



Ultrasonic Flowmeter/ Monitor/Counter/Dosing Unit



measuring
•
monitoring
•
analysing

DUK



- Measuring range:
0.08 - 20 ... 2.5 - 630 l/min
- Accuracy:
0.7 % of reading + 0.7 % of full scale
- Range span: 250
- p_{max} : 16 bar; t_{max} : 90 °C
- Connection:
G 1/2 ... G 3, 1/2" ... 3" NPT female
- Material: brass or stainless steel 1.4408
- Analogue, frequency and switching outputs, compact electronic with digital display, dosing and counter electronic

GS



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Description

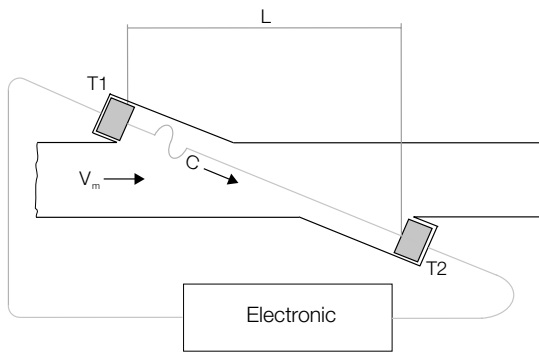
The new KOBOLD type DUK flowmeters are used for the measurement, monitoring, metering and dosing of low viscosity fluids.

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 microprocessor, 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 ± 0.1 % of full scale
- Independent from density and temperature

Areas of Application

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

Technical Details

Sensor

- Measuring principle: ultrasonic
- Range: see table
- Medium: water with max. 1 % solid
- Viscosity: max. 5 mm²/s
- Accuracy: 0.7 % of reading + 0.7 % of full scale
- Repeat accuracy: ±0.1 % of full scale
- 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 t90: approx. 0.5...1 s at flow change > 10 % FS (depending on electronic version)
- Pressure: 0 ... 16 bar
- Pressure loss: max. 150 mbar at full scale
- Protection: IP 65
- Wetted Parts**
- Sensor housing: brass or stainless steel 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): aktive 24 V_{DC}, N/C and N/O
 Switch point: 10...90% FS 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
 Meas. range overflow: flash of the DUO-LED (red/green) from 105 % of full scale

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
 Meas. range overflow: F_{out} approx. 2 kHz from 105 % of full scale

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
 Meas. range overflow: I_{out} approx. 20.5 mA from 103 % of full scale

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
 Meas. range overflow: I_{out} approx. 20.5 mA from 103 % of full scale

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. 30 V_{AC/DC}/2 A/60 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.

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. 30 V_{AC/DC}/2 A/60 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.

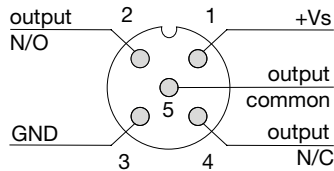
DUK with ADI electronic

Display: bar graph and 5-digit digital display
 Analogue output: 0(4) ... 20 mA, 0 ... 10 V_{DC}
 2 Switching outputs: relay /changeover contact max. 250 V_{AC}, 5 A resistive load max. 30 V_{DC}/5 A
 Settings: via 4 buttons
 Power supply: 100 ... 240 V_{AC} ± 10% or 18 ... 30 V_{AC}/10 ... 40 V_{DC}
 Electrical connection: pluggable terminal block via cable gland

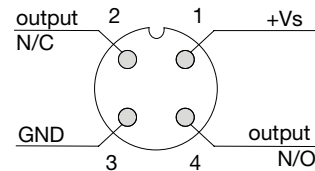
More technical details see data sheet ADI.

Electrical Connection

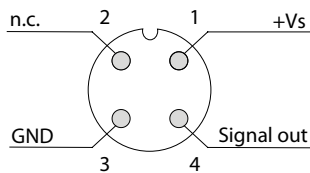
DUK-...S300



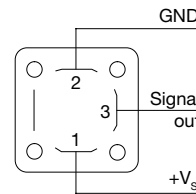
DUK-...S30D



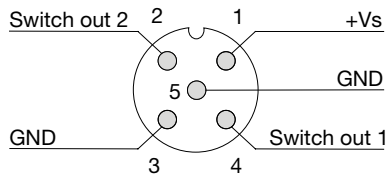
DUK-...F3x0, DUK-...L3x3



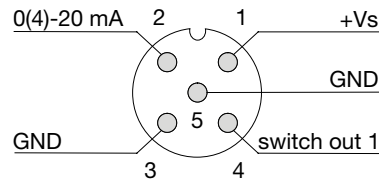
DUK-...L443



DUK-...C30*



DUK-...C34*

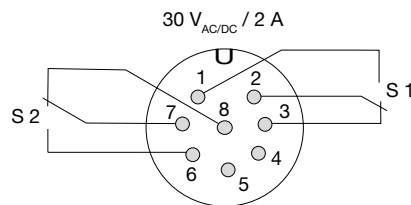
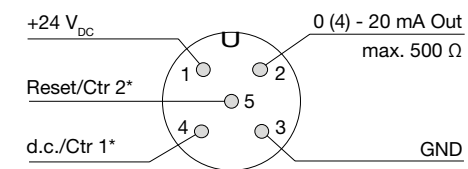


DUK-...E14R, DUK-...G14R Cable Connection

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)

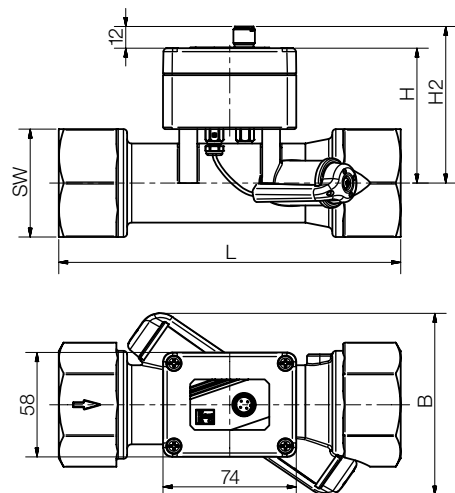
Model / Housing material	Connection ¹⁾	Electronic	Flow direction	Options										
DUK-11 = brass DUK-12 = st. steel 1.4408	G4H = G ½ female G5H = G ¾ female G6H = G 1 female G8H = G 1½ female G9H = G 2 female GBH = G 3 female N4H = ½" NPT female N5H = ¾" NPT female N6H = 1" NPT female N8H = 1½" NPT female N9H = 2" NPT female NBH = 3" NPT female	Switching output S300 = relay, M12-plug S30D = aktiv 24 V _{DC} , M12-plug Frequency output F300 = M12-plug, 500 Hz F390 = M12-plug, 50...1000 Hz Analogue output L303 = M12-plug, 0-20 mA L343 = M12-plug, 4-20 mA L443 = DIN-plug, 4-20 mA Compact electronic C30R = 2x open collector, PNP C30M = 2x open collector, NPN C34P = 0(4)-20 mA, 1x open collector, PNP C34N = 0(4)-20 mA, 1x open collector, NPN ADI electronic <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Display</th> <th>Power supply</th> <th>Output</th> <th>Contacts</th> </tr> </thead> <tbody> <tr> <td rowspan="2">K = bar graph/digital display</td> <td>0 = 100-240 V_{AC/DC}</td> <td>0 = without</td> <td rowspan="2">2 = 2 change-over contacts</td> </tr> <tr> <td>3 = 18-30 V_{AC}, 10-40 V_{DC}</td> <td>4 = 0(4)-20 mA, 0-10 V</td> </tr> </tbody> </table> Counter electronic E14R = LCD, 0(4)-20 mA, 2 x relays, 1.5 m cable E34R = LCD, 0(4)-20 mA, 2 x relays, M12-plug E94R = LCD, 0(4)-20 mA, 2 x relays, cable >1.5 m ²⁾ Dosing electronic G14R = LCD, 0(4)-20 mA, 2 x relays, 1.5 m cable G34R = LCD, 0(4)-20 mA, 2 x relays, M12-plug G94R = LCD, 0(4)-20 mA, 2 x relays, cable >1.5 m ²⁾	Display	Power supply	Output	Contacts	K = bar graph/digital display	0 = 100-240 V _{AC/DC}	0 = without	2 = 2 change-over contacts	3 = 18-30 V _{AC} , 10-40 V _{DC}	4 = 0(4)-20 mA, 0-10 V	L = from left to right R = from right to left T = from top to bottom B = from bottom to top	without = without M = pressure compensation filter for reducing condensation Y = special option (specify in clear text)
		Display	Power supply	Output	Contacts									
K = bar graph/digital display	0 = 100-240 V _{AC/DC}	0 = without	2 = 2 change-over contacts											
	3 = 18-30 V _{AC} , 10-40 V _{DC}	4 = 0(4)-20 mA, 0-10 V												

¹⁾ Standard display in l/min, optional: display GPM (code G instead of H)
²⁾ While ordering please specify cable length in metres

Dimensions

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

Model	G/ NPT	SW [mm]	H [mm]	H2 [mm]	L [mm]	B [mm]
DUK-xxx4	½"	30	63	75	114	85
DUK-xxx5	¾"	36	65	77	126,5	89
DUK-xxx6	1"	46	69	81	146	93
DUK-xxx8	1½"	60	75	87	190	103
DUK-xxx9	2"	76	80	92	238	114
DUK-xxxB	3"	105	90	102	306	135

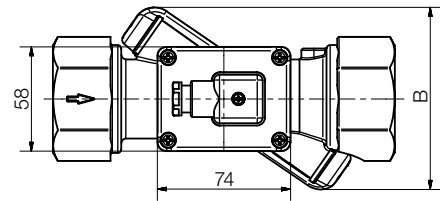
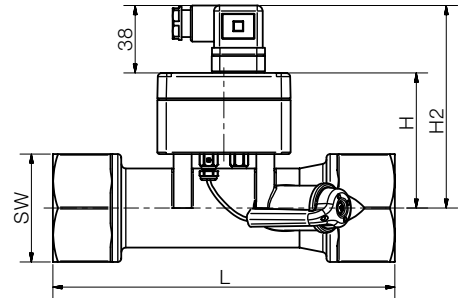




Dimensions (continued)

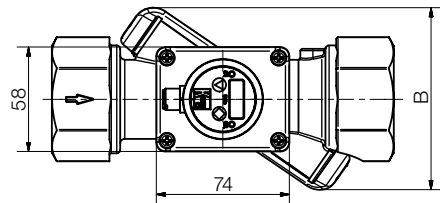
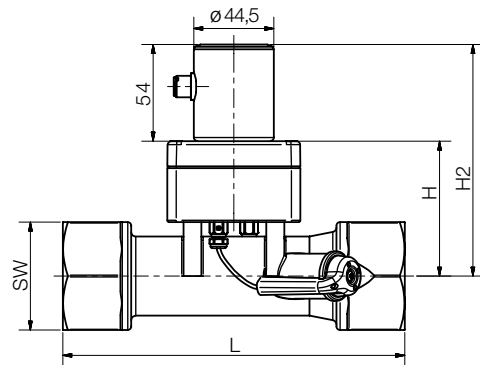
DUK-...L443

Model	G/ NPT	SW [mm]	H [mm]	H2	L [mm]	B [mm]
DUK-xxx4	½"	30	63	101	114	85
DUK-xxx5	¾"	36	65	103	126,5	89
DUK-xxx6	1"	46	69	107	146	93
DUK-xxx8	1½"	60	75	113	190	103
DUK-xxx9	2"	76	80	118	238	114
DUK-xxxB	3"	105	90	128	306	135



DUK-...C3xx

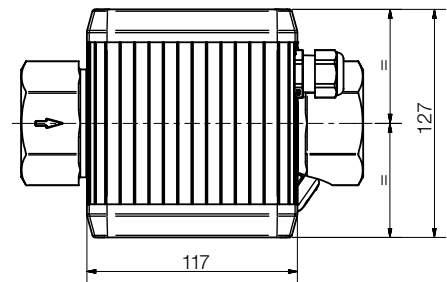
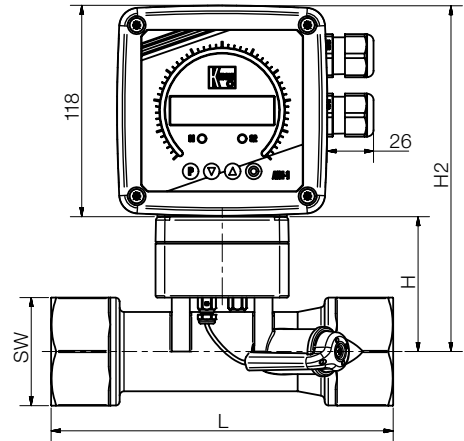
Model	G/ NPT	SW [mm]	H [mm]	H2	L [mm]	B [mm]
DUK-xxx4	½"	30	63	117	114	85
DUK-xxx5	¾"	36	65	119	126,5	89
DUK-xxx6	1"	46	69	123	146	93
DUK-xxx8	1½"	60	75	129	190	103
DUK-xxx9	2"	76	80	134	238	114
DUK-xxxB	3"	105	90	144	306	135



Dimensions (continued)

DUK-...Kxx2

Model	G/ NPT	SW [mm]	H [mm]	H2	L [mm]	B [mm]
DUK-xxx4	½"	30	63	181	114	85
DUK-xxx5	¾"	36	65	183	126,5	89
DUK-xxx6	1"	46	69	187	146	93
DUK-xxx8	1½"	60	75	193	190	103
DUK-xxx9	2"	76	80	198	238	114
DUK-xxxB	3"	105	90	208	306	135



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

Model	G/ NPT	SW [mm]	H [mm]	H2	L [mm]	B [mm]
DUK-xxx4	½"	30	63	125	114	85
DUK-xxx5	¾"	36	65	127	126,5	89
DUK-xxx6	1"	46	69	131	146	93
DUK-xxx8	1½"	60	75	137	190	103
DUK-xxx9	2"	76	80	142	238	114
DUK-xxxB	3"	105	90	152	306	135

