

COMPACT NON-CONTACT RADAR

Level Sensors for Liquids



The CNCR series of compact non-contact radar level sensors uses 80 GHz narrow beam technology for accurate measurement of simple and aggressive liquids. They are easy to setup using Bluetooth on a phone and then send level measurement data to BinView[®] software, a local display, or a PLC. The sensors offer a measuring range up to 98 feet and install in existing vessel openings or non-intrusively when measuring levels in plastic vessels.

How CNCR Radars Work

The sensor transmits a continuous 80 GHz radar signal through the face of the antenna. The signal is reflected off the material surface and received as an echo by the antenna. The frequency difference between the sent and received signals is converted to a measurement that represents the distance to the material surface.

The distance is calculated based upon the vessel height programmed into the unit when it is set up. Setup can be performed without the vessel being emptied to save time.

The measurement output is the distance from the face of the antenna to the material surface. Measurements are displayed in inches, feet, or meters.



80 GHz Technology

The CNCR family of radar level sensors is an alternative to using ultrasonic sensors or pressure transmitters to measure liquid levels contained in tanks or open-air applications. These sensors utilize 80 GHz technology that narrowly focuses the radar signal in an eight-degree beam angle. This technology is extremely reliable in condensation, turbulence, and foam. The narrow beam can be used in confined vessels or standpipes and aimed to avoid pipes or structure that could interfere with the signal.



Non-contact radar technology delivers extremely high measurement accuracy of ± 0.2 inches. Measurements are not affected by changing process conditions such as fluctuating temperature or pressure.

Bluetooth Simplifies Setup

CNCR sensors are set up using a Bluetooth app downloaded to a cell phone or tablet. Setup can also be done on a PC using a Bluetooth USB adapter. Viewing of level measurements and changes to bin parameters can be done via the app at distances up to 80 feet from the sensor. This allows for level monitoring and parameter adjustments to be made without climbing tanks.



Reliable Levels in Liquids

BinMaster's CNCR series of compact radar level sensors are used for non-contact level measurement of many types of simple and aggressive liquids of varying densities. These sensors are appropriate for use in drinking and process water and wastewater applications and many water-soluble chemicals.

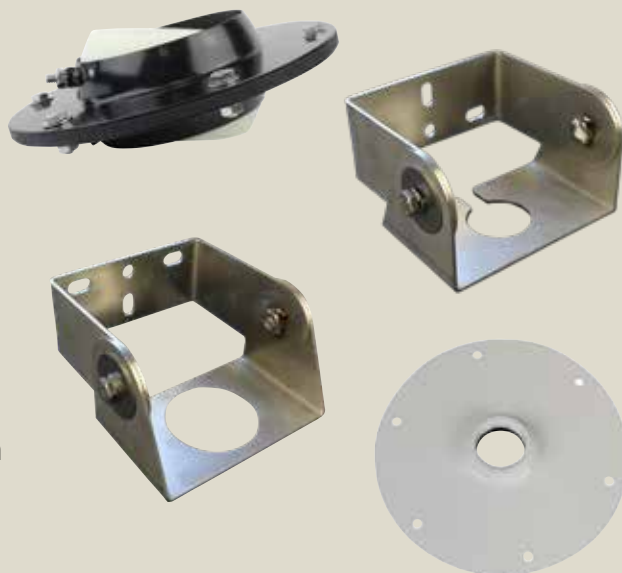
The continuous level sensors also reliably measure in excessive humidity, steam, vapor, and are unaffected by noise. The 80 GHz technology performs accurately if buildup or condensation occurs on the sensor face.



Mounting the CNCR

The CNCR can be mounted using a wall mounted bracket made of stainless steel that extends either 3.25 or 8.0 inches into the vessel. The wall mounted bracket is offered with a 1.0 or 1.5-inch opening. A stainless-steel ceiling mounted bracket with a 1.5-inch opening is also available.

If aiming is desired, select a 1.5-inch swivel mount made of impact resistant plastic that can swivel in one direction up to 40°. All CNCR sensors except the CNCR-190 can also be used with a powder-coated, carbon steel 1.5-inch NPT mounting plate in 0°, 5°, 10°, and 30° angles. The CNCR-190 uses a 1.0-inch flat mounting plate.



Choosing the Right Model

The model best suited to your application will be determined by the distance you need to measure and/or the height of the vessel, whether you need a 4-20 mA or Modbus output, and how you will mount the sensor.

Cabled Sensors - 100 Series

The CNCR-110, 120, 130, and 190 all install using a polyurethane pigtail connection cable available in 16, 32, or 82-foot lengths. These sensors are rated to IP66/IP68 (3 bar) with housings made from durable PVDF material that has excellent chemical, abrasion, and flame resistance and UV stability. The FKM seal provides heat and chemical resistance for long-lasting durability.



CNCR-110

The 110 is the ideal sensor for non-contact liquid level measurement at distances up to 26 feet in applications requiring a high level of environmental protection. It features a two-wire 4-20 mA output and is offered with either a 1.5-inch threaded or straight NPT connection. The cable outlet is on the top of the sensor. They are for use in unclassified areas, non-EX environments, and have general purpose FM/CSA/CE certifications.

CNCR-120 and CNCR-130

The 120 and 130 sensors are suited for non-contact liquid level measurement at distances up to 49 feet in applications requiring a high level of environmental protection. They are offered with either a two-wire 4-20 mA or four-wire Modbus output and a choice of a 1.5-inch threaded or straight NPT connection. The 120 model has the cable outlet on the top for mounting on the top of the vessel, whereas the 130 model has the cable outlet on the side. The 120 and 130 have general purpose FM/CSA/CE approvals for unclassified areas or are offered with optional ATEX/ICEx zone 1, 1/2 or FM/CSA/ATEX/ICEx Class I, II, III approvals.







CNCR-190

The 190 model is for non-contact liquid level measurement at distances up to 98 feet in unclassified applications where a high level of environmental protection from the elements is required. It is offered with either a two-wire 4-20 mA or four-wire Modbus output and features a 1.0-inch threaded or straight NPT connection. The cable outlet is on the top of the sensor. The 190 has general purpose FM/CSA/CE approvals for unclassified areas or are offered with optional ATEX/ICEx zone 1, 1/2 or FM/CSA/ATEX/ICEx Class I, II, III approvals.



CNCR 100 Series Specifications

	CNCR-110	CNCR-120	CNCR-130	CNCR-190
				
MODE OF OPERATION				
Measuring Principle	Radar	Radar	Radar	Radar
Measuring Range	26 ft. (8 M)	49 ft. (15 M)	49 ft. (15 M)	98 ft. (30 M)
Frequency	80 GHz	80 GHz	80 GHz	80 GHz
Beam Angle	8°	8°	8°	4°
Dead Zone	None	None	None	None
Accuracy	≤ 0.2" (5 mm)	≤ .08" (2 mm)	≤ .08" (2 mm)	≤ .08" (2 mm)
Voltage	12 to 35 VDC	12 to 35 VDC, 8-30 VDC	12 to 35 VDC, 8-30 VDC	12 to 35 VDC, 8-30 VDC
Output	2-wire 4-20 mA	2-wire 4-20 mA, 4-wire Modbus	2-wire 4-20 mA, 4-wire Modbus	2-wire 4-20 mA, 4-wire Modbus
Enclosure Material	PVDF	PVDF	PVDF	PVDF
Seal Material	FKM	FKM	FKM	FKM
Enclosure Rating	IP66/IP68 (3 bar)	IP66/IP68 (3 bar)	IP66/IP68 (3 bar)	IP66/IP68 (3 bar)
Mounting	1.5" Threaded NPT, 1.5" Threaded Straight	1.5" Threaded NPT, 1.5" Threaded Straight	1.5" Threaded NPT, 1.5" Threaded Straight	1.0" Threaded NPT, 1.0" Threaded Straight
Connection	16 ft. (5 m), 32 ft. (10 m), 82 ft. (25 m)	16 ft. (5 m), 32 ft. (10 m), 82 ft. (25 m)	16 ft. (5 m), 32 ft. (10 m), 82 ft. (25 m)	16 ft. (5 m), 32 ft. (10 m), 82 ft. (25 m)
OPERATING CONDITIONS				
Process Pressure	-14.5 to +43.51 psi (-1 to +3 bar/-100 to +300 kPa)	-14.5 to +43.51 psi (-1 to +3 bar/-100 to +300 kPa)	-14.5 to +43.51 psi (-1 to +3 bar/-100 to +300 kPa)	-14.5 to +43.51 psi (-1 to +3 bar/-100 to +300 kPa)
Process Temperature	-40° to +140°F (-40° to +60°C)	-40° to +176°F (-40° to +80°C)	-40° to +176°F (-40° to +80°C)	-40° to +176°F (-40° to +80°C)
Ambient Temperature	-40° to +140°F (-40° to +60°C)	-40° to +176°F (-40° to +80°C)	-40° to +176°F (-40° to +80°C)	-40° to +176°F (-40° to +80°C)
Approvals	Unclassified area, non-EX environment, general purpose FM/CSA/CE	Unclassified area, non-EX environment, general purpose FM/CSA/CE; FM/CSA/ATEX/ICEx Class I, II, III; ATEX/ ICEx Zone 1, 1/2	Unclassified area, non-EX environment, general purpose FM/CSA/CE; FM/CSA/ATEX/ICEx Class I, II, III; ATEX/ ICEx Zone 1, 1/2	Unclassified area, non-EX environment, general purpose FM/CSA/CE; FM/CSA/ATEX/ICEx Class I, II, III; ATEX/ ICEx Zone 1, 1/2

Threaded NPT Models - 200 Series

The 210, 220, and 230 all mount using a 1.5" threaded NPT or 1.5" threaded straight NPT connection. The enclosures are rated IP66/IP67, Type 4X to protect them from dust and water damage. They are ideal sensors for non-contact level measurement for basic liquid level applications. They are particularly suitable for use in water treatment, storage tanks with acids, lye, and additives in all industrial areas, or for measuring levels in plastic tanks or IBC containers through the tank walls.

CNCR-210

The compact 210 is a continuous liquid level sensor with a measuring range up to 26 feet. It features a two-wire 4-20 mA output and is offered with either a 1.5-inch threaded or straight NPT connection. It can be used for measuring liquid levels through the tank wall when using on a plastic storage tank or an IBC container.

CNCR-220

The 220 is much like the 210 but offers an extended measuring range up to 49 feet. It features a two-wire 4-20 mA output and is offered with either a 1.5-inch threaded or straight NPT connection. It can be used for measuring liquid levels through the tank wall when using on a plastic storage tank or an IBC container.



CNCR-230

The 230 offers an LED display on the sensor housing making level readings accessible from the sensor. It can be used for measurements ranging up to 49 feet. It features a two-wire 4-20 mA output and is offered with either a 1.5-inch threaded or straight NPT connection. It can be used for measuring liquid levels through the tank wall when using on a plastic storage tank or IBC container.

CNCR 200 Series Specifications

CNCR-210



CNCR-220



CNCR-230



MODE OF OPERATION

Measuring Principle	Radar	Radar	Radar
Measuring Range	26 ft. (8 M)	49 ft. (15 M)	49 ft. (15 M)
Frequency	80 GHz	80 GHz	80 GHz
Beam Angle	8°	8°	8°
Dead Zone	None	None	None
Accuracy	≤ 0.2" (5 mm)	≤ 0.2" (5 mm)	≤ 0.2" (5 mm)
Voltage	12 to 35 VDC	12 to 35 VDC	12 to 35 VDC
Output	2-wire 4-20 mA	2-wire 4-20 mA	2-wire 4-20 mA
Enclosure Material	PVDF	PVDF	PVDF
Seal Material	FKM	FKM	FKM
Enclosure Rating	IP66/IP67, Type 4X	IP66/IP67, Type 4X	IP66/IP67, Type 4X
Display	None	None	LED Display
Mounting	1.5" Threaded NPT, 1.5" Threaded Straight	1.5" Threaded NPT, 1.5" Threaded Straight	1.5" Threaded NPT, 1.5" Threaded Straight
Connection	One 1/2" NPT without plug in either opening	One 1/2" NPT without plug in either opening	One 1/2" NPT without plug in either opening

OPERATING CONDITONS

Process Pressure	-14.5 to +43.51 psi (-1 to +3 bar/-100 to +300 kPa)	-14.5 to +43.51 psi (-1 to +3 bar/-100 to +300 kPa)	-14.5 to +43.51 psi (-1 to +3 bar/-100 to +300 kPa)
Process Temperature	-40° to +140°F (-40° to +60°C)	-40° to +176°F (-40° to +80°C)	-40° to +176°F (-40° to +80°C)
Ambient Temperature	-40° to +140°F (-40° to +60°C)	-40° to +158°F (-40° to +70°C)	-40° to +158°F (-40° to +70°C)
Approvals	Unclassified area, non-EX environment, general purpose FM/CSA/CE	Unclassified area, non-EX environment, general purpose FM/CSA/CE	Unclassified area, non-EX environment, general purpose FM/CSA/CE

CNCR Applications

Food for Humans and Animals

Food ingredients: Liquid ingredients take many forms such as sugars, extracts, and oils that can be translucent, opaque, or transparent.

Beverages: Makers of soft drinks, beer, liquor, energy drinks, or seltzers use water, juices, colorants, and additives in the production process.

Animal fat: This ingredient is used at feed mills for feedstuffs for livestock and in pet foods. It is also used in the production of soap, lubricants, and fatty acids.

Milk and dairy products: Raw milk storage, processing, and pasteurization tanks.

Fat and oil processing: Margarine and shortening production using animal fats and oilseed processing for corn, canola, sunflower, and other oils for human consumption.

Egg processing: Tanks used for storing water used for chilling, cleaning, pasteurizing, and liquid egg processing.

Liquid food processing: Sauces, chocolates, and condiments measured as raw ingredients and finished products in storage tanks.



Drinking or Purified Water

Spring water containment: Drinking water from springs is monitored to ensure sufficient supply.

Purified water tanks: Tanks that store purified water at facilities to ensure efficient plant operations and supply for periods of peak demand.

CNCR Applications

Industrial



Process water: To ensure pressure pumps deliver a continuous supply of process water by monitoring the levels in storage tanks or open basins.

Bulk industrial containers: Measuring levels in IBCs, drums, or totes installing a sensor in the lid or opening or measuring through a plastic wall.

Industrial fluids: Hydraulic fluid, coolants, solvents, cleaners, lubricants, detergents, defoamers, degreasers, brighteners, cutting oils, metalworking fluids, rust and scale removers, and inhibitors.

Industrial manufacturing: Process and day tanks, cooling towers, RO storage, or waste sumps.

Wastewater: Bulk storage tanks, lift stations, open channels, or neutralization tanks.

Cement additives: Measure tanks containing accelerators, retarders, extenders, dispersants, and other characteristic control agents used to modify the properties of cement slurries.

Plasticizer tanks: Measure liquid resins like epoxies, polyurethanes, silicones, and polyester or other types of liquid resins.

Frac or silica sand: Monitoring fracture fluids, process water tanks, and flocculants used in dredge pump mining methods, sedimentation ponds, and wastewater used for processing and washing.

Water-cooled chillers: Ensure a continual water supply for industrial and batch water-cooled chillers by monitoring the level in holding tanks.



Oil & Fuels

Automotive oil and fluids: Monitoring levels of new and waste fluids such as oil, radiator, transmission, power steering, brake, and washer fluids, and air conditioning coolant.

Diesel storage: Bulk storage, transfer tanks, and on-site fuel storage.

Fuel tanks: Accurate measurement of fuels and oils to ensure an adequate supply is on hand for continuous operation.



CNCR Applications

Chemical

Chemical processing: Monitor level in bulk storage tanks, industrial bulk containers (IBCs), or drums.

Chemical tanks: Measuring the level of tanks where water is being treated with chemicals or clarifiers to ensure tanks are filled at levels for optimum dosage.



Conditioning tanks: To ensure chemicals and precipitants are applied properly in optimal, low concentrations.

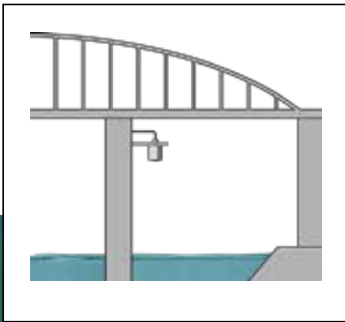
Glues and adhesives: Measuring animal-based or synthetic adhesives containing PVA, ethanol, acetone, and other substances.

Environmental

Sewer overflows: Level monitoring to prevent capacity overloads during heavy rain events. Used to ensure too much water from entering the treatment processes.

Dam levels: Continuous level measurement of the water levels at dams can be coupled with wireless data transmission for either drinking water supplies or flood control.

Flood control: Monitoring river levels at gauge stations is essential to detecting and alerting when water levels are reaching flood stage.



River level measurement: To measure levels of rivers used for drinking water or to detect flooding conditions caused by dam releases or inclement weather.

Open air applications: Utilize these sensors on ships or bridges to measure the distance to the water.



CNCR Applications



Water & Wastewater

Municipal water treatment: Monitoring levels in open channels, lagoons, canals, lift stations, sediment tanks, clarifiers, and chemical feeding tanks.

Pumping stations: Level measurement at the inlet shaft is used to control running of the pumps by alerting when they need to be turned on or off.

Elevated storage tanks: Level monitoring is important to be sure that water pressure and supply is adequate during peak demand periods.

Overflow basins: Sensors can provide overflow protection for sewage treatment plants during flooding or stormwater during heavy rainfall.

Flocculant storage tanks: Monitoring the level of coagulant and flocking agents used remove minerals and organic particulates from water.

Gravel bed filters: Ensuring a consistent level of water is fed into gravel filtration beds used to remove sediment matter.

Open channels: Monitoring flow rate in a stream, irrigation channel, or unpressurized sewage pipe.

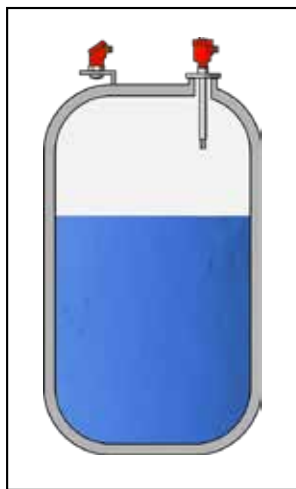
Vacuum sewerage system: Used to measure wastewater tanks at pumping stations that use a vacuum system. Measures accurately in turbulence and foam.

Sludge receiving stations:

To measure the level of sewage sludge pumped from trucks (used to pump septic systems) into receiving tanks to control the input of sludge at the plant.

Equalization basins: Measure levels to ensure consistent flow to downstream processes in wastewater treatment.

Chemical tanks: Measurement of tanks storing chemicals used in the water treatment process.



Summary

CNCR Benefits

- ◆ 80 GHz technology, narrow 8° beam works reliably in challenging conditions
- ◆ Simple installation and setup, fast setup using Bluetooth on a cell phone
- ◆ No dead zone, measures right up to the face of the sensor
- ◆ Chemical resistant enclosure, IP Rated for protection against dust and water ingress
- ◆ Compact design fits in tight spaces, installs through existing openings
- ◆ Real-time measurement to BinView® software or integrated into a plant's PLC
- ◆ Increases safety, no climbing tanks, working over open tanks or sumps, or in confined spaces
- ◆ No maintenance, low cost of ownership



BinMaster is a
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CNCR-1120-PCG