



## DK46 - DK800

### Technical Datasheet

#### Variable-area flowmeter

- Robustly built for many uses
- Local display without auxiliary power
- Excellent long-term stability
- Adaptable to meet customers' requirements
- Replaceable mounting parts that are easily assembled



## DK46 - DK800 variable-area flowmeter

The DK46...DK800 flowmeters are suitable for measuring the volume flow rate of liquids and gases.



### Highlights

- Simple installation and start-up
- Compact design
- Low maintenance
- Limit monitors are optional
- All variants come with high quality needle valves
- No wearing parts
- Fragment protection

### Industries

- Chemical
- Heating, cooling, and air conditioning
- Iron, steel and metal
- Oil & Gas
- Pharmaceutical
- Analytical technology
- Mechanical engineering
- Paper and pulp
- Water

### Applications

- Fine metering
- Gas chromatography
- Minimum level monitoring and control
- In connection with a differential pressure regulator: Ensures constant flow rate in the case of inlet or outlet pressures

## The DK46 - DK800 product family

### Variable-area flowmeters of the type DK glass



For flow rates of 0.04 l/h and greater (water) and 0.5 l/h (air):

- ① DK46 - max. NAMUR two limit monitors or three-wire and inlet and outlet pressure regulator
- ② DK800 - max. NAMUR two limit monitors or three-wire and inlet and outlet pressure regulator
- ③ DK47 - max. NAMUR two limit monitors or three-wire and inlet and outlet pressure regulator
- ④ DK48 - max. NAMUR two limit monitors or three-wire and inlet and outlet pressure regulator

### Instrument designation

Instruments with foot and head pieces made from:

- Stainless steel = DK.../R
- Brass = DK.../N
- PVDF = DK.../PV

For larger flow rates up to 10m<sup>3</sup>/h (water) and 310m<sup>3</sup> (air)

### Variable-area flowmeters of the type VA glass



- ① VA40V - with screw fitting - with max. two limit monitors, NAMUR, or potential-free Reed contact
- ② VA40V - with tube nozzle - with max. two limit monitors, NAMUR or potential-free Reed contact
- ③ VA40V - with flange connection - with max. two limit monitors, NAMUR or potential-free Reed contact
- ④ VA40V - with food and pharmaceutical connection - with max. two limit monitors, NAMUR or potential-free Reed contact

## Technical data

Application range	Flow measurement of liquids and gases
Measuring accuracy	according to directive VDI / VDE 3513, sheet 2
DK46	± 4,0%
DK47	± 2,5%
DK48	± 1,0%
DK800	± 2,5%
Operating pressure PS	Directive 97/23/ EC, April 29, 1999
Test pressure PT	Pressure equipment directive 97/23/EC or AD 2000-HP30
Max. permitted operating gauge pressure PS at 100°	10 bar ①
DK.../PV (head piece and foot piece made from PVDF )	4 bar

① higher pressures upon request

### Process connection

Standard	1/4" NPT internal thread
Options	G 1/4, Ermeto 6 or 8, tube connection 6 mm or 8 mm, Dilo, Gyrolok, Swagelok ①

① other connections upon request

### Materials

Head piece, foot piece	CrNi steel 1.4404 / 316 L, nickle-plated brass, PVDF
Head piece, foot piece optional	HC4
Measuring tube	Borosilicate glass
Float (sphere)	CrNi steel 1.4401 / 316
Float options	Glass, POM, titanium, HC4
DK48 float (All)	CrNi steel 1.4571 / 316 titanium, aluminum, Peek, glass
Metering unit	CrNi steel 1.4571 / 316 Ti
Valve spindle	CrNi steel 1.4404 / 316 L
Standard seals	FPM
Seals	PTFE / FFKM
Seals	EPDM
Protective cover	Polycarbonate

### Weights

Device	DK46	DK47	DK48	DK800
Weight [kg]	0,5	0,6	0,7	0,4
Weight with regulator	2,2	2,3	2,4	2,1

## Limit monitors

### Technical data

Clamp-type terminal	Connection box M16 x 1.5				
Cable diameter	5...10 mm				
Limit monitors	RC10-14-N3	RC15-14-N3	RC10-14-N0	RC15-14-N0	RB15-14-E2
Switching function	Bistable, NAMUR	Bistable, NAMUR	Monostable, NAMUR	Monostable, NAMUR	Bistable, 3-wire
Connection technology	NAMUR, two-wire	NAMUR, two-wire	NAMUR, two-wire	NAMUR, two-wire	Three-wire
Rated voltage U0	8V	8V	8V	8V	
Current consumption	1 mA passage ↓		3 mA - sphere beyond the limit monitor		
Current consumption	3 mA passage ↓		1 mA - sphere is in limit monitor		
Operating voltage Ub					10...30 Vdc
Operating current Ib					0...100mA
No-load current					20mA
Output Ua - passage ↓					≤ 1 V
Output Ua - passage ↑					≥ Ub - 3 V

### Application range of limit monitors

Sphere (CrNi steel)	
Ø 4mm	RC10
Ø 6 mm	RC15 / RB15

DK48 cone no.	Limit monitors
G 13.11	-
G 14.06	-
G 14.08	-
G 15.07	RC10
G 15.09	RC10
G 15.12	RC10
G 16.06	RC10
G 16.12	RC10
G 17.08	RC15 / RB15
G 17.12	RC15 / RB15
G 18.06	-
G 18.08	-
G 18.12	-

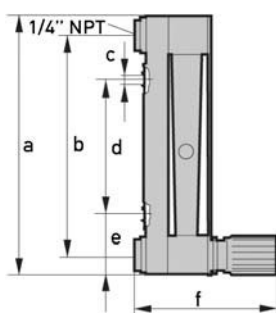
The limit monitors RC15 and RB15 (as max. contact) can only be used for up to 60 l/h water or 2400 l/h air (external diameter of the measuring glass).



Example: DK46 with contact RC15-14-N3

## Dimensions

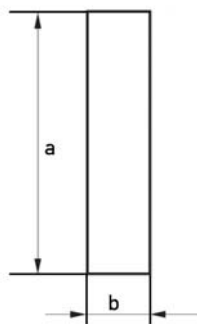
	a	b	c	d	e	f
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
DK46	111	90	4,3	45	33	approx. 82
DK47	196	175	4,3	130	33	approx. 82
DK48	346	325	4,3	280	33	approx. 82
DK800	146	125	4,3	80	33	approx. 82



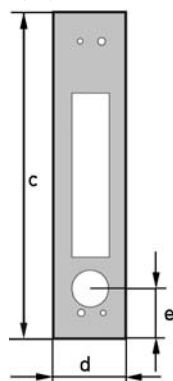
## Switchboard installation dimensions

	a	b	c	d	e
	[mm]	[mm]	[mm]	[mm]	[mm]
DK46	128	32	145	40	27,5
DK47	213	32	230	40	27,5
DK48	363	32	380	40	27,5
DK800	163	32	180	40	27,5

Extract of console panel



Venturi



## Measuring ranges

Measuring span 10 : 1

Flow values 100%

	DK46	DK47	DK800	DK46	DK47	DK800
Sphere Ø mm	Water [l/h]			Air [l/h]		
4	2,5	-	2,5	5	-	5
4	-	-	-	8	-	8
4	-	-	-	16	16	16
4	-	-	-	40	40	40
4	-	-	-	60	100	60
6	5	5	5	100	250	100
6	12	12	12	250	500	250
6	25	25	25	500	800	500
6	40	40	40	800	-	800
6	60	60	60	1200	-	1000
6	100	100	100	-	-	1800
6	-	-	120	-	-	2400
6	-	-	160	-	-	3000
6	-	-	-	-	-	5000
8	120	-	-	-	-	-
8	160	-	-	-	-	-

Reference condition:

water 20°C

air 20°C, 1.2 bar abs. (in a standard state)

Other flow rate measuring ranges can be provided upon request.

The conversion of other materials or operating data (pressure, temperature, density, viscosity) is done with the help of the calculation procedure as detailed in VDE /VDI Directive 3513

## Measuring ranges DK48

Measuring span 10 : 1

Flow values 100%

DK48 cone no.	Water [l/h]	Air [l/h]
G 13.11	0,4	16
G 14.06	0,6	25
G 14.08	1	40
G 15.07	1,6	60
G 15.09	2,5	90
G 15.12	4	140
G 16.08	6	200
G 16.12	10	300
G 17.08 ①	16	500
G 17.12 ①	25	800
G 18.06 ①	40	1200
G 18.08 ①	63	2000
G 18.12 ①	100	3000

① not for DK 48 PV (head and foot piece made from PVDF )

Reference condition:

water 20°C

air 20°C, 1.013 bar abs. (in a standard state)

Other flow rate measuring ranges can be provided upon request.

The conversion of other materials or operating data (pressure, temperature, density, viscosity) is done with the help of the calculation procedure as detailed in VDE /VDI Directive 3513

## Temperatures

Max. temperature of medium	+100°C
Max. Tmed. with limit monitors	+65°C
Min. temperature of medium	-5°C ①
Max. ambient temperature Tamb.	+100°C
Max. Tamb. with limit monitors	+65°C
Min. ambient temperature Tamb.	-20°C ①

① other temperatures upon request

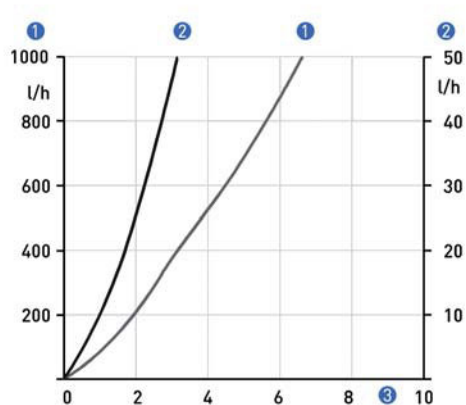
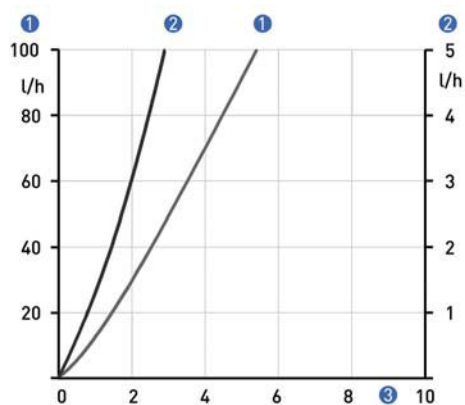


## Valves

Spindle Ø [mm]	Max flowrate		Kv valve characteristic value
	Water [l/h]	Air [l/h]	[m <sup>3</sup> /h]
1	5	100	0,018
2,5	50	1000	0,15
4,5	160	5000	0,48

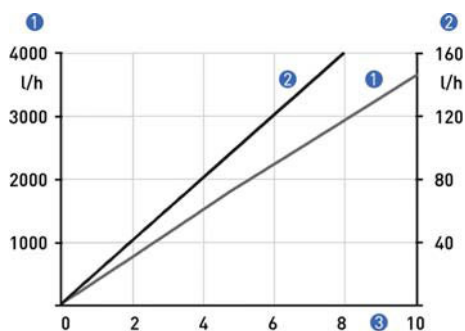
### Valve characteristics

1.0 mm spindle (left hand graph), 2.5 mm spindle (right hand graph)



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

4.5 mm spindle



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

## Differential pressure regulators

Differential pressure regulators are used to provide constant flow rates in the case of variable inlet or outlet pressures. Minimum pressure levels are necessary to operate the regulators (see regulator characteristics).

Differential pressure regulators are not 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 - inlet pressure regulator RE1000:	Current flow rate:	1000 l/h air
	Outlet pressure p2 constant:	1.013 bar abs.

The flow rate is constant in the device in the case of a fluctuating inlet pressure greater than 0.5 bar.

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

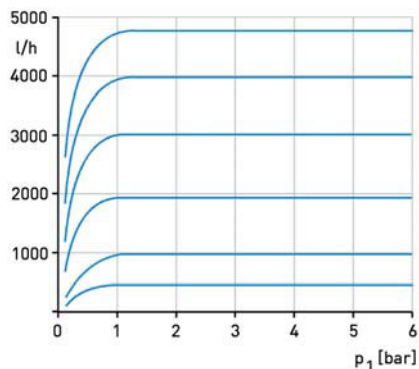
The regulators keep the flow rate constant in the case of a constant inlet pressure and a variable outlet pressure. There must be a pressure differential between the inlet and the outlet pressure for the outlet pressure regulator to function. The inlet pressure p1 must always be greater than the outlet pressure p2.

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

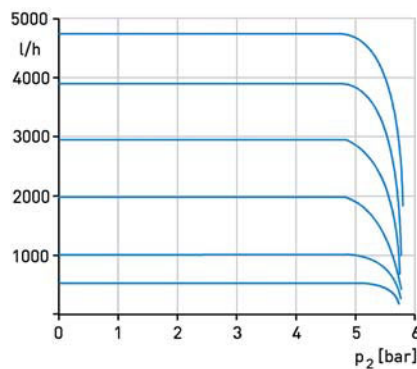
The flow rate is constant in the device in the case of a fluctuating outlet pressure of 0 ... 5.5 bar.

## Regulator characteristics

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



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



## Control ranges

Inlet pressure regulator	Max flow rate		Min. inlet pressure p1 [bar]
	Water	Air	
	[l/h]	[l/h]	
RE-1000	...40	...1000	0,5
RE-4000	...80	...2000	1
	...100	...3000	1,5
	...160	...4000	2
NRE-100	...2,5	...100	0,1
NRE-800		...250	0,1
		...800	0,2
	...25		0,4

Outlet pressure regulator	Max flow rate		Min. pressure diff. [bar]
	Water	Air	
	[l/h]	[l/h]	
RA-1000	...40	...1000	0,5
RA-4000	...100	...2000	1
		...3000	1,5
	...160	...4000	2
NRA-800	...1	...250	0,1
		...500	0,2
	...25	...800	0,4

## Technical data, differential pressure regulator

Standard connection	1/4" NPT
Option	Serto, Ermeto 6 or 8, tube nozzle 6 mm or 8 mm, Dilo, Gyrolok, Swagelok, G 1/4 <sup>①</sup>
Max. operating gauge pressure (at 20°C)	24 bar <sup>②</sup>
Material	CrNi steel 1.4404
Temperature	80°C <sup>③</sup>

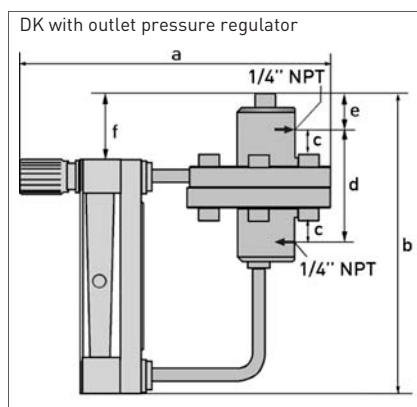
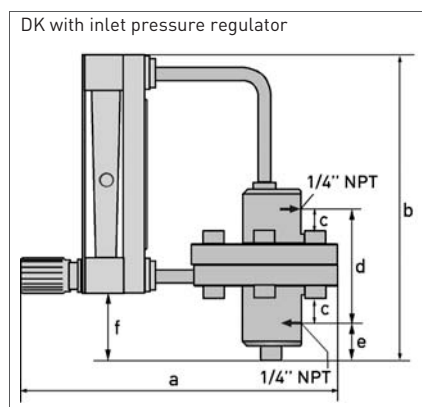
<sup>①</sup> other connections upon request

<sup>②</sup> higher pressures upon request

<sup>③</sup> higher temperatures upon request

## Dimensions with the differential pressure regulator

Dimensions [mm]	a	b	c	d	e	f
DK46	approx. 210	163	approx. 13	70	19	approx. 39
DK47	approx. 210	233	approx. 13	70	19	approx. 39
DK48	approx. 210	383	approx. 13	70	19	approx. 39
DK800	approx. 210	183	approx. 13	70	19	approx. 39



## KROHNE product overview

- Electromagnetic flowmeters
- Variable-area flowmeters
- Mass flowmeters
- Ultrasonic flowmeters
- Vortex flowmeters
- Flow controllers
- Level measuring instruments
- Pressure measuring instruments
- Temperature measuring instruments
- Water Solutions & Analyse
- Complete oil and gas solutions

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