

Guided Wave Radar Level Transmitter



measuring
•
monitoring
•
analyzing

NGR



- For Liquids
- Operates Independent of Density, Temperature, Pressure, Humidity, and Conductivity
- Standard 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



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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:	Continuous, Switch
Probe Length:	78" standard
Measuring Length:	(8" up to 78" by cutting standard probe or up to 157" with user supplied probe)
Process Pressure:	-14.5... 145 PSI
Process Temperature:	-4...212 °F
RoHS Certificate:	Yes
Accuracy of Sensor Element¹⁾:	±0.2"
Repeatability:	≤0.08"
Resolution:	<0.08"
Response Time:	<400 ms
Dielectric Constant (DK):	≥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"

Inactive Area at Process Connector²⁾: 1"

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 or 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. 0.08 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: EN 60529

Temperature Drift: <0.1 mm/K

Lower Signal Level: 3.8 mA ... 4 mA

Upper Signal Level: 20 mA ... 20.5 mA

EMC: EN 61326-1:2006, 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 2 N5 0**)

Model	Version	Material	Signal Output	Output + Switch	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.. = 3/4" NPT Male ..G5.. = G3/4 Male	..0 = 78" (Standard) ..L= 8"...78" (Please Specify Exact Length) ..B ¹⁾ = Mounted on Bypass

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

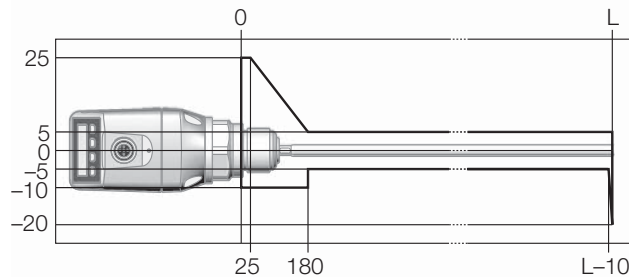
Note: Standard probe length <L> is 78". Optional lengths are available from 8" up to 78". Please clearly specify exact length when ordering.

Plug Connectors and Cables

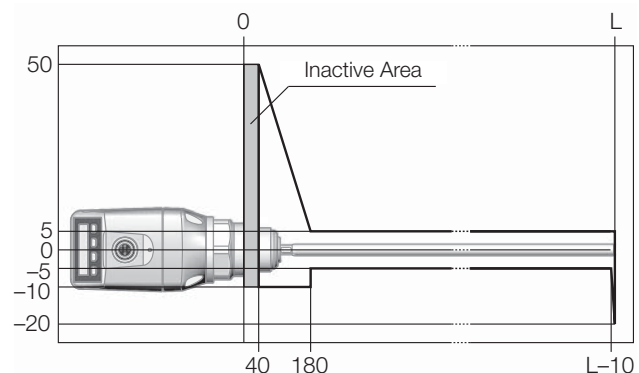
Model	Description
807.007	Cable, M12, 5-pin, Straight Connector Female with Molded Cable, 6 Ft, PUR/PVC (Use with Output Type 2)
807.087	Cable, M12, 8-pin, Straight Connector Female with Molded Cable, 6 Ft, PUR/PVC (Use with Output Type: 4)

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)

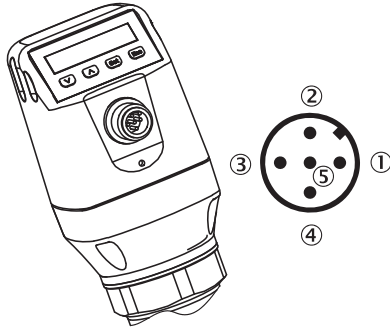


Guided Wave Radar Level Transmitter Model NGR

Electrical Connections:

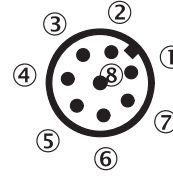
5-pin (w/Output: 2)

Device View



- 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 (w/Output: 4) Device View

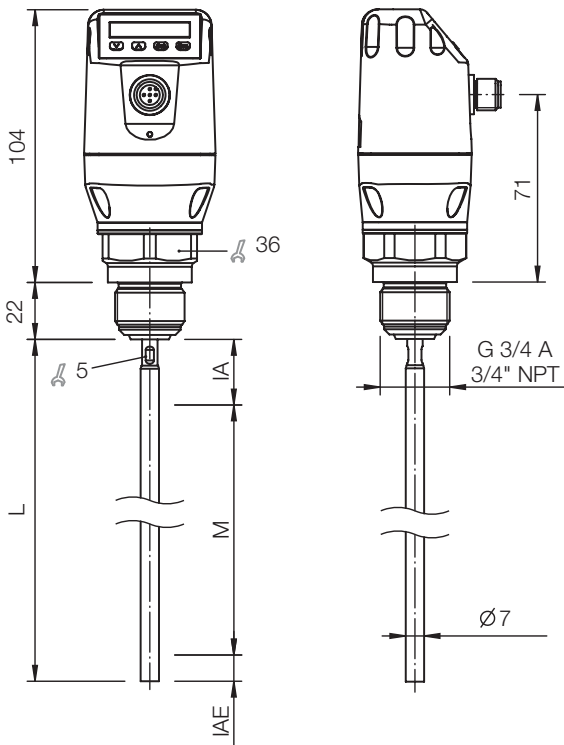


- 1 L⁺: Supply voltage, White
- 2 Q₂: Switching output 2, PNP/NPN, Brown
- 3 M: Ground, reference ground for current-/voltage output, Green
- 4 Q₁: Switching output 1, PNP, Yellow
- 5 Q₃: Switching output 3, PNP/NPN, Grey
- 6 Q₄: Switching output 4, PNP/NPN, Pink
- 7 Q_A: Analog current-/voltage output, Blue
- 8: No function, Red

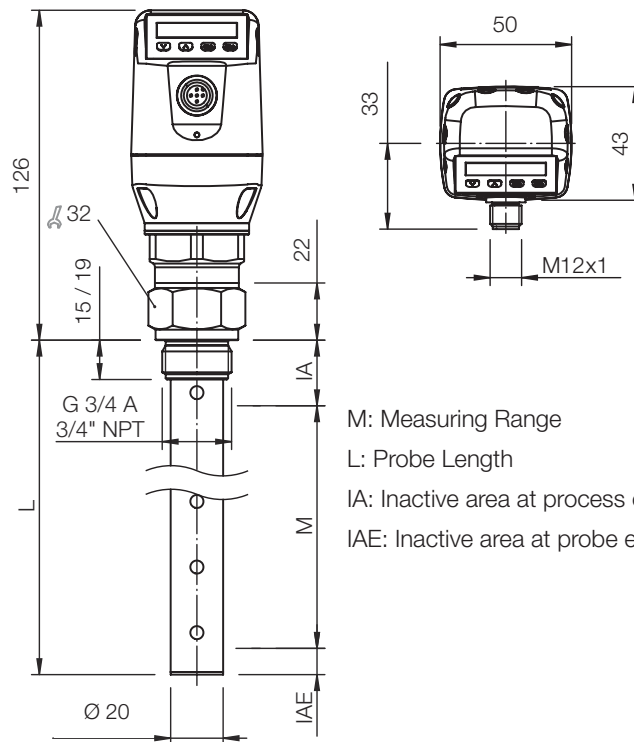
Note: The wire colors indicated above apply to the 807.087 8-pin M-12 accessory cable only. As 8-pin cables are not standardized, verify each wire's function if alternate accessory cables are used.

Dimensions (mm)

Single Probe

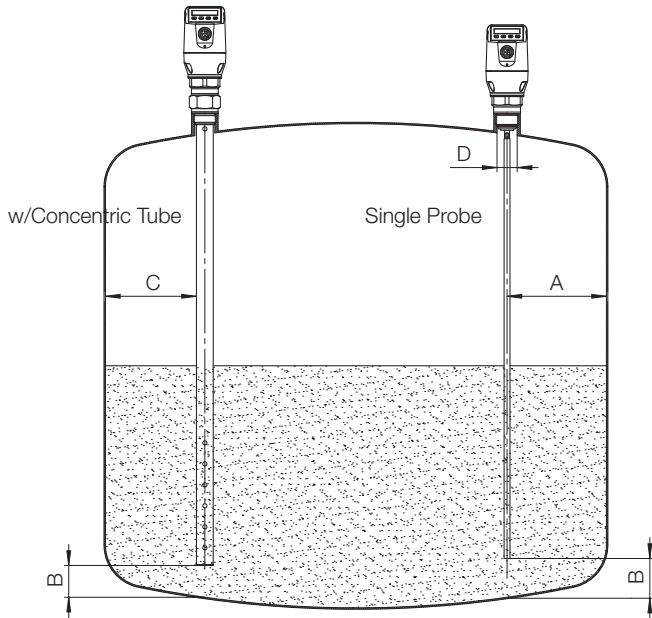


with Concentric Tube



- 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 Requirements:

Unit with single probe mounted in a metal tank

Installation within a nozzle:

$D \geq 1"$

Distance from tank wall/tank bottom:

$A \geq 2"$

$B \geq 0.4"$

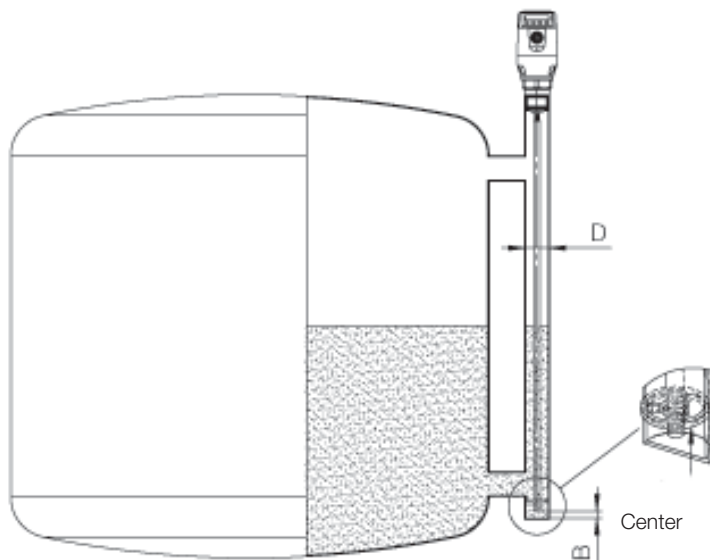
Distance to other tank fittings:

$\geq 4"$

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:

$B \geq 0.4"$

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.