

LD PIPE-TYPE MAGNETIC FLOWMETER

Summary

LD series electromagnetic flowmeter is suitable for conductivity greater than $5\mu\text{S}/\text{cm}$ conductive medium, wide nominal diameter range, to adapt to a variety of practical Environmental conditions, with a variety of power supply mode, a variety of signal output, the use of standard RS-485 serial communication interface, support international General standard MODBUS-RTU communication protocol and GPRS and other wireless and wired communication networking methods, with cumulative Pulse-equivalent output. Provide a wireless meter reading system (computer management software and database) with remote network access.



Features

- Excellent measurement repeatability and linearity
- Good reliability and immunity to interference
- Good pressure tightness
- Low pressure loss measuring tubes
- Intellectualize
- Maintenance-free

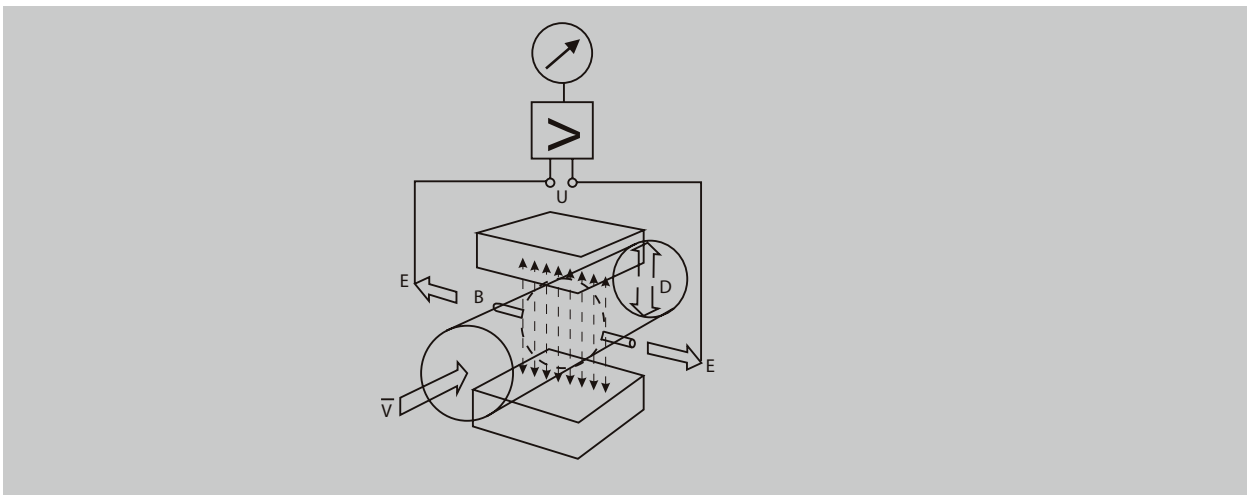
Operating Principle

The operating principle of electromagnetic flowmeter is based on Faraday's law of electromagnetic induction. The right figure in the upper and lower ends of the two electromagnetic coils to produce a constant or alternating magnetic field, when the conductive medium flows through the electromagnetic flowmeter, the flowmeter wall The induced electric potential can be detected between the two electrodes on the left and right of the conductive medium, and the size of the induced electric potential depends on the flow rate of the conductive medium and the magnetic induction of the magnetic field. Strength, conductor width

(inside diameter of the pipe measured by the flowmeter) is proportional to the flow rate of the medium, which is then calculated

The process parameter equation for the induction potential is: $E = K B V D$, In the formula:

- E - induced electric potential; D - measured inner diameter of tube;
- B - magnetic susceptibility.
- V - average flow velocity; K - coefficient related to magnetic field distribution and axial length



Technical Parameters

Implementation Standards	JB/T 9248-2015	
Nominal diameter	10~1200mm	
Flow rate range	0 - 10m/s	
Accuracy	±0.5%R , ±1%R (DN20 below)	
Dielectric conductivity	Theoretical value ≥ 5uS/cm, actual use ≥ 30uS/cm	
Nominal pressure	1.0、 1.6、 2.5、 4.0、 5.0、 6.3MPa	
Environmental temperature	-10°C ~ 55°C	
Medium temperature	Lining materials	Temperature limit
	Neopren (CR)	0 ~ 80°C
	PTFE	0 ~ 120°C
	FEP	0 ~ 120°C
	PFA	-10 ~ 180°C
	PU	-20 ~ 60°C
Output signal	4-20mA ;pulse/frequency 2kHz(default) , 5KHz(Max)	
Cable Outlet Size	M20 x 1.5 (standard nylon waterproof connector, explosion-proof metal connector optional)	
Power supply voltage	110/220VAC(100-240VAC) , 50Hz/60Hz , 24VDC ±10%	
Power consumption	<15VA	
Communication method	RS-485 ,support standard MODBUS-RTU protocol, HART protocol, GPRS	
Signal and ground electrode material	Stainless steel 316L, Hastelloy C, Titanium, tantalum, Plainum	
Electrode type	Interpolation, external electrode on request	
Number of electrodes	DN20 diameter below (including DN20) 2 measuring electrodes, 3 electrodes for DN20 diameter above (2 measuring electrodes +1 ground electrode)	
Connection Flange Standard	Standard carbon steel (Can be customized according to user requirements)	
Grounding Ring	DN20 diameter below (including DN20) default with grounding ring, DN20 diameter above default without grounding ring (Can be customized according to user requirements)	
Grounding Ring Material	Default to be the same with the material of grounding material (Can be customized according to user requirements)	
Shell material	Carbon steel, stainless steel	
Protection class	Spilt type	IP65、 IP68
	All-in-one type	IP65
Pitch/wiring length (spilt type)	Standard 10m connection cable, optional 1~300m	

Outline Drawing

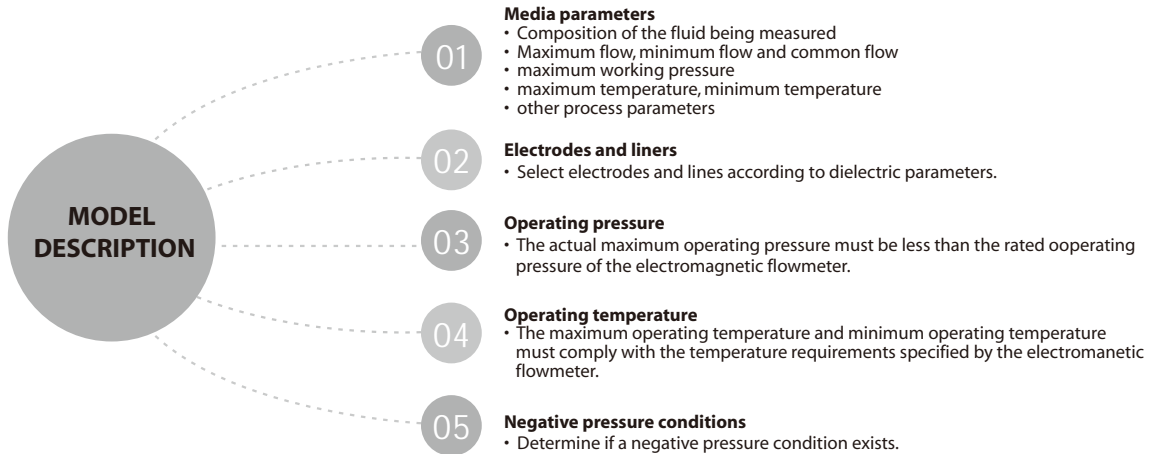
Model	Suffix Code											Instruction
LD-	<input type="checkbox"/>	<input type="checkbox"/>	—	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Electrical flow meter
Pressure rate	1.0											Sensor pressure rate
Installation Form	A1											Flange installation
Dia			50									Sensor Caliber (Refer to caliber selection table)
Body Material				C								Carbon steel
				H1								Stainless steel 304
				H2								Stainless steel 316L
Electrode Material					K1							Stainless steel 316L
					K2							Hastelloy C(HC)
					K3							Hastelloy B(HB)
					K4							Ti
					K5							Ta
					K6							platinoidita
					K7							tungsten carbide
Lining Material					F1							neoprene (CR)
					F2							F46(FEP)
					F21							F46(FEP) Steel mesh
					F3							PFA
					F31							PFA Steel mesh
					F4							Teflon F4(PTFE)
					F6							urethanes (PU)
Protection Level									W65			IP65 protection
									W68			IP68 protection
Switch Installation										C3		One body
										S		Poly type
Power supply										P0		Alternating 110/220V power
										P1		DC 24V Power
Auxiliary function											/T1	4-2 0MA output
											/TH1	4-2 0MA output+hart communication function
											/EX	Explosion proof typy
											/KD1	OLED screen

Model Description

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Model Selection Example

If magnetic flow meter model is LD-1.0A1-80CK1F1W65C3P0/T1, it shows functions of this instrument as follows:
Working pressure 1.0MPa, flange installation, diameter DN80, stainless steel 316L electrode, chloroprene rubber lining, protection level IP65, integrated structure (transmitter and sensor are installed together), 4-20mA signal output, working power AC 110/220V.

Selection Table Details

① Pressure rating

- The pressure rating is the rated pressure level that the sensor can withstand. Usually, the pressure on the sensor by the device (such as pumps, etc.) on the measured flow of the pipeline medium exerted pressure, beyond the rated pressure of the sensor, will lead to electromagnetic flowmeter leakage and can not work properly or even damage the electromagnetic flowmeter.
- The main pressure levels are 1.0MPa, 1.6MPa, 2.5MPa and 4.0MPa.
- In the selection of pressure level, there should be a certain margin. For example, the working pressure of the pipeline medium is 0.8MPa, then at least 1.6MPa electromagnetic flowmeter pressure level should be used.

② Installation type

- It needs to be compatible with the way the piping is installed for the measured flow rate. Flanged installation requires a flanged interface to the pipe in which the measured flow is to be installed.
- Electromagnetic flowmeter can be installed in stainless steel pipe, cast iron pipe, PE pipe and so on, different pipes need to choose different forms of installation of electromagnetic flowmeter, installation need to be reliable grounding, PE pipe and other non-metallic pipes need special attention.

③ Caliber

- The caliber of the electromagnetic flowmeter should generally match the caliber of the measured flow pipe, while the choice of caliber should also match the measured medium flow rate, see the caliber selection table, as far as possible to make the measured medium of the common flow rate in the yellow font area of the table.

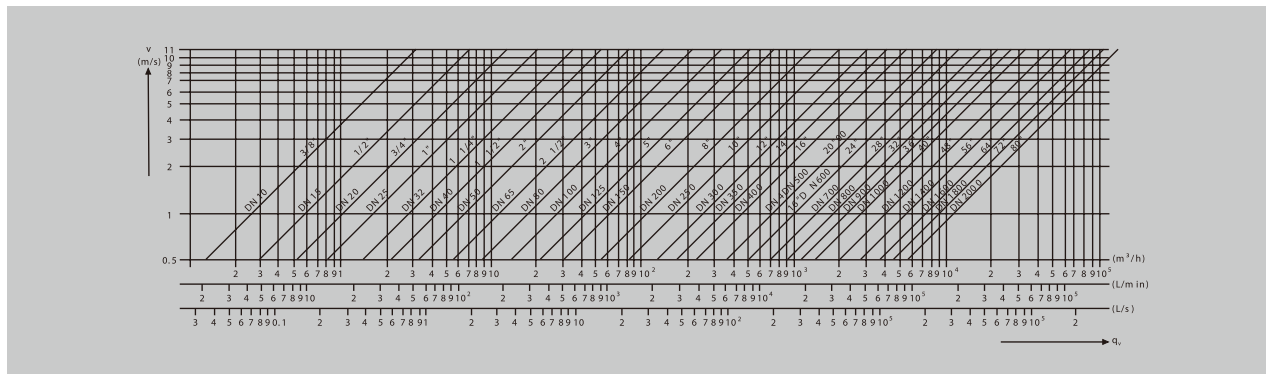
④ **Caliber selection table**

Diameter mm	Flow rate (m/s) Flow comparison table (m ³ /h)										
	0.5	1	2	3	4	5	6	7	8	9	10
15	0.3	0.6	1.3	1.9	2.5	3.2	3.8	4.5	5.1	5.7	6.4
20	0.6	1.1	2.3	3.4	4.5	5.7	6.8	7.9	9	10.2	11.3
25	0.9	1.8	3.5	5.3	7.1	8.8	10.6	12.4	14.1	15.9	17.7
32	1.4	2.9	5.8	8.7	11.6	14.5	17.4	20.3	23.2	26.1	29
40	2.3	4.5	9	13.6	18.1	22.6	27.1	31.7	36.2	40.7	45.2
50	3.5	7.1	14.1	21.2	28.3	35.3	42.4	49.5	56.5	63.6	70.7
65	6	11.9	23.9	35.8	47.8	59.7	71.7	83.6	95.6	107.5	119.5
80	9	18.1	36.2	54.3	72.4	90.5	108.6	126.7	144.8	162.9	181
100	14.1	28.3	56.5	84.8	113.1	141.4	169.6	197.9	226.2	254.5	282.7
125	22.1	44.2	88.4	132.5	176.7	220.9	265.1	309.2	353.4	397.6	441.8
150	31.8	63.6	127.2	190.8	254.5	318.1	381.7	445.3	508.9	572.5	636.2
200	56.5	113.1	226.2	339.3	452.4	565.5	678.6	791.7	904.8	1017.9	1131
250	88.4	176.7	353.4	530.1	706.9	883.6	1060.3	1237	1413.7	1590.4	1767.1
300	127.2	254.5	508.9	763.4	1017.9	1272.3	1526.8	1781.3	2035.7	2290.2	2544.7
350	173.2	346.4	692.7	1039.1	1385.4	1731.8	2078.1	2424.5	2770.9	3117.2	3463.6
400	226.2	452.4	904.8	1357.2	1809.5	2261.9	2714.3	3166.7	3619.1	4071.5	4523.8
450	286.3	572.5	1145.1	1717.6	2290.2	2862.7	3435.3	4007.8	4580.4	5152.9	5725.5
500	353.4	706.9	1413.7	2120.6	2827.4	3534.3	4241.1	4948	5654.8	6361.7	7068.5
600	508.9	1018	2036	3054	4071	5089	6107	7125	8143	9161	10179
700	692.7	1385	2771	4156	5542	6927	8313	9698	11083	12469	13854
800	904.8	1810	3619	5429	7238	9048	10857	12667	14476	16286	18095
900	1145.1	2290	4580	6871	9161	11451	13741	16031	18322	20612	22902
1000	1413.7	2827	5655	8482	11310	14137	16964	19792	22619	25447	28274
1200	2035.7	4071	8143	12214	16286	20357	24429	28500	32572	36643	40715

Note:

- The flow/rate data in the table are approximate values, the yellow area is the recommended flow/rate measured by the flow meter.
- Other calibers can be customized.
 - Flow rate flow conversion formula.: $v=354 \times q / D^2$
 - In the formula: q -m³/h, v -m/s, D (DN)-mm
 - Flow rate range: 0.3 ~ 10m/s

⑤ **Curve of relationship between meter size, flow rate and flow rate**



⑥ **When the size of the sensor is selected to be the same as the size of the connected process pipe**

- Usually choose the flowmeter caliber and process pipe caliber, both to meet the engineering needs, and easy to install, no pressure loss, the proposed flow rate in the pipe 0.5 ~ 5m / s range.
- The new design of the project is designed to take into account both current operating conditions and future conditions when the equipment is operating at full capacity when choosing the flow rate. When the new equipment is operating, the flow rate is at a lower state, and when normal production occurs, the flow rate in the pipe is at a higher state.
- With the correct selection, the instrument can be adapted to different flow rates simply by changing the range setting.

Electrode Materials

- The electrode is used to get the electric signal of the flow rate and will be in direct contact with the measured medium, so when choosing the electrode material, the adaptability of the electrode material and the measured medium should be considered, i.e. the corrosion resistance, passivation, wear and other factors of the electrode material should be considered.
- A variety of electrode materials are available (including stainless steel 316L, Hastelloy B (HB), Hastelloy C (HC), Titanium (Ti), Tantalum (Ta), Platinum (Pt), etc.) to suit different measurement media.
- The choice of electrode material should be determined by the corrosiveness of the medium to be measured, the corrosion resistance of the electrode material is shown in the table of corrosion resistance and range of use of electrode material, more detailed information can be found in the anticorrosion manual.

Electrode Materials

Material	Corrosion resistance
Stainless steel 316L	Application: 1. Domestic water, industrial water, raw water well water, urban sewage 2. Weak corrosive acid, alkali, salt solution
Hastelloy B(HB)	Application: 1. Non-oxidizing acids, such as hydrochloric acid (concentration less than 10%), etc 2. Base (part), such as sodium hydroxide (concentration less than 50%), - cut concentration of ammonium hydroxide base solution 3. Acids (partial), such as phosphoric acid, organic acid not applicable: nitric acid
Hastelloy C(HC)	Application: 1. Mixed acid, such as chromic acid and sulfuric acid mixed solution 2. Oxidizing salts, such as Fe3+, Cu2+, seawater are not applicable: hydrochloric acid
Ti	Application: 1. Salt (part), e.g. (1) chloride (chloride press/iron, etc.) (2) Sodium salt, potassium salt, ammonium salt, subaerate, seawater 2. Alkali (part), such as potassium oxide, ammonium hydroxide 'barium hydroxide base solution is not applicable: hydrochloric acid' sulfuric acid 'phosphoric acid, hydroft acid and other reducing acids
Ta	Applicable: 1. Strong acids, such as hydrochloric acid (concentration less than 40%), dilute sulfuric acid and concentrated sulfuric acid (excluding fuming sulfuric acid) 2. g dioxide [, ferric chloride, hyponitrous acid, sodium cyanide, lead acetate, etc. 3. Oxidizing acids, such as nitric acid (including fuming nitric acid), etc., the temperature below 80°C is not applicable to aqua Regis: alkali, hydrofluoric acid
Pt	Application: Almost all acid, base, salt solution (including fuming sulfuric acid, fuming nitric acid) is not applicable: aqua regia, ammonium salt
WC	Application: non-corrosive, strong wear resistance media

Lining Material

- Lining materials according to the corrosiveness of the medium under test, abrasion and temperature to choose, commonly used lining materials, see commonly used lining materials, performance table.
- Rubber has wear-resistant characteristics and is widely used to measure water, industrial water, waste water, sewage, mineral slurry, mud, fiber slurry and other media.
- Polytetrafluoroethylene (PTFE) lining has excellent resistance to strong acid and strong alkali corrosion, it also has reliable high temperature resistance, high temperature does not deform, does not reduce insulation resistance; it also has a non-stick, that is, does not phase with other substances, the surface is smooth. Therefore, the measurement of viscosity (such as syrup) or easy scarring medium (such as alumina), strong corrosive medium (such as sulfuric acid, nitric acid, hydrochloric acid, phosphoric acid, etc.), higher temperature medium or regular steam flushing pipeline occasions and health requirements of the food (such as wine, milk, malt juice) can be used PTFE liner.

Electrode Materials

Lining material	Item	symbol	Performance	Range of application
Rubber	neoprene	CR	<ol style="list-style-type: none"> ① Oil resistance, solvent resistance, oxidation resistance, general acid, alkali and salt and other medium corrosion ② Excellent elasticity, wear resistance, but poor cold resistance 	<ol style="list-style-type: none"> ① 0°C~+80°C non-strong acid, strong reduction, strong oxidizing medium ② Can measure the rise, mud
	urethanes	CR	<ol style="list-style-type: none"> ① High hardness, oil resistance, solvent resistance, with excellent wear resistance and cold resistance ② Poor water resistance, long-term interaction with water will occur hydrolysis 	<ol style="list-style-type: none"> ① Weakly corrosive medium of -20°C~+60°C ② Commonly used to measure slurry measureable rise, mud
Fluoroplastics	Teflon	PTFE or F4	<ol style="list-style-type: none"> ① The most stable chemical properties of a material in plastics, capable of boiling salt acid, sulfuric acid, nitric acid and aqua Regis, but also capable of concentrated alkali and various organic solvents, not resistant to chlorine trifluoride, high temperature oxygen trifluoride, high flow rate liquid fluorine, liquid oxygen, ozone corrosion- ② Poor wear resistance ③ Poor negative pressure resistance 	<ol style="list-style-type: none"> ① -25°C~+120°C ② Strong corrosive media such as concentrated acid and Shouting ③ Health media
	FEP	FEP or F46	<ol style="list-style-type: none"> ① Hydrophobic and non-viscous ② Corrosion resistance second only to FEP ③ Metal mesh can be added when the negative pressure resistance is higher to improve the negative pressure resistance ④ Poor wear resistance 	<ol style="list-style-type: none"> ① -25°C~+120°C Non-abrasive media ② Strong corrosive media such as concentrated acid and Shouting ③ Health media
	PFA Plastic	PFA	The properties are similar to polytetrafluoroethylene	<ol style="list-style-type: none"> ① -25 C~+120 C Non-abrasive media ② Strong corrosive media such as concentrated acid and Shouting ③ Health media

Flow Meter Structure

① Integrated type

Under good field conditions, a monobloc type is generally used, i.e. the sensor and the converter form a single unit.

- The sensor and smart converter are assembled together for an economical price and installation cost and an intuitive display.
- If installed in an inaccessible location, maintenance will be difficult.
- Protects the electronics of the smart converter from the temperature of the fluid in the piping.
- Direct installation outdoors or in harsh operating environments should be avoided.
- The default protection rating for the all-in-one model is IP65.

② Split type

Separate models are used when.

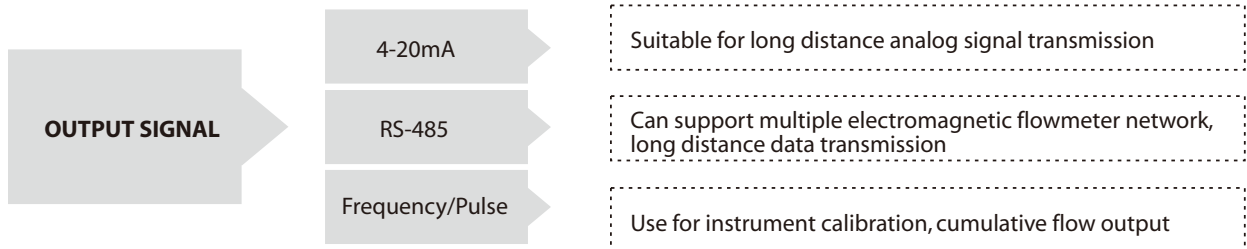
- Where the ambient or converter surface temperature is greater than 55°C.
- Occasions where the pipe vibrations are high.
- Where the aluminum housing of the converter is subject to severe corrosion.
- Where humidity is high or corrosive gases are present.
- The flow meter is installed at high altitude or underground where commissioning is not convenient.
- The default protection class for the split type is IP68. IP65 protection class for the split type is available when not submerged in water or other special conditions and should be specified when ordering.

Description

- The sensor of the split electromagnetic flowmeter is installed in the process piping or permanently buried in a waterlogged area (type IP68), while the smart converter is installed in the instrument room or near the sensor.
- When using the split type electromagnetic flowmeter, the intelligent converter can be far away from the scene of the harsh environment, it is convenient for the users to check, adjust and set the working status of the instrument.
- Consideration should be given to the effect of cable transmission distance and installation, which is generally not more than 30m.
- The connection cable between the sensor and the converter, field installation requires that the cable be protected by a wire duct.

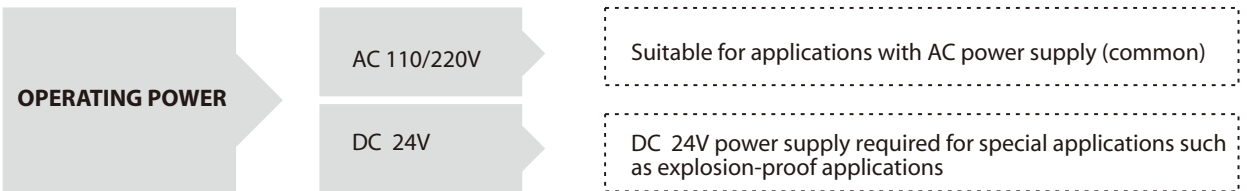
Output signal

The output signal of LD series electromagnetic flowmeter has three types: 4-20mA, RS-485 and frequency/pulse. Users need to select the output signal according to the actual situation and supporting equipment.



Operating power

The operating power of LD series electromagnetic flowmeter has two kinds: AC110/220V(100-240V) and DC24V.

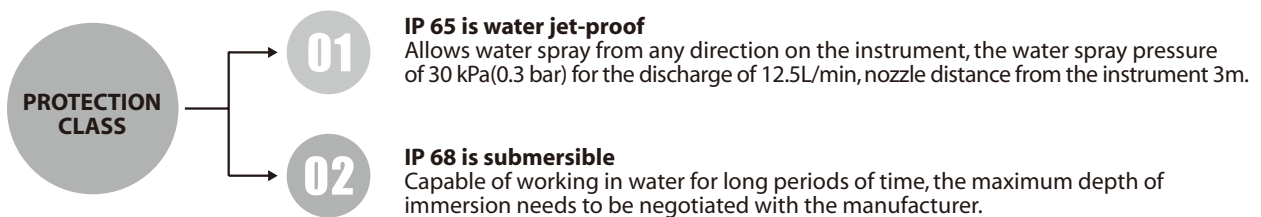


Grounding ring option

- The grounding ring is used to ground the measured medium to improve the stability of electromagnetic flowmeter measurement. However, the grounding ring needs to be in contact with the measured medium, there is the possibility of corrosion and wear, usually after a period of use, need to be replaced.
- LD series electromagnetic flowmeter generally uses grounding electrode instead of grounding ring, which can achieve a better grounding effect and increase the convenience and reliability of use.
- Some small diameter electromagnetic flowmeter only 2 electrodes, the user can configure double grounding ring according to field needs.
- When installing the grounding ring, the grounding ring needs to be installed in the exact pipe location so as not to affect the flow field of the medium being measured.

Protection Class

According to the national standard GB 4208-48 or IEC standard (IEC 529-76) for enclosure protection class.



IP68 should be used if the instrument is below ground level and subject to frequent flooding; IP65 should be used if the instrument is installed above ground level in a non-exposed environment.

Notes for Use of Electromagnetic Flowmeter

- See "Electromagnetic Flowmeter with Reducer Pipe Technical Description" or "Electromagnetic Flowmeter Instruction Manual" for additional reducer pipe.
- The installation and use of electromagnetic flowmeter has corresponding technical requirements, please refer to "Electromagnetic flowmeter installation and use instructions" or "Electromagnetic flowmeter operating instructions".
- For the wiring of electromagnetic flowmeter, please refer to "electromagnetic flowmeter wiring instructions" or "electromagnetic flowmeter operating instructions".
- Consult your supplier for other matters.

Ordering Information

The selection of an electromagnetic flowmeter should clarify the following issues.

1. The measured medium must be conductive fluid, for gas, oil, organic solvents and other non-conductive medium can not be measured.
2. When ordering, you should provide the factory with the measurement range of the electromagnetic flowmeter when you choose the model specifications, and the factory will calibrate the measurement range to ensure the accuracy of the instrument measurement.
3. The user should provide the measured medium, process parameters, flow rate, operating temperature, pressure and other parameters in the selection table to the manufacturer, according to these parameters, choose a suitable flowmeter.
4. When choosing the split type electromagnetic flowmeter, the user should provide the wiring length requirement to the factory according to the distance from the converter installation position to the sensor.
5. If users need to install accessories, such as matching flanges, metal ring gasket, bolts, nuts, washers and other additional requirements, can be proposed at the time of ordering.