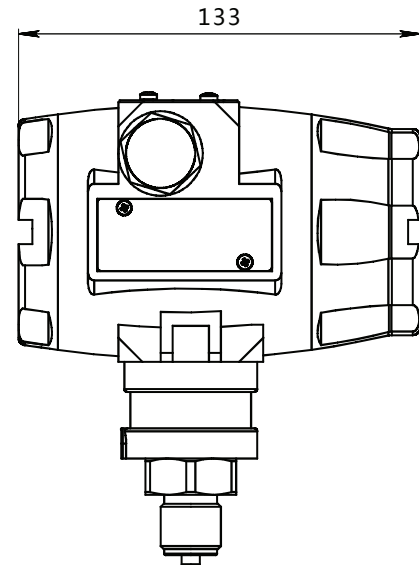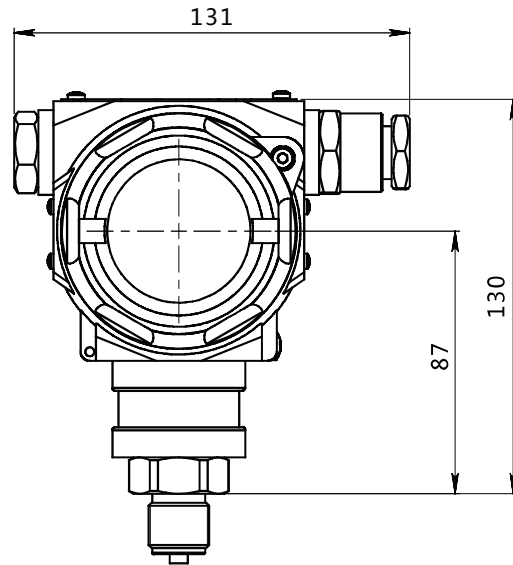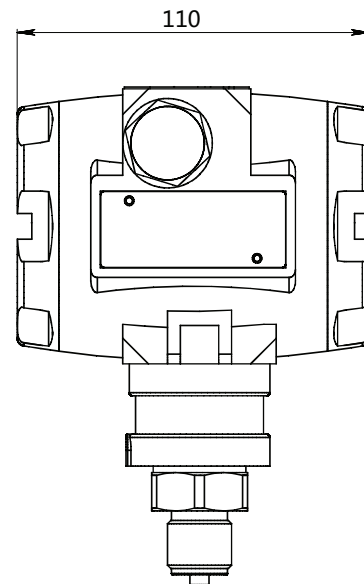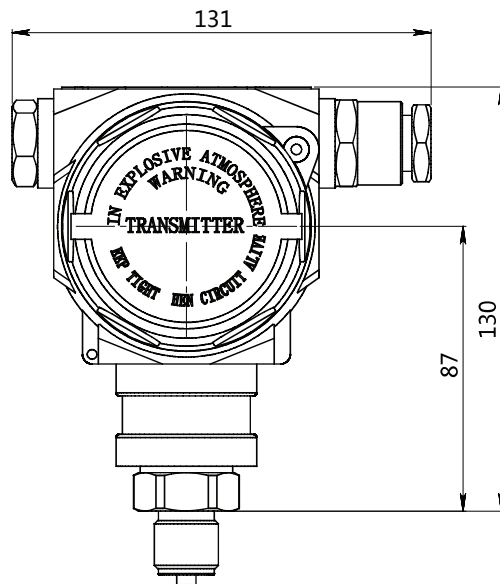
Model 1800PT (Conventional Gauge Pressure Transmitter)
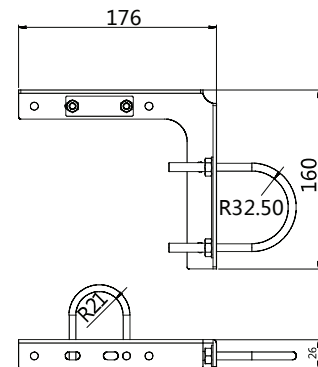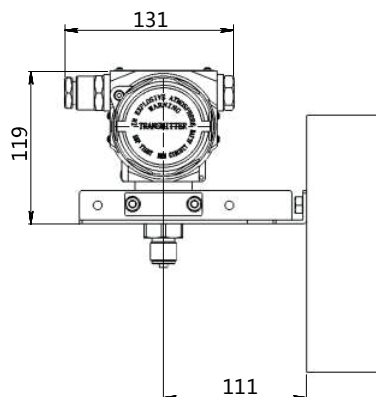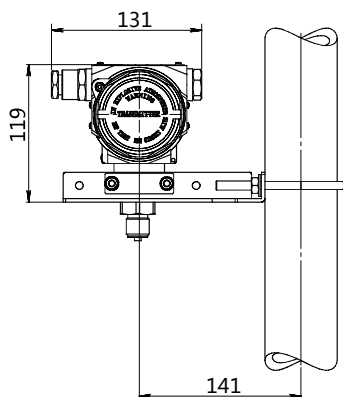## Model 1800PR (Piezoresistive Gauge Pressure Transmitter)

Dimensions = mm

With Integral LCD Display
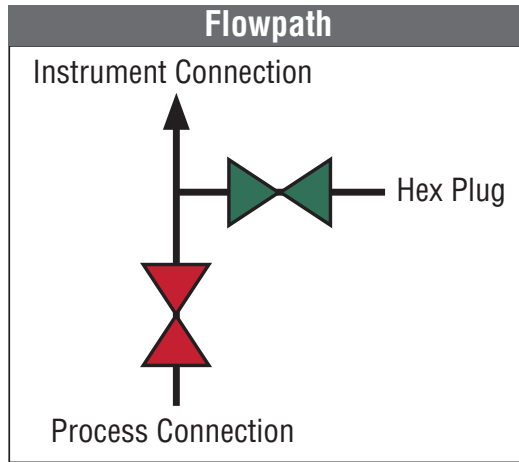(option IN)

Without Display
(option 00)

Pipe Mounting Kit (accessory PK)

Manifolds

If ordered with a 2-valve manifold, please refer to the dimensional connection drawings and flowpath diagram.

Flowpath

Instrument Connection

Hex Plug

Process Connection

Connections

Instrument - 1/2" NPT(F) Process - 1/2" NPT(F)	82 / 166
Instrument - 1/2" NPT(M) Process - 1/2" NPT(F)	90 / 166
Instrument - 1/2" NPT(M) Process - 1/2" NPT(M)	98 / 166

(Dimensions = mm)

SOR

Printed in USA

14685 W. 105th St., Lenexa, KS 66215 ■ 913-888-2630 ■ 800-676-6794 USA ■ SORInc.com

Form 1807 (06.24) ©SOR Inc.