Datasheet

Guided Wave Radar Level Transmitter

SUP-RD701

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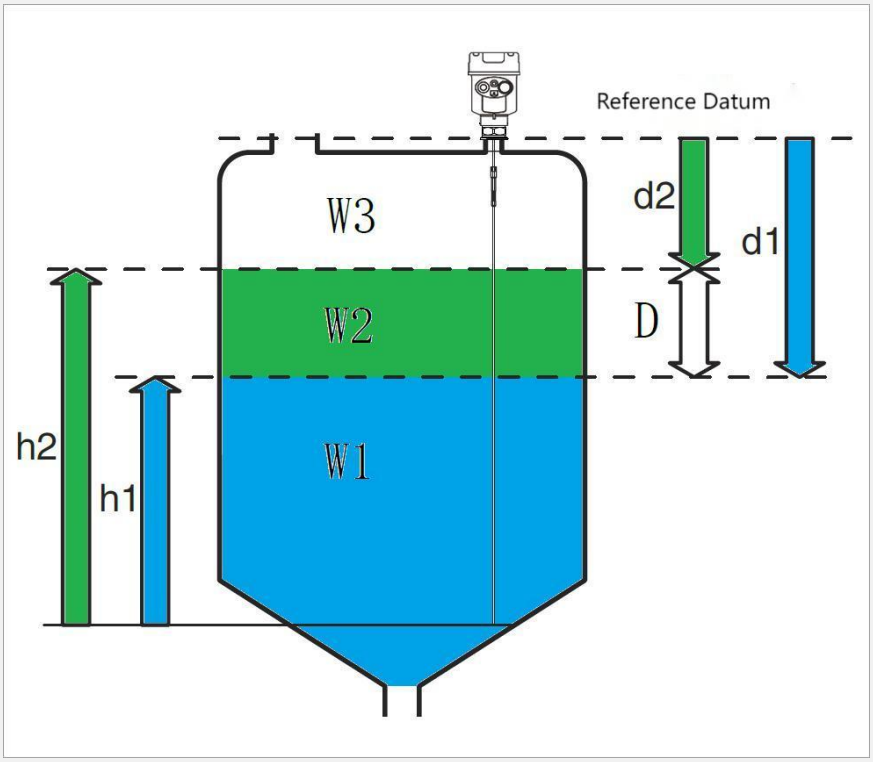
Guided Wave Radar Level Transmitter

Measurement Principle

High-frequency microwave pulses are fired along a steel cable or a metal rod. When it reaches the surface of the measured medium, part of the microwave pulse will be reflected by the medium surface, the other part will penetrate the upper part, and a second reflection occurs on the dividing surface of the upper and lower parts of the medium.

The guided wave radar will record the transmitting time and the time difference between the reflected signal of the two dielectric surfaces, and analyze the distance between the two media and the microwave interface to the radar. The measurement results are transmitted to the wireless AP access point through the RF wireless technology. The wireless AP access point can transmit the data of the wireless radar to the system through the (4~20) mA signal or the RS485.



Features

- High sensitivity acquisition technology is adopted, which has the following advantages:
- Using high sensitivity TDR technology, the media with lower dielectric constant can be detected, which is more suitable for measuring oil media.
- Metal cable or rod antenna, contact measurement, no electronic components in the antenna, stronger stability.
- Use microwave pulse measurement, not affected by the temperature, pressure and steam in the tank, and be more adaptable.
- Micropower emission, and no energy radiation to the environment, and will not be affected by the environment, is more suitable for complex tanks
- Measurement of the internal environment.

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Measurement Pre-requisites

Upper medium (W2).
A. The upper medium must be a non-conductive medium
B. The dielectric constant of the upper medium is best known or used at the distance between the upper and lower parts of the medium interface for calibration.
C. The dielectric constant of the upper medium must be greater than 1.6.
D. The upper medium must be stable, without an alternating medium or a mixing ratio.
E. The minimum thickness of the upper medium is 100mm, clearly separated from the lower medium, and th emulsified thickness is less than 50mm (please consult the manufacturer for special working conditions).
F. The surface is as free of foam as possible
Lower medium (W1): the dielectric constant of the lower medium should be at least 20 larger than that of the u medium, preferably a conductive medium.
Gas medium (W3): the gas medium is an air or a gas mixed medium.
Environmental conditions: the container is best to the metal material, such as non-metal material must use d rod or coaxial antenna.

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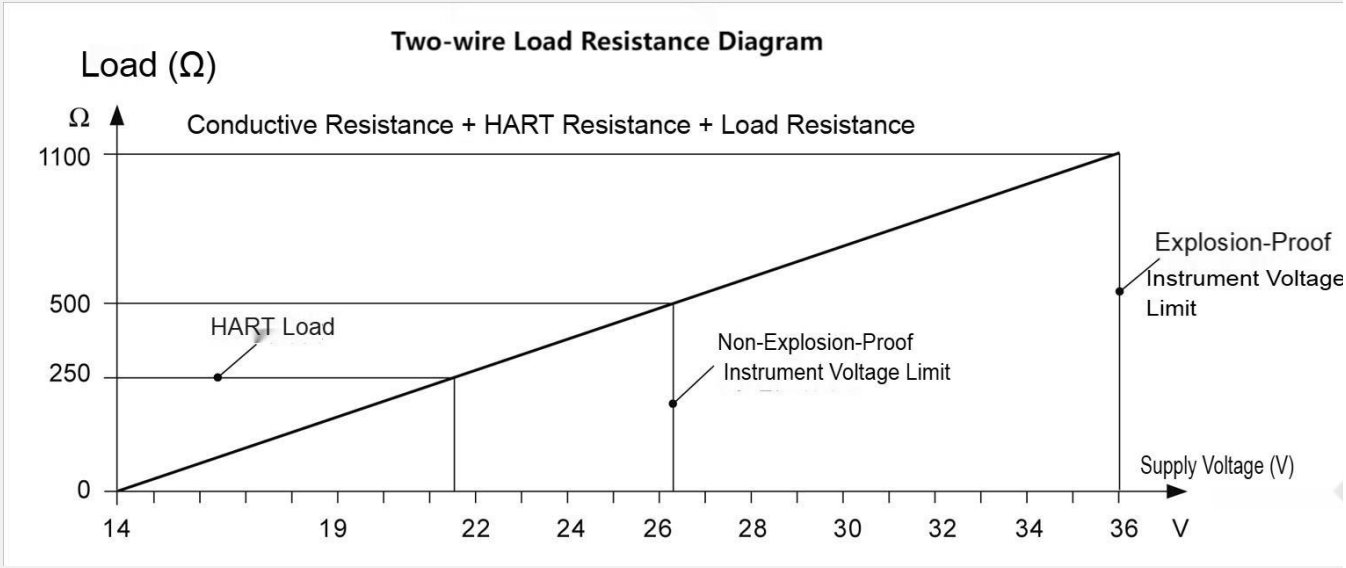
Parameters	
General Data	
The rod type	Stainless steel 304,316L

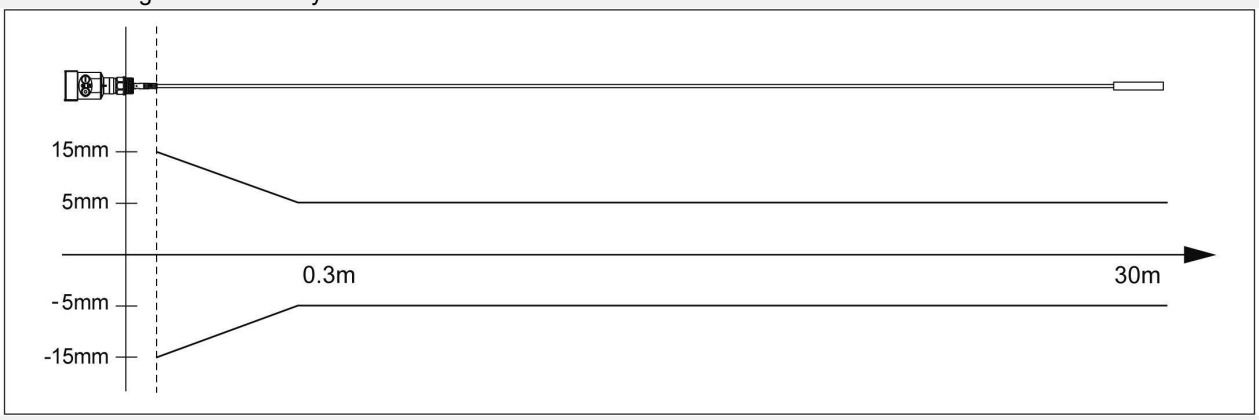
Cable type	Stainless steel 304,316L
Procedure linkage	G1 ½ ″ A thread or 1 ½ ″ NPT thread / flange /clamp
Seal	Viton fluorine rubber, Kalrez fluorinated rubber
Hull	Cast aluminum, plastic, and stainless steel
Case window	Polycarbonate
Earth terminal	Stainless steel, 316L
Power Supply Voltage	
Two-wire system	24 VDC
Four-wire system	6 ~ 24VDC (Modbus-RS485) 198~242VAC (double-chamber diaphragm) 110VAC (double-chamber diaphragm)
Power dissipation	Max. 22.5mA
Allow ripple	- <100Hz Uss < lV - (100 ~ 100K) Hz Uss < l0mV
Cable Parameters	
Cable inlet / plug	1 M20 l.5 cable inlet (cable diameter: 6~12mm) 1 blind block of M20 l.5
Spring wiring terminal	For wire cross-section of 2.5mm²
Flange Outer Parameter	
Output signal	(4 ~ 20)mA HART / Modbus-RS485
Resolution ratio	1.6μA
Breakdown signal	Current output iconstant;20.5mA;22mA;3.9mA
Two-wire system load resistance	See below
Four-wire system of load resistance	Maximum 400 Ω
Integration time	(0~36)s, which is adjustable

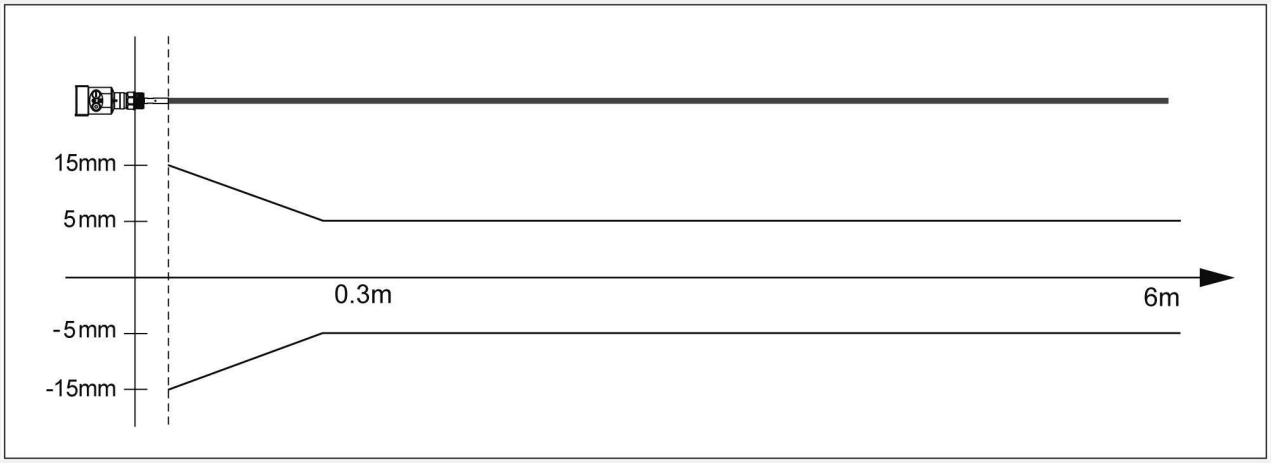


Characteristic Parameter	
Maximum measurement distance	30m / 6m (cable type / rod type)
Measurement interval	About 1s (depending on the parameter settings)

Adjust the time	About 1s (depending on the parameter settings)
Resolution ratio	1mm
Accuracy:	±5mm

Schematic diagram of accuracy





Working storage and transport temperature	(-40～80) ℃
Process temperature	(the temperature of the antenna part) -40~120℃ (standard type) / -40~200℃ (high temperature type)
Relative Humidity	＜95%
Pressure in the tank	Max. 4.0MPa
Shatter-proof	Vibration frequency (10~150) Hz, maximum vibration acceleration l 0 m/s²
Maximum pull	See drawing force diagram

Electrical Connection

- **Power Supply Voltage**

Note:

FOD means Flange outer diameter

BCD: Bolt circle diameter

No: the number of bolts

Diameter: Bolt circle diameter

(4~20) mA / HART (two-wire system) The power supply and the output current signal share a two-core shielded cable. See the technical data for the specific power supply voltage range. For the local safety type, add a safety grille between the power supply and the instrument.

(4~20) mA / HART (four-wire) power supply and current signal are separated, each using a two-core shielded cable. See the technical data for the specific power supply voltage range.

Modbus-RS485 (four-wire system) The power supply line and the Modbus signal line shall use a two-core shielded cable separately. See the technical data for the specific power supply voltage range.

❖ **Installation of the Connecting Cables**

General introduction The power supply cable can be ordinary two-core cable, the outer diameter of the cable shall be (6~12) mm,

To ensure the seal of the cable inlet. If electromagnetic interference exists, shielding is recommended cable.

(4~20) mA / HART (two-wire system) power supply cable can use ordinary two-core cable.

(4~20) The mA / HART (four-wire) power supply cables shall be wired with dedicated earth wires.

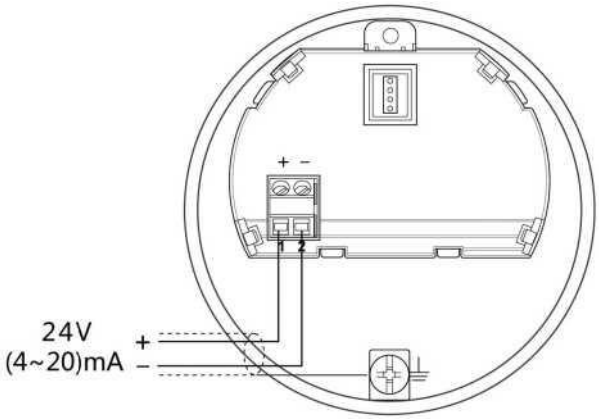
Modbus-RS485 (four-wire system) Power supply cables shall be shielded cables.

Shield and wiring of the cables Both ends of the shielding cable shall be grounded. Inside the sensor, the shield must be connected Internal ground terminal. The external ground terminal on the enclosure must connect to the earth.

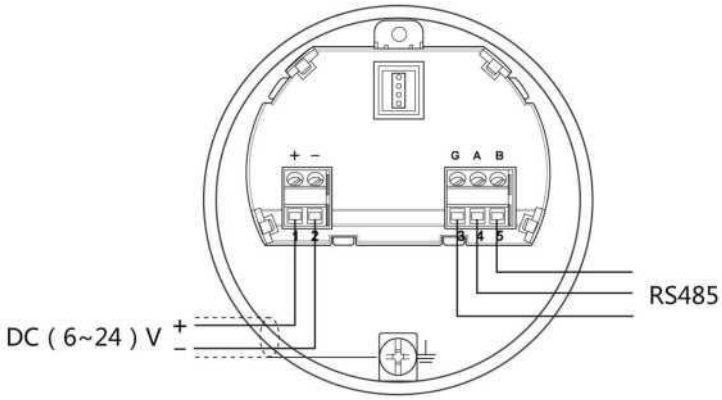
❖ If there is ground current, the shielding cable passes away from the side of the instrument A ceramic capacitor (e. g. 1 nF / 1500V) is grounded to connect The role of the road high-frequency interference signal.

❖ **Attended Mode**

- The 24V two-wire system wiring diagram is as follows:



- The 6-24 V Modbus-RS485 wiring diagram is as follows:



❖ **Explosion-Proof Connection**

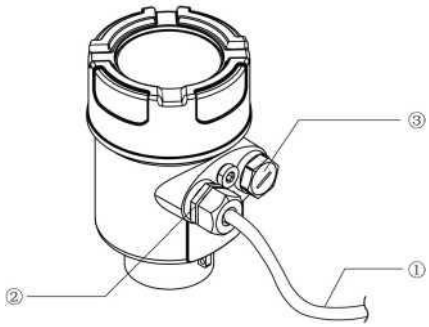
The explosion-proof form of this product is the intrinsically safe type. Explosion-proof sign: Exia IIC T6. This safety current guide radar bit meter is made of die-cast aluminum shell material, and the electronic parts adopt rubber sealing structure to ensure that the spark generated by partial circuit failure does not discharge. This product is suitable for the continuous position measurement of combustible medium below Exia IC T6 explosion-proof grade.

This product shall be powered by a safety gate when used. The FBS-2 safety grid is the associated equipment of this product, and the explosion-proof form is intrinsically safe. Explosion-proof mark: [Exia] C, power supply voltage (21.6~26.4) VDC, short circuit current is 135 mA, working current (4~20) mA.

All cables shall be shielded flexible cable, and the maximum length from meter to safety grid is 500m. The distributed capacitor is 0.1 p F / km and the distributed inductance is 1 mH / km. The instrument must be connected to the earth when installation. Other associated equipment without explosion-proof inspection shall not be used.

❖ **Levels of Protection**

This instrument fully meets the requirements of the protection grade IP66 / 67, please ensure the water resistance of the cable sealing head.as illustrated in following figure:



How to ensure that the installation meets the IP67 requirements:

Please ensure that the seal head is not damaged.

Please ensure that the cable is not damaged.

Ensure that the cables used meet the electrical connection specifications.

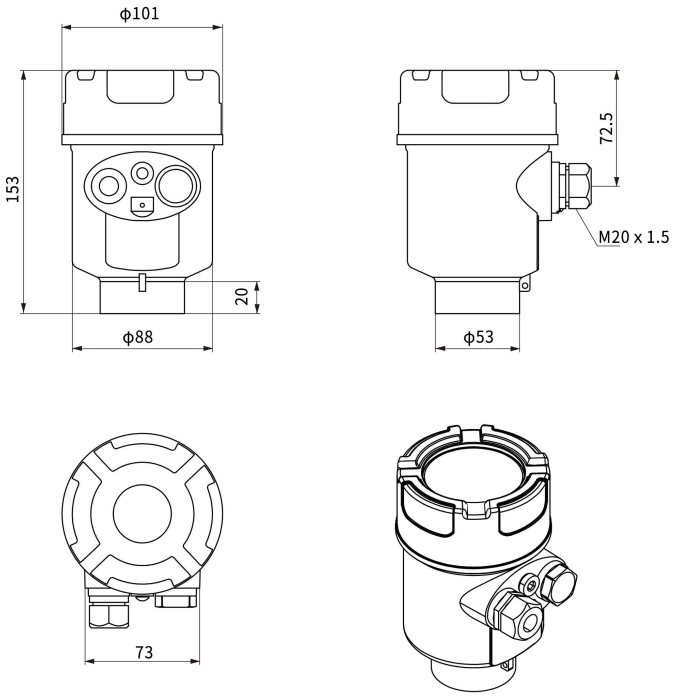
Before entering the electrical interface, bend the cable down to ensure that the water does not flow into the housing, see ①

Tighten the cable seal head, see ②

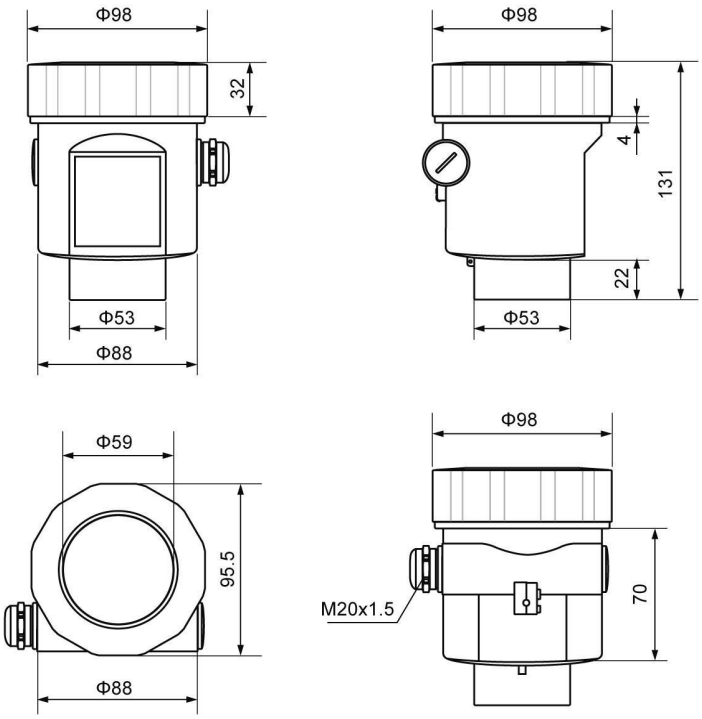
Please plug the unused electrical interface with blind blocking, see ③.

Structure Size (in mm)

- Table Shell Size
  - Casting aluminum case

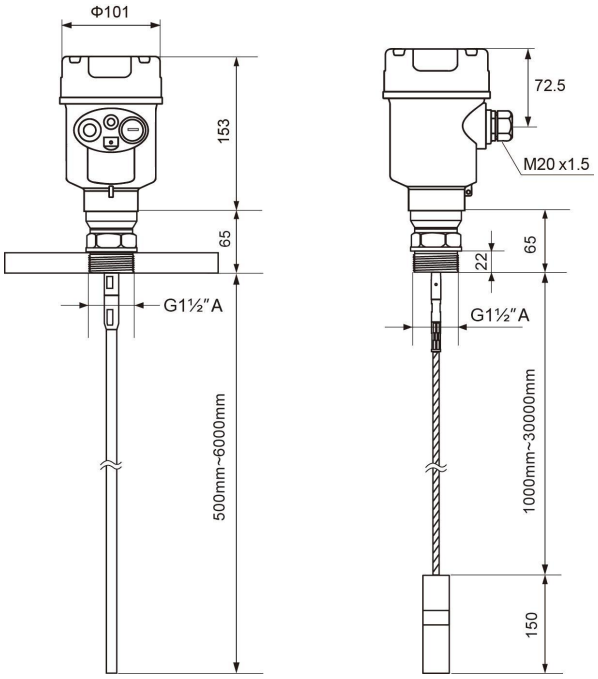


  - Plastic case

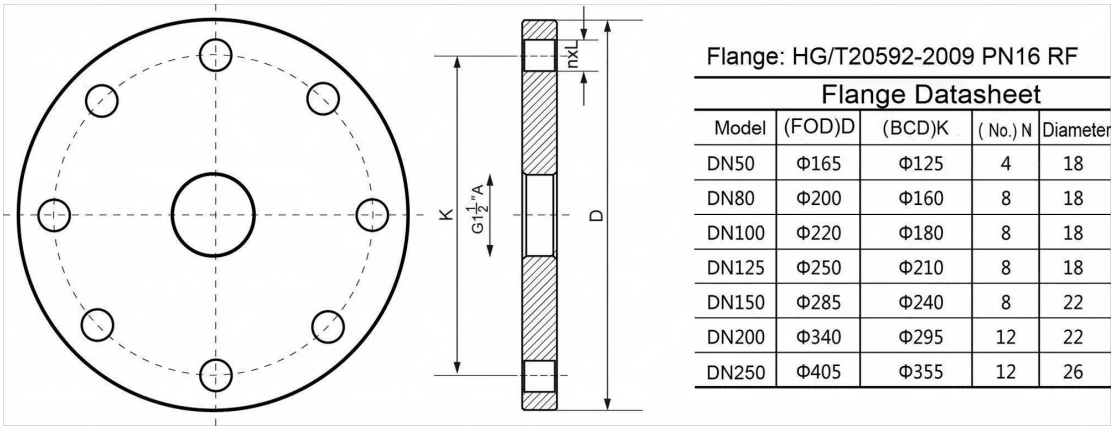


- Product Size

➢ 701



➢ Flange Selection



Flange: HG/T20592-2009 PN16 RF

Flange Datasheet

Model	(FOD)D	(BCD)K	(No.) N	Diameter
DN50	Φ165	Φ125	4	18
DN80	Φ200	Φ160	8	18
DN100	Φ220	Φ180	8	18
DN125	Φ250	Φ210	8	18
DN150	Φ285	Φ240	8	22
DN200	Φ340	Φ295	12	22
DN250	Φ405	Φ355	12	26

Ordering code

RD701-A-B-01-02-03-05-10-XX-GF-GB-GG-GC-XX-A2-SC-R2-XX-LG-LN-HN-HQ-HP-LH-LP-FJ-HR-FL-XX-TE-TJ															Description
SUP-RD701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Measured medium	A														Guided Wave Radar Level Transmitter
	B														Liquid
Antenna length		01													Solid powder
		02													1m
		03													2m
		05													3m
		10													5m
		XX													10m
Antenna type			GF												Others
			GB												Rod type, Φ12mm, 304SS
			GG												Cable type, Φ8mm, 304SS
			GC												Rod type, Φ12mm, 316LSS
			XX												Cable type, Φ4mm, 316LSS
Output and power supply				A2											Others
				SC											Two-wire 4-20mA + HART
				R2											4-20mA + HART, 24VDC
				XX											RS485, 24VDC
Process connection					LG										Others
					LN										G1 1/2 Thread 304SS
					HN										NPT1 1/2 Thread 304SS
					HQ										HG/T20592 PN16 DN50 304SS
					HP										HG/T20592 PN16 DN80 304SS
					LH										HG/T20592 PN16 DN100 304SS
					LP										G1 1/2 Thread 316LSS
					FJ										NPT1 1/2 Thread 316LSS
					HR										HG/T20592 PN16 DN50 316LSS
					FL										HG/T20592 PN16 DN80 316LSS
					XX										HG/T20592 PN16 DN100 316LSS
Heat resistance temperature						TE									Others
						TJ									-40-130℃
Electrical interface, shell material and protection level							WH								-40-250℃