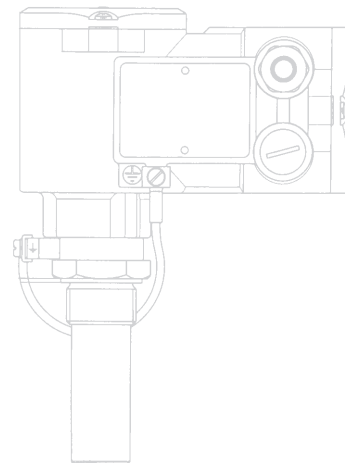
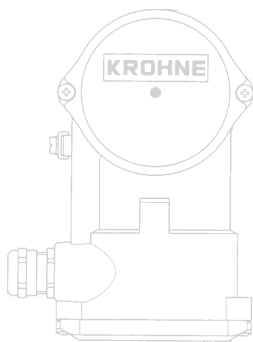
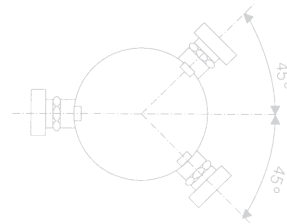


## Electromagnetic flowmeters and switches DWM 1000/2000



Variable area flowmeters

Vortex flowmeters

**Flow controllers**

Electromagnetic flowmeters

Ultrasonic flowmeters

Mass flowmeters

Level measuring instruments

Communications technology

Engineering systems & solutions



## Electromagnetic flowmeters and switches DWM 1000/2000

For measuring and monitoring electrically conductive liquids, pastes and slurries

### Measuring principle

If an electrical conductor is caused to move in a magnetic field, such movement induces a voltage **U** in the conductor.

In this case, the conductor is the electrically conductive liquid. Magnetic field **B** is at rightangles to the direction of flow. The induced voltage **U** is directly proportional to the local flow velocity **v**.

$$U = k \times B \times v \times D$$

**k** Instrument constant  
**B** Strength of magnetic field  
**v** Local flow velocity  
**D** Electrode spacing

Voltage **U** is tapped off from the electrodes, neutral and ground electrode (socket).

### DWM 1000 flow switch

Voltage **U** converted into a switching signal with adjustable switching point.

### DWM 2000 flowmeter

Voltage **U** converted into a flow-proportional output signal, load-independent current 4-20 mA.

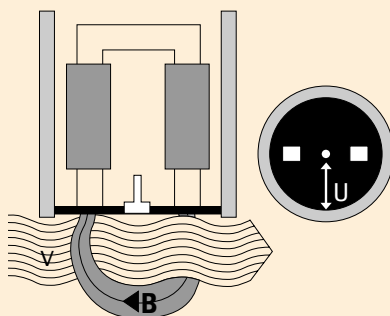
### Versions

- DWM 1000 flow switch, 2-wire system
- DWM 2000 flowmeter, 4-20 mA current output



### Special features

- Process temperature: -25 ... 150°C / -13 ... 302°F
- Operating pressure: 25 bar / 360 psig
- Rugged design
- No moving parts, maintenance-free
- Wetted parts of stainless steel or ceramics
- Electronic unit replaceable at flowing conditions
- For pipelines  $\geq$  DN 50 /  $\geq$  2"



**Technical data**

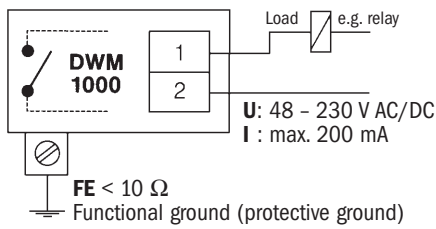
<b>Electromagnetic</b>	<b>... flow switch DWM 1000</b> 2-wire system	<b>... flowmeter DWM 2000</b> current output 4-20 mA
<b>Supply power and output</b>		
Voltage	48-230 V AC, 50/60 Hz or 48-230 V DC (term. 1/2)	24 V DC $\pm$ 20% option: 12 V DC $\pm$ 20% (term. 1, 2)
Power consumption	$\leq$ 5 mA	$\leq$ 50 mA (at 24 V DC/max. 20°C/max. 68°F)
Output	break or make contact, switch-selectable (for relay contact limits see page 4)	passive current output, 4-20 mA, (term. 5/6) load: max. 500 $\Omega$ (24 V DC)
Functional ground FE (protective ground)	$<$ 10 $\Omega$	$<$ 10 $\Omega$
<b>Full-scale range "v" adjustable</b>	0.1-9.9 m/s or 0.3-32.5 ft/s, reference velocity, hysteresis: - 8% at flow falling	1 / 2 / 3 / 4 / 5 / 6 / 7 or 8 m/s equivalent to 3.3/6.6/9.9/13.1/16.4/19.6/22.9 or 26.2 ft/s
<b>Time constant</b>	5, 8 or 10 seconds, adjustable	5 seconds, fixed
<b>Reproducibility</b>	1% of switching point	1% of measured value
<b>Error limits</b>		
$v > 1$ m/s / $>$ 3.3 ft/s	$\pm$ 5% of setting switching point $\pm$ (3 cm/s + 2% of setting switching point) or $\pm$ (1.2 inches/s + 2% of setting switching point)	$\pm$ 5% of measured value ( $\pm$ 2% calibration on side) $\pm$ (3 cm/s + 2% of measured value) or $\pm$ (1.2 inches/s + 2% of measured value)
$v < 1$ m/s / $<$ 3.3 ft/s		
<b>Operating data</b>		
Liquid product	largely homogeneous liquids, pastes and slurries, also with solids content	
Electrical conductivity	$\geq$ 20 $\mu$ S/cm ( $\mu$ mho/cm)	
Operating pressure	$\leq$ 25 bar / $\leq$ 360 psig	
Process temperature	- 25 to + 150°C / - 13 to + 302°F	
Ambient temperature	- 25 to + 60°C / - 13 to + 140°F	
<b>Installation in pipeline</b>		
Nominal size	$\geq$ DN 50 or $\geq$ 2"	
Connection socket	with thread G1A (R1")	
Inlet/outlet run	10 x DN / 5 x DN, dependent on flow profile (DN = nominal size)	
<b>Protection category</b>		
to EN 60529/IEC 529	IP 66, equivalent to NEMA 4 and 4X	
<b>Electromagnetic compatibility (EMC)</b>		
	to EN 50081-1, 50082-2	
<b>Local display</b>		
	flashing LED (DWM 1000 P only)	
<b>Cable entry</b>		
	PG 13.5	
<b>Power terminals</b>		
	cable cross-section max. 1.5 mm <sup>2</sup> or 16 AWG	
<b>Materials</b>		
<u>Sensor</u>	stainless steel 1.4435 (316 L) with ceramic insulation (zirconium oxide) and Viton gasket	
<u>Housing</u>	polycarbonate (option: diecast aluminium with epoxy finish)	
DWM 1000	diecast aluminium with epoxy finish	
DWM 2000	platinum	
<u>Electrode</u>	stainless steel 1.4435 (316 L), others on request	
<u>Connection socket</u>		
<u>Cable entry</u>		
Polycarbonate housing	polyamide	
Aluminium housing	nickel-plated brass (polyamide on request)	
<u>Gaskets</u>		
Connection	Klingerit (without asbestos)	
Housing cover	buna N	

**Electrical connection and setting**

**DWM 1000 flow switch (2-wire system)**



- Terminals 1 and 2 are used for the electrical connection (wire cross-section: max. 1.5 mm<sup>2</sup> or 16 AWG). Polarity is arbitrary.
- The flow switch must **not** be connected to power without an electrical load (e.g. relay)!
- If more than one DWM 1000 is used, make sure they are not connected in parallel. Only one common return is allowed. Provide a separate fuse for each flow switch.

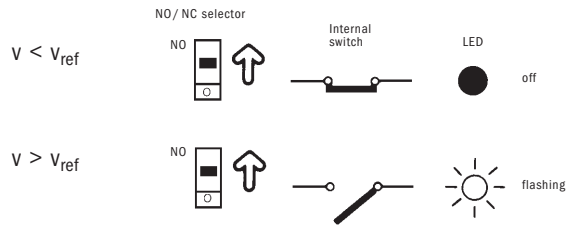


**Relay limits**

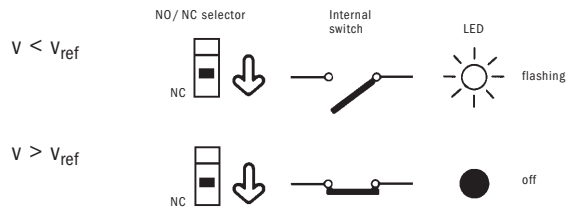
Supply voltage	Min. load current/power for DC	Min. load current/power for AC	Max. load current/power	Peak current/power (max. 40 ms)
48 V	40 mA/1.92 W	30 mA/1.44 VA	400 mA/19.2 VA	3 A/192 VA
110 V	30 mA/3.3 W	20 mA/2.2 VA	400 mA/44 VA	3 A/440 VA
220 V	20 mA/4.4 W	10 mA/2.2 VA	400 mA/88 VA	3 A/880 VA

The holding current of the series-connected relay must be higher than 5 mA, i.e. the relay must drop out when circuit current falls below 5 mA.

**Make contact (NO) = normally open**



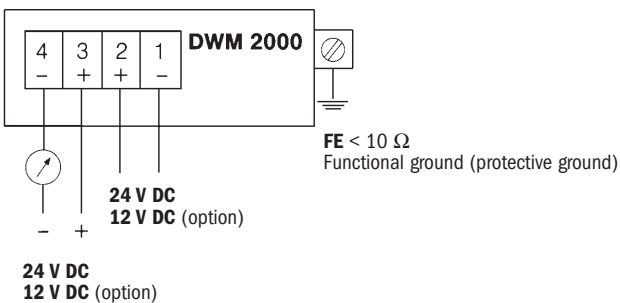
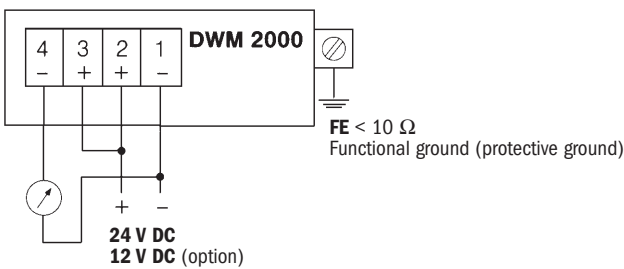
**Break contact (NC) = normally closed**



**DWM 2000 flowmeter (current output)**



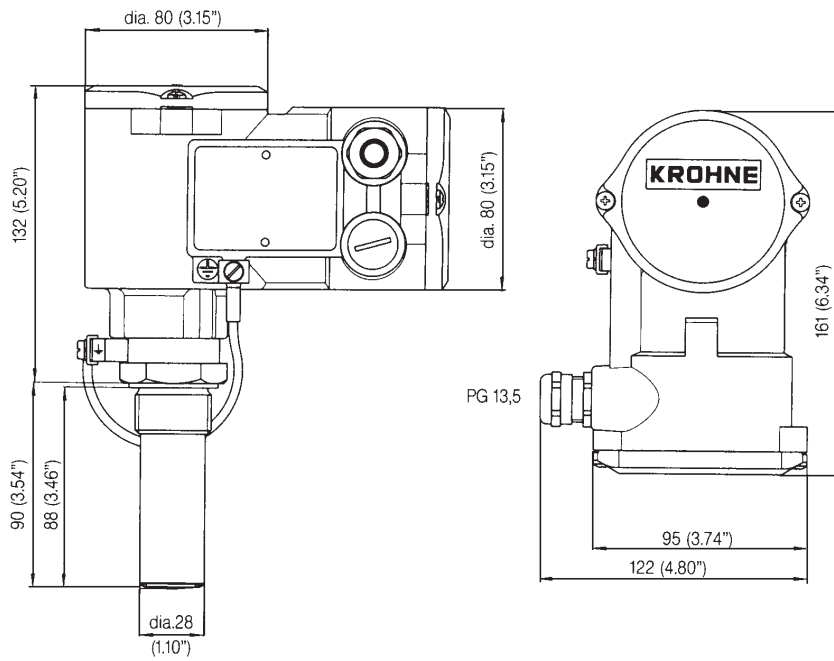
- Take note of polarity!
- 4-20 mA current output, load max. 500Ω!



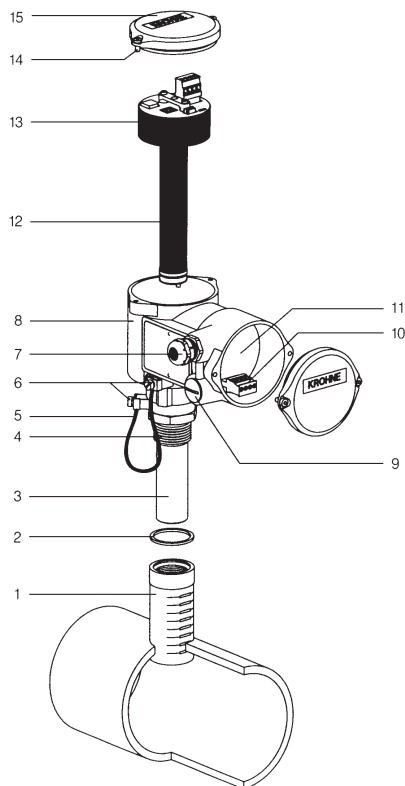
**Dimensions and weights**

**Diecast aluminium housing**

Weight excl. socket: approx. 1.85 kg (4.08 lb)



Dimension in mm (inches)



**Component parts**

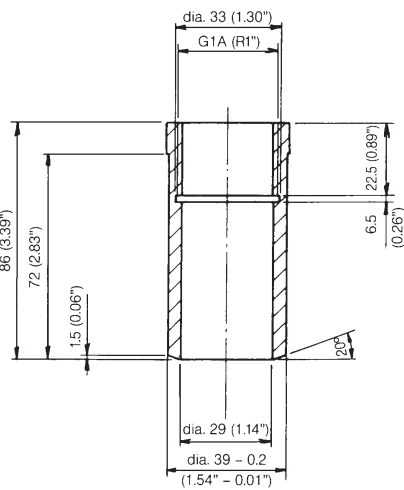
- 1 Connection socket
- 2 Gasket
- 3 Sensor
- 4 Threaded connection
- 5 Grounding cable
- 6 Ground connection
- 7 Cable entry PG 13.5
- 8 Housing
- 9 Blanking plug
- 10 Supply terminals
- 11 Connection housing
- 12 Magnet coils and electrode contacts
- 13 Electronic unit
- 14 Cover screws
- 15 Cover with fitted gasket

## Installation

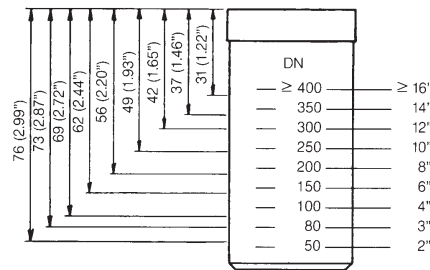
### Installation in the pipeline

- Refer to diagrams for installation location and insertion depth of the connection socket.
- Hole diameter in pipeline: 39 mm or 1.54 inches.
- Straight inlet/outlet run: 10 x DN / 5 x DN
- In keeping with the nominal diameter of the pipeline (see markings insertion depth), strength weld the connection socket perpendicular to the pipeline axis.  
The position of the sensor is not important when screwing in the flowmeter.  
The electronic housing can be rotated, refer to "Electrical connection and setting".

### Dimensions connection socket

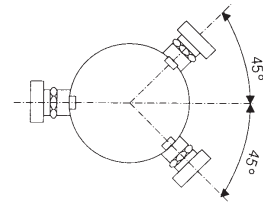


### Markings insertion depth

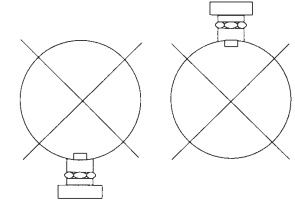


### Installation location

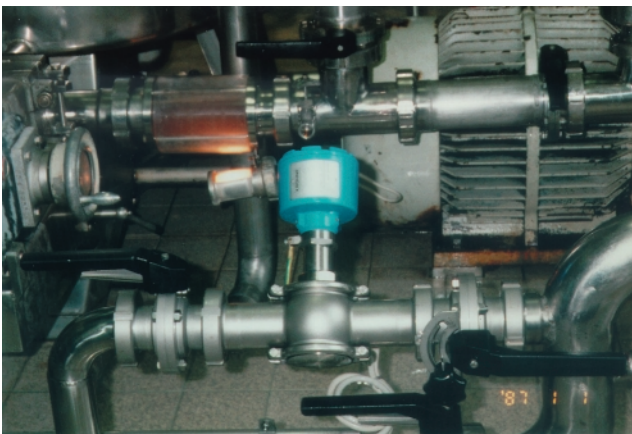
#### correct



#### incorrect



Dimensions in mm (inches)



**Ordering Code**

Instrument										
V741	0	1	DWM 1000	Standard						
		2	DWM 2000	Standard						
		4	DWM 1000 L	L= 500 mm						
		5	DWM 1000 L	L= 1000 mm						
		7	DWM 2000 L	L= 500 mm						
		8	DWM 2000 L	L= 1000 mm						
			<b>Connection</b>							
		1	G 1							
		3	G 1 1/2	+ adjustable screw with safety chain						
		4	1 1/2" NPT	+ adjustable screw with safety chain						
		A	FT	Tuchenhagen connection						
			<b>Housing type</b>							
		B	Aluminium not CE	IP 67						
		C	Aluminium CE	IP 67	Standard					
		D	Stainless Steel	IP 68	+ 10 m cable					
			<b>Functions</b>							
		1	One adjustable threshold DWM 1000							
		2	Current output 4/20 mA DWM 2000							
			<b>Supply voltage</b>							
		1	48 - 250 V DC / AC	(Standard DWM 1000)						
		2	24 V DC	(Standard DWM 2000)						
		3	12 V DC	(DWM 2000 only)						
		A	48 V AC	relay	(DWM 1000)				Telemechanique / RHZ 32	
		B	48 V DC	relay	(DWM 1000)				Telemechanique / RHZ 32	
		C	110 V AC	relay	(DWM 1000)				Telemechanique / RHZ 32	
		D	110 V DC	relay	(DWM 1000)				Telemechanique / RHZ 32	
		E	230 V AC	relay	(Standard DWM 1000)				Klöckner-Möller	
			<b>Approval</b>							
		01	Without							
		11	EX ZONE 2							
			<b>Connection</b>							
		0	Without spool piece							
		1	DN 25	PN 40	Stainless Steel					
		2	DN 32	PN 40	Stainless Steel					
		3	DN 40	PN 40	Stainless Steel					
		4	DN 50	PN 40	Stainless Steel					
		H	1" ASA	150 lb	Stainless Steel					
		K	1 1/4" ASA	150 lb	Stainless Steel					
		L	1 1/2" ASA	150 lb	Stainless Steel					
		M	2" ASA	150 lb	Stainless Steel					
		P	1" ASA	300 lb	Stainless Steel					
		R	1 1/4" ASA	300 lb	Stainless Steel					
		S	1 1/2" ASA	300 lb	Stainless Steel					
		T	2" ASA	300 lb	Stainless Steel					
V741	0									<b>Ordering code</b>

**OPTIONS**

Shut off ball valve for DWM/L (1 1/2" connection, brass, nickel plated)

Frequency output for DWM 2000

Digital indicator with integrated counter out 24 V DC power supply