NEW-CONSENS NC400 Electromagnetic flowmeter

1. Product introduction

Electromagnetic flowmeter is a induction instrument that measures the volume flow-rate of the media, which fit for measuring the volume flow-rate of the conducting liquid that the electrical conductivity more than 5 μ s/cm, and widely used in the fields of oil, chemical and water, to measure the flow metering of the source water, clean water and sewage, and other conductive liquid.

The integrated and separated electromagnetic flowmeter is applied The Explosion proof design and common design. The explosion Proof signal Ex is EX dm II BT4

2. Technical features

1) No activity and choked flow, no pressure loss in sounding pipe

2) The measurement is not affected by the density, temperature, pressure, conductivity changes of the liquid.

3) Select the different lining materials, which have the excellent corrosion resistance and abrasion resistance.

4) Low frequency square wave excitation, would not be disturbed by power frequency and site stray, stable and reliable in working.

5) Not affected by the direction of the liquid, and precise measuring in the conditions of positive and negative installation.

6) LCD back lit Chinese display

3.Principle of Operation

The principle (see the chart) of the electromagnetic flowmeter is based on Faraday law of electromagnetic induction, mean that when conducting liquid excise the cutting magnetic line of force motion, then will create the induced electromotive force in the direction of vertical flow velocity vector and magnetic field vector, the induced el ectromotive force is: E=BdV

So the calculation formula of the flow rate is: Q=3600*E*F/B/d (m3/h)

In the formula: B- magnetic induction (T)

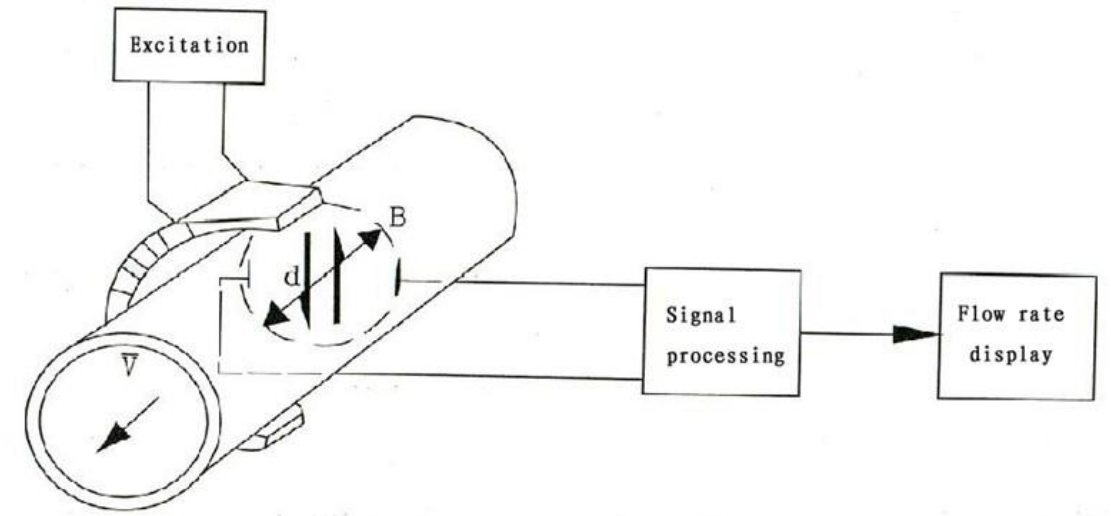
d- electrode spacing (m)

F- Sectional area in duct (m2)

E- Induced electromotive force (V)

For a same flowmeter, d, F and B are the fixed value, so flow rate Q(or flow speed), in proportion to Induced electromotive force E. therefore, Induced electromotive force E in proportion to flow rate Q(or flow speed), after processing and calculating, measuring the transient and accumulated flow-rate

4. Technical Parameter



1） Measuring scope and precision: see Figure 1

Measuring scope （m/s）	Precision
＞0.5~10	±0.5%R ±1.0%R
≤0.5	±0.0025m/s ±0.005m/s

2）Connection: Flange connection, flange clamped

3）Protection grade of the outside shell:

Electromagnetic flowmeter： integrated, IP65
seperated: Transducer IP65
sensor IP67; IP68

4）Material of the electrode: stainless steel, molybdenum stainless steel, Hastelloy alloy B and C, Titanium

5）Nominal pressure:1.0; 1.6; 2.5; 4.0; 6.3; 16; 25; 32MPa

6）Material of the lining: Corrosion resistance rubber, Polyurethane, alumina ceramics, fluoroplastics and temperature resistance synthetic rubber

7）Media temperature:0～60℃;0～70℃; 0～90℃; 0～130℃; 0～180℃

8）Using environment:temperature;sensor:-25～+60℃; transducer and integrated model:-10～+40℃

relative humidity:≤ 85%

9）Working voltage:220VAC or 24VDC

10）Basic output allocation: current output 4～20mA(permitted load resistance is 0～500 Ω)(optoelectronic isolation)

Pulsating chamber output: Pulse equivalent see Figure 2, range is 0～12V

11）The value of the “Accumulation” display see Figure 2

Nominal latus rectum DN （mm）	10-40	50-80	100-400	450-1600
The end number of the accumulated value (m3)	0.001	0.01	0.1	1
Pulse equivalent (m3/cp)	0.000001	0.00001	0.0001	0.001

12）Output allocation: RS 485 serial port

13）could set up the parameter

14）Power failure data storage time:≥ ten years

15）Other functions: Blank pipe status: Chinese character display “Blank Pipe” and red light flickered.

Chinese character display: accumulated flow rate 8 digit, transient 5 digit, Upper and lower flow rate alarm.

5. Type selection parameter and model mark

As the industrial flowmeter, the design unit should check the tested media and process parameter carefully when they selected the type for user, in order to select the correct type.

1. Determine the suitable flow rate scope

The selection of the instrument caliber is determined by the flow rate scope, for Electromagnetic flowmeter, generally choose the site that has the strong flow rate signal and stable work for the instrument for a long time. Suggest you choose the instrument caliber according to the reference of the flow speed-flow rate synopsis (Figure 3) and the actual working condition, recommend the flow speed in the scope of 1-3m/s, which is the best condition for the instrument.

2. Selection of lining and electrode

Except for determine the caliber and flow rate scope of the Electromagnetic flowmeter, still need to select the lining and allocated electrode of the sensor in order to improve the economic applicability, the design unit could select the different lining and electrode according to the different media of the user (see Figure 4 and 5)

3. Pressure and using

Except for determine the above conditions for Electromagnetic flowmeter, still need to select working pressure (see Figure 6), way of installation, protection grade of the shell, explosion-proof requirement, output setting up and other using conditions. The integrated model fits for the good condition room, and separated model fits for serious environment for sensor, the heavy shock for channel, and high temperature for the tested media, please select it according to the model of the instrument.

Figure3

Flow speed m/s / Flow rate m³/s / drift diameter	0.01	1	2	3	4	5	10
10	0.0028	0.2827	0.5655	0.8482	1.1310	1.4137	2.8270
15	0.0064	0.6362	1.2723	1.9085	2.5447	3.1809	6.362
20	0.0113	1.1310	2.2619	3.3929	4.5239	5.6549	11.310
25	0.0177	1.7671	3.5343	5.3014	7.0686	8.8357	17.671
40	0.0452	4.5329	9.0478	13.5717	18.0956	22.6195	45.239
50	0.0707	7.0686	14.1372	21.2058	28.2743	35.3429	70.686
65	0.1195	11.9459	23.8919	35.8377	47.7836	59.7295	119.459
80	0.1810	18.0956	36.1911	54.2687	72.3823	90.4779	180.956
100	0.2827	28.2743	56.5487	84.8230	113.0973	141.3717	282.743
150	0.6362	63.6173	127.2345	190.8518	254.4690	318.0863	636.173
200	1.1310	113.0973	226.1947	339.2920	452.3893	565.4867	1130.973
250	1.7671	176.7146	353.4292	530.1438	706.8583	883.5729	1767.146
300	2.5447	254.4690	508.9380	763.4070	1017.8760	1272.2540	2544.690
350	3.4636	346.3606	692.7212	1039.0818	1358.4424	1731.8030	3463.606
400	4.5239	452.3893	904.7787	1357.1680	1809.5574	2261.9467	4523.893
450	5.7256	572.5553	1145.1105	1717.6658	2290.2210	2826.7763	5725.553
500	7.0686	706.8583	1413.7167	2120.5750	2827.4334	3534.2917	7068.583
600	10.1788	1017.8760	2035.7520	3053.6281	4071.5041	5089.3801	10178.760
700	13.8544	1385.4424	2770.8847	4156.3271	5541.7694	6927.2118	13854.424
800	18.0956	1809.5574	3619.1147	5428.6721	7238.2295	9047.7868	18095.574
900	22.9022	2290.2210	4580.4421	6870.6631	9160.8842	11451.1052	22902.210
1000	28.2743	2827.4334	5654.8668	8428.3002	11309.7336	14137.1669	28274.334

Figure 4 The performance of the lining material and application scope

Lining materials	Mark No.	The performance of the lining material and application scope
Corrosion resistance rubber	1	Could resist acetic acid, oxalic acid, ammonia water, strong oxidant in the high temperature. Generally used in weak acid, weak base and salt solution. The media temperature is: 0-60 ℃
Polyurethane rubber	2	Extreme wear-resistant (equivalent 10 times to natural rubber). Resistant to weak base and acid. Used in intermediate and strong abrasion pulp, coal liquid, slurry, sewage and water. The media temperature is: 0-70 ℃
Alumina ceramics,	3	Better anticorrosion. The media temperature is: 0-1230 ℃ (but not resist to the impack, negotiable)
Fluoroplastics	4	Could resist the boiled hydrochloric acid, sulphuric acid, nitric acid and aqua regia, also concentrated base and kinds of organic thickening agent. Bad wear-resistant and connection. Used in strong corrosive media like concentrated acid and base and healthy media. The media temperature is: 0-130 ℃ (130-180, negotiable)
Temperature resistance synthetic rubber	5	The main performance is the same as Polyurethane rubber.

Figure 5 The performance of the electrode and application scope

Materials	Mark	The performance and application scope
Stainless steel	1	Applied to weak corrosive media like industrial water, domestic water and sewage, more economical
Molybdenum Stainless steel	2	More strong corrosion resistant to nitric acid, room temperature＜5% sulphuric acid, boiled phosphoric acid, formic acid and lye solution, the sulfurous acid under certain pressure, sea water and acetic acid. Widely used in the industry of oil and chemical, urea, vinylon, etc.
Hastelloy alloy B	3	Have the good corrosion resistant to all concentration of the hydrochloric acid that under the boiling point, corrosion resistant to sulphuric acid, phosphoric acid, hydrofluoric acid, organic acid and other non-oxidizing acid, base, salt liquid, and applied in the strong corrosive environment.
Hastelloy alloy C	4	Corrosion resistant to oxidizing acid, like nitric acid, mixed acid or the mixed media of the sulphuric acid, also corrosion resistant to oxidizing salt, like Fe3+, Cu2+, or other oxidant, like hypochlorite and sea water.
Titanium	5	Corrosion resistant to sea water, sorts of chloride and hypochlorite, oxidizing acid

		(including Fuming nitric acid), organic acid and base, etc. not corrosion resistant to pure non-reducing acid (like sulphuric acid and hydrochloric acid). If there is oxidant in the acid (like Fe3+, Cu2+, the corrosion resistance will be lowed)

Figure 6

Nominal pressure (MPa)	1.0	1.6	2.5	4.0	6.3	16	25	32
Mark	01	02	03	04	06	16	25	32

4. Model and mark

☐	Operating environment （explosion-proof，B， N/A, non- explosion-proof）
☐	Model of the transducer (6A, integrated,.5A, separated)
☐	Way of connection （Y-integrated, no separated）
☐	Grounding ring or grounding electrode material (see Figure 5)
☐	Electrode material (See Figure 5)
☐	Nominal pressure （See Figure 6）
☐	Lining material (See Figure 4)
☐	Way of installation (B, flange connection, C flange clamping)
☐	Nominal drift diameter (mm)
NC400	Electromagnetic flowmeter

For instance, intend to use the flange connection integrated Electromagnetic flowmeter that Nominal drift diameter is DN25, and Nominal pressure is 25MPa, the material of the lining is Polyurethane, and the materials of the electrode and grounding electrode (or grounding ring) are 1Cr18Ni9Ti stainless steel, and the model and mark is: NC-25B22511Y6A.