

OUTLINE

An electromagnetic flowmeter consists of a sensor and a transmitter. According to Faraday Law, the flowmeter is used to measure volumetric flow rate for inductive liquids and pulps. Several output signals are available. The main application range can be found in the following fields: chemical industry, power generation and distribution, mine, water treatment, paper industry, pharmaceutical industry, food and environmental protection.

FEATURES

The measurement is independence of the density, viscosity, temperature, pressure and conductivity of the measured fluid.

No moving parts in the measuring tube. No pressure loss.

Low requirement for the upstream and downstream straight pipes; It has a special suitability for pulp measurement.

Remote version and compact version.

The analog output or frequency output is proportional to velocity of fluid.

Wide measuring range;

Magnetic field excitation with low frequency pulse; Low consumption; Stable zero point.

The magnetic field excitation is programmable rectangular wave with low frequency. It increases the stability of flow measurement and has low consumption.

It uses a 16-bit micro-processor, fast processing and high accuracy.

All digital processing, high disturbing resistance, reliable measurement, high accuracy, wide measuring range up to 1500:1

Switching power supply is suitable the wide changing range of voltage, good EMC.

Operating menu in Chinese and English is easy to operate.

Illuminate LCD display with high definition.

Dual direction measurement function; It can display forward direction flow rate and reverse direction flow rate. Three inside counters can respectively display forward direction volume, reverse direction volume and the different volume of both directions. It is possible to communicate via RS485.

Big range of constant coil current for sensor can fit different type sensor of electromagnetic flowmeter.

Multifunction intelligent transmitter has self-test and self-diagnosis function.

EEROM can save the setting and the counters when power off.



STANDARD SPECIFICATION

Application condition

Ambient temperature: -25 ~ +55

Relative humidity: 5% ~ 90%;

Ambient pressure: 86 ~ 106kPa.

Process condition

Conductivity of fluid: more than 5µs/cm

Pressure : 4.0MPa (DN15 ~ DN150)

1.0Mpa (DN200 ~ DN1000)

0.6Mpa (DN1200 ~ DN2000)

Operating temperature:

Remote version: -10<Top <80 (Soft rubber lining)

-10<Top <100 (FEP)

-30<Top <150 (PTFE lining)

Compact version: -10<Top <70

Power supply: 220V AC, 50/60Hz or DC 24V

SENSOR SPECIFICATION

Nominal diameter:

15 , 20 , 25 , (32) , 40 , 50 , (65) , 80 , 100 , (125) , 150 , 200 , 250 , 300 , 350 , 400 , (450) , 500 , 600 , 700 , 800 , 900 , 1000 , 1200 , 1400 , 1600 , 1800 , 2000

Note: The diameter with bracket has a lower priority.

Velocity range: 0m/s~10m/s

Accuracy: ±0.2%, ±0.3%, ±0.5% of the measured value for DN15~DN350;

±0.5% of the measured value
for DN400~DN2000;

Material of measuring tube:
Stainless steel SUS321 (1Cr18Ni9Ti)

Material of lining:
Soft rubber, PTFE, FEP

Material of electrode:
Stainless steel 316Ti (0Cr18Ni12Mo2Ti)

Hastelloy B, Hastelloy C, Titanium, Tantalum

Material of connecting flange:
Carbon steel / Stainless steel SUS304

Housing protection:
IP68 (only for Rpmag62F remote version)
IP65 (others)

Explosion proof: Exdm[ia]ia CT6

TRANSMITTER SPECIFICATION

It is a microprocessor-controlled transmitter. It displays measured values in Chinese, English and Italian. There are two versions with remote and compact.

Technical data:

Process condition

Ambient temperature: -25~+60
Relative humidity: 5%~90%
Power supply: 85~265VAC 47.5~52.5/57.5~62.5Hz
or DC 24V
Consumption: less than 20W

Accuracy: ±0.2%, ±0.3%, ±0.5%

Repeatability

0.07%, 0.1%, 0.17% of the measured value.

Current output

Current output: 4~20mA with electric isolation
Load resistance: 0~750Ω
Basic error:
Basic error of the measured value plus ±10μA

Frequency and pulse output

Frequency output:

For forward direction and reverse direction, the maximum frequency can be set between 1~5000Hz. The output is collector of transistor open with galvanic isolation. External power supply should be less than 30V, and maximum current for the collector is 250mA when it works.

Pulse output:

For forward and reverse direction. The pulse can be up to 15000 per second. The pulse width is up to 25ms. The output is collector of transistor open with galvanic isolation. External power supply should be less than 30V, and maximum current for the collector is 250mA when it works. Via an inside pull-up resistor, frequency and pulse output can use the inner 24V power supply

Display

Display with English, Simplified Chinese, traditional Chinese and Italian, five characters for flow rate and nine characters for volume.

Alarm

Two alarms are the collector of transistor open output with galvanic isolation. External power supply should be less than 30V, and maximum current for the collector is 250mA when it works.

Alarm output for the following faults: Empty pipe direction, analog exceeds its range, frequency exceeds its range the fault for magnetic field excitation, reverse flow rate, the fault of power supply, abnormal gain, limit, totalizer overflow.

Communication

Communication serial output with RS485. It has protection for lightning strike.

Mod-bus and HART communication are available as required.

Damp

2~100s (90%).

Isolation

The isolating voltage should be more than 500V between analog output, pulse (frequency output), alarm and ground.

Input control

It is available as follows via Input control:

- Reset the totalizers. (Reset respectively forward totalizer, reverse totalizer and net totalizer).
- Reset flow rate.
- Hold flow rate for stable processing control).

PRINCIPLE AND DESIGN

Operational principle

All electromagnetic flow meters accord with Faraday Law:

$$U_m = K \times B \times V \times D$$

U_m – Induced signal voltage measured from both electrodes.

K — Sensor corrected factor.

B – Magnetic flux density (Induction), its direction is right angle to flow direction.

V – Velocity of fluid.

D – Inner diameter of the measuring tube.

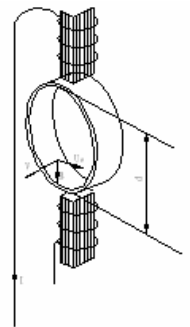


Figure 1

An induced signal voltage will be generated when the inductive liquid flows through a magnetic field. The magnetic field produced by the energized coils in sensor penetrates the magnetically and non-inductive measuring tube and the medium flowing through it. A voltage is generated in the medium, which is proportional to the velocity of the medium. The voltage can be picked up by the electrodes. See figure 1. There are two types of magnetic fields: constant pulse magnetic field and alternative pulse magnetic field.

Design

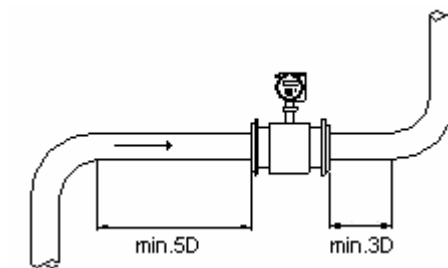
There are compact version and remote version for the electromagnetic flow meters according to their construction. See figure 2.



<Figure 2> Configuration of compact/remote version

STRAIGHT RUN

It is necessary to install a rectifier or straight pipe to normalize the flow profile if there are pipe elbow, flow regulation valve or half-open ball valve in front of the sensor. See figure 3.



<Figure 3> Requirement for straight pipes to install the flowmeter

Order data

There are many items for Series R Pmag62 electromagnetic flow meters. In order to easy order for customers and management for factory, we use numbers to show the main items for productions, see the following order data.

Order data for Series R Pmag62 intelligent electromagnetic flowmeters

Design	Size	ISO	ANSI	Nominal pressure	Lining material	Electrode material	Power supply	Accessory	Communication	Protecting degree	Hazardous
Y - Compact	0015	DN15	1/2								
F - Remote	0020	DN20	3/4								
	0025	DN25	1								
	0032	DN32	1-1/4	1 4.0MPa(DN15-DN150)							
	0040	DN40	1-1/2	2 1.0MPa(DN200-DN1000)							
	0050	DN50	2	3 0.6MPa(DN1200-DN2000)							
	0065	DN65	2-1/2	4 ANSI CLASS 150Lb							
	0080	DN80	3								
	0100	DN100	4		1 Soft rubber (DN50-DN2000)						
	0125	DN125	5		2						
	0150	DN150	6		3 PTFE(DN25-DN1000)						
	0200	DN200	8		4 FEP (F46) (DN15-DN20)						
	0250	DN250	10		5 Others (Specified)						
	0300	DN300	12								
	0350	DN350	14								
	0400	DN400	16								
	0450	DN450	18								
	0500	DN500	20								
	0600	DN600	24								
	0700	DN700									
	0800	DN800									
	0900	DN900									
	1000	DN1000									
	1200	DN1200									
	1400	DN1400									
	1600	DN1600									
	1800	DN1800									
	2000	DN2000									

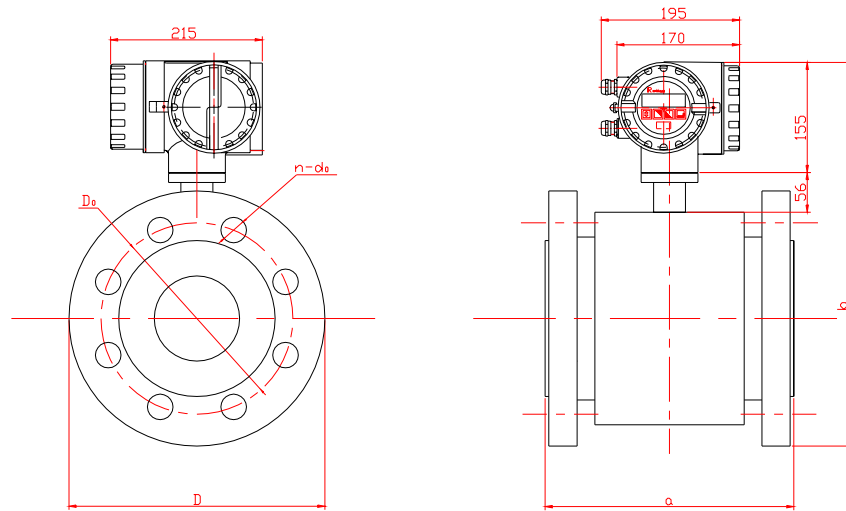
<Sample>

R Pmag62 Y-0300-2-3-1-1-0-1-1-T

(Compact/DN300/1.0MPa/PTFE/S.S/220VAC/No/Standard/IP65/General

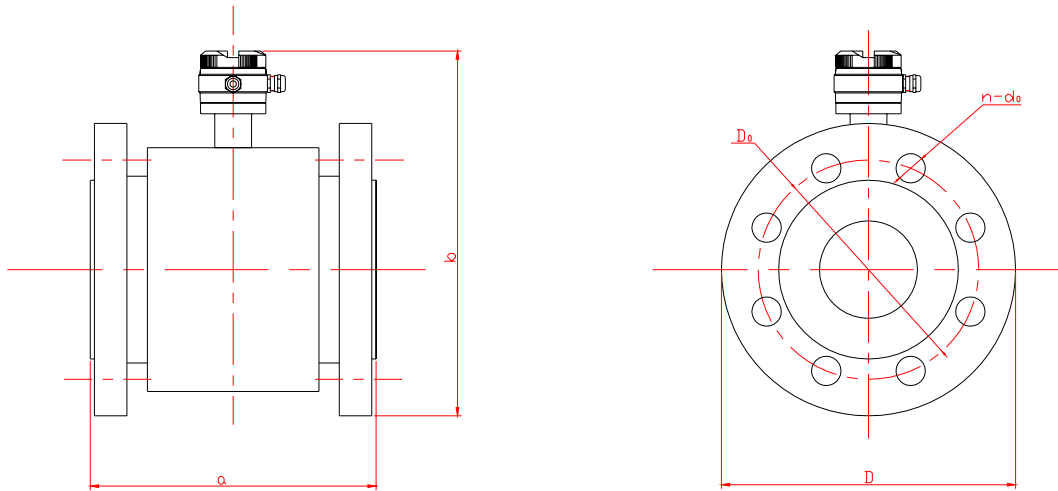
Dimension

Dimension for RPmag62Y electromagnetic flowmeter (compact version)



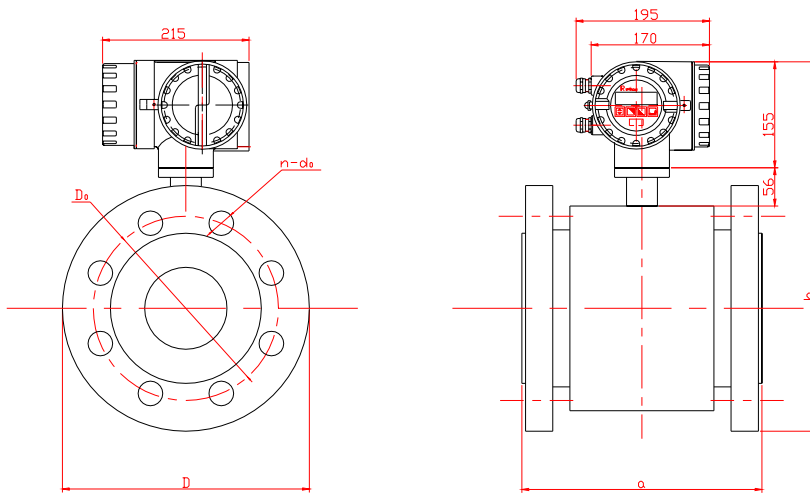
DN (mm)	Pressure (MPa)	Dimension for sensor		Dimension for connecting flange			Weight (kg)
		a	b	D	D ₀	n-d ₀	
15	4.0	200	344	95	65	4—14	9
20	4.0	200	344	105	75	4—14	9.5
25	4.0	200	344	115	85	4—14	10
32	4.0	200	350	140	100	4—18	12
40	4.0	200	360	150	110	4—18	12.5
50	4.0	200	375	165	125	4—18	14.5
65	4.0	200	390	185	145	8—18	16.5
80	4.0	200	405	200	160	8—18	17.5
100	4.0	250	435	235	190	8—22	24.5
125	4.0	250	465	270	220	8—26	31.5
150	4.0	300	495	300	250	8—26	38.5
200	1.0	350	540	340	295	8—22	47.5
250	1.0	450	610	395	350	12—22	64.5
300	1.0	500	655	445	400	12—22	75.5
350	1.0	550	695	505	460	16—22	87.5
400	1.0	600	755	565	515	16—26	124.5
450	1.0	600	815	615	565	20—26	158.5
500	1.0	600	860	670	620	20—26	189.5
600	1.0	600	965	780	725	20—30	371.5
700	1.0	700	1070	895	840	24—30	461.5
800	1.0	800	1180	1015	950	24—33	563.5
900	1.0	900	1300	1115	1050	28—33	624.5
1000	1.0	1000	1410	1230	1160	28—36	657.5
1200	0.6	1200	1575	1405	1340	32—33	758
1400	0.6	1400	1790	1630	1560	36—36	1115
1600	0.6	1600	1990	1830	1760	40—36	1496
1800	0.6	1800	2195	2045	1970	44—39	1946
2000	0.6	2000	2406	2265	2180	48—42	2354

Dimension for Rpmag62F sensor (remote version)



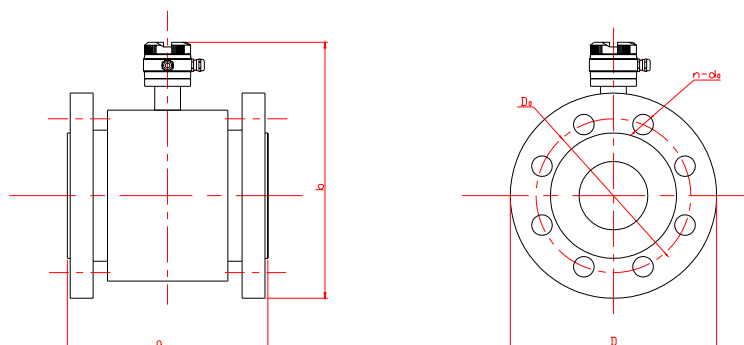
DN (mm)	Pressure (MPa)	Dimension for sensor		Dimension for connecting flange			Weight
		a	b	D	D ₀	n-d ₀	
15	4.0	200	255	95	65	4—14	4.5
20	4.0	200	255	105	75	4—14	5
25	4.0	200	255	115	85	4—14	5.5
32	4.0	200	264	140	100	4—18	7.5
40	4.0	200	270	150	110	4—18	8
50	4.0	200	287	165	125	4—18	10
65	4.0	200	302	185	145	8—18	12
80	4.0	200	318	200	160	8—18	13
100	4.0	250	350	235	190	8—22	20
125	4.0	250	380	270	220	8—26	27
150	4.0	300	405	300	250	8—26	34
200	1.0	350	450	340	295	8—22	43
250	1.0	450	520	395	350	12—22	60
300	1.0	500	565	445	400	12—22	71
350	1.0	550	605	505	460	16—22	83
400	1.0	600	665	565	515	16—26	120
450	1.0	600	730	615	565	20—26	154
500	1.0	600	775	670	620	20—26	185
600	1.0	600	875	780	725	20—30	367
700	1.0	700	980	895	840	24—30	457
800	1.0	800	1090	1015	950	24—33	559
900	1.0	900	1210	1115	1050	28—33	620
1000	1.0	1000	1320	1230	1160	28—36	653
1200	0.6	1200	1490	1405	1340	32—33	753
1400	0.6	1400	1700	1630	1560	36—36	1112
1600	0.6	1600	1900	1830	1760	40—36	1493
1800	0.6	1800	2105	2045	1970	44—39	1943
2000	0.6	2000	2315	2265	2180	48—42	2351

Dimension only for ANSI B16.5 class150 RPmag62Y electromagnetic flowmeter (compact version)



DN		Pressure	Dimension for sensor		Dimension for connecting flange		
mm	in		a	b	D	D ₀	n-d ₀
15	1/2	Class150	200	344	90	60.5	4—16
20	3/4	Class150	200	344	100	70	4—16
25	1	Class150	200	344	110	79.5	4—16
32	1-1/4	Class150	200	352	120	89	4—16
40	1-1/2	Class150	200	358	130	98.5	4—16
50	2	Class150	200	374	150	120.5	4—18
65	2-1/2	Class150	200	388.5	180	139.5	4—18
80	3	Class150	200	402	190	152.5	4—18
100	4	Class150	250	434	230	190.5	8—18
125	5	Class150	250	460	255	216	8—22
150	6	Class150	300	486	280	241.5	8—22
200	8	Class150	350	540.5	345	298.5	8—22
250	10	Class150	450	610.5	405	362	12—26
300	12	Class150	500	673	485	432	12—26
350	14	Class150	550	708	535	476	12—29.5
400	16	Class150	600	768	600	540	16—29.5
450	18	Class150	600	821.5	635	578	16—32.5
500	20	Class150	600	873	700	635	20—32.5
600	24	Class150	600	975.5	815	749.5	20—35.5

Dimension only for ANSI B16.5 class150 Rpmag62F sensor (remote version)

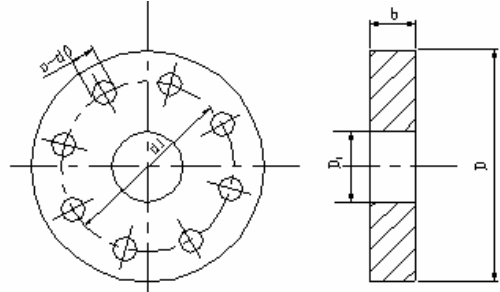


DN		Pressure	Dimension for sensor (mm)		Dimension for connecting flange (mm)		
mm	in		a	b	D	D ₀	n-d ₀
15	1/2	Class150	200	255	90	60.5	4—16
20	3/4	Class150	200	255	100	70	4—16
25	1	Class150	200	255	110	79.5	4—16
32	1-1/4	Class150	200	263	120	89	4—16
40	1-1/2	Class150	200	269	130	98.5	4—16
50	2	Class150	200	285	150	120.5	4—18
65	2-1/2	Class150	200	299.5	180	139.5	4—18
80	3	Class150	200	313	190	152.5	4—18
100	4	Class150	250	345	230	190.5	8—18
125	5	Class150	250	371	255	216	8—22
150	6	Class150	300	397	280	241.5	8—22
200	8	Class150	350	451.5	345	298.5	8—22
250	10	Class150	450	521.5	405	362	12—26
300	12	Class150	500	584	485	432	12—26
350	14	Class150	550	619	535	476	12—29.5
400	16	Class150	600	679	600	540	16—29.5
450	18	Class150	600	732.5	635	578	16—32.5
500	20	Class150	600	784	700	635	20—32.5
600	24	Class150	600	886.5	815	749.5	20—35.5

Selection of flange

Normally you select the flanges with the metric system. The connecting flanges to sensor are produced according to the metric system. When you select the connecting flanges to sensor, you should note the specification of your operating pipe in the order contract. The dimension of the connecting flanges should accord to the following standards.

Flange Size	Pressure	Specification
DN15~DN150	4.0 MPa	GB9119-2000
DN200~DN1000	1.0 MPa	GB9115.1-2000
DN1200~DN2000	0.6 MPa	GB9119-2000



<Figure 4> Connecting flange

<Table 1> Specification GB9119-2000

DN(mm)	4.0MPa						
	D	d ₁	d ₀	Th	n	b	D ₁
15	95	65	14	M12	4	14	28.5 ₀ ⁺¹
20	105	75	14	M12	4	16	32.5 ₀ ⁺¹
25	115	85	14	M12	4	16	34.5 ₀ ⁺¹
32	140	100	18	M16	4	18	42.5 ₀ ⁺¹
40	150	110	18	M16	4	18	49.5 ₀ ⁺¹
50	165	125	18	M16	4	20	61.5 ₀ ⁺¹
65	185	145	18	M16	8	22	77.5 ₀ ⁺¹
80	200	160	18	M16	8	24	90.5 ₀ ⁺¹
100	235	190	22	M20	8	26	116.5 ₀ ⁺¹
125	270	220	26	M24	8	28	141.5 ₀ ⁺¹
150	300	250	26	M24	8	30	170.5 ₀ ⁺²

<Table 2> Specification GB9115.1-2000

DN (mm)	1.0MPa				
	D	d ₁	d ₀	n	D ₁
200	340	295	22	8	221.5 ₀ ⁺²
250	395	350	22	12	276.5 ₀ ⁺²
300	445	400	22	12	327.5 ₀ ⁺²
350	505	460	22	16	359.5 ₀ ⁺²
400	565	515	26	16	411 ₀ ⁺²
450	615	565	26	20	462 ₀ ⁺³
500	670	620	26	20	513.5 ₀ ⁺³
600	780	725	30	20	616.5 ₀ ⁺³
700	895	840	30	24	
800	1015	950	33	24	
900	1115	1050	33	28	
1000	1230	1160	36	28	

<Table 3> Specification GB9119-2000

DN (mm)	0.6MPa				
	D	d ₁	d ₀	n	D ₁
1200	1405	1340	33	32	
1400	1630	1560	36	36	
1600	1830	1760	36	40	
1800	2045	1970	39	44	
2000	2265	2180	42	48	

Note: The dimension in the cells with will be defined according to the operating pipe.

ELECTRIC CONNECTION

There are two versions for the combination of sensor and transmitter: Compact version and Remote version

<Electric connection for remote version between sensor and transmitter>

The content in this section is only suitable for the electromagnetic flowmeter with remote version. The sensors have the same terminal names as the transmitter. The lines must be connected 1:1. See figure 5(a) for non-ex sensors and figure 5(b) for ex sensors.

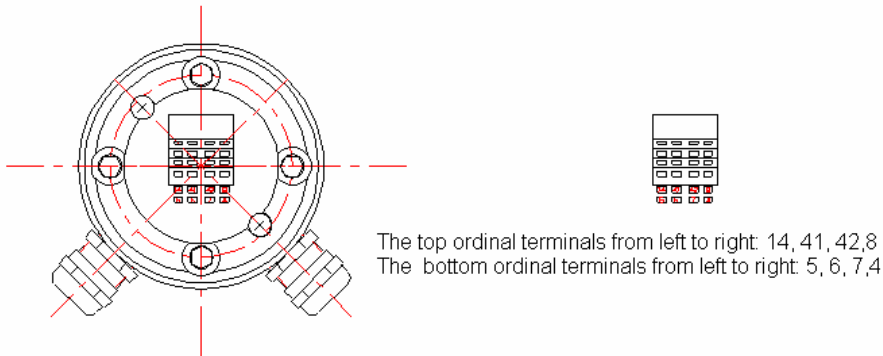


Figure 5(a). Terminals for non-ex sensors and transmitters for remote version

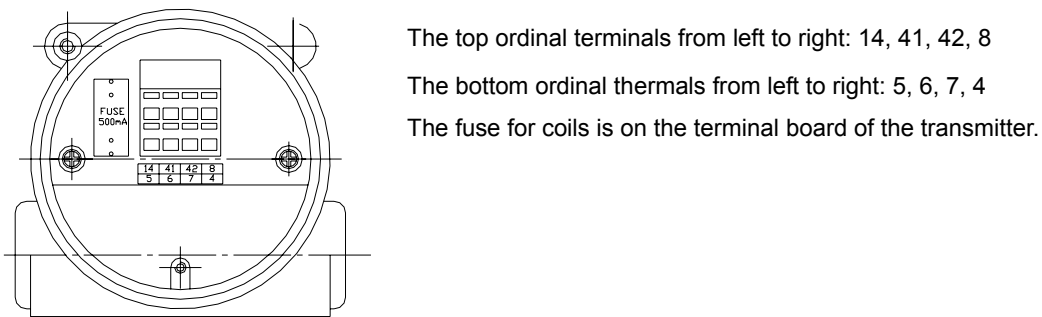


Figure 5(b) Terminals for ex sensors and transmitters for remote version

	Terminal	Designation	Cable color for sensors with IP68 degree of protection	
Top terminals	14	Without		Magnetic field current cable
	41	Magnetic field current 1	Brown	
	42	Magnetic field current 2	Black	
	8	Measuring ground	Yellow-Green	
Bottom terminals	5	Shield for Electrode 1		Electrode cable
	6	Electrode 1	Brawn	
	7	Electrode 2	White	
	4	Shield for Electrode 2		

Figure 6 for electric connection for remove version between sensor and transmitter.

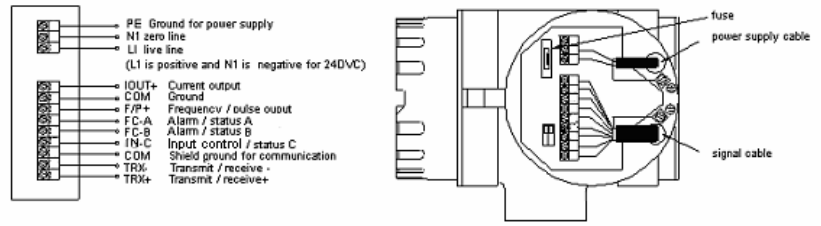
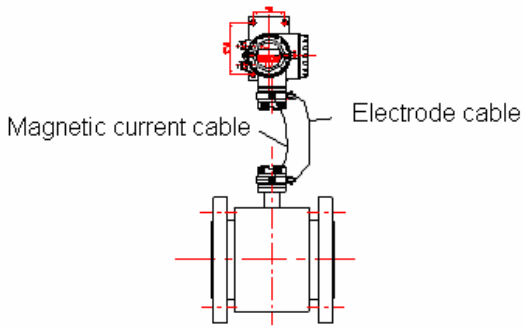
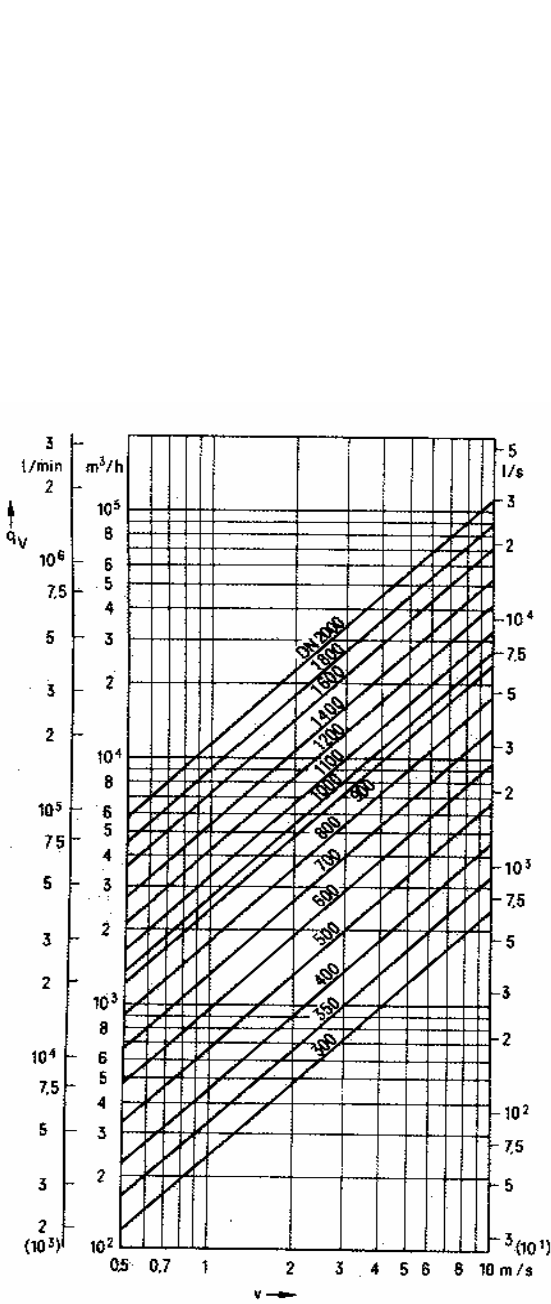
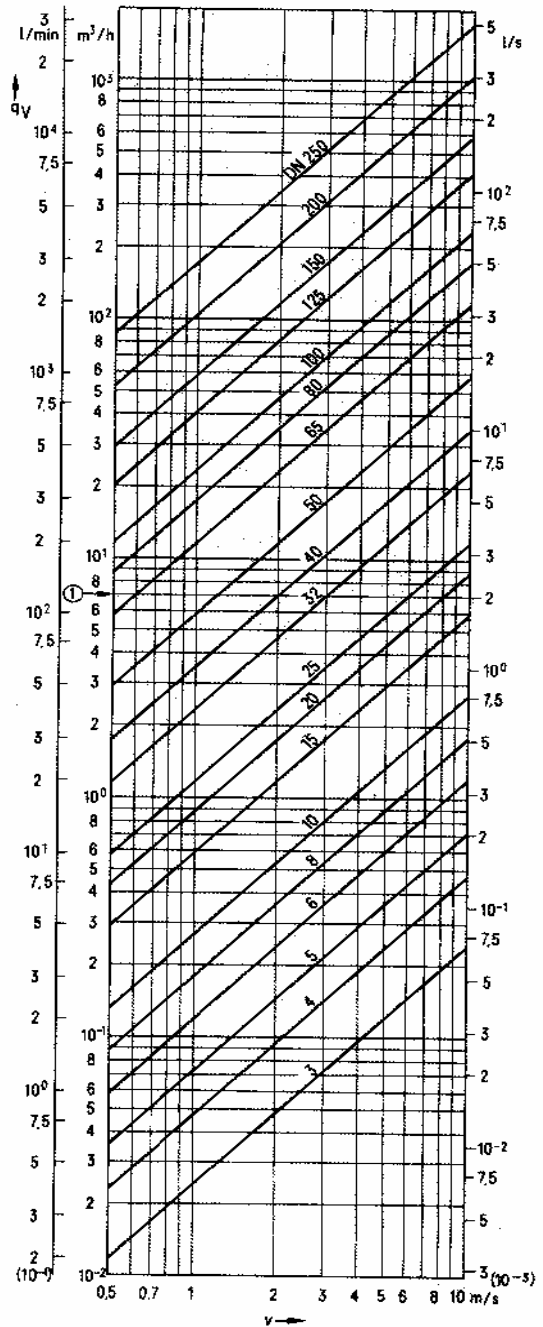


Figure 7 Connection of output and signal for compact version



Flow rate nomogram for DN300~DN2000



Flow rate nomogram for DN3~DN250

ORDERING INFORMATION

Specify the following for order/inquiry.

CUSTOMER	
CONTACT	

Model code selection

Refer to Order Data (Page 4)

Process condition

Fluid Condition

Conductivity:			microS/cm
Measuring range:	(Min)	(Max)	(m3/h, Nm3/h, kg/hr, _____)
Flow speed:	(Min)	(Max)	m/s
Temperature:	(Min)	(Max)	deg C
Pressure:	(Min)	(Max)	(MPa gauge, MPa abs., _____)
Required Accuracy:			(of reading, of F.S.)

Instrument specification

Configuration:	compact /	remote	
Connection flange:			(ANSI, DIN, JIS, _____)
Power supply:	AC220V /	DC24V	
Output signal:	4-20mA /		4-20mA, _____)
Serial communication:			(None/RS485/HART/MOD-BUS/Profibus-DP)
Protection:			(IP65/IP68-Remote only)
Explosion proof:	none /	Ex proof	

Other instructions, if any.

*Specification subject to change without notice.



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