OCTOGON

MANUAL

FRKA

RADAR LEVEL SENSOR

Installation and user manual



Document	Version	Date	Applies to
Installation and user manual	V00x	10/2026	FRKA, all output versions and process connections

This manual describes installation, electrical connection and operation of the FRKA radar level sensor: alignment and wall distance of the radar beam, the display and keys, the two menu levels for the switching and analogue outputs, maintenance and removal.

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1 About this manual

Read this manual before installing the sensor and keep it available for later use. Display texts and menu items are set in a fixed-width typeface, as they appear on the display, for example **`SP1 Set`** or **`menu 2 set`**.

1.1 Signal words

Safety instructions protect users from dangerous situations and prevent material damage. The severity of the risk is indicated by the following signal words:

Signal word	Meaning
Danger	An imminent danger to the user. Failure to comply may result in fatal injury.
Warning	An identifiable hazard. Failure to comply may result in fatal injury and damage to equipment or plant parts.
Caution	A danger. Non-compliance may result in minor injury and material damage to the sensor and/or the plant.
Important	Information that is important to the user.

1.2 Versions covered

Feature	Versions
Outputs	A3: two switching outputs and analogue output 4 … 20 mA · V5: two switching outputs and analogue output 1 … 5 V
Process connection	G1-1/4″ or G1-1/2 male thread · DN 25 or DN 50 flange
Measuring range	500 … 30 000 mm, in steps of 500 mm
Manufacturer type	LM210 series

2 Safety

2.1 Intended use

Danger The sensor may only be used within the specified application range. The temperature must stay within the permissible range. Do not exceed the rated pressure and the rated electrical load. Assembly, commissioning and operation must be carried out in accordance with the applicable national and local safety instructions.

2.2 Liability

No liability is assumed for damage, or for consequential damage, resulting from:

- incorrect use,
- incorrect installation,
- incorrect operation or operation in violation of the provisions of this manual.

2.3 Disposal

The sensor must be handled in accordance with the national or local regulations for electrical and electronic equipment. It must not be disposed of with household waste.

3 Product description

3.1 Principle

The FRKA measures the level by the radar principle, without contact with the medium. The signals are processed by the evaluation circuit and converted into standard industrial electrical signals for output and display.

3.2 Features

- All-metal housing.
- Colour LCD display.
- Keys and a two-level menu for setting.
- Several process connections for different installation requirements.
- The display head can be rotated through 330° for the best reading position.
- Suited to high-viscosity media; strong anti-fouling ability.
- Level measurement of liquids and solids.

3.3 Technical data

Item	Value
Measuring range	500 … 30 000 mm, blind zone 50 mm at the top
Measured medium	liquids and solids
Accuracy	± 2 mm
Beam angle	6°
Pressure resistance	10 bar
Supply voltage	16 … 28 V DC
No-load current consumption	≤ 30 mA at 24 V DC
Switching outputs	2, PNP or NPN, normally open or normally closed, settable
Switching current	< 500 mA
Analogue output, current (A3)	three-wire, 0 … 20 mA or 4 … 20 mA; load ≤ 500 Ω; linearity ≤ ± 1.5 % of the range
Analogue output, voltage (V5)	three-wire, 0 … 5 V or 1 … 5 V; load > 10 kΩ; linearity ≤ ± 1.5 % of the range
Protection	reverse polarity, overload, short circuit
Display	colour LCD
Operating temperature	–20 … +80 °C
Medium temperature	–20 … +80 °C
Storage temperature	–30 … +80 °C
Housing	stainless steel 304
Probe	stainless steel 304, outer layer PTFE
Protection rating	IP67
Electrical connection	M12 × 1 connector

3.4 Order code

Field	Code	Meaning
Series	FRKA	radar level sensor
Output signal	A3 · V5	two switching outputs and 4 … 20 mA · and 1 … 5 V
Process connection	G114M · G112M · F25 · F50	G1-1/4″ · G1-1/2 male thread · DN 25 · DN 50 flange
Measuring range	500 … 30000	range in mm, in steps of 500 mm

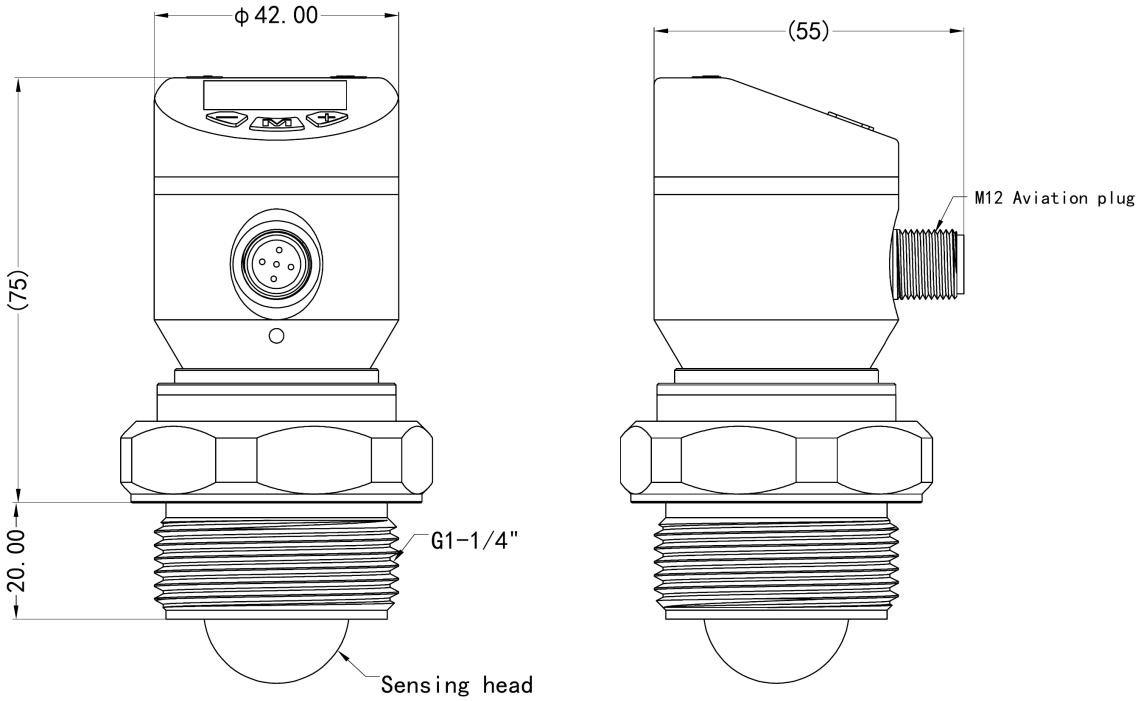
Example: FRKA-A3-G114M-2000 - two switching outputs and 4 … 20 mA, G1-1/4″ thread, measuring range 2 000 mm. Other ranges on request.

3.5 Accessories

Accessory	Description
Connecting cable	M12 × 1, 5-pin, PUR or PVC, 2 · 5 · 10 m, straight or angled
Protective cover	shields the display head

Accessories are ordered by description; please state the sensor type with the enquiry.

4 Dimensions

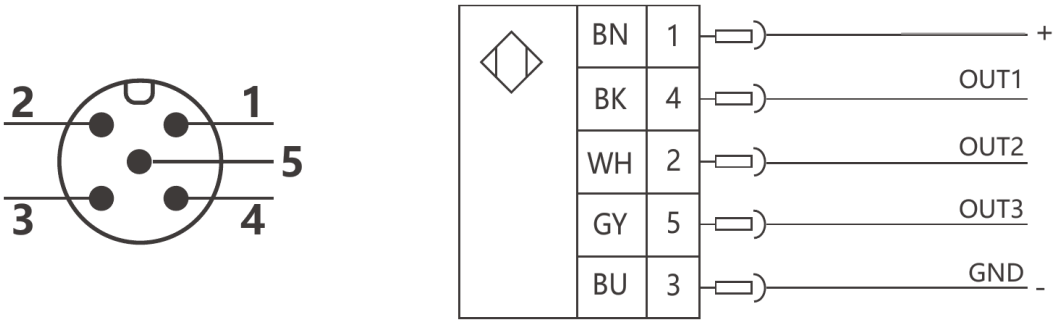


Front and side view, version with G1-1/4″ thread. Dimensions in mm.

Dimension	Value
Display head	Ø 42 mm, depth (55) mm including the M12 connector
Top of the display head to the thread	(75) mm
Thread length	20 mm, G1-1/4″

The radar antenna (sensing head) sits under the process connection. The display head can be rotated through 330° around the axis.

5 Electrical connection



M12 × 1 connector, 5-pin: pin layout (left) and wiring (right).

Pin	Colour	Signal	Function
1	BN (brown)	+	power supply (+), 16 … 28 V DC
3	BU (blue)	GND	power supply (–)
4	BK (black)	OUT1	level switch 1, PNP (factory default) or NPN
2	WH (white)	OUT2	level switch 2, PNP (factory default) or NPN
5	GY (grey)	OUT3	level, analogue: A3 4 … 20 mA (factory default), V5 1 … 5 V

PNP or NPN is selected in the menu (**`PNP/NPN Set`**, section 8.3).

6 Installation

6.1 Beam and distance from the wall

- The radar reflector (sensing head) must protrude from the nozzle into the vessel.
- The beam angle is 6°. The beam radius R at the measuring distance H follows from H = R / tan 3°.

Minimum distance R between the beam axis and the vessel wall:

Measuring distance H	1 000 mm	2 000 mm	3 000 mm	4 000 mm	5 000 mm	10 000 mm
Distance from the wall R	60 mm	110 mm	160 mm	210 mm	270 mm	530 mm
Mirror-smooth metal wall	30 mm	60 mm	80 mm	110 mm	140 mm	240 mm

For mirror-like smooth inner walls made of metal (such as stainless steel 304), the distance from the wall can be reduced by 50 %.

6.2 Installation instructions

Two points to note during installation:

- Align the sensor with the material level, as vertical to the surface as possible.
- Avoid false echoes.

For typical working conditions:

- Ensure there are no interfering objects within the beam, such as people, ladders and steps.
- Install the sensor so that the beam avoids the feed inlet.
- Keep the minimum distance from the wall (section 6.1); otherwise incorrect readings are likely.
- Conical vessels: direct the beam at the bottom of the vessel; otherwise the measurement near the bottom may be inaccurate.

6.3 Checking the sensor on a test bench

- Place the sensor at the edge of the table and keep it on the same horizontal line as the target.
- There must be no interfering objects above or below the test path.
- The target must be a solid wall - not paper, plastic, glass or similar.
- An uneven or tilted placement of the sensor leads to unstable readings.

7 Display and keys

Element	Function
Output 1 signal lamp	state of switching output 1
Output 2 signal lamp	state of switching output 2
Main value	current level value
Unit	unit of the level value
Bar and %	percentage of the range
Key –	up / reduce
Key M	confirm / save
Key +	down / increase

8 Menu

8.1 Operation

– From the main screen, M opens menu level 1.
– The keys – and + move to the previous or next menu item.
– M opens the selected item. In the value screen, – and + change the value or the option, M confirms and saves it.
– At **menu 2 set**, M opens menu level 2; the + key returns to the main screen.
– After the last item of level 2 (**BG colour**) the menu returns to the main screen; – on the first item of level 2 goes back to level 1.

8.2 Menu level 1

Display	Function	Unit
SP1 Set	switch 1: set point	mm
rP1 Set	switch 1: reset point	mm
SP2 Set	switch 2: set point	mm
rP2 Set	switch 2: reset point	mm
L-LRV	lower range limit	mm
L-URV	upper range limit	mm
menu 2 set	enter menu level 2	

8.3 Menu level 2

Display	Function	Setting
Factory Reset	factory data reset	the display shows **5S**: hold the key for 5 s
OUT1 Set	output mode of switch 1	**W-NC** · **W-NO** · **H-NO** · **H-NC**
OUT2 Set	output mode of switch 2	**W-NC** · **W-NO** · **H-NO** · **H-NC**
dS1 Set	switch 1: output delay	s
dR1 Set	switch 1: reset delay	s
dS2 Set	switch 2: output delay	s
dR2 Set	switch 2: reset delay	s
Unit Set	unit setting	e.g. mm
PNP/NPN Set	switching outputs PNP or NPN	**PNP** · **NPN**
S-L-data	calibration, low point	**L-0-SET** (mm), **L-0-CAL**
S-H-data	calibration high point	**L-H-SET** (mm), **L-H-CAL**
L-PACE	filter damping	
Low level cut	low level cut-off	+ / –, mm
S-M-data	median value coefficient	**L-M-SET**, **L-M-CAL**
d-P-set	decimal places	
Digit colour	colour of the main value	
BG colour	main background colour	

Output modes: **W-NC** window, normally closed · **W-NO** window, normally open · **H-NO** hysteresis, normally open · **H-NC** hysteresis, normally closed.

Important No procedure is given for the calibration items **S-L-data**, **S-H-data** and **S-M-data**. Do not change them without consulting octogon.

9 Maintenance, cleaning and removal

9.1 Maintenance

The sensor does not require maintenance.

Warning Periodically check whether the sensor is working properly. If it does not work properly, stop the operation immediately.

9.2 Cleaning

Caution Use of an improper cleaning agent may damage the sensor.

– Polycarbonate parts may be cleaned with mild soap or detergent, or with isopropyl alcohol. Rinse with water immediately after cleaning; do not leave cleaner on the surface. Do not clean in high heat or in direct sunlight.

– Known to affect polycarbonate and not to be used: halogenated solvents (benzene, gasoline, acetone, carbon tetrachloride), strong alkaline agents, methyl ethyl ketone, abrasive substances, and the cleaners ZEP Fast 505, Pinesol and Formula 409.

9.3 Removal

Danger Only remove the sensor when the system is depressurised and the power supply is disconnected. Disconnection from pressure and power supply must be carried out by trained or instructed personnel in accordance with the state of the art.

Warning The surface of the housing may become very hot at high operating temperatures.