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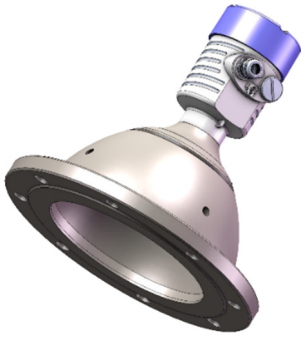
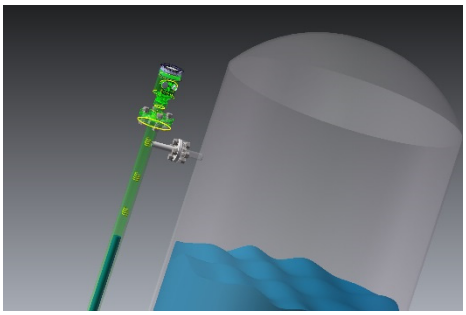
# ANL-9081S Still-pipe gauge version

# Non-contact Radar Level Transmitters

*Version V.2024*





## Characteristics

- The ANL-9081N with circularly polarized antenna is a premium non-contact radar level gauge for still-pipe measurement.
- Typical applications are crude oil tanks with floating roofs and gasoline/ product tanks with or without floating roofs.
- Using a unique Low Loss Mode to transmit the radar waves in the center of the pipe, which could eliminate degradation of the accuracy due to rust and product deposits inside the pipe.
- Provides for temperature, level measurement in still-pipe. (multi point temperature probe)
- Fits any floating roof tank with an existing 150mm/200mm still-pipe.

## Specifications

**For more technical details see the Rex Technical Description.*

| ANL-9081S | Lens material PTFE | Lens material PEEK | N60 (cool version) |
|---|---|---|---|
| Max. measuring range | 40M | 40M | 40M |
| Tx/Rx frequency | Tx/Rx frequency 76.2 to 80.2GHz Dynamic FM Sweep Bandwidth 1~4GHz<br>(The adjustment FM range can be customized according to the ISM requirements of the customer's region) | | |
| Near blind spot | < 100mm from the flange down surface | | |
| Meas. Principle | FMCW Radar System using Low Loss Mode. | | |
| Lens Antenna Medium | PTFE Φ100mm | PEEK Φ100mm | PEEK Φ100mm |
| Antenna beam / Gain | Beam angle 3.5°/ Gain 31.51dB | Beam angle 3.5°/ Gain 31.4dB | |
| Still-pipe dimensions (standard) | 150mm, or 200mm | | |
| Meas. Accuracy | ±1mm (<15m range)、±2mm (>15m) | | |
| Ambient temperature | -40 ... +85 °C (Operating ambient temperature) | | -60 ... +105 °C |
| Process (operating tank) temperature | -40°C ... +200°C | -60°C ... +200°C | |
| Process pressure | -0.2 ~ +0.5MPa | -0.5 ~ +1.5MPa | |
| Process connection | Flanges >= DN100 | | |
| Signal output | 4-20 mA/HART7 2-wire, 4-20 mA/HART7 4-wire, Profibus PA / DP, Ethernet-APL, Modbus protocol 4-wire | | |
| Variables influencing meas. accuracy | Specifications for the digital measured value<br>Temperature drift - Digital output: ±1mm/10K relating to the max. measuring range or max. 15 mm<br>Additional deviation through electromagnetic interference acc. to EN-61326: < ±10 mm<br>Specifications apply also to the current output<br>Temperature drift - Current output: ±0.01%/10K relating to the 16.7 mA span or max. ±0.15%<br>Deviation in the current output due to digital/analogue conversion<br>Non-Ex and Ex-ia version: < ±1µA; Ex-d-ia version: < ±1µA<br>Additional deviation through electromagnetic interference acc. to EN-61326: < ±150µA | | |
| Indication/Adjustment (LOI) | 160x80 LCD FSTN RGB backlight monitor adapter with keyboard module, operation Temp. -20°C ... 70°C.<br>or 128x64 OLED monitor adapter with keyboard module, operation Temp. -55°C ... 80°C. (option)<br>or 230x240 LCD TFT colors monitor adapter with keyboard module, operation Temp. -20°C ... 70°C. (option only for 4-wrie)<br>(APP) Radar MobileManager via BT wireless connection<br>(PC software) Radar PCManager /or Via a PC with PACTware/DTM (an interface converter AiW-305 USB CONNECT is required) | | |
| Power supply | 16V ~ 40 VDC / Load resistor > 600Ω | | |
| Wireless communication | Bluetooth 5.0 (Bluetooth 4.0 LE compatible), communication range 40m, in rainy day 20m | | |
| Approvals | Ex ia IIC T6 Ga IP67; Ex d IIC T6 Gb IP67 | | |
| Housing | Double chamber, Aluminum / Stainless steel, IP66 / IP67 / IP68 | | |
| Applications | liquids, still pipes and chambers applications<br>It is also the preferred technology for applications with heavy deposition or very sticky and viscous fluids or where ball valves | | |

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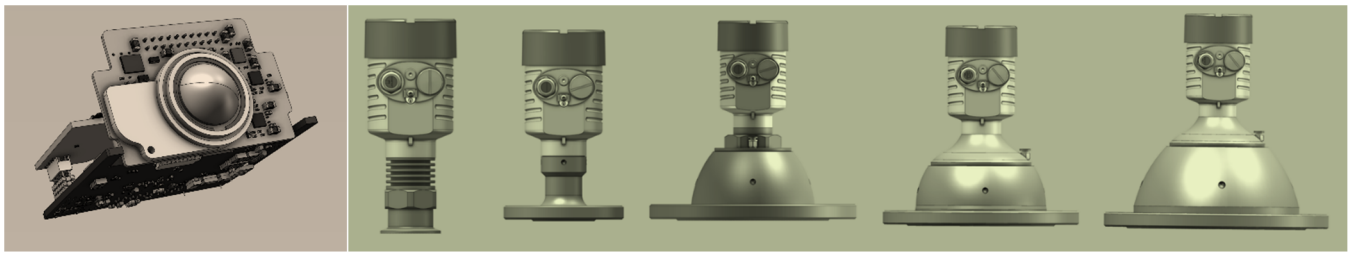
# Using Radar level transmitter in Still Pipes and Chambers

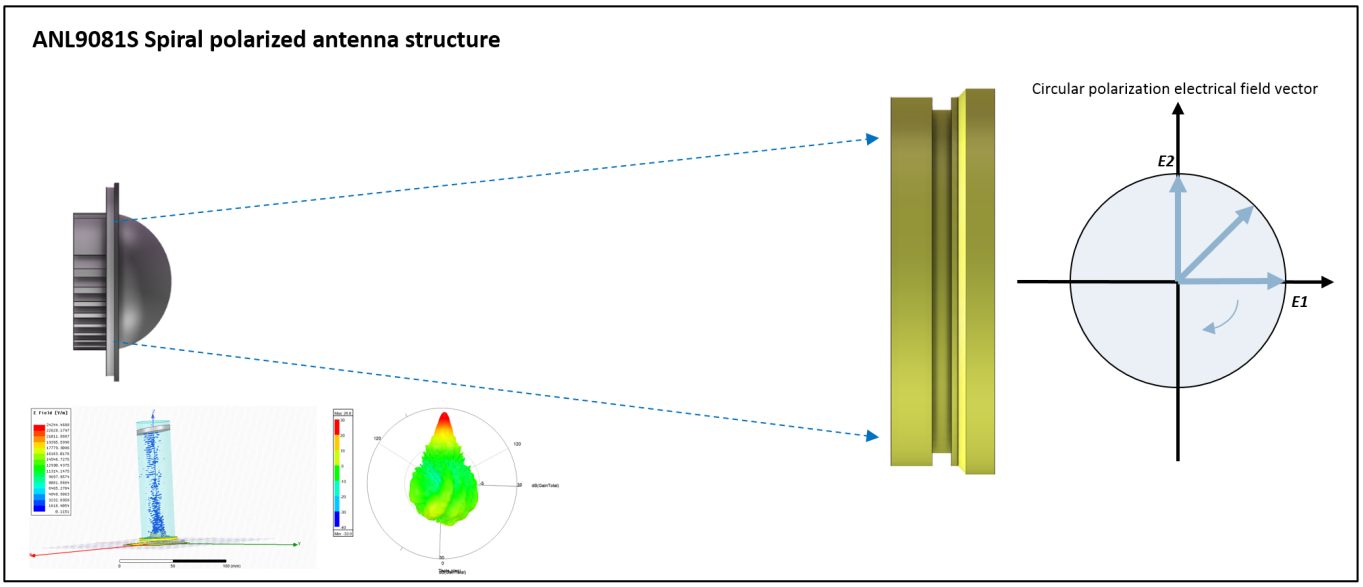
Still pipes and chambers (bypass chambers, bridles, side-pipes, bypass pipes) are used in many applications and many different types of tanks and vessels. Radar transmitters can be used in these installations, but function differently in pipes than in normal vessel installations.
Although process radars can often be installed in still pipes to measure level, which the speed data to be corrects for radar wave propagation through pipe diameter data, all process radars, regardless of their brand or type, are designed to perform optimally in free-propagating processes. Installed in a distillation tube, the accuracy of the process radar may be compromised by the propagation of microwaves through the distillation tube.

When a radar transmitter is used in a metal pipe, the microwave signal is directed and contained within the pipe. The radar echo signal becomes stronger, which is an advantage for low dielectric and/or turbulent applications, especially over longer distances.
For highest accuracy in still pipes, we have developed the ANL-9081 Radar Level Transmitter with unique circularly polarized antennas utilizing a low-loss microwave mode dedicated for still pipes.



### Circularly polarized antenna and low-loss microwave mode

When a radar level transmitter is used inside the pipe, more than one microwave mode is generated and each mode has a unique propagation speed. The number of microwave modes that are generated varies with the frequency of the radar signal and the pipe diameter. This low-loss microwave mode virtually eliminates degradation of the accuracy due to rust and product deposits inside the pipe.




### Performance and measuring range

The ANL9081S radar level transmitter firmware contains a tube measurement mode, when this mode is turned on, the transmitter will be optimized for still pipe measurements. The dynamic gain curve will be adapted for pipes and the lower propagation velocity of the radar signal in the pipe will be compensated. The following figures reflect the anticipated performance for different radar devices when used in a pipe installation.

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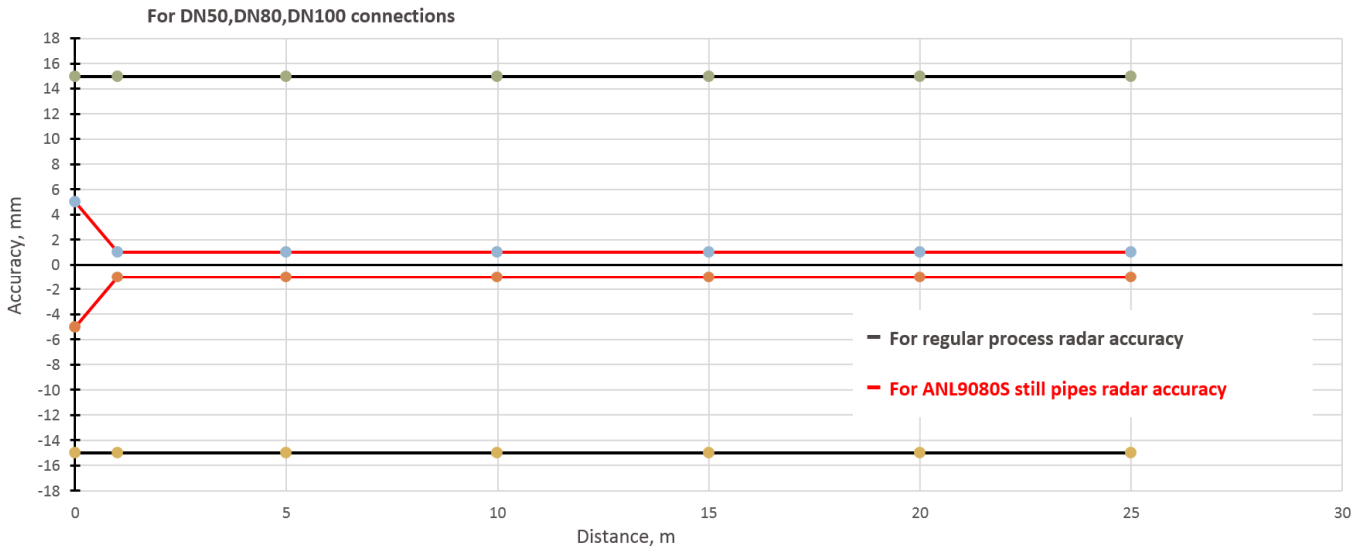


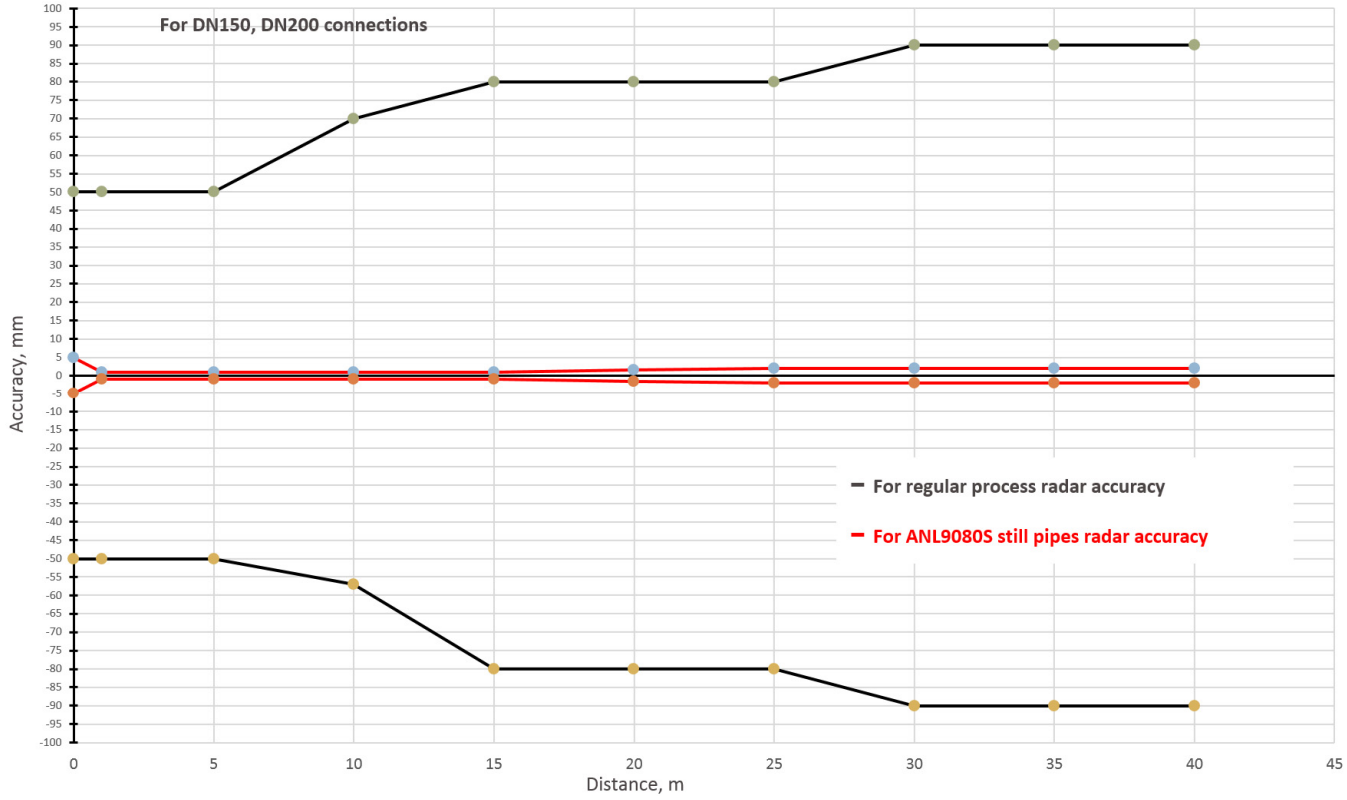


**NOTE:**

1. Accurate pipe diameter required for a proper level calculation.
2. Build-up or deposits inside the pipe may decrease the performance.
3. If the pipe inner diameter deviates, a scale factor error will appear for measurements in long pipes.
4. The ANL-9081S accuracy shown in up figure, it applies to antenna sizes matching the pipe diameter.

For best accuracy it's recommended to perform a two-point offset measurement:

1. Measure with a high level in the tank. Match the measured level value to a reference measurement and adjust the Calibration Offset parameter.
2. Measure with a low level in the tank. Match the measured level value to a reference measurement and adjust the Pipe Inner Diameter parameter.

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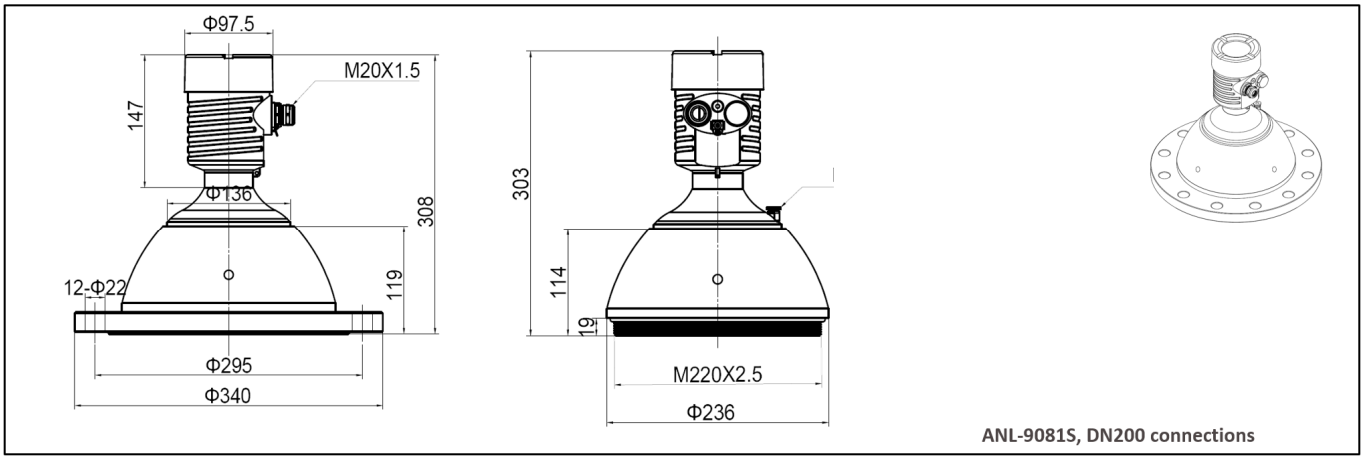
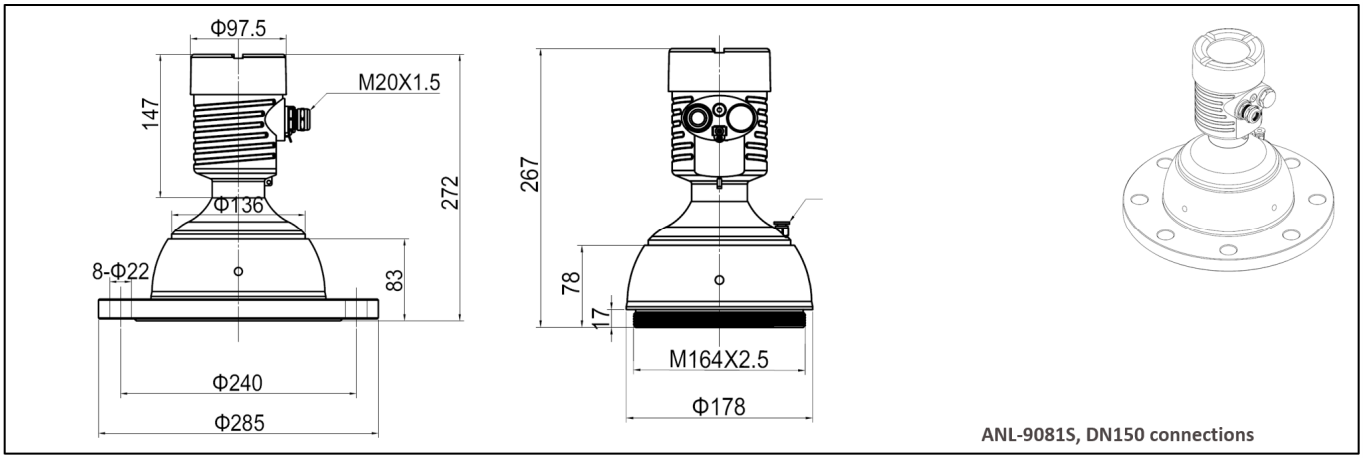
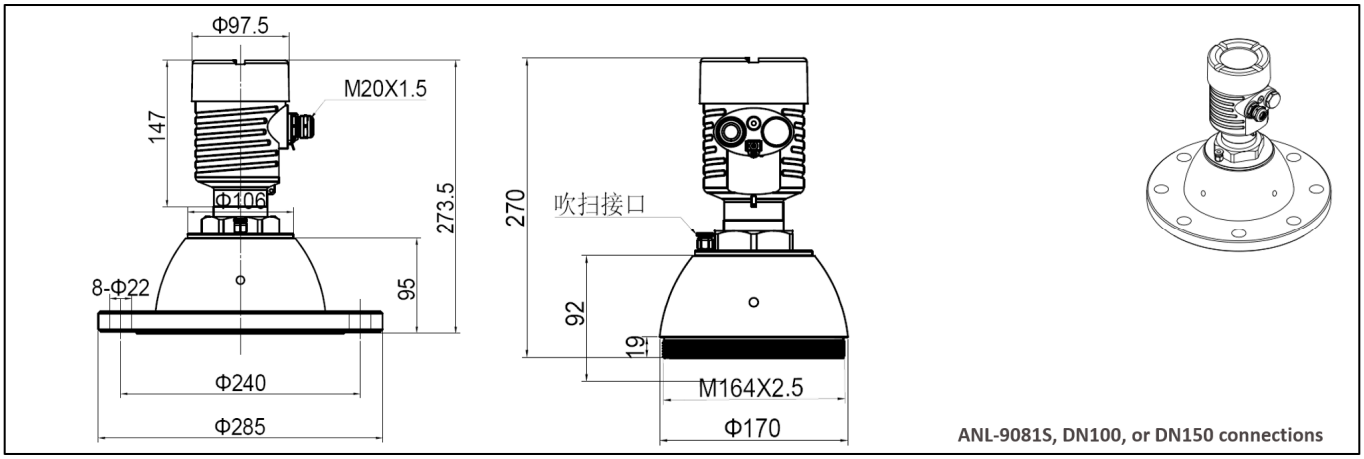
# Product Dimensions



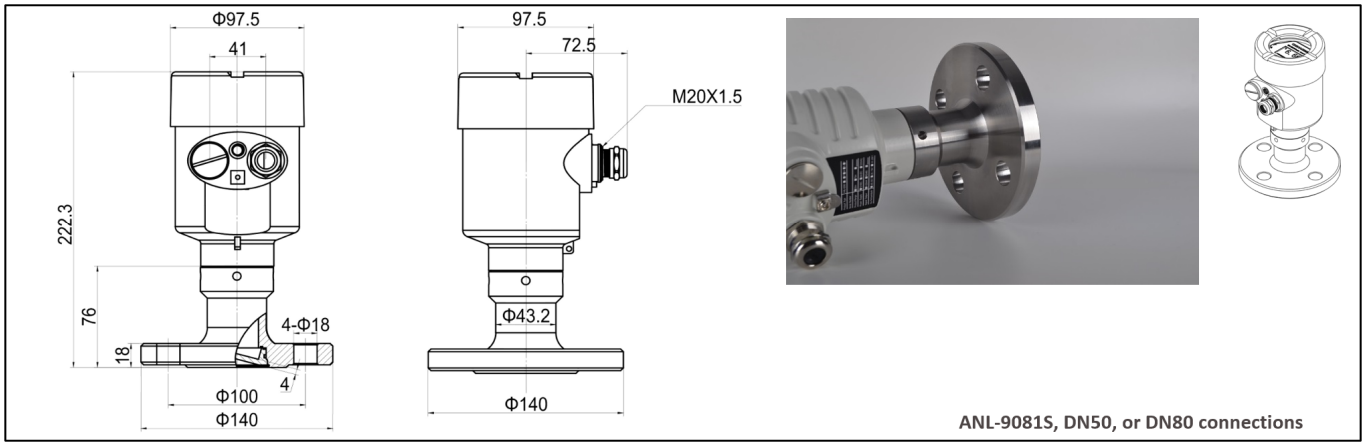

ANL-9081S, DN200 connections




ANL-9081S, DN150 connections




ANL-9081S, DN100, or DN150 connections




ANL-9081S, DN50, or DN80 connections

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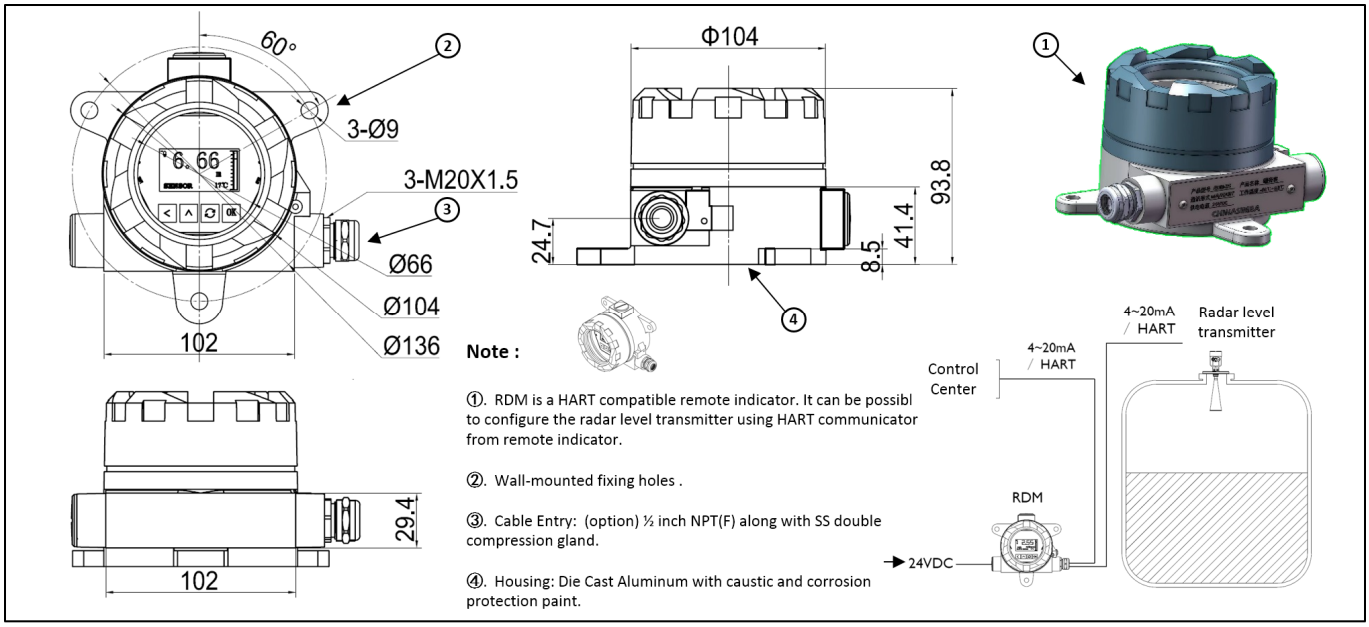
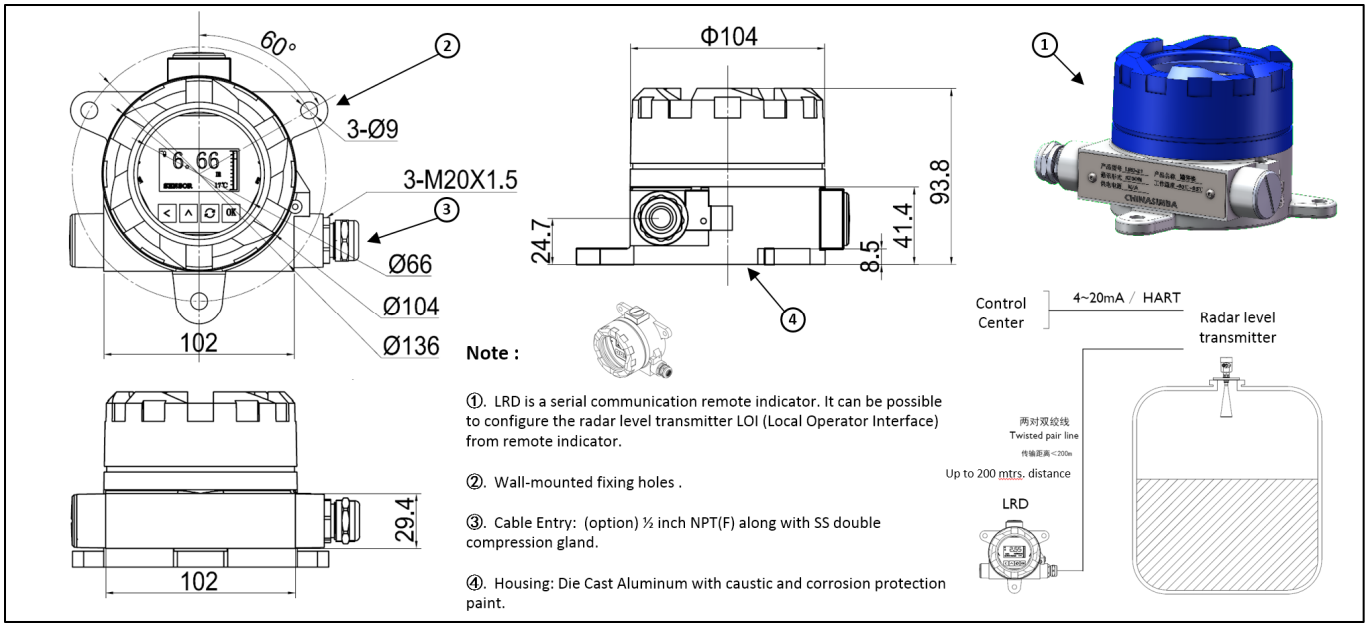
# Remote programmer cum Indicator Adapters

## Remote indicator with HART compatible (RDM-25)




## Remote indicator via Serial communication (LRD-21)




## Remote indicator via Bluetooth communication

ANL9080 radar level transmitters (with Bluetooth function) can be connected to mobile phone through Bluetooth wireless system. The mobile phone needs to install the RadarMobileManager APP. This is a free registered APP (Android and IOS etc.) software, which can be downloaded and installed directly in major APP Stores, or please contact the relevant product suppliers.

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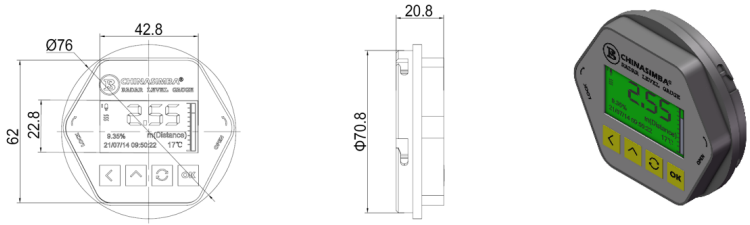
## Indication/Adjustment LOI Adapter

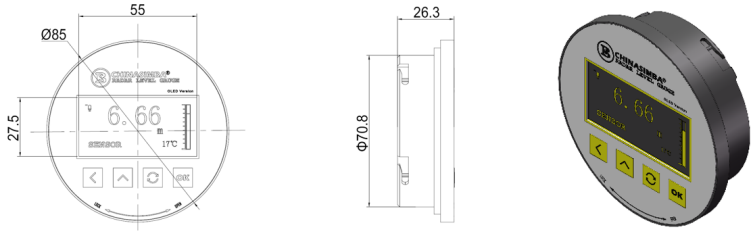
### 160x80 LCD RGB Backlight Monitor Adapter

Display type: FSTN
View direction: 6 o'clock
Operation temperature : -20°C ... 70°C



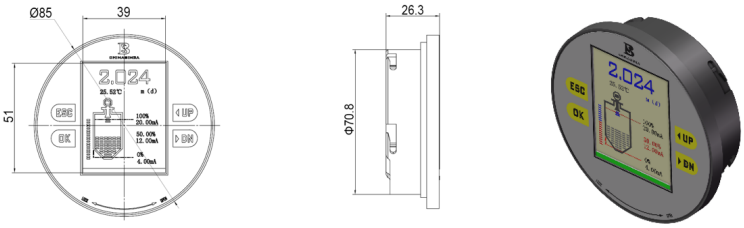

### 128x64 OLED graphic Monitor Adapter

Display type: OLED
View direction: 180 o'clock
Operation temperature : -55°C ... 80°C




### 320x240 LCD TFT colors Monitor Adapter

Display type: 2.4" TFT 65K/262K colors
View direction: 6 o'clock
Operation temperature : -20°C ... 70°C

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