Akım Elektronik Ltd Şti

UNIVERSAL CURRENT METER

Rev.1.0

27.11.2017

User Manuel

Contents

Introduction

Akım Elektronik Muline (Current Meter) device is used for water speed measurement in rivers, water channels and seas. Akım Muline device has been developed with high technology, and has a non-corrosive chrome body. Device is manufactured as a whole set including different types of propellers allowing measurement in the most shallow water depths.

Propeller socket of the muline body has a double ball-bearing filled with oil for smooth rotation.

Contact Transition: Each rotation of the propeller is transferred into signal by a magnet, and sent to digital current meter counter to be used for speed calculation. Frictionless rotation must be achieved using suitable propeller size for accurate measurement. Contact mechanism has an easy replaceable structure.

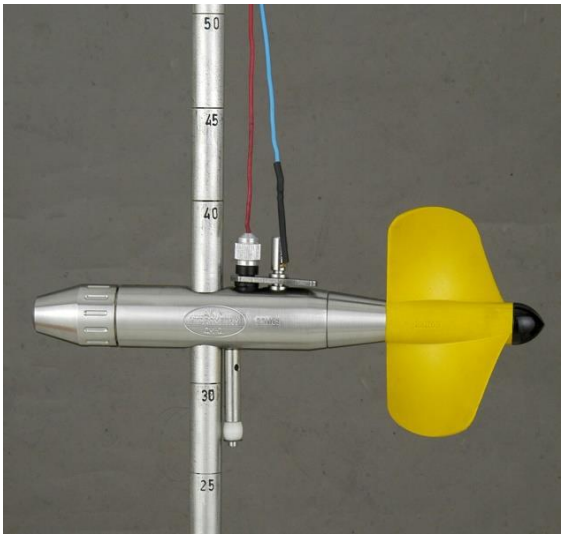
User may simply go in to the water and measure water speed of the depths up to half a meter. The pipe is placed at the bottom of water, and device is rotated on this pipe in certain time periods. Sharp end of the pipe allows a safe and stable penetration into the bottom avoiding excess insertion.

Device has a robust body allowing operation under rough conditions.

Muline can measure between 0.03 m/sec and 12.00 m/sec.

Device type and size are conform with international standards.

Devices are suitable for use with crane, roller and telepheric, etc.



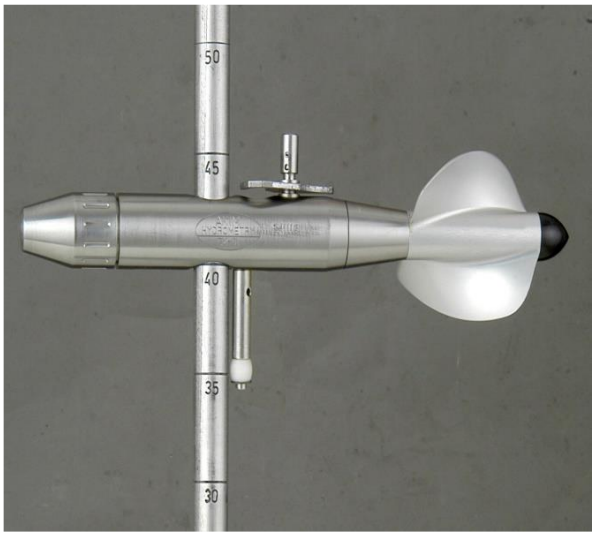


Figure 1 : Plastic Yellow Propeller 125 mm Metal Propeller 80mm

1. Bag Contents

1.20 m length rods (two each) provided for measurement are made of stainless chrome material. Rods are 10 cm range scaled, and 1 mm scaled between 0 cm and 10cm.

Muline is provided with whole set of accessories and materials.

a. Body
b. 3 Propellers, propeller pivot and housing
c. Rod and bottom iron
d. Electronic speed display (counter)
e. 3 m connection cable
f. Proper type and amount of lubricant
g. Necessary tools for mounting and demounting (screwdriver, key, cloth etc.)

Metal propellers are 125 mm diameter and 0.025 m/sec minimum speed.

Number of propeller turns in the water is transmitted by connection cable (cable length: 3m) to the counter, therefore the plugs on cable ends are stainless.

2. Working Principle

Speed is calculated based on the count of propeller turns. k and coefficients in V=k×n+Δ formula used for speed calculation are defined in the device calibration. These coefficients and pre-defined speed values of “n” turn count are loaded on the device and also provided as text document.

P1 P2 P3 P4 P5 P6

Propeller No	Propeller Dimension	Max.Speed(m/sn)	Min.Speed(m/sn)	Component Effect	Material
1	100 mm dia 0,125 m pitch	5,0	0,025	± 45º	Metal
2	80 mm dia 0,50 m pitch	10,0	0,040	± 5º	Metal
3	125 mm dia 0,25 m pitch	12,0	0,025	± 5º	Metal
4	125 mm dia 0,30 m pitch	10,0	0,035	± 5º	Plastic
5	125 mm dia 0,25 m pitch	10,0	0,030	± 15º	Aluminum
6	80 mm dia 0,50 m pitch	5,0	0,035	± 15º	Aluminum

Reed-contact sensor is used for pulse. Reed sensor is durable till 1 million pulses.

Instrument operation range is between 0.025 m/sec. and 10 m/sec.

Counter’s maximum reading capacity is 30 puls.

Maximum cable length between Counter and Current Meter is 70 m.

2.1. Speed Formula

V = k×n+Δ n= pulse÷time (sec)

V= Water Speed m/sec

k= Cross-sectional area of propeller in the water (m)*

n= Average turn count per second

Δ= Muline characteristic (m/sec)*

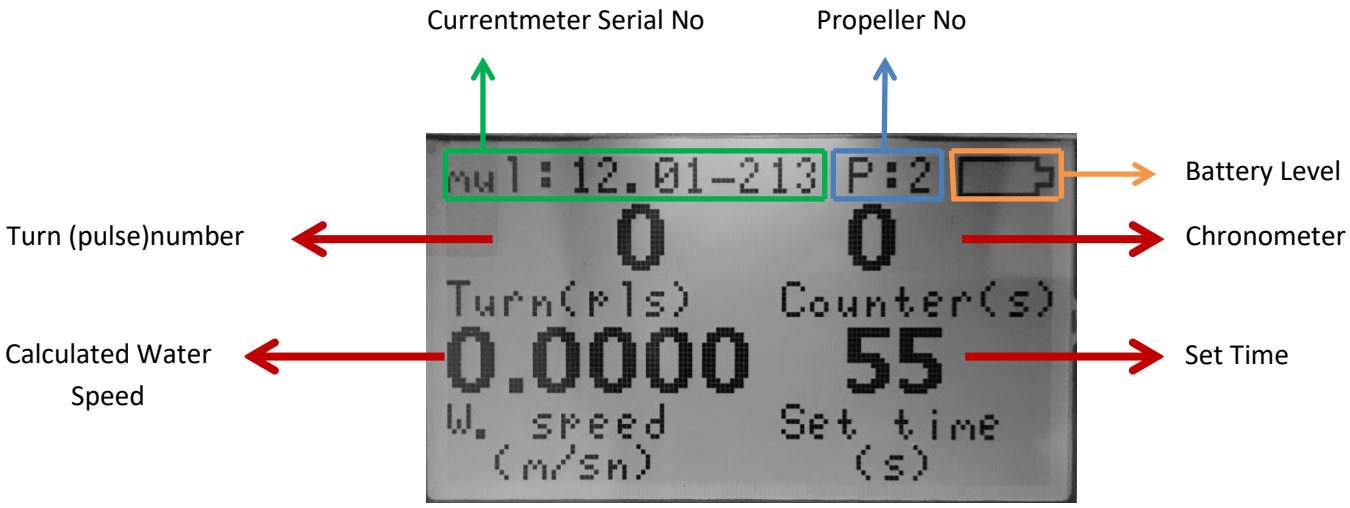
* These values are fixed numbers and obtained from the open channel tests.

3.Electronic Counter

3.1. Electronic Counter Features

Max. Count	30 pulse/s.
Temp. Range	-20 ºC + 70 ºC
Power Supply	3.7v Li-ion Batarya
Box Dimensions	53,5X18X8 cm

3.2. Electronic Counter LCD



3.3.Electronic Counter Usage and Button Functions

On – Off Button .(Press 2second while openning)

This button should be used to select the propeller number. If not, the wrong measurement is made.

Set Time can be set with this button if sampling is required for several seconds (a value in the range of 5sec ... 200sec can be selected).

After the propeller type and time interval is selected, the measurement is started by pressing the start button. After the first press of the start button , the currentmeter starts the timer. Then, after the chorometer is loaded, the first and last cycles are continued until the take the last turn pulse number so that the margin of error is removed.

You can stop the measurement by pressing the stop button at any point of the measurement. The new measurement will start when you press the start button again.

The backlight can be turned on or off using the back light button.

Propeller Calibrations Upload Menu

Firstly close the counter.Then press the 

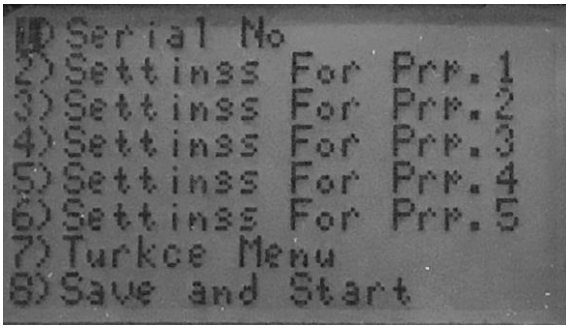
button again.

Before the counter openning press the 

button and 

button at the same time untill the calibration menu pops out.

After doing this, the following calibration screen will be displayed.



Direction signs and input/output symbols on the Counter buttons will work in this section.

In this menu you can enter and change the Currentmeter serial number.

You can enter calibrated values for 5 different propellers.

You can change the language setting in English or Turkish.

If you select Save and Start at the end of your changes. The settings you made are saved and the counter returns to the measurument screen.

Functions of the butons in the calibration menu:

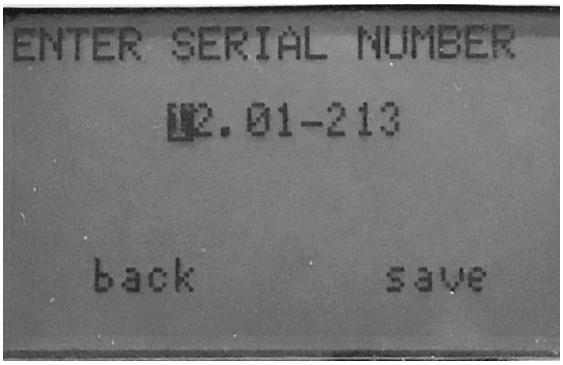
Enter button

Exit button.(Press 3 second to exit.You will turn to main menu)

Used to increase the numbers (to scroll up and down on the main screen.)

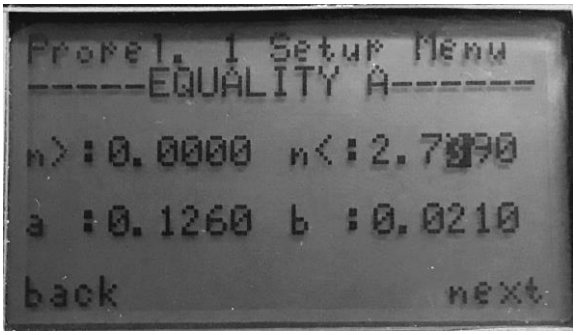
Between numbers, used for bouncing to the right value.

Between numbers, used for bouncing to the left value.



This is the menü that you enter the serial number of currentmeter.You can change the numbers by pressing the up button.After the number (9) you can select the (–) or (.) characters.

After pressing the right sign button you will jump to next number.At the end of the number you will jump to back or save section.If you press enter button on save section.Then you will save the serial number and turn back to main menu.



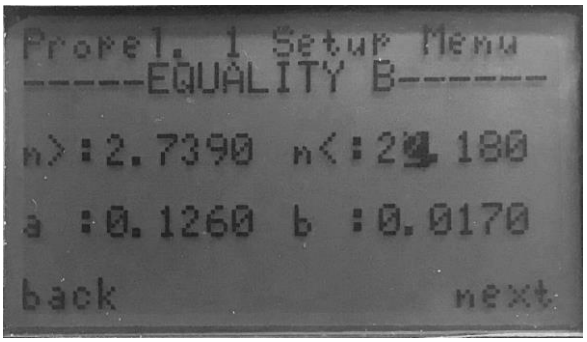
You can enter the values written in the calibration book to the propeller settings section.

(n>) and (n <) parts specify the tour interval of the propeller.

a and b are the coefficients of friction in that range (calibration values)

If you come to the (next) and press enter button , you will come to the Equality B Menu.

You can enter the coefficient for higher tour interval values in this section.



As you can see in the picture, the tour interval of Equality A (n>) comes otomatically to the tour interval of Equality B (n<).

Means that in Equality A,B and C menus.You can set 3 different tour interval for your calibration values (a and b)

0.0000 …….. 2.7390 Equality A

2.7390…….22.180 Equality B

22.180…….99.999 Equality C

a and b values are frictions of the propeller.(You can find them in calibration book)

After you've made all of your propeller settings press 

button for 3 second and turn back to main menu.

Then if you select the save and start option, you will be ready to measure the water speed.

Notes :

If the measurement range you entered is incompatible. In this case the measurement result is 0. In this case, double check the range of tour intervals or the selected propeller type.

Counter comes with a rechargeable battery. You can learn the charging status from the on-screen battery level logo. You need to see the battery charge logo in the battery level logo when you plug the counter to the USB cable.

Once the battery is fully charged, the battery will stop charging itself to protect itself.

There is also overheating protection in the battery unit. If the battery gets too hot while charging, it will stop charging automatically.

Even when the battery is completely empty, the counter can operate without battery thanks to the power it receives via USB.

Even if the battery is discharged, by using spare power bank, measurement can be made by taking power from power bank.