Smart Electromagnetic Flowmeter

POOYAB-SM6

POOYAB

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Application:

- Smart Manufacturing Solutions
- Water & Wastewater Infrastructure
- Water & Wastewater Treatment
- Food & Beverage Processing
- Chemical Processing & Refining

Introduction:

This device comprises an integrated metering system and an advanced datalogger that accurately measures and collects consumption data and events.

Daily, the Events and data submitted by each device are exchanged with the "Pooyac Online Monitoring Platform" by the GPRS/SMS platform or on the requested duration. To learn more about the Monitoring Platform please refer to the product page on the website.
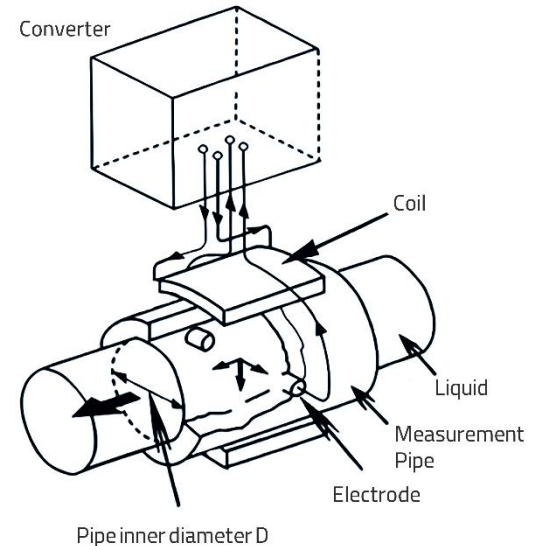
Additionally, this device complies with industrial communication requirements. Several communication interfaces are incorporated to enable integrity with industrial controllers, including M-Bus, 2wire Loop Current, Modbus-RTU, pulse output, and Lora.

Working principle:

The medium passing through the pipe is subjected to a constant alternating magnetic field. According to Faraday's law of electromagnetic induction, the voltage induced in the medium is proportional to its velocity as it moves through the magnetic field. This induced voltage is picked up by two internal electrodes in contact with the medium. The signal is then amplified, and the volumetric flow rate is calculated by considering the pipe's cross-sectional area.

Features:

- Forward and reverse metering
- Internal EM disruption detector
- Empty pipe recognition
- Available in separate and integrated models
- Anti-UV & Anti-impact display box
- 3-Year Extended-life battery
- Internal Clock with backup battery (IEC62054)
- 360° rotatable LCD for consumption and event display
- M-Bus Port for External Electricity Meter Connection
- Optical Port for Device Reading and Configuration (IEC62056)
- RS485 (Modbus-RTU) for Real-Time Flow and Cumulative Consumption Display
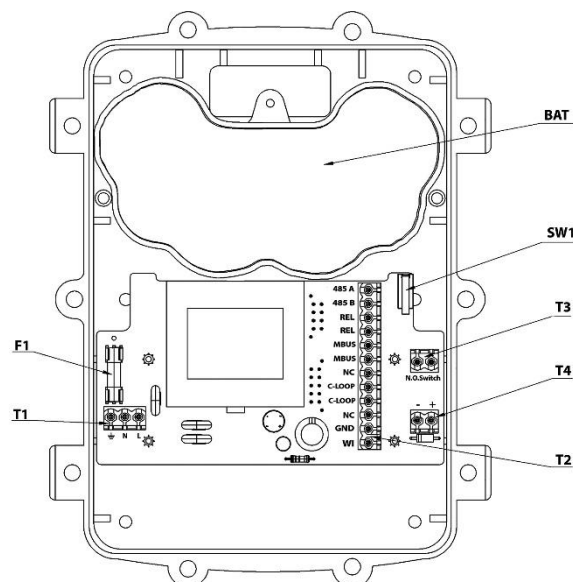- Internal GPS Module (Optional)

Converter
Coil
Liquid
Measurement Pipe
Electrode
Pipe inner diameter D

Technical Parameters

Measuring Principle	Electromagnetic	Minimum Conductivity	5μS/cm
Dynamic Range	R160	Battery Type	Non-Rechargeable, 2x19mAh
Accuracy Class	±0.5% Reading	Battery Life	3 years (Usage)
Ambient Temp.	-20 ... +60°C		10 years (Expiration)
Process Temp Range	Depending on the Liner Material	Power	24vDC / 220vAC / 380vAC
Protection Class	IP68	Max. Static Pressure [bar]	16,25 [Optional]
Process Connection	Flange DIN, ANSI	Output Signal	4-20mA RS485 [Modbus-RTU] LoRa Pulse M-Bus Infrared Reading
Pipe Size [inch]	2,3,4,5,6,8,10, 12,14,16,20		
Compatible Media	Compatible with liner material		

Material		Design Features	
Liner	Polyethylene [PE] PTFE Hard Rubber EPDM Custom	Sleek, compact and suited design to the specific conditions of the installation location. The ability to install in all horizontal, inclined and vertical situations Waterproof with IP68 degree of protection 360° rotatable LCD Structure: integrated and separated	
Body Material	Carbon Steel		
Electrode	Titanium SS316L Hastelloy		
Display Box	Polycarbonate (Anti-UV & Anti-impact)		

Standards & Certificates

ISO 17025, ISO 4064, OIML Standards
license number 11101/100/98 dated 06/20/98 from the IRI Ministry of Energy.
Conformity certificate of 0.2% accuracy (Certificate No. 971415 dated 10/08/98 of SAM laboratory.

CE   ISO   ISO4064 CERTIFIED   ISO/IEC

Flow value table

Size	Recommended Flow Value		Factory Setting				Cut-off Level
	~Q_{min}	~Q_{max}	Current Output 4 ... 20mA	Pulse Output			
			Measuring Range	Volume/Pulse	Pulse/m3		
[Inch]	[m³/h]	[m³/h]	[m³/h]	[Liter/Pulse]	[#/m3]		[m³/h]
2	0.1	20	0 ... 16	120	8.33		0.06
3	0.25	50	0 ... 40	300	3.33		0.15
4	0.39375	78.75	0 ... 63	472.5	2.12		0.23625
5	0.625	125	0 ... 100	750	1.33		0.375
6	1	200	0 ... 160	1200	0.83		0.6
8	1.5625	312.5	0 ... 250	1875	0.53		0.9375
10	2.5	500	0 ... 400	3000	0.33		1.5
12	3.9375	787.5	0 ... 630	4725	0.21		2.3625
14	6.25	1250	0 ... 1000	7500	0.13		3.75
16	10	2000	0 ... 1600	12000	0.08		6
20	15.625	3125	0 ... 2500	18750	0.05		9.375

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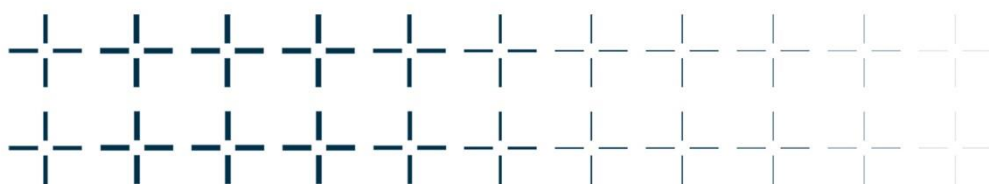
Wiring Diagrams:

Item	Tag	Description	Item	Tag	Description
AC Fuse	F1	0.5A 250VAC		485A	Modbus
T1 AC Power	⏚	Earth		485B	
	N	Null		Pulse	Pulse Output
	L	220v 50Hz	T2 Interfaces	Common	
T3 Encloser Switch	N.O.			MBUS	M-BUS Port (No Polarity)
	Switch			MBUS	
T4 DC Power	-	GND		NC	-
	+	12 ... 28vDC		C-LOOP	2-wire Loop Current (No Polarity)
SW1 Door Switch		Lock Seal Alarm		C-LOOP	
				NC	-
BAT Battery Box		Replaceable Battery Box		GND	-
				WI	

Modbus RTU Transmission Settings:

Data in the RS485 physical layer are transmitted serially. The communication protocol follows the Modbus RTU standard, and the following formats must be used.

Start	1	2	3	4	5	6	7	8	Stop

Bit sequence without parity checking (8N1)

- Baud rate 9600 bps
- 1 Start bit
- 8 data bits (LSB is sent first)
- No bit for parity checking
- 1 stop bit

All Modbus RTU messages are sent in the following format:

Slave Address	Function Code	Data	CRC
1 byte	1 byte	0 up to 252 byte(s)	2 bytes - CRC16 CRC Low & CRC High

Slave Address:

The address "0" is reserved for broadcasting in the query mode of the Master device. The individual Slave devices can be assigned in the range of 1 – 247. In one network, more than one device with the same address is forbidden. The default address is set to "1".

Function Code:

0x03 (3) "Read Holding Register"

Modbus register layout:

| Type	Address (decimal)	Description
Float	44112	Flow (m^3/h)
Long	44114	Positive Cumulative flow (m^3) (Integral part)
Float	44116	Positive Cumulative flow (m^3) (decimal part)
Long	44124	Negative Cumulative flow (m^3) (Integral part)
Float	44126	Negative Cumulative flow (m^3) (decimal part)

Dimensions:

A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
136	160	190	43	145	211.6

Size [Inch]	Nom. Size [DN]	G [mm]	H [mm]	I [mm]	J [mm]	L [mm]	Screws [#]	Weight [Kg]
2	50	18	390	165	192	200	4	12
3	80	18	422	200	192	200	8	14.5
4	100	18	444	220	240	250	8	17
5	125	18	472.5	250	230	250	8	21
6	150	20	505	285	286	300	8	26
8	200	22	567	340	334	346	8	33
10	250	22	620.5	407	384	400	12	54.6
12	300	25	688.5	457	488	400	12	80
14	350	26	747	520	525	550	12	102
16	400	29	800.5	580	580	600	16	130
20	500	33	942	715	560	600	20	200
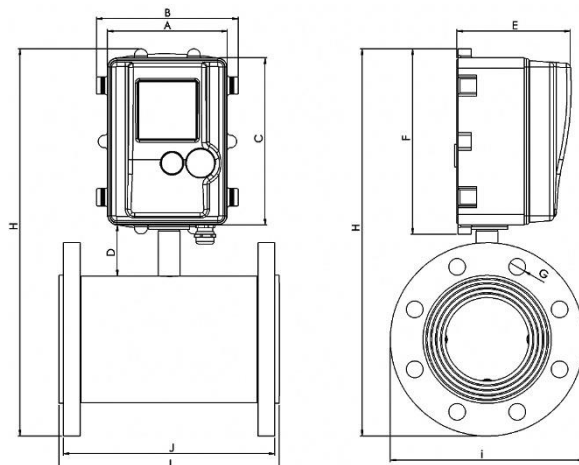
Structure types:
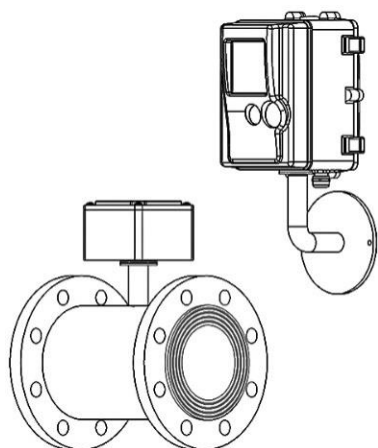
Separated
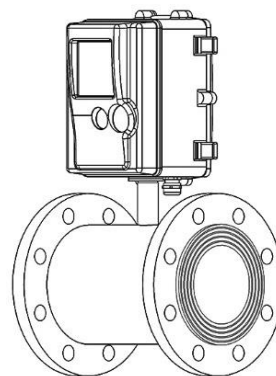
Integrated
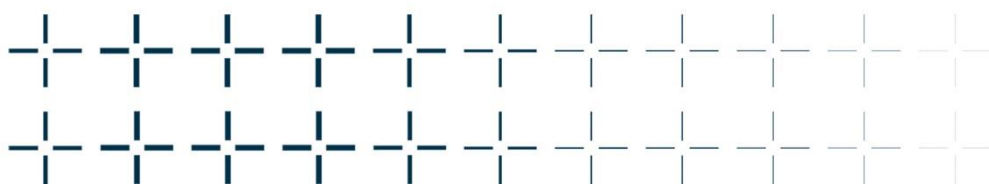
Recommendations regarding installation:
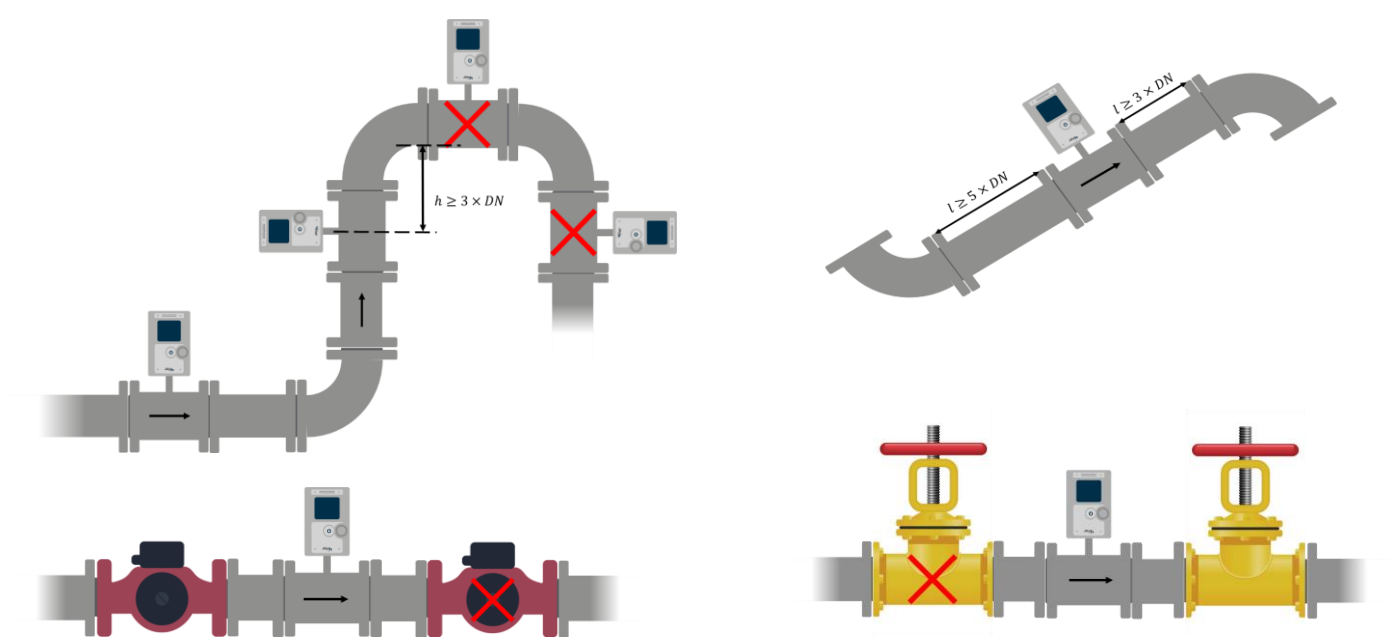
Ordering Procedure:

Model	POOYAB-SM6										
Pipe Size	2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	20"
	DN50	DN80	DN100	DN125	DN150	DN200	DN250	DN300	DN350	DN400	DN500
Liner Material	PE		Hard Rubber		PTFE		EPDM			Custom	
	L1		L2		L3		L4			Lx	
Static Pressure	16Bar					25Bar					
	P16					P25					
Electrode Material	Titanium				316L			Other			
	E1				E2			Ex			
Structure	Integrated					Separated					
	S1					S2					
Power	12...24vDC			220vAC (Single Phase)			380vAC (Two Phase)				
	PW1			PW2			PW3				
Internal Battery	Not included					Non-Rechargeable، 2x19mAh Battery					
	B0					B1					
Output Signal	Modbus		Modbus + 4...20mA			Modbus + Pulse			Modbus + 4...20mA + Pulse		
	O1		O2			O3			O4		
Communications	None		GPRS			LORA			GPRS+LORA		
	C0		C1			C2			C3		

Additional Options			
External Antenna	External GSM/GPRS Antenna Plug		
	/ANT		
GPS	Internal Global Positioning System Module		
	/GPS		
M-BUS	Enable M-BUS Connection		
	/M-BUS		

Example: POOYAB-SM6-DN100-L1-P16-E1-S1-PW1-B1-O1-C1 /ANT

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