

DATASHEET

## Hydromaster series Electromagnetic flow meter

For flow measurement without pressure loss

Hydro master series Electromagnetic Flow Meters are designed for a variety of conductive fluids. Flow meters offer extreme reliability and low cost for flow measurement. Digital Signal Processor based electronics ensures accurate readings for both rate of flow indication and total flow indication.





We provide customers with solutions to their Water Metering problems by manufacturing both Electromagnetic Flow Meters and Domestic Ultrasonic Water Meters to tackle the water scarcity prevalent. Our Main plant is in India with all operations done under one roof. Currently, we manufacture 36,000 EMF's and 100,000 Ultrasonic Meters planned for a fiscal year. Our customers come from various industries such as Wastewater treatment plants, Chemical industries, Municipal water board and Private contractors. We also house an NABL accredited laboratory for water flow calibration for our Electromagnetic Flowmeter. In addition to this our Domestic Meters are calibrated on MID Approved Test Benches to ensure that even the most stringent quality standards are met.



# Contents

General	4
Scope of supply / Technical data	5
General Specifications	6
Flow range	7
Selection of models	8
Basic working for Hydromaster Flow meter	10
Customer end diagnosis/analysis	11
Installation instructions	12
Electrical connections	17
Output data	18
Operation and Set up	24
Alarm and Error informations in display	26
Troubleshooting	26
Safety instructions	27
Sizing charts and Dimensions	28
Warranty details	30

# General

A number of programmable features including In-line calibration are standard. Advanced models can offer relay outputs for signals exceeding rate of flow or total flow set points. Programmable pulse output models are also available in addition to the industry standard 4-20 mA output. Optional RS485/MODBUS interface indicators are also available. Further these meters have a external 4-20mA input which when combined with level sensors can be used for partial flow measurement. These flow meters can be equipped with inbuilt GPS and communication options like GSM 2G/3G/4G, NBloT, Wi-Fi, Bluetooth BLE, Lora or Wireless mesh.



### Special Features

- Accuracy +/- 0.5%
- Working range 0.1 m/s to 5 m/s
- Low flow as low 0.01m/s
- Open / Short Coil Alarms
- Low Flow / High Flow Alarms
- Built-in Empty pipe detection
- Communication Options GSM/GPRS
- NbloT, Wireless Mesh
- IP68 Resistance
- Built in data logger
- Partial pipe detection
- Wireless communication via Bluetooth
- IP 68
- GSM, GPRS, NBloT
- RS 45, pulse output

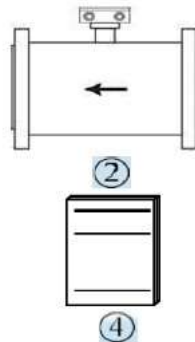
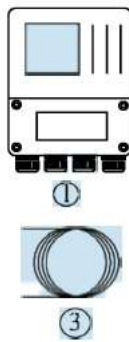




# Scope of supply / Technical data

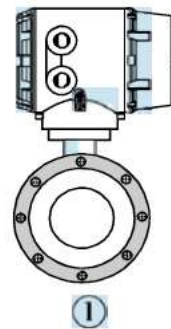
## Remote type

- Remote Electronic converter Box
- Remote type electromagnetic flowmeter
- Signalcable-attached
- Earth plate
- User manual
- Warranty card
- Calibration certificates



## Field type

- Field type electromagnetic flowmeter
- Earth Plate
- User manual
- Warranty Card
- Calibration certificates



## Measuring system

Measuring principle	Faraday's law
Application range	Electrically conductive fluids
<b>Measured value</b>	
Primary measured value	Flow velocity m <sup>3</sup> /h
Secondary measured value	Volume flow m <sup>3</sup>

## Design

Modular construction	The Hydro master flow meter measurement system consists of a flow sensor and a signal converter. It is available as field type and as remote version
Field type version	<p>Power supply - 90-270 V AC with continuous protection up to 440 VAC, 50 Hz</p> <p>Analog Output - Isolated 4-20 mA</p> <p>Digital Output - Pulse. Isolated open collector</p> <p>Communication - Isolated RS485 / MODBUS protocol</p>
Remote type version	<p>Power supply - 90-270 V AC with continuous protection up to 440 VAC, 50 Hz</p> <p>Analog Output - Isolated 4-20 mA</p> <p>Digital Output - Pulse. Isolated open collector output</p> <p>Communication - Isolated RS485 / MODBUS protocol</p>

## Measuring, operating & installation conditions

Operating condition	<p>Flow conditions similar to ISO4064/OIMLR49</p> <p>Flow medium - water</p> <p>Electrical conductivity of fluid <math>\geq 20 \mu\text{s/cm}</math></p> <p>Temperature range rubber lining 55 °C max</p> <p>Temperature range PTFE lining 150 °C max</p> <p>Inlet section - need to maintain minimum 5D</p> <p>Analog Output - Isolated 4-20 mA</p> <p>Operating pressure - 1 to 5 bar</p>
Flow meter accuracy	$\pm 0.5 \%$
Measurement range	0.1 m/s to 5 m/s

## Materials of construction

Sensor housing	Stainless steel materials Gr 304
Measuring tube	Stainless steel materials Gr 304
Flanges	<p>Standard - Carbon steel Gr A105</p> <p>Optional - Stainless steel</p>
Liner	<p>Rubber</p> <p>PTFE</p>
Connection box (only for remote version)	Coated die cast aluminum
Measuring electrodes	<p>Standard - SS316</p> <p>Optional - Hastelloy C, Titanium, Tantalum</p>
Grounding rings	SS304

# General Specifications



Powersupply	90-270 VAC with continuous protection up to 440 VAC, 50 Hz
Powerconsumption	TBD
Signal Input	Induced EMF picked up by sensors in the flowtube
Coil Drive	Constant Current/Frequency
<b>Interface</b>	
Display	128x64 graphical LCD display
Operations	Using 4 keys/Bluetooth (Optional)
<b>Outputs</b>	
Analog Output	Isolated 4-20 mA
Digital Output	Pulse. Isolated open collector output
Communication	Isolated RS485/MODBUS protocol
Isolation Voltage	1.5 KV
Relay Outputs	2 Maximum*
Relay Rating	5 A at 220 VAC linear load
Programmable Setpoints	4
<b>Parameters</b>	
Flow Rate	m <sup>3</sup> /hr. Forward flow indicated with a "+" sign and Reverse flow with a "-" sign
Forward/Reverse	Indicated on Screen
TotalFlow	· Forward Total · Flow Reverse Total Flow · Resettable Total Flow
Date/Time	From Inbuilt RTC
Flow K Factor	0.00001 to 1.99999
Events	Setpoint #1 event Low Flow Peak Flow Leak Detect #1 Empty Pipe No Flow
Errors and alarms	Setpoint #2 Alarm Coil cut Coil Short RTC Failure Memory Fail Sensor Open Sensorshort Leak Detect #2
Data Logging Features	Feature available only on select models
Stored Profiles	Billing Profile Periodic Survey Profile Events/Alarm Profile Health Profile
<b>Communication Features</b>	
Serial Communication	RS485/MODBUS Protocol
Communication Options	Wireless Mesh, GSM 2G/3G/4G. NBloT, LoRa, Wi-Fi, Bluetooth BLE
<b>Memory</b>	
Memory	1MB
Noofrecordsstored	Please see table of profiles
Record Storage Interval	Programmable Minimum: 1 Minute Maximum: 1 Day
Memory Type	Non-Volatile memory
MemoryRetention	100 years
<b>Environmental</b>	
Max.Operating Temperature:	55 °C
StorageTemperature	0-80 °C
Humidity	0-80% non-condensing
Housing	Your scope
<b>Process connections</b>	
<b>Flanges</b>	
ISO 7005	DN 50 to DN 600
ASMEB 16.5	DN 50 to DN 600
DIN 1092-1	DN 50 to DN 600

# Flow range



## Accuracy class 1

Sl no	Size	Q1 Minimum flow rate m <sup>3</sup> /hr	Q2 Transitional flowrate m <sup>3</sup> /hr	Q3 Nominal flowrate m <sup>3</sup> /hr	Q4 Maximum flow rate m <sup>3</sup> /hr	Ra value Q3/Q1
1	DN 50	1.5	2.52	63	78.75	40
2	DN 80	2.5	4	100	125	40
3	DN 100	4	6.4	160	200	40
4	DN125	4	6.4	160	200	40
4	DN 150	6.25	10	250	312	40
5	DN 200	10	16	400	500	40
6	DN 250	10	16	400	500	40
7	DN 300	15	25	630	787	40
8	DN 350	15	25	630	787	40
9	DN 400	25	40	1000	1250	40
10	DN 450	25	40	1000	1250	40
11	DN 500	40	64	1600	2000	40
12	DN 600	40	64	1600	2000	40

## Accuracy class 2

Sl no	Size	Q1 Minimum flow rate m <sup>3</sup> /hr	Q2 Transitional flowrate m <sup>3</sup> /hr	Q3 Nominal flowrate m <sup>3</sup> /hr	Q4 Maximum flow rate m <sup>3</sup> /hr	Ra value Q3/Q1
1	DN 50	0.315	0.504	63	78.75	200
2	DN 80	0.5	0.8	100	125	200
3	DN 100	0.8	1.28	160	200	200
4	DN 125	0.8	1.28	160	200	200
4	DN 150	1.25	2	250	312.5	200
5	DN 200	2	3.2	400	500	200
6	DN 250	2	3.2	400	500	200
7	DN 300	3.15	5.04	630	787.5	200
8	DN 350	3.15	5.04	630	787.5	200
9	DN 400	5	8	1000	1250	200
10	DN 450	5	8	1000	1250	200
11	DN 500	8	12.8	1600	2000	200
12	DN 600	8	12.8	1600	2000	200

# Selection of models



## Hydromaster series remote type


Model name	Hydro master Remote type
Available diameter	DN 50 to DN 600
Type of lining	Rubber, PTFE (Standard) Polyurethane (optional)
Flanges	Carbon steel Gr. A105 (Standard) Stainless steel (optional)
Sensor/electrodes	SS 316 (Standard) Hastelloy C, Titanium, Tantalum (Optional)
Flow velocity	0.1 to 5 m/s Low flow as low as 0.01 m/s
Flow range	63 to 4000 m <sup>3</sup> /hr
Accuracy	± 0.5%
Communication	GSM 2G/3G/4G, NbloT, Wi-Fi, Bluetooth BLE, LoRa, Wireless Mesh
Water proof resistance	IP68
Alarms	Open/short coil alarms Sensor open/short alarms Low Flow / Peak Flow / Leak Detect Alarms Built-in Empty pipe detection
Electronics & electrical Features	128 x 64 Graphical backlit display Pulsed DC operation Programmable digital filters Inbuilt RTC and non-volatile memory to save periodic flow records 4-20mA isolated current output Isolated pulse output Isolated RS485 output Programmable Relay output Batch Control Operation Batch start stop from RS485 commands



## Hydro master series Field type

Model name	Hydro master Field type
Available diameter	DN 50 to DN 600
Type of lining	Rubber, PTFE (Standard) Polyurethane (optional)
Flanges	Carbon steel Gr. A105 (Standard) Stainless steel (optional)
Sensor/electrodes	SS 316 (Standard) Hastelloy C, Titanium, Tantalum (Optional)
Flow velocity	0.1 to 5 m/s Low flow as low as 0.01 m/s
Flow range	63 to 4000 m <sup>3</sup> /hr
Accuracy	± 0.5%
Communication	GSM 2G/3G/4G, NbloT, Wi-Fi, Bluetooth BLE, LoRa, Wireless Mesh
Water proof resistance	IP68
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Reliable flow measurement  
saves water and protects our  
environment

# Basic working for Hydromaster Flow meter



## The Digital Signal Processor core

The heart of the system is the DSP core which controls the entire working of the flow meter. A highly integrated and efficient SMPS is used to power the various building blocks of the unit. The SMPS and other power blocks are controlled by the PMU (Power management unit). The core is responsible for pulsed DC timing, converting the amplified signal using high resolution ADC, digitally filtering the samples and calculating flow velocity, rate flow and integrating total flow. Both Forward and Reverse flow are calculated.

## RTC (Real Time Clock/Calendar)

Time keeping is done by a RTC (Real time clock). This keeps a tab on time, date and the calendar. Apart from keeping time the RTC helps the microcontroller in informing the main controller when it is time to save data into the internal memory.

## Non-Volatile Memory

The internal memory blocks consist of a set of non-volatile modules capable of storing large amounts of data. This module is powered ON when required by the controller. Data is stored in the form of profiles.

The following profiles are available

- Instantaneous Profile
- Billing Profile
- Periodic Profile
- Events and Alarm Profile
- Health Profile

## Measurement

Hydro master uses the pulsed DC measurement technique. Here the current through the coils is changed in direction every few time intervals. This creates a pulsed magnetic field which changes in direction every few milli seconds. The induced EMF is measured by a reference electrode and two main electrodes. The signals are amplified using a instrumentation pump before feeding to the very high resolution Analog to Digital Converter (ADC).

## Multi point Calibration Feature

For higher accuracy and to preserve linearity across the flow range a multiple point calibration technique is used. It is possible to achieve  $\pm 0.2\%$  accuracy with this calibration technique. Instead of one flow calibration factor multiple calibration factors are used for different segments of flow rate.

## User Interface

The Graphical LCD and the keys make the display and user interface mechanism. The keys can be used to display flow, change screens, change setting and the various other functions of the flow meter.

Advanced models have a Bluetooth BLE interface which can be used along with a smart phone. Smart phone app will be provided free of charge. The user interface can be used for instantaneous values, reading the profiles, configuring the settings and for diagnostics (authorized technicians only).



# Customer end diagnosis/analysis



These datasets give the user extensive data to analyse the actual flow pattern and consumption pattern analysis.

## **Water Supply Analysis**

We can get accurate data on when water was available for supply, quantum of water supplied, rate at which it was supplied. For the above analysis we give the low flow, no flow, no water and peak flow time.

## **Line Sizing Analysis**

This helps identify whether the correct flow meter size was chosen for this application. To help in this we give the time of low flow, time of peak flow and time of no flow. This data can be correlated with the actual supply conditions to check if the selected flow meter size was optimal.

## **Maintenance Warning**

Alarm data can be used to analyse the health of the meter. Advance warnings can be generated to make sure meter failures can be identified in advance.

## **Failure Warning**

Alarm data will indicate the failure of flow meters and the actual cause.

## **Consumption Analysis**

Accurate data regarding water consumption can be analysed for various meters in the network to ensure water demand analysis according to time of day and according to month, weekends, festivals and other temporary demand conditions.

## **Communication Health Analysis**

This data can be used to ascertain the effectiveness of the type of communication chosen and how to strengthen them.

## **Billing data Analysis**

Can be used to bill the customer in time and also analyses the consumption pattern.

## **Failure Analysis**

Wealth of diagnostic data provided helps us identify failure modes and root cause for the failure. This will help in servicing the meter in time and to avoid future failure modes.

Areas of application for electromagnetic flow meters of the Hydro-master series: acids, drinks, alkalis etc.

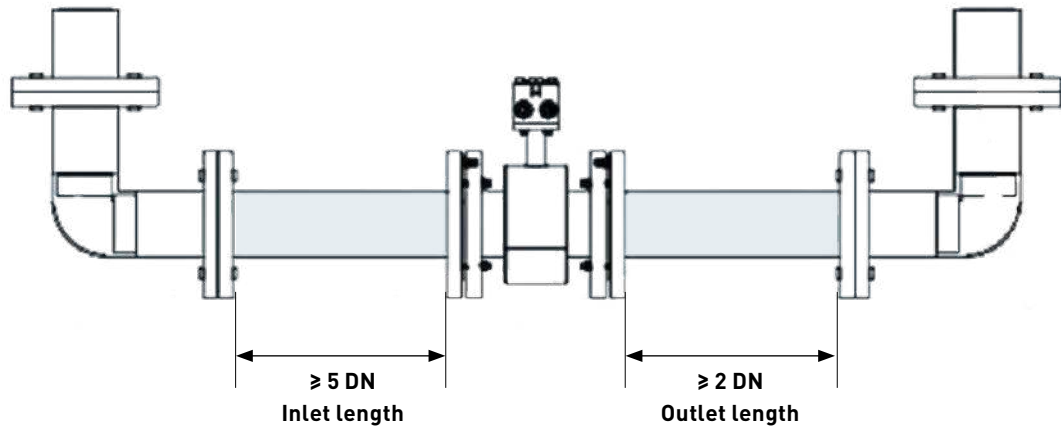


# Installation instructions



For the highest measuring accuracy recommended to follow the below paragraphs of mounting condition.

## Inlet & outlet lengths



## Bends

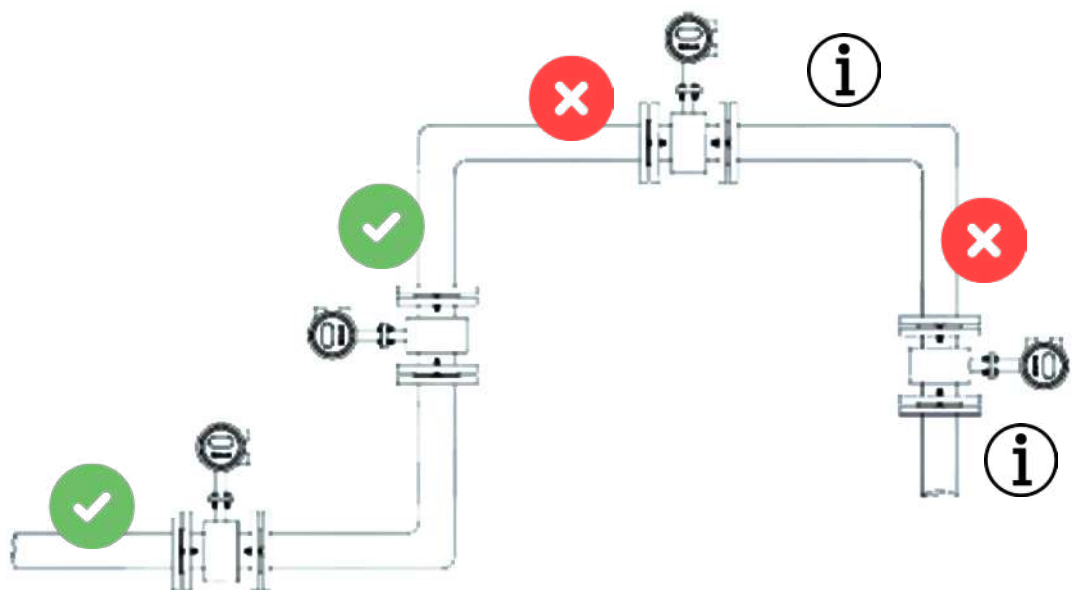
### Installation in bending pipes 90°



Recommended installation positions are at a lowered or ascending section of the pipeline installation. Installation at the highest point will enlarge the risk of flowmeter malfunction, because of air/gas bubbles.

Vertical installation in combination with an open discharge has to be avoided.

Graphical representation with bends



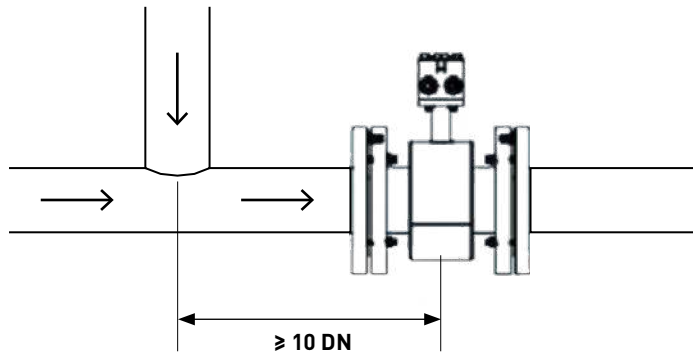
### Caution!

Avoid draining or partial filling of the flow sensor.



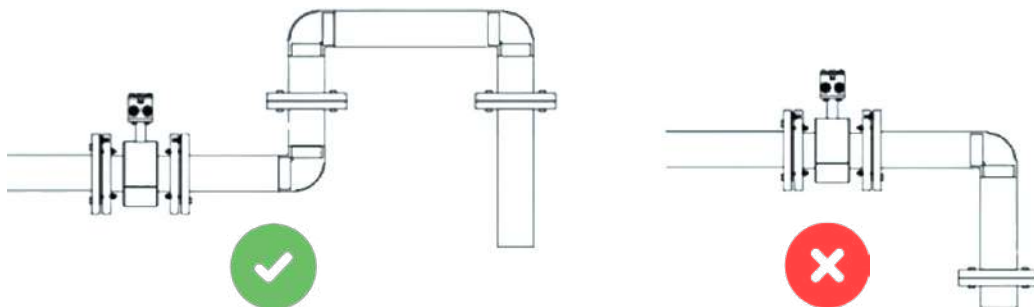
## T section

Installation of flow meter behind a T section



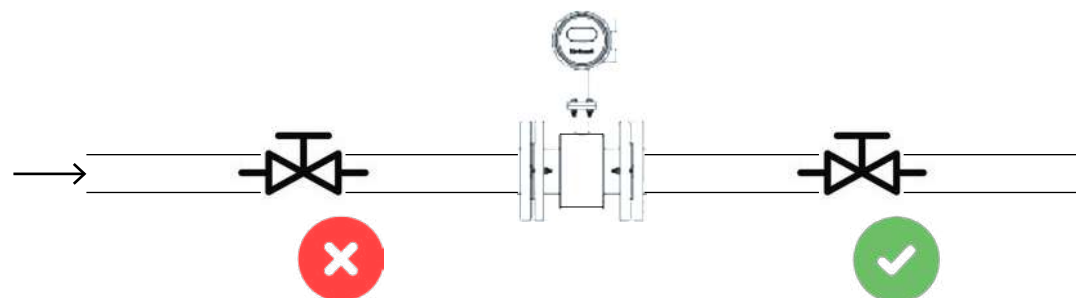
## Open discharge

Installation of flow meter in front of an open discharge



## Control valve

Installation of flow meter in front of a control valve



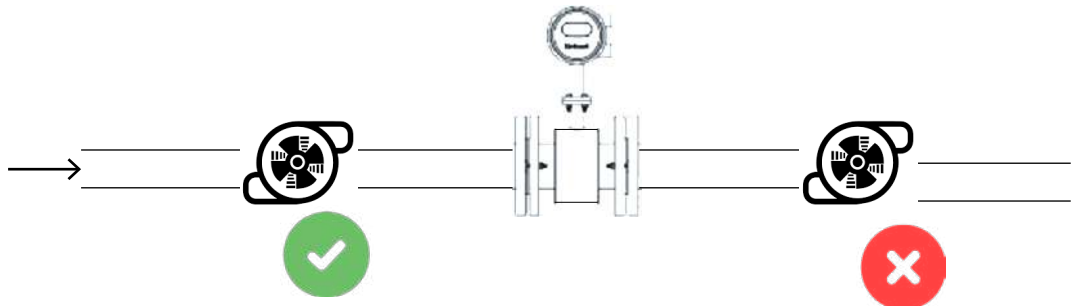
Recommended position to install a flowmeter is downstream a control valve.

An electromagnetic flowmeter can be installed upstream of the control valve there is no cavitation in the pipeline system (e.g. flow profile disturbances are resolved).



## Pump

### Installation behind a pump

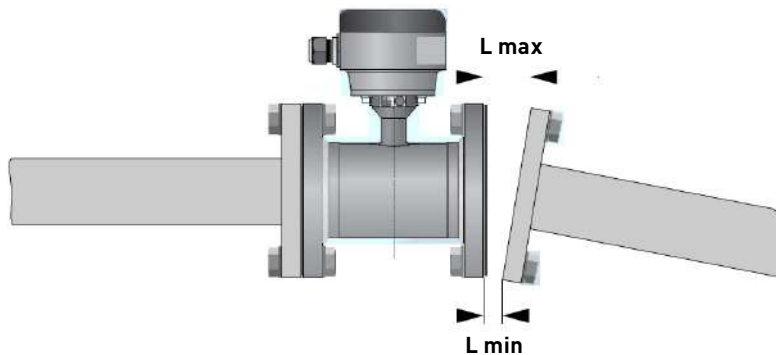


Recommended position to install a flowmeter is downstream a pump (on a position where the flow disturbances of the pump are resolved).

An electromagnetic flowmeter can be installed in the suction line of a pump if there is no cavitation in the pipeline system

## Flange deviation

### Flange to pipe deviation allowance below

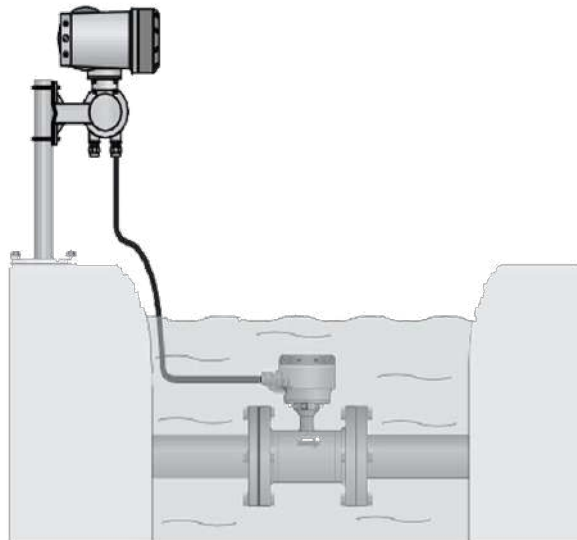


Max. permissible deviation of pipe flange faces:  $L_{max} - L_{min} 0.5 \text{ mm} / 0.02''$

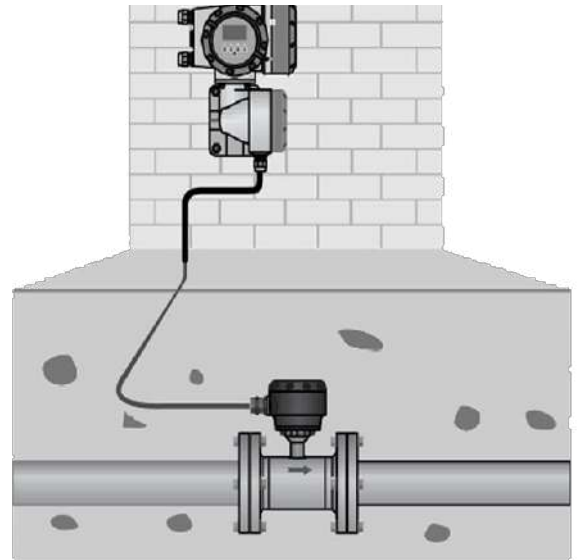


## Installation in submersible and buried conditions

### Installation in submersible condition



### Installation in buried condition



- The Hydro master series flow meter is rated IP68 and is suitable for temporary submersion in flooded measurement chambers. The flow sensor can withstand a 10-meter water column and can be installed (buried) underground also (optional coating for subsurface application).
- The remote version of the Hydro master series signal converters are IP66/67 rated and can be installed in a dry area on the wall of the measuring pit for visual read out of the display.
- It is recommended to place the cables in a protective tube. The standard IP 68 field version is available for special (customer installed) applications. Customer specified cables can be applied by the installer and connected according to IP68 with the separate delivered two-component resin. Contact Product Support Hydronett team.

## Mounting



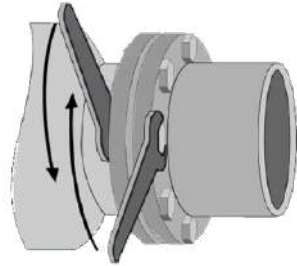
### Caution!

Please take care to use the proper gasket to prevent damaging the liner of the flowmeter. In general, the use of spiral wound gaskets is not advised, as it could severely damage the liner of the flowmeter.



## Flange tight torques and pressures

The maximum pressure and torques values for the flowmeter are theoretical and calculated for optimum conditions and use with carbon steel flanges.



### Tightening of bolts

- Always tighten the bolts uniformly and in diagonally opposite sequence.
- Do not exceed the maximum torque value.
- Step 1: Apply approx. 50% of max. torque given in table.
- Step 2: Apply approx. 80% of max. torque given in table.
- Step 3: Apply 100% of max. torque given in table.

### Maximum flange bolt tightening torques as per ISO 7005

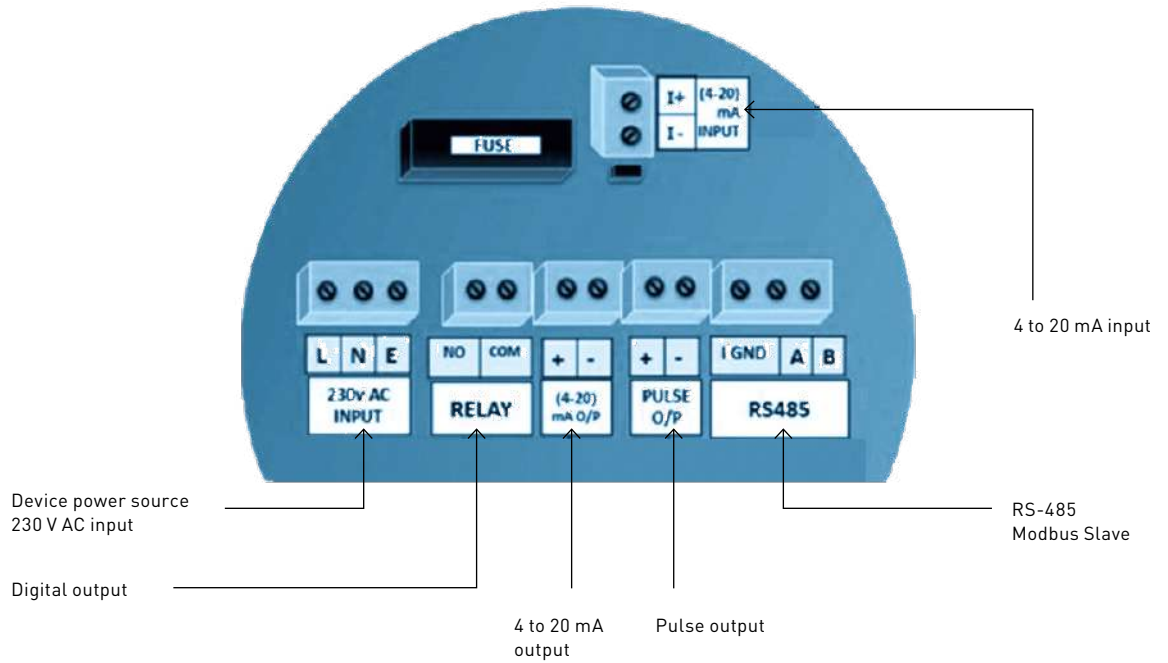
Nominal size DN (mm)	Pressure rating	Bolts	Max. torque (Nm) <sup>1</sup>	
			PTFE	Hard rubber
50	PN 10	4 x M 16	45	43
80	PN 16	8 x M 16	53	45
100	PN 16	8 x M 16	57	47
150	PN 16	8 x M 20	99	68
200	PN 16	8 x M 20	94	69
250	PN 16	12 x M 20	132	72
300	PN 16	12 x M 24	179	122
350	PN 16	16 x M 20	192	168
400	PN 16	16 x M 24	228	220
450	PN 16	20 x M 24	224	212
500	PN 16	20 x M 24	275	310
600	PN 16	20 x M 27	295	325



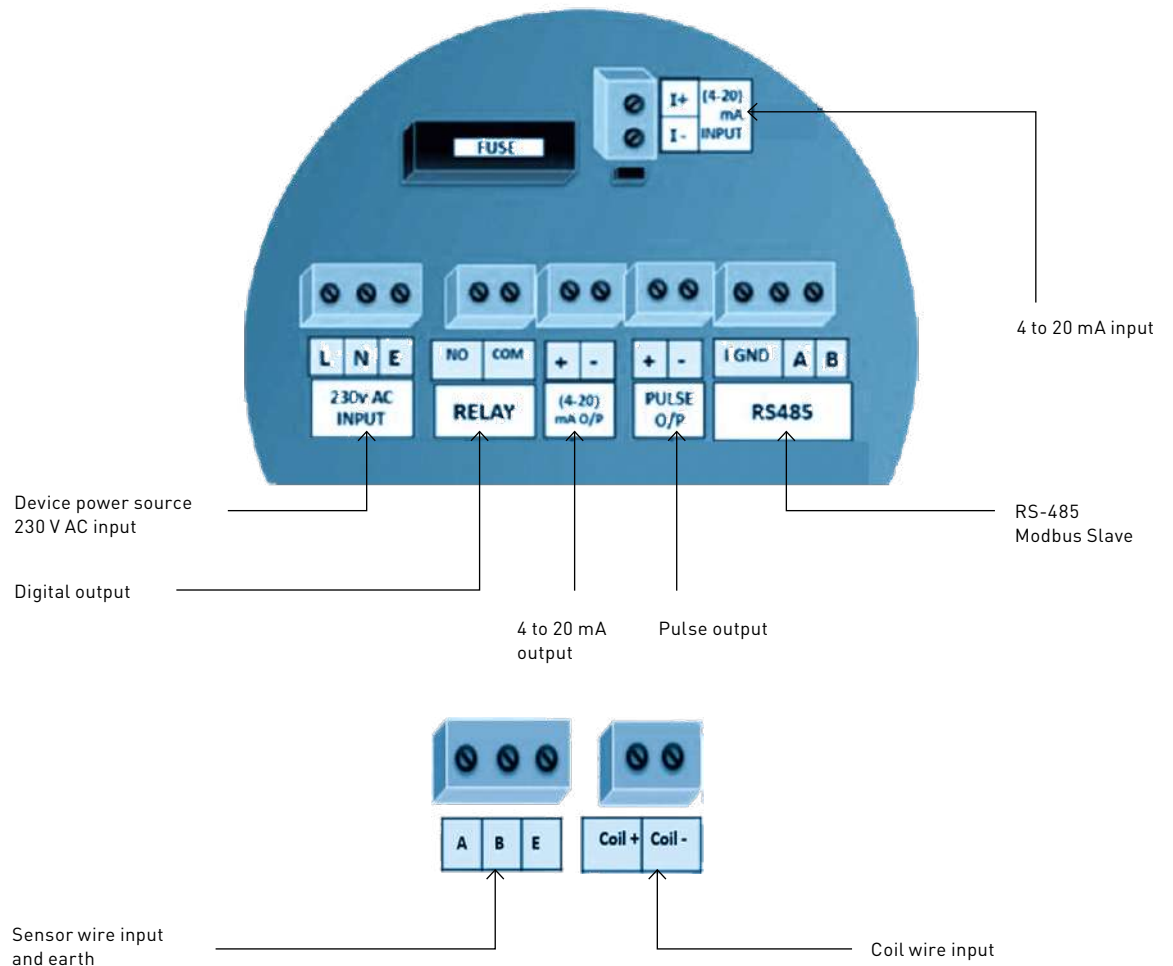
# Electrical connections

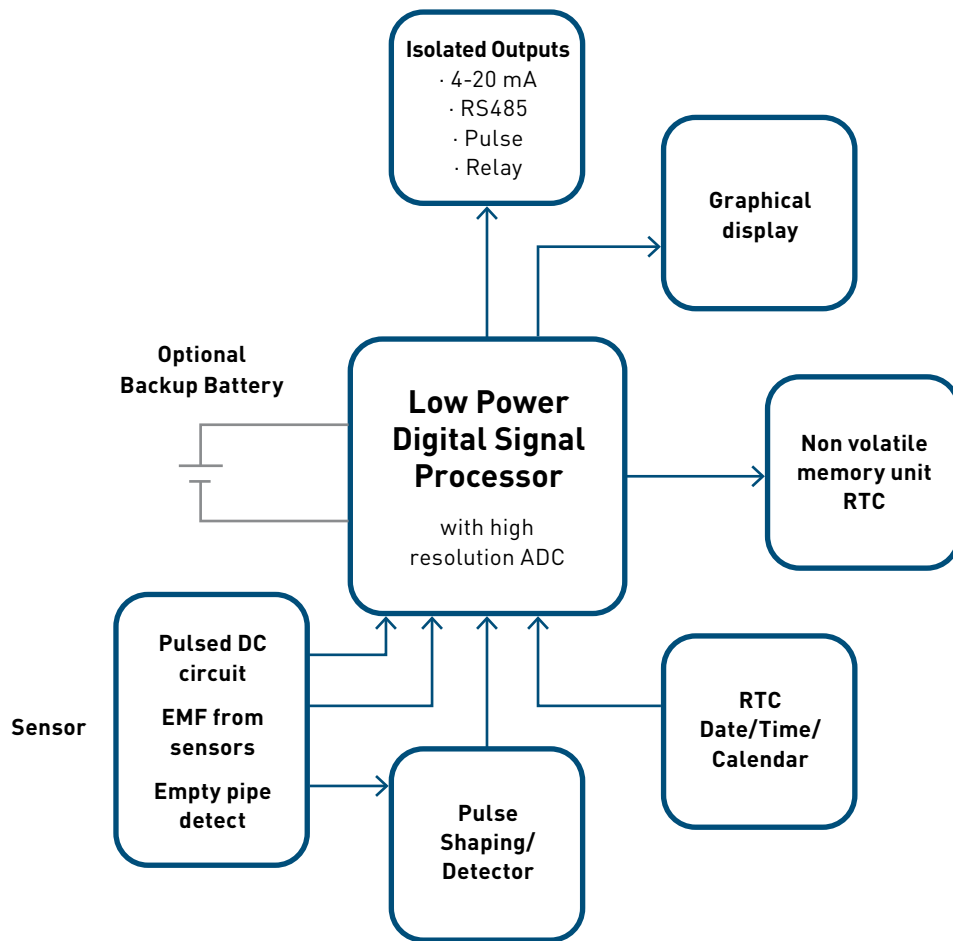


## Hydromaster field type

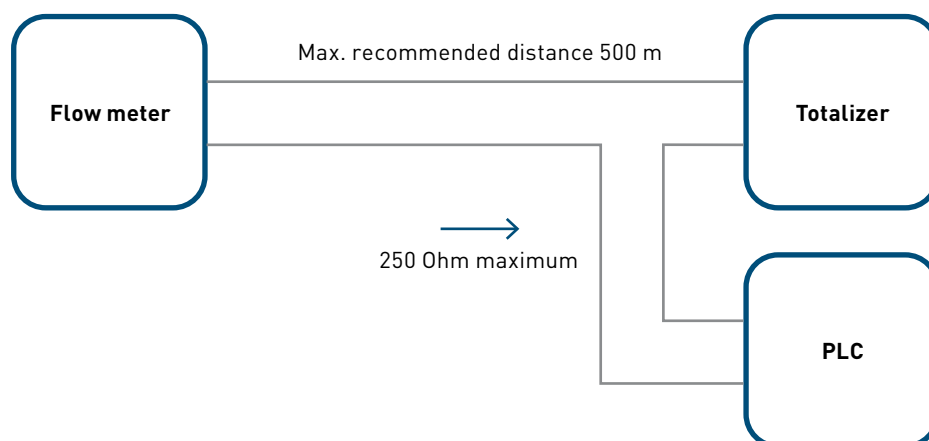


## Hydromaster remote type





## 4- 20 mA output



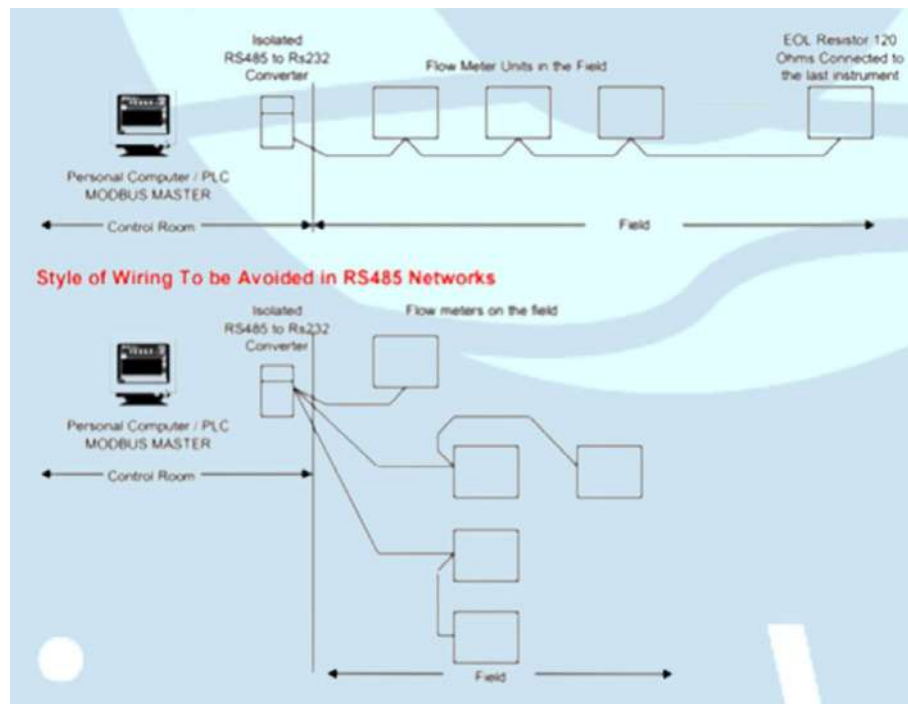
The isolated 4-20mA output is proportional to the flow rate calculated inside the Hydro master. This information is converted to an analog value by a Digital to Analog Converter (DAC) and then to 4-20mA by electronic circuit. Isolation ensures that ground paths between various systems do not destroy electronics.



### Recommended output current settings for various line sizes

Linesize in mm	Output Current Settings in m <sup>3</sup> /h		Output Current Settings in m <sup>3</sup> /h	
	Velocity: 2.5 m/s Maximum		Velocity: 5 m/s Maximum	
	4 mA	20 mA	4 mA	20 mA
50	0	17.6	0	35.2
80	0	45.2	0	90.4
100	0	70.6	0	141.3
125	0	110.4	0	220.8
150	0	159	0	318
200	0	282.6	0	565.2
250	0	441.5	0	883
300	0	635.8	0	1271.7
350	0	865.4	0	1731
400	0	1130.4	0	2260.8
450	0	1430.6	0	2861.3
500	0	1766.2	0	3532.5
750	0	3974	0	7948
1000	0	7065	0	14130
1200	0	10173.6	0	20347

### RS485 communication output (MODBUS)



Hydro master comes with standard RS485 / MODBUS protocol to export data to the outside world. All information like rate flow, forward flow, reverse flow, programmable parameters and other host of information can be read from the flow meter. In addition to reading the pa-

rameters the programmable parameters can be remotely programmed using the RS485 interface. Here are the standard parameters that can be read and written.



### MODBUS registers details

Address	Parameter	R/W
0	Rate of Flow (Low Word)	R
1	Rate of Flow( High Word)	R
2	Total Flow Forward (Low word)	R
3	Total Flow Forward (High Word)	R
4	Total Flow reverse (Low Word)	R
5	Total Flow reverse (High Word)	R
6	Total Flow Forward Before Decimal Point (Low word)	R
7	Total Flow Forward Before Decimal Point (High word)	R
8	Total Flow Reverse Before Decimal Point (Low word)	R
9	Total Flow Reverse Before Decimal Point (High word)	R
000A	Date 32 (Low word)	R
000B	Date 32 (High word)	R
000C	Reserved	R
000D	Reserved	R
000E	Batch Total Flow (Low word)	R
000F	Batch TotalFlow (High word)	R
190	Rate Flow Setpoint #1 Max	R/W
193	Rate Flow Setpoint #1 Min	R/W
195	Rate Flow Setpoint #2 Max	R/W
197	Rate Flow Setpoint #2 Min	R/W
199	Relay Mode #1	R/W
201	Relay Mode #2	R/W
203	4 mA Value	R/W
205	4 mA Value	R/W
0207 - 0225	Reserved	R/W
226	System	R/W
228	Log Interval	R/W
230	Reserved	R/W
232	Reserved	R/W
234	Filter	R/W

### Details of Batch Operation controlled through MODBUS communication.

To set a batch flow use the 10 functions. Write the total flow allowed in the batch to address 08.

Value in Hex	Description
1	Slave ID
10	FunctionID
0	Batch total flow address high byte
8	Batch total flow address low byte
0	No of registers high
2	No of registers low
4	Byte account
aa	Batch flow MSB of high word
bb	Batch flow LSB of high word
cc	Batch flow MSB of low word
dd	Batch flow LSB of low word
CRCH	CRC high byte
CRCL	CRC low byte

Value in Hex	Description
1	Slave ID
6	FunctionID
3	Batch control address high byte
FE	Batch control address low byte
0	Control word high
aa	Control word low
CRCH	CRC high byte
CRCL	CRC low byte

To start the batch, send a 06 function to address 03fe shown below.

Where?

aa is the control word.

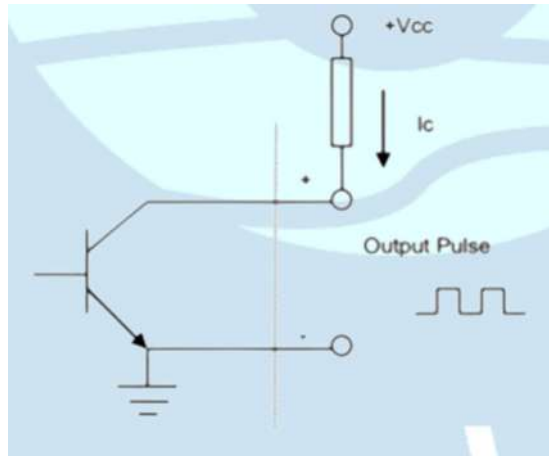
aa = 1 (Start the batch), aa = 2 (Stop the batch)



### Pulse output

Consists of fixed pulses per liter or per m<sup>3</sup> of flow passed in the line.

Equivalent Circuit for Pulse Output



### Recommended pulse output interface connections

- Note1: Current  $I_c = (+V_{cc} - 0.3) / \text{Pullup Resistor Value}$
- Note 2: Voltage above the maximum pullup voltage will irreversibly damage the meter output.
- Note3: Pullup resistor selection that results in current above the maximum current will irreversibly damage the meter output

Item	Value
Pulse output Type	Open Collector (NPN)
Maximum Pullup Voltage (+Vcc)	30 Volts
Minimum Pullup Voltage (+Vcc)	5 Volts
External Pullup Resistor Minimum	To be chosen so that current $I_c$ does not exceed 20mA. See Note 1
External Pullup Resistor Maximum	To be chosen so that current $I_c$ does not fall below 1mA. See Note 1
Over Voltage Protection	Not provided. See Note 2
Over Current Protection	Not provided. See Note 3

Note 1: Current  $I_c = (+V_{cc} - 0.3) / \text{Pullup Resistor Value}$

Note 2: Voltage above the maximum pullup voltage will irreversibly damage the meter output.

Note 3: Pullup resistor selection that results in current above the maximum current will irreversibly damage the meter output



### Recommended Pulse Output Interface Connections

Line size in mm	Pulse Weight Settings in ml/Pulse Velocity: 5 m/s Maximum		Pulse Weight Settings in ml/Pulse Velocity: 10 m/s Maximum	
	Minimum*	Maximum	Minimum*	Maximum
15	1	65535	2	65535
20	2	65535	5	65535
25	3	65535	5	65535
32	5	65535	9	65535
40	7	65535	13	65535
50	10	65535	20	65535
80	26	65535	51	65535
100	40	65535	79	65535
125	62	65535	123	65535
150	89	65535	177	65535
200	157	65535	314	65535
250	246	65535	491	65535
300	354	65535	707	65535
400	628	65535	1256	65535
500	982	65535	1963	65535
750	2208	65535	4416	65535
1000	3925	65535	7850	65535
1200	5652	65535	11304	65535
1500	8832	65535	17663	65535
2000	15700	65535	31400	65535
3000	35325	65535	65535	65535

### Relay Outputs

Hydromaster can be shipped with a relay output which is programmable for batch operation or simple alarm operation based on rate flow. This is a useful mechanism for alerting the user for under flow / high flow and other alarms

### SetPoint Relay Activation Mode

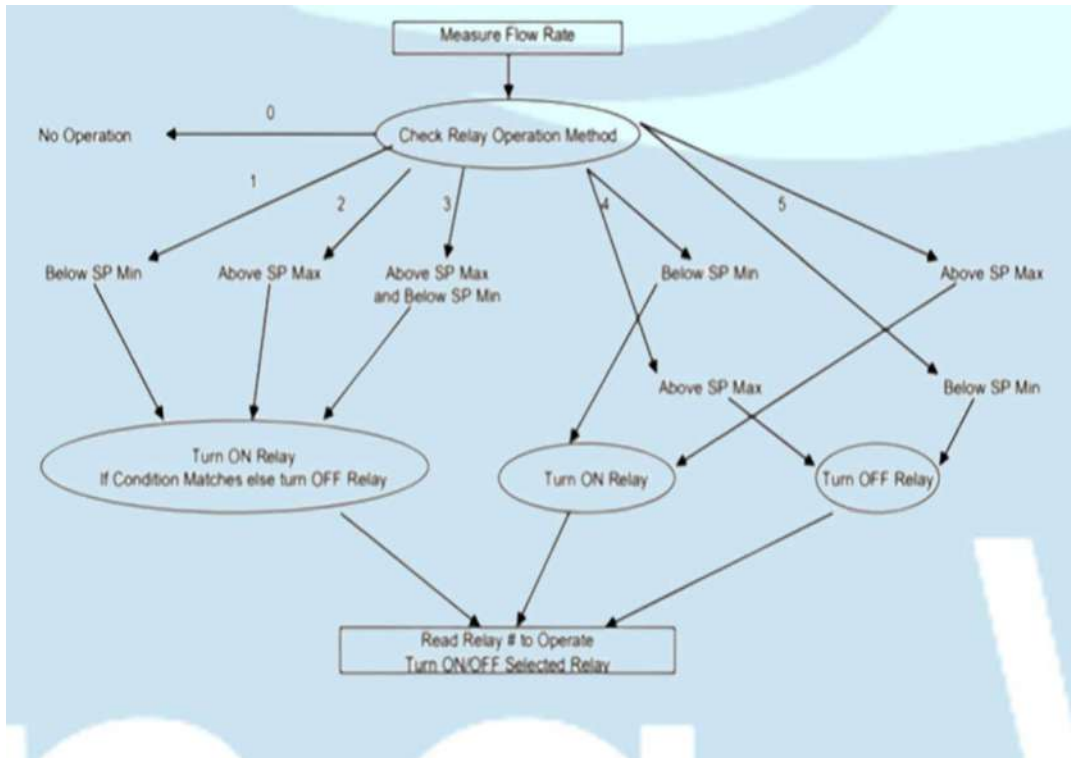
Value	Relay Operation
0	Not activated
1	Activate relay below Flowrate Setpoint Minimum
2	Activate relay above Flow rate Setpoint Maximum
3	Activate relay below Flowrate Setpoint and above Flow rate Setpoint Maximum
4	Activate Relay below Flow rate Setpoint Minimum. Deactivate Relay after Flow rate Setpoint Maximum
5	Activate Relay above Flow rate Setpoint Maximum. Deactivate Relay below Flow rate Setpoint Minimum
6	Batch Mode Operation



### Batch mode operation

Batch mode operation can be controlled both from the keys provided or from RS485 communication interface. Batch mode operation allows you to Preset a batch volume and start the batch. Relay is ON as soon as the batch is started. Relay is OFF when the batch volume is complete. This relay can be used to switch ON/OFF pumps or valves to control the amount of water.

### Block diagram of relay operation for setpoint

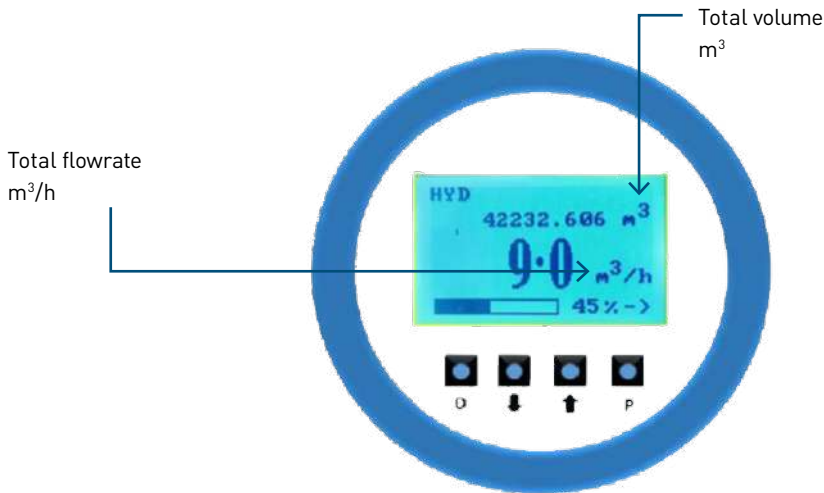




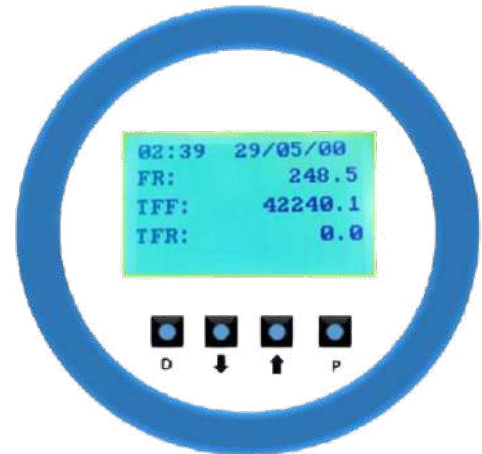
## Display & Keys

Hydromaster series

Screen 1



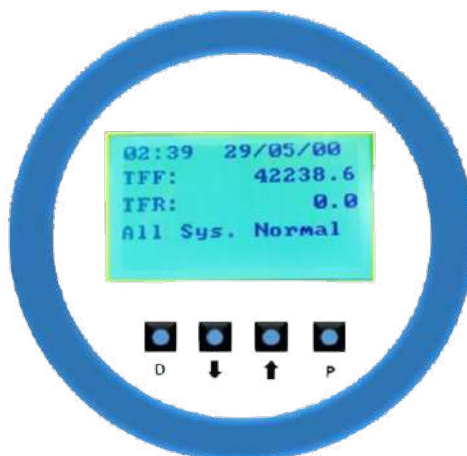
Screen 2



- Line: 1) it displays company name & Alarm indication.
- Line: 2) it displays total flow with units as Liter or Cubic meter (Based on system settings).
- Line: 3) it displays flow rate with units/ Liter per hour/ Liter per min/ Liter per sec/ Cubic meter per hour/ Cubic meter per min/ Cubic meter per sec (Based on system settings).
- Line: 4) it displays bar graph representation of flow rate with numerical percentage & direction of flow.

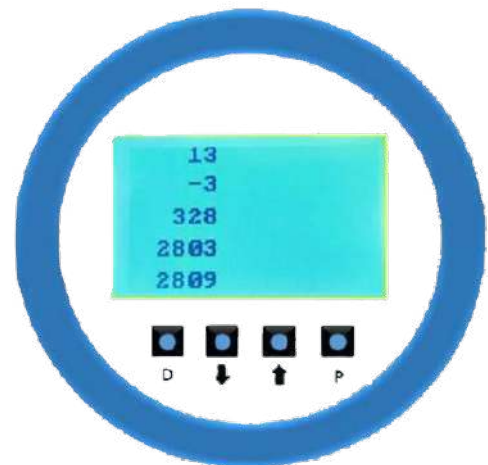
- Line: 1) it displays date & time.
- Line: 2) it displays flow rate.
- Line: 3) it displays total flow forward.
- Line: 4) it displays total flow Reverse.

Screen 3



Screen 4

Diagnostics screen for service engineer

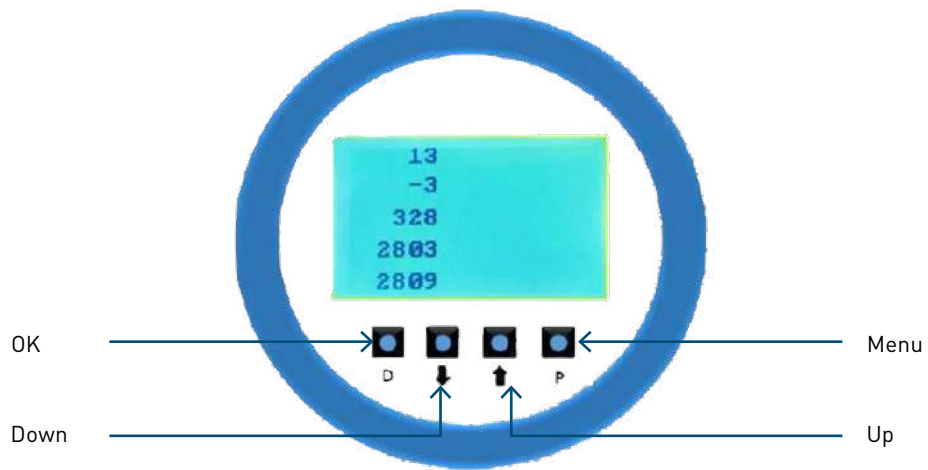


- Line: 1) it displays date & time.
- Line: 2) it displays total flow forward.
- Line: 3) it displays total flow Reverse.
- Line: 4) it displays Alarm indication





## Keys



### Password and Settings:

- Password Protects programming menu alone.
- It should start up with numerical number.
- To enter into to the programming menu.
- Press "PKey".

Enter the password, Password is a 3[1, 2, 3] digit number. Press "Up" key to increment the number or "Down" key to decrement the number. To move to the next digit place, press the "P" key. To exit the Programming menu, press the "D"



Password should be entered in order to access to menu



# Alarm and Error informations in display

- Setpoint #2 Alarm
- Coil cut
- Coil Short
- RTC Failure
- Memory Fail
- Sensor Open
- Sensor short
- Leak Detect #2

## Troubleshooting

Symptom	Solution
No display & No output signals	Check the input supply voltage
	Check the power supply fuse
	If the above mentioned are working properly then there should be a defect in electronic parts kindly replace/order the spare electronic box
Measured value visible but no output-signals at current and pulse outputs	Electronicboxdefective/replace/reorderspareelectronic box
Water flow available but electronic box showing empty indication	Check sensor & coil wire connections between flow tube & electronic box
	Check diagnostics screen 4 for example if 400 is the cutoff setted for empty pipe. If the third line is showing below the set value then it is considered as empty . so kindly re set to the value to the below level of shown value
No waterflow and pipe also empty. But display showing reading	Check diagnostics screen 4 for example if 400 is the cutoff setted for empty pipe. If the 3rd line in the display is showing above 400 then it is considered as no empty pipe detected. so kindly reset the value to above the displayed value
Waterflow available but in display flow readings is not showing	Check diagnostics screen 4firstline . If the first line is showing negative then it means flowtube is not mounted as per flow direction. If the mounting is as per flow direction but still showing negative/ minus in the first line then it means coil wire should be inter-changed. Check sensor, earth, coil wire connections between flow tube & electronic box are properly connected. Check the coil resistance is OK
Waterflow available but in display diagnostics screen ADC value not showing	If the above are working properly still issue occurs then kindly disassembly flow meter from the pipe line and check the sensor screw to the sensorwire continuity is OK/not ok. If all the above are working properly still issue occurs then kindly replace the electronic box



## Intended use



### Caution!

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator



### Information!

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose

### Warning!

If the device is not used according to the operating conditions (refer to chapter Technical information's), the intended protection could be affected.

### Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect or incidental and consequential damages.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.

### Product liability and warranty

The operator shall bear responsibility for the suitability of the device for the specific purpose. The manufacturer accepts no liability for the consequences of misuse by the operator.

Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective "Standard Terms and Conditions" which form the basis for the sales contract shall also apply

### Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements and accident prevention regulations.

If you the manual is not in local language or if your are unable to understand the contents in the manual request to contact the Manufactures service team for safe instructions

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appear in the form of icons as shown below.

### Safety instructions for operator

In general, devices from the manufacturer may only be installed, commissioned, operated and maintained by properly trained and authorized personnel.

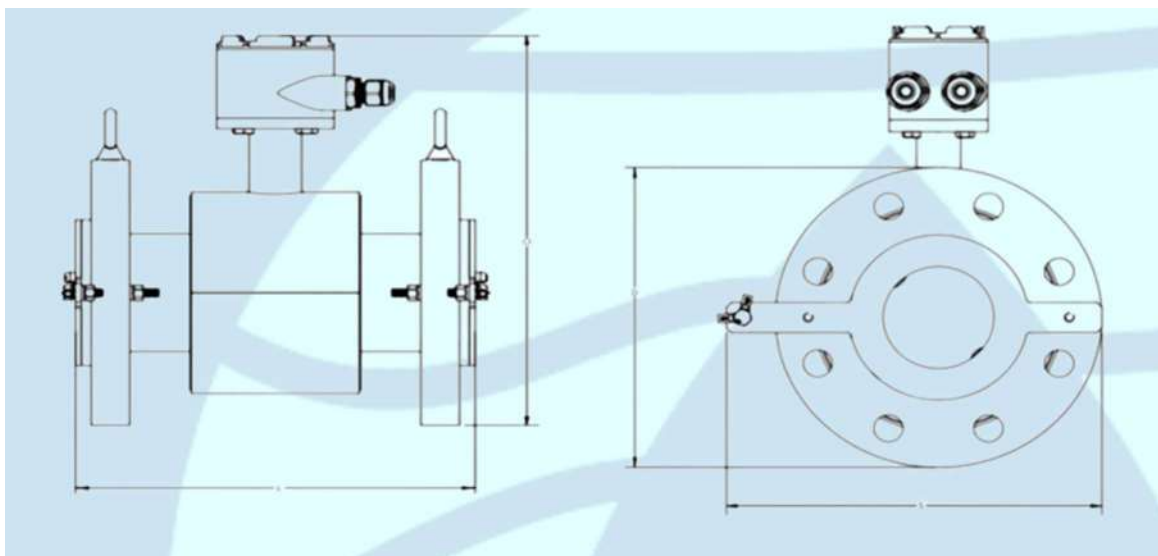
This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device



# Sizing charts and Dimensions

## Field mount type

SLNO	Model ID	Schedule	Lining	DN	Pressure Nominal	Length L	Outer diameter D	Total height H	Transmitter Box Length A	Transmitter Box Height M	Earth plate Length S
1	Hydro Master50 Series	10	PTFE/ Rubber	50	PN6/PN10/PN 16/ PN20/PN25/ PN40	206	165	387	238	120	195
2	Hydro Master80 Series	10 & 40	PTFE/ Rubber	80	PN6/PN10/PN 16/ PN20/PN25/ PN40	206	200	426	238	120	230
3	Hydro Master100 Series	10 & 40	PTFE/ Rubber	100	PN6/PN10/PN 16/ PN20/PN25/ PN40	258	220	449	238	120	264
4	Hydro Master150 Series	10 & 40	PTFE/ Rubber	150	PN6/PN10/PN 16/ PN20/PN25/ PN40	309	285	480	238	120	320
5	Hydro Master200 Series	10 & 40	PTFE/ Rubber	200	PN6/PN10/PN 16/PN20/PN25/ PN40	356	340	595	238	120	393
6	Hydro Master250 Series	10 & 40	PTFE/ Rubber	250	PN6/PN10/PN 16/ PN20/PN25/ PN40	456	405	635	238	120	420
7	Hydro Master300 Series	10, 40& STD	PTFE/ Rubber	300	PN6/PN10/PN 16/PN20/PN25/ PN40	506	460	685	238	120	505
8	Hydro Master350 Series	10, 40& STD	PTFE/ Rubber	350	PN6/PN10/PN 16/ PN20/PN25/ PN40	506	520	735	238	120	560
9	Hydro Master400 Series	10, 40& STD	PTFE/ Rubber	400	PN6/PN10/PN 16/ PN20/PN25/ PN40	606	580	790	238	120	605
10	Hydro Master500 Series	10,40& STD	Ptfe /Rubber	500	PN6/PN10/PN 16/PN20/PN25/ PN40	806	715	915	238	120	730
11	Hydro Master600 Series	10,40& STD	Ptfe /Rubber	600	PN6/PN10/PN 16/ PN20/PN25/ PN40	806	840	950	238	120	855






## Remote type

SLNO	Model ID	Schedule	Lining	DN	Pressure Nominal	Length L	Outer diameter D	Total height H	Transmitter Box OD	Transmitter Box Height G	Earth plate Length S
1	Hydro Master 50Series	10	PTFE/Rubber	50	PN6/PN 10/PN 16/PN 20/PN25/ PN40	206	165	260	61	64	195
2	Hydro Master 80Series	10 & 40	PTFE/Rubber	80	PN6/PN 10/PN 16/PN 20/PN25/ PN40	206	200	294	61	64	230
3	Hydro Master 100 Series	10 & 40	PTFE/Rubber	100	PN6/PN 10/PN 16/PN 20/PN25/ PN40	258	220	333	61	64	264
4	Hydro Master 150 Series	10 & 40	PTFE/Rubber	150	PN6/PN 10/PN 16/PN 20/PN25/ PN40	309	285	394	61	64	320
5	Hydro Master 200 Series	10 & 40	PTFE/Rubber	200	PN6/PN 10/PN 16/PN 20/PN25/ PN40	356	340	365	61	64	393
6	Hydro Master 250 Series	10 & 40	PTFE/Rubber	250	PN6/PN 10/PN 16/PN 20/PN25/ PN40	456	405	496	61	64	420
7	Hydro Master 300 Series	10,40&STD	PTFE/Rubber	300	PN6/PN 10/PN 16/PN 20/PN25/ PN40	506	460	551	61	64	505
8	Hydro Master 350 Series	10,40&STD	PTFE/Rubber	350	PN6/PN 10/PN 16/PN 20/PN25/ PN40	506	520	557	61	64	560
9	Hydro Master 400 Series	10,40&STD	PTFE/Rubber	400	PN6/PN 10/PN 16/PN 20/PN25/ PN40	606	580	609	61	64	605
10	Hydro Master 500 Series	10,40&STD	PTFE/Rubber	500	PN6/PN 10/PN 16/PN 20/PN25/ PN40	806	715	733	61	64	730
11	Hydro Master 600 Series	10,40&STD	PTFE/Rubber	600	PN6/PN 10/PN 16/PN 20/PN25/ PN40	806	840	840	61	64	855

# Warranty details



 <b>Warranty Card</b>	
ModelName	
PartNo./Serial No.	
CustomerName/ Address	
City/Country	PinCode
<b>CustomerContact Number</b>	
<b>SaleDate</b>	
<b>Seal</b>	
<b>OneyearWarrantyfromdateofSale</b>	
M/s. Hydronett Private Limited, mahendramedu, <b>Navakkarai</b> , madukkarai Coimbatore, India- 641105 <a href="http://www.Hydronett.com">www.Hydronett.com</a>	



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