LMF Electromagnetic Flowmeter

Product Performance & Features

- Simple structures, firm, no movable parts and long operation life
- No intercepting fluid parts, no pressure loss and fluid clogging
- No mechanical inertia, quick response and good stability, application in automatic examination, adjustment and controlling
- Measuring accuracy not influenced by physical parameters such as style, temperature, viscosity, density and pressure.
- Teflon or rubber liner and different combination of electrode material such as Hastelloy C, Hastelloy B, 316L, Titanium, Tantalum and adapt the need of different mediums.
- Adopt EEPROM memory to measure operation data, safe and reliable protectionof memory.

Product Description

LMF series of electromagnetic flowmeter SMD devices and surface mount (SMT) technology, circuit reliability, low power consumption, and the use of 32-bit embedded microprocessor, fast computing, high precision, low frequency rectangular wave excitation, The stability of the measurement. All digital processing, anti-interference ability, reliable measurement, high precision, range up to 30: 1.

Ultra-low power EMI switching power supply, the use of a wide range of power supply voltage changes, EMC performance. Built-in three integrators, respectively, for positive cumulative, inverse cumulative and the difference calculation. With the average flow of automatic computing function, easy to calibrate the instrument.

At the same time also has a small signal cut off the function, user can set the lower limit of the display panel and the lower limit of the flow, thus removing the interference of small signal flow. In order to enhance the safety, the flow meter is also equipped with a password latch function. After power ON meter, if you need to set parameters, you must enter the advanced password to set the parameters to prevent unauthorized personnel to change the instrument parameters.

Even if the scene of suddenly power failure, the flow meter operation results and user settings will not disappear, EEPROM can protect the set parameters and cumulative value.

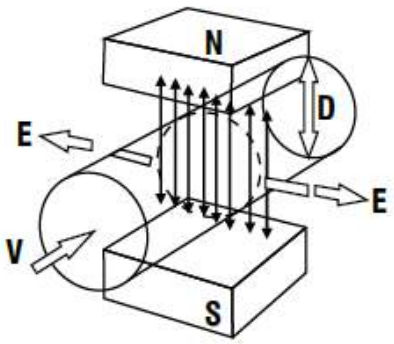
Classification of Products

LMF series smart electromagnetic flow meters consist of sensor and smart signal transducer. And it can be classified into two structures--- integral type and remote type according to the set-up form of the sensor and transducer. In terms of integral type electromagnetic flow meters, transducer and sensor directly assembles as a whole and can not be dissociated.

Working principle

The metering system of the electromagnetic flow meter primary is based on Faraday's laws of electromagnetic induction, on the channel border which is vertical each other with metering tube axis and line of magnetic field mount one pair detecting electrode, when the conductive liquid move along the metering tube axis the conductive liquid cutting the line of magnetic field induce the inductive E.M.F. This EMF detect out by two electrodes on the metering tube, numerical value size is:

E=KBVD
Here: E - inductive EMF;
K - instrument constant;
B - magnetic induction
V - average flow velocity in metering tube section;
D - metering tube inner diameter;



When measuring flow rate, the fluid flow through magnetic field vertical to flow direction, the conductive liquid movement induce one EMF in direct proportion to average flow velocity, so that require measured flow liquid conductivity higher than lowest limit. It's induction voltage signal is detected by two electrodes, and pass through a cable transmit to converter, after through signal treatment and correlative operation, take the integrating flow and the instantaneous delivery indicate on the display screen of the converter.

The sensed signal voltage is converted into the indexing, analogue, and digital output signals in the converter.

Technical Parameters

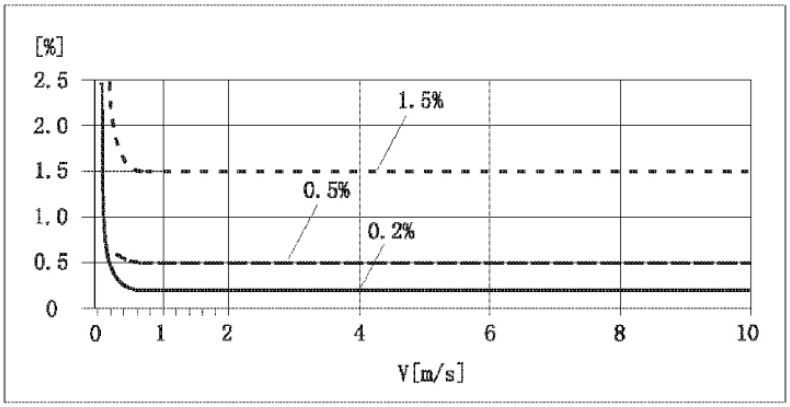
1. Normal working conditions

Ambient temperature: (-25 - 60) ° C

Relative humidity: 5% to 90%
Power supply: Single-phase AC power supply (85 ~ 250) V, (45 ~ 63) Hz:
DC power supply 16VDC ~ 36VDC
Power consumption: less than 20W

2. Measurement accuracy

LMF11: ±0.2%,0.5%;



3. Output variables

3.1 Analog current output

- Load resistance: (0-10) mA, (0 -1.5) k Ω,
- Basic error: 0.1% ± 10μ A, (4-20) mA, (0-750)Ω。

3.2 Digital frequency output

- Frequency output range: (1 ~ 5000) Hz
- Output Electrical Isolation: Opto-isolated, isolated voltage> 1000V
- Frequency output drive: FET output, the maximum withstand voltage 36VDC, the maximum load current of 250mA

3.3 Digital pulse output

- Output pulse range: (0-100) pulse / sec <higher than the upper elbow, will lose pulse>
- Output pulse equivalent: (0.001-1.000) m^3 / cp,
  (0.001-1.000) LTR /cp,
  (0.001-1.000) USG /cp,
  (0.001-1.000) UKG /cp ;

Output pulse width: User software settings;
Output Electrical Isolation: Opto-isolated, isolated voltage> 1000V Pulse output drive: FET output, the maximum withstand voltage 36VDC, the maximum load current of 250mA

3.4 Alarm output

- Alarm output contact: ALMH - upper limit alarm: ALML - lower limit alarm
- Output Electrical Isolation: Opto-isolated, isolated voltage> 1000V
- Alarm output drive: transistor output, the maximum withstand voltage of 36V, the maximum load current of 250mA

3.5 Digital communication interface and communication protocol:

- MODBUS interface,
- RTU format,
- Physical interface RS-485,
- Electrical isolation 1000V
- HART interface: support standard HART protocol, configure the HART Communicator, can display the measured value online, and modify the instrument parameters

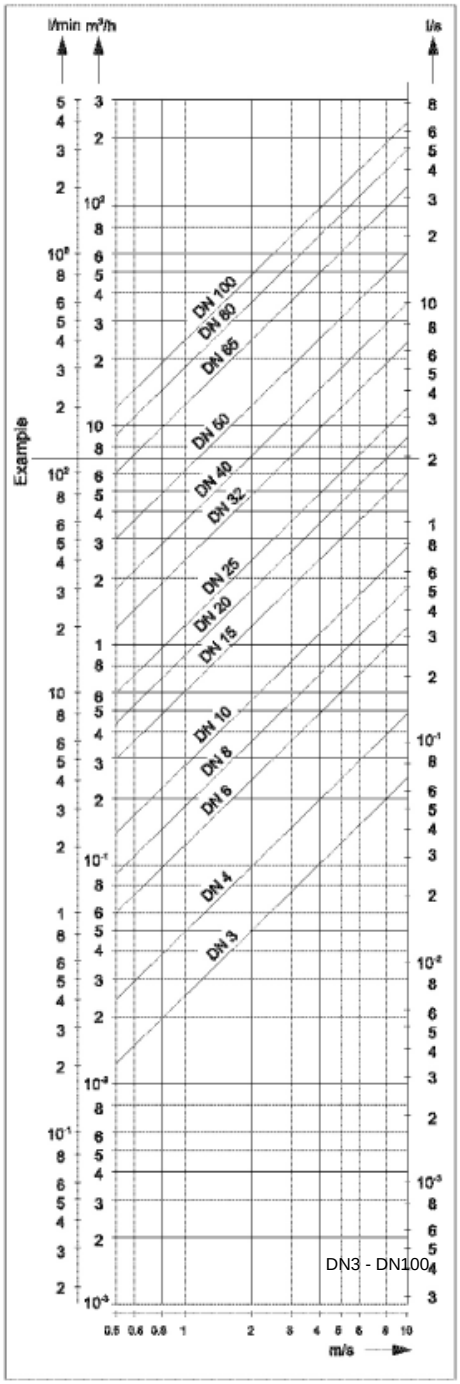
Flowmeter Nominal Size; Pressure and Flow Range

The instantaneous volume flow is a function of the flow rate and the sensor aperture. The instantaneous flow bar graph shows the flow range that each flow meter can measure, and gives several sensor specifications suitable for measuring a given flow rate.

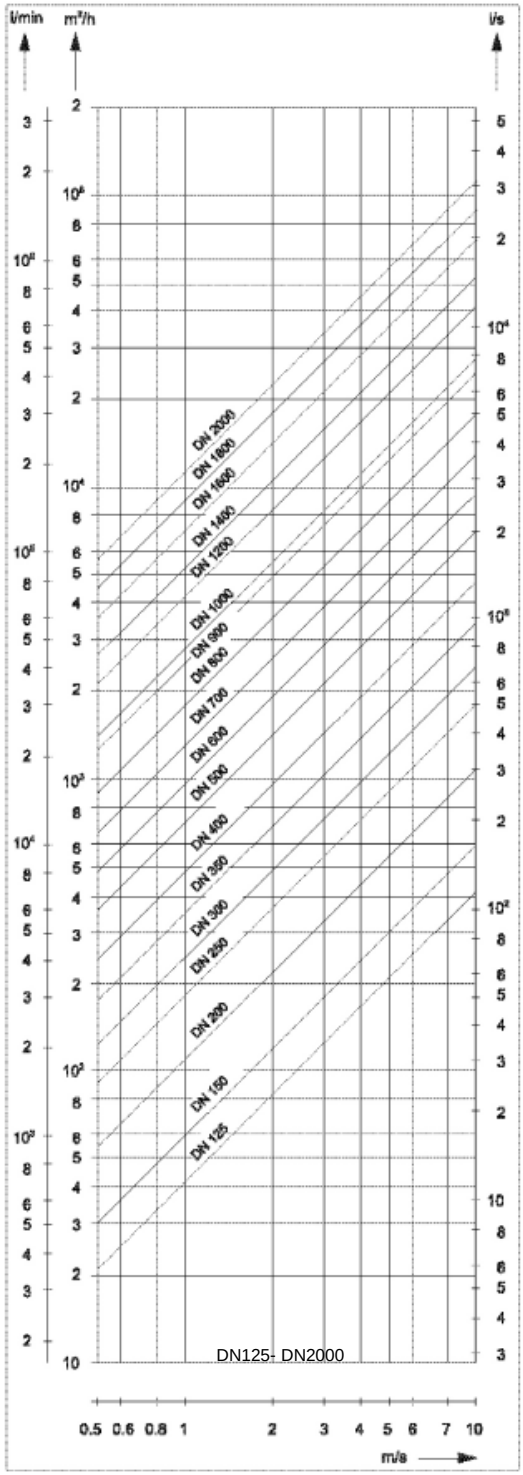
Size DN	Pressure MPa	Min. flowrate 0.5m/s	Max. flowrate 1.0m/s
3	4.0	0.2 l/min	4 l/min
4	4.0	0.4 l/min	8 l/min
6	4.0	1.0 l/min	20 l/min
8	4.0	1.5 l/min	30 l/min
10	4.0	2.25 l/min	45 l/min
15	4.0	5.0 l/min	100 l/min
20	4.0	7.5 l/min	150 l/min
25	4.0	10 l/min	200 l/min
32	4.0	20 l/min	400 l/min
40	4.0	30 l/min	600 l/min
50	4.0	3 m³/h	60 m³/h
65	4.0	6 m³/h	120 m³/h
80	4.0	9 m³/h	180 m³/h
100	1.6	12 m³/h	240 m³/h
125	1.6	21 m³/h	420 m³/h
150	1.6	30 m³/h	600 m³/h
200	1.6	54 m³/h	1080 m³/h
250	1.6	90 m³/h	1800 m³/h
300	1.6	120 m³/h	2400 m³/h
350	1.6	165 m³/h	3300 m³/h
400	1.6	225 m³/h	4500 m³/h
450	1.0	286 m³/h	5700 m³/h
500	1.0	330 m³/h	6600 m³/h
600	1.0	480 m³/h	9600 m³/h
700	1.0	660 m³/h	13200 m³/h
800	1.0	900 m³/h	18000 m³/h
900	1.0	1200 m³/h	24000 m³/h
1000	1.0	1350 m³/h	27000 m³/h
1200	0.6	2100 m³/h	42000 m³/h
1400	0.6	2700 m³/h	54000 m³/h
1600	0.6	3600 m³/h	72000 m³/h
1800	0.6	4500 m³/h	90000 m³/h
2000	0.6	5700 m³/h	114000 m³/h

The instantaneous flow of the electromagnetic flowmeter

example:
Instantaneous flow rate + 7m3 / h (maximum value is the upper limit of the range). When the flow rate is between 0.5 and 10 m / s, the applicable sensor diameter [DN20-DN65].



DN3 - DN100



DN125- DN2000

Selection of Electrode Material(s)

The material of the electrode is selected according to the corrosiveness of the fluid to be measured

Material	Corrosion resistance
SS 316L	1. Domestic water, industrial water, raw water, urban water 2. Dilute acid, dilute alkali and other weak corrosive, alkaline salt solution
Hastelloy B	1. Hydrochloric acid <less than 10% concentration) and other non - oxidizing acid 2. Uranium hydroxide (concentration less than 50%) of all concentrations of ammonium hydroxide alkaline solution. 3. Phosphoric acid, organic acids *Not applicable: nitric acid
Hastelloy C	1. A mixed solution of a mixed acid such as chromic acid and sulfuric acid 2. Oxidizing salts such as Fe +++, Cu ++, seawater *Not applicable: hydrochloric acid
Titanium	1. Salt, such as a) chloride (oxide / magnesium / aluminum / calcium / plating / iron, etc.) b) Sodium salt, ammonium salt, hypochlorite, sea water 2. Concentration of less than 50% potassium hydroxide, ammonium hydroxide, barium hydroxide alkaline solution *Not applicable: hydrochloric acid, sulfuric acid, phosphoric acid, hydrofluoric acid and other reducing acids
Tantalum	1. Hydrochloric acid (concentration less than 40%), dilute sulfuric acid and concentrated sulfuric acid (not including fuming sulfuric acid) 2. Chlorine dioxide, ferric chloride, hypochlorous acid, sodium cyanide, lead acetate, etc. 3. Nitric acid (including fuming nitric acid) and other oxidizing acid, the temperature below 80 ℃ of aqua regia *Not applicable: Alkaline, hydrofluoric acid
Platinum (Pt)	1. Applicable: almost all acid, alkali, salt solution <including fuming sulfuric acid, fuming nitric acid) *Not applicable: aqua regia, ammonium salt
Tungsten carbide	1. Applicable: pulp, sewage, can interfere with solid particles *Not applicable: inorganic acid, organic acid, chloride

Selection of Lining Material(s)

Should be based on the corrosion of the measured medium, wear and temperature to choose. Hard / soft rubber can be resistant to the general weak acid, alkali corrosion, temperature 65 ℃, soft rubber wear resistance, PTFE (PTFE) almost resistant to heat acid other than strong acid, alkali corrosion, medium temperature up to 130 ℃, but not wear and tear. Polyurethane rubber has good wear resistance, but not acid, alkali corrosion, temperature resistance is also poor, the medium temperature is less than 65 ℃.

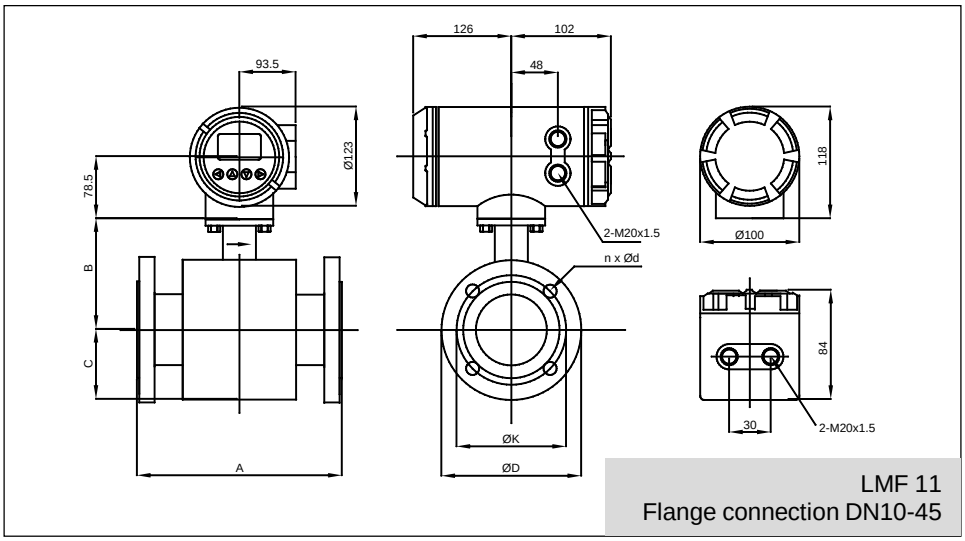
Lining material	The main function	Applicable scope
Hard rubber	• Can be resistant to hydrochloric acid at room temperature, acetic acid, oxalic acid, ammonia, phosphoric acid and 50% sulfuric acid, sodium hydroxide, potassium hydroxide • Avoid strong oxidants	• Below 65ºC • General acid, alkali, salt solution
Soft rubber	• Have better flexibility, better wear resistance • Resistance to the general low concentration of acid, alkali, salt medium corrosion	• Below 65 ° C • Measure the general water, sewage, mud, pulp • Weak acid, weak base, salt medium
Modified PP	• Have good insulation, physical and chemical properties, viscosity • Weak vinegar, weak base, salt, oxidizer	• Below 90 ° C • Common water, hot water, sewage and industrial wastewater
Polytetrafluoroethylene (PTFE) Modified tetrafluoroethane (F46) Modified polytetrafluoroethylene (PFA)	• The most stable chemical properties of plastic in a material, the ability to boil hydrochloric acid, sulfuric acid, nitric acid and aqua regia, but also resistant to alkali and a variety of organic solvents • Poor wear resistance and poor adhesion	• -40ºC to 130ºC (PTFE) • -40ºC to 180ºC (F46) • -40ºC to 200ºC (PFA) • Acid, alkali and other strong corrosive media • Sanitary media

Protection level

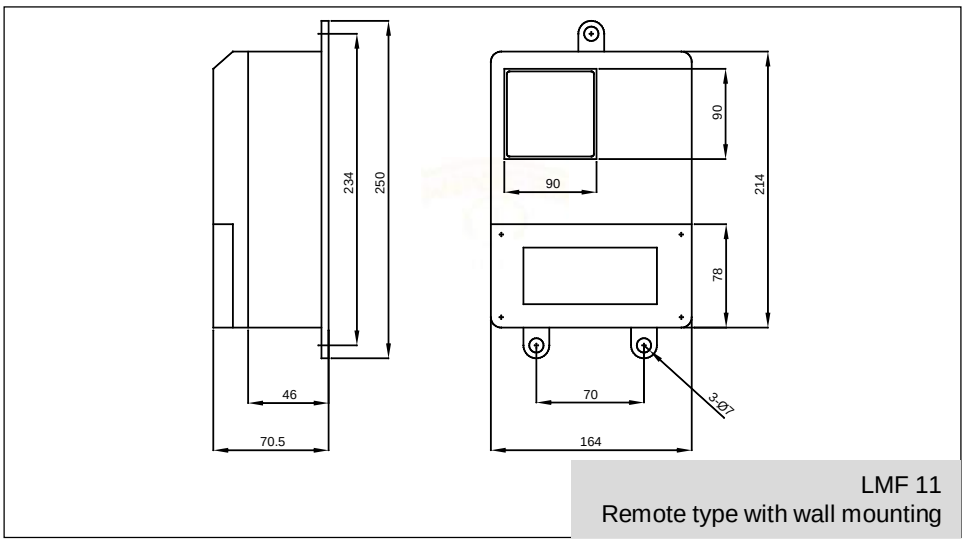
According to EN60529 standard, the enclosure protection class can be divided into:

- IP65 for the spray type, you can allow the faucet from any direction of the instrument water, spray pressure of 30kPa, the water is 12.5 liters / min, spray from the instrument from the distance of 3 meters.
- IP67 for the anti-flooding type, that is, the instrument can be immersed in water for a short time, the highest point should be underwater at least 150cm, duration of at least 30 minutes.
- IP68 for the diving type, should be able to work long hours in the water, the maximum depth of its penetration by the manufacturer and the user consultation.

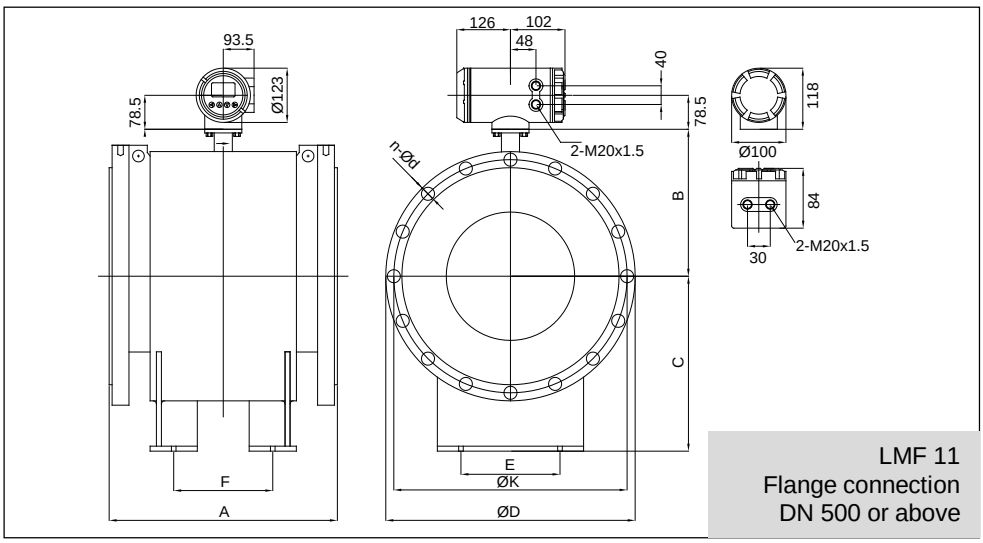
Protection principle selection principle should be based on the above requirements and the actual conditions of the instrument selected. If the instrument below the ground, often flooded, should use IP68: If the instrument on the ground, you can use IP65.



LMF 11
Flange connection DN10-45



LMF 11
Remote type with wall mounting



LMF 11
Flange connection
DN 500 or above

LMF11 Series Pressure Rated Table

DN	Pressure								
	MPa	A	B	C	E	F	Φ D	Φ K	n x Φd
10	4.0	150	95	50			90	60	4 x Φ14
15							95	65	
20							105	75	
25			100	55			115	85	
32			105	60			140	100	4 x Φ18
40			110	65			150	110	
50		197/202	121	76			165	125	
65			130	85			185	145	8 x Φ18
80			135	90			200	160	
100	1.6	247/252	145	100			220	180	
125			161	116			245	210	
150		297/302	171	126			280	240	8 x Φ22
200		348/352	199	154			335	295	12 x Φ26
250		398/402	224	179			405	355	12 x Φ22
300		498/502	249	204			440	400	
350			274	229			500	460	16 x Φ22
400		598/602	305	260			565	515	16 x Φ26
450	1.0		330	285			615	565	20 x Φ26
500		/600	360	403	300	240	670	620	
600			410	453		270	780	725	20 x Φ30
700		/700	467	560	400	350	895	840	24 x Φ30
800		/800	517	610		400	1010	950	24 x Φ33
900		/900	567	660		470	1110	1050	28 x Φ33
1000		/1000	617	712		570	1225	1160	28 x Φ36
1200	0.6	/1200	719	814	600	710	1400	1340	32 x Φ33
1400		/1400	819	914		900	1625	1560	36 x Φ36
1600		/1600	919	1036	800	1040	1825	1760	40 x Φ36
1800		/1800	1021	1138		1180	2045	1970	44 x Φ39
2000		/2000	1121	1238		1350	2265	2180	48 x Φ42

LMF11 – Ordering information

Description	Series																
Electromagnetic Flowmeter	LMF11																
Accuracy level																	
Standard ±0.5%		A															
High Precision ±0.2%		B															
Installation method																	
Flange type			F														
Lining Material																	
Hard rubber				H													
Soft rubber				S													
PTFE				T													
F46				R													
PFA				P													
Special				Z													
Nominal Diameter	**Pressure rating**																
DN3	4.0 MPa				03												
DN4	4.0 MPa				04												
DN6	4.0 MPa				06												
DN8	4.0 MPa				08												
DN10	4.0 MPa				10												
DN15	4.0 MPa				15												
DN20	4.0 MPa				20												
DN25	4.0 MPa				25												
DN32	4.0 MPa				35												
DN40	4.0 MPa				40												
DN50	4.0 MPa				50												
DN65	4.0 Mpa				65												
DN80	4.0 MPa				80												
DN100	1.6 MPa				1H												
DN125	1.6 Mpa				1Q												
DN150	1.6 MPa				1F												
DN200	1.6 MPa				2H												
DN250	1.6 MPa				2F												
DN300	1.6 MPa				3H												
DN350	1.6 MPa				3F												
DN400	1.6 MPa				4H												
DN450	1.0 MPa				4F												
DN500	1.0 Mpa				5H												
DN600	1.0 MPa				6H												
DN700	1.0 MPa				7H												
DN800	1.0 MPa				8H												
DN900	1.0 MPa				9H												
DN1000	1.0 MPa				IT												

Electromagnetic Flowmeter (General Applications)

Description	Series																	
DN1200	0.6 Mpa				2M													
DN1400	0.6 Mpa				4M													
DN1600	0.6 Mpa				6M													
DN1800	0.6 Mpa				8M													
DN2000	0.6 Mpa				0M													
Note: When the precision is 0.2%, the diameter range is only DN10 ~ DN1000																		

Electrode material	**Ground electrode**																	
SS 316L	No	A																
Hastelloy B	No	B																
Hastelloy C	No	H																
Titanium	No	M																
Tantalum	No	T																
Platinum iridium	No	P																
Tungsten carbide	No	U																
SS 316L	Yes	E																
Hastelloy B	Yes	N																
Hastelloy C	Yes	O																
Titanium	Yes	I																
Tantalum	Yes	Q																
Platinum iridium	Yes	G																
Tungsten carbide	Yes	V																
Special		Z																

Working pressure																	
PN 6 (EN1092-1 or HG / T 20592)	B																
PN10 (EN1092-1 or HG / T 20592)	C																
PN16 (EN1092-1 or HG / T 20592)	D																
PN25 (EN1092-1 or HG / T 20592)	E																
PN40 (EN1092-1 or HG / T 20592)	F																
Class 150 (ASME B16.5 or HG / T 20615)	G																
Class 300 (ASME B16.5 or HG / T 20615)	H																
Special	Z																

Flange material																	
Carbon steel	1																
SS 304	2																
SS 316	3																
SS 316L	4																

Pairing flange material																	
No	0																
Carbon steel	1																
SS 304	2																
SS 316	3																
SS 316L	4																

Electromagnetic Flowmeter (General Applications)

LMF11 – Ordering information continue…

Description	Series																
Grounding ring																	
No									A								
SS 304									B								
SS 316									C								
SS 316L									D								
Special									Z								
Temperature rating																	
Standard <65°C										0							
Standard <130°C										1							
Standard <180°C										2							
Standard <200°C										3							
Display LCD & sensor																	
Integrated											T						
Remote type											R						
Output signal (Communication)																	
4 ~ 20mA + pulse												01					
4 ~ 20mA + HART												02					
4 ~ 20mA + Modbus (RS485)												03					
4 ~ 20mA + Profibus												04					
Power supply																	
220 VAC													G				
24 VDC													K				
Protection class																	
IP65														0			
IP67														1			
IP68														2			
Explosion protection																	
No															0		
Flameproof Exd IIC T6															1		
Electrical connection																	
M20 × 1.5																0	
1/2 "-14 NPT																1	
Cable length																	
No																	0
Customer specified (up to 50 meters)																	X
Special selection sensor (optional)																	
SS 304																	X
SS 316																	Y
SS 316L																	Z
Custom																	0