



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

**1.0 INTRODUCTION:**

The Series 420 Pressure and Pressure/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 life if proper care is used 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, the user, will take the time to read and heed these instructions, you should get many years of satisfactory use out of these solid-state Sapphire Melt Pressure Transmitters.

**2.0 IMPORTANT WARNING:**

- 2.1 Do not remove the protective plastic cap until the transmitter is ready to be installed.
- 2.2 The transducer mounting-well machining must be checked before installation of the transducer. (Mounting Well must be free of frozen plastic or degraded polymer).
- 2.3 Transducer should only be removed or installed when the extruder is near operating temperature and there is no pressure in the barrel. Failure to do so can result in cross-threading and side-force pressure on the sensor tips, 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 transducer into the mounting well, the machining tolerances of the well must be confirmed. 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 not uncommon 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" (.3-4mm) from the extruder bore. As the extruder barrel wears, the 0.015" recess will be reduced 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, that is taken care of by the 45° angle shoulder on the transducer seat. Spacer shims are seldom required, but they are required when the well depth is less than design specification due to:
  - a. Barrel wear.
  - b. Reaming & Tapping wear
  - c. Improper machined depth (even in new machines).

- 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 thermocouple junctions for temperature measurement are not adjustable.

