

# PNA161



PNA161 has been designed to operate in applications involving high gamma radiations. Manufactured with the ruggedized EFE proprietary sensing technology, it has been tested with gamma doses above 1000kGy.

Its Wheatstone bridge which is sputtered on a metal diaphragm delivers an unamplified output which can be conditioned by standard amplifiers. We can set up PNA161 with our AMP320, a signal conditioning device, fully analogue and without any software or firmware, to deliver a 0-10V or 4-20mA output. We can also supply the adapted cable assembly adapted to environments with radiations.

Being all stainless steel, PNA161 is compatible with most of the fluids. Its small package and low mass make it very adapted to application where space is at a premium and generate less waste to be processed.

Its manufacturing process, including traceable controls and special burn-in, gives the best insurance of high performance and stability in the most challenging applications.

## FEATURES

- Qualified in High Gamma Radiations
- Tested with Gamma Dose > 1000 kGy
- All Stainless Steel Design
- Miniature Pressure Sensor
- Operating from -40 to +125°C
- Available with full scales from 3bar to 250bar

## APPLICATIONS

|   |                       |
|---|-----------------------|
|   | Aerospace             |
| X | Energy / Nuclear      |
|   | Embedded Applications |
|   | Test Benches          |
|   | Others                |



## TECHNICAL SPECIFICATIONS

- Pressure Specifications

|                                 |   |
|---------------------------------|---|
| Pressure ranges (FS)            | -1/+3bar; -1/+4bar;<br>3bar; 5bar; 10bar; 20bar; 40bar; 100bar; 250bar<br>-14.5/+40PSI ; -14.5/+60PSI;<br>50PSI; 70PSI; 150PSI; 300PSI; 500PSI; 1500PSI; 3500PSI; |
| Type                            | Absolute ; Gage   |
| Type (only for ranges > 40 bar) | Sealed Gage   |
| Safe overload                   | 150% FS   |
| Burst pressure                  | 300% FS or 1000bar whichever is less (380bar for 1/4 VCR option)  |

- Electrical Specifications

|                          |  |
|--------------------------|--|
| Power Supply             | 5 to 15Vdc, stabilized and filtered  |
| Consumption              | < 3mA typ.   |
| Insulation               | > 1000 MOhms under 50Vdc at ambient temperature  |
| Input / Output Impedance | 3 to 6 kOhms   |
| Offset                   | ±3% FS   |
| Sensitivity              | 2 to 5mV/V   |
| Signal's convention      | For compound ranges (FS = -1 to +3bar for example), offset is at atmospheric pressure and sensor's signal @ -100%FS (-1bar) is proportionnal to signal @ +100%FS (+3bar). Sensitivity is the sensor's signal from -100% to +100%FS (4bar). |
| Signal Bandwidth         | DC to 1000Hz @-3dB   |



- Accuracy

|                                      |   |
|--------------------------------------|---|
| Nonlinearity and hysteresis combined | $\pm 0.25\%$ FS typ. / $\pm 0.35\%$ FS max. |
| Non repeatability                    | $\pm 0.02\%$ FS typ.                        |

- Environmental Specifications

|   |   |
|---|---|
| Compensated temperature range             | 0 to +60°C  |
| Operating temperature range               | -40 to +125°C   |
| Combined thermal zero & sensitivity shift | $\pm 0.02\%$ FS/°C<br>Option: $\pm 0.01\%$ FS/°C  |
| Electrical protection                     | Protected against polarity inversion  |
| EMC protection                            | Compliant to EN61000  |
| Gamma Radiations                          | Tested in Gamma Radiations (Cobalt 60 source) with following conditions:<br>- Total dose up to 1122 kGy<br>- Flow rate up to 21 kGy/h<br>- Flow rate variations up to 9.8 Gy/s <sup>2</sup> |

- Technical Specifications

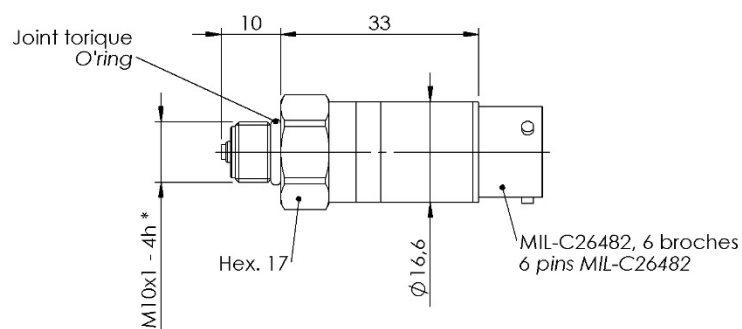
|                             |   |
|-----------------------------|---|
| Electrical connection       | Hermetic MIL C-26482 - 6 pins Receptacle, EN3646-Y1-10-06-MN                  |
| Mechanical connection       | M10x1-4h male ;<br>Options : 3/8-24 UNF-3A male, 1/4 VCR male (short version) |
| Sealing                     | EPDM O-ring 7.65 x 1.63 for M10x1 male and 3/8-24 UNF male                    |
| Material(s) of wetted parts | Stainless Steel : 316L, 17-4PH and 15-5PH                                     |
| Weight                      | < 50g   |
| Enclosure protection        | IP65 for absolute and sealed gage versions                                    |
| Cleaning                    | Oxygen cleaning service   |



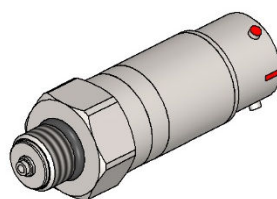
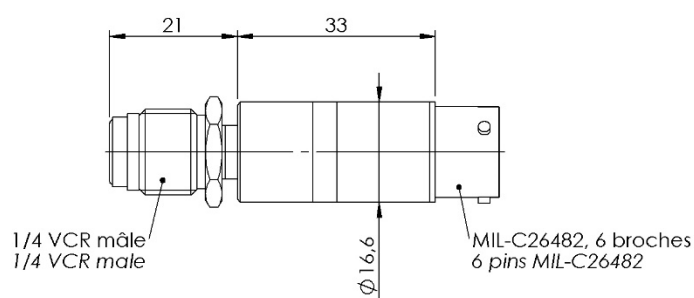
## CODIFICATION

|   |              |          |          |              |          |           |           |          |          |          |          |
|---|--------------|----------|----------|--------------|----------|-----------|-----------|----------|----------|----------|----------|
| <b>High Radiation Resistant<br/>Miniature Pressure Sensor</b> | <b>PNA16</b> | <b>1</b> | <b>S</b> | <b>20bar</b> | <b>A</b> | <b>02</b> | <b>03</b> | <b>A</b> | <b>1</b> | <b>1</b> | <b>-</b> |
| <b>Output Signal</b>  |              |          |          |              |          |           |           |          |          |          |          |
| 2 to 5mV/V  |              | 1        |          |              |          |           |           |          |          |          |          |
| <b>Material</b>   |              |          |          |              |          |           |           |          |          |          |          |
| Stainless Steel   |              |          | S        |              |          |           |           |          |          |          |          |
| <b>Range</b>  |              |          |          |              |          |           |           |          |          |          |          |
| Example : 20bar   |              |          |          | 20bar        |          |           |           |          |          |          |          |
| <b>Type</b>   |              |          |          |              |          |           |           |          |          |          |          |
| Absolute  |              |          |          |              | A        |           |           |          |          |          |          |
| Gage  |              |          |          |              | G        |           |           |          |          |          |          |
| Sealed Gage   |              |          |          |              | SG       |           |           |          |          |          |          |
| <b>Mechanical connection</b>                                  |              |          |          |              |          |           |           |          |          |          |          |
| M10x1-4h male   |              |          |          |              |          | 02        |           |          |          |          |          |
| 3/8-24 UNF-3A male  |              |          |          |              |          | 11        |           |          |          |          |          |
| 1/4 VCR male (short version)                                  |              |          |          |              |          | 22        |           |          |          |          |          |
| <b>Electrical Connection</b>                                  |              |          |          |              |          |           |           |          |          |          |          |
| Hermetic MIL C-26482 - 6 pins Receptacle                      |              |          |          |              |          |           | 03        |          |          |          |          |
| <b>Compensated temperature range</b>                          |              |          |          |              |          |           |           |          |          |          |          |
| 0 to +60°C  |              |          |          |              |          |           |           | A        |          |          |          |
| <b>Nonlinearity and hysteresis combined</b>                   |              |          |          |              |          |           |           |          |          |          |          |
| ±0.25% FS typ. / ±0.35%FS max.                                |              |          |          |              |          |           |           |          | 1        |          |          |
| <b>Combined thermal zero &amp; sensitivity shifts</b>         |              |          |          |              |          |           |           |          |          |          |          |
| ±0.02% FS/°C  |              |          |          |              |          |           |           |          |          | 1        |          |
| ±0.01%FS/°C   |              |          |          |              |          |           |           |          |          | 2        |          |
| <b>Options</b>  |              |          |          |              |          |           |           |          |          |          |          |
| Special marking   |              |          |          |              |          |           |           |          |          |          | G        |

## DIMENSIONS




\* Autre filetage disponible :  
Other thread available :  
3/8-24 UNF-3A



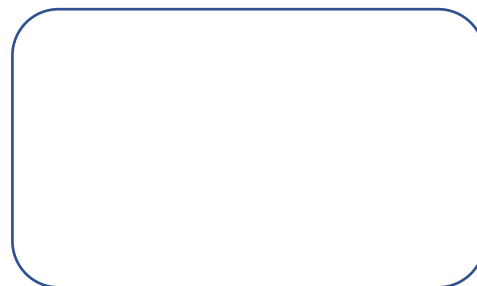
ECHELLE 1 : 1  
SCALE 1 : 1

Dimensions : mm

## WIRING

|  | MIL C-26482 - 6 PINS |            |
|---|----------------------|------------|
|   | mV/V OUTPUT          | PIN        |
|   | + Excitation         | PIN A      |
|   | - Excitation         | PIN D      |
|   | + Signal             | PIN B      |
|   | - Signal             | PIN C      |
|   | Sensor's Housing     | PINS E & F |

## AGENT



**L'ESSOR FRANÇAIS ELECTRONIQUE  
EFE**

16-18 rue Porte a Bateaux - 27540 Ivry-la-Bataille - France  
Tel: + 33 2 32 22 35 05 - Fax : + 33 2 32 36 93 08

[www.efe-sensor.com](http://www.efe-sensor.com) • [infos@efe-sensor.com](mailto:infos@efe-sensor.com)