RETTAR

bluepoint TECHNOLOGIES

Compact Radar Level Meter

Assist in Digital Management of Industrial Materials

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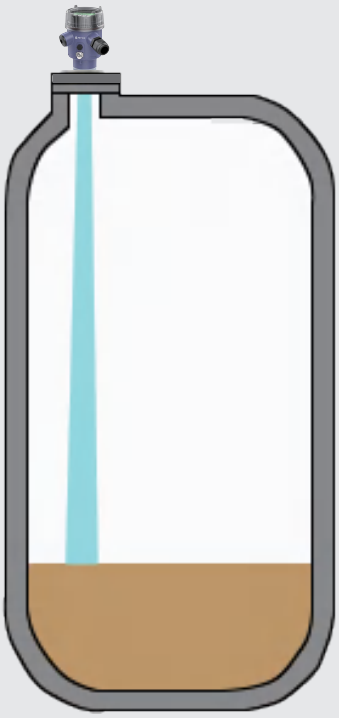
Measuring Principle

CPR1X00 series 80GHz radar level meters using Terahertz electromagnetic wave and FMCW frequency modulated continuous wave technology.Radar emits 76-81GHz high-frequency microwave signals with linear frequency modulation. CFR2X00 series 140GHz radar level meters using Terahertz electromagnetic wave and FMCW frequency modulated continuous wave technology.Radar emits 120-140GHz high-frequency microwave signals with linear frequency modulation. The microwave signal is emitted from the radar antenna, and when it encounters the surface of the measured medium, some of its energy is reflected back by the surface of the medium and received by the radar antenna.In radar, a portion of the microwave transmitted signal is mixed with the received signal to obtain the difference frequency signal between the two. The differential frequency signal is obtained by Fourier transform algorithms such as FFT or DFT to obtain the differential frequency spectrum signal, thereby obtaining the frequency difference. According to the linear frequency modulation signal, the frequency difference is proportional to time, thus obtaining the time difference. Based on the time difference and the distance between the antenna and the surface of the measured medium, the distance between the antenna and the surface of the measured medium can be calculated.



Product Advantages

High cost-effective

- Compared with the traditional radar, it maintains the excellent performance at the same time, it really realises the high quality but not expensive for the enterprise to save the cost, and provides the cost-effective microwave level measurement solution in some simple working conditions.

Small installation size:

- Compact and lightweight structure
- Suitable for small caliber containers;
- Applications with limited installation space.

Multiple debugging methods

- Debugging through Bluetooth connection to radar (mobile phone; tablet).
- Debugging through upper computer software.
- Debugging through a HART communicator can display the echo curve.
- CFR2X00 series built-in LCD liquid crystal display and debugging unit LCD liquid crystal debugging.

High protection: IP68

- Designed for simple working conditions, it can operate stably even in harsh environments and provide reliable microwave level measurement;
- Full sealing design, protection level up to IP68, waterproof and moisture-proof, both dustproof and waterproof, have reached the industry leading level, to provide users with a full range of protection.

Instrument Profile

Cable

CPR1100 Radar Liquid Level Meter

CPR1200 Radar Solid Level Meter

Application	Liquid level measurement with simple process conditions	Level measurement of block and powder materials with simple process conditions
Measuring Range*	35m	35m
Antenna Form/Material	Lens antenna/PP	Lens antenna/PP
Beam Angle	8°	3°
Contact Medium Material	PP	PP
Process Connection	Thread G1½ /flange/hoisting	Thread G3 /flange/hoisting
Process Temperature*	-40℃...+100℃	-40℃...+100℃
Process Pressure*	-1...3bar	-1...30bar
Accuracy	±2mm	±2mm
Resolution Ratio	1mm	1mm
Response Time	< 2s	< 2s
Frequency Range	76~81GHz	76~81GHz
Signal Output	4...20mA/HART/RS485	4...20mA/HART/RS485
Display Debugging	Tank side monitor,phone(Bluetooth) Upper computer software（RS485/HART）	Tank side monitor,phone(Bluetooth) Upper computer software（RS485/HART）
Electrical Connection	M20*1.5（cable diameter 6~12mm）½ NPT	M20*1.5（cable diameter 6~12mm）½ NPT
Ingress Protection	IP68	IP68
ATEX	Ex ia IIC T6	Ex ia IIC T6 Ex iaD tD A21 IP67 T80℃/T290℃

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Compact

CFR2100 Radar Level Meter

Application	Measurement of liquids, solids, etc. with simple process conditions
Measuring Range*	35m
Antenna Form/Material	Lens antenna/PVDF/PP
Beam Angle	8°
Contact Medium Material	PVDF/PP
Process Connection	Thread G1½/flange/hoisting
Process Temperature*	-40℃…+100℃
Process Pressure*	-1…3bar
Accuracy	±2mm
Resolution Ratio	1mm
Response Time	< 2s
Frequency Range	120~140GHz
Signal Output	4…20mA/HART/RS485
Display Debugging	LCD、Phone（Bluetooth）、Upper computer software、Tank side monitor
Electrical Connection	M20*1.5（cable diameter 6~12mm）½ NPT
Ingress Protection	IP67
ATEX	Ex ia IIC T6

Specification

The actual measurement range of the instrument depends on antenna size, medium reflectivity, installation location, and possible interference reflections.± 2mm is the precision of the instrument laboratory under standard conditions.

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Selection and Application

Cable CPR1X00	Compact CFR2X00
CPR1100 liquid measurement（liquid/corrosive liquid）	Used for liquid and solid level measurement
CPR1200 solid measurement（block、powder）	Configuring LCD display unit
Simple installation	Adopting IP67 protection grade
Adopting IP68 protection grade	Smartphone bluetooth debugging
Smartphone bluetooth debugging	Measuring range 35m
Output signal 4 ...20 mA/HART/RS485	Output signal 4 ...20 mA/HART
CPR1100 is suitable for simple liquid measurements with high protection requirements, such as hydrological treatment, meteorological stations, pumping stations, open channels, etc. CPR1200 is suitable for measuring solid materials with high protection requirements, such as powders, blocks, etc.	CFR2100 adopts a 140GHz radar level meter, equipped with an LCD display unit, with a max measurement range of 35 meters. The instrument installation is simple and does not come into contact with the medium, and is not affected by changes in the medium. It can be operated wirelessly using a smartphone and is suitable for measuring corrosive liquids and solids with simple process conditions.

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Application examples

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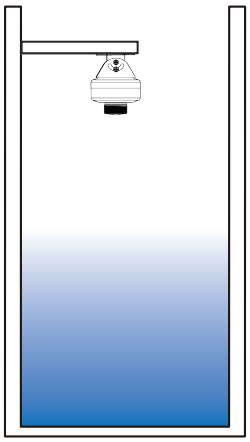
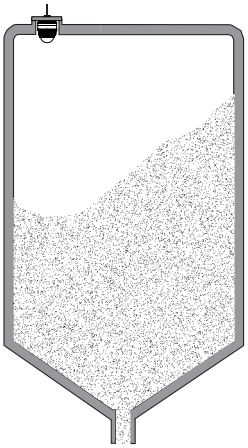
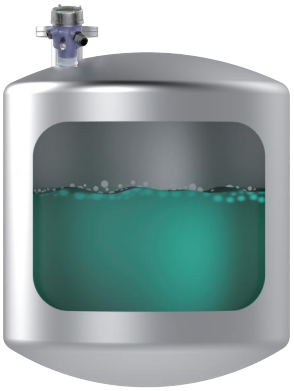


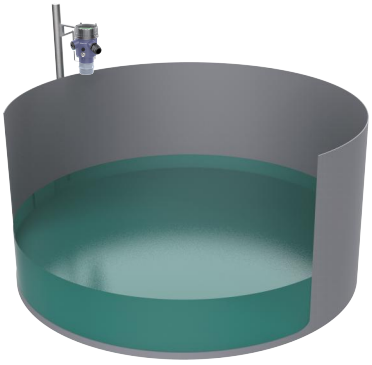
① Water level measurement/hoisting



② Solid silo material level measurement/ flange installation



③ Storage tank liquid measurement/ flange installation



④ Open pool liquid measurement/hoisting

Electronic Components

CPR1X00 series radar level meter electronic components

(1) Two-wire system 4...20mA

Power supply voltage: 18-36VDC

Connecting cable: Power wiring must be operated by qualified professionals. If there is a possibility of overvoltage surge, overvoltage protection devices must be installed.

Precaution: The power supply must be turned off when wiring.

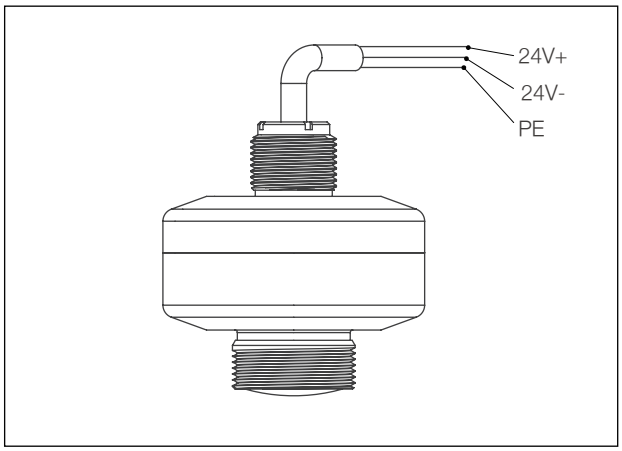


Diagram: CPR1100 Radar level meter wiring

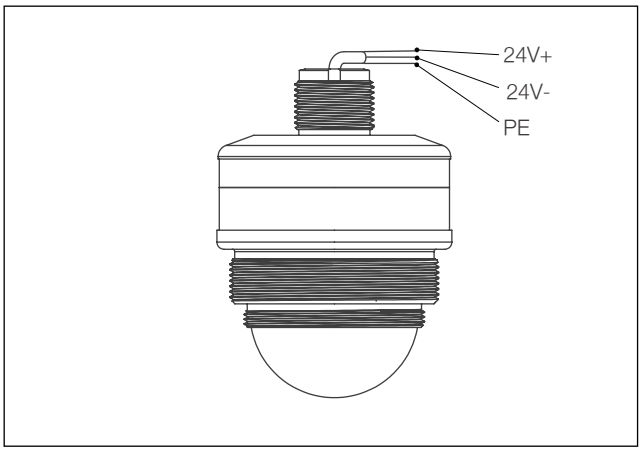


Diagram: CPR1200 Radar level meter wiring

(2) Distribution of wiring cables

Identification	Function	Polarity
24V+	Power supply	V+
24V-	Power supply	V-
PE	Ground wire	A

(1) 4…20mA–Two-wire system/HART/RS485

Supply voltage: 20-28VDC

Connecting cable: 4…20mA/HART (two wire system) instrument power supply and current signal share a two core cable. The cable should be shielded with an outer diameter between 6-12mm. Ensure the sealing of the cable entry, and it is recommended to use standard two core cables for wiring. The recommended cable model is Belden3076F. For intrinsically safe types, a safety barrier must be added between the power supply and the instrument.

Shielded cables and grounding:

Both ends of the shielded cable should be grounded.

The grounding terminal inside the instrument housing is used for cable shielding or grounding of a dedicated grounding wire.

The external grounding terminal of the instrument housing is used to complete the grounding between the instrument and the on-site ground.

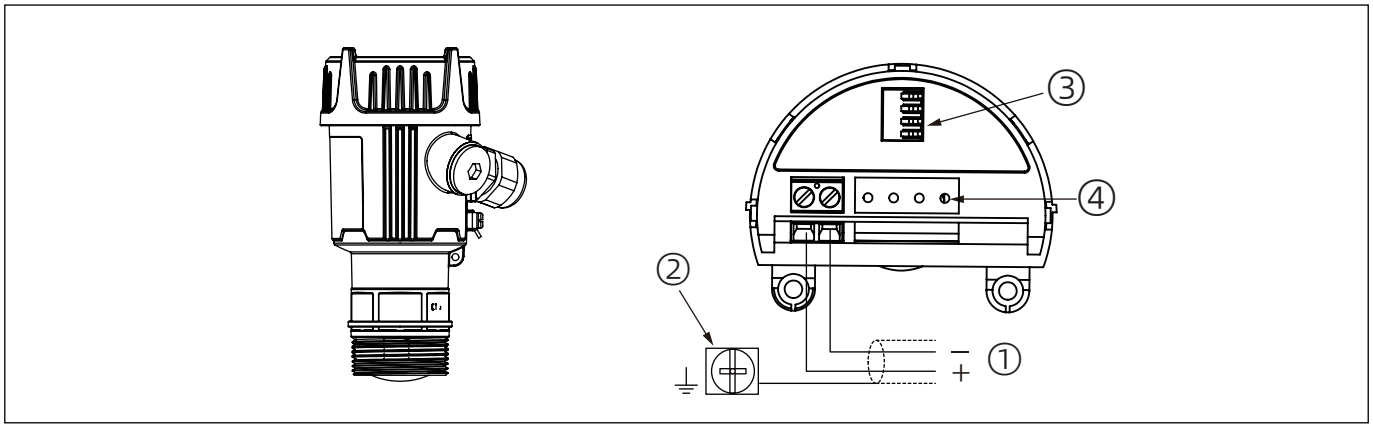


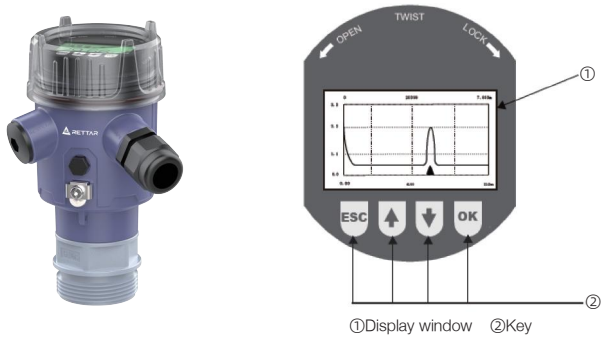
Diagram: Wiring compartment of the CPR2X00 series radar level meter 24V single compartment housing

① 24V Power supply line
② Grounding screw inside the case
③ LCD connection module
④ Wiring terminal block

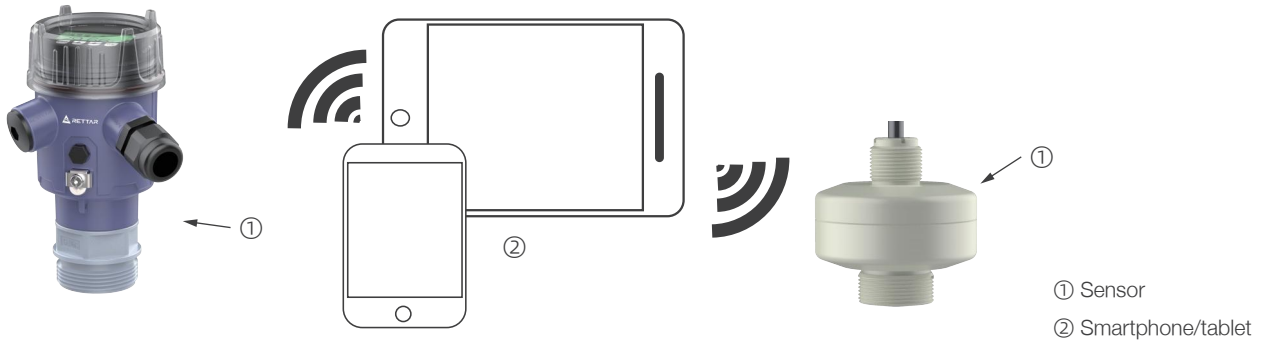
Instrument Debugging

Conduct on-site debugging

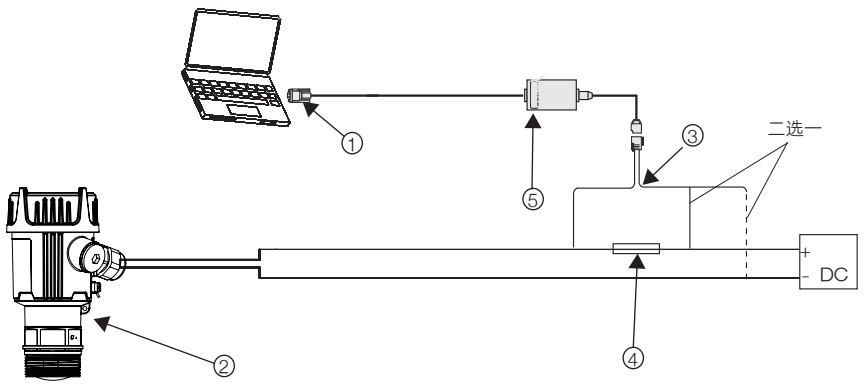
（1）Through LCD display module（Only applicable for optional use with CFR2X00 series radar)



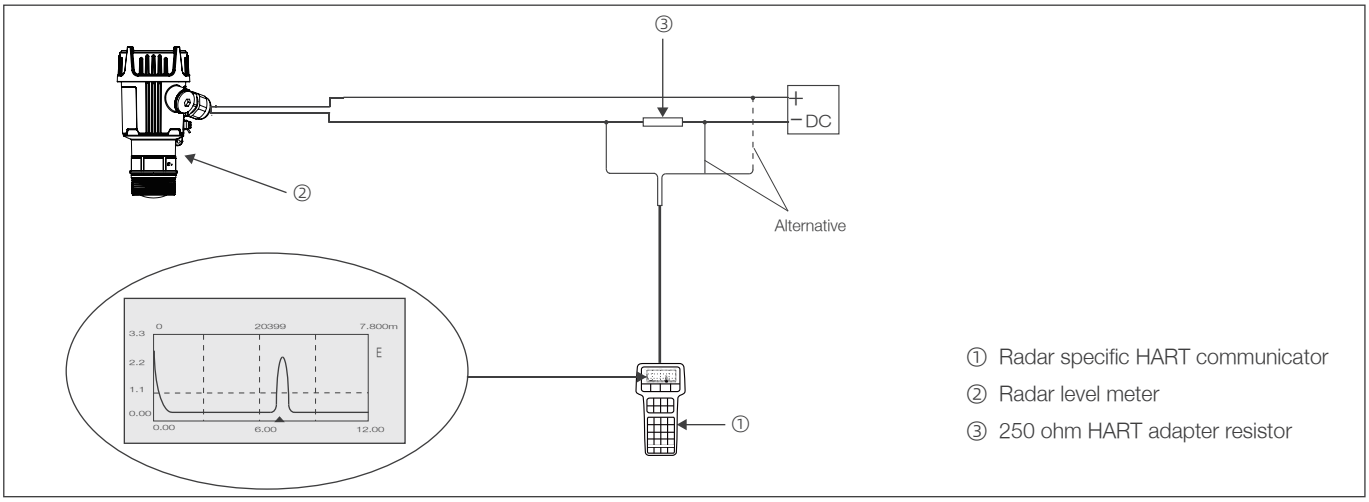
（2）Debugging via smartphone or tablet device using Bluetooth functionality



（3）Debugging through the LEVELWARE software

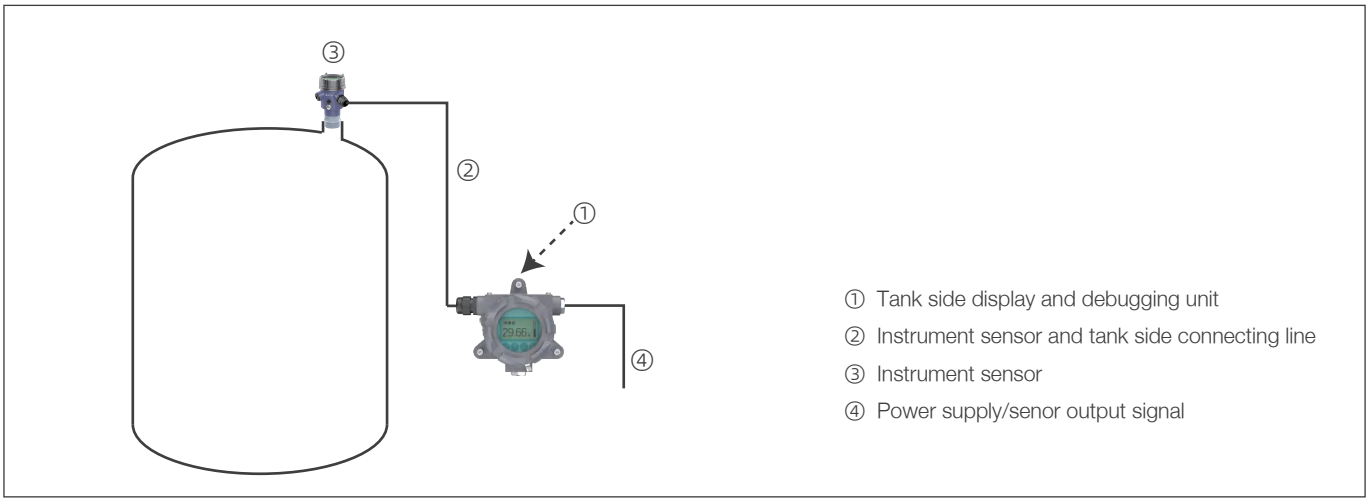


（4）HART Communicator

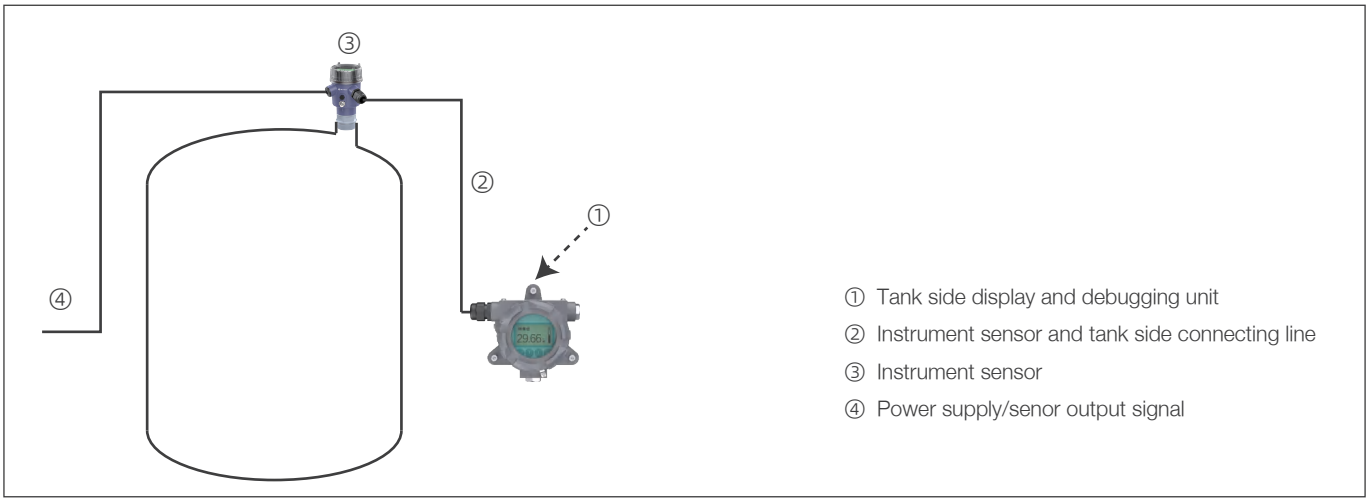


Remote debugging

Remote display unit———positive tank side



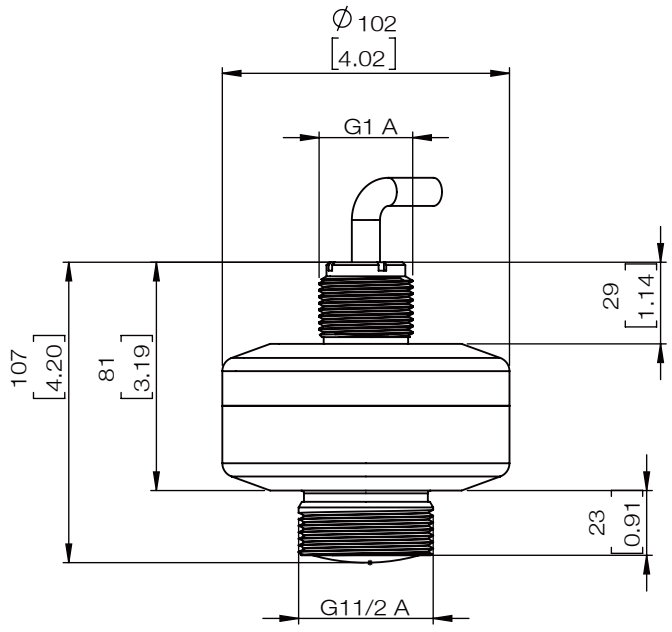
Remote display unit———passive tank side



Structure Size

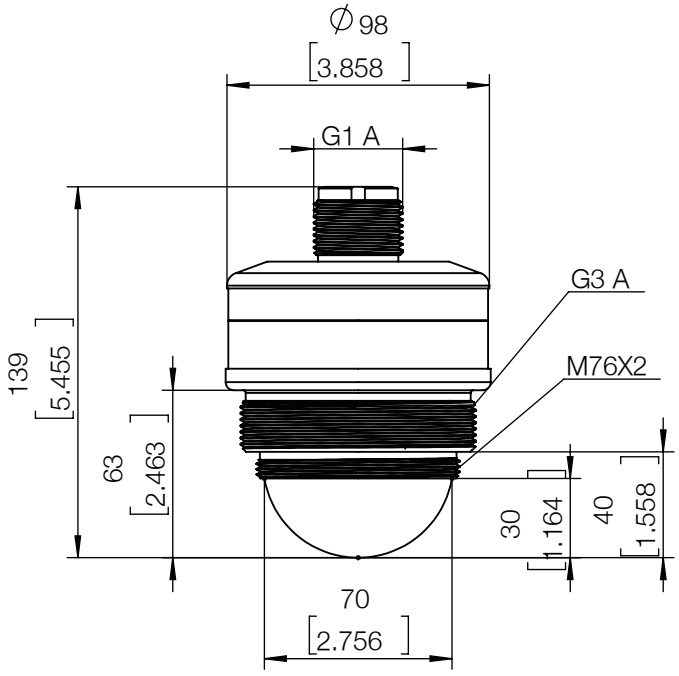
Instrument size (Note: The values marked in [ ] are in inches, and the rest are in millimeters)

CPR1100 Radar Liquid Level Meter



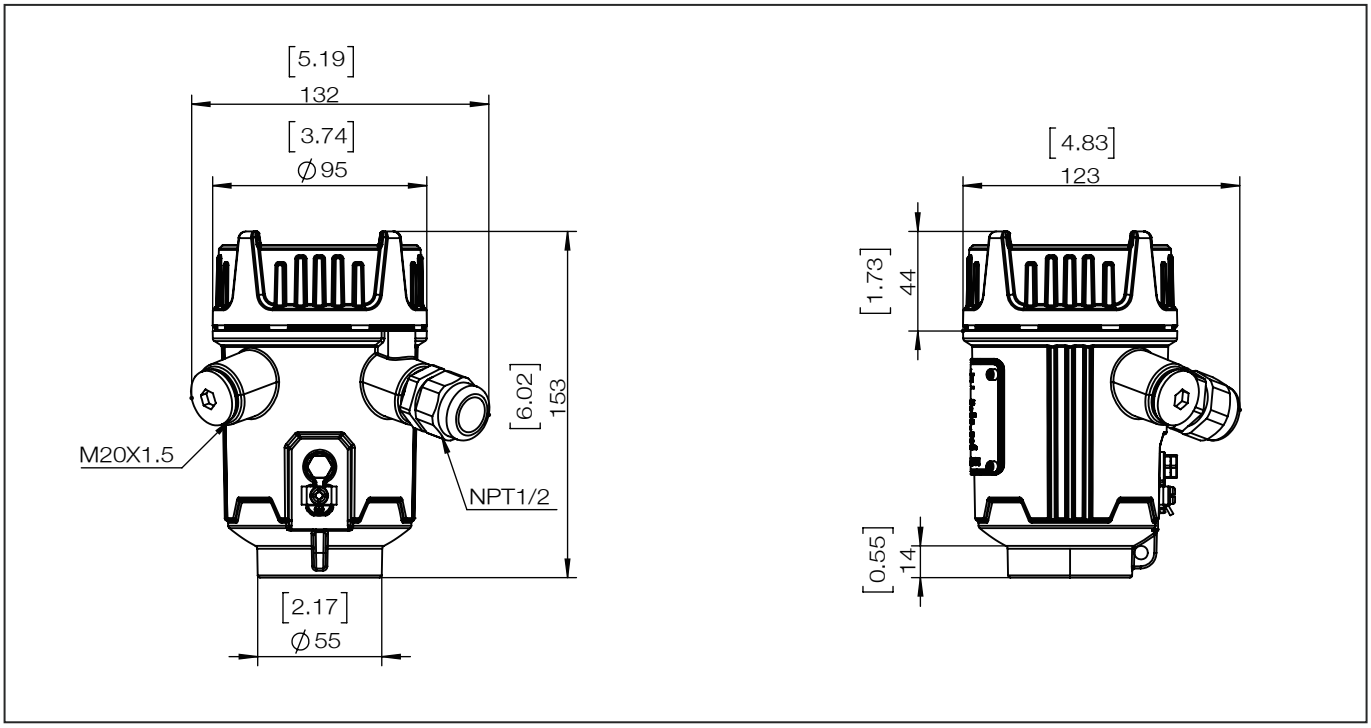
weight: about 0.35kg

CPR1200 Radar Solid Level Meter

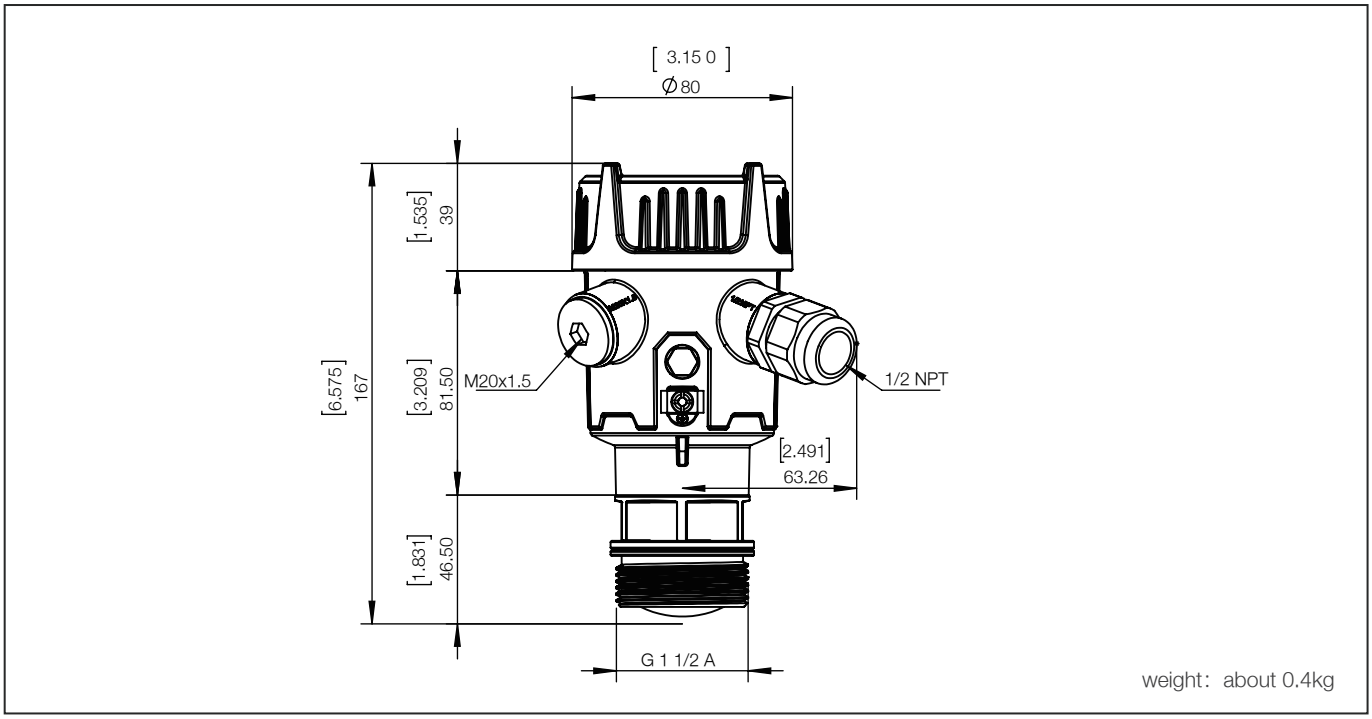


weight: about 0.7kg

CFR2X00 Series Radar Level Meter Housing Size



CFR2100 Radar Level Meter



weight: about 0.4kg

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