



## DK32 DK34 DK37 Technical Datasheet

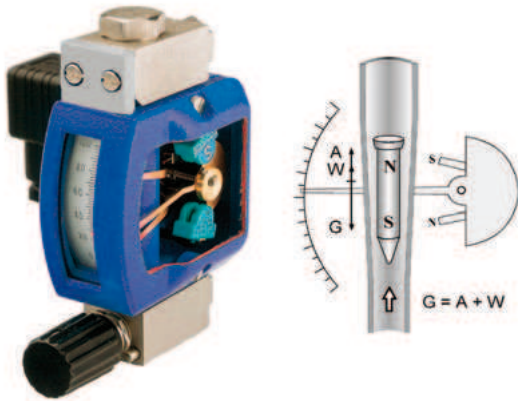
### Variable area flowmeter

- 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:

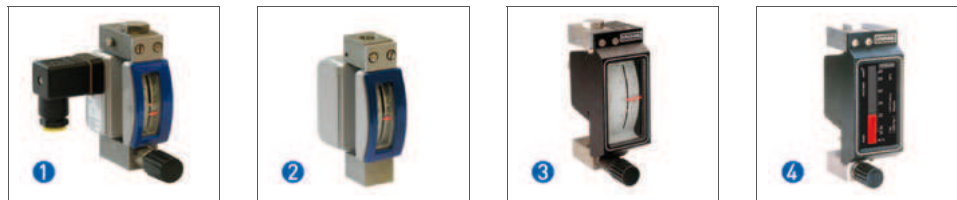
- Chemical
- Heating, Cooling and Air-conditioning
- Iron, Steel & Metal
- Electronics
- Oil & Gas
- Petrochemistry
- Power Plants
- Machinery
- Paper & Pulp
- Water

### 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:

- ❶ DK32 with max. two limit switches, NAMUR or open collector or floating type reed contact
- ❷ DK32 with max. two limit switches, NAMUR or open collector or floating type reed contact
- ❸ DK37/M8M with max. two limit switches, NAMUR or open collector
- ❹ 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



- ❶ 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)
- ❷ 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)
- ❸ 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
- ❹ 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 µA / 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             |  |

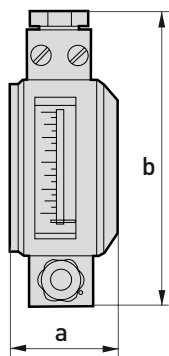
## M8E process variable

|                           |             |                    |
|---------------------------|-------------|--------------------|
| 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                |

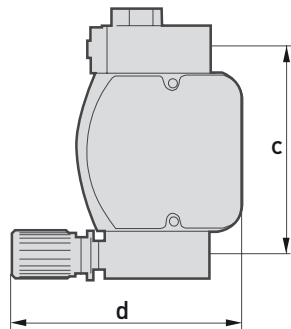
## Dimensions

| 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 |

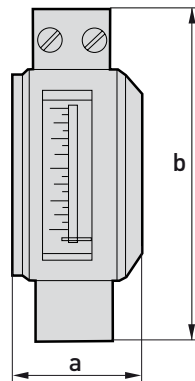
DK32



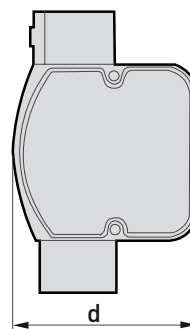
DK32



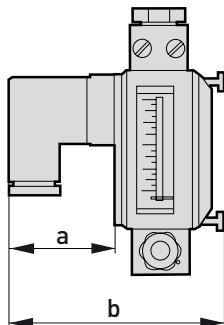
DK34



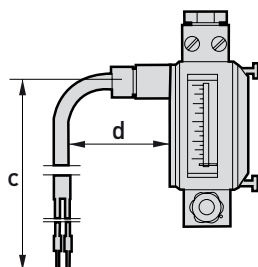
DK34



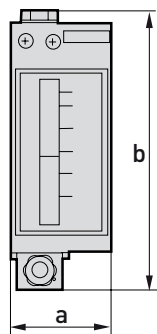
DK32 (DK34) with K1/K2



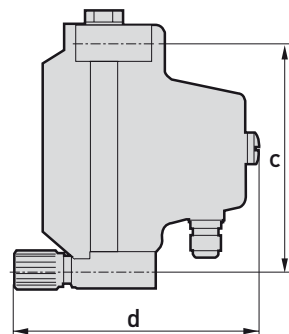
DK32 (DK34) with K1/K2



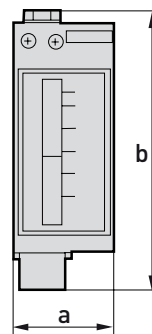
DK37/M8M with valve



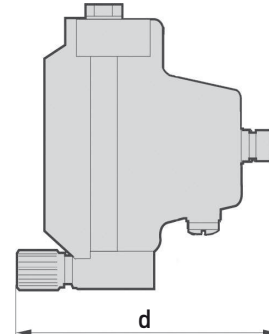
DK37/M8E



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]        | [m3/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  $p_2$ .

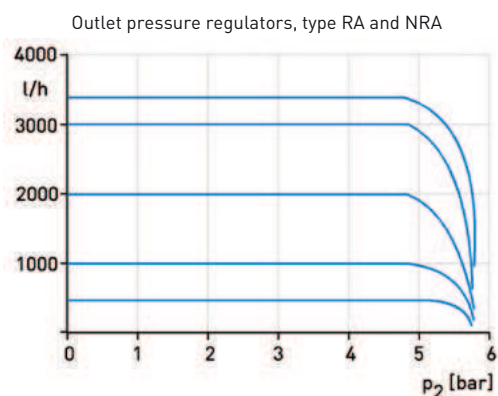
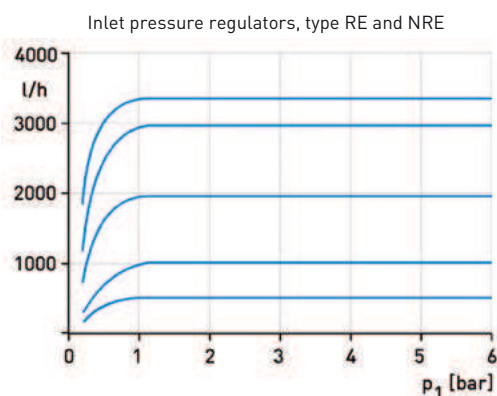
|                                            |                          |          |
|--------------------------------------------|--------------------------|----------|
| Example: outlet pressure regulator NRA-800 | Current flow rate:       | 800l air |
|                                            | 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                                                                            |

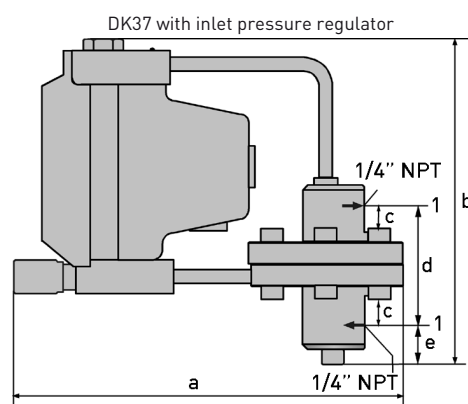
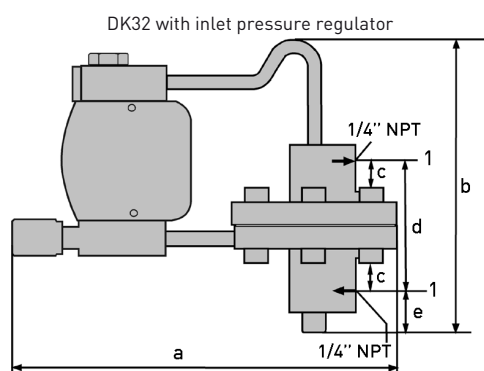
① other connections on request

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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### Representatives

Algeria  
Argentina  
Cameroon  
Canada  
Chile  
Columbia  
Croatia  
Denmark  
Ecuador  
Egypt  
Finland  
Gabon  
Ghana  
Greece  
Hong Kong  
Hungary  
Indonesia  
Iran  
Ireland  
Israel  
Ivory Coast  
Japan  
Jordan  
Kuwait  
Libya  
Lithuania  
Malaysia  
Mauritius  
Mexico  
Morocco  
New Zealand  
Peru  
Portugal  
Romania  
Saudi Arabia  
Senegal  
Slovakia  
Slovenia  
Sweden  
Taiwan  
Thailand  
Tunisia  
Turkey  
Venezuela  
Yugoslavia

### Other countries

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