

INSTRUCTION MANUAL

UNIVERSAL CURRENT METER



QUALITY SYSTEM
ISO: 9001
CERTIFIED

**LAKSHMI ENGINEERING
WORKS**

Mfg & Supp of: Soil, Cement and Concrete
Testing Equipment, Survey, Drawing, Hydrological,
Metrological, Geological, Scientific Instruments **(All
type of Water Current Meters)**

172(NEW329), Maktoolpuri, Roorkee- 247667
Distt.-Haridwar (Uttarakhand)

Contents

INTRODUCTION.....2

UNPACKING YOUR OSS-B1 CURRENT METER4

OPERATION.....5

SPECIFICATION7

MIANTENANCE.....8

SERVICE & RECALIBRATION10

FAULT FINDING.....10

REPLACEMENT OF CABLE ENDS.....13

PART LIST.....15

INTRODUCTION

The LEW Current Meter is a world recognised design instrument for measuring the velocity of water in shallow natural water courses, rivers, canals, and pipe line. The provides solutions for all velocity measuring applications.

One of the great features of the is it can be used with 20 mm diameter wading rod and relocating device, streamlined suspension tube, portable winches and permanent cableway installations, with streamlined or ground feeling weights. A tail fin assembly is provided to control directional stability during suspended measurements.

The comes with lots of accessories which enable the user to endure water flow measurement easily and accurately.



All current meters manufactured by LEW 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 m/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 electromagnetic 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 with and has been reproduced from **ISO 3455:1976**.

The purpose of this manual is to make the user familiar with the OSS-B1 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).

UNPACKING YOUR CURRENT METER

This package should contain:

- Body
- Lead
- Body Key
- Fan type A (Fan type 1,2 and 4 are accessories)
- 3 wading rods 1.8m (3 sections) or 3.00m (3 sections)
- CMC20A , PVD100 or CMC3 counter
- 2 spare bearings
- 1 reed switch
- Screwdriver (Short)
- Screwdriver (Small)
- O-Rings for (fan carrier-1, reed switch cover -2, lead-1, terminal post-1)
- Post ground
- 1 oil bottle
- Rating Tables

Note: Tail Fin Stem Assembly and other accessories are supplied on request.

OPERATION

One impulse signal is produced per Fan revolution. As shown in figure1 below, this signal is generated by an encapsulated reed switch (1) which resides inside the meter body (2) and a permanent magnet (3) set into the rotating Fan assembly. A cover sealed with two O-rings provides a water-tight housing for the reed switch, while gold plated contact pins ensure low-resistance signal passage.

The voltage must not exceed 9V DC. Provided the impulse 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).

Four type of stainless steel Fans (4) can be used with this meter, all these Fans are supported on bearings which run within the oil filled hub of the Fan assembly. The capillary oil passage between the stainless steel axle (5) and Fan carrier (6), prevents entry of water to the bearings. A locknut on the shaft locates the bearings and sets the end float of the assembly.

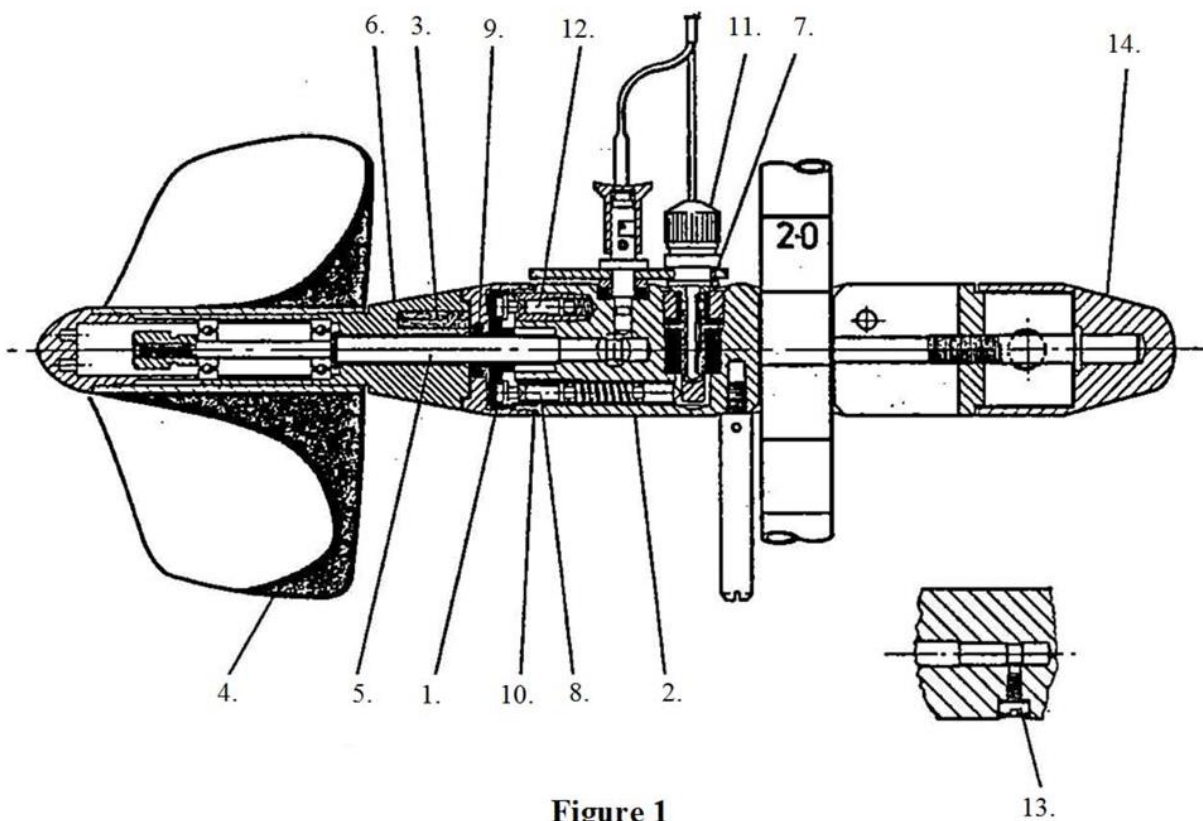


Figure 1

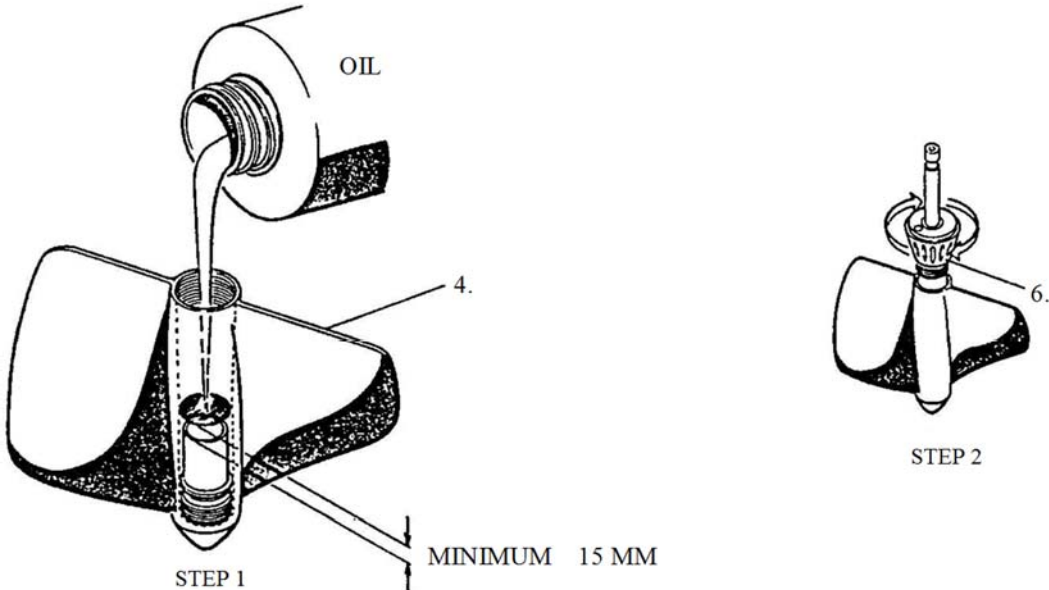


Figure 2

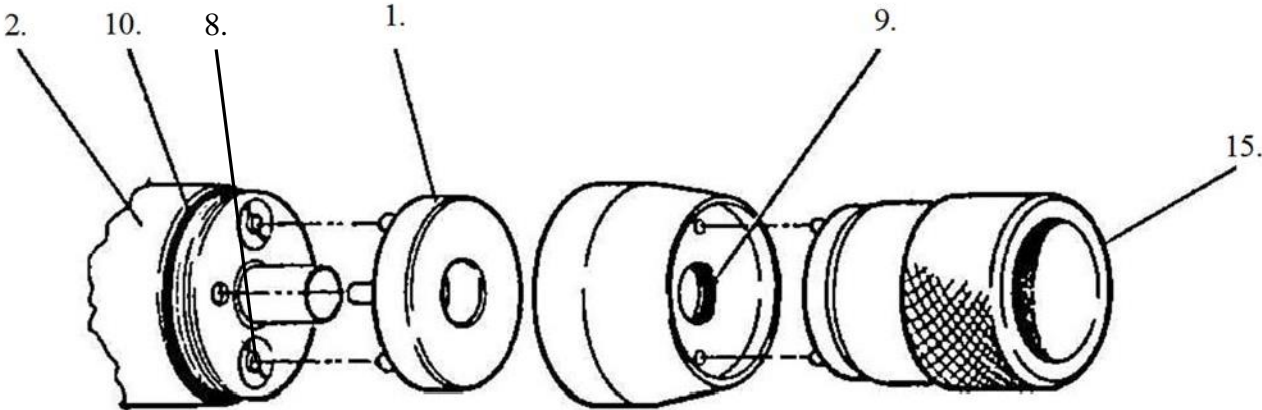


Figure 3

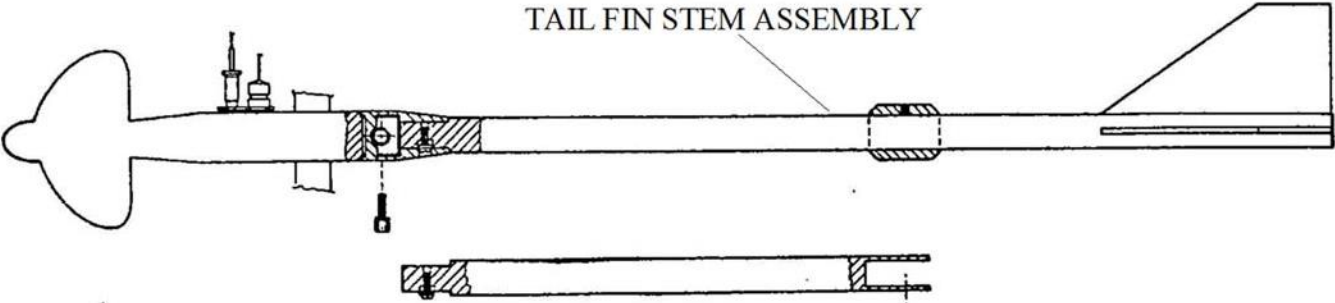


Figure 4

SPECIFICATION

Switch Encapsulated reed single contact per revolution, maximum volts 9V DC
maximum power 1.6 Watts.(if spark suppression in counter).

Fans Stainless Steel

Fan No.	Description	Starting Velocity m/s	Range of Component Effect	Maximum Velocity m/s
A	100mm Dia. 0.125 m pitch	0.025	±45°	5.0
1	125mm Dia. 0.25 m pitch	0.025	±5°	10.0
2	125mm Dia. 0.50 m pitch	0.040	±5°	10.0
4	80mm Dia. 0.25 m pitch	0.040	±5°	4.0

Mounting - 20mm diameter wading rods with clamp
 - Streamlined suspension tube with adaptor
 - Hanger bar
 - Pointer (to suit 20mm diameter rod) WR06-03

MIANTENANCE

The maintenance of the 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 Fan assembly
- Undo the fan carrier
- Remove fan carrier and shaft assembly (do not put it down anywhere it may attract dirt particles)
- Hold the fan upright and $\frac{3}{4}$ fill with oil
- Replace the oil bottle cap
- Replace axle and fan carrier, excess oil will be forced up through the capillary gap around the axle, ensure fan carrier 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
- Slide the fan assembly into the body and use the stubby screwdriver to tighten the retaining screw to lock the fan assembly in place
- Prior to spin test hold the current meter in the horizontal position and spin by hand for approx. one minute to get rid of the hydraulic pressure
- Spin test the meter against time. This is required to test the performance of the shaft and bearings
- Spin test results are dependent on the fan type and temperature (see table below).

<i>Spin Test</i>	
<i>Fan No.</i>	<i>Time (sec)</i>
<i>A</i>	<i>Minimum 110 sec</i>
<i>1</i>	<i>Minimum 85 sec</i>
<i>2</i>	<i>Minimum 70 sec</i>
<i>4</i>	<i>Minimum 90 sec</i>

- After the spin test is performed connect your current meter to the counter using the lead, this important to test the lead, reed switch and counter.

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.

- Spin test meter
- Undo the cleaning jar cap and $\frac{3}{4}$ filling with white spirit
- Remove fan assembly from meter body by undoing the retraining screw and separating the body from the fan
- Remove fan carrier and shaft assembly (do not put it down anywhere 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 and bearing assembly into the cleaning jar.
- Agitate them.
- Fill up the fan with white spirit put your thumb in place of carrier and shake it really hard for a few seconds.
- Blow dry the shaft assembly, fan carrier and fan
- Re-assemble the fan, if discharge measurement is finished
- Wipe box clean and return the fan assembly to the case
- If continuing a discharge measurement, Refill the fan with oil as per section 1
- Spin test the current meter at per section 1
- Repeat all the above steps for every discharge measurement
- Tip the white spirit in a spare bottle

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

Section 3: Tips for Easy Maintenance

It is advisable that the user maintain the OSS-B1 current meter at all time.

- Keep the 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 current meter about once a month if it is used on a daily basis (i.e. Fully dismantle shaft assembly, fan carrier and fan; Clean each item using hot soapy water and then rinse with white spirit)
- Check the lead and new the ends connections
- 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)

SERVICE & RECALIBRATION

- Recalibrate the current meter every 300 hours of use or once a year whichever comes first.
- 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.

FAULT FINDING

Mechanical Fault Finding

Symptom	Possible Causes	Action	Remark
Failed spin test	<ul style="list-style-type: none">• Dirty or faulty bearings	<ul style="list-style-type: none">• Clean Bearings and try to spin test again. If Problem persists replace bearings.	<ul style="list-style-type: none">• Dirty bearings can be identified towards the end of the spin test when the fan stops suddenly.
	<ul style="list-style-type: none">• Bent shaft	<ul style="list-style-type: none">• If the shaft is slightly bent return to LEW for repair.• If the shaft is very bent return to LEW or replacement.	<ul style="list-style-type: none">• 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.

Electrical Fault Finding

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

Faults will be either CLOSED CIRCUIT or OPEN CIRCUIT, and if the CMC-20A counter is used, set the control switches to “ON” and “INT” (ie. no time limit). Spin the Fan 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

Symptom	Possible Cause	Action
Fault occurs only when meter in water	<ul style="list-style-type: none"> • Water entering contact plug receptacle and earth between plug and body 	<ul style="list-style-type: none"> • Replace damaged plug or missing seal (see figure 7)
Circuit closed in any magnet position, but open with magnet removed	<ul style="list-style-type: none"> • Reed switch failed 	<ul style="list-style-type: none"> • Replace reed switch assembly (Figure 3)
Circuit closed without magnet in position	<ul style="list-style-type: none"> • Reed switch damaged • Water damaged during handling allowing contacts to earth onto meter body 	<ul style="list-style-type: none"> • Replace reed switch assembly • Remove reed switch (Figure 3 No.1) and insulated contact assembly (Figure 3 No 8). Drain or wipe away water. Flush with alcohol or methyl. Spirits, then air dry. Apply silicone grease to contact surfaces and thread on insulating sleeve before replacing. Check damaged O-rings (Figure 3 No 9 and10) replace. Apply silicon grease before fitting. • Check for damage to spigot through reed switch assembly. Return to factory for repairs.

Open Circuit Fault

Symptom	Possible Cause	Action
Open circuit between plug (11) and insulated reed switch contact (8) (Figure 3)	<ul style="list-style-type: none">- Faulty plug contact- Faulty insulated contact assembly (8) (Figure 3)	<ul style="list-style-type: none">- Check fit of plug in hole- Remove, wipe surface clean and check spring compression. Re-assemble with silicone grease on all surfaces.
No closure of reed switch contact when magnet in position.	<ul style="list-style-type: none">- Damaged Reed Switch Assy.	<ul style="list-style-type: none">- Replace
Reed switch operating but signal not passing to body.	<ul style="list-style-type: none">- Faulty earth contact (12) (Figure 3)	<ul style="list-style-type: none">- Check spring compression. Remove assembly and wipe clean contact surfaces with silicon grease and re-assemble.

REPLACEMENT OF CABLE ENDS

Impulse Counter End and Complete Repair

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

NOTE: Repair to either plug end individually can be made also, by only cutting away the damaged end and following steps b, d & e.

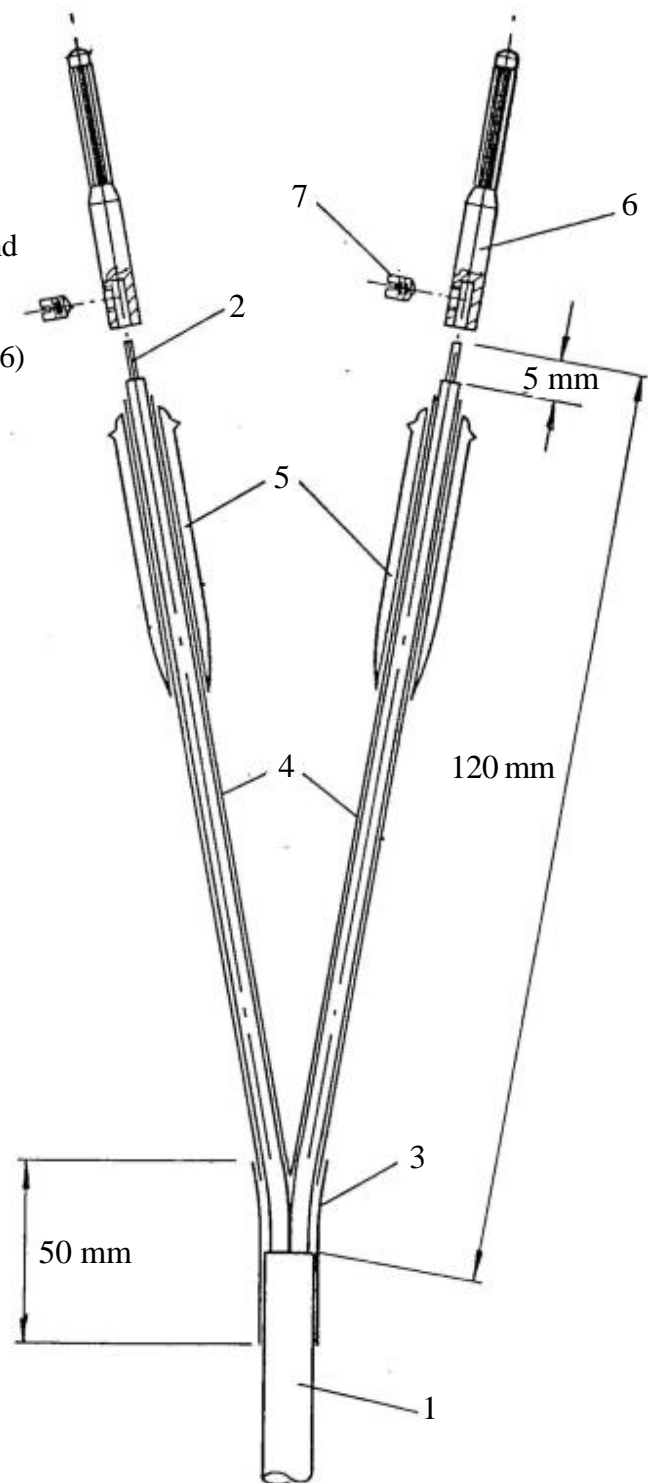


Figure 5

Current Meter Ends and Complete Repair

- a. Shorten cable (1) to new length and strip outer insulation (2) to 140mm (red plug end) and 120mm (black plug end).
- b. Expose 5mm of conductors (3) and twist strands tightly, then solder.
- c. Slide on heat shrink sleeve (4) red (5), and black (6) identifying sleeves.
- d. On the positive (+) end, push plug cap (7), washer (8), rubber bush (9) and plug holder (10) over cable.
- e. Lock conductor into plug pin (11), then slide back into plug holder and screw plug cap into place.
- f. Fit rubber seal (12) to plug pin.
- g. For the negative (-) end, slide on black heat shrink tube (13). Push conductor into the earth pin (14) and solder in place. Bring heat shrink sleeve forward onto earth pin and fix down with heat.
- h. Fix down heat shrink sleeve (4) over main cable termination.
- i. 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 6.

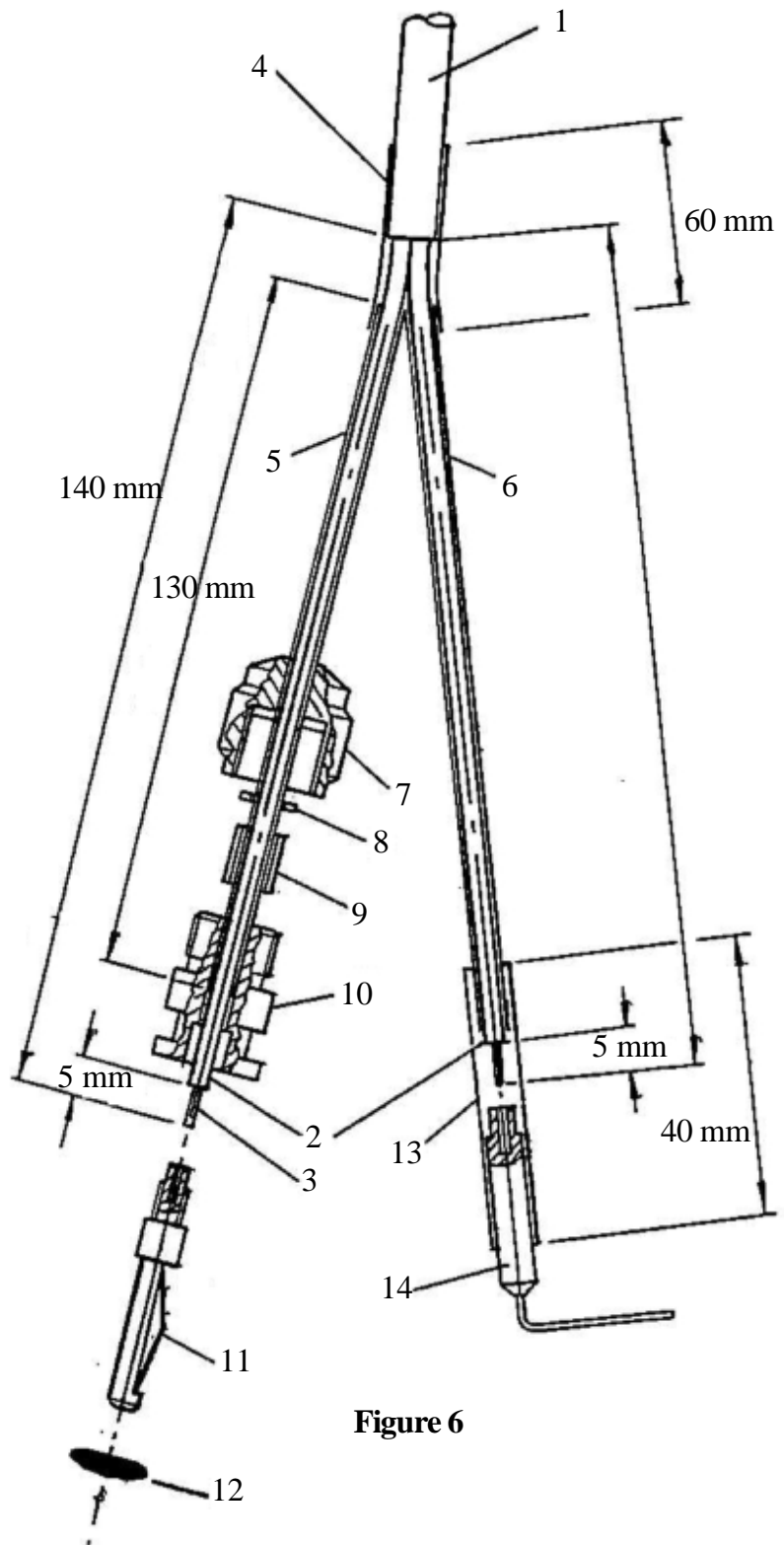


Figure 6



4 Type of fans available:

- 1- Fan No.4 Part No. CMB01
- 2- Fan No. 2 Part No. CMB17
- 3- Fan No. A Part No. CMB18
- 4- Fan No. 1 Part No. CMB21



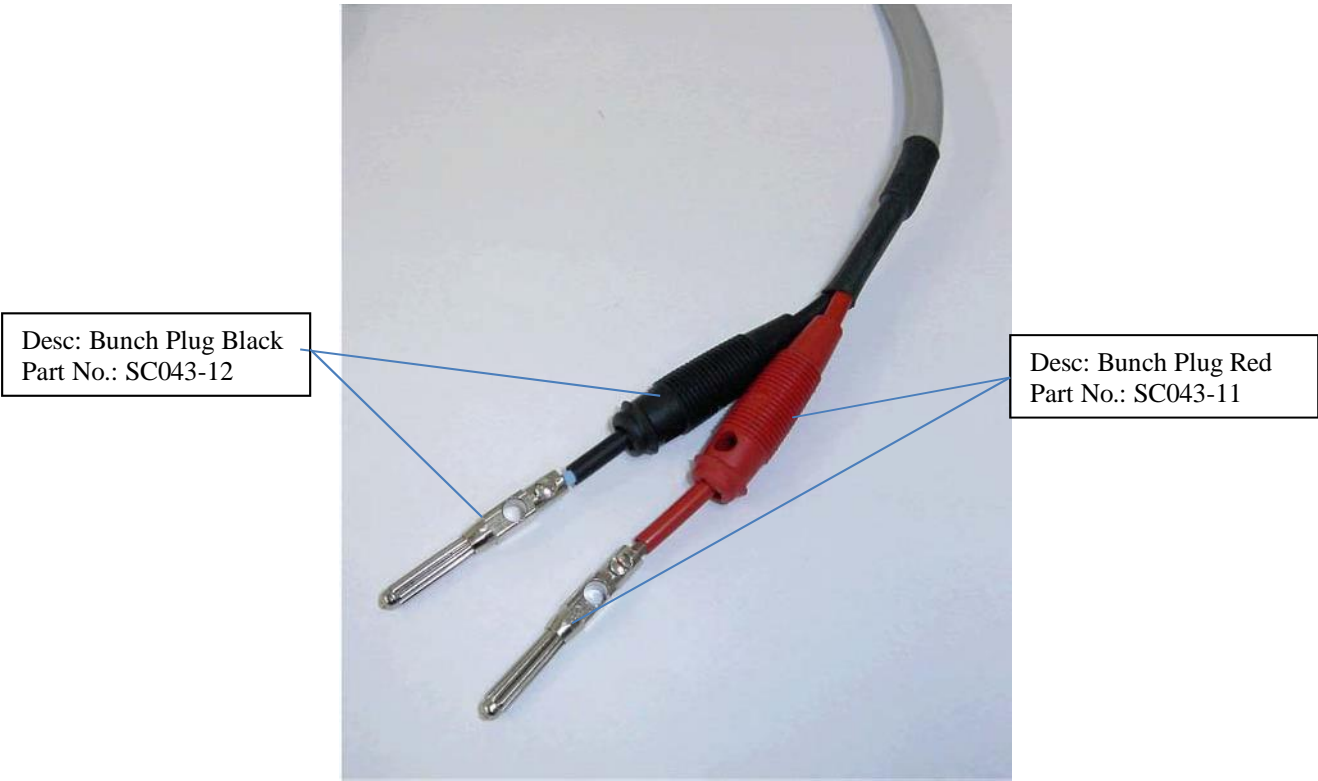
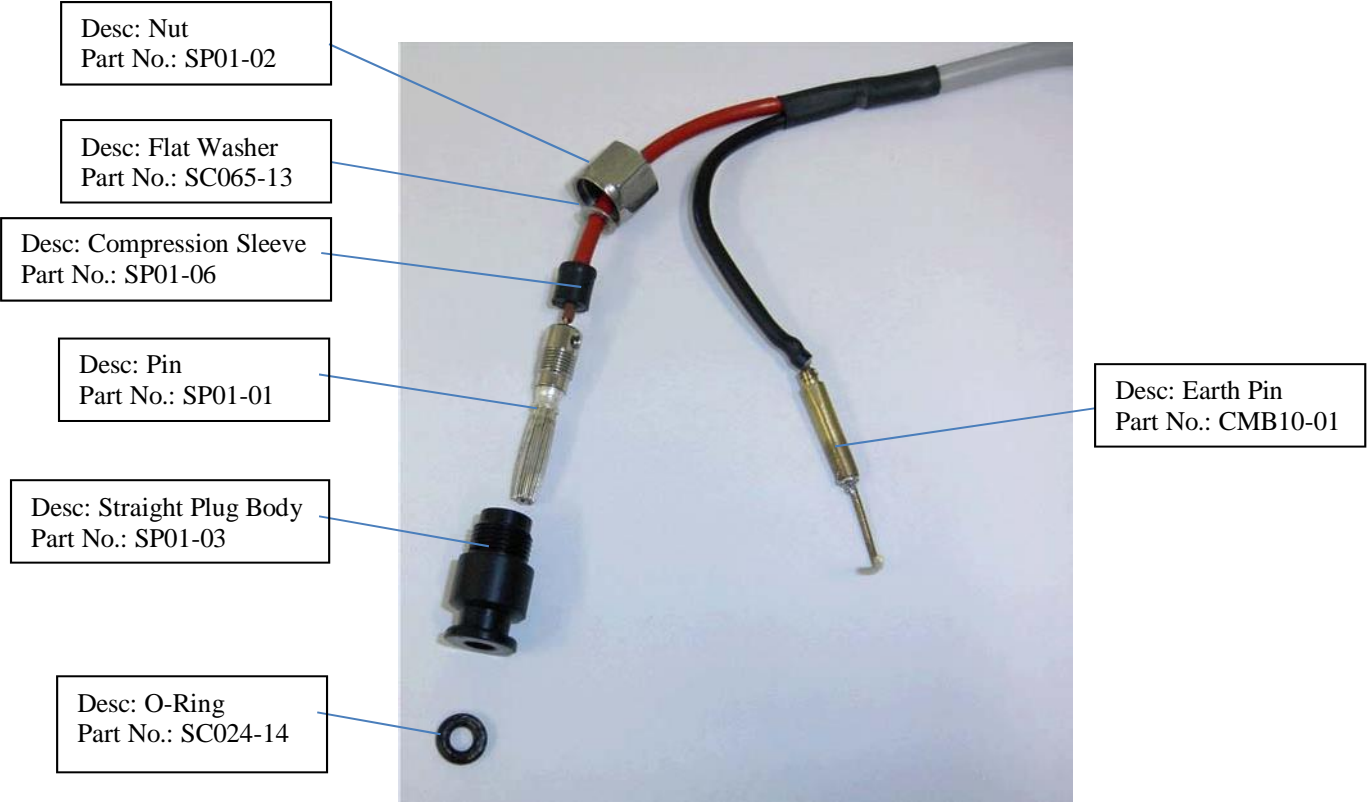
Desc: Body Key
Part No.: CMB15



Desc: Ground Post- Fan 80 Dia.
Part No.: CMB03-05



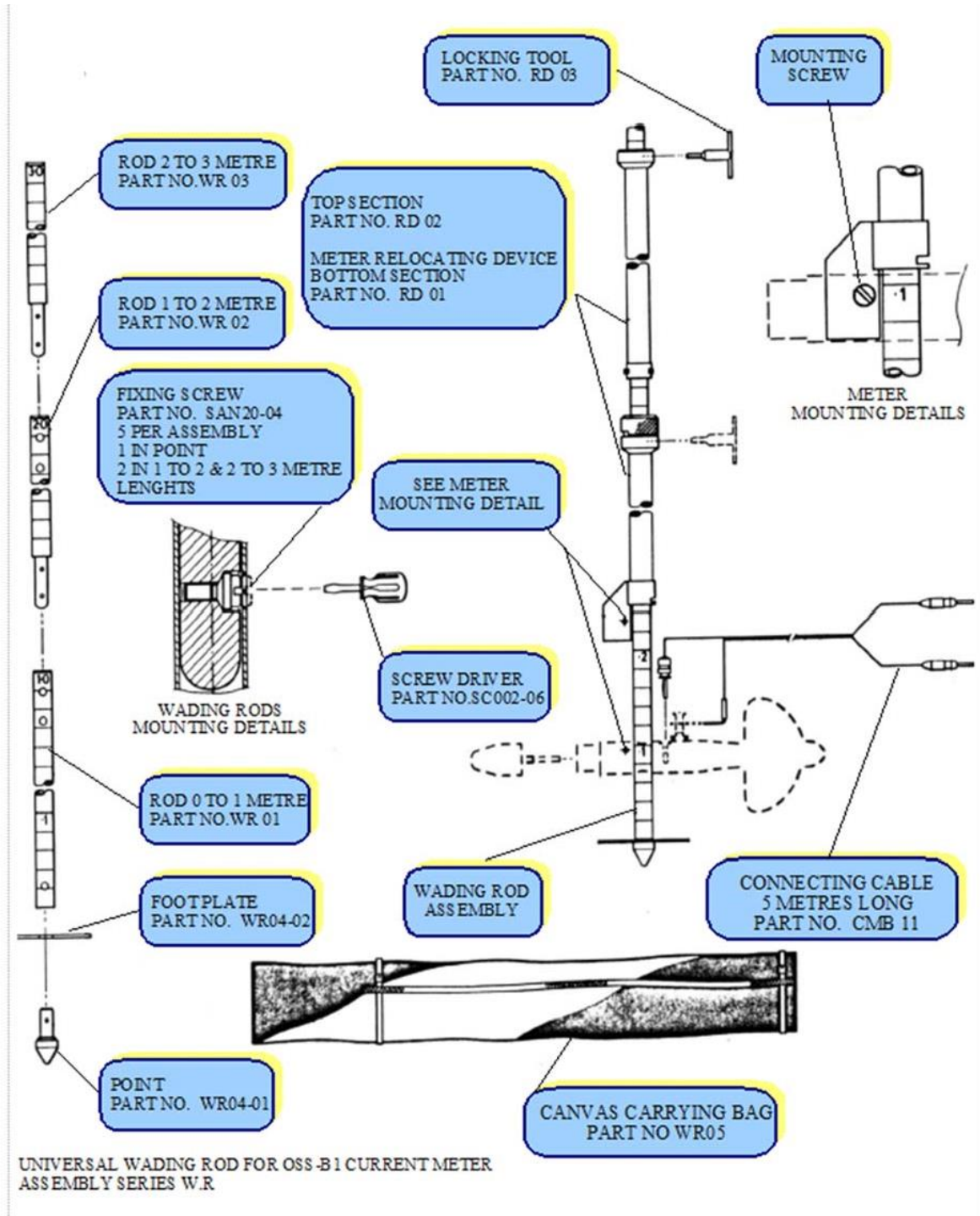
Desc: Ground Post- Fan 125 Dia.
Part No.: CMB03-06



UNIVERSAL WADING RODS & RELOCATING DEVICES

	<u>ITEM</u>	<u>PART NO.</u>	<u>QTY</u>
	Three "W.R." series wading rod sections, plated alloy steel, graduations each 2cm and markings at decimetre (10cm) intervals. 0 – 0.6 metre 0.6 – 1.2 metre 1.2 – 1.8 metre	WRS01 WRS02 WRS03	1 1 1
	Point & Foot Plate	WRS04	1
	Canvas Carrying Bag	WR11	1
	Fixing Screw	SAN20-04	5
	Screwdriver	SC002-06	1
	Three "W.R." series wading rod sections, plated alloy steel, graduations each 2cm and markings at decimetre (10cm) intervals. 0 - 1 metre 1 - 2 metre 2 - 3 metre	WR01 WR02 WR03	1 1 1
	Point	WR04-01	1
	Foot Plate	WR04-02	1
	Canvas Carrying Bag	WR11L	1
	Fixing Screw	SAN20-04	5
	Screwdriver	SC002-06	1
METER RELOCATING DEVICE, STAINLESS STEEL, TWO X 1 METRE SECTIONS			
	Bottom Section	RD01	1
	Top Section	RD02	1
	Locking Tool	RD03	1

UNIVERSAL WADING RODS & RELOCATING DEVICES



R
T
N
o
.
S
S
T
0
4