Variable Area Flow Meter for low volume flow

KDS

- Flow measuring of liquids and gas
- Can be used in the chemical industry or in medical or laboratory engineering.
- Precision, reliability and efficiency are the remarkable features of this device.
- Robust mechanical system with a low rate of wear

- **NEW**
  Analog output 4-20 mA for all measuring ranges

Function

The fluid flows from bottom to top through the meter tube of the flow meter. The float is lifted until an annular gap between the measuring cone and the float is produced which corresponds to the flow.
The forces acting on the float are in equilibrium.

The height of the float resulting from the flow rate is transmitted by the permanent magnet in the float through the magnetic tracking system in a rotation to the pointer axis of the analog indicator unit.

The variable-area flowmeter consists of a stainless steel device with an integrated conical stainless steel measuringtube and a vertically movable float. The valve for setting the flow rate is built-in (only KDS-K/C).

Application

The KDS meter is suitable for flow measurement of liquid or gaseous products in pipes.
It shows the current flow rate in volume or mass per unit in time.

Applications: flow measurement, dosing, monitoring, adjusting and control of liquid and gaseous products.

The devices are available with additional electrical equipment for process monitoring and control.

- Design for horizontal and vertical connections available
- A variety of sealing materials
- Wall mounting possibility (KDS-C)
- Differential Pressure Flow Controller (option) (KDS-R)
- High pressure versions (option)
- Flange version (BGK)
- Analog output KDS(BGK)-E

Versions:

KDS-K/C

KDS-S

KDS-R

BGK

KDS/BGK - E (with analog output)

Measuring Ranges:

Reference condition: water at 20°C acc. VDE/ VDI 3513

KDS-K, C

Range	H_2O [l/h]	Air [Nl/h] 1,013 bar abs.	press.loss H_2O [mbar *]
A	0,1-1,0	5-50	6
B	0,25-2,5	15-80	7
C	0,6-6,0	40-210	7
D	1,0-10	60-350	10
E	1,6-16	48-480	12
F	2,5-25	75-750	17
G	4,0-40	120-1200	25
H	6,0-60	180-1800	45
I	10-100	300-3000	95

*full open valve

KDS-S

Range	H_2O [l/h]	Luft [Nl/h] 1,013 bar abs.	press.loss H_2O [mbar]
A	0,1-1,0	5-50	6
B	0,25-2,5	15-80	7,5
C	0,6-6,0	40-210	7,5
D	1,0-10	60-350	8
E	1,6-16	48-480	9
F	2,5-25	75-750	10
G	4,0-40	120-1200	11
H	6,0-60	180-1800	12
I	10-100	300-3000	15
J	16-160	480-4800	20
K	20-200	600-6000	28

KDS-R

Range	H_2O [l/h]	Air [Nl/h] 1,013 bar abs.
A	0,1-1,0	5-50
B	0,25-2,5	15-80
C	0,6-6,0	40-210
D	1,0-10	60-350
E	1,6-16	48-480
F	2,5-25	75-750
G	4,0-40	120-1200
H	6,0-60	180-1800
I	10-100	300-3000

BGK

Range	H_2O [l/h]	Air [Nl/h] 1,013 bar abs	Press.loss H_2O [mbar]
A	0,1-1,0	5-50	6
B	0,25-2,5	15-80	7,5
C	0,6-6,0	40-210	7,5
D	1,0-10	60-350	8
E	1,6-16	48-480	9
F	2,5-25	75-750	10
G	4,0-40	120-1200	11
H	6,0-60	180-1800	12
I	10-100	300-3000	15
J	16-160	480-4800	20
K	20-200	600-6000	28

Technical data

Sensor

Materials:	
Indicator housing	Polyamid; , cover Ultramid
Measuring cone, float, armature:	Stainless steel 1.4404 / 1.4571 (316L / 316TI) other materials on request
Sealing:	Valve sealing: KDS-K/C/R : PTFE Conus sealing KDS-S: PTFE Regulator membrane KDS-R: Viton(standard), PTFE
Process connection:	KDS-K/S/C :standard ¼“ NPT (F), Ermeto / Swagelok: 6/8/10/12/15 mm; G ¼ (M), G ½ (M) Hose connection ¼” (6,35 mm) as Adapter available Special connection on request BGK: flange DN 10/15/25 PN40; ANSI ½ / ¾ /1“ Class 150/300/600
Nominal pressure:	(KDS-K, C,/ BGK) PN 40 (KDS-S) PN 63 (optional up to 420 bar) (KDS-R,) 16 bar (Special versions up to PN40) (max. unilateral pressure rating of the membrane = 7 bar)
Process temperature:	-40°C up to +130°C (without switch/ electronic) Limit switch: NJ1,5-6,5N -25…+100°; NJ 2-11SN -40…+100°C -40°C up to +100°C (c/w electronic KDS-…E)
Ambient temperature:	-25°C up to +70°C
Weight:	KDS-K/C/S 0,65 kg KDS-R 1,4 kg BGK 2,4 kg
Ingress protection:	IP 65 (EN60529)

Certification

Explosion protection:	BVS 03 ATEX H/B 113

Display

%-scale
Measuring range scale

Electrical outputs

1 up to max. 2 induktive limit switches,NAMUR
(Pepperl & Fuchs NJ 1,5-6,5N); 8,2 V (R_i ~1KΩ)
(NJ 2-11-SN); 5…25 VDC (safety wiring)

Analog output (KDS-…E)	4-20 mA, 2-wire, passive; 14-30V ; burden max. 500Ω version non Ex or Ex (intrinsically safe) electrical connection via M12 plug
Ambient temperature:	-25°C up to +70°C

Accuracy

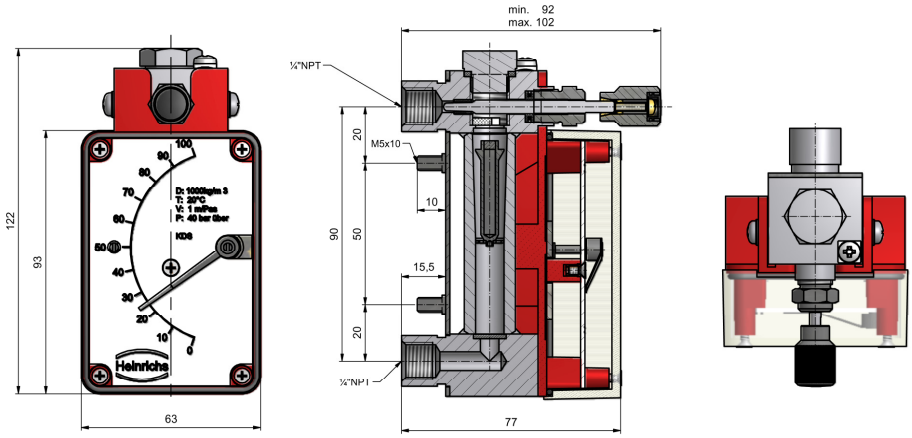
Liquid/Gas:	± 3% qG 50 acc. VDE/VDI 3513

Certification

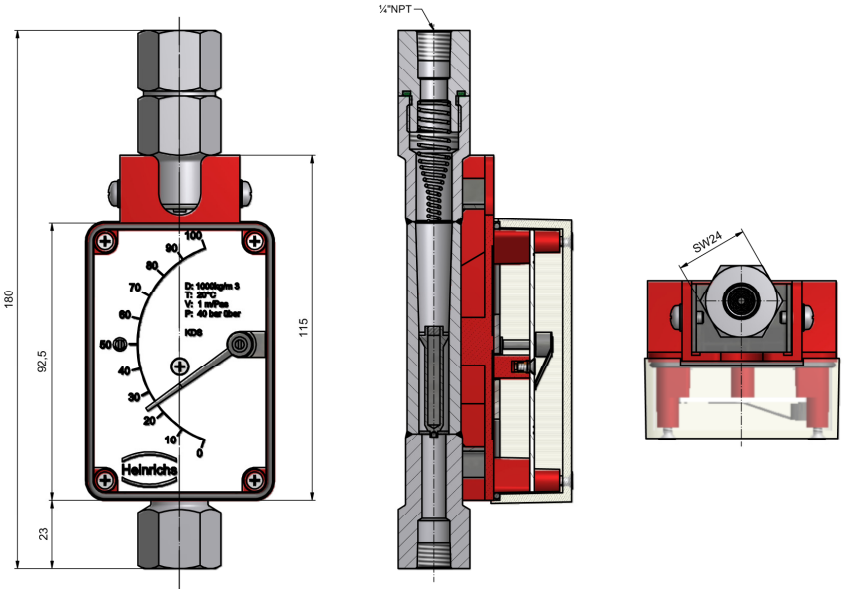
Explosion protection:	NJ1,5-6,5N PTB 00 ATEX 2048 X II 2G Ex ia IIC T6-T4 NJ 2-11SN PTB 00 ATEX 2049 X II 2G Ex ia IIC T6-T4 ZELM 03 ATEX 0128 X II 1D Ex iaD 20 T...°C KDS-(E) II 2G Ex ib IIC T4 Gb, II 2D Ex ib IIIC T 135°C Db
CE-Marking:	Explosion Protection Directive 94/9/EC, PED 97/23/EG
Electromagnetic compatibility for add-on electrical sensors:	EMC-Directive 2004/108/EG EN 61326-1:2006
SIL	SIL conformity acc. IEC-61508-2:2000 and IEC-61508-2:2010, declaration of conformity as separate document available

Dimensions

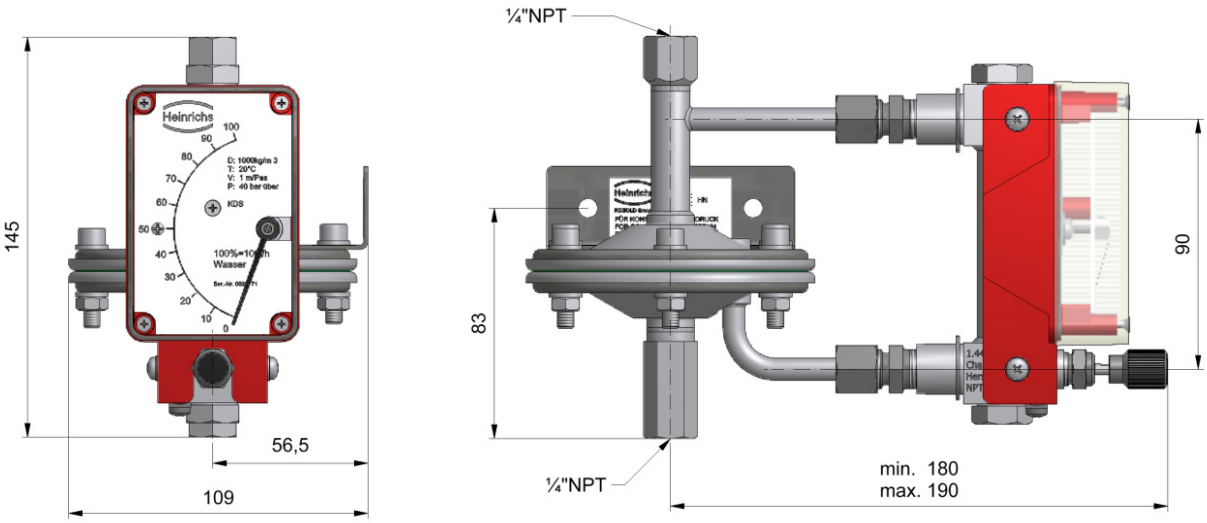
KDS-K, C



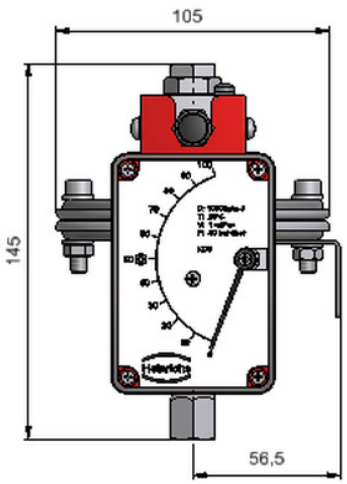
KDS-S

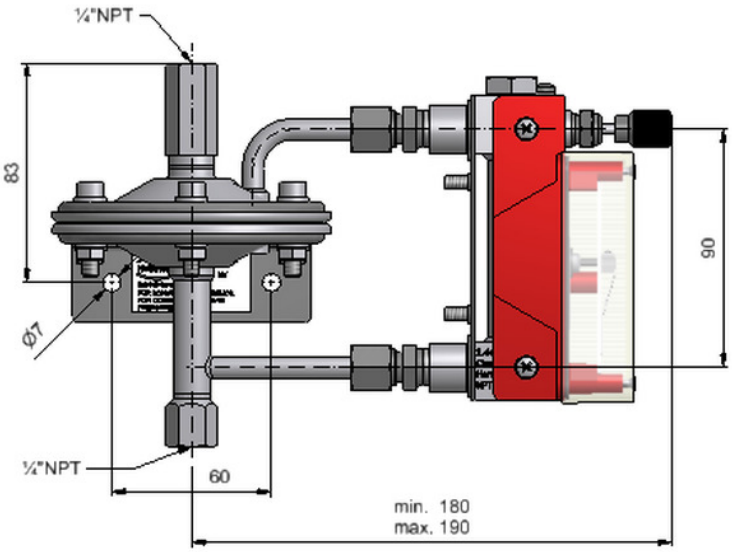


KDS-R...-N with conn ¼“ NPT (F) version with constant outlet pressure

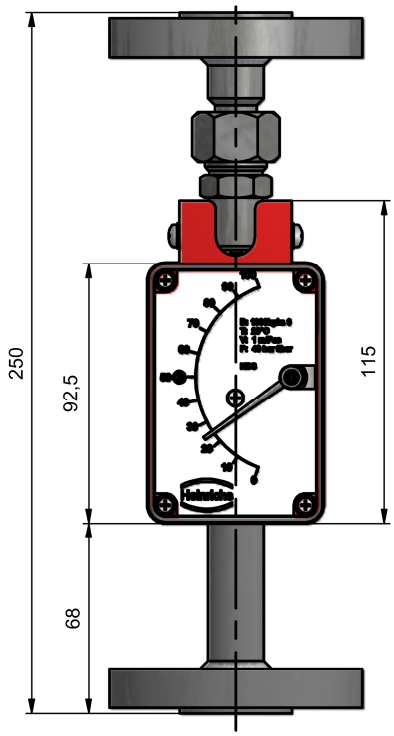


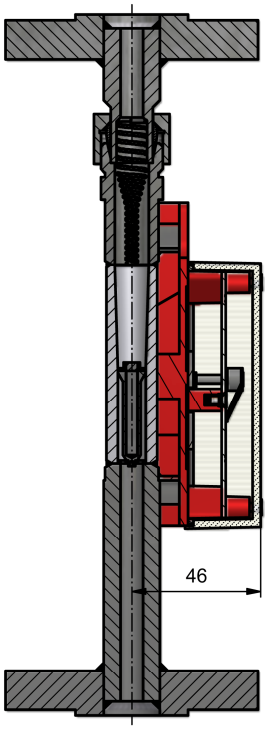
KDS-R...-V with conn. ¼“ NPT (F) version with constant inlet pressure

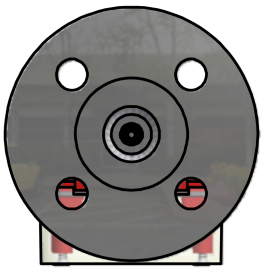




BGK







MODEL CODE

KDS				
-	**Model**			
K	**Variable Area Flowmeter, rear connection,**			
C	**Variable Area Flowmeter, for panel mounting,**			
S	**Variable Area Flowmeter, inline version,**			
-	**Range**		Air 1,013 bar abs.,	
A	H_2O:	0,1 - 1 l/h	Air 5-50 Nl/h	
B	H_2O:	0,25 - 2,5 l/h	Air 15-80 Nl/h	
C	H_2O:	0,6 - 6 l/h	Air 40-210 Nl/h	
D	H_2O:	1 - 10 l/h	Air 60-350 Nl/h	
E	H_2O:	1,6 - 16 l/h	Air 48-480 Nl/h	
F	H_2O:	2,5 - 25 l/h	Air 75-750 Nl/h	
G	H_2O:	4 - 40 l/h	Air 120-1200 Nl/h	
H	H_2O:	6 - 60 l/h	Air 180-1800 Nl/h	
I	H_2O:	10 - 100 l/h	Air 300-3000 Nl/h	
J	H_2O:	16 - 160 l/h **ONL**	Luft 480-4800 Nl/h	**ONLY KDS-S**
K	H_2O:	20 - 200 l/h **ONL**	Luft 600-6000 Nl/h	**ONLY KDS-S**
-				
	Sealing			
P	PTFE			
X	Special option (acc. customer specification)			
	Valve			
3	without		Standard for KDS-S	
U	bottom	not with el. output "E"	**(not for KDS-S)**	
O	top	(standard)	**(not for KDS-S)**	
-				
	Certificates			
0	without			
1	Certificate of compliance with the order, 2.1		(13,00 €)	2)
2	Test report, 2.2		(13,00 €)	2)
B	Inspection certificate 3.1 with material certificate (DIN EN 10204:2004)		**(only on KDS-S)**	
C	Inspection certificate 3.2 with material certificate (DIN EN 10204:2004)		**(only on KDS-S)**	
-				
	Scale		Approval	
A	%-Scale (H2O)		IIC 2GD c IIC (BVS 03 ATEX H-B 113)	
B	Measuring Range-Scale (H2O)		IIC 2GD c IIC (BVS 03 ATEX H-B 113)	
C	Standard-scale (Air)		IIC 2GD c IIC (BVS 03 ATEX H-B 113)	
D	%-Scale (Media)		IIC 2GD c IIC (BVS 03 ATEX H-B 113)	
E	Measuring Range-Scale (Media)		IIC 2GD c IIC (BVS 03 ATEX H-B 113)	
F	Double scale acc customer specification			
X	Agency approved, customer specified.			
	Switches		Processtemperature	
0	without		-40°C - +130°C	
1	1 x inductive switch, initiator (NJ 1,5-6,5-N)		-25C - +100°C	
2	2 x inductive switch, initiator (NJ 1,5-6,5-N)		-25C - +100°C	
3	1 x inductive switch, initiator (NJ 2-11-SN)		-25C - +100°C	
A	KEI 1 (NJ 1,5 - 6,5 N) Harting		-25C - +100°C	
B	KEI 2 (NJ 1,5 - 6,5 N) Harting		-25C - +100°C	
E	Transmitter 4-20mA w/o HART	**ATEX expected Q3 2012**		
X	Agency approved, customer specified.			
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	Accessories			
0	without			
X	with (separate specification necessary)			

Heinrichs
KOBOLD Group

BGK

-	Flange connection
301B	DN10 PN40 Form B1 DIN EN 1092-1
305B	DN15 PN40 Form B1 DIN EN 1092-1
305D	DN15 PN40 Form D DIN EN 1092-1
309B	DN25 PN40 Form B1 DIN EN 1092-1
309D	DN25 PN40 Form D DIN EN 1092-1
201R	½" Class 150 RF ASME B16.5-2003
221R	½" Class 300 RF ASME B16.5-2003
241R	½" Class 600 RF ASME B16.5-2003
202R	¾" Class 150 RF ASME B16.5-2003
222R	¾" Class 300 RF ASME B16.5-2003
203R	1" Class 150 RF ASME B16.5-2003
223R	1" Class 300 RF ASME B16.5-2003
203J	1" Class 150 RTJ ASME B16.5-2003
223J	1" Class 300 RTJ ASME B16.5-2003
XXXX	special connection

	Range	Air 1,013 bar
A	H_2O: 0,1 - 1 l/h	Air 5-50 Nl/h
B	H_2O: 0,25 - 2,5 l/h	Air 15-80 Nl/h
C	H_2O: 0,6 - 6 l/h	Air 40-210 Nl/h
D	H_2O: 1 - 10 l/h	Air 60-350 Nl/h
E	H_2O: 1,6 - 16 l/h	Air 48-480 Nl/h
F	H_2O: 2,5 - 25 l/h	Air 75-750 Nl/h
G	H_2O: 4 - 40 l/h	Air 120-1200 Nl/h
H	H_2O: 6 - 60 l/h	Air 180-1800 Nl/h
I	H_2O: 10 - 100 l/h	Air 300-3000 Nl/h
J	H_2O: 16 - 160 l/h	Air 480-4800 Nl/h
K	H_2O: 20 - 200 l/h	Air 600-6000 Nl/h
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	Certificates		
0	without		
1	Certificate of compliance with the order, 2.1	(13,00 €)	2)
2	Test report, 2.2	(13,00 €)	2)
B	Inspection certificate 3.1 with material certificate (DIN EN 10204:2004)		
C	Inspection certificate 3.2 with material certificate (DIN EN 10204:2004)		
-			

	Scale	Approval
A	%-Scale (H2O)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
B	Measuring Range-Scale (H2O)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
C	Measuring Range-Scale (Air)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
D	%-Scale (Media)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
E	Measuring Range-Scale (Media)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
F	Double scale acc customer specification	
X	special acc customer specification.	

	Switches	Processtemperat
0	without	-40°C - +130°C
1	1 x inductive switch, initiator (NJ 1,5-6,5-N)	-25C - +100°C
2	2 x inductive switch, initiator (NJ 1,5-6,5-N)	-25C - +100°C
3	1 x inductive switch, initiator (NJ 2-11-SN)	-25C - +100°C
A	KEI 1 (NJ 1,5 - 6,5 N) Harting	-25C - +100°C
B	KEI 2 (NJ 1,5 - 6,5 N) Harting	-25C - +100°C
E	Transmitter 4-20mA w/o HART **ATEX expected Q3 2012**	
X	Agency approved, customer specified.	

-	Accessories
0	without
X	with (separate specification necessary)

KDS

-	**Model**	
R	**Flow Controller, vertical connection,**	
	Range	Air 1,013 bar
A	H_2O: 0,1 - 1 l/h	Air 5-50 Nl/h
B	H_2O: 0,25 - 2,5 l/h	Air 15-80 Nl/h
C	H_2O: 0,6 - 6 l/h	Air 40-210 Nl/h
D	H_2O: 1 - 10 l/h	Air 60-350 Nl/h
E	H_2O: 1,6 - 16 l/h	Air 48-480 Nl/h
F	H_2O: 2,5 - 25 l/h	Air 75-750 Nl/h
G	H_2O: 4 - 40 l/h	Air 120-1200 Nl/h
H	H_2O: 6 - 60 l/h	Air 180-1800 Nl/h
I	H_2O: 10 - 100 l/h	Air 300-3000 Nl/h
-		
	Sealing	
P	PTFE	
X	Special option (acc. customer specification)	
	Material requirement (Block-no. 4)	
M	standard	
X	Special option (acc. customer specification)	
	Valve	
U	without	
O	bottom not with el. output "E"	
-	top	
	Certificates	
0	without	
1	Certificate of compliance with the order, 2.1	(13,00 €) 2)
2	Test report, 2.2	(13,00 €) 2)
-		
	Scale	Approval
A	%-Scale (H2O)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
B	Measuring Range-Scale (H2O)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
C	Measuring Range-Scale (Air)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
D	%-Scale (Media)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
E	Measuring Range-Scale (Media)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
F	Double scale acc customer specification	
X	Special acc. customer specification	
	Switches	Processtemperat
0	without	-40°C - +130°C
1	1 x inductive switch, initiator (NJ 1,5-6,5-N)	-25C - +100°C
2	2 x inductive switch, initiator (NJ 1,5-6,5-N)	-25C - +100°C
3	1 x inductive switch, initiator (NJ 2-11-SN)	-25C - +100°C
A	KEI 1 (NJ 1,5 - 6,5 N) Harting	-25C - +100°C
B	KEI 2 (NJ 1,5 - 6,5 N) Harting	-25C - +100°C
E	Transmitter 4-20mA w/o HART **ATEX expected Q3 2012**	
X	Agency approved, customer specified.	
-		
	Flow-Controller (stainless steel)	
V	Upstream pressure constant / downstream pressure variabel (HV)	Valve on outlet
N	Downstream pressure konstant / upstream pressure variabel (HN)	Valve on inlet
	Diaphragm material	
V	Viton (standard)	
P	PTFE	
	Pressure	
16	max. 16 bar	max. pressure difference 7 bar
25	max. 25 bar, Valve not closing	max. pressure difference 7 bar
-		
	Accessories	
0	without	
X	with (separate specification necessary)	

For further information see device description KDS-BGK_GB_XX_en.
Subjects to change without notice.

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