



# P022 Series

## P022 Series

### DIFFERENTIAL PRESSURE TRANSDUCER

#### FEATURES

- Rugged Stainless Steel Construction
- 0-50 thru 0-10,000 psid Pressure Range
- Compatible with Wet or Dry Media
- 300% Static Line Pressure
- 3 or 4-wire amplified voltage output,  $\pm 5$  VDC, 4-20 mA current loop, 0.5-1.0 mV/V
- Integral male or female pressure connections
- CE mark (amplified voltage units only)

#### SPECIAL OPTIONS AVAILABLE:

- Deep Submersible





### OVERVIEW

The P022 Series differential pressure transducer is designed for a wide variety of industrial type applications requiring high reliability, durability and accuracy. They provide a high output signal and are designed to withstand temperature, shock and vibration.



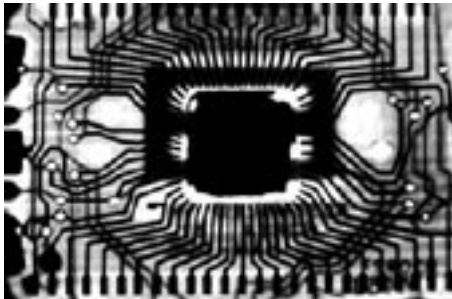
Submersible Differential Transducer

### FEATURES

- Reliable bonded foil strain gage technology
- 3 or 4-wire amplified voltage output,  $\pm 5$  VDC, 4-20 mA current loop, 0.5-1.0 mV/V
- Reverse polarity protection
- EMI/RFI filter protection
- Field adjustable span and zero

## APPLICATIONS

- Vehicle test stands
- Underwater remote operated vehicles
- Laboratory testing
- Off road vehicles
- Differential pressure measurements across filters and valves



## TECHNOLOGY

The P022 Series features bonded foil strain gage technology, considered one of the most durable and abuse resistant technologies available today. The bonded foil strain gage transducer measures pressure when a fluid is introduced into a simple low volume chamber (port), where it acts against the diaphragm. Proportional to the applied pressure, the resistance change is conditioned by internal circuit devices to produce the transducer's output.

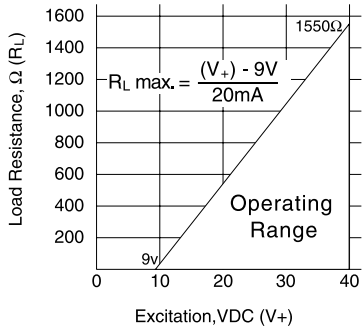


## SPECIFICATIONS

<b>MODEL:</b>	P022
<b>PRESSURE RANGE:</b>	±50 thru ±10,000 psid ±3 bar thru ±690 bar
<b>OUTPUT RANGE:</b>	±5 VDC ±0.5% FSO (Types A, B, C) bi-directional 0.5 to 1.0 mV/V nominal (Type M) 4-20 mA ±0.5% FSO (Type T) uni-directional 12 ± 8 mA ± 0.5% bi-directional
<b>ZERO BALANCE:</b> (Field-Adjustable ±5% typical)	±1.0% FSO
<b>STATIC ERROR BAND:</b> (BSL - Nonlinearity, Hysteresis, and Nonrepeatability combined) Bsl- Best Straight Line	±0.50% FSO
<b>NONREPEATABILITY:</b>	±0.1% FSO
<b>THERMAL ZERO SHIFT:</b>	±0.01% FSO/°F ±0.018% FSO/°C
<b>THERMAL SENSITIVITY SHIFT:</b>	±0.01%/°F ±0.018%/°C
<b>OPERATING TEMPERATURE RANGE:</b>	-40°F to 185°F -40°C to 85°C
<b>COMPENSATED TEMPERATURE RANGE:</b>	0°F to 160°F -20°C to 70°C
<b>MAX. SAFE EXPOSURE TEMP.:</b>	+250°F, +125°C
<b>EMI FILTERS:</b>	10 MHz 5dB 10 GHz 70dB (Min. Insertion Loss)
<b>ELECTRICAL PROTECTION:</b>	Reverse Polarity on Input Overvoltage Protection Clamping Diodes on Signal

**EXCITATION:**

15 to 32 VDC (Type A)  
 9 to 28 VDC (Types B, C)  
 5 to 18 VDC (Type M)  
 9 to 40 VDC at the transmitter (Type T)



**Important Note: T type circuit  
 4-20 mA has over-scale limit of 34mA**

**CURRENT CONSUMPTION:**  
 (Typical)

28 mA (Types A, B)  
 13 mA (Type C)  
 VEXC/350 (Type M)  
 4-20 mA (Type T)

**RESOLUTION:**

Continuous

**NATURAL FREQUENCY:**

Approximately 6 KHz for 50 psi range rising to approx. 230 KHz for 5,000 psi range

**RISE TIME: (10-90%)**

Less than 1 ms typical

**STATIC LINE PRESSURE:**

300% of range or 10,000 psi; whichever is less

**PROOF PRESSURE:**

3 times rated pressure or 15,000 psi, whichever is less

**BURST PRESSURE:**

5 times rated pressure or 25,000 psi, whichever is less

**MATERIAL:** (sensor/housing)

15-5 PH S.S. / 300 series S.S.

**WEIGHT:**

Approximately 3.5 oz. or 100 g

**IDENTIFICATION:**

origin are identified on the case

Model, range, serial #, connections, manufacturer & country of



## MODEL CHART

The chart below will assist you in selecting a transducer configuration.

Model Selections	
<b>1 Series / Accuracy</b>	
P022	P022 Series with $\pm 0.5\%$ SEB BSL
<b>2 Circuit Type</b>	
A	$\pm 5$ VDC Signal Output (Differential, Exc = 15-32)
B	$\pm 5$ VDC Signal Output (Differential, Exc 9-28)
C	$\pm 5$ VDC Signal Output (Single Ended)
M	0.5 to 1.0 mV/V Nominal
T	4-20mA or 12mA $\pm 8$ mA Signal Output
<b>3 Pressure Connection</b>	
B	7/16-20 37 male (for 1/4 tube)
C	7/16-20 fem. MS33649-4 (for 1/4 tube)
G	7/16-20 SAE female (for 1/4 tube)
H	1/4-18 NPT female
I	1/4-18 NPT male
J	1/8-27 NPT male
<b>4 Electrical Connection</b>	
A	PTIH-10-6P (mate #80002, sold separately)
B	PCIH-10-6P (mate #80001, sold separately)
C	Cable 1 meter 28 AWG PVC
D	Cable 1 meter 24 AWG Teflon <sup>®</sup>
F	Flying Leads 1 meter 24 AWG Teflon <sup>®</sup>
I	Mini-Hirschmann (DIN 43650-C, included)
S	Submersible Connector
<b>5 Common Options / Modifications</b>	
004	Shunt Calibration (N/A on the T Circuit)
005	Shunt Calibration ( $80\% \pm 1\%$ ) (N/A on the T Circuit)
017	0-10 VDC FSO (C Circuit)
066	0-10 VDC FSO + 80% shunt (N/A on the T Circuit)
071	Integral snubber (male threads only)
597	Monel <sup>®</sup> alloy K-500 submersible housing
###	Additional cable lengths / types
###	Special wiring (specify)
<b>Mating Connector and Cable (required)</b>	
3000165.xx where xx represents feet	

Pressure Selections	
<b>6 Pressure Range</b>	
min.	$\pm 50$ psid
< >	we accommodate any range in between
max.	$\pm 10,000$ psid
<b>7 Units [Available Pressure Range]</b>	
psi	50 psi thru 10,000 psi
bar	3 bar thru 690 bar
kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup> thru 700 kg/cm <sup>2</sup>
KPa	300 KPa thru 70,000 KPa
in Hg	100" Hg thru 20,000" Hg
other	consult factory
<b>8 Pressure Reference</b>	
Differential	Reference to standard atmospheric pressure at sea level

SEB: Static Error Band  
BSL: Best Straight Line

### P022 Submersible Connector

Connections using Part #: 3000165.xx mating connector and cable:

Circuit Type	A	B	C	M	T
<i>Cable Color</i>					
RD	+Exc	+Exc	+Exc	+Exc	N/C
GN	+Sig	+Sig	+Sig	+Sig	CASE
WT	-Sig	-Sig	CASE	-Sig	OUT
BK	Comm	Comm	Comm	Comm	IN

(See Circuit Drawings on page 7)

*Note: When attaching cable to the connector on the transducer, align the nubs of the cable with the indent on the transducer's connector plate and push together. To avoid accidental connector disconnect, thread the locking sleeve to the transducer connector plate and securely fasten.*

P022 Submersible Options Only

## HOW TO ORDER

Trans Metrics' P022 Series model numbers are constructed as a series of numbers and letters that identify the accuracy, electrical circuit, pressure connection, electrical connection, and any options or features which may be unique to a particular pressure transducer.

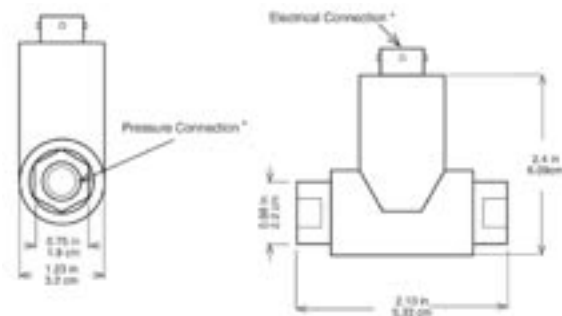
The model number below features **1** a P022 series pressure transducer, **2**  $\pm 5$  VDC output, **3** 7/16-20 female thread and **4** a PT1H-10-6P electrical connection. Any other options selected **5** would be assigned a three (3) digit number which would be added to the end of the model number.

Pressure selections should be specified including the **6** pressure range, **7** units and **8** pressure reference.

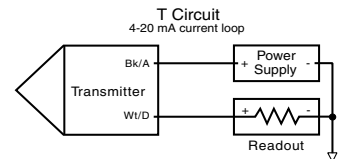
### Example:

<b>Model</b>					<b>Range</b>		
<b>P022</b>	<b>C</b>	<b>G</b>	<b>A</b>	<b>004</b>	<b>100</b>	<b>psi</b>	<b>d</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Series/ Accuracy	Circuit Type	Pressure Connections	Electrical Connection	Options	Pressure Range	Units	Pressure Reference

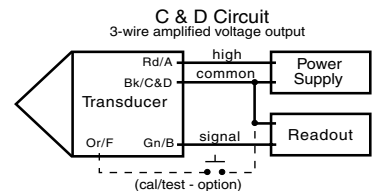
## DIMENSIONAL AND CIRCUIT DRAWINGS



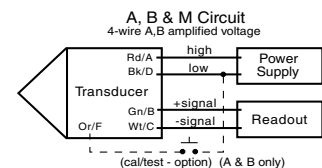
2 - Wire Circuits



3 - Wire Circuits



4 - Wire Circuits



## RECOMMENDED PRACTICES AND WARNINGS

Trans Metrics recommends careful consideration of the following factors when specifying and installing Trans Metrics pressure units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and max. temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to proof pressure or max. temperature is acceptable on a limited basis (i.e., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at proof pressure or maximum temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where dangerous runaway conditions could result.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. Orient unit so that moisture does not enter the enclosure via the electrical connection.
- Unit must not be altered or modified after shipment. Consult Trans Metrics if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- For all applications, a factory set unit should be tested before use.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Use only factory authorized replacement parts and procedures.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY OF REPAIR AND REPLACEMENT

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (F.O.B. Trans Metrics); provided, however, that this warranty applies only to equipment found to be so defective within a period of 12 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives.

EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE

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SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE IMPUTED TO SELLER IS LIMITED TO THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED HEREIN. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*Trans Metrics specifications subject to change without notice.*

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