



## DK32 - DK34 - DK37 Technical Datasheet

### Variable area flowmeters

- Local measurement, setting and monitoring of very low flow rates
- Compact design, no inlet and outlet sections
- High resistance to pressure and temperature

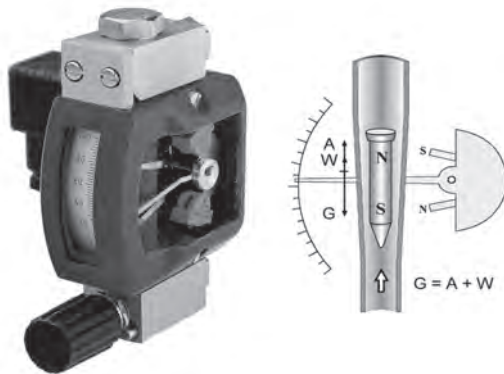


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## 1.1 Flowmeter solutions in an all-metal design

The solid metal DK flowmeters are suitable for measuring liquids and gases. Because of their robust design the flowmeters are particularly suited for difficult operating and environmental conditions.

The extremely compact design and the elimination of inlet and outlet sections allows for simple and cost-effective integration into measuring systems such as process analytics systems.



### Highlights

- DK32 with horizontal connections - with valve
- DK34 with vertical connections - without valve
- DK37 with a higher measuring accuracy accuracy and larger indication
- Narrow design enabling a high packing density
- Easy installation and commissioning

### Industries

- Chemical
- Petrochemical
- Oil & Gas
- Mechanical and plant engineering
- Analytics system building
- Compressor and pump technology

### Applications

The devices are particularly suitable for the measurement of small quantities of:

- Process or carrier gases
- Nitrogen, CO<sub>2</sub> or other industrial gases
- Sample flows for process analytics systems
- Flushing fluids for measuring systems
- Air or water
- Chemicals and additives
- Lubricating, cooling and anti-corrosive agents

## 1.2 Variable area flowmeters of the type DK metal

## DK32



- Max. two limit switches (NAMUR) or floating reed contact
- Horizontal process connections
- For flow rates from 0.15 l/h water and 1.6 l/h air
- Optional in design "valve on top" or without valve

## DK34



- Max. two limit switches (NAMUR) or floating reed contact
- Vertical process connections
- For flow rates from 0.15 l/h water and 1.6 l/h air
- Optional in design "valve on top" or without valve

## DK32/DK34 with flange connection adapter



Flange connection adapters with a standard length of 250 mm / 9.8" and DN15/DN25 flanges can be used for connection to the process instead of the NPT/G threads.

**DK37/M8E**

- Electronic bargraph indicator
- 4...20 mA current output and HART® communication
- For flow rates from 0.15 l/h water and 1.6 l/h air
- Optional in design "valve on top" or without valve

Standard housing M8E:  
PPS, conductive plastic  
Optional housing M8E/R:  
stainless steel 1.4404/CF8M

**DK37/M8M**

- Max. two limit switches (NAMUR)
- For flow rates from 0.15 l/h water and 1.6 l/h air
- Optional in design "valve on top" or without valve

Standard housing M8E:  
PPS, conductive plastic  
Optional housing M8E/R:  
stainless steel 1.4404/CF8M

**DK32 / DK37 with flow regulator**

The inlet or outlet pressure regulators are used to provide constant flow rates in the case of variable inlet or outlet pressures.

### 1.3 Functional principle

The flowmeter operates in accordance with the float measuring principle.

The measuring unit consists of a metal cone in which a float can move freely up and down. The flow goes from bottom to top.

The float adjusts itself so that the buoyancy force  $A$  acting on it, the form drag  $W$  and weight  $G$  are in equilibrium:  $G = A + W$

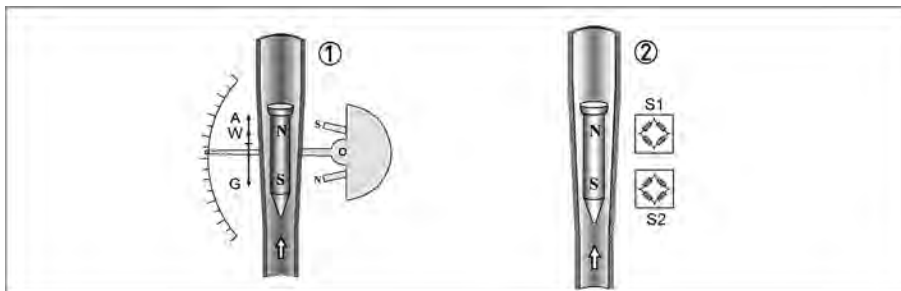


Figure 1-1: Functional principle

For DK32, DK34 and DK37/M8M ① the flow-dependent height of the float in the measuring unit is transmitted by means of a magnetic coupling on a scale.

For DK37/M8E ② the flow-dependent height of the float in the measuring unit is transmitted to the electronic display by means of a magnetic coupling on sensors S1 and S2.

## 2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).*

### Measuring system

Application range	Flow measurement of liquids or gases
Function / Measuring principle	Variable area measuring principle

### Measured value

Primary measured value	Float position
Secondary measured value	Operating volume flow, standard volume flow or mass flow

### Measuring accuracy

Directive	VDI/VDE 3513, sheet 2 (q <sub>G</sub> = 50%)
DK32, DK34	4.0%
DK37	2.5%

### Operating conditions

Max. operating temperature TS	Depending on the version (refer to nameplate)
	Standard version: up to +150°C / +221°F
	HT version: up to +200°C / +392°F
Max. operating pressure PS	Depending on the version (refer to nameplate)
	Standard version: 130 barg / 1885 psig ①
Max. test pressure PT	Depending on the version (refer to nameplate)
	Standard version: 202 barg / 2930 psig ①

### Ingress protection

DK32 / DK34 without cable entry	IP66 and IP68
DK32 / DK34 with cable entry	IP65
DK37 with PPS indicator	IP66
DK37 with stainless steel indicator	IP66 / IP67

### Installation conditions

Inlet and outlet sections	None
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① Higher pressures on request

## Materials

Top fitting, bottom fitting, cone	CrNi steel 1.4404 / 316 L
Screw 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 stem	CrNi steel 1.4404 / 316 L
Gasket of screw plug	PTFE
Gasket of dosing unit	FPM/PTFE, PTFE, FFKM or EPDM ①
Indicator housing of DK32, DK34	Die-cast aluminium, coated
Indicator housing of DK37/M8_/	PPS
Indicator housing of DK37/M8_/R/	Stainless steel 1.4408/CF8M

① Other gasket materials on request

## Other options on request:

- Surface passivation of all metallic, wetted parts
- Special materials: e.g. Hastelloy<sup>®</sup>, Monel<sup>®</sup> a.o.

## Temperatures

Max. product temperature at $T_{amb.} < +40^{\circ}\text{C} / +104^{\circ}\text{F}$	[°C]	[°F]
DK34, DK32/37 without valve	-80...+150	-112...+302
DK32/37 with valve FPM/PTFE or FFKM	-25...+150	-13...+302
DK32/37 with valve PTFE or EPDM	-40...+150	-40...+302
DK32 HT, DK34 HT high-temperature with FFKM	-25...+200	-13...+392

Permissible ambient temperature ①	[°C]	[°F]
DK32, DK34, DK37/M8M without electrical built-ins	-40...+70	-40...+158
DK32/DK34 with limit switches I7S2002-N or SJ2-SN	-40...+70	-40...+158
DK32/DK34 with limit switches SC2-N0 or SJ2-S1N	-25...+70	-13...+158
DK37/M8E	-40...+70	-40...+158
DK32 HT, DK34 HT high-temperature	-25...+200	-13...+392

① For restrictions in hazardous areas refer to the temperature tables in the supplementary Ex instructions



## Indicator DK32, DK34, DK37/M8M with limit switches

DK32 - 34 /K./S DK37/M8M	Cable gland	M16 x 1.5		
	Terminal connection	1.5 mm <sup>2</sup>		
DK32 - 34 /K./S	Clamping range	4.5...10 mm / 0.18...0.4"		
DK37/M8M	Clamping range	3...7 mm / 0.12...0.28"		
DK32 - 34/K./L	Ø Connecting cable	Approx. 7 mm / 0.28"		
	Cable length	Approx. 1.7 m / 5.6 ft (other lengths on request)		
Limit switches	SC2-N0 I7S2002-N	SJ2-SN ①	SJ2-S1N ①	
Connection type NAMUR	2-wire	2-wire	2-wire	
Switching element function	Normally closed	Normally closed	Normally open	
Nominal voltage U <sub>0</sub>	8 VDC	8 VDC	8 VDC	
Pointer vane not detected	≥ 3 mA	≥ 3 mA	≤ 1 mA	
Pointer vane detected	≤ 1 mA	≤ 1 mA	≥ 3 mA	
DK32 - DK34 with reed contact	Type	Bistable		
	Switching reproducibility	< 5% of full scale range		
	Switching capacity	12 VA ②		
	Max. turn-on voltage	30 VDC ②		
	Max. switching current	0.5 A ②		

① safety oriented

② Reduced values for Ex

## Indicator DK37/M8E

Cable gland	M16 x 1.5
Clamping range	3...7 mm / 0.12...0.28"
Terminal connection	2.5 mm <sup>2</sup>
Measuring signal	4...20 mA = 0...100% flow value in 2-wire technology
Power supply	14.8...30 VDC
Min. power supply for HART®	20.5 VDC
Power supply influence	< 0.1%
Dependence on load impedance	< 0.1%
Temperature influence	<10 µA/K
Max. external resistance / load	640 Ω (30 VDC)
Min. load for HART®	250 Ω
Software firmware version	01.15
Identification number	3204090400
NAMUR type test acc. to NE 95	Fulfills NE 21, NE 43

**M8E HART® configuration**

Manufacturer name (code)	KROHNE Messtechnik (69)
Model name	M8E (230)
HART® protocol revision	5.1
Device revision	1
Physical layer	FSK
Device category	Transmitter

**M8E process variable**

Process variable flow rate	Values [%]	Signal output [mA]
Over range	+102.5 (±1%)	20.24...20.56
Device error identification	>106.25	≥21.00
Maximum	112.5	22
Multi-Drop operation	-	4.5
Min. U <sub>ext.</sub>	14.8 VDC	

**Approvals**

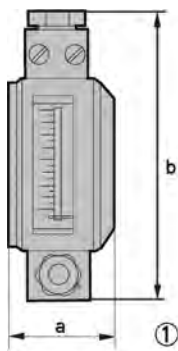
Standard	Display	Marking
ATEX	DK32, DK34, DK37/M8M without electrical built-ins	II2GD c IIC TX
	DK32, DK34	II2G Ex ia IIC T6 Gb II3G Ex nA IIC T6 Gc
	DK37/M8_/ PPS	II2G Ex ia IIC T6 Gb
	DK37/M8_/R stainless steel	II2G Ex ia IIC T6 Gb II2D Ex ia IIIC T75°C Db
IECEX	DK32, DK34	Ex ia IIC T6 Gb
	DK37/M8_/ PPS	Ex ia IIC T6 Gb
	DK37/M8_/R stainless steel	Ex ia IIC T6 Gb Ex ia IIIC T75°C Db
FM (US)	DK32, DK34	IS/I/1/ABCD;T6 NI/I/2/ABCD;T6 S/II, III/2/FG;T6 IS/I, II, III/1/A-G NI/II/2/ABCD
QPS (US/C)	DK37	IS/I/1/ABCD; T6 (in preparation)
Other approvals as NEPSI, INMETRO, CCOE on request.		

## 2.2 Dimensions and weight

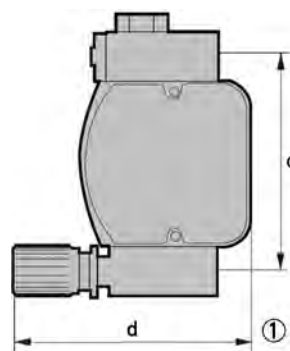
### Dimensions DK32, DK34

	Device	a		b		c		d	
		[mm]	[""]	[mm]	[""]	[mm]	[""]	[mm]	[""]
①	DK32 with valve and horizontal process connection	42	1.66	118	4.65	90	3.55	100	3.94
②	DK34 without valve and vertical process connection	42	1.66	110	4.33	-	-	75	3.07
③	DK32, DK34 with limit switches	46	1.81	approx. 90	approx. 3.55	1500	59	approx. 50	approx. 1.97
④	DK32 with flange adapter	-	-	250	10.2	90	3.55	approx. 195	approx. 7.68
	DK34 with flange adapter	-	-	250	10.2	-	-	-	-

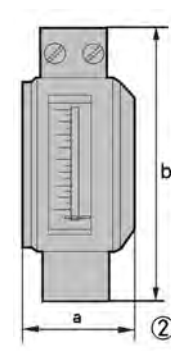
DK32



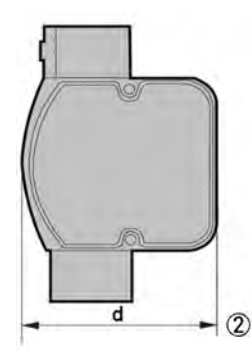
DK32



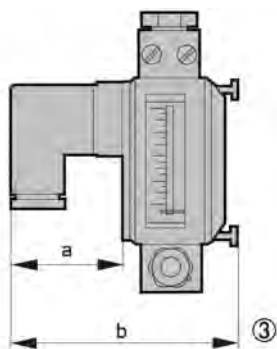
DK34



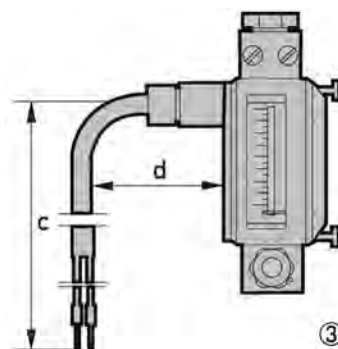
DK34



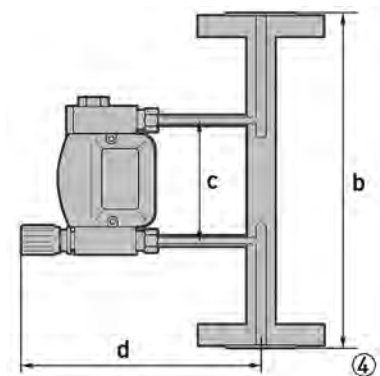
DK32 (DK34) with K1/K2



DK32 (DK34) with K1/K2



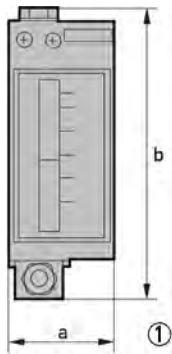
DK32 (DK34) with flange adapter



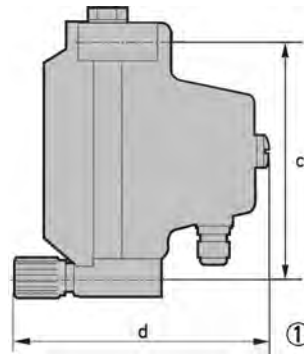
Dimensions DK37

	Device	a		b		c		d	
		[mm]	[""]	[mm]	[""]	[mm]	[""]	[mm]	[""]
①	DK37/M8E with valve and horizontal process connection	56	2.21	153	6.03	125	4.92	approx. 144	approx. 5.67
②	DK37/M8E with valve on top	56	2.21	183	7.21	155	6.11	approx. 144	approx. 5.67
③	DK37/M8M/K . with valve and horizontal process connection	56	2.21	153	6.03	125	4.92	approx. 160	approx. 6.15
④	DK37/M8M/K . without valve and vertical process connection	56	2.21	145	5.71	145	5.71	approx. 144	approx. 5.52
⑤	DK37/M8E without valve and vertical process connection	56	2.21	145	5.71	145	5.71	approx. 121	approx. 4.77

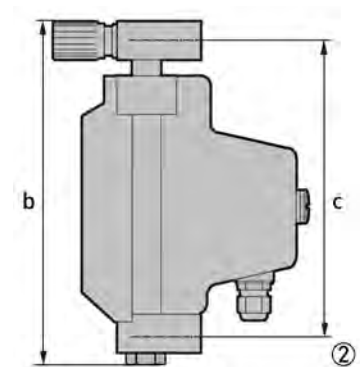
DK37/M8M with valve



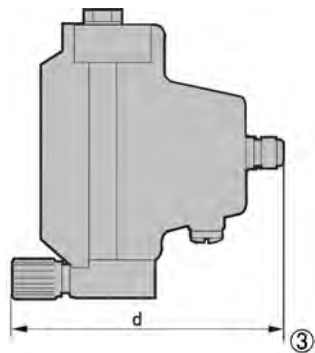
DK37/M8E with valve



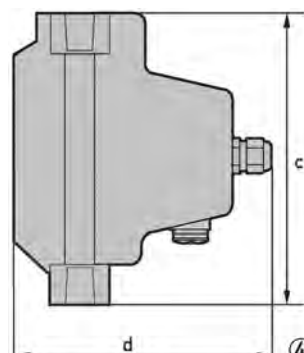
DK37/M8E with valve on top



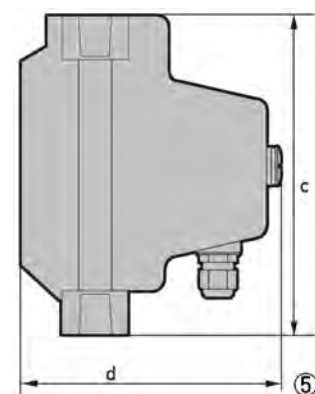
DK37/M8M with K1/K2



DK37/M8M without valve and vertical connection



DK37/M8E without valve and vertical connection



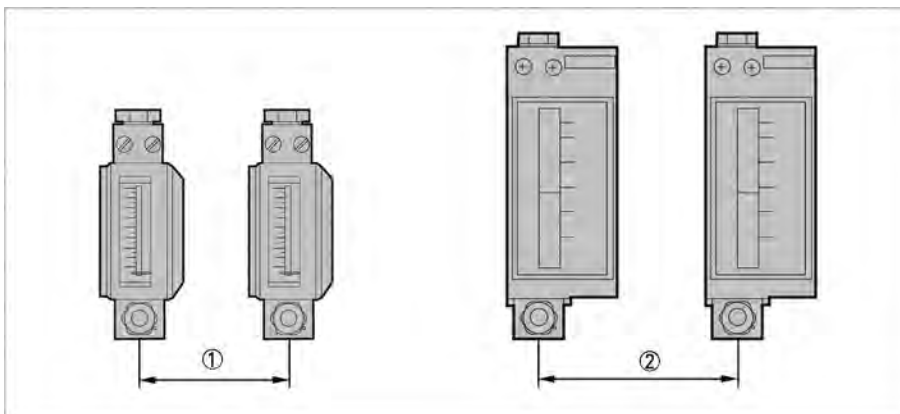
**Total length of flange connection adapter:**

DK37/M8M valve top/bottom and DK37/M8E valve bottom: 250 mm / 9.8"

DK37/M8E valve top: 300 mm / 11.8"

### Minimum distance

When installing several measuring devices side by side, a minimum distance between them has to be observed.



	Device	[mm]	["]
①	DK32 / DK34	60	2.36
②	DK37/M8M	100	3.94
②	DK37/M8E	120	4.73

### Weights

	approx. g	approx. lb
DK32	700	1.54
DK34	600	1.32
DK37/M8M	800	1.76
DK37/M8E	1000	2.21
DK32 with differential pressure regulators	2500	5.51
DK37/M8E with differential pressure regulators	2800	6.18
DK37/M8M with differential pressure regulators	2600	5.73
DK37/M8M/R	2100	4.63
DK37/M8E/R	2300	5.07
DK37/M8M/R with differential pressure regulators	3900	8.60
DK37/M8E/R with differential pressure regulators	4100	9.04

### Process connection

Standard	¼" NPT female
	G¾, Ermeto, Serto, Dilo, Gyrolok, Swagelok, flanges ①

① Other connections on request

## 2.3 Measuring ranges

Measuring span: 10 : 1  
 Flow values: Values = 100%  
 Water: +20°C / +68°F  
 Air: +20°C / +68°F, 1.013 bara / 14.7 psia

Cones	Flow, water		Flow, air		Pressure loss	
	[l/h]	[GPH]	[NI/h]	[SCFH]	[mbar]	[psi]
K 005	-	-	16 ①	0.6 ①	14	0.21
K 005	-	-	50	1.9	31	0.46
K 010	1.5 ①	0.4 ①	70 ①	2.6 ①	66	0.97
K 010	3	0.8	100	3.7	66	0.97
K 015	5	1.3	150	5.6	19	0.28
K 040	10	2.5	400	15	27	0.40
K 080	25	6.5	800	30	55	0.81
K 125	40	11	1250	45	42	0.62
K 200	60	16	2000	75	85	1.25
K 300	80	20	2500	90	117	1.72
K 340	100	25	3400	130	166	2.44

① with titanium float

*The operating pressure should be at least double the pressure loss for liquids and five times for gases. The indicated pressure losses are valid for water and air at maximum flow rate. Other flow ranges on request. Conversion of other media or operating data is performed using the calculation method in accordance with VDI/VDE directive 3513.*

### Reference condition for gas measurements:

Flow measurements for gases are attributed to

NI/h or Nm<sup>3</sup>/h: Volume flow at standard (norm.) conditions 0°C / +32°F, 1.013 bara / 14.7 psia (DIN 1343)

SCFM or SCFH: Volume flow at standard (std.) conditions +15°C / +59°F, 1.013 bara / 14.7 psia (ISO 13443)

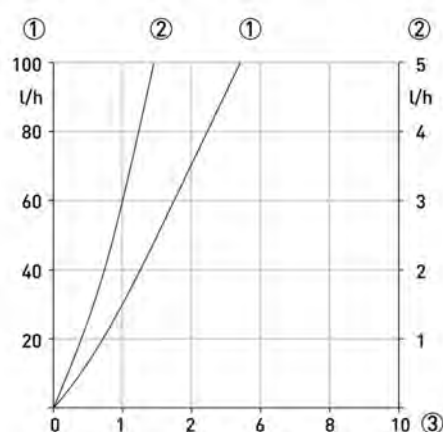
## Valves

Measuring span: 10 : 1  
 Flow values: Values = 100%  
 Water: +20°C / +68°F  
 Air: +20°C / +68°F, 1.013 bara / 14.7 psia

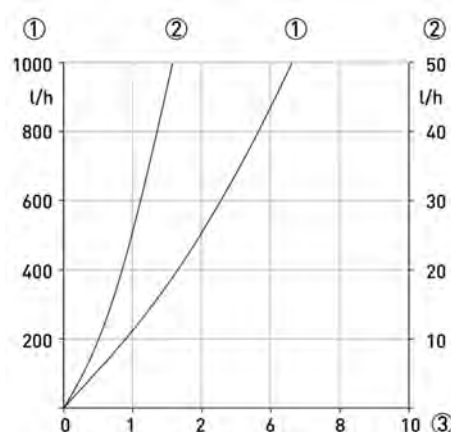
Only DK32 and DK37			Max. flow Qv				Valve characteristic value	
Cones	Valve stem		Water		Air		Kv	Cv
	Ø [mm]	Ø ["]	[l/h]	[GPH]	[NI/h]	[SCFH]	[m <sup>3</sup> /h]	[GPM]
K 005 - K 010	1	0.039	5	1.32	100	3.72	0.018	0.021
K 015 - K 040 - K 080	2.5	0.98	50	13.2	1000	37.2	0.15	0.175
K 125 - K 340	4.5	0.177	160	42.3	4300	160	0.48	0.552

### Valve characteristics

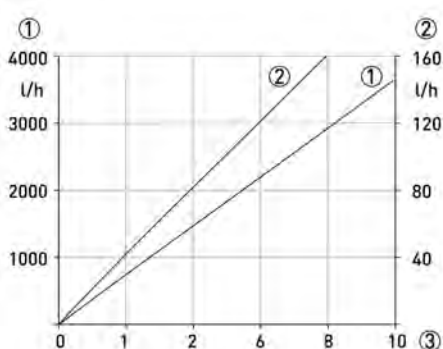
Spindle 1.0 mm / 0.039"



Spindle 2.5 mm / 0.098"



Spindle 4.5 mm / 0.177"



- ① Flow, air
- ② Flow, water
- ③ Spindle revolution n

## 2.4 Differential pressure regulators

Differential pressure regulators are used (only DK32 and DK37) to guarantee constant flow during fluctuating inlet and outlet pressure. Minimum pressures are required to operate the regulators (refer to regulator characteristics).

### Differential pressure regulators are not equivalent to pressure reducing valves!

#### ① Inlet pressure regulators, type RE, NRE

The regulators keep the flow rate constant in the case of a variable inlet pressure and a constant outlet pressure.

Example of inlet pressure regulator RE-1000:	Current flow rate:	1000 l/h air
	Outlet pressure p2 constant:	1.013 bara / 14.7 psia

The flow rate in the device remains constant with a fluctuating inlet pressure greater than 0.5 bar / 7.25 psi.

#### ② Outlet pressure regulator, type RA, NRA

The regulators keep the flow rate constant in the case of a constant inlet pressure and a variable outlet pressure.

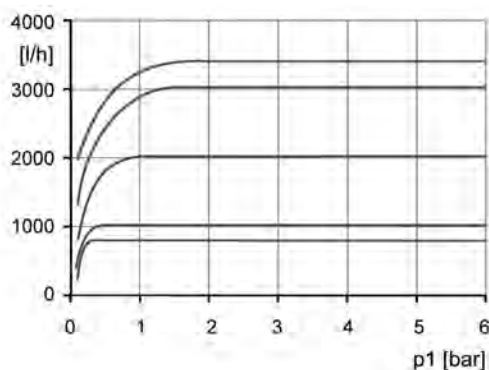
There must be a pressure differential between the inlet and the outlet pressure for the outlet pressure regulators to function. The inlet pressure p1 must always be greater than the outlet pressure p2.

Example for outlet pressure regulator NRA-800	Current flow rate:	800 l/h air
	Inlet pressure constant:	6 bar / 87 psi

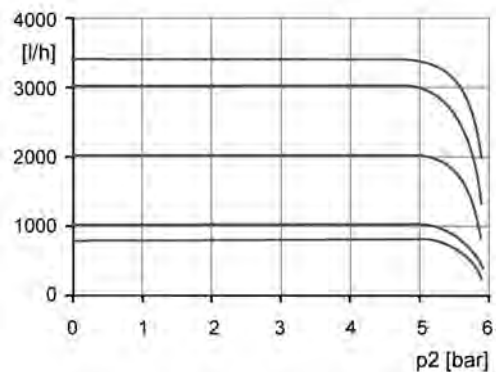
The flow rate in the device remains constant with a fluctuating outlet pressure greater than 0...5.5 bar / 0...79.8 psi.

### Regulator characteristics

#### ① Inlet pressure regulators, type RE and NRE



#### ② Outlet pressure regulators, type RA and NRA





**Control ranges**

Measuring span: 10 : 1  
 Flow values: Values = 100%  
 Water: +20°C / +68°F  
 Air: +20°C / +68°F, 1.013 bara / 14.7 psia

**Inlet pressure regulator ①**

	Max. flow rate				Min. inlet pressure	
	Water		Air			
	[l/h]	[GPH]	[NI/h]	[SCFH]	p1 [bar]	p1 [psi]
RE-1000	...40	...11	...1000	...37	0.5	7.25
RE-4000	...80	...20	...2000	...75	1	14.5
	...100	...25	...3000	...110	1.5	21.8
	...160	...42	...4000	...150	2	29
NRE-100	...2.5	...0.6	...100	...3.7	0.1	1.45
NRE-800	-	-	...250	...9.0	0.1	1.45
	-	-	...800	...30	0.2	2.9
	...25	...6.6	-	-	0.4	5.8

**Outlet pressure regulator ②**

	Max. flow rate				Min. inlet pressure		Min. pressure diff. *	
	Water		Air					
	[l/h]	[GPH]	[NI/h]	[SCFH]	p1 [bar]	p1 [psi]	Δp [bar]	Δp [psi]
RA-1000	...40	...11	...1000	...37	0.5	7.25	0.4	5.8
RA-4000	...100	...25	...2000	...75	1.5	21.8	1.2	17.4
	-	-	...3000	...110	1.5	21.8	1.2	17.4
	...160	...42	...4000	...150	2	29	1.5	21.8
NRA-800	...1	...0.25	...250	...9.0	0.1	1.45	0.05	0.73
	-	-	...500	...19	0.2	2.9	0.1	1.45
	-	-	...800	...30	0.4	5.8	0.2	2.9
	...25	...6.6	-	-	0.4	5.8	0.4	5.8

\* Differential pressure between inlet and outlet pressure

**Reference condition for gas measurements:**

Flow measurements for gases are attributed to

NI/h or Nm<sup>3</sup>/h: Volume flow at standard (norm.) conditions 0°C - 1.013 bara (DIN 1343)

SCFM or SCFH: Volume flow at standard (std.) conditions 15°C - 1.013 bara (ISO 13443)

Technical data for differential pressure regulator

Standard connection	1/4" NPT
Option	Serto, Ermeto 6 or 8, hose nozzle 6 mm or 8 mm, Dilo, Gyrolok, Swagelok, G1/4
Max. operating gauge pressure (at +20°C / +68°F)	64 barg / 928 psig
Product temperature	+150°C / +302°F
Material	CrNi steel 1.4404
Gasket	PTFE
Diaphragm	Carbon / graphite-filled PTFE
O-ring	FPM or FFKM

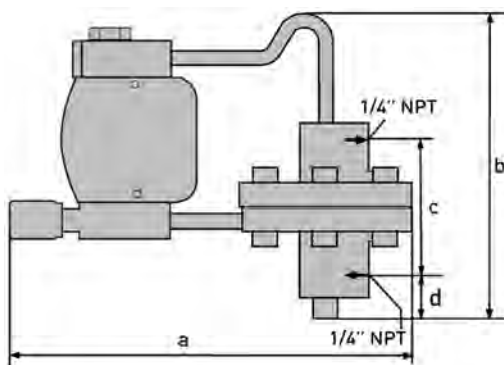
Higher pressures and temperatures, other connections or materials on request

Dimensions with differential pressure regulators

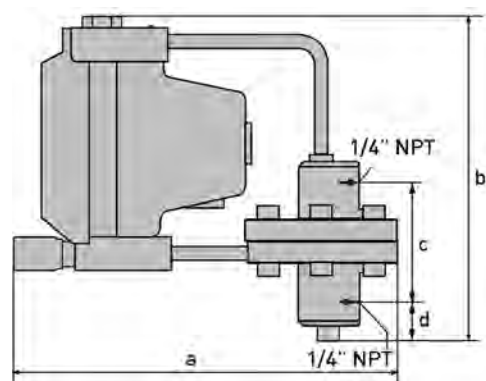
	approx. a		approx. b		c		d	
	[mm]	[""]	[mm]	[""]	[mm]	[""]	[mm]	[""]
DK32	230	9.1	163	6.4	70	2.8	23	0.91
DK37	230	9.1	200	7.9	70	2.8	23	0.91
DK37/M8E ①	230	9.1	230	9.1	70	2.8	23	0.91

① with outlet pressure regulator

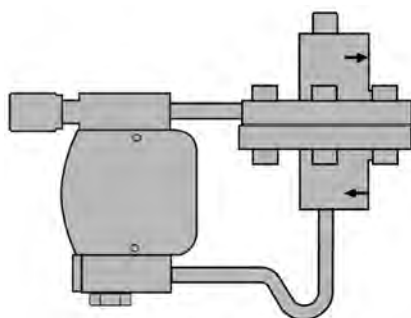
DK32 with inlet pressure regulator



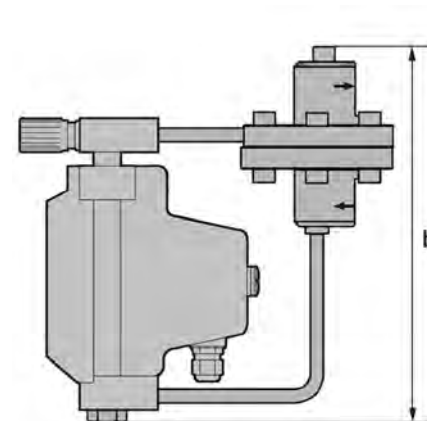
DK37/M8M and M8E with inlet pressure regulator



DK32 with outlet pressure regulator



DK37/M8E with outlet pressure regulator



### 3.1 Intended use

*Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.*

*This device is a Group 1, Class A device as specified within CISPR11:2009. It is intended for use in industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.*

*The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.*

The variable area flowmeters are suitable for measuring gases and liquids.

**The devices are particularly suitable for the measurement of small quantities of:**

- Process or carrier gases
- Nitrogen, CO<sub>2</sub> or other industrial gases
- Sample flows for process analytics systems
- Flushing fluids for measuring systems
- Air or water
- Chemicals and additives
- Lubricating, cooling and anti-corrosive agents

*For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.*

*Do not use any abrasive media containing solid particles.*

### 3.2 Installation conditions

***When installing the device in the piping, the following points must be observed:***

- *The variable area flowmeter must be installed vertically (measuring principle). Flow direction from bottom to top. For installation recommendations please refer also to directive VDI/VDE 3513, sheet 3.*
- *Before connecting, blow or flush out the pipes leading to the device.*
- *The piping for gas flow need to be dried before the device is installed.*
- *Use connectors suitable for the particular device version.*
- *Align the piping centrally with the connection bores on the measuring device so they are free of stresses.*
- *If necessary, the piping has to be supported to avoid the vibrations transmitted to the measuring device.*
- *Do not lay signal cables directly next to cables for the power supply.*
- *When several devices are installed next to one another, a minimum distance between the devices is necessary (for details refer to chapter "Technical data").*

## 4.1 Electrical connection of the limit switches

The electrical connection of the limit switches is made:

- DK.././S - in connection plug
- DK.././L - via a cable assembly

The following procedures are to be performed (DK.././S):

- Loosen the screw ⑥ of the connector plug
- Pull out the plug.
- Remove the screw ⑥ completely from the plug.
- Insert a screwdriver in the marked opening ⑤ (lift) and remove the terminal block.
- Lead the connection cable through the cable gland.
- Insert the cable (max. 1.5 mm<sup>2</sup>) and tighten it.

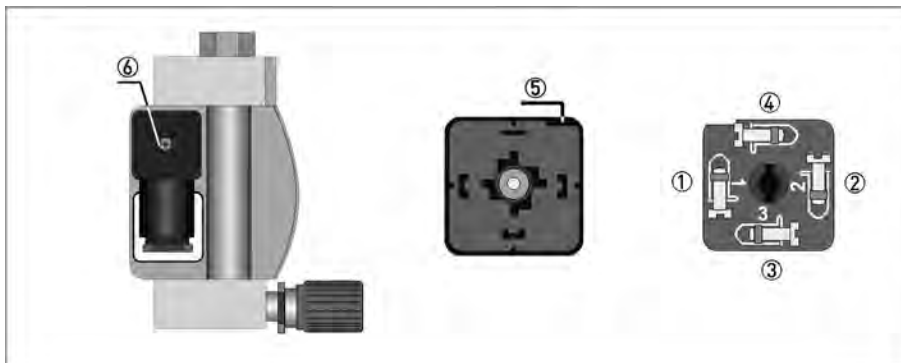


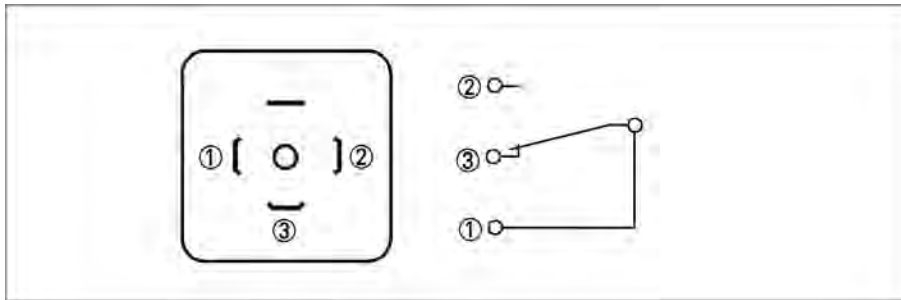
Figure 4-1: Electrical connection of the limit switches

⑤ - Lift slot

⑥ - Fastening screw of connection box

	Contact connection	Stranded wire colour for cable assembly
①	Min minus	white
②	Min plus	yellow
③	Max minus	green
④	Max plus	brown

### Connection of 3-wire reed contact

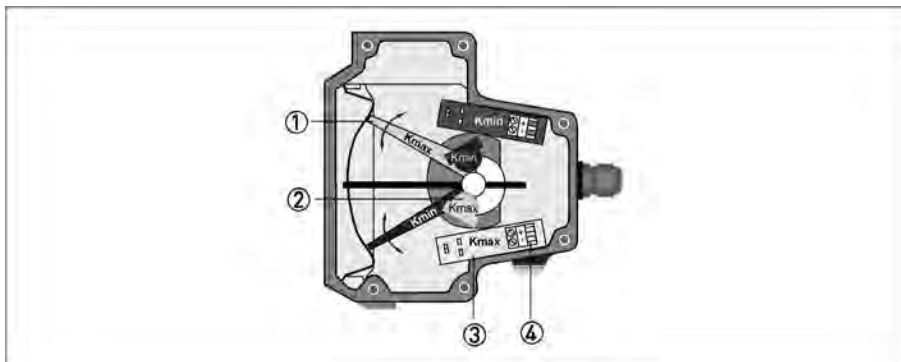


Stranded wire colour for devices with cable assembly:

- ① Silicone-insulated wire - yellow/green / FEP-insulated wire - red
- ② Silicone-insulated wire - brown / FEP-insulated wire - brown
- ③ Silicone-insulated wire - blue / FEP-insulated wire - blue

## 4.2 Limit switches DK37/M8M

The limit switches can be set over the entire measuring range using the maximum pointer. The set limit values are displayed on the scale. The pointers are set to the desired limit values using a slip coupling along the scale.



- ① Maximum pointer, switching point indicator
- ② Limit switches
- ③ Connection board
- ④ Connection terminal

If the pointer vane goes into the slot, an alarm is triggered. An alarm is also triggered in the event of a cable break or short circuit if a suitable amplifier is used.

## 4.3 Electrical signal output DK37/M8E

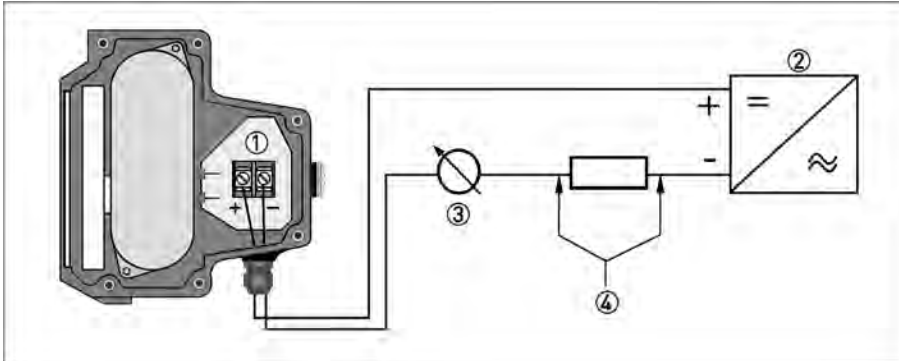


Figure 4-2: Electrical connection M8E

- ① Terminal connection
- ② Power supply 14.8...30 VDC
- ③ Measuring signal 4...20 mA
- ④ External load, HART<sup>®</sup> communication

Wiring must be planned with great care when it comes to connecting other devices such as evaluation units or process control. Internal connections in these devices (e.g. GND with PE, mass loops) may lead to non-permitted voltage potentials which could negatively affect the function of the device itself or that of a device connected to it. In such cases a protected extra-low voltage (PELV) is recommended.

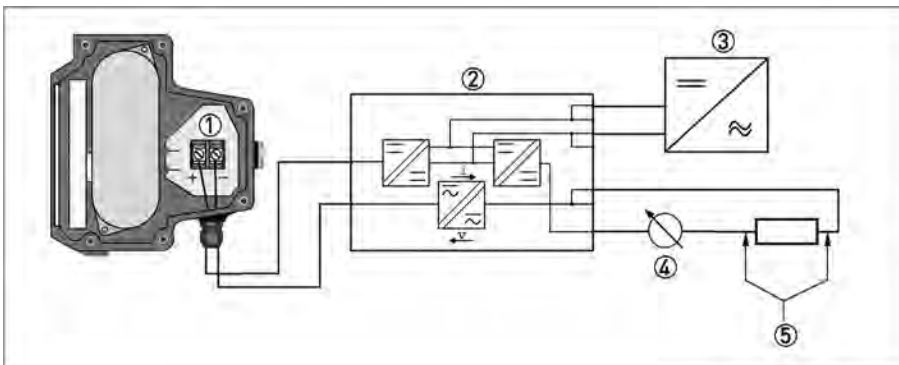


Figure 4-3: Electrical connection with galvanic isolation

- ① Terminal connection
- ② Signal converter isolator with galvanic isolation
- ③ Power supply (refer to isolator information)
- ④ Measuring signal 4...20 mA
- ⑤ External load, HART<sup>®</sup> communication

### 4.3.1 Power supply

*The supply voltage has to be between 14.8 VDC and 30 VDC. This is based on the total resistance of the measuring loop. To determine this, add up the resistances of each component in the measuring loop (not including the device).*

The required supply voltage can be calculated using the following formula:

$$U_{\text{ext.}} = R_L * 22 \text{ mA} + 14.8 \text{ V}$$

with

$U_{\text{ext.}}$  = minimum supply voltage

$R_L$  = total measuring loop resistance

*The power supply has to be able to supply a minimum of 22 mA.*

### 4.3.2 Load for HART<sup>®</sup> communication

*For HART<sup>®</sup> communication a load of at least 230  $\Omega$  is required.*

The maximum load resistance is calculated as follows:

$$R_L = \frac{U_{\text{ext.}} - 14,8\text{V}}{22 \text{ mA}}$$

*Use a twisted two-core cable to prevent electrical interference from impeding the DC output signal.*

*In some cases a shielded cable may be necessary. The cable shield may only be grounded (common ground connection) at one point (on the power supply unit).*

### 4.3.3 Configuration

The M8E electronic indicator can be configured via HART<sup>®</sup> communication. DD (Device Descriptions) for AMS 6.x and PDM 5.2 as well as a DTM (Device Type Manager) are available for configuration. They can be downloaded free of charge from our website.

The current flow rate can be transmitted using the integrated HART<sup>®</sup> communication. A flow counter can be configured. Two limit values can be monitored. The limit values are assigned either to flow values or to the counter overflow. The limit values are not depicted on the display.

Please provide us with the missing information so that we can be of help to you as quickly as possible.

Then please fax this page to the appropriate sales associate. We will then contact you as soon as possible.

### Device data

Connection type:	<input type="checkbox"/> 1/4" NPT	<input type="checkbox"/> [others]		
Connection:	<input type="checkbox"/> Horizontal	<input type="checkbox"/> Vertical		
Pressure rating:				
Display:	<input type="checkbox"/> DK32	<input type="checkbox"/> DK34	<input type="checkbox"/> DK37/M8M	<input type="checkbox"/> DK38/M8E
Display options:	<input type="checkbox"/> K1 ① <input type="checkbox"/> K2 ②	<input type="checkbox"/> K1 ① <input type="checkbox"/> K2 ②	<input type="checkbox"/> K1 ① <input type="checkbox"/> K2 ②	
Differential pressure regulators:	<input type="checkbox"/> Inlet pressure regulator	<input type="checkbox"/> Outlet pressure regulator		
Approval:	<input type="checkbox"/> None	<input type="checkbox"/> ATEX	<input type="checkbox"/> FM	<input type="checkbox"/> NEPSI

① 1 limit switch

② 2 limit switches

### Rating data

Medium:			
Operating pressure:		<input type="checkbox"/> Absolute pressure	<input type="checkbox"/> Gauge pressure
Rated pressure:			
Operating temperature:			
Rated temperature:			
Density:		<input type="checkbox"/> Standard density	<input type="checkbox"/> Operating density
Viscosity:			
Flow range:			
Comments:			

### Contact data

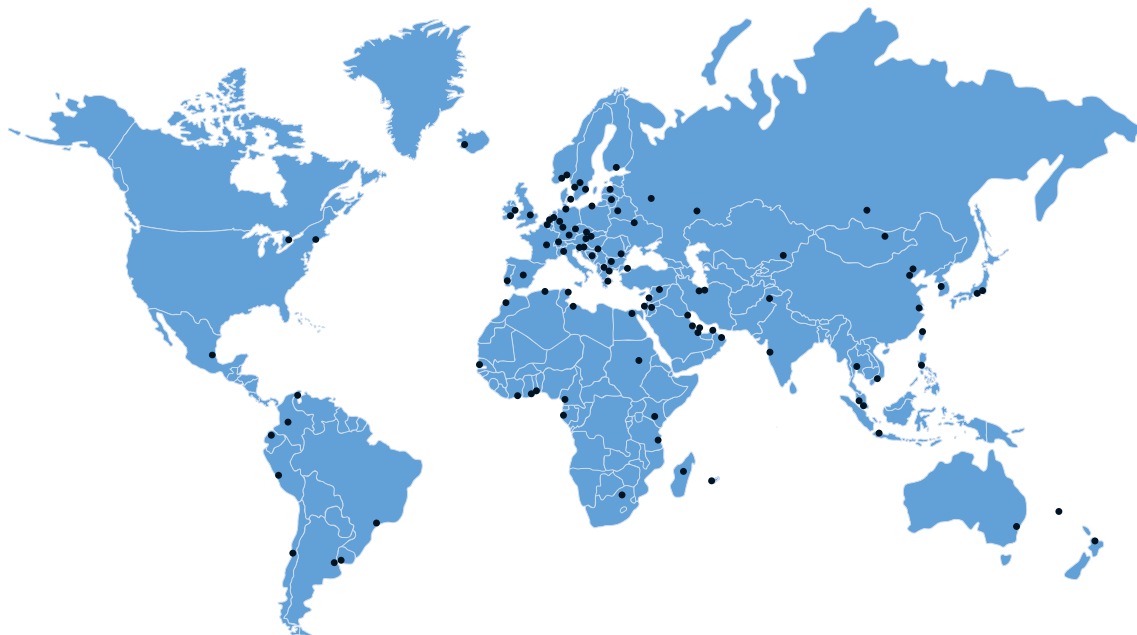
Company:	
Contact person:	
Telephone number:	
Fax number:	
E-mail:	











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