



Ultrasonic Flowmeter/ -Monitor/-Counter/-Dosing Unit



measuring
•
monitoring
•
analysing

DISAI
Automatic Systems

T. 962 448 450 www.disai.net

DUK



- Measuring range:
0.08 - 20 ... 2.5 - 630 L/min
- Accuracy: $\pm 1.5\%$ of F.S.
- Range span: 250
- p_{\max} : 16 bar; t_{\max} : 90 °C
- Connection: G 1/2 ... G 3, 1/2 ... 3 NPT IG
- Material: brass or st. st. 1.4408
- Analogue, frequency and switching outputs, compact electronic with digital display, dosing and counter electronic



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KOBOLD Messring GmbH
Nordring 22-24
D-65719 Hofheim/Ts.
☎ Head Office:
+49(0)6192 299-0
+49(0)6192 299-23398
✉ info.de@kobold.com
www.kobold.com

Description

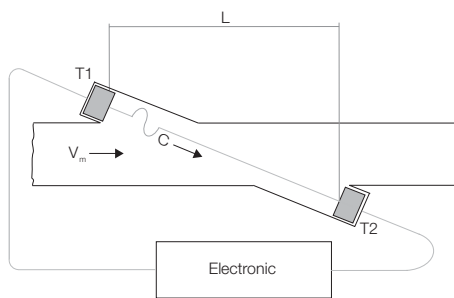
The new KOBOLD type DUK flow meters are used for the measurement, monitoring, metering and dosing of low viscosity fluids.

The devices work on the principle of the difference in running times. This is based on the fact that ultrasonic waves in a medium are influenced by the speed of flow.

Two sensors mounted opposite one another in the pipeline function simultaneously as transmitter and receiver of ultrasound signals.

If there is no flow, then the running times of both signals are identical. If the medium is flowing, then the running time of the signal against the flow is longer than that with the flow.

The running time difference, which is determined by a micro-processor, is proportional to the speed of flow.



The devices can be equipped with a switching output, a frequency output or an analogue output. In addition, a compact circuit can be selected that features a digital display, a switching output and an analogue output.

The device series is rounded off by an optionally available dosing and meter circuit. The meter circuit indicates the momentary flow rate in the first line of the display and the partial or total quantity in the second line. A dosing circuit controls simple filling tasks and similarly measures flow rates, total amounts and filling amounts. The analogue output and two relay outputs can be used for further processing of the signals.

Advantages

- High range span of 1:250
- Small pressure loss
- High repeat accuracy $\pm 0.5\%$ of F.S.
- Independent from density and temperature

Areas of Application

- Machine building
- Automotive
- Robotic
- Cooling
- Hot water

Technical Data

Sensor

- Measuring principle: ultrasonic
- Range: see table
- Medium: liquids with max. 1 % solid
- Viscosity: max. 3 mm²/s
- Accuracy: $\pm 1.5\%$ of F.S.
- Repeat accuracy: $\pm 0.5\%$ of F.S.
- Mounting position: in all directions, flow in direction of the arrow (horizontal: electronic on top or below)
- In-/Outlet: 10 x DN
- Media temperature: -20 ... +90 °C
- Ambient temperature: -20 ... +70 °C
- Response time: approx. 0.5...1 s (depending on electronic version)
- Pressure: 0 ... 16 bar
- Pressure loss: max. 150 mbar at F.S.
- Protection: IP 65
- Wetted Parts**
- Sensor housing: brass or st. st. 1.4408
- Sensors: PEEK
- Seal: NBR, other on request

Measuring Ranges and Weights

Model	Measuring range [L/min]	Size [G/NPT]	DUK-...S30x DUK-...F3xo DUK-...Lxx3	DUK-...C3xx	DUK-...Exxx DUK-...Gxxx	DUK with ADI 24 V	DUK with ADI 230/115/48 V
DUK-1xx4	0.08 - 20	½"	approx. 850 g	approx. 1050 g	approx. 1000 g	approx. 2150 g	approx. 2700 g
DUK-1xx5	0.16 - 40	¾"	approx. 1050 g	approx. 1250 g	approx. 1200 g	approx. 2350 g	approx. 2900 g
DUK-1xx6	0.25 - 63	1"	approx. 1450 g	approx. 1650 g	approx. 1600 g	approx. 2750 g	approx. 3300 g
DUK-1xx8	0.6 - 150	1½"	approx. 2350 g	approx. 2550 g	approx. 2500 g	approx. 3650 g	approx. 4200 g
DUK-1xx9	1 - 250	2"	approx. 3800 g	approx. 4000 g	approx. 3950 g	approx. 5100 g	approx. 5650 g
DUK-1xxB	2.5 - 630	3"	approx. 7100 g	approx. 7300 g	approx. 7250 g	approx. 8400 g	approx. 8950 g



DUK-...S300, DUK-...S30D

Display: Duo-LED for switch status
 Switching output (..S300): relay SPDT, max. 1 A/30 V_{DC}
 Switching output (..S30D): active 24 V_{DC}, N/C and N/O
 Switch point: 10...90% of f.s. in 10% - steps that can be configured by the customer using a rotary switch
 Power supply: 24 V_{DC} ± 20 %
 Power consumption: 30 mA
 Electrical connection: plug M 12, 5-pin

DUK-...F300, DUK-...F390

Impulse output: PNP, Open Collector, max. 200 mA
 Frequency at F.S.: 500 Hz (...F300)
 50...1000 Hz (...F390) proportional to flowrate
 Power supply: 24 V_{DC} ± 20 %
 Power consumption: 25 mA
 Electrical connection: plug M 12, 5-pin

DUK-...L303; DUK-...L343

Output: 0(4)-20 mA, 3-wire
 Load: max. 500 Ω
 Power supply: 24 V_{DC} ± 20 %
 Power consumption: max. 45 mA
 Electrical connection: plug M 12x1

DUK-...L443 (usage with AUF-3000)

Output: 4-20 mA, 3-wire
 Load: max. 500 Ω
 Power supply: 24 V_{DC} ± 20 %
 Power consumption: max. 45 mA
 Electrical connection: plug DIN 43650

DUK-...C3xx (Compact electronic)

Display: 3-digit LED
 Analogue output : 0(4)...20 mA adjustable (only DUK-...C34x)
 Load: max. 500 Ω
 Switching output: 1(2) semiconductor PNP or NPN, set at factory
 Contact function: N/C-N/O-frequency programmable (approx. 1400 Hz at F.S., uncalibrated)
 Settings: via 2 buttons
 Power supply: 24 V_{DC} ± 20 %
 Power consumption: approx. 100 mA
 Electrical connection: plug M 12x1

DUK-...Exxx (Counter electronic)

Display: LCD, 2 x 8 digit, illuminated total, part and flow quantities, units selectable
 Analogue output 0(4)...20 mA adjustable
 Load: max. 500 Ω
 Switching output: 2 relays, max. 250 V/5 A/1000 VA
 Settings: via 4 buttons
 Functions: reset, MIN/MAX memory, flow monitor, monitoring for part and total quantity, language
 Power supply: 24 V_{DC} ± 20 %, 3-wire
 Power consumption: approx. 170 mA
 Electrical connection: cable connection or M12 plug
more technical details see data sheet ZED in the brochure Z2

DUK-...Gxxx (Dosing electronic)

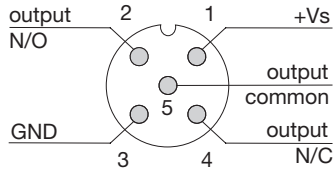
Display: LCD, 2 x 8 digit, illuminated dosing-, total-, and flow quantity, units selectable
 Analogue output 0(4)...20 mA adjustable
 Load: max. 500 Ω
 Switching output: 2 relays, max. 250 V/5 A/1000 VA
 Settings: via 4 buttons
 Functions: dosing (relay S2), start, stop, reset, fine dosing, correction amount, flow switch, total quantity, language
 Power supply: 24 V_{DC} ± 20 %, 3-wire
 Power consumption: approx. 170 mA
 Electrical connection: cable connection or M12 plug
more technical details see data sheet ZED in the brochure Z2

DUK with ADI electronic

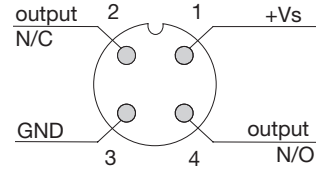
Display: bar graph, 3.5-digit digital or combination display; batch system
 Analogue output : 0(4)...20 mA, 0...10 V
 Switching output: 2 x relays/SPDT
 max. 115/230 V_{AC},
 5A resistive load
 max. 30 V_{DC}/5 A or
 2 Open-Collector
 5-50 V_{DC}, I_{total} = 50 mA
 Settings: via 3 buttons
 Power supply: 230/115/48/24 V_{AC}, 24 V_{DC}
 Electrical connection: pluggable terminal block
 cable gland
more technical details see data sheet ADI electronic in the brochure Z2

Electrical Connection

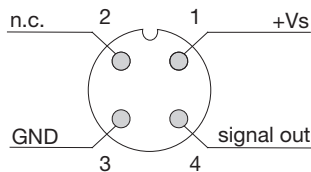
DUK-...S300



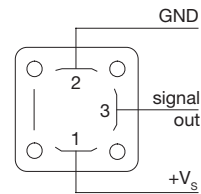
DUK-...S30D



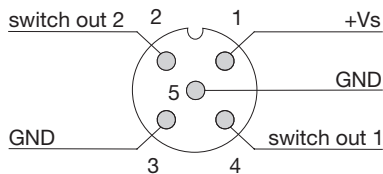
DUK-...F3x0, DUK-...L3x3



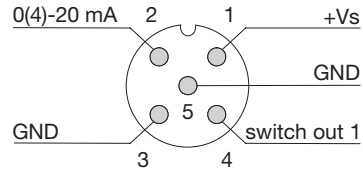
DUK-...L443



DUK-...C30*



DUK-...C34*

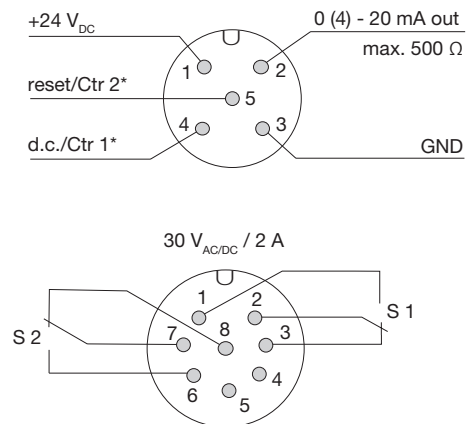


DUK-...E14R, DUK-...G14R Cable Connection

Wire number	DUK-...E14R counter electronic	DUK-...G14R dosing electronic
1	+24 V _{DC}	+24 V _{DC}
2	GND	GND
3	0(4)-20 mA	0(4)-20 mA
4	GND	GND
5	reset part quantity	Control 1*
6	n. c.	Control 2*
7	relay S1	relay S1
8	relay S1	relay S1
9	relay S2	relay S2
10	relay S2	relay S2

* Control 1 <-> GND: Start-Dosing
 Control 2 <-> GND: Stop-Dosing
 Control 1 <-> Control 2 <-> GND: Reset-Dosing

DUK-...E34R, DUK-...G34R Plug Connection



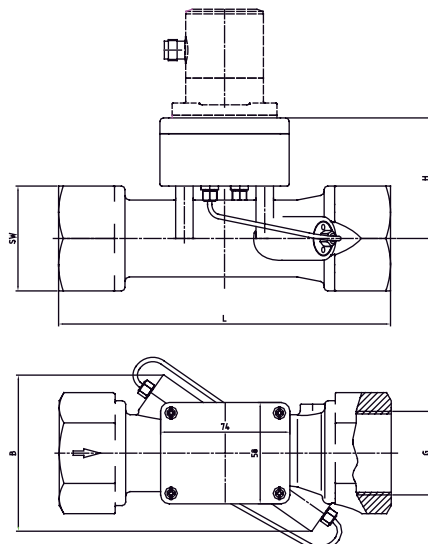
Order Details (Example: DUK-11 G4H S300 L)

Model/Housing material	Connection*	Electronic	Flow direction																								
<p>DUK-11 = brass</p> <p>DUK-12 = st. st. 1.4408</p>	<p>G4H = G ½ IG</p> <p>G5H = G ¾ IG</p> <p>G6H = G 1 IG</p> <p>G8H = G 1½ IG</p> <p>G9H = G 2 IG</p> <p>GBH = G 3 IG</p> <p>N4H = ½ NPT IG</p> <p>N5H = ¾ NPT IG</p> <p>N6H = 1 NPT IG</p> <p>N8H = 1½ NPT IG</p> <p>N9H = 2 NPT IG</p> <p>NBH = 3 NPT IG</p>	<p>Switching output</p> <p>S300 = relay, M12-plug</p> <p>S30D = active 24 V_{DC}, M12-plug</p> <p>Frequency output</p> <p>F300 = M12-plug, 500 Hz</p> <p>F390 = M12-plug, 50...1000 Hz</p> <p>Analogue output</p> <p>L303 = M12-plug, 0-20 mA</p> <p>L343 = M12-plug, 4-20 mA</p> <p>L443 = DIN-plug, 4-20 mA</p> <p>Compact electronic</p> <p>C30R = 2xOpen Collector, PNP</p> <p>C30M = 2xOpen Collector, NPN</p> <p>C34P = 0(4)-20 mA, 1xOpen Collector, PNP</p> <p>C34N = 0(4)-20 mA, 1xOpen Collector, NPN</p> <p>ADI electronic</p> <table border="1"> <thead> <tr> <th>Display</th> <th>Power supply</th> <th>Output</th> <th>Contacts</th> </tr> </thead> <tbody> <tr> <td>B = bar graph</td> <td>0 = 230 V_{AC}</td> <td>0 = without</td> <td>0 = without</td> </tr> <tr> <td>D = digital</td> <td>4 = 115 V_{AC}</td> <td>1 = 0-10 V</td> <td>2 = 2 relay SPDT</td> </tr> <tr> <td>K = bar graph/digital display</td> <td>1 = 48 V_{AC}</td> <td>2 = 0-20 mA</td> <td>6 = 2 Open Collector</td> </tr> <tr> <td>A = dosing unit</td> <td>2 = 24 V_{AC}</td> <td>4 = 4-20 mA</td> <td></td> </tr> <tr> <td></td> <td>3 = 24 V_{DC}</td> <td></td> <td></td> </tr> </tbody> </table> <p>Counter electronic</p> <p>E14R = LCD, 0(4)-20 mA, 2xrelays, 1 m cable</p> <p>E34R = LCD, 0(4)-20 mA, 2xrelays, M12-plug</p> <p>Dosing electronic</p> <p>G14R = LCD, 0(4)-20 mA, 2xrelays, 1 m cable</p> <p>G34R = LCD, 0(4)-20 mA, 2xrelays, M12-plug</p>	Display	Power supply	Output	Contacts	B = bar graph	0 = 230 V _{AC}	0 = without	0 = without	D = digital	4 = 115 V _{AC}	1 = 0-10 V	2 = 2 relay SPDT	K = bar graph/digital display	1 = 48 V _{AC}	2 = 0-20 mA	6 = 2 Open Collector	A = dosing unit	2 = 24 V _{AC}	4 = 4-20 mA			3 = 24 V _{DC}			<p>L = from left to right</p> <p>R = from right to left</p> <p>T = from top to bottom</p> <p>B = from bottom to top</p>
Display	Power supply	Output	Contacts																								
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* Standard display in L/min, optional: display GPM (code G instead of H)

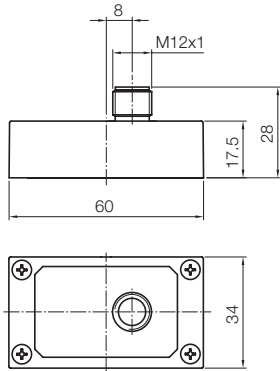
Dimensions DUK-Sensor

Model	G/NPT	SW [mm]	H [mm]	L [mm]	B [mm]
DUK-xxx4	½	30	57	114	ca.72
DUK-xxx5	¾	36	59	126.5	ca. 76
DUK-xxx6	1	46	63	146	ca. 80
DUK-xxx8	1½	60	69	190	ca. 90
DUK-xxx9	2	76	74	238	ca. 97
DUK-xxxB	3	105	84	306	ca. 122

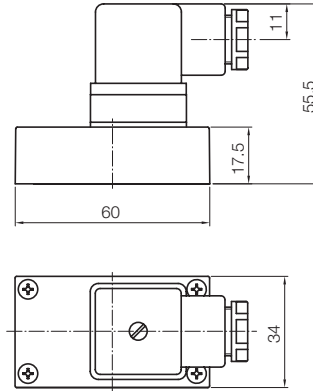


Dimensions

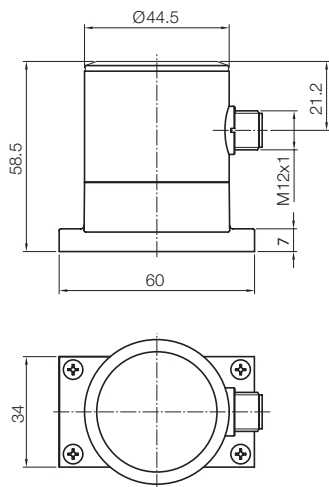
DUK-...S30x, DUK-...F3x0, DUK-...L3x3



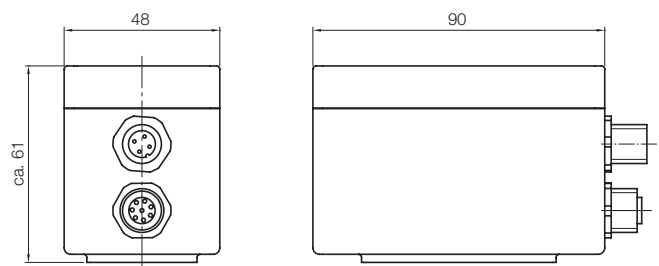
DUK-...L443



DUK-...C3xx



DUK-...ExxR, DUK-...GxxR



DUK with ADI electronic

