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 160 l/min
- simple installation via connection threads
- alternative signal output interfaces (current loop / relay / Modbus RTU)
- 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.asv-stuebbe.com/produkte/mess-und-regeltechnik

PVC-U

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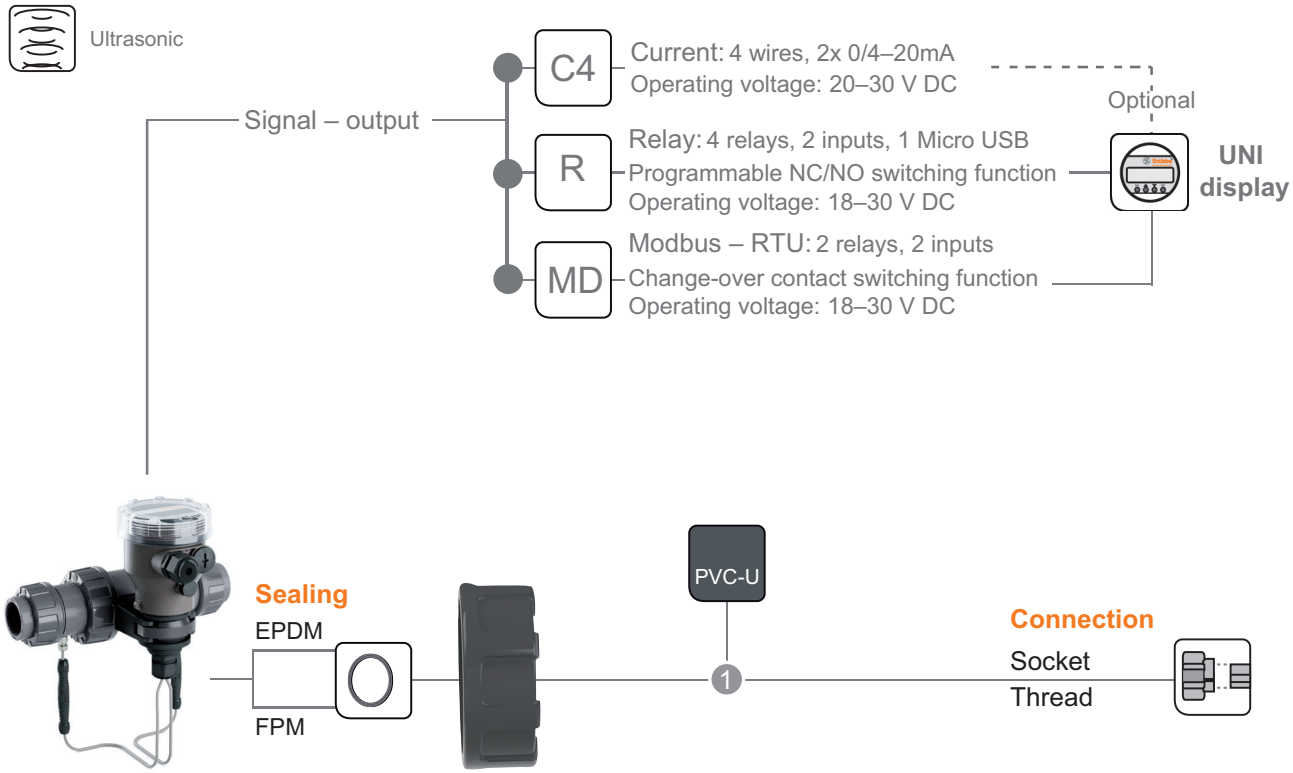
Pictogram Ultrasonic flow measuring/dosing unit USF C4 / R / MD

USF C4 / R / MD



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

1 **PVC-U** socket DIN

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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 ASV 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

ASV resistance guide
- www.asv-stuebbe.de/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 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 takes over data bus communication. It contains two additional freely programmable relay outputs which can be used for directly intervening in the process if necessary.

Measuring value
- Flow

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

Weight
- Weight of sensor: 0.6 kg
- Weight of display head: 0.3 kg

Accessories
- Display and control unit (UNI display)

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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 PVC DN25
Measuring			
Measuring range		l/min	5–160
Measuring resolution		l/h	≤ 1
Ultrasonic frequency		MHz	1
Measuring interval		ms	10
Measuring deviations of measured value Reference condition (VDE/VDI 2642)		%	±1.5
Power up		s	5
Step response (10–90%)		s	‹ 200ms Integration time 0–6000 ms, adjustable
Temperature compensation			manual
Voltage supply			
Voltage supply		V DC	18–30
Power consumption		W	3
Signal output			
C4		mA	0/4–20
R			4 relays, 5 A / 230 V AC
MD			Modbus RTU 2 relays, 1 A / 30 V/DC 2 inputs, electrically isolated
Connection cable			
Cable outside diameter		mm	5–11
Nominal cross-section (max.)	Voltage supply	mm²	0.25
	Relay outputs	mm²	0.5
	Gate inputs	mm²	0.25
	Modbus	mm²	0.25
Material coming into contact with the media			
Sensor			PVC
Sensor housing			PVC
Sensor seal			FPM or EPDM
Union nut			PVC
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	0–60
Atmospheric ambient pressure		bar	0.8–1.1
Relative humidity		%	20–85
Process temperature		°C	0–60
Process pressure		bar	10

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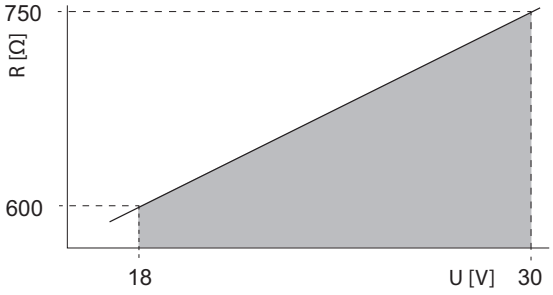
			Value USF PVC DN25
Mechanical data			
Weight of sensor		kg	0.6
Weight of display head		kg	0.3
Mounting position			as required
Connection thread AG		inch	1 1/2“
Flow coefficient (kv value)		m³/h	10
Type of protection			IP 67

Ohmic resistance

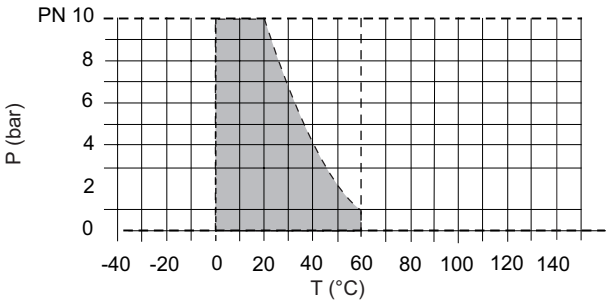


	Description
R	Max. ohmic resistance
U	Voltage supply

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

Pressure/temperature diagram



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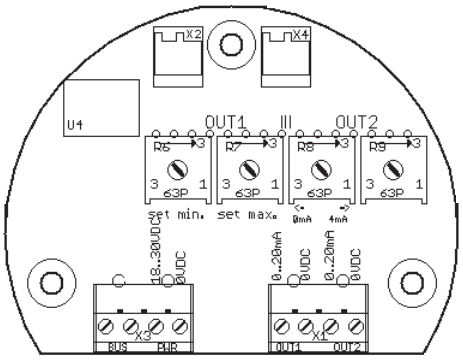
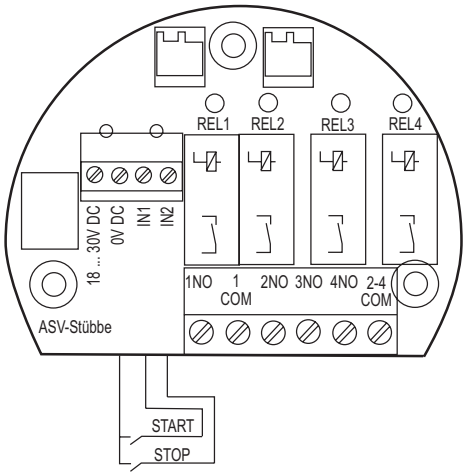
Connection plan USF, 4-wire current version, Process connection



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 pressure
OUT1: 0 V DC	Earth, pressure
OUT2: 0–20 mA	0/4–20 mA temperature
OUT2: 0 V DC	Earth, temperature

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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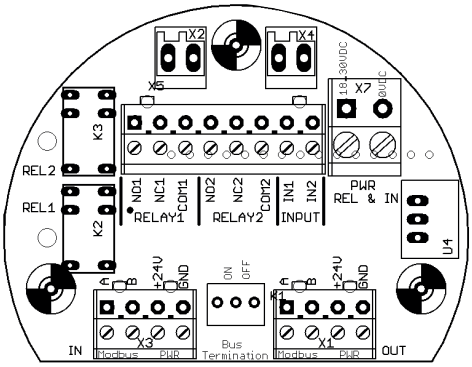
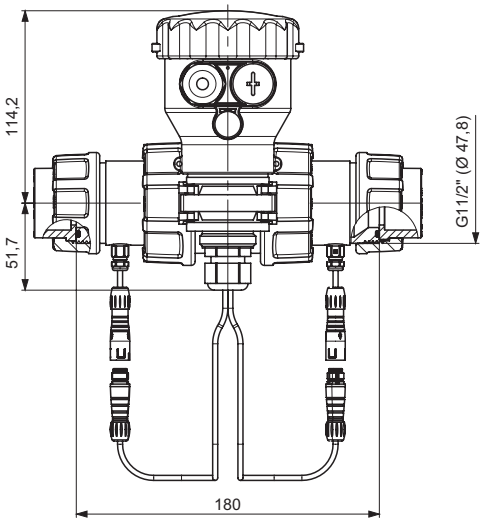
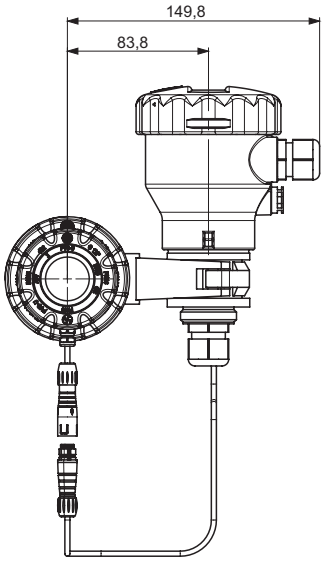
Connection plan USF, Modbus RTU version, Process connection







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	RS485 A
B	RS485 B
PWR: +24 V	Operating voltage supply, sensor
PWR: GND	Operating voltage supply, sensor (earth)

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