

# Types of Pressure Transducers for Teledyne Isco Syringe Pumps

## Overview

### Theory of Operation

The pressure transducer is a sensitive device that contains a pressure differential circuit which constantly transmits the pressure reading inside the cylinder of the pump. The controller uses this information to regulate the pressure and avoid overpressure conditions. The pressure information can also be exported for data collection, to trigger alarms, and to perform other external control tasks.

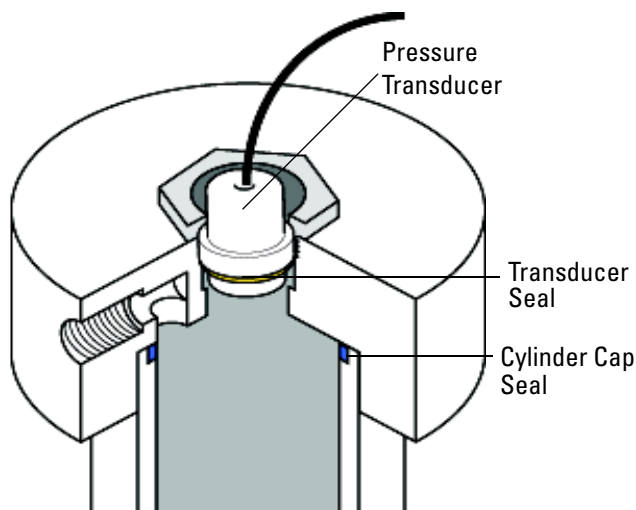
Some applications require the pressure transducer to have special capabilities. This bulletin will discuss the different types of pressure transducers and their uses.

### Types of Pressure Transducers

There are five types of pressure transducers: Standard, Top Mount, Side Mount, High Accuracy and High Temperature. Pressure transducers can be internal (inside) or external (outside) depending on the type of pressure transducer.

**Table 1: Accuracy of Pressure Transducers**

Type of Transducer	Accuracy
Standard	± 0.5%
High Accuracy	± 0.1%
High Pressure	



**Figure 1: Cross section of internal pressure transducer**

**Table 2: Standard Transducer Specifications (Top Mount)**

Pump	Pressure	Port	Transducer Type	Material
65D	20,000 psi	F250C	External	17-4 PH/ 15-SP H
65DM	10,000 psi	1/8" Valco	Internal	Titanium
100DM	10,000 psi	1/8" Valco	Internal	Titanium
100DX	10,000 psi	1/8" Valco	Internal	Titanium
260D	7,500 psi	1/8" Valco	Internal	Titanium
500D	3,500 psi	1/8" NPT	Internal	Titanium
1000D	2,000 psi	1/4" NPT	Internal	Hastelloy



**Figure 2: Top Mount Pressure Transducer**

**Table 3: Specifications for Top Mount Pressure Transducer**

Model	Port Size	Pressure	Type
500D	1/8" NPT	3750 psi	Internal
260D	1/8" Valco	7500 psi	Internal
100DM/DX	1/8" Valco	10,000 psi (standard)	Internal



**Figure 3: Side Mount Transducer**

**Table 4: Specifications for Side Mount Pressure Transducer**

Model	Port Size	Pressure	Type
500D	1/8" NPT	3750 psi	Internal
260D	1/8" Valco	7500 psi	Internal
100DM/DX	1/8" Valco	10,000 psi	Internal
1000D	1/4" NPT	2000 psi (standard)	Internal

The Side Mount transducer is internal and is the same as the Standard transducer, but the signal amplifier is mounted to the side of the cap instead of on top to lower the height of the unit.



**Figure 4: High Accuracy (left) & High Temperature (right)**

**Table 5: Specifications for High Accuracy & High Temperature Transducers**

Model	Port Size	Pressure	Type
500D	1/8" NPT	3750 psi	External
260D	1/8" Valco	7500 psi	External
100DM /DX	1/8" Valco	10,000 psi	External
1000D	1/4" NPT	2000 psi	External

The High Temperature pressure transducer is similar to the High Accuracy (external) pressure transducer but can be heated up to 200°C. The transducer amplifier, in the cable near the pump, cannot be heated to that temperature.

**Pressure Transducer Materials**

The wetted material on the standard transducer is titanium, except for the 65D which is 17-4PH/15-5PH and the 1000D which is Hastelloy. The 65DM, 100DM, 260D, and 500D transducer wetted surfaces are made of titanium. When a Hastelloy package is purchased, all options come in Hastelloy, but the 1000D is always Hastelloy.

**Wetted Materials**

**Table 6: Isco Pump Wetted Materials**

Pump	Transducer	Cap	Piston	Seal	Transducer Seal
1000D	Hastelloy (internal)	Nitronic 50	Nitronic 50	Graphite/PTFE	Gold plated nickel
500D	Titanium (internal)				
260D	Options: Hastelloy (external)	Option: Hastelloy	Option: Hastelloy		
100DM/DX					

**Troubleshooting & Maintenance**

**Calibration & Re-zeroing**

This adjustment is done on the pressure amplifier board on top of the cylinder. The A0 portion of the schematic details this board.

To access this board, remove the amplifier cover at the top of the pump. Connect a valve with inlet tubing and a 10 micron filter to one port of the pump. Connect a pressure gauge with a precision of 0.25% accuracy to the second pump port. Both the valve and the gauge must be rated above the maximum pressure of the pump.

Then, do the following:

1. Fill the pump with fluid.
2. With the fittings in both ports tight and the valve open, adjust R61 (offset) on the pressure amplifier board for 0.000, ±0.050 V at TP52, with respect to TP51.
3. Press ZERO PRESS and close the inlet valve.
4. Put the pump in constant pressure mode. Enter a pressure setpoint of 69 bar (1000 psi), then press the RUN key.

5. When the pressure is stable, adjust R53 (gain) so that the pressure gauge and the controller front panel both read  $69\pm 3$  bar,  $1000\pm 43$  psi.
6. Enter the maximum pressure.
7. When the pressure is stable, adjust R53 to match the pressure gauge reading to the pressure setpoint, to within 1.7 bar (25 psi).

For more information on Pressure Transducer Calibration see section 9.14 in the D-series Pumps Installation and Operation guide.

## **Error Messages**

### **Pressure Signals**

If liquid cools in the pump, becoming thick, it can cause an external transducer to read incorrectly because is unable to flow freely to the transducer.

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