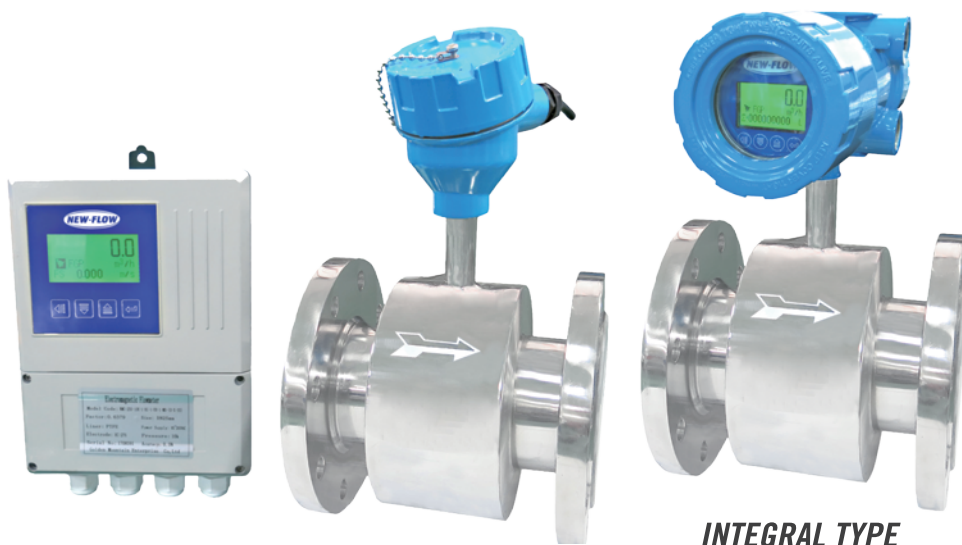


ELECTROMAGNETIC FLOWMETER

NMG SERIES

None Pressure Loss & Shorter Straight Pipe
Low Power Consumption / Zero Point Stable & High Accuracy



REMOTE TYPE

INTEGRAL TYPE

Approvals:



The NMG-Series electromagnetic flowmeter is used to measure the volume flow of conductive liquids and slurries in closed pipes. The measuring flow rate is not affected by density, viscosity, temperature and pressure of fluids.

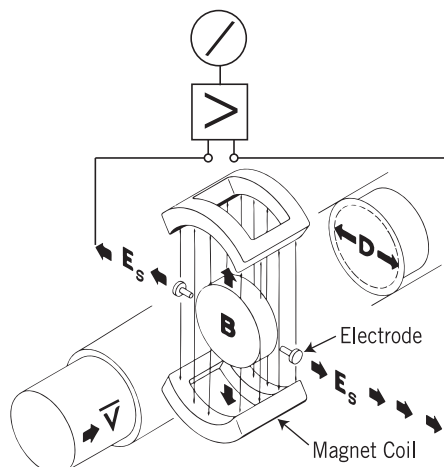
Technical Data

- Meter Size :** 15mm~2400mm
- Flange Rating :** PN10, PN16, ANSI 150#, JIS 10K, and others on request
- Case Housing Material :** Aluminum alloy with painting
- Housing Protection Class :** Weather proof & Explosion proof type available
- Electrical Connection :** Female 1/2"NPT, 3/4"NPT, M20 x P1.5 and M25 x P1.5 available
- Pressure Limited :** 1.6 Mpa (for meter size 15~300mm)
1.0 Mpa (for meter size 350~1000mm)
0.6 Mpa (for meter size 1200~2400mm)
- Ambient Temperature Limited :** -20°C~+70°C
- Relative Humidity :** 5%~90%
- Operation Medium Temperature of Lining :**

PTFE Lining	-20°C ~+120°C
PFA Lining	-20°C ~+120°C
CR Lining	-20°C ~+80°C

- Electrodes & Grounding Electrodes Material :** SS316L, Hastelloy-B, Hastelloy-C, Titanium(Ti), Tantalum(Ta), and Platinum/Iridium(Pt/Ir) available
- Sensor Case Material :** Carbon Steel, SS304 or SS316 available
- Measuring Tube Material :** SS304
- Connection Flange Material :** SS316, SS304, Carbon Steel available
- Cable Length Limited :** 10M standard; Max. 30M option available

Principle of Operation



➤ Magnetic flowmeters operate on the principle of Michael Faraday's Law of Electromagnetic Induction.

$$E = B \times D \times \bar{V}$$

- B** = Magnetic Field Density
- D** = Pipe I.D
- E** = Magnitude of the Voltage
- \bar{V}** = Average Velocity of the Medium

Basic Functions

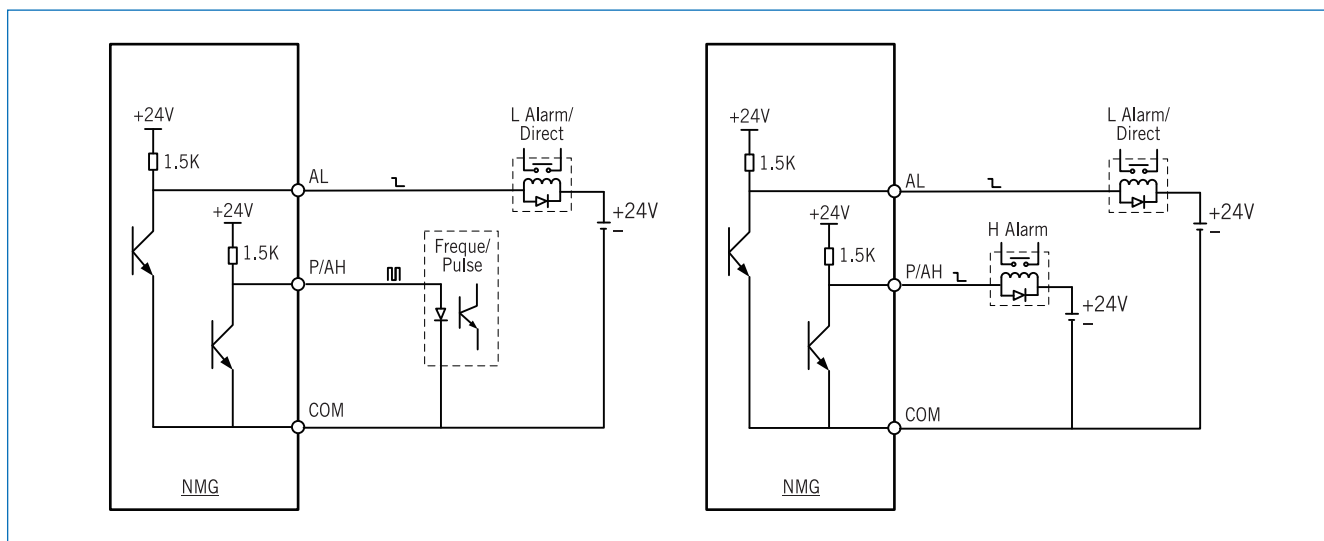
- **Low-Frequency Square-Wave Exciting:** 1/10, 1/16 and 1/25 power frequency (50/60Hz)
- **Exciting Current:** 125mA
- **For Empty Pipeline Measurement:** No need to add additional electrode
- **Current Speed Range:** 0.3~10 m/s
- **Current Speed Resolution:** 1 mm/s
- **Fluid Conductivity:** >20 μ S/cm; pure water or liquid mixed with pure water is not suitable for use.
- **Power Supply:** 85~265VAC, 50/60Hz, or DC24V (\pm 10%) available
- **Communication Function:** MODBUS RTU Protocol (RS-485) or HART communication option available
- **Displaying Mode Language:** English
- **Analog Output:** 0~10 mA or 4~20 mA; and Equivalent Pulse Output can be set
- **Three Integrator Gross Inside:** Respective Register: Forward integrated flow / Reverse integrated flow / Difference integrated flow
- **Alarm Functions:** Support Excitation, Pipes Empty, Upper and Lower Alarm
- **Small Flow Linear Correction Functions:** Four-Points linear correction
- **Data Back Up and Restore:** Manufacturer's original information back up and restore
- **Data Export and Import:** Use of external EEPROM to import and export the instrument parameters (except converter) and accumulation
- **Converter Functions:**
 - 16-bit high performance microprocessor
 - 2 x 16 LCD Display
 - Setting parameter convenient
 - Programming reliable
 - Surface mounting technology (SMT)
 - Self-Test & Self-Diagnostic

Output Performance

- **Analog Current Output :** Load Resistor: 0~1200 Ω for 0~10mA
0~600 Ω for 4~20mA
Accuracy: 0.1% \pm 10 μ A
- **Frequency Output :** Frequency Output Range: 1~5000 Hz
Output electric isolate: Photoelectric isolate. Isolate Voltage: >1000VDC
Frequency Output: Internal pull up resistor of 1500 Ω , the drive current 16mA.
The highest voltage is 24VDC for external power supply, and the maximum load current is 100mA.
- **Pulse Output :** The Equivalent Pulse: 0.001~1.000 m³/cp
0.001~1.000 Ltr/cp
Pulse output width: Square wave output, and the maximum high level is 50ms.
Pulse output isolate: Photoelectric isolate. Isolate Voltage: >1000VDC
Pulse output: Internal pull up resistor of 1500 Ω , the drive current 16mA.
The highest voltage is 24VDC for external power supply, and the maximum load current is 100mA.

NOTICE.

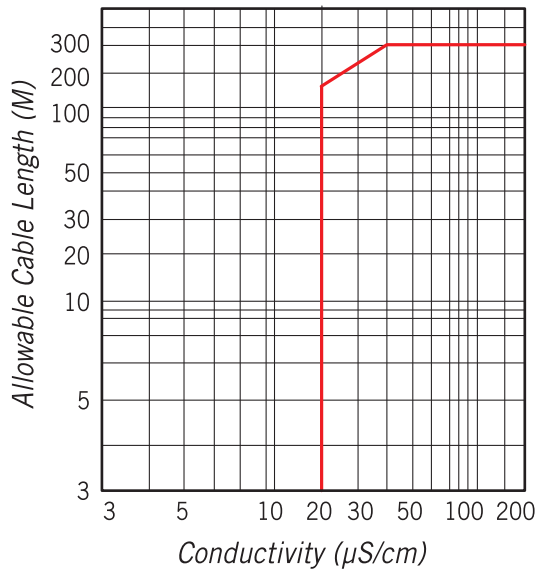
1. The frequency output, pulse output and upper limit alarm output share be same wiring terminal of P/AH.
2. Frequency/pulse digital output has 2 connected points: output connected point (P/AH), ground point (COM).
3. The lower limit alarm output and flow direction output share the same wiring terminal of AL.



Digital Communication Port & Protocol

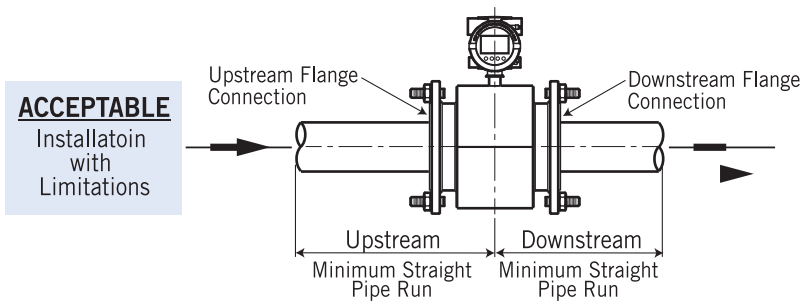
- **MODBUS Protocol** : Physical interface RS-485, electric isolate, format of RTU. Please use Modbus-Config-Tool software to set parameters, or read real-time flow, totalized flow value, etc.
- **HART Protocol** : The standard HART of communication protocol, please use the HART-Config-Tool software, or HART handheld, to set parameters, or read real-time flow, totalized flow value, etc.

Electrical Conductivity & Cable Length



- When the cable length exceeds 30M, cables may not be supplied. Check whether the cable is supplied with the specs.

Recommended Piping Diagram



ACCEPTABLE
Installatoin
with
Limitations

**HORIZONTAL
FLOW TO
LEFT OR RIGHT**

- 1. Meter pipe must be full. If meter is in gravity fed vertical pipe run, flow should be upward.
- 2. Meter must be oriented in accordance with flow direction.
- 3. When required, flow control valve must be located downstream of magnetic flowmeter.
- 4. Straight run upstream of a well-designed magmeter measured from center of meter (electrode) for standard accuracy (1% rate):

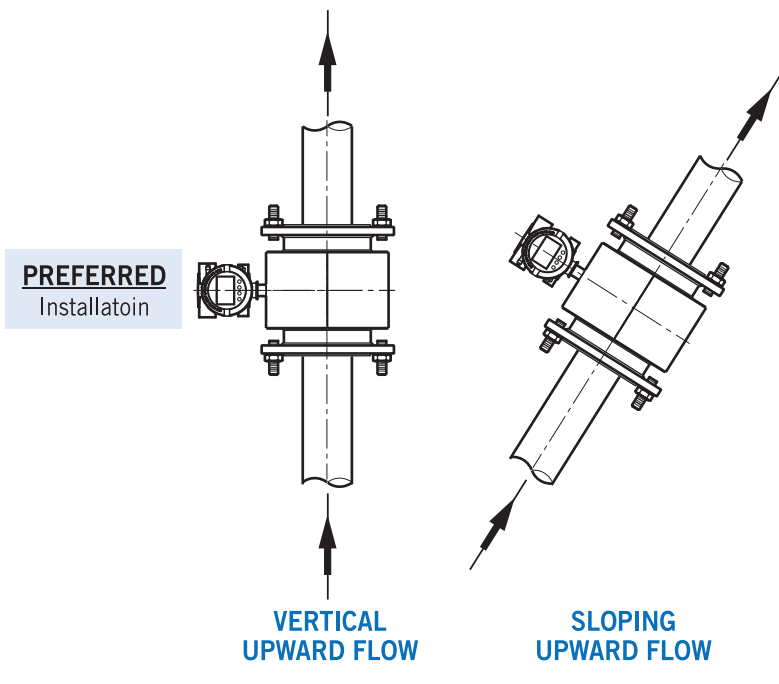
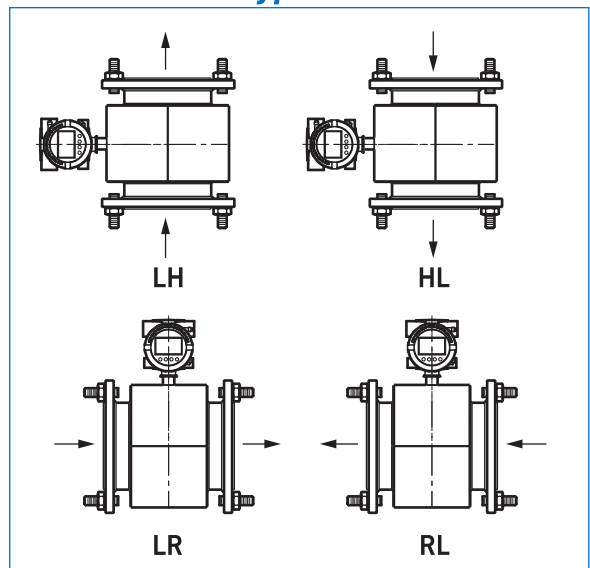
Elbow, 3D

Pump, 10D

Control Valve, 10D* (Should be located downstream of the magmeter.)

For higher accuracy requirements, use twice the distances shown.

Flow Direction Type

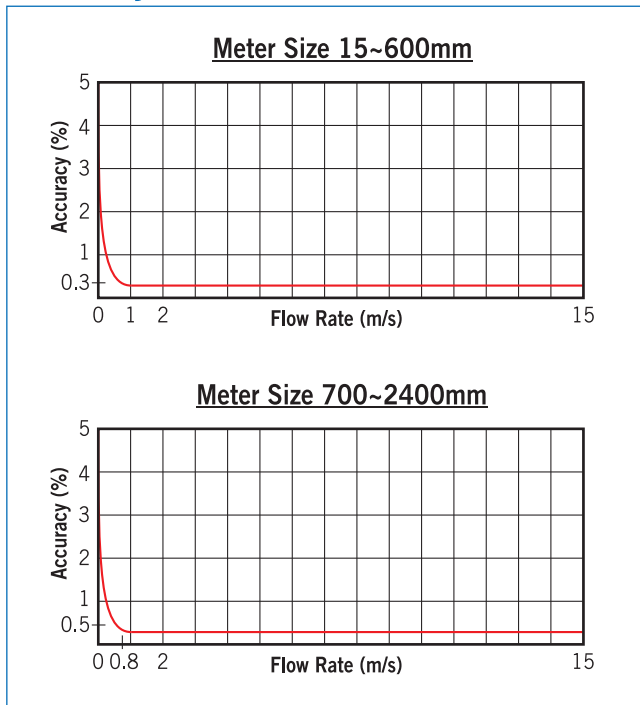


PREFERRED
Installatoin

**VERTICAL
UPWARD FLOW**

**SLOPING
UPWARD FLOW**

Accuracy Curve



Accuracy

METER SIZE (mm)	MEASURING RANGE IN TERMS OF FLOW VELOCITY	ACCURACY
15~600	0.3~10 m/s	±0.3% R
700~2400	0.3~1 m/s	±1.0% R
	1~10 m/s	±0.5% R

NOTE.: %R: Reading Rate

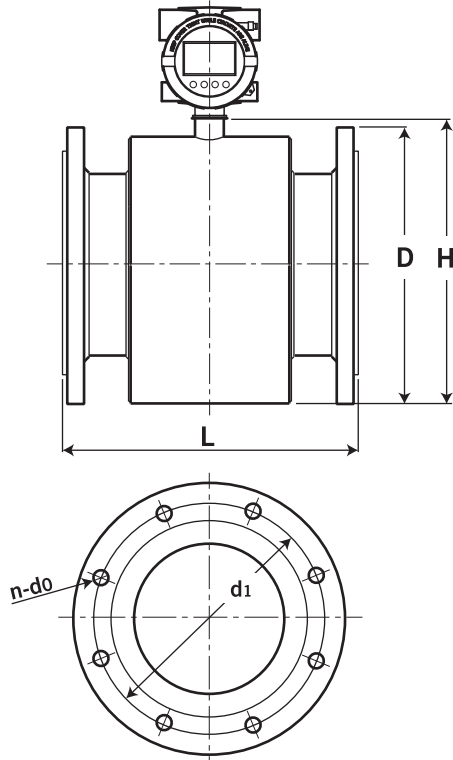
Standard Flow & Flow Rate Corresponding Table

Meter Size	Flow Rate	0.1 m/s	1 m/s	10 m/s	15 m/s
15 mm	0.06362 m ³ /h	0.06362 m ³ /h	0.63617 m ³ /h	6.36171 m ³ /h	9.54257 m ³ /h
20 mm	0.11310 m ³ /h	0.11310 m ³ /h	1.13097 m ³ /h	11.3097 m ³ /h	16.9645 m ³ /h
25 mm	0.17671 m ³ /h	0.17671 m ³ /h	1.76714 m ³ /h	17.6714 m ³ /h	26.5071 m ³ /h
32 mm	0.28953 m ³ /h	0.28953 m ³ /h	2.89528 m ³ /h	28.9528 m ³ /h	43.4293 m ³ /h
40 mm	0.45239 m ³ /h	0.45239 m ³ /h	4.52388 m ³ /h	45.2388 m ³ /h	67.8583 m ³ /h
50 mm	0.70686 m ³ /h	0.70686 m ³ /h	7.06857 m ³ /h	70.6857 m ³ /h	106.028 m ³ /h
65 mm	1.19459 m ³ /h	1.19459 m ³ /h	11.9458 m ³ /h	119.458 m ³ /h	179.188 m ³ /h
80 mm	1.80956 m ³ /h	1.80956 m ³ /h	18.0955 m ³ /h	180.955 m ³ /h	271.433 m ³ /h
100 mm	2.82743 m ³ /h	2.82743 m ³ /h	28.2743 m ³ /h	282.743 m ³ /h	424.114 m ³ /h
125 mm	4.41786 m ³ /h	4.41786 m ³ /h	44.1786 m ³ /h	441.786 m ³ /h	662.679 m ³ /h
150 mm	6.36172 m ³ /h	6.36172 m ³ /h	63.6171 m ³ /h	636.171 m ³ /h	954.257 m ³ /h
200 mm	11.3097 m ³ /h	11.3097 m ³ /h	113.097 m ³ /h	1130.97 m ³ /h	1696.45 m ³ /h
250 mm	17.6714 m ³ /h	17.6714 m ³ /h	176.714 m ³ /h	1767.14 m ³ /h	2650.71 m ³ /h
300 mm	25.4468 m ³ /h	25.4468 m ³ /h	254.468 m ³ /h	2544.68 m ³ /h	3817.03 m ³ /h
600 mm	101.787 m ³ /h	101.787 m ³ /h	1017.87 m ³ /h	10178.7 m ³ /h	15268.1 m ³ /h
1000 mm	282.743 m ³ /h	282.743 m ³ /h	2827.43 m ³ /h	28274.3 m ³ /h	42411.5 m ³ /h
1200 mm	407.150 m ³ /h	407.150 m ³ /h	4071.50 m ³ /h	40715.0 m ³ /h	61072.6 m ³ /h
1400 mm	554.177 m ³ /h	554.177 m ³ /h	5541.77 m ³ /h	55417.7 m ³ /h	83126.5 m ³ /h
1600 mm	723.823 m ³ /h	723.823 m ³ /h	7238.23 m ³ /h	72382.3 m ³ /h	108573.4 m ³ /h
1800 mm	916.088 m ³ /h	916.088 m ³ /h	9160.88 m ³ /h	91608.8 m ³ /h	137413.3 m ³ /h
2000 mm	1130.97 m ³ /h	1130.97 m ³ /h	11309.7 m ³ /h	113097 m ³ /h	169645 m ³ /h
2200 mm	1368.48 m ³ /h	1368.48 m ³ /h	13684.8 m ³ /h	136848 m ³ /h	205217.7 m ³ /h
2400 mm	1628.60 m ³ /h	1628.60 m ³ /h	16286.0 m ³ /h	162860 m ³ /h	244290.2 m ³ /h

Dimensions

INTEGREL TYPE (Model: NMG-EH)

*Meter size 15~600mm are "Integral" or "Remote Type" available.



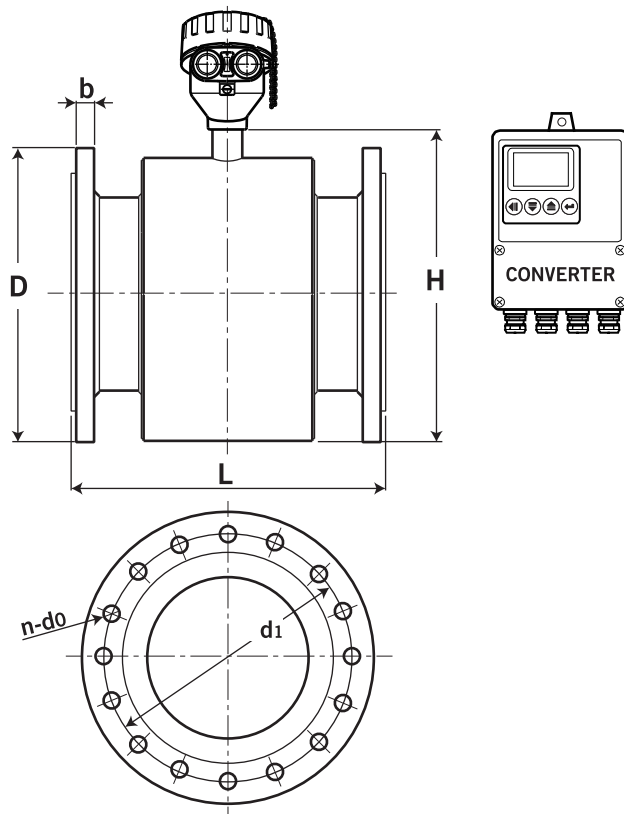
Please Note: D, n-d₀ & d₁ dimension are according to the flange rating and size.

For Meter Size 15~600mm:

Meter Size	L	H	Approx. Weight
15	200	147	10 Kg
20	200	154	12 Kg
25	200	156	14 Kg
32	200	166	15 Kg
40	200	172	16 Kg
50	200	191	17 Kg
65	250	200	25 Kg
80	250	218	29 Kg
100	250	242	31 Kg
125	250	277	36 Kg
150	300	302	41 Kg
200	350	362	45 Kg
250	450	412	50 Kg
300	500	472	60 Kg
350	500	522	145 Kg
400	500	572	180 Kg
450	550	626	215 Kg
500	550	676	245 Kg
600	600	776	335 Kg

REMOTE TYPE (Model: NMG-ERS/ERC)

*Meter size 700~1000mm are only "Remote Type".



Please Note: D, n-d₀ & d₁ dimension are according to the flange rating and size.

For Meter Size 700~2400mm:

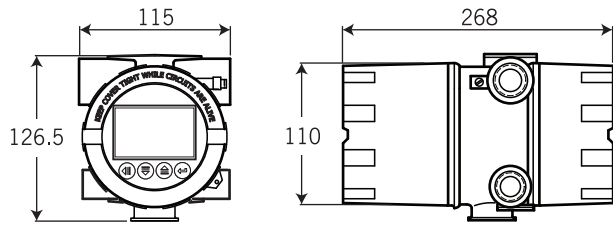
Meter Size	L	H	Approx. Weight
700	700	866	435 Kg
800	800	966	545 Kg
900	900	1076	655 Kg
1000	1000	1200	810 Kg
1200	1200	1406	875 Kg
1400	1400	1632	1235 Kg
1600	1600	1832	1555 Kg
1800	1800	2036	2085 Kg
2000	2000	2236	2610 Kg
2200	2200	2436	3210 Kg
2400	2400	2636	3910 Kg

Head & Converter Type

「Integral Type (NMG-EH)」

IP68

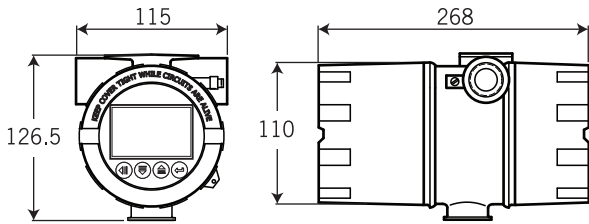
Housing Model: (A1) Weather proof, IP68
Head Material: Aluminum alloy
Conduit Size: Female 1/2" NPT, 3/4" NPT, M20 x P1.5, M25 x P1.5



Explosion Proof

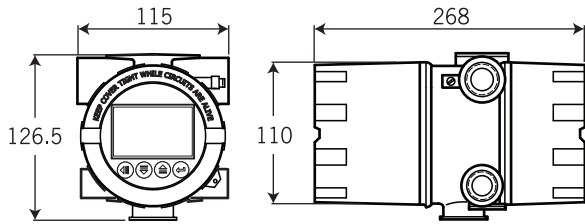
Housing Model: (C1) Ex. Certificate on Housing only
Head Material: Aluminum alloy
Conduit Size: 1/2" or 3/4" NPT(F) available

Ex d IIC Gb
 Ex tb IIIC Db



Explosion Proof

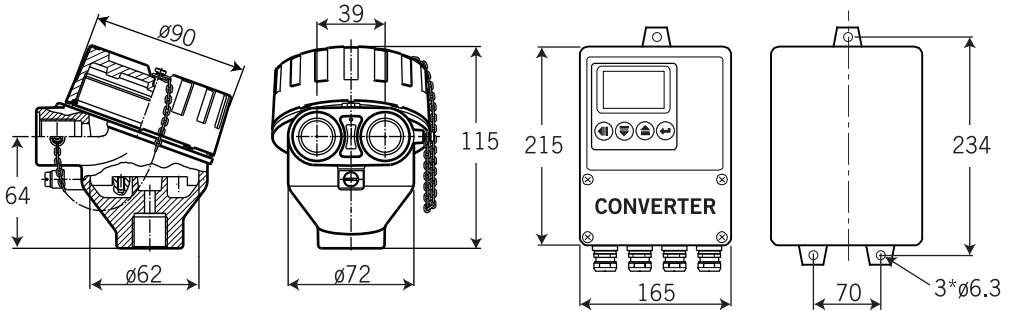
Housing Model: (C3) Europe Union ATEX Certification
 (C4) Taiwan Explosion Proof Certification
Head Material: Aluminum alloy
Conduit Size: Female 1/2" NPT, 3/4" NPT, M20 x P1.5, M25 x P1.5



「Remote Type (NMG-ERS/ERC)」

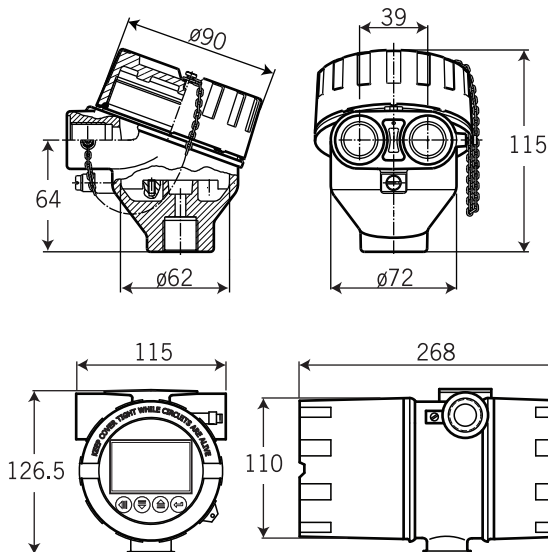
IP68

Housing Model: (A2) Weather proof, IP68
Converter Protection Class: Weather proof, IP65
Head Material: Aluminum alloy
Conduit Size: 1/2", 3/4" NPT(F) available



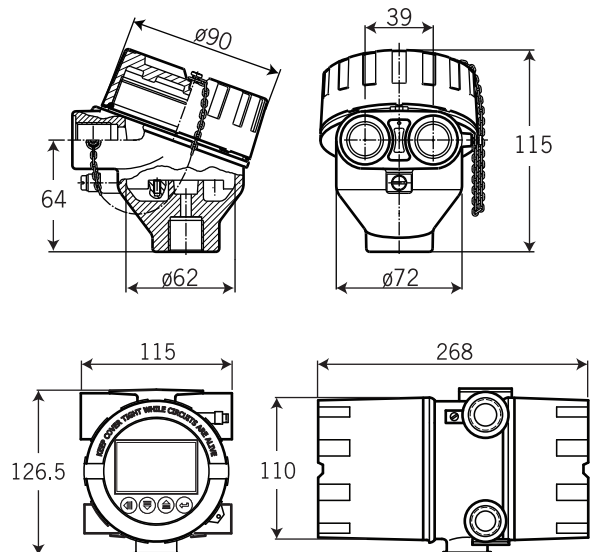
Explosion Proof

Housing Model: (C2) Ex. Certificate on Housing only
Head Material: Aluminum alloy
Converter Material: Aluminum alloy
Conduit Size: 1/2" or 3/4" NPT(F) available




Explosion Proof

Housing Model: (C5) Europe Union ATEX Certification
Head Material: Aluminum alloy
Converter Material: Aluminum alloy
Conduit Size: Female 1/2" NPT, 3/4" NPT, M20 x P1.5, M25 x P1.5



Ordering Information

NMG	Code	Type	Code	Electrodes & Grounding Electrodes Material
	EH	Integral Type		(SL) SS316L (HB) Hastelloy-B (HC) Hastelloy-C
	ERS	Remote Type / 10M (cable 10M, standard)		(Ti) Titanium (Ta) Tantalum (Pt) Platinum/Iridium (Pt/Ir)
	ERC	Remote Type / ____M (Please fill out the required cable length, and the maximum length is 30M.)		
			Code	Communication Protocol Type
			MB	4~20mA / RS485
			MC	4~20mA / HART
			Code	Power Supply
			1	85~265 VAC, 50/60Hz
			2	DC24V (±10%)
			Code	Housing Model / Protection Class
			Integral Type	(A1) / Weather Proof, IP68
				(C1) / <i>Ex. Certificate on Housing Only</i> Ex d IIC Gb ; Ex tb IIIC Db
				(C3) / <i>Europe Union ATEX Certification</i> II 2 G D Ex db IIB + H2 T6 Gb Ex tb IIIC T85°C Db
				(C4) / <i>Taiwan Explosion Proof Certification</i> Ex d IIB + H2 T6 Gb
			Remote Type	(A2) / Weather Proof, IP68+IP65
				(C2) / <i>Ex. Certificate on Housing Only</i> 1026  II 2 GD EEx d IIC + Ex d IIC Gb; Ex tb IIIC Db
				(C5) / <i>Europe Union ATEX Certification</i> II 2 G D Ex db IIB + H2 T6 Gb Ex tb IIIC T85°C Db
			Code	Conduit Size
			E	½"NPT(F)
			F	¾"NPT(F)
			G	M20 x P1.5(F)
			H	M25 x P1.5(F)
			O	Option
			Code	Flow Direction
			0	LH
			5	HL
			10	RL
			20	LR

Code	Meter Size
150	15mm
200	20mm
250	25mm
320	32mm
400	40mm
500	50mm
650	65mm
800	80mm
101	100mm
125	125mm
151	150mm
201	200mm
251	250mm
301	300mm
351	350mm
401	400mm
451	450mm
501	500mm
601	600mm
701	700mm
801	800mm
901	900mm
102	1000mm
122	1200mm
142	1400mm
162	1600mm
182	1800mm
202	2000mm
222	2200mm
242	2400mm

*Meter size 15~600mm: Integral or Remote type available.
*Meter size 700~2400mm: Remote type only.

Code	Flange Rating
6	PN6
15	ANSI 150#
5K	JIS 5K
10	PN10
30	ANSI 300#
10K	JIS 10K
16	PN16
60	ANSI 600#
16K	JIS 16K
20	PN20
90	ANSI 900#
20K	JIS 20K
25	PN25
150	ANSI 1500#
30K	JIS 30K
40	PN40
250	ANSI 2500#
40K	JIS 40K
0	Other: _____

Code	Connection Flange Material
SS	SS316
S4	SS304
CB	Carbon Steel

Code	Sensor Case Material
SS	SS316
S4	SS304
CB	Carbon Steel

Code	Lining Material
1	PTFE/F4(*)
2	PFA
3	CR

*Meter size ≤ 50mm, only can use PTFE/F4 lining.