

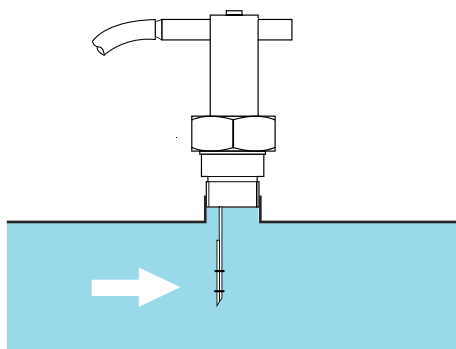
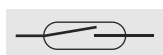
# Paddle flow controller CDP



CDP 10 to CDP 50



CDP 52



In operation

- 1 Reed contact N.O. / N.C.
- Stainless steel or brass versions
- Low pressure drop
- Fittings: On tee up to ND50 or BSP 1/2"

## APPLICATIONS

Detection of presence or absence of flow of a liquid in a pipe under pressure. The liquid must be free of magnetic particles.

## DESCRIPTION

The CDP operates a switch outside the liquid: The flow drives the paddle. A magnet on top of paddle actuates a Reed contact, located outside the fluid. The reverse movement of the paddle is generated by a leaf-spring.

These controllers offer a simple, reliable and inexpensive solution for flow monitoring in pipelines.

CDP controllers are mounted in-line, pipes up to ND 50 with a Tee, BSPF threads. For larger diameters, CDP must be mounted on-line, on an adaptor BSP 1/2" female thread.

### Accessories:

- The Reed contact has a low switching power:

The use of a relay ES 2001 (doc. 250-02) will protect the Reed and allows a remote loop signal with greater breaking capacity on a change-over relay output (500 VA/ 250 V A / 5A - 1A/ 125 V DC/ 40 W).

## TECHNICAL FEATURES

Body	AISI 316 Ti Brass
Seal	FPM on stainless steel version NBR on brass version
Temperature limit	110 °C (other on request)
Ambient temperature	70 °C
Pressure limit	25 bar
Fittings	DN 10 to DN 50: Tee with BSP female threads ND 50 and larger: male thread BSP 1/2"
Contact output	N.O. or N.C. according the Reed contact orientation
Switching power	230 V / 1.5 A / 80 W / 90 VA max.
Output cable	PVC; 3-wire; 1 mm <sup>2</sup> ; 1.5 m long
Trigger point adjustment	±15 % of table values, horizontal pipe; See next page
Protection	IP 65

### Caution:

Thresholds are for water at 20 °C and for a flow in horizontal pipe. Mounting could be on a vertical pipe with ascending flow; Then, threshold value will be greater than the one from the table. The pipe slope of a flowing down piping must be less than 40 %.

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Paddle flow controller  
**CDP**

DEB

710-01 /1

10-12-2019

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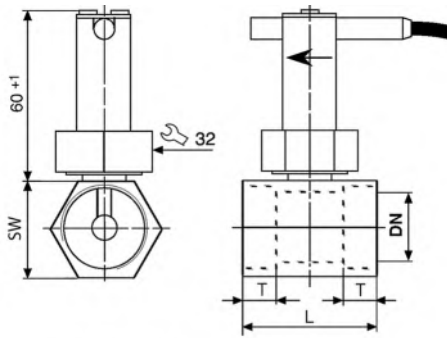
## CODE NUMBERS AND REFERENCES

Code	Description	ND	Fitting	Body	Switching flow ranges (Water)		Flow max. [ l/min ]
					Closing [ l/min ]	Opening [ l/min ]	
710 100	CDP-10 L 3/8"	10	3/8"	Brass	2.7 ... 4.5	1.7 ... 3.5	40
710 115	CDP-15 L 1/2"	15	1/2"		4.5 ... 6.6	3.0 ... 5.5	45
710 120	CDP-20 L 3/4"	20	3/4"		8.5 ... 12.0	6.5 ... 11.0	80
710 125	CDP-25 L 1"	25	1"		13 ... 20	11 ... 19	130
710 132	CDP-32 L 1 1/4"	32	1 1/4"		17 ... 26	15 ... 25	160
710 140	CDP-40 L 1 1/2"	40	1 1/2"		28 ... 45	27 ... 43	300
710 150	CDP-50 L 2"	50	2"		45 ... 58	43 ... 56	500
710 152	CDP-52 L 1/2"	> 50	1/2"		44 ... 65	40 ... 60	500
710 200	CDP-10 l 3/8"	10	3/8"	AISI	2.7 ... 4.5	1.7 ... 3.5	40
710 215	CDP-15 l 1/2"	15	1/2"		4.5 ... 6.6	3.0 ... 5.5	45
710 220	CDP-20 l 3/4"	20	3/4"		8.5 ... 12.0	6.5 ... 11.0	80
710 225	CDP-25 l 1"	25	1"		13 ... 20	11 ... 19	130
710 232	CDP-32 l 1 1/4"	32	1 1/4"		17 ... 26	15 ... 25	160
710 240	CDP-40 l 1 1/2"	40	1 1/2"		28 ... 45	27 ... 43	300
710 250	CDP-50 l 2"	50	2"		45 ... 58	43 ... 56	500
710 252	CDP-52 l 1/2"	> 50	1/2"		44 ... 65	40 ... 60	500

### Spare part:

710 370	CDP-370	Replacement contact for CDP series; Output cable, 1.5 m long
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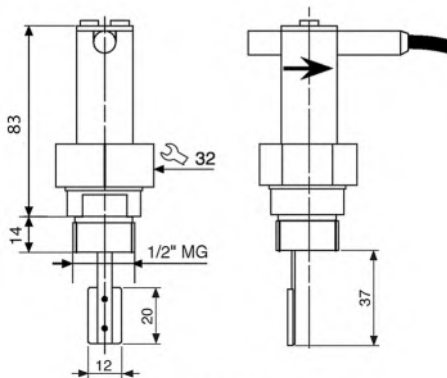
## DIMENSIONS



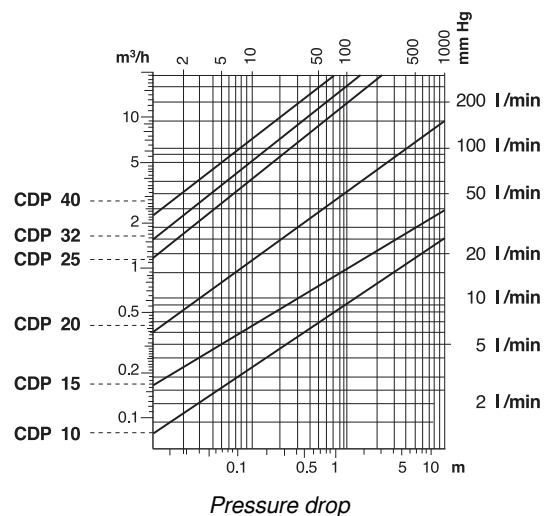
CDP 10 / 15 / 20 / 25 / 32 / 40 / 50

DN	10	15	20	25	32	40	50
T	11	11	11	15	15	15	15
<b>Brass version:</b>							
L	50	50	50	50	50	50	50
SW	30	30	30	37	46	52	70
<b>AISI 316 version:</b>							
L	50	50	50	62	64	70	110
SW	30	30	30	-	-	-	-

Dimensions in mm



CDP 52



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**Paddle flow controller  
CDP**

10-12-2019

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**DEB**

**710-01/2**

# Paddle flow controller CDP-P



- For clear liquids
- Body in PPO, paddle in polypropylene
- For pipes ND 25 up to ND 65
- Mounting: On tee, or on-line with BSP 1/2" thread

## APPLICATIONS

The CDP-P is designed to control a flow-rate in water piping.

## DESCRIPTION

A pallet mounted perpendicular to the flow, actuates a changeover switch.

## MOUNTING

The threshold ranges listed are for water at 20 ° C with horizontal pipe. Mounting could be on a vertical pipe with ascending flow; Then, threshold value will be greater than the one of table. The pipe slope of a flowing down piping must be less than 40 %.

## CODE NUMBER AND REFERENCE

Code	Reference	Description
710 500	CDP-P	Paddle flow controller, in PPO

## TECHNICAL FEATURES

Materials	Body and fitting: PPO glass fiber reinforced; Seal: NBR Paddle: PP; Seal: Santoprene (Chemical resistance to Ozone; Other many disinfectants for water: On request)
Fitting	BSP 1/2"
Torque	7 N.m
Piping	From ND 25 up to ND 65
Temperature limits	Liquid: +5 ... +80 °C Ambient: +5 ... +50 °C
Pressure limit	1 MPa (PN 10) at 20 °C
Contact	Reed contact: N.O. without flow
Switching power	3 A / 250 V AC
Trigger point	See table, listed values ± 30 %
Connection	Cable (max. 50 °C): 3 0.75 mm <sup>2</sup> ; Length: 2 m
Protection	IP 65

**EC Conformity: The instrument meets the legal requirements of the current European Directives**

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**Paddle flow controller  
CDP-P**

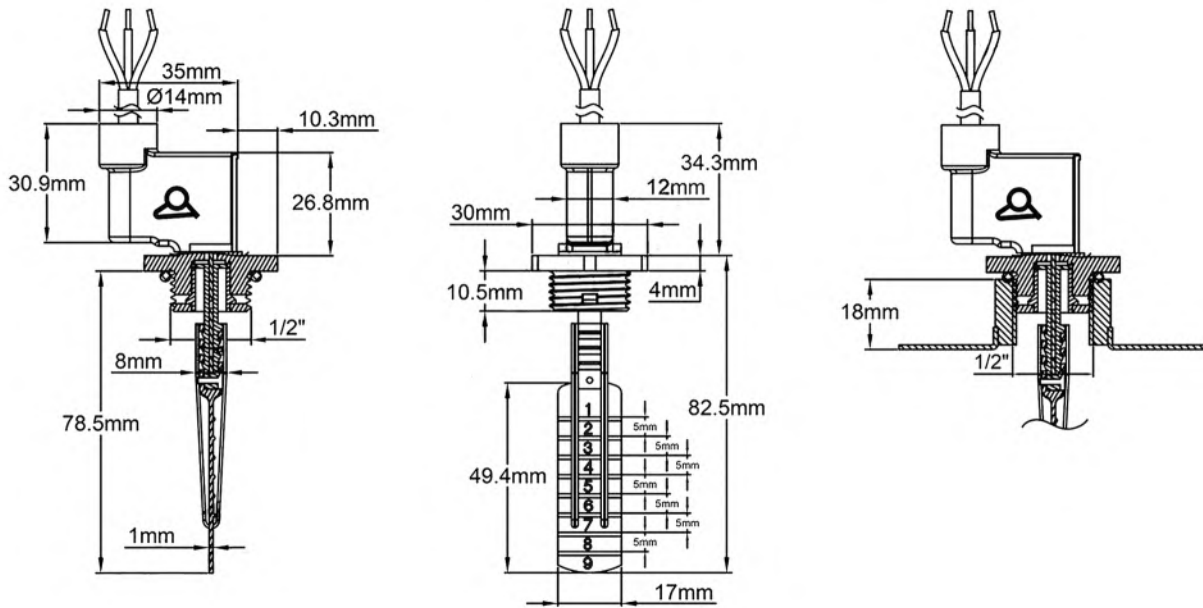
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**710-03/1**

## DIMENSIONS



Trimnable paddle; one mark each 5 mm (9 segments)

## TRIGGER POINTS

Average values of threshold ranges [ l / min ] according inner diameter [ mm ] of pipe.  
Indicative values for water at 20 ° C

Paddle	Inner diameter of pipe [ mm ]									
	Ø 25		Ø 32		Ø 40		Ø 50		Ø 63	
	Opening	Closing	Opening	Closing	Opening	Closing	Opening	Closing	Opening	Closing
	[ l / min ]		[ l / min ]		[ l / min ]		[ l / min ]		[ l / min ]	
1	34	32	67	63	123	113	225	200	506	424
2	23	19	50	48	98	93	173	153	389	324
3			40	38	76	73	143	128	321	271
4					61	58	110	106	220	200
5					49	46	89	84	200	178
6							73	68	165	150
7							62	58	152	138
8									133	123
9									113	108

**Closing contact** With increasing flow (N.O. contact without flow)  
**Opening** With decreasing flow (N.O. contact without flow)

(Flow-rate values are indicative: ±30 %)

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**Paddle flow controller  
CDP-P**

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**710-03/2**

# Flap spring-loaded type flow-meters KFS



KFS

- For gases and liquids
- DN 25 to DN 600
- Carbon steel, Stainless steel, PVC, PPH, PVDF
- Horizontal or vertical mounting
- Independent of viscosity
- Outputs: 4-20 mA, contacts, totalizer, ATEX version

## APPLICATIONS

On-line visualization of the instantaneous flow rate in multiple fields: Water treatment, chemical industry, industrial processes, etc. The measurement is independent of viscosity and is suitable for indicating the flow of water, alkaline solutions and gases.

## DESCRIPTION

The flow indicator KFS is used to evaluate flows in piping from DN25 up to DN600. Each flow indicator is calibrated according to customer requirements and equipped with a scale specific to the medium.

The measuring cell includes a flap spring-loaded moved by the medium. The angle of rotation of the flap changes according to the flow. A magnetic coupling transfers the movement to a pointer on a dial (Fig. A).

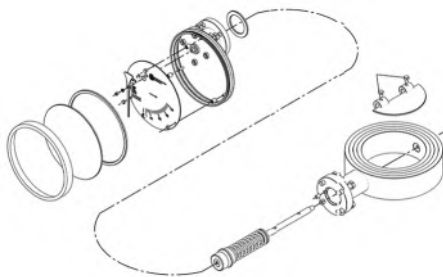
- The KFS series proposes two types of local indicators.
- KFS Standard: Stainless steel case with bayonet lock.
  - KFS-M40: M40 case with output: 4-20 mA and Totalizer

### Options: Contact outputs

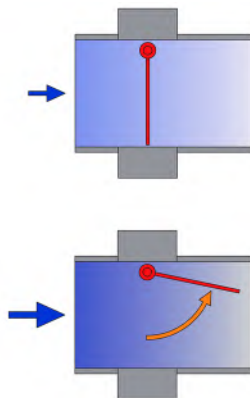
For process control purposes, the measuring device can be equipped with contacts, inductive or Reed type. Each contact (max. 2) is adjustable over the entire measurement range.

### Option: Analogue output 4-20 mA

A transmitter is added: 4-20 mA; 2-wire; Signal is proportional to the flow-rate. It is factory calibrated; no calibration needed on site. The calibration values are stored in a memory chip. The transmitter is protected against reverse polarity.



Pic. A



Operating principle



KFS-M40

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Flap spring-loaded type  
flow-meters  
**KFS**

05-02-2021

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713-10/1

## THE DIFFERENT MODELS OF KFS Series

KFS Standard case, IP 66	Contact-s	4-20 mA	Totalizer	ATEX	Specificities
KFS	---	--	---	---	Standard mechanical indicator
KFS-IK1	Yes				+ 1 contact NAMUR, 2-wire; bistable, or N.O. or N.C.
KFS-IK2	Yes				+ 2 contacts NAMUR, 2-wire; bistable, N.O. or N.C.
KFS-IKS1	Yes				+ 1 inductive contact, 3-wire; bistable, or N.O. or N.C.
KFS-IKS2	Yes				+ 2 inductive contacts, 3-wire; bistable, N.O. or N.C.
KFS-RK1	Yes				+ 1 Reed contact, 2-wire; bistable, or N.O. or N.C.
KFS-RK2	Yes				+ 2 Reed contacts, 2-wire; bistable, N.O. or N.C.
KFS Ex	---				Yes
KFS-IK1 Ex	Yes			Yes	+ 1 Inductive contact, ATEX version
KFS-IK2 Ex	Yes			Yes	+ 2 Inductive contacts, ATEX version

KFS-M40: Case M40, IP 68	Contact-s	4-20 mA	Totalizer	ATEX	Specificities		
KFS-M40	---	---	---	---	Mechanical indicator M40		
KFS-M40-EM	---	Yes			+ 4-20 mA output		
KFS-M40-EM-IK1	Yes	Yes			+ 4-20 mA output + 1 inductive contact		
KFS-M40-EM-IK2	Yes	Yes			+ 4-20 mA output + 2 inductive contacts		
KFS-M40-EMZ	---	Yes			Yes	+ Totalizer + LCD display	
KFS-M40-IK1	Yes	---			Indicator + 1 inductive contact		
KFS-M40-IK2	Yes				Indicator + 2 inductive contacts		
KFS-M40-Ex	---	Yes			---	Yes	Mechanical indicator M40, ATEX version
KFS-M40-EM Ex	---					Yes	+ 4-20 mA output, ATEX version
KFS-M40-EM-IK1 Ex	Yes					Yes	+ 4-20 mA output + 1 inductive contact, ATEX version
KFS-M40-EM-IK2 Ex	Yes		Yes	+ 4-20 mA output + 2 inductive contacts, ATEX version			
KFS-M40-EMZ Ex	---		Yes	Yes		Totalizer +LCD Display, Explosion proof version	

## MATERIALS

DN	Fluid temperature Max.	Pressure Max.	Measuring cell	Wet parts	Wet seal <sup>2)</sup>
25 - 600	-70 ... +200 °C <sup>4)</sup>	PN 6/10 <sup>3)</sup>	S355	AISI 316 Ti (1.4571)	Sil 4400
25 - 600	-70 ... +200 °C <sup>4)</sup>	PN 6/10 <sup>3)</sup>	1.4571	AISI 316 Ti (1.4571)	Sil 8800
25 - 80	0... +20 °C	10 bar	PVC	AISI 316 Ti (1.4571) <sup>1)</sup>	EPDM
100 - 300	0... +20 °C	6 bar			
25 - 300	0... +40 °C	6 bar			
25 - 80	0... +20 °C	10 bar	PP	AISI 316 Ti (1.4571) <sup>1)</sup>	EPDM
100 - 300	0... +20 °C	6 bar			
25 - 300	0... +80 °C	1.5 bar			
25 - 80	-40 ... +20 °C	10 bar	PVDF	AISI 316 Ti (1.4571) <sup>1)</sup>	FPM
100 - 300	-40 ... +20 °C	6 bar			
25 - 300	-40 ... +140 °C	6 bar			

The liquid must not freeze.

<sup>1)</sup> : Hastelloy C4 as an option

<sup>2)</sup> : Others on request

<sup>3)</sup> : Option as PN 16/ 25/ 40

<sup>4)</sup> : KFS Ex, KFS-IK1 Ex et KFS-IK2 Ex: possibility to have a thermic insulation pipeline and instrument.

Indicator	KFS	KFS-M40-EM
Case	AISI 304 (1.4301)	Painted aluminum
Pointer	Painted aluminum	Painted aluminum
Dial	Coated aluminum	Coated aluminum
Window	PC (Glass as an option)	Glass

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Flap spring-loaded type  
flow-meters  
**KFS**

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## TECHNICAL FEATURES

Accuracy	5 % F.S.
Scale units:	l/h or m <sup>3</sup> /h or else on request
Scale factor	Minimum 1:10
Protection	Indicator: IP 66 (or IP 67 for KFS-EM)
Corrosion protection	Carbon steel version: Epoxy painted, kiln-dried, blue (RAL 5017), satin finish Corrosion class: C2
Wafer mounting	Standard body width: 50 mm 60 mm for PVC / PP / PVDF & DN 250-300
Fitting	Between flanges, type DIN EN 1092-1, PN 6/10/16/25/40 On request: ASME B16.5, JIS B 2220 (others on request)

### • Reed contacts, RK1 and RK2:

RK1	1 Reed contact, bistable, or N.O. or N.C.
RK2	2 Reed contacts, bistable, N.O. or N.C.
Switching power	Max. 5 VA ; 0.25 A / 50 V AC Maxi 3 W ; 0.25 A / 75 V DC
Ambient temperature	-25...+105 °C

The switching point is adjustable over the full measuring range. The pointer of the indicator activates a built-in inductive switch by means of a metal paddle. The switching point is indicated by a pointer on the flow-meter scale.

### • Inductive contacts, IK1 and IK2 (NAMUR, 2-wire):

The trigger points are adjustable over the entire measuring range. A maximum of two (2) contacts can be mounted.

IK1	1 Inductive contact, NAMUR, 2-wire, bistable, or N.O. or N.C.
IK2	2 Inductive contacts, NAMUR, 2-wire, bistable, N.O. or N.C.
Slot width	2.0 mm
Hysteresis	1.0 % v. E ... 10 % v. E
Accuracy	Repeatability: ≤ 2.0 %
Temperature drift	≤ ± 10 %
Ambient temperature	-25...+70 °C
Voltage	Nom. 8.2 V DC (via insulation switching amplifier KFA)
Switching frequency	≤ 2.5 kHz
Power consumption	Active area uncovered: ≥ 2.1 mA Active area covered: ≥ 2.1 mA
Protection	Against reverse polarity
Certification	KEMA 02 ATEX 1090 X
Inductance (Li)	266 µH
Capacitance (Ci)	* Values for pre-assembled cables up to 10 m
ATEX cert.	Ex II 1G Ex ia IIC T4...T6 Ga (Max. Ui = 20 V DC; li = 60 mA; Pi = 130 mW)
Option	Explosion proof version

### • Inductive contacts, IKS1 and IKS2 (3-wire):

IKS1	1 Inductive contact, bistable, or N.O. or N.C.
IKS2	2 Inductive contacts, bistable, N.O. or N.C.
Power supply	24 V DC
Current switched I(A)	≤ 100 mA
Power consumption	Open circuit: ≤ 10 mA
Ambient temperature	-25...+70 °C
Voltage drop (at I max.)	≤ 1.2 V

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Flap spring-loaded type  
flow-meters  
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**• Analogue output 4-20 mA (EM models):**

Power supply	24 V DC
Output signal	4 ... 20 mA
	For flow-rate from 0 to 100 %
	> 20.8 mA for alarm status
Power supply influence	< 0.1 %
External resistance dependence	< 0.1 %
Temperature incidence	< 5 µA/K
External resistance	
Ambient temperature	-25 ... +60 °C
Agreement	TÜV 15 ATEX 7805 X
Inductance (Li) / Capacitance (Ci)	~ 0 µH / 10 nF
ATEX cert.	EX II 2G Ex ia IIC T6...T1 Gb (Max. Ui = 30 V; li = 130 mA; Pi = 1 W)

**• Analogue output 4-20 mA + Totalizer (EMZ model)**

The EMZ flow totalizer in 2-wire technology is used in combination with the electrical current output EM. An LCD display indicates the total flow value (cumulated) and may be commuted for instant flow-rate display as 0 ... 100 %.

The EMZ has two galvanically insulated binary outputs which can be configured as a contact output or pulse output. The pulse output supplies for each displayed counter increment a number of pulses, which number is adjustable. If the voltage drops, an automatic backup takes place. If an indicator with totalizing function is to be used in potentially explosive areas, it must be connected to an intrinsically safe circuit.

2 binary outputs	Galvanically insulated, passive
Connection types	NAMUR (EN 60947-5-6) 2 wire or Transistor output (passive, open collector) 3-wire

**Open collector output:**

Power	24 V DC; Max. 30 V DC
Load, RL	250 ... 1000 Ω
Current	Max. 100 mA
P max.	500 mW

**NAMUR contact output:**

Uo	8.2 V DC
Ri 1)	1000 Ω
Signal current	> 3 mA: switching value reached < 1 mA: switching value not reached

1): Switching power amplifier with Uo = 8,2 V CC and Ri = 1000 Ω

**Pulse output:**

T on	setting from 50 to 500 ms
T off	Depending on flow-rate
f max.	10 Hz
Pulse value	Setting in flow units (e.g. 5 pulses per cubic meter)
Ambient temperature	-40...+70 °C

**• ATEX version**

Explosion protection according to Directive 2014/34/EU.

The following versions are also available in the type-tested explosion-proof variant for Zone 1 and 2 of device categories 2 and 3, atmosphere G, in compliance with Directive 2014/34/EU.

KFS Ex	Mechanical indicator
KFS-IK1 Ex	With one inductive limit value contact *
KFS-IK2 Ex	With two inductive limit value contacts *
KFS-M40-EM Ex	With 4-20 mA output *
KFS-M40-EMZ Ex	With totalizer *

(\*): Connection to intrinsically safe circuits only



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**KFS**

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**713-10/4**



## MEASURING RANGES

### Measuring ranges, scales for water at 20 °C

DN	Standard ranges in m <sup>3</sup> /h					
25	0.5 - 7	1 - 12				
32	0.5 - 8	1,8 - 18	3 - 30			
40	0.6 - 6	1 - 10	2 - 20	3 - 30	5 - 50	
50	0.8 - 8	2 - 20	3 - 35	5 - 50	7 - 70	
65	2 - 20	4 - 40	6 - 60	9 - 90	11 - 110	
80	2 - 20	4 - 40	6 - 60	10 - 100	12 - 120	20 - 200
100	4 - 40	8 - 80	12 - 120	16 - 160	20 - 200	25 - 250
125	5 - 55	8 - 80	12 - 120	14 - 140	20 - 200	35 - 350
150	6 - 60	10 - 100	14 - 140	18 - 180	22 - 220	35 - 350
200	5 - 50	9 - 90	12 - 120	15 - 150	20 - 200	25 - 250
250	18 - 180	25 - 250	30 - 300	40 - 400		
300	15 - 170	20 - 220	25 - 250	30 - 300	50 - 500	

DN	Specific ranges in [m <sup>3</sup> /h] of water at 20 °C					
200	40 - 400	60 - 600				
250	50 - 500	60 - 600				
300	60 - 650	90 - 900				
350	50 - 500	70 - 700	90 - 900	100 - 1000		
400	60 - 600	75 - 750	110 - 1100	400 - 1850		
500	70 - 700	100 - 1000	135 - 1350	200 -		
600	80 - 800	125 - 1250	165 - 1650			

### Measuring ranges for Air at 0 °C and 1013 mbar abs (standard conditions)

ND	Range Nm <sup>3</sup> /h (standard conditions)	
25	15 - 150	30 - 300
32	15 - 150	30 - 300
40	15 - 150	40 - 400
50	18 - 180	75 - 750
65	18 - 180	80 - 800
80	20 - 200	100 - 1000
100	25 - 250	220 - 2200
125	25 - 250	260 - 2600
150	30 - 300	300 - 3000
200	40 - 400	300 - 3000
250	100 - 1000	400 - 4000
300	150 - 1500	500 - 5000

Intermediate measuring ranges possible

The measuring ranges for the series KFS-EM/EMZ differ slightly from the above values.

Measuring ranges for other fluids and operating conditions: On request.

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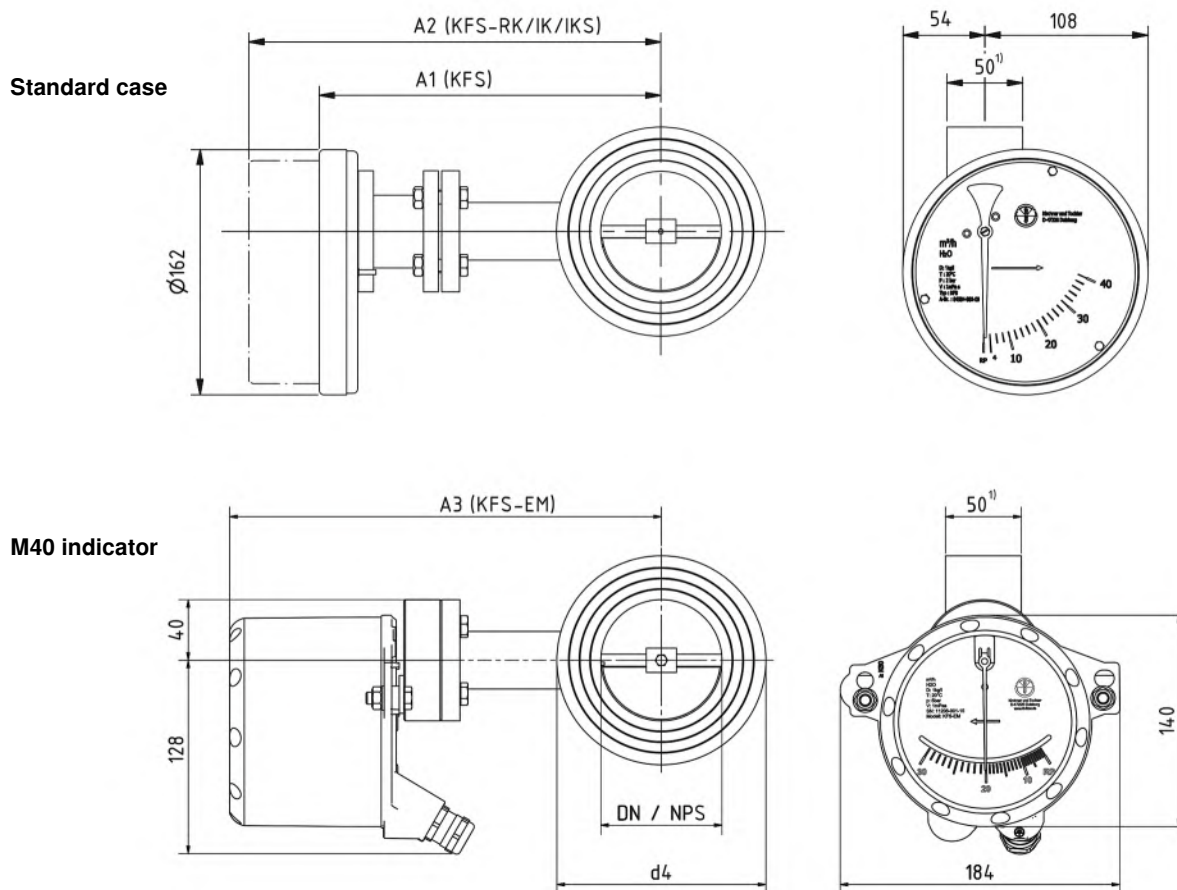
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**713-10/5**

## DIMENSIONS



DN	d <sub>4</sub>	Masse [kg]		ASME flange		KFS		KFS-RK/IK/IKS		KFS-M40-EM/EMZ	
		Steel	PVC <sup>1)</sup>	NPS	d <sub>4</sub>	A1 <sup>2)</sup>	A1 <sup>2)</sup> (ASME)	A2 <sup>2)</sup>	A2 <sup>2)</sup> (ASME)	A3 <sup>2)</sup>	A3 <sup>2)</sup> (ASME)
25	68	3.8	2.0	1"	51	202	199	249	246	242	242
32	78	3.8	2.0	1 1/4"	64	206	204	253	251	245	247
40	88	3.8	2.0	1 1/2"	73	206	206	253	253	251	249
50	102	3.9	2.1	2"	92	211	212	258	259	256	255
65	122	5.0	2.3	2 1/2"	105	219	217	266	264	262	260
80	138	5.6	2.5	3"	127	226	225	273	272	269	268
100	158	6.4	2.7	4"	157	236	237	283	284	279	280
125	188	8.0	2.8	5"	186	249	250	296	297	292	293
150	212	8.8	3.3	6"	216	261	263	308	310	304	306
200	268	11.4	3.7	8"	270	286	287	333	334	329	330
250	320	13.0	4.5	10"	324	311	313	358	360	354	356
300	370	22.0	4.9	12"	381	336	338	383	385	379	381
350	430	29.3	—	—	—	376	—	423	—	404	—
400	482	31.5	—	—	—	401	—	448	—	429	—
500	585	39.0	—	—	—	451	—	498	—	494	—
600	685	45.5	—	—	—	501	—	548	—	544	—

All dimensions are in mm ; Excepted for NPS inner diam. ASME flange fittings

<sup>1)</sup>: Models in PVC, PP, PVDF with DN 250 and 300: Thickness is 60 mm.

<sup>2)</sup>: PVC, PP and PVDF versions differ minimally from the standard.

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## INTERNATIONAL

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**Flap spring-loaded type  
flow-meters  
KFS**

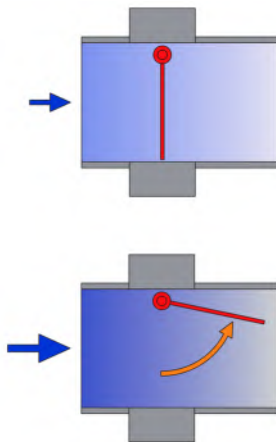
05-02-2021

D-713.10-EN-AB

**DEB**

**713-10/6**

# Flap-type flow-meters KLA



Operating principle

- For liquids
- From ND 15 up to ND 200
- Horizontal or vertical mounting
- Independent of viscosity
- Outputs: 4-20 mA, contacts; ATEX versions

## APPLICATIONS

A flap-type flow-meter is ideal wherever a rugged, reliable and economical device is required for visualization and monitoring of flows.

## DESCRIPTION

The KLA series flow-meter is based on the same operating principle as the KFS series. Inside the meter a flap moves up and down in analogy to the amount of liquid flowing through.

In the KLA-GS version the quantity is directly indicated by the flap; The flow meter is equipped with hard glass screens at the front and at the back. The flow-rate reading is done on an integrated scale into the front hard glass screen. The economical version KLA Standard provides a direct visual display.

In both versions a magnet transmits the movement of the flap to a pointer in the case.

For process control, the measuring device can be equipped with:

- 1 or 2 inductive contacts
- 1 analogue transmitter, 4-20 mA output: angular position transducer  
The signal must be linearized.

## MODELS

KLA	Magnet coupling with pointer
KLA-GS	With glass window
KLA-IK	With 1 inductive contact
KLA-IKS	With 1 contact, 3-wire PNP
KLA-EM	4-20 mA output: angular position transducer
KLA-V4A	Stainless steel AISI 316 Ti (1.4571)
KLA Ex	ATEX version
KLA-IK Ex	ATEX version with 1 inductive contact

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Flap-type flow-meters  
**KLA**

24-11-2020

D-713.12-EN-AA

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713-12/1

## TECHNICAL FEATURES

Fittings	DN 15 - 200 / 1" - 8" Flanges DIN EN 1092-1 to 3 Option: ANSI B16.5 150 lbs
Nominal pressure	Standard: PN 10 (Specific version: PN 6)
Corrosion protection	Epoxy powder coating, glossy blue RAL 5017 Rubber lining: NR-isoprene quality Corrosion class : C3
Liquid temperature limits <sup>1)</sup>	Max. 100 °C Max. 90 °C with rubber lining On request: up to 150 °C <sup>1)</sup> : The liquid must not freeze
Ambient temperature	Max. 90 °C
Scale factor	1:10
Accuracy	5 % F. S.
Protection	IP 54 IP 53 with contacts

### Features of contacts: IK and IKS

<b>IK</b>	2-wire; Namur Adjustable
Type	Bistable (N.O./N.C.)
Power supply	NAMUR: 8.2 V DC (NAMUR) Other applications: Max. 8 ... 20 V DC
Consumption	≥ 2.1 mA ≤ 1.2 mA
Repeatability	≤ 2 % F. S.
Temperature drift	≤ ±10 %
Hysteresis	1 ... 10 %
Temperature stability	-25...+70 °C
Approval	According to KEMA 02 ATEX 1090X
Certification Ex	Ex II 2 G Ex ia IIC T6 Gb / II 1 D Ex ia IIIC T95 ° C Da
SIL	According to IEC 61508: SIL 3 and PL
Protection	IP 67
MTTF	According to SN 29500: 6,198 year (40 °C) (Ed. 99) 40 °C
Electrical connection	Cable Ø 3 mm, blue, Lif9YYW, PVC; 2 m long 2 x 0.14 mm <sup>2</sup>

<b>IKS</b>	3-wire PNP
Type	Bistable (N.O./N.C.)
Power supply	10 ... 30 V DC
Repeatability	≤ 2 % F. S.
Temperature drift	≤ ±10 %
Hysteresis	3 ... 15 %
Nominal current	DC ≤ 100 mA
No-load current	≤ 15 mA
Residual current	≤ 0.1 mA
Temperature stability	-25 ... +70 °C
Protection	IP 67
MTTF	According to SN 29500: 2,283 years (Ed. 99) 40 °C
Electrical connection	Cable Ø 3 mm, grey, Lif9Y-11Y, PUR; 2 m long 3 x 0.14 mm <sup>2</sup>

### Features of Analogue Output: EM

<b>EM</b>	4 ... 20 mA; 3-wire
Accuracy	± 1 %
Temperature drift	< 50 ppm/ °C
Operating temperature	-20 ... +70 °C
Operating voltage	Ub: 12 ... 36 V DC
Load impedance	300 Ω at Ub = 24 V 50 Ω at Ub = 12 V
Consumption	< 0.2 W, load-free output
Measuring cycle	250 ms
Lifetime	> 10 <sup>6</sup> cycles
Protection	IP 64

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Flap-type flow-meters  
**KLA**

24-11-2020

D-713.12-EN-AA

**DEB**

**713-12/2**

## MEASURING RANGES

DN	Range of water at 20 °C		Maximum operating pressure	
	Horizontal flow [m <sup>3</sup> /h]	Vertical flow [m <sup>3</sup> /h]	Standard version [bar]	Glass window version [bar]
15	0.2 - 1	0.2 - 1.5	10	10
	0.3 - 6	1 - 6.5		
20	0.3 - 1	0.5 - 1.5	10	10
	0.3 - 6	1 - 6.5		
25	0.2 - 1	0.2 - 1.5	10	10
	0.3 - 6	1 - 6.5		
32	0.5 - 4	0.5 - 4	10	9
	0.7 - 7	0.6 - 6		
	3 - 30	2.5 - 25		
40	0.5 - 4	0.5 - 4	10	9
	0.7 - 7	0.6 - 6		
	3 - 30	2.5 - 25		
50	0.5 - 4	0.5 - 4	10	9
	0.7 - 7	0.7 - 7		
	3 - 30	3 - 30		
65	1 - 8	2 - 15	10	10
	2 - 15	4 - 15		
	4 - 50	5 - 40		
80	1 - 10	2 - 10	10	10
	2 - 20	3 - 20		
	7 - 70	5 - 50		
100	1.5 - 15	1.5 - 15	10	10
	12 - 120	10 - 100		
125	2 - 20	2 - 20	10	7
	14 - 140	12 - 120		
150	2 - 25	4 - 25	10	6,5
	5 - 50	10 - 80		
	16 - 160	15 - 140		
	15 - 200 *)	-		
200	8 - 80	15 - 150	10	-
	25 - 300	20 - 300		

Min and Max flow-rate for each range according installation, with pressure drop of 20 to 30 mbar depending of the liquide.  
Intermediate measuring ranges are available on request.

\*) : Only with glass window and horizontal installation

## MATERIALS

Models	Fitting	Flap	Bearing	Disc	Blind flange / Ring	Seal	ND
KLA	EN-GJL-200	1.4571	1.4571	1.4571	EN-GJL-200 / S355	NBR	15 - 150
	S355, welded	1.4571	1.4571	1.4571	S355	NBR	200
KLA-V4A	1.4571, welded	1.4571	1.4571	1.4571	1.4571	FPM	25 - 100
KLA-GS	EN-GJL-200	1.4571	1.4571	Soda-lime glass <sup>1)</sup>	S355	NBR	15 - 25
KLA-GS-V4A	1.4571, welded	1.4571	1.4571	Borosilicate glass	1.4571	FPM	25 - 100
KLA - Rubber lined	EN-GJL-200 + isoprene	1.4571	1.4571	1.4571	EN-GJL-200 / S355 + isoprene	Sil-C8200	32 - 150
		Hastelloy C4	Hastelloy C4	1.4571 - PTFE		Sil-C8200	32 - 150
		PTFE	Hastelloy C4	1.4571 - PTFE		Sil-C8200	80 - 150
		PTFE	PTFE	1.4571 - PTFE		Sil-C8200	80 - 150

Others on request: Seals, cast bronze (CuSn)

<sup>1)</sup> : Option, with borosilicate glass

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Flap-type flow-meters  
**KLA**

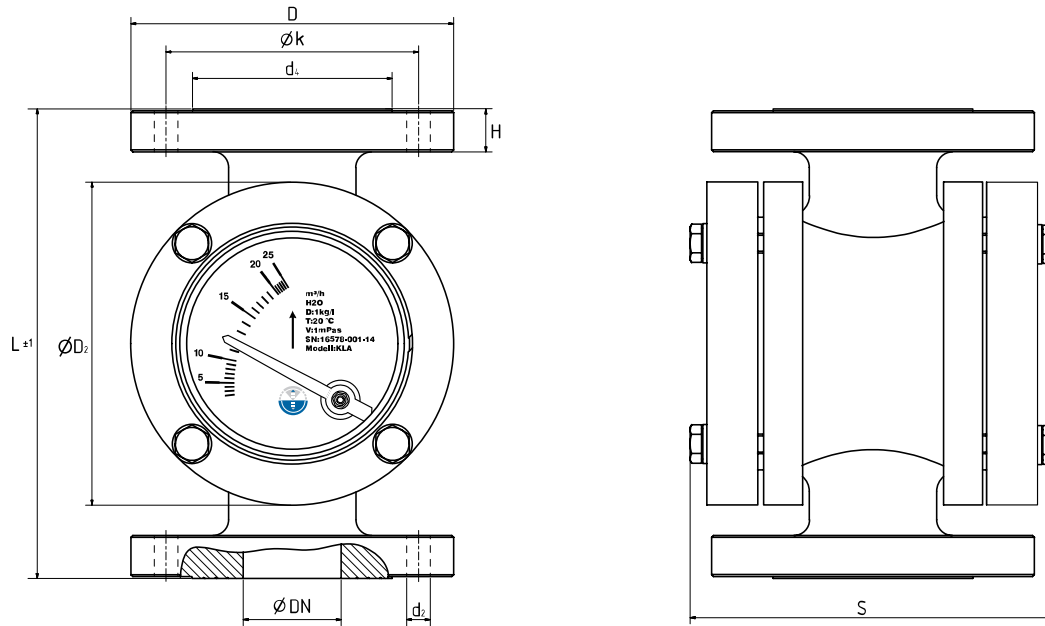
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24-11-2020

D-713.12-EN-AA

## DIMENSIONS



DN	Ø D [mm]	Ø k [mm]	Ø d <sub>1</sub> [mm]	Ø H [mm]	L [mm]	Ø D <sub>2</sub> [mm]	d <sub>2</sub>	Screw	S /IK [mm]	GS [mm]	EM [mm]	[kg]
15	95	65	45	18	170	119	M12	x4	145	132	166	8
20	105	75	58	18	170	119	M12	x4	145	132	166	8.5
25	115	85	68	18	170	119	Ø 14	x4	145	132	166	9
32	140	100	78	21	240	165	Ø 18	x4	176	186	197	16
40	150	110	88	21	240	165	Ø 18	x4	176	186	197	16
50	165	125	102	21	240	165	Ø 18	x4	176	186	197	17
65	185	145	122	21	280	185	Ø 18	x4	201	217	222	22
80	200	160	138	22	320	225	Ø 18	x8	214	227	235	34
100	220	180	158	24	350	245	Ø 18	x8	267	278	288	43
125	250	210	188	25	380	285	Ø 18	x8	299	310	320	58
150	285	240	212	25	380	295	Ø 22	x8	299	310	320	64
200	340	295	268	27	550	370	Ø 22	x8	386	-	407	104

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Flap-type flow-meters  
**KLA**

DEB

713-12/4

24-11-2020

D-713.12-EN-AA



## INSTALLATION

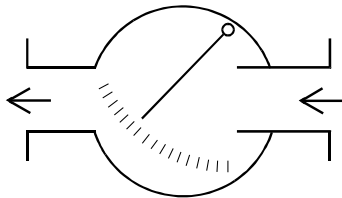
### Mounting:

With the order: flow direction to confirm.

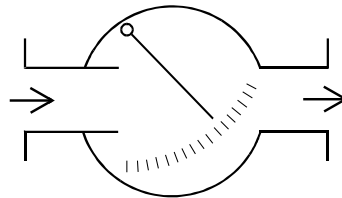
Screws, nuts and gaskets are not supplied.

Respect straight distances: as a minimum 3 times the pipe diameter.

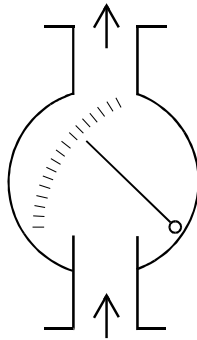
### Flow direction



Right to left



Left to right



Bottom to top

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Flap-type flow-meters  
**KLA**

24-11-2020

D-713.12-EN-AA

**DEB**

**713-12/5**

# Flow indicator OPTIFLUX ECFV



- Direct view of the flow of a liquid
- Vertical or horizontal mounting
- Ranges up to 60 l/min
- Fittings: 1/4" ... 1" BSP F.
- Body: Nickel-plated brass

## APPLICATIONS

- Checking directly the circulation of a liquid
- Well adapted to piping with clean liquids, lubricating fluids, in heating and cooling systems, industrial water plants.

## DESCRIPTION

With its turbine, OPTIFLUX ECFV shows the circulation of a liquid through the transparent glass tube. For flow rates above the last half of the range, the indicator can be mounted either horizontally or vertically. For lower flow rates (first half of range) vertical mounting is recommended with rising fluid.

## TECHNICAL FEATURES

Range	1 ... 60 l/min (See the table below)
Temperature	-10 ... +90 °C
Pressure limits	Up to 5 ... 10 bar according the model
Fittings	BSP-F from 1/4" up to 1"

### Materials:

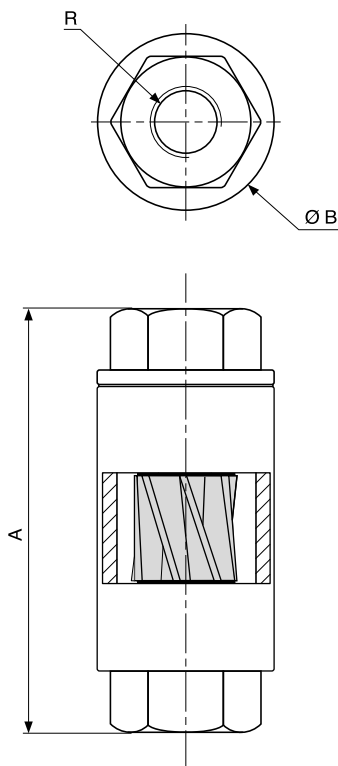
Body	Nickel-plated brass
Turbine	Hostaform (red)
Transparent tube	Borosilicate glass
Seals	Nitrile rubber

## CODE NUMBERS AND REFERENCES

Code	Reference	Flow range [l/min]	Pressure max. [bar]
719 150	ECFV 1BV	1...10	10
719 155	ECFV 2BV	2...20	8
719 160	ECFV 3BV	3...30	
719 165	ECFV 4BV	4...40	5
719 170	ECFV 5BV	6...60	

## DIMENSIONS

Reference	Fitting threads	A [mm]	Ø B [mm]	Mass [g]
ECFV 1BV	BSP-F 1/4"	59	25	125
ECFV 2BV	BSP-F 3/8"	71	30	130
ECFV 3BV	BSP-F 1/2"			160
ECFV 4BV	BSP-F 3/4"	106	47	675
ECFV 5BV	BSP-F 1"			572



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Flow indicator  
**OPTIFLUX ECFV**

20-11-2020

D-719.02-EN-AD

**DEB**

719-02/1

# In-line sight glass SGL



- Direct visualization of flows
- ND 50 to ND 250
- Borosilicate glass tube
- Pressure drop free
- Simple - Reliable - Maintenance free

## APPLICATIONS

The devices Visioflux SGL are used for the direct viewing of liquid in piping. SGL is useful for water, lubricating oil, alkaline or acid liquids. By selecting the appropriate material, the sight glass can be used with aggressive liquids.

## DESCRIPTION

The transparent tube is made of borosilicate glass, plus four spacers and two flanged fittings. Due to its simple design, the service is maintenance-free. With the external radial seals, there is no change in cross-section and thus, no pressure loss. The Visioflux SGL exists in two standard versions (Steel or stainless steel) and may be supplied with a plastique frame (PVC, PPH or PVDF) We also carry out special manufacturing, on specifications.

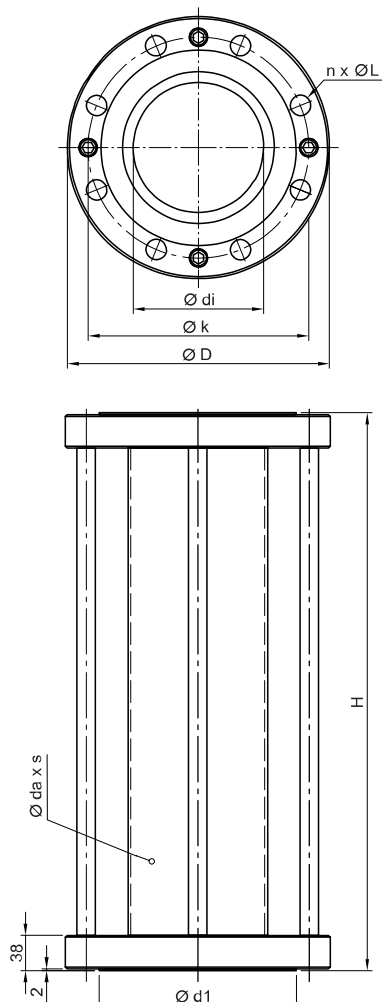
## TECHNICAL FEATURES

Operating temperature <sup>1)</sup>	Max. 70 °C
	<sup>1)</sup> The liquid must not freeze
Ambien temperature	Max. 70 °C
Fittings	Flanged type DIN EN 1092-1, PN10 (other on request)
Corrosion protection	Epoxy paint, kiln-dried, traffic blue (RAL 5017), satin finished
Protection class	C2

Materials	SGL	SGL-V4A
Sight glass	Borosilicate glass	Borosilicate glass
Spacers	S355	AISI 316 Ti (1.4571); Option: Hastelloy C4
Flanges	S355	AISI 316 Ti (1.4571); Option: Hastelloy C4
Seals	NBR	NBR (Option: FPM)

## DIMENSIONS

ND	Ø D	Ø k	Ø d1	n	Ø L	H	Ø da	s	Ø di	P max.
50	165	125	102	4	18	600	63.5	4.5	54.6	8 bar
65	185	145	122	8	18	600	77	5	67	9.7 bar
80	200	160	138	8	18	600	90	5	80	8.2 bar
100	220	180	158	8	18	600	115	5	105	6.4 bar
125	250	210	188	8	18	600	140	5	130	5.2 bar
150	285	240	212	8	22	600	170	5	160	4.2 bar
200	340	295	268	8	22	600	200	5	190	3.6 bar
250	395	350	320	12	22	600	270	5	260	2.6 bar



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In-line sight glass  
SGL

30-12-2020

D-719.10-EN-AA

DEB

719-10/1

# Variable Area Flowmeters RA 60 / FA 60



- Direct reading on calibrated tube
- Range: From 0.1 l/h up to 1,500 m<sup>3</sup>/h
- Accuracy ±2 %
- For liquid or for gas
- Materials: Glass, Steel or Stainless Steel
- Adjustable contacts
- Analogue output 4-20 mA or 0-10 Volt
- ATEX version

## APPLICATIONS

Direct reading of flow-rate on gases or on liquids:

- Water treatment, Industrial process (paper mill, textiles etc.), Chemical and pharmaceutical industries, Heating and cooling plants

## DESCRIPTION

The measuring principle is that of the variable area flowmeter, the float is moved by the fluid inside a calibrated conical glass tube. The borosilicate glass conical is inside a steel case with a transparent reading window.

Versions:

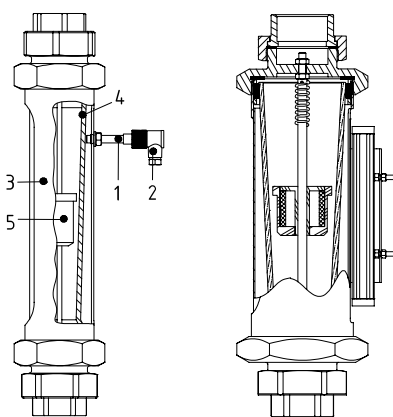
RA 60	Fittings: Unions BSP-F: 1/4" to G 3"
FA 60	Fittings: Flange ND 10 to ND 200
RA/ FA 60-MSK1	With N.C. bistable contact
RA/ FA 60-MSK2	With N.O. bistable contact
RA / FA 60-MSKW	With bistable changeover contact
RA / FA 60-EM *	With analogue output 4-20 mA or 0-10 Volt (Only on model sizes 100 and 110)
RA / FA 60... Ex	ATEX, explosion-proof version

### Contacts:

These flowmeters can be equipped with a magnetic float and Reed contacts, trigger points adjustable over the entire measuring range.

### Output 4-20 mA or 0-10 Volt:

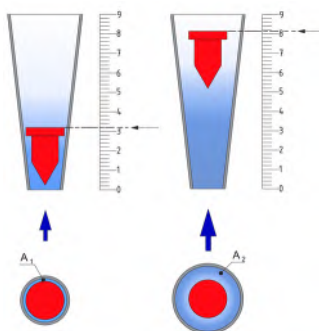
The transmitter is connected to a Hall effect, linear signal ruler. The analogue signal is the image of the float position. The transmitter is connected via an M12 connector. This output is useful for applications using a PLC. The device is compact with a high level of repeatability.



Contact output

- 1) : Reed contact
- 2) : Connector, elbow shape
- 3) : Flowmeter
- 4) : Measuring tube
- 5) : Magnetic float

4-20 mA output (Hall effect sensor)



Operating principle

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## Variable Area Flowmeters RA 60 / FA 60

07-12-2020

D-727.01-EN-AC

DEB

727-01 /1

## TECHNICAL FEATURES

Nominal pressure	PN 10 at 20 °C
Pressure limits	See the table "Measuring ranges"
Operating temperature	Max. 80 °C depending of the version (Option: 100 °C)
Scale factor	1:10
Accuracy class	According to VDE/VDI 3513 page 2 (08/2008)
Error limit (G)	1.6 %
Linear limit (qG)	50 %
Fittings / RA 60	Union, 2 pieces Inner cylindrical insert, thread according to DIN EN 10226-1 (ISO 7-1)
Raccords / FA 60	Flange PN 10 according to DIN EN 1092-1, Other fittings on request
Corrosion protection	Epoxy coating, glossy blue (RAL 5017)
Corrosion class	C3

### Materials

Steel case	Steel Pipe, P235
Ends / RA 60	S355 (size 19), EN-GJL-200 (size 30 - 36), Cast aluminum from size 43 and larger
Threaded seal	Malleable cast iron, zinc plated
Flanges / FA 60	S355
Measuring tube	Borosilicate glass
Protective screen	Perspex
Seals	NBR (Options: FPM, EPDM, FFKM)
Floats for liquids <sup>1)</sup>	AISI 316 Ti (Options: PVC, PP, PVDF or PTFE with weighted core)
Floats for Gas <sup>1)</sup>	Anodized aluminum (Option: PVC, PP, PTFE, PVDF or AISI 316 Ti)
Floats for versions with contacts <sup>1)</sup>	For liquids: AISI 316 Ti with magnetic core For gas: PVC with magnetic core Other materials on request <sup>1)</sup> Small floats are not guided. With guide rod from size 30 and greater (Detailed description on request)

### Potential free contacts, features

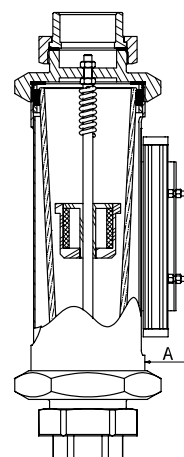
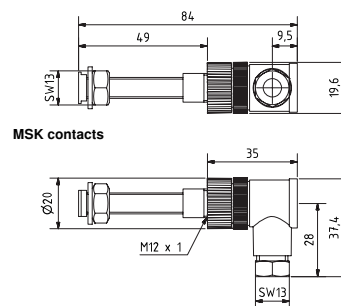
	MSK1	MSK2	MSKW
Operation	Bistable N.C.	Bistable N.O.	Bistable, changeover
Max. voltage	50 V AC / 75 V DC	50 V AC / 75 V DC	50 V AC/75 V DC
Max. current	0.5 A	0.5 A	0.5 A
Switching power	10 W/VA	10 W/VA	5 W/VA
Range T ° <sup>1)</sup>	-20...+90 °C	-20...+90 °C	-20...+90 °C

<sup>1)</sup> : Consider as well the the temperature limit of the flowmeter

### Features of transmitters 4-20 mA -- EM <sup>1)</sup>

Measuring scale [A...B]	160 mm
Repeatability	≤ 0.1% of measuring range ≤ depending on sensor position
Ambient temperature	-25...+70 °C
Output signal	4-20 mA or 0-10 Volt; 3-wire
Power supply	15...30 V DC
Electrical connection	M12 connector / elbow shape
Protection	IP 67
LEDs indication	Green: Power ON Yellow: Float position

<sup>1)</sup> 4-20 mA or 0-10 Volt outputs: Available only for size 100 and 110 models.



4-20 mA output  
Size 100: A = 47 mm  
Size 110: A = 47 mm

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Variable Area Flowmeters  
**RA 60 / FA 60**

07-12-2020

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727-01 /2

## MEASURING RANGES

Size	Scale: Water at 20 °C	Scale: Air <sup>1)</sup>	RA 60 - Union Fittings	FA 60 - Flanges ND..	Max. P. at 20 °C [bar]
10	0.1 – 1 l/h 15 – 150 l/h	0.3 – 3 l/h 0.25 – 2.5 m <sup>3</sup> /h	Rp ¼"	10	10
			Rp ⅜"	15	
			Rp ½"	20	
				25	
19	12 – 120 l/h 0.12 – 1.2 m <sup>3</sup> /h	0.15 – 1.5 m <sup>3</sup> /h 1.6 – 16 m <sup>3</sup> /h	Rp ½"	10	10
			Rp ¾"	15	
			R 1"	20	
				25	
30	0.1 – 1 m <sup>3</sup> /h 0.3 – 3 m <sup>3</sup> /h	1.3 – 13 m <sup>3</sup> /h 3.6 – 36 m <sup>3</sup> /h	Rp 1"	25	10
			Rp 1 ¼"	32	
			Rp 1 ½"	40	
36	0.4 – 4 m <sup>3</sup> /h	4 – 40 m <sup>3</sup> /h	Rp 1 ¼"	32	8
			Rp 1 ½"	40	
			R 2"	50	
43	0.9 – 9 m <sup>3</sup> /h 1.6 – 16 m <sup>3</sup> /h	5 – 50 m <sup>3</sup> /h 16 – 160 m <sup>3</sup> /h	Rp 1 ½"	40	8
			Rp 2"	50	
			Rp 2 ½"	65	
100	1.6 – 16 m <sup>3</sup> /h 2 – 20 m <sup>3</sup> /h	12 – 120 m <sup>3</sup> /h 28 – 280 m <sup>3</sup> /h	Rp 2"	65	6
			Rp 2 ½"	80	
			R 3"	100	
110	2.5 – 25 m <sup>3</sup> /h 3 – 30 m <sup>3</sup> /h	14 – 140 m <sup>3</sup> /h 44 – 440 m <sup>3</sup> /h	Rp 2 ½"	65	5
			Rp 3"	80	
				100	
150	—	30 – 300 m <sup>3</sup> /h 100 – 1000 m <sup>3</sup> /h	—	80	4
				100	
				125	
				150	
180	—	30 – 300 m <sup>3</sup> /h 150 – 1500 m <sup>3</sup> /h	—	150	3
				200	

<sup>1)</sup> At Standard Temperature and Pressure: 0 °C at 1013 mbar Abs  
On request: Measuring ranges for other fluids and operating conditions

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Variable Area Flowmeters  
**RA 60 / FA 60**

07-12-2020

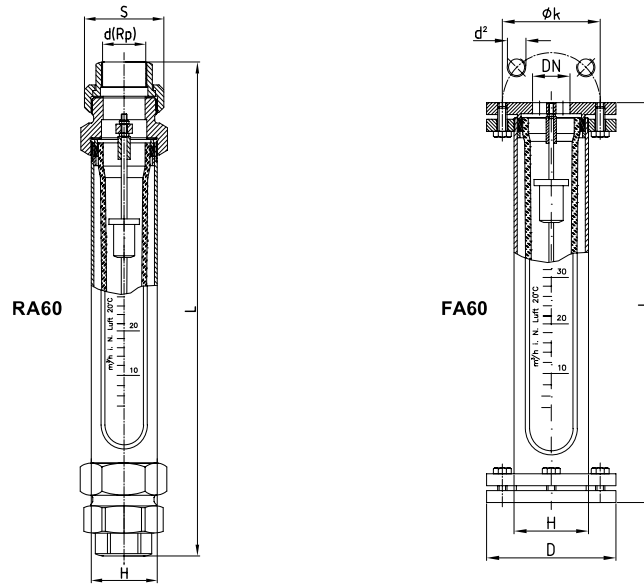
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## DIMENSIONS



RA 60						FA 60								
Size	Union	S [mm]	d' [mm]	L [mm]	H [mm]	Size	DN	L [mm]	H [mm]	D [mm]	k [mm]	x Vis	d²	
10	Rp 1/4"	28	12	388	28	10	10	340	28	90	60	4	M12	
	Rp 3/8"	32	16	390			15	95	65	4	M12			
	Rp 1/2"	39	20	393			20	105	75	4	M12			
19	Rp 1/2"	39	20	405	45	19	25	115	85	4	4	M12		
	Rp 3/4"	48	25	407			10	340	45	90	60	4	M12	
	Rp 1"	55	32	415			15	95	65	4	M12			
30	Rp 1"	55	32	415	60	30	20	105	75	4	4	M12		
	Rp 1 1/4"	67	40	430			25	115	85	4	M12			
	Rp 1 1/2"	74	50	436			25	115	85	4	M12			
36	Rp 1 1/4"	67	40	430	75	36	25	340	60	115	85	4	M12	
	Rp 1 1/2"	74	50	436			32	140	100	4	M16			
	Rp 2"	90	63	446			40	150	110	4	M16			
43	Rp 1 1/2"	74	50	440	95	43	32	340	75	140	100	4	M16	
	Rp 2"	90	63	446			40	150	110	4	M16			
	Rp 2 1/2"	111	75	460			50	165	125	4	M16			
	Rp 3"	131	90	470			50	165	125	4	M16			
100	Rp 2"	90	63	446	115	100	40	340	95	150	110	4	M16	
	Rp 2 1/2"	111	75	458			50	165	125	4	M16			
	Rp 3"	131	90	470			65	185	145	4	M16			
110	Rp 2 1/2"	111	75	462	133	110	65	340	133	185	145	4	M16	
	Rp 3"	131	90	474			80	200	160	8	M16			
							100	220	180	8	M16			
d¹ : For welding or solvent welding						150	80 <sup>1)</sup>	640	178	220	160	8	M16	
							100	220	180	8	M16			
							125	250	210	8	M16			
							150	285	240	8	M20			
							180	150	640	219	285	240	8	M20
								200	340	295	8	M20		

<sup>1)</sup> : For installation, length: 655 mm

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**Variable Area Flowmeters**  
**RA 60 / FA 60**

07-12-2020

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**727-01 /4**

# Low flow-rates area flowmeters SGK 1-3



- Direct reading on a calibrated tube
- Water: 0.1 – 1 l/h ... 1.2 m<sup>3</sup>/h
- Air: 0.3 – 3 l/h ... 16 m<sup>3</sup>/h
- Maxima: 10 bar or 100 °C
- Measuring glass tube: Conical (Pyrex®)
- Fittings: BSP ¼" or ½"
- OPTIONS :  
Pressure regulator  
Limit value switches  
Analogue output 4-20 mA  
ATEX version available

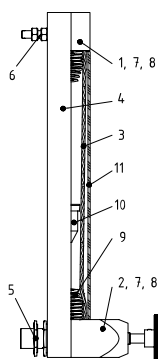
## APPLICATIONS

Flowmeters SGK 1-3 are used for direct reading and measuring of low flow-rates on liquids and gases. They are designed for reduced space, in laboratory, in technical rooms.

## DESCRIPTION

The measuring principle is that of the variable area flowmeter, the float is moved by the fluid inside a calibrated conical glass tube. The glass tube (3) is sealed at each end by an O-ring protected against damaged by a flat gasket (inserted in the parts 1 and 2).

These flowmeters can be equipped with an adjustment valve and they receive limit value switches. The signal output from limit value switches are easily connected to a PLC or monitoring device. The GK2 version can be fitted with a ruler with a 4-20 mA transmitter (Hall effect sensors).



- 1) Head (here: vertical outlet, model B1)
- 2) Adjustment valve (here: at bottom, type B1)
- 3) Conical measuring glass tube
- 4) Body
- 5) Fittings with nut BSP ¼" or ½"
- 6) Nut M5 or M8 for fastening heads
- 7) O-ring seals inside 1) & 2); Not shown
- 8) Gaskets inside 1) & 2); Not shown

Standard versions:

<b>SGK-1</b>	For smallest flows of air and water
<b>SGK-2</b>	For medium flows of air and water
<b>SGK-3</b>	Low flows of air and water
<b>...-MSK1</b>	With bistable Reed contact N.C.
<b>...-MSK12</b>	With bistable Reed contact N.O.
<b>...-MSKW</b>	With changeover Reed contact
<b>...-RC <sup>1)</sup></b>	With inductive limit value switch
<b>...-EM <sup>2)</sup></b>	With analogue output 4-20 mA or 10 V

<sup>1)</sup> Flow-rates < 2 l/h of water; < 80 l/h of air

<sup>2)</sup> Available only with SGK-2 version (other ranges on request)

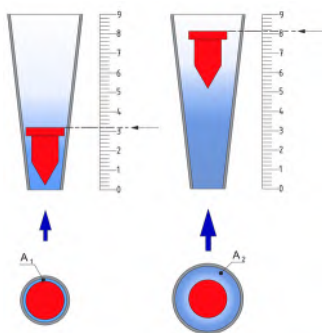
### Limit value switches:

These flowmeters can be equipped with a magnetic float and Reed contacts, triggerpoints adjustable over the entire measuring range. For small flows up to 30 l/h, detection by inductive contact series RC will be used.

### Analogue output 4-20 mA or 0-10 V:

The output signal is obtained by using a linear Hall effect displacement sensor. The output signal is proportional to the height of the magnetic float position. The sensor is plugged through a connector M12.

This output is useful for applications using a PLC. The device is compact with a high level of measurement repeatability.



Principle

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Low flow-rates area  
flowmeters  
**SGK 1-3**

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**728-05/1**

## TECHNICAL FEATURES

Fittings	Threads or male or female according DIN EN ISO 228 T1 Option : Hose couplings
Design	From "A" to "Do" types: Report to the table "DESIGN" (end of document)
Operating temperature	With NBR seals: Max. 80 °C With FPM seals: Max. 100 °C
Operating pressure	Max. 10 bar (Without water hammer event)

### Measuring tube

Reading scale	Engraved scale
Graduated scale length	SGK 1-2: ~150 mm SGK 3: ~220 mm
Accuracy class	VDE/VDI 3513, page 2
Error limit (G)	1.6 %
Linear limit (qG)	50 %
Calibration	According application specifications

### Materials

Body	Anodized aluminum
Fittings	Standard: Or anodized aluminum, or PVC Options: AISI 316 Ti or PVDF
Seals	Standard: NBR for Aluminum version FPM for AISI 316 Ti version Options: EPDM, Perlast® (FFKM)
Conical measuring tube	Borosilicate glass
Float	Aluminum, PVC, PP, AISI 316 Ti Option: PTFE
Pressure regulator	Needle: AISI 316 Ti

Other materials on request

	Reed contact features		
	MSK1	MSK2	MSKW
Function	Bistable NC	Bistable NO	Bist. Changeover
Max. Voltage	50 V AC / 75 V DC	50 V AC / 75 V DC	50 V AC/75 V DC
Max. Current	0,5 A	0,5 A	0,5 A
Switching capacity	10 W/VA	10 W/VA	5 W/VA
Temperature <sup>1)</sup>	-20...+90 °C	-20...+90 °C	-20...+90 °C

<sup>1)</sup> The thermal endurance of the flow meter is crucial.

	Inductive contacts features	
	RC 10-14-N3	RC 15-14-N3
Inner diameter	10 mm	15 mm
Rated voltage	8 V DC	8 V DC
Consumption	1 mA / 3 mA	1 mA / 3 mA
Max. speed (float)	≤10 m/s	≤10 m/s
Self-inductance	≤120 mH	≤120 mH
Temperature range	-20...+70 °C	-20...+70 °C
Switching function	NAMUR bistable	NAMUR bistable

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Low flow-rates area  
flowmeters  
**SGK 1-3**

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**728-05/2**

**Analogue output 4-20 mA - EM, features**

Measuring range [A...B]	125 mm, 160 mm
Repeatability	≤ 0.1% F.S. ≤ dependent upon position sensor
Linearity deviation	≤ 1 % v.E.
Temperature drift	≤ ±0,03 % /K
Ambient temperature <sup>1)</sup>	-25....+65 °C
Operating voltage	15...30 V DC
Idle current	≤ 15 mA
Analogue output <sup>2)</sup>	4-wire transmitter
Load resistor on 4-20 mA	≤ 0,4 kΩ
Output 0-10 V	0...10 V
Load resistor on 0-10 V	≥ 4,7 kΩ
Sampling rate	200 Hz
Connection	Plug Connector, M12 x 1
Protection	IP 67
Signaling LED	Green: Operating Yellow: Position sensor in detection range

<sup>1)</sup> The thermal endurance of the flow meter is crucial.

<sup>2)</sup> 2-wire version available on request

**MEASURING SCALES**

	<b>Range for Air <sup>1)</sup></b>	<b>Range for Water</b>
<b>SGK-1</b>	0.3 - 3 l/h 0.25 - 2.5 m <sup>3</sup> /h	0.1 - 1 l/h 15 - 150 l/h
<b>SGK-2</b>	6 - 60 l/h 0.58 - 5.8 m <sup>3</sup> /h	0.5 - 5 l/h 20 - 200 l/h
<b>SGK-3</b>	0.15 - 1.5 m <sup>3</sup> /h 1.6 - 16 m <sup>3</sup> /h	12 - 120 l/h 0.12 - 1.2 m <sup>3</sup> /h

Measuring scales for other fluids and operating conditions: On request

<sup>1)</sup> For standard operating conditions at 0 °C and 1013 mbar ABS

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**Low flow-rates area  
flowmeters  
SGK 1-3**

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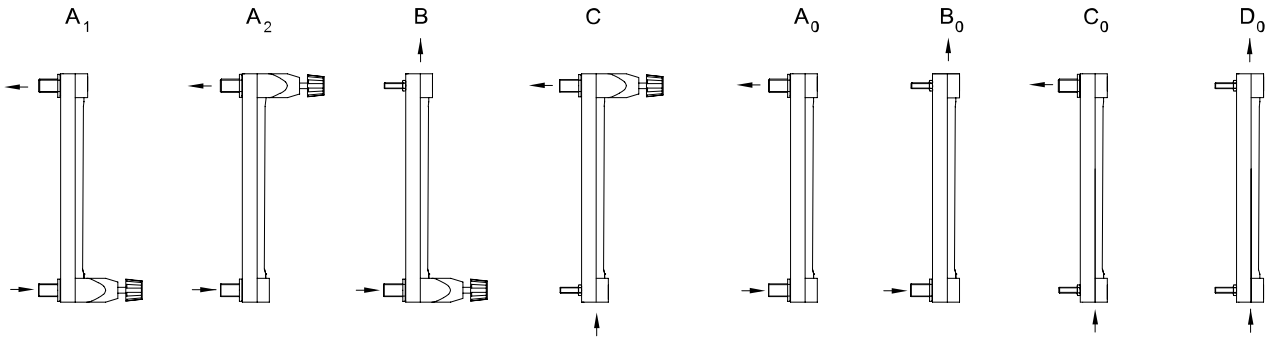
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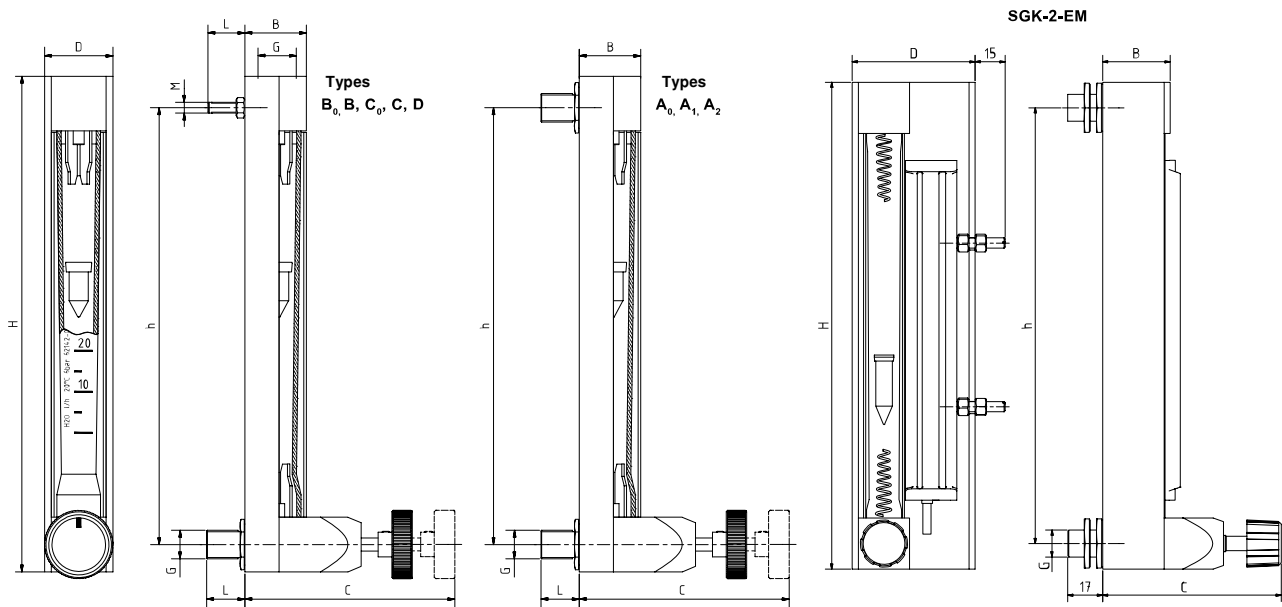
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## DESIGN



## DIMENSIONS



	G	Types	H [mm]	h [mm]	M	L [mm]	B [mm]	D [mm]	C maxi [mm]
SGK-1	1/4"	A <sub>1</sub> , A <sub>2</sub> , A <sub>0</sub>	238	213	-	~ 22.5	27.5	30	80 (Only: A <sub>1</sub> , A <sub>2</sub> )
SGK-2	1/4"	A <sub>1</sub> , A <sub>2</sub> , A <sub>0</sub>	238	213	-	~ 22.5	27.5	30	80 (Only: A <sub>1</sub> , A <sub>2</sub> )
	1/4"	B, B <sub>0</sub> , C, C <sub>0</sub>	242	211	M5	~ 22.5	27.5	30	80 (Only: B, C)
	1/4" i	D <sub>0</sub>	246	209	M5	~ 22.5	27.5	30	-
SGK-2-EM	1/4"	A <sub>1</sub> , A <sub>2</sub> , A <sub>0</sub>	238	213	-	~ 17	33	60	85 (Only: A <sub>1</sub> , A <sub>2</sub> )
SGK-3	1/2	A <sub>1</sub> , A <sub>2</sub> , A <sub>0</sub>	363	323	-	~ 27	45	50	135 (Only: A <sub>1</sub> , A <sub>2</sub> )
	1/2	B, B <sub>0</sub> , C, C <sub>0</sub>	363	320	M8	~ 27	45	50	135 (Only: B, C)
	1/2 i	D <sub>0</sub>	363	317	M8	~ 27	45	50	-

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Low flow-rates area  
flowmeters  
**SGK 1-3**

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728-05/4

# Plastic flow indicator IDP



IDP: Variable area flow indicator

- Direct reading
- All wet parts in plastics
- Measuring tubes: PVC or Polysulfone
- Ranges: Up to 60 m<sup>3</sup>/h
- Specific scales for Air, HCl, NaOH, etc.
- Options: Adjustable contacts, ruler with 4-20 mA transmitter

## APPLICATIONS

IDP series, flow-rate indicators are ideally suited for continuous monitoring of flow for air and neutral, basic or acid liquids.

## DESCRIPTION

IDP or PDP indicators use the principle of variable area flow-meter: the fluid flow raises a diver in a conical tube, expanding the cross section of the passage of fluid. The diver moves up proportionally to the flow-rate.

Standard equipment includes a graduated scale in l/h of water at 20 °C. In options there are specific scales; Air in Nm<sup>3</sup>/h (1 to 9 bar ABS); HCl at 30 / 33 %; NaOH at 30 % and at 50 %. See the data sheet 730-06

With magnetized versions, the Z60 transmission ruler converts the diver position into a 4-20 mA signal. See the data-sheet 730-07

### Mounting precautions:

Flow indicators must be installed vertically with rising fluid. It is recommended to have a length upstream of 10 x ND and a length downstream of 5 x DN.

## TECHNICAL FEATURES

Pressure	Max. 10 bar at 20 °C
Température limits at 1 bar	PVC: 0 ... +50 °C PSU: 0 ... +90 °C (or 60 °C with standard PVC fittings)
Graduated scale	l/h of water at 20 °C (standard)

### Materials

Measuring tubes	PVC or Polysulfon
Diver and stoppers	PVDF
Diver guide rod	PVDF-coated stainless steel (ND 50 and 65)
Seals	Standard: EPDM; FPM in option
Fittings:	Standard: PVC Unions for solvent welding Options: See the table "Fittings"

### Contacts Z42 and Z40

The flow indicator must have a diver with a built-in magnet (PVDF-A)

Switching power	Max. 10 W / 12 VA; 230 V AC; 0.5 A
Operating	Z42: N.O. without flow Z40: N.C. without flow

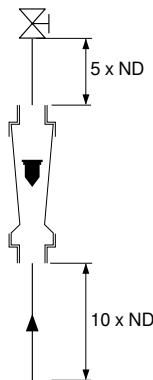
Protection	IP 65 - Pluggable terminal block
Ambient temperature	0... +55 °C

Overloads and inductive or capacitive loads may damage the contacts. It is recommended to use a contact protection like a relay ES 2001 (see data-sheet 250-02).

**EC Conformity:** The instrument meets the legal requirements of the current European Directives.



Contacts Z42 or Z40



Recommended mounting

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Plastic flow indicator  
IDP

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## CODE NUMBERS AND REFERENCES

IDP Type	ND	D [mm]	R	Range Flow in [l /h]	$\Delta P$ [mbar]	Code			
						PVC	PVC-A	PSU	PSU-A
50	25	30	1"	50...500	23	730 700	730 740	730 720	730 760
100	25	30	1"	100...1 000	23	730 701	730 741	730 721	730 761
150	32	40	1 1/4"	150...1 500	23	730 702	730 742	730 722	730 762
250	32	40	1 1/4"	250...2 500	23	730 703	730 743	730 723	730 763
200	40	50	1 1/2"	200...2000	25	730 704	730 744	730 724	730 764
300	40	50	1 1/2"	300...3 000	25	730 705	730 745	730 725	730 765
600	50	63	2"	600...6 000	25	730 706	730 746	730 726	730 766
1 000	50	63	2"	1 000...10 000	25	730 707	730 747	730 727	730 767
1 500	50	63	2"	1 500...15 000	28	730 708	730 748	730 728	730 768
2 000	65	75	2 1/2"	2000...20 000	46	730 709	730 749	730 729	730 769
3 000	65	75	2 1/2"	3 000...30 000	46	730 710	730 750	730 730	730 770
8 000	65	75	2 1/2"	8 000...60 000	47	730 711	730 751	730 731	730 771

$\Delta P$ : Pressure drop (water at 20 °C)

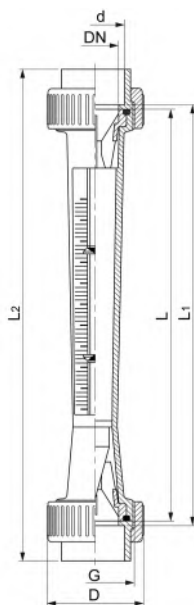
### FITTINGS and FPM SEALS:

ND	Ø	FPM Seals	Female threads			PPH unions	Flanged fittings	
			Cast iron	AISI 316	PVC		PVC	PPH
25	32	P53 959	730 300	730 305	730 301	730 302	730 306	730 307
32	40	P53 960	730 350	730 355	730 351	730 352	730 356	730 357
40	50	P53 961	730 400	730 405	730 401	730 402	730 406	730 407
50	65	P53 962	730 500	730 505	730 501	730 502	730 506	730 507
65	75	P53 963	730 600	-	730 601	730 602	730 606	730 607

### CONTACTS:

Code	Reference	Description
730 998	Z42 NO	Contact Z42, Max. 12 VA / 230 V / 0.5 A, Bi-stable N.O.
730 999	Z40 NF	Contact Z40, Max. 12 VA / 230 V / 0.5 A, Bi-stable N.C.

## DIMENSIONS



ND	d	R	G	D [mm]	L [mm]	L1 [mm]	L2 [mm]	Mass [kg]
25	32	1"	1 1/2"	60	350	356	400	0.5
32	40	1 1/4"	2"	72	350	356	408	0.6
40	50	1 1/2"	2 1/4"	83	350	356	418	1.2
50	63	2"	2 3/4"	103	350	356	432	1.7
65	75	2 1/2"	3 1/2"	122	350	356	444	2.9

Dimensions are for standard models with PVC unions.

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Plastic flow indicator  
IDP

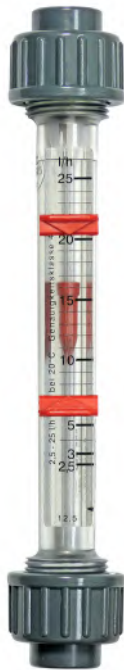
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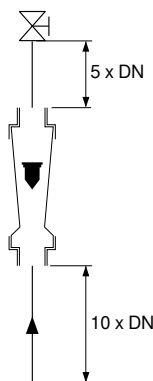
# Small plastic flow indicator PDP



PDP: Variable area flow indicator



Contacts Z42 or Z40



Recommended mounting

- Direct reading
- All wet parts in plastics
- Materials: PVC, PSU, PVDF, EPDM
- Scales from 2.5 up to 1,000 l/h of water  
Other scales: Air in Nm<sup>3</sup>/h, HCl and NaOH.
- Option: Adjustable contacts

## APPLICATIONS

PDP series are ideally suited for continuous measurement of flow for air and neutral, basic or acidic liquids.

## DESCRIPTION

PDP indicator applies the principle of variable area flow-meter: the flow raises a diver in a conical tube expanding the cross section of fluid passage. The diver moves up proportionally to the flow-rate (diver is commonly named "float").

Standard equipment includes a graduated scale in l/h of water at 20 °C. In options there are specific scales: Air in Nm<sup>3</sup>/h; HCl at 30...33 %; NaOH at 30 % & 50 %. See data -sheet 731-04

### Precautions for mounting:

Flow indicators must be installed vertically with rising fluid. It is recommended to have a length upstream of 10 x ND and downstream of 5 x ND.

## TECHNICAL FEATURES

Pressure limit	10 bar max. at 20 °C
Temperature limits at 1 bar	PVC: 0 ... +50 °C (Water) PSU (Polysulfone): 0 ... +90 °C (Max. 60 °C with PVC fittings) PVDF (option) on request
Graduated scales	l/h (Standard for water at 20 °C)
Specific scales	Air in Nm <sup>3</sup> /h (1 to 9 bar absolute pressure) HCl (30 ... 33 %); NaOH (30 % and 50 %)

### Materials

Measuring tubes	PVC or PSU (Polysulfone)
Diver and stoppers	PVDF
Seals	EPDM (standard) - FPM in option
Unions	PVC for solvent welding
Fittings	Standard: PVC Unions for solvent welding Options: See the table "Fittings"

### Contacts Z42 and Z40

The flow indicator must have a diver with a built-in magnet (PVDF-A)

Switching power	Max. 10 W / 12 VA; 230 V AC; 0.5 A
Operation	Z42: Change-over contact, N.O. without flow Z40: Change-over contact, N.C. without flow

Protection IP 65 - Pluggable terminal block

Ambient temperature 0... +55 °C

Overloads and inductive or capacitive loads may damage the contacts. It is recommended to use a contact protection like a relay ES 2001 (see data-sheet 250-02).

**EC Conformity:** The instrument meets the legal requirements of the current European Directives

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## Small plastic flow indicator PDP

16-04-2019

D-731.03-EN-AE

DEB

731-03/1

## CODE NUMBERS AND REFERENCES

PDP Type	ND	D [mm]	R	Range Flow [l/h]	$\Delta P$ [mbar]	Code			
						PVC	PVC-A	PSU	PSU-A
2.5	10	16	3/8"	2.5 ... 25	4.5	731 700	731 750	731 800	731 850
5	10	16	3/8"	5...50	4.5	731 701	731 751	731 801	731 851
10	10	16	3/8"	10 ... 100	4.5	731 702	731 752	731 802	731 852
15	15	20	1/2"	15 ... 150	4.4	731 703	731 753	731 803	731 853
20	15	20	1/2"	20 ... 200	4.4	731 704	731 754	731 804	731 854
30	25	32	1"	30 ... 300	8.1	731 705	731 755	731 805	731 855
50	25	32	1"	50 ... 500	8.1	731 706	731 756	731 806	731 856
100	25	32	1"	100 ...1,000	8.1	731 707	731 757	731 807	731 857

$\Delta P$  : Pressure drop, water at 20 °C  
PVDF models: on request

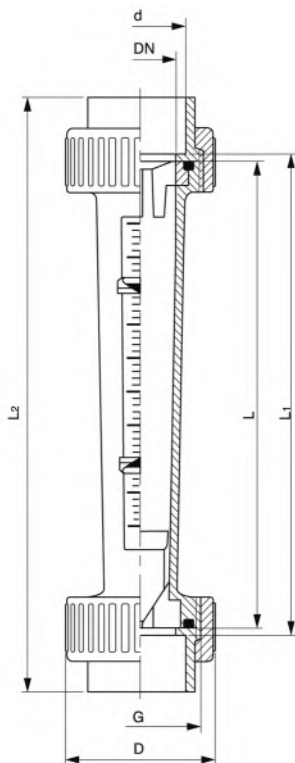
### Fittings:

ND	Ø	FPM seals	Female threads			PPH smooth couplings	Flanges	
			Cast iron	AISI 316	PVC		PVC	PPH
10	16	P53 955	730 195	730 105	730 101	730 102	730 106	730 107
15	20	P53 56	730 200	730 205	730 201	730 202	730 206	730 207
25	32	P53 959	730 300	730 305	730 301	730 302	730 306	730 307

### Contacts:

Code	Reference	Description
730 998	Z42 NO	Contact Z42, Max. 12 VA / 230 V / 0.5 A, Change-over, N.O.
730 999	Z40 NF	Contact Z40, Max. 12 VA / 230 V / 0.5 A, Change-over, N.C.

## DIMENSIONS



ND [mm]	d	R	BSP	D [mm]	L [mm]	L1 [mm]	L2 [mm]	Mass [kg]
10	16	3/8"	3/4"	35	165	171	199	0,08
15	20	1/2"	1"	43	185	191	223	0,13
25	32	1"	1 1/2"	60	200	206	250	0,24

Dimensions are for standard PDP with PVC unions.

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Small plastic flow indicator  
**PDP**

16-04-2019

D-731.03-EN-AE

DEB

731-03/2

# Flow-rate indicator for liquid G6/G5



- For liquids
- Various scales up to 63,000 l/h
- Diver: AISI 316 L or PTFE
- Fittings: Flanges or threads
- Options: 4-20 mA, contacts, Ex version

## APPLICATIONS

Local indication of instant flow of liquids.

## DESCRIPTION

The flow-rate is indicated on the front (magnetic coupling of the diver with the external indicator). The short distance of 250 mm between flanges allows an installation in reduced space. In addition, no straight pipe distances upstream and downstream are required.

### Operation:

Through the measuring tube (including a calibrated orifice and a conical diver), the flow lifts the diver (up to equilibrium height against its weight). The direct reading is on an analogue display, isolated from the liquid.

The direct reading is on an analogue display, isolated from the liquid.

**This instrument must be installed for a vertical and upward flow.**

## TECHNICAL FEATURES

Turndown:	1 to 10
Scale length:	80 mm
Accuracy	± 1.5 % F.S (without transmitter) ± 1 % F.S. (with transmitter 4-20 mA)
Repeatability	0.5 % F.S.
Pressure limit	40 bar
Temperature limits	-10 ... +150 °C (without contacts) -10 ... +100 °C (with contacts) -10 ... +90 °C (with transmitter 4-20 mA) -30 ... +300 °C (Version high temperature)
Fittings	Flanges PN 16, UNI EN 1092-1 (standard G6), Threads DIN 11851 (standard G5); NPT on request
Protection	IP 67

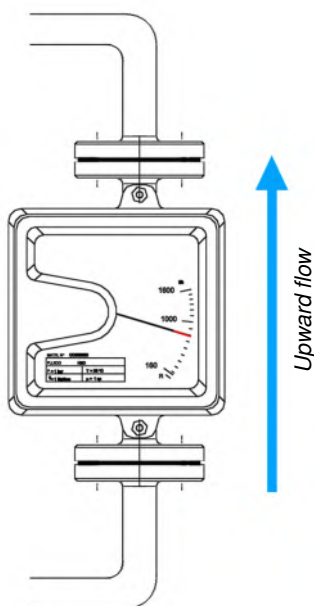
### Materials:

Housing	Cast aluminum; Epoxy painted
Wet parts	AISI 316 L Options : Titanium, Hasteloy C

### Options

- Alarms: 1 or 2 inductive contacts adjustable on full scale; Supply 8 V DC
- Transmitter 4-20 mA, 2-wire, LCD display (Flow-rate, %, Totalization); Power supply 24 V DC ±10 %
- Ex version: EEx ia IIC T6 (Intrinsic safety) or EEx d IIB T4 (Explosion-proof cabinet)

**EC Conformity:** The instrument meets the legal requirements of the current European Directives.



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Flow-rate indicator for liquid  
**G6/G5**

19-03-2020

D-741.01-EN-AB

**DEB**

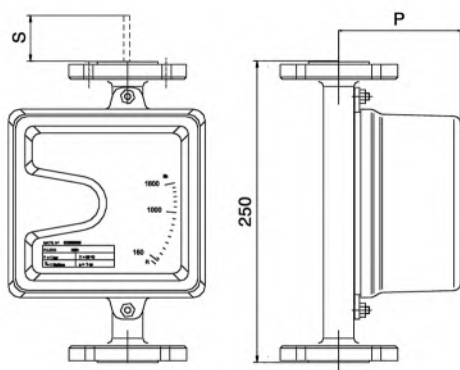
741-01 /1

## CODE NUMBERS AND REFERENCES

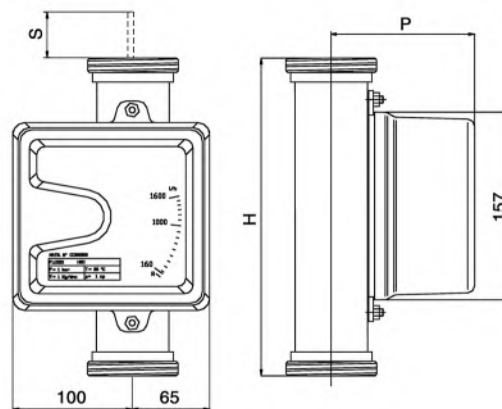
G6 with flanges UNI EN 1092-1 (Scale for water at 20 °C)

Type - ND	$\Delta P$ for AISI 316 [mbar]	Flow indicator; Wet parts AISI 316 L		Flow indicator; Wet parts: PTFE	
		Code	Flow-rate [l / h]	Code	Flow-rate [l / h]
2600 - ND 15	150	741 215	2.5 ... 25	-	-
		741 216	4...40	741 415	2.5 ... 25
		741 217	6.3 ... 63	741 416	4...40
	160	741 218	10...100	741 417	6,3...63
	170	741 219	16...160	741 418	10...100
	180	741 220	25...250	741 419	16...160
	190	741 221	40...400	741 420	25...250
2800 - ND 25	110	741 222	63...630	741 421	40...400
		741 225	100 ... 1 000	741 425	63...630
	140	741 226	160 ... 1 600	741 426	100 ... 1 000
	170	741 227	250 ... 2 500	741 427	160 ... 1 600
3100 - ND 50	210	741 228	400 ... 4 000	741 428	250 ... 2 500
	230	741 250	630 ... 6 300	741 450	400 ... 4 000
	250	741 251	1 000 ... 10 000	741 451	630 ... 6 300
3300 - ND 80	250	741 252	1 600 ... 16 000	741 452	1 000 ... 10 000
3400 - ND 100	260	741 253	2 500 ... 25 000	741 453	1 600 ... 16 000
		741 280	4 000 ... 40 000	741 480	3 000 ... 30 000
		741 290	6 300 ... 63 000	741 490	4 000 ... 40 000

## DIMENSIONS [mm]



G6 model



G5 model

Type	G6: flange fittings				G5: Threaded fittings				
	UNI EN 1092-1	S [mm]	P [mm]	Mass [kg]	DIN 11851	H [mm]	S [mm]	P [mm]	Mass [kg]
2600	DN 15	39	103	3.8	1"	265	31.5	123	2.7
2800	DN 25	55	110	4.9	1 1/2"		45.5	130	3.3
3100	DN 50	67	128	9.9	2 1/2"		60.5	148	5.7
3300	DN 80		141	13.5	4"	274	53	168	8.2
3400	DN 100		157	16.5	-	-	-	-	-

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Flow-rate indicator for liquid  
**G6/G5**

19-03-2020

D-741.01-EN-AB

DEB

741-01 /2

# Variable area flowmeters SGM - 250



- **Magnetic transmission**
- **Ranges from 2.5 l/h up to 100 m<sup>3</sup>/h (Water)**
- **Body and float: AISI 316; PTFE; PVC; PPH**
- **Fittings: Flanges or threaded BSP**
- **Outputs: Contacts; 4/20 mA + totalizer**
- **ATEX Version**

## APPLICATIONS

- Direct reading of flow-rate on gases or on liquids: - Water treatment, Industrial process (paper mill, textiles etc.), Chemical and pharmaceutical industries, Heating and cooling plants

The SGM flowmeters are suitable when glass or plastic reading tubes are not useful because of fluid opacity or their high temperature and pressure or for safety reasons. These flowmeters can be calibrated on our benches, according to each fluid and according to the operating conditions.

The small distance between fittings (250 mm) allows an installation in a small space; Straight unimpeded pipe runs should have a length equal to 5x DNupstream and 3x DN downstream of the installation location.

## DESCRIPTION

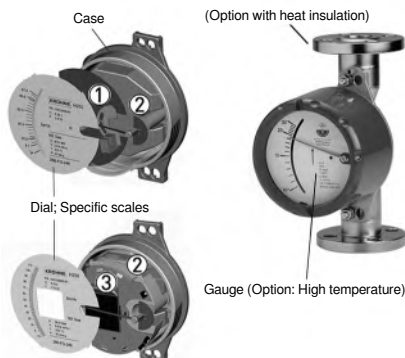
The measuring principle is that of the variable area flowmeter, the float is moved by the fluid inside a calibrated conical measuring tube. The vertical position of the float is transmitted magnetically to a dial gauge. The circulation of the fluid lifts the float to the point of equilibrium resulting from its weight, the pushing force and the free passage section. Bodies and floats are available in various materials to provide excellent resistance in adequation with dangerous, hot or aggressive fluids and for total safety.

The SGM - 250 indicator is a case, modular, to accommodate all electrical options and the graduated scale. The electrical accessories are plugged-in onto a rack. So, they can be replaced or upgraded without stopping the process and without having to remove the pointer. The HT version of SGM -250 is suitable for use in extreme temperatures.

The flowmeter can be ordered with magnetic filter and/or float damper. These can also be retrofitted at any time.

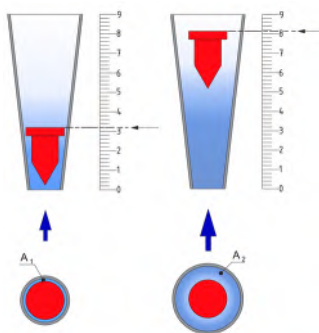
In the case of variable or pulsating flow, a damper can additionally be installed for the pointer. SGM - 250 can be equipped with a limit value switch and/or measuring transmitter with electrical analog output for a PLC or a totalizer.

**These flowmeters are only suitable for vertical installation, with the direction of flow being from bottom to top.**



- (3) : Flow totalizer (EMZ)
- (1) : Contacts, IK1, IK2, IKS1, IKS2
- (2) : Output signal (EM)

Fig A : Modules



Principle

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Variable area flowmeters  
**SGM - 250**

01-06-2021

D-741.10-EN-AA

**DEB**

**741-10/1**



## TECHNICAL FEATURES

	AISI 316 L version		PVC or PP versions	
<b>Accuracy</b>	VA/C4 (Standard) PTFE/ Ceramic *	1.6 acc. VDI/VDE 3513 pt. 2 2.5 acc. VDI/VDE 3513 pt. 2	SG-PP-/PVC	2.5 acc. VDI/VDE 3513 pt. 2
<b>Pressure</b>	DN 15, 25, 50 DN 80 , DN 100	PN 40 PN 16	DN 25, DN 50 DN 65, DN 80, DN 100	PN 16 PN 10
<b>Fittings</b>	Flanges BSP-M	According to EN-1092-1 ANSI B 16.5, JIS B 2220 <sup>1)</sup> DIN 11851, DIN EN ISO 228	Flanges Spigot ends or PP or PVC	According to EN-1092-1 ANSI B 16.5, JIS B 2220 <sup>1)</sup> DIN 11851, DIN EN ISO 228 <sup>1)</sup>
<b>Indicator</b>	Scale: l/h; m <sup>3</sup> /h; Graduated along 90 mm; Scale factor 1:10 Case, pointer: Painted aluminum; Dial: Sheath aluminum; Window: Glass			

\* : Alternative (on request) ----- <sup>1)</sup> : Option

Model	Tube / Float	Temperature	Ambient	Version	Tube / Float	Temperature	Ambient
SGM/VA	AISI 316 L	-70...+300 °C	-40...+120 °C	SGM-PP	PP	0...+80 °C	0...+80 °C
SGM/C4	Hastelloy C4	-70...+300 °C	-40...+120 °C	SGM-PVC	PVC	0...+40 °C	0...+40 °C
SGM/PTFE	PTFE <sup>1)</sup> /PTFE	-70...+70 °C	-40...+70 °C	<----- <sup>1)</sup> : Tube of AISI 306 L with lining			
SGM/PTFE/K	PTFE <sup>1)</sup> / Ceramic	-70...+150 °C	-40...+70 °C				
SGM / TFM / K	TFM <sup>1)</sup> / Ceramic	-70...+250 °C	-40...+120 °C				

### Models

#### Materials

<b>VA</b>	Stainless steel 316 L
<b>C4</b>	Hastelloy C4
<b>PTFE</b>	PTFE <sup>1)</sup> /PTFE
<b>PTFE/K</b>	PTFE <sup>1)</sup> / Ceramic
<b>TFMK</b>	TFM <sup>1)</sup> / Ceramic
<b>PP</b>	Polypropylene
<b>PVC</b>	Polyvinyl chloride

#### Inductive contacts

<b>O</b>	Without contact
<b>IK1</b>	With 1 inductive contact (SC3,5-NO-Y)
<b>IK2</b>	With 2 inductive contacts (SC3,5-NO-Y)
<b>IKS1</b>	with one electronic switch (SB3,5-E2)
<b>IKS2</b>	With two electronic switches (SB3,5-E2)

#### Analogue output 4-20 mA

<b>O</b>	Without transmitter
<b>EM</b>	With output 4-20 mA
<b>EMZ</b>	With output 4-20 mA + totalizer

#### Contact-s + output 4-20 mA

<b>O</b>	Without
<b>IK-EM</b>	With 1 inductive contact + output 4-20 mA
<b>IK1-EMZ</b>	With 1 inductive contact + output 4-20 mA + totalizer
<b>IK2-EM</b>	With 2 inductive contacts + output 4-20 mA
<b>IK2-EMZ</b>	With 2 inductive contacts + output 4-20 mA + totalizer
<b>IKS1-EM</b>	With 1 electronic contact + output 4-20 mA
<b>IKS1-EMZ</b>	With 1 electronic contact + output 4-20 mA + totalizer
<b>IKS2-EM</b>	With 2 electronic contacts + output 4-20 mA + totalizer
<b>IKS2-EMZ</b>	

#### ATEX, Explosion-proof design

<b>O</b>	Standard
<b>EEx</b>	Explosion-proof version, all metal
<b>EM-EEx</b>	Explosion proof version, with output 4-20 mA
<b>IK1-EEx</b>	Explosion proof version, with 1 inductive contact
<b>IK2-EEx</b>	Explosion proof version, with 2 inductive contacts
<b>IK1-EM EEx</b>	Explosion proof version, with 1 inductive contact + output 4-20 mA
<b>IK2-EM EEx</b>	Explosion proof version, with 2 inductive contacts + output 4-20 mA

SGM VA O EM O O

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Variable area flowmeters  
**SGM - 250**

01-06-2021

D-741.10-EN-AA

DEB

741-10/2

## MEASURING RANGES

Stainless steel versions				
Fittings	H <sub>2</sub> O scale / AISI 316 float	Δ P [mbar]	Air scale at 0 °C and 1013 mbar ABS	Δ P [mbar]
DN 15 or ½"	2.5 - 25 l/h	26	65 - 650 l/h	21
	4 - 40 l/h	26	100 - 100 l/h	21
	6.3 - 63 l/h	26	150 - 1500 l/h	21
	10 - 100 l/h	26	220 - 2200 l/h	21
	16 - 160 l/h	26	360 - 3600 l/h	21
	25 - 250 l/h	26	550 - 5500 l/h	21
	40 - 400 l/h	28	1 - 10 m <sup>3</sup> /h	21
	63 - 630 l/h	32	1.4 - 14 m <sup>3</sup> /h	22
	70 - 700 l/h	38	1.8 - 18 m <sup>3</sup> /h	38
	100 - 1000 l/h	50	2.8 - 28 m <sup>3</sup> /h	50
	160 - 1600 l/h	85	5 - 50 m <sup>3</sup> /h 85	85
DN 25 or 1"	63 - 630 l/h	32	1.4 - 14 m <sup>3</sup> /h	24
	100 - 1000 l/h	33	2.3 - 23 m <sup>3</sup> /h	24
	160 - 1600 l/h	34	3.5 - 35 m <sup>3</sup> /h	25
	250 - 2500 l/h	38	5 - 50 m <sup>3</sup> /h	26
	400 - 4000 l/h	45	9.5 - 95 m <sup>3</sup> /h	30
	630 - 6300 l/h	103 <sup>2)</sup>	11 - 110 m <sup>3</sup> /h 18 - 180 m <sup>3</sup> /h	78 103 <sup>2)</sup>
DN 50 or 2"	630 - 6300 l/h	74	8 - 80 m <sup>3</sup> /h	13
	1 - 10 m <sup>3</sup> /h	77	11 - 110 m <sup>3</sup> /h	13
	1.6 - 16 m <sup>3</sup> /h	84	15 - 150 m <sup>3</sup> /h	13
	2.5 - 25 m <sup>3</sup> /h	104	23 - 230 m <sup>3</sup> /h	60
			35 - 350 m <sup>3</sup> /h	69
70 - 700 m <sup>3</sup> /h	104			
DN 80 or 3"	2.5 - 25 m <sup>3</sup> /h	68	35 - 350 m <sup>3</sup> /h	16
	4 - 40 m <sup>3</sup> /h	89	40 - 400 m <sup>3</sup> /h	16
	6.4 - 64 m <sup>3</sup> /h	125	100 - 1000 m <sup>3</sup> /h	95
180 - 1800 m <sup>3</sup> /h			125	
DN 100 or 4"	6.3 - 63 m <sup>3</sup> /h	120		
	10 - 100 m <sup>3</sup> /h	220		

<sup>2)</sup> : 300 mbar with damper

The float damping system is recommended for use with gases.

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Variable area flowmeters  
**SGM - 250**

01-06-2021

D-741.10-EN-AA

**DEB**

**741-10/3**

PTFE versions				
fittings	H <sub>2</sub> O scale / PTFE float	Δ P [mbar]	Air scale at 0 °C and 1013 mbar ABS	Δ P [mbar]
DN 15 or ½"	2.5 - 25 l/h	65	70 - 700 l/h	65
	4 - 40 l/h	66	110 - 1100 l/h	66
	6.3 - 63 l/h	66	180 - 1800 l/h	66
	10 - 100 l/h	68	280 - 2800 l/h	68
	16 - 160 l/h	72	480 - 4800 l/h	72
	25 - 250 l/h	86	700 - 7000 l/h	86
	40 - 400 l/h	111	1,000 - 10,000 l/h	111
DN 25 or 1"	63 - 630 l/h	70	1.6 - 16 m <sup>3</sup> /h	70
	100 - 1000 l/h	80	3 - 30 m <sup>3</sup> /h	80
	160 - 1600 l/h	108	4.5 - 45 m <sup>3</sup> /h	108
	250 - 2500 l/h	158	7 - 70 m <sup>3</sup> /h	158
	400 - 4000 l/h	290	12 - 120 m <sup>3</sup> /h	194
DN 50 or 2"	400 - 4000 l/h	81	11 - 110 m <sup>3</sup> /h	81
	630 - 6300 l/h	110	18 - 180 m <sup>3</sup> /h	110
	1 - 10 m <sup>3</sup> /h	170	25 - 250 m <sup>3</sup> /h	170
DN 80 or 3"	1.6 - 16 m <sup>3</sup> /h	81		
	2.5 - 25 m <sup>3</sup> /h	95		
DN 100 or 4"	4 - 40 m <sup>3</sup> /h	100		

The float damping system is recommended for use with gases.

Ceramic versions				
Fittings	H <sub>2</sub> O scale / Ceramic float	Δ P [mbar]	Air scale at 0 °C and 1013 mbar ABS	Δ P [mbar]
DN 15 or ½"	3 - 30 l/h	62		
	5 - 50 l/h	64	180 - 1800 l/h	64
	7 - 70 l/h	66	240 - 2400 l/h	66
	13 - 130 l/h	68	400 - 4000 l/h	68
	20 - 200 l/h	70	650 - 6500 l/h	70
	25 - 250 l/h	72	900 - 9000 l/h	72
DN 25 or 1"	50 - 500 l/h	55	1,8 - 18 m <sup>3</sup> /h	55
	70 - 700 l/h	60	2,2 - 22 m <sup>3</sup> /h	60
	110 - 1100 l/h	70	3 - 30 m <sup>3</sup> /h	70
	160 - 1600 l/h	82	5 - 50 m <sup>3</sup> /h	82
	250 - 2500 l/h	100	7,5 - 75 m <sup>3</sup> /h	100
DN 50 or 2"	450 - 4500 l/h	70	14 - 140 m <sup>3</sup> /h	70
	630 - 6300 l/h	80	20 - 200 m <sup>3</sup> /h	80
	1.1 - 11 m <sup>3</sup> /h	110	35 - 350 m <sup>3</sup> /h	110
DN 80 or 3"	1.6 - 16 m <sup>3</sup> /h	70		
	2.5 - 25 m <sup>3</sup> /h	85		

The float damping system is recommended for use with gases.

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Variable area flowmeters  
**SGM - 250**

01-06-2021

D-741.10-EN-AA

**DEB**

**741-10/4**

PVC and PP versions

Fittings	H <sub>2</sub> O scale / PVC or PP float	Δ P [mbar]	Air scale at 0 °C and 1013 mbar ABS	Δ P [mbar]
DN 15 or ½"	10 - 100 l/h	15	0,4 - 4 m <sup>3</sup> /h	25
	16 - 160 l/h	15	0,6 - 6 m <sup>3</sup> /h	25
	25 - 250 l/h	15	1 - 10 m <sup>3</sup> /h	25
	40 - 400 l/h	15	1,6 - 16 m <sup>3</sup> /h	25
	60 - 600 l/h	15	2 - 20 m <sup>3</sup> /h	25
DN 25 or 1"	16 - 160 l/h	10	0,6 - 6 m <sup>3</sup> /h	20
	25 - 250 l/h	10	1 - 10 m <sup>3</sup> /h	20
	40 - 400 l/h	10	1,6 - 16 m <sup>3</sup> /h	20
	60 - 600 l/h	10	2,5 - 25 m <sup>3</sup> /h	20
	100 - 1000 l/h	10	4 - 40 m <sup>3</sup> /h	20
	160 - 1600 l/h	10	6 - 60 m <sup>3</sup> /h	20
	240 - 2400 l/h	10	9 - 96 m <sup>3</sup> /h	20
DN 40 or 1 ½"	150 - 1500 l/h	20	5 - 50 m <sup>3</sup> /h	25
	250 - 2500 l/h	20	8 - 80 m <sup>3</sup> /h	25
	400 - 4000 l/h	20	14 - 140 m <sup>3</sup> /h	25
DN 50 or 2"	250 - 2500 l/h	15	9 - 90 m <sup>3</sup> /h	25
	400 - 4000 l/h	15	15 - 150 m <sup>3</sup> /h	25
	600 - 6000 l/h	15	20 - 200 m <sup>3</sup> /h	25
	1,000 - 10,000 l/h	15	35 - 350 m <sup>3</sup> /h	25
DN 65 or 2 ½"	800 - 8000 l/h	15	25 - 250 m <sup>3</sup> /h	25
	1 - 10 m <sup>3</sup> /h	15	40 - 400 m <sup>3</sup> /h	25
DN 80 or 3"	1 - 10 m <sup>3</sup> /h	15	40 - 400 m <sup>3</sup> /h	25
	1.6 - 16 m <sup>3</sup> /h	15	60 - 600 m <sup>3</sup> /h	25
DN 100 or 4"	1.6 - 16 m <sup>3</sup> /h	20	60 - 600 m <sup>3</sup> /h	25
	2 - 20 m <sup>3</sup> /h	20	100 - 1000 m <sup>3</sup> /h	25
DN 125 or 5"	3 - 30 m <sup>3</sup> /h	20	150 - 1500 m <sup>3</sup> /h	30
	4 - 40 m <sup>3</sup> /h	20	200 - 2000 m <sup>3</sup> /h	30
	6 - 60 m <sup>3</sup> /h	20	220 - 2200 m <sup>3</sup> /h	30
DN 150 or 6"	8 - 80 m <sup>3</sup> /h	25	250 - 2500 m <sup>3</sup> /h	35
	10 - 100 m <sup>3</sup> /h	25	300 - 3200 m <sup>3</sup> /h	35

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Variable area flowmeters  
**SGM - 250**

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**741-10/5**

## OUTPUTS FEATURES

### SC3,5-N0-Y (2-wire); IP 67 (EN 60529/IEC 529)

Function	NC (normally closed) - NAMUR
Rated current $U_0$	8 V
Consumption	$\geq 3$ mA when pointer vane not sensed $\leq 1$ mA when Pointer vane sensed
Ambient temperature	-25...+100 °C
EMV	According to NE 21
SIL	According to IEC 61508
Agreement	PTB 99 ATEX 2219X (only with isolation switching amplifier)

### SB3,5-E2 (3-wire); IP 67 (EN 60529/IEC 529)

Function	PNP / NO (normally open)
Rated current $U_0$	10...30 V DC
Consumption	$\leq 0,3$ V DC UB -3 V DC
Ambient temperature	-25...+70 °C
Continuous current, Max.	100 mA
No load current	IO $\leq 15$ mA
EMV according to	EN 60947-5-2

### 4-20 mA output, transmitter EM

Power supply	12...30 V DC (HART®: Min. 20 V DC)
Consumption	4...20 mA (0 to 100 % measuring scale)
NAMUR failure signal	> 21 mA
Repeatability	< 0,1 % F.S.
Linearity error	< 0,1%
Influence of supply power	< 0,1%
External resistance dependence	< 0,1%
Temperature effect	<10 $\mu$ A /K
Max. load impedance	Max. 0 (250 *) ...800 $\Omega$ maxi
Certificate	PTB 00 ATEX 2063

\* With HART®-communication, this value is the minimum value.

For use in potentially explosive areas: Built-in equipment may only be connected to separate intrinsically safe circuits.

### Counter / Totalizer EMZ

#### Outputs: Two binary outputs, passive, galvanically isolated

Power	Rated voltage: 24 V DC (Max. 30 V DC)
Load RL	250...1000 $\Omega$
Continuous current, Max.	100 mA
Pmax.	500 mW

#### Connection types: 2 off NAMUR (EN 60947-5-6) <sup>1)</sup> or Transistor output (passive, open collector)

$U_0$	8.2 V DC
$R_i$	1000 $\Omega$
Signal current	> 3 mA (Switching value reached) < 1 mA (Switching value not reached)

#### 2 pulse outputs

T on	Set up between 50 and 500 ms
T off	Depending on flow rate
Frequency Max.	10 Hz
Pulse output	Set up in flow units e.g. 5 pulses per m <sup>3</sup>
Ambient temperature	-40...+70 °C

<sup>1)</sup> Switching amplifier with  $U_0 = 8,2$  V DC and  $R_i = 1000 \Omega$

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Variable area flowmeters  
**SGM - 250**

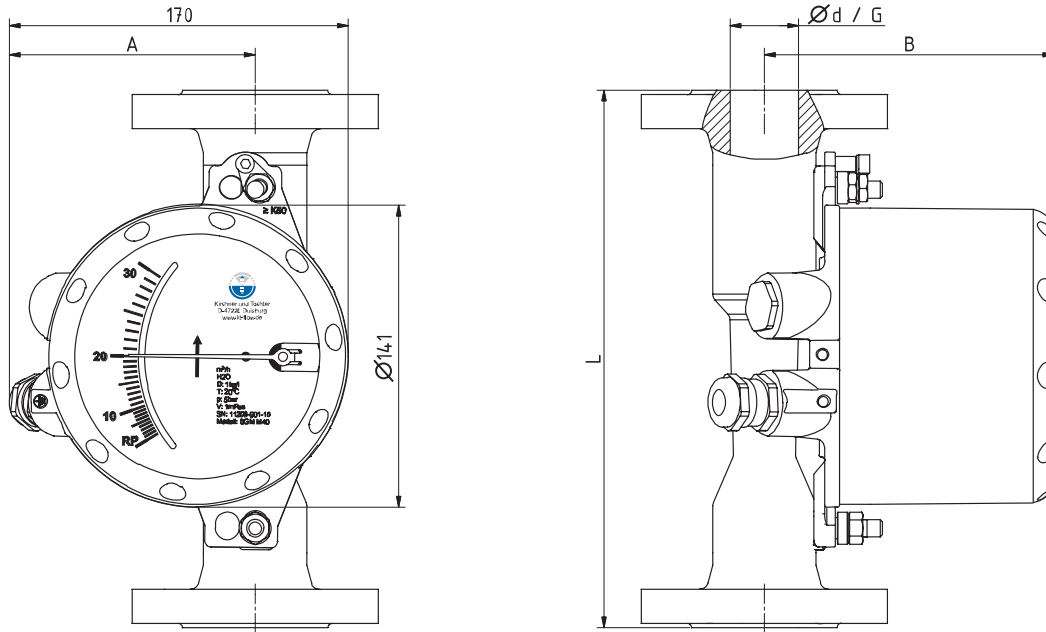
01-06-2021

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DEB

741-10/6

## DIMENSIONS



### Flanged stainless steel version

DN	PN	L [mm]	A [mm]	B [mm]	Ø d [mm]	AISI 316 [kg]	Ceramic/ PTFE [kg]
15	40	250	104	114	20	3.5	3.5
25	40	250	104	127	32	5	5
50	40	250	117	139	65	8,2	10
80	16	250	117	155	89	12.2	13
100 <sup>1)</sup>	16	250	117	164	114	14	15

<sup>1)</sup> Only with PTFE lining

Overall length for devices with internal thread to DIN EN ISO 228: 300 mm; To ANSI B 16.5 (from 3"/ 300 Lbs and over): 300 mm  
Other fitting types on request

### Female threads fittings, stainless steel version

DN	G	L [mm]	A [mm]	B [mm]	Ø d [mm]	Mass [kg]
15	G ½"	300	104	114	20	3.5
15	½" NPT	300	104	114	20	3.5
15	¾" NPT	300	104	114	20	3.5
15	G 1"	300	104	114	20	3.5
25	G 1"	300	104	127	32	5
25	1" NPT	300	104	127	32	5

### Plastic versions, PVC or PP

DN	PN	L [mm]	A [mm]	B [mm]	Ø d [mm]	PP [kg]	PVC [kg]
15	16	250	104	153	25	1.6	1.8
25	16	250	104	158	40	1.8	2
50	10	250	104	171	60	2.8	3.2
65	10	250	104	185	75	3.6	4
80	10	250	117	188	90	4.2	4.9
100	10	250	117	200	114	4.8	5.6

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**Variable area flowmeters**  
**SGM - 250**

01-06-2021

D-741.10-EN-AA

**DEB**

**741-10/7**

# V-notch weir systems DEBITBAC

- Flow-rate from 1 to 80 m<sup>3</sup>/h
- Custom made on request, in PP
- Ready to use
- NF X10-311 compliance



## APPLICATIONS

- Flow measurement for effluent monitoring
- Monitoring before discharge in natural environment or to a sewer
- Gravity flow measurement

## DESCRIPTION

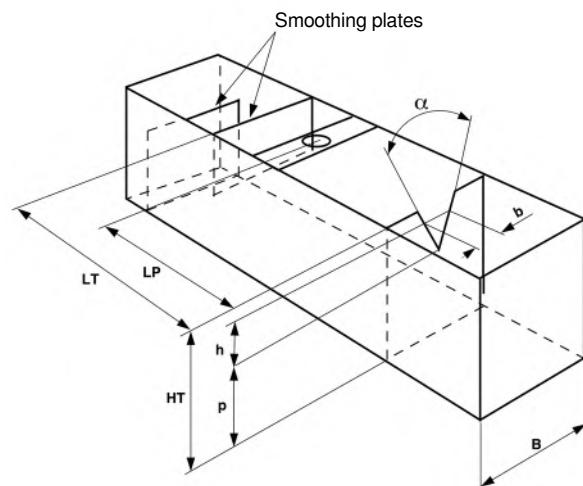
Choice of a weir plate must consider the maximum flow-rate and the lieu of installation. Specific dimensional requirements such as minimum width, minimum height, minimum weir load and other parameters must be observed.

On request, we realize customized weir adapted to your needs and in conformity with the standard NF X10-311. Each instrument is delivered with its table "flow rate vs. height".

Our instruments can be fitted with accessories like level transmitter holder, probes holder, etc. to allow an easy start up and full compliance with standard.



DEBITBAC with measuring instruments



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V-notch weir systems  
**DEBITBAC**

29-05-2020

D-755.02-EN-AC

**DEB**

755-02/1



## CODE NUMBERS AND REFERENCES

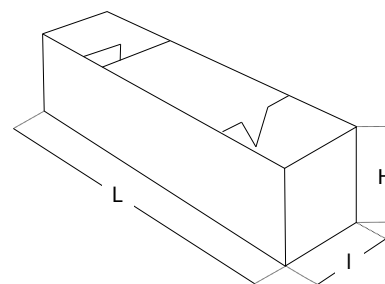
Standard models are listed below.

Code	Reference	Minimum flow		Maximum flow		Overflow	
		[ mm ]	[ m <sup>3</sup> /h ]	[ mm ]	[ m <sup>3</sup> /h ]	[ mm ]	[ m <sup>3</sup> /h ]
755 428	E0035 - V $\acute{e}$ 28°4	60	1.21	200	22.98	250	39.92
755 429	E0036 - V $\acute{e}$ 28°4	60	1.21	100	4.18	150	11.30
755 453	E0037 - V $\acute{e}$ 53°8	60	2.29	165	27.70	215	53.45
755 454	E0038 - V $\acute{e}$ 53°8	60	2.29	100	8.02	150	21.00
755 490	E0039 - V $\acute{e}$ 90°	60	4.49	100	15.88	150	43.40

Other ranges: on request

## DIMENSIONS

Reference	Length ( L )	Width ( I )	Height ( H )
E0035 - V $\acute{e}$ 28°4	1920	520	900
E0036 - V $\acute{e}$ 28°4	1250	520	500
E0037 - V $\acute{e}$ 53°8	2330	520	755
E0038 - V $\acute{e}$ 53°8	1730	520	500
E0039 - V $\acute{e}$ 90°	2700	520	500



## ACCESSORIES

Our level transmitters allow the measurement of flow-rate, record of data such as flow-rate and totalization; Examples:



### BAMOSONIC

Ultrasonic level transmitter  
(data-sheet 597-06)



### BAMOBUL

Air bubbling level transmitter  
(data-sheet 758-02)



### BAMOPHAR 759

Flow calculator, recorder  
(data-sheet 759-03)



### NANODAC

Multichannel recorder  
(data-sheet 212-02)

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V-notch weir systems  
**DEBITBAC**

29-05-2020

D-755.02-EN-AC

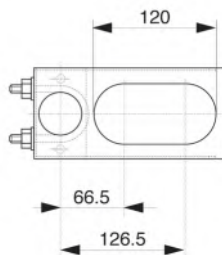
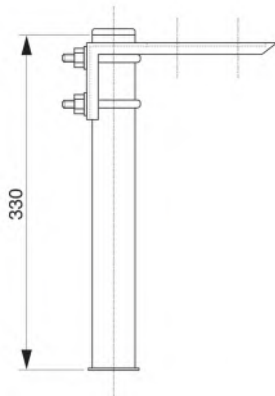
**DEB**

**755-02/2**

# Level transmitter for Open Channels BAMOSONIC



Support avec capot de protection (Option)



- Level monitoring for Open Channels
- Range: up to 4 m
- No contact with the liquid
- Powered through the loop 4-20 mA; 2-wire
- Protection: IP 67

## APPLICATIONS

BAMOSONIC is used to continuous monitoring of liquid level in open channels (Venturi or weir, data-sheets 755-01 & 755-02).

With a US beam angle of 6° it is perfectly suited for level measurement on exponential section channels (see date-sheet 755-30).

## DESCRIPTION

BAMOSONIC is a high performance ultrasonic transmitter with integrated transducer and electronic processing module. Compact, this transmitter is powered by the loop (4-20 mA; 2-wire) and stands out for its reliability and high accuracy.

Positioned above the surface of the liquid, the BAMOSONIC provides an output signal proportional to the liquid level.

The stainless steel holder facilitates the positioning of the device over an open channel, particularly convenient for flow measurements in wastewater treatment plants.

## TECHNICAL FEATURES

Measuring range	Up to 4 m (Upper dead zone of 20 cm)
Transducer	PP
Head housing	PBT
Fitting	BSP 1 1/2"
Liquid temperature	-30 ... +90 °C
Ambient temperature	-25 ... +70 °C
Pressure	0.5 ... 3 bar (absolute)
Seals	EPDM
Protection	Transducer: IP 68; Housing: IP67
Accuracy	± (0.2% of measured distance +0.05% of scale) <i>Under optimal conditions and stabilized temperature</i>
Resolution	< 2 m: 1 mm; from 2 to 4 m: 2 mm
Beam measuring angle	6°
Power supply	12 ... 36 V DC; 48 ... 720 mW
Output signal	4-20 mA; 2-wire
Electrical connection	Cable glands: 2 of M20x1.5 and 2 of NPT 1/2" For cable: Ø 6 to 12 mm Wire cross section: Max. 1.5 mm <sup>2</sup>
Electrical protection	Class III
OPTION	Protective cover

## CODE NUMBERS AND REFERENCES

Code	Reference	Description
597 220	BAMOSONIC N-PP 4m	Ultrasonic level transmitter
597 902	BAMOSONIC N-DIS	Programming module
755 501	SP/BAMOSONIC	BAMOSONIC Holder
755 504	CAP/BAMOSONIC	Protective cover to fix on BAMOSONIC holder

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Level transmitter for Open  
Channels  
**BAMOSONIC**

18-03-2021

D-755.03-EN-AC

755-03/1

# Open channels with exponential section VENTURI CHANNELS DEBITFLO



- 7 channels in composite material, with approach channels
- Flow rate ranges from 0.22 m<sup>3</sup>/h up to 1440 m<sup>3</sup>/h
- Easy civil engineering

## APPLICATIONS

Measurement of flow-rate in open channel for sewage treatment plants, washing treatment and water treatment in industry etc.

## DESCRIPTION

The Venturi of exponential section is designed to measure flow-rate in a straight linear open channel.

This Venturi add to the advantages of a classic channel, a larger measuring range. With the parabolic shape of the restriction, the Venturi is more accurate at low flow-rates.

This Venturi allows a scale factor from 1 to 100 (to compare to 1 to 20 on classic Venturi).

Example: Measurement from 3.6 m<sup>3</sup>/h up to 360 m<sup>3</sup>/h for channel type 5 with exponential section.

The table flow-rate vs. height of liquid is supplied with each Venturi, and the limnometric scale on stainless steel ruler comes with the approach channel.

An extended version of ISO 4359 includes the Venturi with exponential section.

### Strength and resistance of the channels:

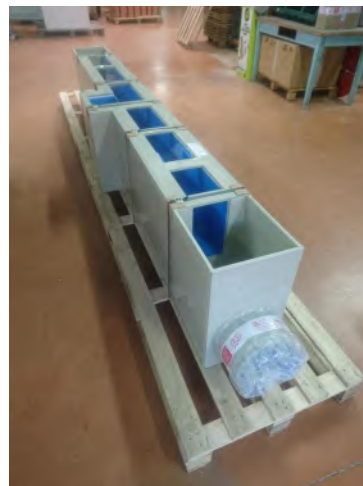
These glass fiber reinforced polyester channels have an extremely reduced roughness coefficient and resistance to aggressive and charged effluents. The solidity is ensured by transverse stiffeners allowing their direct installation in formwork.

### Simplified installation:

On request, we supply assemblies (approach channel + Venturi) integrated in a plastics housing allowing a simple and mobile installation.



Example: Channel with level/flow-rate and pH monitoring



Complete channel in a plastic housing, ready to install.

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Open channels with  
exponential section

VENTURI CHANNELS DEBITFLO

03-06-2020

D-755.30-EN-AC

DEB

755-30/1

## CODE NUMBERS AND DIMENSIONS

Below: Scales available with corresponding overall dimensions [mm] and internal widths of the approach channels.

**Important: Refer to commissioning recommendations (straight lengths, measuring point, etc.)**

Code	Description	Length	Width	Height	Internal width
<b>Flow-rate: 0.22 to 22 m<sup>3</sup>/h</b>					
755 615	VENTURI, exponential, Type 1	750	158	230	-
755 616	LARGE approach channel, Type 1	950	158	230	90
755 617	LARGE approach channel, Type 1, with sided measurement well	950	308	230	90
755 618	Limnometric scale, spare part ruler type 1	-	-	-	-
<b>Flow-rate: 0.43 to 43 m<sup>3</sup>/h</b>					
755 625	VENTURI, exponential, Type 2	1000	198	280	-
755 626	LARGE approach channel, Type 2	1300	198	280	130
755 627	LARGE approach channel, Type 2, with sided measurement well	1300	348	280	130
755 629	Limnometric scale, spare part ruler type 2	-	-	-	-
<b>Flow-rate: 0.90 to 90 m<sup>3</sup>/h</b>					
755 634	VENTURI, exponential, Type 3	1350	270	345	-
755 636	LARGE approach channel, Type 3	1900	270	345	190
<b>Flow-rate: 1.80 to 180 m<sup>3</sup>/h</b>					
755 644	VENTURI, exponential, Type 4	1800	390	430	-
755 646	LARGE approach channel, Type 4	2800	390	430	280
<b>Flow-rate: 3.60 to 360 m<sup>3</sup>/h</b>					
755 654	VENTURI, exponential, Type 5	2500	534	510	-
755 656	LARGE approach channel, Type 5	4200	534	510	420
<b>Flow-rate: 7.20 to 720 m<sup>3</sup>/h</b>					
755 664	VENTURI, exponential, Type 6	3150	666	650	-
755 666	LARGE approach channel, Type 6	5500*	666	650	550
<b>Flow-rate: 14.40 to 1440 m<sup>3</sup>/h</b>					
755 674	VENTURI, exponential, Type 7	4200	860	855	-
755 676	LARGE approach channel, Type 7	7300*	860	855	730

(\*): Approach channel in 2 parts

Our level probes and converters make it possible to measure the flow and, if necessary, to record the data (flow and totalization). Example of instrumentation:



**BAMOSONIC**  
Ultrasonic level transmitter  
(data-sheet 597-06)



**BAMOBUL**  
Air bubbling level transmitter  
(data-sheet 758-02)



**BAMOPHAR 759**  
Flow calculator / recorder  
(data-sheet 759-03)



**NANODAC**  
Multichannel recorder  
(data-sheet 212-02)

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Open channels with  
exponential section

**VENTURI CHANNELS DEBITFLO**

03-06-2020

D-755.30-EN-AC

**DEB**

**755-30/2**

# Air bubbling level transmitter BAMOBUL



- Level measurement on open channel
- For wastewater
- Direct interface to BAMOPHAR 759
- Range: 0 to 500 mm Water Column
- Output: 4-20 mA

## APPLICATIONS

- Level measurement for Venturi or weir plates.

## DESCRIPTION

This application requires a highly accurate level measurement due to an exponential relation between flow and water level. BAMOBUL combines an air generator with a highly accurate pressure transmitter. On the air circuit, the sensor measures the pressure necessary for an effective escape of air bubbles. The pressure measured is then equal to the hydrostatic pressure of the column of liquid at the point of evacuation of the air.

In order to minimize the measurement error due to a variation in the air flow between the high and low levels, the injection pump includes a micro-valve. End-user has access to the adjustment of "0 flow rate" and to full measurement scale. The BAMOBUL delivers an analogue signal of 4-20 mA.

BAMOBUL is wall mount; Protection IP 55. The air tubing fits through instant fittings for rilsan tube Ø 6x4 (between main unit and the probe). Electrical connections: through screw terminals, protected inside the IP55 cabinet. The probe is in AISI 316 L, adjustable in depth by a sliding fitting. A stainless steel plate may be fixed on the channel.

## TECHNICAL FEATURES

### Pressure sensor - Level ranges

Measuring ranges 0... 100 / 0 ... 300 / 0 ... 500 mm WC  
(measuring range to specify when ordering)

Temperature limits: 0... +50 °C

Accuracy ≥ 1 %

Response time < 1 s

### Air compressor

Flow rate Empty channel: 250 l/h

Pressure limit: 50 mbar (about 500 mm WC)

Pump body ABS

Air flow adjustment: From 0 to 100 %; Regulated for a constant flow rate

Power supply: 230 V - 50/60 Hz - 8 VA

### Specifications

Settings of 0 and F.S. Push button and LED indicator

Default detection Clogged or cut tubing

Alarm output: Changeover contact; 230 V / 5 A

Sensor supply Through the main unit

Analogue output 4-20 mA (active signal); Max. 600 Ω; Limited to 23 mA

Main power supply 230 V - 50/60 Hz

Cabinet IP 55 - Wall mounting

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Air bubbling level transmitter  
**BAMOBUL**

19-03-2020

D-758.02-EN-AB

**DEB**

**758-02/1**



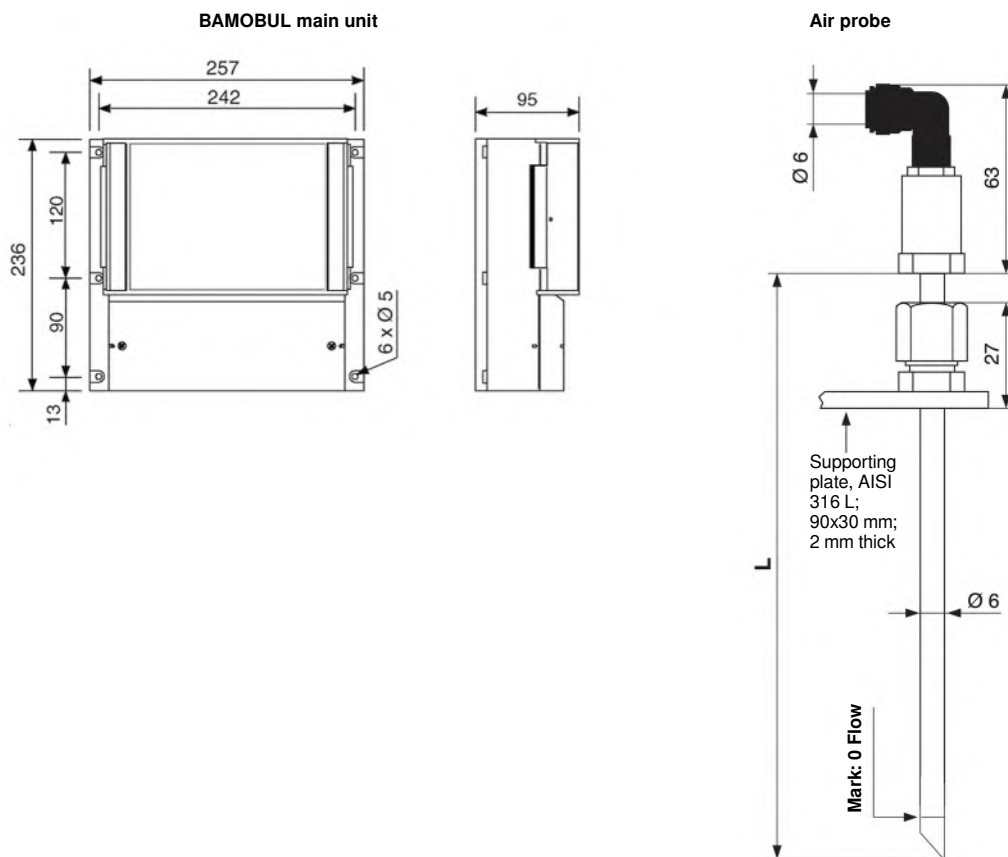
## Air probe:

AISI 316 L; Channel mounting with its supporting plate, adjustable fitting, BSP 1/2", secured by counter-nut.  
The height is adjusted on site (position mark).  
Air tubing fitting for Rilsan tube  $\varnothing$  6x4

## CODE NUMBERS AND REFERENCES

Code	Reference	Description
758 121	BAMOBUL 758 MA	Blind wall cabinet - 4-20 mA output
758 010	CAB1	Air probe AISI 316 L; $\varnothing$ 6 mm; L = 220 mm
758 011	CAB2	Air probe AISI 316 L; $\varnothing$ 6 mm; L = 400 mm
758 012	CAB3	Air probe AISI 316 L; $\varnothing$ 6 mm; L = 515 mm
758 013	CAB4	Air probe AISI 316 L; $\varnothing$ 6 mm; L = 690 mm
758 014	CAB5	Air probe AISI 316 L; $\varnothing$ 6 mm; L = 870 mm
758 017		Rilsan tube $\varnothing$ 6x4 (per meter, at requested length)

## DIMENSIONS



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Air bubbling level transmitter  
**BAMOBUL**

19-03-2020

D-758.02-EN-AB

DEB

758-02/2

# Flow calculator for open channels **BAMOPHAR 759**

Wall mount model



- Color touch screen
- Display of level, flow-rate, daily volume and totalization
- Flow-rate tables for Venturi and weir plates
- 1 Input 4-20mA and 1 input Pt 100 Ohm
- 2 analogue outputs 0/4-20 mA
- 4 programmable relay outputs; 2 as alarms, 1 for sampler, 1 for pulse output)
- **OPTIONS:**  
RS 422 /J-BUS + **LOGGER**  
Extension terminal for a second measurement input

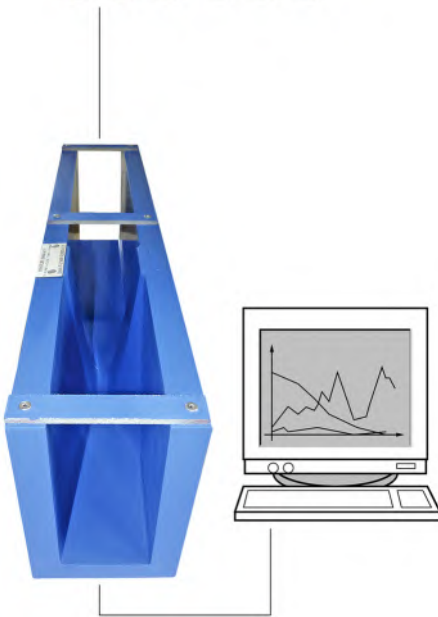
## DESCRIPTION

The reading is easy on the 4.3" color touch screen for flow-rate or height of liquid, as well as for totalization. Through a user friendly menu, settings are easy for thresholds, alarms, sampler monitoring and all parameters.

BAMOPHAR 759 converts the input signal directly into flow-rate, through a calculator and using formulas and calibration tables of our Venturi channels (ISO 4359) and our standard V or U channel weirs.

### Extension terminal (panel, wall or DIN rail mounting):

- Allows a second measurement (Turbidity, pH, Conductivity, etc.)  
Data from this blind unit are displayed on the main device
- Connected to main unit with a 2x2-wire shielded cable  
(Cable length between both devices: max. 500 m)
- Extension terminal uses the RS 422 and data logger of main unit



Panel mount model  
(main unit + Extension terminal)

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Flow calculator for open  
channels

**BAMOPHAR 759**

07-01-2020

D-759.03-EN-AE

**DEB**

759-03/1



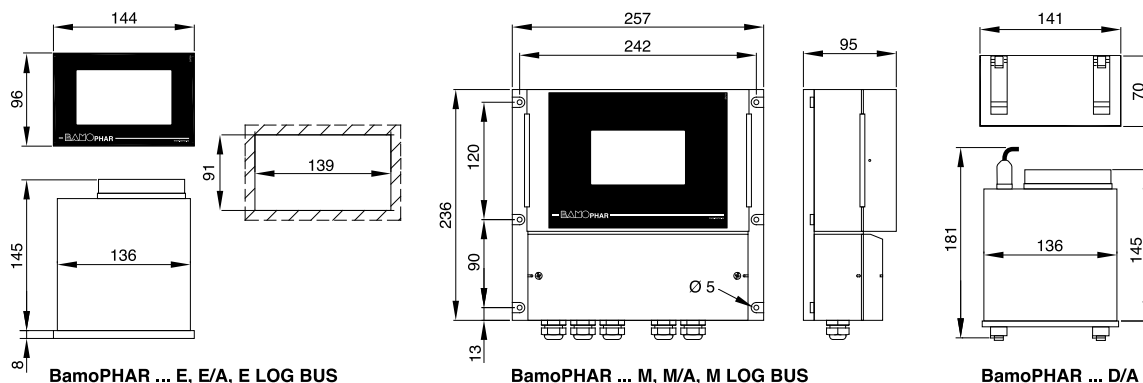
## TECHNICAL FEATURES

End-user interface	Color touch screen 4.3", resolution 480x272 pixels Display of measurements, flow rate, temperature, height of liquid, daily volume and totalization, status of relays Settings - Configuration keyword protected
Measurement Scales	Height of liquid (mm) - Resolution 1 mm Flow-rate (m <sup>3</sup> /h) - Resolution 0.1 m <sup>3</sup> /h Volume (m <sup>3</sup> ) - Resolution 1 m <sup>3</sup>
Volumes and totalization	Daily volume - on 8 digits - Reset to zero through the menu Totalization - on 8 digits - No reset to zero
Measurement signals inputs	4-20 mA proportional to height of liquid Temperature Pt 100 $\Omega$ sensor (-20 ... 160 °C)
Memorized flow-rate tables	In memory for Venturi channels, weir plates in V or U
Thresholds S1 and S3	2 contacts N.O., potential free, dedicated to flow-rate or temperature or to an external sensor. Adjustable hysteresis from 0 to 100 % - Adjustable timer from 0 to 9999 s
Sampler monitoring S2	Set up on volume (m <sup>3</sup> ) 1 contact N.O., potential free. Adjustable timer (closed contact) from 0 to 9999 s
Pulse output S4	For external counter - 1 pulse/m <sup>3</sup> 1 contact N.O., potential free
Contact Initial resistance	100 m $\Omega$ max. (voltage drop 6 V DC 1 A)
Switching power	3 A, 277 V AC; 3 A, 30 V DC (nominal)
Switching capacity (min.)	100 mA, 5 V DC (variable according to switching frequency, ambient conditions, accuracy)
Measurement output	0/4-20 mA (max. 600 $\Omega$ ) proportional to flow-rate - Programmable scale Temperature ( °C )
Main power supply	230 V AC - 50/60 Hz (others on request) - Consumption 10 VA
Models	Panel mounting, 96x144 mm; Front IP65; Rear IP40 Wall mounting, IP65, with cable glands

### OPTION (RS 422 + Logger)

Interface	RS422 output, J-BUS link - Binary slave mode - 2400 to 9600 bauds
Data Logger	Record of cycle average measurement - 150 000 records max. on memory card.

## DIMENSIONS



BamoPHAR ... E, E/A, E LOG BUS

BamoPHAR ... M, M/A, M LOG BUS

BamoPHAR ... D/A

## CODE NUMBERS AND REFERENCES

Code	Reference	Description
759 501	BAMOPHAR 759 E	Panel mounting 96x144 mm - Front IP 65; Rear IP 40
759 502	BAMOPHAR 759 E/A	Panel mounting 96x144 m- Extension, blind monitor - Front IP 65; Rear IP 40
759 503	BAMOPHAR 759 D/A	DIN Rail mounting - Extension, blind monitor / IP40
759 504	BAMOPHAR 759 E LOG BUS	Panel mounting 96x144 mm - RS422 + LOGGER - Front IP 65; Rear IP 40
759 510	BAMOPHAR 759 M	Wall mounting, IP 65, cable glands
759 511	BAMOPHAR 759 M/A	Wall mounting - Extension, blind monitor - IP 65, cable glands
759 513	BAMOPHAR 759 M LOG BUS	Wall mounting - RS 422 + LOGGER - IP 65, cable glands

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Flow calculator for open  
channels  
**BAMOPHAR 759**

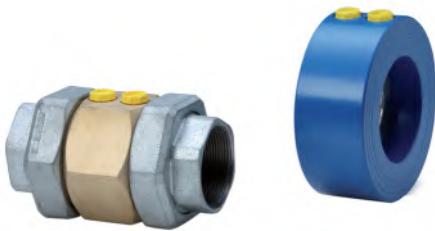
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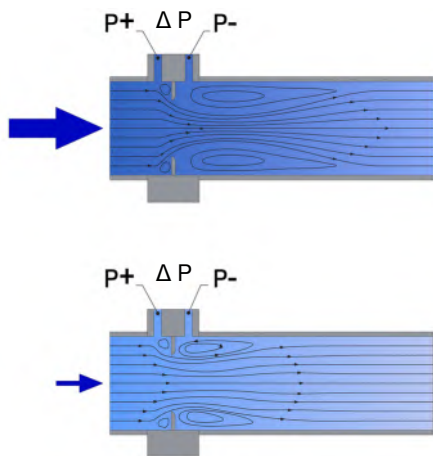
# Orifice flow-meter DDM-DB



- For liquids and gases
- Wafer type or Threaded fittings
- ND 40 to 200, or Threads 1/4" to 2"
- Horizontal or vertical installation
- No moving parts
- Materials: Brass, steel, stainless steel

## APPLICATIONS

These differential pressure flowmeters are of the most common use, in all measurements with liquids, gases or steam in various industries. They are designed for various operating conditions, under normal conditions (Water supply, swimming pool, etc.) as well as with high pressure and temperature (Steam, hydrocarbons, etc.) and aggressive fluids. They are economical, reliable for natural gas or wet gas measurements. The orifice flow-meter (differential pressure flowmeter) covers a wide range of piping diameters.



Principle

## DESCRIPTION

The device works according to the principle of differential pressure, proportional to the square of the volume rate of flow through the pipeline. A DDM flow-meter consists of an orifice plate, integrated into an armature, flanged or with unions fittings. The low and high pressure outlets on either side of the plate can be connected to a differential pressure sensor (pressure gauge, pressure switch, differential pressure transmitter).

The reliability of the measurement depends of the constant flow at the measuring point. The region of steady flow should covers piping distances of 6 DN upstream and 4 DN downstream of the device.

Several versions in steel, stainless steel or brass are available:

<b>DDM-DN</b>	Wafer, flanges acc. DIN EN 1092-1
<b>DDM-Gi</b>	Female threads acc. DIN EN ISO 228
<b>DDM-Ga</b>	Male threads acc. DIN EN ISO 228
<b>DDM-Rp</b>	Unions acc. DIN EN 10226-1 (ISO 7-1)

- Every BAMO Kirchner instrument is tested in conformity with EC directives.
- The corresponding declaration of conformity is available on request.
- The current version in force is available on our WEB site.
- Our production center Kirchner, is certified DIN EN ISO 9001: 2015

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Orifice flow-meter  
**DDM-DB**

03-03-2021

D-763.01-EN-AA

**DEB**

**763-01 /1**

## TECHNICAL FEATURES

Measuring principle	Orifice plate for differential pressure measurement.
Differential pressure	Air : 5 to 1000 mbar Water: 100 to 1000 mbar
Pressure drop	About 40 % of measured differential pressure
Pressure resistance strength	PN 16 (Caution with the pressure limit of the display unit)
Ambient temperature	-10...+70 °C
Fluid temperature	Standard: Max. -10 ... +70 °C; Max. 130 °C with insulated pipe The fluid must not freeze. Option: Temperature limit over 130 °C on request
<b>Fittings:</b>	
Wafer mounting, between flanges	PN10 or PN16 according DIN EN 1092-1, shapes A & B
Unions (Rp)	2 pieces - Female thread, cylindrical, DIN EN 10226-1 (ISO 7-1)
Female thread (Gi)	Cylindrical, internal fastening screw thread according to DIN EN ISO 228
Male thread (Ga)	Cylindrical, external fastening screw thread according to DIN EN ISO 228 T1
<b>Materials:</b>	
<b>DDM-DN</b>	Ring in S355 (Option AISI 316 Ti) Corrosion protection: Epoxy powder coating, traffic blue (RAL 5017) glossy Corrosion class: C3 Orifice plate: AISI 316 Ti
<b>DDM- Rp, Gi, Ga</b>	Fittings: Malleable cast iron, zinc plated (Rp only) Orifice plate: Brass Seals: NBR (other on request)

## MEASURING RANGES

For water: Other liquids on request.

\*) for AIR at standard operating conditions: 0 °C and 1013 mbar ABS (in-between ranges on request)

### Wafer mounting flow-meters (DDM-DB-DN)

DDM DN	Water [m³/h]		*) AIR [m³/h]	
	Lowest range	Highest range	Lowest range	Highest range
40	0.85 - 5	5.35 - 32	5.8 - 35	25 - 150
50	1.2 - 7	8.7 - 52	9 - 54	45 - 270
65	2 - 12	13 - 78	13.5 - 81	83 - 500
80	3 - 18	19.7 - 118	20 - 120	125 - 750
100	4.7 - 28	30.7 - 184	35 - 210	142 - 850
125	7.3 - 44	48 - 288	60 - 360	292 - 1750
150	10.7 - 64	68.8 - 413	75 - 450	433 - 2600
200	18.8 - 113	122.5 - 735	125 - 750	667 - 4000

### Unions (DDM-DB-Rp) and threaded fittings (female: DDM-DB-Gi / Male; DDM-DB-Ga)

DDM Rp, Ga, Gi	Water [m³/h]		*) AIR [m³/h]	
	Lowest range	Highest range	Lowest range	Highest range
¼"	0,05 - 0,3	0.2 - 1.2	0.5 - 3	1.3 - 8
⅜"	0,05 - 0,4	0.4 - 2.3	0.8 - 5	2.3 - 14
½"	0.1 - 0.7	0.75 - 4.5	1 - 6	3.5 - 21
¾"	0.2 - 1.3	1.4 - 8.5	1.3 - 8	7.5 - 45
1"	0.35 - 2	2.25 - 3.5	2.0 - 12	9 - 54
1 ¼"	0.6 - 3.5	4 - 24	4.0 - 24	18 - 108
1 ½"	0.85 - 5	5.35 - 32	5.8 - 35	25 - 150
2"	1.25 - 7.5	8.65 - 52	8.3 - 50	45 - 270

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Orifice flow-meter  
**DDM-DB**

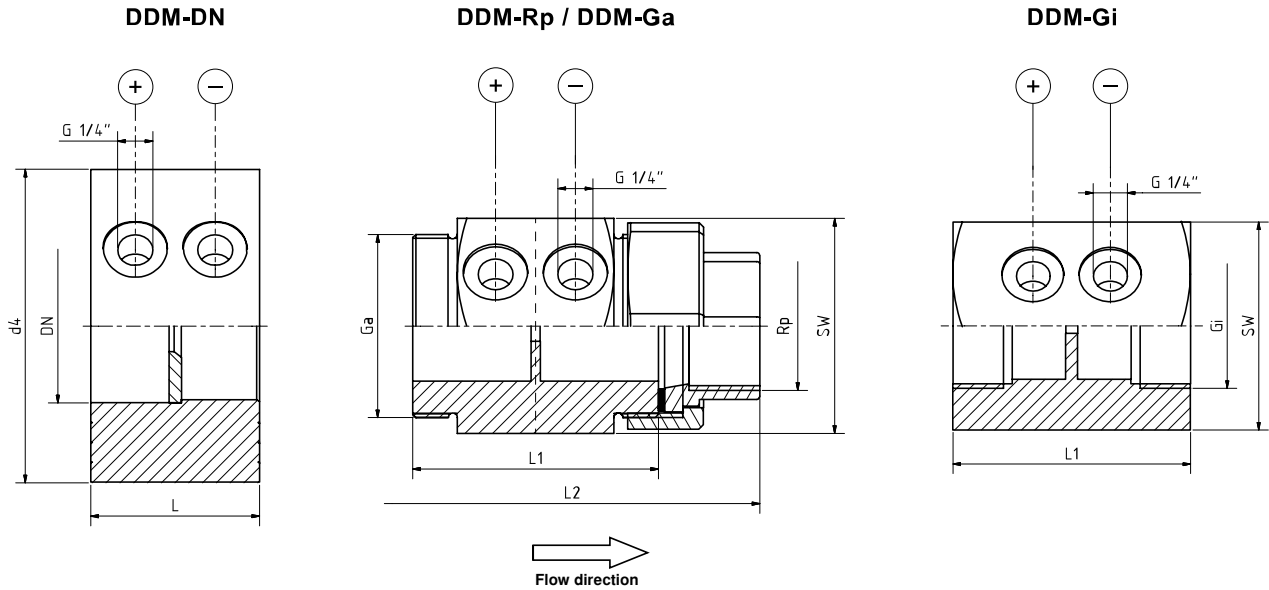
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D-763.01-EN-AA

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**763-01 /2**

## DIMENSIONS - FITTINGS



DDM-DN			DDM- Rp, Gi, Ga							
DN	d4	L	Rp	L1	L2	SW	Gi	Ga	L1	SW
40	88	55	1/4"	80	124	41	1/4"	3/4"	80	41
50	102	55	3/8"	80	128	46	3/8"	3/4"	80	46
65	122	55	1/2"	80	128	46	1/2"	1 1/8"	80	46
80	138	55	3/4"	80	128	50	3/4"	1 1/4"	80	50
100	158	55	1"	80	136	60	1"	1 1/2"	80	60
125	188	55	1 1/4"	80	146	70	1 1/4"	2"	80	70
150	212	55	1 1/2"	80	149	70	1 1/2"	2 1/4"	80	70
200	268	55	2"	90	164	85	2"	2 3/4"	90	85

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**Orifice flow-meter  
DDM-DB**

03-03-2021

D-763.01-EN-AA

**DEB**

**763-01 /3**

# Orifice plate, flow indicator U6

- Mounting in all positions
- For pipes from ND 40 up to 300
- Water: up to 770 m<sup>3</sup>/h  
Air: up to 8650 Nm<sup>3</sup>/h



## APPLICATIONS

These equipments are for large flow-rates, particularly on pipes greater than 2" .

## DESCRIPTION

The direct reading flow-indicator is mounted in bypass on the orifice plate. Optimum precision is achieved with a customized orifice according to operating conditions.

The U6 can be mounted on any vertical or horizontal pipe, regardless of the direction of flow.

However, the position of the flow indicator (below or above the axis of the pipe) must be specified.

The device is wafer mounted, between flanges PN10 (not supplied, neither flat seals).

## TECHNICAL FEATURES

Measuring ranges	Water: 0 ... 25 up to 770 m <sup>3</sup> /h Air: 0 ... 180 up to 8650 Nm <sup>3</sup> /h
Accuracy	± 2.5% F.S.
Repeatability	± 0.5% of reading
Scale factor	From 1 to 8 (linear)
Temperature	Buna seals: 0 ... 90 °C FPM seals: 0 ... 120 °C
Pressure limit	21 bar
<b>Materials</b>	
Body	Cast iron and brass
Orifice	AISI 316
Reading tube	Borosilicate glass
Diver for water	AISI 316
Diver for air	Aluminum
Stoppers	AISI 316
Seals	Buna "N"
<b>OPTIONS</b>	
Seals	FPM
Body	AISI 316 L for ND up to 100

### Alarm contacts for minimum or maximum flow-rates

Inductive contacts	mono or bistable
Ambient temperature	-25 ... +60 °C
Sealing	IP 67
<b>Associated electronic device</b>	NAMUR type relay RDN 11

**EC Conformity: The instrument meets the legal requirements of the current European Directives.**

## OPERATING CONDITIONS

Fluid	.....
Pressure	..... bar
Temperature	..... °C
Density	..... kg/m <sup>3</sup> or kg/Nm <sup>3</sup>
Maximum flow rate	..... m <sup>3</sup> /h or Nm <sup>3</sup> /h
PIPE:	..... Ø / mm, ..... Thickness / mm, ..... Material

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Orifice plate, flow indicator  
**U6**

19-03-2020

D-764.01-EN-AA

**DEB**

**764-01 /1**

## FLOW MEASURING RANGES

Below, flow rates are applicable to flow indicators U6 - . . 00 depending on the diameter of the pipe.  
For air measurements, the operating, pressure and temperature, must be considered.  
The air must be dry in order to avoid any condensation in the bypass measuring tube.

**P = Pressure drop created by the orifice plate at the measuring point**  
**H = Pressure drop effective, non-recoverable**

The flow rates correspond to the maximum values available for each pipe diameter, in accordance with DIN 1952, according to the pressure ratios P and H.

These values are for information only, since the orifice is necessarily calibrated according to the operating conditions of each project.

### Water: Maximum flow rates

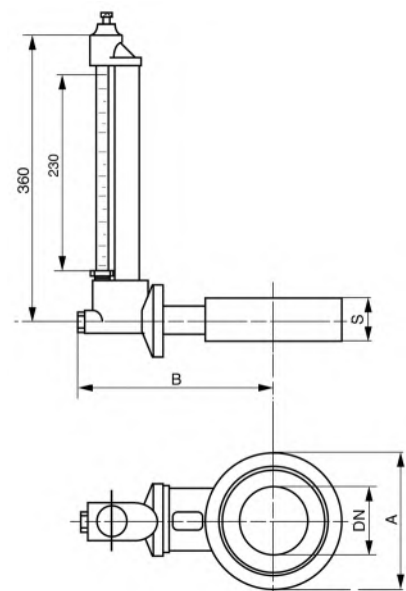
Pipe	H = 250 mbar		H = 400 mbar		H = 630 mbar		H = 1000 mbar	
	[ m <sup>3</sup> /h ]	ΔP = 88 mbar	[ m <sup>3</sup> /h ]	ΔP = 140 mbar	[ m <sup>3</sup> /h ]	ΔP = 220 mbar	[ m <sup>3</sup> /h ]	ΔP = 350 mbar
ND 50	25		32		40		51	
ND 80	57		72		90		114	
ND 100	98		124		155		195	
ND 125	154		195		245		308	
ND 150	245		272		340		430	
ND 200	385		485		610		770	

### Air: Maximum flow rates:

Pipe	H = 16 mbar		H = 25 mbar		H = 40 mbar		H = 160 mbar	
	[ m <sup>3</sup> /h ]	ΔP = 5 mbar	[ m <sup>3</sup> /h ]	ΔP = 8 mbar	[ m <sup>3</sup> /h ]	ΔP = 13 mbar	[ m <sup>3</sup> /h ]	ΔP = 53 mbar
ND 50	180		220		280		560	
ND 80	450		560		710		1,430	
ND 100	700		880		1,120		2,250	
ND 125	1,000		1,300		1,650		3,100	
ND 150	1,600		2,000		2,500		5,000	
ND 200	2,820		3,500		4,500		8,650	

## DIMENSIONS

Type	Pipe	A [mm]	B [mm]	S [mm]
U6 - 3000	ND 40	88	167	34
U6 - 3100	ND 50	100	174	
U6 - 3200	ND 65	115	184	
U6 - 3300	ND 80	130	194	
U6 - 3400	ND 100	155	204	
U6 - 3500	ND 125	180	219	
U6 - 3600	ND 150	210	234	38
U6 - 3800	ND 200	265	264	
U6 - 4000	ND 250	315	294	
U6 - 4200	ND 300	370	324	



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Orifice plate, flow indicator  
**U6**

19-03-2020

D-764.01-EN-AA

**DEB**

**764-01 /2**



# Orifice plate, flow-meters DB Series



- For aggressive liquids
- Direct reading indicator on pipes from ND 50 up to ND 200
- Mounting in all positions
- According standard NF X 10-102
- Options: Flow contact; Output signal

## APPLICATIONS

- Clean waters: Tap water, swimming pool water
- Aggressive liquids (acidic or basic)

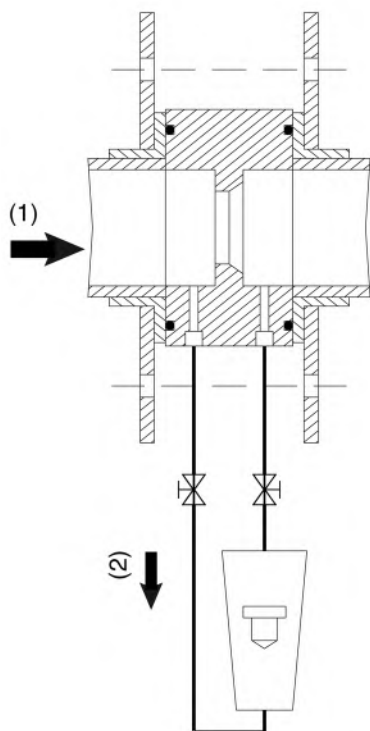
## DESCRIPTION

Wafer mounting: The orifice plate is inserted between 2 flanges. The differential pressure is between the inlet and outlet, one on each side of the plate. The differential pressure is related to the flow rate inside the main pipe. The flow indicator is part of the bypass, allowing a direct reading.

In order to obtain a proportional relation to the main flow, a BORDA nozzle is inserted before the flow indicator.

### Option with output signal:

Instead of an indicator, a flow transmitter may be installed.



(1) : Main line  
(2) : Differential flow

## TECHNICAL FEATURES

Flow ranges	From 2 up to 350 m <sup>3</sup> /h (water)
Accuracy	± 4 %
Repeatability	± 0,4 %
Scale amplitude	2 to 10
Pressure limit	10 bar (water at 20 °C)
Temperature limits	PVC: 50 °C; PPH: 90 °C; PVDF: 120 °C
Pressure drop	On request

### Materials:

Orifice plate (standard)	PVC
Associated flow indicator	PVC or polysulfone
Diver	PVDF
Bypass	Same as the orifice plate
Stop valves	Same as the orifice plate
Seals	EPDM
BORDA injector	PVC, PPH or PVDF

### Options:

- Reed contact: See data-sheet da731-03
- Output signal: Transmitter on request

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Orifice plate, flow-meters  
**DB Series**

29-12-2020

D-765.01-EN-AD

765-01 /1



## CODE NUMBERS AND REFERENCES

Ranges indicated on the table are for DB/PDP flow indicators.  
These scales, are not contractual, may be modified according operating conditions.  
Higher flow rates, greater diameters: On request

Flow rates are indicated for pipes in PVC and PN 10.  
In all events, the thickness and the real inner diameter of pipe have to be specified, so we may assure the specifications of the system.

DB Series, [ m <sup>3</sup> /h ] (water at 20 °C)				
ND	Scale N° 1	Scale N° 2	Scale N° 3	Scale N° 4
50	2...10	5...25	-	-
65	2...10	6...30	-	-
80	3...15	6...30	10...50	-
100	4...20	6...30	15...80	-
125		6...30	15...80	30...150
150		10...50	20...100	40...200
200		20...100	40...200	70...350

## INSTALLATION REQUIREMENTS

The respect of requirements is necessary to warrant a coherent measurement with the accuracy of the system.  
The straight distances upstream the plate, are the strict necessary minimum (depend on the final calculation of the system).

Number of D (diameter), see the table N° 3 of standard NFX 10 102

↓	
6 to 23	Single elbow at 90° or a Tee (flow rate by one way)
17 to 40	2 elbows at 90°, 2 different planes
5 to 15	Reducing from 2 D to 1 D along distance of 1.5 D to 3 D
6 to 15	Valve 100 % opening (type ball valve)

The upstream distance depends on the ratio between the inner diameter (D) of the pipe and the diameter of the orifice plate.  
The exact lengths to be observed in order to maintain the accuracy are communicated after study of each case.

## WAFER MOUNTING

The loose sockets will be centered with the flanges.  
The inner diameter of the sockets must be exactly the same one of the pipe to avoid turbulences.

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Orifice plate, flow-meters  
**DB Series**

29-12-2020

D-765.01-EN-AD

765-01 /2

## DEFINITION OF THE FLOWMETER

The DB flow-meter is manufactured in accordance with operating conditions: to provide before any quote.

**Liquid** : .....  
**Density** : ..... ( kg/m<sup>3</sup> )  
**Pressure** : ..... (bar)  
**Temperature** : ..... ( °C )  
**Max. flow-rate** : ..... ( m<sup>3</sup>/h )  
**Piping** : ..... ( Ø in mm )  
 : ..... ( thickness in mm )  
 : ..... Material

**Flow direction** : ..... VA ..... Uprising liquid  
 : ..... VD ..... Liquid going down  
 : ..... GD ..... Liquid flowing to the RIGHT  
 : ..... DG ..... Liquid flowing to the LEFT

**Mounting** : ..... VB ..... (VERTICAL pipe / bottom reading)  
 : ..... VH ..... (VERTICAL pipe / Top reading)  
 : ..... HB ..... (HORIZONTAL pipe / bottom reading)  
 : ..... HH ..... (HORIZONTAL PIPE / Top reading)

VERTICAL pipe - Uprising flow



VB

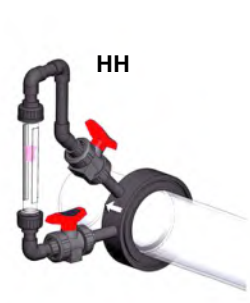


VH

HORIZONTAL pipe - Liquid flowing to the left



HB



HH

VERTICAL pipe - Liquid going down



VB

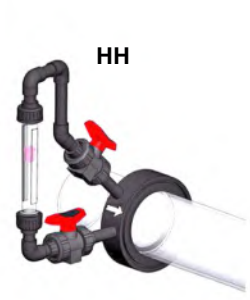


VH

HORIZONTAL pipe - Liquid flowing to the right



HB



HH

Flow contact: See data-sheet da 731-03

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Orifice plate, flow-meters  
**DB Series**

29-12-2020

D-765.01-EN-AD

765-01 /3

# Flow measurement in stationary sprinkler systems

## SMB

- Agreement VdS: G 4990049 (Germany)
- From ND 80 to ND 250
- Free mounting position & flow direction
- Indicator: direct mounting or remoted
- Scales: m<sup>3</sup>/min or % according directives



### APPLICATIONS

The sprinkler measuring orifice SMB is used for monitoring efficiency of pump in test piping of stationary sprinkler systems. It works according to the principle of differential pressure created with an orifice plate.

### DESCRIPTION

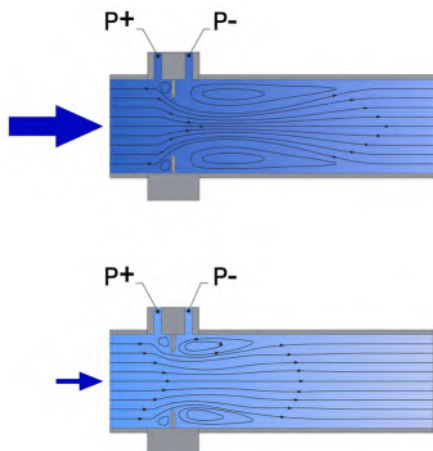
The SMB is integrated into the pipeline between flanges as a wafer flow-meter. A differential pressure occurs at the orifice, which is proportional to square of the volume flow through the pipeline.

The differential pressure is indicated by a differential-pressure gauge. We calibrate on bench the gauge according the flow rates. The instant value of flow rate is directly read on the dial.

The version SMB-OE displays the differential pressure as a percentage value. The operator can read the equivalent flow in m<sup>3</sup>/min on a label fixed to the casing.

Thanks to its particular articulate design, integration of the SMB is possible in any flow direction. The display pivots by 180 degrees in both directions.

In case of vibrations in the Sprinkler system, the SMB may be fitted with flexible capillaries, to remote the gauge.



Operating principle

### SMB series:

<b>SMB</b>	Reading scale in m <sup>3</sup> /min
<b>SMB-OE</b>	Reading scale in %
<b>SMB-...Minimess</b>	Remote display gauge with flexible capillaries

### TECHNICAL FEATURES

<b>Agreement</b>	<b>VdS : G 4990049</b>
Operating principle	Measurement of differential pressure from an orifice plate
Accuracy	2.5 % F. S.
Operating pressure	Max. 16 bar
Installation	According VdS guideline CEA 4001 chapter 7.4
Process fitting	Wafer mount, between flanges DIN EN 1092-1, PN 16

### Materials

Orifice plate	Aluminum, hard coated
Screwed connections	Nickel-plated brass, 1.4308
Ball valves	Nickel-plated brass
Dial gauge	Aluminum, coated

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Flow measurement in  
stationary sprinkler systems  
**SMB**

06-06-2021

D-765.10-EN-AA

**DEB**

**765-10/1**

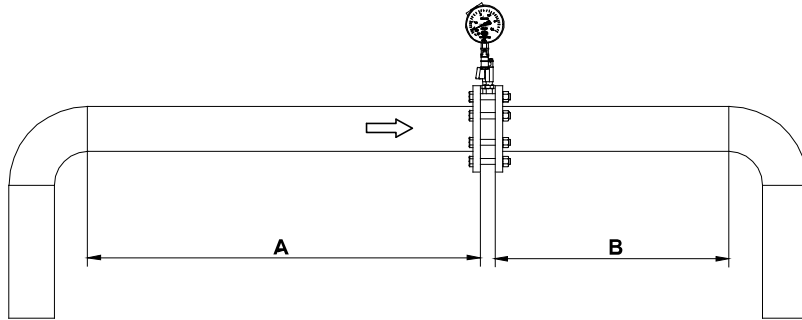
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### Pipe straight lengths:

Optimal accuracy is performed if the piping is in conformity to the VdS guidelines. The inlet and outlet pipe sections must not contain valves, elbows, diameter changes or the like.

When using a pump that create flow fluctuations, we recommend to extend the inlet distance from x10 ND to x18 ND. If vibrations causes unstable readings, a hose clearance may be used (Separate Minimes® flexible, length = 1500 mm).



Models	Minima for inlet straight pipe	Minima for outlet straight
	A [mm]	B [mm]
SMB 80	800	400
SMB 100	1000	500
SMB 150	1500	750
SMB 200	2000	1000
SMB 250	2500	1250

### MEASURING RANGES AND ACCURACY

Models	DN	Range [m <sup>3</sup> /min] <sup>1)</sup>	Ranges VdS directive		Max. deviation of F.S.	
			[m <sup>3</sup> /min]	(% on SMB-OE)	[m <sup>3</sup> /min]	[%]
SMB 80	80	0.4 - 2.1	0.6 (28,5 %) -	2.1 (100 %)	± 0.0525	± 2.5
SMB 100	100	0.6 - 3.4	1 (29.4 %) -	3.4 (100 %)	± 0.085	± 2.5
SMB 150	150	1.4 - 7.25	2 (27.58 %) -	7.25 (100 %)	± 0.18125	2.5
SMB 200	200	2.6 - 12.35	4 (32.35 %) -	12.35 (100 %)	± 0.30875	± 2.5
SMB 250	250	3 - 18.12	4 (22.85 %) -	18.12 (100 %)	± 0.453	± 2.5

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Flow measurement in  
stationary sprinkler systems  
**SMB**

06-06-2021

D-765.10-EN-AA

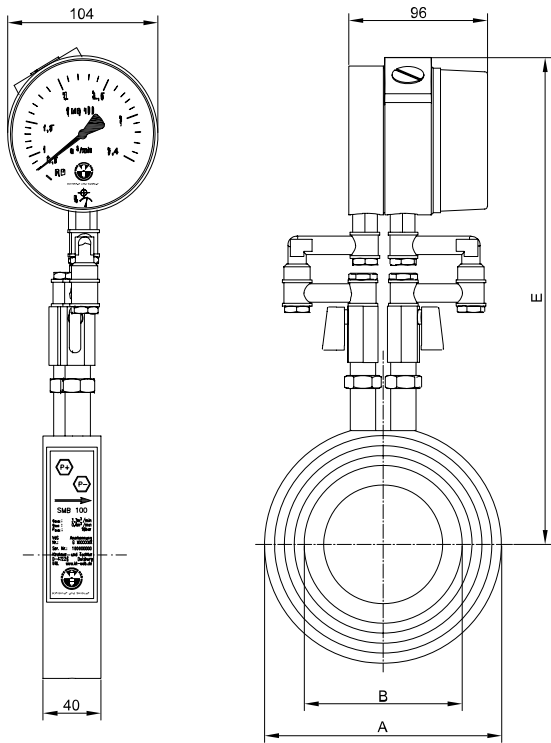
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**765-10/2**

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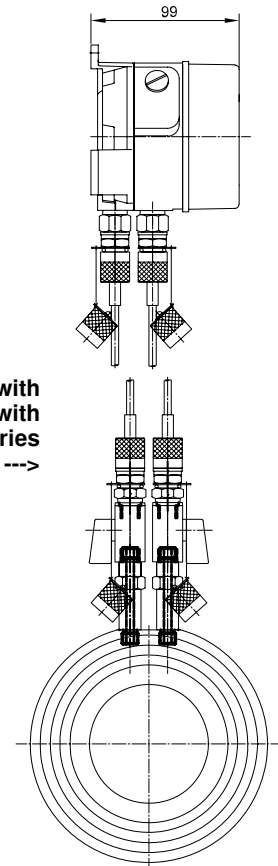
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## DIMENSIONS



**SMB / SMB-OE**

SMB / SMB-OE with  
remote display with  
flexible capillaries  
Minimess --->



Models	A [mm]	B [mm]	E [mm]
SMB 80	144	84.1	311
SMB 100	164	108.9	321
SMB 150	220	161.8	349
SMB 200	275	211.1	377
SMB 250	331	264.5	406

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Flow measurement in  
stationary sprinkler systems  
**SMB**

06-06-2021

D-765.10-EN-AA

**DEB**

**765-10/3**

# Electromagnetic flow-meter BAMOMATIC



- Ranges from 0.1 up to 250 l/min
- 2 Outputs: Analogue and pulse
- No moving parts
- Small dimensions
- High accuracy

## APPLICATIONS

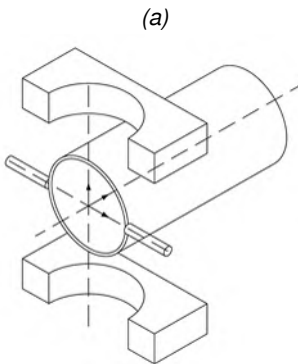
- Mechanical and industrial engineering fields
- Cleaning process
- Liquid dosage
- On board skids, etc.

## DESCRIPTION

BAMOMATIC is a flowmeter based on the principle of electromagnetic induction to measure flow-rate on electrically conductive liquids ( $> 20 \mu\text{S}/\text{cm}$ ). It is perfectly suited for dosing or totalizing liquids. Each instrument is calibrated on a bench test at  $\pm 5/1000$  pulses of water at  $23^\circ\text{C}$ . Density of the liquid, its temperature or its pressure have no influence on the measurement; No moving parts in this flow-meter: it ensures operations without mechanical wear.

The measuring principle is based on Faraday's law (a): In an electromagnetic flow-meter, the liquid section is in a magnetic field created by solenoid coils. Electrode sensors are located on a plane, perpendicular to the magnetic field, in contact with the (conductive) liquid, allowing measurement of the generated voltage. This voltage is directly proportional to the fluid velocity and therefore to the flow-rate (for a constant flow section).

(a): According to Faraday's law, electromagnetism principle, the voltage induced in a moving conductor through a magnetic field, is directly proportional to the conductor speed.



## TECHNICAL FEATURES

Electrical connections	Built-in 4-pin plug M12x1
Power supply	12 ... 24 V DC $\pm 10\%$
Consumption	Max. 3.6 W
Accuracy	$\pm 0.7\%$ of reading; $\pm 0.3\%$ of range (Factory tests with water at $23^\circ\text{C}$ )
Repeatability	$\pm 1\%$
Response time	$< 100$ ms
Electrical protection	Short-circuit proof; Protection against reverse polarity
Signal outputs	Push-pull square wave and 4-20 mA
Status display	Green LED: Flashing proportionally to the flow-rate
Nominal diameter	DN 3; DN 8; DN 15; DN 20; DN 25
Fittings	BSP-M: $\frac{3}{8}$ "; $\frac{1}{2}$ "; $\frac{3}{4}$ "; 1"; $1\frac{1}{4}$ "
Materials	Housing: ABS Fittings and measuring tube: PVDF Option: POM Sealing: EPDM seals Electrodes: Stainless steel 316 L (1.4404) Option : Hastelloy C electrodes and FPM seals
Minimum conductivity	$20 \mu\text{S}/\text{cm}$
Pressure limits	10 bar at $20^\circ\text{C}$ ; 8 bar at $40^\circ\text{C}$ ; 6 bar at $60^\circ\text{C}$
Operating temperature	Liquid: $-10 \dots +60^\circ\text{C}$ Ambient: $+5 \dots +60^\circ\text{C}$ ; Storage: $-15 \dots +60^\circ\text{C}$
Protection	IP 65 (cable connected) according EN 60529

**EC Conformity:** The instrument meets the legal requirements of the current European Directives.

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## Electromagnetic flow-meter BAMOMATIC

22-10-2020

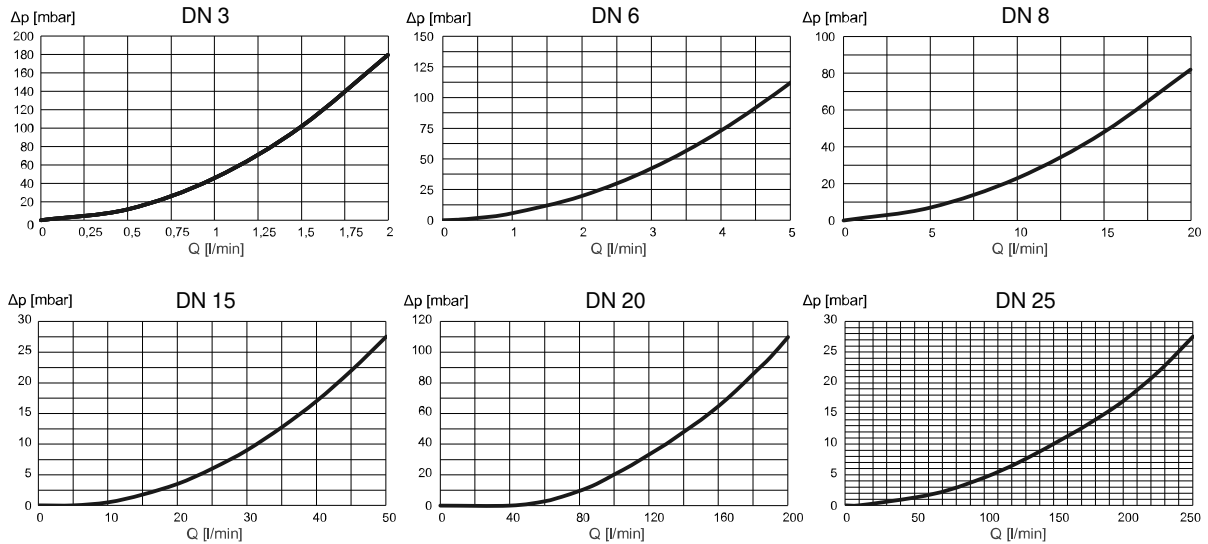
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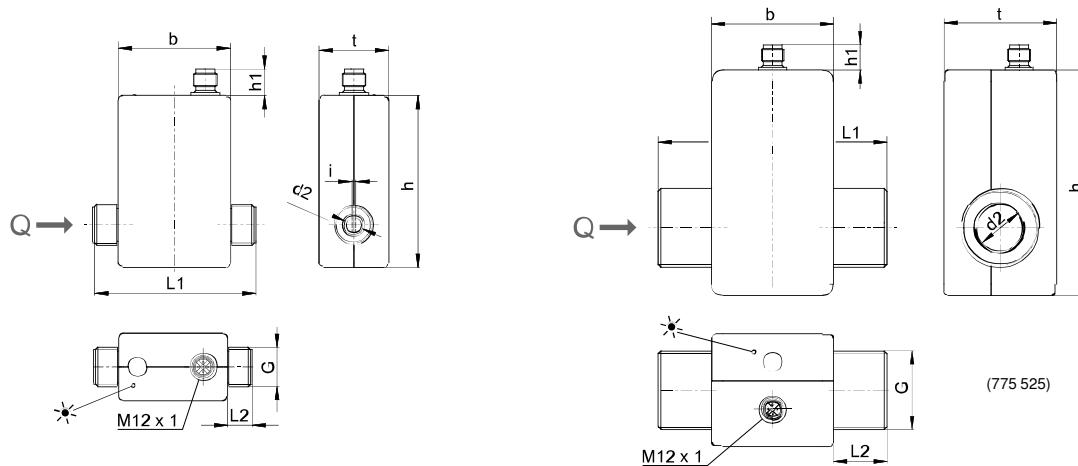
## PRESSURE DROP vs. FLOW-RATE



### CODE NUMBERS AND REFERENCES

Code	Tube material	Fittings (BSP-M)	DN	Inner Ø [mm]	Range [l/min]	Pulse/l	Resolution [ ml/pulse ]
775 503	PVDF	3/8"	3	3	0.1 ... 2	10,000	0.1
775 506	PVDF	1/2"	8	8x2.5 rectangular section	0.25 ... 5	4,000	0.25
775 508	PVDF	1/2"	8				
775 515	PVDF	3/4"	15	14	2.5 ... 50	400	2.5
775 520	PVDF	1"	20	18	5 ... 200	200	5
775 525	PVDF	1 1/4"	25	25	12.5 ... 250	80	12.5

### DIMENSIONS



Code	L1 [mm]	L2 [mm]	G	d2 [mm]	b [mm]	h [mm]	h1	t [mm]	Mass [g]
775 503	85	13	3/8"	Ø 3	58	89	13.5	36	360
775 506	85	13	1/2"	Ø 8	58	89	13.5	36	360
775 508	85	13	1/2"	Ø 8	58	89	13.5	36	360
775 515	90	16	3/4"	Ø 14	58	89	13.5	36	360
775 520	90	16	1"	Ø 18	58	89	13.5	36	360
775 525	122	28.5	1 1/4"	Ø 25	65	120	13.5	60	360

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## Electromagnetic flow-meter BAMOMATIC

22-10-2020

D-775.02-EN-AB

### DEB

### 775-02/2

# Ultrasonic flow-meter BAMOFLONIC



PSU version (ND 10 to 25)



HD-PE version (ND 32 to 50)

- 7 models ND 10 to ND 50
- Flow ranges from 0.3 up to 900 l/min
- Analogue output: 0/4-20 mA
- Digital output to set on site
- Back-lighted display

## APPLICATIONS

Flow measurements on conductive and non-conductive liquids in various industrial, cosmetic and food applications.  
Examples: Demineralized water, liquid cosmetics, bases, acids, etc.

## DESCRIPTION

BAMOFLONIC applies propagation ultrasonic waves principle to measure the speed of a liquid, then to calculate the corresponding flow-rate. Therefore, It is convenient for liquids electrically conductive or not.  
Important: The liquid must be clear and homogeneous.

The absence of a moving part ensures its operation without mechanical wear. Wet parts are of PSU or of HD-PE

## TECHNICAL FEATURES

Power supply	24 V DC / 3.6 W
Outputs	Digital output: to set as pulses (0.1 to 3000 ml/pulse) or empty tube alert, flowing back alarm, dosage, or min./max. flow alarm. Analogue output: 0/4 ... 20 mA, scalable
Display	Alphanumeric back lighted LCD display
Connexions	Connector M12 -5 pins (supplied)
Accuracy	±2 % of reading and ±3 mm/s
Repeatability	≤ 0,5 %
Liquid temperature limits:	0... +80 °C for version in PSU, ND 10 to 25 0... +50 °C for version in HD-PE, ND 32 to 50
Pressure limits	16 bar max. at 20 °C (PSU, ND 10 & 15) 10 bar max. at 20 °C (PSU, ND 20 & 25) 7 bar max. at 20 °C (HD-PE, ND 32 to 50)
Protection	IP 67 for PSU ND 10 to 25; IP 65 for HD-PE ND 32 to 50
Fittings	BSP threads (standard) PVC Unions (see accessories) <i>Other fittings on request: Straight tube, Clamp DIN 11864</i>
Materials	PSU (Polysulfone): ND 10 to 25; 2 EPDM flat seals HD-PE: ND 32 to 50; 2 EPDM flat seals
<b>Options</b>	
Digital input	To start a dosage (Connector M12 - 8 pins)
Accuracy	±1 % of reading and ±3 mm/s, ±6 mm/s for NB 10 - 3/8" (according to VDI/VDE 2642)
Remote interface	To set all parameters (Adaptor USB/ RS485 with software), or remote display module

**EC conformity: The instrument meets the legal requirements of the current European Directives**

### Accessories:

- Kit of PVC fittings for solvent welding
  - Relay, for interfacing a dry contact
- See table Codes and references

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Ultrasonic flow-meter  
**BAMOFLONIC**

16-01-2020

D-776.01-EN-AG

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776-01 /1

## CODE NUMBERS AND REFERENCES

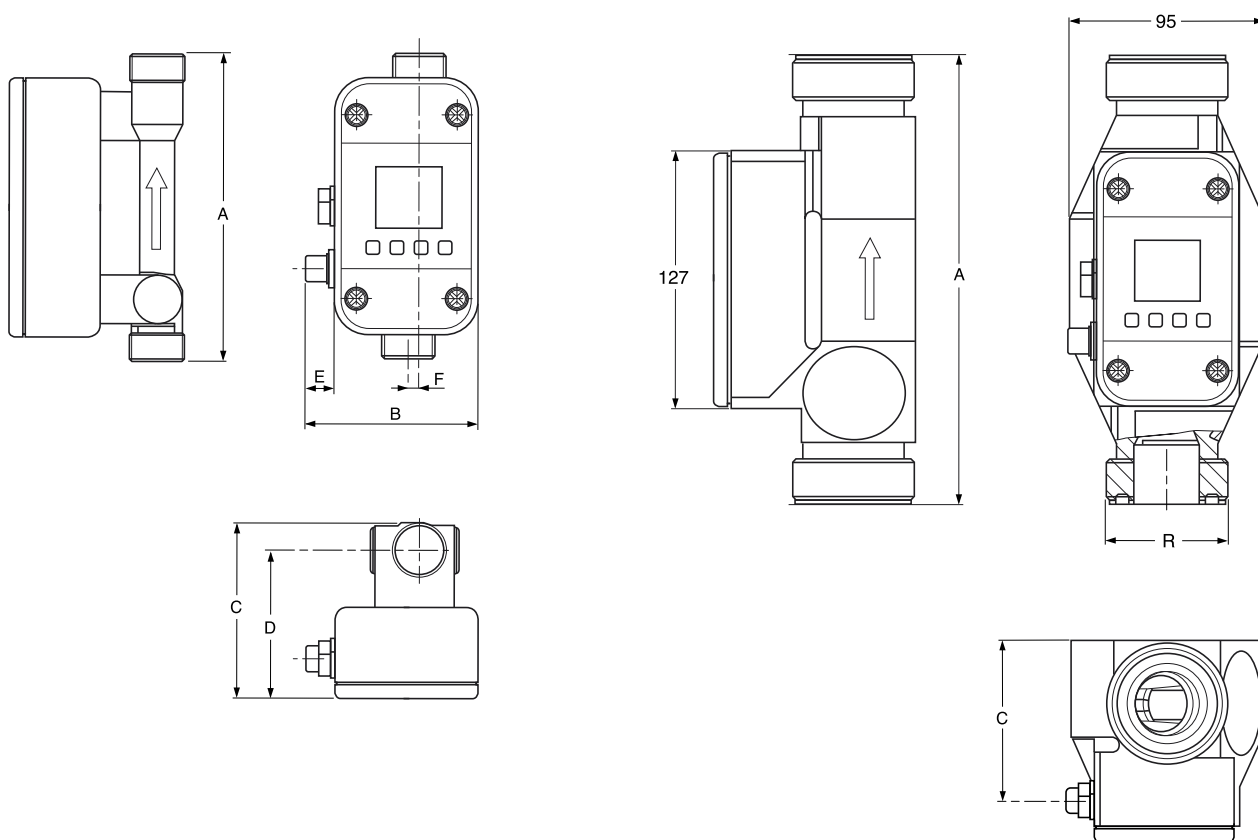
Code	Reference	ND	Measuring scale		Fittings	
			l /min	l /h	BSP (standard)	PVC (kit)
776 010	BAMOFLONIC DN10	10	0.3 ... 21	18...1260	1/2"	776 910
776 015	BAMOFLONIC DN15	15	0.9 ... 36	54...2160	3/4"	776 915
776 020	BAMOFLONIC DN20	20	3.5 ... 60	210...3600	1"	776 920
776 025	BAMOFLONIC DN25	25	5.0 ... 240	300...14 000	1 1/4 "	776 925
776 027	BAMOFLONIC DN32	32	6...300	360...18 000	2"	-
776 028	BAMOFLONIC DN40	40	24...500	1440...30 000	2 1/4"	
776 029	BAMOFLONIC DN50	50	45...900	2700...54 000	2 3/4"	

### Accessory

251 260	RSZE*	Relay for dry contact, 24 V DC; Outputs: 2 changeover contacts, 8 A, 260 V AC, status display by LED
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\* To connect to the digital output configured as NPN or PNP.

## DIMENSIONS



ND	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	Mass (kg)
10	147	84	83	70.5	15	5	0,332
15	147	84	84.5	71.1	15	5	0,344
20	160	84	94.2	77.6	15	5	0,414
25	168	84	98.5	77.6	15	5	0,454
32	220	97	99				1,000
40	220	97	122				1,100
50	220	97	131				1,200

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Ultrasonic flow-meter  
**BAMOFLONIC**

16-01-2020

D-776.01-EN-AG

**DEB**

**776-01 /2**

# Ultrasonic flow-meter BAMOFLONIC - PFA



- 4 models ND 7 to ND 20
- Measuring ranges from 0.09 up to 120 l/min
- Wet parts in PFA; Casing in PP
- 1 Analogue output 0/4-20 mA
- 1 Digital output, to set up

## APPLICATIONS

Flow measurements or dosing sequences of aggressive or neutral liquids:

- Chemicals strongly alkaline or acidic
- CIP (Clean In Place)
- Lixiviates, etc.

## DESCRIPTION

BAMOFLONIC - PFA applies propagation ultrasonic waves principle to measure the speed of a liquid, then to calculate the corresponding flow-rate. Therefore, it is convenient for liquids electrically conductive or not.

Note: The liquid must be homogeneous and clear.

As no moving parts are concerned, BAMOFLONIC operates without mechanical wear. Wet parts are of PFA.

BAMOFLONIC - PFA can operate without its remote display unit. If liquid properties are different to water (viscosity, waves propagation, etc.), it is recommended to use the remote display unit. It allows to display and modify the flow-meter parameters (output signals, reset of totalizer, dosing function, etc.).

## TECHNICAL FEATURES

Power supply	24 V DC / 3.6 W
Outputs	1 Digital output (to set as pulses or empty tube alarm, reverse flow, dosage, min. or max. flow-rate) 1 Analogue output 0/4-20 mA
Interface	For settings and/ or display on remote unit
Connector	M12, 5 pins (included)
Accuracy	± 2 % of reading and ± 0.3 mm/s
Repeatability	≤ 0.5 %
Liquid temperature	0... +60 °C
Pressure	6 bar at 20 °C
Protection	IP 65
Fittings	Quick coupling connectors (flare type, see the table)
Materials	Body: PFA (Perfluoralkoxy); Casing: PP

### Options:

Digital input	To launch a dosage (Connector M12 8 pins)
Accuracy	± 1 % of reading and ± 0.3 mm/s

**EC Conformity:** The instrument meets the legal requirements of the current European Directives



Remote display unit for  
BAMOFLONIC - PFA

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Ultrasonic flow-meter  
**BAMOFLONIC - PFA**

12-07-2018

D-776.02-EN-AA

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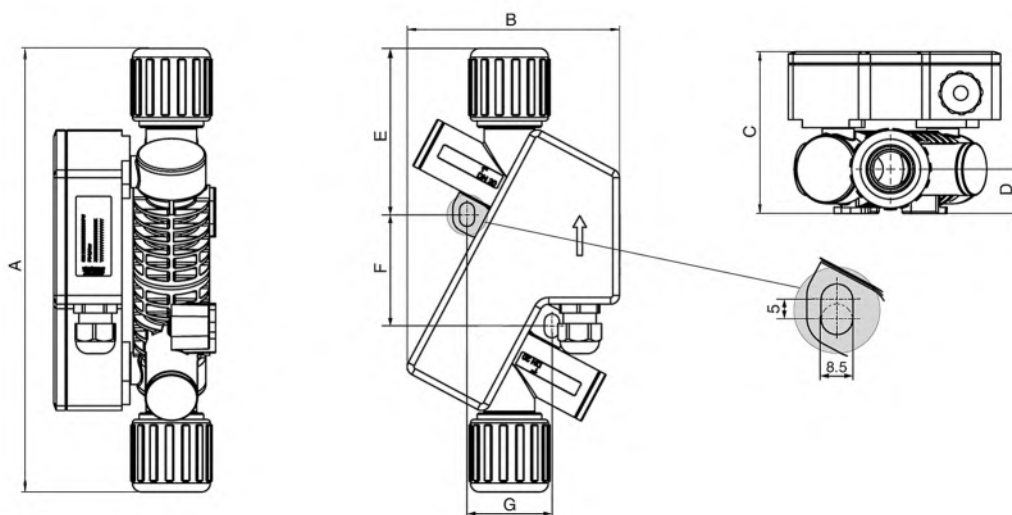
776-02/1

## CODE NUMBERS AND REFERENCES

Code	Reference	ND	FLARE couplings	Range	
				l/min	l/h
776 008	BAMOFLONIC PFA DN7	7	3/8"	0.09 ... 6.00	5.4 ... 360
776 011	BAMOFLONIC PFA DN10	10	1/2"	0.3 ... 24	18...1440
776 016	BAMOFLONIC PFA DN15	15	3/4"	0.9 ... 60	54...3600
776 021	BAMOFLONIC PFA DN20	20	1"	1.2 ... 120	72...7200

On request: Low flow-rate, from 0.03 ... 6.0 l/min (ND 7 / raccord 3/8")

## DIMENSIONS

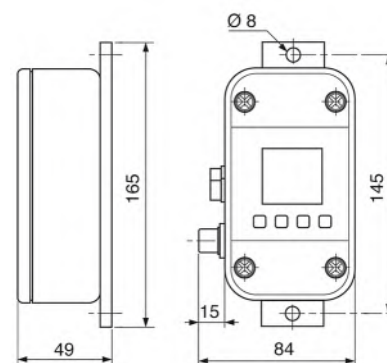


ND	Fittings	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	Mass [kg]
7	3/8"	218	120	79	16	77	63	48	1.3
10	1/2"	219.5	120	79	16	78.5	64	48	1.3
15	3/4"	227	120	82	19	82	64	48	1.3
20	1"	251	120	91.5	25	94	64	48	1.6

## REMOTE DISPLAY UNIT

**Code** 776002  
**Reference** Remote display for BAMOFLONIC - PFA

Housing IP 65; in PSU (Polysulfone),  
 anodized aluminum wall bracket  
 Power supply 18 ... 30 V DC, 3.6 W  
 Connector M12; 5 pins  
 Ambient temperature +5 ... +60 °C  
 Storage temperature 0... +70 °C  
 Display LCD; Backlighted  
 Keypad 4 keys



**EC Conformity:** The instrument meets the legal requirements of the current European Directives

Remote display unit is supplied with a 5 m long cable (connector 5 pins fitted), a Te connector and an electric plug "Europlug" (5 pins connector). The set allows display and modification of settings of flow-meter, as well as recovering of output signals.

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Ultrasonic flow-meter  
**BAMOFLONIC - PFA**

12-07-2018

D-776.02-EN-AA

**DEB**

**776-02/2**



# Ultrasonic flow-meter BAMOFLONIC 42i



- For liquids electrically conductive or not
- Ranges from 0.024 up to to 60 l/min
- Wet parts all in PE-HD
- 1 Analogue output 0/4-20 mA
- 1 Digital output (various functions)

## APPLICATIONS

The BAMOFLONIC 42i is well suited for measuring flow and dosing liquids:

- Demineralized water, cosmetics, liquid foods
- Toxic chemicals
- Aggressive liquids such as acids and alkalis

## DESCRIPTION

BAMOFLONIC 42i applies propagation ultrasonic waves principle to measure the speed of a liquid, then to calculate the corresponding flow-rate.

Therefore, it is convenient for liquids electrically conductive or not.

BAMOFLONIC 42i has no moving components and is therefore wear-free.

The device is characterized by its high measuring accuracy and reproducibility. Some liquids or their concentrations, are not compatible with the ultrasonic measuring principle; Please, contact us for information.

## TECHNICAL FEATURES

Power supply	24 V DC / 3,6 W
Outputs	1 Digital output to set up (pulses or alarm for empty tube, flowing back alarm, dosage, or min./max. alarms). 1 Analogue output 0/4 ... 20 mA, scalable
Display	Alphanumeric back lighted LCD display
Electrical connection	Connector M12 (5 pins)
Accuracy	Standard, $\pm 2\%$ of reading and $\pm 3$ mm/s (According VDI/VDE 2642)
Repeatability	$\leq 0.5\%$
Liquid temperature	0... +60 °C
Pressure	max. 7bar at 20 °C
Protection	IP 65
Fittings	Internal threads BSP
Materials	PE-HD (option: PVDF for ND10)
Options	Access to engineering parameters with USB/RS485 adaptor and software Remote display Accuracy: $\pm 1\%$ of reading and $\pm 3$ mm/s

**EC Conformity: The instrument meets the legal requirements of the current European Directives**

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Ultrasonic flow-meter  
**BAMOFLONIC 42i**

19-10-2018

D-776.04-EN-AB

**DÉB**

**776-04/1**

## CODE NUMBERS AND REFERENCES

ND	Code	Measuring range		Fittings
		l/min	l/h	
5	776 030	0.024 ... 3	1.44 ... 180	G1/2"
7	776 032	0.09 ... 6	5.4 ... 360	G1/2"
10	776 034	0.3 ... 24	18 ... 1440	G3/4"
15	776 036	0.9 ... 60	54 ... 3600	G1"

**On request: Wet parts in PVDF for ND10 (code 776 044)**

Measuring ranges at constant flow-rate, for pulsating flow-rate from 0.5 l/h (= 0.008 l / min)

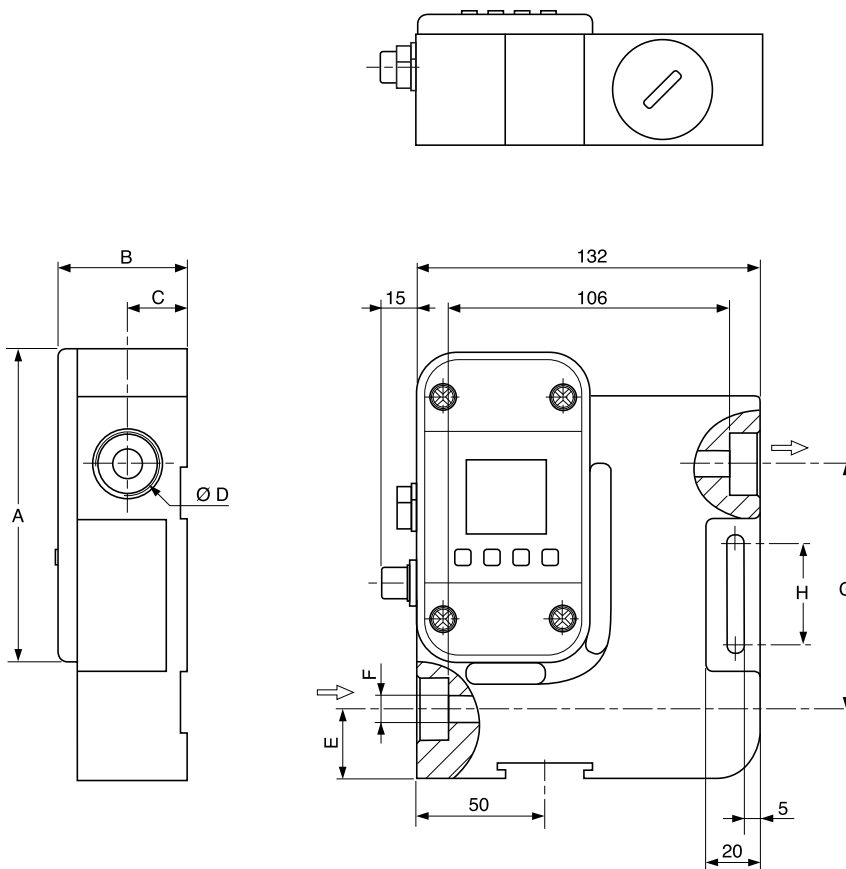
Fitting adaptor (in option): BSP 1/2", 3/4", 1" on request

### Accessories:

Code	Reference	Description
251 260	RSZE*	Interfacing relay 24 V DC, 2 change-over contacts, 8 A / 260 V AC, LED indicator of status

\* To connect to the digital output (set as NPN or PNP output)

## DIMENSIONS / WEIGHT



ND	A [mm]	B [mm]	C [mm]	D [inch]	E [mm]	F [mm]	G [mm]	H [mm]	Mass [kg]
5	168	50	23	G1/2"	25	7	98	40	0.670
7	168	50	23	G1/2"	25	7	98	40	0.670
10	171	50	23	G3/4"	26.5	10	95	40	0.720
15	176	55	25	G1"	29	15	90	30	0.895

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Ultrasonic flow-meter  
**BAMOFLONIC 42i**

19-10-2018

D-776.04-EN-AB

**DÉB**

**776-04/2**



# Paddle wheel flow sensor BAMOFLU 100



- On-line flow sensor
- From ND 15 up to ND 600
- Output: Rectangular pulses
- Materials: PVC, PPH, PVDF or AISI 316

## APPLICATIONS

BAMOFLU is designed for neutral or slightly aggressive liquids, free from solid particles (demineralized water, pool water after filtration, etc.)

## DESCRIPTION

The liquid flow, causes rotation of a 5-blade paddle wheel with magnetic inserts. Variations of magnetic field produce pulses whose frequency is directly proportional to the speed of the fluid.

The liquid may content no more than 2 % of solid particules, non-magnetique and size < 0.5 mm.  
The viscosity may be between 0.5 and 20 cSt, beyond which an on-site calibration will be necessary.

### Commissioning recommendations:

- The pipeline must always be full
  - Do not have liquid / gas interfaces
  - The flow-rate must be between 0.8 and 10 m/s
- Refer to the manual for the required straight lengths.*

## TECHNICAL FEATURES

Output	From 38 to 45 Hz according fitting vs. pipe I.D. Rectangular pulses, 5 ... 24 V DC
Power supply	7 ... 30 V DC / 30 mA (stabilized) Sensor protected against reverse polarity
Measuring range	0.8 ... 10 m/s
Accuracy	± 1 % With calibrated frequency converter
Repeatability	± 0.5 %
Linearity	± 1 %
Pressure limits	PPH & PVDF: 10 bar at 20 °C AISI 316 L: 25 bar (with stainless steel nut)
Temperature limits	PVC: 40 °C; PPH: 85 °C; PVDF & AISI 316: 100 °C
Body	PPH or PVDF or AISI 316 L
Paddle wheel	E-CTFE (Halar)
Rotor shaft	Ceramic (Al <sub>2</sub> O <sub>3</sub> )
Seals	FPM (standard); EPDM on request
Connector	Plug DIN 43 650, IP 65

**EC Conformity:** The instrument meets the legal requirements of the current European Directives

## CODE NUMBERS AND REFERENCES

Code	Reference	Description
780 100	BAMOFLU 100 - PVC	PVC paddle wheel flow sensor
780 125	BAMOFLU 100 - PPH	PPH paddle wheel flow sensor
780 150	BAMOFLU 100 - PVDF	PVDF paddle wheel flow sensor
780 175	BAMOFLU 100 - AISI 316	AISI 316 L paddle wheel flow sensor

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Paddle wheel flow sensor  
**BAMOFLU 100**

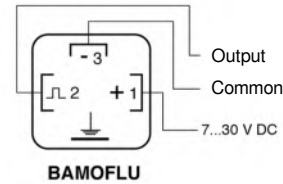
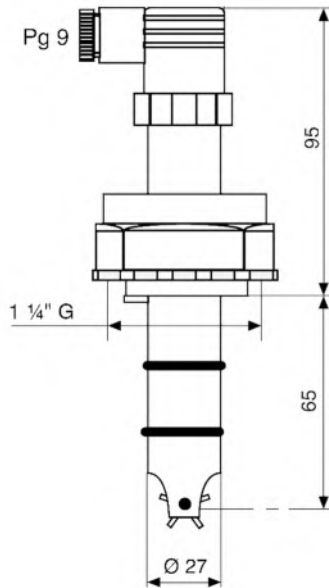
29-12-2020

D-780.01-EN-AD

**DÉB**

**780-01 /1**

## DIMENSIONS



## RELATED CONVERTERS

Our converters are delivered set up according the application parameters confirmed with the purchase order: Flow rate max. and pipe I.D. For programmable converters, the setting is saved to nonvolatile internal memory (EEPROM type).

### BIF 6040: Flow-rate indicateur and counter

The BIF 6040 provides display by red LED of instantaneous flow and flow totalization.

It is fully configurable on site without any simulator.

It provides a power supply of 24 V DC to the sensor (12 V DC on request).

Panel mount, standard cut: 48 x 96 mm.

(Data-sheet 282-01)

### BCP 48: Counter and downcounter

The BCP 48 performs simple counting or a dosage.

Set up may be done on site without a simulator.

It provides a power supply of 12 V DC to the sensor.

Panel mount, standard cut: 48 x 45 mm.

(Data-sheet 289-03)

### BAMOTOP 281: Frequency converter

The BAMOTOP 281 converts the pulse signal into an analogue signal 0/4 ... 20 mA , or, 0/2 ... 10 V.

This converter is delivered with a set up according the application parameters confirmed with the purchase order.

Rail DIN mounting (DIN 35).

It provides a power supply of 12 V DC to the sensor.

(Data-sheet 281-01)



BIF 6040



BCP 48



BAMOTOP 281

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Paddle wheel flow sensor  
**BAMOFLU 100**

29-12-2020

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**780-01 /2**

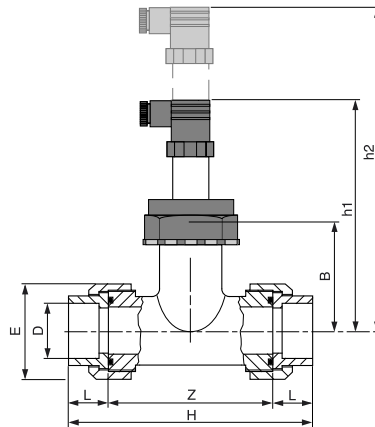
## MOUNTING ACCESSORIES

### Mounting Tees:

The mounting tees in PVC, PPH, PVDF or AISI 316L are convenient for pipes from ND 15 to ND 40 with half-unions and FPM seals (flanges or to weld on site: on request).

For pipe inner diameters ND 15 to ND 300, we can supply sleeves with flanges, center to center = 250 mm (Materials: on request).

Pressure limit 10 bar at 20 °C  
 Temperature limit Depending of sensor material  
 Fitting PVC: Solvent welding; PPH or PVDF: Fusion welding



#### PVC version

Code	ND	D	R	H	Z	L	B	E	h1	h2
780 205	15	20	1"	113	81	16	73	53	168	243
780 207	20	25	1 1/4"	126	88	19	80	62	170	245
780 209	25	32	1 1/2"	139.5	95.5	22	81	71	173	248
780 211	32	40	2"	170	118	26	84	84	177	252
780 213	40	50	2 1/4"	199	137	31	82,5	98	181	256

#### PPH version

Code	DN	D	R	H	Z	L	B	E	h1	h2
780 240	15	20	1"	111	73	14.5	73	53	168	243
780 242	20	25	1 1/4"	120.5	80	16	80	62	170	245
780 244	25	32	1 1/2"	133.5	81	18	81	71	173	248
780 246	32	40	2"	163.5	84	20.5	84	84	177	252
780 248	40	50	2 1/4"	195	82.5	23.5	82.5	98	181	256

#### PVDF version

Code	DN	D	R	H	Z	L	B	E	h1	h2
780 260	15	20	1"	111	82	14.5	73	53	168	243
780 262	20	25	1 1/4"	120.5	88.5	16	80	62	170	245
780 264	25	32	1 1/2"	133.5	97	18	81	71	173	248
780 266	32	40	2"	161.5	120.5	20.5	84	84	177	252
780 268	40	50	2 1/4"	193.5	146.5	23.5	82.5	98	181	256

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Paddle wheel flow sensor  
**BAMOFLU 100**

29-12-2020

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**780-01/3**

### Supporting collars:

For mounting on plastic pipes only (PVC, PE or PPH), we supply support collars in PP or PVC-C with NBR seal.

### Simplified BAMOFLU mounting:

The support collar is delivered with the special adaptor to fit the BAMOFLU to the threaded sleeve of the collar.  
The fitting is pre-mounted on the collar and does not require any adjustment on site.  
The complete assembly respects the immersion distance ( $0.12 \times \text{ØD}$ ).

### Technical features:

Pipeline	From ND 40 (O.D. 50 mm) up to ND 100 (O.D. 110 mm)
Body	Polypropylene or PVC-C
Adaptor	PPH or PVC-C
Seal	O-ring in NBR (EPDM or FPM on request)
Screws	Galvanized steel
Pressure limit	10 bar at 20 °C
Temperature limit	55 °C

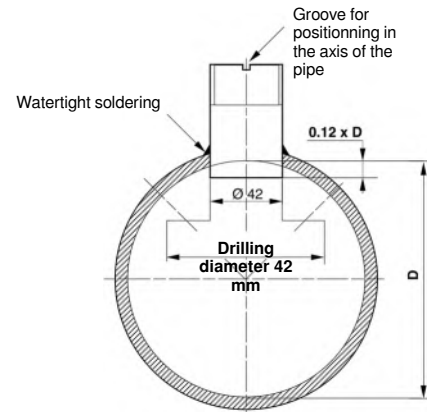


Supporting collar including fitting for BAMOFLU

PE/ PPH version		PVC-C version		Dimensions		
Code	Reference	Code	Reference	ND	Ø d	R
780 901	COL 50 PE	-	-	40	50	1 ½"
780 906	COL 63 PE	780 907	COL 63 PVC-C	50	63	2"
780 911	COL 75 PE	780 912	COL 75 PVC-C	65	75	2 ½"
780 916	COL 90 PE	780 917	COL 90 PVC-C	80	90	3"
780 921	COL 110 PE	780 922	COL 110 PVC-C	100	110	4"

### BF150 adaptor:

Adaptors available for pipes from ND 50; In AISI 316L, PVC, PPH or PVDF. The adaptor allows sensor mounting on-line.  
For mounting with adaptors( BF150 ), it is important to respect the immersion distance specified on the drawing.  
This dimension complies with the standard ISO 7145-1982, respecting relation with inner diameter  $0.12 \times \text{ØD}$



Code	Reference	Description
780 200	BF 150-I	Aaptor in AISI 316 L for welding
780 201	BF 150-PVC	Adaptor in PVC for welding
780 202	BF 150-PPH	Adaptor in PPH for welding
780 203	BF 150-PVDF	Adaptor in PVDF for welding

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Paddle wheel flow sensor  
**BAMOFLU 100**

29-12-2020

D-780.01-EN-AD

**DÉB**

**780-01 /4**

# Turbine flow sensor FFG



- **Applications: Totalization; Low flow-rates**
- **Versions: Or in Arnite, or in PVDF**
- **Ranges: From 2 up to 940 l/h**
- **High resolution frequency output**
- **Fitting: BSP 1/4"**

## APPLICATIONS

- With neutral or aggressive liquids
  - Clear liquids free of particles, non-crystallizing.
- The flow must be homogeneous and piping always full of liquid.  
(FFG turbine type is not suitable for measuring gas flow)

## DESCRIPTION

The FFG flow sensor allows measurements of low flow-rates for remote reading or totalization with appropriate monitors (See Codes and References on next page)

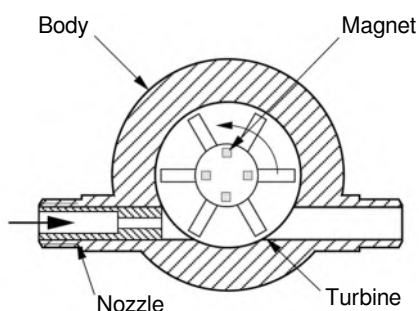
The dynamic pressure of the liquids makes rotate the turbine. The liquid passes through a calibrated nozzle, which increases its speed and that of the turbine. Magnets are integrated to the turbine and activate an Hall effect sensor inside the top cover. The electronic generates a pulsating signal, proportional to the speed of rotation of the turbine and therefore to the flow-rate.

### Recommendations for assembly:

The FFG works in any position, but it is recommended to mount it on a horizontal axis, with its upper body in a horizontal plane, to obtain reliable and precise measurements.  
Respect the straight pipe section of 150 mm upstream and 50 mm downstream in order to obtain a uniform flow.  
Installing an upstream filter prevents suspended particles from blocking the turbine (during commissioning, and, normal operation).

### Associated electronics:

- BAMOWIZ : Flow rate indicator and flow totalizer, digital and graphical display, relays and analogue outputs (Data-sheet 217-01)
- BIF 6040: Flow indicator and totalizer with options for thresholds and analogue output (Data-sheet 282-01)
- BCP 48: Counter and downcounter for dosage with 2 set points (Data-sheet 289-03)
- BAMOTOP 281: Frequency converter for analogue output 0/4-20 mA or 0/5-10 V (Data-sheet 281-01)



Option: BAMOWIZ monitor

All these electronic monitors include supply to the sensor FFG and can be set up before shipment according your specifications.

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Turbine flow sensor  
FFG

20-01-2021

D-784.01-EN-AD

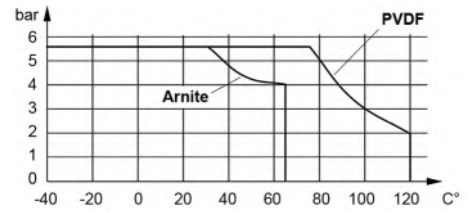
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784-01 /1



## TECHNICAL FEATURES

Measuring ranges	According the nozzle size: 2 to 35 l/h - up to 10 to 550 l/h of water PVDF model, without nozzle: 150 to 940 l/h
Accuracy	± 1 % F.S. with scale factor 1:10 ± 2 % F.S. with scale factor 1:25
Repeatability	> 0.25 %
Temperature	Ambient: 0 ... + 40 °C Limits: See the diagram Pressure vs. Temperature
Viscosity	0.2 ... 20 cSt



Pressure vs. temperature diagram

### Materials:

Body / Sealing	PVDF / FPM Arnite / Silicone
Turbine	PVDF
Nozzle	PTFE
Turbine axes	PCTFE

Power supply	4.5 ... 24 V DC
Consumption	Max. 20 mA
Output signal	Open collector - NPN - Max. load 20 mA
Connections	Plug DIN 43650, IP65
Accepted cable	3 x 0.75 mm <sup>2</sup> , shielded; Max. 100 meters 3 x 0.75 mm <sup>2</sup> , without shield; Max. 30 meters
Fittings	BSP 1/4"
Mass	185 g

**EC Conformity:** The instrument meets the legal requirements of the current European Directives.

## CODE NUMBERS AND REFERENCES

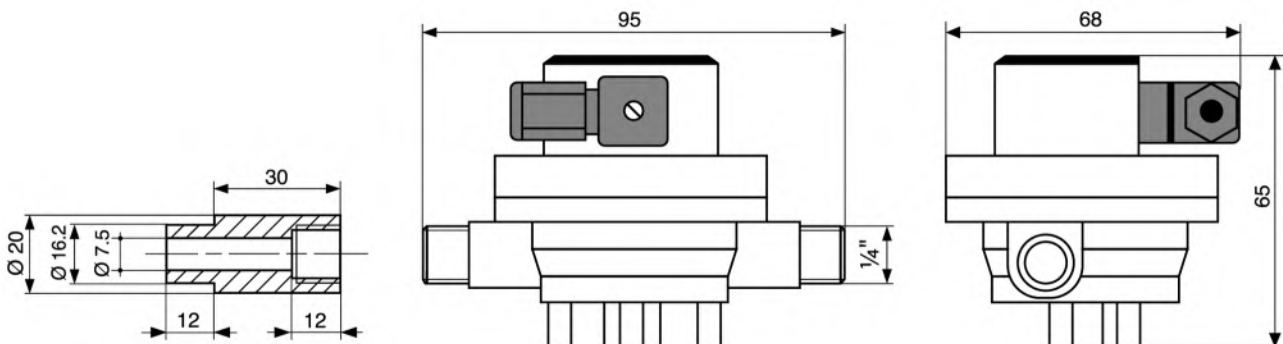
Below, values should be considered as approximated values.

Code	Reference	Description	Code	Description	Flow range*	Pulses **
784 606	FFG 6/PVDF	Flow sensor PVDF / FPM seal; Max. 950 l/h	784 001	Nozzle, Ø 1 mm, PTFE	1.2 ... 35 l/h	3413 pulse/l
			784 002	Nozzle, Ø 2 mm, PTFE	3...140 l/h	1687 /l
			784 003	Nozzle, Ø 3 mm, PTFE	7...340 l/h	1045 /l
			784 004	Nozzle, Ø 4 mm, PTFE	10...550 l/h	721 /l
784 406	FFG 6/A	Flow sensor Arnite / Silicone seal; Max. 465 l/h			14 ... 465 l/h	343 pulse/l
784 101	R1/4-FFG/PVC	U-PVC coupling BSP-F 1/4" diam. 16 mm (solvent welding to piping)				

\* Maximum flow rates are for a pressure drop of 1 bar, P<sub>max</sub> 3.3 bar Higher flow rates may be possible, but, the pressure drop would increase by the square of flow rate.

\*\* : The number of pulses per litre may differ depending on the installation. We recommend to calibrate the device on site (pulses per litre) according to the installation.

## DIMENSIONS



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Turbine flow sensor  
**FFG**

20-01-2021

D-784.01-EN-AD

**DEB**

**784-01 /2**

# Low flow-rate flowmeters 1900/1901/1903



- Direct reading of low flow-rates
- 3 models - C to C (A): 100, 170 or 320 mm
- ATEX version on request
- Pressure limit: 16 bar
- Temperature: -20 ... +100 °C
- Borosilicate glass tube
- Protection screen: PMMA (Ex version: PCC)
- Sealing: rubber, FPM, EPDM
- Fittings: NPT-F or BSP-F size 1/4"
- **OPTIONS:**  
Pressure regulator  
Inductive contacts

## APPLICATIONS

Direct reading flow indicators with adjustment valve for low flow rates of liquids or gases (valve on request for models 1901 and 1903)

## PRINCIPLE

Variable area flowmeters: the diver ("float") moves inside a conical measuring tube.

## LIMIT SWITCHES

Inductive type: Only for metal float; Cable output; Supplied with 1 m long cable  
Add an amplifier relay providing an appropriate power supply to the inductive contact

For contact in ATEX version: the contact must be connected via an Intrinsic Safety relay (RDN11, data-sheet 250-03)

## CODE NUMBERS AND REFERENCES

Code	Type	Materials (body, valve)	C to C A [ mm ]	Height scale	Length B [ mm ]	Accuracy
790 101	1900	PVC	100	63	128	±5 %
790 200	1900	AISI 316 L	100	63	128	
790 300	1901	AISI 316 L	170	90	198	±3 %
790 400	1903	AISI 316 L	320	240	348	

## OPTIONS, ACCESSORIES

Code	Description
790 035	Inductive contact, monostable
790 037	Inductive contact, bistable
251 011	Intrinsic safety relay RDN 11 (NAMUR)
790 051	Protection screen for 1901 model without contact
790 053	Protection screen for 1903 model without contact
790 205	Needle valve for stainless steel models with range ≤ 60 NI/h

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Low flow-rate flowmeters  
**1900/1901/1903**

15-02-2021

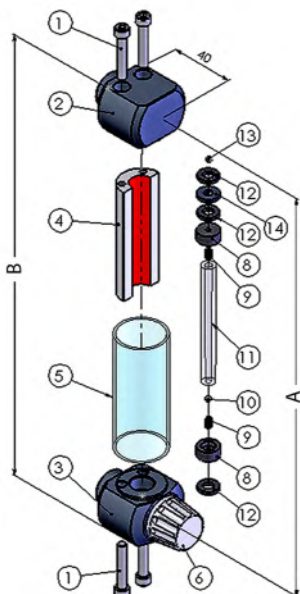
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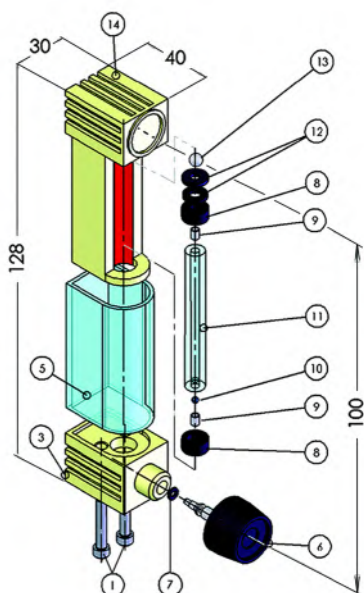
790-01 /1



1900; 1901; 1903 valve/ISI 316 L body and



1900 - PVC body and valve



- 1) Screw
- 2) Top armature
- 3) Bottom armature/ needle valve
- 4) Rear frame
- 5) PMMA Protection screen
- 6) Valve needle
- 7) O-ring seal
- 8) Reading tube seal
- 9) Spring
- 10) Float
- 11) Reading tube
- 12) Washer
- 13) On request: Check ball
- 14) PVC flowmeter armature

## TECHNICAL FEATURES

1900 model		
Float material	AIR scale: 20 °C & 1 bar ABS	Water scale at 20 °C
Glass	1...10 NI/h	-
AISI 316 L	2,5...25 NI/h	-
Glass	3...30 NI/h	-
AISI 316 L	5...60 NI/h	0,025...0,85 l/h
Glass	10...100 NI/h	0,2...2 l/h
AISI 316 L	20...190 NI/h	0,5...5 l/h
Glass	20...250 NI/h	0,25...6 l/h
AISI 316 L	40...460 NI/h	1...13 l/h
Glass	50...600 NI/h	0,5...15 l/h
AISI 316 L	100...1100 NI/h	3...36 l/h
Tungsten carbide	150...1600 NI/h	5...50 l/h
Glass	250...850 NI/h	4...20 l/h
AISI 316 L	450...1600 NI/h	13...50 l/h
Tungsten carbide	400...2000 NI/h	15...70 l/h

1901 model		
Float material	AIR scale: 20 °C & 1 bar ABS	Water scale at 20 °C
Glass	85...850 NI/h	2...20 l/h
AISI 316 L	160...1600 NI/h	5...50 l/h
Tungsten carbide	200...2000 NI/h	7...70 l/h

1903 model		
Float material	AIR scale: 20 °C & 1 bar ABS	Water scale at 20 °C
Glass	3...60 NI/h	0,07...1 l/h
AISI 316 L	10...115 NI/h	0,2...3 l/h
Glass	4...115 NI/h	0,1...2,5 l/h
AISI 316 L	16...220 NI/h	0,2...6 l/h
Glass	4...190 NI/h	0,05...4 l/h
AISI 316 L	10...340 NI/h	0,1...10 l/h
Glass	20...560 NI/h	0,3...11 l/h
AISI 316 L	40...1000 NI/h	1...30 l/h
Glass	20...600 NI/h	0,5...15 l/h
AISI 316 L	40...1100 NI/h	3...36 l/h
Tungsten carbide	100...1400 NI/h	1...45 l/h
Glass	85...850 NI/h	1,9...19 l/h
AISI 316 L	160...1600 NI/h	5...50 l/h
Tungsten carbide	200...2100 NI/h	7...70 l/h

On request, models 1901 and 1903 can be supplied with a needle valve.

Stainless steel models with measuring ranges  $\leq 60$  NI/h require the addition of a precision valve.  
(Code Nr 790 205)

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Low flow-rate flowmeters  
**1900/1901/1903**

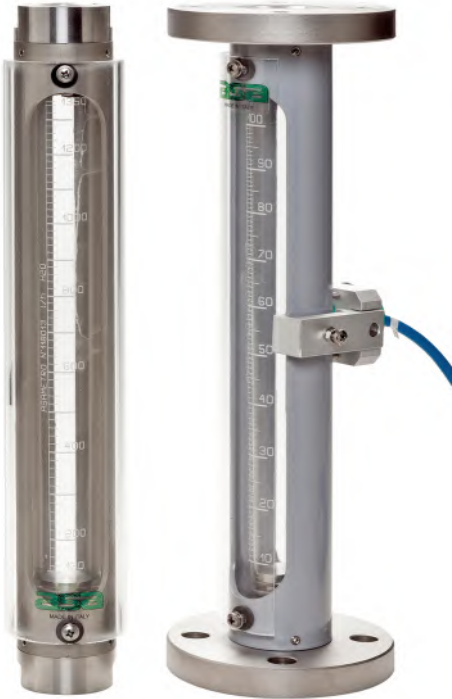
15-02-2021

D-790.01-EN-AB

DEB

790-01 /2

# Variable area glass flow indicators E Series



- Direct reading
- Accuracy  $\pm 2\%$
- For liquids or for gases
- Materials according ranges
- Adjustable contacts

## APPLICATIONS

The E series flow indicators are used for flow-rate reading or on gases or on liquids:

- Water treatment plants
- Manufactures (pulp industry, textile industry, etc.)
- Chemical, pharmaceutical industries
- Heating or cooling plants

## DESCRIPTION

The E Series are variable area flow indicators, the diver ("float") moves inside a calibrated conical tube.

These flow indicators may be calibrated according the fluid properties and operating conditions.

They accept flow switches, inductive monostable contacts, adjustable over the entire measuring range.

## TECHNICAL FEATURES

Accuracy	$\pm 2\%$ F. S. (Full Scale)
Repeatability	$\leq 0.25\%$ of reading
Scale length	250 mm
Unit	On request of customer
Temperature limits	0... 90 °C with Buna seals 0... 120 °C with FPM seals
Fittings	Or BSP-F Or flanges (DIN, ANSI, etc.)
<b>Materials</b>	
Thread fittings	Or carbon steel, or AISI 316, or PVDF On request: Hastelloy, Titanium
Flanges	Or AISI 316, or painted carbon steel
Measuring tube	Borosilicate glass
Spherical diver	According to specifications (see further on)
Conical diver	Standard: AISI 316 L; Or Aluminum (application for air) Options: PVDF, PTFE, Hastelloy B or C, Monel or titanium
Stops	AISI 316 L, or PVDF On request: Hastelloy, monel
Seals	Standard: NBR; Or FPM
Body	Epoxy painted carbon steel Or AISI 304 L

### Monostable inductive contacts

Intrinsically safe version (CENELEC, EEX ib II C)	
Repeatability	$\pm 0.3\%$ F.S.
Ambient temperature	-25 ... +60 °C
Protection	IP 67
Cable length	1 m

### Accessories

Transparent protection screen	PMMA
Guiding rod (when specified)	Or AISI 316, Or same material as of the diver

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Variable area glass flow  
indicators  
**E Series**

29-06-2020

D-795.01-EN-AA

DEB

795-01 /1

## MEASURING RANGES

- Ranges in l/h for water at 20 °C
- Ranges in NI/h for air at 20 °C and P = 1013 mbar abs
- Operating pressure, Max. at T < 100 °C: see next table

Diver type	l/h	ΔP [mbar]	NI/h	ΔP [mbar]	P Max.
Model 2600 - spherical divers					
Glass ball	0.07 ... 1		3...60		24 bar
Stainless steel ball	0.2 ... 3		10...115		
Glass ball	0.1 ... 2.5		4...115		
Stainless steel ball	0.2 ... 6		16...220		
Glass ball	0.05 ... 4		4...190		
Stainless steel ball	0.1 ... 10		10...340		
Glass ball	0.3 ... 11		20...560		
Stainless steel ball	1...30		40 ... 1,000		
Tungsten carbide ball	1...45		100 ... 1,400		
Glass ball	1.9 ... 19		85...850		
Stainless steel ball	5...50		160 ... 1,600		
Tungsten carbide ball	7...70		200 ... 2,100		
Model 2600 - conical divers					
AISI 316 L, conical Aluminum, conical (*)	4...40	3	100 ... 1,000 *	2	21 bar
	6.3 ... 63	8	130 ... 1,300 *	4	
	7...70	10	160 ... 1,600	5	
	10...100	7	160 ... 1,600 *	2	
	13...130	12	250 ... 2,500	5	
			250 ... 2,500 *	5	
			400 ... 4,000	12	
		4	400 ... 4,000 *	2	
		10	600 ... 6,000 *	5	
		16	630...630	6	
		1,000 ... 10,000	15		
2800 Models (conical divers)					
AISI 316 L, conical Aluminum, conical (*)	40...400	8	1,000 ... 10,000 *	6	14 bar
	63..630	19	1,250 ... 12,200 *	9	
	65...680	23	1,600 ... 16,000	15	
	100 ... 1,000	18	1,600 ... 16,000 *	5	
	130 ... 1,300	33	2,500 ... 23,500 *	13	
			2,500 ... 23,500	13	
		4,000 ... 40,000	34		
3000 Models (conical divers)					
AISI 316 L, conical Aluminum, conical (*)	160 ... 1,600	11			10 bar
	250 ... 2,500	27	4,000 ... 40,000 *	9	
	320 ... 3,200	44	5,500 ... 58,000 *	17	
			6,300 ... 63,000	22	
			1,000 ... 10,000	63	7 bar
	400 ... 4,000	20	6,300 ... 63,000 *	6	
	630 ... 6,300	48	10,000 ... 100,000 *	15	
	700 ... 7,000	60	12,500 ... 125,000 *	23	
		16,000 ... 160,000 *	38		
Models 3100 (conical divers)					
AISI 316 L, conical Aluminum, conical (*)	1,000 ... 10,000	45	16,000 ... 160,000 *	13	6 bar
	1,300 ... 13,000	76	24,000 ... 240,000 *	30	
			25,000 ... 250,000	32	
			40,000 ... 400,000	82	

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Variable area glass flow  
indicators  
**E Series**

29-06-2020

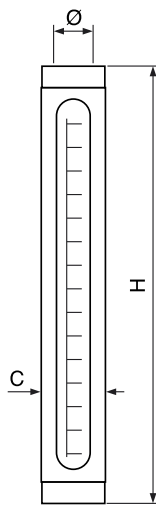
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**DEB**

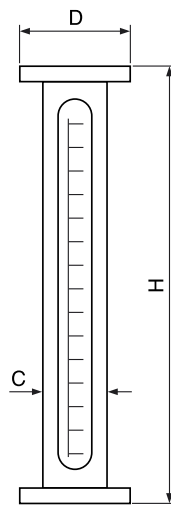
**795-01 /2**

The flow rates indicated in bold type refer to models with aluminum divers.

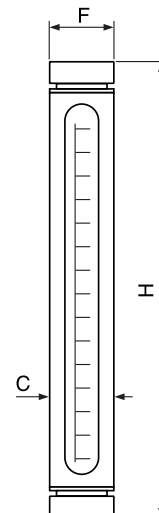
## DIMENSIONS



(1)



(2)



(3)

### (1) E5 Series - female thread fittings

Model	Ø	Ø C [mm]	H [mm]	Mass [kg]
E5-2600	½"	38	360	1.0
E5-2800	1"	54	360	2.1
E5-3000	1 ½"	80	460	5.9
E5-3100	2"	100	490	9.6

### (2) E6 series - PN 10 flanged fittings

Model	ND	Ø C [mm]	Ø D [mm]	H [mm]	Mass [kg]
E6-2600	15	38	95	353	2.2
E6-2800	25	54	115	353	4.1
E6-3000	40	80	150	446	9.2
E6-3100	65	100	185	480	15.2

### (3) E5 series - DIN 11851 fittings

Model	ND	Ø C [mm]	Ø F [mm]	H [mm]	Mass [kg]
E5-2600	20	38	44 x 1/6	357	1.2
E5-2800	25	54	52 x 1/6	381	2.5
E5-3000	40	80	65 x 1/6	470	8.1
E5-3100	65	100	95 x 1/6	510	15.2

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Variable area glass flow  
indicators  
**E Series**

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