KROHNE

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CMD

Installation and operating instructions

DW 181 – 184

Standard, high-temperature, tropical and ATEX versions

Flow switches

Table of contents

General advice on safety

This manual gives a complete set of instructions for the installation, operation and maintenance of the standard and ATEX versions of the DW 18 flow switches.
DW 18 flow switches must be used with liquids that do not have any gas pockets.
Special regulations are applicable to the use of equipment in hazardous locations, and these are described in this booklet. Data is supplied on explosion protection.
Assembly, installation, commissioning and maintenance of equipment in hazardous areas must only be carried out by qualified personnel with relevant explosion protection training.

Standards / Approvals

DW 18 flow switches meet the protection requirements of **Directive 89/336/EEC** in conjunction with **EN 50081-1 and EN 50082-2**, and **Directives 73/23/EEC** and **93/68/EEC** in conjunction with **EN 61010-1,** and also bear the **CE symbol**.
These instruments, when ordered with the appropriate options, are certified for use in hazardous locations by the INERIS certification agency under **INERIS 03ATEX0045X**. They respect the Health & Safety regulations in force by conforming to **EN 50014 (+ A1 & 2), EN 50018, EN 50020, EN50284, EN 50281-1-1 (+ A1)** and **EN 13463-1**.

Ex safety instructions

The DW 18 flow switch series are suitable for monitoring flow of liquid in pipes in hazardous areas. They may be approved for use in explosive atmospheres of all flammable substances in Gas Group IIC in Zone 1 and applications requiring Category 2 equipment for EEx d applications and Gas Group IIC in Zone 0 requiring Category 1 equipment with an intrinsically-safe power supply for
EEx ia applications.

Ex Equipment Category Definitions
Category 1 G/D – instruments: for intrinsically-safe applications
The signal converter for the limit switch options and the measuring components are located in hazardous areas requiring instruments qualified as being category 1. The G/D rating states that the instrument is qualified for gas and dust environments. EEx ia-approved devices must be used with a certified intrinsically-safe power supply.

Category 2 G/D – instruments: for applications using the EEx d-rated explosion-proof box
The signal converter for the limit switch options and the measuring components are located in hazardous areas requiring instruments qualified as being category 2. The G/D rating states that the instrument is qualified for gas and dust environments.

Handling

The device weighs between approx. 2 kg (4.5 lb) and 14 kg (30 lb). Carry using both hands to lift the device carefully by the tube. If necessary, use lifting gear.
Avoid hard blows, jolts, impacts, etc. when handling the DW 18.

Product liability and warranty

The DW 18 flow meter is designed solely for measuring the flow rate of liquids without any gas pocket. Special codes and regulations apply to its use in hazardous areas.
Responsibility as to suitability and intended use of these level gauges rests solely with the user. Improper installation and operation of our level gauges may lead to loss of warranty.
In addition, the "General conditions of sale", forming the basis of the purchasing contract, are applicable.
If you need to return the level gauge to the manufacturer or supplier, please refer to the information given in Appendix B.

Items included with supply

The scope of supply encompasses, in the version ordered:
- Flow meter

Documentation supplied

- Installation and operating instructions (this manual) including description of special versions and functions.

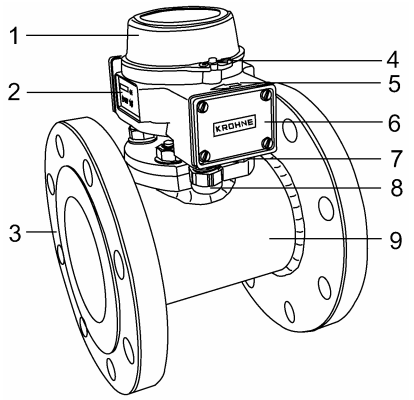
Official approvals and certificates

Application	Approved by	Instrument version	Certification mark
ATEX certification	INERIS	DW 18 TYPE 18.	Certificate no. INERIS 03ATEX0045X*

*This EC-type Examination Certificate is available in KROHNE's download centre on http://www.krohne.com/.

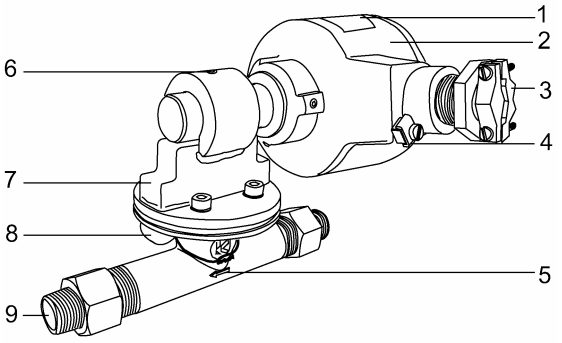
Principle components

DW 18 Standard or EEx ia version



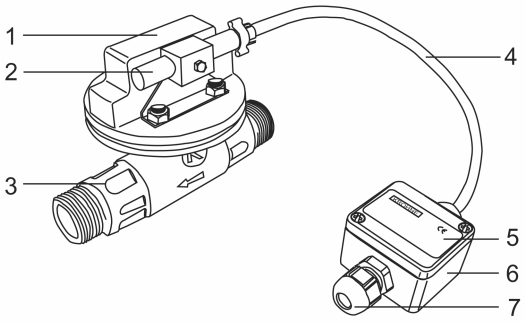
1 Indicator type G (linear scale) or A (dial)
2 Equipment label*
3 Flange (illustrated) or screwed connection
4 Indicator cover locking pin
5 Flow direction arrow (DW183/4)
6 Wiring compartment cover
7 Gland (plugged)
8 Cable fitting (PG 13.5)
9 Measuring tube

DW 18 EEx d version



1 Equipment labels*
2 MS 12/BRX switch housing
3 Cable fitting (to be supplied by the customer)
4 PE terminal
5 Flow direction arrow (on measuring tube for DW181/2)
6 Socket set screw for adjusting switch position
7 Pressure housing
8 Equipment dog-tag (tag no., etc.)
9 Screw-on connection

DW 18 HT (H3) version



1 Pressure housing
2 Switch sheathed in a PTFE cartridge
3 Measuring tube
4 Electric cable in fibre glass sheathing
5 MS 14 switch information label
6 Wiring box
7 Cable fitting (PG 9)

* Equipment labels shown on next page

Equipment labels

Standard label (all devices)

1 Designation code acc. to order options list (e.g.V7BD1...)*

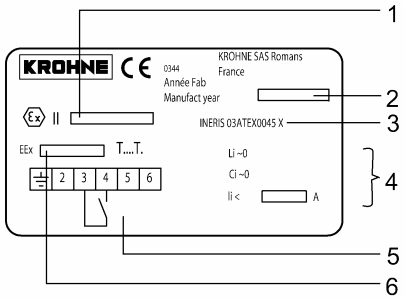
2 Type code (e.g. DW181/C/011/B/G/KA/N/G1)**

3 Purchase order number

4 Factory serial number

5 Customer tag number

EEx ia supplementary information label (e.g. version K1 NO)



1 ATEX gas group and equipment category (e.g. II 1 GD)

2 Year built

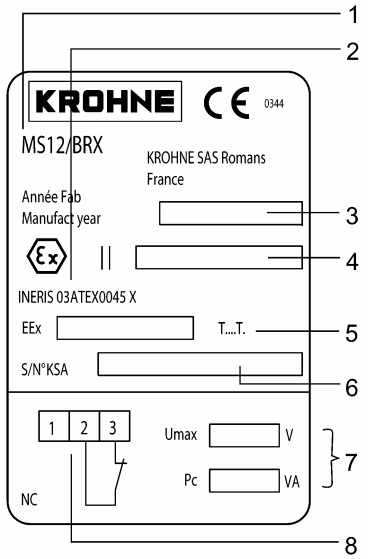
3 ATEX certification code

4 Electrical safety values

5 Wiring diagram

6 Protection concept & gas group + sub-div. and temperature class (e.g. EEx ia IIC T3...T6)

EEx d supplementary information label (e.g. version NC)



1 Limit switch code

2 ATEX certification code

3 Year built

4 ATEX gas group and equipment category (e.g. II 1/2 GD)

5 Protection concept & gas group + sub-div. and temperature class (e.g. EEx d IIC T3...T6)

6 Factory serial number

7 Maximum switching capacity

8 Wiring diagram

* See DW 181-184 Data sheet for a list of order options and designation codes
** See type code definitions on the next page

Type code

Refer to the standard device label, item 2 on the previous page.

DW . . . / . / . . . . / . . / . / . . . / . . / . .
1 2 3 4 5 6 7 8

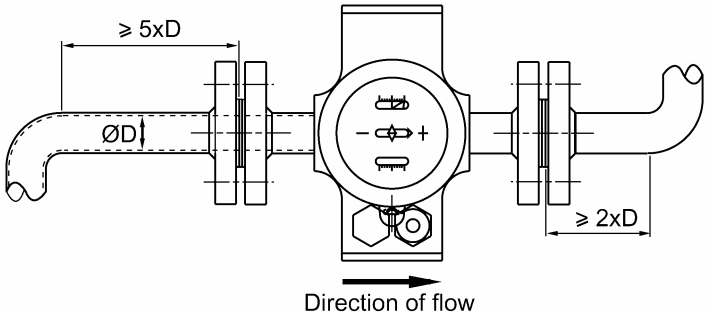
Type code element	Code	Code definition
1 Type series	181	For horizontal or vertical pipes, screw connection G¾…G2, measuring system C or E*
	182	For horizontal or vertical pipes, flange connection DN15…65 and ½"…2"-150 lbs, measuring system C or E*
	183	For horizontal or vertical pipes, flange connections DN65…200 and 3"…8"-150 lbs, measuring system P*
	184	For horizontal pipes (DN ≥250 or 10", mounting flange DN150 PN16 or 6"-150 lbs, measuring system P*
2 Measuring system	C	Measuring disc in tapered tube
	E	Nozzle with baffle
	P	Baffle in constant diameter pipe
3 Code number	011 - 204	See section 7.1: Flow range table for the characteristics of each code number.
4 Material of construction - see also section 7.2	B	Bronze
	RR	Stainless steel (SS) 316 L
	R	SS 316L measuring tube, steel connection
	N	Steel
5 Indicator system	G	Linear scale marks
	A	Dial with flow units
6 Limit switches	K1	1 NC or 1 NO switch**
	K2	1 NC and 1 NO switch**
	KV1	Amplifier relay: 1 change-over switch**
	KV2	Amplifier relay: 2 change-over switches**
7 Application field	N	Normal locations
	Ex d	Hazardous locations
	Ex ia	Intrinsically-safe applications
8 Connection	G ¾…G2	Pipe thread
	DN15…200 (½"…8")	Flange connection

* Refer to section 9.1
** Bistable.
NO is a "normally open" switch during operation (closed switch when flow is decreasing)
NC is a "normally closed" switch during operation (closed switch when flow is increasing).

1 Mechanical Installation

1.1 Positioning the flow switch

No obstacles along the pipe within five diameters (D) upstream and two diameters downstream of the instrument.



1.2 Installation in hazardous areas (Ex applications)

Read all instructions referring to flow switches in hazardous locations before installation.

Check that the flange, gasket and other materials in contact with the product are compatible. Refer to the information given on the converter nameplate, the flange markings and specifications given in the ATEX approval certificate.

1.3 Connecting the DW 18 to the pipe

- Before installation, clean the piping to remove any dust or weld debris.
- Fit the instrument on the pipe with the arrow on the housing pointing in the direction of flow.
- Flange connections: ensure that the gaskets are in place, flange facings are aligned and parallel and that the bolts have been tightened with the amount of torque specified in European or local (if outside the E.U.) standards.

1.4 Flow direction

The DW 183 and DW 184 can be installed in any position on the piping. However, the position of installation and the flow direction must be indicated in the customer order (i.e. up, down, left to right and right to left) as the weight of the baffle disc is taken into account when calibrating the instrument. Flow direction must be indicated for DW 181 and DW 182 instruments equipped with type A indicators.

The DW 184 is used for high-velocity or turbulent flows in pipes with diameters greater than DN250. A special device, called a stilling well, is immersed in the liquid flow and channels the fluid through a tube in which the disc moves, secured to the end of a rigid support. This reinforced pivot enables the flow switch to be used in difficult conditions.

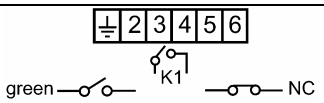
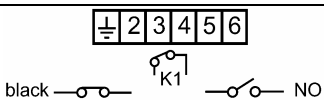
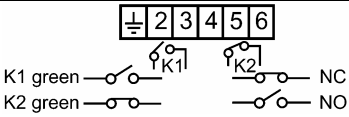
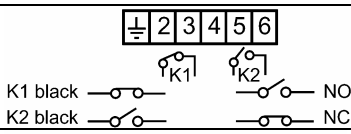
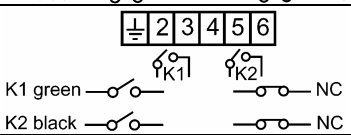
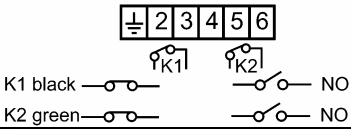
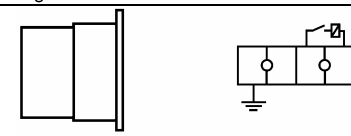
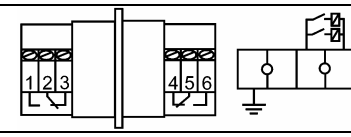
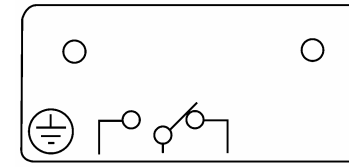
These instruments are only supplied with an index display (indicator type “G”) and switches. They are not equipped with a graduated dial. The heights of the connection piece indicated for the production of the mating flange must be respected.

2 Electrical Connections

Disconnect the power supply before opening the housing

- The electrical connection conforms to the standard EN61010-1, protection class 1 (for aluminium housing) or class 2 (for PVC housing), voltage category III, and interference degree 2.
- The DW range conforms to EMC directives NF EN 50 081.1 (Emission) and NF EN 50 082.2 (Immunity).
- It is obligatory to have a switching or circuit breaking device, following present regulations. The devices should completely isolate the unit and be easily accessible, close to the unit.
- Both the live (L) and neutral (N) wires should be protected by a fuse (4…6.3 A Time Lag). During the wiring procedure the ground wire should always be connected first (relevant only for aluminium housing).
- EEx ia versions must be used with a certified intrinsically-safe power supply.

N.B. Use of the unit outside the specifications detailed in this manual can compromise the safety measures designed into the unit. Always disconnect the power supply before accessing the terminals.

Number of switches	Switch types	0% 100% of the range Limit switch adjustable over entire range	
1	Type K1		A
	Type K1		B
2	Type K2		C
	Type K2		D
	Type K2		E
	Type K2		F
1	Type KV1		G
1	Type KV2		H
K1 + K2	Change over (SPDT)		

3 Commissioning

3.1 General notes

The flow switch is delivered pre-calibrated and ready for use. Open the valves slowly when starting operation.

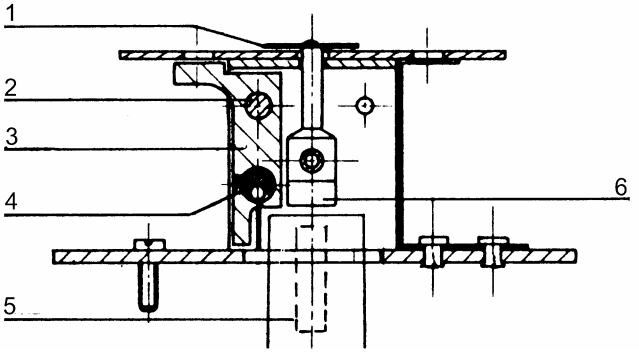
3.2 Adjusting the limit switches - standard and EEx ia flow switch versions

The limit switches can be adjusted individually over the entire measuring range. To adjust, remove the locking pin securing the cap and remove the cap.

3.2.1 Type G indicator

The limit switch adjustment is indicated by a green strip (normally closed switch) or a black strip (normally open switch) in a graduated window. For flow switches manufactured before September 1, 1991, the strips are red (normally closed switch) or orange (normally open switch).
Each graduation corresponds to 1/10 of the total measuring range, i.e. 35 l/h for a flow range of 50…400 l/h. This system enables the limit switch to be adjusted without having to circulate fluid in the pipe. It is only necessary to adjust the micrometer screw (item 2) in order to move the switch support (item 3) which has the coloured strip on its upper section.

"G" linear index indicator assembly

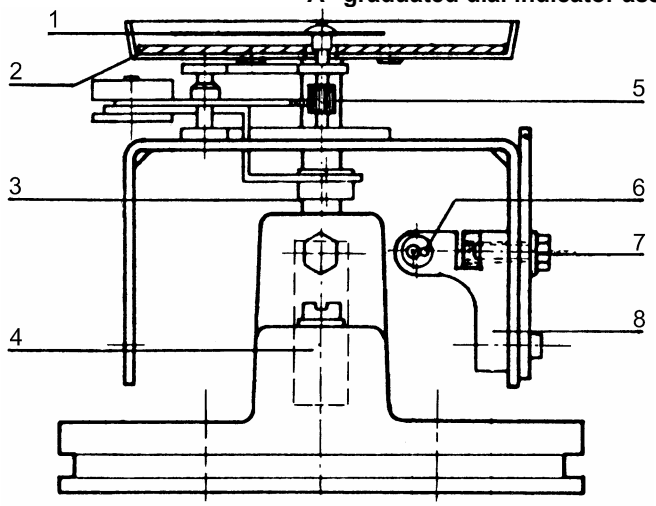


1 Index
2 Micrometer screw
3 Switch support
4 Switch
5 Control magnet
6 Following magnet

3.2.2 Type A indicator

The switch is adjusted by unlocking the adjustment screw (item 7) and repositioning the switch support arm (item 8).

"A" graduated dial indicator assembly



1 Pointer

2 Dial

3 Following magnet

4 Control magnet

5 Mechanism

6 Switch

7 Adjustment screw

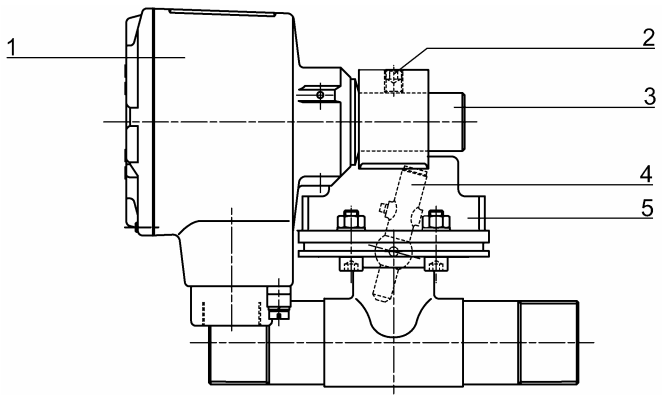
8 Switch support

3.3 Adjusting the limit switches - EEx d flow switch version

3.3.1 MS 12/BRX switch

The switch is adjusted by unscrewing the limit switch adjustment screw M8x10 (2) on top of the pressure housing with a 4mm hexagon key. The switch (in its metal sheath) may then be repositioned as required before retightening the screw. The original position is etched onto the sheath.

MS 12/BRX switch assembly



1 MS 12/BRX switch

2 Limit switch adjustment screw

3 Switch sheath

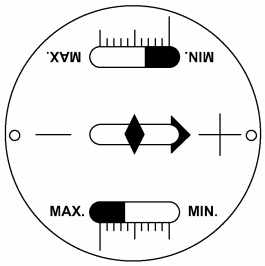
4 Switch magnet

5 Pressure housing

4 Display

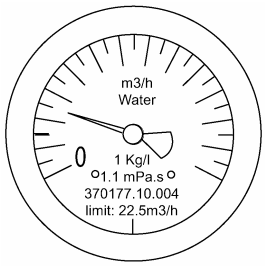
4.1 Local Flow indication

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 DN100 (4") 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 marked on the dial. With this indicator it is also possible to adjust the switching points at non-flowing conditions.

High-temperature versions are supplied without a local indicator.

4.2 Limit Switches

Every flow switch can be equipped with either one or two limit switches which can be adjusted over the entire measurement range.

Limit switch specifications

Type and number of switches	Switch rating
Standard	
K1(K2) single (twin for K2) bi-stable limit switch	14VA max. (max. 350 V AC, max. 0.4 A) reed type IA42 ATF 15-45
EExi safety values	Ii < 500mA, Ci = 0 nF, Li = 0 µH
With change over	
K1(K2) single (twin for K2) bi-stable limit switch	3 VA max. (max. 28 V DC, max. 0.25 A) type reed CM21…
EExi safety values	Ii< 500 mA, Ci= 0 nF, Li= 0 µH
With relay	
KV1 (KV2) Power supply: 240/110/48/24 V AC (50/60 Hz) 110/48/24 V DC Response time: 5…12ms	2000 VA max. (max. 250 V AC, max. 8 A) relay type Finder
EEx d values	See section 4.3: EEx d version
High-temperature version (non-EEx) single bi-stable limit switch	18 VA max. (max. 220 V, max. 0.8 A) reed type IA13….

The switch ratings are given for standard resistance loads. Make sure you use the correct protection circuits when using other types of load (e.g. inductive).

4.3 EEx d version

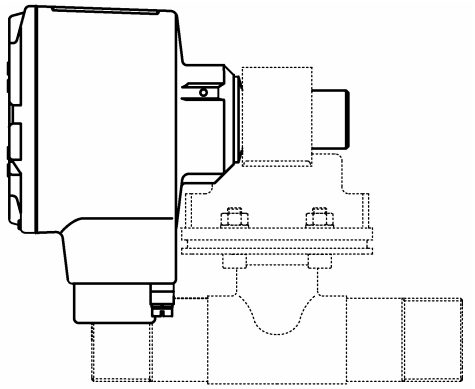
The MS 12/BRX (EEx d) switch features a flameproof aluminium enclosure. The limit switches are type K1 and K2 bi-stable reed switches without changeovers or KV1 relays and are supplied without a local display.

Approval	EEx d IIC T6…T1
INERIS certificate	03 ATEX 0045X

Technical data
MS 12/BRX switch

Switches	NC*** and NO****
Switch rating K1, K2 (reed switch) KV1 (relay)	 14 VA (350 V AC; 0,25 mA 2000 VA (250 V AC; 8 A
Max. switching capacity dissipated by Ex d housing	20 VA; 1.5 A; 380 V AC
Ambient temperature	-40…+80°C or -40…+175°F
Process temperature	max. 150°C or max. 300°F*
Protection category to EN 60529/NEMA 250	IP 65 / NEMA 6 when T195…80°C or T380…175°F*,**
Screw connection	M20 x 1.5 without cable entry fitting***

* T80…T195°C depending on the ambient temperature and process temperature (see section 7: Technical data).
**Maximum surface temperature of device.
***Optional: M25x1.5 or NPT ¾ threads



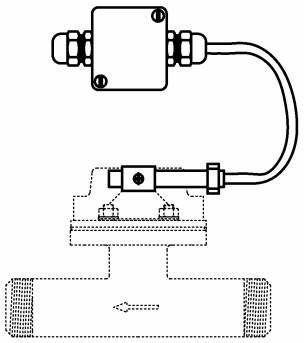
4.4 High-temperature version (KROHNE temperature class H3, non-EEx)

All DW 18 switches can be supplied for high-temperature service up to max. 300°C or 570°F but without indicator.
The switches are located in a PTFE cartridge fastened directly to the measuring unit.

Sealing material:

DW 181 / DW 182	Klingerit (asbestos-free)
DW 183 / DW 184	Klingerit or fully welded (optional)

Cable connection (350 mm or 13 ¾ ") to aluminium terminal housing: fibre glass sheathing



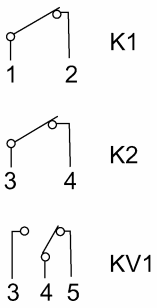
Technical data

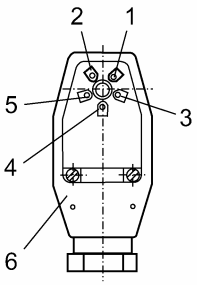
MS 14 (NC* or NO****) switch**	
Max. switching capacity	20 VA; 0,5 A; 250 V DC
Ambient temperature	-25…+60°C or -15…+140°F
Protection category to EN 60529/IEC 529	IP 44
Cable fitting	PG 9 (supplied)

*** NC: switch that is "normally closed" during operation (closed switch when flow is increasing)
**** NO: switch that is "normally open" during operation (closed switch when flow is decreasing)

4.5 Tropical version (non-EEx)

The flow switch junction boxes are equipped with an Amphenol socket outlet for use in tropical climates. The matching plug is also supplied.





1-5 Terminals

6 Connecting plug

Switch used	Terminals used	Connection data
K1	1,2 4	For switch K1 For ground connection
K2	1,2 3,5 4	For switch K1 For switch K2 For ground connection
KV1	1,2 3,4,5	For power supply For change over (SPDT)

5 Service

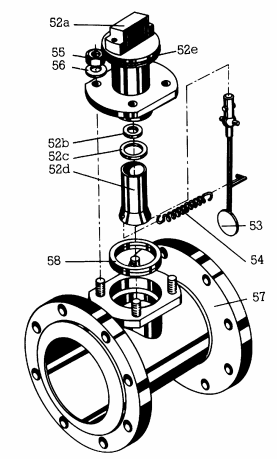
5.1 Maintenance

In normal operation no maintenance is required. However, the flow switch must be cleaned if particles in suspension in the liquid build up on the measuring mechanism.

Caution
Check that the cleaning product used will not chemically react with (i.e. corrode) the component materials.

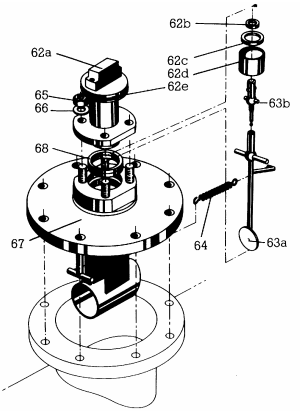
5.2 Exploded view of instruments

DW 183 Std / EEx ia



52a	Pressure resistant housing
52b	PTFE ring
52c	Washer
52d	Tube
52e	O-ring
53	Magnet lever with measuring disc
54	Measuring spring
55	Nut
56	Spring washer
57	Tubular body with collar and flanges
58	PTFE gasket

DW 184 Std / EEx ia

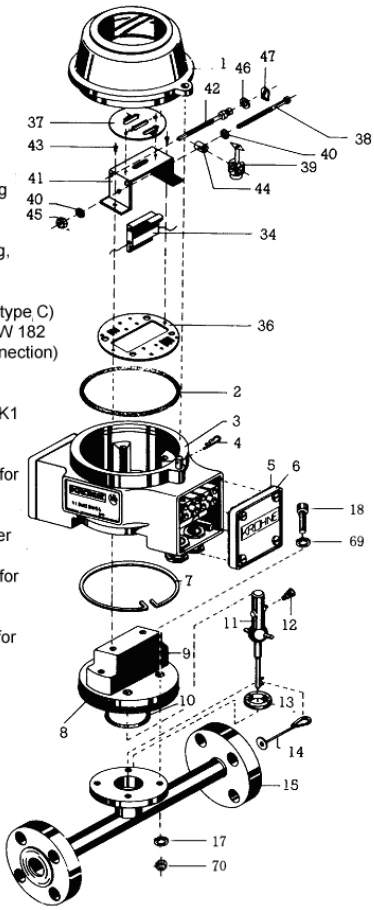


62a	Pressure resistant housing
62b	PTFE ring
62c	Washer
62d	Tube
62e	O-ring
63a	Measuring disc
63b	Magnet lever
64	Measuring spring
65	Nut
66	Spring washer
67	Flange with stilling well
68	PTFE gasket

The parts listed above are not supplied separately. Please refer to section 5.3: Spare parts for a list of available spare parts.

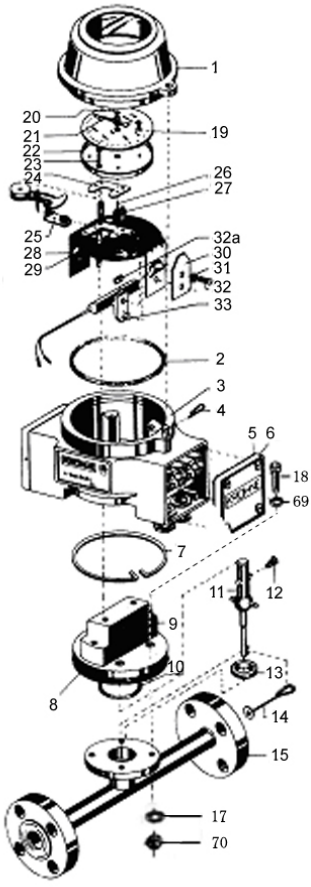
DW 182 (181) Std / EEx ia with indication G

1 Cap
2 O-ring
3 Housing
4 Locking pin
5 Gasket
6 Cover
7 Snap ring
8 O-ring
9 Pressure housing
10 O-ring
11 Magnet lever
12 Measuring spring, complete
13 PTFE ring
14 Measuring disc (type C)
15 Tubular body (DW 182 with flanged connection)
17 Spring washer
18 Screw
34 Reed contact G/K1
36 Baseplate
37 Scale
38 Adjusting screw for indicator
39 Pointer
40 Tooth lock washer
41 Strirup
42 Adjusting screw for contact G
43 Rivets
44 Revolving body for indicator
45 Nut
46 Spring washer
47 Snap washer
69 Bonded seal
70 Nut



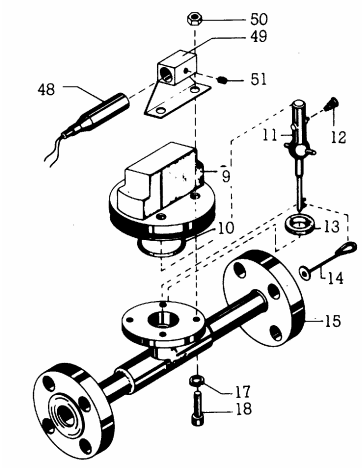
DW 182 (181) Std / EEx ia with indication A

1 Cap
2 O-ring
3 Housing
4 Locking pin
5 Gasket
6 Cover
7 Snap ring
8 O-ring
9 Pressure housing
10 O-ring
11 Magnet lever
12 Measuring spring, complete
13 PTFE ring
14 Measuring disc (type C)
15 Tubular body (DW 182 with flanged connection)
17 Spring washer
18 Screw
19 Dial
20 Countersunk screw
21 Pointer
22 Dial mount
23 Countersunk screw
24 Bearing plate
25 Revolving body with magnet
26 Pinion
27 Spacer pin
28 Baseplate
29 Pin
30 Clamp plate
31 Washer
32 Adjusting screw
32a Nut
33 Reed contact A/K1
69 Bonded seal
70 Nut



DW 182 H3/K1 High-temperature version (Std)

9	Pressure resistant housing
10	O-ring
11	Magnet lever
12	Measuring spring complete
13	PTFE-ring
14	Measuring disc
15	Tubular body
17	Snap ring
18	Screw
48	Reed switch H3/K1
49	Mount
50	Nut
51	Hexagon socket head screw



The parts listed above are not supplied separately. Please refer to section 5.3: Spare parts for a list of available spare parts.

5.3 Spare parts

Measuring spring DW 181 / 182 "C"

Magnet lever (Tag 11)/ PTFE Ring (Tag 13)/ Measuring spring (Tag 12)/ Measuring disc (Tag 14)

DN	N°	Code	DN	N°	Code
DN15	C011	XF71010100	DN40	C041	XF71010800
	C012	XF71010200		C042	XF71010900
	C013	XF71010300		C043	XF71011000
	C014	XF71010400	DN50	C051	XF71011100
DN 25	C021	XF71010500		C052	XF71011200
	C022	XF71010600		C053	XF71011300
	C023	XF71010700		C054	XF71011400

Measuring spring DW 181 / 182 "E"

Magnet lever (Tag 11)/ PTFE Ring (Tag 13)/ Measuring spring (Tag 12)/ Measuring disc (Tag 14)

DN	N°	Code	DN	N°	Code
DN15	E015	XF71011500	DN40	E045	XF71012300
	E016	XF71011600		E046	XF71012400
	E017	XF71011700	DN50	E055	XF71012500
	E018	XF71011800		E056	XF71012600
	E019	XF71011900			
DN 25	E025	XF71012000			
	E026	XF71012100			
	E027	XF71012200			

Measuring spring DW 183 (2 springs supplied – Tag 54)

Meter code n°	Flow Direction		
	↔	↑	↓
P081	XF71012700	XF71012800	XF71012900
P082	XF71013000	XF71013100	XF71013200
P083	XF71013300	XF71013400	XF71013500
P084	XF71013600	XF71013700	XF71013800
P085	XF71013900	XF71014000	XF71014100
P086	XF71014200	XF71014300	XF71014400
P087	XF71014500	XF71014600	XF71014700
P088	XF71014800	XF71014900	XF71015000
P089	XF71015100	XF71015200	XF71015300
P101	XF71015400	XF71015500	XF71015600
P102	XF71015700	XF71015800	XF71015900
P103	XF71016000	XF71016100	XF71016200
P104	XF71016300	XF71016400	XF71016400
P105	XF71016500	XF71016600	
P106	XF71016700	XF71016800	XF71016900
P107	XF71017000	XF71017100	XF71017200
P108	XF71017300	XF71017400	XF71017500
P109	XF71017600	XF71017700	XF71017800
P121	XF71017900	XF71018000	
P122	XF71018100	XF71018200	XF71018300
P123	XF71018400	XF71018500	
P124	XF71018600	XF71018700	XF71018800
P125	XF71018900		
P126	XF71019000	XF71019100	
P127	XF71019200	XF71019300	
P128	XF71019400	XF71019500	XF71019600
P129	XF71019700	XF71019800	

Measuring spring DW 183 (2 springs supplied - Tag 54) continued from last page …

Meter code n°	↔	↑	↓
P151	XF71019900	XF71020000	XF71020100
P152	XF71020200	XF71020300	XF71020400
P153	XF71020500	XF71020600	XF71020700
P154	XF71020800	XF71020900	XF71021000
P155	XF71021100		
P156	XF71021200	XF71021300	XF71021400
P157	XF71021500	XF71021600	XF71021700
P158	XF71021800	XF71021900	XF71022000
P159	XF71022100	XF71022200	XF71022300
P201	XF71022400	XF71022500	XF71022600
P202	XF71022700	XF71022800	XF71022900
P203	XF71023000	XF71023100	
P204	XF71023200	XF71023300	XF71023400
P205	XF71023500	XF71023600	XF71023700
P206	XF71023800	XF71023900	XF71024000

Kit gasket DW 181 / 182

Tag	Description	Silicon code	Viton code	Perbunan code
2	O-ring D 88,49 X 3,53	XF71030100	XF71030200	XF71030300
8	O-ring 74 X 3 X 80			
10	O-ring D 36,17 X 2,62			
13	PTFE ring			

Kit gasket DW 181…4 (ring for pressure resistant housing)
for special applications using DW 181…4 HT/H3 version

Description	Code	Description	Code
PTFE	XF71030400	Klingerit	XF71030500

Pressure housing DW 181 / 182

Tag	Description	Standard code	HT version code	Ex version code
9	pressure housing	XF71040100	XF71040200	XF71040300
18	screw A2 70 CHC, M6-20 DIN 912			
16	nut A2 70 HM6			
17	spring washer A4 W6			

Reed switch "A" DW 181 / 182 / 183

Tag	Description	NO** code	NC* code	Changeover code
33	reed switch	XF71050900	XF71051000	XF71051100
32a	nut A2 70H,M3			
31	spring washer A2 M3 plate			
32	screw A2 70 H3-10 DIN933			
30	clamp plate			

Reed switch "G" DW 181 / 182 / 183

Tag	Description	NO** code	NC* code	Changeover code
34	reed switch G/K1	XF71051200	XF710105300	XF71051400
46	spring washer D5X9			
47	snap ring AC E005 REF A 75 55			

* NC: switch that is “normally closed” during operation (closed switch when flow is increasing)
** NO: switch that is “normally open” during operation (closed switch when flow is decreasing)

Complete plastic housing for ...

Code	Description
XF71060100	DW18/AK1 green
XF71060200	DW18/AK1 black
XF71060300	DW18/AK1 "INV"
XF71060400	DW18/AK2 green/green
XF71060500	DW18/AK2 black/black
XF71060600	DW18/AK2 green/black
XF71060700	DW18/AK2 black/green
XF71060800	DW18/AKV1 24VAC
XF71060900	DW18/AKV148VAC
XF71061000	DW18/AKV1 110VAC
XF71061100	DW18/AKV1 220VAC
XF71061200	DW18/AKV1 24VDC
XF71061300	DW18/AKV1 48VDC
XF71061400	DW18/AKV1 110VDC
XF71061500	DW18/AKV2 24VAC
XF71061600	DW18/AKV2 48VAC
XF71061700	DW18/AKV2 110VAC
XF71061800	DW18/AKV2 220VAC
XF71061900	DW18/AKV2 24VDC
XF71062000	DW18/AKV2 48VDC
XF710612100	DW18/AKV2 110VDC
XF71062200	DW18/GK1 green
XF71062300	DW18/GK1 black
XF71062400	DW18/GK1 INV.yellow
XF71062500	DW18/GK2 green/green
XF71062600	DW18/GK2 black/black
XF71062700	DW18/GK2 green/black
XF71062800	DW18/GK2 black/green

Code	Description
XF71062900	DW18/GKV1 24VAC
XF71063000	DW18/GKV1 48VAC
XF71063100	DW18/GKV1 110VAC
XF71063200	DW18/GKV1 220VAC
XF71063300	DW18/GKV1 24VDC
XF71063400	DW18/GKV1 48VDC
XF71063500	DW18/GKV1 110VDC
XF71063600	DW18/GKV2 NC 24VAC
XF71063700	DW18/GKV2 NC 48VAC
XF71063800	DW18/GKV2 NC 110VAC
XF71063900	DW18/GKV2 NC 220VAC
XF71064000	DW18/GKV2 NC 24VDC
XF71064100	DW18/GKV2 NC 48VDC
XF71064200	DW18/GKV2 NC 110VDC
XF71064300	DW18/KV1/BRX NC 220V AC
XF71064400	DW18/KV1/BRX NC 110V AC
XF71064500	DW18/KV1/BRX NC 110V DC
XF71064600	DW18/KV1/BRX NC 48V AC
XF71064700	DW18/KV1/BRX NC 48V DC
XF71064800	DW18/KV1/BRX NC 24V AC
XF71064900	DW18/KV1/BRX NC 24V DC
XF71065000	DW18/KV1/BRX NO 220V AC
XF71065100	DW18/KV1/BRX NO 100V AC
XF71065200	DW18/KV1/BRX NO 110V DC
XF71065300	DW18/KV1/BRX NO 48V AC
XF71065400	DW18/KV1/BRX NO 48V DC
XF71065500	DW18/KV1/BRX NO 24V AC
XF71065600	DW18/KV1/BRX NO 24V DC

NC: switch that is “normally closed” during operation (closed switch when flow is increasing)
NO: switch that is “normally open” during operation (closed switch when flow is decreasing)

Kit indicator type A

Tags	Description	Code
22…29	Indicator sub-assembly (A)	XF71065900

Kit indicator type G

Tags	Description	Code
36…47	Indicator sub-assembly (A)	XF71066000

Kit cap/cover DW 181/182/183

Tag	Description	Code
1	cap	XF71070100
2	O-ring Perb D 88,49 X 3,53	
4	locking pin 316L for cover	
5+6	gasket + cover + nut	

Kit measuring system

Tags	Description	Code
52a…e, 53…56,57	DW 183 / RR	XF71080100
	DW 183 / RR / HT	XF71080400
-	DW 183 / RR / EXD	XF71080300

Reed switch for EXD or HT versions

Tag	Description	Code
48	MS 14/HT NC MS 14/HT NC	XF 71051500 XF 7101600
-	MS 12/BRX (EXD) NC	XF 71051700
-	MS 12/BRX (EXD) NO	XF 71051800

5.4 Inspection procedure

5.4.1 Inspection procedure: measuring assembly

Check the condition of the measuring system, cone-disc or nozzle-disc. Check the condition of the spring. In the event of leaks between the body and the cap, tighten the four bolts securing the cap. Change the O-ring if necessary. Carefully follow the maintenance procedures in section 5.5.

5.4.2 Inspection procedure: housing (DW181 & DW182 models)

Check switch operation using an ohmmeter. Check the operation of the indicating mechanism. By removing the lock ring (Tag no. 7, section 5.2) holding the housing onto the assembly, it is possible to remove the housing from the measuring body without removing the flow switch from the pipe, or stopping the flow. Carefully follow the maintenance procedures in section 5.5.

5.5 Basic servicing procedures

DW 181…4 servicing by the customer is limited by warranty to:
- Changing the position of the dial on the type A indicator
- Removing the display assembly
- Removing the spring-loaded probe assembly
- Changing gaskets in DW 183 flow controllers

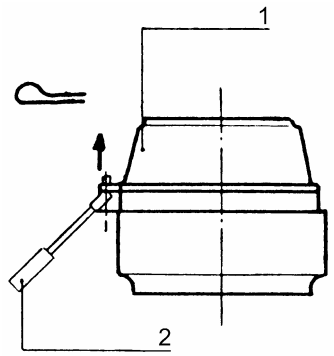
Other repairs must be done by KROHNE-authorized service staff.
Read all servicing instructions carefully.

5.5.1 Changing the position of the dial on the type A indicator

Warning :
Do not remove the 4 bolts holding the pressure housing onto the measuring tube.

For the “A” indication version, it may be necessary to modify the position of the dial when flow direction has been reversed, in order to read the flow rate correctly. Follow the steps 1 to 6.

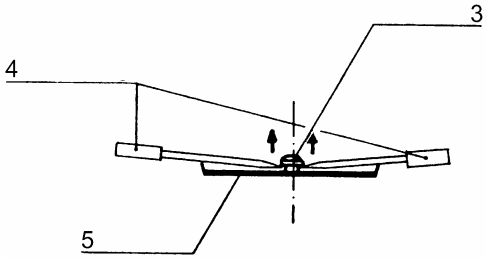
Step 1
Remove the locking pin and remove the cap.



1 Dial

2 Screwdriver

Step 2
Extract the pointer using an extractor or the flats of two screwdrivers placed at either side of the pointer.



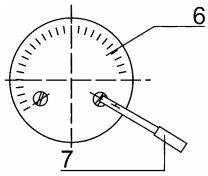
3 Pointer

4 Screwdriver

5 Dial

Step 3
Unscrew the dial.

Step 4
Reposition the dial as required; attachment holes are provided to reposition the dial in 90° steps. Fit screws.

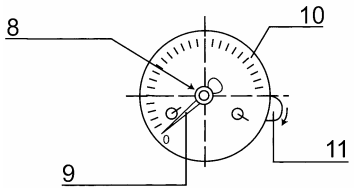


6 Dial

7 Screwdriver

Step 5
Hold the pivoting arm and fit the pointer aligned with zero.

Step 6
Reinstall the cap and locking pin.



8 Interference fit between pointer shaft and hole in dial

9 Pointer

10 Dial

11 Pivoting arm

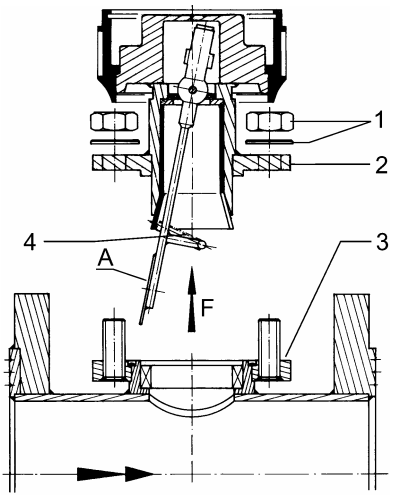
5.5.2 Removing the display assembly: operating faults in the housing DW18x Std /EExia flow controllers equipped with type G or A indicators

Warning :
Do not remove the 4 bolts holding the pressure housing onto the measuring tube.

If the fault lies inside the housing, return the display assembly to the factory for standard replacement. The display may be removed under flow conditions.

- Remove the whole display assembly from the pressure housing by extracting the snap-ring underneath the display. See section 5.2 for the exploded views of the DW18 Std/EExia devices to locate this component (Tag no. 7).

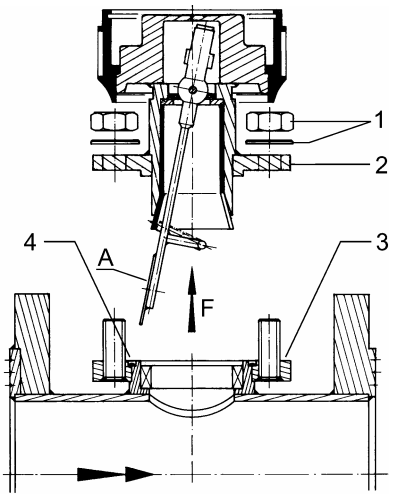
5.5.3 Cleaning the springs or changing the measuring system sub-assembly



Warning:
Remember to shut off the flow before performing this operation

Step 1
UNSCREW the 4 nuts and washers dia. M12 (1).
Step 2
SEPARATE the two components (2) and (3) using a screwdriver.
Step 3
REMOVE the pressure housing (2) in the direction of the arrow F.
Either Step 4A…
CLEAN the springs (4)
… or Step 4B
CHANGE the measuring system sub-assembly
Step 5
REASSEMBLE by following instructions 1, 2, 3 and 4 in reverse order. Take care to orient the measuring disc (A) so that it is facing upstream.

5.5.4 Changing gaskets in DW 183 flow controllers



Warning:
Remember to shut off the flow before performing this operation

Step 1
UNSCREW 4 nuts and washers dia. M12 (1).
Step 2
SEPARATE the two components (2) and (3) using a screwdriver.
Step 3
REMOVE the pressure housing (2) in the direction of the arrow F.
Step 4
REMOVE the gaskets from their recess (4).
Step 5
CHANGE the gaskets and reassemble by following instructions 1, 2, 3 and 4 in reverse order. Take care to orient the measuring disc (A) so that it is facing upstream.

6 Technical Data

	DW 181	DW 182	DW 183	DW 184
Full-scale range (100% values)				
Flow rate m^3/h (US GPM)	0.16…30 (0.7…132)	0.16…30 (0.7…132)	24…250 (106…1100)	–
Flow velocity m/s (ft/s)	–	–	–	0.4…4 (0.66…1.31)
Connection				
Pipe thread G	$^3/_4$" … 2"	–	–	–
Flanges to DIN 2501 (NFE 29203)	–	DN15- DN50/PN40 (DN65/PN16)	(DN65), DN100, DN125, DN150/PN16 DN80/PN40, DN200/PN10	DN150/ PN16…PN25
Flanges to ANSI B16.5 Class 150 lb/RF	–	$^1/_2$"…2" ($2^1/_2$")	3" ($2^1/_2$")…8"	6"
Information on other standards and pressure ratings supplied on request				
Measuring system				
Measuring disc with tapered tube	C	C	–	–
Nozzle with baffle	E	E	–	–
Baffle	–	–	P	P
Indicator				
Scale division 1 to 10 in flow units	G A	G A	G A (≤DN100 / 4")	G –
Pipe run / flow direction				
Vertical/upwards	VU	VU	VU	–
Vertical/downwards	VO	VO	VO	–
Horizontal/either way	H	H	H	H
Max. operating pressure*, ***				
	- 40bar or 580psig -	≤DN50 or 2": 40 bar or 580 psig ≥DN65 or 3": 16 bar or 230 psig	≤DN150 or 6": 16 bar or 230 psig ≥DN200 or 8": 10 bar or 145 psig** DN150 PN16 <13 bar (for dangerous fluids only – group 1 Directive 67/548/CEE -) DN80 PN40 <25 bar (for dangerous fluids only – group 1 Directive 67/548/CEE -)	- 25 bar or 365 psig - DN150 PN16 <13 bar (for dangerous fluids only –group 1 Directive 67/548/CEE -) DN80 PN40 <25 bar (for dangerous fluids only –group 1 Directive 67/548/CEE -)

* Information on higher pressure levels supplied on request, ** PN 16 optional,
*** Subject to process connection used and flange temperature

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
HT–version w/o indicator	≤300°C or ≤570°F	≤300°C or ≤570°F	≤300°C or ≤570°F	≤300°C or ≤570°F

*** Subject to process connection used and flange temperature

Special conditions for ATEX applications

Flow indicator DW18* EEx d

Authorized markings: ⟨Ex⟩ 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: ⟨Ex⟩ 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…80°C according to process temperature and ambient temperature

Viscosity					
Standard	mPa.s	≤30 or	≤30 or	≤30 or	≤30 or
	lb/ft.s	$\leq 20x10^{-3}$	$\leq 20x10^{-3}$	$\leq 20x10^{-3}$	$\leq 20x10^{-3}$
Special version	mPa.s	>30 or	>30 or	>30 or	>30 or
	lb/ft.s	$>20x10^{-3}$	$>20x10^{-3}$	$>20x10^{-3}$	$>20x10^{-3}$
Repeatability (switching point)		±3%	±3%	±3%	±3%
Measuring accuracy (Indicator A)		±15%	±15%	±15% (≤DN100, 4")	–
Protection category to EN 60529 / IEC 529		IP 55 (standard version) IP 44 (high-temperature version) IP 65 (ATEX version)			
Electromagnetic compatibility (EMC)		EN 50081-1 and 50082-2			

Limit switches	
Type	**Number and description**
K1	1 N/C* or 1 N/O* switch (bistable) or 3-wire SPDT (change over)
K2	1 N/C* or 1 N/O* switch (bistable) or 3-wire SPDT (change over) 2 N/C* or 2 N/O* switches also possible in conjunction with high-temperature version H3
KV1, KV2	1,2 changeover switches (bistable) with amplifier relay
Type	**Max. switching capacity rating**
K1, K2 (standard)	max. 14 VA (max. 350 V AC; max. 0.4 A)
K1, K2 with changeover	max. 3 VA (max. 28 V DC; max. 0.25 A)
EEx d characteristics	max. dissipation (Ex d housing): 20 VA; max. 380 V AC; max. 1.5 A
EEx ia safety values	Ii < 500 mA, Ci = 0 nF, Li = 0 µH
Reed switch, HT	18 VA (max. 220 V; max. 0.8 A)
KV1, KV2	max. 2000 VA (max. 250 V AC, max. 8 A)
Amplifier relay characteristics	
Power supply	240/110/48/24 V AC, 110/48/24 V DC
Response time	5…12 ms

* Refer to section 2: Electrical connections for definition.

6.1 Flow range table by flow range code

Meter size									
DW 181	DW 182		Code	Flow range – Indicator G and A		Pressure loss $p_{max.}$			
	Flanges					for $q_{min.}$		for q_{max}	
Screw	DIN	ASME		l/h	US GPM	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…16.61	25	0.36	140	2.03
$1^1/_2$"	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"	50/65	2"/$2^1/_2$"	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…16000	35.00…70.45	30	0.44	140	2.03

* only with indicator G

Meter size DW 183		Indicator G – Flow range		Code	Indicator A – Flow range		Code	Pressure loss $p_{max.}$	
DIN	ASME	m^3/h	US GPM		m^3/h	US GPM		mbar	psig
65/ 80	$2^1/_2$"/3"	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
		28…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	24	0.35
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…150	198…793	P 157	37	0.54
		90…120	528…969	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	0.64
		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

	Flow velocity		Scale ratio
	m/s	ft/s	
≥DN250 (10”)	0.2…0.4	0.66…1.31	1 : 2
(or 65)	0.2…1	1.31…3.28	1 : 2.5
	1…4	3.28…13.12	1 : 4
	4	13.12	1 : 4

6.2 Instrument version materials

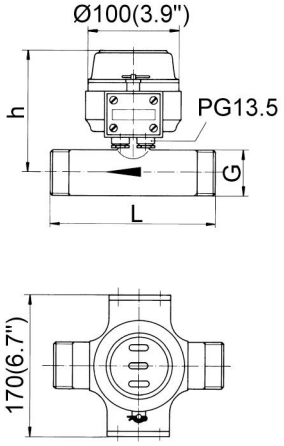
Version	Cap	Gasket *	Measuring system	Measuring tube	Connection	Housing
DW 181/B	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Bronze	Bronze	Polycarbonate
DW 181/RR	Stainless Steel 316 L	Buna	Stainless Steel 316 L	Stainless Steel 316 L	Stainless Steel 316 L	Polycarbonate
DW 182/RR	Stainless Steel 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: steel-clad flanges used in all cases.
* *Steel flanges for >DN100 or 4” instruments have stainless steel 316 L cladding.

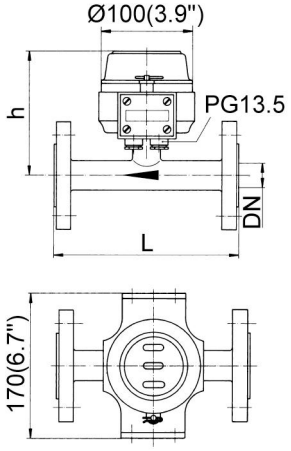
7 Dimensions and Weights

Type	Connection		Dimension h		Dimension L		Weight	
	DIN	ASME	mm	inches	mm	inches	kg	lb
DW 181 Std/EEx ia	G 3/4"		115	4.53	135	5.31	1.7	3.75
	G1"		120	4.72	160	6.30	1.8	3.97
	G1 1/2"		130	5.12	180	7.09	2.2	4.85
	G2"		135	5.31	190	7.48	2.6	5.73
DW 182 Std/EEx ia	15	1/2"	115	4.53	200	7.87	3.0	6.61
	25	1"	120	4.72	200	7.87	4.0	8.82
	40	1 1/2"	130	5.12	200	7.87	5.5	12.13
	50	2"	135	5.31	200	7.87	7.2	15.87
	65	2 1/2"	135	5.31	200	7.87	9.3	20.50
DW 183 Std/EEx ia	65	2 1/2"	185	7.28	200	7.87	11.5	25.35
	80	3"	185	7.28	200	7.87	12.5	27.56
	100	4"	195	7.68	200	7.87	14.0	30.86
	125	5"	210	8.27	300	11.81	18.0	39.68
	150	6"	220	8.66	300	11.81	23.0	50.71
	200	8"	250	9.84	300	11.81	35.0	77.16
DW 184 Std/EEx ia	150	6"					13.5	29.76

DW 181 Std / EEx ia

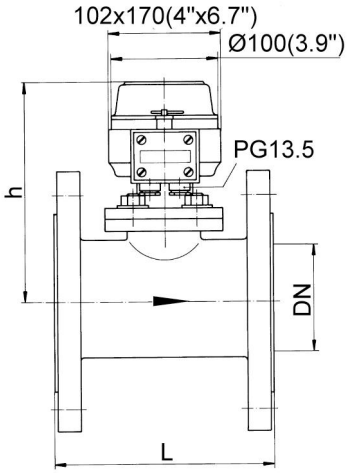


DW 182 Std / EEx ia

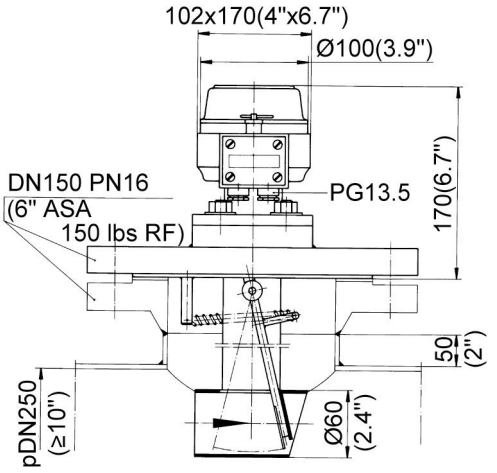


Dimensions in mm (inches)

DW 183 Std / EEx ia



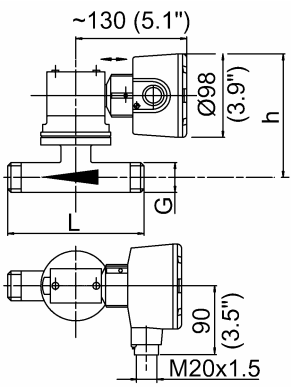
DW 184 Std / EEx ia



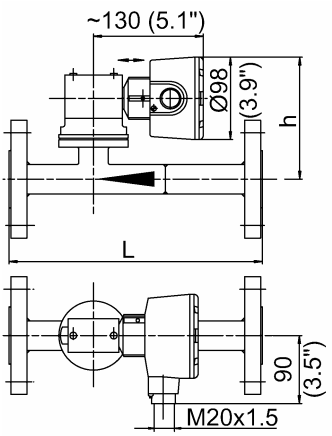
Dimensions in mm (inches)

Type	Connection		Dimension h		Dimension L		Weight	
	DIN	ASME	mm	inches	mm	inches	kg	lb
DW 181 EEx d	G 3/4"		140	5.51	135	5.31	2.35	5.18
	G1"		145	5.71	160	6.30	2.45	5.40
	G1 1/2"		155	6.10	180	7.09	2.85	6.28
	G2"		160	6.30	190	7.48	3.25	7.16
DW 182 EEx d	15	1/2"	140	5.51	300	11.81	3.65	8.05
	25	1"	145	5.71	300	11.81	4.65	10.25
	40	1 1/2"	155	6.10	300	11.81	6.15	13.56
	50	2"	160	6.30	300	11.81	7.85	17.31
	65	2 1/2"	160	6.30	300	11.81	9.95	21.94
DW 183 EEx d	65	2 1/2"	210	8.27	400	15.72	12.15	26.79
	80	3"	210	8.27	400	15.72	13.15	28.99
	100	4"	220	8.66	400	15.72	14.65	32.30
	125	5"	232	9.13	400	15.72	18.65	41.12
	150	6"	245	9.65	400	15.72	23.65	52.14
	200	8"	275	10.83	400	15.72	35.65	78.59
DW 184 EEx d	150	6"	n/a	n/a	n/a	n/a	14.15	31.20

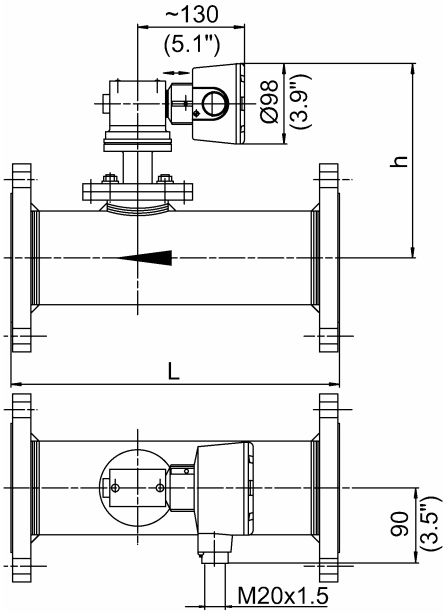
DW 181 EEx d*



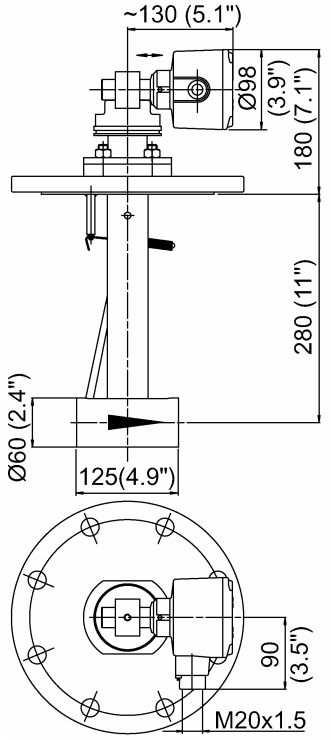
DW 182 EEx d*



DW 183 EEx d*



DW 184 EEx d*

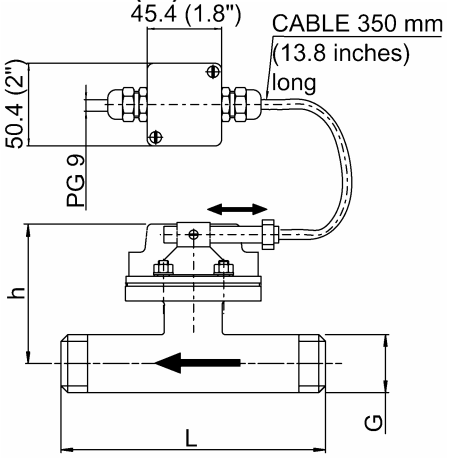


Dimensions in mm (inches)

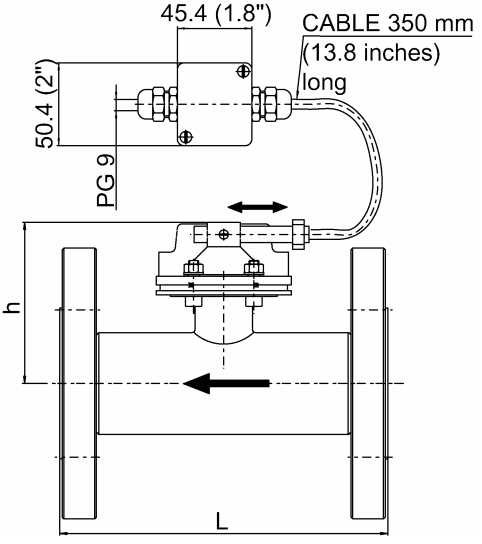
* The MS 12 / BRX (EEx d) switch is supplied without cable fitting. Only EEx d-certified components and fittings are to be used with the MS 12/BRX switch.

Type	Connection		Dimension h		Dimension L		Weight	
	DIN	ASME	mm	inches	mm	inches	kg	lb
DW 181 HT (H3)	G 3/4"		76	2.99	135	5.31	1.10	2.42
	G1"		81	3.19	160	6.30	1.20	2.65
	G1 1/2"		91	3.58	180	7.09	1.60	3.53
	G2"		96	3.78	190	7.48	2.00	4.40
DW 182 HT (H3)	15	1/2"	76	2.99	300	11.81	2.40	5.29
	25	1"	81	3.19	300	11.81	3.40	7.50
	40	1 1/2"	91	3.58	300	11.81	4.90	10.80
	50	2"	96	3.78	300	11.81	6.60	14.55
	65	2 1/2"	96	3.78	300	11.81	8.70	19.18
DW 183 HT (H3)	65	2 1/2"	146	5.75	400	15.72	10.90	24.03
	80	3"	146	5.75	400	15.72	11.90	26.24
	100	4"	156	6.14	400	15.72	13.40	29.54
	125	5"	168	6.61	400	15.72	17.40	38.36
	150	6"	181	7.13	400	15.72	22.40	49.38
	200	8"	211	8.31	400	15.72	34.40	75.84
DW 184 HT (H3)	150	6"	n/a	n/a	n/a	n/a	12.90	28.44

DW 181 HT (H3)

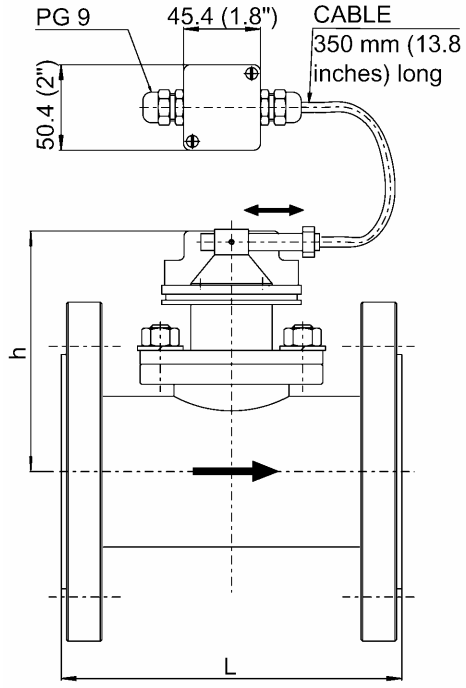


DW 182 HT (H3)

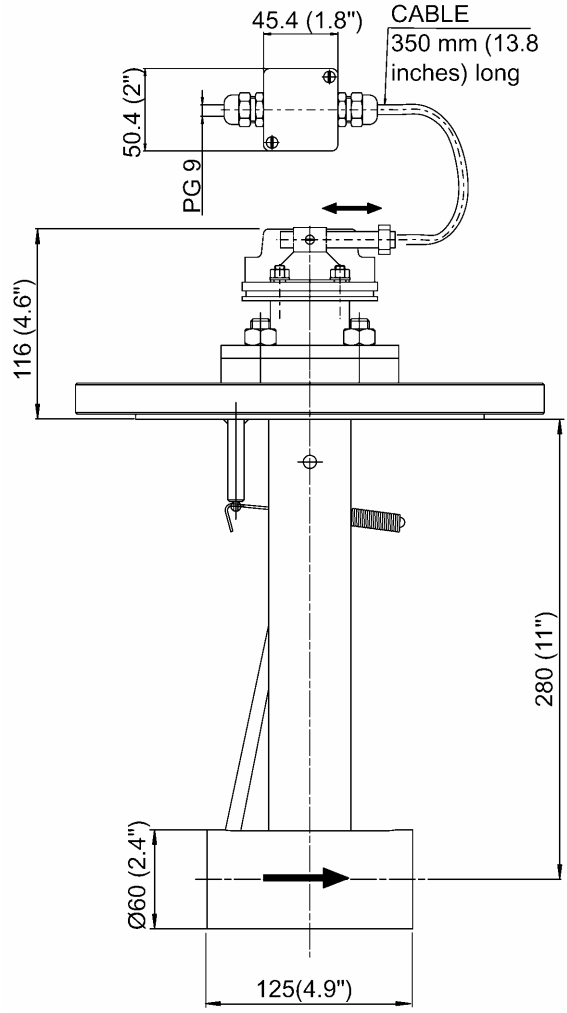


Dimensions in mm (inches)

DW 183 HT (H3)



DW 184 HT (H3)



Dimensions in mm (inches)

8 Measuring Principle

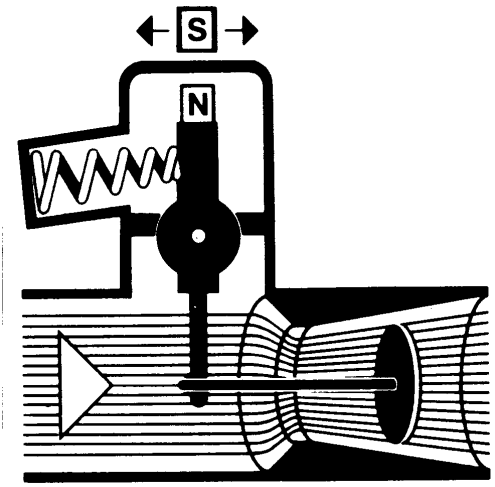
8.1 Measuring systems

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

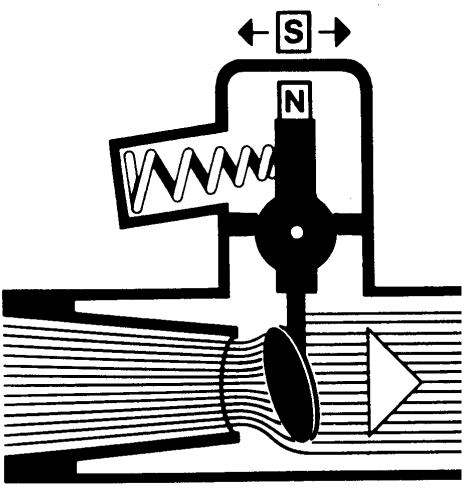
Measuring system E:
Instead of being located in a tapered tube, this system incorporates a nozzle (DW 181, DW 182 only) to increase the flow velocity. This version is particularly suitable for liquids with solids content.

Measuring system P
(DW 183 and 184 flow switches only)
This 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)



8.2 DW 183

The model DW 183 is recommended for pipe diameters from DN65…200, which can be installed in any position in the piping. The diameter of the measuring tube depends on the flow to be measured and the connection is adapted to that of the piping.
The maximum flow rate is 4 m/sec. The DW 183 is available in the “N” (carbon steel) “R” (stainless steel-coated carbon steel) or “RR” (stainless steel) versions. The indicator and the switches are the same as those used in the standard model.
For instruments without flow indication, the scale ratio between min. and max. range values is 1:2.5. A scale ratio of 1:4 is possible if required by the two limit switches. For instruments with flow indication, the scale ratio is 1:4.
For vertical installation, the position of the installation and the flow direction should have been indicated in the order for calibration in order to take the weight of the disc into account.

Appendix A: Declaration of conformity: CE

Konformitätserklärung

Wir : KROHNE SA
Usine des Ors
26103 ROMANS
France

erklären in alleiniger Verantwortung, daß das Produkt :

Durchfluss-Kontrollgerät

Typ : DW 181
DW 182
DW 183
DW 184

einschliesslich der K1 K2, KV2 und KV1 Kontakte

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen Dokumenten übereinstimmt :

Niedrigspannung	NF EN 61010-1
EMV	EN 50081-1
	EN 50082-2
ATEX*	EN 50014+A1+A2
	EN 50018
	EN 50020
	EN 50281-1-1+A1
	EN 50284
	EN 13463-1

*Nur für Ex Geräte.

gemäß den Bestimmungen der Richtlinien 89/336/EWG (Elektromagnetische Verträglichkeit), 73/23/EWG(Niederspannungrichtlinie) und 94/9/EG (ATEX).

Romans, den 13.Mai 2003

Christian SAVARY
Geschäftsleiter

Declaration of Conformity

We : KROHNE SA
Usine des Ors
26103 ROMANS
France

declare under our sole responsibility that the product :

Flow Controller

Type : DW 181
DW 182
DW 183
DW 184

including the limit switches K1, K2, KV2 and KV1

to which this declaration relates, is in conformity with the following standards or other normative documents :

Low tension	NF EN 61010-1
EMC	EN 50081-1
	EN 50082-2
ATEX*	EN 50014+A1+A2
	EN 50018
	EN 50020
	EN 50281-1-1+A1
	EN 50284
	EN 13463-1

*For Ex devices only

according to the provisions of Directive 89/336/EEC (Electromagnetic Compatibility, 73/23/EEC Low voltage Directive) and 94/9/EC (ATEX).

Romans, May 13th, 2003

Christian SAVARY
Managing Director

Déclaration de conformité

Nous : KROHNE SA
Usine des Ors
26103 ROMANS
France

déclarons sous notre seule responsabilité que le produit :

Contrôleur de débit

Type : DW 181
DW 182
DW 183
DW 184

incluant les contacts : K1, K2, KV2 et KV1

auquel se réfère cette déclaration, est conforme aux normes ou autres documents normatifs :

Basse tension	NF EN 61010-1
CEM	EN 50081-1
	EN 50082-2
ATEX*	EN 50014+A1+A2
	EN 50018
	EN 50020
	EN 50281-1-1+A1
	EN 50284
	EN 13463-1

*Seulement pour les appareils Ex

conformément aux dispositions de la directive 89/336/CEE (Compatibilité Electromagnétique), 73/23/CEE (Basse tension) et 94/9/CE (ATEX).

Romans, le 13 mai 2003

Christian SAVARY
Directeur Général

KROHNE CE – declaration conformity CE DW 18 05/2003

Appendix B: If you need to return a device for testing or repair to KROHNE

If installed and operated in accordance with these operating instructions, your device will rarely present any problems.
Should you nevertheless need to return a device for checkout or repair, please pay strict attention to the following points:
Due to statutory regulations concerning protection of the environment and the health and safety of our personnel, KROHNE may only handle, test and repair returned flow meters that have been in contact with liquids if it is possible to do so without risk to personnel and environment. This means that KROHNE can only service your unit if it is accompanied by a certificate in line with the following model confirming that the flow meter is safe to handle.

If the unit has been operated with toxic, caustic, flammable or water-endangering liquids, you are kindly requested

- to check and make sure, if necessary by rinsing or neutralizing, that all cavities are free from such dangerous substances.
  (Directions on how you can find out whether the unit has to be opened and then flushed out or neutralized are obtainable from KROHNE on request.)
- to enclose a certificate with the level gauge confirming that it is safe to handle and stating the liquid used.

KROHNE regrets that it cannot service your flow meter unless accompanied by such a certificate.

Specimen certificate

Company: _____ Address: _____

Department: _____ Name: _____

Tel. No.: _____

The enclosed flow meter,

Type: _____

KROHNE Order No. or Series No.: _____

has been operated with the following liquid: _____

Because this liquid is

- ☐ water-endangering
- ☐ toxic
- ☐ caustic
- ☐ flammable

we have

- ☐ checked that all cavities in the unit are free from such substances
- ☐ flushed out and neutralized all cavities in the unit

We confirm that there is no risk to man or environment through any residual liquid contained in this flow meter.

Date: _____ Signature: _____

Company stamp:

Note