

To measure the flow of positive and negative output pulse frequency output 4-20mA

Suporting RS-485 communication.

LDG type intelligent electromagnetic flowmeter

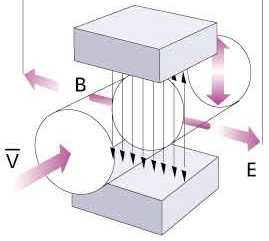
LDG intelligent electromagnetic flow meter for measuring the volume flow in closed conduits conductive liquid and slurry, such as clean water, sewage, various chemical salt solution, mud slurry . Pulp , pulp and liquid foods etc . Measuring principle

The measurement principle of the LDG type intelligent electromagnetic flowmeter is based on Faraday’s law of electromagnetic induction: when the conductive liquid cuts the magnetic force in the magnetic field, the conductor

generate induced electric potential . Its induced electric potential E is



E=KBVD



Measure the average flow velocity in the pipe section

Measure the inner diameter of the pipe section

Meter constant

where：k-

B-一 Magnetic induction

V-

When measuring the flow rate, the conductive liquid velocity ▽ flowing through the magnetic field perpendicular to the flow direction. Flowable electrically conductive liquid induces a velocity proportional to the average voltage. Which induced voltage signal by means of direct contact with the liquid of two or more detection electrodes. and sent through a cable converter through intelligent processing.

Then LCD display or convert into standard signal 4~ 20mA and 0~1 kHz output,

How to choose the right type

Selection instruments is very important work in the instrumentation applications. According to the data show , the instrument has practical applications in two-thirds of the failure is selected instrument error type and error safety equipment caused . Please pay special attention

1 . Data Collection

①        Name of the measured fluid;

②        Maximum flow, minimum flow:

③        Maximum working pressure,

④        Maximum temperature. Minimum temperature.

2. The measured fluid must have a certain degree of conductivity, with a conductivity of > 5nS / cm.

3.  The maximum flow and minimum flow must comply with the values ​​in the table below：：

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Inner diameter mm | 10 | 15 | 20 | 25 | 32 | 40 | 50 | 65 |
| Minimum (m3/h) | 0.0283 | 0.0636 | 0J2 | 0.176 | 0.29 | 0.452 | 0.7 | 1.19 |
| Maximum (m3/h) | /./ | 9.W | 16 96 | 26.5 | 43.42 | 67.85 | 106.0 | 179.0 |
| Inner diameter mm | 80 | 100 | 125 | 150 | 200 | 250 | 300 | 350 |
| Minimum (m3/h) | 1.8 | 2.82 | 4.41 | 6.36 | 11.3 | 17.6 | 25.4 | 34.6 |
| Maximum (m3/h) | 271.0 | 424.0 | 662.0 | 954.0 | 1690 | 2650 | 3810 | 5190 |
| Inner diameter mm | 400 | 450 | 500 | 550 | 600 | 700 | 800 | 900 |
| Minimum (m3/h) | 45.2 | 57.2 | 77 6 | 85.5 | 101 0 | 138.0 | 180.0 | 2290 |
|  | | | | | | | | |
| Maximum (m3/h) | 6780 | 8570 | 10600 | 12800 | 15200 | 2O7CO | 27100 | 34300 |
| Inner diameter mm | 1000 | 1100 | 1200 | 1400 | 1600 | 1800 | 2000 | 2200 |
| Minimum (mVh) | 282.0 | 342.0 | 407.0 | 554.1 | 732.7 | 9160 | 1131.0 | 1368,4 |
| Maximum (m3/h) | 42400 | 51300 | 61000 | 83121 | 108566 | 137404 | 169635 | 205258 |

4． The actual maximum working pressure must be less than a meter rated working pressure.

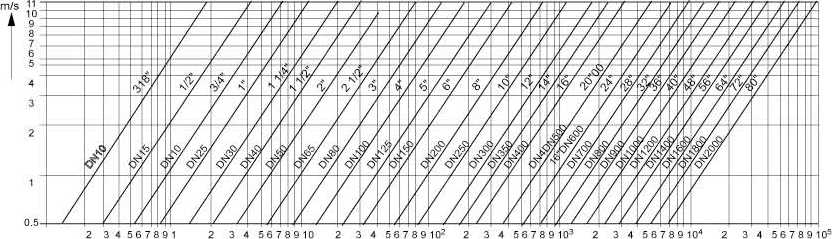
5． The maximum operating temperature and minimum working temperature must meet the temperature requirements of the flowmeter.

6． To determine whether the presence of negative pressure.

You can select the table according to the respective traffic electromagnetic flowmeter, an inner diameter of the electromagnetic flowmeter if the selected match with the current process pipe inner diameter . Shall be shrink tube or pipe expansion,

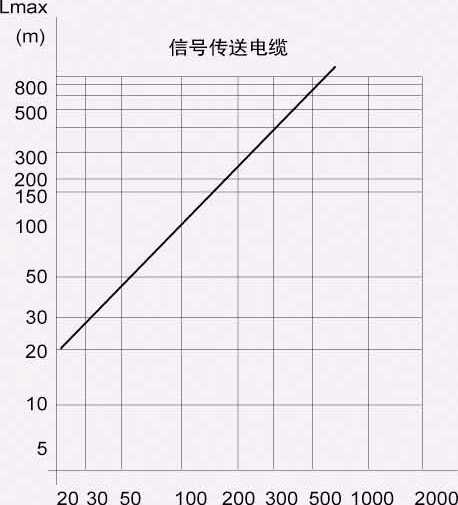
1.       If the pipeline shrink tube. Should be considered due to pressure loss, and reducers will affect the process.

2.       Consider from the product price. You can choose a smaller caliber electromagnetic flowmeter. Relatively reduce investment.

3.       When measuring clean water. Economic velocity is 2-3m / s. When the measured solution and crystallization, should be appropriately increase the flow rate. Avoid dead electromagnetic flowmeter electrode is covered.

The relationship curve of flowmeter inner diameter, flow rate and quantity of flow .

•The relationship between the maximum distance of the split type, the cross-section of the copper core of the cable and the conductivity of the medium



Signal transmission cable

For example: the conductivity of general tap water is about 100 p S/cm. The maximum distance of the split is about 100cm.

In practical applications, the shorter the separation distance, the better. The cable is too long. Affected by its distributed capacitance, it is easy to cause signal interference.

How to choose electrode material

The electrode material should be selected according to the corrosiveness of the fluid to be tested. Please refer to the relevant anti-corrosion manual. Tests should be made for special fluids.

|  |  |
| --- | --- |
| Material | Corrosion resistance |
| Stainless steel containing molybdenum | Nitric acid. <5" C sulfuric acid at room temperature. Boiling phosphoric acid. Formic acid. Alkaline solution. |
| (0 Cr 18 Ni 12 Mo 2 Ti) | Sulfurous acid under certain pressure. Sea water, acetic acid |
| Hastelloy c Ha Ff will be gold B | Oxidizing acid resistance. Oxidizing salt. Sea water resistance. Non-oxidizing acid resistance. Non-oxygen |
| (HC, HB) | Chemical salt. Alkali. Sulfuric acid at room temperature |
| titanium | Sea water, various chlorides and hypochlorous hydrochloric acid. Chlorinated acids (including fuming nitric acid>, |
| (HC) | Organic acid, alkali |
| Tantalum | Other chemical media except hydrofluoric acid, fuming sulfuric acid and alkali. Including boiling point |
| (Ta) | Hydrochloric acid, nitric acid and <175' C sulfuric acid |
| platinum  (PD | Various acids, bases, and salts. Excluding aqua regia |

How to choose lining material

The lining material should be selected according to the corrosiveness, abrasiveness and temperature of the measured medium

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Lining  Name Symbol  material | | | Performance Maximum  working temperature | | Applicable liquid |
| Rubber | Neoprene |  | Medium abrasion resistance. Resistant to the corrosion of low-concentration acid-base salts. | <80 \*C | Tap water, industrial water, sea water |
| Polyurethane rubber |  | Excellent wear resistance.  Poor acid and alkali resistance | <60 \*C | Pulp, mineral pulp and other slurries |
| Fluoroplastic | Polytetrachloroethylene | F 4 or PTFE | The chemical performance is very stable. It is resistant to boiling hydrochloric acid .  Corrosion of sulfuric acid, aqua regia and concentrated alkali | <180 [ 'C | Corrosive acid-base salt liquid |
| Translation of tetrafluoroethylene and hexafluoropropylene: Teflon FEP | F 46 or FEP | The chemical properties are slightly inferior to F 4 |  | Corrosive acid-base salt liquid |
| Tetrafluoroethylene and ethylene | F 4 or ETFE | The chemical properties are slightly inferior to F 4 |  | Corrosive acid-base salt liquid |
| plastic | Polyethylene | P 0 | Stable chemical properties | <60 \*C | Sewage |
| Polyphenylene sulfide | PPS |  | <150 \*C | Hot water |

How to choose the protection level

According to the national standard GB 4208-84 and the International Electrotechnical Commission standard IEC 529 76, the standards for the degree of protection of enclosures are:

IP 65: Water spray-proof type. Allows the tap to spray water to the sensor from any direction. The spray pressure is 30 kPa. The water output is 12.5 L / S and the distance is 3 m.

IP 68: Submersible type, long-term work in the water.

The degree of protection should be selected according to the actual situation. ■The sensor is installed below the ground, often flooded. P 68 should be used, and the sensor should be installed above the ground. IP 65 should be used.

How to choose additional features

The basic type of LDG intelligent electromagnetic flowmeter has display. Output 4\_20 mA and 0\_1 kHz. Alarm and other functions. Other additional functions can be added according to the actual situation:

1. Split installation: the sensor needs to be installed below the ground or other reasons. Split installation should be selected

2. RS - 485 communication: the sensor needs to communicate with other equipment. The RS - 485 communication function is required,

3. If you need other functions, please call to customize;

How to change the direction of the converter box

The converter box can be changed in four different directions as required.

1. Change of the direction of the converter box of the combined flowmeter

①Remove the 4 hexagon socket screws fixing the converter box =

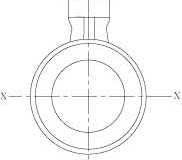
②Turn the converter box to the ideal direction. Pay attention to the internal connection line when rotating.

③Re -fix the converter box.

How to choose the installation point correctly

The correct selection of the installation point and the correct installation of the meteor meter are both very important links. If there is a mistake in the installation process, the lighter will affect the accuracy of the star measurement. The heavy one will affect the service life of the flowmeter. It may even damage the flowmeter.

Pay special attention when choosing the installation location:

1. The axis of the measuring electrode must be approximately horizontal

2. The measuring pipe must be completely filled with liquid

3.    Must be at least in front of the flowmeter 5xD {D is the inner diameter of the straight pipe meter) length. Backward must have at least 3xD (D is the flowmeter internal diameter) length of straight pipe

~~—「 —~~

5xD 3xD

4.        The flow direction of the fluid is the same as the arrow direction of the flowmeter

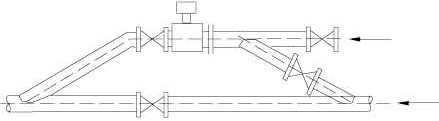
5.        A vacuum in the pipeline will damage the inner lining of the flowmeter. Special attention is required

6.        There should be no strong electromagnetic field near the flowmeter

7.        There should be ample space near the flowmeter for installation and maintenance.

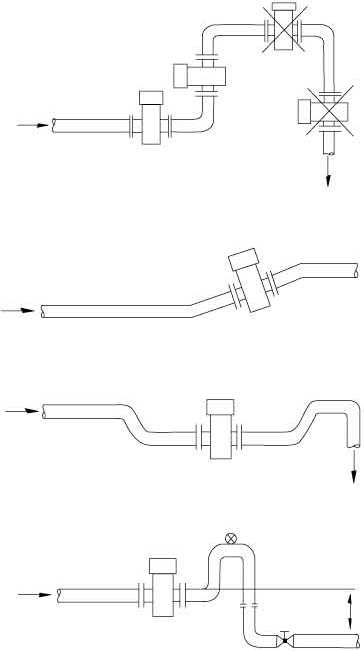
8.        If the measuring pipe vibration. Should be fixed in abutment on both sides of the flowmeter

9.        Measurement of mixing liquids of different media. The distance between the mixing point and the

 meter must have at least 30xD (D is the inner diameter of the meter) length meter must have at least 30xD (D is the inner diameter of the meter

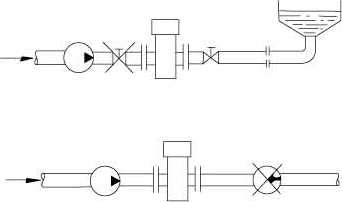
10.  In order to facilitate the cleaning and maintenance of the flowmeter in the future, a bypass pipeline should be installed.

11.      When installing a PTFE-lined flowmeter . The bolts connecting the two flanges should be tightened evenly . Otherwise, the PTFE lining will be easily crushed . It is best to use a torque wrench.

 How to choose the correct installation method

It should be installed at the lower part of the horizontal pipe and the vertical upward position,

Avoid installation at the highest point of the pipeline and vertically downwards.

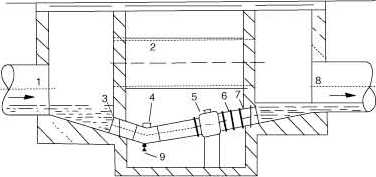


It should be installed on the rise of the pipeline.

Install in the pipe that discharges at the opening. should be installed at the lower part of the pipe

If the pipe drop exceeds 5m, install it downstream of the sensor.

The control valve and shut-off valve should be installed downstream of the sensor and installed at the outlet of the pump



The sensor must not be installed at the inlet of the pump. It should be installed at the outlet of the pump

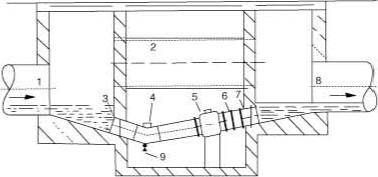
Measures of installing flow meters in measuring wells

1. inlet 2. Overflow pipe 3. Population gate

4. Cleaning hole 5. Flow meter 6. Short pipe

7. Outlet 8. Drain valve





Instrument wiring and installation requirements

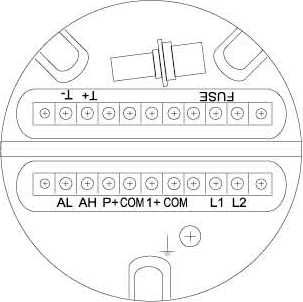
If the split installation is adopted, the connected signal cable adopts a customized special cable . The shorter the cable, the better

Excitation cable can choose YZ medium-sized rubber sheath cable . Its length is the same as that of signal cable.

The signal cable and the excitation cable must be strictly separated, cannot be laid in the same pipe, cannot be laid in parallel, and cannot be twisted together. They should be worn separately in the steel pipe.

Excitation signal cable and the cable as short as possible, excess cable volume can not be together . Shall be cut off excess cable . And re-weld joint.

|  |  |
| --- | --- |
| The terminal label of the integrated converter | |
| I +: | Flow current output |
| COM : | Current output ground |
| P +: | Two-way flow frequency (pulse ) output |
| COM : | Frequency (pulse ) output ground |
| AL : | Lower limit alarm output |
| AH ; | Upper limit report output |
| COM : | Report output destination |
| FUSE : | Input power fuse |
| T 1 +: | RS 485 communication output |
| T 2-: | RS 485 communication output |
| L 1: | 220 V (24 V ) power input |
| L 2: | The terminals of 220 V (24 V ) power input converter are marked: |

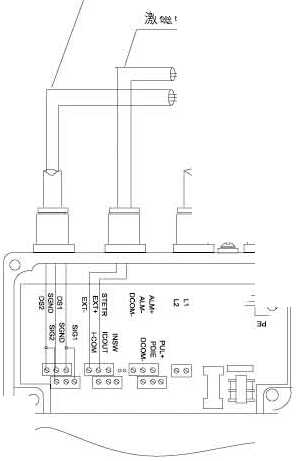


Terminal markings of split converters

|  |  |  |
| --- | --- | --- |
| SIGI： | Signal 1 | Connect to split type sensor |
| SGND: | Signal ground |
| SIG2： | Signal 2 |
| DSi: | Incentive shielding 1 |
| DS2： | Incentive shielding2 |
| EXT+： | Excitation current + |
| EXT-： | Excitation current - |
| INSW： |  | |
| ICOUT： | Positive and negative flow current output | |
| ICCOM： | Current output ground | |
| ALM2： | Empty tube. Excitation disconnection status alarm output | |
| PUL+； | Positive and negative flow frequency (pulse) output | |
| PD old： |  | |
| D- | Frequency (pulse) output ground | Two-way alarm output |
| COM： | Lower limit alarm output |
| ALM I : | Upper limit alarm output |
| STETR： | Alarm output ground |

Signal cable (double-core

Exciter（YHZ-2X1）

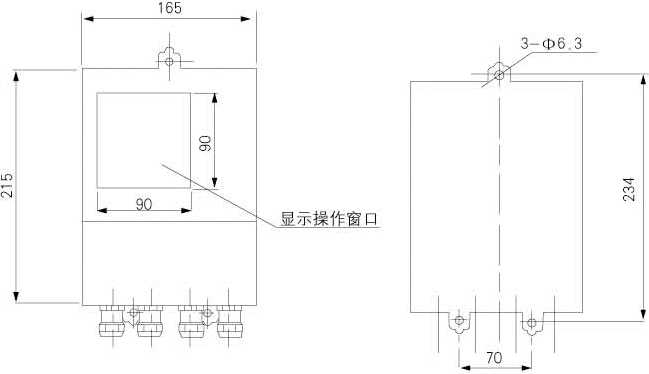
double-shielded STT3200)

Appearance of split electromagnetic flowmeter and converter installation ruler



Converter appearance size

165x215x70 (width, height and thickness)

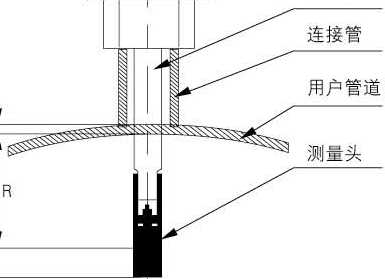
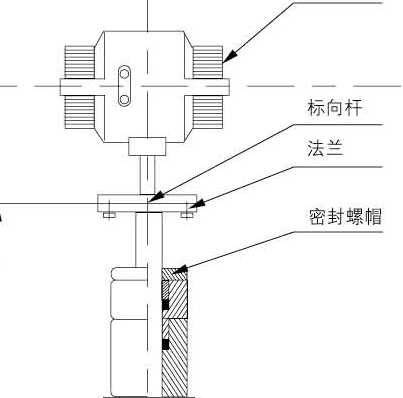


Show operation window

Converter installation size (wall-mounted)

The structure and dimensions of the plug-in electromagnetic flowmeter

|  |  |  |  |
| --- | --- | --- | --- |
| DN | Standard pipe X wall thickness | R | L |
| 250 | 273x11.5 | 125 | 600 |
| 300 | 325x12.5 | 150 | 625 |
| 350 | 377x3.5 | 175 | 650 |
| 400 | 426x3 | 200 | 675 |
| 450 | 480x15 | 90 | 565 |
| 500 | 530x15 | 100 | 575 |
| 600 | 630x9 | 120 | 595 |
| 700 | 720x10 | 140 | 615 |
| 800 | 820x10 | 160 | 635 |
| 900 | 920x10 | 180 | 655 |
| 1000 | 1020x10 | 200 | 675 |
| 1200 | 1220x10 | 240 | 715 |
| 1400 | 1420x10 | 280 | 755 |
| 1600 | 1620x10 | 320 | 795 |
| 1800 | 1820x10 | 360 | 835 |
| 2000 | 2020x10 | 400 | 975 |

Structure composition: The plug-in electromagnetic flowmeter is composed of measuring head (electrode assembly 1. insertion rod, insertion mechanism (ball valve, connecting short pipe, flange, etc.) and converter (integrated or split) .

Pole

Flange

Sealing nut

Ball valve

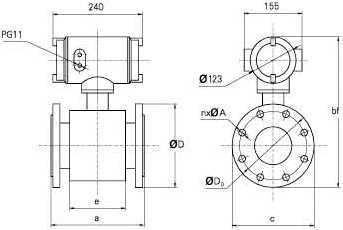
Connecting pipe

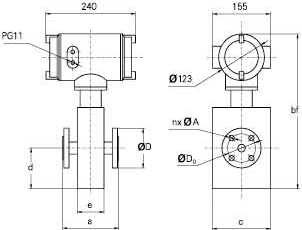
User pipeline

Measuring head

Note: The relationship between the outer diameter and wall thickness of the standard pipe provided above is for reference only.

R is the insertion depth.

Overall dimensions of integrated flowmeter



DN 6-20 DN 25-1000

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DN** | Rated pressure Apparatus dimensions (mm) | | | | | | Flange connection size (mm) | | |
| (MPa) a bf | | | c | d | e | D Do | | nxA |
| 10 | 4.0 | 150 | 408 | 156 | 107 | 72 | 90 | 60 | 4x14 |
| 15 | 150 | 408 | 156 | 107 | 72 | 95 | 65 | 4x14 |
| 20 | 150 | 408 | 156 | 107 | 72 | 105 | 75 | 4x14 |
| 25 | 150 | 303 | 115 |  | 78 | 115 | 85 | 4x14 |
| 32 | 150 | 319 | 140 |  | 78 | 140 | 100 | 4x18 |
| 40 | 150 | 332 | 150 |  | 93 | 150 | 110 | 4x18 |
| 50 | 200 | 346 | 165 |  | 109 | 165 | 125 | 4x18 |
| 65 | 200 | 367 | 185 |  | 105 | 185 | 145 | 8x18 |
| 80 | 200 | 382 | 200 |  | 101 | 200 | 160 | 8x18 |
| 100 | 1 .6 | 250 | 397 | 220 |  | 150 | 220 | 180 | 8x18 |
| 125 | 250 | 429 | 250 |  | 150 | 250 | 210 | 8x18 |
| 150 | 300 | 459 | 285 |  | 180 | 285 | 240 | 8x22 |
| 200 | 1.0 | 350 | 517 | 340 |  | 222 | 340 | 295 | 8x22 |
| 250 | 400 | 570 | 395 |  | 254 | 395 | 350 | 12x22 |
| 300 | 500 | 617 | 445 |  | 316 | 445 | 400 | 12x22 |
| 350 | 500 | 668 | 505 |  | 305 | 505 | 460 | 16x22 |
| 400 | 600 | 723 | 565 |  | 380 | 565 | 515 | 16x26 |
| 450 | 600 | 773 | 615 |  | 380 | 615 | 565 | 20x26 |
| 500 | 600 | 825 | 670 |  | 400 | 670 | 620 | 20x26 |
| 600 | 600 | 930 | 780 |  | 456 | 780 | 725 | 20x30 |
| 700 | 700 | 1038 | 895 |  | 545 | 895 | 840 | 24x30 |
| 800 | 800 | 1148 | 1015 |  | 580 | 1015 | 950 | 24x33 |
| 900 | 900 | 1248 | 1115 |  | 690 | 1115 | 1050 | 28x33 |
| 1000 | 1000 | 1355 | 1230 |  | 750 | 1230 | 1160 | 28x36 |
| 1200 | 0.6 | 1200 | 1674 | 1405 |  | 1206 | 1405 | 1340 | 32x33 |
| 1400 | 1400 | 1874 | 1630 |  | 1406 | 1630 | 1560 | 36x36 |
| 1600 | 1600 | 2084 | 1830 |  | 1606 | 1830 | 1760 | 40x36 |
| 1800 | 1800 | 2304 | 2045 |  | 1806 | 2045 | 1970 | 44x39 |
| 2000 | 2000 | 2504 | 2265 |  | 2006 | 2265 | 2180 | 48x42 |
| 2200 | 0.25 | 2200 | 2704 | 2405 |  | 2206 | 2405 | 2315 | 52x45 |

Flowmeter model description

Specification code Description

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Instrument type | LDG | | | | | | | | | Intelligent electromagnetic flowmeter |
| Path code | XXX | | | | | | | | Example 100 means DNIOO. If the path is followed by 丨, it means plug-in.  Connect AI means adjustable plug-in |
| Electrode form | 1 | | | | | | | | Standard fixed |
| 2 | | | | | | | | Scraper |
| 3 | | | | | | | | Removable and replaceable |
| Electrode Materials | | 0 | | | | | | | stainless steel |
| 1 | | | | | | | Platinum Pt |
| 2 | | | | | | | HastelloyB(HB} |
| 3 | | | | | | | TantalumTa |
| 4 | | | | | | | TitaniumT\_ |
| 5 | | | | | | | HastelloyC(HC> |
| Lining material | |  | 3 | | | | | | Neoprene |
|  | 4 | | | | | | Polyurethane rubber |
|  | 5 | | | | | | F4(PTEE)polytetrafluoroethylene |
|  | 6 | | | | | | F46(FEP)Polyfluoroethylene propylene |
|  | 7 | | | | | | F40(ETFE)tetrafluoroethylene-ethylene copolymer |
|  | 8 | | | | | | P〇(PE)polyethylene |
|  | 9 | | | | | | PPSpolyphenylene sulfide |
| Rated pressure(MPa> | | | 4.0 | | | | | | DN10.80 |
| 1.6 | | | | | | DN100-150 |
| 1.0 | | | | | | DN200-1000 |
| 0.6 | | | | | | DN1100-2000 |
| 0.25 | | | | | | DN2200 |
| Working temperature | | | | E | | | | | <8(TC |
| H | | | | | <180‘C |
| Grounding ring | | | | 0 | | | | | Without grounding ring |
| 1 | | | | | With grounding ring |
| Protection leve | | | |  | 0 | | | | IP65 |
|  | 1 | | | | IP68 |
| Converter type | | | | | 0 | | | | All-in-one |
| 1 | | | | Split |
| Communication | | | | | | 0 | | | No |
| 1 | | | RS-485 |
| 2 | | | Hart |
| 3 | | | PA bus |
| 4 |  | | FFbus |
| Shell material | | | | | | | -0 | | Carbon steel |
| 1 | | stainless steel |
| Meter body flange | | | | | | | 0 | | Carbon steel |
| 1 | | stainless steel |
| Install timing flange | | | | | | |  | 0 | Imperial |
|  |  | band |
| Power supply | | | | | | | | 0 | 220VAC |
| 1 | 24VDC |
| Meter mileage （XXX) | | | | | | | | | Example: (2000) means that the maximum current corresponding to 20mA is 2000m3/h |

Example丨: LDG—100-223-1.6E-0000-0010

Description 1: LDG type intelligent electromagnetic flow chamber meter. DN100. Scraper type Hastelloy B electrode. Neoprene lining. Rated pressure 1.6Mpa. Temperature <8 (TC. No grounding ring. IP65.-Integrated. No communication. Shell Materials and the body flange is carbon steel. With mounting matching flange (including bolts and nuts). 220V AC power supply,

Example 2: LDG-5001 \_ 105-1.6E-0000-1001 (2000)

Description 2.1\_06 plug-in intelligent electromagnetic flow meter, 01^00. Standard fixed stainless steel electrode. Plastic lining rated pressure 1.6(^^. Temperature<80;(:. No grounding ring. 1? 65.-Asana. No communication. The outer shell material is stainless steel. The flange of the meter body is carbon steel. There is no mounting matching flange. 24V DC power supply. The maximum current setting corresponding to 20nA is 20X>nVh.

Technical Parameters

The performance value of the product does not exceed the error given. The error-free value given refers to the Average performance value obtained from a series of instruments of the same model.

Measuring fluid -- 一conductive liquid, slurry

Conductivity >5 p S/cm

Velocity range 0.5~10m/s

Extended range 0.1~15m/s

Flow direction - -一Positive. Reverse, flow

Accuracy level一 一 ±0.2% ±0.3% ±0.5%

Repeatability ±0.1% ±0.15% ±0.25%

Work pressure < 4 .Ompa (DN10-80)

<1,6mpa(DN!00~150)

<1. Ompa (DN200-1000) <0.6mpa(DN1100-2200) Special pressure-resistant customized fluid temperature一 一E Level<80々

—H Level <180'C

Protection level IP65

IP68

Electrode material一 -- stainless steel 316L

Hastelloy (B.C) Bags

—Titanium electrode form- 一Standard, scraper. Foldable

Number of electrodes 2- 6

Lining material Neoprene

Polychloroprene rubber

-F4IPTFE) PTFE

F46(FEP) PTFE

F40(ETFE) PTFE

PO(PE) Polyethylene

--PPS benzene sulfide flange material Carbon steel. Stainless steel

output signal Standard current 4〜20mA

-Frequency 0~1kHz output function -- 一Forward and reverse, net flow signal

Communication RS-485

Hart

PA master-FF bus alarm (normally open) one-empty pipe

.Excitation, flow upper and lower limits

Power supply DC24V10VA

AC220V10VA working environment一- -- Temperature：-25'C~60'C

—Humidity：5%~90%