

Flow - Rotor



Characteristics

System	Mechanical-magnetical, Infrared
Evaluation	Flow speed, quantity, totalizers for quantities
Process connection	PVC-U / PVDF-fitting,
Media	Non adherent liquids
Process pressure	10 bar
Process temperature	-40..+85 °C

Applications

- Quantity measurement for filling processes
- Monitoring of mixing processes
- Beverage industry
- Chemical industry

Product Information

Sensors and Instrumentation

Function

The flow rate is one of the most frequently acquired process variables in industry. Flow rate measuring instruments are used in the sectors water and waste water, chemistry and petrol chemistry, oil and gas, energy and steam generation, pharmaceuticals, paper and cellulose as well as in the sectors' food and beverage and cover numerous applications specific for the industry .

Advantages

- reliable proven technology
- universally applicable, favourably-priced and space saving
- can also be used as counter
- magnetic or optoelectronic measurement transmission

Device Overview

Features	Measuring range	Media	Input/ measuring method	Output signal	Process connection	Process temperature	Process pressure	Page
Type								
Displays								
DF9648	0.1..8 / 15 kHz	-	NPN, PNP, Namur sensor AC-signals	Alarm output (relay, transistor), analog output 0/4..20 mA	-	-	-	3
UNICON-DF	0.1 / 10..2000 Hz	-	NPN, PNP, Namur sensor AC-signals	Alarm output (transistor), analog output 4..20 mA	-	-	-	6
Sensors								
FS222	0.1..120 L/min	Transparent liquids, max. 15 cSt.	Infrared	Transistor push / pull	G ¼ G ½ G ¾ G 1 ¼	-40..85 °C	Max. 10 bar at 22°C	8
FS242	0.3..6 m/s	Washy solutions without solid parts	Magnetic (Hall sensor)	Impulse (transistor) NPN / PNP or analog output 4..20 mA	Fitting FF25	0..60 °C	Max. 10 bar at 22°C	9
Accessories								
FF25 (Fitting for FS242)	-	-	-	-	PVC-U Standard Fittings, DN15..DN100	0..60°C	Max. 10 bar at 22°C	10

Mistakes reserved, technical specifications subject to change without notice.

Product Information

Flow Meter DF9648



- Measuring range programmable ±99999 Digit
- Measuring unit programmable
- 2 totalizers programmable
- Pulse output for external evaluation
- Max. 4 alarm outputs, relay or electronic
- Isolated analog output 0/4..20 mA, 0/2..10 V

Characteristics

The Flow-Meter DF9648 is used in food technology, chemical and pharmaceutical industry and water technology. In connection with any type of pulse flow sensor the current flow rate and total flow can be measured, displayed and converted to an analog output signal. The dosage of quantity may be realized by using the alarm outputs. The optional pulse output allows an external summation of the flow quantity.

Technical data

Power supply

- Supply voltage : 230 V AC ±10 %; 115 V AC ±10 %; 24 V AC ±10 % or 24 V DC ±15 %
- Power consump. : max. 3.5 VA, with analog output 5 VA
- Operating temp. : -10..+55 °C
- CE-conformity : EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13

Measuring input

- Type : sensor with ac-output (coil), Namur-sensor or Hall-sensor (rectangular-signal) programmable alternative external pulses 0/5..24 VDC
- Coil : switching threshold programmable ±5..±2000 mV, pull-down resistor 100 kΩ
- NPN sensor : low level < 0.9 V, high level > 2.1 V pull-up resistor 20 kΩ
- PNP sensor : low level < 0.9 V, high level > 2.1 V pull-down resistor 20 kΩ
- Namur : low level < 1.2 mA, high level > 2.1 mA, hysteresis approx. 0.5 mA pull-down resistor 1 kΩ
- Relay : pulse width min. 5 ms
- Frequency : input A or B 0.1 Hz..15 kHz (contact max. 30 Hz) input A and B together 0.1 Hz..8 kHz (contact max. 30 Hz)
- Reset-input : low level < 0.9 V, high level > 2.1 V, pull-down resistor 20 kΩ pulse width min. 5 ms, reset at rising edge
- Accuracy : ≤ 0.1 % ±1 Digit
- Sensor supply : 8 V DC stabilized (Namur), 24 V DC (coil, NPN, PNP, Push-Pull), Ri approx. 150 Ω, max. 50 mA (25 mA with 4 relay output)

- Display : LED red, 14.2 mm
- Parameter : LED 2-digit red, 7 mm (parameter - and output indicator)
- Display range : flow -99999..99999 Digit, totalizer -99999..0..999999 Digit, with leading zero suppression, max. 3 decimals, daily totalizer not voltage safe, total totalizer voltage safe

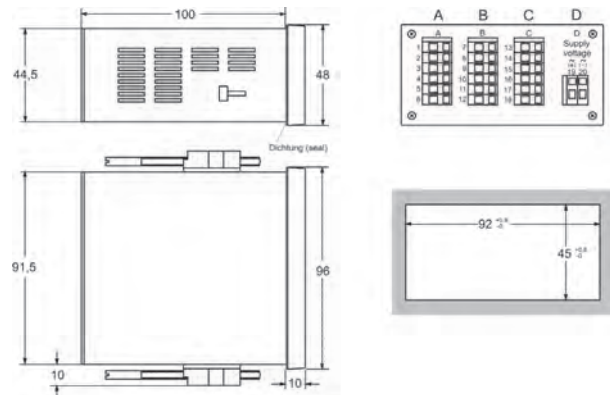
Output

- Relay : SPDT <250 V AC<250 VA<2 A, <300 V DC<50 W<2 A
- Transistor : max. 35 V AC/DC / 100 mA, with short circuit protection
- Analog : 0/4..20 mA burden ≤500 Ω; 0/2..10 V load >500 Ω, isolated automatic output changing (burden dependent)
- Accuracy : 0.1 %; TK 0.01 %/K
- Pulse output : transistor ≤ 5 Hz, relays ≤ 0.1 Hz (max. 500,000 switching cycles) pulse width 100 ms

Case

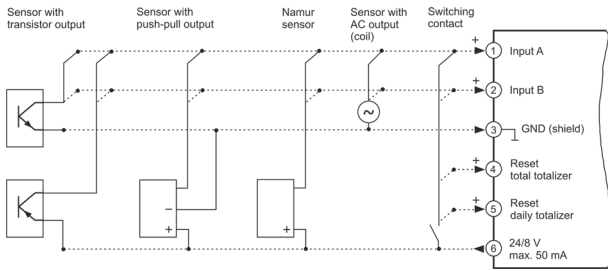
- Case : panel case DIN96x48 mm, material PA6-GF; UL94V-0
- Dimensions : front 96x48 mm, mounting depth 100 mm,
- Weight : max. 390 g
- Connection : clamp terminals, 2 mm² single wire, 1.5 mm² flexible wire, AWG14
- Protection class : front IP65, terminals IP20, acc. to BGV A3

Dimensions



Product Information

Connection diagram



Ordering code

DF9648 - 1. - 2. - 3. - 4. - 5. - 6. - 7.

1. Terminal strip A	
1	Input for sensors with AC-signals (coil), pulse signal (Namur, NPN, PNP, Push-Pull) or switching contact
2	as 1, but additional input for addition/subtraction
2. Terminal strip B	
00	not installed
2R	2 relay outputs
2T	2 electronic outputs (alarm/pulse output)*
3. Terminal strip C	
00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output
4. Terminal strip D supply voltage	
0	230 V AC ±10 % 50-60Hz
1	115 V AC ±10 % 50-60Hz
4	24 V AC ±10 % 50-60Hz
5	24 V DC ±15 %
5. Options	
00	without option
11	*pulse output (only at terminal strip B)
6. Unit appears in the unit field	
7. Additional text above the display (3x90 mm HxW)	

* Strip B: output A1 = alarm, A2 = pulse output

Connection diagram for terminal strips B-D see page 5

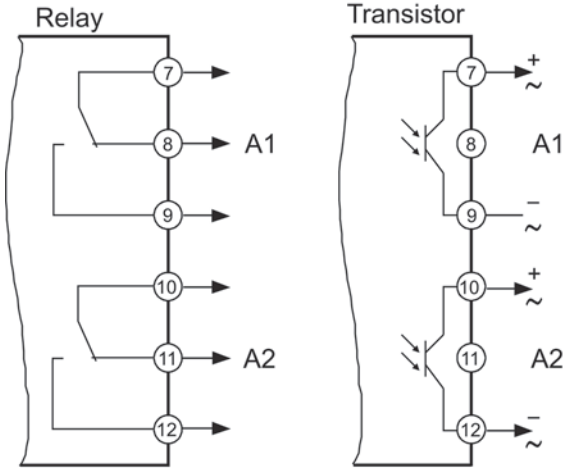
Product Information

Connection Diagrams X9648, Terminals B-D

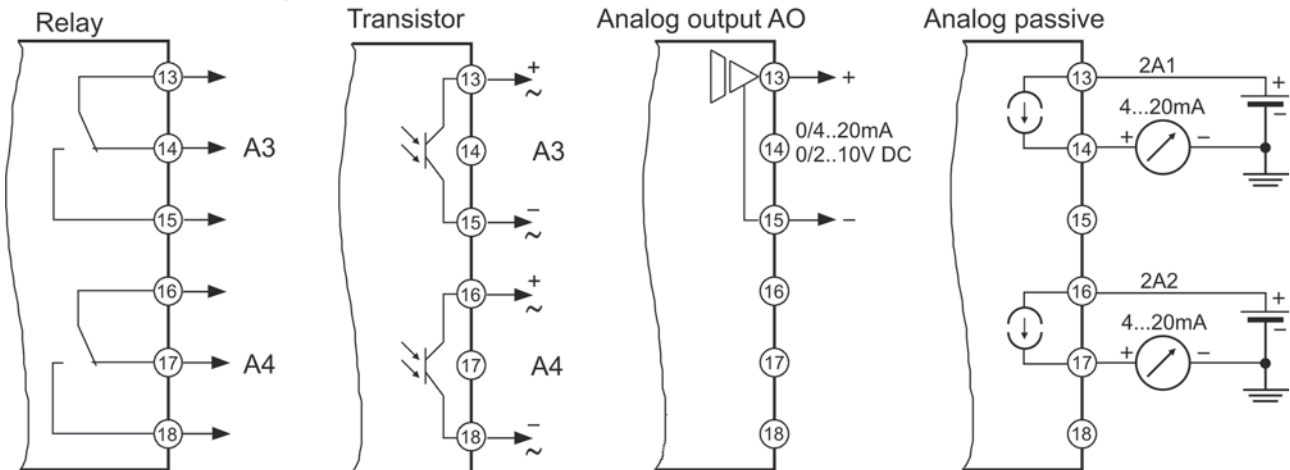
Terminal strips B, C, D

Terminal strip A belongs to each article.

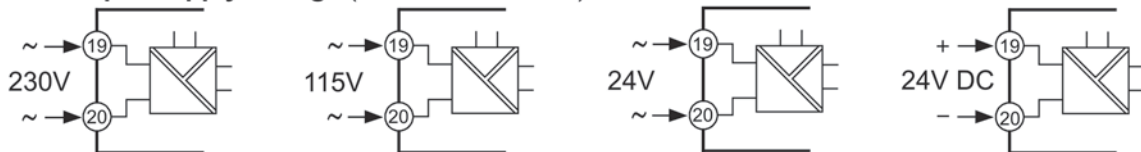
Terminal strip B (varies with versions)
 2 alarm outputs



Terminal strip C (varies with versions)
 2 alarm outputs



Terminal strip D supply voltage (varies with version)



Product Information

Flow Converter
UNICON-DF®



- **Measuring range programmable from ±99999 Digit**
- **Unit programmable**
- **Totalizer programmable**
- **Output 4..20 mA, loop powered**
- **Impulse output for external evaluation**
- **2 alarm outputs electronic, voltage free**

Characteristics

The Flow-Converter UNICON-DF is used in food technology, chemical and pharmaceutical industry and water technology. In connection with any type of pulse flow sensor the flow rate can be measured, displayed and converted in a 4..20 mA signal. An additional feature is the summation function (totalizer). Using the alarm outputs a quantity dosage can be realized. The overall totalizer is zero voltage protected and can only be reset by a special code (password protection).

Technical data

Power supply
 Loop voltage : 12..30 V DC, 2-wire
 Operating temperature : -10..+55 °C
 CE- conformity : EN50022, IEC61000-4-3/4/5

Measuring input
Type : Inductive transmitter (coil), Namur sensor or e.g. Hall-Sensor (rectangular pulse) programmable alternatively external pulses 0/5..24 V DC.

- Coil : switching level from ±5..±1000 mV programmable

- NPN sensor : switching level < 0.9 V low, > 2.1 V high pull-up-resistance 20 kΩ

- PNP sensor : switching level < 0.9 V low, > 2.1 V high pull-down-resistance 20 kΩ

- Namur : switching level < 1.4 mA low, > 1.8 mA high, hysteresis approx. 0.4 mA

Frequency : 0.1/10..2000 Hz (depends on the measuring interval)

Outputs
 Signal : 4..20 mA
 Burden : $RA \leq (U_b - 14 \text{ V}) \div 0,02 \text{ A}$
 Accuracy : ± 0.1 % measuring value ± 2 Digit
 Impulse output : Transistor ≤ 5 Hz, load max. 60 mA, short-circuit-proof impulse width 100 ms, quantity / volume per impulse programmable from 1..99999 Digit

Alarm outputs

Transistor : max. 30 V DC, 60 mA, short-circuit-proof

Voltage drop : < 2V

Display : LCD-dot matrix, 4.9 mm character height 2 lines 16 character each

Flow : -99999..0..99999 Digit, max. 3 decimal digits

- Unit : l/s, l/min, l/h, m³/s, m³/min, m³/h, (US)gal/s, (US)gal/min, (US)gal/h, bar(rel)/s, bar(rel)/min, bar(rel)/h

Totalizer : -999999..0..999999 Digit, max 3 decimal digits

- Unit : l, m³, (US)gallon, barrel

- Storage : daily totalizer, not voltage safe total totalizer, voltage safe

Case : field mounting

Material : Case Polyamide with fiber glass PA6-GF/GK 15/15, Front foil Polyester

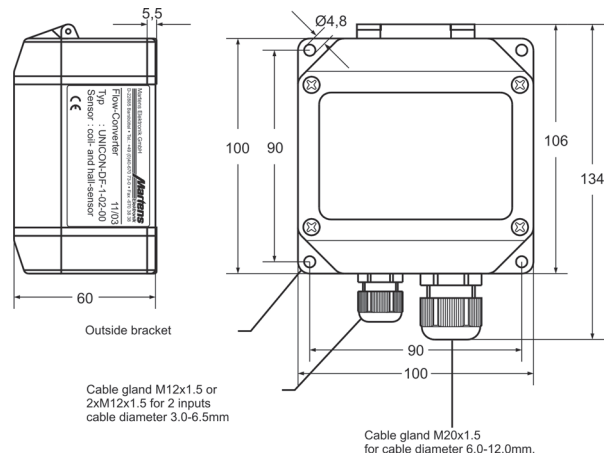
Dimensions : 100 x 100 x 60 mm (WxHxD)

Weight : max. 360 g

Connection : screw terminal with pressure plate, 2,5 mm² flexible, 4 mm² single wire

Protection class : IP65, terminals IP20 acc. to BGV A3

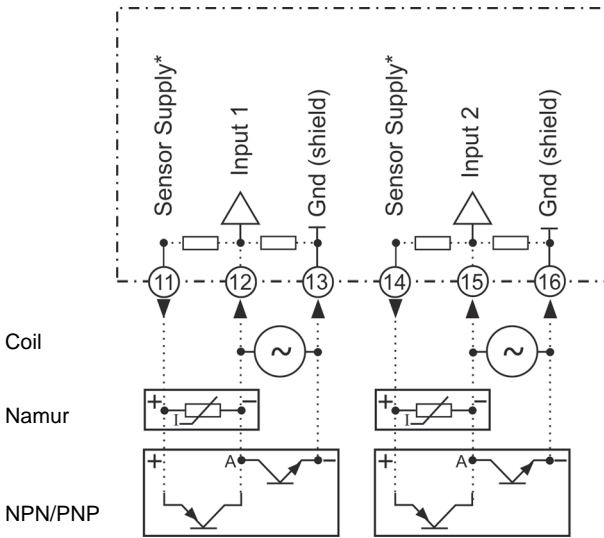
Dimensions



Product Information

Connection diagrams

Terminal strip sensor input

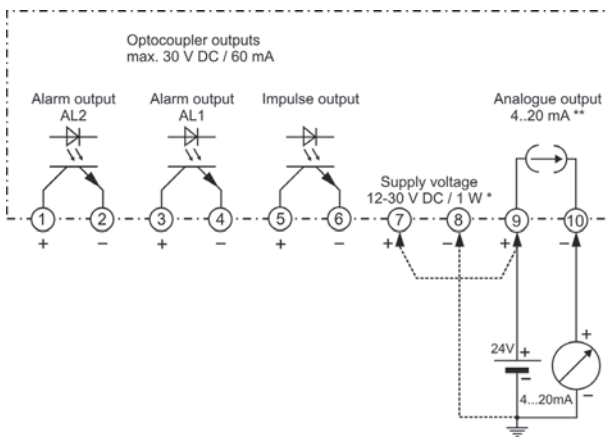


Ordering code

UNICON-DF - 1. - 2. - 3.

1. Type	
1	inductive sensor (coil), Namur sensor, NPN and PNP sensor (Impulse), analog output 4..20 mA, 1 Impulse output for ext. evaluation, 2 electronic alarm outputs
2	as 1, but additional input for addition / subtraction, incl. 2nd cable gland
2. Mounting	
02	field mounting, connection of the flow sensor with separate cable
3. Options	
00	without option

Terminal strip in-/outputs



* Separate supply voltage over the terminals 7 and 8 only when using Namur sensors (according to DIN EN60947) or sensors with NPN- or PNP output with power demand $U_b > 5 \text{ V} / > 2 \text{ mA}$.
 ** For supplying the converter use terminals (9) and (10) as shown. If the converter is used for monitoring only, terminals (9) and (10) must be connected direct to the supply voltage.

Product Information

Flowrate Sensor FS222



- High chemical resistance
- Transparent medium necessary, max. viscosity 15 cSt
- 6 measuring ranges 0.1..120 L/min
- Transistor output push-pull
- Process pressure max. 10 bar

Characteristics

The FS222 is a volumetric turbine flow sensor manufactured in PVDF for high precision flow measurement in 6 different ranges from 0.1 up to 120 L/min. The repeatability is 0.1 % of the measured value. The sensor is chemical resistant and optional provided with a replaceable Cartridge (MR1-3) that minimizes system downtime. The maintenance is efficiently handled by simply removing the inner cartridge assembly. Within a minute the flow meter is completely renewed without technical assistance. The sensor is not suitable for measurements of liquids with solid parts.

Technical data

Power supply
 Supply voltage : 8..24 V DC
 Electrical connection : signal cable 1 m
 CE-conformity : N 55022 Class A & B, EN61000-6

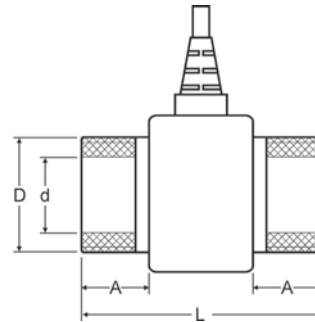
Output
 Measurement ranges : 0.1..120 l/min (see ordering code)
 measuring ranges 2-6 with built-in filter

Impulse : transistor push/pull
 Load : max. 2.2 kΩ
 Frequency range : 15..1200 Hz depends to the measuring range
 Accuracy : 1.5 %

Process data
 Repeatability : 0.1 %
 Medium : transparent (IR-operating mode)
 Medium temperature : -40..+85 °C
 Process pressure : max. 10 bar
 Viscosity : max. 15 cSt (depending on the MR)
 Pressure loss : 0.5 bar at 50 %, 2 bar at 100 %

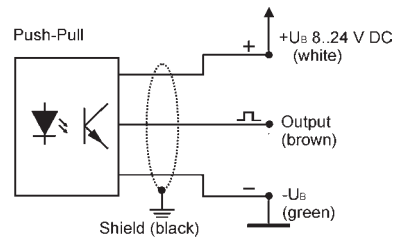
Material
 Process : PVDF
 Case : PVDF

Dimensions



MR	A	D	d	L
1	9.5	1/4"	6,5	39
2	12.7	1/2"	13	47
3	12.7	1/2"	13	47
4	18.5	3/4"	17	63
5	24.5	1 1/4"	29	80
6	24.5	1 1/4"	29	80

Connection diagram



Ordering code

FS222 - 1. - 2. - 3. - 4.

1. Measuring range MR			
	Range l/min	K-factor pulses/L	Process connection
1	0.1..2	36000	G 1/4"
2	0.3..9	8000	G 1/2"
3	0.5..15	3200	G 1/2"
4	1..30	1200	G 3/4"
5	2.5..75	450	G 1 1/4"
6	4..120	225	G 1 1/4"
2. Material			
4	Case and turbine PVDF, other material on request		
3. Electrical connection			
1	connection cable 1 m		
2	connection cable 2 m		
4. Options			
00	without option		

Product Information

Flowrate Sensor FS242



- Measuring ranges from (0)0.3..6 m/s
- Impulse output PNP/NPN or Analog output 4..20 mA, 2-wire
- Filter function
- Process pressure max. 10 bar
- Medium temperature max. 60 °C

Characteristics

The Flow-Sensor FS242 was designed for continuous flow measurement of pure liquids (without solid parts). The rotor of the FS242 turns in the liquid stream. Small magnets inside the wings generate pulses, when passing a hall sensor built-in the body of the sensor. The pulse frequency is directly proportional to the flow speed. Dependent on the selected version a built-in electronic circuit provides PNP and NPN output or loop powered analog output 4..20 mA. The pipe diameter should be selected to get flow speed within the range 0.3..6.0 m/s under different operating conditions. Suitable flow fittings FF25 for different pipe sizes are available. For pressure and temperature please mind material specified data of PVC-U.

Technical data

Power supply
 Supply voltage : 4..30 V DC (impulse output)
 10..30 V DC (analog output 4..20 mA)

Working temperature : 0..60 °C
 Electrical connection : 4 pole plug DIN EN 175301-803/A
 CE-conformity : IEC61326:2004, IEC 61000-4-2/3/4/5/6
 CISPR16-1/2

Output
 Measuring range : (0)0.3..6.0 m/s
 (flow quantities see table)

Impulse : transistor NPN / PNP open collector,
 max. 20 mA, short circuit protection

Analog : 4..20 mA
 Accuracy : 2.5 % of the measuring range, +0.5 %
 of the end value in the range 0.3..6 m/s

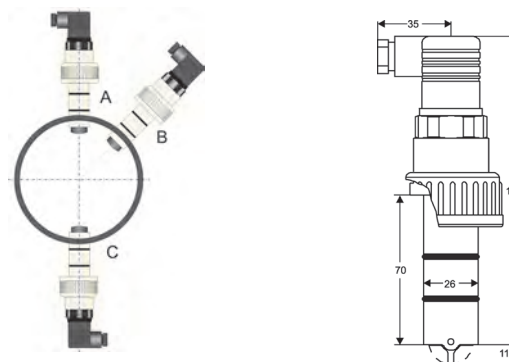
Repeatability : 0.5 %
 Medium temperature : 0..60 °C
 Process pressure : max. 10 bar
 Min. Reynoldsno. : 4500

Material
 Sensor body/ cap nut : PP
 Seal : EPDM
 Rotor : PVC-U
 Bearing : ceramic Al₂O₃
 Weight : 140 g
 Protection class : IP65

K-factor and flow ranges

Fitting	K-factor [Impulse/liter]	Flow range [l/min]	Flow range [m³/h]
FF25-2-0-DN15	132.4	0.. 60.7	0.. 3.64
FF25-2-0-DN20	73.45	0.. 109.5	0.. 6.57
FF25-2-0-DN25	41.02	0.. 196.0	0.. 11.76
FF25-2-0-DN32	24.56	0.. 327.4	0.. 19.64
FF25-2-0-DN40	15.47	0.. 519.7	0.. 31.18
FF25-2-0-DN50	9.284	0.. 866.0	0.. 51.96
FF25-2-0-DN65	6.252	0..1286.0	0.. 77.16
FF25-2-0-DN80	4.451	0..1806.3	0..108.98
FF25-2-0-DN100	2.815	0..2856.1	0..171.37

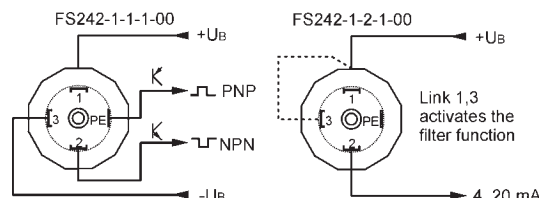
Dimensions / mounting instructions



Horizontal flow direction

- A Installation without air bubbles (optional)
- B Installation with temporarily air bubbles and small solid parts
- C Installation without solid parts

Connection diagram



Ordering code

FS242 - 1. - 2. - 3. - 4.

1. Measuring range [m/s]	2. Output	3. Material	4. Options
1 (0)0.3..6.0	1 impulse NPN / PNP 2 analog 4..20 mA	1 PVC-U, PP, ceramic, EPDM, max. 60 °C	00 without option

Note:
 Flow fitting FF25 see page 10

Product Information

Flow Fitting FF25

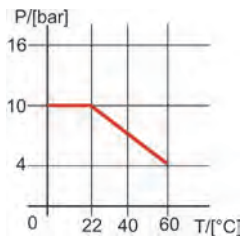


- Material PVC-U
- Medium temperature 0..60°C
- Process pressure max. 10 bar at 22°C
- Pipe diameter from DN15 up to DN100
- Mounting with PVC-U standard fittings

Characteristics

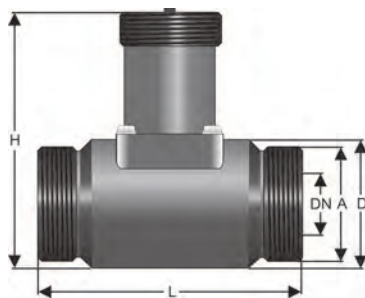
The flow fitting FF25 is specially designed for the flowrate sensor FS242.

Pressure-temperature diagram PVC-U



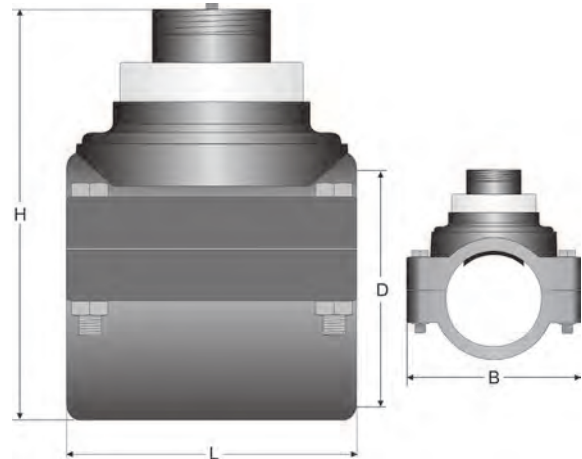
Dimensions

FF25-2-0-XX-00



DN	A	D	L	H
15	G 1	49.2	90	100.3
20	G 1 ¼	51.2	100	103.3
25	G 1 ½	54.0	110	107.5
32	G 2	68.0	110	117.6
40	G 2 ¼	72.3	120	123.3
50	G 2 ¾	86.0	130	134.7

FF25-3-0-XX-00



DN	L	H	D	B
65	105	143	75	136
80	105	161	90	154
100	105	176	110	176

Ordering code

FF25 - 1. - 2. - 3. - 4.

1. Process connection	
2	union nut (up to DN50)
3	drilling pipe clamp (up from DN65)
2. Material	
0	PVC
3. Nominal diameter process connection	
	DN15, 20, 25, 32, 40, 50, 65, 80, 100
4. Options	
00	without option

Product Information

Sensors and Instrumentation

Product Overview

„Industrial Sensors and Instrumentation“

- Temperature
- Flow
- Level / Filling Height
- Analysis
- Humidity
- Pressure
- Weighing Instruments



„Process Instrumentation “Hygienic Design“

- GHMadapt
- Temperature
- Flow
- Level / Filling Height
- Analysis



“Laboratory Instrumentation“



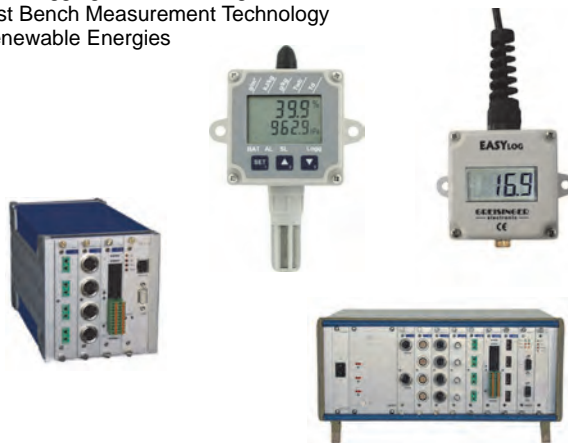
„Industrial Electronics“

- Displays / Controller
- Transmitter / Signal conditioning
- Isolating converters
- Safety and Monitoring Devices
- Power Electronics
- Calibration and Testing



“Measuring Data Acquisition“

- Data Logging and Monitoring
- Test Bench Measurement Technology
- Renewable Energies



... professional Instruments “MADE IN GERMANY”