

### The GBMCT-6D Series Digital Transducer for Industrial High Pressure, I<sup>2</sup>C & SPI Protocols



#### DESCRIPTION

Advanced Sensors Glass Bond Multi Chip Technology (GBMCT) 6D Series incorporates the latest mixed signal ASIC (Application Specific Integrated Circuit) with a *glass bonded* silicon gage to provide a leading *Digital Output* design for Industrial Transducers. The GBMCT 6D Series provides a 14bit digital pressure and 11 bit digital temperature output offered in SPI and I<sup>2</sup>C protocols. The rugged design is compatible with a wide range of harsh media including refrigerants, compressed air, and hydraulic fluids. The designs superior performance provides 1% Total Error across a wide temperature range of -20 to 85°C and overall error of less than 2.5% over -40 to 125C. The flexible design incorporates many process fitting and connector types making it the ideal choice for OEM customers.

#### APPLICATIONS

- Hydraulic and Pneumatic
- HVAC
- Pumps and Compressors
- Refrigeration Systems
- Energy and Water Management

#### FEATURES

- Digital Temperature & Pressure Output
- ASIC Compensation
- Wide Temperature Range
- Hash Media Compatible
- High Accuracy
- Low Overall Errors, 1%TEB
- All Welded Design
- Custom Outputs and Ranges Available

#### SPECIFICATIONS

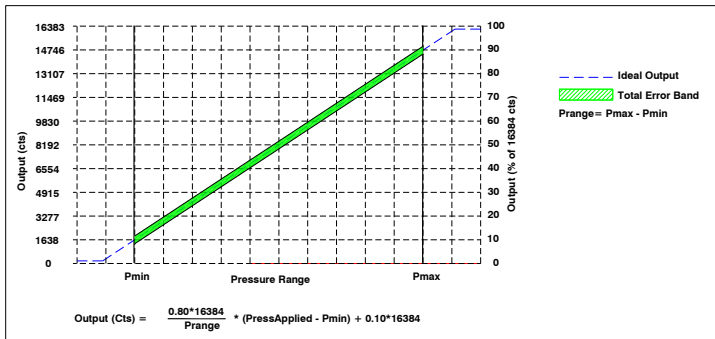
|                                   | Symbol | Min   | Typical    | Max  | Unit   | Note |
|-----------------------------------|--------|-------|------------|------|--------|------|
| <b>Performance Specifications</b> |        |       |            |      |        |      |
| Supply Voltage                    |        | 2.7V  | 3.3        | 5.50 | V      |      |
| Current Consumption               |        |       |            | 3    | mA     |      |
| Pressure Resolution               |        |       |            | 14   | bits   |      |
| Temperature Resolution            |        |       |            | 11   | bits   |      |
| Output at Pmin                    |        |       | 1638       |      | cts    |      |
| Output at Pmax                    |        |       | 14746      |      | cts    |      |
| Span                              | FSS    |       | 13107      |      | cts    |      |
| Pressure Accuracy                 |        | -0.25 |            | 0.25 | mA     | 2    |
| Total Error Band                  | TEB    | -1.0  |            | 1.0  | %FSS   | 3    |
| Temperature Accuracy              |        |       | 2.5        |      | °C     |      |
| Long Term Stability               |        |       | ±0.4       |      | %FSS   |      |
| Conversion Time                   |        |       | 1.0        |      | mS     | 4    |
| Power On to Valid Data            |        |       |            | <10  | mS     | 5    |
| Life                              |        | 1kk   |            |      | cycles |      |
| Weight                            |        |       |            | 120  | grams  |      |
| Compensated Temperature           |        |       | -20 to 85  |      | °C     |      |
| Operating Temperature             |        |       | -40 to 125 |      | °C     |      |

| SPECIFICATIONS                     | Symbol | Min                  | Typical | Max | Unit  | Note   |
|------------------------------------|--------|----------------------|---------|-----|-------|--------|
| <b>Absolute Maximum Conditions</b> |        |                      |         |     |       | 6      |
| Supply Voltage                     |        | -16                  |         | 16  | V     |        |
| Storage Temperature                |        | -50                  |         | 150 | °C    |        |
| Burst Pressure                     |        |                      |         | 3x  | Range |        |
| Insulation Resistance              |        | 10                   |         |     | MΩ    | 500Vdc |
| Wetted Materials                   |        | 316L, Epoxy, Silicon |         |     |       |        |

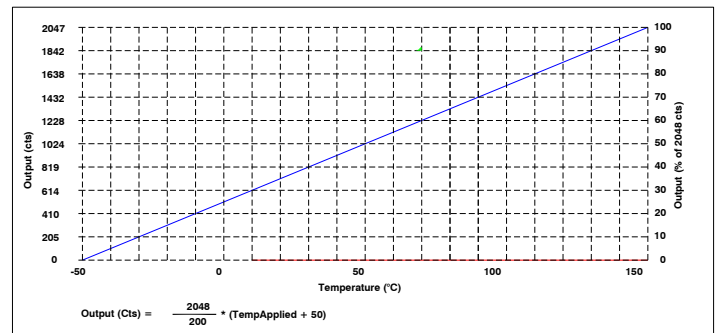
**Reference Conditions:** Vsupply: 3.30Vdc or 5.00, Ta=25 °C.

1. All specification at reference conditions unless otherwise noted. Output is ratio metric to supply voltage.
2. Maximum deviation from a Best Fit Straight Line through Pmin and Pmax measured at 25 °C. Errors included Pressure Non Linearity, Pressure Hysteresis and Repeatability.
3. Maximum deviation from the Ideal Transfer Function expressed as a percentage of the %FSS over the compensated temperature range. Includes calibration errors (Offset & Span), temperature errors (Offset & Span), pressure non-linearity, pressure and thermal hysteresis.
4. The time for the output DAC to be updated with new data.
5. The time for the output DAC to have valid data after a power on reset.
6. Exceeding Absolute Maximum Specification may damage the device. Extended exposure beyond the operating conditions may affect device reliability.

### PRESSURE AND TEMPERATURE TRANSFER FUNCTIONS



Pressure Transfer Function, TEB Error



Temperature Transfer Function

### CONSTRUCTION

### Material

|                    |                         |
|--------------------|-------------------------|
| <b>Wetted</b>      |                         |
| Port               | 17-4 PH Stainless Steel |
| <b>External</b>    |                         |
| MEMS Sense Element | Silicon Gage            |
| Sensor Die Bond    | Fused Glass Bond        |
| Housing Tube       | 303 Stainless Steel     |
| Connector          | PBT Glass Filled        |
| Cable Jacket       | TPE                     |

### MECHANICAL DIMENSIONS in [mm]

#### M12x1 IEC 61076-2-101, Binder 09 0439 387 04 Protection Class (IEC 60529): IP67

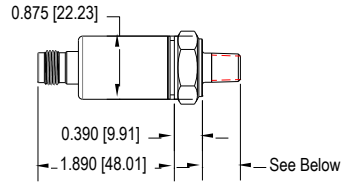
Mating M12x1 Connector  
4 Position Female Type D

Voltage  
Regulated, Ratiometric

Pin 1: Supply +  
Pin 4: Output +  
Pin 3: Common

4-20mA  
Transmitter

Pin 1: Supply +  
Pin 4: Not Connected  
Pin 3: Supply -

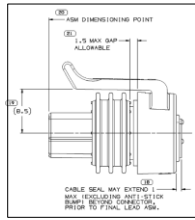


See Below

#### PACKARD CONNECTOR Type A

Protection Class (IEC 60529): IP66

Mating Packard Connector  
Housing Part Number: 12078090  
Socket Part Number: 12103881

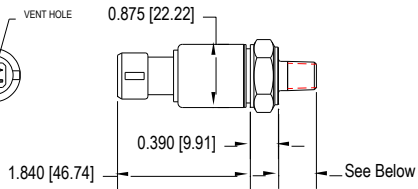


Voltage  
Regulated, Ratiometric

Pin A: Supply +  
Pin B: Common  
Pin C: Output +

4-20mA  
Transmitter

Pin A: Supply +  
Pin B: Supply +  
Pin C: Not Connected



See Below

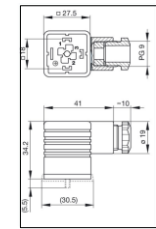
#### HIRSCHMANN CONNECTOR

DIN 43650 FORM A, Part Number 933 376-100

Protection Class (IEC 60529): IP65

Mating Hirschmann Connector

Part Number: 931 969-100  
Gasket (NBR) Part Number: 730 801-002  
Knurled Screw Part Number: 732 574-001

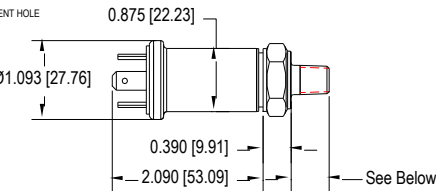
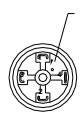


Voltage  
Regulated, Ratiometric

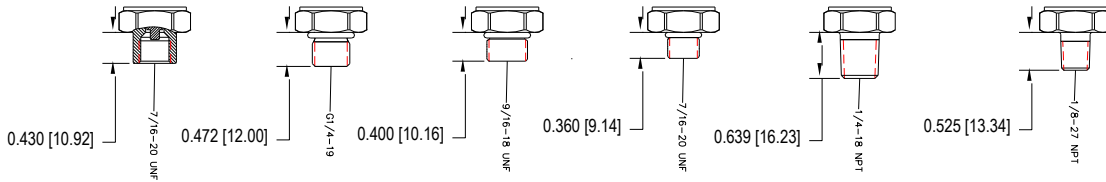
Pin 1: Supply +  
Pin 2: Common  
Pin 3: Output +  
Pin 4: Case

4-20mA  
Transmitter

Pin 1: Supply +  
Pin 2: Supply +  
Pin 3: Not Connected  
Pin 4: Case



See Below



7/16-20 UNF SAE J1926-3  
Female

Seal: O-Ring  
Mating Standard: SAE J514  
Installation: 18 N m [12.3 ft lb]

G1/4-19 ISO 1179-3

Seal: O-Ring  
Mating Standard: ISO 1179-1  
Installation: 50 N m [38.9 ft lb]

9/16-18 UNF SAE J1926-3

Seal: O-Ring  
Mating Standard: SAE J1926-1  
Installation: 30 N m [22.1 ft lb]

7/16-20 UNF SAE J1926-3

Seal: O-Ring  
Mating Standard: SAE J1926-1  
Installation: 18 N m [12.3 ft lb]

1/4 -18 NPT ANSI B1.20.1

Seal: Pipe Threads  
Mating Standard: ANSI B1.20.1  
Installation: 2-3 Turns Past Finger Tight

1/8-27 NPT ANSI B1.20.1

Seal: Pipe Threads  
Mating Standard: ANSI B1.20.1  
Installation: 2-3 Turns Past Finger Tight

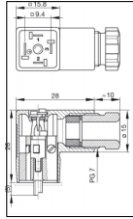
### HIRSCHMANN CONNECTOR

DIN 43650 FORM C, Part Number 933 114-100

Protection Class (IEC 60529): IP65

#### Mating Hirschmann Connector

Part Number: 933 024-100  
Gasket (NBR) Part Number: Supplied

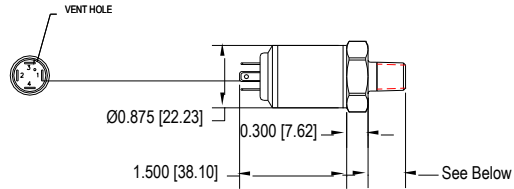


Voltage  
Regulated, Ratiometric

Pin 1: Supply+  
Pin 2: Common  
Pin 3: Output+  
Pin 4: Case

4-20mA  
Transmitter

Pin 1: +Supply  
Pin 2: -Supply  
Pin 3: Not Connected  
Pin 4: Case



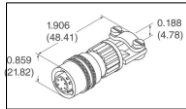
### BENDIX CONNECTOR

MIL-C-26482, Part Number PT02A-10

Protection Class (IEC 60529): IP65

#### Mating Bendix Connector

Part Number: PT06A-10-6S



Digital  
I2C / SPI

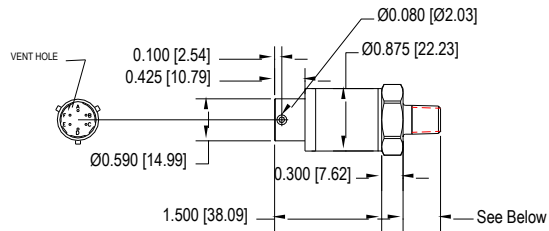
Pin A: Supply+  
Pin B: SDAMISO  
Pin C: Supply-  
Pin D: SCK/SCLK  
Pin E: SS/INT  
Pin F: Vent

Voltage  
Regulated, Ratiometric

Pin A: Supply+  
Pin B: Output+  
Pin C: Common  
Pin D: Common  
Pin E: Not Connected  
Pin F: Vent

4-20mA  
Transmitter

Pin A: B: Supply+  
Pin C: D: Supply-  
Pin E: Not Connected  
Pin F: Vent



### FLYING LEADS

300 V Overall Foil Shield  
Multiconductor, PVC, PVC

Protection Class (IEC 60529): IP65

Voltage  
Regulated, Ratiometric

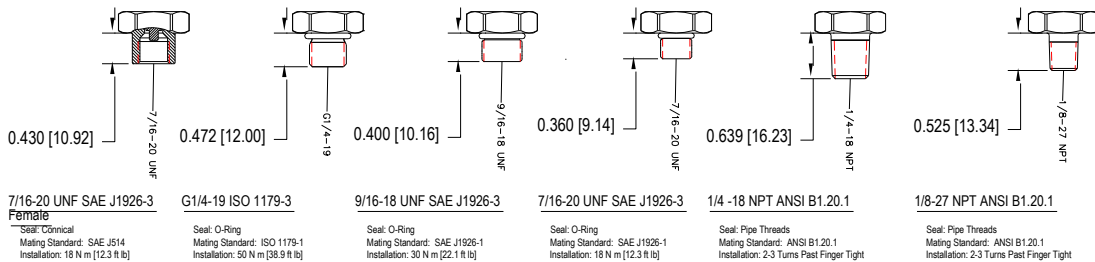
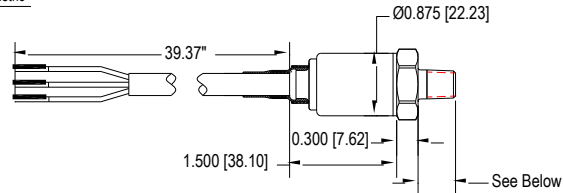
RED: Supply+  
GRN: Output+  
WHT: No Connection  
BLK: Common

Digital  
I2C / SPI

RED: Supply+  
BROWN: SDAMISO  
YELLOW: Supply-  
GREEN: SCK/SCLK  
PINK: SS/INT

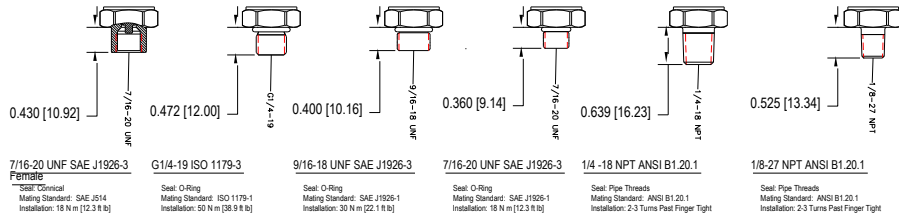
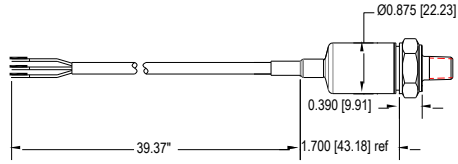
4-20mA  
Transmitter

RED: Supply+  
BLK: Supply-



### LOW PROFILE, FLYING LEADS

300 V Overall Foil Shield  
Multiconductor, PVC, PVC  
Protection Class (IEC 60529): IP65



### PART NUMBERING FOR ORDERS

| Series   | Port Type                           | Pressure range (psi) | Pressure Units | Pressure Type (Range Availability) [Package Availability] | Calibrated Voltage       | Digital Protocol   | Electrical Connection  | Options      |
|----------|-------------------------------------|----------------------|----------------|---|--------------------------|--|--|--------------|
| GBMCT-6D | N1 = 1/8 -27 NPT<br>N2 = 1/4-18 NPT | 0300                 | P=PSI          | G= Gage<br>[All Port Types]                               | 3=3.3Vdc<br><br>5-5.0Vdc | I1=I2C, 0x28H<br>I2=I2C, 0x38H<br>I3=I2C, 0x48H<br><br>S1=SPI Protocol | M1=Micro M12<br>P2=Packard, Power B<br>HA=Hirschmann Form A<br>HC=Hirschmann Form C<br>B1=Bendix<br>F1=Flying leads, 1 Meter<br>Fx=Flying leads, x=#of Meter<br>Fx LP=Flying leads, Low Profile<br>x=#of Meter | -L Low Power |
|          |                                     | 0500                 |                |   |                          |  |  |              |
|          |                                     | 1000                 |                |   |                          |  |  |              |
|          | S1 = 7/16-20UNF<br>S2 = 9/16-18UNF  | 1500                 | B=Bar          |   |                          |  |  |              |
|          |                                     | 2500                 |                |   |                          |  |  |              |
|          |                                     | 5000                 |                |   |                          |  |  |              |
|          | G1 = G1/8                           | 7500                 | M=mPa          |   |                          |  |  |              |
|          |                                     | 10k0                 |                |   |                          |  |  |              |
|          |                                     | 20.0                 |                |   |                          |  |  |              |
|          | F1 =Female, 7/16-20UNF              | 35.0                 |                |   |                          |  |  |              |
|          |                                     | 50.0                 |                |   |                          |  |  |              |
|          |                                     | 0100                 |                |   |                          |  |  |              |
| 0250     |                                     |                      |                |   |                          |  |  |              |
| 0350     |                                     |                      |                |   |                          |  |  |              |
| 0500     |                                     |                      |                |   |                          |  |  |              |
| 2.50     |                                     |                      |                |   |                          |  |  |              |
|          | 5.00                                |                      |                |   |                          |  |  |              |
|          | 7.00                                |                      |                |   |                          |  |  |              |
|          | 10.0                                |                      |                |   |                          |  |  |              |
|          | 15.0                                |                      |                |   |                          |  |  |              |
|          | 20.0                                |                      |                |   |                          |  |  |              |
|          | 30.0                                |                      |                |   |                          |  |  |              |
|          | 50.0                                |                      |                |   |                          |  |  |              |

Part Number Example: **GBMCT-6D N150.0BG3IP1**

**1/8NPT, 0-50Bar , Gage, 3.3Vdc, I2c Protocol, Packard Connector, Pmin=0, Pmax=50Bar**

### WARRANTY

Pressure sensors have a limited one-year warranty to the original purchaser. AVSensors will repair or replace, at its option, without charge those items it finds defective. This is the buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall AVSensors be liable for consequential, special, or indirect damages. This warranty does not apply to units that have been modified, misused, neglected or installed where the application exceeds published ratings. Specifications may change without notice. The information supplied is believed to be accurate and reliable as of this printing, however, we assume no responsibility for its use.