

## 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

KOBOLD Instruments, Inc.  
1801 Parkway View Drive  
Pittsburgh, PA 15205  
☎ Main Office:  
1.800.998.1020  
1.412.788.4890  
✉ info@koboldusa.com  
www.koboldusa.com



**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

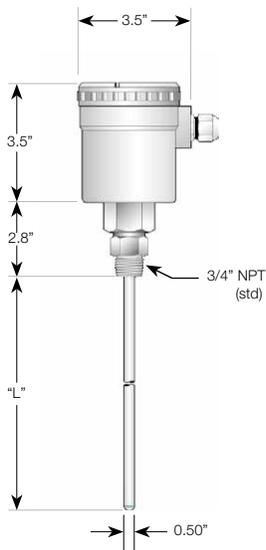
**PTFE Fitting:** 14.7 PSIG max



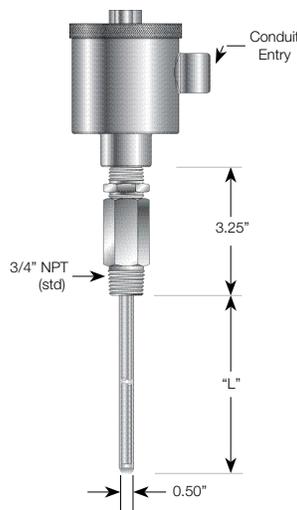
NRF Ordering Information	
<b>NRF-2</b>	<b>Probe Construction</b> = 4-20mA Loop Powered Outputs for Level and Temperature
<b>NRF-3</b>	= 4-20mA Loop Powered for Level, RTD Pt100, 3-wire, a = 0.00385, DIN EN 60751 for Temperature
	<b>Temperature Measuring Range</b>
<b>00</b>	= Pt-100 3-wire RTD Output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

Dimensions

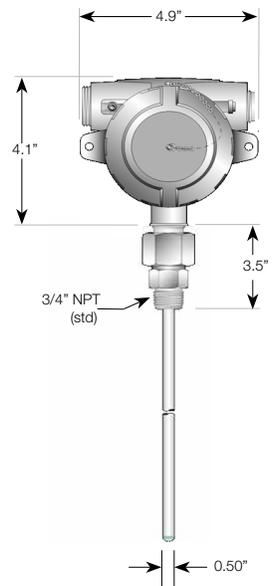
Polyamide Housing



Stainless Steel Housing



Epoxy Coated Aluminum Housing



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