

## NPI Series All Media Solid State Sensor Pressure Transducer High Pressure

### 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
- All media compatible, IsoSensor design
- High sensitivity, 200mV FSO with 1.0mA excitation
- 316 stainless steel, wetted surfaces
- Linearity 0.1% FSO typical
- Thermal accuracy FSO 0.2% typical
- Three standard ranges: 0–500 to 0–5,000 psi available, sealed gage or absolute
- Smallest sizes available, standard configurations include:
  - 1/2"–20 UNF threaded male port with 1.0" flange
  - 0.59" diameter x 0.87" long cylinder with o-ring seals
- Modular design: other ports or new OEM package configurations can be accommodated
- Custom configurations and other pressure ranges available. Please consult factory



### DESCRIPTION

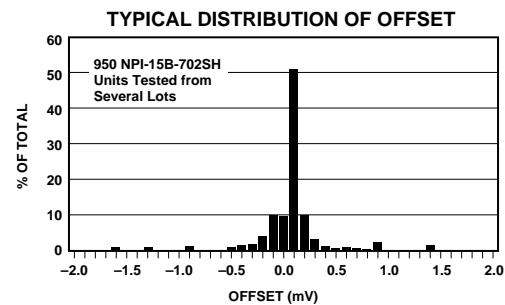
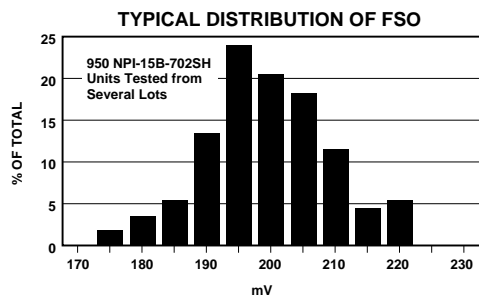
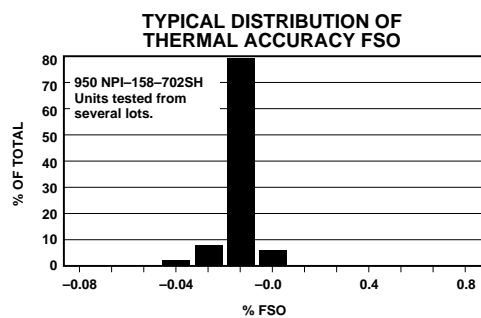
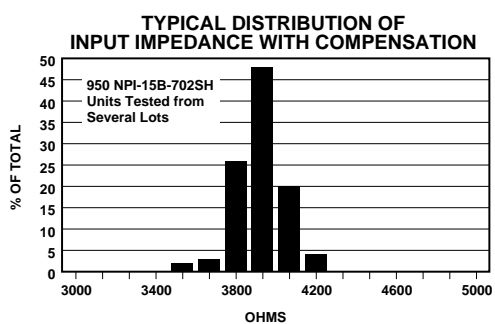
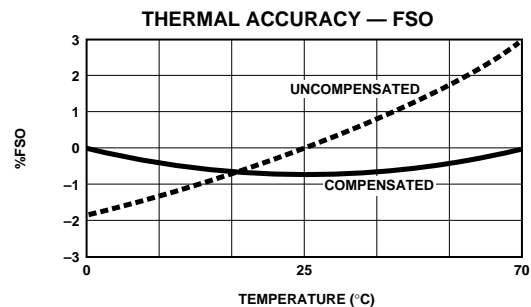
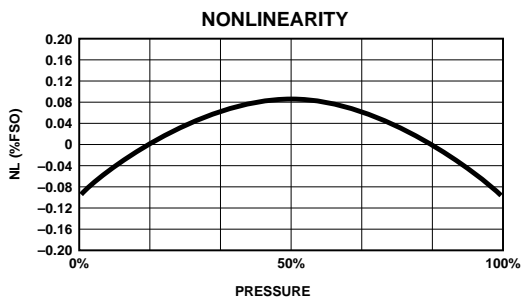
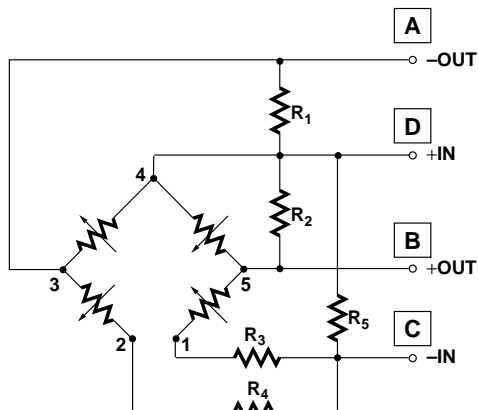
The Lucas NovaSensor® NPI Series incorporates state-of-the-art IsoSensor technology, which gives the OEM user the best in price and performance. They are designed to operate in hostile environments and yet give the outstanding sensitivity, linearity, and hysteresis of a silicon sensor. The piezoresistive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

For compensation of temperature effects, a complete resistor network is supplied on a hybrid ceramic substrate. The IsoSensor design has minimized temperature effects to provide 0.75% maximum thermal errors over the 0 to 70°C compensated range.

OPERATING  
CHARACTERISTICS

PARAMETER	VALUE	UNITS	NOTES		
GENERAL					
Pressure Range	0–3,500	kPa	≈ 0–500 psi		
	0–7,000	kPa	≈ 0–1,000 psi		
	0–35,000	kPa	≈ 0–5,000 psi		
Maximum Pressure	2 x		rated pressure		
ELECTRICAL @ 25°C (77°F) unless otherwise stated					
Input Excitation	1.0	mA	1.5mA max.		
Insulation Resistance	10 <sup>7</sup>	Ω	@ 50 V <sub>DC</sub>		
Input Impedance	4,000	Ω	± 20%		
Output Impedance	5,000	Ω	± 20%		
Bridge Impedance	5,000	Ω	± 20%		
ENVIRONMENTAL					
Temperature Range					
Operating <sup>(9)</sup>	–40 to +125	°C	–40° to +257°F		
Compensation Range	0 to +70	°C	+32° to +158°F		
Vibration	10	g <sub>RMS</sub>	20 to 2000Hz		
Shock	100	g	11 milliseconds		
Life (Dynamic Pressure Cycle)	10 x 10 <sup>6</sup>	cycles	500/1000 psi		
	1 x 10 <sup>6</sup>	cycles	5000 psi		
MECHANICAL					
Weight	≈ 28	grams	NPI–15A–XXX		
	≈ 47	grams	NPI–15B–XXX		
Media Compatibility	All corrosive media compatible with 316 stainless steel				
Case and Diaphragm Material	316 stainless steel				
Recommended O-Ring	Type A: 12mm (.472") ID x 1.5mm (.059") wall				
	Type B: 2-013 per ISO 3601/1				
Performance <sup>(8)</sup>		Compensated <sup>(1)</sup>			
3,500, 7,000 & 35,000 kPa					
Parameter	Units	Min.	Typ.	Max.	Notes
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	0.01	0.05	
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

- Notes:**
1. Performance with offset, thermal accuracy of offset and thermal accuracy of FSO compensation resistors.
  2. FSO measured with 1.0mA input excitation.
  3. Linearity by best fit straight line.
  4. 0 to +70°C with reference to 25°C.
  5. 0° to 70°C.
  6. Normalized offset/bridge voltage — 100 hours.
  7. 1 year.
  8. All values measured at 25°C and at 1.0mA constant current, unless otherwise noted.
  9. Reduced performance outside compensation range.

TYPICAL  
PERFORMANCE  
CHARACTERISTICSSCHEMATIC  
DIAGRAM

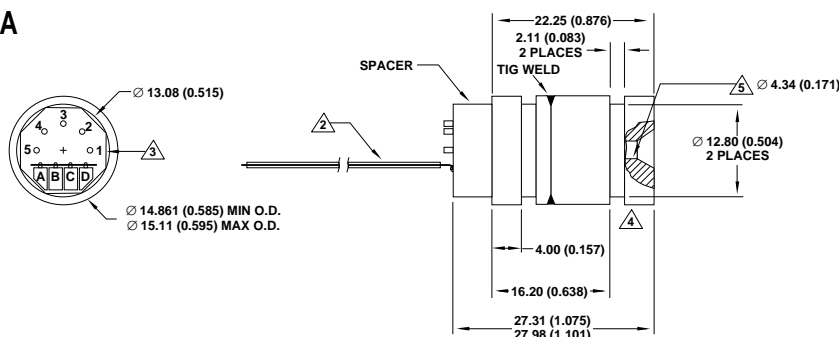
TERMINAL CONNECTIONS

A	-OUT	C	-IN
B	+OUT	D	+IN

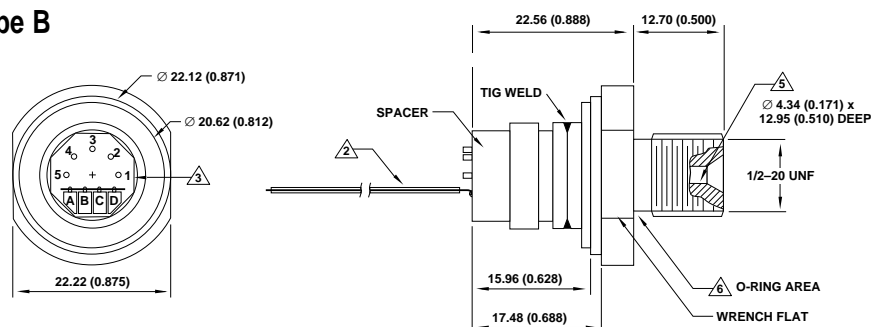
Note: Pin #4 connected to chip substrate.

PACKAGE  
DIAGRAMS

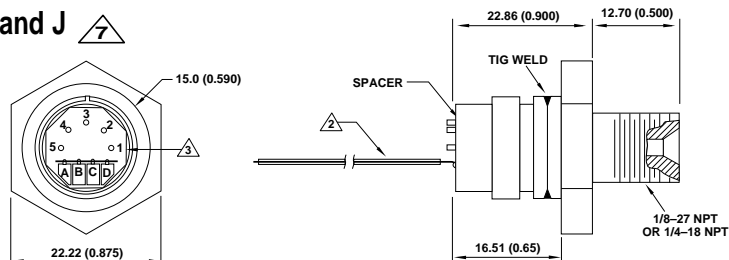
## Port Type A



## Port Type B



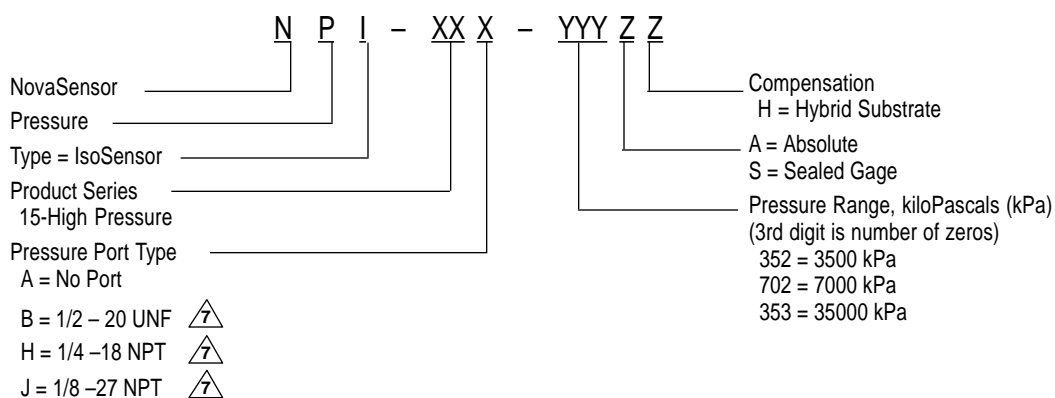
## Port Type H and J



**Notes:** 1. All dimensions in millimeters(inches).  
2. A flat, 2" long Kapton flex cable is standard.  
3. Ceramic substrate.

4. Uses 12 mm ID x 1.5 mm o-ring for outside seal.  
5. Uses 2 – 003 per I.S.O. 360 1/1 o-ring for inside seal.  
6. Uses 2 – 013 per I.S.O. 360 1/1 o-ring for outside seal.  
7. Not available for 35,000 KPa.

## ORDERING



**Ordering Example:** Assume a requirement for absolute pressure transducer with type A pressure port with a 0–35,000 kiloPascal range, with hybrid compensation substrate. Model number would be: NPI-15A-353AH.

**Sales Terms:** Lucas NovaSensor standard sales terms apply. Prices and specifications are subject to change without notice.

**Warranty:** Lucas NovaSensor warrants its products against defects in material and workmanship for 12 months from date of shipment. Products not subjected to misuse will be repaired or replaced. THE FOREGOING IS IN LIEU OF ANY OTHER EXPRESSED OR IMPLIED WARRANTIES. Lucas NovaSensor reserves the right to make changes to any product herein and assumes no liability arising out of the application or use of any product or circuit described or referenced herein.

Lucas NovaSensor  
1055 Mission Court  
Fremont, CA 94539

Lucas

Telephone: 510-490-9100  
Fax: 510-770-0645  
Telex: 990010

Rev.0794