SMAAT
TECHNIQUES

PreAqua
Naturaleza TecnoLógica

Electromagnetic flow meter
FLODEM

Technical Sheet

- **Excellent cost-effectiveness**
- **Sold in 50 Countries**
- **Various models available**
- **Product complies with CE**

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Electromagnetic Flow Meter
FLODEM

DESCRIPTION

FLODEM electromagnetic flow meters are designed according to the Faraday Law, and are used to measure the flow of liquid or pulp with a conductivity greater than 5 µS/cm.

The flow meter measures flow by detecting the speed of the fluid passing through a magnetic field. Electrodes are in direct contact with the fluid, generating a voltage proportional to the flow speed around the electrodes.

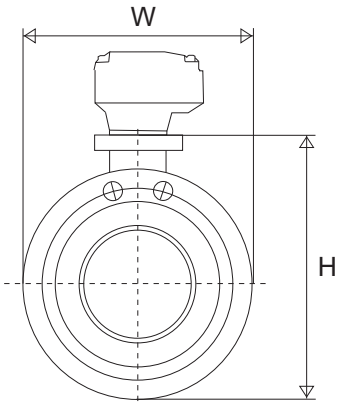
AVANTAGES

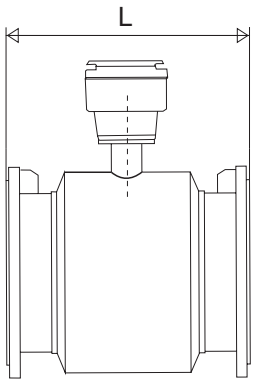
- Dual frequency excitation system ensures stable measurement in environments with electronic interference
- Integrated lightning protection
- Flow measurement in douleb-side directions
- Sensitive to flow variations
- Detection of low flow
- Detection of empty pipes

TECHNICAL CHARACTERISTICS

Electromagnetic flow meter FLODEM	
Precision	± 0,5 % ± 0,2 %
Diameter	DN 15 ... DN 1600
Process connection	Flange type DIN 2501 / EN 1092-1, ASME B16,5 / B16,47, JIS, AS219
Nominal pressure	PN 10 ... PN 100, ASME classe 150, 300, 600
Electrical conductivity	≥ 20 µS / cm
Electrodes	Stainless steel 316L, Hastelloy B, Hastelloy C, Titane, Tantale, Monel, Platine-iridium, Tungsten carbonate
Measuring tube	Stainless steel, carbon steel
Temperature	Ambient : - 20 ... + 60 °C, - 40 ... + 60 °C in option Stockage : - 20 ... + 70 °C Process : - 25 ... + 180 °C
Power supply	16 ... 30 VCC, 220 VAC, 110 VAC
Output signal	4 ... 20 mA + protocol HART, MODBUS RS485 can be congured as active or passive Optoelectronic coupler
Display	LCD graphic display, configurable
Thermal Type	Joule, Pt100
Transmitter	Version compacte or separate
Electrical connection	Polyamide cable gland in M20 × 1.5
Language	French, English, Portuguese, Polish, Italian, Turkish, Korean
Protection	IP65, IP67, IP68 for separate version
Certificate ATEX	Ex d ia IIC T6 Ex d IIB T4
Material	Housing: low-copper cast aluminum, coated

DIMENSION (MM)

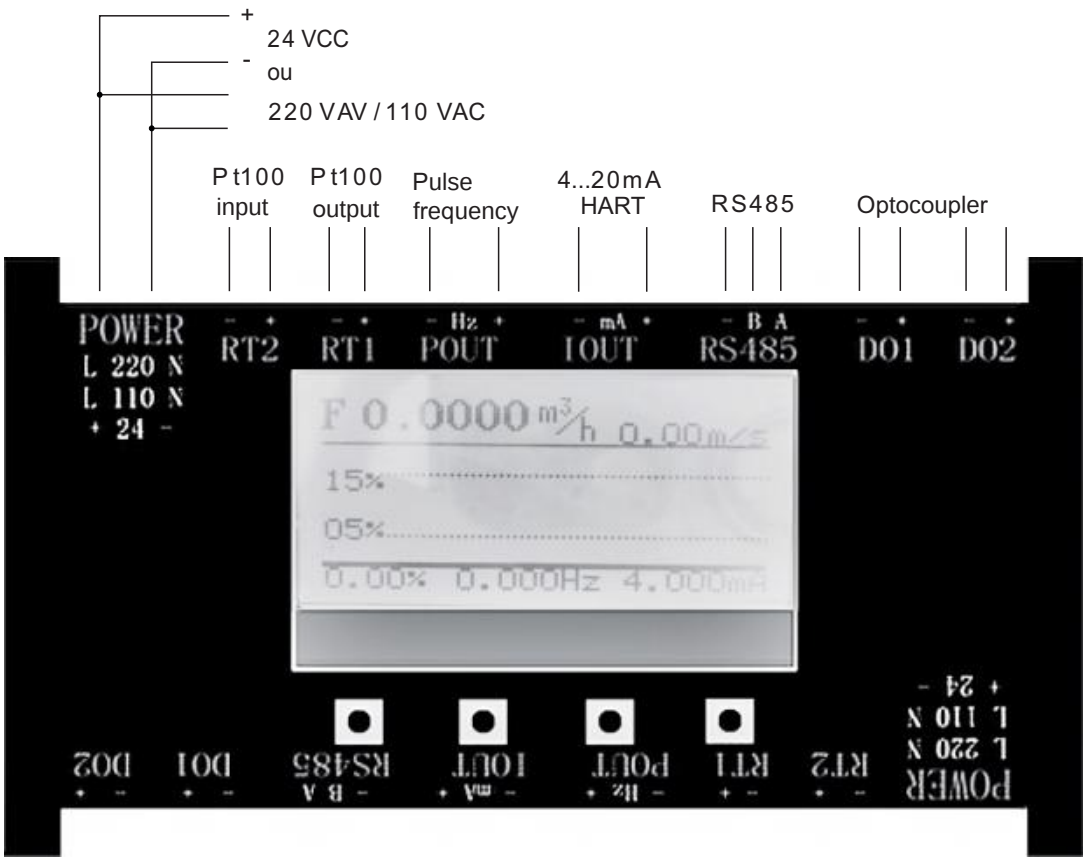




Nominal diameter (DN)	Dimension (mm)		
	L	W	H
15	160	95	175
25	160	105	180
32	160	105	186
40	160	135	200
50	200	150	210
65	200	165	225
80	200	180	240
100	200	200	255
125	250	220	275
150	250	245	300
200	300	285	335
250	400	340	390
300	500	395	450
350	500	445	505
400	600	505	556
450	600	565	615
500	600	615	670
600	600	670	725
700	700	780	845
800	800	895	930
900	900	1010	1035
1000	1000	1100	1135
1100	1100	1220	1250
1200	1200	1450	1465

(Exact dimensions will be conrmed when ordering)

ELECTRICAL CONNECTION



Power supply

L
220 VAC ± 10 %
110 VAC ± 10 %
N

\+
DC 16 ... 30 VCC
24 VCC recommended
-

Output signal 4 ... 20 mA

\+
4-20mA
-
HART

Output signal RS485

B
A
MODBUS RTU
RS485

Frequency/pulse output signal

\+
Hz
-

Frequency: 0-5000 Hz
rectangular wave
Pulse width: 1-50 ms
Interdependent pulse coefficient and pulse width, automatic dynamic calculation

Temperature calculation output signal

\+
RT1
-
Pt100 input
\+
RT2
-
Pt100 output

The product is equipped with a heat function, which uses the relationship between flow rate and temperature to obtain a joule value widely used in heating applications.

SELECTION GUIDE

Electromagnetic flow meter FLODEM	Code	Description
Process connection	C	Wafer type
	F	Flange type
	I	Sanitary type
	O	Other type à préciser
Fluid	L	Liquid
	G	Gas
	S	Steam
Diametre	15	DN 15
	20	DN 20
	...	
	1600	DN 1600
Electrode	S	Standard type fix
Electrode material	A	Stainless steel 316L
	B	Hc
	C	Ta
	D	Ti
	E	Hb
	F	Tungsten carbonate
	G	PT
	H	Others
Lining	R	Rubber
	J	Polyurethane
	M	PFA
	F	F46
	Q	Others
Measuring tube material	4	Stainless steel 304
	6	Stainless steel 306
Flange material	4	Stainless steel 304
	6	Stainless steel 306
	C	Carbon steel
Housing material	4	Stainless steel 304
	6	Stainless steel 306
	C	Carbon steel
Pression process	06	0,6 MPa
	10	1,0 MPa
	16	1,6 MPa
	40	4,0 MPa
	T	Others
Transmetteur	I	Intergrate Version
	D	Separate Version

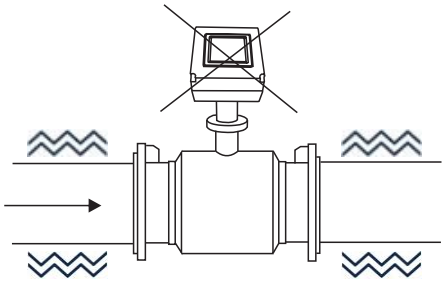
GUIDE DE SELECTION (suite)

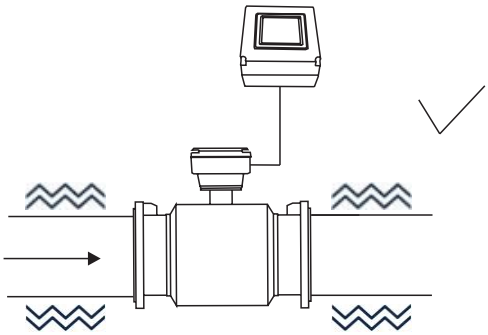
Electromagnetic flow meter FLODEM	Code	Description
Output signal	P	Frequency, pulse
	A	4 ... 20 mA
	R	RS485
	H	HART
	O	Autres
	D	Alarm * 1
	2D	Alarm * 2
Power supply	0	220 VAC
	1	110 VAC
	2	24 VCC
	3	Battery
Protection	1	IP65
	2	IP67
	3	IP68
Certificate ATEX	O	Without ATEX
	Ex	Explosion proof
Flange type	DIN	Type DIN 2501 / EN 1092-1
	ANSI	Type ANSI
	Q	Other types
Other parameters	P	Stainles steel polishing
	Q	Other parameter to specify

INSTALLATION

- **Vibration**

On pipes with high vibrations, it is recommended to use a FLODEM flow meter with a remote transmitter, in order to avoid damaging the transmitter.

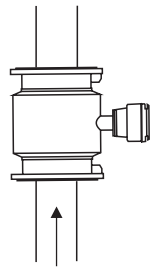




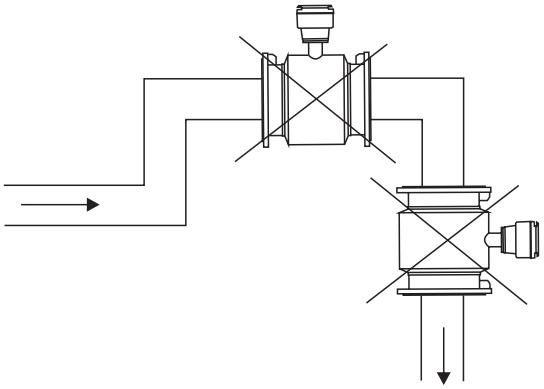
INSTALLATION (suite)

- **Liquid**

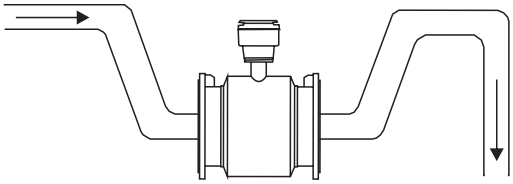
Mounting the FLODEM flow meter on the liquid uid must ensure complete filling of the liquid in the measuring pipe. It is recommended to install the flow meter on vertical piping in the upward direction of the uid. Mounting on vertical piping in the downward direction of the uid with free flow is prohibited.
The recommended mounting of the flow meter on horizontal piping is to install the flow meter on a U-shaped pipe, as shown below, for clean, uncharged liquid uid.



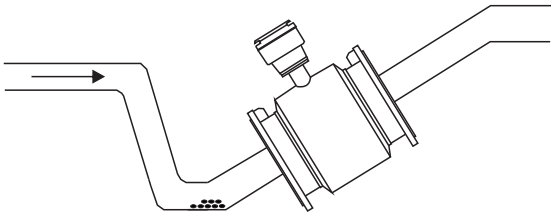
Mounting suitable for
clean or charged liquids



Mounting not suitable for liquids



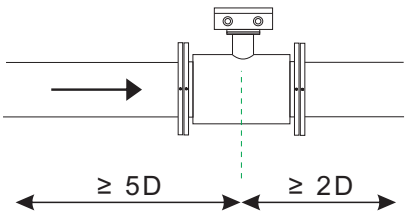
Mounting suitable for clean, uncharged liquids



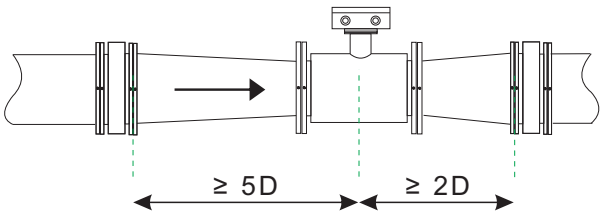
Mounting suitable for charged liquids

- **Straight inlet and outlet lengths**

Piping diameter identical to that of flow meter



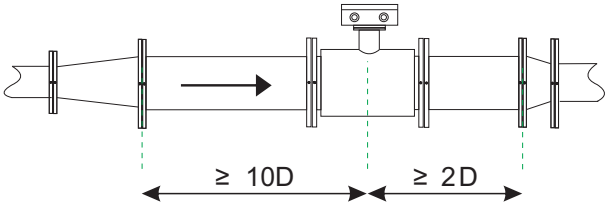
Convergent piping



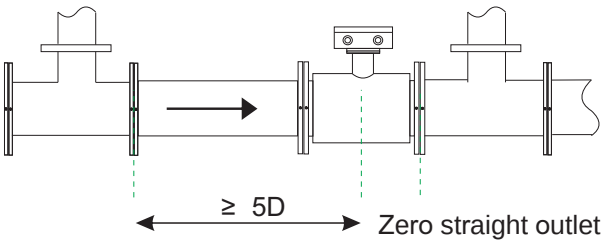
INSTALLATION (suite)

- **Straight inlet and outlet lengths (continued)**

Divergent piping

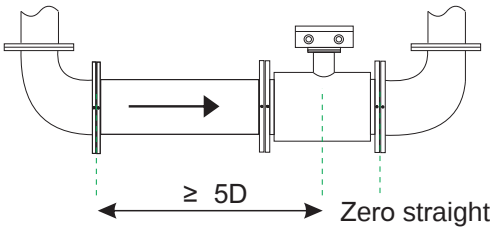


Piping with tees



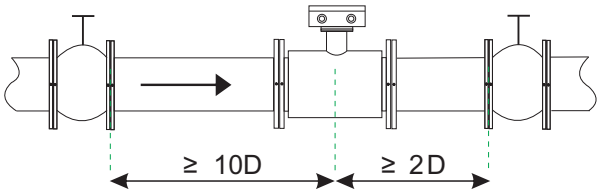
Zero straight outlet length is allowed

Piping with elbows



Zero straight outlet length is allowed

Piping with valves



Vortex Flow Meter
DV 100

Technical Sheet

- **Excellent cost-effectiveness**
- **Sold in 50 Countries**
- **Various models available**
- **Product complies with CE**

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Vortex Flow Meter
DV 100

DESCRIPTION

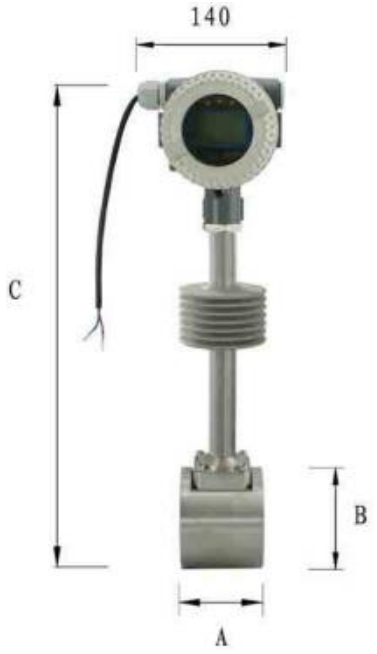
DV 100 vortex flow meters are designed according to the principle of the Karman effect (i.e. the generation of eddy currents). When the uid reaches an unproled body, it separates creating small vortices (alternating vortices) which create areas of variable pressure detectable by the sensor. The frequency of these vortices is directly linked to the speed of the uid.

DV 100 series is used to measure the flow of liquids and gases, including steam (saturated or superheated). It has demonstrated excellent reliability in various industrial, civil and municipal applications.

TECHNICAL CHARACTERISTICS

Vortex Flow Meter DV 100	
Fluid	Gas Liquid (multi-phase liquid are prohibited)
Diametre	DN 25 ... DN 300
Precision	Gaz : ± 1 %, ± 1,5 % Liquid : ± 1 %
Repeatability	Gas : 0,5 % Liquid : 0,33 %
Measuring Range	Gas : 7 ... 40 m/s Liquid : 0,7 ... 7 m/s
Sortie	4 ... 20 mA / Pulse
Pressure	16 bar by default, other pressures on request
Process Temperature	Standard: - 40 ... + 250 °C High temperature version : + 100 ... + 350 °C
Ambient temperature	- 20 ... + 65 °C
Housing materials	Stainless steel 304 Stainless steel 316
Process connection	Wafer Flange
Power supply	12 VCC 24 VCC Battery lithium 3,6 V
Output signal & communication	Pulse 4 ... 20 mA MODBUS RS 485
Protection	IP65
Electrical connection	M20 × 1,5 cable gland

DIMENSION (MM)



DV 100 wafer connection version, dimensions is as below

DV 100 flange connection version, with Temperature & pressure compensation

DN	A	B	C
25	65	65	368
32	66	65	374
40	80	76	382
50	80	89	388
65	93	102	402
80	100	114	408
100	126	136	435
125	146	160	463
150	166	182	489
200	196	248	543
250	210	282	596
300	240	334	648

e

SELECTION GUIDE

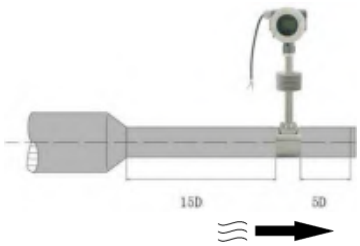
Vortex Flow Meter DV 100	Code	Description
Process Connection	C	Wafer
	F	Flange
Fluid	L	Liquid
	G	Gas
	S	Steam
Diameètre	25	25 mm
	32	32 mm
	...	
	300	300 mm
Power supply	A	Double power (24V CC ou 12V CC + battery 3,6 V)
	D	Battery lithium 3,6 V
	E	24 VCC / 12V CC
Display	Y	With display
	N	Without display
Output signal	P	Pulse
	A	4 ... 20 mA
	R	RS485
	Q	Other demand for signal output
Sensor materials	4	Stainless steel 304
	6	Stainless steel316
	Q	Other demand for material
Temperature	A	- 40 ... + 250 °C
	B	+ 100 ... + 350 °C
Pression	16	16 bar
	25	25 bar
	40	40 bar
	Q	Other demand for pressure
Certificate ATEX	N	Without ATEX
	EX	ATEX

INSTALLATION

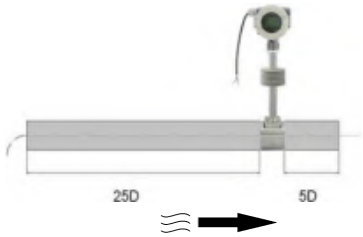
- **Location**

Avoid installing the DV 100 next to high voltage and high frequency equipment, radiation from high temperature sources, radioactive influences, high shock or highly corrosive environments. Favor locations that are easy to access for maintenance.

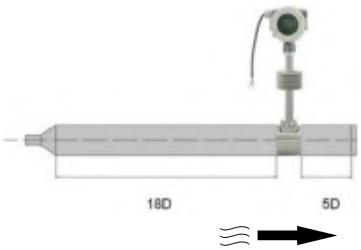
- **Straight inlet and outlet lengths**



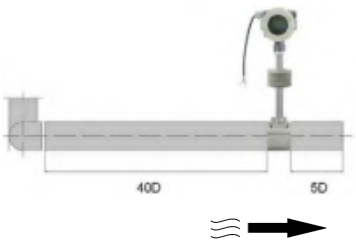
Concentric contract opening-valve



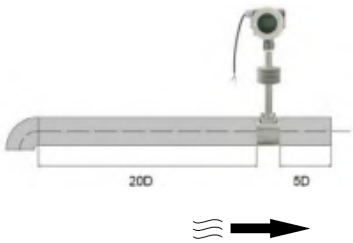
Two 90 degree Elbow which on a same plane



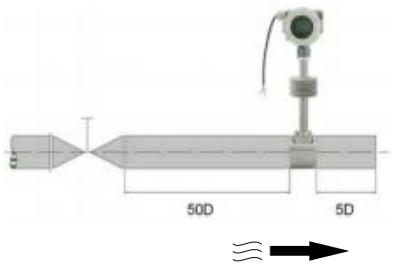
Concentric expanded pipe



Two 90 degree Elbow which not on a same plane



90 degree elbow



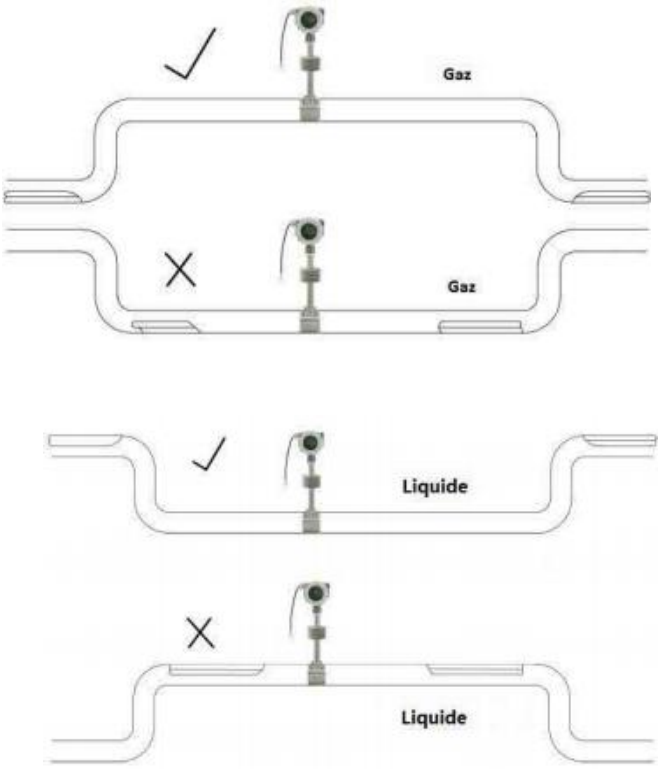
Control valve half open the valve (not recommend)

- **Resistance for vibration and shock**

It is strongly recommended to install the DV 100 vortex flow meter on pipelines without strong vibrations or violent shocks, particularly horizontal pipelines. If this cannot be avoided, measures should be taken to reduce vibration and strengthen the sensor.

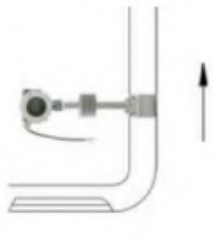
- **Mounting position for gas and liquid**

Horizontal mounting position, transmitter head on top



Horizontal mounting position, transmitter heads to the side

✓ Gaz
✓ Liquide



Dry gas: rising or falling fluid
Wet gas: rising fluid Liquid: r
ising fluid

Horizontal mounting position, transmitter heads down

This installation position is not recommended

× Superheated gas or steam
✓ Saturated steam
✓ Hot liquid

Installation on an insulated pipe

The height of the insulation must not exceed one third of the transmitter stem.

Location of the temperature tap and the external pressure tap (if necessary

The location of the external temperature measurement is between 6D and 8D downstream of the measuring tube.
The location of the external pressure tap is between 3D and 5D downstream of the measuring tube.

Thermal mass flow meter
DMT Series

TECHNICAL SHEET

- **Excellent cost-effectiveness**
- **Sold in 50 Countries**
- **Various models available**
- **Product complies with CE**

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Thermal mass flow meter
DMT

DESCRIPTION

DMT flanged or insert thermal gas mass flow meters measure natural gas, biogas, methane, nitrogen, air, compressed air, etc. They are designed according to the thermal principle. The meter measures temperature difference between the two probes, and provides a measurement proportional to the mass flow.

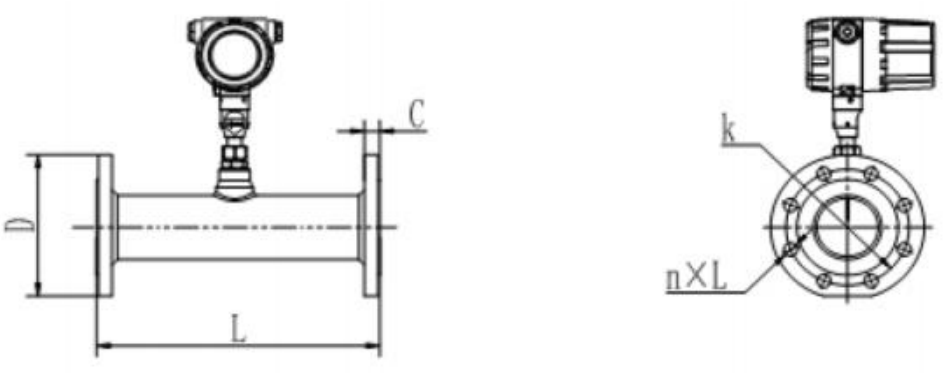
DMT thermal mass flow meters offer a wide measuring range and resist pressure up to 40 bar, with accuracy up to 1%.

TECHNICAL CHARACTERISTICS

Thermal mass flow meter DMT	
Fluid	Gas (except acetylene gas)
Process connection	Insertion Flange
Diametre	Insertion Version : DN 15 ... DN 4000 Flange Version : DN 15 ... DN 2000
Flow Rate	0,1 ... 120 Nm/s
Precision	± 1 % ... ± 2,5 %
Temperature	Sensor: - 40 °C ... + 220 °C Transmitter : - 20 °C ... + 45 °C
Pressure	Insertion Version : ≤ 25 bar Flange Version : ≤ 40 bar
Power supply	24 VCC 220 VAC
Response time	1 s
Output signal & communication	4 ... 20 mA + protocol HART RS485
Alarms	1 alarm 2 alarms
Transmitter	Compact Version Seperate Version déportée
Measuring tube materials	Steel
Display	LCD
Data displayed	Mass flow Standard volume flow Cumulative flow Standard flow etc ...
Protection	IP65
Sensor materials	Insertion version: stainless steel Flange connection version: stainless steel, carbon steel

DIMENSION (MM)

Dimensions of thermal mass flow meters with flange process connection



Dimensions with DIN type flange

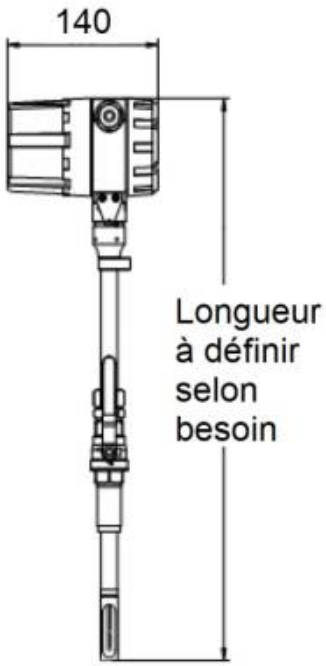
DN	Outside diameter	Drill circle diameter	Trousdes bolts No. × Diam	Bolt sizes	Joint Scope		Flange thickness	Face to face length
	D	k	n × L		d	f	C	L
15	95	65	4 × 14	M12	46	2	14	170
20	105	75	4 × 14	M12	56	2	16	170
25	115	85	4 × 14	M12	65	2	16	160
32	140	100	4 × 18	M16	76	2	18	160
40	150	110	4 × 18	M16	84	2	18	160
50	165	125	4 × 18	M16	99	2	20	160
65	185	145	4 × 18	M16	118	2	20	160
80	200	160	8 × 18	M16	132	2	20	180
100	220	180	8 × 18	M16	156	2	22	180
125	245	210	8 × 18	M16	185	2	23	180
150	280	240	8 × 20	M18	210	2	23	180
200	335	295	8 × 20	M18	265	2	25	200
250	405	355	8 × 22	M20	320	2	28	220
300	460	410	8 × 24	M22	375	2	30	240
350	520	470	16 × 26	M24	436	2	34	300
400	580	525	16 × 30	M27	485	2	35	300
450	640	585	20 × 30	M27	515	2	38	400
500	705	650	20 × 34	M30	608	2	43	400

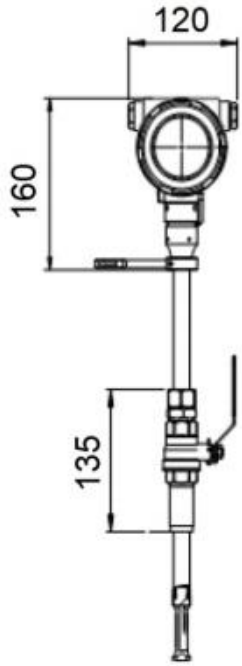
(Exact dimensions will be conrmed when ordering)

DIMENSION (MM) (suite)

Dimensions of insertion type thermal mass flow meters

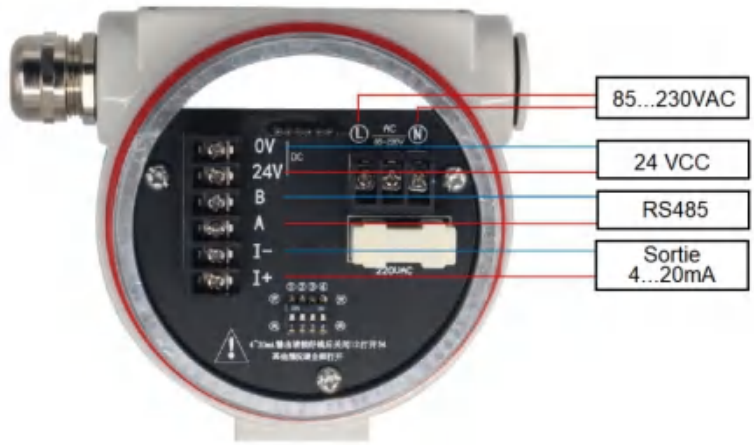
The plug-in type with built-in ball valve (in-line mounting is custom-made) should be inserted into the piping, and the sensor position should be between half and a quarter of the piping. The exact length of the measuring rod will be specified when ordering according to the pipe diameter and the length of the inlet and outlet straight section of the flow meter.





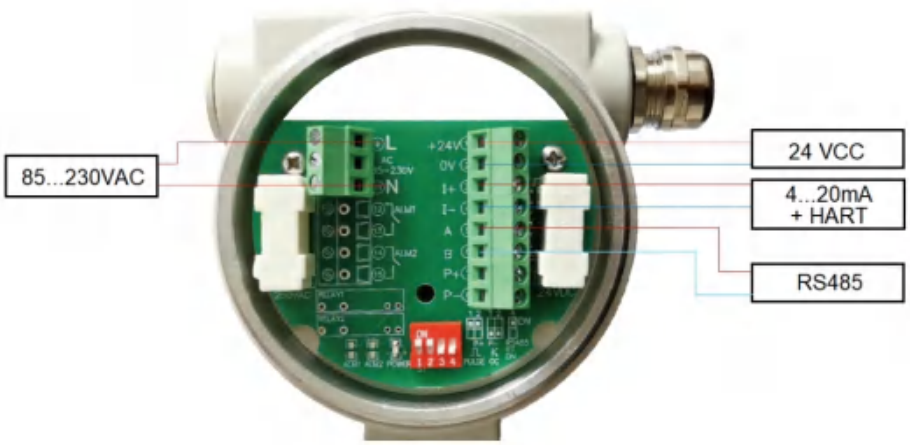
ELECTRICAL CONNECTION

Electrical connection in the transmitter for the output signal in 4 ... 20 mA



ELECTRICAL CONNECTION

Electrical connection in the transmitter for the output signal in 4 ... 20 mA with HART protocol

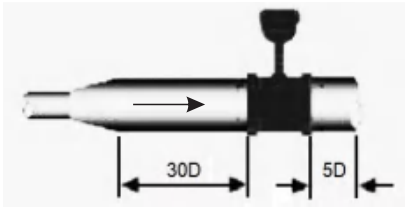


INSTALLATION

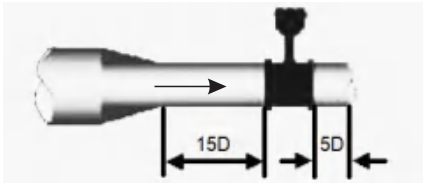
- **Location**

The installation of thermal mass flow meter must ensure that flow rate of fluid passing through the pipe is stable and constant during the measurement. A straight section of inlet and outlet piping is required to stabilize flow downstream of diverging or converging reducers, tees, elbows, valves and other obstacles. Generally speaking, the length of the inlet straight section of the flow meter should be greater than 10D, the length of the outlet straight section of the flow meter should be greater than 5D. Please select the length of the straight section according to the installation situation as shown in the gures below.

- **Straight inlet and outlet lengths**



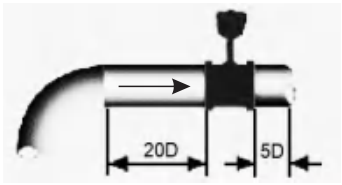
Divergent piping, flow meter in downstream of a concentric reduction



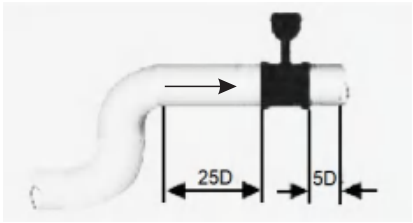
Converging piping, flow meter downstream of a concentric reduction, or flow meter downstream of a fully open valve

INSTALLATION (suite)

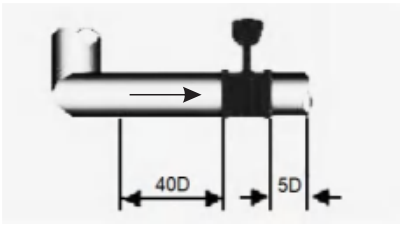
- **Straight inlet and outlet lengths (continued)**



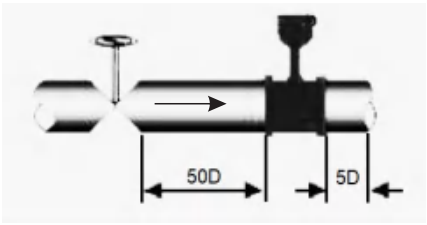
Flow meter downstream of a 90° elbow or tee connector



Flow meter downstream of two 90° elbows (opposites) on the same plane



Flow meter downstream of 2 3D 90° elbows (opposite, not in the same plane)



Flow meter downstream of a half-open control valve

Where the straight section length cannot be met on site, gas rectifiers can be installed in series upstream of the flow meter to significantly reduce the required straight length.

Variable area flow meter
Série RTM

TECHNICAL SHEET

- **Excellent cost-effectiveness**
- **Sold in 50 Countries**
- **Various models available**

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Variable area flow meter
RTM

DESCRIPTION

RTM variable area flow meters are designed according to the float measurement principle. In the vertical measuring tube, when the uid passes through the tube from bottom to top, the float moves upwards . The float stabilizes at a height when the lifting force on the float is balanced with the gravity of the float. The circulation ring spacing area between the float and the diaphragm or conical tube remains constant. The area of the annular space is proportional to the increasing height of the float. The height of the float represents the flow rate of the fluid.

AVANTAGES

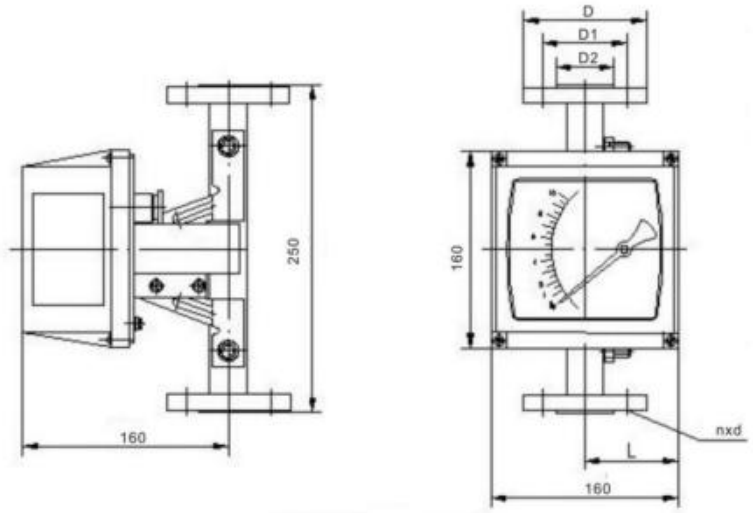
- All-metal construction
- Reliable measurement with high precision
- Outputs in 4 ... 20 mA or switch is in option
- Measure opaque or corrosive liquid fluids
- Resistance to high pressure up to 40 bar
- Resistance to high temperatures up to 400°C
- Flow direction can be vertical from top to bottom or horizontal

TECHNICAL CHARACTERISTICS

Variable area flow meter RTM	
Measuring range	Liquid : 2,5 ... 300 000 L/h Gas : 0,07 ... 3000 m^3/h
Measuring scale	10 : 1 (DN ≤ 100 mm) 5 : 1 (DN > 100 mm)
Precision	± 2,5 % ± 1 % is option for liquid
Pression	≤ 40 bar for diametre DN15, DN25, DN40 and DN50 ≤ 16 bar for DN80, DN100 and DN 150
Process Temperature	- 40 °C ... + 100 °C - 80 °C ... + 400 °C is option - 10 °C ... + 120 °C with Lining F46
Ambient temperature	Mechanical pointer version: - 400 °C ... + 65 °C Digital version : - 25 °C ... + 65 °C
Process connection	Flange Wafer Screw
Electrical connection	M20 × 1,5
Protection	IP65
Certificat ATEX Transmitter	Ex ia IIC T6, Ex ib IIC T6 Ex d IIC T6
Viscosity	≤ 5 mPa.s pour DN15 ≤ 250 mPa.s pour Dn25 ... DN150
Power supply	24 VCC 2 wire Battery lithium 3,6 V
Measuring tube material	Stainless steel 304, or lining in PTFE / F46 Stainless steel 316L, or lining in PTFE / F46
Float Material	Stainless steel 304, Stainless steel 316L PTFE, F46

DIMENSION (MM)

Dimensions of the RTM vertical model LZ500 / LZ501 variable area flow meter with flange process connection

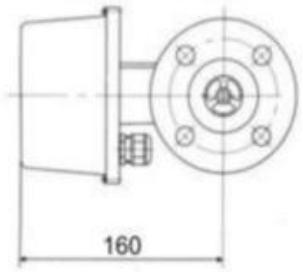


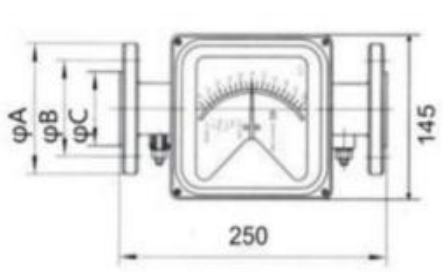
Diamètre nominal (DN)	Dimension (mm)			
	D1	D	f	n - Ød
15	65	95	224	4 - Ø14
25	85	115	245	4 - Ø14
40	110	150	266	4 - Ø18
50	125	160	285	4 - Ø18
80	160	195	306	8 - Ø18
100	180	215	336	8 - Ø18
150	240	280	366	8 - Ø23

(Les dimensions exactes seront confirmées lors de la commande)

DIMENSION (MM) (suite)

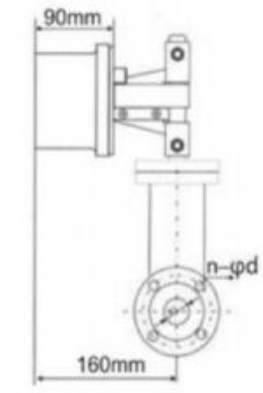
Dimension du débitmètre à section variable RTM modèle horizontal LZ504 / LZ505 avec raccordement process à bride

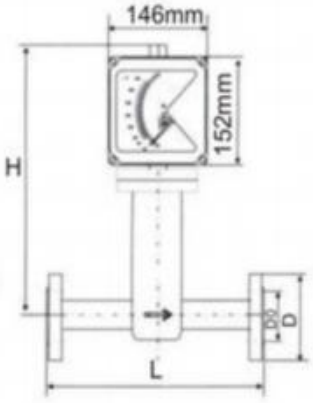




DN	ØA	ØB	ØC	n - Ød
15	95	65	46	4 - Ø14
25	115	85	65	4 - Ø14
40	150	110	84	4 - Ø18
50	160	125	99	4 - Ø18
65	185	145	115	4 - Ø18
80	195	160	132	4 - Ø18
100	215	180	156	4 - Ø18

(Exact dimensions will be conrmed when ordering)



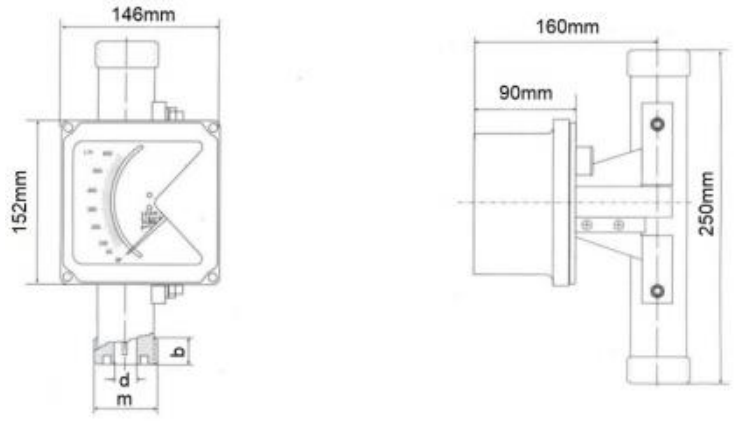


DN	DO	D	H	L	n - Ød
15	65	95	385	250	4 - Ø14
25	85	115	395	250	4 - Ø14
40	110	150	465	300	4 - Ø18
50	125	160	460	300	4 - Ø18
80	160	195	445	400	8 - Ø18
100	180	215	435	400	8 - Ø18

(Exact dimensions will be conrmed when ordering)

DIMENSION (MM) (suite)

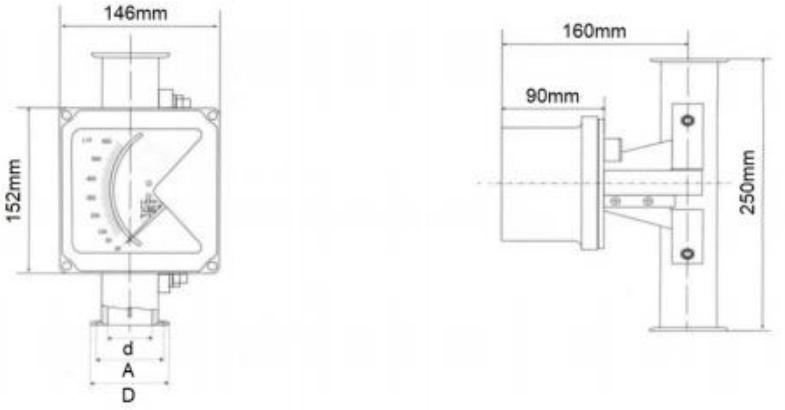
Dimensions of the RTM vertical model variable area flow meter LZ500 / LZ501 with screw-in process connection



DN	m	d	b
15	Rd34 × 1/8"	16	12
25	Rd52 × 1/6"	26	14
40	Rd65 × 1/6"	40	14
50	Rd78 × 1/6"	50	14
80	Rd110 × 1/6"	81	20
100	Rd130 × 1/4"	100	20

(Les dimensions exactes seront confirmées lors de la commande)

Dimensions of the RTM vertical model variable area flow meter LZ500 / LZ501 with wafer type process connection



DN	D	d	A
15	34	15,7	27,5
25	50,5	25,4	43,5
40	50,5	38,1	43,5
50	64	47,8	56,5
80	106	72,1	97
100	119	97,6	110

(Les dimensions exactes seront confirmées lors de la commande)

SELECTION GUIDE

Variable area flow meter RTM	Code	Description
Model	LZ	Mechanical
	LZD	With output signal
Fluid direction	LZ500	Bottom into top
	LZ501	Top to bottom
	LZ502	Bottom to top transverse
	LZ503	Bottom transverse to top transverse
	LZ504	Left to right
	LZ505	Right to left
Diameter	10	DN 10
	...	
	250	DN 250
	3/8"	3/8 "
	...	
	7"	7"
Measuring tube material	R4	Stainless steel 304
	R6	Stainless steel 316L
	F	With lining in PTFE
	Ti	Titanium alloy
	HC	Hastelloy
Indicate type	M1	Square housing with pointer instantaneous flow indicator
	M2	Square housing with pointer instantaneous flow indicator, with digital indicator for instantaneous and cumulative flow
	M3	Round housing with pointer instantaneous flow indicator, with digital indicator of instantaneous and cumulative flow
Power Supply and Output Signal	0	Flow meter with local indicator without power supply for M1 model only
	A	220 VAC power supply with 4 ... 20mA output signal
	B	220 VAC power supply without output signal
	C	24 VDC 2-wire power supply with output signal: dry contact, 4 ... 20 mA
	D	24 VDC 3 or 4 wire power supply, with pulse output signal
	E	Battery powered without output signal
	H	24 VDC 2-wire power supply, with 4 ... 20 mA output signal + HART protocol
End of class (alarm)	K1	End of course at higher flow rate
	K2	End of course at lower flow rate
	K12	Course ends at higher and lower flow rates
Certificate ATEX	i	Ex ia IIC T6
	d	Ex d IIB T6, Ex d IIC T6

SELECTION GUIDE

Variable area flow meter RTM	Code	Description
Process Connection	J4	ANSI flange
	J5	JIS flange
	J6	Screw connection
	J7	Wafer connection
Additional parametres	T	Clip version
	Z	Version with damping
	G	High Pressure Version
	M	High Temperature Version
Fluid	L	Liquid
	G	Gas

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