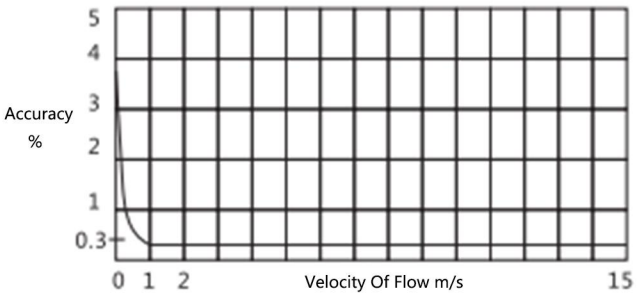
Electromagnetic Flowmeter

Working Principle

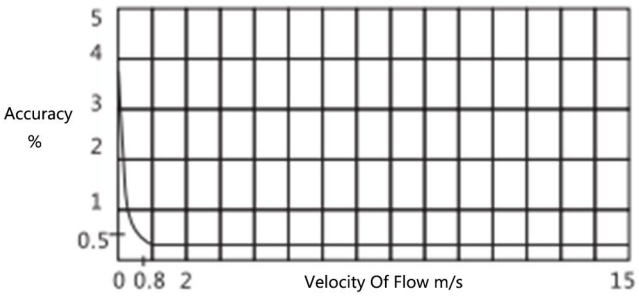
The electromagnetic flowmeter is manufactured with the latest electromagn etic flow technology, and has the following characteristics:

1. The measurement is not affected by the change of fluid density, viscosity, temperature, pressure and conductivity;
2. There are no flow obstructing parts and pressure loss in the measuring pipe, and the requirements for straight pipe section are low;
3. Series nominal diameter DN4~DN3000. There are many choices for sensor lining and electrode materials;
4. The converter adopts a novel excitation mode, with low power consumption, stable zero point and high accuracy. The flow range can reach 1500:1;
5. The converter can be integrated or split with the sensor;
6. The converter adopts 16 bit high-performance microprocessor, 2X16LCD display, convenient parameter setting and reliable programming;
7. The flowmeter is a two-way measurement system with three integrators: total forward, total reverse and total difference; It can display positive and negative flow, and has multiple outputs: current, pulse, digital communication, HART, RS485 protocol;
8. The converter adopts surface mounting technology (SMT), with self inspection and self diagnosis functions;
9. Rubber and polyurethane lined sensors are intrinsically immersed;
10. Explosion proof instruments can be used in corresponding explosion-proof places;
11. Electromagnetic flowmeter is used to measure the volume flow of conductive liquid and slurry in closed pipes, and is applicable to chemical industry, electric power, metallurgy, petroleum,water supply and drainage, paper making, medicine, food and other departments.

Parameter



DN15-DN600 Accuracy curve



DN700-DN3000 Accuracy curve

Sensor

Maximum flow rate	15m/s		
Accuracy (See accuracy curve)	DN15-DN600	Indicating value±0.5% (velocity of flow≧1m/s)、±0.2% ±3mm/s (velocity of flow<1m/s)	
	DN700-DN3000	Indicating value±0.5% (velocity of flow≧0.8m/s) ±4m m/s (velocity of flow<0.8m/s)	
Fluid conductivity	>50ps/cm		
Nominal pressure	DN10-DN200	1.6MPa	
	DN250-DN1000	1.0MPa	
	DN1200-DN2000	0.6MPa	
	DN2200-DN3000	0.6MPa	
Ambient temperature	Sensor	-25 ° C ~+60 ° C	
	Converter and all in one type	-10 ° C ~+60 ° C	
Lining materials and Maximum fluid temperature	Lining material	Separable type	All in one type
	Teflon	120° C (Customized)	70° C
	PFA	180° C (Customized)	70° C
	Perfluoroethylene propylene	160° C (Customized)	70° C
	Polychloroprene rubber	80° C (Customized)	70° C
	Polyurethane	80° C	70° C
Signal electrode form	Fixed type (DN15-DN2600), scraper type (DN80-DN3000)		
Signal electrode and grounding electrode materials	Molybdenum containing stainless steel, Hastelloy B, Hastelloy C, titanium, tantalum, platinum iridium alloy, stainless steel coated tungsten carbide		
Connecting flange	Carbon Steel		
Grounding flange	Stainless steel 1Cr18Ni9Ti		
Inlet protection flange material	DN15-DN600	Stainless steel 1Cr18Ni9Ti	
	DN700-DN3000	Carbon Steel	
Enclosure protection	DN15-DN150 separate rubber or polyurethane lined sensor	IP65、IP68 (Additional order)	
	DN200-DN2600 separate rubber or polyurethane lined sensor	IP68 Underwater 10m	
	Other sensors and all converters	IP65	
Spacing (separate type)	The distance between the converter and the sensor is generally not more than 100m; A special order is required if it exceeds 100 meters.		

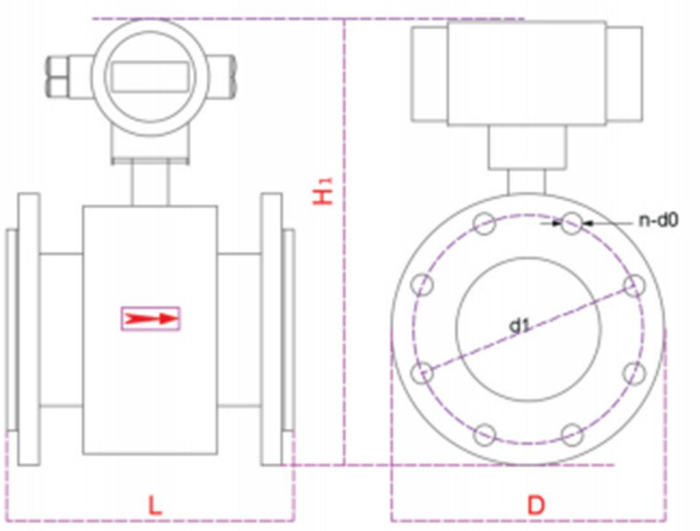
*DN700 - DN3000, the accuracy of special ordering can reach ± 0.3% of the indicated value (flow rate ≥ 1m/s) or ± 3mm (flow rate < 1m/s).

Special up to ± 0.2% accuracy flowmeter

Outline Dimension Drawing

DN10-DN200,1.6、4.0MPa

Outline drawing of sensor and integrated body



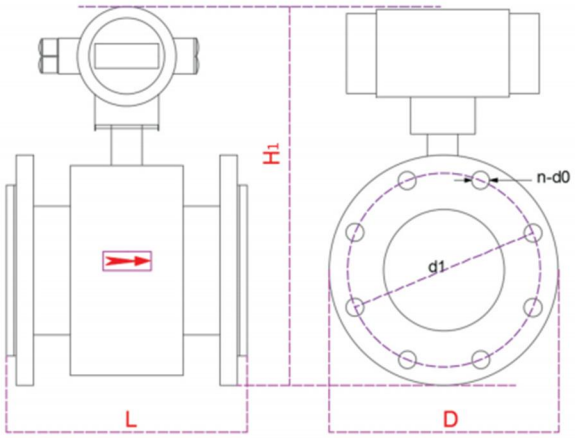
Overall Dimensions Flange Size (GB/T 9119)

Dia DN	L	H_1	H_2	Dia DN	1.6MPa				4.0MPa			
					D	d_1	d_0	n	D	d_1	d_0	n
DN15	200	290	220	DN15	95	65	14	4	95	65	14	4
DN20	200	292	222	DN20	105	75	14	4	105	75	14	4
DN25	200	298	228	DN25	115	85	14	4	115	85	14	4
DN32	200	307	237	DN32	135	100	18	4	135	100	18	4
DN40	200	318	248	DN40	145	110	18	4	145	110	18	4
DN50	200	328	258	DN50	160	125	18	4	160	125	18	4
DN65	200	348	278	DN65	180	145	18	4	180	145	18	4
DN80	250	360	290	DN80	195	160	18	8	195	160	18	8
DN100	250	393	323	DN100	215	180	18	8	235	190	22	8
DN125	250	413	343	DN125	245	210	18	8	270	220	26	8
DN150	300	450	380	DN150	280	240	25	8	300	250	26	8
DN200	300	603	533	DN200	345	295	25	12	375	320	30	12

Outline Dimension Drawing

DN10-DN200, 1.0、1.6MPa

Outline drawing of sensor and integrated body

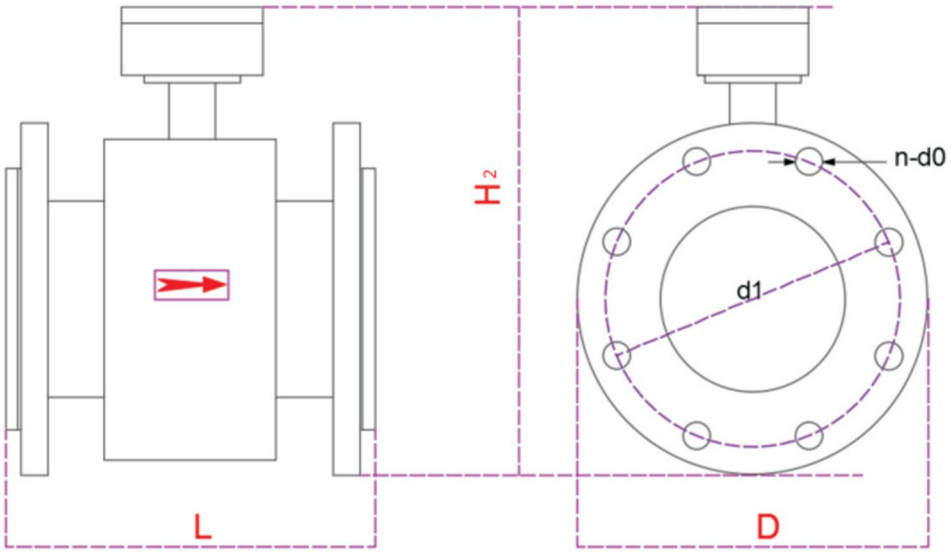


Overall Dimensions Flange Size (GB/T 9119)

Dia DN	L	H_1	H_2	Dia DN	1.0MPa				1.6MPa			
					D	d_1	d_0	n	D	d_1	d_0	n
DN250	450	528	458	DN250	390	350	23	12	405	355	26	12
DN300	500	603	533	DN300	440	400	23	12	460	410	26	12
DN350	500	658	588	DN350	500	460	23	16	520	470	26	16
DN400	500	723	653	DN400	565	515	26	16	580	525	30	16
DN450	550	765	728	DN450	615	565	26	20	640	585	30	20
DN500	550	838	768	DN500	670	620	26	20	715	650	34	20
DN600	600	923	853	DN600	780	725	30	20	840	770	36	20
DN700	700	914	819	DN700	895	840	30	24	910	840	36	24
DN800	800	1014	919	DN800	1010	950	34	24	1025	950	39	24
DN900	900	1114	1019	DN900	1110	1050	34	28	1125	1050	39	28
DN1000	1000	1214	1119	DN1000	1220	1160	36	28	1255	1170	42	28

Outline Dimension Drawing

DN1200-DN3000, 0.6MPa Outline drawing of sensor and integrated body



Overall Dimensions

Flange Size (GB/T 9119)

Dia DN	L	H_1	H_2	Dia DN	0.6MPa			
					D	d_1	d_0	n
DN1200	1200	1414	1319	DN1200	1405	1340	33	32
DN1400	1400	1614	1519	DN1400	1630	1560	36	36
DN1600	1600	1814	1719	DN1600	1830	1760	36	40
DN1800	1800	2014	1919	DN1800	2045	1970	39	44
DN2000	2000	2214	2119	DN2000	2265	2180	42	48
DN2200	2200	2364	2269	DN2200	2475	2390	42	52
DN2400	2400	2564	2469	DN2400	2685	2600	42	56
DN2600	2600	2764	2669	DN2600	2905	2810	48	60
DN2800	2800	2960	2865	DN2800	3115	3020	48	64
DN3000	3000	3160	3065	DN3000	3315	3220	48	68

Selection Principle

The fluid to be measured must be conductive liquid or slurry, and its conductivity shall not be less than 50 μ s/cm. The fluid to be measured shall not contain many ferromagnetic substances or bubbles Proper pressure grade, lining material, electrode material and instrument structure shall be selected for the characteristics of the measured fluid.

Select Diameter

1. Since the electromagnetic flowmeter has a high range of 1500:1, the instrument diameter is usually the same as the process pipe
2. If the measured medium contains solid particles, the recommended flow rate range is l-3m/s. If the actual flow rate is too large and inconvenient to change, the optional instrument diameter is larger than the process pipe drift diameter to appropriately reduce the flow rate of the flow meter measuring pipe section and reduce the wear of particles on the electrode and lining.
3. If there may be sediment in the process pipe, the recommended flow rate is 2-5m/s. If the actual flow rate is too small and it is inconvenient to change the process pipe, the optional instrument diameter is small the flow rate of the flow meter shall be appropriately increased in the diameter of the process pipe to avoid the impact of sediment on the accuracy of the instrument.
4. If the flow rate is too small and high precision measurement is required, a sensor smaller than the diameter of the process pipe can be selected to increase the flow rate and ensure high accuracy. in case of the above items 2, 3 and 4, reducers must be installed upstream and downstream of the flowmeter. The central cone angle of reducer shall not be greater than 15., And there are at least 5 times of process pipes upstream of the reducer Straight pipe section of diameter.

To help with model selection, the following table lists the flow rates corresponding to several representative flow rates. The flow velocity corresponding to any flow can also be quickly calculated by using this table: if the flow is known the measurement value Q (m3/h), and then the flow value Q1 corresponding to lm/s flow rate under the corresponding diameter is found in the table, then:

Flow rate V=Q/Q1(m/s)

流速-流量对照表

dia mm \ rate m/s	0.1	1	2	3	4	5	15
15	0.064	0.6362	1.2723	1.9085	2.5447	3.1809	9.5426
20	0.133	1.1310	2.2619	3.3929	4.5239	5.6549	16.9646
25	0.177	1.7671	3.5343	5.3014	7.0686	8.8357	26.5072
40	0.452	4.5239	9.0478	13.5717	18.0956	22.6195	67.8584
50	0.707	7.0686	14.1372	21.2058	28.2743	35.3429	106.0288
65	1.195	11.9459	23.8918	35.8377	47.7836	59.7295	179.1886
80	1.810	18.0956	36.1911	54.2867	72.3823	90.4779	271.4336
100	2.827	28.2743	56.5487	84.8230	113.0973	141.3717	424.1150
150	6.362	63.6173	127.2345	190.8518	254.4690	318.0863	954.2528
200	11.310	113.0973	226.1947	339.2920	452.3893	565.4867	1696.4600
250	17.671	176.7146	363.4292	530.1438	706.8583	883.5729	2650.7188
300	25.447	254.4690	508.9380	763.4070	1017.8760	1272.3450	3817.0351
350	34.636	346.3606	692.7212	1039.0818	1385.4424	1731.8030	5195.4089
400	45.293	452.3893	904.7787	1357.1680	1809.5574	2261.9467	6758.8401
450	57.256	572.5553	1145.1105	1717.6658	2290.2210	2862.7763	8588.3289
500	70.686	706.8583	1413.7167	2120.5750	2827.4334	3534.2917	10602.8752
600	101.788	1017.8760	2035.7520	3053.6281	4017.5041	5089.3801	15268.1403
700	138.544	1385.4424	2770.8847	4156.3271	5541.7694	6927.2118	20781.6354
800	180.956	1809.5574	3619.1147	5428.6721	7238.2295	9047.7868	27143.3605
900	229.022	2290.2210	4580.4421	6870.6631	9160.8842	11451.1052	34353.3157
1000	282.743	2827.4334	5654.8668	8482.3002	11309.7336	14137.1669	42411.5008
1200	407.150	4071.5041	8143.0082	12214.5122	16286.0163	20357.5204	61072.5612
1400	554.177	5541.7694	11083.5389	16625.3083	22167.0778	27708.8472	83126.5416
1600	723.823	7238.2295	14476.4589	21714.6884	28952.9179	36191.1474	108573.4421
1800	916.088	9160.8842	18321.7684	27482.6525	36643.5367	45804.4209	137413.2627
2000	1130.973	11309.7336	22619.4671	33929.2007	45238.9342	56548.6678	169646.0033
2200	1368.478	13684.7776	27369.5552	41054.3328	54739.1104	68423.8880	205217.6640
2400	1628.602	16286.0163	32572.0326	48858.0490	65114.0653	81430.0816	244290.2448
2600	1911.343	19113.4268	38226.8536	57340.2840	76453.7072	95567.1340	286701.4020

Lining Material Selection

Lining material	Main performance	Scope of application
Teflon	1. It is the most stable chemical property of plastic materials; It is resistant to boiling hydrochloric acid, sulfuric acid, nitric acid and aqua regia, as well as concentrated alkali and various organic solvents, and is not resistant to the corrosion of chlorine trifluoride, oxygen trifluoride, high flow rate liquid fluoride, liquid oxygen and ozone. 2. Poor wear resistance 3. Poor anti negative pressure capability.	1. 100 ° C, 150 ° C (special order) 2. Strong corrosive media such as concentrated acid and alkali 3. Hygienic media
Polychloroprene	1. It has excellent elasticity, high breaking force and good wear resistance 2. It is resistant to the corrosion of ordinary low concentration acid, alkali and salt media, and is not resistant to the corrosion of oxidizing media.	1. 80 ° C, 120 ° C (special order) 2. General water, sewage, slurry and mineral slurry with weak abrasiveness.
Polyurethane rubber	1. Excellent abrasion resistance (equivalent to ten times of natural rubber) 2. Acid and alkaline resistance. 3. It cannot be used for water mixed with organic solvent.	1、＜80° C 2. Mineral slurry, coal slurry, slurry, etc. with neutral and strong wear。

Electrode Material Selection

Electrode material	Corrosion resistance
OCr18Ni12Mo2Ti	It is used for industrial water, domestic water and sewage. It is a medium with weak corrosivity and can be widely used in petroleum, chemical, vinylon and other industries.
SS coated with tungsten carbide	It is used in non corrosive and highly abrasive media.
Hastelloy B (HB)	It has good corrosion resistance to all concentrations of hydrochloric acid below the boiling point, and is also resistant to non oxidation of sulfuric acid, phosphoric acid, hydrofluoric acid, organic acid, etc Corrosion of sexual acid, alkali and non oxidizing salt solution.
Hastelloy C (HC)	It is resistant to the corrosion of oxidizing acids, such as nitric acid, mixed acid, or mixed medium of citric acid and sulfuric acid, as well as salts with oxidation resistance, such as Corrosion of Fe+++, Cu++or other oxidants. Such as the corrosion of hypochlorite solution and seawater above normal temperature.
Ti	It can resist the corrosion of seawater, various chlorides and hypochlorites, oxidizing acids (including fuming nitric acid), organic acids, alkalis, etc., and can not resist the corrosion of more pure reducing acids (such as sulfuric acid, hydrochloric acid). However, if the acid contains oxidants (such as nitric acid, Fe++, Cu++M), the corrosion will be greatly reduced
Ta	It has excellent corrosion resistance and is very similar to glass. Except for hydrofluoric acid, oleum and alkali, it can resist corrosion of almost all chemical media (including hydrochloric acid, nitric acid, sulfuric acid and aqua regia).
Platinum iridium alloy	It is applicable to almost all chemicals, but not aqua regia and ammonium salt.

The above two tables are for reference only because of the wide variety of media and their corrosivity is affected by temperature, concentration, flow rate and other complex factors The user shall.
If necessary, conduct corrosion resistance test of simulated materials, such as coupon test.

Selection Of Lining Protection Flange And Grounding Flange

Flange Type	Scope of application
Grounding flange (grounding ring)	Suitable for non-conductive pipes such as plastic pipes. However, sensors with PTFE lining are not required.
Inlet protection flange	When the medium has strong wear resistance, it is often used with polyurethane lining, but the lining is PTFE sensor unsuited.