



## USER'S GUIDE

# Installation & Operation Instructions EESIFLO EASZ-10P PORTABLE DOPPLER FLOW METER

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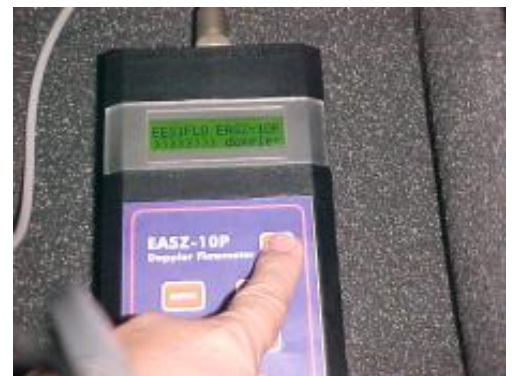
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## Introduction



The EASZ-10P Flow Meter measures the velocity of fluids in pipelines using a totally non-intrusive principle and gives flow rates and total in either METRIC or IMPERIAL units

The EASZ-10P utilises a high speed, 16-bit microprocessor unit with 32-Kbyte FLASH memory. The user-friendly flowmeter comes with a range of features to ensure easy and reliable flow measurement. The flow signal from the flow sensor is continuously analysed and should the signal quality become unacceptable an error message is displayed.

It is designed for use with sewage, waste water, pulp stock, mining slurries, food products and other fluids which contain in excess of 0,1% suspended solids or bubbles. The particle size for successful operation must be greater than 100 microns.

## Sensor mounting

### Location

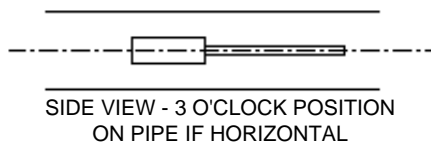
- Select a location for mounting the sensor at a point where the flow profile is fully developed. Generally the principle of 10 pipe diameters of straight pipe upstream, and 5 pipe diameters downstream will suffice, but should valves or bends exist upstream of the sensor, the amount of straight pipe immediately upstream will need to be increased.
- Ensure that the sensor is mounted as far as possible from potential noise sources, such as pumps, control valves etc. and mount the sensor at approximately 3/9 o'clock on the pipe (if horizontal) to avoid errors due to air pockets on top, or sediment at the bottom of the pipe.
- Either vertical or horizontal pipe runs are acceptable for sensor mounting.

### Surface preparation

- Before attaching the transducer head to the pipe surface, an area slightly larger than the flat surface of the transducer must be cleaned to bare metal. (A small amount of pipe pitting, even with spots of paint or rust, will not cause problems).

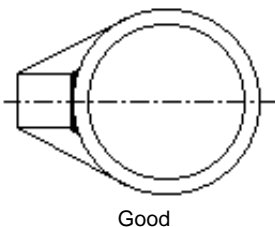
### Orientation

- The transducer must be mounted accurately, parallel to the pipe axis, for correct performance, and transducer to pipe contact should be along the centre line of the transducer head.



### Bonding

- Bonding to the pipe is achieved with silicone coupling compound. Be sure to fill in any air gaps that may remain at the pipe transducer interface with additional compound.
- A pipe clamp kit is included with the flow meter. It includes silicone coupling compound and straps for pipe diameters up to 300 mm. In applications with excessive vibration it is recommended that you purchase optional mounting tracks for tighter fixing



## Keypad System

Pressing the ON/OFF button turns the flowmeter ON and OFF.

- The 10P has an easy to use 4-button programming system.
- The MENU button is used to scroll through the menu structure.
- The SAVE button is used to save entered changes to the flowmeter programme.
- The and buttons are used to change numbers and scroll through options.

## Battery

### Recharging and battery care

- The 10P is supplied with 4 x 1.2V 650mAh AA size Ni-Cd removable cells and a 110/230Vac battery charger.
- Charge battery fully before first use and thereafter recharge only when fully discharged. The 10P will indicate an error message when battery charge is low and automatically switch off.
- The 110/230Vac battery charger supplied as standard with the 10P is a 65mA constant current charger. The 10P should be switched off during charging. The charge time for the 650mAh cells supplied is 14-16 hours (maximum 20 hours). THE CELLS MUST NOT BE OVER CHARGED. Under charging of the cells will reduce the life and capacity of the cells.

### Low power consumption

- The 10P is designed for low power consumption allowing over 10 hours operation before re-charging the battery. The 10P features a Low Battery warning with automatic power down.

### Storage

- If the 10P is to be stored for an extended time period the cells should be removed.

## Menu System (10P Version 1.00)

The 10P menu system is easy to use and designed for programming simplicity.

With the 10P powered up the 10P will test the suitability of the flow signal. If the signal is suitable the flow total and flow rate are displayed, if not an error message is displayed.

00000000 lt 3.9768 l/s
---------------------------

START PROGRAMMING - Press "**MENU**"

### Units

Mn_1	units? Metric
------	------------------

Metric and English units of rate and total measurement are available.  
Press ▲ until desired value is displayed and **MENU** to continue.

### Pipe ID

Mn_2	Pipe ID mm 53.4
------	--------------------

The precise dimension of the pipe internal diameter (ID) at the point of measurement must be entered.

Use the ► button to locate the cursor below the number to be changed and press the ▲ button until the desired value is displayed and **MENU** to continue

### Rate units

Mn_3	rate units? l/s
------	--------------------

Press ▲ until desired unit is displayed and **MENU** to continue.

## Total units

Mn_4	tot units? lt
------	------------------

Press ▲ until desired unit is displayed and **MENU** to continue

## Clear total?

Mn_5	clr total? save total
------	--------------------------

The total can either be cleared or saved.

Press ▲ to either save or clear the total and **MENU** to continue.

## Damping

Mn_6	damping? 5.0 Sec
------	---------------------

The level of damping can be selected.

Press ▲ until desired unit is displayed and **MENU** to continue

## Cut-off

Mn_7	% cutoff 2%
------	----------------

The level of cut-off can be entered.

Press the ▲ button until the desired value is displayed and **MENU** to continue.

## Save data

Mn_8	save data? Press SAVE
------	--------------------------

Press **SAVE** to accept all changes made.

## Error/Warning Messages

Error message	Error	Possible solution
<ul style="list-style-type: none"> <li>poor signal</li> </ul>	<ul style="list-style-type: none"> <li>Poor signal</li> <li>Flow rate less than minimum flow rate of 0.25m/s</li> </ul>	<ul style="list-style-type: none"> <li>Increase flow rate</li> </ul>
<ul style="list-style-type: none"> <li>no signal</li> </ul>	<ul style="list-style-type: none"> <li>No signal</li> </ul>	<ul style="list-style-type: none"> <li>Establish flow</li> <li>Inject air into line</li> </ul>
<ul style="list-style-type: none"> <li>charge battery</li> </ul>	<ul style="list-style-type: none"> <li>Battery charge low</li> </ul>	<ul style="list-style-type: none"> <li>Charge battery</li> </ul>
<ul style="list-style-type: none"> <li>total error counts &gt; 100/s</li> </ul>	<ul style="list-style-type: none"> <li>Totaliser count-rate too high</li> </ul>	<ul style="list-style-type: none"> <li>Select more suitable total units</li> </ul>
<ul style="list-style-type: none"> <li>rate overflow</li> </ul>	<ul style="list-style-type: none"> <li>Rate &gt; 999 999</li> </ul>	<ul style="list-style-type: none"> <li>Select more suitable rate units</li> </ul>

## Troubleshooting guide

PROBLEM	POSSIBLE SOLUTION
<b>Meter reading lower than expected</b>	
<ul style="list-style-type: none"> <li>• Source particles velocity not indicative of average velocity</li> </ul>	<ul style="list-style-type: none"> <li>• Relocate sensor to a position where source particles are expected to be moving at the average velocity</li> </ul>
<ul style="list-style-type: none"> <li>• Incorrect mounting of flow sensor</li> </ul>	<ul style="list-style-type: none"> <li>• Remount sensor correctly</li> </ul>
<ul style="list-style-type: none"> <li>• Programming error</li> </ul>	<ul style="list-style-type: none"> <li>• Review all programmed entries</li> </ul>
<ul style="list-style-type: none"> <li>• Flow rate lower than expected</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate possible causes and confirm flow rate independently</li> </ul>
<ul style="list-style-type: none"> <li>• Insufficient particle size or concentration</li> </ul>	<ul style="list-style-type: none"> <li>• Locate sensor at position where acceptable particle size or concentration is expected.</li> <li>• Inject air into the line</li> </ul>
<b>Meter reading when there is no flow</b>	
<ul style="list-style-type: none"> <li>• Local ultrasonic noise source</li> </ul>	<ul style="list-style-type: none"> <li>• Relocate sensor or remove noise source</li> </ul>
<b>"Poor signal" displayed when flow exists</b>	
<ul style="list-style-type: none"> <li>• Insufficient particle size or concentration</li> </ul>	<ul style="list-style-type: none"> <li>• Locate sensor at position where acceptable particle size or concentration is expected.</li> <li>• Inject air into the line</li> </ul>
<ul style="list-style-type: none"> <li>• Sensor coupling to pipe poor</li> </ul>	<ul style="list-style-type: none"> <li>• Remount sensor to pipe correctly</li> </ul>
<b>Meter reading higher than expected</b>	
<ul style="list-style-type: none"> <li>• Programming error</li> </ul>	<ul style="list-style-type: none"> <li>• Review all programmed entries</li> </ul>
<ul style="list-style-type: none"> <li>• Flow rate higher than expected</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate possible causes and confirm flow rate independently</li> </ul>
<ul style="list-style-type: none"> <li>• Particle velocity at sensor not indicative of average velocity</li> </ul>	<ul style="list-style-type: none"> <li>• Relocate sensor to a position where source particles are expected to be moving at the average velocity</li> </ul>
<ul style="list-style-type: none"> <li>• Incorrect mounting of flow sensor</li> </ul>	<ul style="list-style-type: none"> <li>• Remount sensor correctly</li> </ul>
<ul style="list-style-type: none"> <li>• Local electrical noise</li> </ul>	<ul style="list-style-type: none"> <li>• Relocate sensor</li> </ul>
<b>Meter reading erratic</b>	
<ul style="list-style-type: none"> <li>• Particle velocity at sensor not indicative of average velocity and erratic</li> </ul>	<ul style="list-style-type: none"> <li>• Relocate sensor to a position where the velocity profile is expected to be suitable</li> </ul>

## Questions and Answers

### **The pipe vibrates. Will it affect the flow meter?**

Common vibration frequencies are far lower than the sonic frequencies used by the flow meter, and will not normally affect accuracy or performance.

### **Will pipe corrosion affect accuracy of the flow meter?**

Yes. Rust, loose paint etc. must be removed from the outside of the pipe to provide a clean mounting area when installing a Doppler sensor. Severe corrosion/oxidation on the inside of the pipe may prevent the Doppler signal from penetrating into the flow. If the pipe cannot be cleaned, a spool piece should be installed for sensor mounting.

### **What effect do pipe liners have on the flow meter?**

The air gap between loose insertion liners and the pipe wall prevent the Doppler signal from entering the flow. Better results can be expected with bonded liners such as rubber, epoxy or tar, however an on site test is recommended to determine if the application is suitable for a Doppler flow meter.

### **Why is Doppler only recommended for liquids containing suspended solids or gases?**

The Doppler sensor transmits sound into the flow stream, which must be reflected back to the sensor to indicate flow velocity. Gas bubbles or suspended solids act as reflectors for the Doppler signal. As a guideline, EESIFLO Doppler flow meters are recommended for liquids containing solids or bubbles with a minimum size of 100 microns and a minimum concentration of 100 ppm.

### **Can the sensor be submerged in water?**

Yes, for short periods of time or by accident, but not for continuous operation. The sensor is constructed to withstand submersion without damage, but external liquid moving in contact with the sensor can be interpreted as flow and cause false readings.

### **Can I change the length of the sensor cable?**

No. A 2m cable is supplied with the 10P as standard.

### **Does the direction of flow matter for Sensor mounting?**

The 10P Doppler flow meter will measure and totalize flow in either direction. A check valve should be used in applications where backflow may occur.