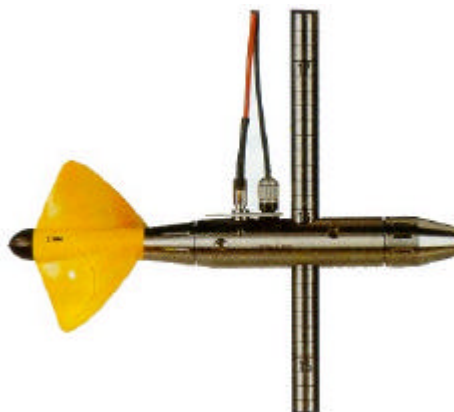


# Universal Current Meter F1

Art. no. : 13.12

## User Manual



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## 1. Application range

The Universal Current Meter F1 serves for measuring the current velocity in brooks, rivers, channels and seas.

## 2. Product description

The Universal Current Meter can be used as rod equipment, as well as suspended current meter equipment with mechanical single drum winch and cable way installations. The round, streamlined meterbody and the meteraxle are made of non-corrosive high grade steel. The hub of the propeller is filled with oil and moves on two very smooth running precision ball-bearings. The oil-filling and a capillary seal prevents from water penetrating. A buffer stop, which can be screwed in, protects the propeller against touching the ground. Impulses are given frictionless and direct with the permanent magnet. For each propeller turning, one impulse is given. The contact pick-up, which is placed as plug-able unit in a watertight chamber, can be changed without problems.

### 2.1 Parts survey

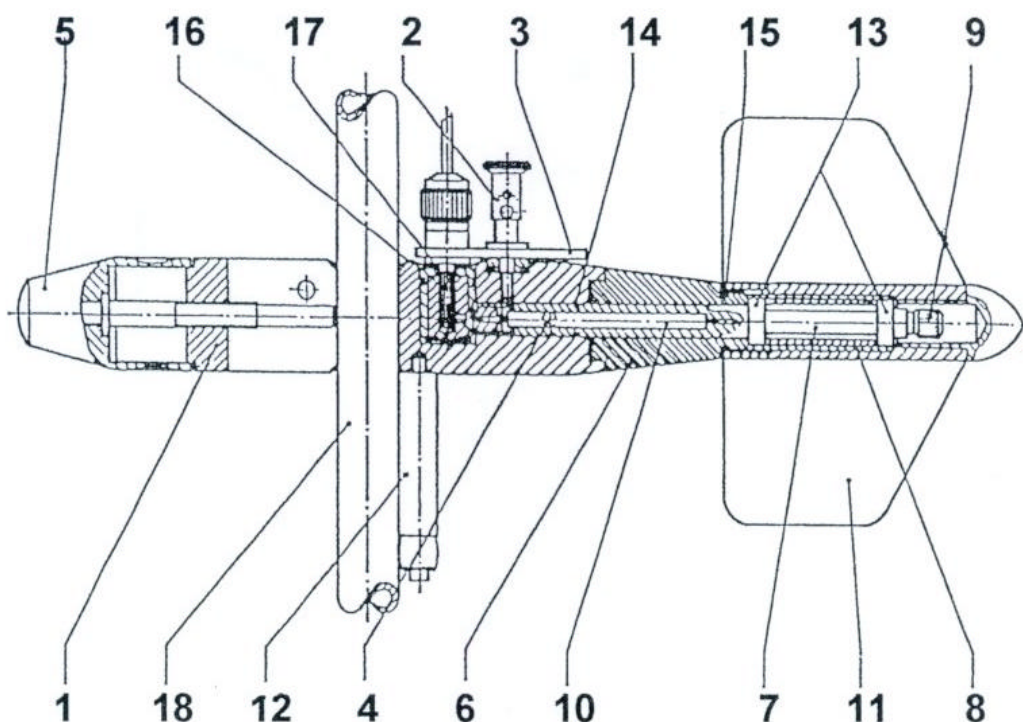


fig. 0

part	part no.:	part	part no.:
1 meterbody	1700101001	11 propeller	17005
2 negative terminal	1700102	12 buffer stop	17025
3 bolt	1700101013	13 ball-bearing	1700101032
4 screw for meteraxle (on the back)	1700101037	14 O-ring 8x1	DIN 6500005044
5 screw for rod	1700105	15 O-ring 15,49 x 1,47	DIN 6500005072
6 taper (reducer)	1700103	16 cable with plug	17028
7 meteraxle	1700101028	17 O-ring	DIN 6500005020
8 spacer	1700101031	18 rod	17047
9 knurled nut	1700101033		
10 reed switch	1700104		

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### 3. Safety and danger instructions

Please take care, that this current meter is a precision measuring instrument, which has to be handled carefully. Observe strictly the items in the operation and maintenance manual.

### 4. Current meter mountings

For different kinds of use suitable guide devices are available:

#### 4.1 On rod 20mm dia

On rod 20 mm dia., fixed rigid with direction indicator (fig. 1)

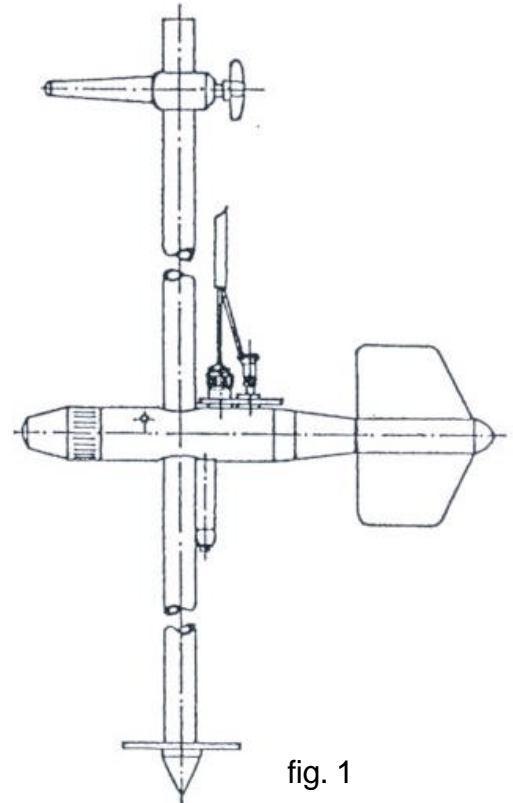


fig. 1

#### 4.2 On rod with relocating device (relocating device)

The movement of the current meter on the marked rod is actuated by means of the relocating device. Extension of rod and relocating device is possible with meter sections (fig. 2)

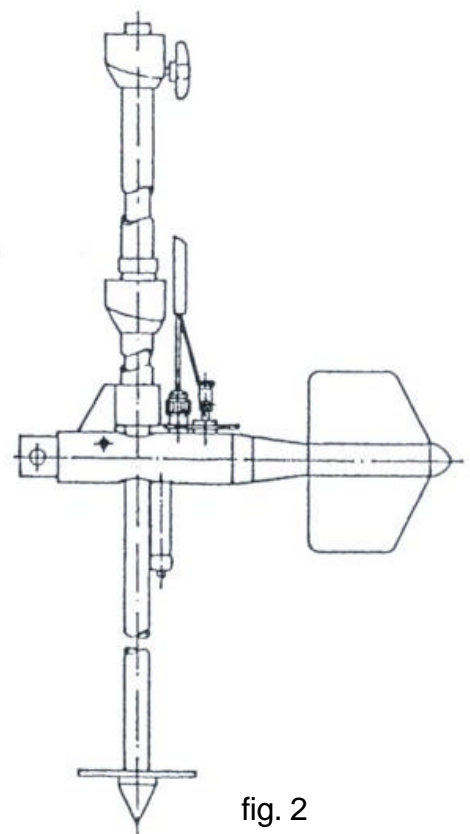


fig. 2

### 4.3 On rod 20 mm dia. with tail plane

- for best positioning to the flow direction - and special clamp for fixing the cable. The movement of the current meter to different measuring points will be effected by opening the excentric lever and shifting the cable. In order to avoid deviation of the cable, it will be guided on the rod by means of the wire-clasps. For better lowering there is an additional cross plane available (fig.3).

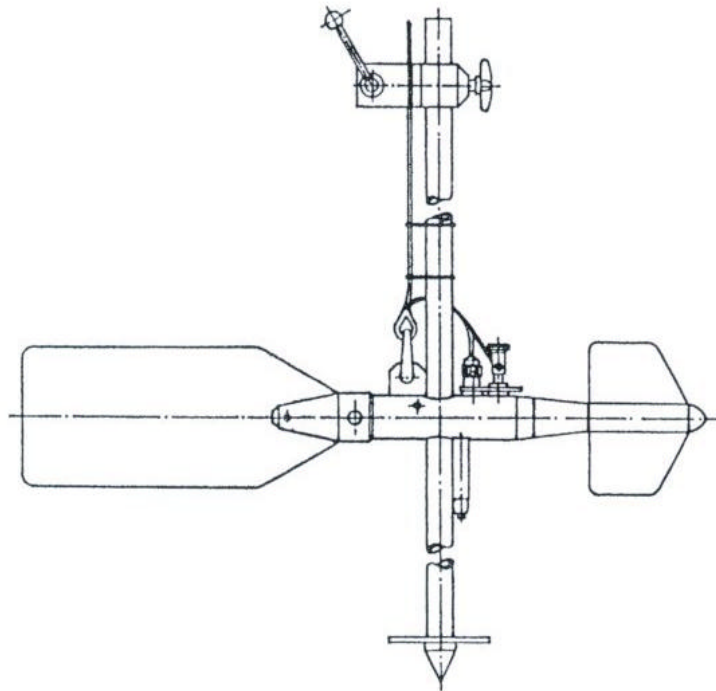


fig. 3

### 4.4 Cable suspended with sinker 5 kg and 10 kg

with tail plane of 0,88m length. This device is used for measurements from bridges with winch mounted on a jib (fig. 4).

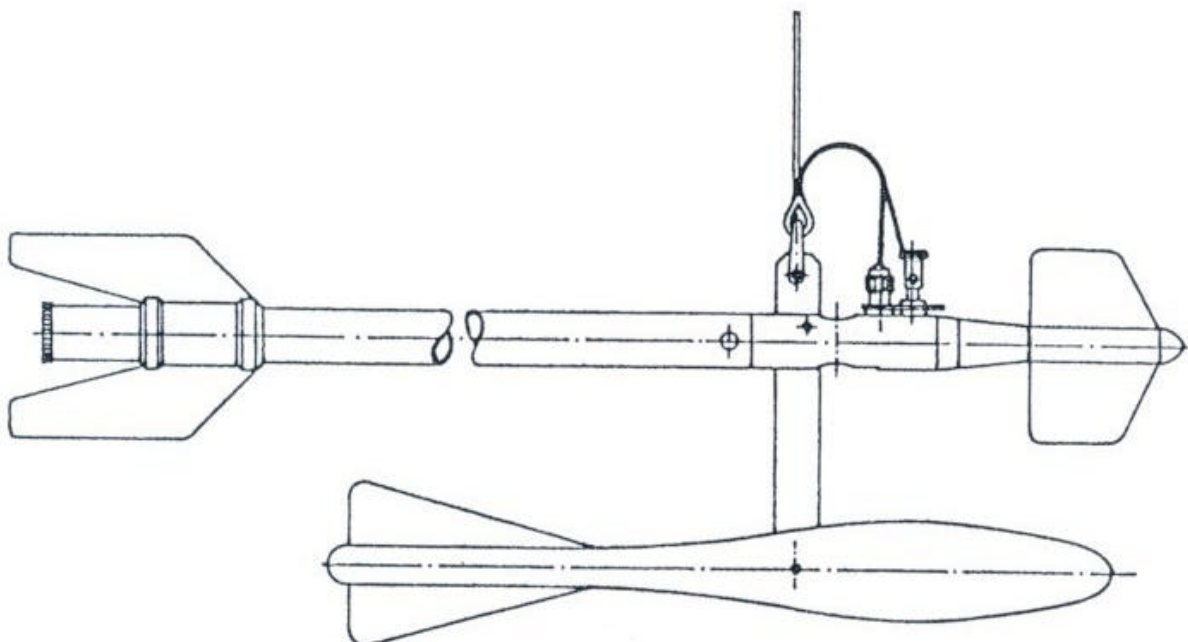


fig. 4

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#### 4.5 Cable suspended with sinker(torpedo) 25kg, 50kg and 100kg

with tail-plane and ground sensor for elaborating a cross-profile. This suspended current meter equipment mostly will be used together with stationary installations (fig.5).

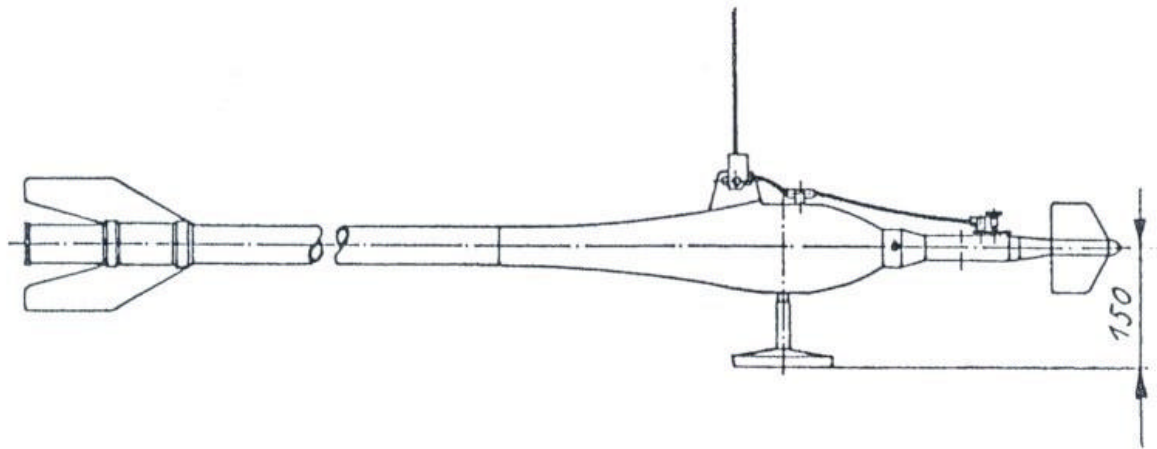


fig. 5

#### 4.6 As measuring unit at turbine runs

with special mounting device for control of the efficiency range.

#### 4.7 Cable connections

- insert plug (F-5) (+) into the socket, press it and shift bolt (13) back
- put second core (-) into the cross-boring, after pressing the pole-clamp (10)
- connect cable to the signal counter corresponding to the colours of the banana plugs

#### 4.8 Propeller fixing

The propeller is manufactured of fibre-glass reinforced plastic with metal treaded inset. Shift propeller on spacer (fig. 6/6) and screw it with taper (fig. 6/8).

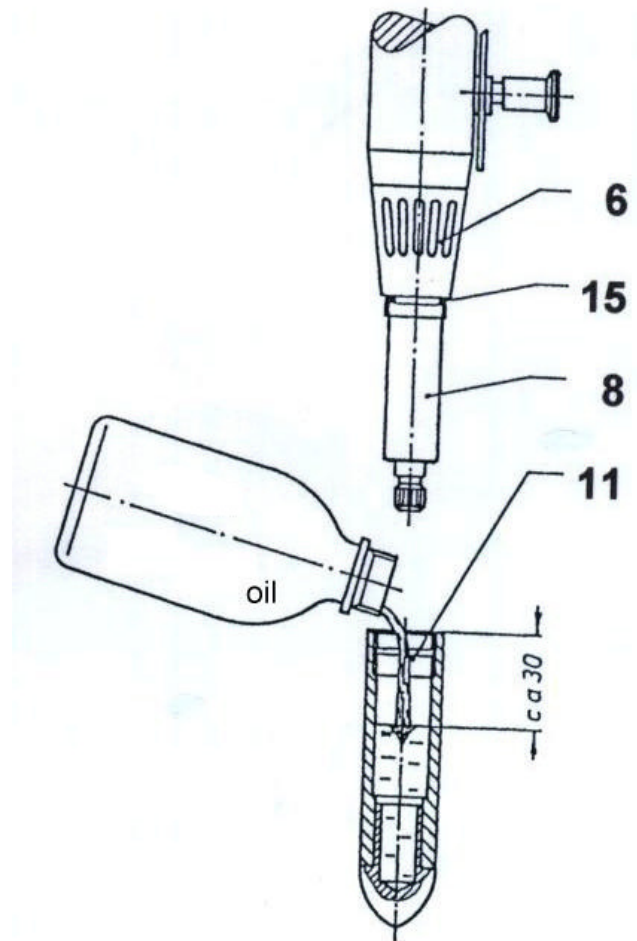
**Attention:** Tighten threat smoothly.

## 5. Operation

### 5.1 Starting and oil change

The hub of the propeller is filled with special oil. The oil filling and a capillary seal protect the ball bearings against water and dirt entering the chamber. The current meter is delivered without oil filling. Before starting, oil must be filled into the hub. If the current meter is not used for a longer period, empty the oil from the hub. Before starting, always check whether there is oil in the hub, otherwise refill it as follows:

- keep meterbody at taper (6), propeller (11) shows downwards. Turn the propeller to the left and take it off. Protect ball-bearings from dirt and dust.
- empty the used oil from the chamber, check the O-ring (15) for damage, if necessary exchange it. Refill new oil up to approx. 30 mm below propeller rim.
- shift the propeller again in the spacer (6) and rescrew it by turning to the right.



## 5.2 Contact transmission

max. permissible voltage 6V DC

max. permissible current 0.3A

Condition for these values is a good spark extinguisher at the receiver side. In any case, we recommend to use preferably signal counters. Their contact load is so low - due to a respective amplifier circuit - that an optimal use of the contact can be reached. The contact is composed to an easy exchangeable unit and consists of pick-up for the contact and two plugs.

The electrical contact pick-up will be switched by a rotating permanent magnet once per revolution, which corresponds to one signal at the counter.

By interruption of the circuit, please check:

- a) is the cable damaged:
- b) voltage of battery
- c) damage on the connection or plug?
- d) defective reed switch?
- e) failure in the impulse counter ?

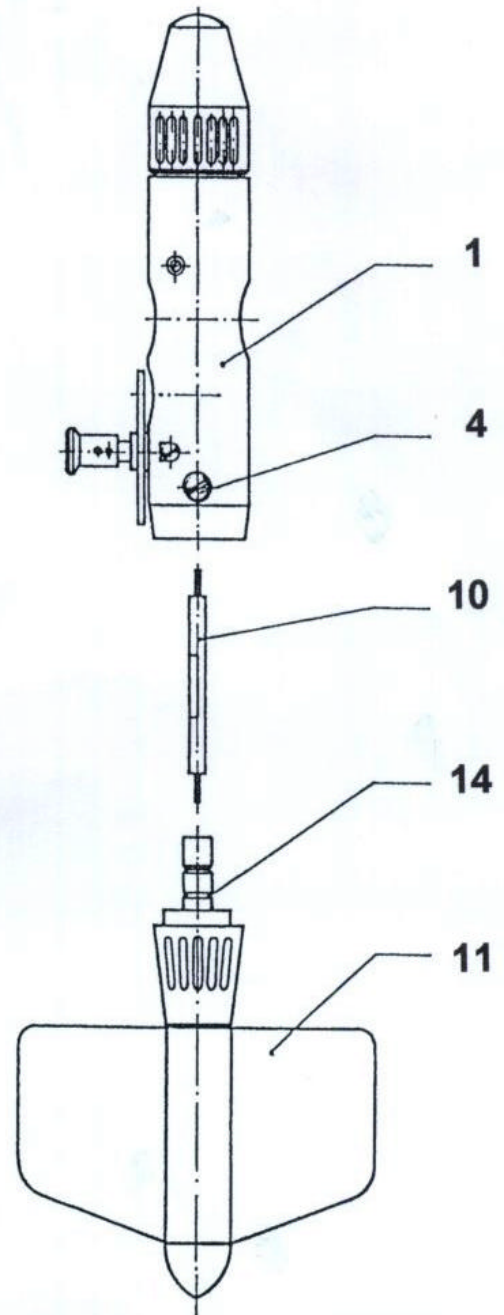


fig. 7

Changing of the reed switch:

Open screw for meter axle (4) approx. 4 turns, then detach meter body (1) from taper with propeller. Take reed switch (10) out of the meter axle. Check O-ring (14) for damage, if necessary, exchange it. Assembling will be effected vice-versa.



## 6. Maintenance

### 6.1 Ball-bearings

Extremely smooth running ball-bearings of stainless steel are used. They have to be protected absolutely against dirt and dust. For cleaning use purified benzine only.

### 6.2 Cleaning and change of ball-bearings

#### 6.2.1 Dismounting

Remove the propeller according to item 4.1; open knurled nut (9). Push taper (reducer / 6) from axle (7). By slightly knocking on the taper (6) (held vertically as shown on the picture), one by one front ball-bearing (13), spacer (8) and rear ball-bearing (13) are falling down.

#### 6.2.2 Cleanings of ball-bearings

hold ball-bearing with tweezers and clean it in benzine. Dry by air and oil again with special oil - do not use it without oil !

#### 6.2.3 Mounting of cleaned resp. new ball-bearings

fill rear ball-bearing (13), spacer (8) and front ball-bearing (13) into the taper (6). Push spacer (8) with parts included onto axle (7) and screw up knurled nut (9) again.

**Attention!** When screwing up propeller (11) please consider item 5.1 (setting into operation and change of oil)

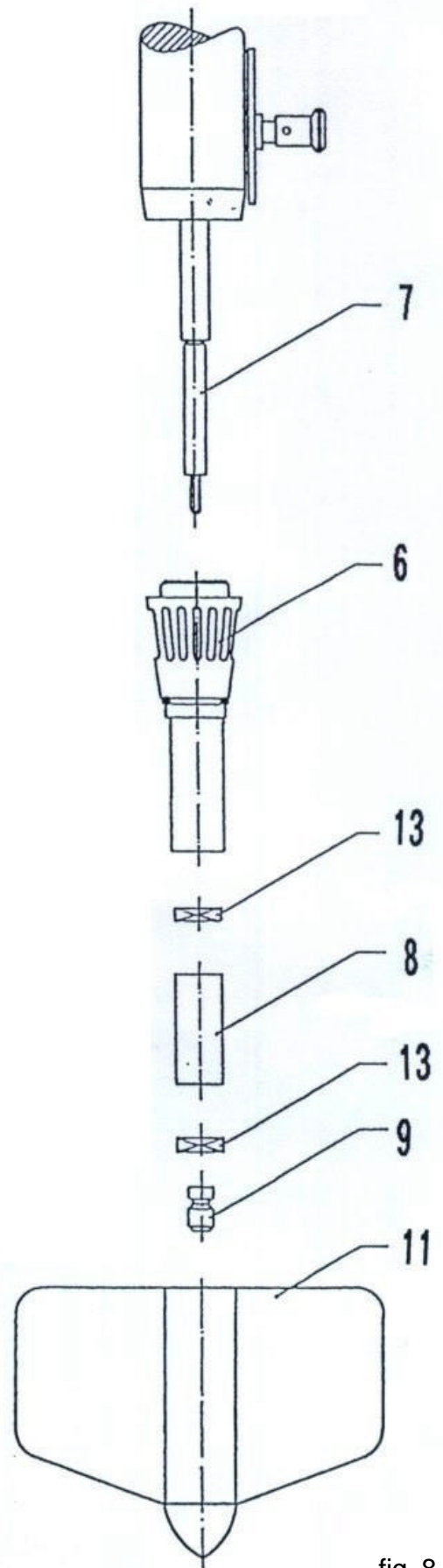


fig. 8

## 6.3 Shortening of the cable

If the cable is damaged on the plug (+ pole), or if it has to be shortened, go ahead as follows:

- a) cut off damaged part of the cable
- b) insulate cable according to drawing and twist wire together.
- c) push plug-cap (2), then rubber bushing (3,4) size 2 and 3 over the cable. Then push cable through plug-holder (1) and solder it to the wire.
- d)

**If the damage is on the negative pole (-), repair it as follows:**

- a) cut off the damaged part of the cable
- b) insulate cable according to drawing and twist wire together.
- c) Solder wire into contact shoe (fig.9/6).
- d) push shrink hose (5 mm dia.) overhead and shrink it by means of a soldering hammer.

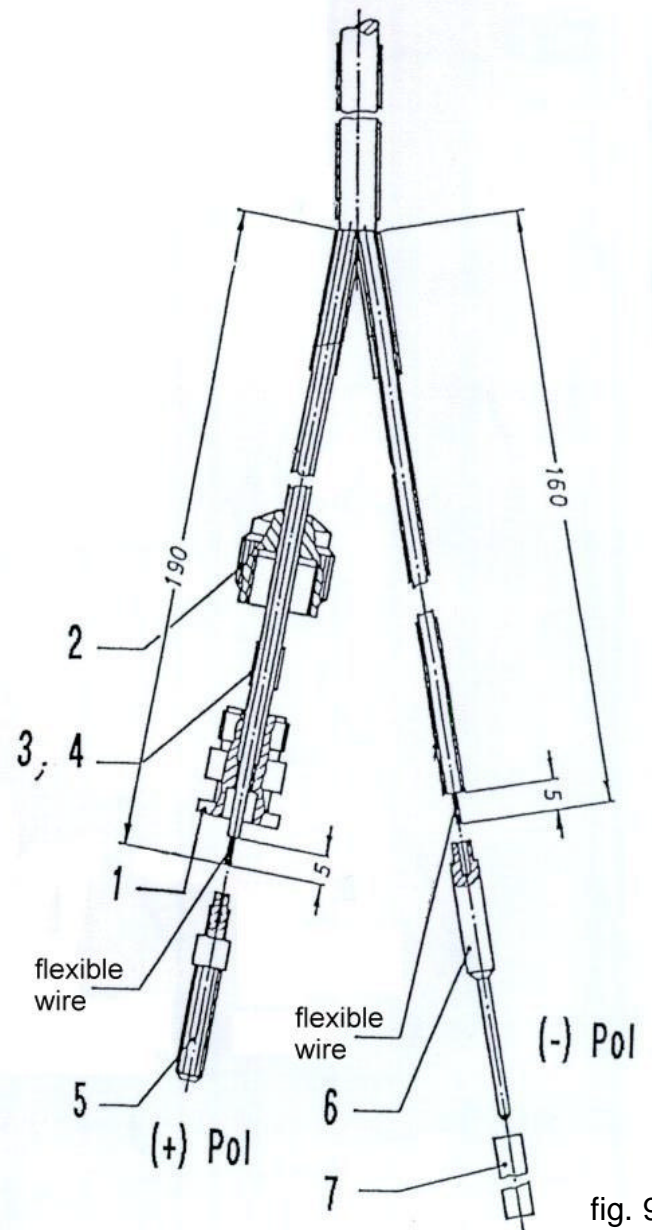


fig. 9

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## 7. Determination of current velocity

When using our standard propeller, an individual calibration is not necessary. With respect to the fact that all standard propellers are produced of the same mould, a standard calibration result is available. The propellers are absolutely stable, made of Polyamid B, fibre glass reinforced, which shows a very high stability and excludes deformations.

In case an individual calibration should be required despite, it will be made in a special calibration channel with meterbody, the propellers and parts concerned.

The current velocity ( $v$ ) is determined as follows:

$$v = k * n + \Delta$$

whereas:

$v$  = velocity cm/sec.

$k$  = hydraulic pitch (cm) determined in the calibration channel

$n$  = number of propeller revolutions per second

$\Delta$  = current meter constant

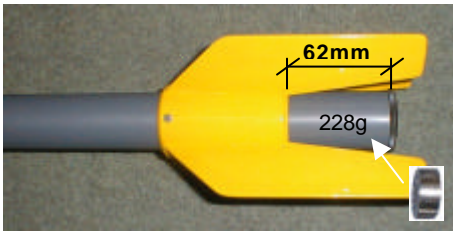
**Table of the standard calibrations for Universal Current Meter Equipment F1**

$\varnothing$ Propeller	pitch	rod	sinker 10kg	sinker 25kg	sinker 50kg	sinker 100kg
80mm	125mm	x	x	x	x	x
80mm	250mm	x				
80mm	300mm	x	x	x	x	x
80mm	500mm	x	x	x	x	x
125mm	125mm	x	x	x		x
125mm	250mm	x	x	x	x	x
125mm	300mm	x	x	x	x	x
125mm	500mm	x	x	x	x	x
125mm	1000mm	x	x	x	x	

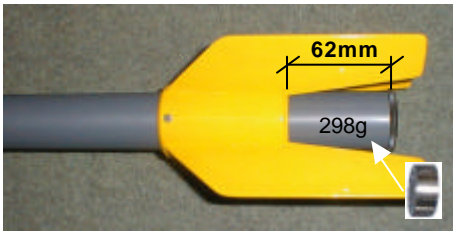
## 8. Technical Data

Material: non-corrosive steel V 17  
Measuring range: 0,025m/s – 10 m/s  
Output: plug-able pick-up with 1 impulse/revolution  
Dimensions: incl. propeller 310 x 125 x 125 mm

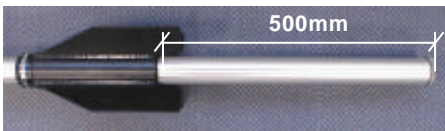
## 9. Sinkers for suspended current meters



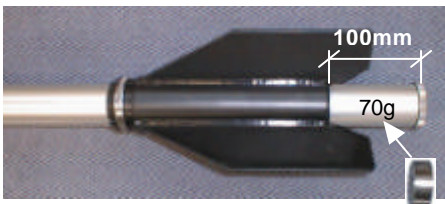
Long tail plane **5kg** plastic  
880mm counterbalance 228g.



Long tail plane **10kg** plastic  
880mm counterbalance 298g.



Long tail plane **25kg**  
840mm +500mm without counterbalance,  
cap without threaded spindle.



Long tail plane **50kg**  
840mm +500mm counterbalance 70g



Long tail plane **100kg**  
840mm +500mm counterbalance 500g