

## DK46 I - DK47 I

Technical Datasheet

### Variable-area flowmeter

- Local indication without auxiliary power
- Adaptable to meet customers' requirements
- Replaceable mounting parts that are easily assembled

## DK46 I - DK47 I variable-area flowmeter

The DK46 I and DK47 I flowmeters are suitable for measuring the volume flow rate of liquids and gases.



- 1 DK46 I
- 2 DK47 I

### Highlights

- Simple installation and start-up
- Compact design
- Low maintenance
- Limit switches 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 variable inlet or outlet pressures

## Options und variants

### DK devices with limit switches



The DK devices can be provided with max. two limit switches, NAMUR or 3-wire open collector.

### DK with differential pressure regulators



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

## Instrument designation



Instruments with head ① and foot pieces ② made from:

Stainless steel = DK.../R

Brass = DK.../N

## Technical data

Application range	Flow measurement of liquids and gases
Measuring accuracy acc. to Directive VDI / VDE 3513 sheet 2 ( $q_G = 50\%$ )	
DK46 I	4.0%
DK47 I	2.5%
Operating pressure PS	Pressure equipment directive 97/23/EC
Test pressure PT	Pressure equipment directive 97/23/EC
Max. perm. operating gauge press. PS at TS = 212°F (100°C)	
DK.../R (head piece and foot piece made from stainless steel)	145 psig (10 bar) ①
DK.../N (head piece and foot piece made from brass)	145 psig (10 bar) ①

① higher pressures upon request

## Materials

Head piece, foot piece	CrNi steel 1.4404 / 316 L, nickle-plated brass
Head piece, foot piece optional	Hastelloy
Measuring tube	Borosilicate glass
Float (sphere)	CrNi steel 1.4401 / 316
Float options	Glass, POM, titanium, Hastelloy C4
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	PTFE / FPM
Seals options	PTFE / FFKM, PTFE / EPDM
Seals options	EPDM, FFKM
Protective cover	Polycarbonate

## Temperatures

Max. temperature of medium T <sub>m</sub>	+212°F (+100°C)
Max. T <sub>m</sub> with limit switches	+149°F (+65°C)
Min. temperature of medium T <sub>m</sub>	+23°F (-5°C) ①
Max. ambient temperature T <sub>amb</sub>	+212°F (+100°C)
Max. T <sub>amb</sub> with limit switches	+149°F (+65°C)
Min. ambient temperature T <sub>amb</sub>	-4°F (-20°C) ①

① other temperatures upon request

## Technical data limit switches

Clamp-type terminal	Connection box M16 x 1.5 - Cable diameter 5...10 mm				
Limit switches	RC10-14-N3	RC15-14-N3	RC10-14-N0	RC15-14-N0	RB15-14-E2
Switching function	Bistable	Bistable	Monostable	Monostable	Bistable, 3-wire
Connection technology	NAMUR, two-wire	NAMUR, two-wire	NAMUR, two-wire	NAMUR, two-wire	Three-wire
Rated voltage U <sub>0</sub>	8 VDC	8 VDC	8 VDC	8 VDC	
Current consumption	1 mA passage ↓		3 mA - sphere beyond		
Current consumption	3 mA passage ↓		1 mA - sphere is in limit monitor		
Operating voltage U <sub>b</sub>					10...30 VDC
Operating current I <sub>b</sub>					0...100mA
No-load current					20mA
Output U <sub>a</sub> - passage ↓					≤ 1 VDC
Output U <sub>a</sub> - passage ↑					≥ U <sub>b</sub> - 3 VDC

## Application range of limit switches

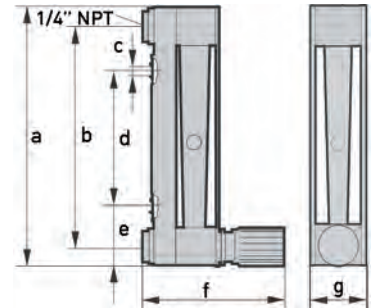
DK46 I, DK47 I	
Sphere	Limit switches
∅ 4mm	RC10
∅ 6 mm	RC15 / RB15
∅ 8 mm	-

The limit switches RC15 and RB15 (as max. contact) can only be used for up to 60 l/h (16 gal/h) water (external diameter of the measuring glass).

## Dimensions and weights

### Dimensions

[inch] [mm]	a	b ± 0.01 ± 0.25	c	d	e	f approx.	g
DK46 I	5.32 135	4.49 114	0.17 4.3	1.77 45	1.30 33	3.23 82	1.1 28
DK47 I	9.65 245	8.82 224	0.17 4.3	5.12 130	1.30 33	3.23 82	1.1 28



### Weights

Device	DK46 I	DK47 I
Weight [kg]	0.5	0.7
Weight with regulator	2.1	2.3

### 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

## Measuring ranges

Measuring span 10 : 1

Flow values 100%

Sphere Ø mm	Water				Air			
	DK46 I		DK47 I		DK46 I		DK47 I	
	[GPH]	[l/h]	[GPH]	[l/h]	[SCFH]	[l/h]	[SCFH]	[l/h]
4	0.65	2.5	-	-	0.22	5	-	-
4	-	-	-	-	0.3	8	-	-
4	-	-	-	-	0.6	16	0.6	16
4	-	-	-	-	1.5	40	1.5	40
4	-	-	-	-	2.5	60	3.8	100
6	1.3	5	1.3	5	3.8	100	-	-
6	3	12	3	12	9	250	9	250
6	6.5	25	6.5	25	18	500	18	500
6	11	40	11	40	30	800	30	800
6	16	60	16	60	45	1200	-	-
6	25	100	25	100	-	-	-	-
8	30	120	-	-	-	-	-	-
8	42	160	-	-	-	-	-	-

Reference condition:

water 68°F (20°C)

air 68°F (20°C), 17.4 psi (1.2 bar abs.) in a standard state

Other flow rate measuring ranges can be provided upon request.

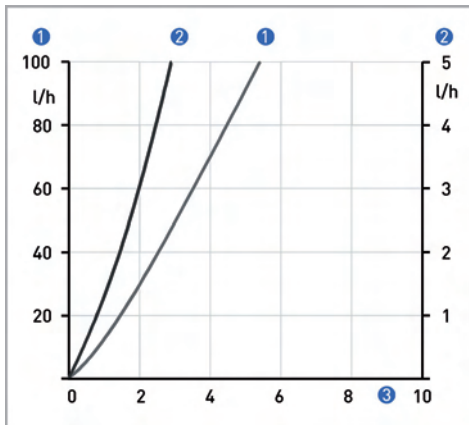
The conversion of other materials or operating data (pressure, temperature, density, viscosity) is done with the help of the calculation procedure as detailed in Directive VDI /VDE 3513

Valves

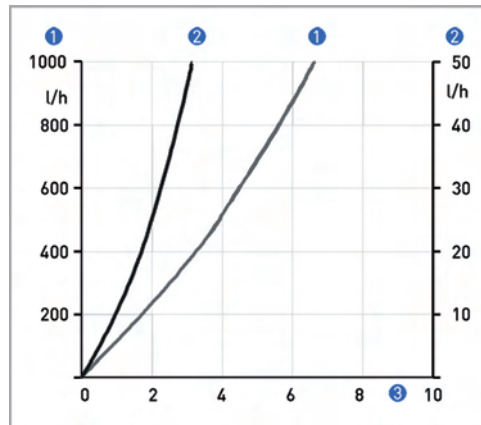
Spindle Ø [mm]	Max flowrate				CV/Kv valve characteristic value	
	Water [l/h]		Air [l/h]			
	[GPH]	[l/h]	[SCFH]	[l/h]	[gal/min]	[m <sup>3</sup> /h]
1	1.32	5	3.5	100	0.021	0.018
2.5	13.2	50	35	1000	0.17	0.15
4.5	42.3	160	177	5000	0.56	0.48

Valve characteristics

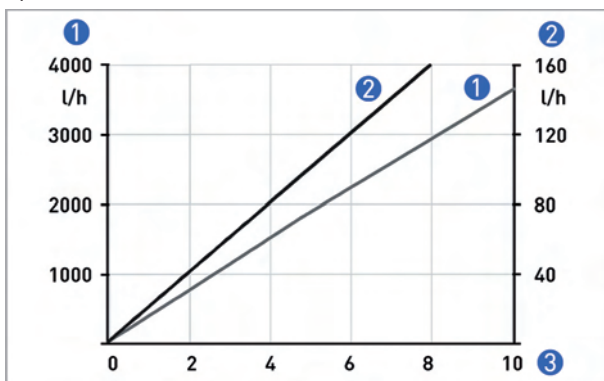
spindle Ø 1.0mm



spindle Ø 2.5mm



spindle Ø 4.5mm



- 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:	35 ft <sup>3</sup> /h (1000 l/h) air
	Outlet pressure p <sub>2</sub> constant:	14.7 psi (1.013 bar abs.)

The flow rate is constant in the device in the case of a fluctuating inlet pressure greater than 7.3 psig (0.5 bar).

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

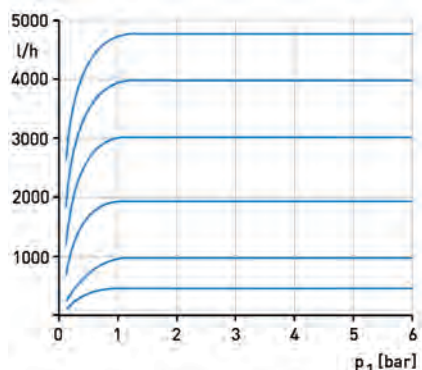
The regulators keep the flow rate constant in the case of a constant inlet pressure and a variable outlet pressure. There must be a pressure differential between the inlet and the outlet pressure for the outlet pressure regulator to function. The inlet pressure p<sub>1</sub> must always be greater than the outlet pressure p<sub>2</sub>.

Example - outlet pressure regulator NRA 800	Current flow rate:	28.3 ft <sup>3</sup> /h (800 l/h) air
	Inlet pressure constant:	87 psig (6 bar)

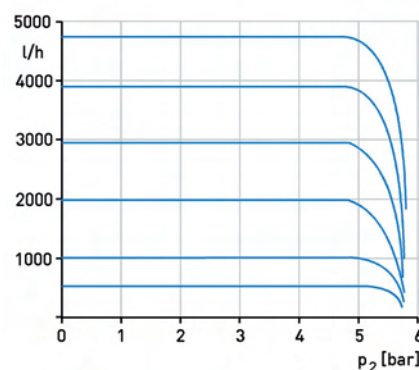
The flow rate is constant in the device in the case of a fluctuating outlet pressure of 0 ... 80 psig (5.5 bar).

## 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 $\Delta p_1$	
	Water		Air			
	[gal/h]	[l/h]	[ft <sup>3</sup> /h]	[l/h]	[psig]	[bar]
RE-1000	...10	...40	...35	...1000	7.3	0.5
RE-4000	...21	...80	...70	...2000	14.5	1
	...26	...100	...106	...3000	21.8	1.5
	...42	...160	...141	...4000	29	2
NRE-100	...0.66	...2.5	...3.5	...100	1.5	0.1
NRE-800			...8.8	...250	1.5	0.1
			...28	...800	2.9	0.2
	...6.6	...25			5.8	0.4

Outlet pressure regulator						
	Max flow rate				Min. pressure diff.	
	Water		Air			
	[gal/h]	[l/h]	[ft <sup>3</sup> /h]	[l/h]	[psig]	[bar]
RA-1000	...10	...40	...35	...1000	7.3	0.5
RA-4000	...26	...100	...70	...2000	14.5	1
			...106	...3000	21.8	1.5
	...42	...160	...141	...4000	29	2
NRA-800	...0.26	...1	...8.8	...250	1.5	0.1
			...18	...500	2.9	0.2
	...6.6	...25	...28	...800	5.8	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 PS	145 psig (10 bar) <sup>②</sup>
Material	CrNi-Steel 1.4404
Temperature	TS = 212°F (100 °C) <sup>③</sup>

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

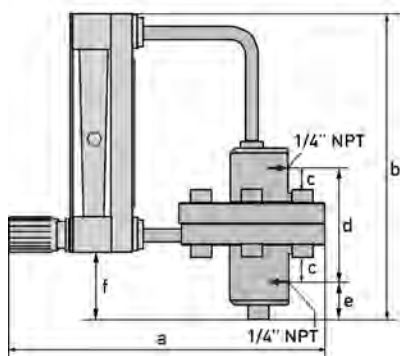
<sup>②</sup> higher pressures upon request

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

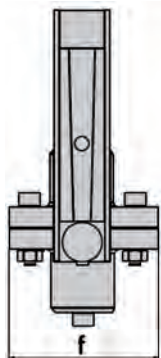
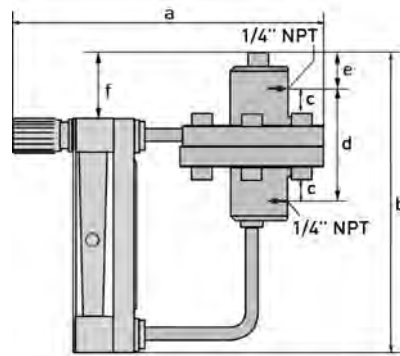
## Dimensions with the differential pressure regulator

Dimensions [inch] [mm]	a approx.	b	c approx.	d	e	f approx.	g
DK46 I	8.27 210	7.37 187	0.51 13	2.76 70	0.75 19	1.54 39	3.55 90
DK47 I	8.27 210	11.11 282	0.51 13	2.76 70	0.75 19	1.54 39	3.55 90

DK with inlet pressure regulator



DK with outlet pressure regulator



## KROHNE measuring technology - Product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Mass flowmeters
- Ultrasonic flowmeters
- Vortex flowmeters
- Flow controllers
- Level measuring instruments
- Temperature measuring instruments
- Pressure measuring instruments
- Analysis
- Oil and gas industry

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