



THERMOTEST-300 HEATING CONSTANT TEMPERATURE CALIBRATION BATH

Operating manual

! *Before using this instrument, carefully read the operating manual.*

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This manual provides the information needed to operate THERMOTEST-300 heating constant temperature calibration bath.

INTRODUCTION

Intended Use

THERMOTEST-300 heating constant temperature calibration bath is intended for utility or precision thermometer testing and calibration.

Environmental Conditions

Indoor use only.

Ambient temperature: +10...+35 °C.

Air humidity: max. relative humidity 80 % for temperatures up to +31 °C,

Max. mains fluctuation of ± 10 % are permissible.

Safety recommendations

The instrument ensures safe operation when installed, operated, and maintained according to operating manual. Thoroughly study this manual prior to beginning operation.

Do not store the instrument in aggressive atmosphere.

Protect the instrument from contamination.

Always use only recommended thermal fluids. Don't use acid or corroding materials.

Avoid strikes to the housing, vibrations, damage to the operating element panel (keypad, display), and contamination.

Take care that the mains supply features a low impedance to avoid any negative affects on the instrument being operated in the same mains.

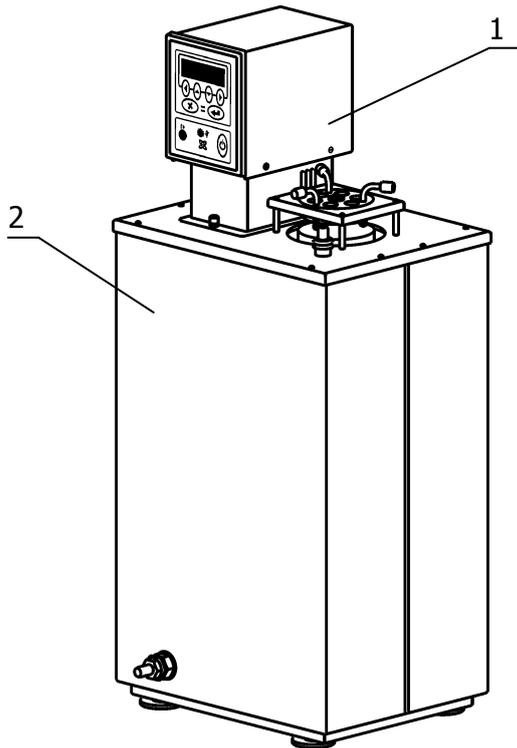
The instrument is designed for operation in a controlled electromagnetic environment. This means that transmitting devices (e.g. cellular phones) should not be used in the immediate vicinity. Magnetic radiation may influence other units with components susceptible to magnetic fields (e.g. a monitor).

Make sure the instrument is regularly checked for proper condition.

Only qualified personnel are authorized to perform configuration, installation, maintenance and repairs of the instrument.

! *CAUTION: The instrument is not for use in explosive atmosphere.*

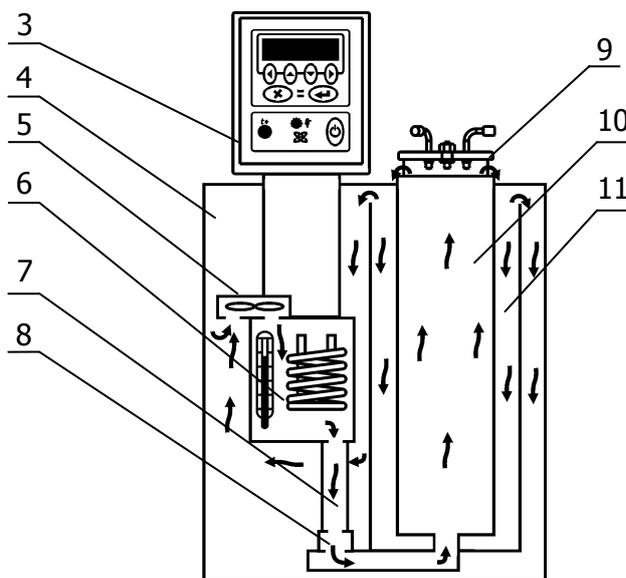
Appearance and parts names



THERMOTEST-300 consists of heating immersion circulator 1 and bath tank 2. The bath tank contains main 4, operating 10 and supplementary 11 baths. The main bath includes heating immersion circulator with output pipe 7 and connecting socket 8.

The operating principle of THERMOTEST-300 is based on supporting a preset constant temperature of flowing thermal fluid in the bath tank and providing a good temperature uniformity of operating bath 10. The circulation of the thermal fluid is provided by rotary pump 5, located in the heating immersion circulator.

Maintaining of the preset temperature by means of heating is provided by immersion circulator 1.



Pump 5 of immersion circulator 1 pours thermal fluid from main bath 4 to chamber 6 with heater and temperature sensor. In the chamber thermal fluid temperature is adjusted and poured into operating bath 10 through output pipe 7, connected to socket 8. Then thermal fluid returns to supplementary bath 11 by overflowing.

Holder for thermometers 9 is installed either on a stand for liquid-in-glass thermometers, or on a stand for resistance thermometers.

For liquid-in-glass thermometers thermal fluid level is close to the thermometer readings.

Operating bath 10 can be removed, which makes the cleaning procedure much easier.

USING THERMOTEST-300

! *NOTE: Throughout this manual, keystrokes are represented in **bold type**; references to messages on the display are in "quotes."*

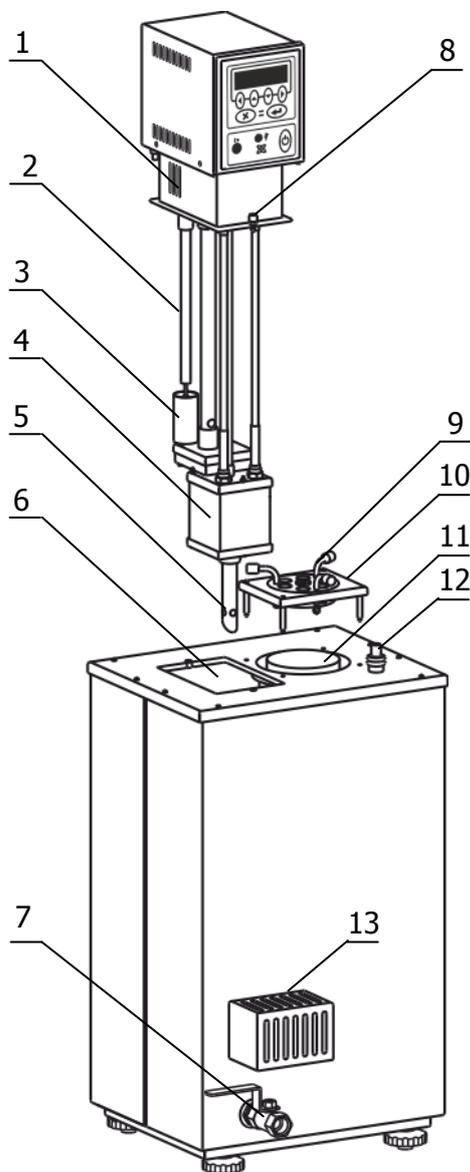
Before using the bath, carefully read the operating manual.

Preparation

Carefully select a spot for installing instrument with free air access for circulator ventilation. Make sure it is far away from any kind of heat source.

! *THERMOTEST-300 should be installed in a well ventilated area or in a fume hood, because oxidation and thermal degradation of thermal fluid at high temperatures produces volatile products.*

Place the instrument on an even surface with a pad, made of nonflammable material.



Make sure that the low level protection float 3 moves freely downward under its own weight when the circulator is in vertical position. If not, remove the possible float rod clamp by shifting free end of the protective tube 2, in which the rod is.

Insert output pipe 5 with diagonal cut in corresponding socket of chamber 4 and secure it with a screw. Place the circulator in the main bath. Pipe 5 should be inserted in the clutch on the bottom of the bath. Secure the circulator with screws 8 on the bath cover.

Make sure that the tank drain valve 7 is closed and put the safety cover 13 on it.

Pour thermal fluid in operating bath 11 to fill up the baths of the instrument. Overflow of cold thermal fluid from the operating bath in the main and a supplementary bath may require considerable time. The resulting thermal fluid level should be monitored by the control probe 12 — it must be between two marks. Also, the thermal fluid level in the main bath should be enough to lift float 3 of the circulator.

Connect the circulator to the power supply.

Turn the circulator on. The pump should start draining the thermal fluid. If the pump functions properly, the thermal fluid level in the operating bath should increase; and the thermal fluid should be poured into the supplementary bath. If the thermal fluid is not being pumped, immediately turn the circulator off.

There are two possible reasons for the pump improper functioning:

- pipe 5 is not inserted into the clutch on the bottom of the main bath;
- air lock in the pump.

To eliminate the first reason — undo screws 8, carefully lift the circulator about 4 cm high and insert pipe 5 into the clutch on the bottom of the main bath.

To eliminate the second reason — turn the circulator on and off till the air lock disappears and the thermal fluid is poured from the operating bath by overflowing; or wait for about 30 minutes.

If float 3 is in position lower than the level of triggering safety system (when the pump is activated):

- turn the instrument off;
- make sure the float functions properly;
- add 0.5 L of thermal fluid;
- make sure that the thermal fluid level is not exceeded the upper mark of control probe;
- turn the instrument on.

Repeat the procedure till the safety system stops being triggered.

Insert stand 10 with the pegs inside apertures on the bath. Place holder for thermometers 9 on top of the stand.

To operate the instrument, read the "M15 Heating Immersion Circulator. Operating manual."

Using the calibration bath

! *While operating the bath be cautious to avoid getting burnt from the contact with heated surfaces or thermal fluid.*

When working with the thermal fluid over a long period of time at temperature over 200 °C, its viscosity gradually increases till 300 mm²/sec at 20 °C. It also acquires light brown color. Spontaneous polymerization with the formation of gelatinous substance might happen.

To prolong the life of the thermal fluid:

- use holders for thermometers, which limit access of air to the thermal fluid surface;
- close the operating bath when the instrument reaches temperature setpoint or is in between the calibration procedures.

Add thermal fluid as you operate the calibration bath since the level of thermal fluid will decrease because of the loss, which will result in triggering the appropriate safety system.

It is necessary to check thermal fluid at least one a month. If its viscosity reaches 300 mm²/sec at 20 °C, change thermal fluid immediately.

Changing thermal fluid

Turn the instrument on and set temperature at 100 °C.

When thermal fluid reaches 60 °C, select type of thermal fluid — "Any" and set the possible minimal temperature, for example, 10 °C. This procedure is necessary in order to deactivate heater if there is an air lock while filling the system with thermal fluid.

Turn the instrument off. Remove safety cover and screw a draining hose from delivery packet to valve 7. The other end of the hose put in a tank of not less than 20 L in volume to collect thermal fluid.

Open the valve 7 and drain thermal fluid in the tank.

! *Never drain thermal fluid hotter than 100 °C. It may break the drain valve.*

Remove stand 10 from the bath tank. Then remove circulator 1 and operating bath 11. Clean them thoroughly.

Remove draining hose. Fill the bath with new thermal fluid.

Select type of thermal fluid — "PMS-100". This is necessary to ensure that instrument used soft mode of heating the thermal fluid in order to prolong its life.

GENERAL SPECIFICATIONS

Working temperature range:	+100...+300 °C
Recommended thermal fluid	Polymethylsiloxane fluid PMS-100
Set-point resolution	0.01 °C
Display resolution	0.01 °C
Temperature stability	±0.02 °C
Temperature uniformity	±0.01 °C
Digital setting accuracy	±0.2 °C
Digital setting repeatability	±0.02 °C
Heating capacity	2000 W
Bath volume	14 Liters
Dimensions, W×D×H	480×330×830 mm
Bath opening	90 mm
Bath depth	530 mm
Weight	30 kg
Power supply	230 V, 50/60 Hz, 2.5 kW
Warranty	2 years