

Guided Wave Radar Level Transmitter



measuring
•
monitoring
•
analyzing

NGR



- For Liquids
- Operates Independent of Density, Temperature, Pressure, Humidity, and Conductivity
- Standard Maximum Measuring Length: 6.5 Ft (longer lengths possible)
- Maximum Temperature: 212 °F
- Maximum Pressure: 145 PSI
- Output: 4-20 mA/0-10 V with Switching Output PNP or NPN



KOBOLD companies worldwide:

ARGENTINA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHILE, CHINA, COLOMBIA, CZECH REPUBLIC, EGYPT, FRANCE, GERMANY, GREAT BRITAIN, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, ROMANIA, SINGAPORE, SOUTH KOREA, SPAIN, SWITZERLAND, TAIWAN, THAILAND, TUNISIA, TURKEY, 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 NGR is a level sensor that uses TDR technology (time domain reflectometry) and can be used in oil and water based liquids without calibration. The NGR's guided radar uses time-of-flight technology to measure electromagnetic pulses. The time difference between the sent pulse and the reflected pulse is used to calculate the level, both as a continuous value (analog output) and an adjustable switching point (switching output). With a probe that can be changed or cut in the field, the sensor can be quickly integrated into almost any application. The sensor's intuitive setup uses four buttons and an integral display to ensure quick and easy adaptation to the application.

Product Features

- Immune to deposit formation
- Accurate measurement, even when the type of liquid changes
- 3-in-1: Combined display, analog output (acc. NAMUR NE 43) and switching output
- Rugged design increases longevity
- Time and cost savings due to low maintenance and quick installation
- Compact, rotatable housing ensures easy installation
- No interference when several sensors are mounted next to each other
- Concentric versions for plastic tanks or $DK > 1.8$

Technical Data

Media:	Free-flowing liquids
Measurement:	Switch, continuous
Probe Length:	78" standard
Measuring Length:	(4" up to 78" by cutting standard probe or up to 236" with user supplied probe)
Process Pressure:	-14.5 ... 145 PSI
Process Temperature:	-4 ... 212 °F
RoHS Certificate:	Yes
Accuracy of Sensor Element¹⁾:	±0.2 inches
Repeatability:	≤0.07 inches
Resolution:	<0.07 inches
Response Time:	<400 ms
Dielectric Constant:	≥5 for single probe ≥1.8 with concentric tube
Conductivity:	No limitation

Max. Level Change: ≤19.68 in/s

Inactive Area at Probe End¹⁾: 0.4 inches

Inactive Area at Process Connector²⁾: 1 inch

¹⁾ With water under reference conditions

²⁾ With parameterized tank with water under reference conditions, otherwise 40 mm.

Wetted Parts: 316L Stainless Steel, PTFE

Process Connection: ¾" NPT or G¾ A

Housing Material: Plastic PBT

Max. Probe Load: ≤6 Nm

Supply Voltage³⁾: 12 V_{DC} ... 30 V_{DC}

Power Consumption: ≤100 mA at 24 V_{DC} without output load

Initialization Time: ≤2 s

Electrical Connection: M12x1, 5-pin
M12x1, 8-pin

Output Signal³⁾: Analog output 4 mA ... 20 mA / 0 V ... 10 V
1 PNP-transistor output and 1 PNP/NPN-transistor output (user selectable) (Option 2) or 1 PNP-transistor output and 3 PNP/NPN-transistor output (user selectable) (Option 4)

Output Load: 4 mA ... 20 mA <500 Ω at U_v > 15 V,
4 mA ... 20 mA <350 Ω at U_v > 12 V,
0 V ... 10 V >750 Ω at U_v ≥ 14 V

Hysteresis: Min. 0.07 inches, freely adjustable

Signal Voltage HIGH: V_s - 2 V

Signal Voltage LOW: ≤2 V

Output Current: <100 mA

Inductive Load: <1 H

Capacitive Load: 100 nF

Enclosure Rating: IP67: EN60529

Temperature Drift: <0.1 mm/K

Lower Signal Level: 3.8 mA ... 4 mA

Upper Signal Level: 20 mA ... 20.5 mA

EMC: EN61326-1:2006, 2004/108/EG

Ambient Operating Temperature: -4 to 140 °F

Ambient Storage Temperature: -40 to 176 °F

³⁾ All connections are polarity protected. All outputs are overload and short-circuit protected.

Order Details (Example: **NGR-1 2 4 1 N5 B**)

Model	Version	Material	Signal Output	Output + Contacts	Connection	Probe Length
NGR-	..1.. = Single Probe (metal tanks DK > 5) ..2.. = Concentric (plastic tanks or metal tanks DK > 1.8)	..2.. = Stainless Steel/PTFE	..4.. = 4-20 mA/ 0-10 V Switchable	..2.. = 1xPNP+1xPNP/NPN ..4.. = 1xPNP+3xPNP/NPN	..N5.. = ¾" NPT Male ..G5.. = G¾ Male	..0 = 78" (Standard) ..L = 8"...78" (Please Specify Exact Length) ..B¹⁾ = Mounted on Bypass

¹⁾ Only possible with NGR-1. For bypass specifications, please see NBK-M datasheet.

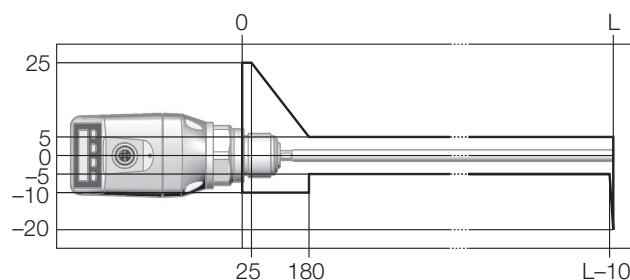
Note: Standard probe length <L> is 78". Optional lengths are available from 4" up to 78". Please clearly specify exact length when ordering.

Plug Connectors and Cables

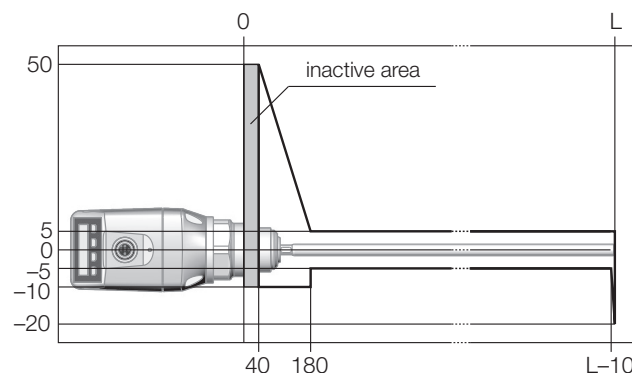
Model	Description
807.007	Cable, M12, 5-pin, Straight Connector Female with Molded Cable, 6 Ft, PUR/PVC (Use with Output Type 2)
807.087	Cable, M12, 8-pin, Straight Connector Female with Molded Cable, 6 Ft, PUR/PVC (Use with Output Type: 4)

Accuracy Diagrams (mm):

Accuracy Diagram



General Accuracy Diagram

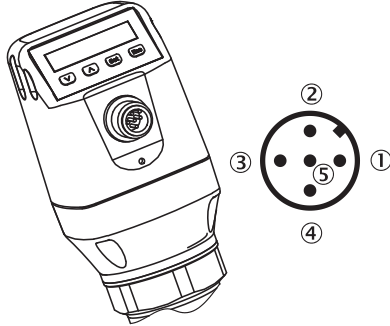


Reference Conditions:

Container with a diameter of 3 Ft.
 Central installation of the sensor
 Minimum distance to built-in components > 11.81 inches
 Distance from the end of probe to tank bottom > 0.59 inches
 Air humidity: 65% +/- 20%
 Temperature: 70 °F +/- 9 °F
 Pressure: 0 PSIG ± 0.3 PSIG
 Media: water (dielectric constant = 80)

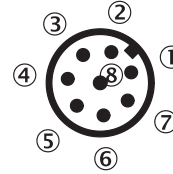
Connection type:

5-pin



- 1 L⁺: supply voltage, brown
- 2 Q_A: analog current-/voltage output, white
- 3 M: ground, reference ground for current-/voltage output, blue
- 4 Q₁: switching output 1, PNP, black
- 5 Q₂: switching output 2, PNP/NPN, grey

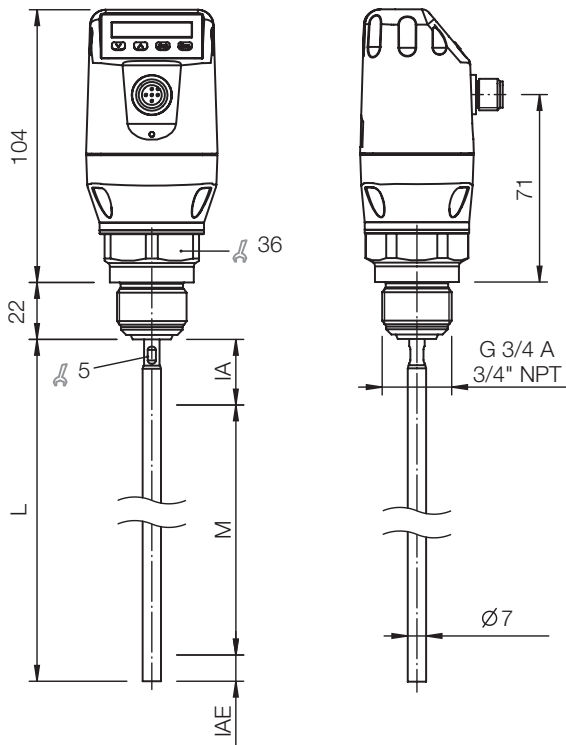
8-pin



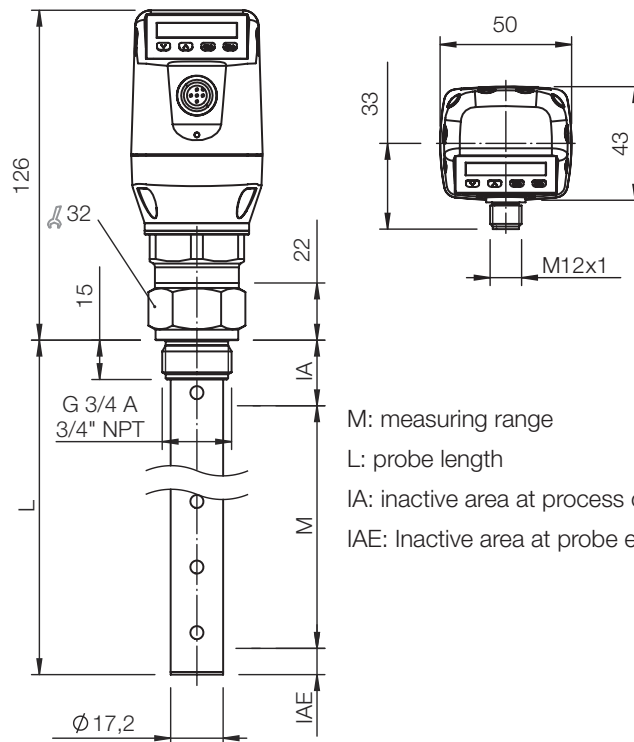
- 1 L⁺: supply voltage
 - 2 Q₂: switching output 2, PNP/NPN
 - 3 M: ground, reference ground for current-/voltage output
 - 4 Q₁: switching output 1, PNP
 - 5 Q₃: switching output 3, PNP/NPN
 - 6 Q₄: switching output 4, PNP/NPN
 - 7 Q_A: analog current-/voltage output
 - 8: no function
- The wire colors in 8-pin cables are not standardized. Please note the wiring of the sensor.

Dimensions (mm)

Single Probe

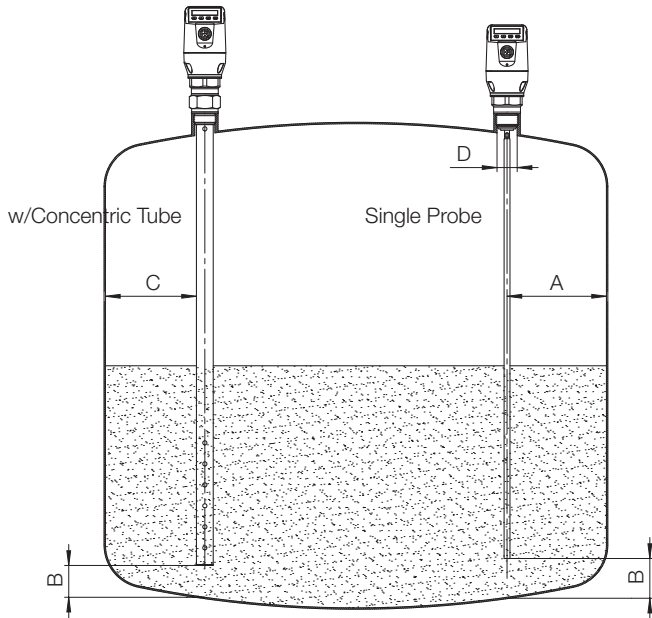


with Concentric Tube



- M: measuring range
- L: probe length
- IA: inactive area at process connection: 1 inch
- IAE: Inactive area at probe end: 0.4 inches

Installation in a Tank



Installation Instructions:

Unit with single probe mounted in a metal tank

Installation within a nozzle:

$D \geq 1"$

Distance from tank wall/tank bottom:

$A \geq 2$ inches

$B \geq 0.4$ inches

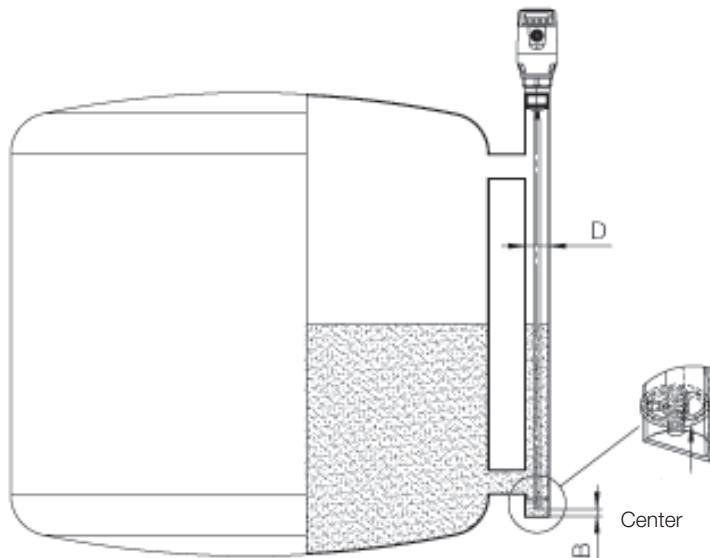
Distance to other tank fittings:

≥ 4 inches

Unit with concentric tube is suitable for use in both metallic and non-metallic tanks

C = with a concentric tube there are no minimum distances to the tank wall or to other tank fittings required

Installation of a Single Probe within a Metal Immersion Tube or Metal Bypass



$D \geq 1.5"$

Distance tank wall/tank bottom:

$B \geq 0.4$ inches

Centering: To prevent contact between the probe and the bypass pipe during oscillations, the probe should be centered according to its length, depending on the diameter of the bypass pipe. To do this, it is necessary to insert one or two centering pieces.