



**SEN-420 SERIES
(SEN-421,422,423,424)
MELT PRESSURE/TEMPERATURE TRANSMITTERS
INSTALLATION INSTRUCTIONS**

1.0 INTRODUCTION:

The Series 420 Pressure and Temperature Transmitters use the proven Silicon-on-Sapphire Technology for direct measurement of pressure without the necessity of using mercury, NaK, or push rods to isolate the sensing diaphragm from the high temperature environment. The sapphire diaphragm is thicker and more abrasion resistant than the conventional mercury-filled melt pressure transmitters. These transmitters can give the user unprecedented long life if properly cared for in installation and removal.

In the plastics industry, 85% of all replacements are the result of improper handling of the transmitters. The other 15% is a result of wear-out. If you will take the time to read and heed these instructions, you should get many years of use out of Sensonetics' Series 420 Pressure and Temperature Transmitters.

2.0 IMPORTANT WARNING:

- 2.1 Do not remove the protective plastic cap until the Series 420 Pressure and Temperature Transmitters is ready for installation.
- 2.2 Verify the mounting well machining dimensions before installation of the transducer. The mounting well must be free of frozen plastic or degraded polymer. See the attached drawing for mounting well dimensions for this model: DM
- 2.3 Transducer should only be removed or installed when the extruder is near operating temperature and no pressure in the barrel. Failure to do so can result in cross-threading and side-force pressure on the sensor tip, leading to damage and/or improper functioning. No transducer can work properly with a pinching force on the diaphragm.

INSTALLATION:

- 3.1 Prior to installing the transmitter, verify the dimensions of the mounting well per the attached drawing. Mounting wells that are out of tolerance are the single most common cause of premature transducer failure. The use of a mounting well gage plug (available from Sensonetics) coated with Dykem Blue will confirm the concentricity, diameter, and the condition of the 45-degree seat. In high abrasion applications, it is common to have a burr form at the inner lip of the mounting well which can ruin the diaphragm.
- 3.2 The transducer tip should be recessed 0.015" from the extruder bore. As the extruder barrel wears, the 0.015" recess will become smaller until the transducer diaphragm is flush with the bore of the extruder. This is a very precarious position for the transducer. Shims are available from the factory, which seat on the 45-degree cone and act as a spacer; backing off the transducer diaphragm from the extruder barrel bore.
- 3.2 It is not the purpose of the spacer shim to act as a gasket. This function is taken care of by the 45° angle shoulder on the transducer seat in the mounting well. Spacer shims are not required, but they are useful when the mounting well depth is less than design specification due to wear or improper mount well depth as per attached drawing.
- 3.3 It is important that the tip of the melt pressure unit be slightly recessed in the barrel, but flush downstream. This prevents damage in the screw area and prevents disruption of laminar flow in the die area.
- 3.4 The transducer threads should be coated with a high temperature anti-seize compound such as NEVER-SEEZ by Bostik or C5A by Felpro. Liberal use of anti-seize compounds will reduce the chances of galling.

3.5 A Torque wrench should be used to ensure proper mounting torque. In most cases, an adequate seal can be achieved with less than **40 inch-pounds** of force. The maximum mounting torque is 100 inch-pounds. In no case should 100 inch pounds be exceeded. If a torque wrench is not available, install the unit two hands tight in a clean well and using a 6" adjustable wrench; tighten an additional 1/8 -1/4 turn. Note: The higher the installation torque, the harder it is for the removal of the transmitter.

3.6 Install the transducer as detailed above in the empty cold machine and calibrate the transmitter per the Following procedure:

4.0 CALIBRATION:

Prior to subjecting the transducer to operating pressure and temperature, it is important to set the end points to 4.0 mA at Pressure and 20.0 mA at full-scale pressure. There are 2 methods that can be used to calibrate the transducer:

4.1 First method, without a pressure calibrator:

4.1.1 With temperature at room ambient (or close to 80 °F) and with zero pressure applied, adjust reading to 4.0 mA by turning "PZERO" zero trim pot located under the cover screw on the electronic case.

4.1.2 Short RCal (Calibrating Resistor) pins together and adjust reading to 16.8mA by turning "PSPAN" span trim pot located under the cover screw next to the zero trim pot.

Repeat steps 4.1.1 to 4.1.2 as necessary to fine tune adjustment.

Second method, with a Pressure Calibrator:

4.2.1 With temperature at room ambient (or close to 80 °F) and with zero pressure applied, adjust reading to 4.0 mA by turning "PZERO" zero trim pot located under cover screw on the electronic case.

4.2.2 Apply full scale pressure to transmitter and adjust reading to 20.0 mA by turning the "PSPAN" span trim pot located under cover screw next to the zero trim pot.

4.2.3 Repeat steps 4.2.1 to 4.2.2 as necessary to fine tune adjustment.

4.3 Adjust machine temperature to operating temperature and allow at least 30 minutes for transducer to reach thermal equilibrium.

4.3 After another 30 minutes soak time, re-adjust zero reading to 4.0 mA by turning "PZERO" zero trim pot. (Make sure there is no pressure applied to transducer at this time).

Transducer is now ready to use. (*NOTE: DO NOT adjust span at any temperature other than 80 ± 10 °F*). Adjustment of span at any temperature will require calibration with a Pressure Calibrator (see paragraph 4.2).

4.6 Make sure to reset zero occasionally to insure more accurate measurements. Reset span only at room ambient temperature using RCal method if calibrating without a Pressure Calibrator.

4.7 On SEN-422 models, the temperature sensor of the transmitter is factory set to 4.0mA at 80 °F and 20.0mA at 500 or 750°F unless special calibration is noted on the housing. These settings can be changed if desired, consult factory before making any adjustment to "TSPAN".

4.8 All models listed above that have thermocouples (JTC) for temperature measurement are not adjustable.

WARNING: Avoid Cold Starts! DO NOT Turn the extruder screw until sufficient soak time has been allowed. Jog screw several times before running while watching pressure, to avoid cold start damage.

5.0 CLEANING:

5.1 NEVER CLEAN melt pressure transducers using extreme high temperatures such as molten salt baths, blow torches; muffle furnaces or any high temperature process, which exceeds 750 °F. Internal damage to the sensing elements and conductors will occur.

5.2 PROPER CLEANING procedure for dissolvable polymers is to use the appropriate solvent or di-Me2-Pyrrolidene combined with fine brass wire brushing by hand. For non-dissolving polymers such as PP, HDPE, PE, PTFE, etc., it is advisable to warm the plastic coated tip to a temperature not to exceed 600 °F and gently brass-wire brush the tip and the threads. If large amounts of plastic are present, try cutting and peeling the plastic from the probe. Do not use this method close to the sapphire diaphragm, since it is possible to cause damage in this area. Take care not to pry the sapphire diaphragm from the tip using a "dental" pick.

