

ELECTROMAGNETIC FLOWMETER

NMG SERIES

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

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

Type / Protection Class :

TYPE	PROTECTION CLASS	
	Case Housing	Converter Display
Integral Type (EH Type)	Weather Proof Type: IP68	
	Explosion Proof Type: (Certificate on Housing Only) Ex d IIC Gb; Ex tb IIIC Db	
Remote Type (ERS/ERC Type)	Weather Proof Type: IP68	Weather Proof Type: IP65
	Explosion Proof Type: (Certificate on Housing Only) 1026 Ex II 2 GD EEx d IIC	Explosion Proof Type: (Certificate on Housing Only) Ex d IIC Gb; Ex tb IIIC Db

Meter Size : 15mm~1000mm

Flange Rating : PN10, PN16, ANSI 150#, JIS 10K, and others on request

Case Housing Material : Aluminum alloy with painting

Electrical Connection : ½" or ¾" NPT female, and others option available

Pressure Limited : 1.6 Mpa (for meter size 15~300mm);
 1.0 Mpa (for meter size 350~1000mm)

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

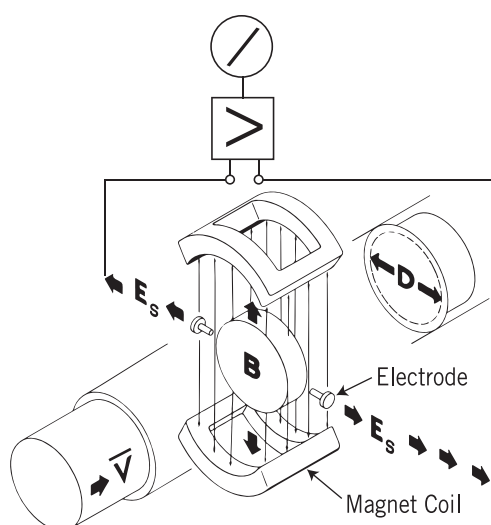
Sensor Case Material : Carbon Steel, SS304 available

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

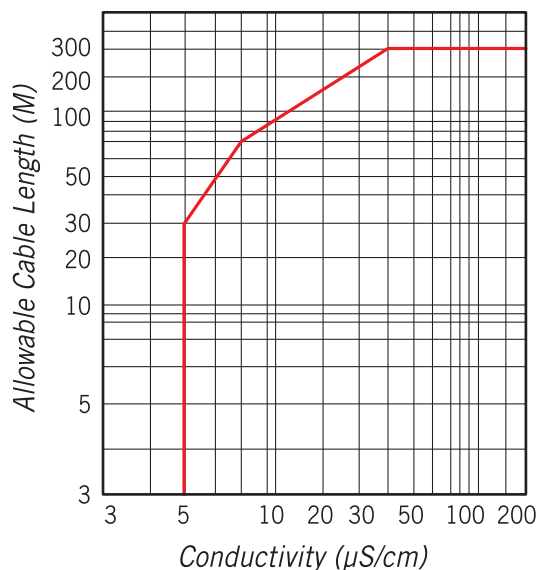
D = Pipe I.D

E = Magnitude of the Voltage

$\bar{V}$ = Average Velocity of the Medium



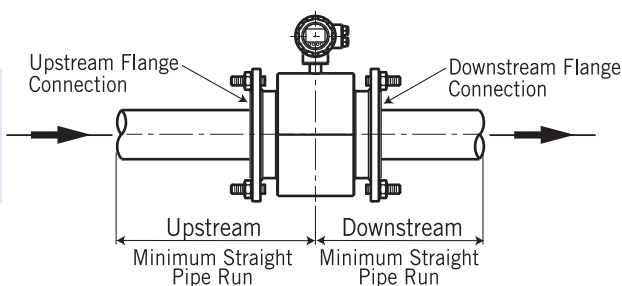
Electrical Conductivity & Cable Length



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

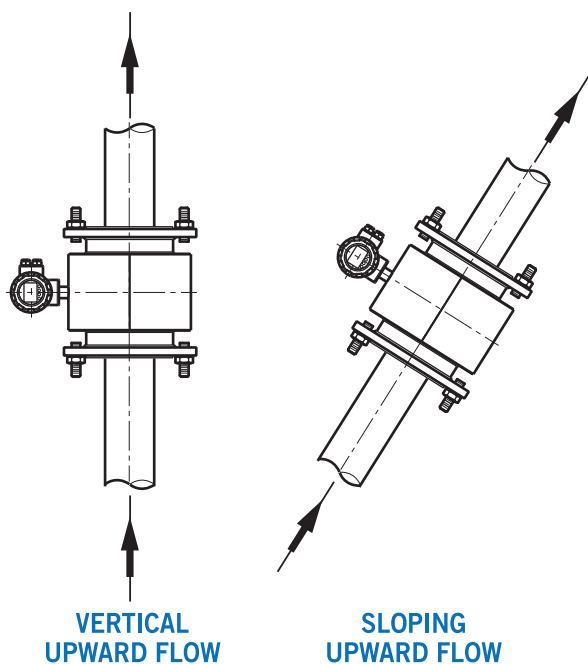
Recommended Piping Diagram

ACCEPTABLE
Installatoin
with
Limitations



**HORIZONTAL
FLOW TO
LEFT OR RIGHT**

PREFERRED
Installatoin



- 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):

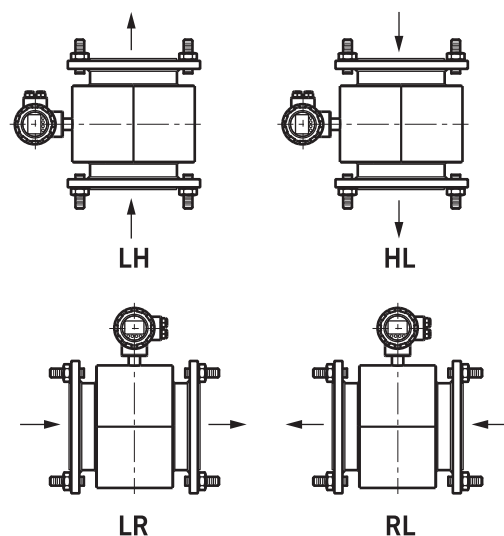
Elbow, 3D

Pump, 10D

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

For higher accuracy requirements, use twice the distances shown.

Flow Direction Type



Basic Functions

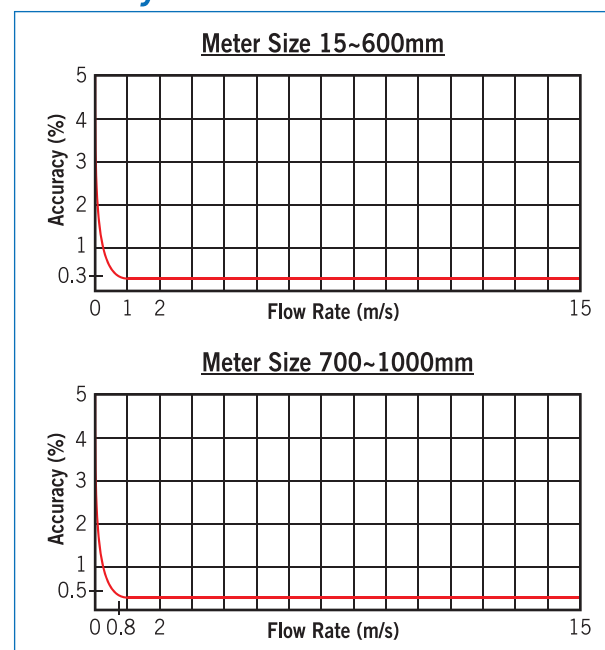
- **Low-Frequency Square-Wave Exciting:** 1/10, 1/16 and 1/25 power frequency (50/60Hz)
- **Exciting Current:** 125mA
- **For Empty Pipeline Measurement:** No need to add additional electrode
- **Current Speed Range:** 0.1~15 m/s
- **Current Speed Resolution:** 1 mm/s
- **Fluid Conductivity:** $\geq 5\mu\text{S/cm}$
- **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

Accuracy

METER SIZE (mm)	MEASURING RANGE IN TERMS OF FLOW VELOCITY	ACCURACY
15~20	≤ 0.3 m/s	$\pm 0.25\%$ F.S
	0.3~1 m/s	$\pm 1.0\%$ R
	1~15 m/s	$\pm 0.5\%$ R
25~600	0.1~0.3 m/s	$\pm 0.25\%$ F.S
	0.3~1 m/s	$\pm 0.5\%$ R
	1~15 m/s	$\pm 0.3\%$ R
700~1000	≤ 0.3 m/s	$\pm 0.25\%$ F.S
	0.3~1 m/s	$\pm 1.0\%$ R
	1~15 m/s	$\pm 0.5\%$ R

NOTE.: %F.S: Full Scale / %R: Reading Rate

Accuracy Curve



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	Flow	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	1.13097 m ³ /h	11.3097 m ³ /h	16.9645 m ³ /h
25 mm		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	2.89528 m ³ /h	28.9528 m ³ /h	43.4293 m ³ /h
40 mm		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	7.06857 m ³ /h	70.6857 m ³ /h	106.028 m ³ /h
65 mm		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	18.0955 m ³ /h	180.955 m ³ /h	271.433 m ³ /h
100 mm		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	44.1786 m ³ /h	441.786 m ³ /h	662.679 m ³ /h
150 mm		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	113.097 m ³ /h	1130.97 m ³ /h	1696.45 m ³ /h
250 mm		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	254.468 m ³ /h	2544.68 m ³ /h	3817.03 m ³ /h
600 mm		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	2827.43 m ³ /h	28274.3 m ³ /h	42411.5 m ³ /h

Output Performance

► Analog Current Output :

Load Resistor: 0~1200Ω for 0~10mA

0~600Ω for 4~20mA

Accuracy: 0.1%±10μA

► Frequency Output :

Frequency Output Range: 1~5000 Hz

Output electric isolate: Photoelectric isolate. Isolate Voltage: >1000VDC

Frequency Output: Internal pull up resistor of 1500Ω, 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.

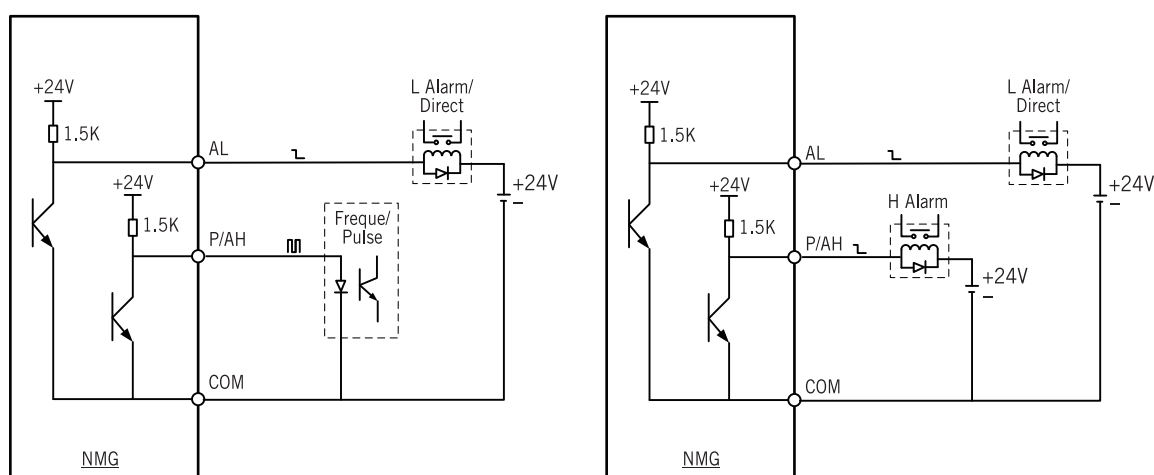
Pulse output isolate: Photoelectric isolate. Isolate Voltage: >1000VDC

Pulse output: Internal pull up resistor of 1500Ω, 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.

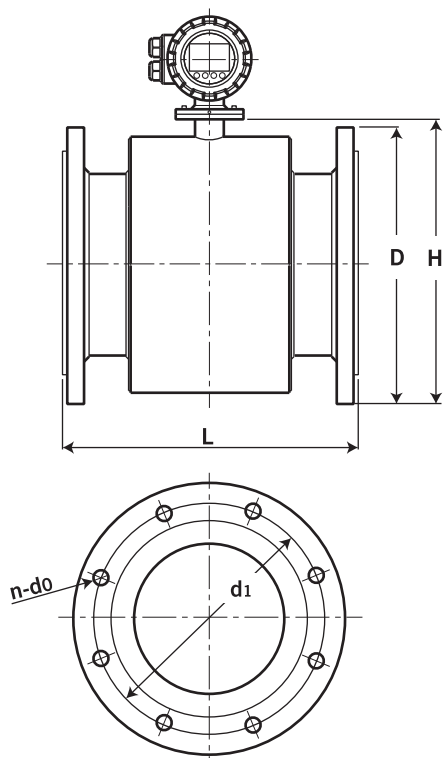
► HART Protocol :

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.

Dimensions

INTEGREL TYPE (Model: NMG-EH)

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



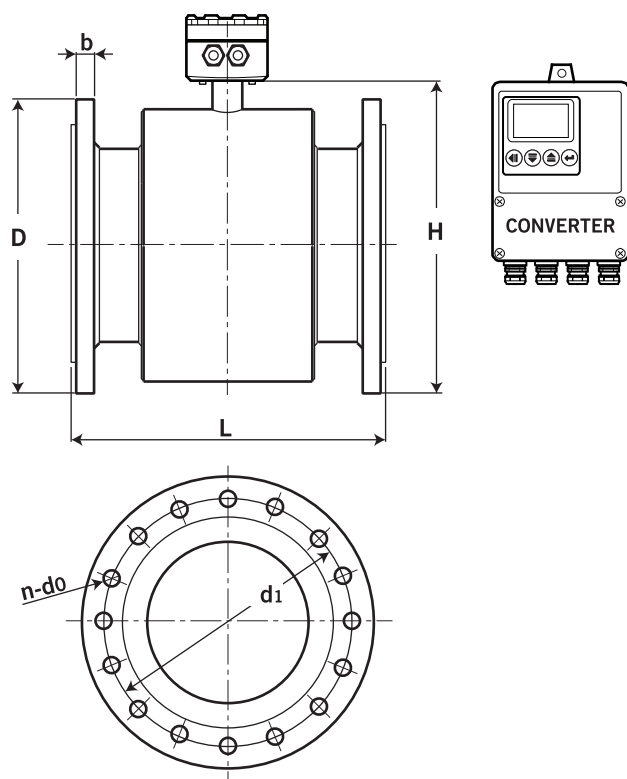
Please Note: D, n-d0 & d1 dimension are according to the flange rating and size.

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 700~1000mm:

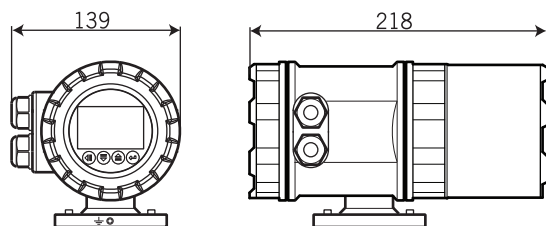
Meter Size	L	H ϕ ~	Approx. Weight
700	700	866	435 Kg
800	800	966	545 Kg
900	900	1076	655 Kg
1000	1000	1200	810 Kg

Head & Converter Type

「Integral Type (NMG-EH)」

IP68

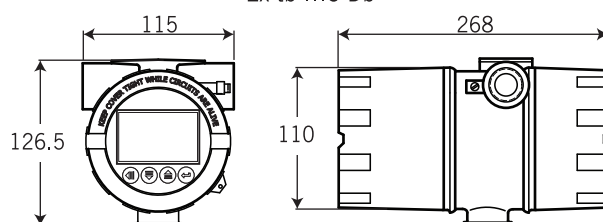
Housing Model: (A1) Weather proof, IP68
Head Material: Aluminum alloy
Conduit Size: ½" or ¾"NPT(F) available



Explosion Proof

Housing Model: (C1) Ex. Certificate on Housing only
Head Material: Aluminum alloy
Conduit Size: ½" or ¾"NPT(F) available

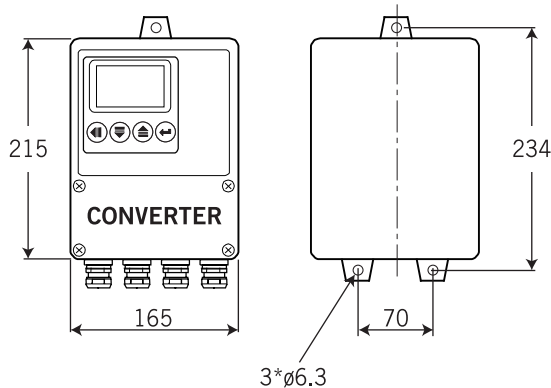
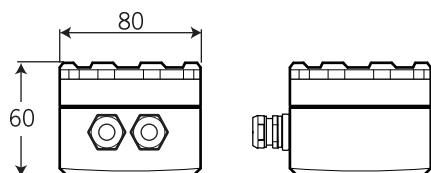
Ex d IIC Gb
 Ex tb IIIC Db



「Remote Type (NMG-ERS/ERC)」

IP68

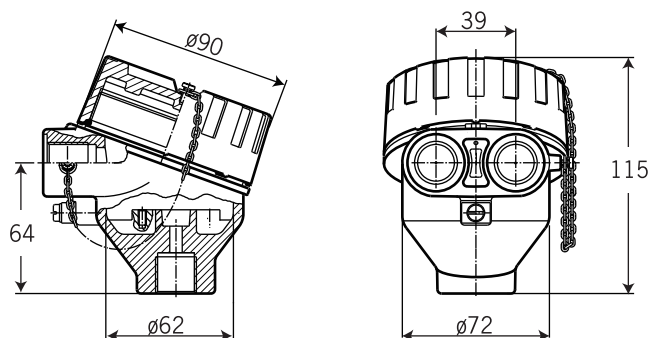
Housing Model: (A2) Weather proof, IP68
Converter Protection Class: Weather proof, IP65
Head Material: Aluminum alloy
Conduit Size: ½" or ¾"NPT(F) available



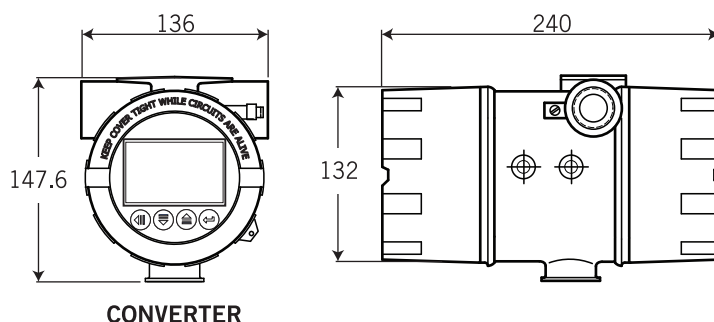
Explosion Proof

Housing Model: (C2) Ex. Certificate on Housing only
Head Material: Aluminum alloy
Converter Material: Aluminum alloy
Converter Protection Class: Ex. Certificate on Housing only
Conduit Size: ½" or ¾"NPT(F) available

1026 Ex II 2 GD EEx d IIC
 Ex d IIC Gb; Ex tb IIIC Db



Ex d IIC Gb; Ex tb IIIC Db



unit=mm

Ordering Information

NMG	Code	Type
	EH	Integral Type
	ERS	Remote Type / 10M (Cable 10M, standard)
	ERC	Remote Type / ____M (Please fill out the required cable length, and the maximum length is 30M.)
	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
	*15~600mm (Code 150~601): Integral or Remote type available.	
	*700~1000mm (Code 701~102): Remote type only.	
	Code	Flange Rating
	(10)	PN10
	(16)	PN16
	(15)	ANSI 150#
	(10K)	JIS 10K
	(O)	Others: _____
	Code	Connection Flange Material
	(SS)	SS316
	(S4)	SS304
	(CB)	Carbon Steel
	Code	Sensor Case Material
	(S4)	SS304
	(CB)	Carbon Steel
	Code	Lining Material
	1	PTFE/F4 (*)
	2	PFA
	3	CR
	(*): Meter size ≤ 50mm, only can use PTFE/F4 lining.	
	Code	Electrodes & Grounding Electrodes Material
	(SL)	SS316L
	(HB)	Hastelloy-B
	(HC)	Hastelloy-C
	(Ti)	Titanium
	(Ta)	Tantalum
	(Pt)	Platinum/Iridium (Pt/Ir)
	Code	Converter Function Type
	MB	Button / Dual Line Display / Standard Output / RS485
	MC	Button / Dual Line Display / Standard Output / HART
	Code	Power Supply
	1	85~265VAC, 50/60Hz
	2	DC24V (±10%)
	Code	Protection Class / Housing Model
	Integral Type	(A1) Weather Proof, IP68
	(C1)	Ex. Certificate on Housing Only / Ex d IIC Gb; Ex tb IIIC Db
	Remote Type	(A2) Weather Proof, IP68+IP65
	(C2)	Ex. Certificate on Housing Only / 1026 Ex II 2 GD EEx d IIC Ex d IIC Gb; Ex tb IIIC Db
	Code	Conduit Size
	E	½"NPT(F)
	F	¾"NPT(F)
	O	Option
	Code	Flow Direction
	0	LH
	5	HL
	10	RL
	20	LR