

## Capacitance Level and Temperature Transducer



measuring  
•  
monitoring  
•  
analyzing

NRF-2 NRF-3



- Measures Both Level and Temperature
- Loop Powered 4-20 mA Operation
- Compact, High Quality Design
- Probe Lengths to 12 ft
- Temp. Range: 32...122 °F to -58...302 °F
- Fittings: 3/4" NPT and Others Available
- Level Accuracy:  $\pm 1\%$  of Span in Metal Tanks
- Temperature Accuracy:  $\pm 0.5\%$  of Span



KOBOLD companies worldwide:

ARGENTINA, AUSTRALIA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHILE, CHINA, COLOMBIA, CZECH REPUBLIC, EGYPT, FRANCE, GERMANY, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, REPUBLIC OF KOREA, ROMANIA, SINGAPORE, SPAIN, SWITZERLAND, TAIWAN, THAILAND, TUNISIA, TURKEY, UNITED KINGDOM, USA, VIETNAM

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**Description**

The KOBOLD series NRF-2 and NRF-3 combination level and temperature transmitters are truly a unique product. They are designed to measure level and temperature of conductive and non-conductive liquids in tanks. For level sensing, the probe measures the change in capacitance that occurs as level changes in the tank. For temperature sensing, the probe utilizes a platinum resistive element. The NRF-2 includes a loop powered transmitter for both level and temperature while the NRF-3 includes a loop powered transmitter for level and a 3-wire RTD output. A choice of rugged enclosure types with either standard NPT or optional Tri-Clamp® process connections are offered. The standard probe material is PFA clad 316 SS. Easy level calibration is accomplished via 4 push buttons with temperature calibration adjustment (if required) via two potentiometers located on the transmitter.



**Applications**

- Waste Treatment Plants
- Refineries
- Food and Beverage Industry
- Fire Protection Systems
- Water Storage Tanks
- Chemical Holding Tanks

**Technical Details**

**Level Specifications**

**Accuracy:** ± 1% of span  
(w/constant liquid dielectric)

**Repeatability:** ± 0.1 % of span

**Max. Length:** 12 feet

**Electrical Specifications**

**Input Power:** 12-30 VDC, polarity protected

**Output:** 4-20 mA, 2-wire

**Max. Loop Res:** 700 Ohm @ 24 VDC

**Calibration:** Via 4 push button switches

**Dampening Adjust:** 0...30 Seconds

**Temperature Range**

**Process:** -100...350 °F

**Ambient:** -58...140 °F

**Temperature Specifications**

**Input:** Pt-100, 3-wire,  $\alpha = 0.00385$ ,  
DIN EN 60751

**Output:** 4-20 mA loop powered,  
Linear to temperature

**Power Supply:** 12-30 VDC, polarity protected

**Long Term Drift:** ± 0.05 % FS / year

**Accuracy:** ± 0.5 % FS

**Span/Zero Adjustment:** 20 turn potentiometer,  
±10% for zero and span

**Max. Loop Resistance:** [  $V_{supply} - 9 \text{ VDC}$  ] / 20 mA

**Open Circuit Detection:** Over-scale limit ( 27.0 mA )  
or Under-scale limit ( 2.2 mA )

**Temperature Range**

**Process:** -100...350 °F

**Ambient:** -58...140 °F

**Mechanical Specifications**

**Enclosures:** Polyamide NEMA 4,  
Stainless NEMA 4X or  
Aluminum NEMA 4X

**Process Connection:** 3/4" NPT. Tri-Clamp®  
others available, consult factory

**Fitting Material:** 316 SS or PTFE

**Probe Material:** PFA clad 316 Stainless Steel

**Maximum Pressure**

**316 SS Fitting:** 500 PSIG @ 70 °F  
250 PSIG @ 300 °F  
100 PSIG @ 350 °F

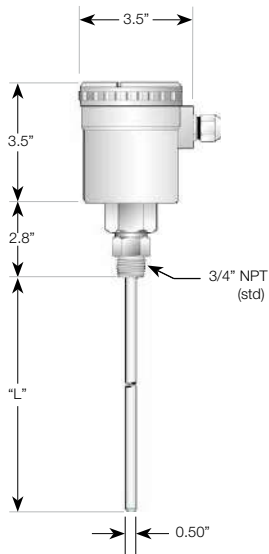
**PTFE Fitting:** 14.7 PSIG max



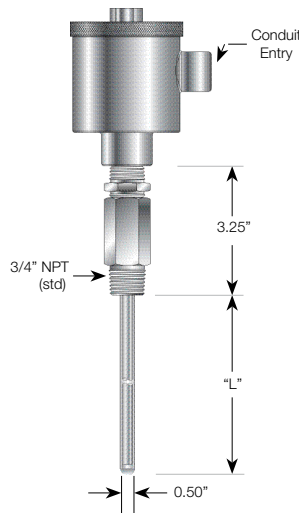
NRF Ordering Information	
<b>NRF-2</b> <b>NRF-3</b>	<p><b>Probe Construction</b></p> <p>= 4-20mA Loop Powered Outputs for Level and Temperature</p> <p>= 4-20mA Loop Powered for Level, RTD Pt100, 3-wire, <math>\alpha = 0.00385</math>, DIN EN 60751 for Temperature</p>
	<p><b>Temperature Measuring Range</b></p> <p><b>00</b> = Pt-100 3-wire RTD Output (used with NRF-3 only)</p> <p><b>05</b> = 32...122 °F (0...50 °C)</p> <p><b>10</b> = 32...212 °F (0...100 °C)</p> <p><b>20</b> = 32...392 °F (0...200 °C)</p> <p><b>55</b> = -58...122 °F (-50...50 °C)</p> <p><b>51</b> = -58...302 °F (-50...150 °C)</p>
	<p><b>Process Connection</b></p> <p><b>1</b> = 3/4" NPT, Stainless Steel</p> <p><b>2</b> = 3/4" NPT, PTFE (Only Available with Polyamide Housing)</p> <p><b>3</b> = 1-1/2" Tri-Clamp®</p> <p><b>4</b> = 2" Tri-Clamp®</p> <p><b>8</b> = 2-1/2" Tri-Clamp®</p> <p><b>9</b> = 3" Tri-Clamp®</p>
	<p><b>Enclosure</b></p> <p><b>1</b> = Polyamide</p> <p><b>2</b> = Stainless Steel</p> <p><b>3</b> = Aluminum (Not Available with Tri-Clamp® fitting)</p>
	<p><b>L</b> = Probe Length, Specify in Inches (6" Minimum and 144" Maximum)</p>
<p>NRF-2</p> <p>51</p> <p>1</p> <p>3</p> <p>L = 60"</p>	<p>Sample NRF Part Number</p>

**Dimensions**

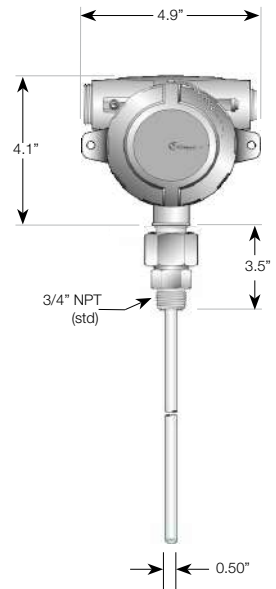
**Polyamide Housing**



**Stainless Steel Housing**



**Epoxy Coated Aluminum Housing**



No responsibility taken for errors; subject to change without prior notice.