PHYWE

Temperature organ

65983-93

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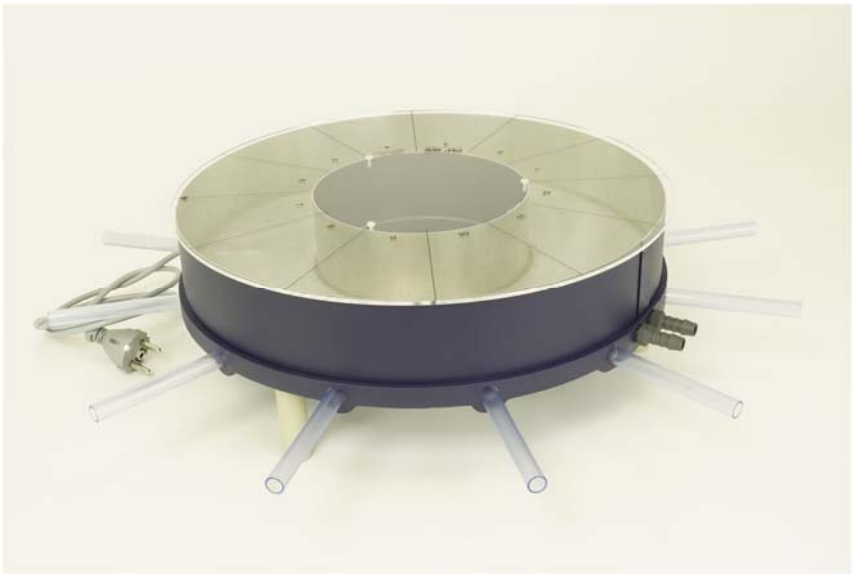

Fig. 1: 65983-93 Temperature organ

Operating instructions

CE The unit complies with the applicable EU-guidelines.

INHALTSVERZEICHNIS

1 SAEFTY PRECAUTIONS

Caution!

- Carefully read these operating instructions completely before operating this instrument. This is necessary to avoid damage to it, as well as for user-safety.
- Check that your mains supply voltage corresponds to that given on the type plate fixed to the instrument.
- Install the instrument so that the on/off switch and the mains connecting plug are easily accessible.
- Only use the instrument in dry rooms in which there is no risk of explosion.
- Do not start up this instrument in case of visible signs of damage to it or to the line cord.
- Only use the instrument for the purpose for which it was designed.

2 PURPOSE AND CHARACTERISTICS

With the temperature organ, biological functions of plants and animals - such as, for example, metabolic activities, germination, growth, development, behavior - at different temperatures can be observed and investigated. The apparatus is therefore a valuable aid in the experimental acquisition of knowledge on the subjects of metabolism and energy exchange, ecology, physiology of stimuli and the senses and behavior. The main constituent of the temperature organ is a ring-shaped, 110 mm wide metal strip in which a temperature gradient between approx. 45°C and 12 - 15°C can be produced by means of a built-in electric heater and throughflow cooling (water pipe). The heating and cooling connections

are arranged diametrically opposite to each other; the temperature gradient is therefore symmetrical in the two halves of the strip. On its outer circumference the strip is provided with 12 equally spaced radial holes to insert thermometers. The strip, which stands on three feet, has annular walls and can be covered with a Plexiglas plate; in this way animals are prevented from escaping from the enclosed annular experimental area.
The cover plate is divided by printed markings into 12 equal, consecutively numbered sectors which serve to fix positions in the experimental area. The apparatus is made ring-shaped so that experimental animals can pass through the cold region unimpeded and will not, as in the case of a linear organ, suffer from hypothermia at the cold end.

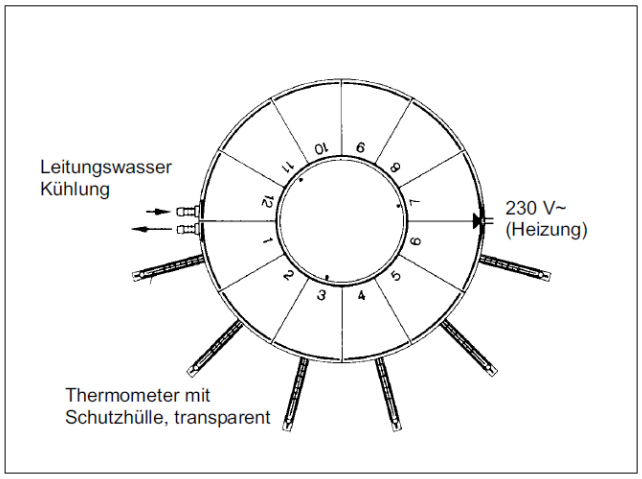

Fig 2: Temperature organ with cover plate

3 HANDLING

To put the temperature organ into service, the heater lead is connected to the mains (230 V AC) and one of the two cooling unions is connected to the water main; the outflowing cooling water is taken to the drain.
(If it is intended that the temperature should go as low as 0°C, a cooling thermostat is required). A -10... +50°C thermometer is inserted as far as it will go into each of the 6 holes in one of the two halves of the strip between the heater and cooling connections and safeguarded against damage due to accidental knocks by slipping a transport protective sleeve over it. Because of the symmetry of the temperature distribution the thermometers need to be fitted in only one half of the strip. The heating and cooling must be left running until the temperature readings remain constant; this is the case after some 30 to 60 minutes, depending on the situation at the start. Then the actual experiment can be begun.

4 EXAMPLES OF EXPERIMENTS

4.1 Determination of the preferred temperatures of insects

Some 20 insects of various kinds, of which there should be 3 of each kind, are marked with colored dots (e.g. nail varnish) and put into the temperature organ. The cover plate is laid on top so that the heater lead is between sectors 6 and 7. The temperature of each pair of sectors 6/7, 5/8...1/12 is read off on the thermometers and noted. After an acclimatization time of 30 minutes the positions of the individual creatures are recorded at 5-minute intervals. After one hour the experiment is discontinued. From the individual test values the average value for each creature is calculated. From the average values of all individuals of one kind their preferred temperature is obtained.

4.2 Effect of the soil temperature on the germination and growth of plants

Five Petri dishes (diameter 100 mm) are filled to the brim with garden soil. The soil in each dish is well moistened with the same amount of tap water. 70 seeds of garden cress (Lepidium sativum) are uniformly distributed on each and the dishes are placed uncovered in the temperature organ. The temperature in the region of the individual dishes is monitored daily and the development of the cress plants (breaking open of the seed husk, emergence of root and shoot, etc.) is recorded each time. The soil is to be kept uniformly moist for all the plants. After 4 - 6 days the experiment is discontinued and the length of the cress plants in the individual Petri dishes is determined. The results of the experiment are best documented by means of a photograph and a graph (abscissae: temperature; ordinates: length of the cress plants).

5 NOTES ON OPERATION

This high-quality instrument fulfils all of the technical requirements that are compiled in current EC guidelines. The characteristics of this product qualify it for the CE mark. This instrument is only to be put into operation under specialist supervision in research, educational and training facilities (schools, universities, institutes and laboratories).

6 EXPERIMENTS

- Effect of the soil temperature on the germination and growth of higher plants P4060100
- Preferential temperature of insects P4060200

7 TECHNICAL DATA

Outer diameter	400 mm
Ring-shaped rail	Width 110 mm
Thermometer bores	*d* = 12,5 mm
Cooling connection	for hoses, d = 8 mm
Supply voltage	230 V
Power consumption	60 VA
Weight	approx. 6 kg

8 LIST OF APARATUS

Temperature organ	65983-93
Lab thermometer -10... +50° C (6x)	38055-00
Rubber tubing, d = 8 mm (2x)	39283-00

9 WARRANTY

We give a warranty of 24 months for units that we have supplied inside the EU, and a warranty of 12 months outside the EU. The following is excluded from the warranty: damage that is due to non-compliance with the operating instructions, improper use or natural wear.

The manufacturer can only be held liable for the function and safety-relevant properties of the unit if the maintenance, service and modifications of the unit are performed by the manufacturer or by an institution that is expressly authorised by the manufacturer.

10 WASTE DISPOSAL

The packaging mainly consists of environmentally-friendly materials that should be returned to the local recycling stations.

Do not dispose of this product with normal household waste. If this unit needs to be disposed of, please return it to the address that is stated below for proper disposal.

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