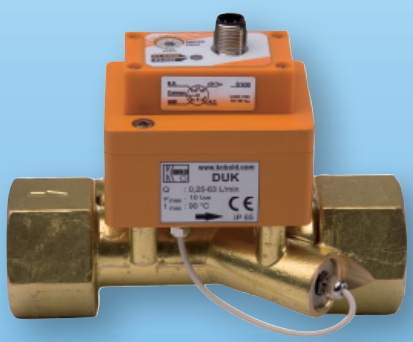
Zertifiziertes QM-System
DIN EN ISO 9001
Zertifikat-Nr. 01017

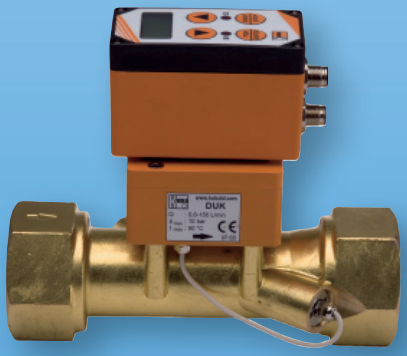
Ultrasonic Flowmeter/ -Monitor/-Counter/-Dosing Unit

KOBOLD

measuring • monitoring • analysing

DUK





- Measuring range: 0.08 - 20 … 2.5 - 630 L/min
- Accuracy: 0.7 % v. of reading + 0.7 % v. f.s.
- Range span: 250
- p_{max}: 16 bar; t_{max}: 120 °C
- Connection: G ½ … G 3, ½ … 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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06 - 2010

Description

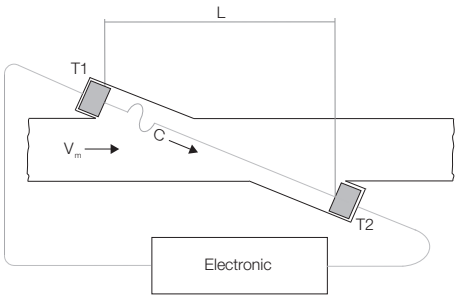
The new KOBOLD type DUK flow meters are used for the measurement, monitoring, metering and dosing of low viscosity fluids.

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 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 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. 30 mm²/s
Accuracy:	0.7 % v. of reading + 0.7 % v. f.s.
Repeat accuracy:	±0.1 % 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 -20 ... +120 °C high temp. version
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 high temp. version FPM

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

06 - 2010

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
Meas. range overflow:	flash of the DUO-LED (red/green) from 105 % of f.s.

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 f.s.

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 f.s.

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 f.s.

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

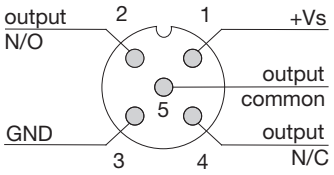
DUK with ADI electronic

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

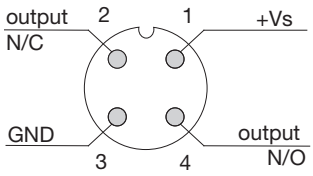
more technical details see data sheet ADI electronic in the brochure Z2

Electrical Connection

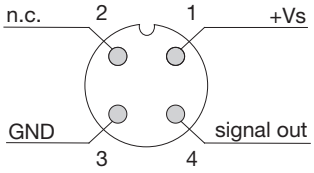
DUK-...S300



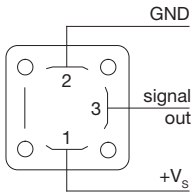
DUK-...S30D



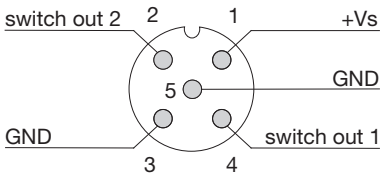
DUK-…F3x0, DUK-...L3x3



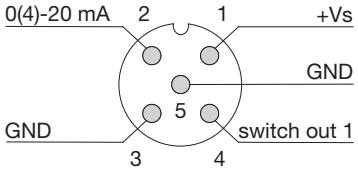
DUK-...L443



DUK-...C30*



DUK-...C34*

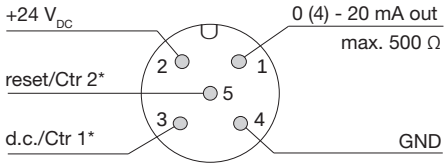


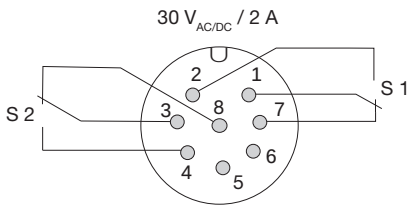
DUK-...E14R, DUK-...G14R Cable Connection

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	n.c.	Control 1*
6	reset part quantity	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





06-2010

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

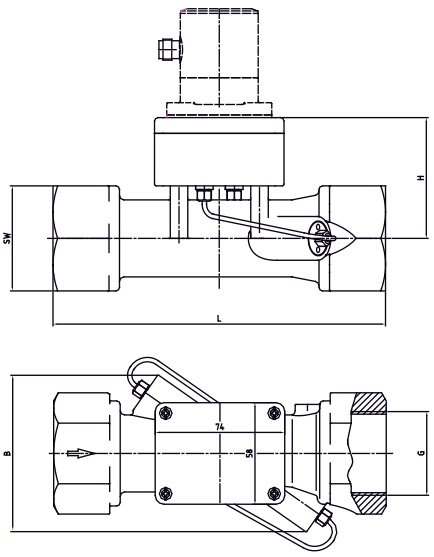
Model / Housing material	Connection*	Electronic	Flow direction
DUK-11 = brass **DUK-12** = st.st. 1.4408 **DUK-21** = high temp. version brass **DUK-22** = high temp. version st.st. 1.4408	**G4H** = G ½ IG **G5H** = G ¾ IG **G6H** = G 1 IG **G8H** = G 1½ IG **G9H** = G 2 IG **GBH** = G 3 IG **N4H** = ½ NPT IG **N5H** = ¾ NPT IG **N6H** = 1 NPT IG **N8H** = 1½ NPT IG **N9H** = 2 NPT IG **NBH** = 3 NPT IG	**Switching output** **S300** = relay, M12-plug **S30D** = active 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** = 2 x Open Collector, PNP **C30M** = 2 x Open Collector, NPN **C34P** = 0(4)-20 mA, 1 x Open Collector, PNP **C34N** = 0(4)-20 mA, 1 x Open Collector, NPN **ADI electronic** **Display:** **B** = bar graph; **D** = digital; **K** = bar graph/ digital display; **A** = dosing unit **Power supply:** **0** = 230 V_{AC}; **4** = 115 V_{AC}; **1** = 48 V_{AC}; **2** = 24 V_{AC}; **3** = 24 V_{DC} **Output:** **0** = without; **1** = 0-10 V; **2** = 0-20 mA; **4** = 4-20 mA **Contacts:** **0** = without; **2** = 2 relay SPDT; **6** = 2 Open Collector **Counter electronic** **E14R** = LCD, 0(4)-20 mA, 2 x relays, 1 m cable **E34R** = LCD, 0(4)-20 mA, 2 x relays, M12-plug **Dosing electronic** **G14R** = LCD, 0(4)-20 mA, 2 x relays, 1 m cable **G34R** = LCD, 0(4)-20 mA, 2 x relays, M12-plug	**L** = from left to right **R** = from right to left **T** = from top to bottom **B** = from bottom to top

* Standard display in L/min, optional: display GPM (code G instead of H)

Dimensions DUK-Sensor

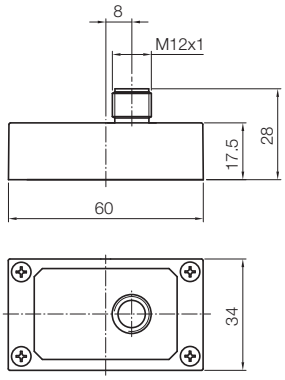
Model	G/NPT	SW [mm]	H [mm]	H* [mm]	L [mm]	B [mm]
DUK-xxx4	½	30	57,5	77,5	114	approx. 72
DUK-xxx5	¾	36	59,5	79,5	126,5	approx. 76
DUK-xxx6	1	46	63,5	83,5	146	approx. 80
DUK-xxx8	1½	60	69,5	89,5	190	approx. 90
DUK-xxx9	2	76	74,5	94,5	238	approx. 97
DUK-xxxB	3	105	84,5	104,5	306	approx.122

* High Temp.-Version

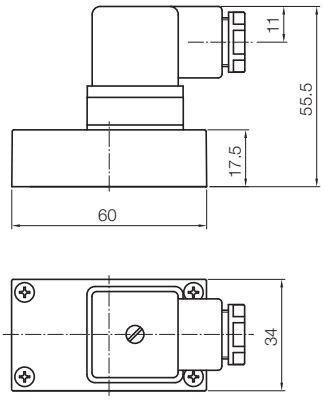


Dimensions

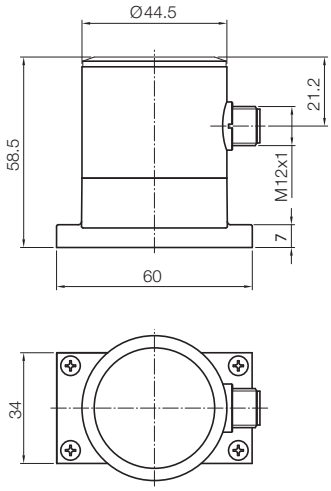
DUK-…S30x, DUK-…F3x0, DUK-…L3x3



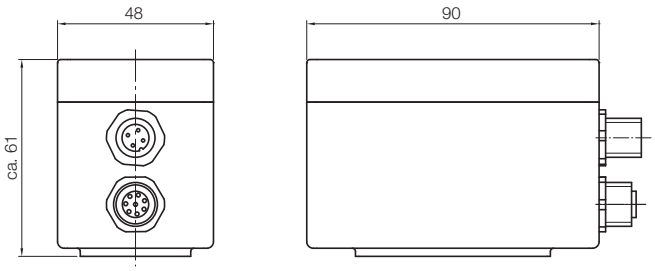
DUK-…L443



DUK-…C3xx



DUK-…ExxR, DUK-…GxxR



DUK with ADI electronic