



Instruction Manual

DR08-15

Turbine Flow Sensor



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Safety Information

General Instructions

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories.

Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions!

The work safety instructions in this manual as well as the safety, accident prevention and environmental protection regulations generally valid for the work area must be observed.

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

Proper Usage

The flow meters DR08-15 are designed to monitor continuous flow rates of liquids which do not attack the device materials. All other usage is regarded as being improper and outside the scope of the device.

In particular, applications in which shock loads occur (for example, pulsed operation) should be discussed and checked in advance with our technical staff.

The series DR08-15 flow meter devices should not be deployed as the sole agents to prevent dangerous conditions occurring in plant or machinery. Machinery and plant need to be designed in such a manner that faulty conditions and malfunctions do not arise that could pose a safety risk for operators.

Dangerous substances

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

Qualified Personnel

The DR08-15 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

Inward Monitoring

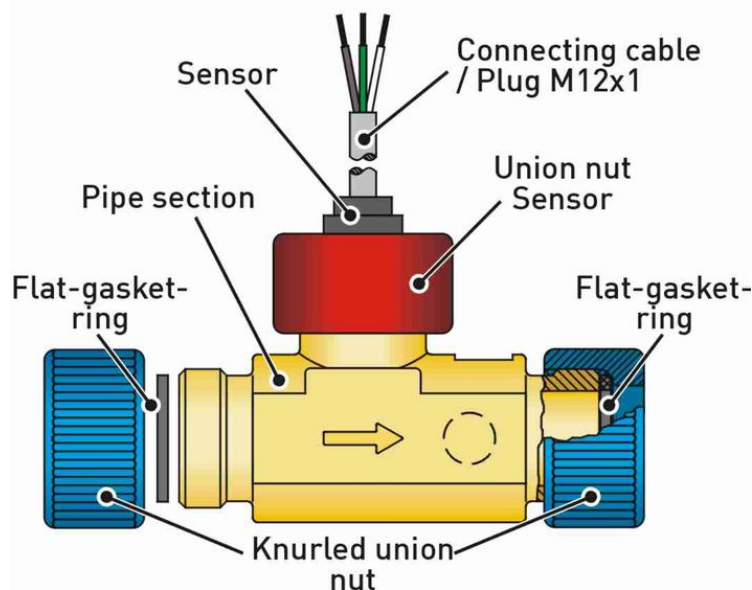
Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked.

Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

Device description

The flow sensors of the series DR08-15 are transducers for flow rate and total flow measurement.

Thanks to its particularly compact design, its very wide measuring range and its convincing measuring accuracy, there are almost unlimited application possibilities.





CAUTION! Malfunction due to bubbles!

Gas bubbles which are also formed by cavitation in the medium can cause a malfunction of the sensor and must be prevented.

Observe the following instructions in order to achieve highest-possible measurement accuracy and specified output signal:

- Before installing the turbine flow monitor flush the pipe carefully. You avoid a blocking of the turbine caused by particles from the pipe installation.
- The installation position of the flow monitor is unreserved. If it is installed into vertical pipes, the flow direction is preferably from below upward. You must avoid a free outlet.
- The arrow which is placed on the flow monitor (➔) shows the only permitted flow direction.
- In order to achieve the best measurement accuracy, a straight tube in front of the flow monitor must be retained, min 10 x DN. Behind the flow monitor, a straight outlet tube of 5 x DN must be kept.
The internal diameter of the in- and outlet tubes must correspond with the internal diameter of the flow monitor. Before and behind the stabilization tubes, the line may be contracted or enlarged.
In practice these instructions often cannot be observed. Then the pulse rate and the measurement accuracy can be affected.
- The flow medium to be monitored should preferably contain as few solid particles as possible.
Present particles must not exceed a diameter of 0.63 mm. If necessary, install a screen filter!
- The material of the devices is not suitable for monitoring oils. The strength of the used plastic parts would be considerably reduced.
- **Attention:**
The union nut of the sensor is sealed and must not be opened!
If this component is opened, the fixation of the turbine system loosens and it is damaged.

Installation in piping:

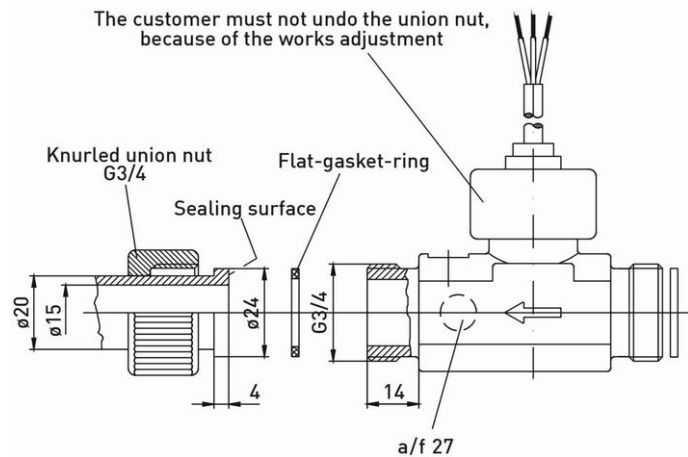
Now you can install the flow sensor in the piping system which was prepared.

Note:

- Only use a suitable sealant for sealing.
If the male thread is to be sealed, make sure that no fibrous sealants (hemp or Teflon tape) get into the flow.

Installation:

- ✚ Make sure that your piping system has a collar. The face of the collar serves as sealing area. The collar is pressed against the flat seal by the provided knurled union nut.
- ✚ Now install the turbine. Make sure that the provided seals fit properly and tighten the union nuts.
- ✚ You must tighten the plastic union nuts with a torque of max. 8 Nm. The brass union nuts with 30 Nm.



Electrical Connection

Attention: We recommend using only shielded connection cables, whereby the shield must be grounded at one end (on the side of the wire ends).

Electrical connection with 4-pin plug M12x1:

Screw the 4-pin plug M12x1 onto the socket and tighten it with a tightening torque of max. 1 Nm.

DR08-15 with pulse output:

The output signal of the device is a frequency signal proportional to the flow rate. The signal shape is a rectangle whose amplitude corresponds approximately to the supply voltage. It is an open collector signal, NPN or PNP switching.

The following electronic device should have a load resistance (pull-up or pull-down resistance) of 5 k Ω in the input.

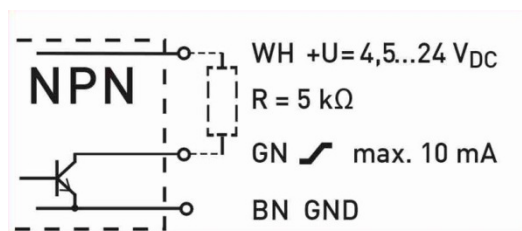
Schematic diagram:

The connection is made via 3 wires; the supply voltage must be applied between +U and GND (ground), the output signal can be tapped between \neg and GND. The colour assignment of the connecting cable or the pin assignment of the plug can be seen in the connection diagram on the type plate.

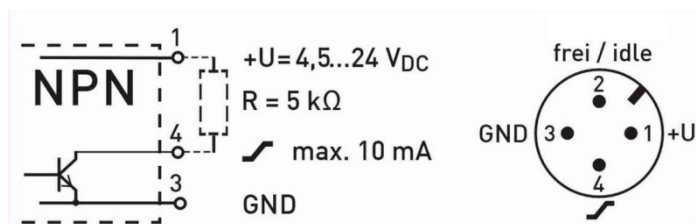
Colour code:

BN = brown
BK = black
BU = blue
GN = green
WH = white
R = resistor

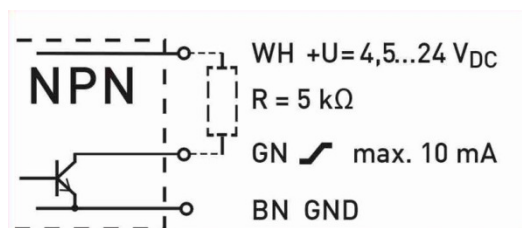
DR08-15 with Hall-sensor and connection cable:



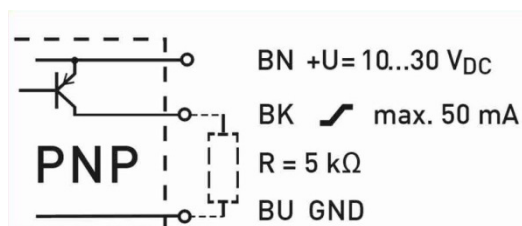
DR08-15 with Hall-sensor and plug M12x1:



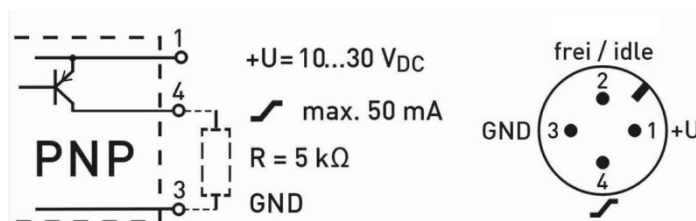
DR08-15 with Hall-sensor, and connection cable, Pmax: 300 bar



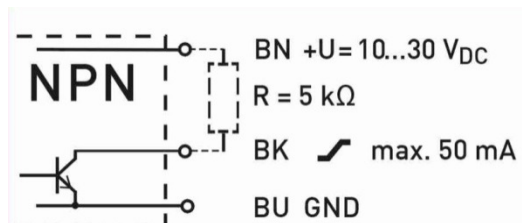
DR08-15 with inductive sensor and connection cable, PNP:



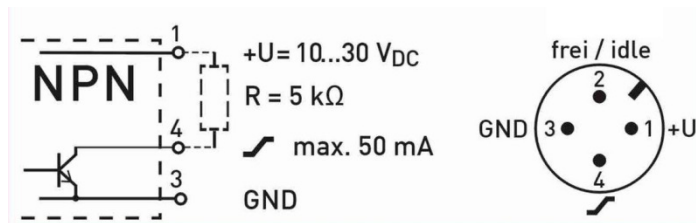
DR08-15 inductive sensor and plug M12x1, PNP:



DR08-15 with inductive sensor and connection cable, NPN:

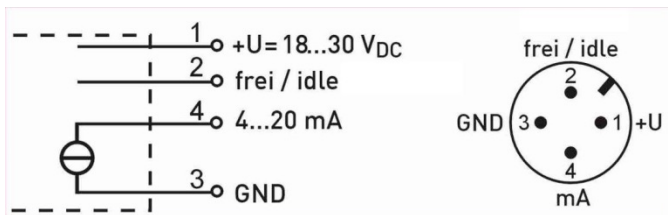


DR08-15 inductive sensor and plug M12x1, NPN:

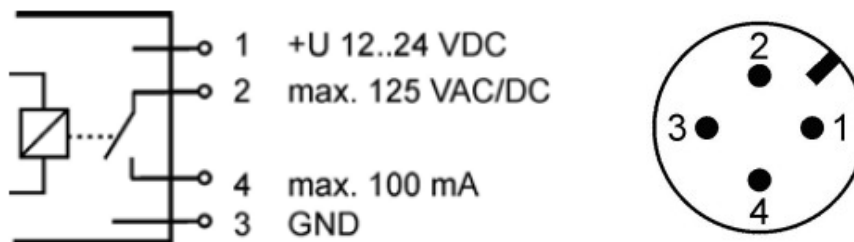


Connection diagram for electric options:

DR08-15 with analogue output (option Ax):



DR08-15 with mounted switching output (option VE):



Pinout:

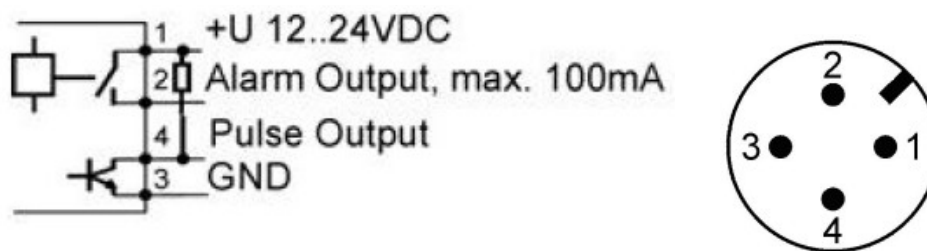
PIN 1: Supply voltage +U 12...24 V_{DC}

PIN 2/4: Switching contact max. 125 V_{AC/DC}, max. 100 mA

PIN 3: GND (Ground)

breaking with decreasing flow

DR08-15 with mounted switching output and additional pulse output (option VEP):



Pinout:

PIN 1: Supply voltage +U 12...24 V_{DC}

PIN 2: Alarm output max. 100 mA

PIN 3: GND (Ground)

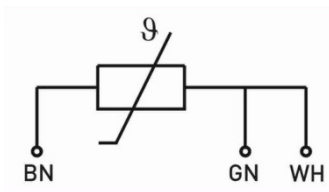
PIN 4: Pulse output, max. 100 mA

contact opens when flow drops below minimum setting

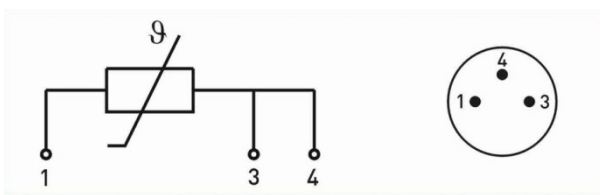
Integrated temperature sensor (optional):

Optionally, the flow monitor can be equipped with an integrated temperature sensor. Connect the wiring as shown in the circuit diagram.

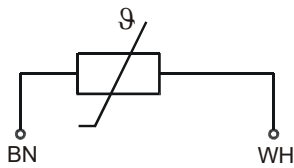
Pt100, class B, 3-wire with connection cable:



Pt100 / Pt1000, class B, 3-wire with plug M8:



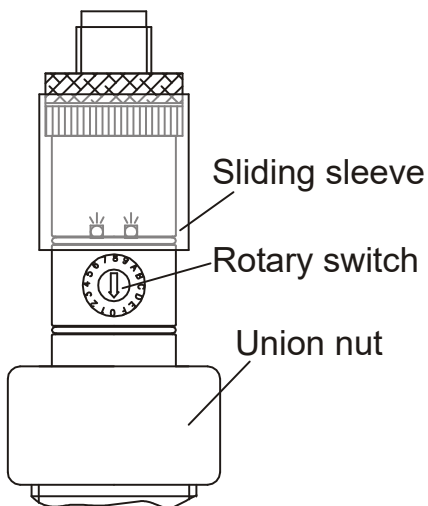
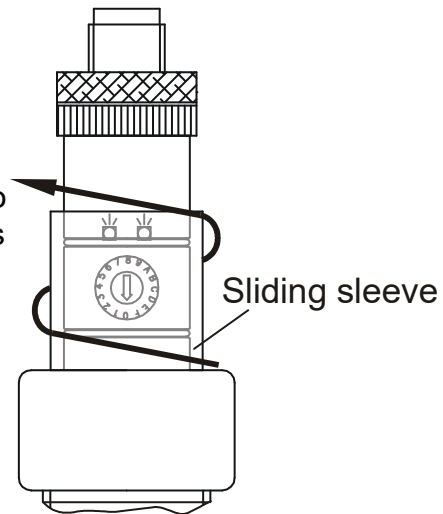
Pt1000, class B, 2-wire with connection cable:



Adjustment of switching points (for option VE und VEP)

You can adjust the switching points with the rotary switch above the red union nut.

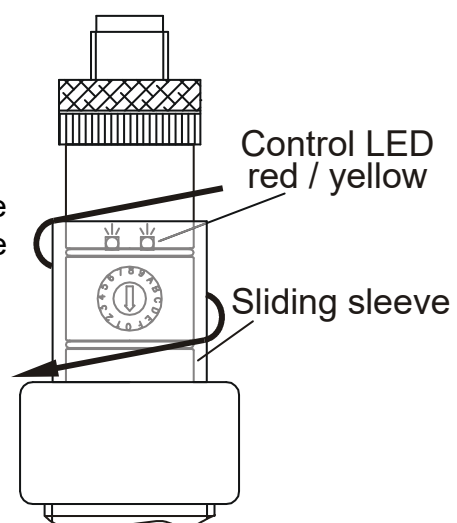
Push the sliding sleeve in a **rotating** movement to the top of the casing, until the adjustment bore is accessible.



Adjust the rotary switch with a small screw driver to the requested switching point.

There are 16 different rotary switch positions available (0 to F, resting).

After adjustment, you must push the sliding sleeve again with a **rotating** movement down over the adjustment bore **and** the two O-rings.



ATTENTION:

The degree of protection IP54 can only be obtained, when the sliding sleeve is seated correctly and a female plug is placed in position.

Two light emitting diodes are optically signalling the monitoring of the flow.

- Yellow LED: volume flow sufficient = „OK“
- Red LED: shortage of flow,
i.e. volume flow insufficient = „ALARM“

Attention:

For functional safety, the M12 male plug installed on top of the upper casing must not be screwed off.

Switching point tables:

Switch position:	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Switching point decreasing flow [l/min]	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,5	5,5	7,5	9,5	11,5	15,5	19,5	24,5	29,5
Switching point increasing flow*	0,5 l/min above the switch-off value															

* The stated values refer to operation with water at 20 °C. Monitoring of fluids with higher viscosities is possible with the effect of deviations from mentioned values.

Cleaning and Maintenance

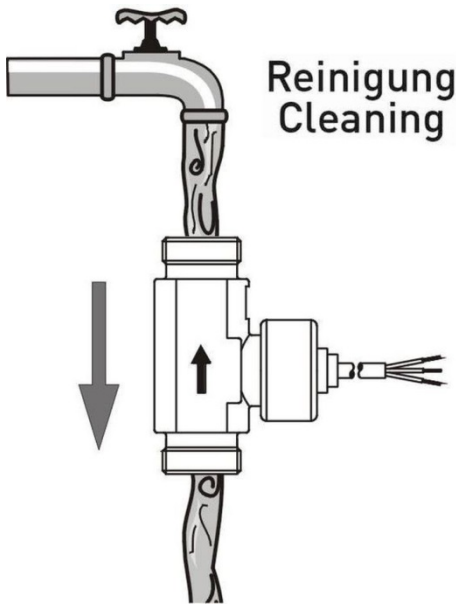
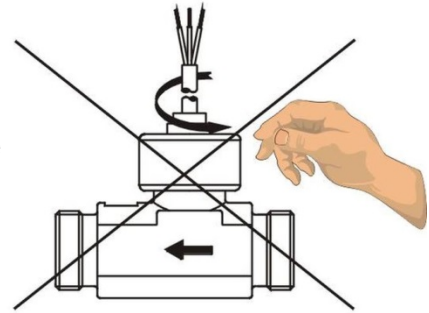
Attention:

The upper union nut (red) is sealed!

It must not be opened.

If this component is opened, the fixation of the turbine system loosens and it is damaged.

A factory repair will be necessary!

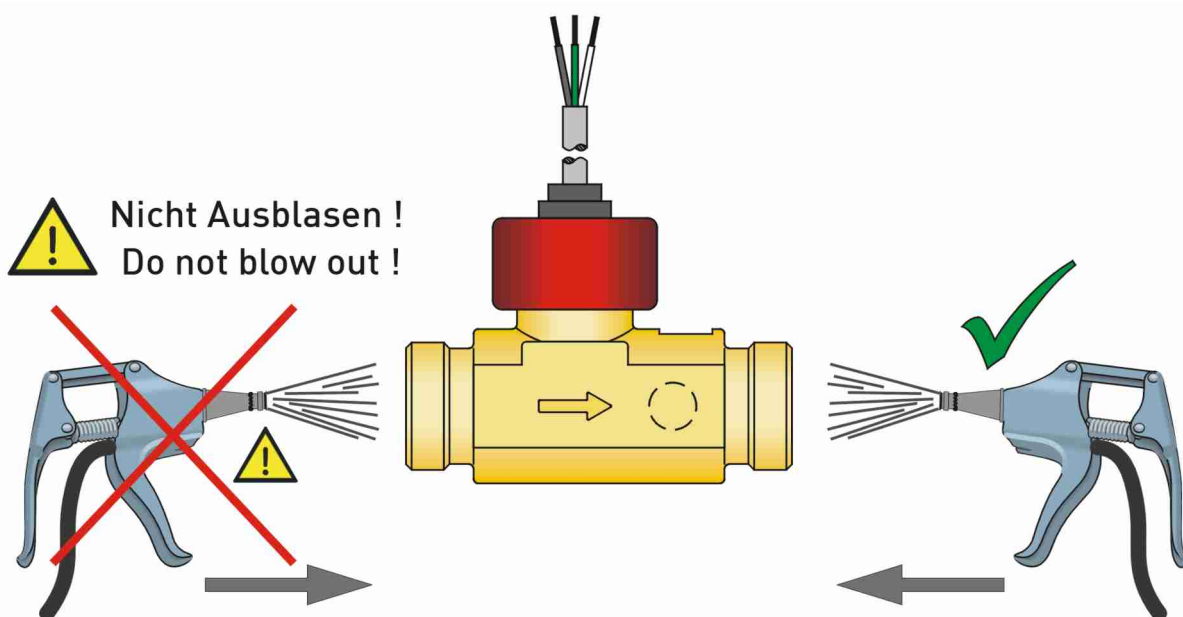


Reinigung
Cleaning

To remove dirt from the flow sensor, you should flush it with water always in opposite direction to the flow.

Warning:

A possible blowing out of the device with compressed air must only be carried out in opposite direction to the flow.



Turbine flow sensor with Hall-sensor and pulse output:

DR08-15.S.x.H...	
Characteristics measurement device *1)	
Measuring range	2...40 l/min • with continuous load max. 20 l/min
Measuring accuracy	±0,4 l/min
Repeatability	±0,1 l/min
Signal output from	≥0,3 l/min
Sensor	Hall-effekt-sensor
Characteristics output signal	
Pulse rate / K factor	855 pulses/l
Resolution	1,2 ml/pulse
Signal shape	square wave signal NPN open collector
Signal current	max 10 mA
Pull-up/down resistor	5 kΩ (recommendation)
Electrical characteristics	
Supply voltage	4,5...24 VDC
Electrical connection: - Cable, shielded T _{max} = - 4-pin plug	1,5 m PVC-wire 70 °C M12x1
Degree of protection (EN 60529)	IP54
Process variables	
Medium temperature, max.	85 °C
Medium temperature, min.	0 °C, non freezing
Ambient temperature	0...75 °C
Nominal diameter	DN 15
Nominal pressure	PN 10
Max. particle size in medium	0,5 mm
Process connection	G¾ male thread with union nuts and gaskets

*1) The stated values refer to operation with water at 20 °C. Monitoring of fluids with higher viscosities is possible with the effect of deviations from mentioned values.

Turbine flow meters with pulse output (Hall-sensor and inductive sensor):

Model	DR08-15.S.x.P...	DR08-15.S.x.I...
Characteristics measurement device *1)		
Measuring range	2...40 l/min • with continuousload max. 20 l/min	
Measuring accuracy	±0,4 l/min	±0,2 l/min
Repeatability	±0,1 l/min	±0,05 l/min
Signal output from	≥0,3 l/min	
Sensor	Hall-effekt-sensor	inductive proximity switch
Characteristics output signal		
Pulse rate / K factor	915 pulses/l	1795 pulses/l
Resolution	1,1 ml/pulse	0,6 ml/pulse
Signal shape	square wave signal NPN open collector	square wave signal PNP or NPN open collector
Signal current	max 10 mA	max. 50 mA
Pull-up/down resistor	5 kΩ (recommendation)	
Electrical characteristics		
Supply voltage	4,5...24 VDC	10...30 VDC
Electrical connection: - Cable, shielded T _{max} = - 4-pin plug	1,5 m silicone-wire 150 °C -/-	2 m (PVC) 70 °C M12x1
Degree of protection (EN 60529)	IP54	
Process variables		
Medium temperature, max.	150 °C	85 °C
Medium temperature, min.	0 °C, non freezing	
Ambient temperature	0...70 °C	
Nominal diameter	DN 15	
Nominal pressure	Pmax: 300 bar	PN 10
Max. particle size in medium	0,5 mm	
Process connection	brass pipe section: G ¾ male thread with union nuts stainless steel pipe section: G ¾ male thread or G ¾ female thread	G ¾ male thread with union nuts and gaskets

*1) The stated values refer to operation with water at 20 °C. Monitoring of fluids with higher viscosities is possible with the effect of deviations from mentioned values.

Turbine flow sensors with analogue output, option Ax:

Version Ax	
Characteristics measurement device *1)	
Measuring range (See type plate for scaling)	0...5 l/min 0...10 l/min 0...20 l/min 0...40 l/min • with continuous load max. 20 l/min
Measuring accuracy - Turbine - Transducer	±0.4 l/min ±1.25 % of reading
Repeatability	±0.1 l/min
Signal output from	≥0,3 l/min
Sensor	Hall effect sensor
Characteristics analogue output	
Output signal	4...20 mA
Signal current	~ 26 mA
Max. load	250 Ω against GND
Residual ripple	0.2 mA (peak to peak) over the entire range
Electrical characteristics	
Supply voltage	18...30 VDC
Max. current consumption	30 mA
Type	3-wire, galvanically not separated, common GND of power supply and output signal
Electrical connection	4-pin plug connector, M12x1
Degree of protection (EN 60529)	IP54
Process variables	
Medium temperature, max.	80 °C
Medium temperature, min.	0 °C, non-freezing
Ambient temperature	0...75 °C
Nominal diameter	DN 15
Nominal pressure	PN 10
Max. particle size in medium	0.5 mm
Process connection	G¾ male thread with union nuts and gaskets

*1) The stated values refer to operation with water at 20 °C. Monitoring of fluids with higher viscosities is possible with the effect of deviations from mentioned values.

Materials in contact with fluid

with Hall-sensor:

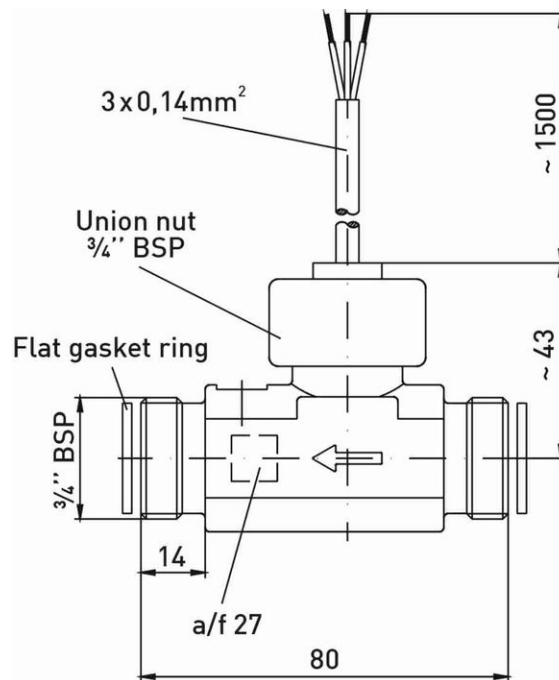
Type	DR08-15.S.K.H... PPE	DR08-15.S.M.H... brass
Pipe section	PPE+PS Noryl™ 30 % glass fibre reinforced	brass
Sensor housing	PPE+PS Noryl™ 30 % glass fibre reinforced	
Turbine system / rotor	PEI ULTEM™	
O-ring / gasket	NBR	
Bearing system / shaft	Shaft Arcap AP1D with hard metal pins in sapphire bearings	
Bearing support	Arcap AP1D	
Rotor assembly	Hard ferrite magnet	
Temperature sensor (optional)	Brass or stainless steel 1.4571	
Screen filter	POM / Stainless steel	

High pressure model and with inductive sensor:

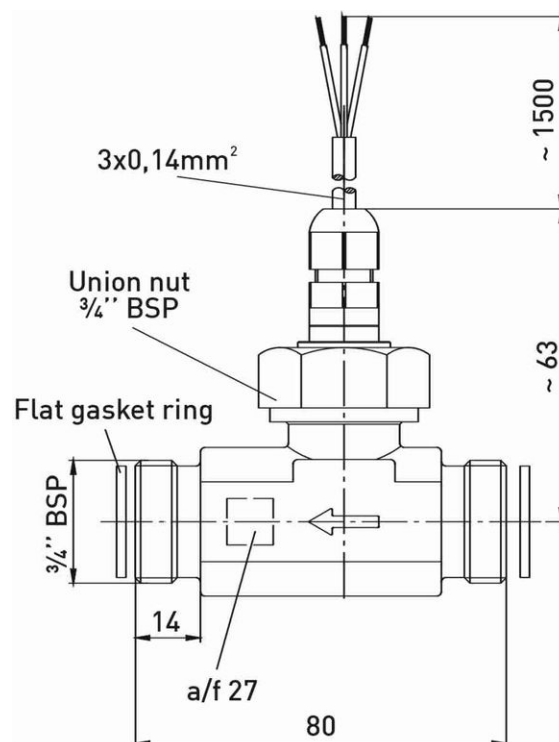
Type	DR08-15.S.M.P brass	DR08-15.S.V.P stainless steel	DR08-15.S.K.I PPE	DR08-15.S.M.I brass
Pipe section	Brass	Stainless steel 1.4571	PPE+PS Noryl™ 30 % glass fibre reinforced	Brass
Sensor housing	Brass	Stainless steel 1.4571	PPE+PS Noryl™ 30 % glass fibre reinforced	
Turbine system / rotor	PEEK Victrex™		PEI ULTEM™	
O-ring / gasket	FKM		NBR	
Bearing system / shaft	Shaft Arcap AP1D with hard metal pins in sapphire bearings			
Bearing support	Arcap AP1D			
Rotor assembly	Hard ferrite magnet		Stainless steel pins	
Temperature sensor (optional)	-/-		Brass or Stainless steel 1.4571	
Screen filter	-/-		POM / Stainless steel	

Dimensions

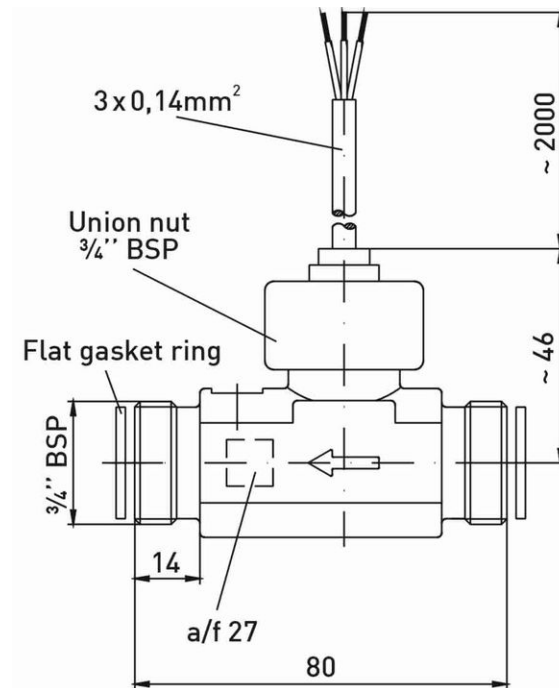
DR08-15.S.K.H... (plastic version, Hall-sensor, with connection cable):



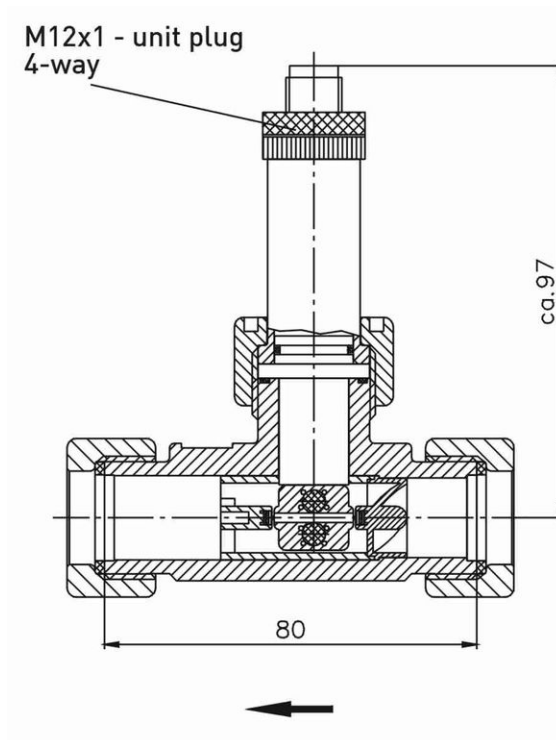
DR08-15.S.M.P... (brass version, Hall-sensor, 300 bar):



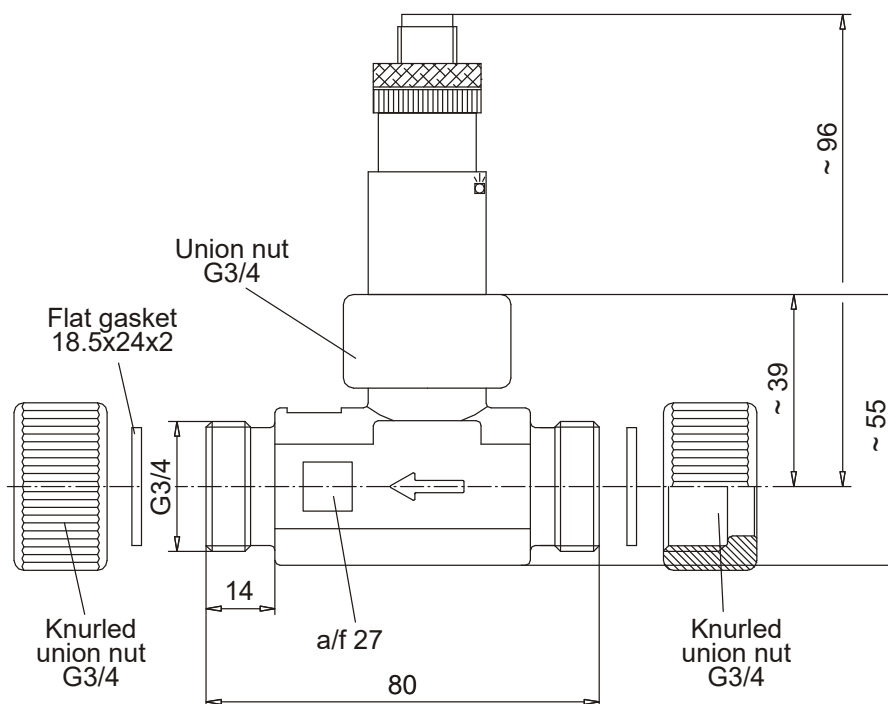
DR08-15.S.x.I... (inductive sensor, connection cable):



DR08-15 with option Ax (analogue output):



DR08-15 with option VE or VEP (Switching output):



DR08

Turbine Flow Sensor

- for low viscosity media
- high measuring accuracy and resolution
- very low series dispersion
- made of plastic, brass or stainless steel
- high temperature resistance
- small installation dimensions
- temperature measurement can be integrated
- ranges: 2...40 l/min up to 0,4...25 m³/h
- P_{max}: 300 bar, T_{max}: 150 °C



Description:

The flow meters of the DR08 series operate according to the turbine wheel principle.

The liquid flows into the turbine body and causes a rotor to rotate in proportion to the flow. Depending on the model, this rotation is converted into an output frequency by an inductive proximity sensor or a Hall sensor.

One of the main features of the DR08 turbine flowmeters is the very low series scatter of identical devices. This eliminates the need for individual adjustment of the individual turbines to the respective downstream electronics, making the DR08 ideally suited for use in series applications

Typical applications:

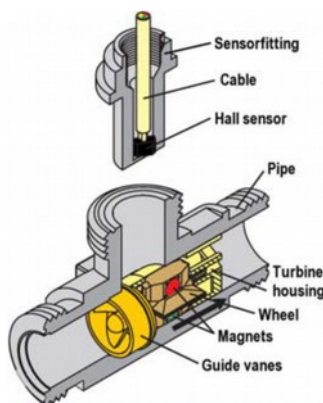
Due to their design, large measuring range and high measuring accuracy, the DR08 turbine flowmeters are suitable for applications in these areas:

- cooling water measurement
- medical technology
- plastics industry
- solar plant
- machine tools
- photo laboratory systems
- tapping and dosing systems
- cooling and heating applications
- heat quantity measurement

Measuring Principle:

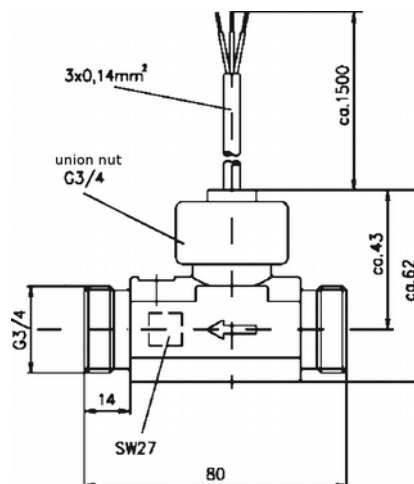
DR08-15 : measuring range 2...40 l/min Axial turbine flow meter with guide vanes.

The liquid flowing into the flow meter is divided into four partial jets by the guide vanes.

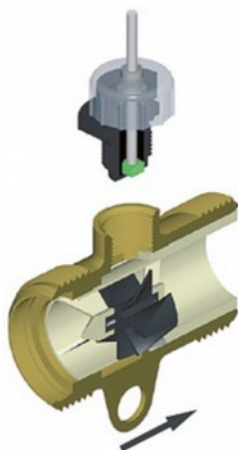


These jets hit the rotor from four directions and cause it to turn. Due to the uniform load on the bearing from four sides, most of the forces are balanced and wear is reduced to a minimum. The extremely hard bearing materials, sapphire and tungsten carbide, also guarantee an exceptionally long service life.

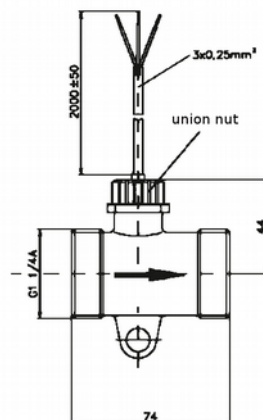
Dimensions:



DR08-25: measuring range 4...160 l/min Axial turbine flowmeter

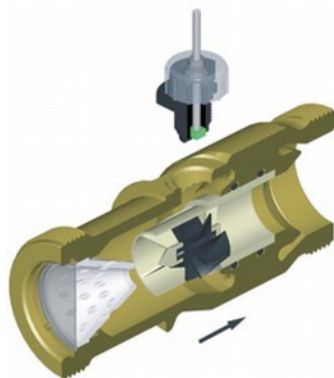


The liquid flowing into the flow sensor causes the turbine wheel to rotate. Thanks to high-quality sapphire bearings and low speeds, the turbine achieves an exceptionally long service life. The rotor speed is converted into an electrical pulse signal (frequency).

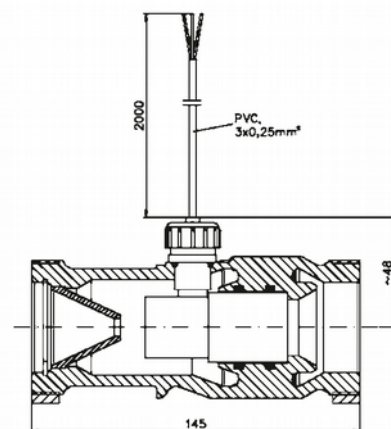


DR08-40: measuring range 0,4...25 m³/h Axial turbine flow meter with partial flow evaluation

A plastic turbine system is located in the centre of the brass turbine body. Due to its design, there is an annular gap around the turbine system.



One part of the liquid flow causes the turbine to rotate, while the other part flows unhindered through the annular gap. The rotor speed is now converted into an electrical pulse signal (frequency). High-quality sapphire bearings and low speeds ensure that the turbine has an exceptionally long service life.



Measuring range, materials and models DR08-15

Order number:	DR08-15	S.	K.	I.	P.	0.	0.	A.	H
Miniature turbine flowmeter for low viscosity media									
Measuring range: S = 2...40 l/min (continuous operation max. 20 l/min)									
Material: K = PPE Noryl housing (not for high pressure version) M = brass housing V = stainless steel housing (only in high pressure version P)									
Model: I = with inductive sensor (not in stainless steel) H = with Hall sensor P = with Hall sensor up to 300 bar, 150 °C (high pressure version)									
Output signal: P = PNP (with inductive sensor only) N = NPN M = transmitter (with option Ax, VE, VEP)									
Electrical connection: P = 1,5 m PVC cable L = 1,5 m silicone cable (only for high temp. version P) S = plug connection M12x1, 4-pin (without mating connec.)									
Additional temperature sensor: 0 = without 1 = Pt100 in brass case 2 = Pt100 in stainless steel case 3 = Pt1000 in brass case 4 = Pt1000 in brass case									
Process connection (con. adapter recommended): A = G 3/4 male thread (Standard) I = G 3/4 female thread (only for high pressure-version P in stainless steel) Connection adapter according to table „Connection adapter“ (separate position)									
Options: 0 = without H = with integrated sieve filter, 0,5 mm (Tmax. 60 °C), POM, st. steel Ax = with mounted transmitter 4...20 mA (x = measuring range end value 5, 10, 20 or 40 l/min) VE = with mounted switching output VEP = with mounted switching output and additional pulse output (5-pin connector required)									

Technical Data:

Materials:

DR08-15.x.K:	flow housing and sensor: PPE Noryl GFN3 turbine insert and impeller: PEI ULTEM O-ring: NBR, optional FKM bearing / axle: ARCAP AP1D with tungsten carbide pins and sapphire bearings impeller assembly: hard ferrite magnet for Hall sensor, st. steel for inductive sensor transducer
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Materials (continued):

DR08-15.x.M:	flow housing: brass transducer: PPE Noryl GFN3, brass for high pressure version turbine insert and impeller: PEI ULTEM, PEEK Victrex bei high pressure version O-ring: NBR, optional FKM bearing / axle: ARCAP AP1D with tungsten carbide and sapphire bearings impeller assembly: hard ferrite magnet for Hall sensor, st. steel for inductive sensor
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DR08-15.x.VP:	flow housing: stainless steel 1.4571 transducer: stainless steel 1.4571 turbine insert and impeller: PEEK Victrex O-ring: FKM bearing / axle: ARCAP AP1D with tungsten carbide and sapphire bearings impeller assembly: hard ferrite magnet
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max. pressure:

DR08-15.x.K:	PN 10
DR08-15.x.M.I / H:	PN 10
DR08-15.x.M.P:	300 bar (up to 150 °C)
DR08-15.x.V:	300 bar (up to 150 °C)

max. medium temperature:

DR08-15.x.K:	85 °C
DR08-15.x.M.I / H:	85 °C
DR08-15.x.M / V.P:	150 °C

accuracy:

DR08-15.x.x.H:	± 1 % of full scale
DR08-15.x.x.P:	± 1 % of full scale (bis 20 l/min)
DR08-15.x.x.I:	± 0,5 % of full scale

repeatability:

DR08-15.x.x.H/P:	± 0,1 l/min
DR08-15.x.x.I:	± 0,05 l/min

supply:

DR08-15.x.x.H / P:	4,5...24 VDC
DR08-15.x.x.I:	10...30 VDC

output signal:

DR08-15.x.x.H / P:	square-wave pulses, 855 (H) / 915 (P) ppl NPN open collector max. 10 mA signal current
DR08-15.x.x.I:	square-wave pulses, 1795 ppl NPN or PNP open collector max. 50 mA signal current

signal output: from 0,3 l/min

max. particle size: 0,5 mm

protection class: IP54

Measuring range, materials and models DR08-25

Order number:	DR08-25	S.	K.	H.	N.	P.	1.	A.	H.
Miniature turbine flowmeter for low viscosity media									
Measuring range: S = 4...160 l/min (continuous operation max. 80 l/min)									
Material: K = PP housing (not for high pressure version M) M = brass housing V = stainless steel housing (only for high pressure version M)									
Model: H = with Hall sensor bis PN 10 M = with Hall sensor bis PN 50									
Output signal: N = NPN M = transmitter (with option Ax, VE, VEP)									
Electrical connection: P = 2 m PVC cable (only DR08-25.x.K.H or ...M.H) S = plug connection M12x1, 4-Pin									
Additional temperature sensor: 0 = without 5 = Pt100 for DR08-25.S.M see table „connection adapters“									
Process connection (con. adapter recommended): A = G 1 1/4 AG connection adapter acc. to table „connection adapter“ (separate position)									
Options: 0 = without H = with sieve filter 0,63 mm made of stainless steel, incl. O-ring made of EPDM Ax = with mounted transmitter 4...20 mA (x = measuring range end value 60, 100 or 160 l/min) VE = with mounted switching output VEP = with built-on switching output and additional pulse output (5-pin connector required)									

Technical Data:

Materials:

DR08-25.x.K:	flow housing : PP sensor sleeve and turbine insert: PPE, Noryl GFN1630V O-ring: EPDM bearing / axle: PA, sapphire, stainless steel 1.4539 impeller: PPE Noryl GFN 1520V impeller assembly: hard ferrite magnet
DR08-25.x.M:	flow housing: brass sensor sleeve and turbine insert: PPE, Noryl GFN1630V sensor sleeve for high pressure version: brass turbine insert: PPE, Noryl GFN1630V O-ring: EPDM bearing / axle: PA, sapphire, stainless steel 1.4539 impeller: PPE Noryl GFN 1520V impeller assembly: hard ferrite magnet
DR08-25.x.V:	flow housing : stainless steel 1.4571 sensor sleeve: stainless steel 1.4571 turbine insert: PPE, Noryl GFN1630V O-ring: EPDM bearing / axle: PA, sapphire, stainless steel 1.4539 impeller: PPE Noryl GFN 1520V impeller assembly: hard ferrite magnet

max. pressure:

DR08-25.x.K.:	PN 10
DR08-25.x.M.H.:	PN 10
DR08-25.x.M.M.:	PN 50
DR08-25.x.V.:	PN 50

max. medium temperature:

DR08-25.x.K.:	80 °C at 2 bar, 60 °C at 5 bar, 30 °C at 10 bar
DR08-25.x.M/V.:	85 °C

accuracy: ± 5 % of measured value
(bis 5 l/min ± 7 % of measured value)

repeatability: ± 0,5 %

supply

DR08-25.x.x.H.:	10...30 VDC
DR08-25.x.x.M.:	6,5...24 VDC

output signal: square wave pulses, 65 ppl
NPN open collector
max. 19 mA signal current

signal output: ab 1 l/min

max. particle size: 0,63 mm

protection class: IP54

Flow

Measuring range, materials and models DR08-40

Order number:	DR08-40	S.	M.	H.	N.	O.	O.	A.	T.
Miniature turbine flowmeter for low viscosity media									
Measuring range: S = 6,7...417 l/min (0,4...25 m³/h)									
Material: M = brass housing									
Model: H = with Hall-Sensor bis PN 10 M = mit Hall-Sensor bis PN 50									
Output signal: N = NPN M = transmitter (with option Ax, VE, VEP)									
Electrical connection: P = 2 m PVC cable (only DR08-40.S.M.H.) S = plug connector M12x1, 4-Pin									
Additional temperature sensor: 0 = without 5 = Pt100 see table „Process connections“									
Process connection (con. adapter recommended): A = G 2 male thread connection adapter acc. to table „connection adapter“ (separate position)									
Options: 0 = without Ax = with mounted transmitter 4...20 mA (x = measuring range end value 150, 250 or 400 l/min) VE = with mounted switching output VEP = with built-on switching output and additional pulse output (5-pin connector required)									

Technical Data:

Materials:

DR08-40: flow housing: brass
impeller: PPE Noryl GFN 1520V
sensor sleeve and turbine insert:
PPE Noryl GFN 1630V
sensor sleeve for high pressure version.:
brass
flow cone: POM
O-Ring: EPDM
bearing / axle: PA, sapphire,
stainless steel 1.4539
impeller assembly: hard ferrite magnet
retaining ring: stainless steel 1.4122

max. pressure:

DR08-40.x.M.H.: PN 10
DR08-40.x.M.M.: PN 50

max. medium temperature: max. 85 °C

accuracy: ± 7 % of measured value
(in the range 0,4...3 m³/h)
± 5 % of measured value
(in the range 3...25 m³/h)

repeatability: ± 0,5 %

supply:

DR08-40.x.x.H.: 10...30 VDC
DR08-25.x.x.M.: 6,5...24 VDC

output signal: square wave pulses, 26,6 ppl
NPN open collector
max. 19 mA signal current

signal output: ab 4,7 l/min

max. particle size: 0,63 mm

protection class: IP54

filter: flat filter 0,63 mm,
included in delivery

Connection adapter DR08-Z:

(including associated seal)

For DR08-15

Type DR08-Z.	Description:	in line with:	Tmax. / Pmax.
A15ST10K	hose nozzle, PA 6.6, d = 10 mm	DR08-15	20 °C bei 10 bar, 60 °C bei 2,5 bar
A15ST12K	hose nozzle, PP, d = 12 mm	DR08-15	20 °C bei 10 bar, 60 °C bei 2,5 bar
A15ST15K	hose nozzle, HDPE, d = 15 mm	DR08-15	20 °C bei 10 bar, 60 °C bei 2,5 bar
A15ST19K	hose nozzle, HDPE, d = 19 mm	DR08-15	20 °C bei 10 bar, 60 °C bei 2,5 bar
A15STW13K	hose nozzle, HDPE, angled, d = 13 mm	DR08-15	60 °C, PN 10
A15STW13M	hose nozzle, brass, d = 13 mm	DR08-15	80 °C, PN 10
A15KM22K	glue socket, PVC d = 22 mm	DR08-15	20 °C bei 10 bar, 60 °C bei 2,5 bar
A15SN20K	welding nipples, PP d = 20 mm	DR08-15	20 °C bei 6 bar, 60 °C bei 2,5 bar
A15VA10M	screwing, brass G 3/8 male thread	DR08-15	110 °C, PN 16
A15VA15M	screwing, brass G 1/2 male thread	DR08-15	110 °C, PN 16
A15VI10M	screwing, brass nickel plated G 3/8 female thread	DR08-15	110 °C, PN 16
A15VI15M	screwing, brass G 1/2 female thread	DR08-15	110 °C, PN 16
A15KL18M	compression fitting, brass, for copper tube d = 18 mm	DR08-15	110 °C, PN 6
A15KL22M	compression fitting, brass, for copper tube d = 22 mm	DR08-15	110 °C, PN 6
A15LA15M	solder connection, brass for copper tube d = 15 mm	DR08-15	90 °C, PN 16
A15LA18M	solder connection, brass for copper tube d = 18 mm	DR08-15	90 °C, PN 16

For DR08-25

Type DR08-Z.	Description:	in line with:	Tmax. / Pmax.
A25ST25K	hose nozzle, PP, d = 25 mm	DR08-25	20 °C bei 10 bar, 60 °C bei 2,5 bar
A25ST30K	hose nozzle, PP, d = 30 mm	DR08-25	20 °C bei 10 bar, 60 °C bei 2,5 bar
A25ST32K	hose nozzle, PP, d = 32 mm	DR08-25	20 °C bei 10 bar, 60 °C bei 2,5 bar
A25SM25K	welding socket, PP, for pipes da = 25 mm	DR08-25	20 °C bei 10 bar, 60 °C bei 2,5 bar
A25KM25K	glue socket, PVC, for pipes da = 25 mm	DR08-25	20 °C bei 10 bar, 60 °C bei 2,5 bar
A25VA25M- PT100	screwing, brass, with Pt100 in brass case, G 1 male thread	DR08-25	85 °C, PN 16
A25VA25M	screwing, brass, R 1 male thread	DR08-25	85 °C, PN 16
A25VA32M	screwing, brass, R 1 1/4 male thread	DR08-25	85 °C, PN 16
A25LA28M	solder connection, brass, for copper tube d = 28 mm	DR08-25	85 °C, PN 16
A25VA25V	screwing, stainless steel, R 1 male thread	DR08-25	85 °C, PN 16

For DR08-40

A40VA40M- PT100	screwing, brass, with Pt100 in brass case, G 1 1/2 male thread	DR08-40	85 °C, PN 16
A40VA40M	screwing, brass, R 1 1/2 male thread	DR08-40	85 °C, PN 16
A40VA50M	screwing, brass, G 2 male thread	DR08-40	85 °C, PN 16
A40LA42M	solder connection, brass, for copper tube d = 42 mm	DR08-40	85 °C, PN 16

Accessory: Connection cable SM12

Order number:	SM12.	4.	2.	G.
M12x1 connector with PVC cable				
Number of poles: 4 = 4-wire				
Cable length: 0 = without cable for self-assembly 2 = 2 m PVC cable (standard) 5 = 5 m PVC cable 10 = 10 m PVC cable				
Type: G = straight W = angled				



DR08...Ax

F/I transmitter with analogue output

All turbine flowmeters of the DR08 series can be equipped with an integrated F/I transmitter and thus provide an analogue signal output 4...20 mA instead of the pulse output.



Technical Data:

Output signal:	4...20 mA
Accuracy (Output signal):	± 1,25 % of measured value (plus the respective accuracy of the turbine flow sensor)
Current limitation:	approx. 26 mA
Scaling:	Different flow ranges, see order code flow sensor other scaling from 10 pieces possible
Power supply:	18...30 VDC
Max. current consumption:	30 mA
Max. burden:	250 Ω against GND
Residual ripple:	0,2 mA (peak-to-peak) over the entire range
Version:	3-wire, not galvanically isolated, common GND of supply voltage and output signal
Electrical connection:	4-pin plug, M12x1
Max. medium temperature:	depending on the Tmax of the flow sensor used, but max. 80 °C
Material of transmitter housing:	plastic PA
Protection class:	IP54

DR08...VE(P)

Limit value transmitter with 16 discretely adjustable switching points



- very wide switching range, therefore only 1 flow meter for all applications:
- safe monitoring of small volume flows
- absolutely exact switching point adjustment
- self-monitoring
- optical signalling by 2 LEDs

Description:

The heart of the DR08...-VE turbine flow meter is the extremely robust DR08 turbine, which has been used reliably in many large series applications for years.

The turbine supplies a flow-proportional frequency signal to a microprocessor. The microprocessor monitors the set minimum flow rate and activates the potential-free alarm contact if the flow rate falls below this value. Even a possible blockage of the turbine is reliably detected and reliably signalled.

In addition to the switching output (contact), a pulse signal is also available as an option. In addition to safe monitoring, a continuous or temporary measurement of the flow rate can also be carried out.

Typical Applications:

Monitoring of cooling circuits of high-quality equipment such as:

- laser systems
- HF generators, etc.

Switch position	Switching point [l/min]					
	DR08-15		DR08-25		DR08-40	
	rising	falling	rising	falling	rising	falling
0	1	0,5	5	3	10	7
1	1,5	1	7	5	13	10
2	2	1,5	8	6	19	15
3	2,5	2	10	8	24	20
4	3	2,5	12	10	30	25
5	3,5	3	14	12	35	30
6	4	3,5	17	15	40	35
7	5	4,5	20	18	47	40
8	6	5,5	22	20	58	50
9	8	7,5	27	25	75	65
A	10	9,5	33	30	90	80
B	12	11,5	38	35	115	100
C	16	15,5	44	40	150	130
D	20	19,5	55	50	190	160
E	25	24,5	75	70	230	200
F	30	29,5	105	100	310	275

The specified switching points refer to water, 20 °C.

Customer-specific switching point tables can be created for 25 or more devices.

Technical Data:

Switching point range (with falling flow) / accuracy:

DN 15: 0,5...29,5 l/min $\pm 2\%$ of the switching point + measurement accuracy of the turbine flow sensor

DN 25: 3...100 l/min $\pm 4\%$ of the switching point + measurement accuracy of the turbine flow sensor

DN 40: 7...275 l/min $\pm 6\%$ of the switching point + measurement accuracy of the turbine flow sensor

Switching point adjustment:

16 different switching points selectable by means of 16-digit rotary switch

Output / maximum contact load:

Switching output only:

potential-free contact, opening at flow underflow

max. contact load 125 VAC/DC, 100 mA

Switching output and pulse output:

switching output: against power supply

switching, max. contact load 100 mA

pulse output: flow proportional

frequency signal, NPN, max. 100 mA

Switching hysteresis: 0,5 l/min (DN 15)
2...5 l/min (DN 25)
3...35 l/min (DN 40)

Power supply: 12...24 VDC

Max. current consump.: 25 mA

Housing: plastic PA, transparent

indicators, internal: LED yellow = ok

LED red = alarm

Electrical connection: 4-Pin plug, M12x1

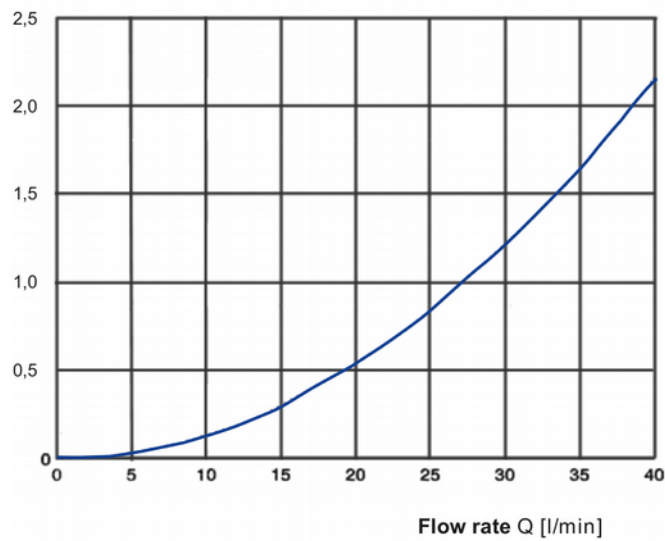
Max. medium temp.: depending on the T_{max} of the flow sensors used, but max. 80 °C

protection class: IP54

Pressure drop:

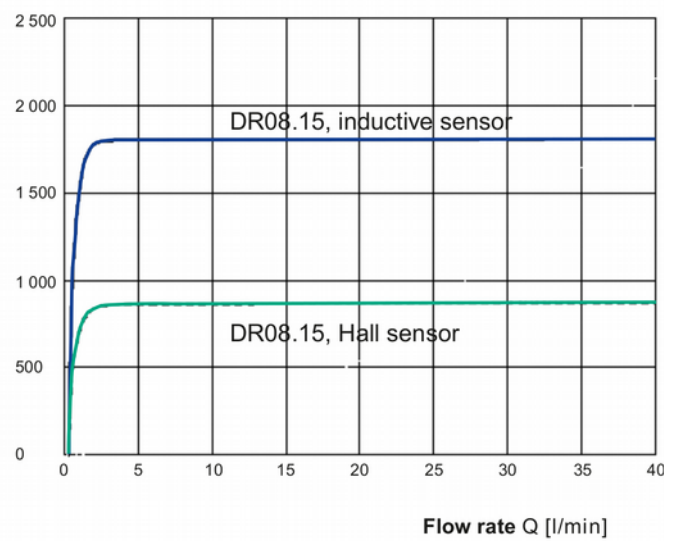
DR08.15

Pressure drop Δp [bar]



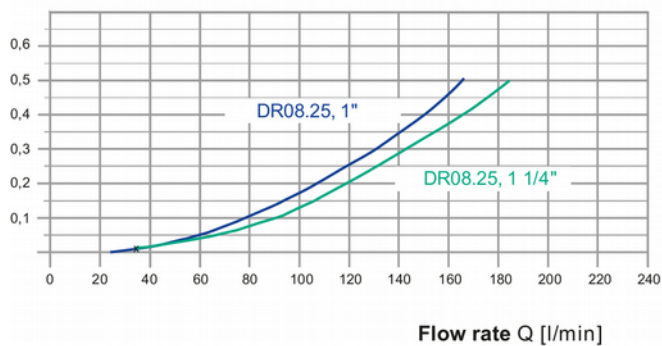
Pulse rates:

Pulse rate [1/l]

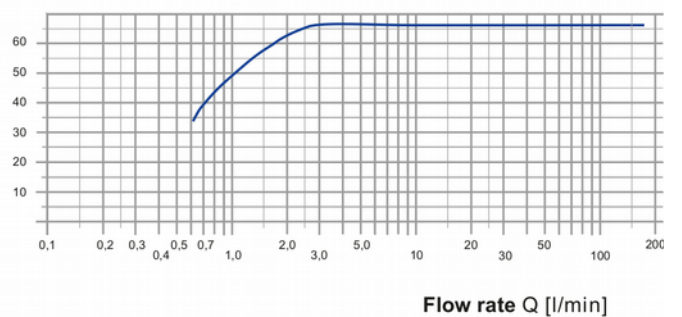


DR08.25

Pressure drop Δp [bar]



Pulse rate [1/l]



DR08.40

Pressure drop Δp [bar]

