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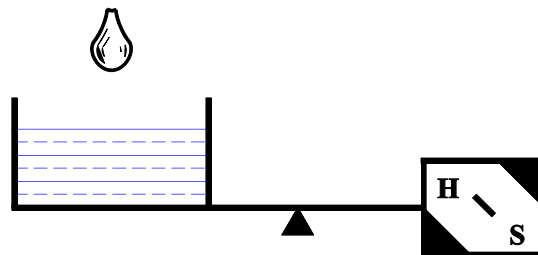
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**HYDROLOGICAL SERVICES PTY LTD**

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**INSTRUCTION MANUAL**  
**MINIATURE CURRENT METER**  
**MODEL OSS-PC1**



QUALITY SYSTEM  
**ISO**  
**9001**  
2000  
CERTIFIED

**HYDROLOGICAL SERVICES PTY LTD**  
PO BOX 332, LIVERPOOL B.C NSW 1871, AUSTRALIA  
Phone: (Int.) 612 9601 2022 Fax:(Int.) 612 9602 6971  
Phone: (Nat.) (02) 9601 2022 Fax:(Nat.) (02) 9602 6971  
Email: sales@hydrologicalservices.com

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### **I HYDROLOGICAL SERVICES STANDARD WARRANTY TERMS**

#### WARRANTY, DISCLAIMER AND LIMITATION OF LIABILITY:

We warrant this product to be free from defects in material and workmanship for a period of three years from the date of shipment hereof or its total rated life, whichever first occurs. During the warranty period, we will repair or replace this product if it is returned to us with shipping charges prepaid and we determine it to be defective. This warranty shall not apply if this product has been subjected to misuse, negligence, accidents, or misapplied, or modified or repaired by unauthorised persons, or improperly installed, and we shall not be liable to any person for personal injury or property damage caused by such a product.

All other warranties, express and implied, including warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, are disclaimed. All other remedies and liabilities, including incidental, consequential, and special damages, losses, and expenses, are excluded.

Note: It is Hydrological Services' policy to support all of our products. If design or workmanship problems arise after this statutory warranty period we request that you contact us.

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## **HYDROLOGICAL SERVICES PTY LTD**

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### **OSS-PC1 CURRENT METER MODEL OSS-PC1**

## **II GENERAL**

The Hydrological OSS-PC1 Pygmy Current Meter is a world recognised design instrument for measuring the velocity of water in shallow natural water courses and canals, small pipes, laboratories and river models. The OSS-PC1 complements the OSS-B1 Universal Current Meter to provide solutions for all velocity measuring applications.

One of the great features of the OSS-PC1 is the ability to sense water flow at a speed as low as 0.025 m/s. Also, its miniature size, makes it suitable for flow measurement in shallow/narrow watercourses, small pipes and canals.

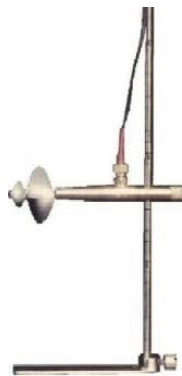
The OSS-PC1 comes with accessories which enable the user to obtain water flow measurement easily and accurately.

All current meters manufactured by Hydrological Services are calibrated in our purpose built high velocity rating tank prior to shipment. This rating tank is considered as best in the world since it can run at a velocity of 0.005 ms/s minimum and 8 m/s maximum with a velocity resolution of +/- 0.001mm

As part of our service we are able to recondition and recalibrate current meters of any make, including electro magnetic and other solid state meters. Calibration is directly traceable to International Standards.

All current meters are calibrated in accordance with **AS 3778.6.3-1992**. This standard is identical to **ISO 3455:1976**.

The purpose of this manual is to make the user familiar with the OSS-PC1 current meter. It is a sensitive and reliable precision instrument. It is advisable to read this manual carefully and fully understand its use. After reading this manual if you are not sure about any details, please do not hesitate to contact our office (contact details are on the cover of this manual).



## **III UNPACKING YOUR PYGMY**

## **CURRENT METER**

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This package should contain:

- C Pygmy Body
- C Pygmy Lead
- C Body Key
- C Fan type 1 and Fan type 3 ,( Fan 5 is an accessory).
- C 3 wading rods (0.50m ,1.00m ,1.50m)
- C Current Meter counter
- C 2 spare bearings
- C 2 ε clips
- C 2 tightening bars
- C 2 fan O'rings
- C 1 pygmy leads
- C 1 oil bottle
- C Rating Tables
- C Counter manual
- C This manual

#### **IV OPERATION**

Each propeller rotation produces one pulse signal. This signal is generated by an encapsulated reed switch and a permanent magnet set into the rotating shaft assembly.(see figure 5 )

The voltage must not exceed 9V DC. Provided the pulse counters have spark-suppression circuits, the meter can be loaded with up to 1.6 watts. All our counters meet these requirements (refer to specification).

Three types of propellers can be used with this meter, all these propellers are anodised aluminium and are supported on an axle with bearings, which run in an oil filled chamber inside the meter body. Surface tension of the oil in the passage between the stainless steel axle and axle nut, is the only seal to retain the oil.



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### **VI MAINTENANCE**

The maintenance of the OSS-PC1 current meter can be divided in three sections as stated below.

#### *Section 1: Prior to discharge measurements*

##### Initial set up

- Open the case and pick up the current meter body
- Undo the axle nut using the body key
- Remove the shaft assembly with the tip of your fingers (do not put it down anywhere where it may attract dirt particles)
- Add oil to the meter body
- Hold the body upright and  $\frac{3}{4}$  fill as shown in figure2
- Replace the oil bottle cap
- Insert axle into body, excess oil will be forced up through the capillary gap around the axle, ensure nut is tightened
- Wipe the excess oil of the meter using lint free paper towel
- Do not forget to close the oil bottle straight after usage to avoid contamination of the oil
- Attach the desired fan to the shaft
- For to spin test, hold the current meter in the horizontal position with the fan facing your mouth and blow air forcefully (do not flick by hand you may bend the shaft). Let the fan spin for about a minute to get rid of any hydraulic pressure
- Spin test the meter against time using a stop watch. This is done to ensure the meter is operating satisfactorily
- Spin test results are dependent on the fan type, axle size, and temperature (see table below)

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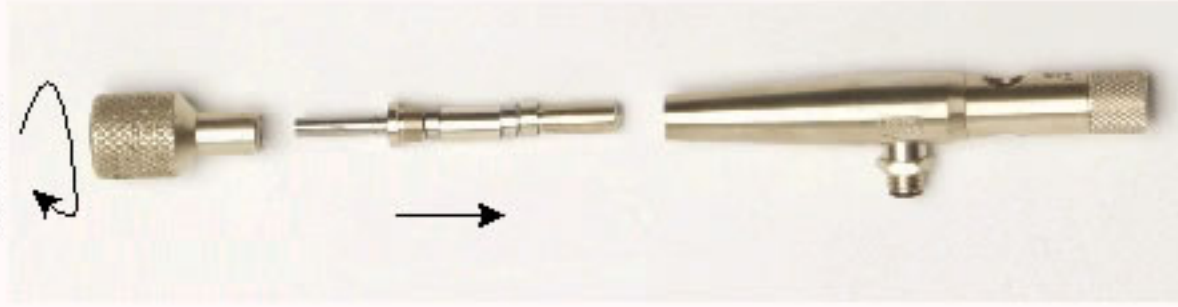
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<i>For 4.0 Dia Shaft</i>	
<i>Fan No.</i>	<i>Time (sec)</i>
<i>1</i>	<i>Minimum 36 sec</i>
<i>3</i>	<i>Minimum 13 sec</i>
<i>5</i>	<i>Minimum 11 sec</i>

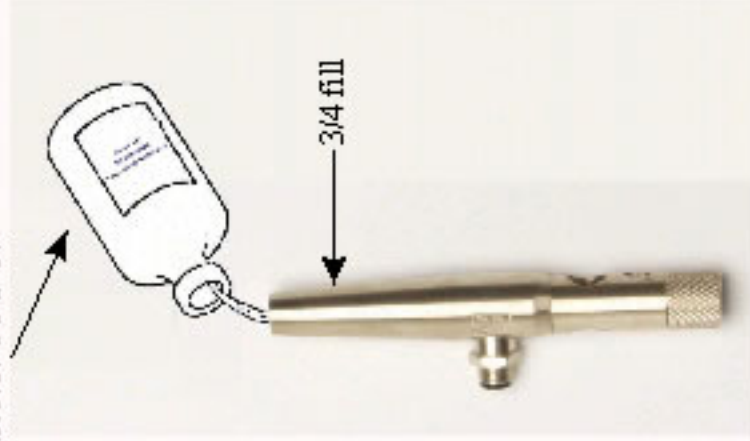
<i>For 2.5 Dia Shaft</i>	
<i>Fan No.</i>	<i>Time (sec)</i>
<i>1</i>	<i>Minimum 40 sec</i>
<i>3</i>	<i>Minimum 15 sec</i>
<i>5</i>	<i>Minimum 13 sec</i>

- After the spin test connect your current meter to the counter with the lead, and check its operation

Clockwise



Filtered Current Meter oil  
supplied by Hydrological  
Services Part No. FYG-17



STEP 3: Hold the body  
upright and 3/4 fill as  
shown above.



STEP 2: Remove the shaft  
assembly with the tip of  
your fingers. (Do not put  
it anywhere it may attract  
dirt particles)

Anti-clockwise



STEP 1: To refill oil undo  
the axle nut using the  
body key.

Note: After every discharge measurements, or one hour of use the current meter should be cleaned with white spirit and refilled with oil, if continuing a discharge measurement. For more information please read the maintenance section of this manual.

STEP 4: Replace axle, excess  
oil will be forced up through  
the capillary gap around the  
axle, ensure nut is tightened

**Figure 2- Refill oil instruction**

*Section 2: During and after Discharge Measurements*

After every discharge measurement, or one hour of use the current meter should be cleaned and refilled with oil, if continuing a discharge measurement.

- Undo the jar the cleaning jar cap and  $\frac{3}{4}$  fill with white spirit
- Undo the axle nut of the current meter body using the body key
- Remove the shaft assembly with the tip of your fingers (do not put it down as it may attract dirt particles)
- Empty the old oil in a recycling container (do not tip oil on the ground this will pollute the environment)
- Put the shaft inside the cleaning jar.
- Agitate the shaft assembly flushing out the oil.
- Fill up the body with white spirit put your thumb in place of axle nut and shake it for a few seconds.
- Blow dry the shaft assembly and the body
- Refill with oil if continuing a discharge or assemble dry for storage
- Tip the white spirit in a spare bottle
- Wipe box clean and return the meter to the case

**Note : Both oil and white spirit can be recycled using filter papers**

*Section 3: Tips for Easy Maintenance*

It is advisable that the OSS-PC1 current meter is properly maintained.

- Keep the OSS-PC1 case clean
- Clean all the tools after usage
- Use lint free paper towels and white spirit (do not use methylated)
- Office service is required for the OSS-PC1 current meter about once a month if it is used on a daily basis (i.e. using soap and then white spirit)
- Check the lead and recondition its ends once a month if it is used on a daily basis (see repair of cable end section).
- If the reed switch fails to operate refer to electrical fault finding section for details
- If the current meter fails the spin test refer to the mechanical fault finding section for details
- Test lead, counter and reed switch (see electrical fault finding section for details)

**VII SERVICE AND RECALIBRATION**

- Recalibrate the current meter every 300 hours of use or once a year whichever ever comes first (see Hydrological Services calibration certificate for details)
- For recalibration only, send the body and the fans that require calibration (to save weight). However, if other items needs repair they can be sent with the body and fans.

**Note: Hydrological Services provides a recalibration and repair service for all types of current meters.**

**VIII FAULT FINDING**

*Mechanical Fault Finding*

<b>Symptom</b>	<b>Possible Causes</b>	<b>Action</b>	<b>Remark</b>
Failed spin test	- Dirty or faulty bearings	- Clean Bearings and try to spin test again. If Problem persist replace bearings.	- Dirty bearings can be identified towards the end of the spin test when the fan stops suddenly.
	- Bent shaft	- If the shaft is slightly bent return to HS for repair. - If the shaft is badly bent return to HS for replacement.	- Bent shaft can be identified by looking at the pointed centre of the fan during spin test. If this point is turning off-centre this indicates that the shaft is bent.
Fan out of balance	- Fan squashed or dropped	- If the fan is slightly out of balance rectify by removing the fan, rotating the shaft approx 50° and re-fitting the fan. If problem persist return the fan and body to HS for repair	- Out of balance fan can be identified right at the end of the spin test, if the fan stops and rotate in the opposite direction this indicates that the fan is out of balance

*Electrical Fault Finding*

If an electrical fault has been traced to the current meter, the following conditions should be checked using a multimeter or impulse counter.

Faults will be either CLOSED CIRCUIT or OPEN CIRCUIT, and if the CMC-20A or PVD100 or CMCsp or CMC3 counter is used, set the control switches to “ON” and “INT” (ie. no time limit). Spin the propeller and if the audible signal sounds continuously, the fault is a “CLOSED CIRCUIT”. If no audible signal is heard, the fault then is an “OPEN CIRCUIT”.

Closed Circuit Fault

<b>Symptom</b>	<b>Possible Cause</b>	<b>Action</b>
Fault occurs only when meter in water	- Water entering contact plug receptacle and earthing between plug and body	- Replace damaged plug (see figure 3)
Circuit closed in any magnet position, but open with magnet removed	- Reed switch failed	- Replace reed switch assembly
Circuit closed without magnet in position	- Reed damaged	- Replace reed switch assembly

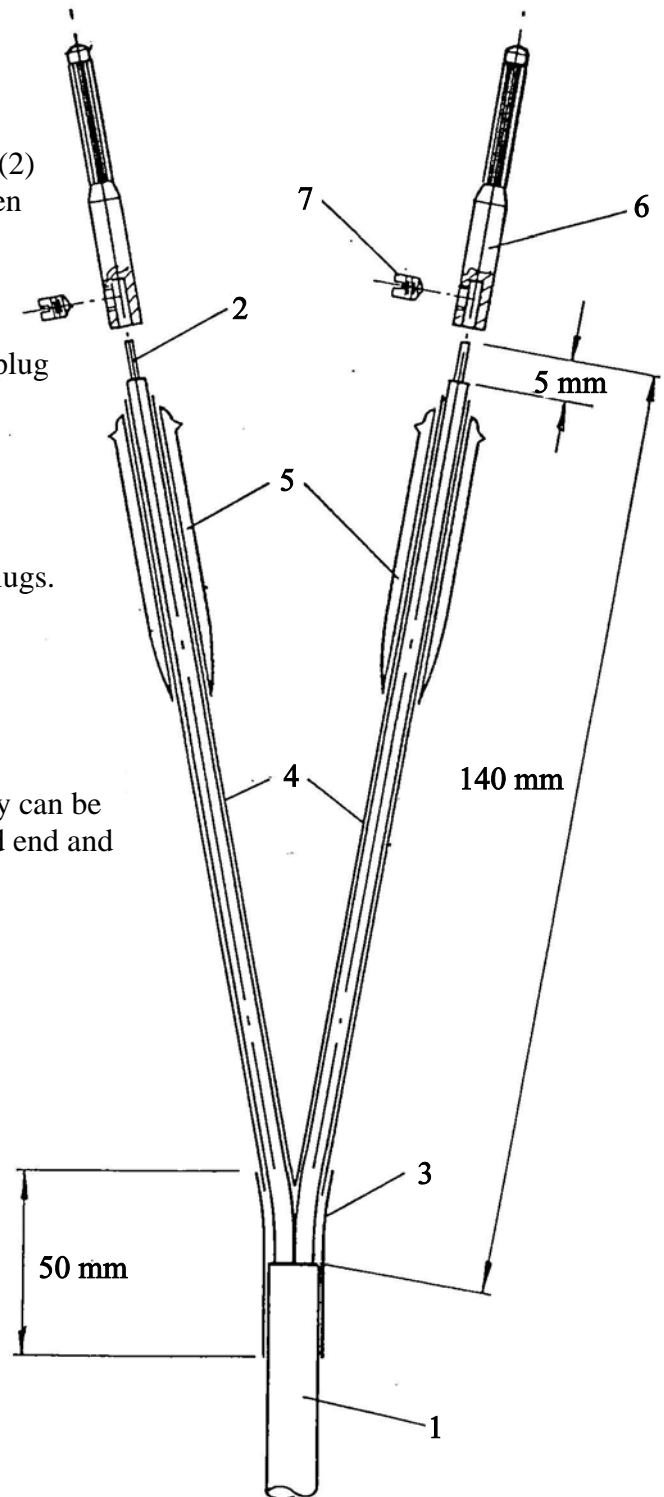
Open Circuit Fault

<b>Symptom</b>	<b>Possible Cause</b>	<b>Action</b>
Open circuit between plug (11) and insulated reed contact (6)	- Faulty plug contact	- Clean contact in plug - retest
	- Faulty insulated contact assembly	- Replace
No closure of reed switch contact when magnet in position	- Damaged Reed	- Replace

**IX REPLACE CABLE ENDS**

***Impulse Counter End and Complete Repair***

- Strip back 140 mm of main cable insulation (1) after shortening to new length.
- Expose 5 mm of conductor (2) and twist strands tightly, then solder.
- Slide on heat shrink sleeve (3), red and black identifying sleeves (4) and plug covers (5).
- Push soldered conductors into plugs (6) and lock with grub screws (7).
- Bring cover forward over plugs.
- Position heat shrink sleeve centrally over grey cable insulation and fix in place



**Figure 3**

**NOTE:** Repair to either plug end individually can be made also, by only cutting away the damaged end and following steps 2, 4 & 5.

***Current Meter Ends and Complete Repair***

1. Divide 750mm of twin mains flex (1) and secure using 30mm of heatshrink tubing (2).
2. Expose 5mm of conductors and twist strands tightly, then solder.
3. Slide heatshrink tubing (3) retaining nut (4), insulating bush(5) and brass contact (6) onto one of the dividing cables.
4. Solder brass contact to wire, taking care to produce a neat joint without melting the plastic insulation on the cable. Dress the contact with a file if necessary.
5. When joint has cooled, slide brass into insulating sleeve until home.
6. Place retaining nut in position on insulating sleeve, than set heatshrink tubing over insulating sleeve and cable, leaving about 4 mm of space between the nut and the heatshrink tubing .
7. Attach bunch plug to the remaining end of the cable in figure 4.6 (a).

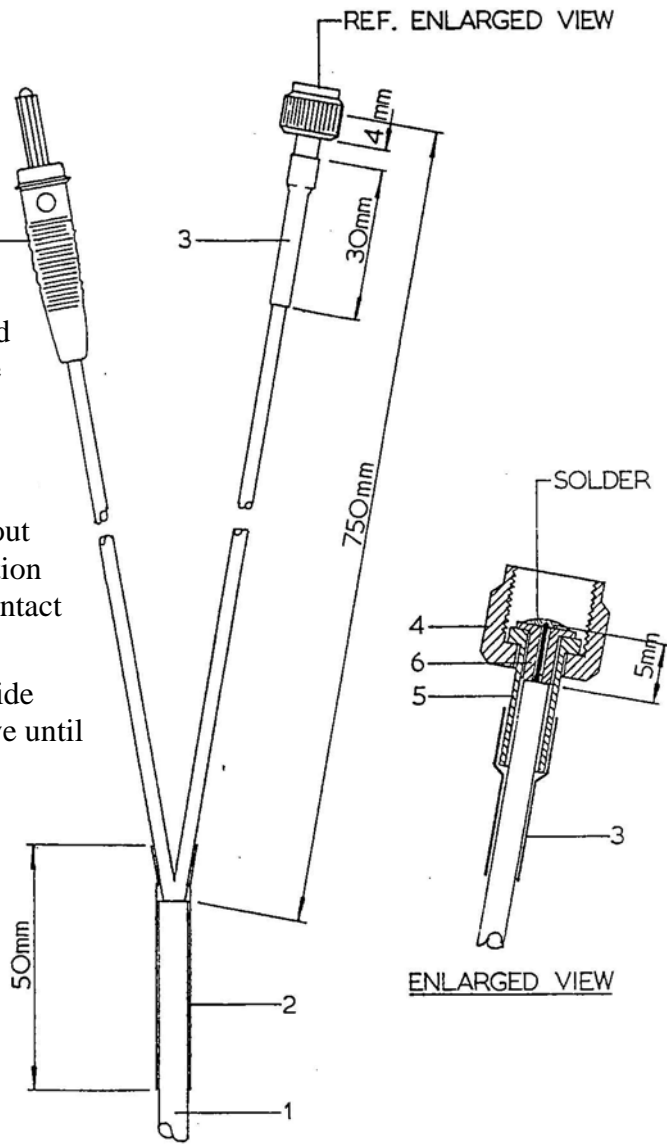


Figure 4

Repairs can be made individually to the positive (+) end with steps 2, 4, 5, and 6 and to the negative (-) end, by following steps 2 and 7. However, the shortened ends of the cable might be difficult to assemble conveniently onto the current meter, and it is usually preferable to reconstruct the cable as detailed in figure 4.

## **X     ADJUSTMENT OF REED SWITCH**

The position of the contact assembly determines the angle of closure of the switch, that is with locknut (item 8, figure 5) loosened, the contact assemble (item 9, figure 5) may be rotated in the body to achieve the optimum 180° switch closure.

Due to the sensitivity of the reed, one quarter turn adjustments are recommended.

An anti clockwise rotation of the switch increased the angle of closure.

A faulty reed switch is indicated when a continuous contact occurs with the contact assembly adjusted fully clockwise into the meter body.

Closures should be checked with an ohm meter or integrating current meter counter.

**XI PART LIST**

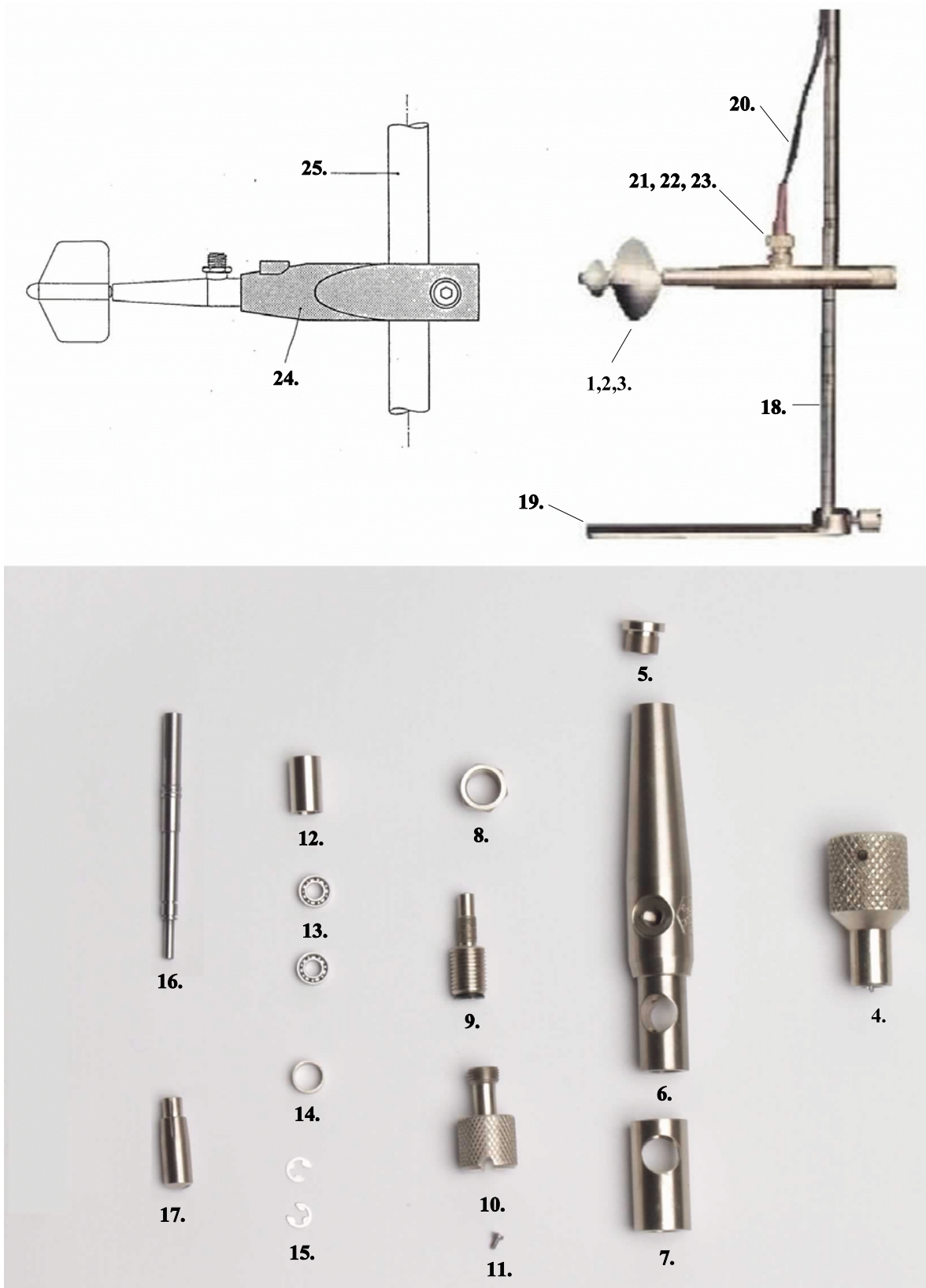


Figure 5. Part List

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<b>No.</b>	<b>ITEM</b>	<b>PART No.</b>	<b>QTY</b>	<b>REMARK</b>
1	Fan 1 50 DIA.X0.05 P	PYG01	1	
2	Fan 3 50 DIA.X0.25 P	PYG03	1	
3	Fan 5 30 DIA.X0.25 P	PYG05	1	
4	Body Key	PYG15	1	
5	Axle Nut	PYG07-02	1	For 2.5 DIA. Shaft
	Axle Nut	PYG07-08	1	For 4.0 DIA. Shaft
6	Meter Body	PYG08-01	1	
7	Clamping Sleeve	PYG08-03	1	
8	Nut	PYG10-06	1	
9	Reed Switch	PYG10	1	
10	Knurled Head Screw	PYG08-02	1	
	Tightening Bar	PYG08-04	2	
11	Screw	SC016-10	1	
12	Bearing Spacer	PYG07-03	1	For 2.5 DIA. Shaft
	Bearing Spacer	PYG07-06	1	For 4.0 DIA. Shaft
13	Bearings	SC058-13	2	For 2.5 DIA. Shaft
	Bearings	SC058-17	2	For 4.0 DIA. Shaft
14	Rear Spacer	PYG07-04	1	For 2.5 DIA. Shaft
	Rear Spacer	PYG07-07	1	For 4.0 DIA. Shaft
15	E clip	PYG07-05	2	For 2.5 DIA. Shaft
	E clip	SC046-21	2	For 4.0 DIA. Shaft
16	Spindle	PYG07-01	1	For 2.5 DIA. Shaft
	Spindle	PYG07-05	1	For 4.0 DIA. Shaft
17	Magnet Carrier	PYG09	1	
18	Wading Rod 0.0-0.5 m	PYG11-01	1	
	Wading Rod 0.5-1.0 m	PYG11-02	1	
	Wading Rod 1.0-1.5 m	PYG11-03	1	
19	Ground Plate	PYG11-04	1	

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	Knurled Clamp Screw	PYG11-05	1	
20	Connecting Lead 2.5 m	PYG14	1	
21	Contact	PYG14-01	1	
22	Insulating Bush	PYG14-02	1	
23	Clamping Nut	PYG14-03	1	
24	Clamp 20 DIA. Rods	PYG13-01	1	
	Clamp Screw	PYG13-02	1	
25	Wading Rods 20 DIA.	WR3/1	1	ONE SET
26	Bunch Plug Red	SC043-11	1	
27	Bunch Plug Black	SC043-12	3	
28	Case	PYG20	1	
29	Oil Bottle (60 ml)	PYG23	1	
30	Oil Bottle (250 ml)	CMB23	1	Standard
31	Manual	PYG100	1	