



## DK32 DK34 DK37

### Technical Datasheet

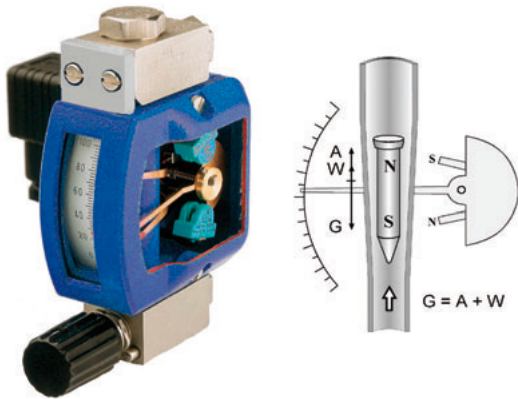
#### Variable area flowmeter

- Rugged design for extreme operating conditions
- Local indication without the need for auxiliary power
- Excellent long-term stability
- Flexible and can be adjusted to meet customer-specific requirements
- Highly resistant to pressure and temperature



## The solution for all-metal flowmeters

DK all-metal flowmeters are suitable for measuring the volumetric or mass flow rate of liquids, gases and vapors. Thanks to their rugged design, the flowmeters are especially suitable for difficult operating and environmental conditions.



### Highlights

- DK32 with horizontal connections - with valve
- DK34 with vertical connections - without valve
- DK37 with higher degree of measuring accuracy and larger display
- DK37 with vertical connections - without valve
- Slim design allows high packing density
- Simple installation and start-up
- Corrosion-resistant
- Low maintenance

### Industries

A universal meter for all industries, such as:

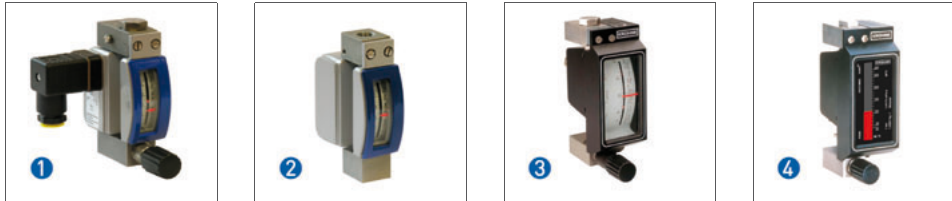
- Chemical
- Heating, Cooling and Air-conditioning
- Iron, Steel & Metal
- Electronics
- Oil & Gas
- Petrochemistry
- Power Plants
- Machinery
- Paper & Pulp
- Water

### Applications

- Fine-dosing
- Gas chromatography
- Monitoring and control of minute quantities
- In conjunction with a differential pressure regulator: helps maintain constant flow rates with fluctuating inlet or outlet pressure

## The all-metal product family

### DK metal variable area flowmeters



For flow rates greater than 0.15 l/h water and 1.6 l/h air:

- ① DK32 with max. two limit switches, NAMUR or open collector or floating type reed contact
- ② DK32 with max. two limit switches, NAMUR or open collector or floating type reed contact
- ③ DK37/M8M with max. two limit switches, NAMUR or open collector
- ④ DK37/M8E - 4...20 mA current output and bar chart display - HART™ communication

For higher flow rates up to 120m<sup>3</sup>/h water and 2800m<sup>3</sup> air

### H250 variable area flowmeters



- ① H250/RR/M9
  - Local indication without the need for auxiliary power
  - max. 2 limit switches, type NAMUR, NAMUR intrinsically safe or 3-wire open collector
  - 2-wire current output 4...20 mA, HART™ or Profibus communication
  - 6-digit flow totalizer (non-Ex)
- ② H250/RR/M10
  - Explosion proof terminal housing Ex d
  - 2 digital adjustable limit switches, 2-wire open collector or type NAMUR
  - 2-wire current output 4...20 mA, HART™ communication
  - Pulse output up to 10Hz (also for electromechanical counters)
  - 12-digit flow totalizer with external reset (batch operation)
- ③ H250/RR/M8M
  - Slim design allows high packing density
  - Local indication without the need for auxiliary power
  - 2 limit switches, 2-wire type NAMUR or NAMUR intrinsically safe
- ④ H250/RR/M8E
  - Slim design allows high packing density
  - 2-wire current output 4...20 mA, HART™ communication

## Technical Data

Field of application	Flow measurement of liquids, gases and vapors
Operating method / measuring principle	Float measuring principle
Measuring accuracy DK32 DK34	± 4% to VDI / VDE Code 3513, Sheet 2
Measuring accuracy DK37	± 2.5% to VDI / VDE Code 3513, Sheet 2
Operating pressure PS	Directive 97/23/EC dated 29 April 1999
Test pressure PT	Pressure Equipment Directive 97/23/EC and AD 2000-HP30
Max. allowable operating pressure PS	130 bar standard ①

① higher pressures on request

### Connection

Standard	1/4" NPT inside thread
	G 1/4, Ermeto, Serto, Dilo., Gyrolok, Swagelok, flanges ①

① other connections on request

### Materials

Head, base, cone	CrNi steel 1.4404 / 316 L
Upper plug	CrNi steel 1.4404 / 316 L
Standard float	CrNi steel 1.4404 / 316 L or titanium
Dosing unit	CrNi steel 1.4571 / 316 Ti
Valve spindle	CrNi steel 1.4404 / 316 L
Valve plug gasket	Viton (FPM) ①
Dosing unit gasket	Viton (FPM) and PTFE ①

① other gasket materials on request

### Weights

	Approx. weights [g]
DK32	700
DK34	600
DK37/M8M	800
DK37/M8E	1000

## Indicators DK32 DK34 DK37/M8M with limit switch

Clamp connection	1.5mm <sup>2</sup>		
Limit switch	SC2-N0	SJ2-SN	SJ2-S1N
Switch element function	Normally closed	Normally closed	Normally open
Nominal voltage U0	8 Vdc	8 Vdc	8 Vdc
Pointer shaft not read	≥3 mA	≥3 mA	≤1 mA
Pointer shaft read	≤1 mA	≤1 mA	≥3 mA

## Indicator DK37/M8E

## M8E current output

Cable fitting	M16 x 1.5	
Cable diameter	8...10 mm	
Clamp connection	4 mm <sup>2</sup>	
Measurement signal	4...20 mA for 0...100% flow value	Two-wire technology
Power supply	14.8...30 VDC	
Min. power supply for HART™	20.5 VDC	
Effect of supply power	< 0.1%	
External resistance dependency	< 0.1%	
Effect of temperature	< 10 uA / K	
Max. external resistance / load impedance	640 Ohm (30 VDC)	
Min. load for HART™	250 Ohm	

## M8E HART

M8E HART™ parameter configuration		
Name of manufacturer (code)	KROHNE Messtechnik (69)	
Name of model	M8E (230)	
HART™ protocol revision	5.1	
Device revision	1	
Physical layer	FSK	
Device category	Transmitter	

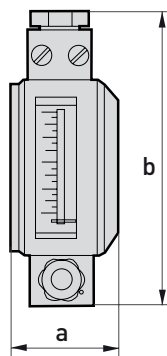
## M8E process variable

M8E process variable flow	Values [%]	Signal output [mA]
Over range	+105 (± 1%)	20.64...20.96
Device error detection	> 110	> 21.60
Maximum	112.5	22
Multi-drop operation	-	4.5

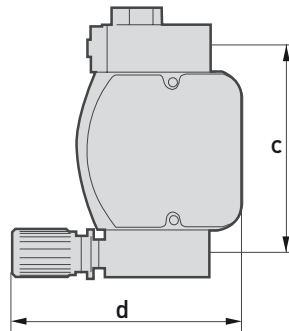
## Dimensions

Device	a	b	c	d
DK32 with valve and horizontal process connection	42	125	90	100
DK34 without valve and vertical process connection	42	110	-	75
DK32 DK34 with limit switches K1/K2	46	approx. 90	1500	approx. 50
DK37/M8E with valve and horizontal process connection	55	153	125	approx. 134
DK34/M8E without valve and vertical process connection	55	138	125	approx. 134
DK37/M8M/K with valve and horizontal process connection	55	153	125	approx. 156
DK37/M8M/K without valve and vertical process connection	55	138	125	approx. 156

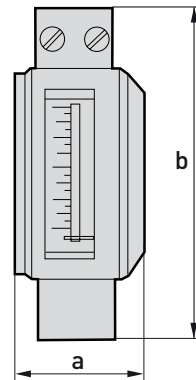
DK32



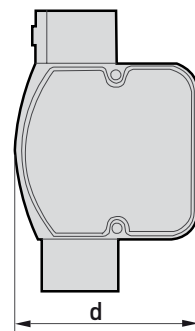
DK32



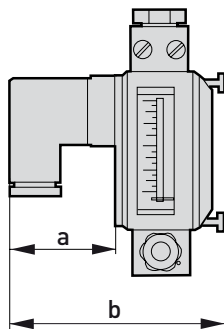
DK34



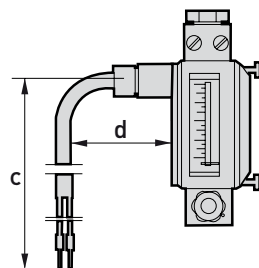
DK34



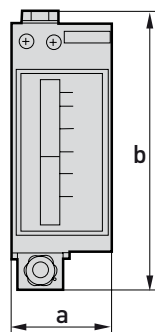
DK32 (DK34) with K1/K2



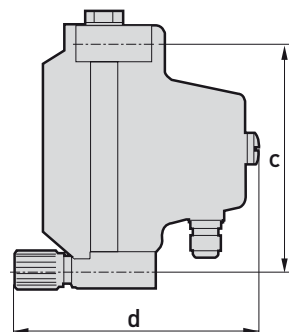
DK32 (DK34) with K1/K2



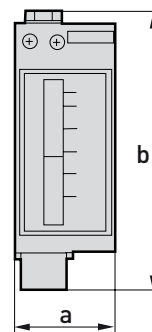
DK37/M8M with valve



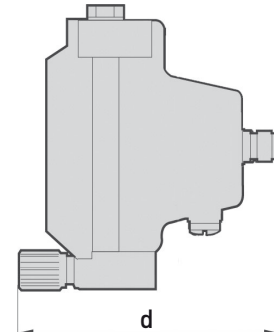
DK37/M8E



DK37/M8M without valve



DK32/M8M with K1/K2



## Measuring ranges

Turndown ratio 10: 1

100% flow values

	Water flow	Air flow	Pressure loss	Valve spindle	Kv valve value
Cones	[l/h]	[l/h]	[mbar]	Ø [mm]	[m <sup>3</sup> /h]
K 005	-	16 ①	14	1	0,018
K 005	-	50	31	1	0,018
K 010	1,5 ①	70 ①	66	1	0,018
K 010	3	100	66	1	0,018
K 015	5	150	19	2,5	0,15
K 040	10	400	27	2,5	0,15
K 080	25	800	55	2,5	0,15
K 125	40	1250	42	4,5	0,48
K 200	60	2000	85	4,5	0,48
K 300	80	2500	117	4,5	0,48
K 340	100	3400	166	4,5	0,48

① with titanium float

Reference condition:

Water at 20°C

Air at 20°C - 1.013 bar abs.

Other flow ranges on request

The conversion to other process products or operating data (pressure, temperature, density, viscosity) is performed at KROHNE using the calculation method in accordance with VDE /VDI Code 3513

### Temperatures

	Temperature [°C]
Max. process temperature DK32 DK34 DK37M8M	+150 ①
Max. process temperature DK32 DK34 with K1/K2 - Tamb. +40°C	+145
Max. process temperature DK32 DK34 with K1/K2 - Tamb. +50°C	+135
Max. process temperature DK32 DK34 with K1/K2 - Tamb. +60°C	+125
Max. process temperature DK37/M8M with K1/K2 - Tamb. +40°C	+150
Max. process temperature DK37/M8M with K1/K2 - Tamb. +50°C	+125
Max. process temperature DK37/M8M with K1/K2 - Tamb. +60°C	+100
Max. process temperature DK37M8E Tamb. +40°C	+135
Max. process temperature DK37M8E Tamb. +50°C	+110
Max. process temperature DK37M8E Tamb. +60°C	+85
	-
Min. process temperature DK34 without valve	-80
Min. process temperature with valve [DK32 DK37]	-40
Min. Tprocess DK37/M8E with electrical indicator	-25
	-
Max. ambient temperature Tamb.	+70
Min. ambient temperature Tamb.	-20

① High-temperature version up to 200 °C (DK32 DK34)

## Differential pressure regulators

Differential pressure regulators are used (only DK32 and DK37) to help maintain constant flow rates at fluctuating inlet or outlet pressures. Minimum pressure levels are required to permit operation of the regulators (see regulator characteristics).

Differential pressure regulators are not pressure reducing valves!

### Inlet pressure regulators, type RE, NRE

The regulators help maintain a constant flow rate at variable inlet pressure and constant outlet pressure.

Example: inlet pressure regulator RE-1000:	Current flow rate:	1000l air
	Constant outlet pressure:	1.013 bar abs.

With a variable inlet pressure greater than 0.5 bar the flow rate  $Q_v$  in the device remains constant.

### Outlet pressure regulators, type RA, NRA

The regulators help maintain a constant flow rate at constant inlet pressure and variable outlet pressure. In order to function, the outlet pressure regulator requires a specific minimum pressure difference between inlet and outlet pressures. Inlet pressure  $p_1$  must always be greater than outlet pressure  $p_2$ .

Example: outlet pressure regulator NRA-800	Current flow rate:	800l air
	Constant inlet pressure:	3 bar

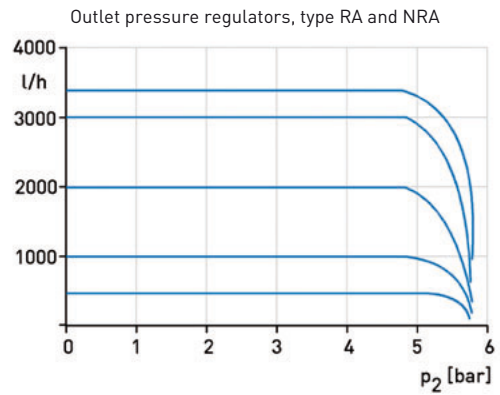
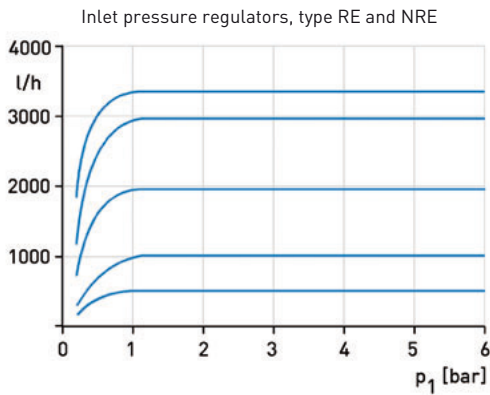
With a variable outlet pressure of 0...2.9 bar the flow rate  $Q_v$  in the device remains constant.

### Adjustment ranges

Regulator type	Max. flow		Minimum	Regulator type	Max. flow		Minimum
	Water	Air	Inlet pressure		Water	Air	Pressure diff.
Inlet pressure	[l/h]	[l/h]	$p_1$ [bar]	Outlet pressure	[l/h]	[l/h]	[bar]
RE-1000	3...40	100...1000	0.5	RA-1000	3...40	100...1000	0,5
RE-4000	50...80	1500...2000	1	RA-4000	60...100		1
	100		1.5			2000...3000	1,5
	120...160	3000...3400	2		120...160	3400	2
NRE-100	1...2.5	60...100	0.1	NRA-800	1	60...250	0,1
NRE-800	25	250	0.1			500	0,2
		500...800	0.2		20...25	800	0,4



Regulator characteristics



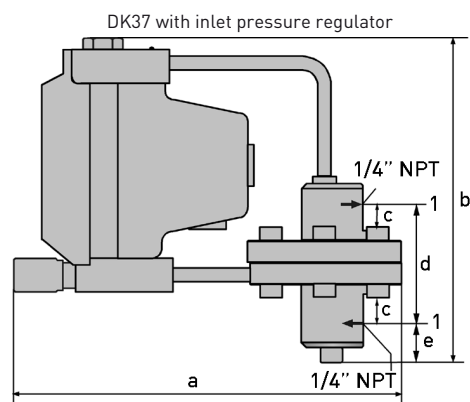
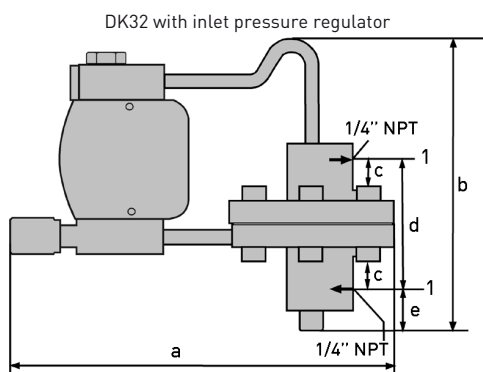
Technical data - differential pressure regulators

Standard connection	1/4" NPT
Optional	Serto, Ermeto 6 or 8, tube nozzles 6 mm or 8 mm, Dilo, Gyrolok, Swagelok, G 1/4 ①
Max. operating pressure (at 20°C)	64 bar ②
Material	CrNi steel 1.4404
Temperature	80°C ③

- ① other connections on request
- ② higher pressures on request
- ③ higher temperatures on request

Dimensions with differential pressure regulators

	Dimensions [mm]				
	a	b	c	d	e
DK32	approx. 230	approx. 163	approx. 13	70	19
DK37	approx. 230	approx. 200	approx. 13	70	19



DK32 and DK37 with differential pressure regulator are delivered as standard without tube bends on the process connector (1).





## KROHNE Overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Mass flowmeters
- Ultrasonic flowmeters
- Vortex flowmeters
- Flow controllers
- Level measuring instruments
- Pressure gauges
- Temperature measuring instruments
- Water solutions & analysis
- Oil and gas turnkey solutions

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