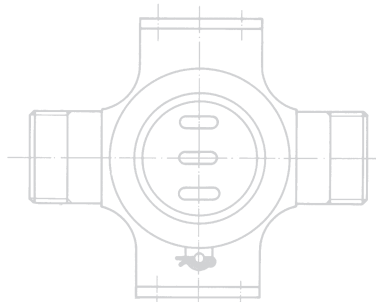
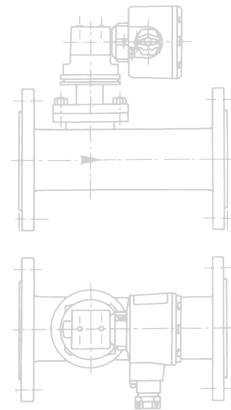
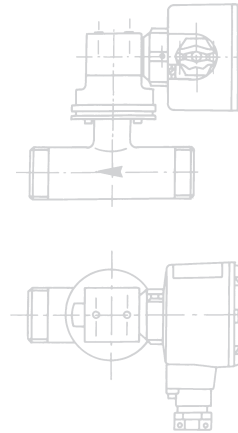
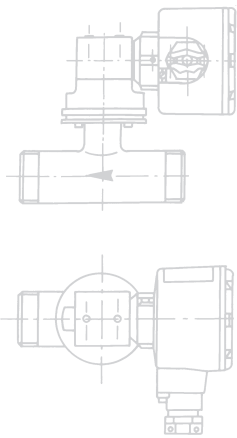


Flow switches

DW 181
DW 182
DW 183
DW 184



Electromagnetic flowmeters

Variable area flowmeters

Mass flowmeters

Ultrasonic flowmeters

Vortex flowmeters

Flow controllers

Level measuring instruments

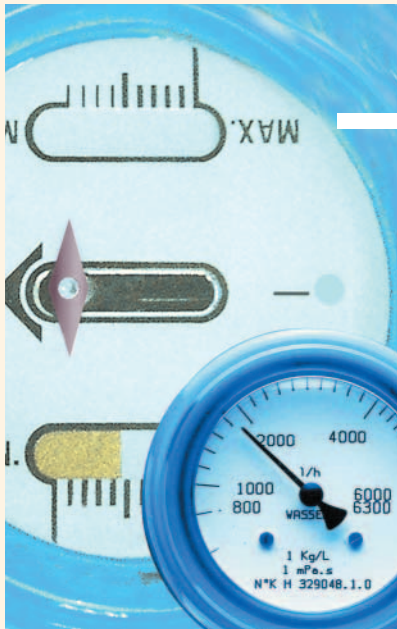
Pressure and temperature

Heat metering

Communications technology

Switches, counters, displays and recorders

Engineering systems & solutions



DW 181, 182, 183 and 184 flow switches

DW 181 for 3/4" ... 2" screw connection

DW 182 for DN 15 ... DN 65 flange connection

DW 183 for DN 65 ... DN 200 flange connection

DW 184 for DN 150 upwards flange connection

Flow switches are used for visual and/or electrical checking of liquid flow. The units are of rugged, glandless construction, and are available in several versions to suit a wide variety of industrial flow monitoring applications.

These instruments, when ordered with the appropriate options, are certified for use in hazardous locations.



Versions

DW 181 (standard)

- for horizontal or vertical pipelines
- with screw connection G 3/4" to 2"
- indicator G or A, see page 8
- 1 or 2 electrical limit switches
- measuring system C or E, see page 8
- flow ranges, see table page 4

DW 182 (standard)

- for horizontal or vertical pipelines
- with flanged connections DN 15 to DN 50 (DN 65) 1/2" to 2", 150 lb
- indicator G or A, see page 8
- 1 or 2 electrical limit switches
- measuring system C or E, see page 8
- flow ranges, see table page 4

DW 183 (standard)

- for horizontal or vertical pipelines
- with flanged connections (DN 65) DN 80 to DN 200, 3" to 8", 150 lb
- indicator G or A, see page 8
- 1 or 2 electrical limit switches
- measuring system P, see page 8
- flow ranges, see table page 4

DW 184 (standard)

- mounting type for horizontal pipelines (DN ≥ 250, 10")
- mounting flange DN 150 / PN 16, 6", 150 lb
- indicator G, see page 8
- 1 or 2 electrical limit switches
- measuring system P, see page 8
- flow ranges, see table page 5

Technical data

	DW 181	DW 182	DW 183	DW 184
Full-scale range (100% values)				
Flow rate [m ³ /h] or [US GPM]	0.16...30 or 0.7...132	0.16...30 or 0.7...132	24...250 or 106...1100	-
Flow velocity [m/s] or [ft/s]	-	-	-	0.4...4 or 0.66...1.31
Connection				
Pipe thread G	3/4" ...2"	-	-	-
Flanges to DIN 2501 (NFE 29203)	-	DN15...DN50/PN 40 (DN65/PN16)	(DN65), DN100, DN125, DN150/PN16 DN80/PN40, DN200/PN10	DN150/PN16-PN25
Flanges to ANSI B 16.5, Class 150 lb/RF	-	1/2" ...2" or 2 1/2"	3" or 2 1/2" ...8"	6"
Information on other standards and pressure ratings supplied on request				
Measuring system				
Measuring disc with tapered tube (C)	C	C	-	-
Nozzle with baffle (E)	E	E	-	-
Baffle (P)	-	-	P	P
Indicator				
Scale division 1...10 (G)	G	G	G	G
in flow units (A)	A	A	A (≤ DN100, 4")	-
Pipe run/flow direction				
Vertical/upwards (VU)	VU	VU	VU	-
Vertical/downwards (VO)	VO	VO	VO	-
Horizontal/either way (H)	H	H	H	H
Max. allowable operating pressure				
	40 bar or 580 psig	40 bar or 580 psig DN65 or 3" 16 bar or 232 psig	16 bar or 232 psig DN80 or 4": 40 bar or 580 psig DN200 or 8": 10 bar or 145 psig	16/25 bar or 232/363 psig
Information on higher pressure levels is supplied on request				
Product temperature				
Standard	≤ 120°C or 250°F	≤ 120°C or 250°F	≤ 120°C or 250°F	≤ 120°C or 250°F
Housing with ventilation	≤ 150°C or 300°F	≤ 150°C or 300°F	≤ 150°C or 300°F	≤ 150°C or 300°F
High-temperature w/o indicator: H3	≤ 300°C or 570°F	≤ 300°C or 570°F	≤ 300°C or 570°F	≤ 300°C or 570°F
For conditions for ATEX applications see page 5.				
Viscosity [mPa · s]				
Standard	≤ 30	≤ 30	≤ 30	≤ 30
Special version	> 30	> 30	> 30	≤ 90
Repeatability (switching point)				
	± 3%	± 3%	± 3%	± 3%
Measuring accuracy (Indicator A)				
	± 15%	± 15%	± 15% (≤ DN100, 4")	-
Protection category				
to EN 60529 /IEC 529	IP 65; High temperature version: IP 44			
Electromagnetic compatibility (EMC)				
	to EN 50081-1, EN 50082-2			
Limit switches				
Type and number				
K1	1 N/C or 1 N/O switch (bistable) or 3-wire changeover switch			
K2	1 N/C and 1 N/O switch (bistable) or 3-wire changeover switch			
	2 N/C or 2 N/O switches also possible in conjunction with high-temperature version H3			
	N/O = "normally open" switch during operation (closed switch when flow is decreasing)			
	N/C = "normally closed" switch during operation (closed switch when flow is increasing)			
	1,2 changeover switches (bistable) with amplifier relay			
KV1, KV2				
Contact rating				
K1, K2 (standard)	max. 12 VA (max. 350 V AC, max. 4 A)			
EEx d characteristics	max. 20 VA (max. 380 V AC, max. 1.5 A)			
EEx ia safety values	li < 500 mA, Ci = 0 nF, Li = 0 µH			
KV1, KV2	max. 1200 VA (max. 250 V AC, max. 6 A)			
Amplifier relay				
Power supply	220/110/24 V AC, 48/24 V DC			
Response time	5 ... 12 ms			

Flow table

Meter size			Code	Flow range		Pressure loss				
DW 181	DW 182	Indicator G and A		l/h	US GPM	P _{max.} for q _{min.}		for q _{max.}		
Screw	Flange DIN DN					ANSI inches	mbar	psig	mbar	psig
3/4"	15	1/2"	C 011	20 ... 160	0.09 ... 0.70	16	0.23	80	1.16	
			C 012	50 ... 400	0.22 ... 1.76	67	0.97	176	2.55	
			C 013	150 ... 1000	0.66 ... 4.40	140	2.03	440	6.38	
			C 014	300 ... 2500	1.32 ... 11.01	150	2.18	490	7.11	
			E 015*	64 ... 160	0.28 ... 0.70	65	0.94	370	5.37	
			E 016*	100 ... 250	0.44 ... 1.10	150	2.18	870	12.62	
			E 017*	160 ... 400	0.70 ... 1.76	18	0.26	110	1.60	
			E 018*	250 ... 630	1.10 ... 2.77	40	0.58	270	3.92	
			E 019*	400 ... 1000	1.76 ... 4.40	18	0.26	110	1.60	
1"	25	1"	C 021	200 ... 1600	0.88 ... 7.04	18	0.26	80	1.16	
			C 022	300 ... 2500	1.32 ... 11.01	26	0.38	180	2.61	
			C 023	500 ... 4000	2.20 ... 17.61	85	1.23	400	5.80	
			E 025	640 ... 1600	2.82 ... 7.04	15	0.22	110	1.60	
			E 026	1000 ... 2500	4.40 ... 11.01	45	0.65	240	3.48	
			E 027	1600 ... 4000	7.04 ... 17.61	25	0.36	140	2.03	
			E 028	2000 ... 16000	8.81 ... 70.45	65	0.94	260	3.77	
1 1/2"	40	1 1/2"	C 041	500 ... 4000	2.20 ... 17.61	14	0.20	68	0.99	
			C 042	800 ... 6300	3.52 ... 27.74	32	0.46	110	1.60	
			C 043	1200 ... 10000	5.28 ... 44.03	60	0.87	160	2.32	
			E 045	2500 ... 6300	11.01 ... 27.74	15	0.22	100	1.45	
			E 046	4000 ... 10000	17.61 ... 44.03	50	0.73	260	3.77	
2"	50 or 65	2" or 2 1/2"	C 051	1200 ... 10000	5.28 ... 44.03	30	0.44	80	1.16	
			C 052	2000 ... 16000	8.81 ... 70.45	65	0.94	260	3.77	
			C 053	2500 ... 20000	11.01 ... 88.06	72	1.04	350	5.08	
			C 054	7500 ... 30000	33.02 ... 132.09	47	0.68	360	5.22	
			E 055	6400 ... 16000	28.18 ... 70.45	20	0.29	110	1.60	
			E 056	8000 ... 20000	35.22 ... 88.06	30	0.44	140	2.03	

*only with indicator G

Meter size		Indicator G		Code	Indicator A		Code	Pressure loss	
DIN	ANSI	Flow range			Flow range			P _{max.}	psig
DN	inches	m ³ /h	US GPM	m ³ /h	US GPM	mbar			
80 or 65	3" or 2 1/2"	10 ... 24	44 ... 106	P 081	-	-	-	10	0.15
		16 ... 40	70 ... 176	P 082	10 ... 40	44 ... 176	P 086	20	0.29
		20 ... 50	88 ... 220	P 083	13 ... 50	55 ... 220	P 087	10	0.15
		24 ... 60	106 ... 264	P 084	15 ... 60	66 ... 264	P 088	12	0.17
		28 ... 70	123 ... 308	P 085	17 ... 70	75 ... 308	P 089	12	0.17
100	4"	16 ... 40	70 ... 176	P 101	-	-	-	10	0.15
		24 ... 60	106 ... 264	P 102	15 ... 60	66 ... 264	P 106	23	0.33
		32 ... 80	141 ... 352	P 103	20 ... 80	88 ... 352	P 107	14	0.20
		40 ... 100	176 ... 440	P 104	25 ... 100	110 ... 440	P 108	23	0.33
		48 ... 120	211 ... 528	P 105	30 ... 120	132 ... 528	P 109	33	0.48
125	5"	24 ... 60	106 ... 264	P 121	-	-	-	20	0.29
		40 ... 100	176 ... 440	P 122	25 ... 100	110 ... 440	P 126	24	0.35
		48 ... 120	211 ... 528	P 123	30 ... 120	132 ... 528	P 127	26	0.38
		60 ... 150	264 ... 660	P 124	37 ... 150	163 ... 660	P 128	24	0.35
		70 ... 180	308 ... 793	P 125	45 ... 180	198 ... 793	P 129	30	0.44
150	6"	40 ... 100	176 ... 440	P 151	-	-	-	30	0.44
		60 ... 150	264 ... 660	P 152	37 ... 150	163 ... 660	P 156	32	0.46
		70 ... 180	308 ... 793	P 153	45 ... 180	198 ... 793	P 157	37	0.54
		90 ... 120	396 ... 528	P 154	55 ... 220	242 ... 969	P 158	34	0.49
		100 ... 250	440 ... 1101	P 155	65 ... 250	286 ... 1101	P 159	30	0.44
200	8"	60 ... 150	264 ... 660	P 201	-	-	-	35	0.51
		70 ... 180	308 ... 793	P 202	-	-	-	40	0.58
		90 ... 220	396 ... 969	P 203	55 ... 220	242 ... 969	P 205	44	0.64
		100 ... 250	440 ... 1101	P 204	65 ... 250	286 ... 1101	P 206	40	0.58

Flow table

DW 184 for measuring tube ≥ DN 250 (10") (or 65)	Flow velocity		Rangeability
	m/s	ft/s	
	0.2 ... 0.4	0.66 ... 1.31	1 : 2
	0.2 ... 1	1.31 ... 3.28	1 : 2.5
	1 ... 4	3.28 ... 13.12	1 : 4
	4	13.12	1 : 4

Instrument versions

Version	Cap	Gaskets*	Measuring system	Measuring tube	Connection	Housing
DW 181/B	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Bronze	Bronze	Polycarbonate
DW 181/RR	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Stainless Steel 316 L	Stainless Steel 316 L	Polycarbonate
DW 182/RR	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Stainless Steel 316 L	Stainless Steel 316 L	Polycarbonate
DW 183/N	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Steel	Steel	Polycarbonate
DW 183/R	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Stainless Steel 316 L	Steel**	Polycarbonate
DW 183/RR	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Stainless Steel 316 L	Stainless Steel 316 L	Polycarbonate
DW 184/N	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Steel	Steel	Polycarbonate
DW 184/R	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Stainless Steel 316 L	Steel***	Polycarbonate
DW 184/RR	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Stainless Steel 316 L	Stainless Steel 316 L	Polycarbonate

* Viton®, silicone, or Klingerit gaskets on request
 ***DW 184/R: Only stainless steel clad flanges are used

** Steel flanges for > DN 100 (4") instruments have
 Stainless Steel 316 L cladding.

Special conditions for ATEX applications

Flow indicator DW18* EEx d

Authorized markings:  II 1/2 GD EEx d IIC T...* IP65 T...°C**,***

Temperature Class	Process temperature	Ambient temperature range
T6 / T80°C or 175°F**	T(fluid) ≤ 60°C or 140°F	-40 ... +50°C or -40 ... +120°F
T5 / T95°C or 200°F**	T(fluid) ≤ 80°C or 175°F	-40 ... +50°C or -40 ... +120°F
T4 / T130°C or 265°F**	T(fluid) ≤ 120°C or 250°F	-40 ... +60°C or -40 ... +140°F
T3 / T195°C or 380°F**	T(fluid) ≤ 150°C or 300°F	-40 ... +80°C or -40 ... +175°F

Flow indicator DW18* EEx ia

Authorized markings:  II 1 GD EEx ia IIC T...* IP65 T...°C**,***

Temperature Class	Process temperature	Ambient temperature range
T6 / T80°C or 175°F**	T(fluid) ≤ 60°C or 140°F	-40 ... +40°C or -40 ... +105°F
T5 / T95°C or 200°F**	T(fluid) ≤ 80°C or 175°F	-40 ... +40°C or -40 ... +105°F
T4 / T130°C or 265°F**	T(fluid) ≤ 120°C or 250°F	-40 ... +50°C or -40 ... +120°F
T3 / T195°C or 380°F**	T(fluid) ≤ 150°C or 300°F	-40 ... +80°C or -40 ... +175°F

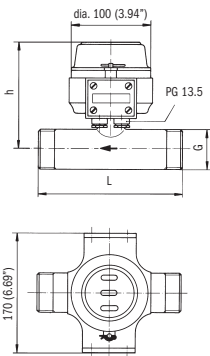
* Maximum surface temperature of device
 ** T3, T4, T5 or T6 according to process temperature and ambient temperature
 *** T195°C ... 80°C according to process temperature and ambient temperature

Dimensions and weights

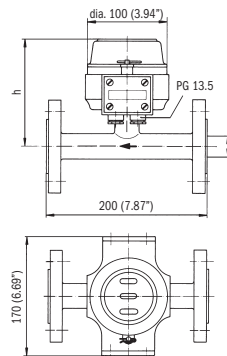
Type	Connection	Dimensions				Weight	
		h	L				
		mm	inches	mm	inches	kg	lb
DW 181	G 3/4"	115	4.53	135	5.31	1.7	3.75
	G 1"	120	4.72	160	6.30	1.8	3.97
	G 1 1/2"	130	5.12	180	7.09	2.2	4.85
	G 2"	135	5.31	190	7.48	2.6	5.73
DW 182	DN 15 (1/2")	115	4.53	-	-	3.0	6.61
	DN 25 (1")	120	4.72	-	-	4.0	8.82
	DN 40 (1 1/2")	130	5.12	-	-	5.5	12.13
	DN 50 (2")	135	5.31	-	-	7.2	15.87
	DN 65 (2 1/2")	135	5.31	-	-	9.3	20.50
DW 183	DN 65 (2 1/2")	185	7.28	200	7.87	11.5	25.35
	DN 80 (3")	185	7.28	200	7.87	12.5	27.56
	DN 100 (4")	195	7.68	200	7.87	14.0	30.86
	DN 125 (5")	210	8.27	300	11.81	18.0	39.68
	DN 150 (6")	220	8.66	300	11.81	23.0	50.71
	DN 200 (8")	250	9.84	300	11.81	35.0	77.16
DW 184	DN 150 (6")	-	-	-	-	13.5	29.76

Type	Connection	Dimensions				Weight	
		h	L				
		mm	inches	mm	inches	kg	lb
DW 181/Ex	G 3/4"	140	5.51	135	5.31	2.35	5.18
	G 1"	145	5.71	160	6.30	2.45	5.40
	G 1 1/2"	155	6.10	180	7.09	2.85	6.28
	G 2"	160	6.30	190	7.48	3.25	7.16
DW 182/Ex	DN 15 (1/2")	140	5.51	-	-	3.65	8.05
	DN 25 (1")	145	5.71	-	-	4.65	10.25
	DN 40 (1 1/2")	155	6.10	-	-	6.15	13.56
	DN 50 (2")	160	6.30	-	-	7.85	17.31
	DN 65 (2 1/2")	160	6.30	-	-	9.95	21.94
	DW 183/Ex	DN 65 (2 1/2")	210	8.27	-	-	12.15
DN 80 (3")		210	8.27	-	-	13.15	28.99
DN 100 (4")		220	8.66	-	-	14.65	32.30
DN 125 (5")		232	9.13	-	-	18.65	41.12
DN 150 (6")		245	9.65	-	-	23.65	52.14
DN 200 (8")		275	10.83	-	-	35.65	78.59
DW 184/Ex	DN 150 (6")	-	-	-	-	14.15	31.20

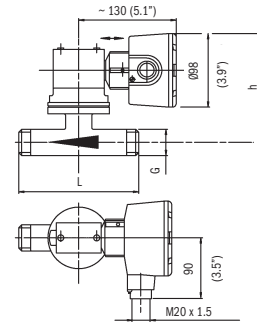
DW 181 Std/Ex ia



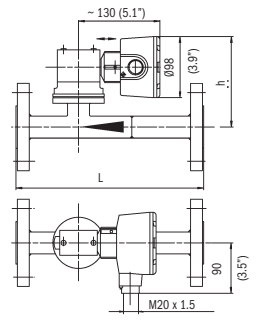
DW 182 Std/Ex ia



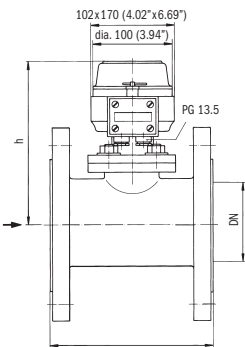
DW 181/Ex d



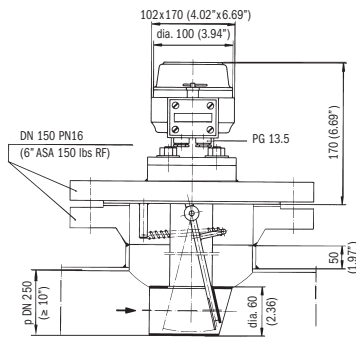
DW 182/Ex d



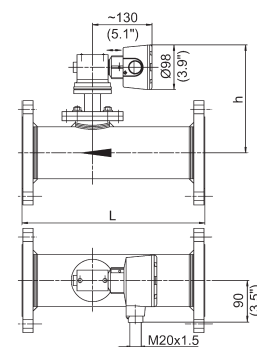
DW 183 Std/Ex ia



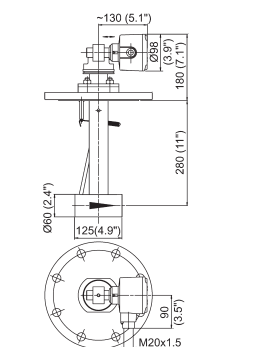
DW 184 Std/Ex ia



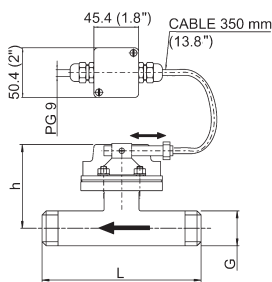
DW 183/Ex d



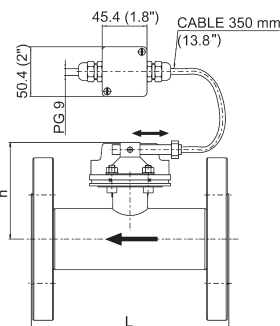
DW 184/Ex d



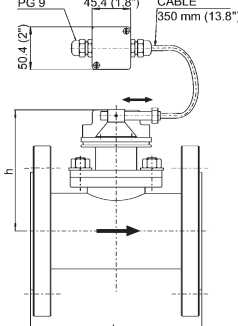
DW 181 HT (H3)



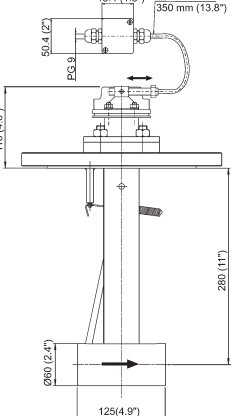
DW 182 HT (H3)



DW 183 HT (H3)



DW 184 HT (H3)



Dimensions in mm (inches)

Special versions

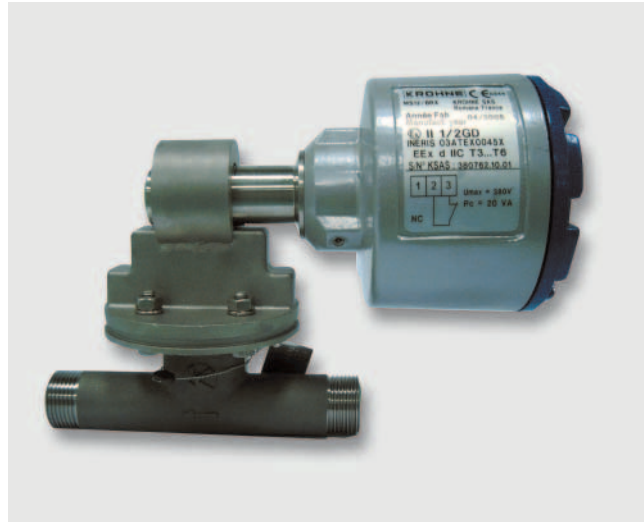
EEx d version

The MS 12/EEx d limit switch is a bistable reed contact without a local display. It features a flameproof aluminium enclosure.

Approval: EEx d IIC T6 ... T1 INERIS Certificate O3 ATEX 0045X.

Technical data Contact MS 12 EEx d (NC or NO)

Max. contact rating	12 VA; 0.5 A; 220 V AC
Ambient temperature	-40°C ... +80°C or -40°F ... +175°F
Process temperature	max. 150°C or 300°F
Protection category to EN 60529/IEC 529	IP 65 (equivalent to NEMA 6) when T195°C ... 80°C* or T385°F ... 175°F *depending on ATEX temperature class - see tables on page 5
Screw connection	M 20 x 1.5 without cable entry fitting



High-temperature version

All DW switches can be supplied without indicator for high-temperature service up to max. 300°C or 570°F.

The contacts are located in a PTFE (H3) cartridge fastened directly to the measuring unit.

Material:

Sealing	- DW 181	Klingerit (asbestos-free)
	- DW 182	Klingerit (asbestos-free)
	- DW 183	Klingerit or fully welded (option)
	- DW 184	Klingerit or fully welded (option)

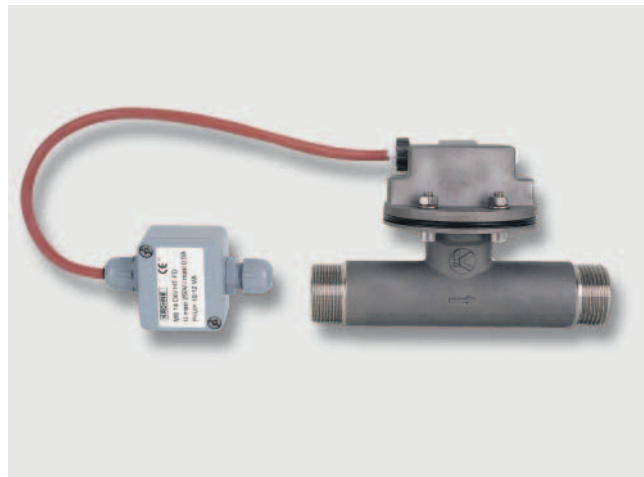
Cable connection (300 mm, 11.81") glass fibre

Cartridge PTFE (H3)

Terminal housing Aluminium

Technical data Contact MS 14 (NC or NO)

Max. contact rating	12 VA; 0.5 A; 250 VA (50Hz)
Ambient temperature	-25°C ... +60°C (-13°F ... +140°F)
Protection category to EN 60529/IEC 529	IP 44
Cable fitting	PG 9



Tropicalized version

For use in tropical climates, the flow switch junction boxes are equipped with an Amphenol socket outlet. The matching plug is also supplied. The entire unit has two epoxy coatings.

Limit switches

Standard equipment for indicators G and A includes one limit switch (reed contact), contact rating 12 VA (type K1). A second limit switch (type K2) can be installed if required. Additionally, amplifier relays, type KV1 or KV2 (KV2 only in conjunction with indicator G), can be installed for higher contact ratings (up to 1200 VA).

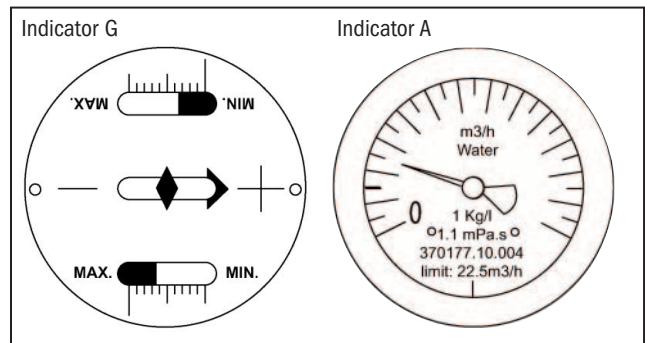
Indicator G

All flow switches can be equipped with indicator G. Scale marks are from 1 to 10 to allow visual control of the flow rate. The switching point may be changed as and when required.

Indicator A

The DW 181, DW 182 and DW 183 flow switches up to meter size DN 200 (8") can be supplied with indicator A. The dial is marked in flow units (e.g. l/h, m³/h) to provide more accurate flow readings. The switching points are factory-set. With this indicator it is also possible to adjust the switching points under zero-flow conditions.

The H3 high-temperature version is supplied without indicator.



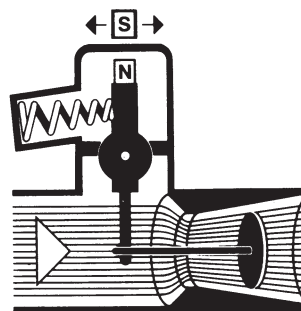
Measuring systems

Measuring system C: a hinged measuring disc moves freely in the axis of a tapered tube (DW 181, DW 182). Under flow conditions, the system adjusts itself so that the force acting on the disc is in equilibrium with the spring force. A given flow rate thus corresponds to a particular position of the measuring disc. A built-in magnet transmits the disc position to the indicator and simultaneously actuates the limit switches.

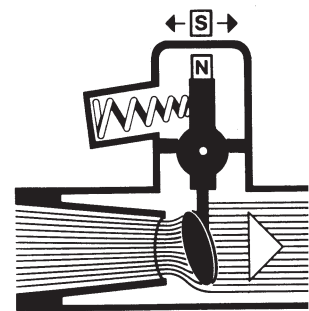
Instead of being located in a tapered tube, **measuring system E** operates with a nozzle (DW 181, DW 182) to increase the flow velocity of the liquid. This version is particularly suitable for liquids with solid content.

Measuring system P is used for large nominal pipe diameters (DW 183, DW 184). It is similar to system E but does not require a nozzle.

Measuring system C



Measuring system E (P)



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