Turbine Flowmeters

Manufacturer of Specialist Flow Instruments

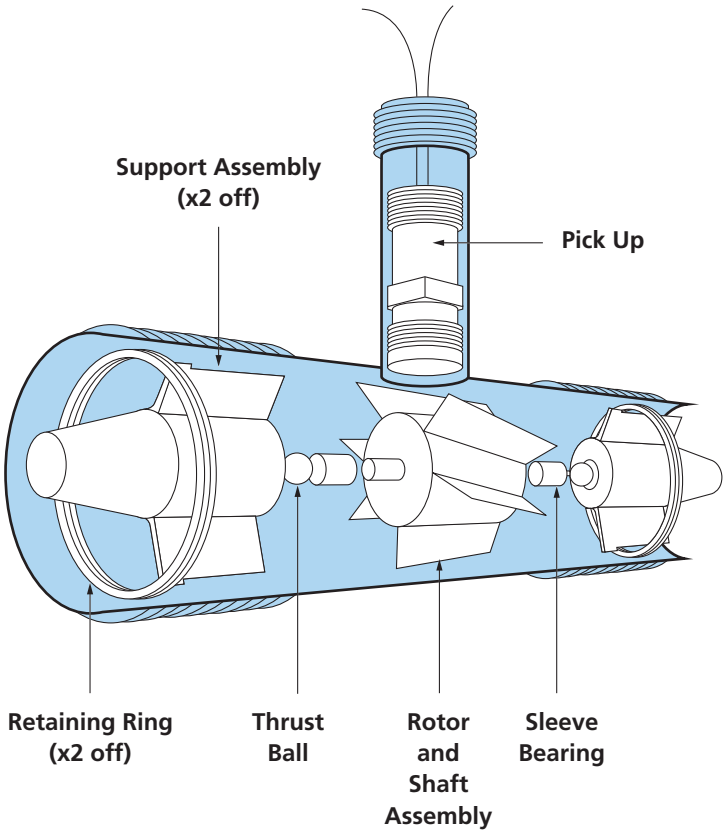
The FM range of Turbine Flowmeters meet the demand of most liquid measurement applications.

Consisting of three component assemblies, fitted inside a stainless steel body (locked with retaining rings), which has a Pick Up (variable reluctance sensor) fitted and come in a range of threaded, flanged and tri clamp styles.

The Rotor and shaft assembly (1 off) which is mounted in sleeve bearings, fitted inside Support assemblies (2 off) is turned by the kinetic energy of the flowing guild at an angular velocity, which in the linear range of the Flowmeter is proportional to the mean axial velocity of the fluid.

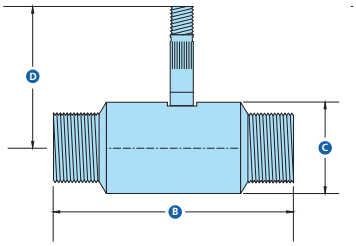
The Rotor blades sweep out the full bore of the flowmeter except for a small tip clearance space. As the blade tips pass the magnetic Pick Up (through the housing wall) they initiate pulse. Flow rate is determined by the frequency of the pulses and Totalised Flow is obtained by summation of the pulsing electrical signal.

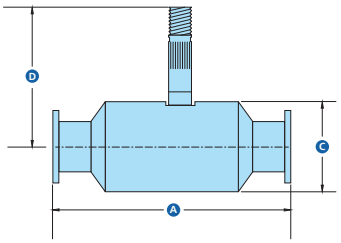
Working Temperature	- 50°C to + 282°C
Accuracy	+ / -0.5% of reading over Flow Range
Repeatability	+ / - 0.15% of reading
Pressure Drop	Less than 0.5 bar at Maximun Flow
Materials	All 316 Stainlesss Steel with ANC1A Rotor
Bearings	Wear Resistant Tungsten Carbide Sleeve
Pick Up	The Lx variable reluctance sensor is hermetically sealed for resistance to moisture and can withstand repeated thermocycling. The magnet is resistant to demagnetization. Output is a low level signal that ranges from 10 mV to 1 V peak to peak. A screened twin core signal cable should be used for connection to the Pick Up.

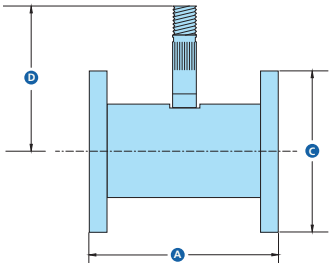


Specification

Model		FM13	FM16	FM19	FM25	FM40	FM50	FM80	FM100
Flow Range		2 - 20	5 - 50	14 - 140	27 - 270	55 - 550	114 - 1140	227 - 2270	454 - 4540
Connections									
Threaded									
T1	BSPP Male	1/2"	3/4"	3/4"	1"	1 1/2"	2"		
T2	NPT Male	1/2"	3/4"	3/4"	1"	1 1/2"	2"		
	Length (mm)	70	76	76	76	114	133		
	Height (mm)	160	160	160	160	170	180		
	Max Pressure (bar)	250	250	250	250	250	250		
Hygienic									
H1	TRI Clamp			3/4"	1"	1 1/2"	2"		
	Length (mm)			64	64m	88	100		
	Height (mm)			160	160	170	180		
	Max Pressure (bar)			50	50	50	50		
Flanged									
F1	ANSI 150	3/4"	3/4"	3/4"	1"	1 1/2"	2"	3"	4"
F2	ANSI 300	3/4"	3/4"	3/4"	1"	1 1/2"	2"	3"	4"
F3	DIN PN 16 (mm)	20	20	20	25	40	50	80	100
F4	DIN PN 40 (mm)	20	20	20	25	40	50	80	100
	Length (mm)	140	140	140	152	165	165	165	210
	Height (mm)	160	160	160	160	170	180	190	220







Pick Up

S	Standard Variable Reluctance Coil
I	Intrinsically Safe Variable Reluctance Coil ATEX Ex ia IIC T6 to T3

Electronics

101a	Totaliser / Flowrate Indicator with pulse output and 4 20 mA output
101ai	Intrinsically safe version ATEX Ex ia IIC T4
101b	Batch Controller
101 bi	Intrinsically safe version ATEX Ex ia IIC T4
101c	Totaliser / Flowrate Indicator with high and low Alarms
101ci	Intrinsically safe version ATEX Ex ia IIC T4
101d	Bi Directional Flow Indication (Fmb Model only)
101di	Intrinsically safe version ATEX Ex ia IIC T4
AMP	Amplifier Board
SCALER	Scaler Board
4 - 20 mA	4 - 20 mA Board

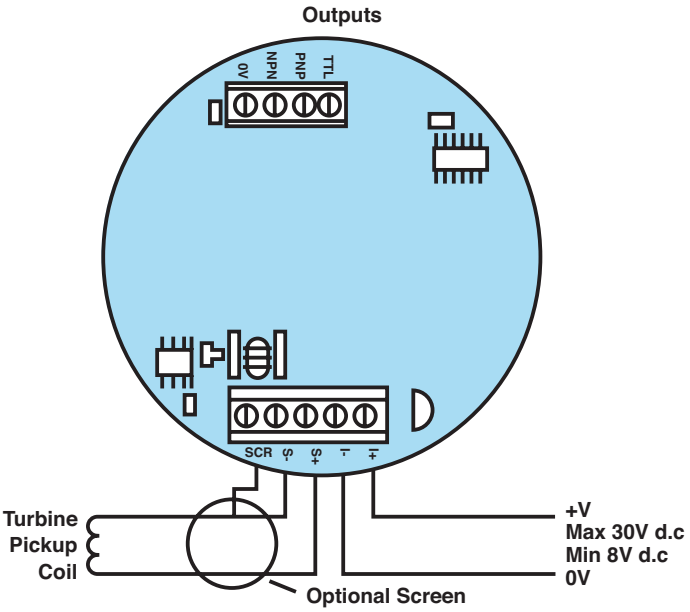
Ordering Code

	Model	Connections	Pick Up	*or*	Electronics
			Pick Up		**Electronics**
e.g.	FM25	T1	S		101a

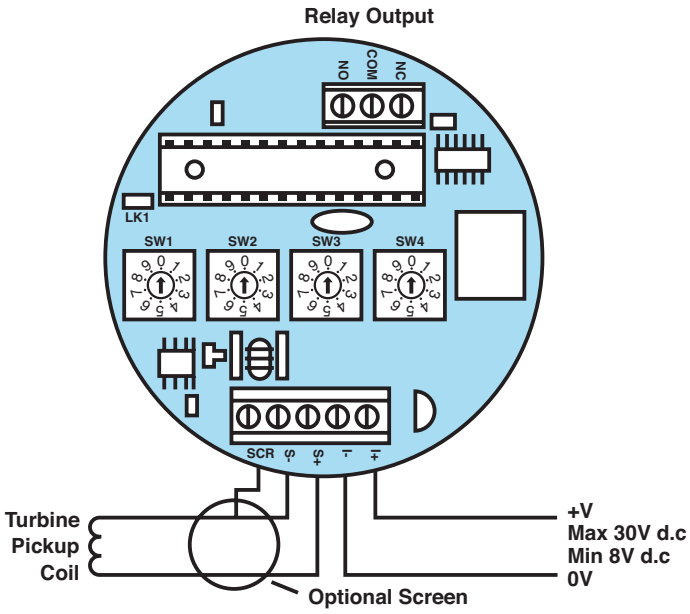
Electronic Solutions

The FM Turbine Flowmeter is usually supplied with any of the 101 range electronic solutions, however it can be supplied with just a signal conditioning board such as an Amplifier, Scaler or 4 – 20mA Board.

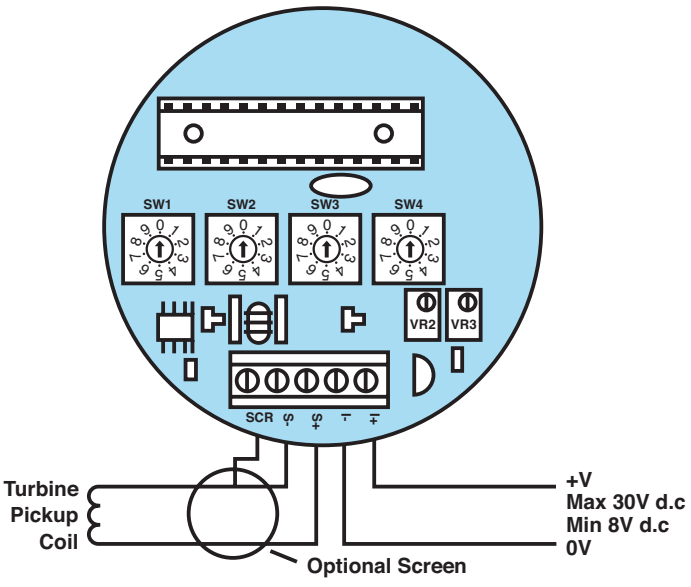
Amplifier Board Connections



Scaler Board Connections



4 - 20mA Board Connections



Installation

- Carry out a visual inspection of the Turbine meter upon receipt, checking for indications of any possible transit damage.
- Inspect all packing material carefully for associated components which may have been packed with the shipment.
- The stem of the Turbine is marked with a direction arrow to indicate the calibrated direction of flow through the Flowmeter.
- Ensure that the Flowmeter is installed in the pipework in the correct orientation to obtain the best reliable operation.
- In order to achieve the best electrical signal output from the Flowmeter install well away from current carrying cables, nearby motors and transformers.
- The Turbine Flowmeter may be installed horizontally or Vertically, but if vertical, it is advisable for the fluid flow to be in the upwards direction.
- It is good practice to install the Flowmeter with a minimum straight run of 10 pipe diameters upstream of the inlet and 5 pipe diameters following the outlet.

Flowmeter By-Pass

Where possible, such as in a new piping system, it is advisable to include a valved by-pass around the Flowmeter. However, the by-pass connections should not be placed within the recommended straight metering run.

Line Purge

In a newly installed piping system (or one in which fittings have been disturbed) the line should be flushed thoroughly prior to installing the Flowmeter, to minimise possible damage from foreign materials.

Meter Protection

- In line strainers (Filters) are recommended for meter protection.
- The degree of filtration required depends on the size of the Flowmeter.
- The following table is a guide to assist in the choice of filtration.

Model	Recommended Mesh Size
FM 13	200 microns (0.2mm)
FM 16	200 microns (0.2mm)
FM 19	200 microns (0.2mm)
FM 25	300 microns (0.3mm)
FM 40	300 microns (0.3mm)
FM 50	300 microns (0.3mm)
FM 80	500 microns (0.5mm)
FM 100	500 microns (0.5mm)
FM 150	500 microns (0.5mm)

- To maintain an accurate flow measurement it is essential to ensure that the pipeline bore is completely filled with liquid and that there is a downstream pressure sufficient to prevent flashing/cavitation.
- To eliminate this condition ensure that the downstream static pressure is at least twice the pressure drop across the meter plus the vapor pressure of the fluid.

Electrical

- The voltage output (A.C. sinewave) generated from the Lx Flowmeter varies from a minimum of 10mV at the lowest flow on the Lx 13 up to 1 V peak to peak for larger Flowmeters at maximum flow.
- A twin core screened signal cable should be used for connection to the Pick Up coil.
- Transmission distances up to 50 meters can be achieved without the need for amplification.
- ATEX Pick Up coils can be fitted for Intrinsically Safe applications.

Pick Up Testing

- Testing the Pick Up coil consists of measuring the resistance with an Ohm Meter.
- The resistance measured between the two wires from the Pick Up coil should be approximately 1700 Ohms.

Maintenance

- Once installed, the Flowmeter will require no regular running maintenance apart from a periodic check on the Pick Up coil.
- It is recommended that the Flowmeter should be removed from the line periodically and inspected for the presence of dirt or foreign bodies in the internal parts.
- The Flowmeter is usually supplied with any of the 101 Range of Electronics, however it can be supplied with just a Signal Conditioning Board such as an Amplifier, Scaler or 4-20mA Board.

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