

KPSI™ Transducers



Pressure Systems, Inc. offers an extensive line of accessories and options to augment the functionality of our KPSI™ Level and Pressure Transducers. These enhancements can be specified with the instrument's order or, in many cases, can be retrofitted in the field. Our Accessories and Options include 1-4 day expedited shipping service, lifetime lightning protection, and a variety of pressure connections to suit almost any installation. Industry-leading performance and reliability, combined with short lead times, responsive, knowledgeable Customer Service personnel, and our ability to customize KPSI transducers to meet virtually any requirement give us our competitive advantage. For trouble-free, cost-effective level and pressure monitoring instrumentation, contact our Sales or Customer Service Team today.

Sensing the Environment™

34 Research Drive
Hampton, VA 23666
USA

www.PressureSystems.com

ISO-9001:2000 Certified

Order on-line!

www.LevelandPressure.com

Phone: 757-865-1243
Toll Free: 800-328-3665
Fax: 757-865-8744
E-mail: sales@PressureSystems.com

INSTALLATION HARDWARE

Pressure Systems offers an extensive array of hardware to facilitate the installation of KPSI Transducers into almost any application. Contact our Technical Support staff for assistance in selecting the hardware that may best suit your application or if you have unique requirements that may require a custom solution.

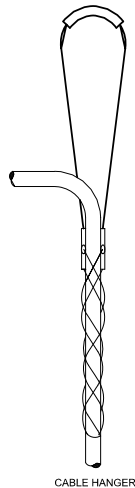
Anti-Snag Cone

Anti-Snag Cones are designed to fit over the cable end of either 1.0" or 0.75" diameter transducers to prevent the transducers from getting hung on obstacles when pulling the cable. The cones are constructed of PVC and come in separate sizes for the two diameters.



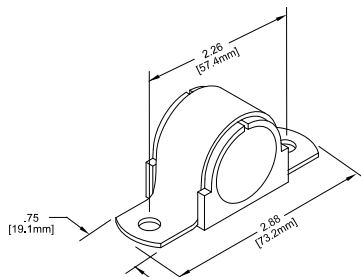
Cable Hanger

The *Cable Hanger* is used to suspend the transducers in the liquid media. The hanger slides onto the cable from the unterminated end and is easily positioned while pushing the ends of the hanger together. As the hanger expands from the weight of the transducer, it grips the cable by the sheath. The cable hanger is 6.0 in (15.3 cm) long and is constructed of 304 stainless steel. **The cable hanger is not recommended for cable lengths in excess of 500 ft (150 m) as it does not take advantage of the Kevlar® strength members in the cable.**



Mounting Clamp

The *Mounting Clamp* is used to secure 1.0" diameter transducers to a bulkhead. The clamp consists of a 304 stainless steel bracket with a thermoplastic insert that holds the transducer housing.

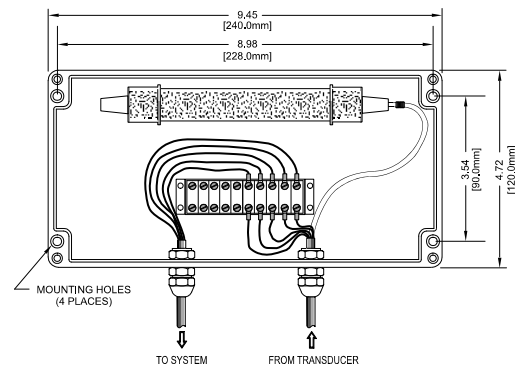


Well Caps

Locking *Well Caps* enable transducers to be suspended within the well while providing security. The vented orange PVC caps are 2" or 4" ID and come with a 304 stainless steel dock (ring and threaded quick-link) to support a cable hanger. The dual-hinge locking lid uses a Buna-N/Nitril o-ring for a watertight seal. The black triangle warning label on the lid can be marked for well identification.

Junction Box

The *Junction Box* provides a water-resistant enclosure for electrically connecting the transducer cable to the users system via a terminal strip. The enclosure also provides convenient location for terminating the vent tube on vented gage transducers. The enclosure can be ordered with either a vent filter or an aneroid bellows. The enclosure is constructed of polycarbonate with a clear top incorporating a neoprene seal. The junction box is rated IP66 and measures 9.45" L x 6.30" W x 4.72" H. Mounting screws are provided.



Identification Tags

Identification Tags are available to attach to the transducer cable to provide easy identification in the field. User-specified information is laser engraved onto the 1.0" square tag, which is constructed of 304 stainless steel.

Cable Splice Kit

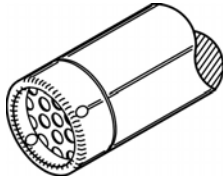
The *Cable Splice Kit* provides a waterproof connection to extend or repair Pressure Systems submersible cables. In many cases, the cable splice kit is a more economical alternative for repairing damaged cable. The kit includes all necessary items to electrically connect and insulate the conductors, couple the vent tubes, and seal the 316 stainless steel housing to either polyurethane and ETFE cable. Assembly instructions are also included.

REPLACEABLE AND INTERCHANGEABLE NOSE CAPS

Submersible transducers having 1.0" diameter housings are shipped with replaceable nose caps of the requested variety at no additional cost when ordered. The nose caps screw on to the front of the transducer housing via a 7/8"-20 UNEF thread with an o-ring seal. Spare or alternative nose caps may be ordered separately.

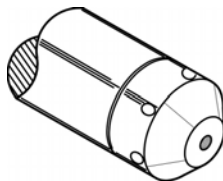
Open-face Nose Cap

The *Open-face Nose Cap* offers the best resistance to clogging. This single-piece nose cap provides maximum exposure of the sensing diaphragm to the liquid media through a protective perforated screen on the front. The open-face nose cap is constructed from molded Delrin®.



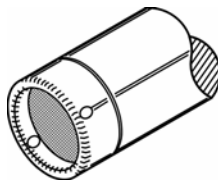
Ported Nose Cap

The *Ported Nose Cap* offers the best protection against damage to the sensing diaphragm. This single-piece nose cap allows the liquid media to enter through 6ea 1/8" holes around the outside and includes a #8-32 UNC-2B threaded hole on the front. The closed-face nose cap is constructed of molded Delrin®.



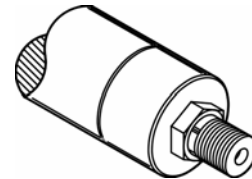
Piezometer Nose Cap

The *Piezometer Nose Cap* offers the best alternative for burying the transducer in the ground without risk to the sensing diaphragm. This two-piece nose cap allows the liquid media to enter through a permeable 40 micron centered stainless steel mesh filter at the front of the cap. The piezometer nose cap is constructed of Delrin®.



Male NPT Nose Cap

The *Male NPT Pressure Nose Cap* offers the best alternative for installing the transducer on a pipe. This single-piece nose cap incorporates a 1/4"-18 or a 1/2"-14 MNPT fitting on the front for connection. The male NPT nose cap is constructed of stainless steel or titanium, as required.

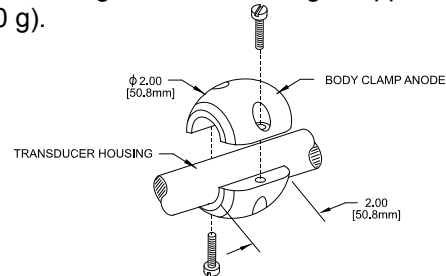


CORROSION PROTECTION

KPSI Transducers are available with optional wetted materials to maintain compatibility with a variety of caustic liquid media. Stainless steel or titanium construction, Viton® seals, and polyurethane or ETFE cable permit the transducers to operate in most liquid environments. In the event galvanic corrosion is anticipated, PSI offers two self-sloughing sacrificial anodes that attach to 1.0" diameter transducers.

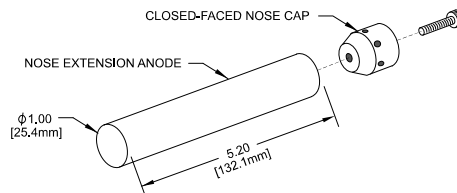
Body Clamp Anode

The *Body Clamp Anode* is a 2.2 in (5.6 cm) diameter zinc sphere of which the two halves bolt on to the transducer housing. The anode weighs approximately 13 oz (370 g).



Nose Extension Anode

The *Nose Extension Anode* is a 5.25 in (13.34 cm) long by 1.0" diameter zinc cylinder that attaches to a closed-face nose cap via an 8-32 threaded hole in the front of the nose cap. The anode weighs approximately 15 oz (417 g) and is shipped with an attached stainless steel closed-face nose cap.

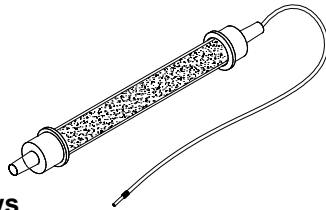


MOISTURE PROTECTION

Two solutions are offered to provide protection against moisture incursion on transducers with vented gage reference pressure format. The choice of which solution to utilize depends on the ability to provide periodic maintenance and the accuracy required for level measurement.

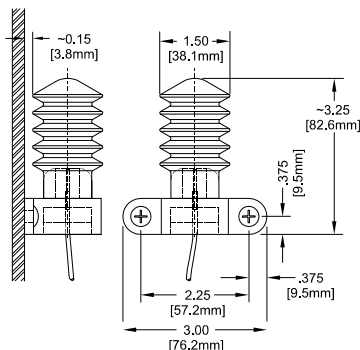
Vent Filter

Vent Filters provide the highest accuracy capability and utilize indicating desiccant to prevent moisture from entering the vent tube and damaging transducers with vented gage reference pressure format. The desiccant will turn from blue to pink when exposed to moisture indicating the need for maintenance. All vented gage transducers are shipped with our SuperDry™ Vent Filter. This latest vent filter design prevents moisture from entering the vent tube **for at least one year without maintenance**, at no additional cost. Spare filters may be ordered. The vent filters are 6.0 in (15.3 cm) long with a 0.75" diameter.



Aneroid Bellows

The *Aneroid Bellows* is a maintenance-free alternative to desiccant filters for moisture protection on vented gage transducers. Made of flexible neoprene material attached to a polycarbonate mounting bracket, the bellows fluctuates with changes in atmospheric pressure maintaining a constant barometric reference. Note that the use of the bellows results in a closed reference pressure system subject to zero shift errors induced by changing temperatures of up to 0.003 psi/°C. The bellows is not recommended for use with accuracy requirements of $\pm 0.25\%$ FS or better, nor for ranges < 2 psi..



DIGITAL DISPLAYS

Pressure Systems offers two types of Display Meters to provide a visual readout of a single KPSI transducer having mA or VDC output. Both varieties utilize a red 0.54" LED display with 4 active characters to indicate a numeric range of -1999 to 9999. The units operate from VAC power and provide a 24 VDC supply for power to the transducer.

The Model 3019 Digital Readouts provide a sophisticated display of the transducer output with six 14-segment LED's for display of true alphanumeric characters; the last two used for process descriptors. These readouts offer programmable input configuration, isolated transducer power supply, selectable 2-point scaling or up to 17-point linearization, optional 4-20 mA retransmission, and two or four optional 10-amp SPDT alarm contacts for control. The 3019 has a NEMA 4X front panel with a polycarbonate bezel and a 1/8 DIN aluminum housing measuring 1.9375" H x 3.75" W x 6.5" D.

The Model 3620 Pump Controllers provide a more rugged package specifically designed to operate external pumps via two 10-amp SPDT alarm contacts. The 3620 provides front panel scaling, operates from -20 to 70°C, and uses 120 or 240 VAC. The NEMA 4X rated enclosure can be surface or panel mounted and measures 3.2" H x 5.5" W x 2.7" D.

Model 3019 Digital Readout	Model 3620 Pump Controller
6 digit 14 segment 0.54" red LED	4 digit 7 segment 0.54" red LED
NEMA 4X front panel	NEMA 4X enclosure
Polycarbonate bezel, 1/8 DIN aluminum housing	Surface or panel mountable polycarbonate housing
Programmable mA or VDC input configuration	Fixed mA or VDC input configuration
Isolated 24 VDC @ 100 A power supply	Regulated 24 VDC @ 25A power supply
0 to 70°C operation	-20 to 70°C operation
20 bit A/D resolution	16 bit A/D resolution
90 to 140 VAC, 50/60 Hz power	Selectable 120/240 VAC, 50/60 Hz power
Plug-in terminal block electrical connections	Screw clamp terminal electrical connections
Selectable flashing display and/or horn alarm notification	Flashing display alarm notification
Optional 2ea or 4ea 10 amp, 250 VAC SPDT contacts	Standard 2 or optional 3ea 10 amp, 250 VAC SPDT contacts
Optional 4-20 mA retransmission	N/A

EXPEDITE SHIPMENT SERVICE

Standard lead times for many of Pressure Systems' line of KPSI Level and Pressure Transducers are 5 working days. At a premium, PSI offers an *Expedite Shipment Service* in order to ship transducers within 1-4 working days. This service includes requirements for custom pressure ranges within the limits of the relevant transducer models as well as custom cable lengths. Expedite shipment service is available on most models. Consult our Customer Service staff for availability.

REFERENCE PRESSURE FORMAT

KPSI Transducers are available in three different *Reference Pressure Formats* to meet varying requirements. The format indicates whether the sensor is referenced to atmospheric pressure (vented gage), a hard vacuum (absolute), or a simulated atmospheric pressure (sealed gage).

Vented gage reference is usually used in lower full-scale range transducers where the sensor must track changes in atmosphere to maintain stated accuracy. Care must be taken to employ appropriate moisture protection to prevent humidity from entering the transducer via the vent tube.

Sealed gage and absolute reference is typically used when the full-scale range is above 700 ft (210 m) H₂O. Changes in atmospheric pressure have negligible impact on the accuracy of transducers at that range and moisture protection is not a concern since no vent tube is required. Sealed gage units are absolute units that are electrically adjusted to simulate reference to the atmospheric pressure at site of the installation. Base elevation with respect to sea level of the site must therefore be specified when ordering sealed gage transducers. Consult our Technical Support staff if you need assistance in choosing the reference pressure format.

TRANSDUCER OUTPUT

A variety of electrical *Transducer Output* signals are available to facilitate interfacing to almost any system. The most popular output signal is 4-20 mA, which is transmitted over two wires along with power for the transducer. Transducers with this output are typically referred to as transmitters and interface with almost any data logger or PLC

Amplified voltage output is also commonplace requiring three wires for power and output signal. Most common is 0-5 VDC, but the full-scale voltage output can be factory-adjusted to as much as 2.5 VDC less than the anticipated excitation voltage supply. Specify the voltage range required when ordering VDC output transducers.

ELECTRICAL CONNECTION

Two basic *Electrical Connection* options are offered to facilitate submerged use in different environments.

The standard connection is a submersible cable exit using a factory molded polyurethane seal to the transducer housing. This provides the best water ingress protection. As an option, a compressed gland seal is offered to facilitate field attachment but requires considerable care in assembly to insure water-proof integrity.

An optional ½"-14 male NPT conduit fitting can also be specified for a more rugged and protected connection. This configuration also employs the standard molded cable seal or the optional gland cable seal.

TEMPERATURE SENSE OUTPUT

As an option, a precision silicon temperature sensor can be installed within the transducer to provide a separate 4-20 mA temperature measurement output over the range of -20 to 60°C. The accuracy of the temperature measurement is ±4°C.

WETTED MATERIALS

Optional *Wetted Materials* are offered for both the transducer and the cable to enable compatibility with a wide range of liquid media.

Transducer Housing Assemblies

The transducer assemblies are most commonly made from 316 stainless steel, which offers good compatibility for most water and hydrocarbon liquid applications. Alternatively, the transducer assembly can be made from titanium, which offers superior compatibility to salt water and chemical liquid applications.

Cable Seals

The molded cable seal is KPSI's standard offering and provides a very reliable injection molded polyurethane seal. The gland cable seal is primarily used for ETFE cable and incorporates a compressed Viton® gland.

Transducer Cable

The jacket on our transducer cable is typically constructed from polyurethane, which provides excellent general-purpose use and reliability with good flexibility and economy. For liquid media such as hydrocarbons and other chemicals, ETFE can be specified providing excellent compatibility and maintaining all the features of the polyurethane though somewhat less flexible and more expensive.

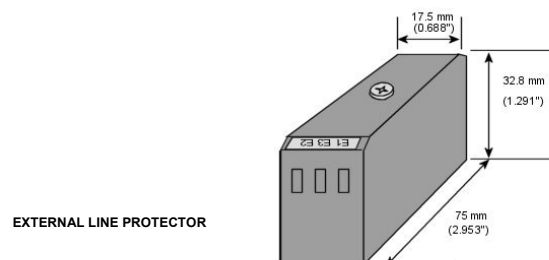
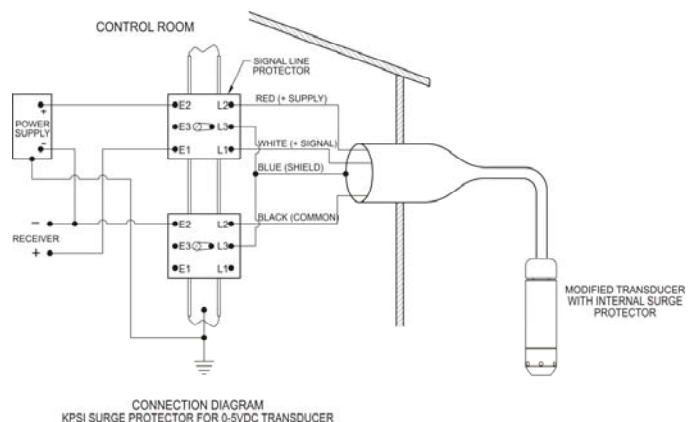
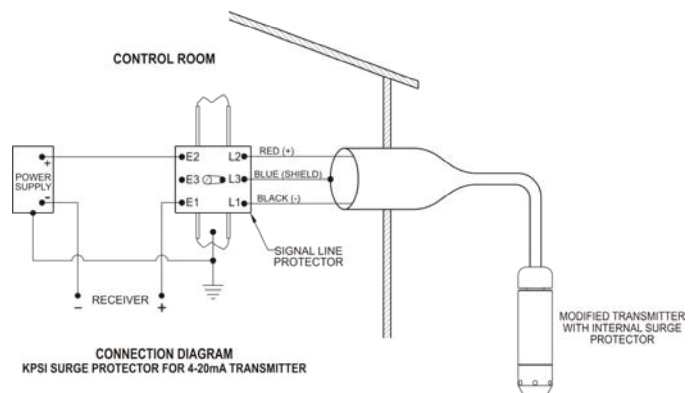
Consult our Technical Support staff for the material best suited for the anticipated media.

LIGHTNING PROTECTION

Lightning Protection is designed to protect KPSI Level and Pressure Transducers from damaging surge voltage and current. The protection is offered for 2-wire 4-20 mA output as well as 3-wire VDC and digital output configurations. This circuit is capable of protecting against fast rising voltage transients as well as current surges associated with lightning discharges. The protectors are a multi-stage design, with a solid-state section that intercepts the leading edge of the surge within nanoseconds. The second stage of the design contains a gas discharge tube which crowbars up to 20,000 ampere currents to ground. The tube remains in the crowbar state until the surge has passed, then automatically resets the line to normal operation without the need to reset a circuit breaker. Each circuit consists of two parts. One is housed integral to

the transducer via a factory-installed extension to the end of the housing while the other is installed by the user between the transducer wiring and the system. External line protection must be used at all times to ensure lifetime warranty coverage. The protectors are FM/UL/CUL Intrinsic Safety rated for use in hazardous environments when used with an appropriate Intrinsic Safety barrier. The transducer carries a **lifetime warranty for damage due to lightning or voltage spikes** when this 2-part option is properly installed. It is not warranted against continuous over voltage. This option is not available for the Series 300DS.

Note: For 4-20 mA output transducers the supply voltage must be at least 15 VDC when Lightning Protection is installed. Lightning Protection is available as an option on all new units.



Installation Hardware

PN: 42-01-66181	Anti-Snag Cone for 1.0" diameter for use with molded cable seal
PN: 42-01-64134	Anti-Snag Cone for 1.0" diameter for use with gland cable seal
PN: 42-01-64136	Anti-Snag Cone for 0.75" diameter for use with gland cable seal
PN: 12-90-0931	Cable Hanger
PN: 49-06-00PC	Mounting Clamp
PN: 840	Junction Box with Vent Filter
PN: 845	Junction Box with Aneroid Bellows
PN: 36-05-1540T79	Identification Tags
PN: 830	Cable Splice Kit
PN: 861-2A	2" vented locking well cap with dock
PN: 861-2B	2" vented locking well cap
PN: 861-2C	2" well dock
PN: 861-4A	4" vented locking well cap with dock
PN: 861-4B	4" vented locking well cap
PN: 861-4C	4" well dock

Replaceable/Interchangeable Nose Caps

PN: 42-30-6659	Open-face Nose Cap
PN: 42-01-1314A	Closed-face Nose Cap
PN: 42-30-6676S	Piezometer Nose Cap
PN: 42-01-64154	Stainless Steel 1/4"-18 Male NPT Nose Cap
PN: 42-01-64154T	Titanium 1/4"-18 Male NPT Nose Cap
PN: 42-02-64180	Stainless Steel 1/2"- 14 Male NPT Nose Cap
PN: 42-02-64180T	Titanium 1/2"-14 Male NPT Nose Cap

Corrosion Protection

PN: 820	Body Clamp Anode
PN: 825	Nose Extension Anode

Moisture Protection

PN: 810	Vent Filter
PN: 815	Aneroid Bellows

Digital Displays

PN: D3019-2-420	Digital Readout, two SPDT 10A control relays, 4-20 retransmission
PN: D3019-4	Digital Readout, four SPDT 10A control relays
PN: D3019-4-420	Digital Readout, four SPDT 10A control relays, 4-20 retransmission
PN: D3620	Digital Readout, NEMA 4X rated, two SPDT 10A control relays
PN: D3621	Digital Readout, NEMA 4X rated, three SPDT 10A control relays

Lightning Protection

PN: 809	External line protector
---------	-------------------------