FEATUES
● Level Ranges up to 230 ft (70 m) H₂O
● Unsurpassed Accuracy of ±0.05% Total Error Band
● SDI-12 Communication Interface
● Welded 316 SS or Titanium Construction
● On-board Surge Protection
● Optional Lifetime Lightning Protection
● Custom Cable Lengths

APPLICATIONS
● Well Monitoring
● Down Hole
● Level Monitoring

● Ground Water Monitoring
● Surface Water Monitoring
● Oceanographic Research
● Dewatering
● Reservoirs
● Tank Level

The Series 500 submersible hydrostatic level transducer represents the leading edge of level sensing technology available today. Incorporating a highly stable media-isolated sensor, the Series 500 features SDI-12 serial-digital interface. SDI-12 is a standard for interfacing data recorders with microprocessor-based sensors, especially in the environmental monitoring field. The transducer meets the demanding requirements of the USGS Office of Surface Water (OSW) accuracy specification for stage monitoring. The Series 500 is intended for applications with requirements that include battery-powered operation with minimal current drain, low system cost, and use of a single recorder with multiple sensors “daisy-chained” on one cable. It will accommodate cable lengths between sensors and recorder up to 200 feet.

Able to operate from unregulated 12VDC power, each unit contains a microprocessor and EEPROM, which in addition to supporting the SDI-12 interface, are used to implement sophisticated compensation algorithms. This technique, combined with superior media-isolated sensing technology and proven packaging, results in a price/performance combination unmatched by any previous technique. The attached electrical cable is custom manufactured to Pressure Systems’ specifications and includes Kevlar® members to prevent errors due to cable elongation, and a unique water block feature that self-seals in the event of accidental cuts to the cable. Each transducer is shipped with our latest SuperDry™ Vent Filter that prevents moisture from entering the vent tube for at least one year without maintenance, even in the most humid environments.

The Series 500 is CE compliant to EN 61000-6-4:2001 and EN 61000-6-2:2001 and have an IP 68 and NEMA 6P housing protection rating.

Order on-line!
www.LevelandPressure.com
ISO-9001:2000 Certified

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### Series 500 Specifications

*Specifications subject to change without notice.*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>500</th>
<th>501</th>
<th>Units</th>
<th>Comments</th>
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<tbody>
<tr>
<td><strong>LEVEL RANGES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Scale Level Ranges</td>
<td>5 thru 230 (1.5 thru 70)</td>
<td>5 thru 50 (1.5 thru 15)</td>
<td>ft H₂O / (m H₂O)</td>
<td>for vented gage reference</td>
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<tr>
<td>Proof Pressure</td>
<td>1.5</td>
<td>x FS</td>
<td></td>
<td></td>
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<tr>
<td>Burst Pressure</td>
<td>2.0</td>
<td>x FS</td>
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<td><strong>STATIC PERFORMANCE</strong></td>
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<tr>
<td>Measurement Accuracy</td>
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<td>N/A</td>
<td>%FS TEB²</td>
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<tr>
<td>Level</td>
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<td>N/A</td>
<td>%FS TEB²</td>
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<tr>
<td>Temperature</td>
<td>±0.01</td>
<td>±0.10</td>
<td>ft H₂O</td>
<td></td>
</tr>
<tr>
<td>Excitation</td>
<td>±0.01</td>
<td>±0.10</td>
<td>% of reading</td>
<td></td>
</tr>
<tr>
<td><strong>Measurement Resolution</strong></td>
<td>±0.0001</td>
<td>% FS</td>
<td></td>
<td></td>
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<tr>
<td>Level</td>
<td>±0.001</td>
<td>% FS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>±0.1</td>
<td>VDC</td>
<td>8 to 28</td>
<td></td>
</tr>
<tr>
<td>Excitation</td>
<td>±0.1</td>
<td>VDC</td>
<td></td>
<td></td>
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<tr>
<td><strong>ENVIRONMENTAL</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Wetted Materials</td>
<td>316 SS or Titanium; Delrin®; polyurethane or Viton®</td>
<td>Delrin® and Viton® are registered trademarks of DuPont.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compensated Temp Range</td>
<td>0 to 50</td>
<td>°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temp Range</td>
<td>-20 to 60</td>
<td>°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection Rating</td>
<td>IP 68, NEMA 6P</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>ELECTRICAL</strong></td>
<td></td>
<td></td>
<td>VDC</td>
<td></td>
</tr>
<tr>
<td>Excitation</td>
<td>6-28</td>
<td></td>
<td>mA</td>
<td>average current during data acquisition</td>
</tr>
<tr>
<td>Input Current</td>
<td>8</td>
<td>11</td>
<td>mA</td>
<td>peak current during data acquisition for addressed sensor (~40mS duration) quiescent</td>
</tr>
<tr>
<td>Interface</td>
<td>SDI-12</td>
<td>RS-485</td>
<td>mA</td>
<td>version 1.3 SDI-12 protocol</td>
</tr>
</tbody>
</table>

**Notes:**
1 Intermediate level ranges are available.
2 Total Error Band (TEB) includes the combined errors due to nonlinearity, hysteresis, nonrepeatability, and thermal effects over the compensated temperature range per ISA S51.1.
Uniquely-Designed Submersible Cable
Our level transducers utilize one of two types of custom cable made specifically for submersible applications. The cable of choice for most applications is a polyurethane-jacketed cable incorporating Kevlar® strength members to prevent errors due to cable elongation, and a water block liner to prevent water intrusion due to minor cuts to the cable jacket. Polyurethane cable is attached to the transducer using an injection molded polyurethane cable seal.

The other alternative is a Tefzel®-jacketed cable which provides superior chemical resistance and toughness, yet preserves the other features found in the polyurethane-jacketed cable. Tefzel® is a Teflon® derivative from DuPont and is the better choice for caustic media or when a high degree of abrasion is anticipated. While more expensive and less flexible, it can save money in the long term due to reduced maintenance costs. Tefzel® cable is attached to the transducer using a compressed Viton® gland cable seal.

Both submersible cables have a pull strength of over 200 lbs. In all installations, care should be taken to ensure no damage occurs to the cable, as cable damage represents one of the most frequent causes of transducer failure. In the case where the user is not sure which material is best, contact Pressure Systems for assistance.

Moisture Protection
Our submersible transducers are equipped with custom, vented cable. The vent provides an atmospheric reference for the sensor, which is necessary for ensuring the highest possible accuracy when making a level measurement. It must be noted that if left unprotected, it provides a pathway for water vapor to enter the level transducer. This vapor will condense into water and could create an offset in the transducer output, or cause permanent damage. For these reasons, a Series 810 desiccant-filled vent filter is provided free of charge with each Series 500 we ship. Our latest SuperDry™ Vent Filter prevents moisture from entering the vent tube for at least one year without maintenance. Replacement filters are available from the factory.
**Installation Tips**
The Series 500 family of submersible transducers may be suspended directly in the media or in a perforated 1” PVC instrumentation still well. Alternatively, the transducer may be attached to a rigid conduit using a ½” NPT male conduit fitting.

When suspending by the cable, users often utilize our cable hanger (PN# 12-90-0931). This device slides onto the cable from the bare-wire end and is easily positioned anywhere on the cable by pushing the ends together. Once positioned, the cable hanger contracts to provide a snug grip.

**Nose Cap**
Several different user-installable nose caps are available for the Series 700, 710, 720, 730, and 735 submersible level transducers. The closed-face port end cap with #8-32UNC-2B threaded hole is best used where weights are required and for those installations where users may encounter sharp, protruding objects. The standard submersible open-face port end cap which allows maximum contact with the liquid media is ideal for wastewater and “greasy” applications where clogging of the sensor is a concern. The ¼” male NPT pressure port end cap is not only useful for calibration purposes but also allows the device to be used as a submersible or above ground pressure transducer. The piezometer port end cap allows the unit to be buried in the ground without damage to the sensor diaphragm.

**Optional Lifetime Lightning/Surge Protection (optional Lifetime Voltage Surge Warranty)**
Lightning/surge protection is offered as an option (PN# OPTION-012) for our Series 500 submersible level transducers. This is achieved through the use of 2 protectors. One is located in a 4 inch long, 1 inch OD 316 SS housing extension attached directly to the non-pressure sensing end of the transducer while the other is located at the surface and grounded via DIN-rail or ground wire. Whether lightning protection is employed or not, the cable shield is left exposed so that the shield can be attached to an earth ground. This option is in addition to the standard onboard surge protection with a 2 year warranty. **A unit ordered with this option is warranted for the life of the instrument against damage due to voltage surge, when this 2-part option is properly installed. Lightning protection is not available for the Series 500 using RS-485 communication.**
Molded Cable Seal

Gland Cable Seal

**ELECTRICAL TERMINATION**

<table>
<thead>
<tr>
<th>22AWG CONDUCTORS IN A SHIELDED CABLE WITH VENT TUBE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SDI-12</strong></td>
</tr>
<tr>
<td>RED + SUPPLY</td>
</tr>
<tr>
<td>BLACK - SUPPLY</td>
</tr>
<tr>
<td>WHITE SIGNAL</td>
</tr>
<tr>
<td>RED + SUPPLY</td>
</tr>
<tr>
<td>BLACK - SUPPLY</td>
</tr>
<tr>
<td><strong>RS-485</strong></td>
</tr>
<tr>
<td>WHITE RS485-A</td>
</tr>
<tr>
<td>GREEN RS485-B</td>
</tr>
<tr>
<td><strong>ALL</strong></td>
</tr>
<tr>
<td>DRAIN WIRE SHIELD</td>
</tr>
</tbody>
</table>

**CE**

- 5 -
### Order Information

#### MODEL | SUBMERSIBLE LEVEL TRANSDUCER
---|---
5 0 0 | SDI-12, Standard
5 0 1 | SDI-12, OSW spec

#### MATERIAL
- S Stainless Steel
- T Titanium

#### REFERENCE FORMAT
- 1 Vented gage

#### OUTPUT
- C SDI-12
- D RS-485, SDI-12 protocol

#### PRESSURE CONNECTION
- A Open-face nosecap
- B Closed-face nosecap
- E Piezometer nosecap
- 2 1/4" - 18 NPT male fitting
- 7 1/2" - 14 NPT male fitting
- F G 1/4 male fitting, BSP
- G M14 x 1.5 – 60º Internal cone male fitting

#### ELECTRICAL CONNECTION
- 0 Molded cable seal
- 4 1/2" - 14 NPT male conduit fitting with molded cable seal
- A Gland cable seal
- B 1/2" - 14 NPT male conduit fitting with gland cable seal

#### LIGHTNING PROTECTION
- A None
- B Lightning Protection

#### LEVEL RANGE
- \( x \times \times \times \times \)

#### CABLE TYPE
- 1 Polyurethane
- 2 Tefzel

#### CABLE LENGTH
- \( x \times \times \times \) (in feet)

#### NOTE:
1. The part number requires the level range to be specified in **pounds per square inch (psi)** to three decimal places. Use the following conversion factors:

   - \( \text{ft H}_2\text{O} / 2.3073 = \text{psi} \)
   - \( \text{m H}_2\text{O} / 0.703265 = \text{psi} \)

   **Examples:**
   - 5 ft \( \text{H}_2\text{O} / 2.3073 = 2.167 \text{ psi} \) (enter 002.167 in the part number)
   - 10 m \( \text{H}_2\text{O} / 0.703265 = 14.219 \text{ psi} \) (enter 014.219 in the part number)

2. Units of measure on standard PSI label. Contact PSI if private labeling is required.

Warranty: The Series 500 product is warranted against defects in material and workmanship for 2 years from date of shipment. Products not subjected to misuse will be repaired or replaced. THE FOREGOING IS IN LIEU OF ANY OTHER EXPRESSED OR IMPLIED WARRANTIES. We reserve the right to make changes to any product herein and assume no liability arising out of applications or use of any product or circuit described. Products described in this Specification are not intended for life support applications.