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Golden Rules Co.,Ltd

Liquid
Radar Level Meter

KC-2021F Series
Flood Management System
RADAR LEVEL METER



The nation's development item, 100% domestic goods, Patent **NO. 10-1660226**

12. Flood Management System Radar Level Transmitter

12-3. Liquid type KC-2021F Series

Radar Level Transmitter

Feature



Non-contact type
KC-2021F Bracket mounting Std.



Non-contact type
KC-2021F (Flange mounting)

- Based on the newly developed CMOS millimeter wave RF chip, more sophisticated RF architecture is realized and the signal-to-noise ratio is increased to have a small dead band (less than 100mm).
- The 5 GHz operating frequency bandwidth means higher measurement resolution and accuracy. The antenna beam angle is 6.5°, which can minimize interference from the surrounding environment and water vapor.
- The accuracy is good enough to have an error of 2mm. A shorter wavelength is designed to increase the reflection characteristic of the frequency.
- It has a beam angle of 6.5° and a self-adaptive automatic gain algorithm function.
- It is easy to find the surface reflection point of the target object.
- Because the PTFE lens antenna is completely sealed, there is no frequency leakage and it can be used safely.
- Since the lens antenna is completely sealed, there is no frequency leakage and it can be used safely.
- It can be installed in closed tanks and public open areas and is not affected by fog and weather.
- Lightweight and small size, easy to transport and simple to install.
- Remote debugging and remote upgrade support can reduce the cost of field personnel.
- You can manage and update services using Internet communication.
- Accuracy: liquid $\pm 2\text{mm}$
- Power: 24V DC, 22.5mA
- Protection class: IP67
- Connection Pressure : -1 ~ 2.0 Mpa
- Signal output: DC 4~20 mA current output @HART

The KC-2021R high-performance version radar level transmitter platform is also an open platform. This means we can continue to upgrade features and make our products highly customizable according to our customers' unique requirements.

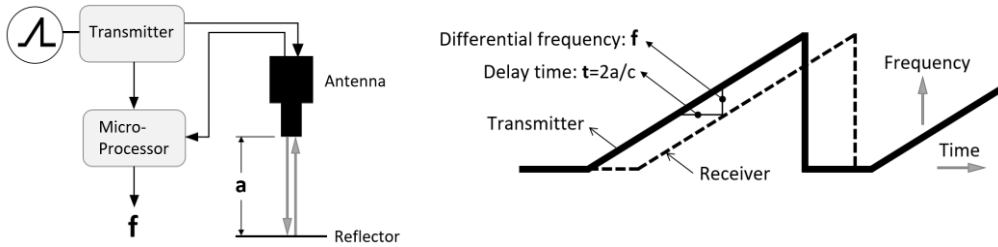
Description

The KC2021F high-performance version radar level transmitter is a powerful level meter that utilizes the "frequency continuous modulation" theory, which can meet the level measurement requirements of liquids.

The KC-2021F Series uses high-performance version radar technology to provide superior signal processing capabilities, and to improve high-frequency measurement technology to a new level, with lower measurement limits and improved stability and accuracy.

It is a non-contact radar level meter with Frequency Modulated Continuous Wave method (FMCW) and is a radar level meter dedicated to liquids in water treatment and all industries.

Products Principle



- Using the frequency difference (Δf) from the received signal by continuously emitting a frequency modulated signal
- The transmission frequency increases linearly with time and the modulation duration remains longer than the time the reflected wave returns.
- The frequency difference of the transmitted and received signals is proportional to the time delay difference (T) of the transmitted signal

$$\Delta f = (df/dt) \cdot T \quad (df/dt \text{ is the swept frequency rate of change})$$

$$a = c \cdot T / 2$$

Products Performance

- ◆ **Precision**
Accuracy (mm): Liquid < ± 2 mm
- ◆ **Repeatability**
< 0.5mm
- ◆ **Response time**
< 100ms
- ◆ **Measuring range**
Liquid: max. 30m
- ◆ **Frequency**
76 to 81 GHz
- ◆ **Resolution**
1-2mm
- ◆ **Beam angle**
6.5°
- ◆ **Measured minimum DK value**
> 2.0
- ◆ **Measurement time**
1m/min to 300m/min (adjustable)
- ◆ **Antenna type**
Lens
- ◆ **Antenna Size**
54mm

Operating Specification

- ◆ **Measuring medium**
Liquid
- ◆ **Measuring pressure range (assembly parts)**
Flange : 0.3 MPa Std.



◆ Fluid & Ambient Temperature

Fluid : Std. -40 ~ 85 °C, Option : -40 ~ 150 °C

Ambient : -40 ~ 85 °C

Humidity : ≤ 95% RH

◆ Input Power

DC 24V, 22.5mA

◆ Output Signal (Std.)

Linear 4~20mA @HART 2-wire

◆ Error Output

4mA, 22mA or 20.5mA (configurable)

◆ LCD Display

LCD display 128 X 64 pixels / level, distance (space), 4-20mA current, %
Adjustment in the window window by the 4 push button attached to the
instrument panel Adjustment variable: Level range: (0 ~ 10m, 0 ~ 20m) Level
unit: m, % Response time / correction value: (1 ~ 7) sec / 0.5 ~ 5 Zero & Span

Body Specification

◆ Wetted Parte

Antenna Body – SUS304 (Option : SUS316, PTFE)

Antenna Lens – PTFE, PVDF

Thread / Flange – 304SS (Option : SUS316, PTFE, PVDF)

Housing – AL.-Casting (Option : Stainless steel)

◆ Flow meter body

Water Proof IP67

◆ Conduit connection (Selection)

½" NPT(F), ½" PF(F), M20X1.5

AWG18 or 0.75m2 Calbe

◆ Flow meter mounting (Selection)

G1.5" Thread, Flange

JIS 10k RF Flange

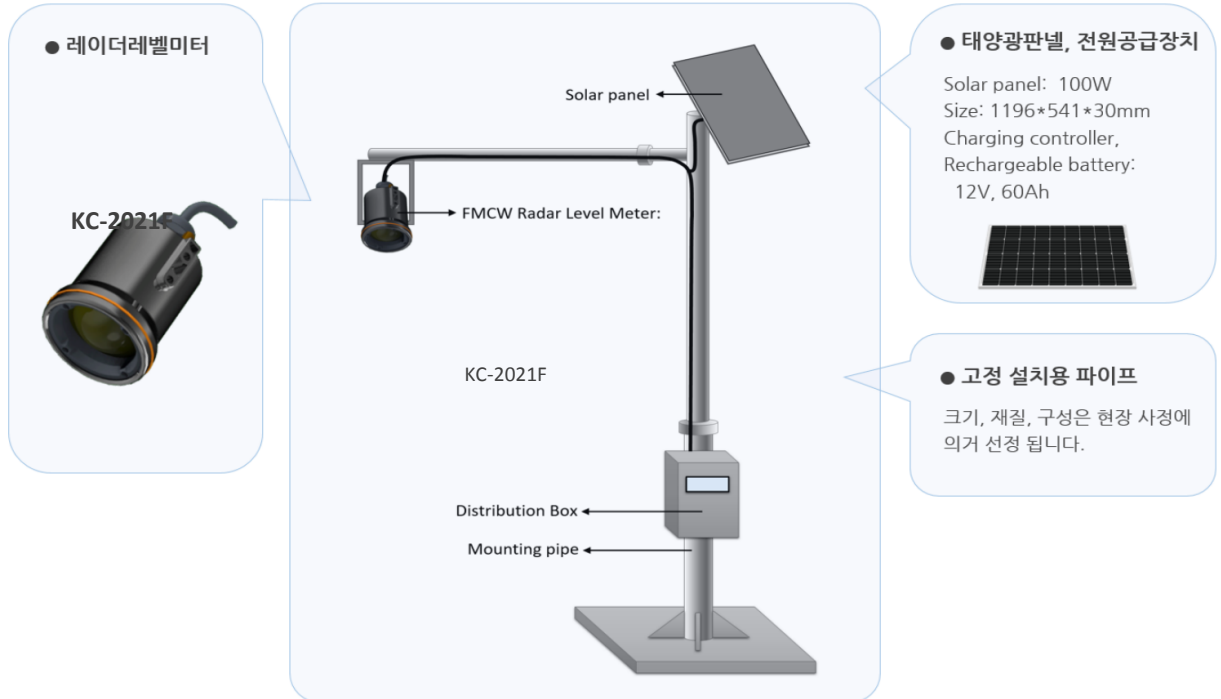
◆ Certificate

KC (CASE All) Certificate

Application example of 'Smart Flood Management System'(KC-2021F)

Application

- Smart flood and sluice management.
- Water level measurement in sewage treatment and wastewater treatment plants.
- Other water treatment plant applications.
- chemical reactor

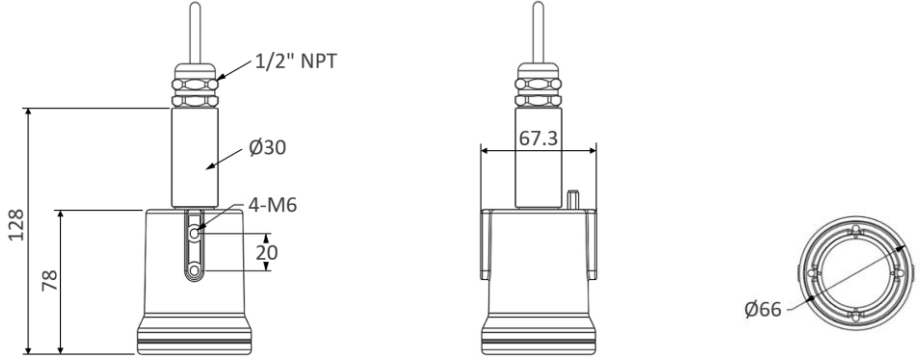


*Caution: This product is a level measurement radar device that cannot perform Rx (receive) unless Tx (transmit) is performed. This wireless device must be installed vertically downward using an integrated or body-exclusive antenna. If it is intended to be installed within a radius of 2 km from the radio astronomical antenna, prior agreement with the observatory is required. *

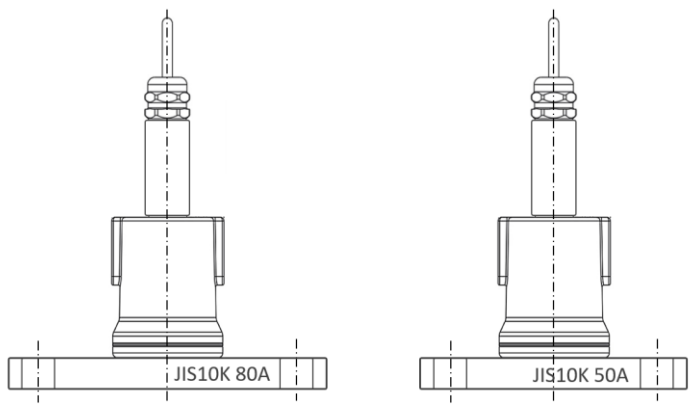
Product and composition assembly drawing I



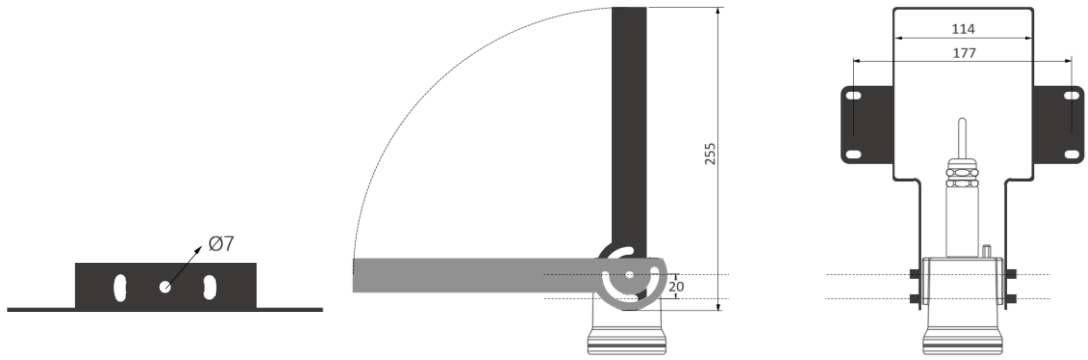
Products drawing dimensions II



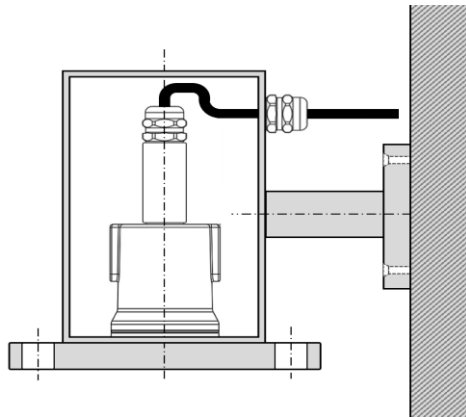
Installation Additional Specifications _ Flange Drawing Dimensions III



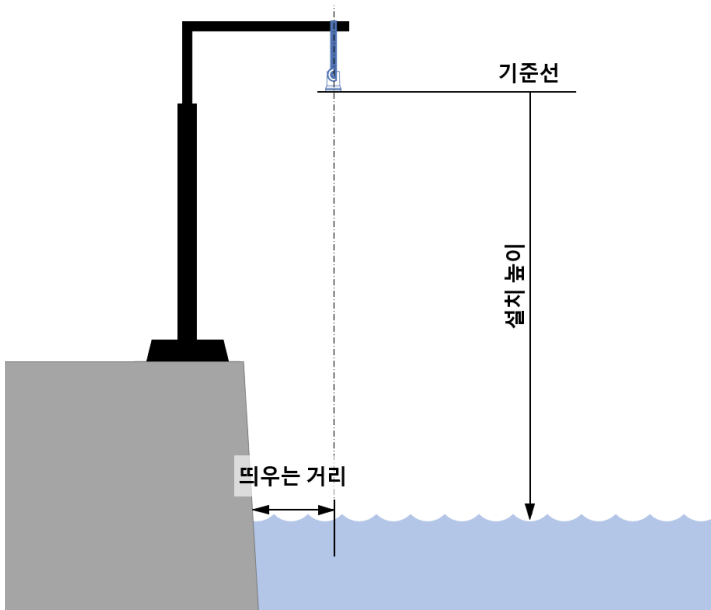
fixing bracket IV



special double structure diagram V



installation dimensions VI



3	0.15
6	0.25
9	0.35
12	0.45
15	0.55
18	0.70
20	0.80
24	0.90
27	1.00
30	1.10

Order Code_ KC-2021F (Flood Management System Radar Level Meter)

Type Conn' spec' Antenna/mat'l Fluid Power Output Display Temp' P-class Option
 KC-20 2 - - - - P - - - - -
 1 2 3 4 5 6 7 8 9 10 11 12

structure type	Code 1
Standard type	1F
Other	2F
Agency approved, customer specified	W

Measured Medium	Code 6
Liquid	1
Agency approved, customer specified	W

Housing/protection grade	Code 11
AL-Casting / IP67	1
Agency approved, customer specified	W

Connection Spec'	Code 2
Bracket (Std.)	B
JIS Flange 50A FF / DN50 / ANSI 50A	F2
JIS Flange 80A FF / DN80 / ANSI 80A	F3
Agency approved, customer specified	W

Input Power	Code 7
24V DC, 4-Wire, 0.2W	1
Agency approved, customer specified	W

Option	Code 12
Double construction for measuring level in manhole.	SP

Agency approved, customer specified	W
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Antenna type/ Mat'l	Code 3,4,5
Type	Material
Lens	PBT
Bracket	Steel
Flange	Black Nylon
Agency approved, customer specified	W

Output Signal	Code 8
RS-485 Only	1
3.6V Battery / UART, NBIOT	2
Agency approved, customer specified	W

Display	Code 9
No Readout	NR
Digital Display (Flow & Total)	DD
Agency approved, customer specified	W

process temp'	Code 10
-40 ~ 85°C (Std.)	1
-40 ~ 150°C (Option)	2
Agency approved, customer specified	W

Requirements when ordering products	<ol style="list-style-type: none"> 1) Product base model 2) Measuring range and highest upper level 3) Fluid type, operating temperature, operating pressure 4) Meter connection method and size 5) Connection flange type and antenna material (standard: SUS304, option: SUS316, PTFE, PVDF) 6) Antenna body material (SUS304, SUS316, PTFE) 7) Tank shape and size: W, D, H 8) Tank nozzle (connection single pipe) size 9) Wire connector size (M20 X 1.5 or 1/2" NPT) 10) Additional options and caveats
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Golden Rules

• **GOLDEN RULES**

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Flow & Level & Pressure & Temperature
water quality analyzer/**TMS**
professional manufacturing

Distributor

Certified in accordance with

KC Q ISO 9001 : 2015

KC Q ISO 14001 : 2015

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