



# IC-LPM Series

Industrial Inline Paddlewheel Flow Meters  
for Continuous Liquid Flow Measurement



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# IC-LPM Series

## Industrial Inline Paddlewheel Flow Meters for Continuous Liquid Flow Measurement

- Cost effective meters for a broad range of liquids
- Good accuracy with low pressure drop
- Robust stainless steel construction
- Versatile, adaptable design with custom options
- High pressure rating up to 100 bar
- High temperature option up to 350°C
- Selection of flow instruments & displays for compact or remote installation
- Choice of outputs including pulse, 4-20 mA
- ATEX rated option

### Application:

- Fuel & oil monitoring
- High temperature thermal oil monitoring
- High pressure water monitoring
- CNC machine slurry coolant monitoring
- Chilled water circuit monitoring
- Chemical & water batching
- Partially contaminated liquid flows
- Deionised water monitoring



# A cost effective option for continuous liquid flow measurement

## Introduction

The IC-LPM series of industrial inline paddlewheel flow meters provides a cost-effective and accurate means of monitoring liquid flow rates over the range of 0.5 to 1200 l/min. IC-LPM meters are available in 15, 20, 25, 40 and 50 mm nominal sizes; each individual meter has a specific standard flow range with a 10:1 turndown ratio \*.

The IC-LPM series has a simple yet robust stainless steel construction that offers excellent corrosion resistance. Its versatile design can be adapted to meet the requirements of varying liquid flow applications or customised for OEM applications: IC-LPM flow meters are supplied with either threaded or flanged connections and a selection of outputs, flow instruments and displays for compact or remote installation; there is a choice of 3 temperature ratings - a standard operating temperature of up to 120°C with medium (up to 230°C) and high (up to 350°C) temperature options; threaded versions will withstand pressures up to 100 bar, although higher pressures options are also available depending on the application.

Additional meter sizes and flow ranges are available for custom applications and meters can also be supplied with an inlet jet to adjust the standard flow range.

IC-LPM paddlewheel flow meters are an ideal replacement for many turbine meters: they offer a lower pressure drop and reduced risk of contamination from liquids with suspended solids, while still achieving an excellent level of repeatability.

## Principle of operation

The IC-LPM meter features a freely supported paddlewheel impeller mounted on a bearing and pin assembly. As the fluid passes through the meter body it causes the paddlewheel to rotate at a speed that is proportional, within a small level of uncertainty, to the stream flow velocity over a 10:1 linear flow range. The rotational speed is measured by a magnetic pick-up housed in the probe assembly.

The paddlewheel is positioned in the top of pipe to avoid solid particle contamination thus preventing possible erosion and/or impact damage which can occur on conventional full bore turbine meters. As a result, the IC-LPM flow meter can be used for monitoring partially contaminated liquid flows. In addition, the pressure drop across the IC-LPM meter is considerably lower (less than 125 mbar) than an equivalently sized turbine meter as the rotor only obstructs a small fraction of the total flow area.

\* Wider flow ranges are possible when combined with FI series flow transmitters



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# Comprehensive selection of flow instruments & displays for compact or remote installation

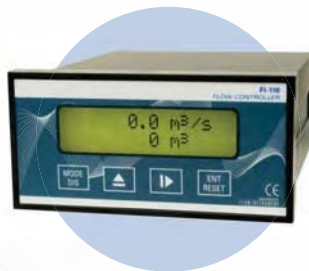


The IC-LPM can be combined with...



### Type FI210 / FI220 flow transmitters

- Rugged diecast aluminium construction
- Choice of powered (FI210) or battery powered (FI220)
- 2-line \* 12-character LCD display
- Total / accumulated total / flow rate
- Compact or remote installation
- Frequency input
- Open collector pulse output
- 4-20 mA output (external loop-powered on FI220)
- Alarm set points (2 relays) on FI210 only



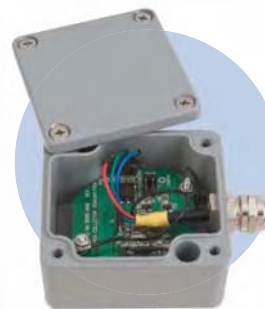
### Type FI110 panel mount flow transmitter

- 2-line \* 16-character LCD display
- Total / accumulated total / flow rate
- Frequency input
- Open collector pulse output
- 4-20 mA output
- Alarm set points (2 relays)



### Type FI200 flow transmitter

- Cost effective ABS construction
- Battery powered
- 2-line \* 12-character LCD display
- Total / accumulated total / flow rate
- Compact or remote installation
- Open collector pulse output
- 4-20 mA external loop-powered output



### Pulse / analogue output modules

- Low mV input range
- PNP/NPN selectable output (pulse module)



Coil only (mV output)

# Introducing the IC-LPM range

## Meter specification

<b>Nominal size</b>	DN15, DN20, DN25, DN40, DN50
<b>Process connection</b>	BSPP(parallel) & BSPT (taper) female threaded, DIN & ANSI flanged; other on request eg PNXX, tri-clamp, NPT, RJT
<b>Flange rating</b>	PN 16, 40, 100 (BS EN 1092-1); ANSI 150, 300, 600 RF (ANSI B16.5)
<b>Compatibility</b>	Solids free and partially contaminated liquids including water, chemicals, hydrocarbons, mineral oils, alcohols
<b>Flow range</b>	0.5 to 1200 l/min, various ranges (see ordering information)
<b>Operating temperature</b>	<b>Standard:</b> -40 to 120°C <b>Medium:</b> -40 to 230°C <b>High:</b> -40 to 350°C
<b>Max operating pressure</b>	<b>All threaded bodies:</b> up to 100 bar <b>Flanged bodies:</b> depends on flange rating and operating temperature range <b>Higher pressure rating on request</b>
<b>Frequency range</b>	25-750 Hz
<b>Pressure drop</b>	Typically less than 125 mbar at maximum flow rate (standard ranges without flow restrictor)
<b>Linearity</b>	±0.5% FSD
<b>Repeatability</b>	±0.1% of reading
<b>Materials</b>	<b>Body:</b> 304 stainless steel (standard); 316 (optional); other materials available on request <b>Rotor:</b> 431 stainless steel <b>Rotor pin:</b> 316 stainless steel; other materials on request <b>Bearings:</b> PEEK 450G (standard & medium temperature); stainless steel ball race (high temperature) <b>O-ring:</b> Buna N (standard); Viton (optional)
<b>Output/display</b>	Coil only (mV); pulse / analogue output modules; flow transmitter (see below)
<b>Installation</b>	Horizontal or vertical flow rising, full pipe only
<b>Approvals</b>	CE, ATEX EEx ia IIC or IIB T6 to T3 (excluding high temperature option)

## Instrument / display specification

Type	Coil only	IC-MV-PO pulse output module	IC-MV-AN analogue output module	FI200 battery powered flow transmitter	FI110/210 powered flow transmitter	FI220 battery powered flow transmitter
Input	-	20-200 mV peak to peak	20-200 mV peak to peak	mV/Pulse	mV/Pulse/ 4-20 mA	mV/Pulse
Frequency range	25-750 Hz	30-1000 Hz	25-750 Hz	0-1000 Hz	0-1000 Hz	0-1000 Hz
Supply voltage	-	5-24 Vdc	24 Vdc	-	24 Vdc/110/220VAC	-
Outputs	mV	Open collector PNP/NPN selectable	4-20 mA, 2 wire current loop	Open collector pulse, 4-20 mA external loop-powered	Open collector pulse, 4-20 mA, relay	Open collector pulse, 4-20 mA external loop-powered
Operating temperature	-	-10 to 55°C	-10 to 55°C	-10 to 55°C	-10 to 55°C	-10 to 55°C
Rating	IP65, ATEX (optional)	IP65	IP65	IP65	FI110: IP65 FI210: IP67, ATEX (consult factory)	IP67

# IC-LPM Inline Paddlewheel Flow Meter

## Versatile configuration that can be adapted or customised to meet your requirements

### Ordering information: IC-LPM flow meter

IC-LPM	Nominal size, flow range (based on H <sub>2</sub> O @ 20°C)
015A	15 mm (1/2") 0.5 - 5 l/min
015B	15 mm (1/2") 1 - 10 l/min
015C	15 mm (1/2") 2 - 20 l/min
015D	15 mm (1/2") 4 - 40 l/min
020A	20 mm (3/4") 6 - 60 l/min
020B	20 mm (3/4") 12 - 120 l/min
025A	25 mm (1") 15 - 150 l/min
025B	25 mm (1") 30 - 300 l/min
040A	40 mm (1.5") 30 - 300 l/min
040B	40 mm (1.5") 60 - 600 l/min
050A	50 mm (2") 60 - 600 l/min
050B	50 mm (2") 120 - 1200 l/min
0Z0Z	Other sizes and flow rates on request

Process connection	
A	BSPP (parallel) female
B	BSPT (taper) female
C	PN16
D	PN40
E	PN100
F	ANSI 150 RF
G	ANSI 300 RF
H	ANSI 600 RF
Z	Other on request (eg PNXX, tri-clamp, NPT, RJT etc)

Max operating temperature	
S	Standard: 120°C
M	Medium: 230°C
H	High: 350°C

Approvals	
0	General purpose
1	ATEX

Output / display	
0	Coil only
P	IC-MV-PO (PNP/NPN) pulsed output
A	IC-MV-AN (4-20 mA) analogue output
D	Flow transmitter / display (specify separately)

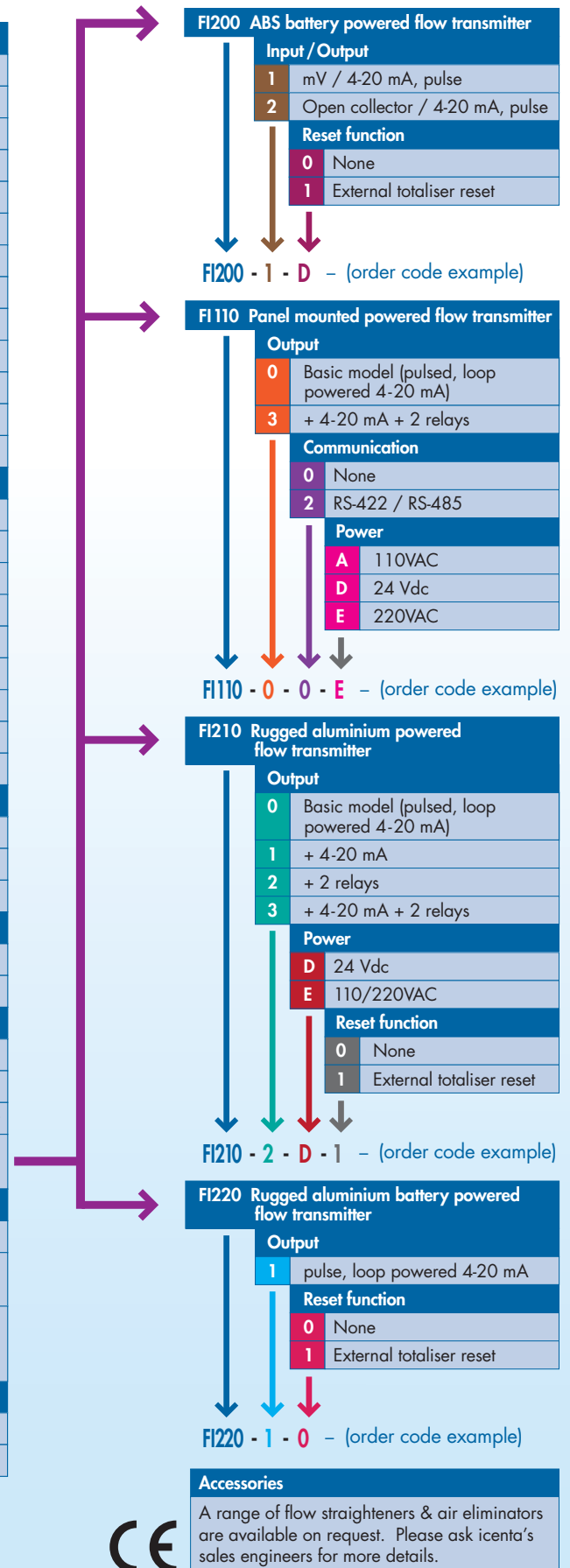
  

Mounting of instrument	
0	No instrument
C	Compact (locally mounted on flow sensor)
R	Wall mounted, including mounting bracket (up to 3 m from sensor, please specify)

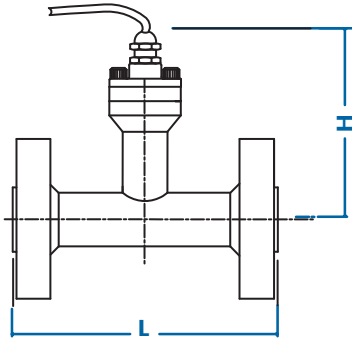
Options	
0	None
1	Specify options

IC-LPM - 015B - D - S - 0 - A - C - 0 - (order code example)

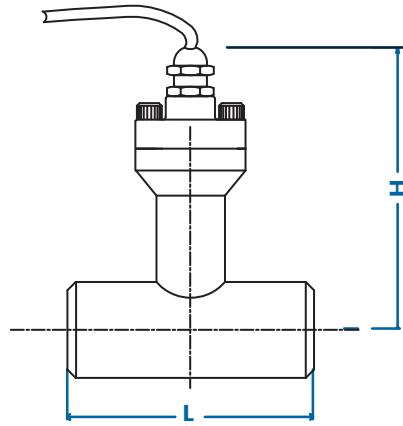




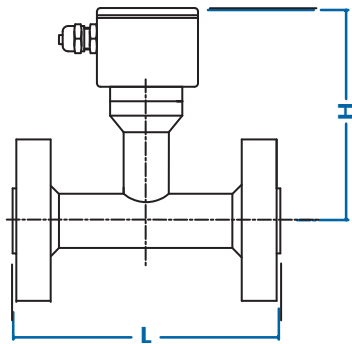
## IC-LPM Dimensions



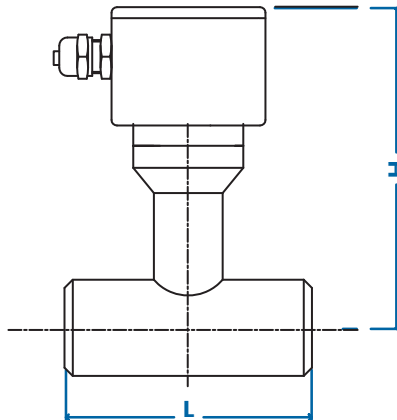
IC-LPM flanged coil only



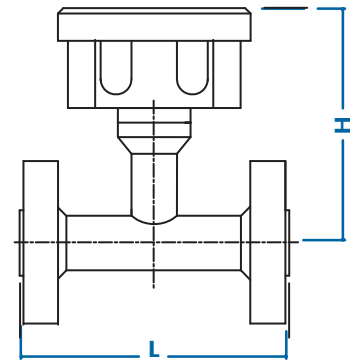
IC-LPM screwed coil only



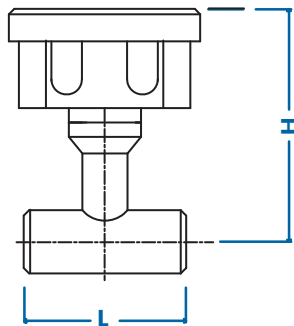
IC-LPM flanged with  
IC-MV-PO/AN output board



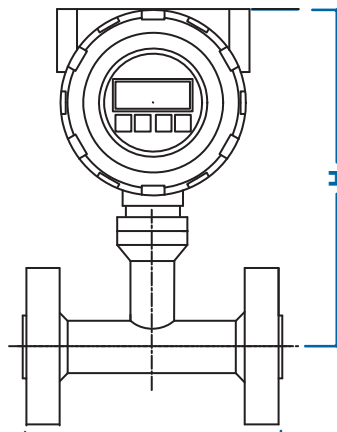
IC-LPM screwed with  
IC-MV-PO/AN output board



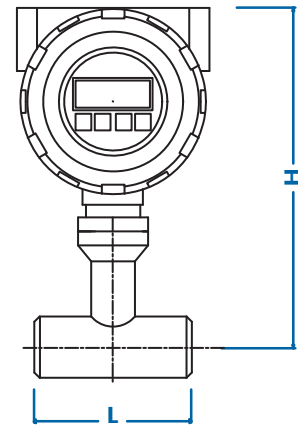
IC-LPM flanged with  
FI200 flow transmitter



IC-LPM screwed with  
FI200 flow transmitter



IC-LPM flanged with  
FI210-FI220 flow transmitter



IC-LPM screwed with  
FI210-FI220 flow transmitter

## Dimensions

Nominal Size	L mm		H mm				Weight kg *	
	Screwed	Flanged	Coil only	IC-MV-PO/AN	FI200	FI220/FI210	Screwed	Flanged
15 mm (1/2")	90	152	100	115	130	192	1.2	2.8
20 mm (3/4")	90	152	100	115	130	192	1.2	3.7
25 mm (1")	100	181	106	121	136	198	1.5	4.8
40 mm (1.5")	120	185	110	125	140	202	2.5	8.9
50 mm (2")	120	205	115	130	145	207	3.0	10.1

\* approximate weight based on IC-MV-PO/AN output board and ANSI 300 / PN40 if flanged

# Ideal for varying liquid flow applications



The IC-LPM is employed by a European temperature control specialist in their range of tool heaters and temperature controllers which ensure that temperatures are accurately managed

within applications such as injection moulding, extrusion and die casting. The standard temperature IC-LPM with mV output is used in water based heaters up to 90°C whilst the high temperature version is used in oil based heaters from 150 to 350°C.

The IC-LPM with battery-powered resettable flow totaliser is used in mobile aircraft deicing systems to monitor use of deicing fluid and allow billing of individual airlines.



The IC-LPM was chosen as a cost effective alternative to a turbine flow meter or insertion paddlewheel meter.



A company that concentrates on fuel storage and handling of diesel and oil is using the standard temperature IC-LPM with a battery

powered flow rate indicator for monitoring the flow of diesel to/from storage tanks. The IC-LPM meter was chosen primarily because of the short lead time compared with supply of an equivalent turbine meter.

A leading provider of engineering solutions in machining technology has integrated the standard temperature IC-LPM with mV output into a CNC milling machine to control flow and optimise usage of machine cutting fluid.



## Installation

The meter can be installed either horizontally or vertically with flow rising and only with a full pipe. For best practice and optimum accuracy, allow at least 10 diameters of straight pipe run upstream and 5 diameters of straight pipe run downstream of the flow meter installation. Greater straight run lengths may be required when installed close to bends, elbows and valves (please consult our engineers with details of your application). If there is not a sufficient straight run of pipe, a flow straightener may be used to reduce the straight run requirements.



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