

# Semiconductor Piezometers and Pressure Transducers

## Applications

For the measurement of...

- Ground water elevations
- Pore water pressure
- Pumping and slug tests
- Uplift pressures in dam foundations
- Hydraulic pressures in tanks and pipelines
- Wick drain efficiency
- Water pressure behind tunnel linings
- Aquifer storage and recovery
- Watershed, drainage basin and recharge areas
- Groundwater network automation



• Model 3400 Semiconductor Piezometer.

## Operating Principle

The 3400 Series Semiconductor Piezometers (3400S/SV) and Pressure Transducers (3400H) are intended for dynamic measurements of fluid or pore water pressure, or for static pressure measurements where the readout system or data acquisition system is incompatible with vibrating wire type transducers.

The transducers use molecularly bonded (CVD) high output strain gages to provide 100 mV output for full pressure when used with a 10 VDC supply. The high output versions are fitted with an ASIC providing outputs of 0-5 VDC or 4-20 mA, which are capable of being used in control and indicating loops without further amplification.

Piezometers incorporate a filter stone ahead of the diaphragm, which allows the fluid to pass through but prevents soil particles from impinging directly on the diaphragm. Standard porous filters are 316 stainless steel. High air-entry ceramic filters are available for use in applications requiring that air be prevented from passing through the filter.

## Advantages and limitations

The transducer is made from 17-4 stainless steel and is housed in a rugged 304 stainless steel housing (316 housing optional) guaranteeing a high level of corrosion resistance, and providing long term reliable measurements in all applications.

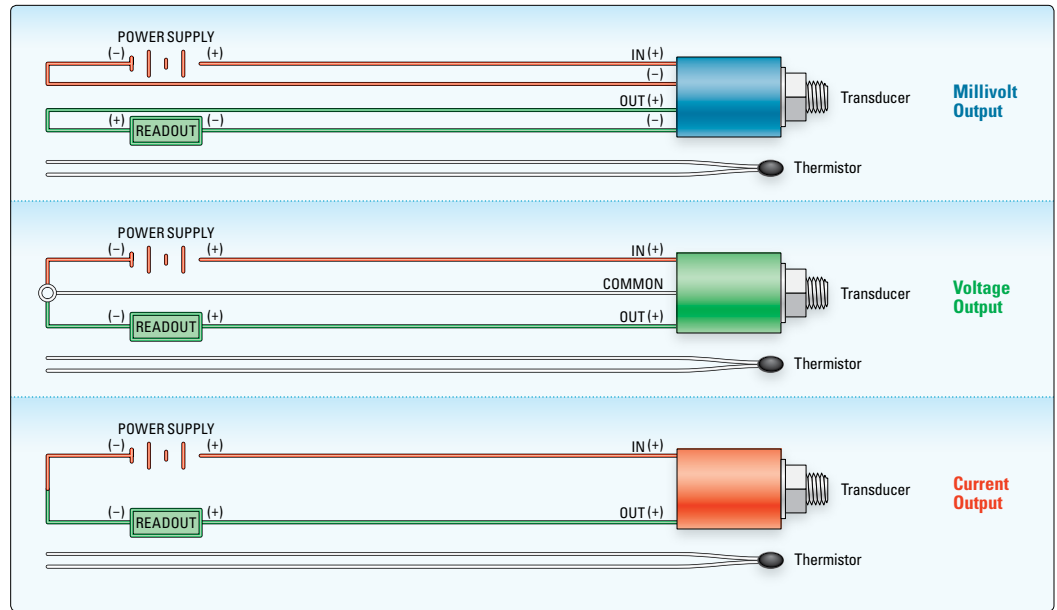
Signal cables are attached via proprietary bulkhead seals providing a high integrity, waterproof assembly. A variety of cable types are available to suit particular user applications.

Vented versions of all models are available to provide automatic compensation for barometric pressure fluctuations.

A thermistor located in the housing permits the simultaneous measurement of temperature at the piezometer location.



• Model 3400 and Dial Gage Pressure Transducer on a tee fitting.



• Model 3400 Semiconductor Piezometer wiring schematics.

## Technical Specifications

|                   |   |
|-------------------|---|
| Standard Ranges   | 100, 250, 400, 600 kPa; 1, 2.5, 6 MPa               |
| Over Range        | 2 × rated pressure                                  |
| Response Time     | 0.5 ms  |
| Wetted Parts      | (Transducer) 17-4 PH stainless steel                |
| Output            | 10 mV/v, 4-20 mA, 0-5 V                             |
| Accuracy          | ±0.25% F.S. or better                               |
| Linearity         | <0.5% F.S.  |
| Shock             | 20 g, 11 ms (per MIL-STD.-810E Method 516.4 Proc 1) |
| Temperature Range | -20°C to +80°C                                      |
| Length × Diameter | 194 × 32 mm   |

## Input/Output Specifications

| Model                      | Output Type | Input                 | Output           |
|----------------------------|-------------|-----------------------|------------------|
| 3400H-1, 3400S-1, 3400SV-1 | Millivolt   | 10 VDC regulated      | 100 mV (10 mV/V) |
| 3400H-2, 3400S-2, 3400SV-2 | Voltage     | 6.5-35 VDC above span | 0-5 VDC          |
| 3400H-3, 3400S-3, 3400SV-3 | Current     | 24 VDC (7-35 VDC)     | 4-20 mA (2 wire) |

## Cable Specifications

| Model                              | Cable  |
|------------------------------------|--|
| 3400H-1, 3400S-1, 3400H-2, 3400S-2 | <b>04-375V9:</b> 4 twisted pairs, Violet PVC Jacket, 9.53 mm Ø                               |
| 3400SV-1, 3400SV-2                 | <b>04-375VT1:</b> 4 twisted pairs, Black PVC Jacket, integral vent tube, 9.5 mm Ø            |
| 3400H-3, 3400S-3                   | <b>02-250V6:</b> 2 twisted pairs, Blue PVC Jacket, 6.35 mm Ø                                 |
| 3400SV-3                           | <b>02-335VT8:</b> 2 twisted pairs, Yellow Polyurethane Jacket, integral vent tube, 8.51 mm Ø |



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