

# Biometra TSC ThermoShaker

Order No. 846-051-600 (230 V)

Order No. 846-051-690 (115 V)



## Manual

846-9-990-031



**Please read these instructions carefully  
before using this apparatus!**



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Manual for apparatus with serial number 010143-1208-0106 or higher

## 2 Safety

### 2.1 Definition of Symbols:



Caution: Read these operating instructions fully before use and pay particular attention to sections containing this symbol.



Caution: Surfaces can become hot during use.



Caution: Danger! High voltage!



Caution: Fragile!

### 2.2 Safety Precautions

#### General Safety:

- Use only as specified by the operating instructions, or the intrinsic protection may be impaired.
- The unit should be saved from shocks or drops.
- The unit must be stored and transported in a horizontal position (see packaging labelling).
- After transport or storage in humid conditions, dry out the unit before connecting it to the supply voltage. During drying out the intrinsic protection may be impaired.
- The unit must be placed on a level, non-flammable surface away from flammable materials.
- Use appropriate vessels / tubes for temperature required. Ensure that the operating temperature is less than the maximum operating temperature of your sample material.
- Clean the unit only with a damp cloth. Do not use chemical cleaning agents.
- Before using any cleaning or decontamination method except those recommended in this manual, users should check with the Biometra Service Department that the proposed method will not damage the equipment.
- Do not make modifications to the design of the unit.
- The ThermoShaker TSC has to be used only with a power supply compatible with the connection port and with similar electrical parameters like the included power supply. It is highly recommended only to use this supplied power supply.

### **Electrical Safety:**

- Connect only to a power supply with a voltage corresponding to that on the serial number label at the rear of the unit.
- The TSC Thermoshaker has to be used only with a power supply compatible with the connection port and with similar electrical parameters like the included power supply. It is highly recommended only to use this supplied power supply.
- Ensure that the mains switch and isolating device (external power supply) are easily accessible during use.
- Do not plug the unit into the mains outlet without grounding, and do not use extension lead without grounding.
- Before moving, disconnect at the power supply socket.
- To turn off the unit completely, disconnect the external power supply from the mains outlet.
- Never fill liquid directly into the blocks (always use vessels).
- If liquid is spilt inside the unit, disconnect it from the power supply and have it checked by a competent person.
- Disconnect the mains before removing the outer cover. Note there are no user serviceable parts inside in the unit. (Warranty is void if cover has been removed by user!)

### **During Operation:**

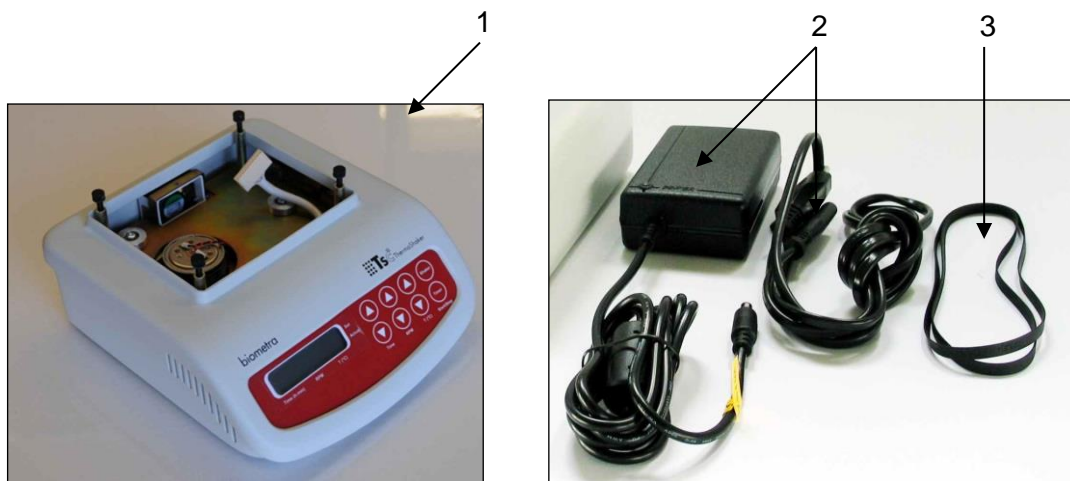
- Do not leave the operating unit unattended.
- Do not impede the platform motion during operation.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures.
- Do not operate the unit if it is faulty or been incorrectly installed.
- For indoor use only.
- Do not operate the unit outside the laboratory premises.
- Do not check the temperature by touch. Use a thermometer.
- Do not touch surfaces which become hot during high temperature operation.
- Do not put any hot blocks on inflammable surfaces.
- To reduce the risk of eye injury during high temperature operation, use safety goggles or spectacles.

### **Biological & Chemical Safety:**

- It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or inside the equipment.

### 3 Scope of Delivery

The **Biometra TSC ThermoShaker** (Order No. 846-051-600/690) is delivered with



**Fig. 1: Delivered parts**

- 1 x ThermoShaker apparatus (Fig. 1/1)
- 1 x External power supply unit + cable (Fig. 1/2)
- 2 x Spare rubber belt (Fig. 1/3)
- 4 x Rubber spacers for block screws
- 1 x Manual

*Interchangeable block modules (Fig. 2) have to be ordered separately and will be delivered separately.*

## 4 Accessories

### Interchangeable block-modules

Order No.	Description
846-051-615	Interchangeable block module for TSC, 24 x 1.5 ml tubes
846-051-616	Interchangeable block module for TSC, 24 x 2.0 ml tubes
846-051-612	Interchangeable block module for TSC, 20 x 0.2 ml + 12 x 1.5 ml tubes
846-051-613	Interchangeable block module for TSC, 20 x 0.5 ml + 12 x 1.5 ml tubes
846-051-614	Interchangeable block module for 96 well microtiter plates or 96 x 0.2 ml tubes



- ❶ 846-051-615 24 x 1.5 ml tubes
- ❷ 846-051-616 24 x 2.0 ml tubes
- ❸ 846-051-612 20 x 0.2 ml + 12 x 1.5 ml tubes
- ❹ 846-051-613 20 x 0.5 ml + 12 x 1.5 ml tubes
- ❺ 846-051-614 96 well microtiter plates or 96 x 0.2 ml tubes

**Fig. 2: Biometra TSC ThermoShaker and interchangeable block modules**

## 5 General Information

The **TSC ThermoShaker** is a compact bench top shaking incubator, ideal for all applications requiring heating, cooling and shaking in microtubes up to 2.0 ml, within the temperature range of -15 °C below room temperature (RT) to +100 °C.

The intensive mixing operation and the incubation/heating/cooling mode can be used either combined or independently from each other, i.e. the device can work as a thermoshaker, incubator without shaking/mixing or as shaker/mixer without temperature control.



The **TSC ThermoShaker** is applicable for DNA and RNA analysis, extraction of lipids and other cell components, DNA library creation, biochemical studies of enzymatic reactions and processes, extraction of metabolites from cellular material, preparation of samples for electrophoresis, etc.

The **TSC ThermoShaker** provides:

- Peltier elements for active cooling
- Variable speed, variable temperature micro tube thermoshaker
- Gentle to vigorous mixing of samples (2 mm shaking orbit)
- Soft start function
- Even amplitude throughout the shaker platform
- Timed shaking operation (1 min. to 96 hours) with buzzer and automatic switch-off
- Set parameters will be saved
- Low voltage power supply (for safe cold room operation)

## 6 Installation

### 6.1 Unpack and Check

Unpack and carefully examine the **TSC ThermoShaker**. Report any damage to Analytik Jena. Save all packing material if damage is found.



**Attention!** Automatic balancing system in this product produces light metal-like noise when moving the unit which is likely to be heard during unpacking. It is normal occurrence and does not indicate to a fault!

Do not attempt to operate this device if physical damage is present.

If you would like to send the unit back to us, please read the return instructions (page 17).

### 6.2 Installation

Place the apparatus upon even horizontal non-flammable surface away from any flammable material.

To provide optimum ventilation ensure clearance around the apparatus: 20 cm on each side. Ensure additional clearance from the bottom side and do not place any object below the unit.

Plug the external power supply unit (AC/DC adapter supplied with the shaker) into the 12 V socket at the rear side of the apparatus.

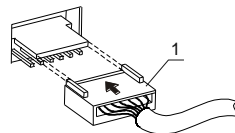
### 6.3 Installation of Block Modules



**Attention:** Installation and change of block modules have to be performed only when the Power switch is turned off and the external power supply is disconnected from the mains outlet.

Choose the block module.

Connect the plug to the contact terminal according to Fig. 3/1 on the bottom side of the block module. Make sure that the connector is mounted tightly.



**Fig. 3: Connecting block modules**

Align the block module that the warning labels are facing the front of the unit.

Secure with the four knurled screws.

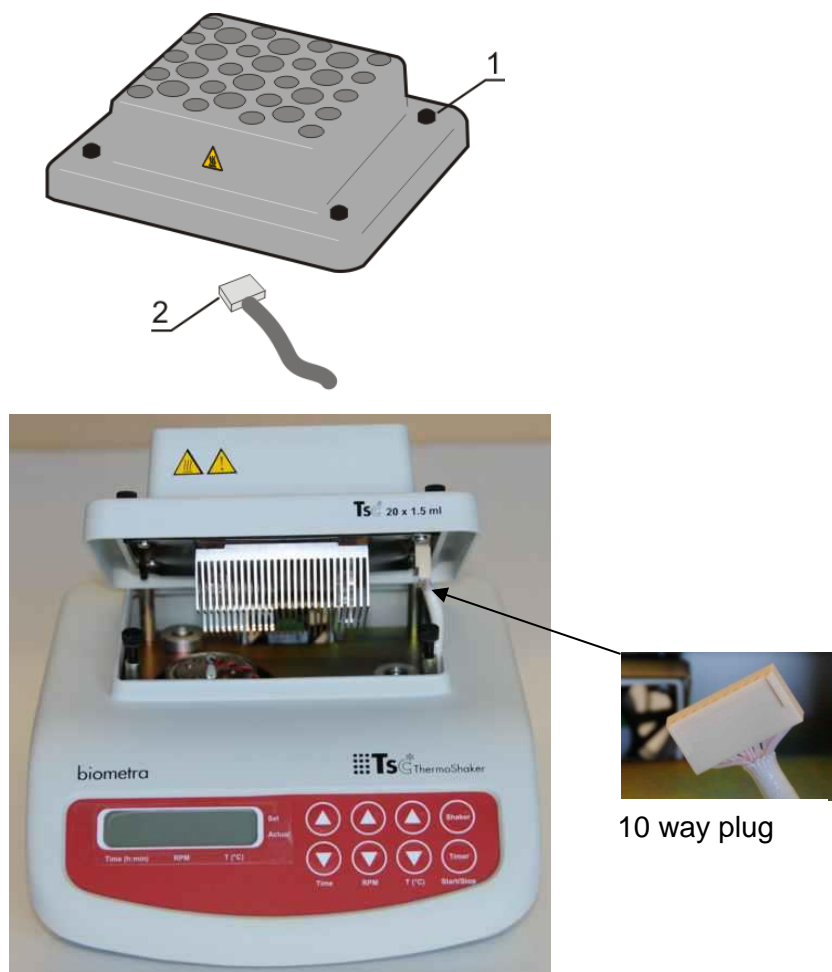
Installing the 96-well block module, drive one by one 4 screws for several turns and fix them with the hexagonal key (included with the block module).



## 6.4 Changing Block Modules

Turn the power switch to off and disconnect the external power supply from the mains outlet.

Remove the four knurled screws (Fig. 4/1) and disconnect the 10 way plug (Fig. 4/2).



**Fig. 4: Changing block modules**

Select the new block module.

Install the block module according to 6.3.



**Attention:**

Please handle the block modules carefully, do not let them drop.  
Please disconnect and connect the 10 way plug carefully, do not damage it.

## 7 Operation of TSC ThermoShaker

Before starting, please

check the tubes / microtiter plates before using.

- be sure that tubes / microtiter plates are thermo-resistant.
- don't heat the tubes / microtiter plates over the melting point of the material they are made of (use thermo-resisting polypropylene tubes).
- remember that thin-walls tubes have a higher thermo-conducting factor.

Under the action of high temperature (> 85°C) tube caps can open, thus causing sample volume shrinkage or potential health risk when working with infected material. To prevent such cases it is recommended to use tubes with cap lock of Safe-Lock® type.

For efficient mixing it is recommended to fill test tubes up to 75% of the rated volume.

### Starting Operation:

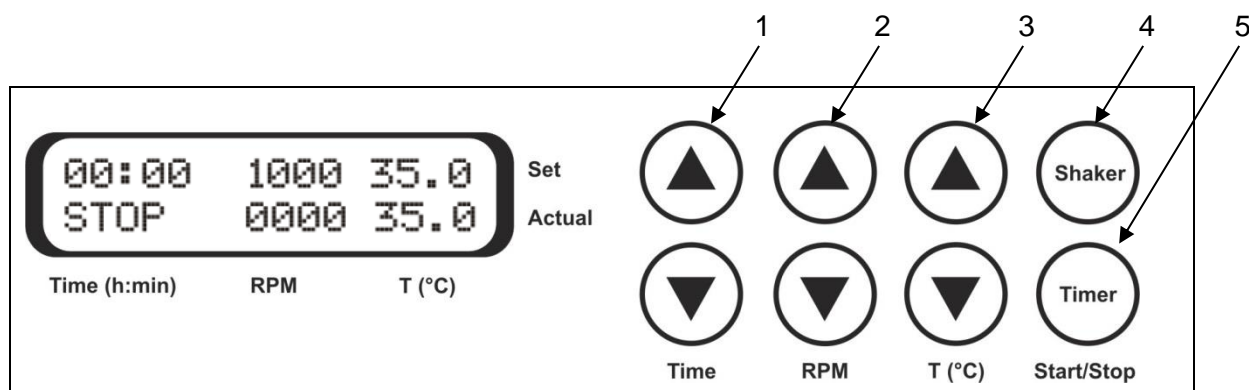
Connect the power supply unit to the mains. Switch on by using the on-off switch at the rear side of the TSC (Fig. 5).



**Fig. 5: Rear side of the TSC**

The upper line of the display (settings) shows time, RPM and temperature set earlier. (Fig. 6)

The lower line of the display (actuals) shows current readings of the same parameters (STOP - time, 000 - RPM, thermoblock temperature °C, which automatically starts rising according to the temperature set in the upper line). (Fig. 6)



**Fig. 6: Control panel**

The time of temperature stabilisation depends on the initial temperature but does not exceed 15-20 min if the set temperature is 37.0 °C.

## 7.1 Parameter Setting

Use the readings in the upper line of the display (set point), while setting the necessary parameters.

### 7.1.1 Reaction Time (TIME)

With the help of “▲” and “▼” buttons (Fig. 6/1) set the required working time interval in hours and minutes. If the button is pressed for longer time the increment becomes bigger (1 min increments to reach 10, 20, 30, 40, 50 or 60 min, after this 10 min increments until reaching the full hour and finally 1 hour increments).

### 7.1.2 Shaking Intensity (RPM)

With the help of “▲” and “▼” buttons (Fig. 6/2) set the required shaking intensity in revolutions per minute (increment 10 RPM). If the button is pressed for longer time the increment becomes bigger (10 RPM for the first 10 steps, after these 100 RPM increments to reach 1,400 RPM).

### 7.1.3 Reaction Temperature (T, °C)

With the help of “▲” and “▼” buttons (Fig. 6/3) set the necessary temperature (increment 0.1°C). If the button is pressed for longer time the increment becomes bigger (0.1°C increments to reach 1°C, 2°C, ....., after this 1°C increments until reaching 10°C, 20°C,... and finally 10°C increments to reach 100°C).

#### Notes:



The set parameters can also be changed during operation.

The block temperature is maintained independently of the set time and shaking speed

### 7.1.4 Program Execution

After the **TS1 ThermoShaker** has reached thermal stabilisation (when the set and current temperature readings become the same) insert tubes into the platform sockets of the interchangeable block module.

Press the “Shaker”-Start/Stop button (Fig. 6/4). The platform will start rotation and the timer indicator will start counting up the time interval (with 1 min precision).

#### Note:



If the rotation speed is set to zero, pressing “Shaker”-Start/Stop button starts the timer but the platform does not move.

At the end of the program (after the set time elapses) the platform motion stops and the timer shows the flashing reading STOP accompanied by the repetitive sound signal until the “Shaker”-Start/Stop button is pressed.

If the working time is not set (or deleted) and the timer indicator in the upper line shows 00:00, pressing the “Shaker”-Start/Stop button causes the apparatus to operate continuously until the “Shaker”-Start/Stop button is pressed again.

If required, there is possibility to restart the timer when it is running. Press the “Timer”-Start/Stop button once (Fig. 6/5) to stop the timer. Press the “Timer”-Start/Stop button again to restart the timer.

The platform motion can be stopped at any time by pressing the “Shaker”-Start/Stop button. In this case the program and the platform motion stop, the timer is set back to zero and switches into the STOP mode. Press the “Shaker”-Start/Stop” button to repeat the operation with the same time and speed.

**Attention:**



At the end of the set time period the platform movement is stopped automatically, but the heating can be stopped only manually by reducing the temperature with the “▼“ T(°C) key (Fig. 6/3 - lower button) till the OFF sign appears in the upper line of the display.

At the end of operation switch off the unit by using the on-off switch at the rear side of the TS1 (Fig. 5).

## 8 Calibration

The instrument is pre-calibrated at the factory (calibrating coefficient - 1.00) for operation with measured temperature from sensor installed in the thermoblock.

To enter the calibration coefficient, hold TIMER-START/STOP key (Fig. 6/5) pressed for more than 8 sec to activate calibration mode. Display will show the calibration coefficient as shown on fig.8/1.

To restore the factory settings with the help of Temp. “▲” and “▼” keys (Fig. 6/3) set 1.000 value as shown on fig.8/1.

To exit calibration mode press SHAKER-START/STOP key (Fig. 6/4) once.

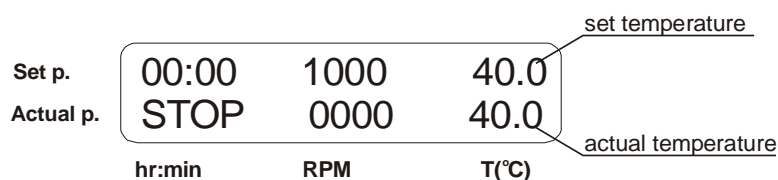
### 8.1 Calibration procedure

To perform calibration install independent sensor (accuracy 0.5°C) inside tubes into the block sockets or right in thermoblock special sensor socket.

Set the necessary temperature (e.g. 40°C).

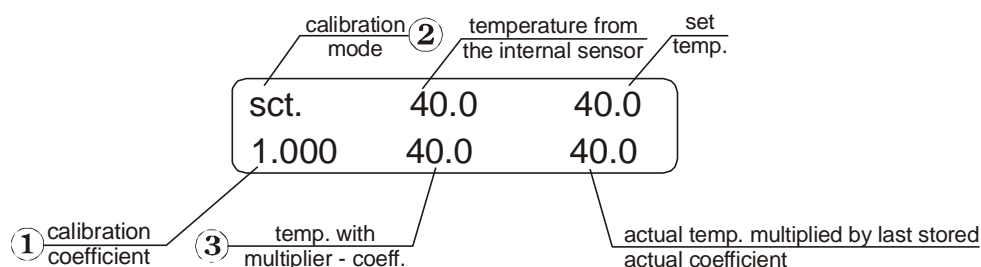
After the unit reaches the set temperature (when the set and current temperature readings becomes the same) it is necessary to leave unit for 30 min for thermal stabilization.

Let us assume that the readings of independent sensor is 39 °C, but the display's actual temperature is 40 °C (Fig.7), it is necessary to add correction 1 °C.

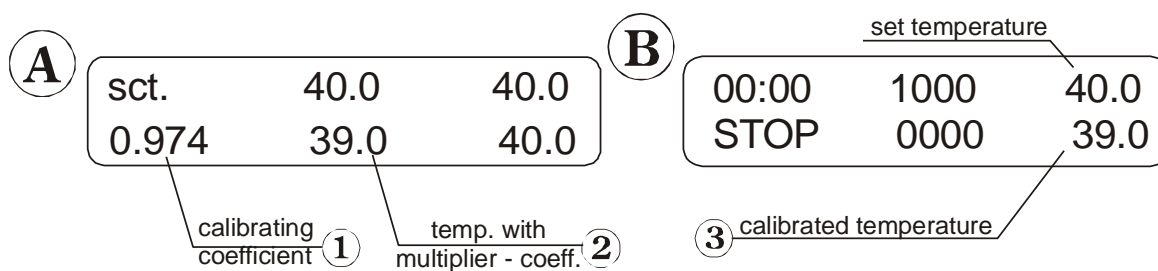


**Fig.7 Control panel in operation mode**

Hold TIMER-START/STOP key (Fig. 6/5) pressed for more than 8 sec. to activate calibration mode. Display will show the following parameters as shown on fig.8.



**Fig.8 Control panel in calibration mode**



**Fig.9 Control panel in calibration and operation mode**

To set the new temperature value, use the Temperature with multiplier - coefficient readings (Fig.8/3).

With the help of Temp. “▲” and “▼” keys (Fig.6/3) change the calibration coefficient (Fig.9A/1) so, that the new temperature value (Fig.9A/2) corresponds to the independent sensor temperature. In our example the calibration coefficient will be 0.974 (in range: 0.936 up to 1.063; increment 0.001).



This calibrating coefficient will correct temperature though all operation range.

After calibration press SHAKER-START/STOP key (Fig.3/4) once to save the changes and exit calibration mode.

The display will show calibrated temperature as shown on fig.9B/3 and the unit will continue thermal stabilization according to the previously set temperature.

## 9 Maintenance

All products covered in this manual are designed to comply with IEC61010-1 and can be flash tested. As they are fitted with radio frequency interference suppressers it is recommended that only a D.C. test is performed.

No other routine service is required.

### 9.1 Cleaning

The case can be cleaned with a damp cloth after disconnection. Do not use liquids that contain concentrate organic solvents, alkali or acid nor abrasives.

Standard ethanol (75%) can be used for cleaning and disinfection of the unit.



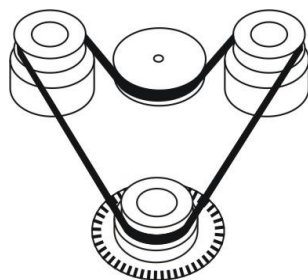
#### **Attention:**

Disconnect the unit from the power supply socket.

Before using any decontamination or cleaning method except that recommended, check with our Service Department that the proposed method will not damage the equipment.

### 9.2 Rubber belt replacement

Dependent on the frequency and the mixing speed it might be necessary to regularly replace the rubber belt. We recommend a replacement after a period of 1.5 years of operation respectively after 2,000 hours of operation.



**Fig. 6: Rubber belt replacement.**

- Remove the external power supply unit (AC/DC adapter supplied with the shaker) from the mains and from the 12 V socket at the rear side of the apparatus.
- Remove 4 fixation screws on the shaker bottom and remove the bottom plate.
- Replace the rubber belt (Fig. 6).
- Assemble the unit.

## 10 Specifications

Temperature setting range	+4 °C to +100 °C
Temperature control range	RT –15 °C to +100 °C
Temperature setting resolution	0.1 °C
Temperature stability	±0.1 °C
Temperature accuracy at +37°C	±0.5 °C
Temperature uniformity over the block	
at +4 °C	±0.6 °C
at +37 °C	±0.1 °C
at +100 °C	±1.0 °C
Average heating rate (20 x 1.5 ml block) In the range from +25 °C to +100 °C	5 °C/min
Average cooling rate (20 x 1.5 ml block) - in the range from +100 °C to +25 °C - in the range from RT to 15 °C below +25 °C	5 °C/min (from +100 °C to +25 °C in 14 min) 1,8 °C/min (from +25 °C to +4 °C in 12 min)
Time of block-module heating from +25 °C to +37° C	6 min 15 min (average, including temperature stabilisation)
Temperature calibration coefficient range	0,936 ... 1,063 (± 0.063)
Speed range	250 -1,400 RPM (increment 10 RPM)
Max. speed deviation	
at 250 RPM	2%
at 1,400 RPM	0.7%
Orbit	2 mm
Independent timer with sound signal	1 min - 96 hrs (increment 1 min)
Maximum continuous operation time (recommended interval between operation sessions not less than 8 h)	max. 96 h
Display	16 x 2 characters, LCD
Capacity of interchangeable block modules	24 x 1.5 ml tubes 24 x 2 ml tubes 20 x 0.5 ml + 12 x 1.5 ml tubes 20 x 0.2 ml + 12 x 1.5 ml tubes 96 x 0.2 ml or 96 well MTP



Input current	12 V, 5 A
Power consumption	60 W
External power supply	input AC 100 – 240 V, 50/60 Hz output DC 12 V
Dimensions (W x D x H)	205 x 230 x 130 mm
Weight (with power supply)	4.1 kg (at max.)

The **TS1 ThermoShaker** is designed for operation in closed laboratory rooms, cold rooms or incubators at ambient temperature from +4 °C to +40 °C and maximum relative humidity of 80% for temperatures up to +31 °C decreasing linearly to 50% relative humidity at +40 °C.

## 11 Service

Should you have any problems with this unit, please contact our service department or your local Biometra dealer:

### **Analytik Jena/Biometra GmbH**

#### **Service Department**

Rudolf-Wissell-Straße 14 - 16

D-37079 Göttingen

Germany

Phone: +49 5 51 / 50 88 1 - 10 -12 or -14

Fax: +49 5 51 / 50 88 1 - 11

E-mail: [service@analytik-jena.com](mailto:service@analytik-jena.com)

If you would like to send the unit back to us, please read the following instructions.

### 11.1 Device return information



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#### **WARNING**

Risk of damage to health due to improper decontamination! Perform a professional decontamination before returning the device to Analytik Jena AG.

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#### **NOTICE**

Biometra GmbH must refuse acceptance of contaminated devices. The sender may be liable for any damage caused by inadequate decontamination of the device.

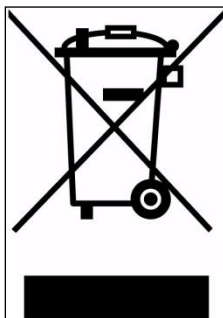
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- Please clean all device components from biologically hazardous, chemical or radioactive contamination (see also section "Cleaning").
- Download the decontamination declaration as an editable PDF document in German or English from the Internet:  
[https://www.analytik-jena.com/fileadmin/content/service/customer/Declaration\\_of\\_decontamination\\_en\\_01.pdf](https://www.analytik-jena.com/fileadmin/content/service/customer/Declaration_of_decontamination_en_01.pdf).

Complete the form and attach the signed decontamination declaration to the outside of the shipment.

- Only use the original packaging for the shipment and insert the transport lock.  
If the original packaging is no longer available, please contact Biometra GmbH or your local dealer.
- Please attach the warning note "CAUTION! SENSITIVE ELECTRONIC DEVICE!" to the packaging.
- Please include a sheet containing the following data:
  - Name and address of the sender
  - Name and telephone number of a contact for inquiries
  - A detailed description of the fault, the precise conditions and situations under which the fault occurs

## 12 Note for Disposal of Electric/Electronic Waste



**This symbol (the crossed-out wheeled bin) means, that this product should be brought to the return systems and/or separate systems available to end-users according to your country regulations, when this product has reached the end of its lifetime!**

For details, please contact your local distributor!

This symbol applies only to the countries within the EEA\*.

\*EEA = European Economic Area, comprising all EU-members plus Norway, Iceland and Liechtenstein.

## 13 Declaration of Conformity

**Biometra GmbH**

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37079 Göttingen  
Telefon +49 551 50686 0  
Telefax +49 551 50686 66  
E-Mail info@analytik-jena.de

Göttingen, den 22.11.2018

Biometra erklärt als Hersteller in alleiniger Verantwortung, dass die Produkte  
*Biometra declares as manufacturer under sole responsibility that the products*

Typen	<b>Biometra TSC ThermoShaker</b>	<b>Biometra TS1 ThermoShaker</b>
Types:		
Best.-Nr.	846-051-600, 846-051-690	846-051-500, 846-051-590
Order No.:		

den folgenden Europäischen Richtlinien und angewandten harmonisierten Normen entsprechen:  
*conform to the following European Directives and applied harmonized standards:*

Richtlinie <i>Directive</i>	Norm <i>Standard</i>	Ausgabejahr <i>Year of Publication</i>
2014/35/EU Niederspannungsrichtlinie/LVD	EN 61010-1	2010
	EN 61010-2-10	2014
	EN 61010-2-051	2015
2014/30/EU EMV/EMC	EN 61326-1	2013
	EN 55011	2009
2011/65/EU RoHS	EN 50581	2012

Dr. Juergen Otte  
Head of Quality Management

For and behalf of Biometra GmbH