



# YPL LEVEL & INSTRUMENTS

FLOW METER: YPL-MFM60

## DESCRIPTION

YPL-MF Electromagnetic flow meters as they are called, operates on Faraday's law of electromagnetism to measure flow of conductive liquids. These flow meters efficiently measure liquid flow rate of liquids & converts it into 4-20mA output current signal or display it on LCD display unit. These flow meters incorporates advanced microprocessor based data processing electronics to ensure efficient and accurate operation, clear LCD unit to display flow rate & Totalized flow with EEPROM memory to store data.

Flow meter is sub classified into two main models:

Integral Type - LCD: transmitter cum display electronic unit is mounted on top of the flow sensor.

Remote Type - LCD: transmitter cum display electronic unit is separate wall mounted type & is connected to the flow tube sensor, with special cable to be ordered along with the flow meter.

Flow meter consists of a hollow cylindrical shaped main flow sensing unit, its inner surface is lined with suitable insulation material called liner. Two sensing electrodes are placed diagonally opposite to each other. When excitation signals are given to these electrodes, a magnetic field with a magnetic flux (B), is generated in the direction vertical to the measuring pipe sensor. At this time if the flux with specific electro-conductivity flows through the measuring pipe, the line of magnetic force will induce electromotive force E. Electromotive force E is in directly proportional to magnetic flux B. With the product of inside diameter 'd' of flow meter pipe and average flow velocity V, electromotive force E (signal of the flow) is measured by electrodes and sent through cable to transmitter unit. Transmitter magnifies these flow signals by computing flow rate of flux and after converting displays it as liquid flow rate on LCD & a 4-20 mA current output is also obtained.  $E = K B d V$

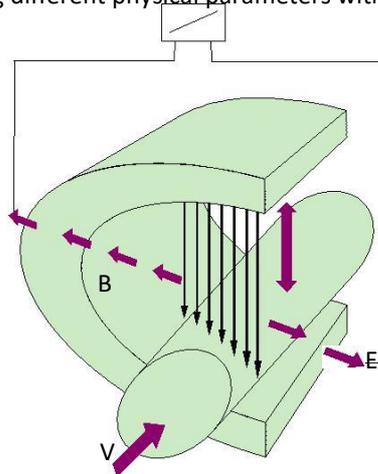
In the equation: E = signal voltage of inner electrodes (v) B

= density of magnetic flux (T)

d = inside diameter of measuring pipe (m)

V = average flow velocity (m/s)

In above equation, d is a constant. Since excitation current is constant B is also a constant. We can know from  $E = K B d V$  that flow rate of volume Q is directly proportional to signal voltage E, that is, signal voltage of flow rate induction E is in linear relation to flow rate of volume Q. So if only E is measured flow rate Q can be defined, which is the basic operating principle of magnetic flow meter. From  $E = K B d V$  we can see that the temperature of the measured flux medium, density, pressure, electro-conductivity and the liquid-solid proportion of the liquid medium will not affect the measurement result. To moving condition if only it accords with the flow of axial symmetry (such as laminar flow) it will not affect the result of the measurement. Due to its operating principle, same magnetic flow meter can be used for different liquids having different physical parameters without any modification & with great efficiency.



Magnetic flow meters are the efficient way for flow measurement of conductive liquids having conductivity greater than 5  $\mu\text{S}/\text{cm}$ . Liquids should be enough conductive for better performance (conductivity of raw water lies between 500 -1000  $\mu\text{S}/\text{cm}$ ).

The flow meter's electronic unit is easy to configure by push buttons, have LCD display and efficient signal processing components. Various versions are available for use in different liquid media. Different Liners like Rubber & PTFE are available, for corrosive liquids like acidic effluent, acids, chemicals, pulps, juices, corrosive water etc. choice of optional measuring electrodes are available like SS316L, Hastelloy B, Hastelloy C, Titanium, Tantalum are available. Different models are available for high temperature operation and optional HART interface, RS485, RS232 communication, back light LCD display etc.

For proper selection of right flow meter operating parameters like Flow rate, Pressure, Temperature, liquid conductivity, liquid

corrosive nature etc. are to be foreseen and evaluated. Flow meter can thereby be selected with desired line size, flow rate, Liner material, Electrode material, temperature version & type of LCD display unit required etc. along with other general technical specifications.

**Application:** Water, Sewage, Chemicals, Pharmaceutical, Effluent, Industrial waste, solid mixed liquids, Acids, Paper

Model with PTFE Liner



Model with PTFE Liner



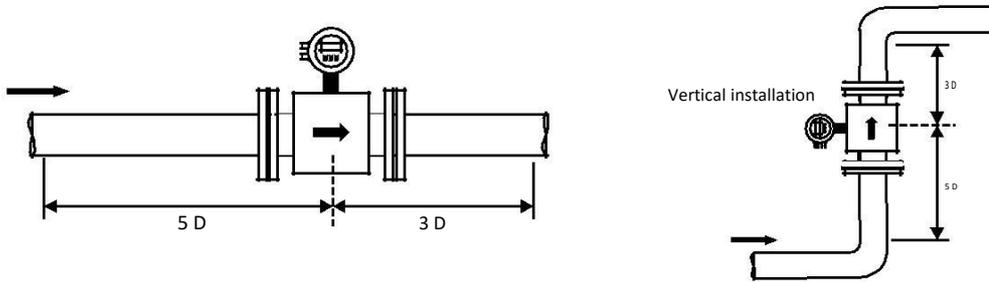
Model with Rubber Liner

MODEL	YPL-FM	
Versions	Integral	Remote
Protection	IP 65	IP 65 (IP 67, IP 68 optional)
Connection	Flanged - CS	
Sizes	DN 25 ~ DN 2000	
Liners	Rubber / PTFE	
Supply	220 V AC , 50 Hz / Optional 24 V DC	
Output	4 - 20 mA	
Process Temperature	-20 to 180 Deg. C as per model selection	
Media	Liquids with conductivity ratio more than 5 $\mu$ S/cm	
Electrodes	SS 316L / Hastelloy B,C / Ti / Ta	
Accuracy	0.3% ~ 0.5%	
Flow tube	SS-304	
Outputs (optional)	HART / RS 232 / RS 485	
Signal Cable (optional)	10 ~ 20 meter integral (with remote version only)	

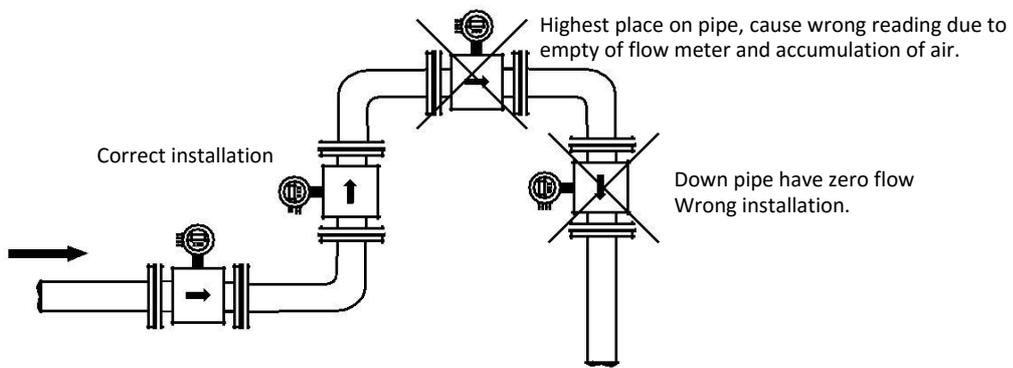
Flow meter to be installed vertically or horizontally on the pipe line, so that Flow meter shall always remain filled with flowing liquid during measurement. Vertical installation is recommended, so that flow meter shall always remain fully filled with liquid.

For installation few of following methods are recommended for proper and efficient working of flow meters.

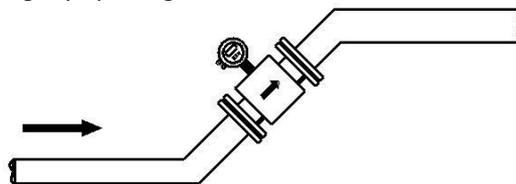
1. Flow meter to be installed with suitable straight pipe lengths for proper liquid flow, 5D at upstream (inlet) and 3D at down stream (outlet). D is the size of flow meter dia. All bends, valves etc. should be placed after or before these minimum clear straight pipe lengths. Arrangement should be made for easy removal and assembly of flow meter.



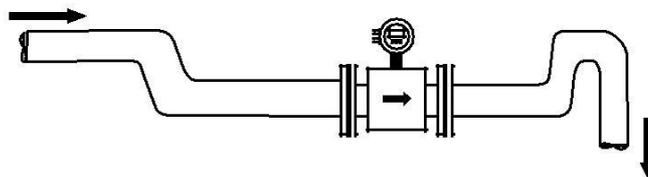
2. Flow meter to be installed at lower pipe or vertically at the upward pipe, where it should always operate fully filled. Never install it at highest place on pipe line, as flow meter may work empty or collection of air bubble may cause erratic reading. Also do not install on down pipe as it may remain empty and give wrong working.



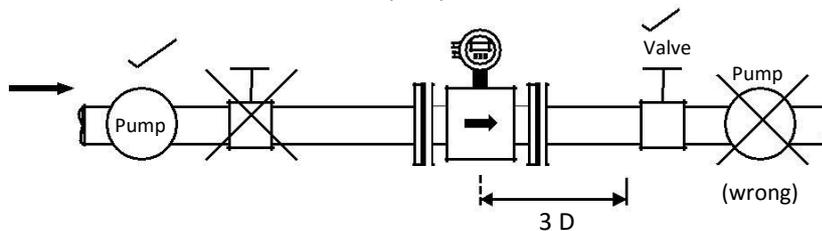
3. Install Flow meter where pipe is slightly up rising.



4. On drainage discharge pipe, flow meter should be installed at lower point on pipe, so it should not work empty.



5. Install the control valve or shut off valve at downstream of meter. Always install flowmeter at the outlet of Pump and never to be installed before the suction of pump.



Above are few indicative recommendations to install flow meter. Do refer to instruction manual before final installation. Remote version models are available with special flow signal cable. Flow rate is indicated in m<sup>3</sup>/hr and other parameters on LCD display unit of flow meters. Consider selection of proper electrodes, liner material, flow rate, pressure etc. for correct flow meter selection.

SIZE	FLOW RATE (m <sup>3</sup> /hr)	SIZE	FLOW RATE (m <sup>3</sup> /hr)
DN - 15	0.6 ~ 6.36	DN - 450	57.23 ~ 5722.65
DN - 20	0.11 ~ 11.30	DN - 500	70.65 ~ 7065.00
DN - 25	0.18 ~ 17.66	DN - 600	101.74 ~ 10173.60
DN - 32	0.29 ~ 28.94	DN - 700	138.47 ~ 13847.40
DN - 40	0.5 ~ 45.22	DN - 800	180.86 ~ 18086.4
DN - 50	0.71 ~ 70.65	DN - 900	228.91 ~ 22890.60
DN - 65	1.19 ~ 119.40	DN - 1000	282.60 ~ 22860.00
DN - 80	1.81 ~ 180.86	DN - 1200	406.94 ~ 40694.40
DN - 100	2.83 ~ 282.60	DN - 1400	553.90 ~ 55389.60
DN - 125	4.42 ~ 441.56	DN - 1600	723.46 ~ 72345.60
DN - 150	6.36 ~ 635.85	DN - 1800	915.62 ~ 91562.40
DN - 200	11.30 ~ 1130.40	DN - 2000	1130.40 ~ 113040.00
DN - 250	17.66 ~ 1766.25	DN - 2200	1367.78 ~ 136778.40
DN - 300	25.43 ~ 2543.40	DN - 2400	1627.78 ~ 162777.60
DN - 350	34.62 ~ 3461.85	DN - 2600	1910.38 ~ 191037.60
DN - 400	45.22 ~ 4521.60		

For flow meter selection, flow range for each size flow meter to be checked along with other operational parameters including flow rate, temperature, max. operating pressure, liquid type, liquid conductivity etc.

