



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
- Analogue output 4-20mA



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

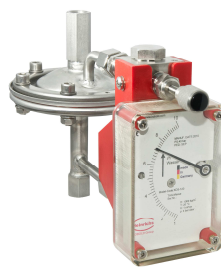
Versions:



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

Type	Measuring range	Measuring range for water at 1000 kg/m ³ [l/h]	Measuring range for air at 1.013 bars abs [NI/h]	Pressure loss H ₂ O [mbar *] KDS-R	Pressure loss H ₂ O [mbar*] KDS-K/C	Pressure loss H ₂ O [mbar] KDS-S, BGK
KDS-K/C/R	A	0.1-1.0	3 - 30	350	6	6
	B	0.25-2.5	5-50	350	7	7.5
	C	0.6-6.0	18 - 180	350	7	7.5
KDS-S	D	1.0-10	30 - 300	350	10	8
	E	1.6-16	48 - 480	350	12	9
BGK	F	2.5-25	75 - 750	350	17	10
	G	4.0-40	120 - 1200	350	25	11
	H	6.0-60	180 - 1800	350	45	12
	I	10-100	300 - 3000	350	95	15
only KDS-S, BGK	J	16-160	480 - 4800		-	20
	K	20-200	600 - 6000		-	28

- with fully opened valve

Additional special flow ranges (for gases only)

Type	Measuring range	Measuring range for water at 1000 kg/m ³ [l/h]	Measuring range for air at 1.013 bars abs [NI/h]	Pressure loss H ₂ O [mbar *] KDS-R	Pressure loss H ₂ O [mbar*] KDS-K/C	Pressure loss H ₂ O [mbar] KDS-S, BGK
KDS-K/C/R	L	-	6-60	350	-	7.5
KDS-S	M	-	7-70	350	-	7.5
BGK	N	-	11-110	350	-	7.5



Technical data

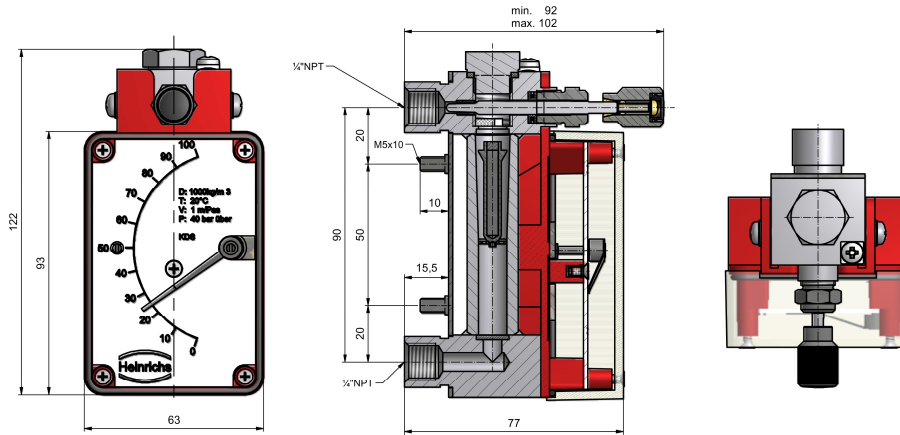
Sensor

Materials:	Polyamid; , cover Ultramid
Indicator housing	Stainless steel 1.4404 / 1.4571 (316L / 316TI)
Measuring cone, float, armature:	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 1/4" NPT (F), Ermeto / Swagelok: 6/8/10/12/15 mm; G 1/4 (M), G 1/2 (M) Hose connection 1/4" (6,35 mm) as Adapter available Special connection on request BGK: flange DN 10/15/25 PN40; ANSI 1/2 / 3/4 /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)
<u>Certification</u>	
Explosion protection:	BVS 03 ATEX H/B 113 (mechanical)
Display	%-scale Measuring range scale
Electrical outputs	1 up to max. 2 inductive limit switches,NAMUR (Pepperl & Fuchs NJ 1,5-6,5N); 8,2 V (Ri ~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 BVS 12 ATEX E 093 X, IECEx BVS 12.0061X
Ambient temperature:	-25°C up to +70°C
<u>Accuracy</u>	
Liquid/Gas:	± 3% qG 50 acc. VDE/VDI 3513
<u>Certification</u>	
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 BVS 12 ATEX E 093 X, IECEx BVS 12.0061X
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

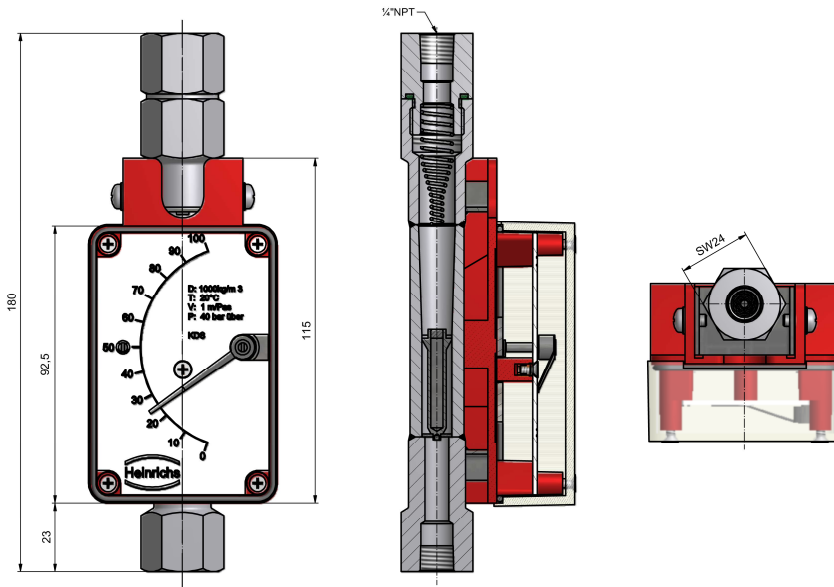


Dimensions

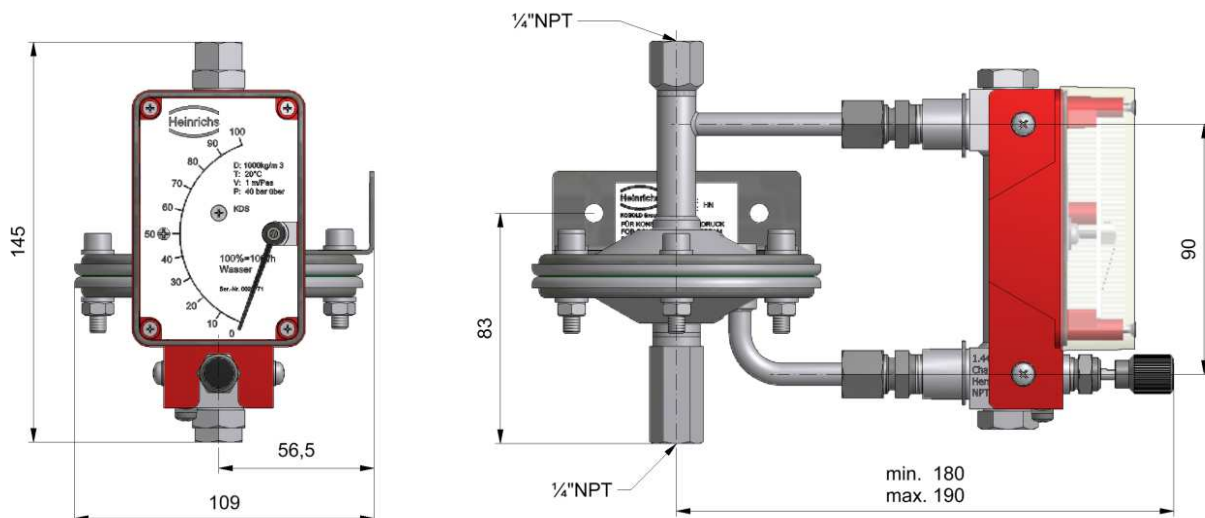
KDS-K, C



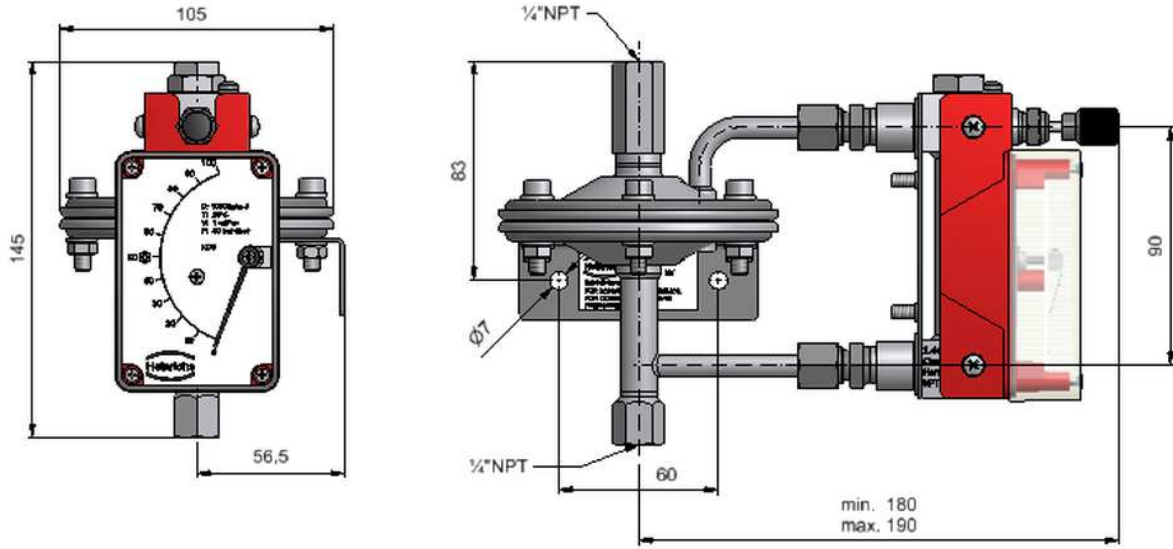
KDS-S



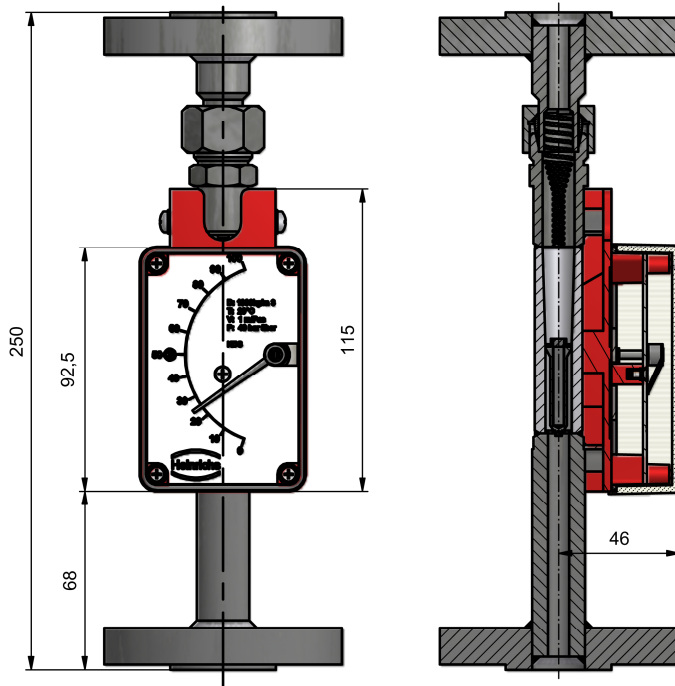
KDS-R...-N with conn 1/4" NPT (F) version with constant outlet pressure



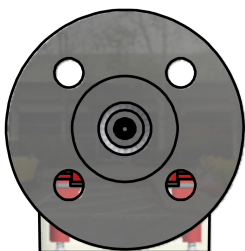
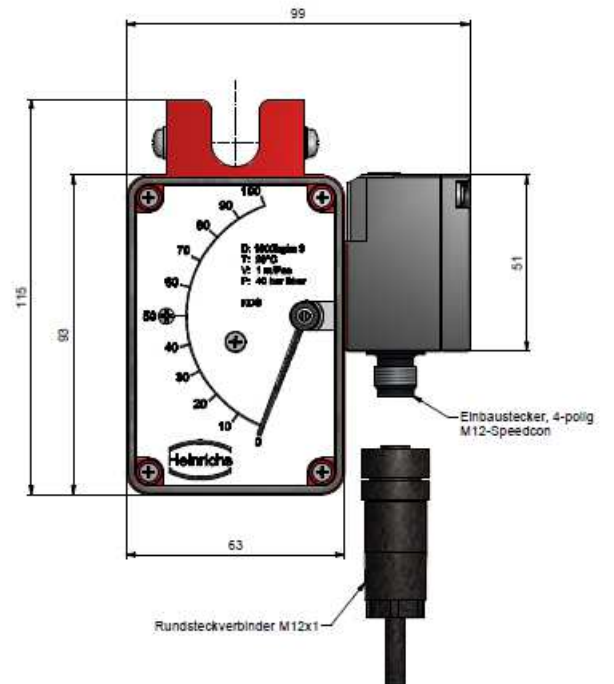
KDS-R...-V with conn. 1/4" NPT (F) version with constant inlet pressure



BGK



KDS-E Indication with analog output





MODEL CODE

KDS	
-	Model
K	Variable Area Flowmeter, rear connection,
C	Variable Area Flowmeter, for panel mounting,
S	Variable Area Flowmeter, inline version,
-	Range
A	H ₂ O: 0,1 - 1 l/h Air 1,013 bar abs., 3-30 NI/h
B	H ₂ O: 0,25 - 2,5 l/h Air 5-50 NI/h
C	H ₂ O: 0,6 - 6 l/h Air 18-180 NI/h
D	H ₂ O: 1 - 10 l/h Air 30-300 NI/h
E	H ₂ O: 1,6 - 16 l/h Air 48-480 NI/h
F	H ₂ O: 2,5 - 25 l/h Air 75-750 NI/h
G	H ₂ O: 4 - 40 l/h Air 120-1200 NI/h
H	H ₂ O: 6 - 60 l/h Air 180-1800 NI/h
I	H ₂ O: 10 - 100 l/h Air 300-3000 NI/h
J	H ₂ O: 16 - 160 l/h ONL Luft 480-4800 NI/h ONLY KDS-S
K	H ₂ O: 20 - 200 l/h ONL Luft 600-6000 NI/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 2)
2	Test report, 2.2 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
A	%-Scale (H ₂ O) Approval IIC 2GD c IIC (BVS 03 ATEX H-B 113)
B	Measuring Range-Scale (H ₂ O) 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
0	without Processtemperature -40°C - +130°C
1	1 x inductive switch, initiator (NJ 1,5-6,5-N) -25°C - +100°C
2	2 x inductive switch, initiator (NJ 1,5-6,5-N) -25°C - +100°C
3	1 x inductive switch, initiator (NJ 2-11-SN) -25°C - +100°C
A	KEI 1 (NJ 1,5 - 6,5 N) Harting -25°C - +100°C
B	KEI 2 (NJ 1,5 - 6,5 N) Harting -25°C - +100°C
E	Transmitter 4-20mA w/o HART
X	Agency approved, customer specified.
-	Accessories
0	without
X	with (separate specification necessary)



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	1/2" Class 150 RF ASME B16.5-2003
221R	1/2" Class 300 RF ASME B16.5-2003
241R	1/2" Class 600 RF ASME B16.5-2003
202R	3/4" Class 150 RF ASME B16.5-2003
222R	3/4" 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 ₂ O: 0,1 - 1 l/h	Air 3-30 NI/h
B	H ₂ O: 0,25 - 2,5 l/h	Air 5-50 NI/h
C	H ₂ O: 0,6 - 6 l/h	Air 18-180 NI/h
D	H ₂ O: 1 - 10 l/h	Air 30-300 NI/h
E	H ₂ O: 1,6 - 16 l/h	Air 48-480 NI/h
F	H ₂ O: 2,5 - 25 l/h	Air 75-750 NI/h
G	H ₂ O: 4 - 40 l/h	Air 120-1200 NI/h
H	H ₂ O: 6 - 60 l/h	Air 180-1800 NI/h
I	H ₂ O: 10 - 100 l/h	Air 300-3000 NI/h
J	H ₂ O: 16 - 160 l/h	Air 480-4800 NI/h
K	H ₂ O: 20 - 200 l/h	Air 600-6000 NI/h
-		

	Certificates
0	without
1	Certificate of compliance with the order, 2.1
2	Test report, 2.2
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 (H ₂ O)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
B	Measuring Range-Scale (H ₂ O)	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	
X	Agency approved, customer specified.	

	Accessories
-	
0	without
X	with (separate specification necessary)



KDS		Model	
-		Flow Controller, vertical connection,	
R			
A		Range	Air 1,013 bar
B		H ₂ O: 0,1 - 1 l/h	Air 3-30 NI/h
C		H ₂ O: 0,25 - 2,5 l/h	Air 5-50 NI/h
D		H ₂ O: 0,6 - 6 l/h	Air 18-180 NI/h
E		H ₂ O: 1 - 10 l/h	Air 30-300 NI/h
F		H ₂ O: 1,6 - 16 l/h	Air 48-480 NI/h
G		H ₂ O: 2,5 - 25 l/h	Air 75-750 NI/h
H		H ₂ O: 4 - 40 l/h	Air 120-1200 NI/h
I		H ₂ O: 6 - 60 l/h	Air 180-1800 NI/h
-		H ₂ O: 10 - 100 l/h	Air 300-3000 NI/h
P		Sealing	
X		PTFE	
		Special option (acc. customer specification)	
M		Material requirement (Block-no. 4)	
X		standard	
		Special option (acc. customer specification)	
U		Valve	
O		without	
-		bottom not with el. output "E"	
		top	
0		Certificates	
1		without	
2		Certificate of compliance with the order, 2.1	2)
-		Test report, 2.2	2)
A		Scale	Approval
B		%-Scale (H2O)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
C		Measuring Range-Scale (H2O)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
D		Measuring Range-Scale (Air)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
E		%-Scale (Media)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
F		Measuring Range-Scale (Media)	IIC 2GD c IIC (BVS 03 ATEX H-B 113)
X		Double scale acc customer specification	
		Special acc. customer specification	
0		Switches	Processtemperat
1		without	-40°C - +130°C
2		1 x inductive switch, initiator (NJ 1,5-6,5-N)	-25C - +100°C
3		2 x inductive switch, initiator (NJ 1,5-6,5-N)	-25C - +100°C
A		1 x inductive switch, initiator (NJ 2-11-SN)	-25C - +100°C
B		KEI 1 (NJ 1,5 - 6,5 N) Harting	-25C - +100°C
E		KEI 2 (NJ 1,5 - 6,5 N) Harting	-25C - +100°C
X		Transmitter 4-20mA w/o HART	
-		Agency approved, customer specified.	
V		Flow-Controller (stainless steel)	
N		Upstream pressure constant / downstream pressure variabel (HV)	Valve on outlet
		Downstream pressure konstant / upstream pressure variabel (HN)	Valve on inlet
V		Diaphragm material	
P		Viton (standard)	
		PTFE	
16		Pressure	
25		max. 16 bar	max. pressure difference 7 bar
-		max. 25 bar, Valve not closing	max. pressure difference 7 bar
0		Accessories	
X		without	
		with (separate specification necessary)	



For further information see manual.
Subjects to change without notice.

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