Truflo® — UltraFlo® UF-500

Clamp-On Ultrasonic Flow Meter Sensor

ICON PROCESS CONTROLS™ Corrosion-Free Instrumentation Equipment™

Quick Start Manual

truflo®

Read the user's manual carefully before starting to use the unit.
Producer reserves the right to implement changes without prior notice.

Safety Information

- De-pressurize and vent system prior to installation or removal
- Confirm chemical compatibility before use
- **DO NOT** exceed maximum temperature or pressure specifications
- **ALWAYS** wear safety goggles or face-shield during installation and/or service
- **DO NOT** alter product construction

Warning | Caution | Danger

Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, or failure, injury, or death.

Do Not Use Tools

Use of tool(s) may damage produced beyond repair and potentially void product warranty.

Intended Use

The **UltraFlo®** ultrasonic flow meter should only be used for measuring the flow of pure, homogeneous liquids - it is not intended for use in medical applications!

The volume flow meter **UltraFlo®** is built in accordance with industry standard EN 61010 regulations (corresponds to VDE 0411 "Safety specifications for electrical measurement, control and laboratory devices").

The manufacturer is not responsible for improper use, losses of work caused by either direct or indirect damage, and for expenses incurred during installation or use of the flow meter.

The manufacturer is not liable for any injury, damage or harm due to inappropriate or unintended use or modifications of the flow meter. Conversions and/or changes to the flow meter may only be made, if they are expressly performed in accordance with the operating instructions in this operating manual.

Personnel for Installation, Commissioning, and Operation

All operations described in this instruction manual (i.e. assembly, electrical installation, commissioning and maintenance of the flow meter) must be carried out only by trained personnel or an accredited person. The qualified personnel must have read and understood the operating instructions in this manual and must follow said instructions accordingly.

The installer has to ensure that the flow meter is correctly connected according to the electrical connection diagrams in this operating manual.

Serious injury or death from electric shock may occur if wiring, installation, disassembly or removal of wires is performed while electrical power is energized.

Warranty and post warranty service must be exclusively carried out by the manufacturer.

Product Description

The **Truflo® UF-500** series clamp-on ultrasonic flow meters are easy to install with exceptional long life performance and they require no alteration to current piping configurations.

The sensor sends over 50 pulses/sec in order to provide accurate measurement of liquid flow rates in full pipes and can be used in low pressure systems.

Features

- Wide Dynamic Flow Range
- High Accuracy
- Pipe Sizes ½ – 10"
- Lightweight
- Excellent External Corrosion Resistance
- No Contact with Liquid
- No Moving Parts
- Data Logging (day | month | year)
- Suitable for RO | DI Systems
- Simple Programming & Installation

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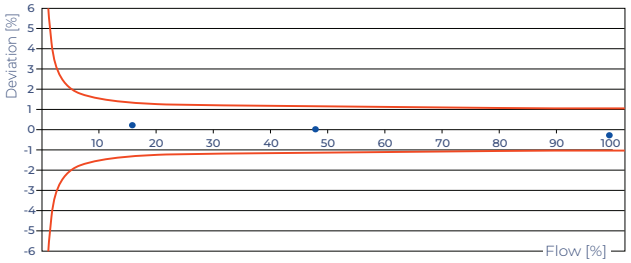
Technical Specifications

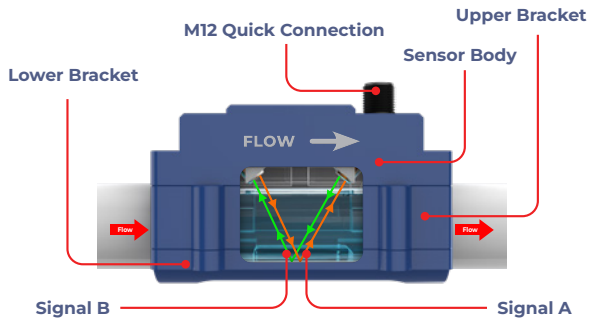
General		
Operating Range	0.3 – 15 ft/s	0.1 – 5 m/s
Pipe Size Range	½ – 10”	DN15 – DN250
Temperature Range	32 to 122°F	0 to 50°C
	32 to 302°F *(HT model)*	0 to 150°C *(HT model)*
Repeatability	±0.8% of max. range @ 25 °C (77 °F)	
Linearity	±2.0% of max. range @ 25 °C (77 °F)	
Output	Pulse | 4-20mA | RS485	
Viscosity Range	10 cPs Max.	
Materials		
Sensor Body	Teflon® Epoxy Coated Aluminum	
Electrical		
Power Supply	24 VDC	
Connection	M12	
Display		
OLED 128 * 64 Dot Matrix		
Totalizer Units		
6-Digit Accumulator		
Standards & Approvals		
CE | FCC | RoHS Compliant		

Measuring Points



Example: Measuring points of a calibrated UltraFlo® UF-500

Working Principle



Other Considerations

Ensure Proper Installation

Proper installation plays a crucial role in ensuring the accuracy of the UF-500 flow meter. Any errors or misalignments during installation can lead to inaccurate measurements. The UF-500 is designed with ease of installation in mind. Installation time is typically less than two minutes.

Installation Location

Selecting an appropriate location away from disturbances such as bends, valves, or pipe irregularities is essential as it will effect the flow profile (see Page 17).

Flow Profile

The flow profile refers to the velocity distribution across the pipe’s cross-section. If the flow profile is not uniform, the accuracy of the ultrasonic flow meter can be compromised. Factors such as bends, valves, or obstructions in the pipe can cause variations in the flow profile. The flow meter’s accuracy can be improved by ensuring a smooth and fully developed flow profile (see Page 17).

Transducer Care

The transducers are the key components of an ultrasonic flow meter that emit and receive ultrasonic signals. The transducer surface should be free from air bubbles, dirt, or deposits which can interfere with the ultrasonic signal. Ensure that the pipe surface is clean and smooth.

Signal Interference

External factors can introduce signal interference, affecting the flow meter’s accuracy. Electrical equipment, nearby machinery, or electromagnetic fields can disrupt the ultrasonic signals. Shielding the flow meter from these interferences or relocating it to a less disruptive environment can help mitigate inaccuracies caused by signal interference.

Pipe Conditions and Material

The condition and material of the pipe through which the liquid flows can impact the accuracy of the ultrasonic flow meter. Irregularities in the pipe, such as corrosion, scaling, or rough surfaces, can cause signal reflections or attenuations, leading to inaccuracies. It is important to regularly inspect the pipe and address any issues promptly to maintain accurate measurements.

Model Selection

UltraFlo® 500 — Clamp-On Ultrasonic Flow Meter		
Size	**Part Number**	**Material**
½”	UF500-A-15	Teflon® Epoxy Coated Aluminum
¾”	UF500-A-20	Teflon® Epoxy Coated Aluminum
1”	UF500-A-25	Teflon® Epoxy Coated Aluminum
1 ½”	UF500-A-40	Teflon® Epoxy Coated Aluminum
2”	UF500-A-50	Teflon® Epoxy Coated Aluminum
3”	UF500-A-80	Teflon® Epoxy Coated Aluminum
4”	UF500-A-100	Teflon® Epoxy Coated Aluminum
6”	UF500-A-150	Teflon® Epoxy Coated Aluminum
8”	UF500-A-200	Teflon® Epoxy Coated Aluminum
10”	UF500-A-250	Teflon® Epoxy Coated Aluminum

Add Suffix -
‘P’ - Pulse Output
‘HT’ - High Temperature

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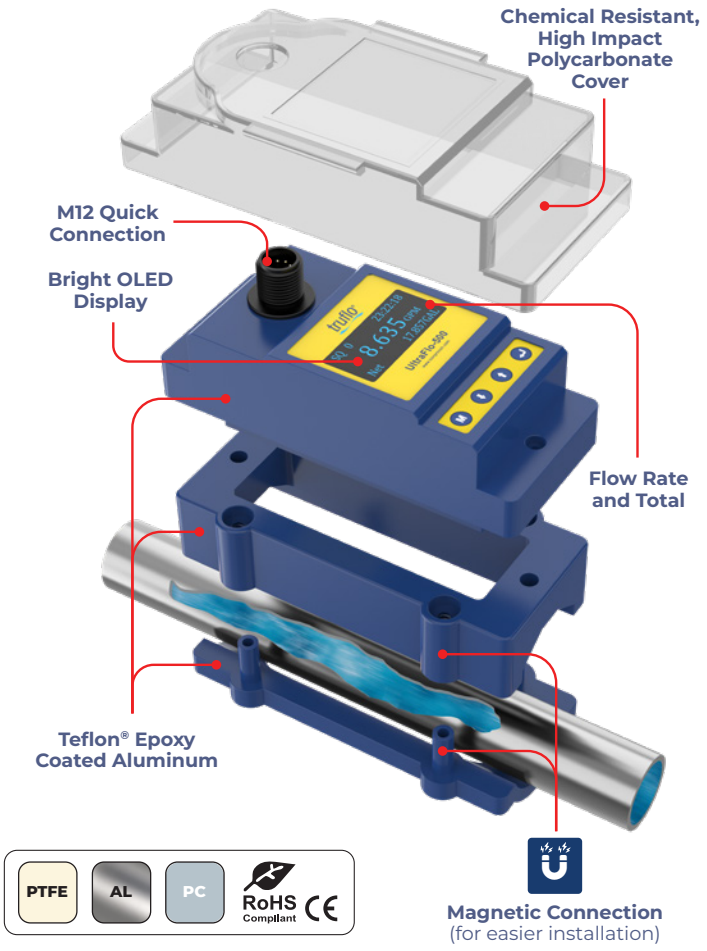
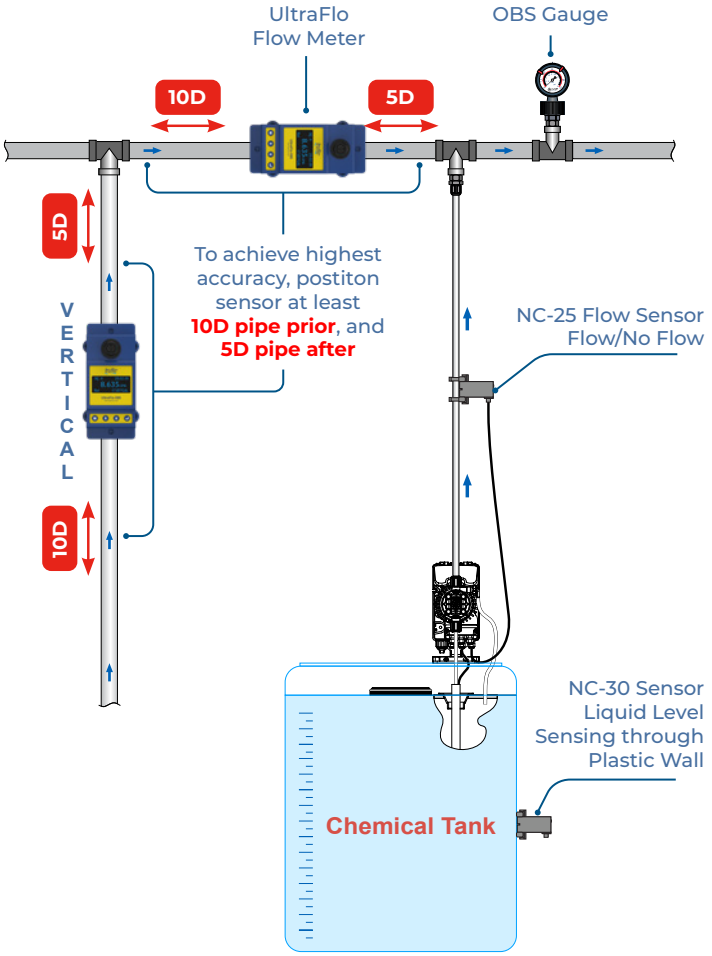
Exploded View



Application Example



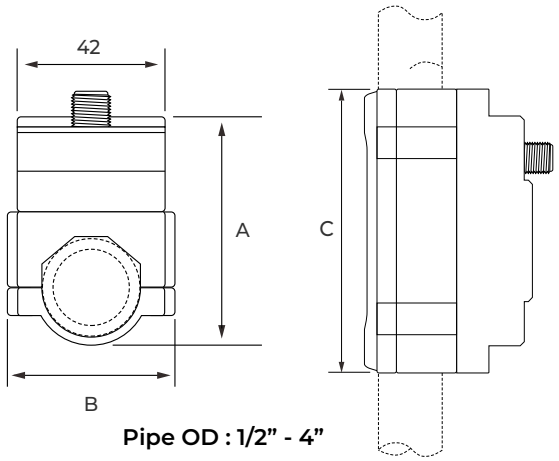
Outside Dimension

Pipe/ Tube Size (mm)	ASME/ANSI	½"	¾"	1"	1 ¼"	1½"	2"	2½"	3"	4"	6"	8"	10"
	OD min.	16.5	22	32	38	48	58	72	86	108	142	196	250
	OD	20	25	32	40	50	63	75	90	110	160	200	250
	OD max.	23	28	35	45	54	64	78	92	116	169	223	277

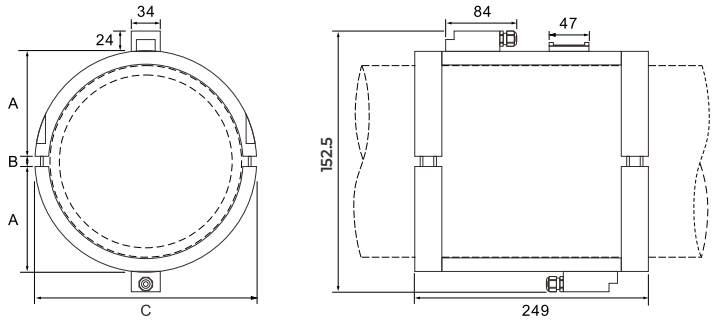
Minimum Flow Range

Size ASME/ANSI		½"	¾"	1"	1 ¼"	1½"	2"	2½"	3"	4"	6"	8"	10"
Flow Range (L/min)	0.03m/s	0.57	0.88	1.45	2.26	3.53	5.61	7.95	11.45	17.1	303	530	867
	0.5m/s	9.4	14.7	24.1	37.7	58.9	93.5	132.5	190.9	285.1	505	884	1445
	1.5m/s	28.3	44.2	72.4	113.1	176.7	280.5	397	572.6	855.3	1600	2651	4336
	5m/s	94.2	147.2	241.2	376.9	588.9	934.9	1325.4	1908.5	2851	5055	8838	14454
Flow Range (Gal/min)	0.03m/s	0.15	0.23	0.38	0.6	0.93	1.48	2.1	3.03	4.52	80.04	140.01	229.04
	0.5m/s	2.48	3.88	6.37	9.96	15.56	24.7	35	50.43	75.32	133.41	233.53	381.73
	1.5m/s	7.48	11.68	19.13	29.88	46.68	74.1	104.88	151.27	225.95	422.68	700.32	1145.45
	5m/s	24.89	38.89	63.72	99.57	155.57	246.97	350.13	504.17	753.15	1335.39	2334.75	3818.34

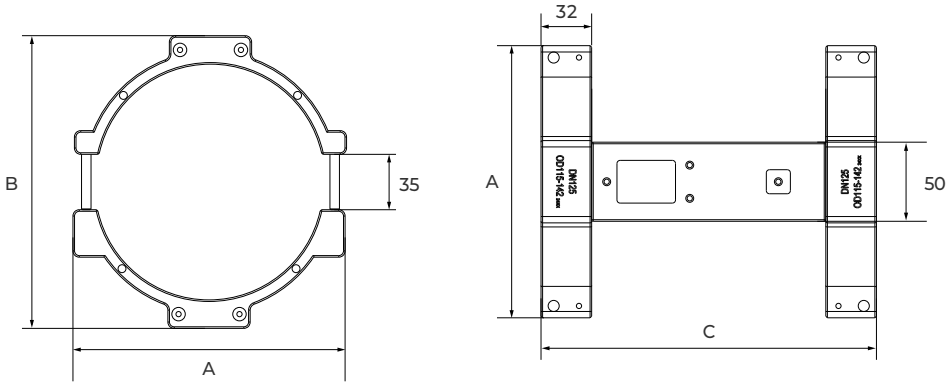
Dimensions

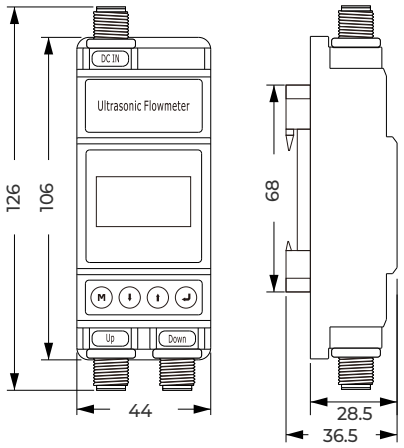


Pipe OD : 1/2" - 4"



Pipe OD : 6"





Pipe OD : 8" - 10"

Model	Pipe OD	OD Range	A (mm) Max.	B (mm)	C (mm)
UF500-15	½"	16.5 - 23	86 (Max.)	58	106
UF500-20	¾"	22 - 28	86 (Max.).	58	106
UF500-25	1"	32 - 35	91 (Max.)	58	106
UF500-40	1½"	48 - 54	110 (Max.)	78	106
UF500-50	2"	58 - 64	126 (Max.)	91	130
UF500-80	3"	86 - 92	154 (Max.)	119	150
UF500-100	4"	108 - 116	177 (Max.)	143	174
UF500-150	6"	158 - 169	199	212	205
UF500-200	8"	196 - 223	253	266	263
UF500-250	10"	250 - 277	307	320	276

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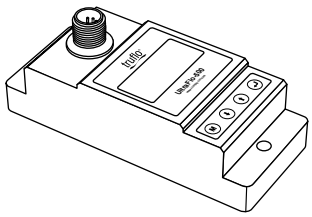
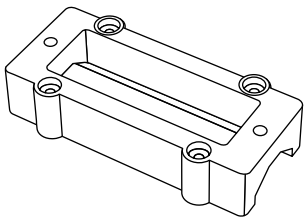
Components

1



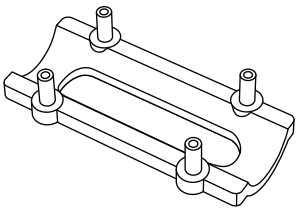
Sensor Body

2



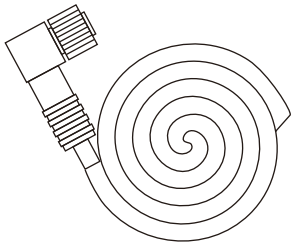
Upper Bracket

3



Lower Bracket

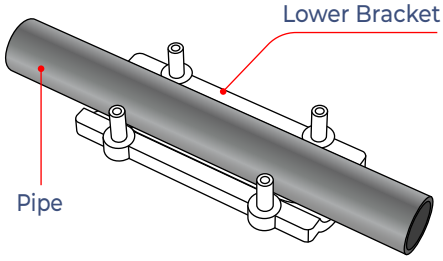
4



M12 Cable

Installation and Connection

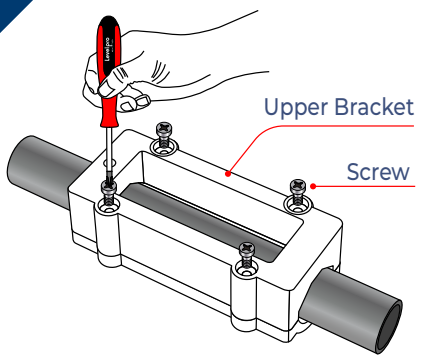
1



Make sure no dirt, paint, or other stains on the surface of the tube.

Position the Lower Bracket on the pipe.

2

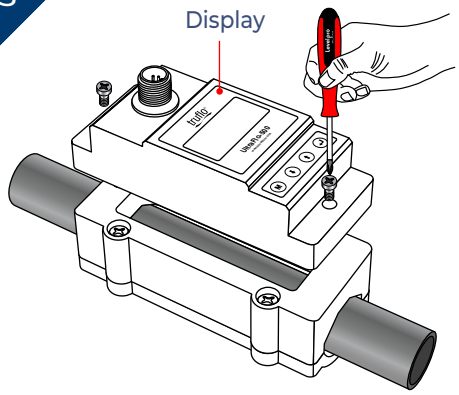


Align Upper Bracket to the pipe position. Magnets will hold brackets in place.

Using the mounting screws, connect Upper and Lower Brackets together.

Ensure parts are snug | DO NOT over-tighten!

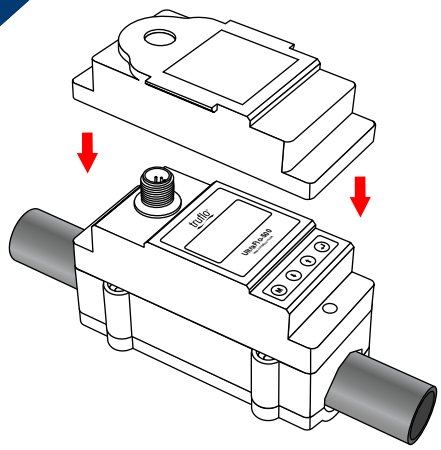
3



Position display over Upper Bracket and connect using the mounting screws.

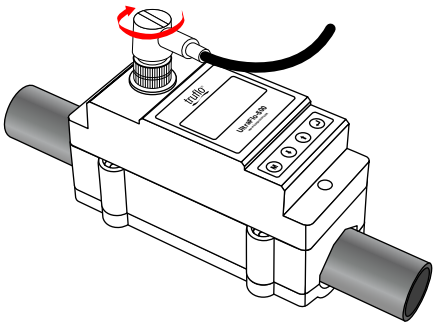
DO NOT over-tighten!

4



Install Polycarbonate Cover.

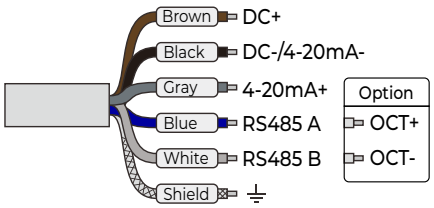
5



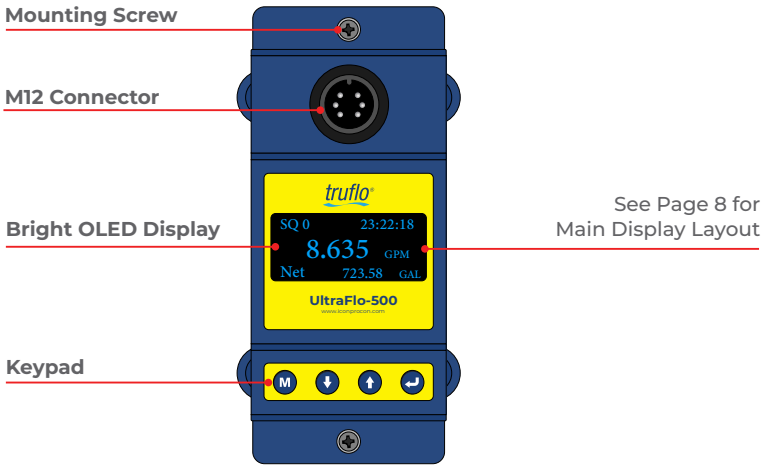
Connect M12 Cable.

6

Wiring Diagram



Display Example



Keypad Functions

Follow these guide lines when using the Flow Meter Keypad :

Press M to Enter Setup Menu or to Return to previous menu during programming.
Press ↓ | ↑ to Select system options.
Press ↓ to Move to the Next Digit.
Press ↑ to Modify Digits (0-9).
Press ↵ to Display Different System Options or to Confirm Selection.

Powering ON

When connected to a VDC Power Supply, the UltraFlo® UF-500 will begin to run a self-diagnosis program.

Signal Quality (SQ Value)

SQ value is short form for Signal Quality. It indicates the level of the signal detected.

SQ value is indicated by numbers from 0-99.

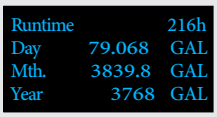
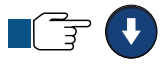
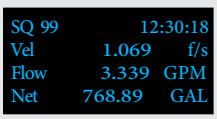
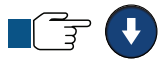
"00" is the minimum signal that could be detected and "99" represents the maximum.

Normally, the transducer position should be adjusted repeatedly and coupling compound should be checked frequently until the signal quality detected is as strong as possible.

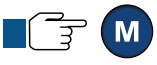
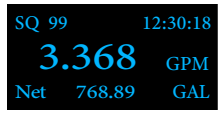
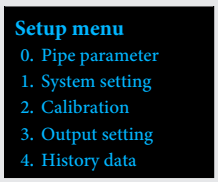
Main Display Layout

Display Features

(Refer to Page 7 for Keypad Functions)

STEPS	DISPLAY	OPERATION
1 Main Display ▸ 		When powered on, digits will appear : · Flow Rate | Totalizer. · Signal Quality (SQ) & Time.
2 Totalizer ▸ 		Runtime | Daily Flow Total | Monthly Flow Total | Yearly Flow Total.
3 Flow Rate | S.TOT Totalizer ▸ 		Flow Rate | S.ToT Totalizer.
4 Flow Rate | Velocity | Net Total. ▸ 		Velocity | Flow Rate | Net Totalizer.
5 Velocity | Net Totalizer ▸ 		Press ⬇ to Display Velocity | Net Totalizer. Press ⬆ to Return to Previous Menu.

Setup Menu

STEPS	DISPLAY	OPERATION
1 Main Display ▸ 		When powered on, digits will appear : · Flow Rate | Flow Total · Signal Quality & Time.
2 Setup Menu ▸ 		Press M to Display Setup menu. Using the ⬇ | ⬆ buttons, the following options are available : 0. Pipe parameter 1. System setting 2. Calibration 3. Output setting 4. History data

Pipe Parameter Setup Menu

(Refer to Page 7 for Keypad Functions)

STEPS	DISPLAY	OPERATION
1 Setup Menu ▸	**Setup menu** 0. Pipe parameter 1. System setting 2. Calibration 3. Output setting 4. History data	Press (M) to Display **Setup menu**. Select "**0. Pipe parameter**", then Press (↵).
2 Pipe Parameter ▸	**Pipe Setting** 0. Outer diameter 1. Wall thickness 2. Material 3. Fluid type	0. Outer diameter : Press (↵) to modify and Use (↑) to change digits and (↓) to move to the next digit. Press (↵) to confirm new outer diameter. Outer diameter 32. 00 mm / Outer diameter 32. 00 mm 1. Wall thickness : Press (↵) to modify and Use (↑) to change digits and (↓) to move to the next digit. Press (↵) to confirm new wall thickness. Wall thickness 2. 00 mm / Wall thickness 2. 00 mm 2. Material : Press (↵) and Use (↓) | (↑) to choose between displayed options. Press (↵) to confirm selection. Material 0. PVC / Material 0. PVC 1. Carbon Steel 2. Steel / Material 3. Copper 4. PVDF 5. PFA / Material 6. PTFE 7. PU 8. Aluminum 3. Fluid type : Press (↵) and Use (↓) | (↑) to choose between displayed options. Press (↵) to confirm selection. Fluid type 0. Water / Fluid type 0. Water 1. Sea Water 2. Oil 3. Other

System Setting Setup Menu

(Refer to Page 7 for Keypad Functions)

STEPS	DISPLAY	OPERATION
1 Setup Menu ▸	**Setup menu** 0. Pipe parameter 1. System setting 2. Calibration 3. Output setting 4. History data	Press M to Display **Setup menu**. Use ↓ to Select "**1. System setting**", then Press ↵.
☞ ↓ + ↵		
2 System Setting ▸	**System Setting** 0. System unit 1. Flow rate unit 2. Total unit 3. Total RESET 4. Time set 5. System lock 6. System INFO 7. Display dir. 8. Damping 9. Display format	0. System unit : Press ↵ and Use ↓ | ↑ to choose between displayed options. Press ↵ to confirm selection. **System unit** 0. Metric → **System unit** 0. Metric 1. English 1. Flow rate unit : Press ↵ and Use ↓ | ↑ to choose between displayed options. Press ↵ to confirm selection. **Flow rate unit** 2. GPM → **Flow rate unit** 0. m3/h 1. LPM 2. GPM 2. Total unit : Press ↵ and Use ↓ | ↑ to choose between displayed options. Press ↵ to confirm selection. **Total unit** 2. GAL → **Total unit** 0. m3 1. L 2. GAL 3. Total RESET : Press ↵ to Reset Parameters. **Total RESET** ENT TO RESET → **Total RESET** ENT TO continue 4. Time set : Press ↵ to modify and Use ↑ to select digits and ↓ to move to the next digit. Press ↵ to confirm new set time. yy-mm-dd 24-06-20 hh:mm 12:30 When modifying, the default is 30 seconds. Generally, it is unnecessary to modify date & time as the system is equipped with a highly reliable perpetual calendar chip.

From Next Page
To Next Page

STEPS	DISPLAY	OPERATION
2 System Setting ▸	**System Setting** 0. System unit 1. Flow rate unit 2. Total unit 3. Total RESET 4. Time set 5. System lock 6. System INFO 7. Display dir. 8. Damping 9. Display format	

5. System lock :

System unlocked ENT to lock	ENT key word 0000	ENT key word System locked OK
System locked ENT to unlock	ENT key word 0000	ENT key word System unlocked OK

When the system is locked, any modifications to the system are prohibited, but the parameter is still readable.

6. System INFO : Press ↵ 5 times to enter Manual Totalizer.

System INFO Flowmeter SN: 30001399 V1.38	Manual Totalizer ENT To Start 0. 00000 m3/h SQ 0 0. 0000 L	Manual Totalizer ENT To Stop 0. 00000 m3/h SQ 0 0. 0000 L

The displayed serial number (SN) of the meter is only assigned to each flow meter ready to leave the factory. The factory uses it for files setup and for management by the user.

Manual totalizer is a seperate totalizer used for flow measurement and calculation.

7. Display dir :

The display direction of the screen can be inverted by a 180° rotation.

Press ↵ and Use ↓ | ↑ to choose between displayed options.

Press ↵ to confirm selection.

Display dir. 0. Normal	Display dir. 0. Normal 1. Inversion

8. Damping :

When the flow regime is unstable and the display value changes greatly, damping can be set to adjust the measurement response speed of the product (unit is in secs.).

Press ↵ to modify and Use ↑ to change digits and ↓ to move to the next digit.

Press ↵ to confirm new damping.

Damping 000	Damping 000

9. Display format :

Press ↵ and Use ↓ | ↑ to choose between displayed options.

Press ↵ to confirm selection.

Display format 0. x 0. 001	Display format 0. x 0. 001 1. x 0. 01 2. x 0. 1 3. x 1

The display digit of the measured value can be set through the zoom function. It is displayed after the decimal point by default 3 digits.

You can choose to display 2 digits after the decimal point, one digit after the decimal point and 0 digits after the decimal point.

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Calibration Setup Menu

(Refer to Page 7 for Keypad Functions)

STEPS	DISPLAY	OPERATION
1 Setup Menu ▸	**Setup menu** 0. Pipe parameter 1. System setting **2. Calibration** 3. Output setting 4. History data	Press M to Display **Setup menu.** Use ↓ to Select "**2. Calibration**", then Press ↵.
2 Calibration ▸	**Calibration** 0. Scale factor 1. 4-20mA CAL 2. Set zero 3. Lowflow cut 4. Manual zero 5. Hi AGC 6. Negative flow	0. Scale factor : Refers to the ratio between the "actual value" and "reading value". For example, when the measurement is 2.00 and it is indicated at 1.98 on the instrument, the scale factor reading is 2/1.98. This means that the best scale factor constant is 1.01. Press ↵ to modify and Use ↑ to change digits and ↓ to move to the next digit. Press ↵ to confirm new scale factor. Scale factor 1.000 → Scale factor 1.000 1. 4-20mA CAL : Check if the current loop has been calibrated before leaving the factory. Press ↵ to correct. Use ↑ | ↓ to change new values. 4mA Calibrate 25492 → 4mA Calibrate 25492 20mA Calibrate 4555 → 20mA Calibrate 4555 · Press ↵ twice to switch between 4mA & 20mA, and at the same time, check with an ammeter to verify that Current Loop output displays values. · It is is necessary to re-calibrate the current loop if over the permitted tolerance. · The displayed value has no meaning, but is only used for internal records. · Check the displayed value of ammeter (multimeter). 2. Set zero : Press ↵ to choose Ent or Reset. Use ↓ | ↑ to move between the two options. Press ↵ to Reset the Zero Point which was set by the user. Set zero / Ent To set zero / Reset zero → Set zero / Press Ent To Go → Set zero / Waiting . . . / SQ 88 / Vel 0.035 f/s Set zero / Ent To set zero / Reset zero → Set zero / Enter To Reset After setting, return to the main interface to see that the flow is "0". If you return to the main interface and the flow is not "0", the setting was unsuccessful and you should check whether the installation is correct or not.

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STEPS	DISPLAY	OPERATION
2 Calibration ▸	**Calibration** 0. Scale factor 1. 4-20mA CAL 2. Set zero 3. Lowflow cut 4. Manual zero 5. Hi AGC 6. Negative flow	

3. Low flow cut :

Flow rate falls below the low flow cutoff value.

Press ↵ to modify. Use ↑ to change digits and ↓ to move to the next digit.

Press ↵ to confirm.

Lowflow cut 0. 0500 m/s	Lowflow cut 0 0500 m/s

This function can prevent that when the pump stops working and the liquid flows at a low speed in the pipe, data accumulation error caused by continuous reading of flow meter. Input is generally recommended 0.05m/s as the low flow cut-off point (**Plastic Version**). The low flow cut-off value is independent of the measurement results.

Generally, pipes made of SS304 or SS316 with wall thickness of more than 2mm will receive false signals due to the interference of pipe wall signals. It is recommended that the low flow rate be cut off at 0.08m/s or above (**Stainless Steel Version**).

4. Manual zero :

Press ↵ to modify. Use ↑ to change digits and ↓ to move to the next digit.

Press ↵ to confirm.

Manual zero 0. 000 GPM	Manual zero 0 000 GPM

This method is not commonly used and is only suitable for experienced operators. Manually input the value and add it to the measured value to obtain the actual value.

5. Hi AGC :

Press ↵ and use ↓ | ↑ to move between OFF and ON.

Press ↵ to confirm selection.

Hi AGC 0. OFF	Hi AGC 0. OFF 1. ON

High gain switch used to amplify pipes when weak signals are detected.

6. Negative flow :

Turn 'ON' if the flow is opposite to the direction indicated in the flow meter.

Press ↵ and use ↓ | ↑ to move between ON and OFF.

Press ↵ to confirm selection.

Negative flow 0. ON	Negative flow 0. ON 1. OFF

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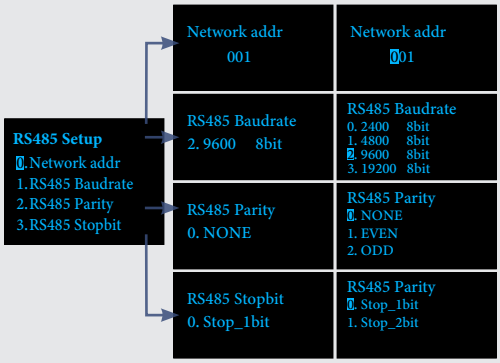
Output Setting Setup Menu

(Refer to Page 7 for Keypad Functions)

STEPS	DISPLAY	OPERATION
1 Setup Menu	**Setup menu** 0. Pipe parameter 1. System setting 2. Calibration 3. Output setting 4. History data	Press M to Display **Setup menu**. Use ↓ to Select "**3. Output setting**", then Press ↵
2 Output Setting	**Output Setting** 0. RS485 Setup 1. 4-20mA range 2. Alarm value 3. OCT output 4. OCT multiplier	0. RS485 Setup :



Press ↵ to change. Use ↓ | ↑ to move between options.

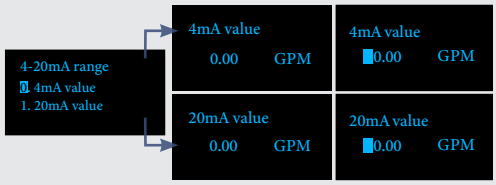
Press ↵ to confirm selection.

This window is used to set RS485 serial port.

It must match the equipment's connected parameters.

8 stopbit is fixed length.

1. 4-20mA range :

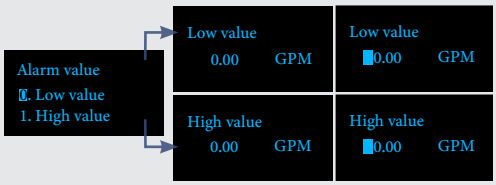


Press ↵ to change. Use ↓ | ↑ to move between options.

Press ↵ to confirm selection.

Set the Current Loop output value according to the flow value at 4mA and 20mA (the default flow unit is GPM).

2. Alarm value (optional) :



Enter the low alarm value; any measured flow lower than the low value, will activate the alarm in the OCT hardware or relay output signal.

Enter the high alarm value; any measured flow higher than the high value, will activate the alarm in the OCT hardware or relay output signal.

3. OCT output (Applicable to OCT output model) :

The OCT output in the flow meter is an isolated collector open circuit output with programmable open and close qualifications.

The user can program the open and close functions under the following conditions: the system alarm signals are being activated or the totalizer pulse is being transmitted.

Pulses provide cumulative output, and the equivalent of each pulse is 0.01L~ 100m3. It can be set through the menu.

The maximum number of pulses output per second is 40.

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STEPS	DISPLAY	OPERATION
2 Output Setting ▸	**Output Setting** 0. RS485 Setup 1. 4-20mA range 2. Alarm value 3. OCT output 4. OCT multiplier	OCT Wiring Diagram :  To select OCT output, an external 5-10K pull-up resistor shall be connected at the OCT + end; Add a 5-24vcd power supply at VDC and com ends, as shown in the figure above. 4. OCT multiplier (Applicable to OCT output model) : Press ↵ and Use ↑ | ↓ to move between the options. Press ↵ to confirm. **OCT multiplier** 3. x1 **OCT multiplier** 0. x0. 001 1. x0. 01 2. x0. 1
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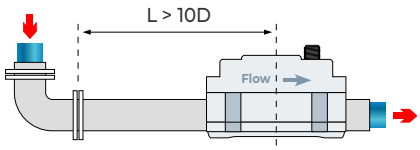
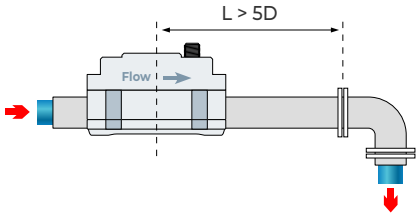
Data Logging Setup Menu

STEPS	DISPLAY	OPERATION
1 Setup Menu ▸	**Setup menu** 0. Pipe parameter 1. System setting 2. Calibration 3. Output setting 4. History data	Press M to Display **Setup menu**. Use ↓ to Select "**4. History data**", then Press ↵. 0. Pipe parameter 1. System setting 2. Calibration 3. Output setting 4. History data
		
2 History Data ▸	**History data** 0. By Day 1. By Month 2. By Year	0. By Day : Display flow total for days. Day 00-23-10-17 FTD 55. 174 GAL Use ↓ | ↑ to scroll between days. 1. By Month : Display flow total for months. Month 00-23-10- FTM 55. 174 GAL Use ↓ | ↑ to scroll between months. 2. By Year : Display flow total for years. Year 00-20232 FTY 55. 174 GAL Use ↓ | ↑ to scroll between years.

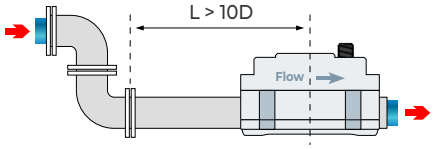
Installation Positions

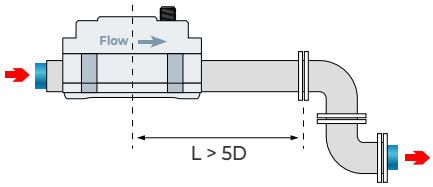
Source : 90° Elbow



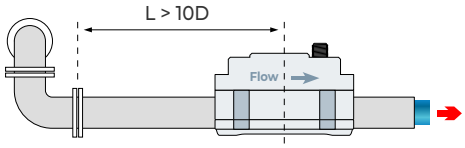


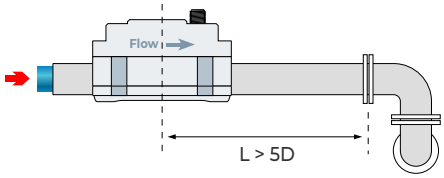
Source : 2 x 90° Elbow in One Plane



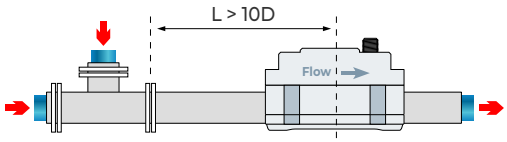


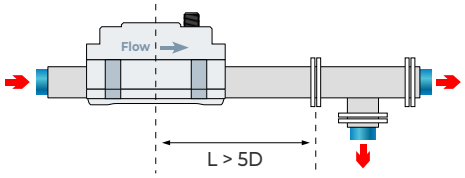
Source : 2 x 90° Elbow in Different Plane



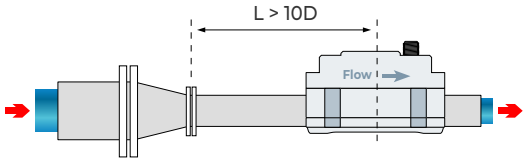


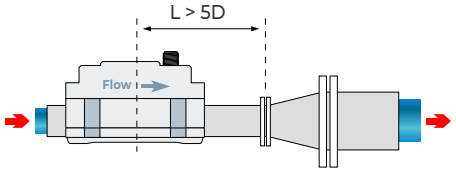
Source : T-Section



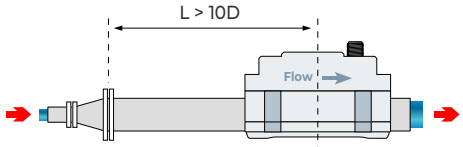


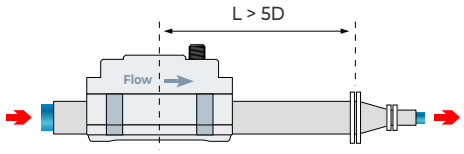
Source : Reducer



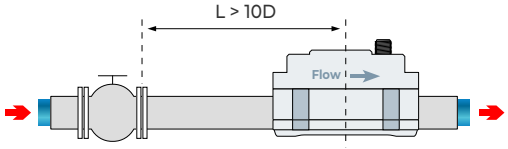


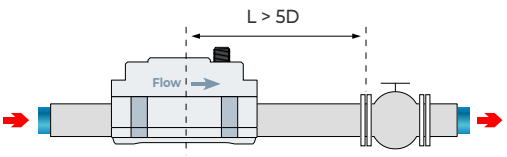
Source : Diffuser





Source : Valve





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3. have been modified or altered;
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5. have been involved in accidents or natural disasters; or
6. are damaged during return shipment to Icon Process Controls Ltd

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