

## DESCRIPTION

The outboard-thermometer serves for the measurement of water temperature and for extraction of water samples on board of ships.

## CONSTRUCTION OF THE DEVICE

The major components are: water vessel (1) with protecting rubber barrel (2), outer thermometer- shielding tube with vertical scale display (3), inner plastic tube (4) with thermometer (5), terminal with holding eyelet (6), pin (7) and rubber ring (8).

The water vessel is a thick walled brass cylinder with an upper and a lower flange of red brass Rg 5. Two layouts for the upper part are possible: with and without spout. The sea water-proof and oil-proof rubber barrel is manufactured so as to dampen occasional bumps against the side of the ship. The outer thermometer-protecting tube with scale display is manufactured out of brass. It is hard soldered into the upper casting. The design of the scale display enables correct reading of the whole temperature range from  $-10...+40$  °C.

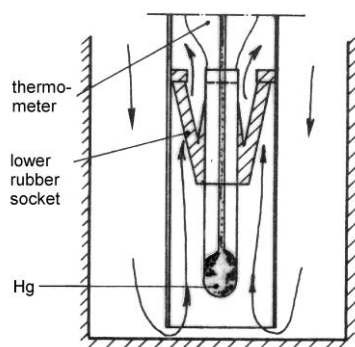
The terminal is again an Rg 5-casting, which fits onto the thermometer-protecting tube. For fixation a cylindrical pin is inserted into the terminal and the tube. This pin is located below the rubber-ring in order not to get lost. Only after having removed this ring the pin may be drawn out. All mentioned brass and red brass parts are dull chrome plated warranting a better protection against corrosion.

A thermometer filled with coloured petroleum is used.

The measuring range extends from  $-10...+40$  °C with a scale division of 0.5 °C. If desired, a finer graduation-reducing the measuring range-may be provided (special layout). Each thermometer can be delivered with an official test certificate (extra price). The thermometer is kept in its position through an upper and a lower rubber socket in the interior of the plastic tube. This tube is easily inserted into the outer tube in such a way, that their scale displays coincide.

Technical data are subject to change!

Due to the fact that the plastic tube reaches down very close to the bottom of the water vessel, it is achieved that the filling water flows necessarily past at the bottom of the thermometer and a well-mixed and hence uniform-temperature condition of the water sample is obtained (see sketch).



Water flow during filling the vessel (principle)

## TECHNICAL DATA

Measuring range: -10...+40 °C

Scale division: 0,5 °C

Meas. precision: ±0,5 °C

## DIMENSIONS

Bucket: Height: 385 mm  
max. Ø: 135 mm

Transportation case: approx. 455 x 275 x 425 mm

## WEIGHT

Bucket: approx. 6 kg

Transportation case: approx. 11 kg

## ORDERING CODE

Navy bucket, complete with transportation case and accessories. **2510.0000**

Navy bucket with thermometer and rope but without transportation case and accessories. **2511.0000**

Official test certificate and other measuring ranges upon requirement!

## LIST OF CONTENTS

### TRANSPORTATION BOX

1. Transportation- and storage case, empty
2. complete outboard-thermometer
3. rope, 20 m
4. bar of round section
5. spare thermometer
6. 3 guard rings
7. 3 protective sleeves
8. 3 protecting covers



## OPERATING INSTRUCTIONS

### Handling:

The outboard-thermometer is delivered with rope. The transportation- and storage case, which contains all required accessories, as well as tools and spare parts, has turned out to be of practical value. (See illustration).

The rope, which is contained in the transportation case, is fastened by means of a shackle at the terminal eyelet; the bucket then can be lowered into the water. To avoid incorrect measurements, the bucket should be allowed to stay for a while in the water so that a heat exchange between the seawater and all units can

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take place. For the same reason, during a certain time before the measurement, the device should be screened from incident solar radiation, as otherwise a rather high temperature difference may arise between the device and the sea water. After having taken the bucket on board the temperature has to be read off immediately in order to get correct values. After use the device and the rope have to be dried before storage in the transportation case.

## MAINTENANCE

The bucket is essentially maintenance-free!

## REPLACEMENT OF THERMOMETER

After stripping the upper rubber-ring off the underlying cylindrical pin is pushed out with the corresponding taper plug and the head (terminal) is taken off. By means of the included hook the plastic tube is lifted and drawn out of the protecting tube (outer tube).

In order to replace the defect thermometer the upper rubber socket is removed and the thermometer is taken out. The lower rubber socket remains in the plastic tube and can be rubbed with talcum so as to facilitate the installation of the new thermometer. The assemblage is carried out in reverse order as described.

## IMPORTANT NOTE

### SEPARATED LIQUID COLUMNS – WHAT DO YOU DO?

#### Before using thermometers with wetting liquid, observe!

By vibrations, e.g. during transport, it may happen that the liquid column separates in the capillary of the thermometer. This inevitable damage can be fixed by performing with the lower thermometer bulb end short tapping movements on the palm. During this the thermometer is held in vertical position. The separated liquid parts will slowly reunite with the liquid column. In addition, one can heat the liquid vessel with the fingertip during this process.

Before each measurement at a lower temperature than the one currently displayed on the thermometer, allow the thermometer to cool slowly so that the wetting liquid follows completely. For very accurate temperature determinations, the cooling rate should be approximately 1 °C per minute up to the temperature at which measurements are to be taken.

**The procedures for thermometers in which organic liquids are is similar.**