Free Range Radar Transmitter
Model FRT

Applications

- For continuous measurement of liquid and solid levels
- For containers with internal components such as stirring devices and heating coils
- For measurement of level in tall silos, large storage rooms, and silos with grates
- For industries with high hygiene requirements, such as food and beverage, and biopharmaceuticals
- Suitable for almost all industries and application scenarios

Advantages

- Non-contact measurement method, with the benefits of no wear and reduced maintenance during operation
- 80GHz FMCW radar technology, unaffected by process conditions such as temperature, pressure, spraying and foam, ensuring accurate measurement results
- With a beam angle as small as 3° and false echo filtering technology, suitable for level measurement in almost any container
- With small blind zone, adhesion or buildup does not affect the measurement results
- Compliant with the NAMUR NE43 and NAMUR NE107 self-diagnostic standard, supporting rapid hierarchical maintenance management and response
- Standard Bluetooth functionality, along with commissioning solutions via WeChat mini-program, Android, iOS, and Windows, allowing for convenient on-site commissioning
- Supports hot-swappable electronic modules without disturbing process connections, enabling rapid backup and restoration of instrument settings
- Excellent display readability, weather resistance, and reliable performance for outdoor installation and use

FRT Free Range Radar Transmitter

Description

The FRT series free range radar transmitters achieve continuous level measurement of both liquid and solid materials through 80GHz Frequency Modulated Continuous Wave (FMCW) technology. The instrument emits high-frequency electromagnetic signals through an antenna. These signals are reflected off the surface of the medium and then received back by the antenna. The transmitted and received signals are processed by a series of signal processing techniques and determined through algorithms within the sensor's electronic components, and then converted into level output. This technology allows for the measurement of level for almost all types of liquid and solid media under virtually any process condition.

With its field-friendly, easy-to-use configuration and commissioning approach, the free range radar transmitter provides an easy-to-install, accurate, reliable, and cost-effective solution for a wide range of level measurement applications. Additionally, it can offer customized solutions tailored to specific operational needs and conditions.

Smart in sensing

Specifications

Technical data	
Applications	■ Liquid level ■ Material level
Measuring range	■ 30 m ■ 60 m ■ 120 m
Measuring error	±1 mm (depending on the model)
Beam angle	■ 3° ■ 8° ■ 14° ■ 20°
Measuring rate	W frequency band (80 GHz technology)
Setting method	■ Display module ■ WeChat mini program ■ myWIKA level (Android/iOS APP) ■ Hart

Electronics module	
Case material	■ Cast aluminum ■ 316L precision casting
Electrical connection	■ M20*1.5 ■ 1/2 NPT
Operating voltage	14 ... 28 V DC
Electrical protection	Reverse polarity protection
Output signal	4 ... 20 mA (NAMUR NE43)/HART 7
Communication mode	■ Hart ■ Bluetooth
Ingress protection	IP 66/68 (5m, 30 mins)

Process connection			
Standard	**Dimensions**	**Class**	**Sealing face**
DIN EN ISO 1179-2	■ G 3/4 ■ G 1 ■ G 1 1/2 ■ G 2		
B1.20.2M	■ 3/4 NPT ■ 1 NPT ■ 1 1/2 NPT ■ 2 NPT		
ASME B16.5	■ 2" ■ 3" ■ 4" ■ 5" ■ 6" ■ 8"	■ 150lb ■ 300lb ■ 600lb ■ 900lb	■ RF ■ FF
HG/T 20592	■ DN50 ■ DN80 ■ DN100 ■ DN125 ■ DN150 ■ DN200	■ PN6 ■ PN10 ■ PN16 ■ PN25 ■ PN40	■ RF ■ FF

HG/T 20615	■ DN50 ■ DN80 ■ DN100 ■ DN125 ■ DN150 ■ DN200	■ Class 150 ■ Class 300 ■ Class 600 ■ Class 900	■ RF ■ FF
ASME BPE	■ CLAMP 1.5" ■ CLAMP 2"		
Process connection material	■ 316L+PTFE ■ 316L+PEEK		
Antenna			
Structure	■ Lens antenna ■ Compact antenna		
Materials	■ PTFE ■ PEEK		
Sealing	■ PTFE ■ EPDM ■ FKM ■ FFKM ■ SIL		

Process conditions	
Process pressure	-0.1 ... 4 MPa
Process temperature	-40 ... +250 °C (-40 ... +482 °F)
Ambient, storage and transport temperature	-40 ... +80 °C (-40 ... +176 °F)
Relative humidity	< 95% RH
Measurable medium	Dielectric coefficient ≥ 1.5 (for values < 1.5, please consult the manufacturer)

Display module	
Language	Set through menu
	■ CN ■ EN
Backlighting	Green/Red
Distance units	Set through menu
	■ m ■ cm ■ mm

Bluetooth module	
Version	5.0
Frequency range	2,400 ... 2,500 MHz
Effective range	10 m [1)]
Hardware switch	ON / OFF

1) Laboratory test data, actual working conditions may vary

Test	
Vibration	Sine wave 5-100 Hz 10g 1.5mm
Ingress protection	IP 66/68 (5m, 30 mins)
EMC (IEC 61000-4-2/3/4/5/6/8 EN 55011:2016/A1:2017)	■ ESD ■ RS ■ EFT ■ Immunity against surge voltages (surge) ■ Conducted HF signals ■ PFMF ■ Radiated emissions

Test report	
Certificates	■ 2.2 Test report per EN 10204 ■ 3.1 Inspection certificate per EN 10204
Calibration	■ Factory calibration certificate ■ Third-party calibration certificate

Approvals and declarations

Icon	Description	Territory
	NEPSI Hazardous areas Flameproof for gas + Enclosure protection for dust Ex db IIC T2 ... T6 Gb; Ex tb IIIC T85°C ... T300°C Db Intrinsic safety for gas + Intrinsic safety for dust Ex ia IIC T1 ... T6 Ga; Ex ia IIIC T_{200}102°C Da	China
	Hart Hart 7	
	NAMUR Signal output per NAMUR NE43 Field instrument self-diagnosis per NAMUR NE107	

Relevant Ex parameters

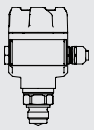
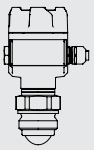
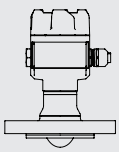
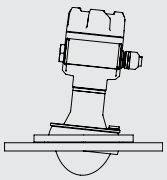
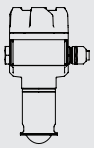
Ex parameters	
Ex marking	Ex ia IIC T1 ... T6 Ga Ex ia IIIC T_{200}102 °C Da
Connection values	
Terminals	1-6
Max. voltage U_i	28 V
Max. current I_i	130 mA
Max. power P_i	0.91 W
Effective internal capacitance C_i	≈ 0 µF
Effective internal inductance L_i	≈ 0 mH
Ambient temperature range	
Temperature class	T6: -40°C ... +38°C T5: -40°C ... +56°C T2 ... T4: 40°C ... +80°C T_{200}102°C: -40°C ... +67°C

Ex parameters	
Ex marking	Ex db IIC T2 ... T6 Gb; Ex tb IIIC T85°C ... T300°C Db
Ambient temperature range [2]	
Temperature class	T6: -40°C ... +75°C T2 ... T5 (T85°C ... T300°C): 40°C ... +80°C

2) When considering the effect of medium temperature, see the FRT Operating Instructions for details on the operating temperature range

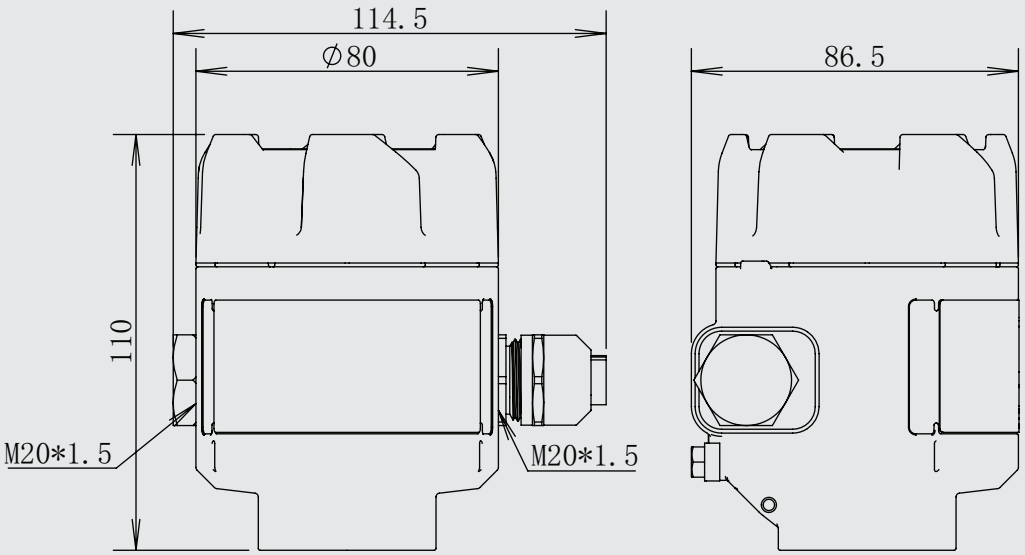
*If you have any special requirements, please let us know when ordering

Model

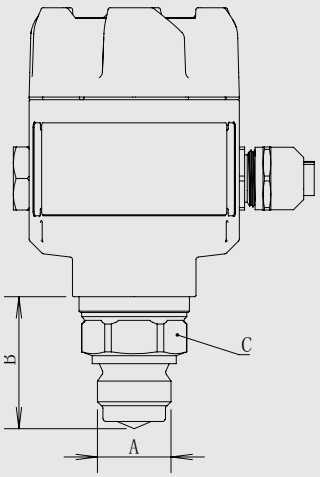
Model	Product appearance	Dimensions	Beam angle	Process temperature	Process pressure	Antenna material	Sealings material
FRT-C		G¾, G1, ¾ NPT, 1 NPT	20°	-40 ... +250 °C	-1 ... 40 bar -100 ... 4000 kPa	PEEK	SIL EPDM FKM FFKM
FRT-S		G1½, 1½ NPT G2, 2 NPT	8°	-40 ... +200 °C	-1 ... 40 bar -100 ... 4000 kPa	PTFE	SIL EPDM FKM FFKM
FRT-S		DN50, DN65, 2", 2½	8°	-60 ... +200 °C	-1 ... 25 bar -100 ... 2500 kPa	PTFE	PTFE
		DN80 ... DN200 3" ... 8"	3°				
FRT-S		DN80 ... DN200 3" ... 8"	3°	-40 ... +200 °C	-1 ... 3 bar -100 ... 300 kPa	PTFE	
FRT-H		Clamp 1.5", Clamp 2"	8°	-40 ... +150 °C	-1 ... 25 bar -100 ... 2500 kPa	PTFE	EPDM SIL

Dimensions (mm)

Case dimensions (cast aluminum and precision-cast stainless steel)

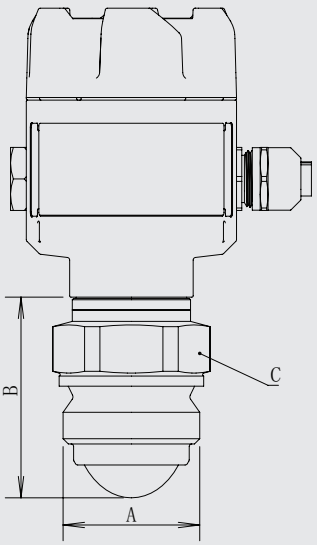


FRT-C Compact antenna



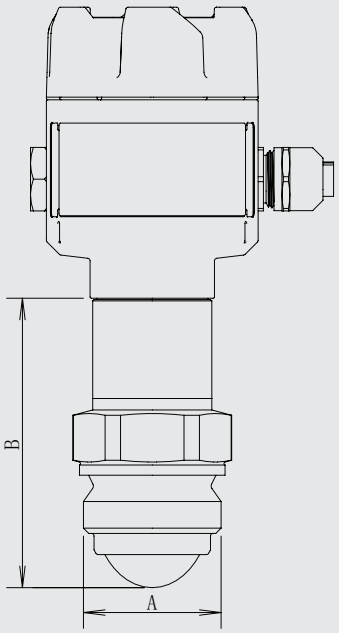
A	B	C
G 3/4	50	SW36
3/4 NPT	50	SW36
G 1	50	SW39
1 NPT	50	SW39

FRT-S Threaded connection, 150°C



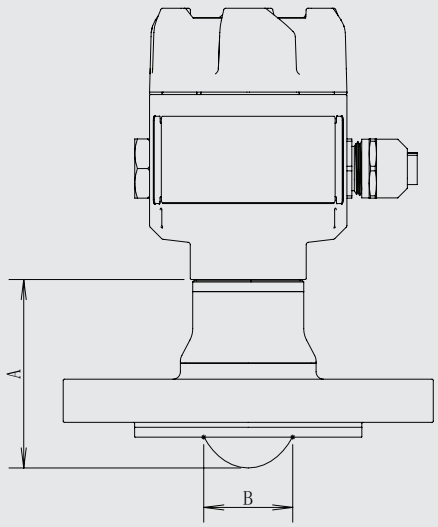
A	B	C
G 1 1/2	76	SW55
1 1/2 NPT	76	SW55
G 2	76	SW55
2 NPT	76	SW55

FRT-S Threaded connection, 200°C

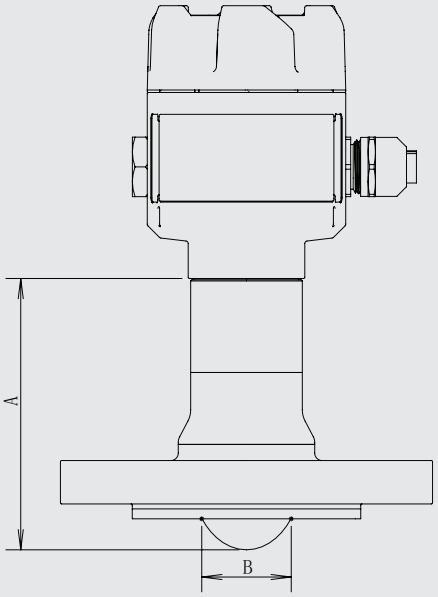


A	B	C
G 1 1/2	110	SW55
1 1/2 NPT	110	SW55
G 2	110	SW55
2 NPT	110	SW55

FRT-S Flange connection, 150°C



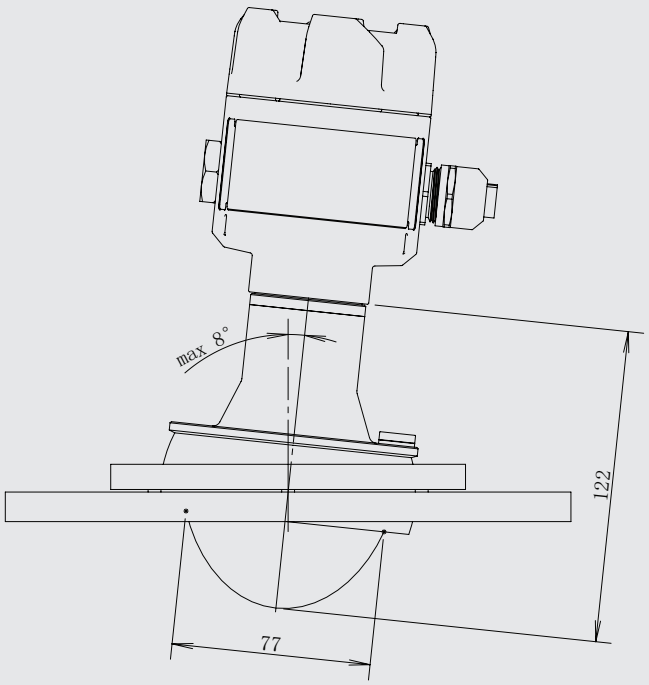
FRT-S flange connection, 200°C



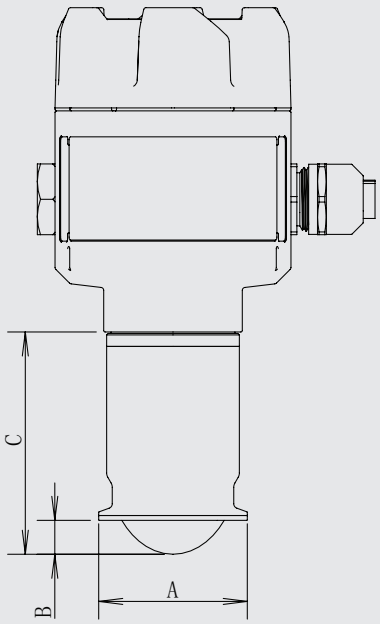
ASME B16. 5			HG/T 20592 HG/T 20615		
Flange size	A	B	Flange size	A	B
2"	77	36	DN50	77	36
2.5"	77	36	DN65	77	36
3"	122	78	DN80	122	78
4"	122	78	DN100	122	78
5"	122	78	DN120	122	78
6"	122	78	DN150	122	78
8"	122	78	DN200	122	78

ASME B16. 5			HG/T 20592 HG/T 20615		
Flange size	A	B	Flange size	A	B
2"	110	36	DN50	77	36
2.5"	110	36	DN65	77	36
3"	155	78	DN80	122	78
4"	155	78	DN100	122	78
5"	155	78	DN120	122	78
6"	155	78	DN150	122	78
8"	155	78	DN200	122	78

FRT-S universal flange connection



FRT-H sanitary clamp connection

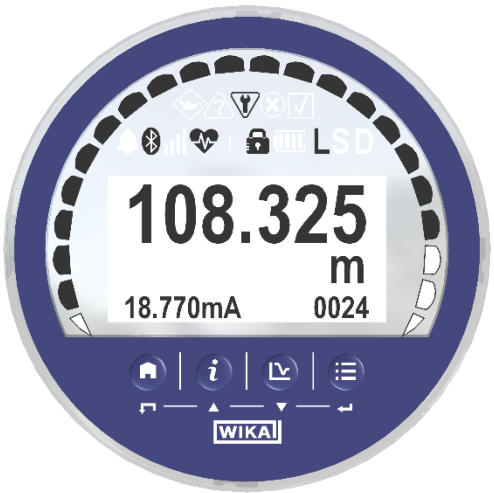


Clamp size	A	B	C
1 1/2"	50.4	12.5	76
2"	63.9	12.5	76

Setup and calibration

Display and setup module

The display and setup module is used to display measured values, make adjustments, and perform diagnostics. It is equipped with a 128x64 dot matrix and segment code combination display with backlighting and four adjustment buttons.



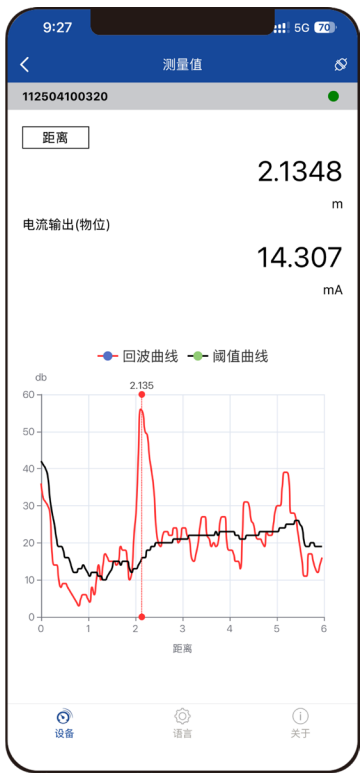
Display and setup module

myWIKA Level APP and WIKA FRT WeChat Mini Program

Download the myWIKA Level app from Tencent App Store, Google Play, or Apple Store, and connect via Bluetooth to view and set the free range radar transmitter.

Search for WIKA FRT in the WeChat Mini Program, and connect via Bluetooth to view and set the free range radar transmitter.

- Convenient and user-friendly
- View measurement results and waveforms
- Set parameters
- Back up and restore settings



iOS devices can download the app from the Apple Store under below link.

Android devices can download the app from the Android Market under below link.

Search for WIKA FRT in the WeChat Mini Program, and connect via Bluetooth to view and set the free range radar transmitter.

Ordering information

Model/Application/Case/Process connection/Material/Output signal/Measurement range/Medium name/Dielectric coefficient/Additional devices/Ex approvals/Certificate type/Additional approvals/Other ordering information

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