Rotameter series 250
metal tube variable area flowmeter

MODELES

- 250 Stainless Steel indicator
- 250 PTFE
- 250 indicator + Alarm
- 250 electronic transmitter 4-20mA
- 250 electronic transmitter 4-20mA ADF

Principle

The instrument must be mounted in a vertical pipe with fluid circulation in the upwards direction.
The self guiding cylindrical float is positioned inside a tapered tube. When the flow passes through the meter the float rises to a position of equilibrium where the weight of the float is balanced by the net force due to the fluid pressure. The float is magnetically coupled to a pointer indicating the rate of flow on the front scale.

Applications

The metal tube 250 series variable area flow meter is a specially designed instrument for measuring the flow of liquids and gases.
Its robust design makes it highly suitable for use on hazardous and corrosive applications as found in most industrial processes.

Description

The instrument comprises:
- A body formed in stainless steel with fixed flange connection
- A stainless steel or an alloy float fitted with a magnet, with guide rods at each end
- Two end stops in stainless steel used as a guide for the float
- An indicator housing unit in aluminium alloy

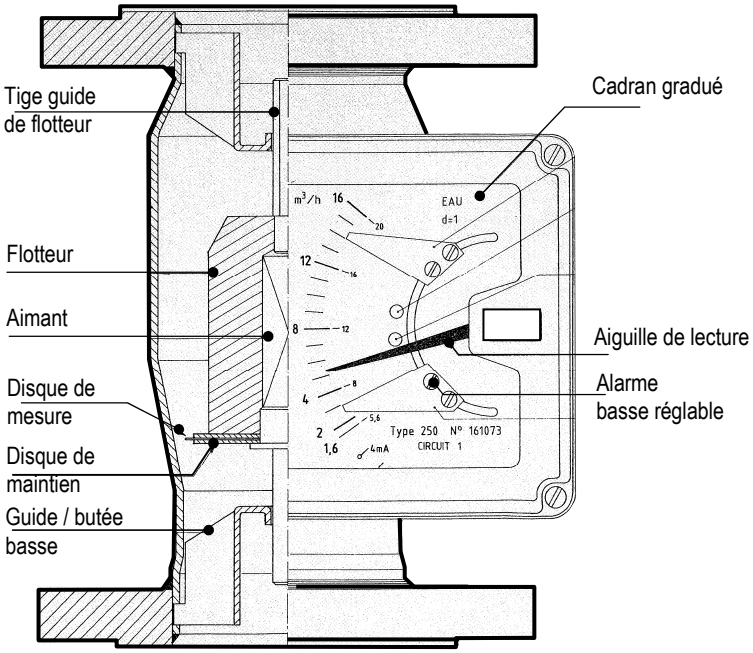
Features

-Choice of connections
- Industry standard length
- High accuracy calibration option
- Robust design
- Magnetically coupled local indicator, transmitter option
- Alarm options
- PTFE versions available
- Fastrack delivery on selective models

Flow meter

Technical characteristic

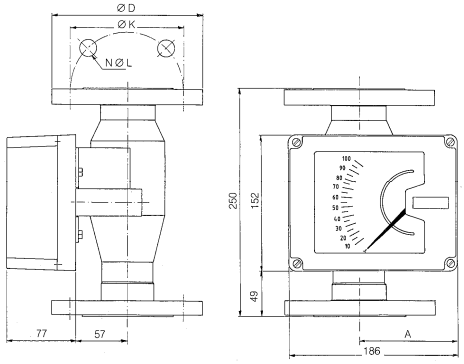
Precision :	2% of the maximum capacity (PTFE 3%) (class 1.6 VDI; VDE 3513 on request).
Report/ratio of scale:	1 to 10
Extended of scale:	to see table “Ranges of flows”.
Pressure of service:	Stainless ≤ 40 bar out of standard Up to 200 bar on request
Note:	With liquids, the operating pressure must be at least equal to two time pressure losses of the apparatus. At least five times with gases.
Temperature of service	Stainless Version: -40 with + 200°C
	Version PTFE: -20 with + 125°C
Note:	● Heat shield required according to option ● Versions high temperatures on request
Materials:	Parts in contact with the fluid (body and float) Z2 NDT 17.13 stainless (316L)
	Aluminium Version: Plate alloy support of aluminium, front aluminium cap moulded with epoxy painting/polyester
	Stainless version: to see options (Z10 code)
Protection:	Indicating case (IP65)
Approximate mass:	DN15 (1/2 ") = 4,5kg DN25 (1 ") = 5kg DN50 (2 ") = 8,5kg DN80 (3 ") = 15kg DN100 (4 ") = 18,5kg
Conformity - Directives	*2014/68/UE* (Equipment under pressure) *, *2014/34/UE* (ATEX) *, 2014/*35/UE* (Low tension) *, 2014/*30/UE* (CEM) *, 2006/*42/CE* (Machine) *



Flow range table

						PTFE LINED		
	LIQUID		GAS Flow capacity m3/h		Pressure DROP	Liquid Max flow		pressure DROP
DN	**M code**	**Max liquid flow rates SG = 1**	**MG code**	**Air 20°C 1023 mbar Abs**	**mbar**	**Code MP**	**SG = 1**	**mbar**
15	M1	100 l/h			35			-
	M2	160 lh	MG2	5	60	MP2	160 l/h	77
(½")	M3	250 l/h	MG3	7.5	60	MP3	250 l/h	70
	M4	400 l/h	MG4	12	60	MP4	400 l/h	70
	M5	600 l/h	MG5	18	65	MP5	600 l/h	77
	M6	1 m3/h	MG6	30	70	MP6	1 m3/h	80
25	M5	600 l/h	MG5	18	45	MP5	600 l/h	45
(1")	M6	1 m3/h	MG6	30	80	MP6	1 m3/h	45
	M7	1.6 m3/h	MG7	48	55	MP7	1.6 m3/h	79
	M8	2.5 m3/h	MG8	75	80	MP8	2.5 m3/h	45
	M9	4 m3/h	MG9	120	85	MP9	4 m3/h	84
	M10	6 m3/h	MG10	180	125	-	-	-
50	M8	2.5 m3/h	MG8	75	55	MP8	4 m3/h	48
(2")	M9	4 m3/h	MG9	120	80	MP9	6 m3/h	92
	M10	6 m3/h	MG10	180	55	MP10	10 m3/h	48
	M11	10 m3/h	MG11	300	80	MP11	6 m3/h	95
	M12	16 m3/h	MG12	480	95	-	-	-
	M13	25 m3/h	MG13	750	130	-	-	-
80	M11	10 m3/h	MG11	300	60	MP13	25 m3/h	50
(3")	M12	16 m3/h	MG12	480	90	MP5	600 l/h	95
or	M13	25 m3/h	MG13	750	60	MP6	1 m3/h	55
100	M14	40 m3/h	MG14	1000	125	MP7	1.6 m3/h	100
(4")	M15	50 m3/h	MG15	1500	-	-	-	-
	M16	60 m3/h	MG16	1800	-	-	-	-
	M17	80 m3/h	MG17	2400	-	-	-	-

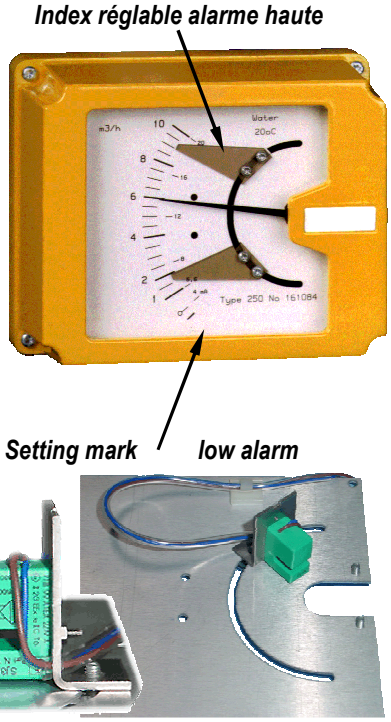
Dimensions



Standard model dimensions						
Size	**PN**	**Ø D**	**ØK**	**ØL**	**N**	**A**
15	16	95	65	14	4	80
	40	95	65	14	4	80
½"	150 lbs	88.9	60.3	15.9	4	80
	300 lbs	95.2	66.7	15.9	4	80
2	16	115	85	14	4	92
	40	115	85	14	4	92
50	150 lbs	107.9	79.4	15.9	4	92
	300 lbs	123.8	88.9	19	4	92
1"	16	165	125	18	4	108
	40	165	125	18	4	108
25	150lbs	152.4	120.6	19	4	108
	300 lbs	165.1	127	19	8	108
80	16	200	160	18	8	122.5
3"	150 lbs	190.5	152.4	19	4	122.5
100	16	220	180	18	8	124
4"	150 lbs	228.6	190.5	19	8	124

ALARM OPTION

• Intrinsic safety version « ia »

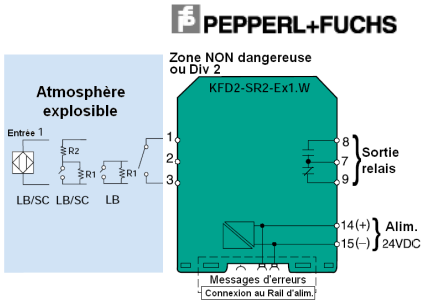


Detectors	with D.C. current 2 wire (SJ3,5. NR. Pepperl&Fuchs) of S.I
Standards	NAMUR and DIN 19234.
Contact numbers	2 adjustable (high and/or low alarm) on the totality of the scale
Note:	*Adjustment accessible on the dial with visual witness on the scale from flow. Can be associated the electronic transmitter. Connection on terminals with screw S=2,5mm ². Exit out of standard on press packs polycarbonate PG9 cables ∅5 to 8 Misters.*
Nominal voltage	8V= (IH ~ 1 kΩ)
Tension of service	5 with 25V= (of use of IS)
No-load voltage	≤ 5.5 V, current of short-circuit Icc ≤ 52 mA
Consumption	out of alarm ≤ 1 mA
	except alarm: ≤ 3 mA (possible inversion by reversing the position of the detecting disc).
Resistance of the line of order	≤ 100 Ω
Temperature of service	−25°C to +60°C
In use of a protection of S.I:	Ex ia IIC T6 Ga/Gb until an ambient temperature of 50°C
	Ex ia IIC T5 Ga/Gb until an ambient temperature of 65°C
	Ex ia IIC T4 Ga/Gb until an ambient temperature of 80°C
Parameters relative to IF	Cint ≤ 40 nF, Lint ≤ 160 µH
Marking ATEX	Ⓔx **II 1/2 G Exia IIC T6-T5-T4 Ga/Gb**
N° certificate	**LCIE01ATEX6063X**
Conformity - Directives	2014/34/UE (ATEX), 2014/35/UCE (low tension) *, 2014/30/UE (CEM) *, 2006/42/CE (Machine) *

** when applicable*

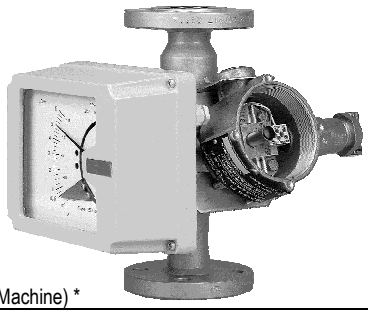
•Amplifiers recommended associated relays (on option)

type	**KFD2-SR2-Ex1.W**	**KFA5-SR2-Ex1.W**	**KFA6-SR2-Ex1.W**
Power pack	20-30 Vcc	115Vca *45/65Hz*	240V~
Consumption	0,5W	≤1W	
Cut of the contacts	250V~/2A/cosφ>0,7; 120V~/4A; 40V=/2A		
Assembly	on symmetrical rail DIN 35mm or fixing by screw		
Classify protection	IP20		
Ambient temperature	- 20°C with + 60°C		
ATEX	Version of I.S. [Ex ia] (PTB97ATEX2271)		
Version (S)	to 1 or 2 input circuits		
Note:	*The diagram of connection and dimensions depend on the selected model. To refer to additional documentation. (Wiring Plan and diagram on request).*		



• Version with contact and flame-proof case "D"

Marking ATEX	Ⓔx **II 2G Exd IIC T6 Gb**
N° certificate	**LCIE01ATEX6060X**
Contact:	Type THEY bistable SPDT
Maximum tension	220V
Running max	1 A
Maximum power	60VA 30W resistive load
Classify protection	IP 66
Materials	Case ADF out of aluminium alloy
Electric connections	on screw connector block (wire 1,5mm ²)
Press standard packing	certified aluminium Exd for armoured cables with ∅ 5 to 12 mm
Conformity - Directives	2014/34/UE (ATEX), 2014/35/UCE (low tension) *, 2014/30/UE (CEM) *, 2006/42/CE (Machine) *



** when applicable*

Notes:

► *taking into account the hysteresis important of the contact THEY, it is recommended to limit the use of the contact with the respective beaches:*

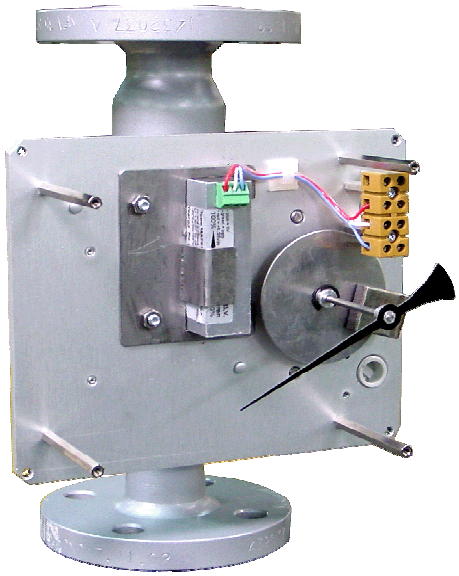
. *Contact with the descent: beach available from 15% to 75% of the full scale*

. *Contact with the rise: beach from 25% to 100% of the full scale.*

To contact the engineering department for all additional information

► *The apparatus is delivered with a press packs Aluminium Exd out of standard (for cables of ∅3 to 12 Misters. Other on request*

ELECTRONIC TRANSMITTER OPTION



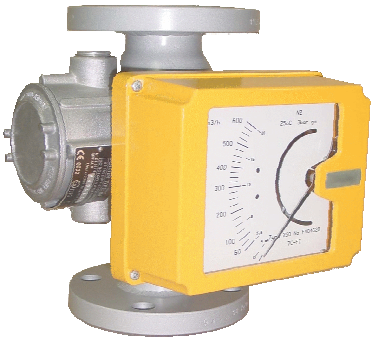
Standard VERSION (Pointer and scale plate indicator) – "T5 code"

Output signal:	4 à 20mA proportional from 10 to 100% of flow range
	4mA corresponds to 0 of the scale (setted position marked --0).
	5,6 mA corresponds to 10% of the fullscale (first measuring value 10%).
	20mA corresponds to 100% of the full scale (top measuring value 100%).
Transmission:	2 wires (connection : see alarm)
Power supply:	UB = 8 to 24 Vcc.
Linearity:	0,5% of max. current
Temperature deviation:	< 0.05% /°C
Permissible ambient temperature:	T= –25 à + 65°C in operation

- **TYPE i250 – Intrinsic safety version – "T6 code"** (to be specify while ordering)

ATEX marquing:	**⟨Ex⟩ II 2 G Exia IIC T6-T5-T4 Ga/Gb**
Certificate N°:	**LCIE01ATEX6063X**
IS Characteristics:	C interne=0nF; L interne=1,8mH; Ii=100mA; Pi=0,75W
Only connect to an approved source in IS version:	Ex ia IIC T6 max. permissible ambient temperature 65°C.
IS power supply:	Voltage UB <30V dc;
Conformity - Directives:	2014/34/UE (ATEX), 2014/35/UE (Low voltage)*, 2014/30/UE (CEM)*, 2006/42/CE(Machine)*

Note :
- ► *IS Alarm fitting (1 or 2 pces) is compatible with Is transmitter*
- ► *LCD indicator is not compatible with IS certificate.*



- **TYPE 250 B4 – Explosion –proof housing - "T4 code"** (to be specify while ordering)

ATEX marquing:	**⟨Ex⟩ II 2 G Exd IIC T6 Gb**
Certificate N°:	**LCIE01ATEX6060X**
Housing coating:	Rough Aluminium finish or yellow painted (without dial)
Characteristics:	Umax = 230V Imax = 15A Pmax = 20W
Power supply:	UB = from 8 to 24 Vcc.
Conformity - Directives:	2014/34/UE (ATEX), 2014/35/UE (Low voltage)*, 2014/30/UE (CEM)*, 2006/42/CE(Machine)*

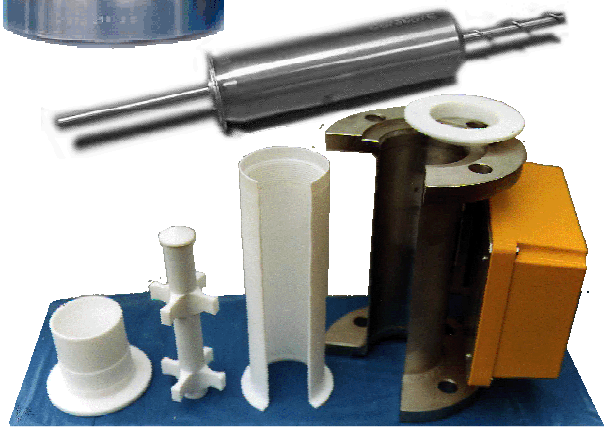
Mechanical OPTIONS

- **Stainless Steel Version - Z10 code -** (to be specify while ordering)

Stainless steel components (316L):	Cover
	Main Support plate
	Nuts and screws
	Magnet assembly, plugs and cable gland(s)
Dimensions:	Unchanged
Use :	For corrosive atmospheres. (Sea area, ...)
Protection Level:	IP66
Coating:	Non painted in standard version

- **Damper for gas floats - Z1 code** (to be specify while ordering)

Use :	Generarly use for gas flow processes (*could be used for liquid processes if needed*)
Availability:	On any Nominal dimensions excepted PTFE version



- **PTFE Version for liquids - C5-C6 code -** ((to be specify while ordering)

PTFE components	Float, all wetted parts, flange seals (see →)
Use :	For corrosive, chemical processes, (NaOH, Hcl, H_2SO_4…)
Flow range	Min 16-160 l/h - Max. 2,5-25 m3/h
Fluid	Only liquids
Process temperature	Max. 120°C
Operating pressure	Max. 16 bar at 20°C in standard

** lorsque applicable*

CODING

250	INSTRUMENT TYPE
Code	Connection code
15	ISO PN Flange NFE 29203/ NE1092 - DN15
25	ISO PN Flange NFE 29203/ NE1092 - DN25
50	ISO PN Flange NFE 29203/ NE1092 - DN50
80	ISO PN Flange NFE 29203/ NE1092 - DN80
100	ISO PN Flange NFE 29203/ NE1092 - DN100
1/2"	Flange ANSI B16-5 DN 1/2"
1"	Flange ANSI B16-5 DN 1
2"	Flange ANSI B16-5 DN 2"
3"	Flange ANSI B16-5 DN 3"
4"	Flange ANSI B16-5 DN 4"

Code	Measuring element code
M..	See flow range table

Code	Construction code
C1	STAINLESS STEEL 316, ISO PN16 Flange RF
C2	STAINLESS STEEL 316, ISO PN40 Flange RF
C3	STAINLESS STEEL 316, Flange ANSI 150# RF
C4	STAINLESS STEEL 316, Flange ANSI 300# RF
C5	PTFE Construction, ISO PN16 Flange (RF)
C6	PTFE Construction, Flange ANSI 150# RF
CX	Special Construction (on request

Code	Transmitter
T6	I.S. magnetic transmitter 4-20mA ⟨Ex⟩ II2G ATEX ExiaIICT6-T5-T4 Ga/Gb (standard housing IP65)
T5	Standard magnetic transmitter 4-20mA (standard housing IP65)
T4	Magnetic transmitter 4-20mA (explosion -proof housing)⟨Ex⟩ II2G ATEX ExdIICT6Gb

Code	Alarms
S1	1 low alarm (without relay)
S2	1 high alarm (with relay)
S3	2 high and low alarms (without relay)
S4	1 low alarm (with relay)
S5	1 high alarm (with relay)
S6	2 high and low alarms (with relay)
S7	2 high and low alarms explosion-proof housing (⟨Ex⟩ II2G ATEX ExdIICT6Gb)

Code	Options
Z1	Damping system (essential for gas flow)
Z2	High temperature shield
Z3	Degreasing and specific packaging for oxygen
Z4	Accuracy class 1.6 (liquids within viscosity limits)
Z5	Intrinsic safety for codes T and/or S
Z6	Special scale
Z7	IS power supply + retransmission
Z9	Epoxy painted indicator housing
Z10	stainless steel indicator housing

250- 25- C1- M8- T4- S3- Z1-Z6

LIMITS CERTIFICATES Of INDIVIDUAL CALIBRATION

BNM 2% or 1.6% VDI-VDE:
Gas : 0,5 l/h to 55 m^3/h
Liquids : 0.1 l/h to 45 m^3/h
Standard certificate 2%:
Gas : 0,5 l/h to 300 m^3/h
Liquids : 0.1 l/h to 100 m^3/h

Models PTFE: 3%

TECHNICAL DATA FOR ESTIMATE/ORDER

- Nature of the measured fluid (standard, group of dangerosity),
- Minimum Flow and desired maximum,
- Density,
- Viscosity in the operating conditions,
- Temperature of service of the measured fluid,
- Operating Pressure of the fluid.

Information required for quote or order:

- Fluid type to be measured.
- Maximum and minimum flow rate required.
- Specific gravity and viscosity at operating conditions.
- Normal working temperature of fluid to be measured.
- Maximum temperature of fluid to be measured.
- Normal pressure of fluid to be measured.
- Maximum pressure of fluid to be measured.
- Scale flow units M3/hr or litres per min

Installation and maintenance

Make sure the Rotameter is positioned as upright as possible and fluid flow is upwards.
Keep the inside of the instrument in a good clean state.

INSTALLATION

To refer to the note of installation, use and maintenance (N°50466-088).
Precautions to be taken:

- To ensure a verticality of the flowmeter as perfect as possible.
- To maintain the interior of the apparatus in good condition of cleanliness (especially in the case of fluid likely to create deposits).
- To envisage a minimal distance from 200mm of the apparatus to any magnetic source as well as any valve or bends (see opposite).

SPARE PARTS

- float and butted,
- cap equipped,
- graduated dial

During the ordering of replacement, it is of primary importance to specify the job number of the apparatus to be repaired before giving reference of any spare part.

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