

# 60 GHz - RADAR FILLING LEVEL SENSOR RFM 2000 C4 / R / MD

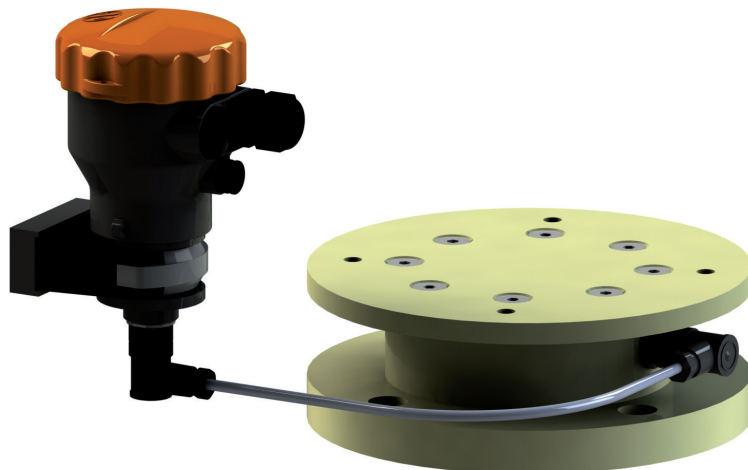
## Features

- measuring range RFM 2000 up to 20 meters
- low angle of radiation
- for distance, volume and filling level measurement
- for containers, open basins or channels
- simple blind flange installation
- alternative signal output interfaces  
(current loop / relay / Modbus RTU)
- contact-free measuring principle

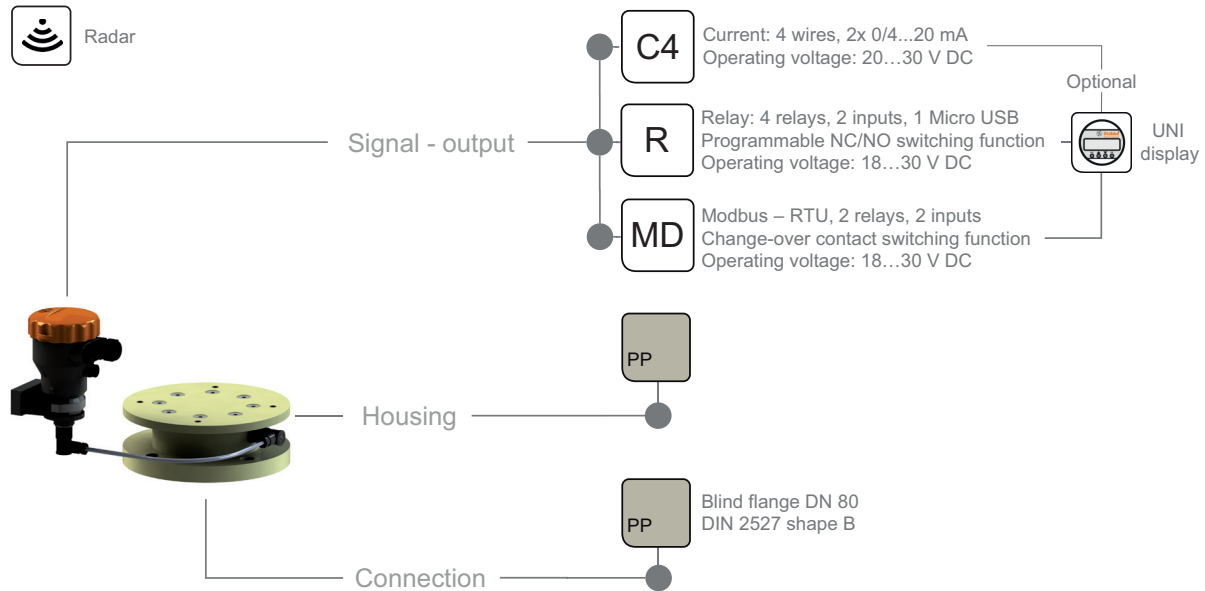
## Attention

The display and control unit (UNI display) is required for setting the sensor in the relay and Modbus version.

[www.asv-stuebbe.com/produkte/mess-und-regeltechnik](http://www.asv-stuebbe.com/produkte/mess-und-regeltechnik)



## RFM C4 / R / MD



- available
- not available

**Note:**

Connection cable, sensor / evaluation unit, 5 meters, included in the delivery scope  
Weathering optionally available

## 60 Ghz - Radar filling level sensor RFM 2000 C4 / R / MD

### Application

- The RFM is an radar sensor for continuous contact-free filling level measurement of liquid medium types.

### Use

- In containers or tanks in almost all industrial sectors
- Suitable for neutral and aggressive fluids, provided the sensor components in contact with the medium are resistant to the medium (medium vapours) according to the ASV Stübbe resistance guide

### The following factors limit accuracy:

- heavily turbulent surfaces
- strong deposit build-up or condensate on the sensor
- operated above the plastic tank jacket

### Application limits

- heavy foam generation
- spurious reflections caused by build-in components

### ASV resistance guide

[www.asv-stuebbe.de/pdf\\_resistance/300051.pdf](http://www.asv-stuebbe.de/pdf_resistance/300051.pdf)

### Ausführung

- RFM with the connection housing separate from the sensor housing, connected with a sensor cable of up to 100 m

### Operation

- 4-wire current version (C4):  
using the integrated potentiometer,  
optionally using the display and control unit (Uni display)
- Relay version (R):  
using the display and control unit (Uni display)
- Modbus RTU version (MD):  
using the display and control unit (Uni display),  
relay / inputs via Modbus

### Function

- The sensor consists of a transducer, which continuously transmits radar pulses to the surface of the medium to be measured. The pulses are received by the sensor as echoes.
- The time between the transmission and receipt of the pulses is measured. This time is proportional to the distance and therefore to the filling height of the medium. The values such as distance, filling height and volume are converted in the connection housing.
- The output values can be indicated by the UNI display and/or transmitted via the respective outputs.
- Versions

#### C4:

The current module transmits the filling level, distance or volume via a standard 0/4–20 mA signal.

#### R:

The relay module is equipped with four programmable relay outputs. It is particularly suitable for the direct control of sensitive plant components, e.g. for dry run protection of pumps.

#### MD:

The Modbus module enables data bus communication. It contains two additional freely programmable relay outputs which can be used for directly intervening in the process if necessary.

### Accessories

- Display and control unit (UNI display)
- Weathering (the weathering increased the protection against UV radiation and heating-up by direct sun radiation and is obligatory for the outside installation)

### Display and control unit (UNI display)

- Can be used for all measuring instruments of the UNI display platform (PTM, HFT, UFM or RFM).
- Housing: ABS
- Cover: PA, transparent
- Display: illuminated LCD
- Operation: 4-key function
- Front film: polyester
- Data logger function with date stamp
- Firmware update is possible
- Parameter settings can be saved and transmitted to other sensors.
- Storage function on a microSD card
- Battery: CR1220, 3 V
- The display unit can be removed from the sensor housing after the settings have been made.
- The display unit is required for setting the relay and Modbus version.



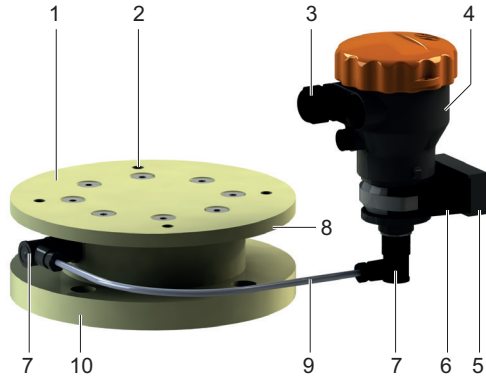
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## Technical data

	RFM 2000
<b>Measuring</b>	
Measuring range	12–2000 cm
Measuring resolution	≤ 1 mm
Measuring frequency	60 GHz
Angle of reflected beam (-3 dB)	8°
Measuring interval	0.2 s
Precision	±2 mm ± 0.005 % of the final value per metre
Power up: -C4, -R, -MD	5 s
Step response (10–90%)	< 1.0 s
<b>Voltage supply</b>	
Voltage supply	18–30 V DC
Power consumption -C4, -R, -MD	5 W max.
<b>Signal output</b>	
C4	0/4–20 mA
R	4 relays, 5 A / 230 V AC
MD	Modbus RTU, 2 relays, 1 A / 30 V/DC 2 inputs, electrically isolated
<b>Connection cable</b>	
Cable outside diameter	5–11 mm
Nominal cross-section, voltage supply	0.34 mm <sup>2</sup>
Nominal cross-section, relay outputs	0.5 mm <sup>2</sup>
Nominal cross-section, gate inputs	0.34 mm <sup>2</sup>
Nominal cross-section, Modbus	0.34 mm <sup>2</sup>

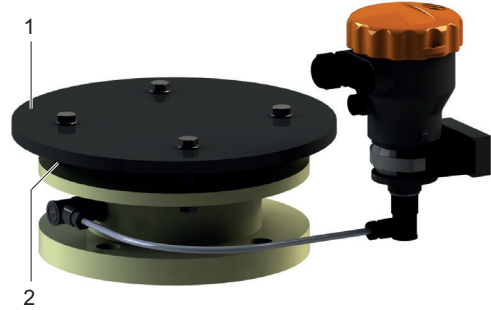
	RFM 2000
<b>Sensor cable</b>	
Cable outside diameter	4–6 mm
Nominal cross-section	0.34 mm <sup>2</sup>
max. length	100 m
<b>Material coming into contact with the media</b>	
Sensor housing	PP
<b>Material not coming into contact with the media</b>	
Sensor housing	PP
Housing, display	PP-GF / PA transparent
Seals	NBR, EPDM
Connection cable, UV-resistant	TPE-V, U
Weathering	PE
<b>Process conditions</b>	
Ambient temperature	-25–60 °C
Atmospheric ambient pressure	0.8–1.1 bar
Process temperature	-20–70 °C
Process pressure	1 bar
<b>Mechanical data</b>	
Weight	1.8 kg
Mounting position	horizontal
Installation blind flange DIN 2527, shape B	DN80
Protection class	IP 67

**Components RFM 2000**



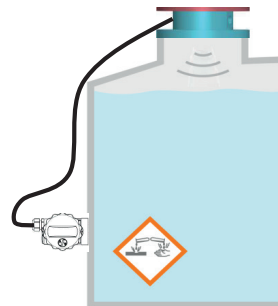
No.	Description
1	Housing cover
2	Fastening holes for weathering (4x)
3	Cable lead throughs
4	Connection housing
5	Spacer
6	Pipe clamp
7	Connector
8	Dripping edge
9	Sensor cable
10	Process connection, flange

**Components RFM 2000 – Layout with weathering**



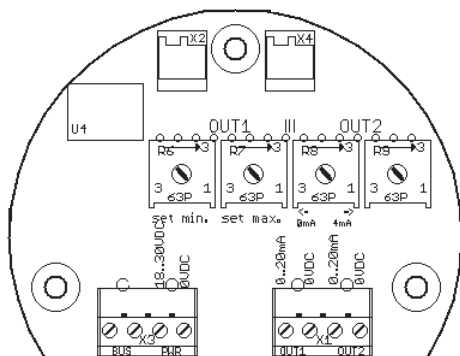
No.	Description
1	Weathering
2	Spacers (4x)

**Assembly example**



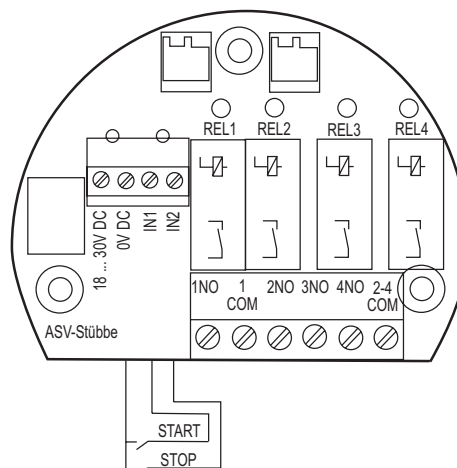
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## Connection plan RFM 2000, 4-wire current version, Process connection



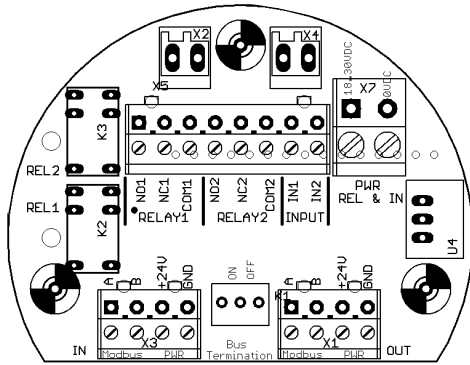
Terminal	Connection
<b>Connector X3</b>	
PWR: 18–30 V DC	Voltage supply (18–30 V DC)
PWR: 0 V DC	Voltage supply (-)
<b>Connector X1</b>	
OUT1:	0/4–20 mA signal (filling level, distance, volume)
OUT1:	mass signal
OUT2:	–
OUT2:	–

## Connection plan RFM 2000, relay version, Process connection



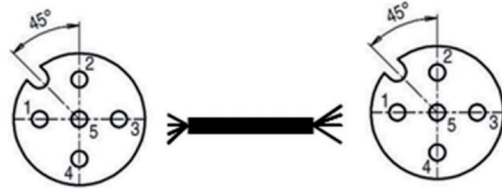
Terminal	Connection
18–30 V DC	Voltage supply (18–30 V DC)
0 V DC	Voltage supply (-)
IN1	Start button
IN2	Stop button
1NO	Relay 1 normally open contact
1COM	Relay 1 COM
2NO	Relay 2 normally open contact
3NO	Relay 3 normally open contact
4NO	Relay 4 normally open contact
2–4 COM	Relay 2–4 COM

## Connection plan RFM 2000, modbus-RTU version, Process connection



Terminal	Connection
<b>Connector X2 / X4</b>	
Plug-type connection	UNI display
<b>Connector X5</b>	
IN1	Start button
IN2	Stop button
NO1	Relay 1 normally open contact
NC1	Relay 1 normally closed contact
COM1	Relay 1 COM
NO2	Relay 2 normally open contact
NC2	Relay 2 normally closed contact
COM2	Relay 2 COM
<b>Connector X7</b>	
PWR: 18-30 V DC	External voltage supply (inputs / relays)
PWR: 0 V DC	External earth
<b>Connector X3 / X1</b>	
A	RS485 A
B	RS485 B
PWR: +24 V	Operating voltage supply, sensor
PWR: GND	Operating voltage supply, sensor (earth)

## Connection diagram RFM 2000, sensor connection



Sensor angular socket

Connection head, angular socket

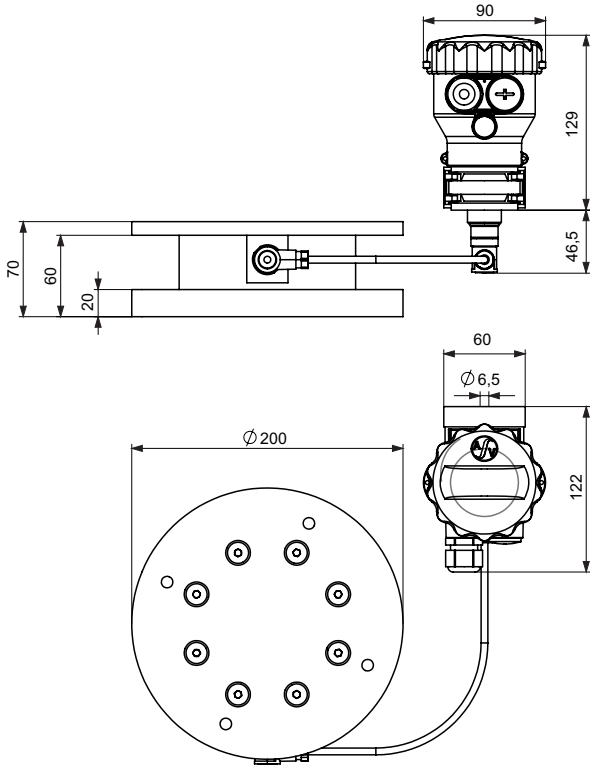
No.	Terminal	No.	Terminal
1	BUS(+)	1	BUS(+)
2	BUS(-)	2	BUS(-)
3	-	3	-
4	0 V DC	4	0 V DC
5	+18-30 V DC	5	+18-30 V DC

For the cable specification, refer to the table "Technical data"

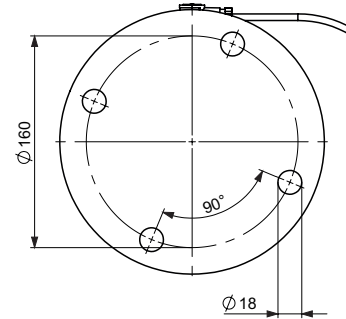


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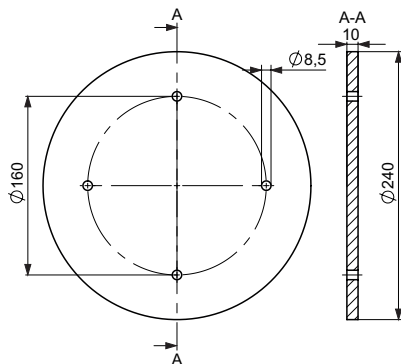
## RFM 2000



## Flange dimensions



## Accessories Weathering



## Spacers

