

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:

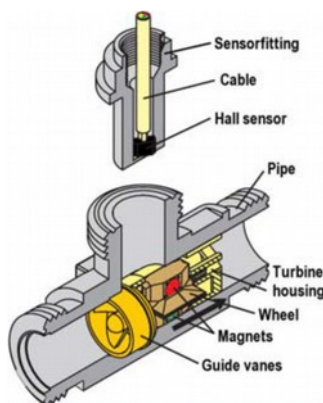
Due to their design, large measuring range and high measuring accuracy, the DR08 turbine flowmeters are suitable for applications in these areas:

- 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:

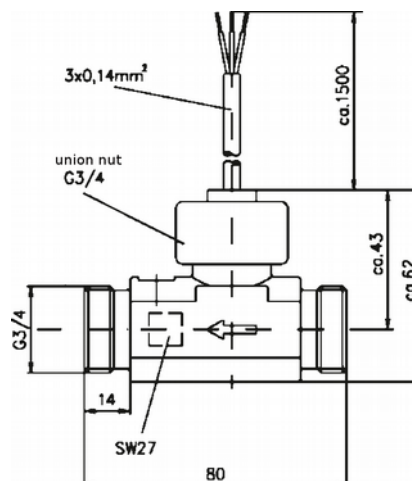
DR08-15 : measuring range 2...40 l/min Axial turbine flow meter with guide vanes.

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

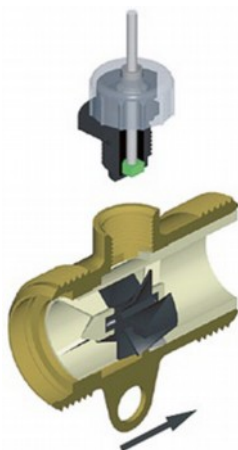


These hit the rotor from four directions and cause it to turn. Due to the uniform load on the bearing from four sides, most of the forces are balanced and wear is reduced to a minimum. The extremely hard bearing materials, sapphire and tungsten carbide, also guarantee an exceptionally long service life.

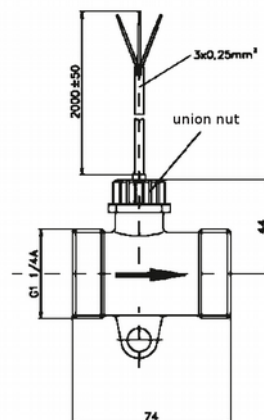
Dimensions:



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

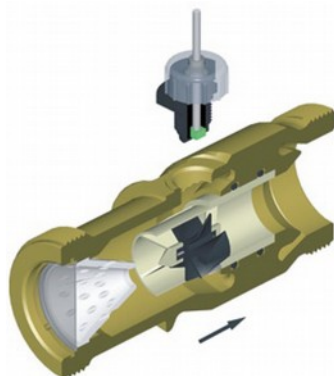


The liquid flowing into the flow sensor causes the turbine wheel to rotate. Thanks to high-quality sapphire bearings and low speeds, the turbine achieves an exceptionally long service life. The rotor speed is converted into an electrical pulse signal (frequency).

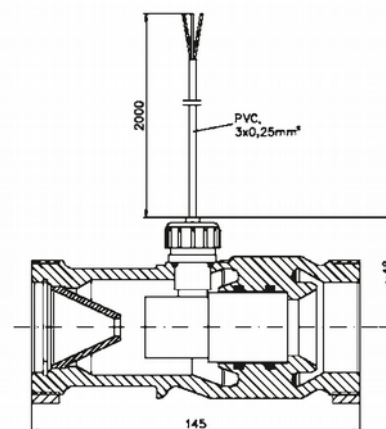


DR08-40: measuring range 0,4...25 m³/h Axial turbine flow meter with partial flow evaluation

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

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

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

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

Measuring range, materials and models DR08-40

Order number: DR08-40 S. M. H. N. 0. 0. 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 % vof 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

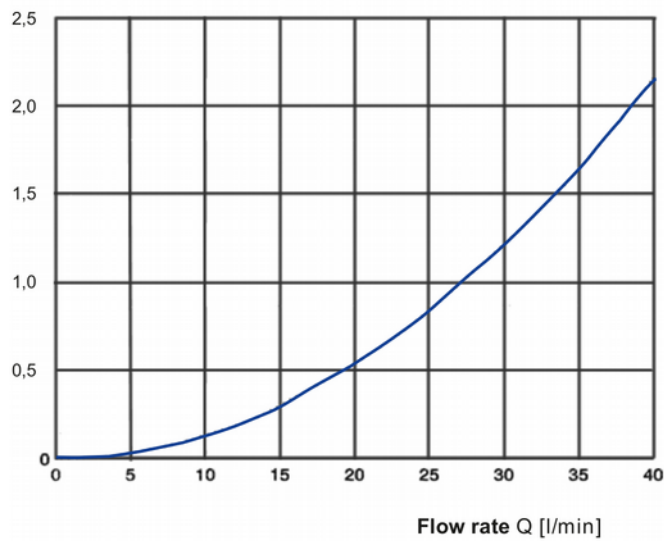
Max. medium temp.: depending on the T_{max} of the flow sensors used, but max. 80 °C

protection class: IP54

Pressure drop:

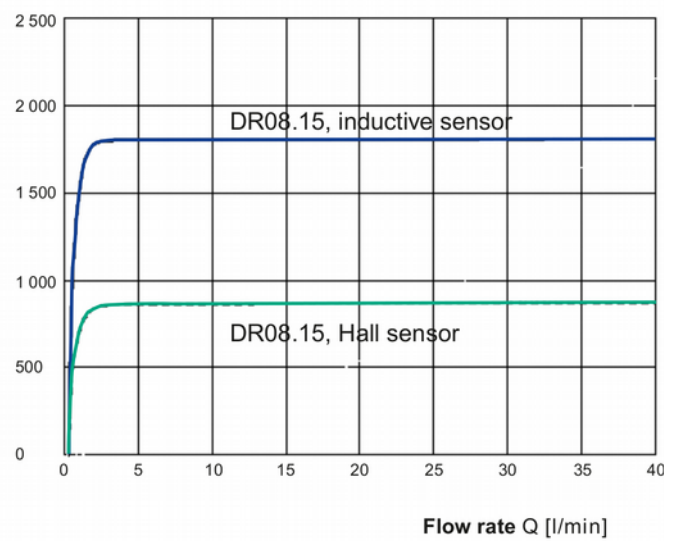
DR08.15

Pressure drop dp [bar]



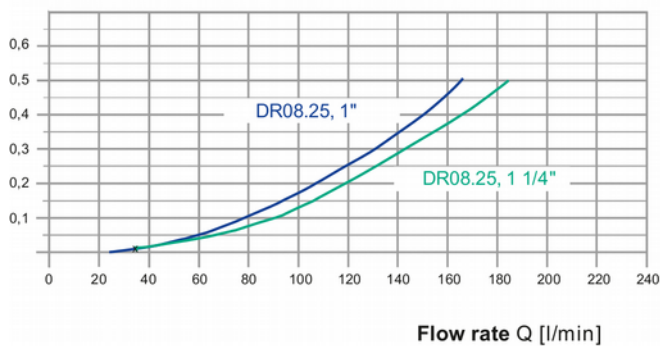
Pulse rates:

Pulse rate [1/l]

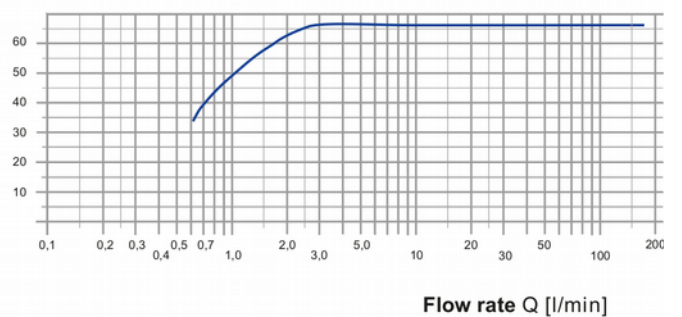


DR08.25

Pressure drop dp [bar]



Pulse rate [1/l]



DR08.40

Pressure drop dp [bar]

