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Datasheet

Insertion-type Electromagnetic Flowmeter

LDGC-SUP-L

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Datasheet**Insertion-type Electromagnetic Flowmeter
LDGC-SUP-L**

The insert-type electromagnetic flow sensor (referred to as the sensor) and the electromagnetic flow converter (referred to as the converter) together form the insert-type electromagnetic flow meter (referred to as the flow meter), which is used to measure the volumetric flow rate of various conductive liquids in the pipeline.



Principle

The working principle of an electromagnetic flowmeter is based on Faraday's law of electromagnetic induction. As shown in Figure 1, two electromagnetic coils located at the top and bottom generate a constant or alternating magnetic field. When a conductive fluid flows through the measuring tube, an electromotive force (EMF) is induced between two electrodes positioned on the inner walls of the pipe.

This induced voltage is directly proportional to the fluid velocity, the magnetic flux density, and the width of the conductor (i.e., the inner diameter of the measuring tube). By processing this signal, the flowmeter can accurately calculate the volumetric flow rate of the medium.

The equation for the induced electromotive force is:

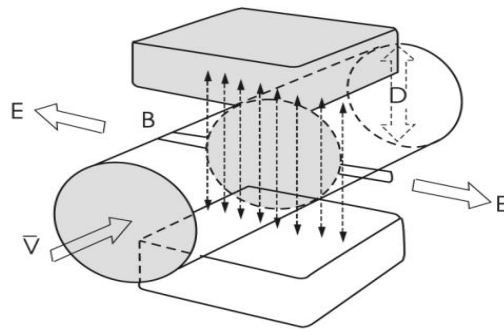


Figure 1

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

Where:

E —Induced electromotive force

K —Meter constant

B —Magnetic induction density

V —Average flow speed in cross-section
of measuring tube

D —Inner diameter of measuring tube

During flow measurement, the conductive fluid passes through a magnetic field that is oriented perpendicular to the direction of flow. As the fluid moves, an electrical potential proportional to the average flow velocity is induced. Therefore, the measured liquid must have an electrical conductivity

greater than the minimum required threshold (typically 5 μ S/cm).

The induced voltage signal is detected by two electrodes and transmitted via a signal cable to the transmitter (converter). After a series of analog and digital signal processing steps, both the cumulative flow and instantaneous flow rate are displayed on the transmitter's screen.

Parameters		
Measuring System		
Applicable Standard	JB/T9248-2015	
Measuring Principle	Faraday’s Law of Electromagnetic Induction	
Function	Real-time measurement of instantaneous flow, velocity, and mass flow (when fluid density is constant), as well as cumulative flow calculation.	
Modular Structure	The measuring system consists of a measuring sensor and a signal converter.	
Transmitter		
Integrated Type	Protection Rating IP65	
Remote Type	Transmitter protection rating: IP65 (Sensor body protection rating: IP65/IP68)	
Measuring Sensor		
Diameter	DN100~DN2000	
Protection Rating	IP67(IP68 Optional)	IP65
Burial Capability	Less than 5 meters (applicable only to remote-type sensors with IP68 rating)	
Sensor Cable	Applicable only for remote-type configuration; standard cable length is 10 meters. For other cable lengths, customization is recommended, with a maximum suggested length of no more than 100 meters.	
Communication		
Serial Communication	RS-485	
MODBUS Interface	RTU format,Physical interface: RS-485,Electrical isolation: 1000V	
Function	Empty Pipe Detection	
Display User Interface		
Display Type	High-definition backlit LCD display	
Display Functionality	9 measurement screens (e.g., measurement values, status, etc.)	
Language Options	Chinese / English	
Units	Customizable units (specified in Section 6.5, Table 6, Item 5)	
Operation Unit	4 mechanical buttons for user control	
Measurement Accuracy		
Maximum Measurement Error	±0.5% of the measured value (for flow velocity ≥ 1 m/s) ±0.5% ± 2 mm/s of the measured value (for flow velocity < 1 m/s)	
Repeatability	0.16%	
Operating Environment		
Environment Temperature	Integrated Flow Meter: -10℃ ~ 55℃ Remote Flow Meter (Sensor Part): -10℃ ~ 60℃ Remote Flow Meter (Converter Part): -10℃ ~ 55℃	
Storage Temperature	-40℃~ 65℃	
Conductivity		
Water	20 μS/cm (Note: Actual measurable conductivity should be greater than 30 μS/cm)	
Other	5 μS/cm (Note: Actual measurable conductivity should be greater than 30 μS/cm)	

Materials	
Sensor Housing	Carbon Steel
Converter	Standard Die-cast Aluminum
Electrical Connection	
Power Supply Voltage	85VAC~250VAC, 45Hz~63Hz, 20VDC~36VDC
Power Consumption	<20W
Signal Cable	Applicable only to remote-type models
Output	
Current Output	(4~20) mA with load resistance (0~750) Ω
Frequency Output	Frequency Output Range:1 to 5000 Hz Electrical Isolation:Optical Isolation Isolation voltage: > 1000 VDC Frequency Output Driver:MOSFET Output Maximum voltage: 36 VDC,Maximum load current: 250 mA
Pulse Output	Pulse Output Equivalent:(0.001~1.000) m ³ / cp (0.001~1.000) Ltr / cp (0.001~1.000) T/ c Pulse Width: 50 ms, automatically converted to a square wave at high frequency. Electrical Isolation: Optical Isolation, isolation voltage: > 1000 VDC Pulse Output Driver: MOSFET Output, maximum voltage: 36 VDC, maximum load current: 250 mA
Alarm Output	Alarm Output Contacts:ALMH – Upper Limit Alarm;ALML – Lower Limit Alarm Electrical Isolation: Optical Isolation, isolation voltage: > 1000 VDC Alarm Output Driver: Darlington Transistor Output, maximum voltage: 36 VDC, maximum load current: 250 mA

Wiring

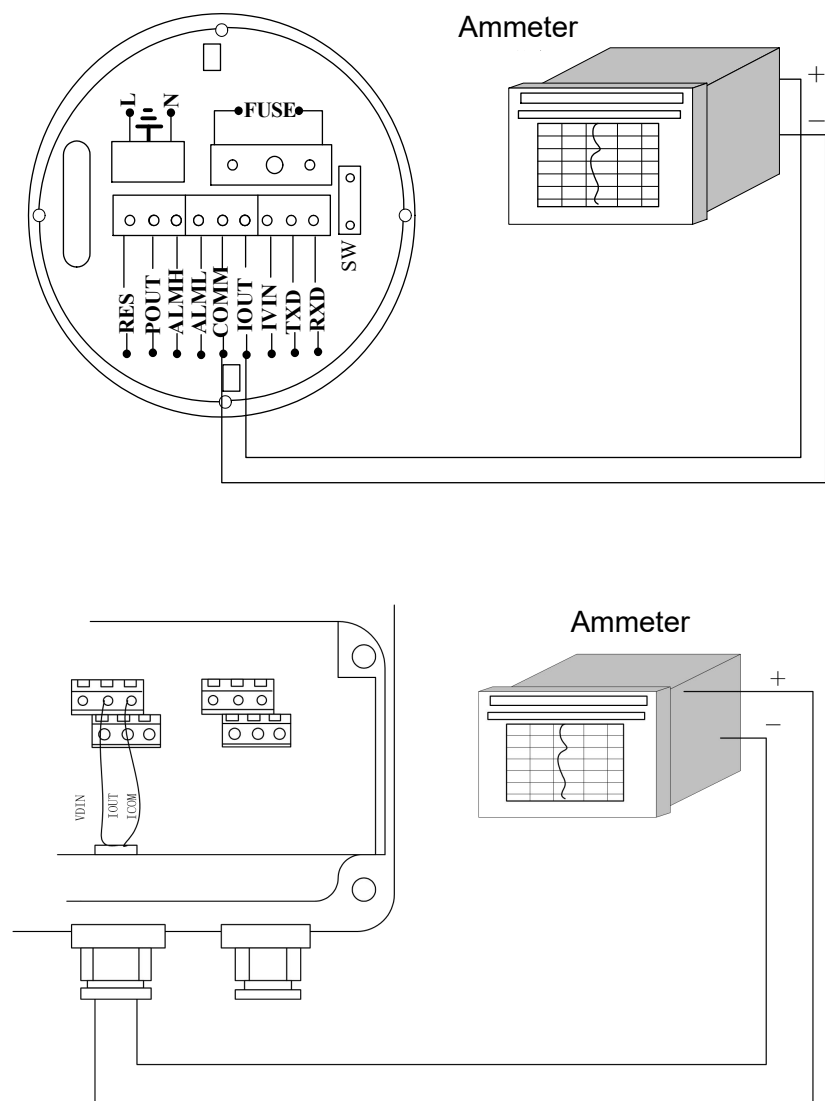


Figure 2 Current Output Wiring Diagram

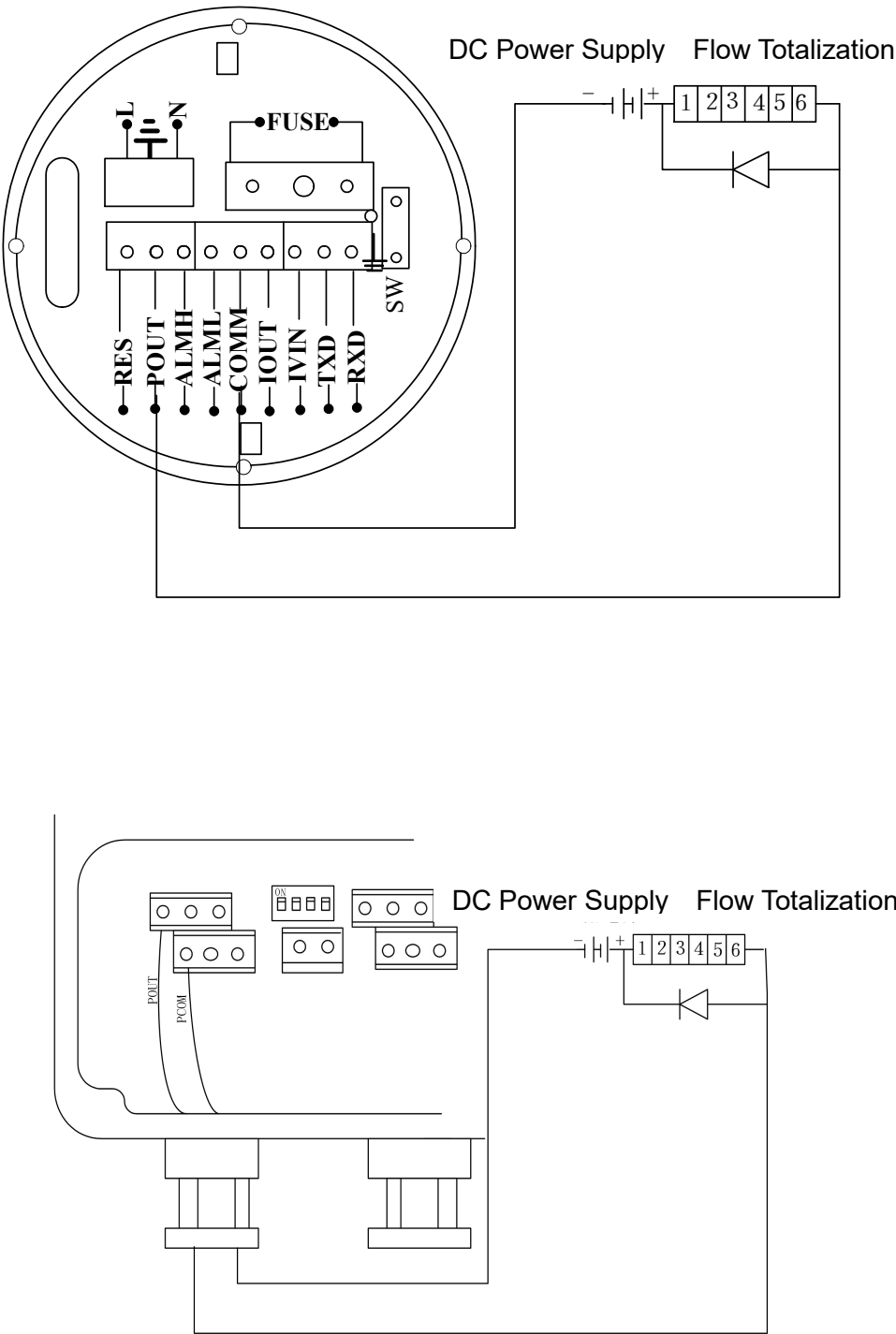


Figure 3 External Power Wiring Diagram for Electronic Counter

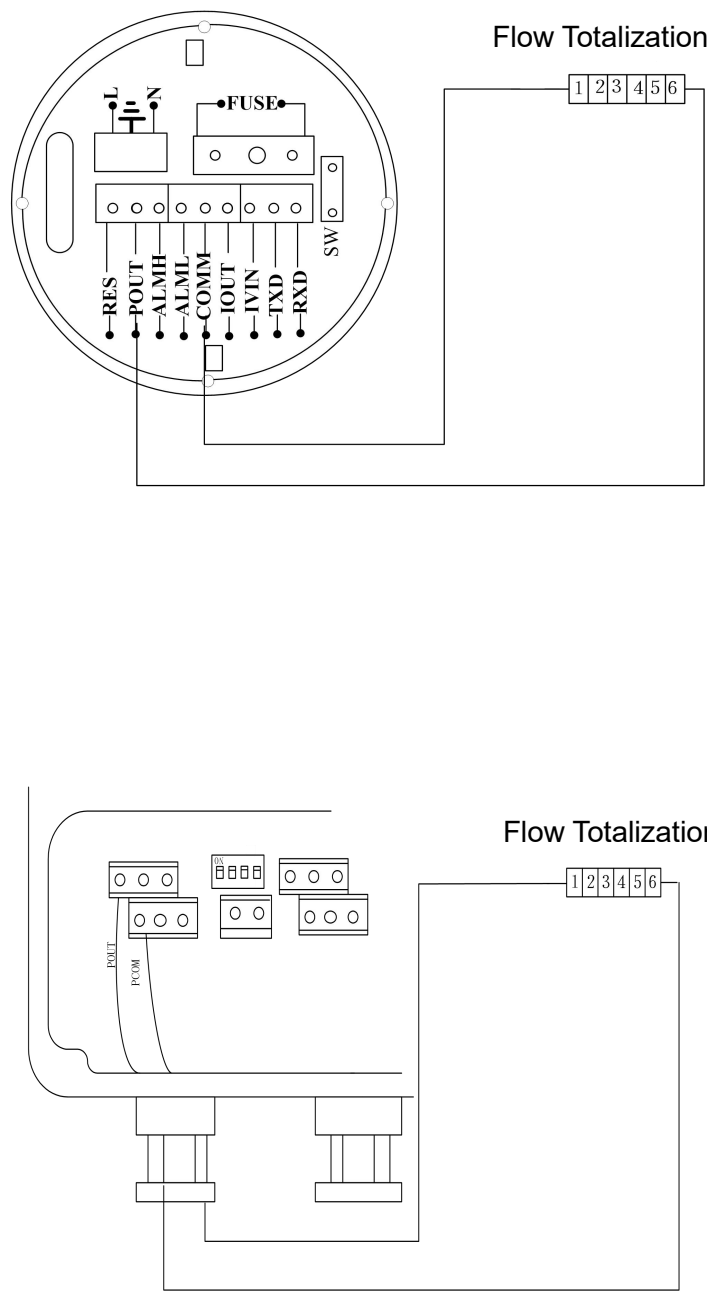


Figure 4 Internal Power Wiring Diagram for Electronic Counter

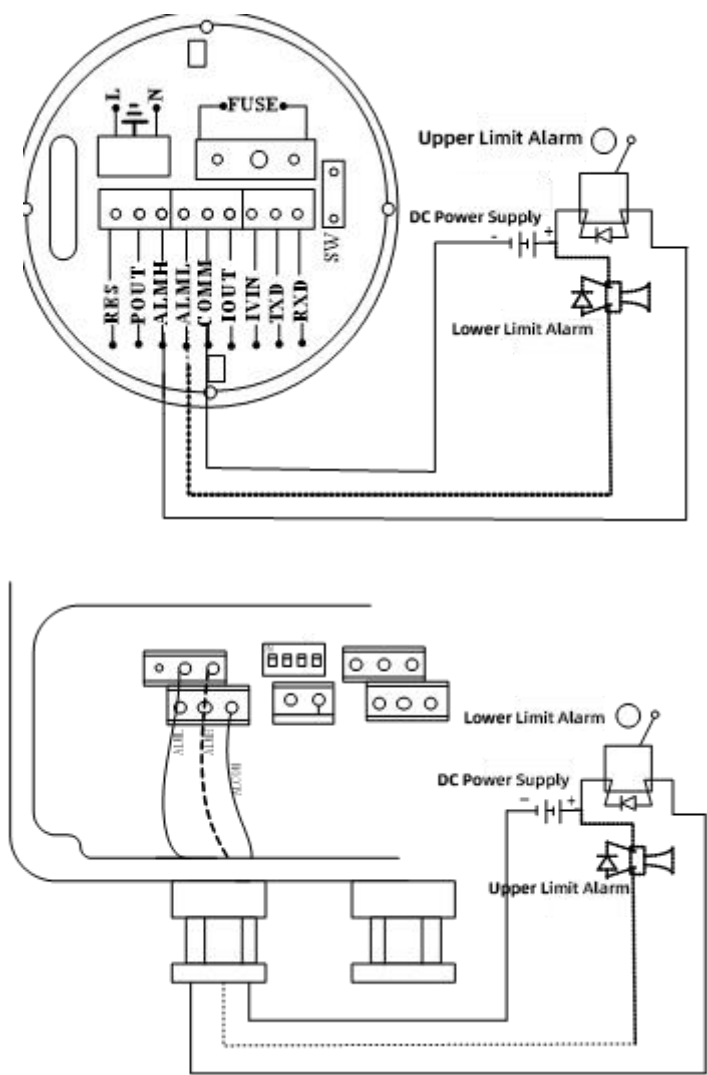


Figure 5 Alarm Output Wiring Diagram

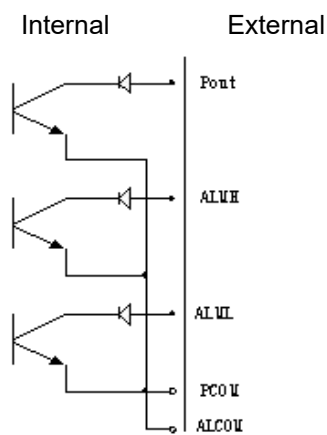
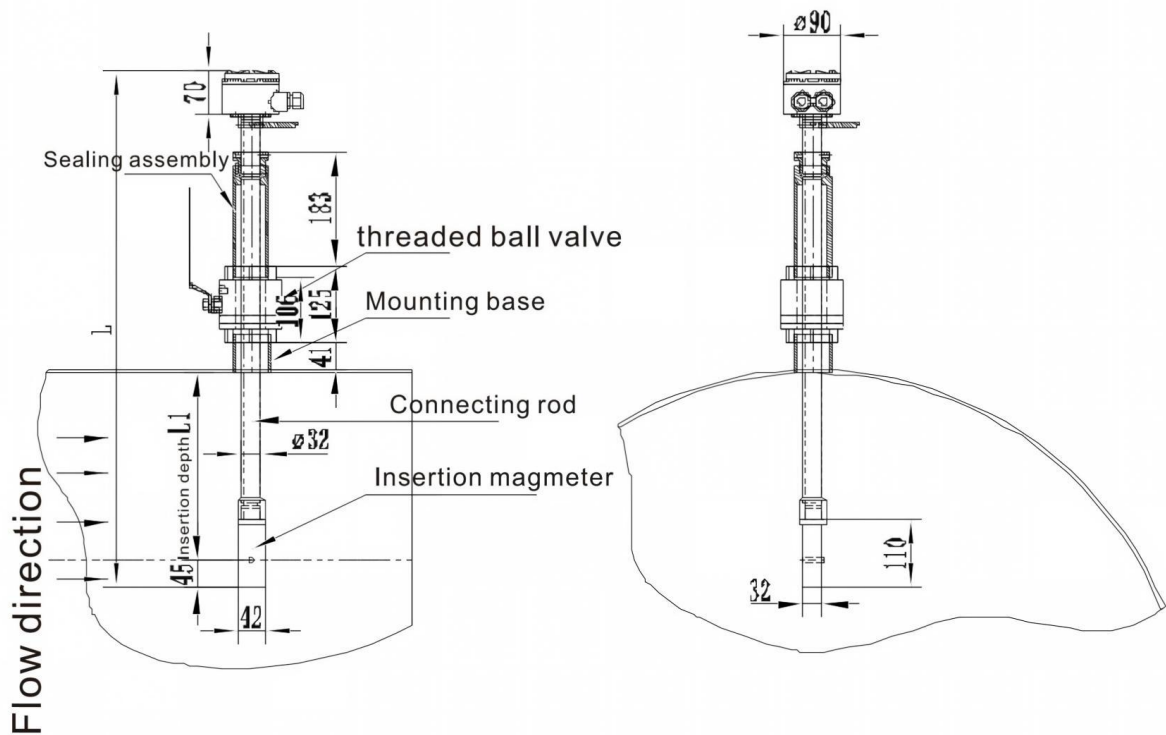


Figure 6 Internal OC Output Connection Method

Dimension

1. Structure



Note: If integrated converter is used, the meter height shall be increased by 81mm.

Figure 7 Product dimensions of remote magmeter (unit: mm)

Table 1 Insertion Type Total Length

Insertion Length	
Specification	Length
DN≤200	630 mm
400≥DN≥250	730 mm
1200≥DN>400	830 mm
2000≥DN>1400	1030 mm

Insertion depth L1: pipe diameter ≤ DN400, insertion depth is ½ DN ;

For pipe diameters > DN400, the insertion depth is ¼ DN

2. Transmitter Dimensions

Integrated Type (Round Housing)

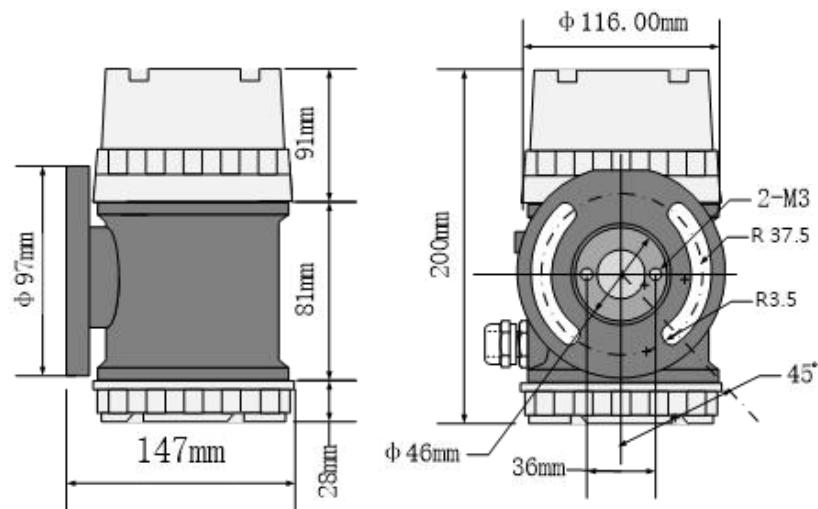


Figure 8

Remote Type (Square Enclosure)

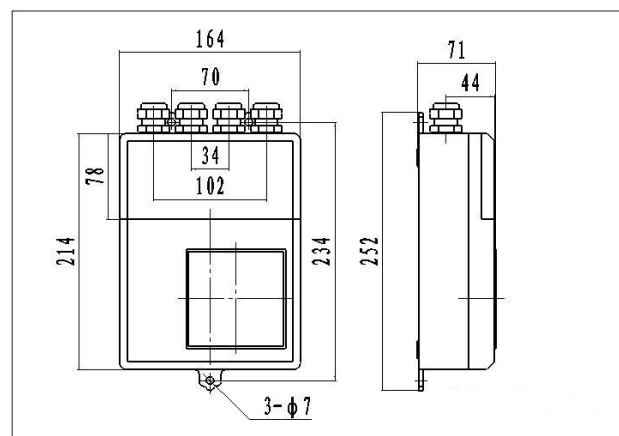


Figure 9

Ordering Code

LDGC-SUP-L -1C-Q3-M-AA-1-WA-00								Description
LDGC-SUP-L	-	-	-	-	-	-	-	
Nominal Diameter	1C							DN100(4")
	1E							DN125(5")
	1G							DN150(6")
	2C							DN200(8")
	2G							DN250(10")
	3C							DN300(12")
	3G							DN350(14")
	4C							DN400(16")
	4G							DN450(18")
	5C							DN500(20")
	6C							DN600(24")
	7C							DN700(28")
	8C							DN800(32")
	9C							DN900(36")
	A0							DN1000(40")
	A2							DN1200(48")
	A4							DN1400(55")
	A6							DN1600(64")
	A8							DN1800(72")
	B0							DN2000(80")
Ball Valve and Mounting Base		Q3						G2 316SS Threaded Ball Valve, with 304SS Mounting Base
		Q4						DN50 Carbon Steel Flanged Ball Valve, with 304SS Mounting Base
		XX						Other
Accuracy			M					1.5 Class
Output and Power Supply				AA				4-20mA+Pulse+RS485, 220VAC
				AB				4-20mA+HART+Pulse, 220VAC
				AM				4-20mA+Pulse+RS485, 24VDC
				AK				4-20mA+HART+Pulse, 24VDC
Insertion Electrode Material					1			Electrode: 316L Stainless Steel Sensor Head: ABS Plastic Insertion Rod: 304 Stainless Steel
Electrical Interface, Housing Material, and Protection Rating						WA		Integrated Type,M20*1.5 Cable Gland,Aluminum Alloy,IP65
						WC		Remote Type,M20*1.5 Cable Gland,Aluminum Alloy,IP68
Remote Cable Length							00	0m

	10	10m
	15	15m
	20	20m
	25	25m
	30	30m
	40	40m
	50	50m
	XX	Other