STÜBBE

Ultrasonic flow measuring/ dosing unit USF C4 / R / MD

Features

- for fluids in pipework
- for flow and volume measurement
- measuring range from 5 l/min to 500 l/min
- simple installation via connection threads
- alternative signal output interfaces (current loop / relay / Modbus RTU)
- possible for Modbus RTU pulse output
- contact-free measuring principle

Note

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

www.stuebbe.com/en/products-systems/instrumentation/

PVC-U PP PVDF

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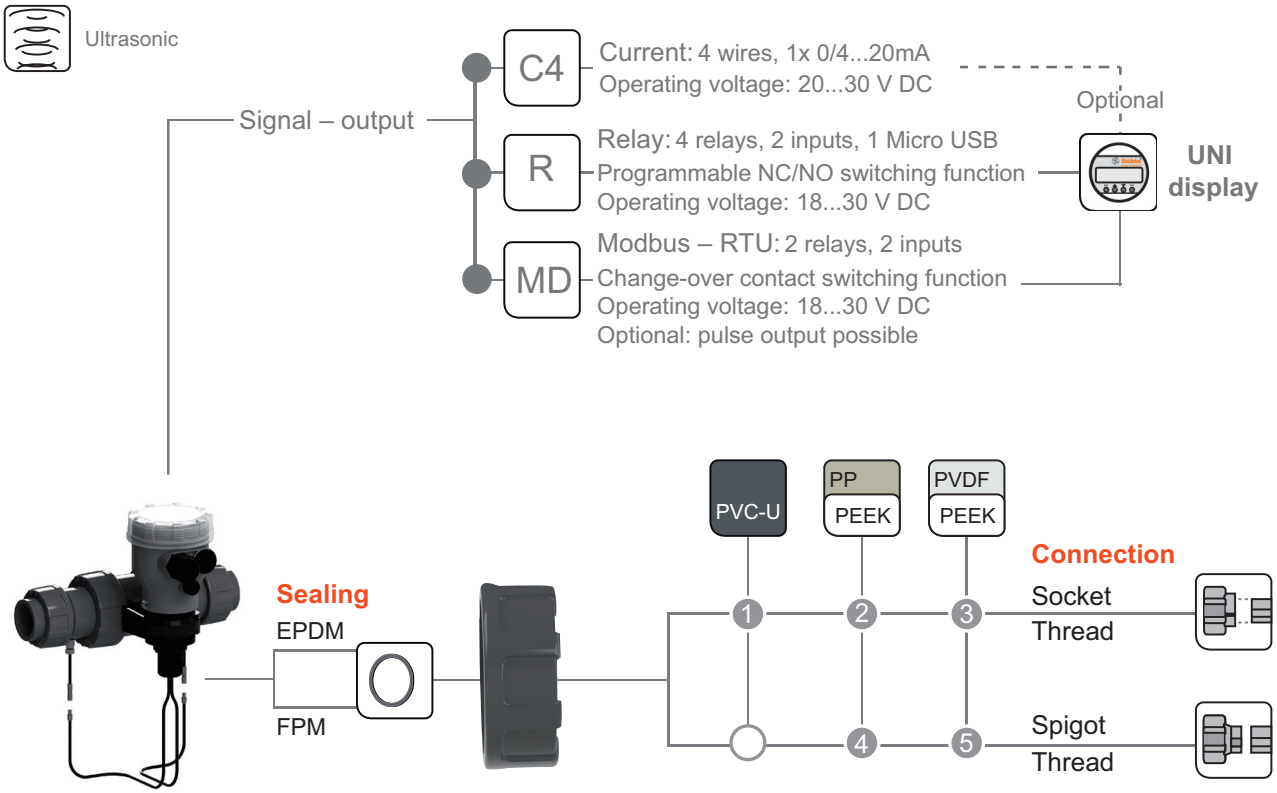
Pictogram Ultrasonic flow measuring/dosing unit USF C4 / R / MD

USF



Basic Nominal Sizes:

DN 8	DN 10	DN 15	DN 20	**DN 25**	DN 32	DN 40	**DN 50**	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400

● available
○ not available

Connection Material (process connection)

1. **PVC-U** socket DIN
2. **PP** socket DIN
3. **PVDF** socket DIN
4. **PP** spigot (IR)
5. **PVDF** spigot (IR)

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Ultrasonic flow measuring/dosing unit USF C4 / R / MD

Application
- The USF is an ultrasonic flow sensor for continuous and contact-free flow measurement of liquid medium types.

Use
- In pipework
- Suitable for neutral and aggressive fluids, provided the sensor components in contact with the medium are resistant to the medium according to the Stübbe resistance guide.
- Based on DIN EN 61326-1, the interference resistance for use in basic electromagnetic environments was tested according to table 1.

Restriction of the accuracy due to:
- Changes in temperature
- Air or gas bubbles in the medium
- Insufficient or excessive flow speeds

Application limits
- Air or gas bubbles in the medium
- Solids in the medium

Stübbe resistance guide
- www.stuebbe.com/pdf_resistance/300051.pdf

Version
- Different inserts
- Different elastomers

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 / pulse version (MD):
  using the display and control unit (Uni display), relay / inputs via Modbus

Function
- The sensor consists of two sound converters placed opposite from each other which alternate in sending and receiving ultrasonic pulses.
- The running time from the sender to the receiver in both directions is measured. If the liquid is at rest, the running time difference is zero.
- If the medium flows through the sensor, there is a running time difference determined by the flow speed.
- The output values can be indicated by the UNI display and/or transmitted via the respective outputs.
  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 is used for data bus communication or can be used as pulse output.
  It contains two additional freely programmable relay outputs which can be used for directly intervening in the process if necessary.
  The pulse output is compatible with RS422 counter inputs e.g. Siemens „TM PosInput“ and is particularly suitable for malfunction-free transfer through long cable lengths. As an alternative, the signal can be converted into a standard 24V pule at the end of the line by means of a converter for the top-hat rail.
  The „pulse RS422 - 24V converter“ is available as an accessory.

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Measuring value
- Flow

Device connection
- see pictograph „Ultrasonic flow measuring/dosing unit USF C4 / R / MD“

Accessories
- Display and control unit (UNI display)

Display and control unit (Uni display)
- Can be used for all measuring instruments of the Uni display platform (USF, PTM, HFT or UFM).
- 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

			Value					
			USF DN25			USF DN50		
			PVC-U	PP / PEEK	PVDF / PEEK	PVC-U	PP / PEEK	–
Measuring								
Measuring range		l/min		5–160			30–500	
Measuring resolution		l/h			≤ 1			
Ultrasonic frequency		MHz			1			
Measuring interval		ms			10			
Step response (10–90%)		s			‹ 200 ms Integration time 0–6000 ms, adjustable			
Measuring deviations of measured value Reference condition (VDE/VDI 2642)		%			±1.5			
Power up		s			5			
Temperature compensation					manual			
Voltage supply								
Voltage supply		V DC			18–30			
Power consumption		W			3			
Signal output								
Current loop C4		mA			0/4–20			
Ohmic resistance (max.) C4		Ohm			600			
Relay R					4 relays, 5 A / 230 V AC, 2 inputs			
Pulse / Modbus RTU MD					2 relays, 1 A / 30 V DC 2 inputs, RS485			
Pulse value MD		ml/pulse			10			
Pulse width MD		ms			0,25			
Cable outside diameter		mm			5–11			
Nominal cross-section (max.)		mm²			0.3			
Connection					pluggable screw connectors			
Material coming into contact with the media								
Sensor			PVC-U	PEEK	PEEK	PVC-U	PEEK	–
Sensor housing			PVC-U	PP	PVDF	PVC-U	PP	–
Sensor seal					FPM or EPDM			
Union nut			PVC-U	PP	PVDF	PVC-U	PP	–
Process sealing					FPM or EPDM			
Material not coming into contact with the media								
Housing					PP-GF			
Housing cover					PP-GF / PA transparent			
Cover seal					NBR			
Connection cable					PVC			
Process conditions								
Ambient temperature		°C			0–50			
Atmospheric ambient pressure		bar			0.8–1.1			
Relative humidity		%			20–85			
Process temperature		°C	0–50	0–70	0–100	0–50	0–70	–
Process pressure		bar			10			

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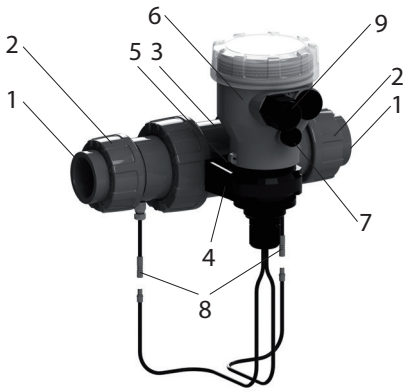
			Value					
			USF DN25			USF DN50		
			PVC-U	PP / PEEK	PVDF / PEEK	PVC-U	PP / PEEK	–
Mechanical data								
Weight of sensor	kg		0.6	0.5	0.7	2	1.5	–
Weight of display head	kg				0.3			
Mounting position					as required			
Connection thread AG	inch			1 1/2“			2 3/4“	
Flow coefficient (kv value)	m³/h			10			48	
Type of protection					IP 67			
Accessories					UNI display, PSU power pack, Pulse RS422 - 24V converter			

Components USF



No.	Description
1	Insert
2	Union nut
3	Sensor housing
4	Fastening clamp
5	Spacer
6	Connection housing
7	Pressure compensation valve
8	Plug-type sensor cable
9	Elect. connection

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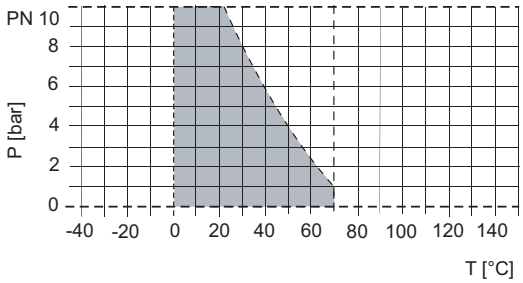
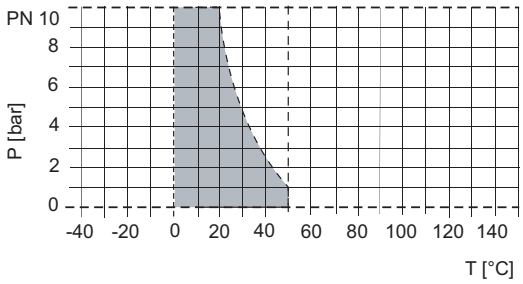
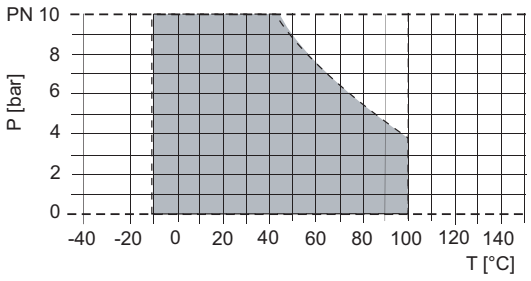
Pressure and temperature diagram



Pressure and temperature limits PP



Pressure and temperature limits PVC-U



Pressure and temperature limits PVDF

	Description
P	Operating pressure
T	Temperature

The pressure/temperature limits of the materials are valid for the stated nominal pressures and a load duration of 25 years.
The values are a guide for flow medium types (DIN 2403), to which the valve material is resistant. For other fluids please refer to the Stübbe resistance guide; reduction ratios may have to be taken into account. The operating life of the wear parts depends on the conditions of use.
The rated pressure (PN) depends on the size and material of the measuring tube/connection.

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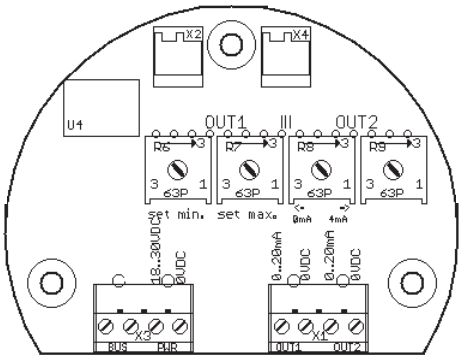
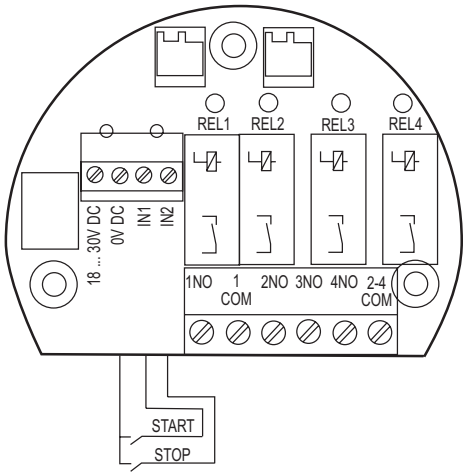
Connection plan USF, 4-wire current version, Process connection



Terminal	Connection
Connector X3	
PWR: 18–30 V DC	Voltage supply (18–30 V DC)
PWR: 0 V DC	Voltage supply (–)
Connector X1	
OUT1: 0–20 mA	0/4–20 mA signal
OUT1: 0 V DC	Earth, signal
OUT2: 0–20 mA	–
OUT2: 0 V DC	–

Connection plan USF, 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

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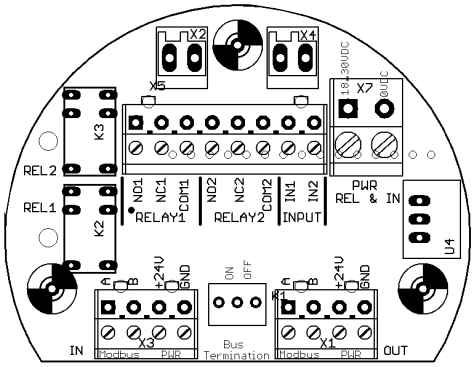
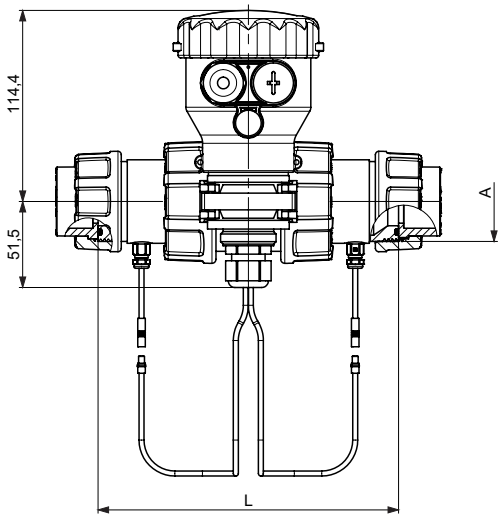
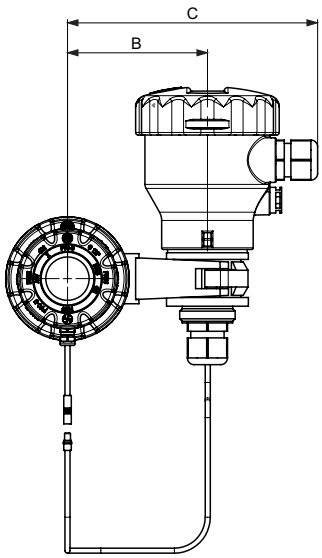
Connection plan USF, Modbus RTU version, Process connection



Terminal	Connection
Connector X2 / X4	
Plug-type connection	UNI display
Connector X5	
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
Connector X7	
PWR: 18–30 V DC	External voltage supply (inputs / relays)
PWR: 0 V DC	External earth
Connector X3 / X1	
A	RS485A / RS422A pulse
B	RS485B / RS422B pulse
PWR: +24 V	Operating voltage supply, sensor
PWR: GND	Operating voltage supply, sensor (earth)





	A*	B	C	L
DN 25	G 1 1/2	84	150	180
DN 50	G 2 3/4	110	176	220

all dimensions in mm / * dimensions in inch

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