

选 型 样 本
SELECTION CATALOGUE

E-mag E

电 磁 流 量 计

ELECTROMAGNETIC FLOWMETER

Longrun Industrial Instrument Co.,Ltd

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E-mag E 型电磁流量计

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E-mag E 型电磁流量计

E-mag E ELECTROMAGNETIC FLOWMETER

1. 概要 SUMMARY

E-mag E 型电磁流量计采用国际电磁流量计最新技术制造，用于测量封闭管道中导电液体和浆液的体积流量。

E-mag E 型电磁流量计的 SMART 转换器采用新颖励磁方式，功耗低，零点稳定，精确度高。

E-mag E 型电磁流量计流量范围可达 1500 : 1。

转换器采用 16 位高性能微处理器，2 x 16 字符显示选择，参数现场设定方便，编程可靠。具有自检和自诊断功能。

双向测量系统内装三个积算器：正向流量、反向流量及差值量累积；正、反流量及多种输出（电流、脉冲、数字通讯、HART-）；保证系统的兼容性。

橡胶和聚氨酯衬里传感器为本质沉浸结构。

E-mag E electromagnetic flowmeter is made with international latest technology for electromagnetic flowmeter, used to measure the volumetric flow of the conductive liquid and slurry in the closed pipes .

The new exciting mode has been adopted on the SMART transmitter of E-mag E electromagnetic flowmeter with low power consumption, stable zero and high accuracy.

The flow range of E-mag E electromagnetic flowmeter can reach 1500:1.

The 16 digits high-efficient microprocessor has been used on the transmitter, optional 2x16 digits display, convenient to set the parameters locally, reliable in programing. It has self-monitoring and diagnostic functions.

There are three totalizers in the bi-directional measuring system: Forward flow, reverse flow and net flow, forward, reverse flow and various output(current, pulse, digital communication HART-); ensure the compatibility of the system.

Sensor with neoprene and polyurethane lining is intrinsically submersible structure.



分离型 Remote Model

2. 测量原理 MEASURING PRINCIPLE

电磁流量计的测量原理是基于法拉第电磁感应定律。其传感器主要由内衬绝缘材料的测量管、穿通测量管壁安装的一对电极和用以产生工作磁场的一对线圈及铁芯组成。当导电液体流经传感器测量管时，在电极上将感应出与流体平均流速成正比的电压信号。该信号经转换器放大处理，实现各种显示功能。

The measuring principle of electromagnetic flowmeter is based on the electromagnetic induction law of Farady. The sensor is mainly composed of measuring tube with isolate lining, a pair of electrodes installed by penetration of the measuring tube wall, a pair of coils and iron core to produce working magnetic field. When the conductive fluid flows through the measuring tube of the sensor, the voltage signal in direct proportion to the average flow velocity of the fluid will be inducted on the electrodes. The signal is amplificatively treated by the transmitter to realize various display functions.



一体型 Integral Model

3. 产品分类 PRODUCT CLASSIFICATION

电磁流量计由传感器和转换器两大部分组成。二者可以分别组成一体型或分离型流量计。其中具有防爆性能的仪表可用于规定的防爆场所。

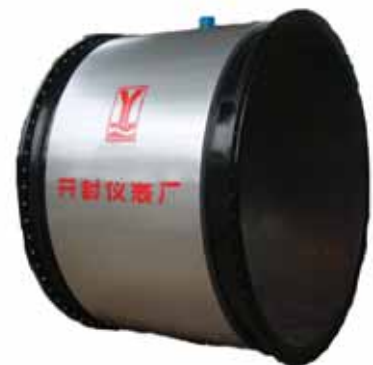
传感器采用法兰连接，有 7 种电极和 5 种衬里供选用。

转换器有：基型和浆液型；按键式和磁键式；有显示和无显示之分。由于基型按键式转换器编程及设定参数方便，建议优先选用。

Electromagnetic flowmeter is composed of sensor and transmitter. The two parts can be respectively formed in integral and remote model of flowmeters. Of them, the instrument with ex-proof function can be used in the specified ex-proof field.

The sensor is connected with flange, with 7 kinds of electrodes and 5 kinds of lining to be chosen.

The transmitter has: process and slurry ; push-button and magnetic-key; with display and without display. Because the process, push-button transmitter is convenient for programming and setting the parameters, we suggest to give priority to select it.



DN2600 传感器
DN2600 Sensor

4. 性能参数 PERFORMANCE PARAMETERS

4.1 整机和传感器 Integral and Sensor

最高流速 Maxim. Flow Velocity	15m/s		
精确度 Accuracy (参见精度曲线) (See accuracy curves)	DN15 ~ DN600	示值的 ±0.3% (流速≥1m/s)、±0.2%** ±0.3% of the reading (Flow velocity≥1m/s) ±0.2%**	
		±3mm/s (流速 Flow velocity≥1m/s)	
	DN700 ~ DN2400*	示值的 ±0.5% (流速≥0.8m/s) ±0.5% of the reading (Flow velocity≥0.8m/s)	
		±4mm/s (流速 Flow velocity<0.8m/s)	
流体电导率 Fluid Conductivity	≥5μS/cm		
公称压力 Nominal Pressure	DN15 ~ DN150	4.0MPa	
	DN200 ~ DN600	1.6 MPa	
	DN700 ~ DN1000	1.0 MPa	
	DN1200 ~ DN2400	0.6 MPa	
环境温度 Ambient Temperature	传感器 Sensor	-25℃ ~ +60℃	
	转换器及一体型 Transmitter and Integral Model	-10℃ ~ +60℃	
衬里材料 及流体最高温度 Lining Material and Maximum Fluid Temperature	衬里材料 Lining Material	流体最高温度 Maximum Fluid Temperature	
		分离型 Remote Model	一体型 Integral Model
	聚四氟乙烯 Teflon	100℃ ;150℃ (需特殊订货) (Need of special.order)	70℃
	聚氯丁橡胶 Neoprene	80℃ ;120℃ (需特殊订货) (Need of special order)	70℃
	聚氨酯 Polyurethane	80℃	70℃
电极形式 Electrode Forms	4 电极结构、 固定式、 刮刀式 4-electrode form, Fixed form, Scraper form		
电极材料 Electrode Material	含钼不锈钢; 不锈钢涂覆碳化钨; 哈氏合金 B; 哈氏合金 C; 钛; 钽; 铂-铱合金 Stainless steel containing Mo; Stainless steel coated with carbonized tungsten; Hastelloy B; Hastelloy C; Titanium; Tantalum; Platinum-iridium alloy		
连接法兰材料 Conne.Flange Material	碳钢 Carbon steel		

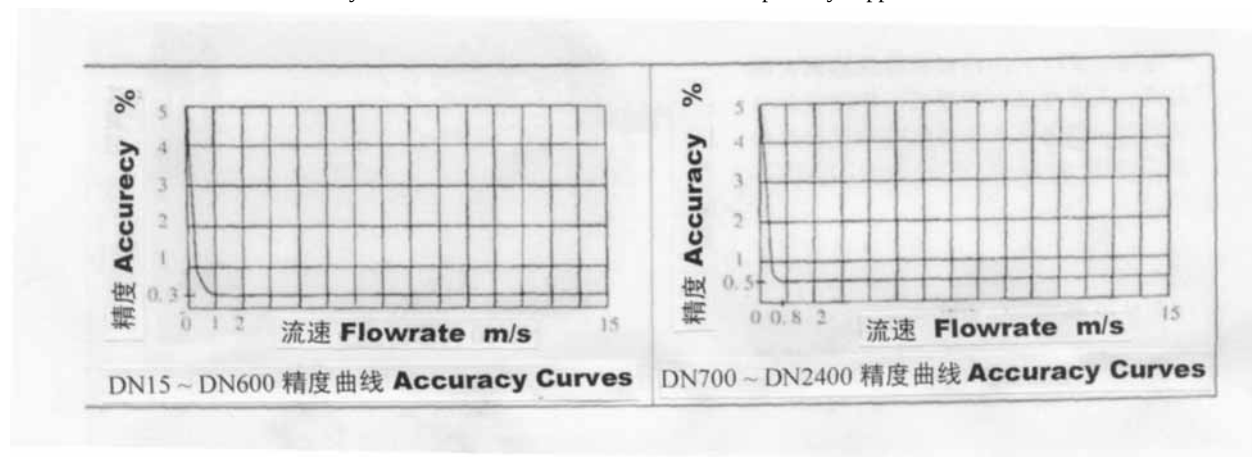
衬里保护法兰材料 Lining Protection Flange Material	不锈钢 Stainless steel 1Cr18Ni9Ti	
	20#合金钢 20# Alloy steel (当流体为强腐蚀性介质时选用, 须在合同中注明) (Clarification must be given in the contract if the fluid is a strongly corrosive medium)	
接地法兰材料 Ground Flange Material	不锈钢 Stainless steel 1Cr18Ni9Ti	
进口保护法兰材料 Inlet Protection Flange Material	DN15 ~ DN600	不锈钢 Stainless steel 1Cr18Ni9Ti
	DN700 ~ DN1600	碳钢 Carbon steel
外壳防护 Housing Protection	DN15 ~ DN150 分离型橡胶或聚氨酯衬里传感器 Remote model of sensor with neoprene or polyurethane lining	IP65, IP68(特殊订货) IP68 (Special order)
	DN200 ~ DN2400 分离型橡胶或聚氨酯衬里传感器 Remote model of sensor with neoprene or polyurethane lining	IP68 水下 10m Under water 10m
	其它传感器和所有转换器 Other sensors and all transmitters	IP65
防爆标志 Ex-proof Mark	DN15 ~ DN600 分离型防爆仪表 Remote model of ex-proof instrument	m II T4 传感器安装在相应的危险区, 转换器安装在安全区。 The sensor will be installed in the corresponding hazardous area, the transmitter in the safe area. md II BT4 传感器和转换器均可安装在相应的危险区。 The sensor and transmitter both can be installed in the corresponding hazardous area.
	DN15 ~ DN600 一体型防爆仪表 Integral model of ex-proof instrument.	md II BT4
间距 (分离型) Distance(Remote Model)	转换器距传感器一般不超过 100m; 超过 100m 需特殊订货 The distance between transmitter and sensor normally is not over 100m, if over 100m, it is in need of special order.	

* DN700 ~ DN2400, 特殊订货精确度可达示值的 $\pm 0.3\%$ (流速 $\geq 1\text{m/s}$) 或 3mm/s (流速 $< 1\text{m/s}$)

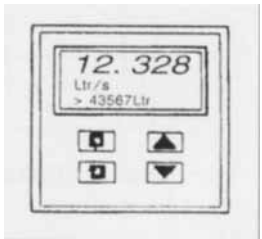
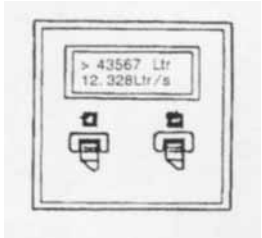
* DN700 ~ DN2400, the instrument accuracy for the special order can reach $\pm 0.3\%$ of the reading (Flow velocity $\geq 1\text{m/s}$) or 3mm/s (Flow velocity $< 1\text{m/s}$)

** 可特殊提供 $\pm 0.2\%$ 精度流量计为标准表

** The instrument with the accuracy of $\pm 0.2\%$ as master instrument can be specially supplied



4.2 转换器 Transmitter

电源 Power Supply	交流 AC	85 ~ 265, 45 ~ 400Hz
	直流 DC	11 ~ 40V
功率 Power	<20VA (含传感器 Including sensor)	
按键和显示 Push-button and Display	 按键式 Push-Button Model	• 4 个薄膜按键可设定选择全部参数。也可利用外接手操器或 PC 机 (RS232), 可对转换器编程。 • 三行 LCD 宽视角、宽温、带背光源显示 第一行: 显示流量值 第二行: 显示流量单位 第三行: 显示正、反及差值总量、报警、流速、流量百分比 • All parameters can be set and chosen by the 4 membrane push-buttons, also applied configurator or PC(RS232) can be used to program the transmitter. • Three lines LCD wide visual angle, wide temperature, display with bias light First Line: Display of flow value Second Line: Display of flow unit Third Line: Display of forward, reverse flow and net flow, alarm, flow velocity, flow percentage.
	 磁键式 Magnetic-Key Model	• 2 个磁键用于显示参数的选择和复位。利用外接手操器或 PC 机 (RS232、RS423/422、或 HART), 可对转换器编程。 • 二行 LCD 宽视角、宽温、带背光源显示 第一行: 显示正、反及差值总量、报警、流速、流量百分比。 第二行: 显示流量。 • 2 magnetic-keys are used to display the parameters and to reset. Use applied configurator or PC (RS232,RS423/422 or HART) to program the transmitter. • Two lines LCD wide visual angle, wide temperature, display with bias light First Line: Display of forward, reverse flow, and net flow, alarm, flow velocity, flow percentage. Second Line: Display of flow.
内部积算器 Inside Accumulators	正向流量、反向流量、差值量均有总量积算器。 Forward flow, reverse flow, net flow each of them is of a totalizer for total volume.	
测试方式 Measuring mode	通过转换器编程测试方式, 可使所有输出为编程值, 从而达到对系统的测试目的。 Through the measuring mode of the transmitter, all output can be changed into programming value so as to reach the purpose of the the measurement to the system.	
互换性 Interchangeability	转换器可与各种口径的传感器互换而无须实流标定。 The transmitter is interchangeable with sensors in various size and has no need of actual flow calibration.	

输出信号 (可编程) Output Signal (Programmable)	单向模拟输出 Unidirectional Analogue Output	• 全隔离，负载$\leq 600\ \Omega$（20mA 时）； • 上限：0~21mA，每档 1mA； • 零点：0~21mA，每档 1mA； • 正、反向流量输出方式编程。 • Entire insulation, load$\leq 600\ \Omega$（20mA hour）； • Upper limit: 0~21mA, 1mA per interval; • Zero point: 0~21mA, 1mA per interval; • Output-mode programming for forward and reverse flow.
	双向模拟输出 Bidirectional Analogue Output	• 输出零点限制为 0mA 或 4mA，其它同单向模拟输出。 • Output zero point is limited at 0mA or 4mA, the others are the same as unidirectional analogue output.
	双向脉冲输出 Bidirectional Pulse Output	• 两路输出分别对应正、反的流量，频率 0~800Hz，上限 1~800Hz 可选，每档 1 Hz； • 方波或选定脉宽，脉宽上限 2.5s，每 1ms 一档； • 带隔离保护的晶体管开关输出，可吸收 250 mA 电流，耐压 35V。 • Two-channel output respectively corresponds to the forward and reverse flow, frequency 0~800Hz, upper limit 1~800Hz optional, 1 Hz per interval; • Square wave or specified pulse width, upper limit of pulse width is 2.5s, 1ms per interval; • Transistor switch output with isolative protection, it can absorb 250mA current, voltage resistance is 35V.
	双路报警输出 Bichannel Alarm Output	• 可报警（编程）高/低流量、空管、故障状态、正/反向流量、模拟超量程、脉冲超量程、脉冲小信号切除，以及输出极性（常开/常闭）等。 • 带隔离保护的晶体管开关输出，可吸收 250 mA 电流，耐压 35V（与脉冲输出不隔离）。 • Alarmable(Programming)high/low flow, empty pipe, fault state, forward/reverse flow, analogue over range, pulse over range, pulse small signal cut off, and output polarity (Normal open/normal close)etc. • Transistor switch output with isolative protection, it can absorb 250mA current, voltage resistance is 35V(Without insulation with pulse output).
	通讯 Communication	RS232 串行接口 9 针 D 型插座。 Profibus 现场总线接口 RS485/423/422（可选）串行输出 兼容性数据连接 RS232 Serial interface 9 pins type D socket.。 Profibus site-bus interface RS485/423/422 (Optional) Serial output, compatible data connection.
输入信号 Input Signal	外部隔离式触点输入，闭合时清（复位）内部积算器（与脉冲输出、报警输出不隔离）。 External insulated contact input, reset of the inner totalizer at the time of close (Without insulation with pulse output, alarm output).	
时间常数 Time Constant	1 至 100s 1 to 100s	
隔离 Insulation	模拟、脉冲/报警与大地之间隔离电压达 50V D. C. 。 The insulation voltage between analogue, pulse/alarm and the ground reaches 50V D.C..	

5.1 传感器外形尺寸 Appearance Size of the Sensor (mm)

5.1 传感器外形尺寸 Appearance Size of the Sensor (mm)

Mount of conn. box
for the remote

Mount of transm. for the integral

分离型安装接线盒

一体型安装转换器

Technical drawings illustrating the mounting dimensions for two types of equipment:

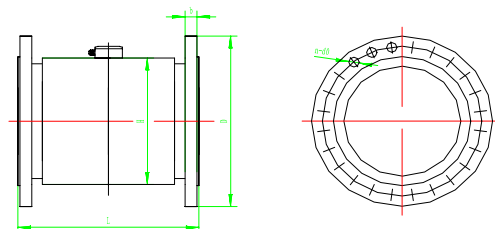
- Separate type mounting terminal box (分离型安装接线盒):** Shows a side view with dimensions 120, 243, and 70. The top view shows mounting holes with dimensions $n-d_0$ and $\phi 1$, and overall dimensions L, b, D, and W.
- Integral type mounting converter (一体型安装转换器):** Shows a side view with dimensions 85, 70, 52, and 203. The top view shows mounting holes with dimensions $n-d_0$ and $\phi 1$, and overall dimensions L, b, D, and W.

DN15~250 外形图

DN15~250 Dimensions

DN200--600外形图

DN200--600 Dimensions



DN700--2600外形图

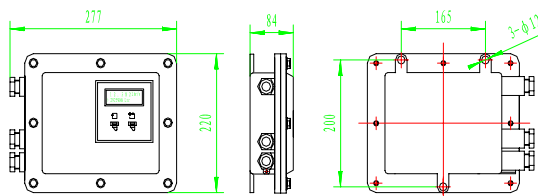
DN700--2600 Dimensions

The technical drawing shows two views of the ESD 600 unit:

- Front View (Left):** A square-shaped unit with a central rectangular opening. Dimensions include a total width of 163 mm, a top flange thickness of 7-8.6 ± 0.5 mm, a main body height of 116 mm, a bottom flange height of 224 mm, and a central opening width of 69 mm.
- Side View (Right):** Shows the profile of the unit with a total depth of 301 mm and a base width of 70 mm.

分离型 (普通)

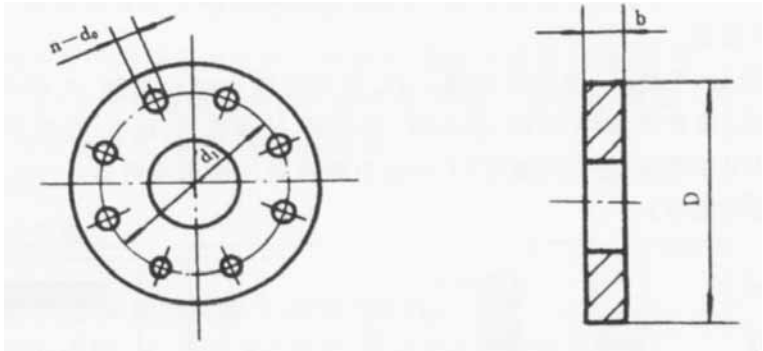
Remote Model(Common)



分离型（防爆）

Remote Model(ex-proof)

5.3 法兰尺寸 (mm) Flange Size(mm)



法兰尺寸图 Diag to the Size the Flange

法兰尺寸 Flange Size (标准 Standard: GB/T9119)

公称通径(mm) Nominal Bore	公称压力 Nominal Pressure 1.6MPa					公称压力 Nominal Pressure 4.0MPa				
	D	d ₁	d ₀	n	b	D	d ₁	d ₀	n	b
15	95	65	14	4	16	95	65	14	4	16
20	105	75	14	4	18	105	75	14	4	18
25	110	85	14	4	18	110	85	14	4	18
40	150	110	18	4	20	150	110	18	4	20
50	165	125	18	4	20	165	125	18	4	20
65	185	145	18	4	20	185	145	18	8	22
80	200	160	18	8	22	200	160	18	8	22
100	220	180	18	8	22	235	190	22	8	26
150	285	240	22	8	24	300	250	26	8	28
公称通径(mm) Nominal Bore	公称压力 Nominal Pressure 1.6MPa					公称压力 Nominal Pressure 1.0MPa				
	D	d ₁	d ₀	n	b	D	d ₁	d ₀	n	b
200	340	295	22	12	26	340	295	22	8	24
250	405	355	26	12	28	395	350	22	12	26
300	460	410	26	12	32	445	400	22	12	28
350	520	470	26	16	35	505	460	22	16	30
400	580	525	30	16	38	565	515	26	16	32
450	640	585	30	20	42	615	565	26	20	35
500	715	650	33	20	46	670	620	26	20	38
600	840	770	36	20	52	780	725	30	20	42

法兰尺寸 Flange Size (标准 Standard: GB/T9119)

公称通径 Nominal Bore	公称压力(Mpa) Nominal Pressure	D	d ₁	d ₀	n	b
700	1.0	895	840	30	24	30
800		1015	950	33	24	32
900		1115	1050	33	28	34
1000		1230	1160	36	28	34
700	0.6	860	810	26	24	26
800		975	920	30	24	26
900		1075	1020	30	24	26
1000		1175	1120	30	28	26
1200		1405	1340	33	32	28
1400		1630	1560	36	36	32
1600		1830	1760	36	40	34
1800		2045	1970	39	44	36
2000		2265	2180	42	48	38
2200		2475	2390	42	52	42
2400		2685	2600	42	56	44
2600		2905	2810	48	60	46

5.4 正确安装 Appropriate Installation

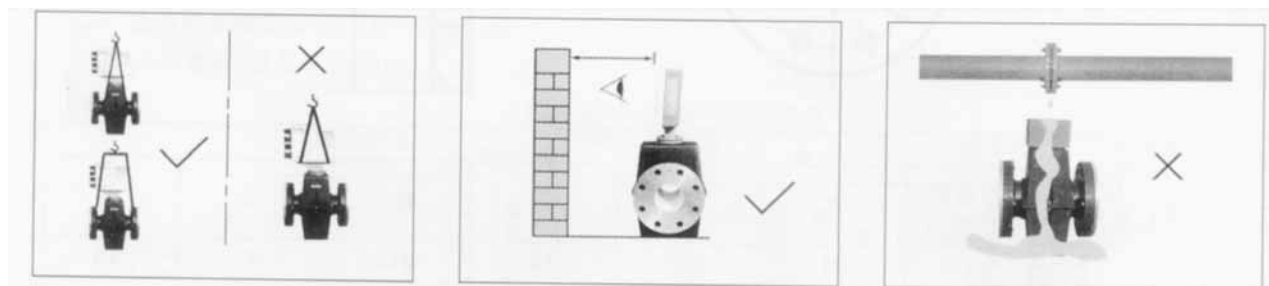
一体型流量计与分离型的传感器安装在管道上，分离型的转换器可墙装或盘装。
防爆仪表的安装、接线和使用，还必须遵守《E-mag 电磁流量计使用说明书——防爆产品的专用部分》。

附图《正确安装流量计图示》

The integral flowmeter and the remote sensor are installed on the pipe, the remote transmitter can be installed on the wall or in the panel.

The ex-proof instrument must be installed, connected, and used obeying 《The Operation Instruction of the E-mag Electromagnetic Flowmeter——The Special Part of the Ex-proof Products 》.

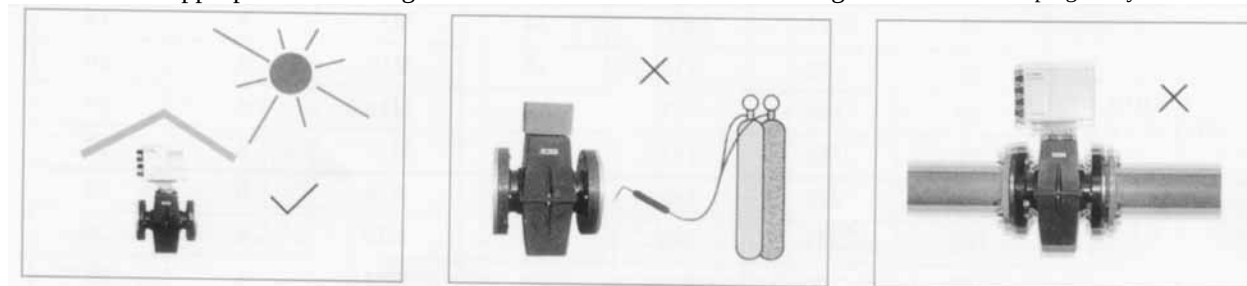
Attached Diag 《Diag for Appropriate Installation of the Flowmeter 》



正确吊装 Appropriate Overhang

方便读数 Convenient for Reading

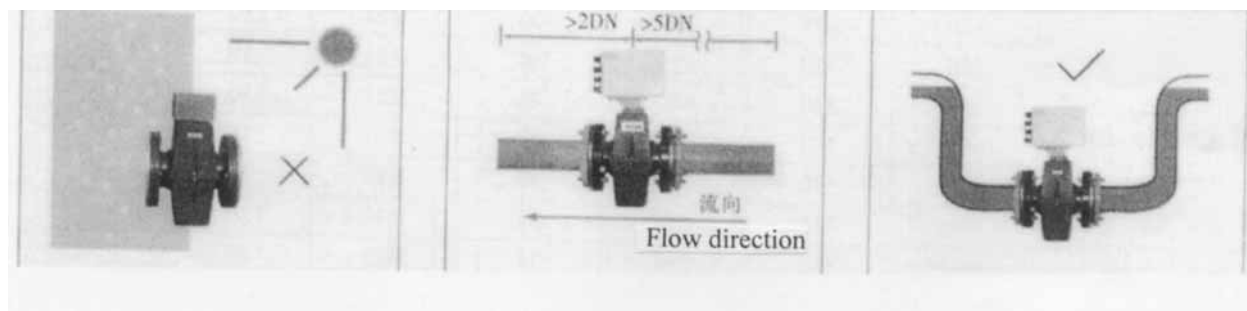
避开滴漏 Keeping Away from Leaking



防止曝晒 Strong Sunshine Prevention

远离火焰 Keeping Far Away from Fire

避免强振 Strong Shake Avoidance



避免过大温差
Great Temperature Difference Avoidance

保证直管段要求
Ensure the Requir. of the Straight Pipe section

充满管道
Full of Pipe



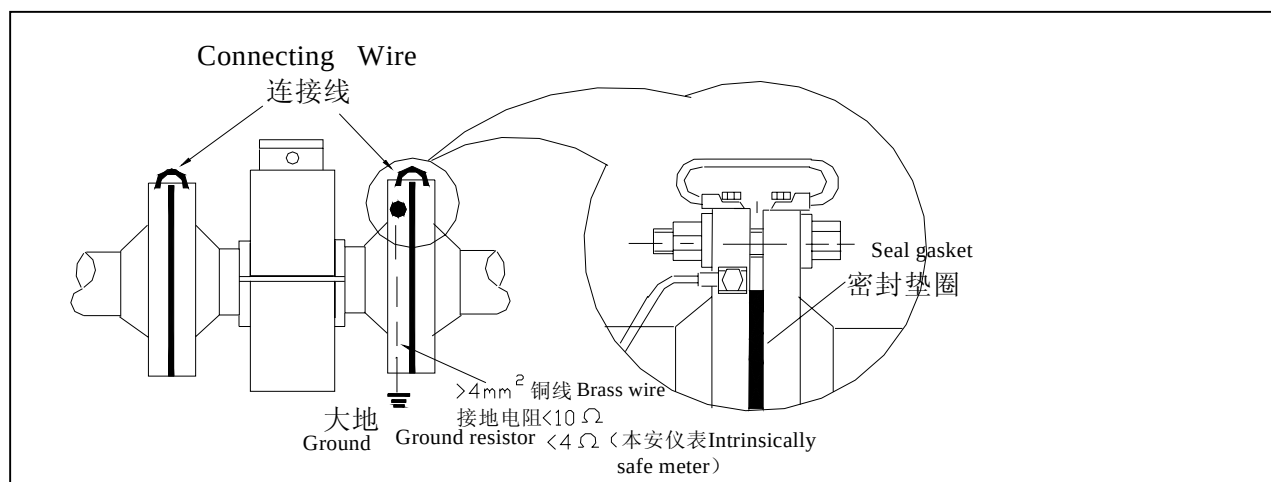
合理支撑
Reasonable Support

正确加装垫圈
Appropriate Washer Fitting

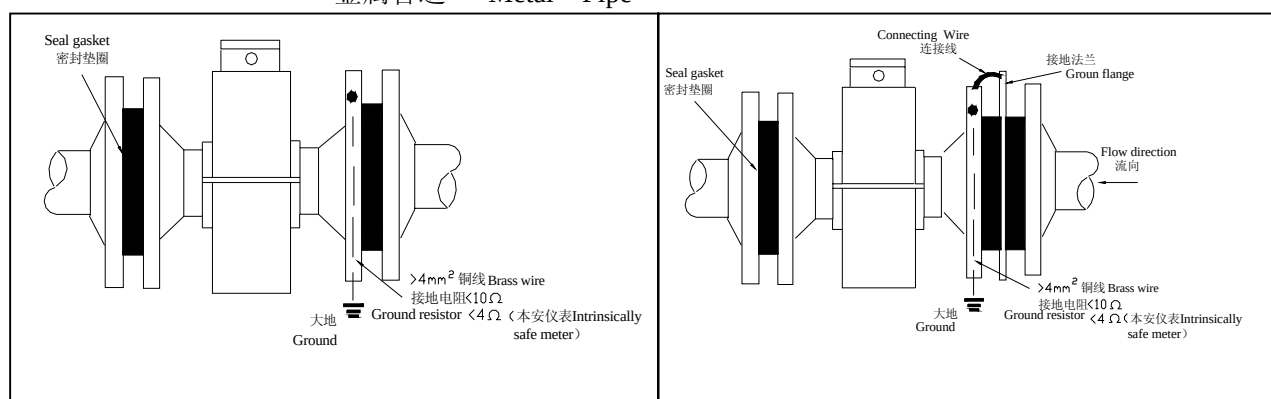
规范布线
Gauge Wiring

6.接线 CONNECTION

6.1 传感器与管道的连接、连线和地线 Connecting the Sensor with the Pipe,the Connecting、Wire、 and the Groundline



金属管道 Metal Pipe

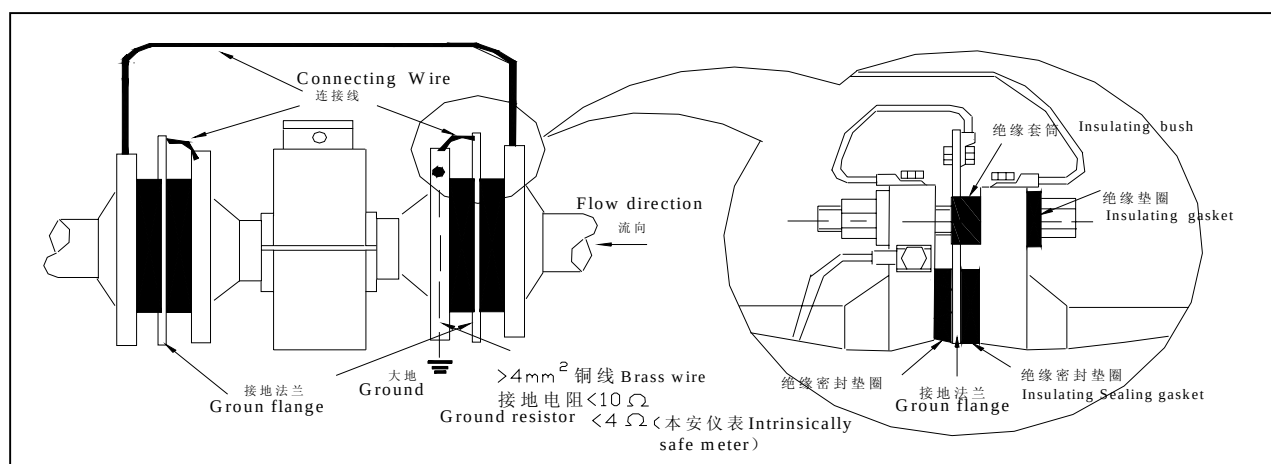


非金属管道，传感器装有接地电极。

Non-metal pipe,the sensor with ground electrode.

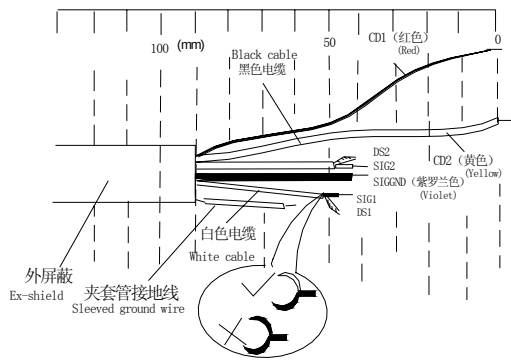
非金属管道，传感器无接地电极。

Non-metal pipe,the sensor without ground electrode.

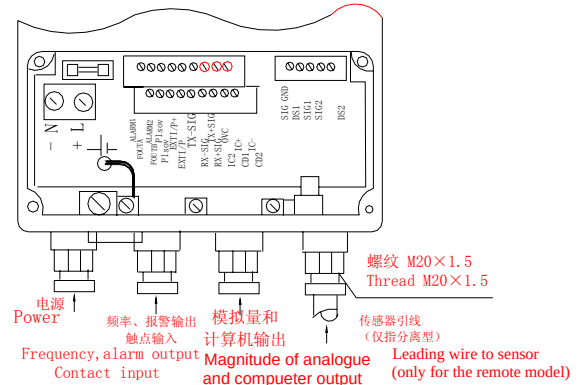


具有阴极保护的管道 The pipe with negative protection

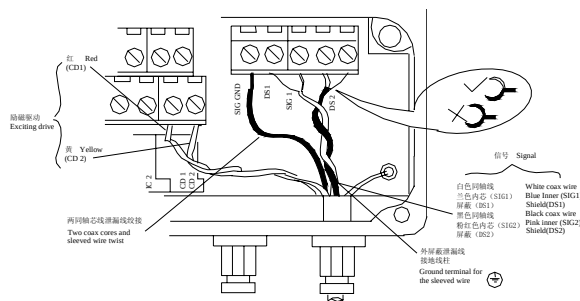
6.2 电气连接



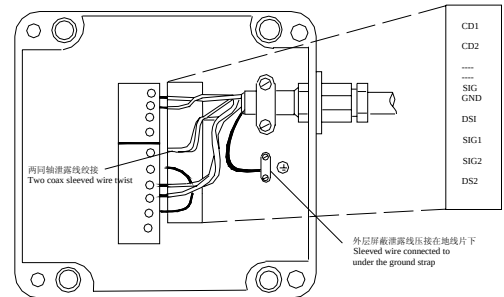
STT3200 电缆剥线示意图 Schematic Diag for Cable Preparation



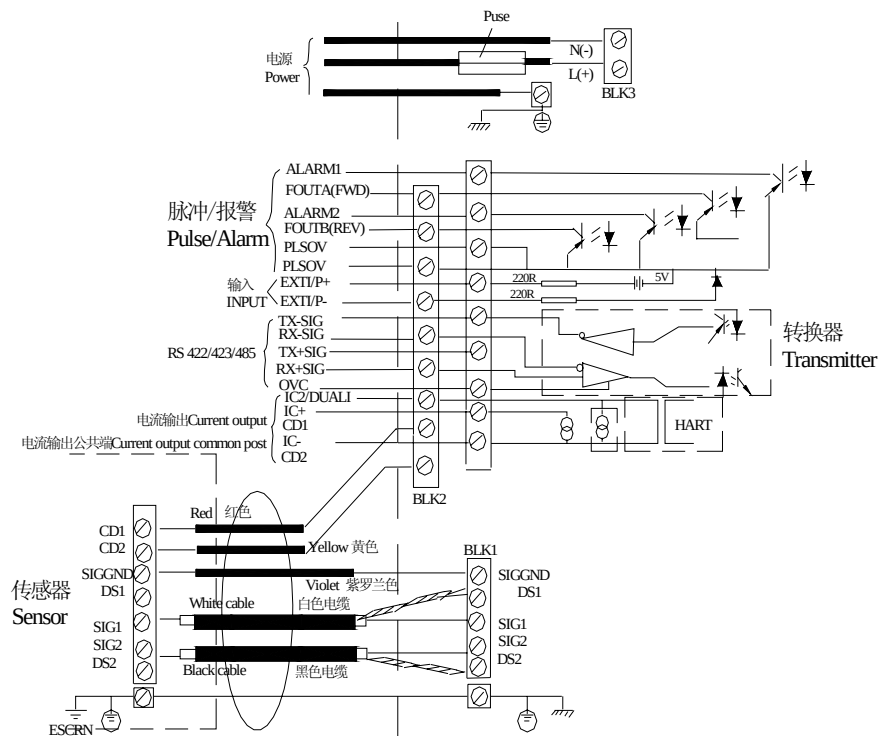
转换器接线端子图 Connecting Posts Diagram to the Transmitter



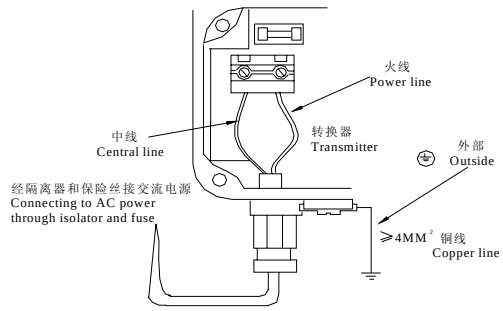
STT3200 电缆 转换器接线图 STT3200 Cable Wiring Diag at Transmitter



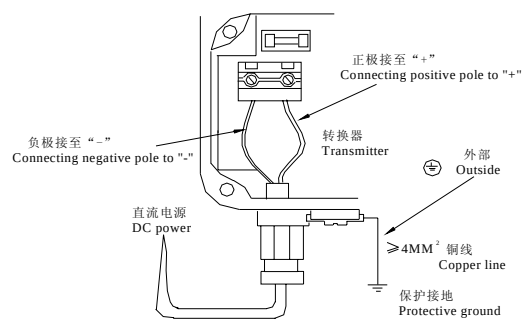
STT3200 电缆 传感器接线图 STT3200 Cable Wiring Diag at Sensor



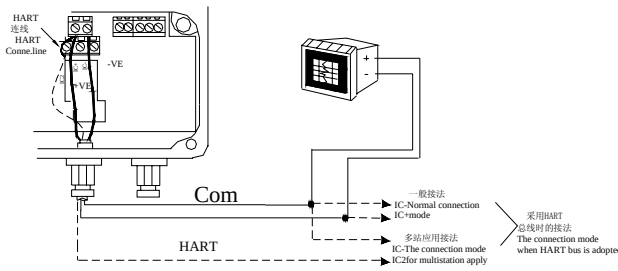
分离型传感器与转换器之间的接线图
Diag for the Wining Between Sensor and Transmitter to the Remote Model



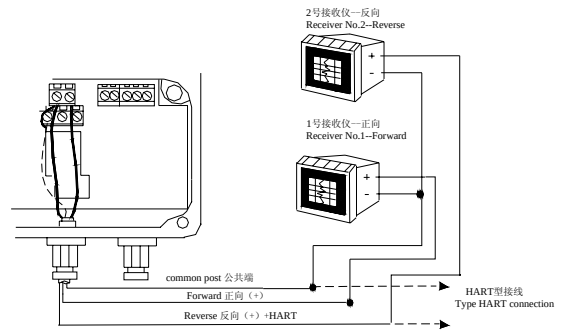
交流供电型电源接线图
Connecting Diag for AC Power Supply



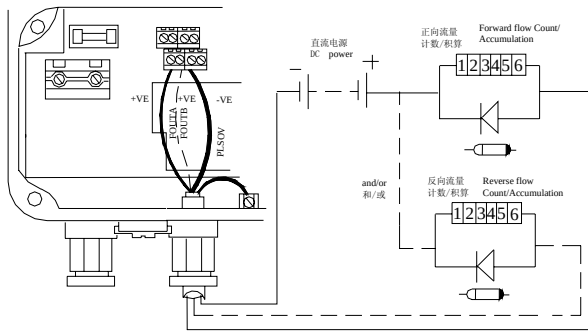
直流供电接线图 Connecting Diag for DC Power Supply



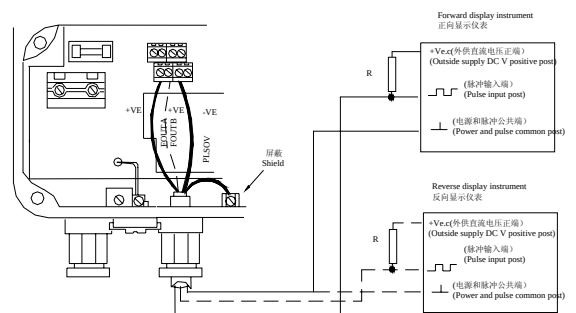
电流输出接线图 Connecting Diag for Current Output



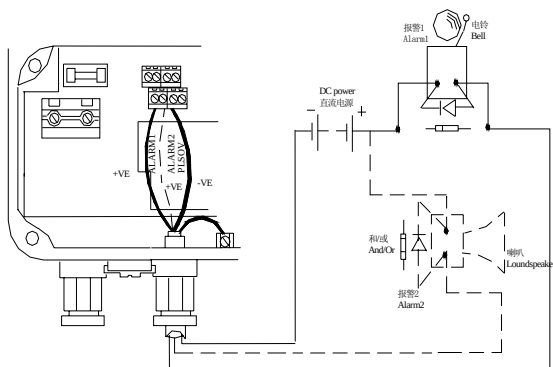
双电流输出接线图 Connecting Diag for Bicurrent Output



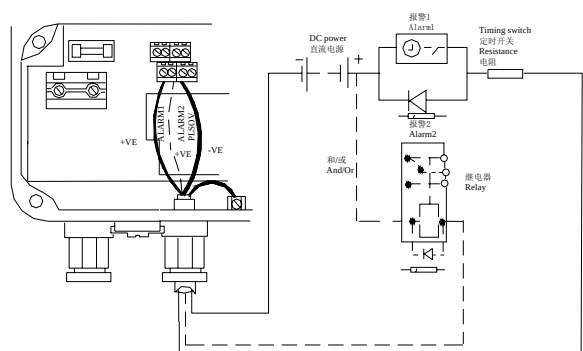
电磁计数器接线示意图 Connecting Schematic Diagram for the Electromagnetic Counter



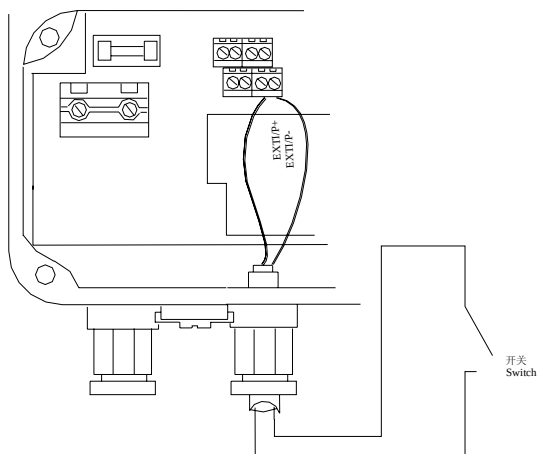
脉冲输出接线示意图 Connecting Schematic Diagram for the Pulse Output



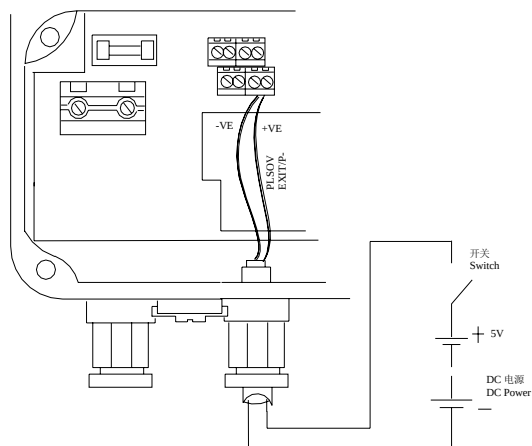
声/光报警输出接线图 Connecting Diag for the Sound/Light Alarm Output



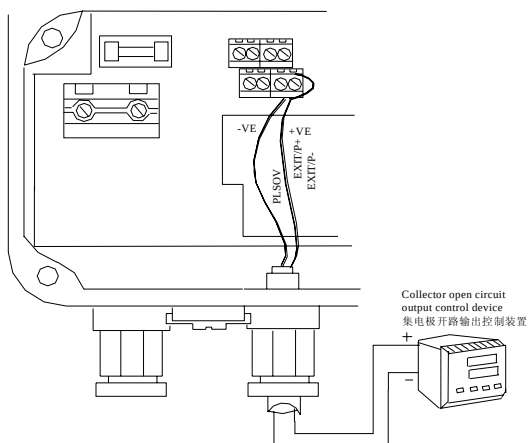
继电器或开关报警输出接线图 Connecting Diag for the Relay or Switch Alarm Output



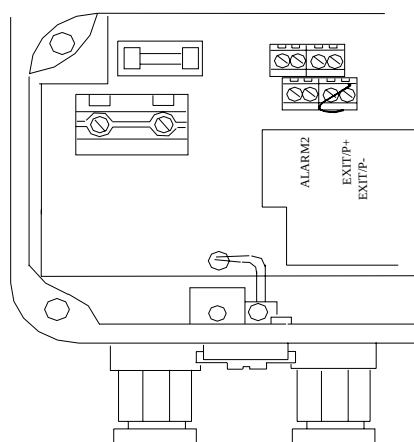
无电压触点输入Contact Input without Voltage



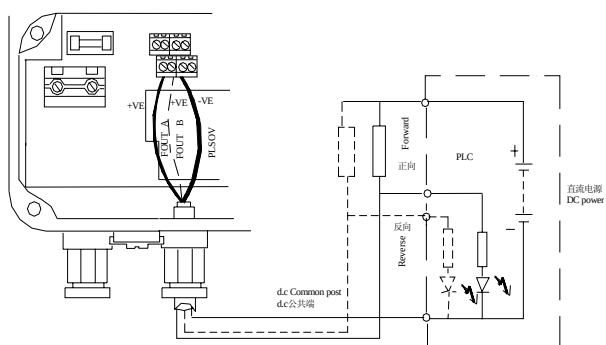
电压信号或逻辑信号输入Voltage Signal or Logical Signal Input



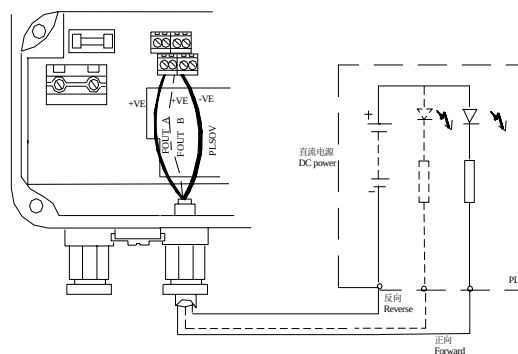
集电极开路（或接地触点）输入
Collector Open Circuit(or Ground Contact) Input



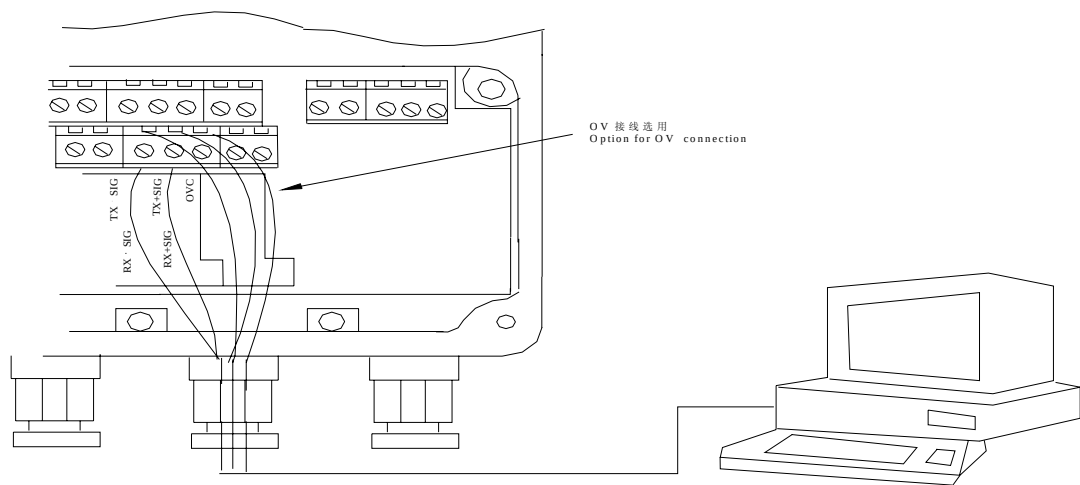
用一路报警自动切换量程输入
Using Uniline Alarm Automatically Switching Range Input



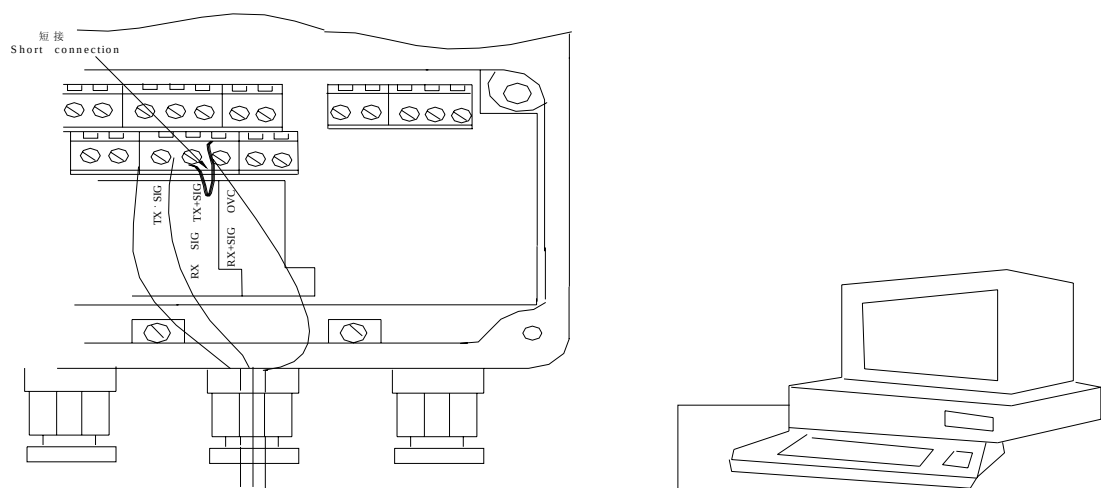
PLC可编程控制器接口示意图（-VE为公共端）
Interface Schematic Diag for PLC Programmable Controller(-VE as common post)



PLC可编程控制器接口示意图（+VE为公共端）
Interface Schematic Diagram for PLC Programmable Controller(+VE as common post)



RS422接线图（平衡式） Connecting Diag RS422(Balance Model)



RS423接线图（单端或RS232） Connecting Diag RS423(Unipost or RS232)

7.选型原则 THE TYPE SELECTION PRINCIPLES

被测流体必须是导电性的液体或浆液，其电导率不小于 $5\mu\text{S}/\text{cm}$ ，被测流体不应含较多的铁磁性物质或气泡，应根据被测流体的温度、工作压力、腐蚀性、磨损性等特性选择合适的压力等级、衬里材料、电极材料及仪表结构形式。

The measured fluid must be the conductive liquid or slurry, its conductivity shall not be less than $5\mu\text{S}/\text{cm}$, and the measured fluid shall not contain much ferromagnetic substance or air bubbles. The suitable pressure grade, lining material, electrode material, and the instrument structure shall be selected in accordance with the characters of the temperature, working pressure, corrosiveness, abrasiveness, etc. of the measured fluid.

7.1 通径的选择 The Selection of the Nominal Bore

- ① 因 E-mag E 型电磁流量计具备 1500 : 1 高范围度，通常选择仪表口径与工艺管道相同。
- ② 若被测介质含固体颗粒，推荐的流速范围为 $1\sim 3\text{m}/\text{s}$ ，如实际流速过大，又不便改的，可选仪表通径大于工艺管道通径，以适当减小流量计测量管段的介质流速，减轻颗粒对电极和衬里的磨损。
- ③ 若工艺管道中可能有沉积物，推荐的流速为 $2\sim 5\text{m}/\text{s}$ ，如实际流速过小，又不便更改工艺管道的，可选仪表通径小于工艺管道通径，以适当增大流量计的介质流速，避免沉积物对仪表精度的影响。
- ④ 在流速太小而又要求高精度计量的，可选小于工艺管道通径的传感器，使流速变大，保证较高精度。

上述②③④项情况，流量计上、下游须装异径管。异径管中心锥角应不大于 15° ，且异径管上游至少有 5 倍工艺管道直径的直管段。

为帮助选型，下表列出了几个具有代表性与流速对应的流量。任何流量对应流速也可快捷地利用本表算出：若已知流量值 $Q (\text{m}^3/\text{h})$ ，再由表中查出相应通径下 $1\text{m}/\text{s}$ 流速对应流量值 Q_1 ，则：

$$\text{对应流速 } V = \frac{Q}{Q_1} (\text{m/s})$$

① As E-mag E Electromagnetic flowmeter has a high range of 1500 : 1, normally, the bore of the selected Instrument is consistent with the processing pipe.

② If the measured medium possibly contains solid grains, the recommended range of flow velocity is $1\sim 3\text{m}/\text{s}$, the actual flow velocity is too high, and not convenient to change, the bore of the instrument to be selected can be bigger than that of the processing pipe so as to slow down the medium flow velocity in the measuring tube section of the flowmeter, reduce the abrasion to the electrode and lining caused by the grains.

③ If maybe there is deposit in the processing pipe, and the recommended flow velocity is $2\sim 5\text{m}/\text{s}$, the actual flow velocity is too low, and it is not convenient to change the processing pipe, the bore of the instrument to be selected can be smaller than that of the processing pipe so as to increase the medium flow velocity of the flowmeter, avoid the affection of the accuracy of the instrument caused by the deposit.

④ In the condition of low flow velocity and high accuracy measurement, the sensor that its bore is smaller than the bore of processing pipe can be selected so as to increase the flow velocity and ensure the higher accuracy.

In the conditions of ② ③ ④ above mentioned, the pipe reducer should be installed at upstream and downstream of the flowmeter. The central cone apex angle of the pipe reducer should not be bigger than 15° , and there must be a straight pipe section of more than five times the length of the diameter of the processing pipe at the upstream of the pipe reducer .

To help with type selection, a few typical flows corresponding to the flow velocity are listed in the following sheet. Any flow velocity corresponding to the flowrate also can be calculated promptly with this list: If flow value $Q (\text{m}^3/\text{h})$ has been known, then, check up from the list the flow value Q_1 corresponding to the flow velocity $1\text{m}/\text{s}$ of the corresponding bore, then:

$$\text{Corresponding flow velocity } V = \frac{Q}{Q_1} (\text{m/s})$$

流速——流量对照表 Sheet of Flow Velocity vs Flowrate								
Flowrate 流量 (m ³ /h) Bore 通径 (mm)	Flow Velo. 流速 (m/s)	0.01 (最小) (Mini.)	1	2	3	4	5	15 (最大) (Maximum)
15		0.0064	0.6362	1.2723	1.9085	2.5447	3.1809	9.5426
20		0.0113	1.1310	2.2619	3.3929	4.5239	5.6549	16.9646
25		0.0177	1.7671	3.5343	5.3014	7.0686	8.8357	26.5072
40		0.0452	4.5239	9.0478	13.5717	18.0956	22.6195	67.8584
50		0.0707	7.0686	14.1372	21.2058	28.2743	35.3429	106.0288
65		0.1195	11.9459	23.8918	35.8377	47.7836	59.7295	179.1886
80		0.0810	18.0956	36.1911	54.2867	72.3823	90.4779	271.4336
100		0.2827	28.2743	56.5487	84.8230	113.0973	141.3717	242.1150
150		0.6362	63.6173	127.2345	190.8518	254.4690	318.0863	954.2588
200		1.1310	113.0973	226.1947	339.2920	452.3893	565.4867	1696.4600
250		1.7671	176.7146	353.4292	530.1438	706.8583	883.5729	2650.7188
300		2.5447	254.4690	508.9380	763.4070	1017.8760	1272.3450	3817.0351
350		3.4636	346.3606	692.7212	1039.0818	1385.4424	1731.8030	5195.4089
400		4.5239	452.3893	904.7787	1357.1680	1809.5574	2261.9467	6785.8401
450		5.7256	572.5553	1145.1105	1717.6658	2290.2210	2862.7763	8588.3289
500		7.0686	706.8583	1413.7167	2120.5750	2827.4334	3534.2917	10602.8752
600		10.1788	1017.8760	2035.7520	3053.6281	4071.5041	5089.3801	15268.1403
700		13.8544	1385.4424	2770.8847	4156.3271	5541.7694	6927.2118	20781.6354
800		18.0956	1809.5574	3619.1147	5428.6721	7238.2295	9047.7868	27143.3605
900		22.9022	2290.2210	4580.4421	6870.6631	9160.8842	11451.1052	34353.3157
1000		28.2743	2827.4334	5654.8668	8482.3002	11309.7336	14137.1669	42411.5008
1200		40.7150	4071.5041	8143.0082	12214.5122	16286.0163	30357.5204	61072.5612
1400		55.4177	5541.7694	11083.5389	16625.3083	22167.0778	27708.8472	83126.5416
1600		72.3823	7238.2295	14476.4589	21714.6884	28952.9179	36191.1474	108573.4421
1800		91.6088	9160.8842	18321.7684	27482.6525	36643.5367	45804.4209	137413.2627
2000		113.0973	11309.7336	22619.4671	33929.2007	45238.9342	56548.6678	169646.0033
2200		136.8478	13684.7776	27369.5552	41054.3328	54739.1104	68423.8880	205217.6640
2400		162.8602	16286.0163	32572.0326	48858.0490	65144.0653	81430.0816	244290.2448
2600		191.1343	19113.4268	38226.8536	57340.2804	76453.7072	95567.1340	286701.4020

7.2 衬里保护法兰和接地法兰的选用

7.2 The Selection to the Lining Protection Flange and the Ground Flange

法兰种类 Kinds of Flanges	适用范围 Application
接地法兰 Ground Flange	适用于非导电管道，如塑料管道。但衬里为聚四氟乙烯的传感器不需要。 Suitable for non-conductive pipes, e.g. plastic pipes. But, the sensor with teflon lining has no need of it.
进口保护法兰 Inlet Protection Flange	当介质有强磨损性时选用，常与聚氨酯衬里配合使用，但衬里为聚四氟乙烯的传感器不适合。 When it is selected to be used for the medium with strong abrasiveness, normally it cooperates with polyurethane lining. But, it's not suitable for the sensor with teflon lining.

7.3 电极材料的选择 The Selection to the Electrode Material

电极材料 Electrode Material	耐 蚀 性 能 Anticorrosion Features
含钼不锈钢 StainlessSteel Containing Mo	用于工业用水、生活用水、污水，具有弱腐蚀性的介质，可广泛用于石油、化工、尿素、维尼纶等工业。 Used for industrial water, city water, wastewater, the media with weak corrosiveness, can be broadly used in the industries of petroleum, chemical, urea, vinylon etc.
不锈钢涂覆碳化物 Stainlss Steel Coated with Carbonized Tungsten	用于无腐蚀性，强磨损性介质。 Used for the media with strong abrasiveness, without corrosiveness.
哈氏合金 B Hastelloy B	对沸点以下一切浓度的盐酸有良好的耐蚀性，也耐硫酸、磷酸、氢氟酸、有机酸等非氧化性酸、碱、非氧化盐液的腐蚀。 With well anticorrosiveness to hydrochloric acid in all concentrations below the boiling point, also proof against the corrosion of unoxidizing acid, alkali, unoxidation salt liquid such as sulphuric acid, phosphoric acid, hydrofluoric acid, organic acid etc.
哈氏合金 C Hastelloy C	能耐氧化性酸、如硝酸、混酸或铬酸与硫酸的混合介质的腐蚀，也耐氧化性的盐类如 Fe^{+++} 、 Cu^{++} 或含其它氧化剂的腐蚀，如高于常温的次氯酸盐溶液、海水的腐蚀。 Can be proof against the corrosion of oxidizing acid, e.g. nitric acid, mixed acid, or the mixed medium of the chromic acid and the sulphuric acid, also proof against the corrosion of oxidizing salts e.g. Fe^{+++} 、 Cu^{++} or containing other oxidizing agent, e.g. hypochlorite solution over normal temperature, sea water.
钛 Titanium	能耐海水、各种氧化物和次氯酸盐、氧化性酸（包括发烟硝酸）、有机酸、碱等的腐蚀，不耐较纯的还原性酸（如硫酸、盐酸）的腐蚀。但如果酸中含有氧化剂（如硝酸、 Fe^{+++} 、 Cu^{++} ）时，则腐蚀性大为降低。 Can be proof against the corrosion of sea water, various kinds of chlorides and hypochlorite, oxidizing acid, (Including fuming nitric acid), organic acid, alkali, etc., not proof against the corrosion of purer reductive acid (e.g. sulphuric acid, hydrochloric acid). But, if the acid contains oxidizing agents (e.g. nitric acid, Fe^{+++} 、 Cu^{++}), the corrosiveness will be much lower.
钽 Tantalum	具有优良的耐腐蚀性，和玻璃很相似。除了氢氟酸、发烟硫酸、碱外，几乎能耐一切化学介质（包括盐酸、硝酸、硫酸和王水）的腐蚀。 With well anticorrosiveness, very similar with the glass. Almost can be proof against the corrosion of all chemical media (Including hydrochloric acid, nitric acid, sulphuric acid and aqua regia) except hydrofluoric acid, fuming sulphuric acid, alkali.
铂铱合金 Platinum-Iridium Alloy	几乎适用于所有化学物质，但不适用于王水和铵盐。 Almost suitable for all chemical matter, but, not suitable for aqua regia and ammonium salt.

7.4 衬里材料的选择 The Selection to the Lining Material

衬里材料 Lining Material	主要性能 Main features	适用范围 Application
聚四氟乙烯 Teflon	- 它是塑料中化学性能最稳定的一种材料；能耐沸腾的盐酸、硫酸、硝酸和王水，也能耐浓碱和各种有机溶剂，不耐三氟化氯、高温三氟化氧、高流速液氟、液氧、臭氧的腐蚀。 - 耐磨性能差 - 抗负压能力强 - It's a kind of material with the most stable chemical feature in the plastics; can be proof against the corrosion of boiling hydrochloric acid, sulphuric acid, nitric acid and aqua regia, also can be proof against the corrosion of concentrated alkali, and various kinds of organic solvents, not proof against the corrosion of trifluorinatedchlor, high temperature trifluorinatedoxy, high flowrate liquid fluorine, liquid oxygen, ozone. - Poor antiabrasiveness. - Strong capacity in antinegative pressure.	100℃、150℃ - 浓酸、碱等强腐蚀性介质。 - 卫生类介质。 100℃, 150℃ - Concentrated acid, alkali etc. Media with strong corrosion. - Sanitary kinds of media.
聚氯丁橡胶 Neoprene	- 有极好的弹性，高度的扯断力，耐磨性能好。 - 耐一般低浓度酸、碱、盐，介质的腐蚀，不耐氧化性介质的腐蚀。 - With very good resilience, high tearing strength, good abrasiveness. - Proof against the corrosion of the media of low concentration acid, alkali, salt, not proof against the corrosion of the oxidizing media.	1.80℃、120℃ - 一般水、污水、磨损性弱的泥浆、矿浆。 80℃, 120℃ - Common water, wastewater, low abrasive slurry.
聚氨酯橡胶 Polyurethane	- 有极好的耐磨性（相当于天然橡胶的十倍）。 - 耐酸、碱性能较差。 - 不能用于混有有机溶剂的水。 - With very good antiabrasiveness (Equal to ten times of the natural rubber). - Poor in antiacid, antialkali. - Can not be used for the water mixed with organic solvent.	<80℃ - 中性强磨损的矿浆、煤浆、泥浆等。 <80℃ - Neutral strongly abrasive mine, coal slurry, etc..

由于介质种类繁多，其腐蚀性又受温度、浓度、流速等复杂因素影响而变化，故 7.3、7.4 两表仅供参考。

用户应根据实际情况自己做出选择，必要时应做拟选材料的耐腐试验，如挂片试验。

As the kinds of the media are too much, its corrosiveness will be changed by the affection of temperature, concentration, flow velocity etc. So, the two sheets of 7.3, 7.4 are only for reference. The users should make the selection according to their actual conditions, the anticorrosive test of the quasi-selected material e.g. hanging-lamella test should be done.

8. 订货注意事项 ORDERING INFORMATION

请用户在订货前阅读本样本，并了解产品型号及编码规定，根据需要提出相应的产品及编码。对分离型仪表，本厂随表供应 10 米 STT3200 电缆，如表间距离超过 10 米，用户应按实际距离向我厂订货。

如有必要还请注明：

- a.要求产品出厂前设定的参数，如流量范围上限值或相应流速上限等；
- b.是否有沉浸使用要求；
- c.是否要求提供安装用配对副法兰；

特殊要求，请与本厂协商

Please read this catalogue before order, and know the product models and code stipulations, propose the corresponding product and code in the light of need. For the remote model of the instrument, the factory will supply 10m of STT3200 cable together with the instrument. If the distance is over 10m, the user could order the cable from our factory according to the actual distance.

Please give clear indication of if it is necessary:

- a.The parameters required to set at factory before despatch, e.g. the upper limited value of the flow range or the upper limitation of the corresponding flow velocity;
- b.Whether there is a requirement to use the instrument in submersion;
- c.Whether there is a requirement to get the flange adaptor used for installation;

For special requirement, please contact the factory.

公称 通径 Nominal Bore (mm)	公称压力 Nominal Pressure				衬里材料 Lining Material				电极材料 Electrode Material								结构形式 Structure Form					转换器 Transmitter		选择件 Sele. Parts		
	4.0	1.6	1.0	0.6	聚 四 氟 乙 烯 F ₄	聚 氟 合 乙 烯 Fs	聚 全 氟 乙 丙 稀 F46	聚 氯 丁 橡 胶 Ne	聚 氨 酯 Po	不 锈 钢 316L	哈 氏 合 金 B Hb	哈 氏 合 金 C Hc	钛 Ti	铂 铱 合 金 Pi	钽 Ta	不 锈 钢 涂 覆 碳 化 钨 Ss	一 体 型 Im	分 离 型 Rm	分 离 沉 浸 型 Rs △	分 离 防 爆 型 Re	一 体 防 爆 型 Ie	基 型 Bm	浆 液 型 Sm	进 口 保 护 法 兰 Ip	接 地 法 兰 Gf	接 地 电 极 Ge
15	*	*			*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20	*	*			*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
25	*	*			*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
40	*	*			*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
50	*	*			*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
65	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
80	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
100	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
150	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
200		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
250		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
300		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
350		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
400		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
450		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
500		*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
600			*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
700			*	*	*		*		*		*					*		*	*	*	*	*		*	*	*
800			*	*	*		*		*		*					*		*	*	*	*	*		*	*	*
900			*	*	*		*		*		*					*		*	*	*	*	*		*	*	*
1000			*	*	*		*		*		*					*		*	*	*	*	*		*	*	*
1200				*			*		*		*					*		*	*	*	*	*		*	*	*
1400				*			*		*		*					*		*	*	*	*	*		*	*	*
1600				*			*		*		*					*		*	*	*	*	*		*	*	*
1800				*			*		*		*					*		*	*	*	*	*		*	*	*
2000				*			*		*		*					*		*	*	*	*	*		*	*	*
2200				*			*		*		*					*		*	*	*	*	*		*	*	*
2400				*			*		*		*					*		*	*	*	*	*		*	*	*
2600				*			*		*		*					*		*	*	*	*	*		*	*	*

说明Explanation: ① * 表示编码中对应通径可选内容。* Expressing the selectable contents of the corresponding bore in the code.②△沉浸结构仅聚氯丁橡胶和聚氨酯衬里可选。△Only the meter with neoprene and polyurethane lining can be chosen in submersion structure.③英文缩写 The short form of the English: F₄—Teflon; Fs—Polyfluoroethylene; F46—Polyfluoroethylpropylene; Ne—Neoprene; Po—Polyurethane; Ss—Stainless Steel; Hb—Hastelloy B; Hc—Hastelloy C; Ti—Titanium; Pi—latinum-Iridiumalloy; Ta—Tantalum; Ss—Stainless Steel Coated with Carbonized Tungsten; Im—Integral Model; Rm—Remote Model; Rs—Remote Submersion Model; Re—Remote Exproof Model; Ie—Integral Exproof Model; Bm—Basic Model; Sm—Slurry Model; Ip—Inlet Protection Flange; Gf—Ground Flange; Sele. Parts—Selectable Parts; Ge—Ground Electrode.

9. 编码表 CODE LIST

MF/E

a			b		c	d	e	f	g	h	i	j	

[illegible]

a b c d e f g h i j

a.Nominal Bore （mm）						f. Ex-proof Marks		
Code	Bore	Code	Bore	Code	Bore	0	No	
150	15	201	200	901	900	1	md II BT4 （Integral model, IP65, Magnetic key, DN15~DN600）	
200	20	251	250	102	1000	2	md II BT4 （Remote model, IP65, Magnetic key, DN15~DN1600）	
250	25	301	300	122	1200	3	m II BT4 （Remote model, IP65, Sensor in safe area, DN15~DN1600）	
400	40	351	350	142	1400	g. Accessories		
500	50	401	400	162	1600			
650	65	451	450	182	1800			
800	80	501	500	202	2000			
101	100	601	600	222	2200			
151	150	701	700	242	2400	h. Structure		
		801	800	262	2600			
b.Nominal Pressure （Mpa）								
06	0.6	(DN700~DN2600)						
10	1.0	(DN200~DN1000)						
16	1.6	(DN15~DN600)						
40	4.0	(DN15~DN150)						
×	×	Special order				3 Electrode scraper structure （DN300~DN1600）		
c.Lining Material						i. Power		
1	Teflon （F ₄ ）		(DN15~DN1000)					
2	Neoprene		(DN65~DN2600)					
3	Polyurethane		(DN15~DN600)					
4	Polyfluoroethylpropylene (F46)		(DN15~DN600)					
5	Polyfluoroethylene (Fs)		(DN15~DN600)			j. Forms of the Transmitter		
d.Electrode Material								
1	Stainless steel 0Cr18Ni12Mo2Ti			(DN15~DN2600)				
2	Hastelloy B			(DN15~DN600)				
3	Hastelloy C			(DN15~DN1600)				
4	Titanium			(DN15~DN600)		1. Push button, 3-line display, normal output* 2.Magnetic key, 2-line display, normal output 3.Magnetic key, 2-line display, two currents 4. Magnetic key, 2-line display, normal output, HATE 5. No button, no display, normal output 6. Slump model, Push button, 3-line display, normal output 7. Slump model, magnetic key, 2-line display, normal output *Normal output: Uniflow-direction current output, forward and reverse pulses, top and low limit alarm, RS232		
5	latinum-Iridiumalloy			(DN15~DN600)				
6	Tantalum			(DN15~DN600)				
7	Stainless Steel Coated with Carbonized Tungsten			(DN15~DN1600)				
e. Sensor Protection								
4	IP65							
5	IP68 (Only for the remote sensor with neoprene and polyurethane lining)							

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