



Turbine Wheel Flow Meter/Monitor for liquids



measuring
• monitoring
• analysing

DRS



- Measuring range: 2 - 40 l/min water
- Measuring accuracy: $\pm 1.5\%$ of full scale
- p_{max} : 200 bar; t_{max} : 80 °C (optional 150 °C)
- Viscosity range: low viscous
- Connection:
G $\frac{1}{2}$ female/male thread,
G $\frac{3}{4}$ male/male thread
 $\frac{3}{4}$ " NPT male/male thread
- Material:
PPO/PEI/brass/stainless steel
- Output:
pulses, 0 - 20, 4 - 20 mA,
Switching output NPN



S4

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Turbine Wheel Flow Meter/Monitor Model DRS

Application

KOBOLD model DRS flow meters are used for measuring and monitoring liquids. Due to its compact construction the mini turbine is suitable for use with machines with minimum available space.

Application Examples

Beverage industry, devices for use in automatic beverage retail systems, washing machines, vehicles, farm equipment, developing machines in the photographic and printed-circuit board industries.

Working Principle

The flow meter operates on the turbine wheel principle. The liquid first flows through a laminar flow element to eliminate turbulence and to route the flow stream to the turbine wheel. The turbine wheel then starts to rotate. This rotary motion is sensed non-contacting by magnets embedded in the turbine wheel and converted to a frequency signal. The frequency is proportional to the flow velocity.

Frequency divider, analogue output or compact electronics with LED display and limit contacts are available as options. An integrated temperature sensor for simultaneous measuring of flow rate and temperature are available as an additional option. The vane is sapphire-supported: this ensures a high degree of linearity and long service life.



Model Summary

- **DRS-0...K000, DRS-0...S000**
OEM version (without CE mark)
direct output from Hall-sensor signal
for DRS-K000 no optional temperature sensor available
DRS-0...S000 up to 150 °C medium temperature
- **DRS-...F300**
Pulse output
- **DRS-...F390**
Pulse output with adapted frequency
Factor 0.25...2
- **DRS-...L...**
Analogue output 0(4)-20 mA / 3-wire
- **DRS-...C30...**
With compact electronics, 3-digit LED display,
limit contacts, no optional temperature sensor available
- **DRS-...C34...**
With compact electronics
3-digit LED display, limit contact, analogue output
no optional temperature sensor available

Technical Details

Measuring range: 2 - 40 l/min water

Sensor pulse output: 384 Hz at 40 l/min
metal sensor (DRS-150; DRS-250)
352 Hz at 40 l/min
plastic sensor (DRS-350)

Max. operating pressure: 200 bar (DRS-150; DRS-250)
16 bar (DRS-350)

Temperature: -20...+80 °C (medium)
-20...+100 °C (bearing)
-20...+150 °C (medium with DRS-...S)

Measuring accuracy: ±1,5% of full scale
±5% vom ME
(DRS-...K000/DRS-...S0000)

Linearity: ±0,5% of full scale

Repeatability: ±0,1% of full scale

Electrical connection: plug connector M12x1
1,5 m cable (DRS-0 only)
2 m cable (DRS-...F5 only)
1,5 m silicone cable (DRS-...S)

Protection: IP 65 (plug connector), IP 66 (cable)

Weight (sensor and electronics)

Sensor: approx. 80 g (DRS-...350)
approx. 550 g (DRS-...150;
DRS-...250)

Electronics: approx. 60 g (DRS-...K.; DRS-...F.;
DRS-...L3...)
approx. 100 g (DRS-...L442)
approx. 450 g (DRS-...Z...)
approx. 650 g (DRS-...C...)

Electrical Data

DRS-0...K0000, DRS-...S000

Supply: 5 ... 24 V_{DC}
Output pulse: rectangular pulse signal,
open collector NPN, max. 10 mA

DRS-...F300; DRS-...F500

Supply: 12-28 V_{DC}
Power consumption: 10 mA
Pulse output: PNP, open collector, max. 20 mA
Option: Pt 100, 3-wire

DRS-...F390

Supply: 24 V_{DC} ± 20 %
Power consumption: 15 mA
Pulse output: PNP, open collector, max. 20 mA
Factor: 1...1/128 set at the factory
Option: Pt 100, 2-wire
Response time: t₉₀=25 s (DRS-91.../-92...)
t₉₀=100 s (DRS-93...)

DRS-...L...

Supply: 24 V_{DC} ± 20 %
Output: 0(4)-20 mA, 3-wire or 2-wire
Max. load: 500 Ω
Option: Pt 100 (2-wire)
Response time: t₉₀=25 s (DRS-91.../-92...)
t₉₀=100 s (DRS-93...)

DRS-...C30...

Compact electronics
Display: 3-digit LED
Switching outputs: 2 semiconductor PNP or NPN,
set at the factory
Contact operation: N/C / N/O contact frequency
programmable
Setting: with 2 buttons
Supply: 24 V_{DC} ±20%, 3-wire
Electrical connection: plug connector M12x1

DRS-...C34...

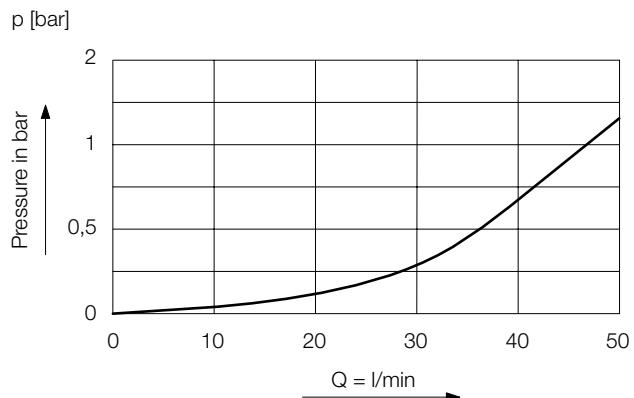
Compact electronics
Display: 3-digit LED
Analogue output: (0)4...20 mA adjustable
Switching outputs: 1 semiconductor PNP or NPN,
set at the factory
Contact operation: N/C / N/O contact / frequency
programmable
Setting: with 2 buttons
Supply: 24 V_{DC} ±20%, 3-wire
Power consumption: approx. 100 mA
Electrical connection: plug connector M12x1



Materials

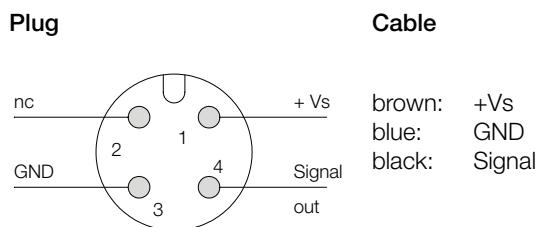
Housing:	PPO, brass or stainless steel 1.4301
Turbine:	PEI
Magnets:	ceramic
Axle:	hard metal
Bearing:	sapphire
Seal:	NBR (others on request) FKM (DRS-0...S000)

Pressure loss

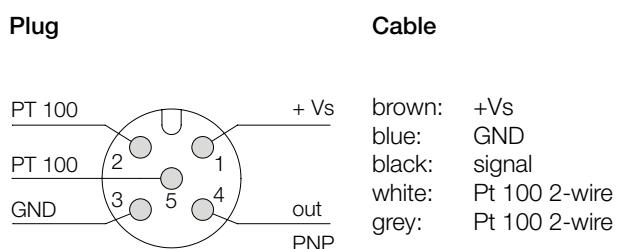


Electrical Connection

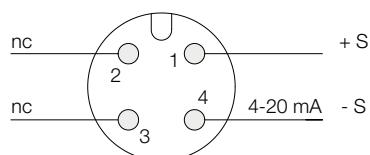
DRS-...F.., DRS-...L3... (3-wire without Pt 100)



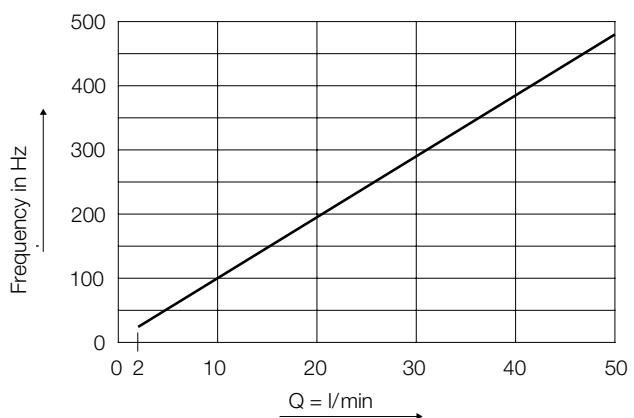
DRS-...F.., DRS-...L3... (3-wire with Pt 100)



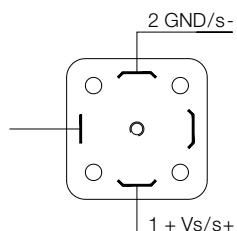
DRS-...L342 (2-wire)



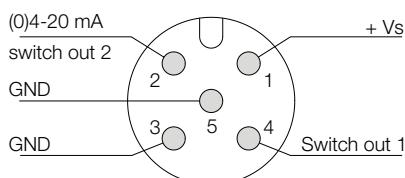
Frequency diagram (DRS-*150, DRS-*250)



DRS-...L442...



DRS-...C3...



Order Details (example: **DRS-9350 I4 L303 0**)

Material sensor housing	Model	Connection	Evaluating electronics	Option
Brass	DRS-9150		Frequency output F300 = plug connector M12x1, PNP F320 = plug connector M12x1, PNP, divider 1:2 F340 = plug connector M12x1, PNP, divider 1:4 F390 = plug connector M12x1, PNP, divider 1...1/128 adjusted F500 = 2 m PVC cable, PNP	
Stainless steel	DRS-9250	I4 = G 1/2 female thread G4 = G 1/2 female/male thread N5 = 3/4" NPT male thread G5 = G 3/4 male thread	Analogue output L303 = plug connector M12x1, 0-20 mA, 3-wire L342 = plug connector M12x1, 4-20 mA, 2-wire L343 = plug connector M12x1, 4-20 mA, 3-wire L442 = plug connector DIN 43 650, 4-20 mA, 2-wire Compact electronics¹⁾ C30M = LED display, 2 x NPN switching output, plug connector M12x1 C30R = LED display, 2 x PNP switching output, plug connector M12x1 C34N = LED display, 4-20 mA, 1 NPN switching output, plug connector M12x1 C34P = LED display, 4-20 mA, 1 PNP switching output, plug connector M12x1	0 = without P = Pt 100 ²⁾ Y = special model
Plastic (PPO)	DRS-9350			

¹⁾ Please specify flow direction in writing.²⁾ For option F3/F5 and L3x3 only, brass or stainless steel version**Plug-on Display**

for model DRS-...L442 (with 4-20 mA output and DIN plug connector)

Description	Order number
4-digit LED, connector DIN 43650, 2-wire, supply through analogue output	AUF-1000
as above however with additional open collector output	AUF-1001

**Order Details OEM Version** (example: **DRS-0350 I4 K0000**)

Material sensor housing	Model	Connection	Evaluating electronics
Brass	DRS-0150	I4 = G 1/2 female thread	Frequency output K0000 = 1.5 m PUR cable, black, NPN, OEM without CE
Stainless steel	DRS-0250	G4 = G 1/2 female/male thread N5 = 3/4" NPT male thread G5 = G 3/4 male thread	S0000 = 1.5 m silicone cable, NPN, OEM without CE, max. 150 °C (not for DRS-0350)
Plastic (PPO)	DRS-0350		S000P = 1.5 m silicone cable, NPN, OEM without CE, Pt 100, max. 150 °C (not for DRS-0350)



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Dimensions [mm]

