NPI-15 Series
Current Driven, Media Isolated High Pressure Sensors

Applications
• Process control systems
• Hydraulic systems and valves
• Automobiles and trucks
• Biomedical instruments
• Refrigeration and HVAC controls
• Appliances and consumer electronics
• Ship and marine systems
• Aircraft and avionic systems

Features
• Solid state, high reliability
• High sensitivity with 200 mV typical FSO with 1.0 mA
• 316L stainless steel, IsoSensor design
• Linearity 0.1% FSO typical
• Thermal accuracy 0.2% FSO typical
• Four standard ranges: 500 psi to 5,000 psi (34 bar to 345 bar) available
• Standard configurations include:
  —1/2–20 UNF threaded male port with 1.0 in (25.40 mm) flange
  —0.59 in (15 mm) diameter x 0.87 in (22 mm) long cylinder with o-ring seals
  —1/4–18 NPT male port with 7/8 in flange
  —1/8–27 NPT male port with 7/8 in flange
• Thermal accuracy FSO 0.2% typical
• Custom configurations and other pressure ranges available. Please consult factory
NPI-15 Series Specifications

Description

The NovaSensor NPI-15 Series incorporates state-of-the-art IsoSensor technology, which gives the OEM user the best in price and performance. They are designed to operate in hostile environments and yet give the outstanding sensitivity, linearity, and hysteresis of a silicon sensor. The piezoresistive sensor chip is housed in a fluid-filled cylindrical cavity and isolated from the measured media by a stainless steel diaphragm and body. As with all NovaSensor silicon sensors, the NPI-15 Series employs SenStable® processing technology, providing excellent stability.

The modular design allows for a variety of pressure port modules which are hermetically welded to the sensor header module. Standard types A, B, H, and J are shown to the right.

For compensation of temperature effects, a complete resistor network is supplied on a hybrid ceramic substrate. The IsoSensor design minimizes temperature errors to provide a maximum offset errors of 0.75% FSO over the 32°F to 158°F (0°C to 70°C) compensated range.

NPI-15 Series schematic diagram

NPI-15 Series dimensions
NPI-15 Series Specifications

Warranty
NovaSensor warrants its products against defects in material and workmanship for 12 months from the date of shipment. Products not subjected to misuse will be repaired or replaced. NovaSensor reserves the right to make changes without further notice to any products herein. NovaSensor makes no warranty, representation or guarantee regarding the suitability of its products for any particular application, nor does NovaSensor assume any liability arising out of the application or use of any product or circuit and specifically disclaims all liability without limitation consequential or incidental damages. The foregoing warranties are exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. No Implied statutory warranty of merchantability or fitness for particular shall apply.

Parameter | Value | Units | Notes
---|---|---|---
**General**
Pressure Range | 3500 | kPa | 507 psi
7000 | kPa | 1015 psi
35,000 | kPa | 5076 psi
Maximum Pressure | 2 x rated pressure
**Electrical** @ 77°F (25°C) unless otherwise stated
Input Excitation | 1.0 | mA | 1.5 mA maximum
Insulation Resistance | 100MΩ | @ 50 VDC
Input Impedance (min) | 4,000 | Ω | ± 20%
Output Impedance | 5,000 | Ω | ± 20%
Bridge Impedance | 5,000 | Ω | ± 20%
**Environmental**
Temperature Range
- Operating | –40 to 257 °F (–40°C to 125°C)
- Compensated | 32 to 158 °F (0°C to 70°C)
Vibration | 10 gRMS | 20 to 2000Hz
Shock | 100 g | 11 milliseconds
Life (Dynamic Pressure Cycle) | 10 x 10⁶ cycles
| 1 x 10⁶ cycles
| 500/1000 psi 34.47/68.94 (bar)
| 5000 psi (344.73 (bar)
**Mechanical**
Weight | ≈28 g (NPI–15A–XXX)
| ≈47 g (NPI–15B–XXX)
Media Compatibility
All corrosive media compatible with 316 stainless steel
Case and Diaphragm Material
316L stainless steel
Recommended O-Ring
Type A: 0.472 in (12 mm) ID x 0.059 in (1.5 mm) wall
Type B: 2-013 per ISO 3601/1
**Performance Parameters** 3,500, 7,000, & 35,000 kPa (Note 1, 8)
Offset | mV | -2 | 1 | 2
Full Scale Output | mV | 170 | 200 | 230 | 2
Linearity | %FSO | –0.25 | 0.1 | 0.25 | 3
Hysteresis and Repeatability | %FSO | –0.05 | 0.1 | 0.05 | 3
Thermal Accuracy of Offset | %FSO | –0.75 | 0.2 | 0.75 | 4
Thermal Accuracy of FSO | %FSO | –0.75 | –0.2 | 0.75 | 4
Thermal Hysteresis | %FSO | –0.2 | 0.1 | 0.2 | 5
Short-Term Stability of Offset | µV/V | 5 | 6
Short-Term Stability of FSO | µV/V | 5 | 6
Long-Term Stability of Offset | %FSO | 0.1 | 7
Long-Term Stability of FSO | %FSO | 0.1 | 7

1. Performance with offset, thermal accuracy of offset and thermal accuracy of FSO compensation resistors.
2. FSO with 1.0 mA input excitation.
3. Linearity by best fit straight line.
4. 32°F to 158°F (0°C to 70°C) with reference to 77°F (25°C).
5. Reduced performance outside compensation range.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Pressure Port Type</th>
<th>Pressure Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No port</td>
<td>3500 kPa</td>
</tr>
<tr>
<td>B</td>
<td>1/2-20 UNF (see note 7)</td>
<td>7000 kPa</td>
</tr>
<tr>
<td>H</td>
<td>1/4-18 NPT (see note 7)</td>
<td>35,000 kPa (NPI-15A Only)</td>
</tr>
<tr>
<td>J</td>
<td>1/8-27 NPT (see note 7)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Absolute</td>
</tr>
<tr>
<td>S</td>
<td>Sealed gauge</td>
</tr>
</tbody>
</table>

Code Voltage
H Constant Current Excitation

Typical model number

6. Normalized offset/bridge voltage—100 hours, typical value, not tested in production.
7. One year, typical value, not tested in production.
8. All values measured at 77°F (25°C) and at 1.0 mA constant current, unless otherwise noted.
9. Reduced performance outside compensation range.