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PST-60HL, Plate Shaker-Thermostat

Premium Product Class

DESCRIPTION

Plate Thermo–Shakers are designed for shaking and thermostating 2 standard 96–well microplates.

A multisystem principle, used in design of the Thermo–Shaker, allows operating it as 3 independent devices:

- Incubator;
- Microplate shaker;
- Thermo–Shaker.

A distinctive feature of Biosan Plate Thermo–Shakers is the**patented by the company Two–Side Microplates Heating**, which allows to achieve full correspondence of the set and actual temperature in the microplate wells.

Thermo-shaker provides heating up to 60°C, which is sufficient for carrying out ELISA tests.

Plate Shaker–Thermostat provides:

- Soft or intensive sample shaking
- Rotation speed regulation, stabilization and indication
- Even rotation amplitude throughout the Thermo-Shaker platform
- Required operation time setting and indication
- Automatic stopping of the platform movement after expiration of the set time
- Setting and indication of the required temperature on the platform
- Automatic fault diagnostics (temperature sensor, platform heating, lid heating etc.)

Application fields:

- Cytochemistry — for in situ reactions
- Immunochemistry — for immunofermentative reactions
- Biochemistry — for enzyme and protein analysis
- Molecular biology — for micro array analysis

Temperature Calibration Function

With the help of the temperature calibration function the user can calibrate the unit approx. ±6% of the selected temperature to compensate differences in the thermal behaviour of plates from different manufacturers.

CAT. NUMBER

BS-010119-AAI	230VAC 50/60Hz Euro plug
BS-010119-AAQ	230VAC 50/60Hz UK plug
BS-010119-AA4	230VAC 50/60Hz AU plug
BS-010119-AAJ	100VAC 50/60Hz US plug, 120VAC 60Hz US plug
BS-010119-BK	IQ OQ document
BS-010119-CK	PQ document

SPECIFICATIONS

Temperature setting range	+25°C ... +60°C
Temperature control range	+5°C above ambient... +60°C
Temperature setting resolution	0.1°C
Temperature stability	±0.1°C
Temperature uniformity at +37°C	±0.25°C
Temperature calibration coefficient range	0.936...1.063 (± 0.063)
Heating	Patented two–side microplate heating
Speed control range	250–1200 rpm (increment 10 rpm)
Digital time setting	1 min–96 hrs / non–stop (increment 1 min)
Timer sound signal	+
Orbit	2 mm
Display	LCD, 16 x 2 signs
Maximum continuous operation time	168 h
Max. height of microtest plate	18 mm
Number of microtest plates	2
Platform dimensions (w x d)	250 x 150 mm
Overall dimensions (W×D×H)	270 x 260 x 125 mm
Weight	6.1 kg
Input current/power consumption	12 V DC, 3.3 A / 40 W
External power supply	Input AC 100–240 V; 50/60 Hz; Output DC 12 V

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PST-60HL-4, Plate Shaker-Thermostat

Premium Product Class

DESCRIPTION

Plate Thermo–Shakers are designed for shaking and thermostating 4 standard 96–well microplates.

A multisystem principle, used in design of the Thermo–Shaker, allows operating it as 3 independent devices:

- Incubator;
- Microplate shaker;
- Thermo–Shaker.

A distinctive feature of Biosan Plate Thermo–Shakers is the**patented by the company Two–Side Microplates Heating**, which allows to achieve full correspondence of the set and actual temperature in the microplate wells.

Thermo-shaker provides heating up to 60°C, which is sufficient for carrying out ELISA tests.

Plate Shaker–Thermostat provides:

- Soft or intensive sample shaking
- Rotation speed regulation, stabilization and indication
- Even rotation amplitude throughout the Thermo-Shaker platform
- Required operation time setting and indication
- Automatic stopping of the platform movement after expiration of the set time
- Setting and indication of the required temperature on the platform
- Automatic fault diagnostics (temperature sensor, platform heating, lid heating etc.)
- Spring clamps

Application fields:

- Cytochemistry — for in situ reactions
- Immunochemistry — for immunofermentative reactions
- Biochemistry — for enzyme and protein analysis
- Molecular biology — for micro array analysis

Temperature Calibration Function

With the help of the temperature calibration function the user can calibrate the unit approx. ±6% of the selected temperature to compensate differences in the thermal behaviour of plates from different manufacturers.

CAT. NUMBER

BS-010128-AAI	230VAC 50/60Hz Euro plug
BS-010128-AAQ	230VAC 50/60Hz UK plug
BS-010128-AA4	230VAC 50/60Hz AU plug
BS-010128-AAJ	100VAC 50/60Hz US plug, 120VAC 60Hz US plug
BS-010128-AK	IQ OQ document
BS-010128-BK	PQ document

SPECIFICATIONS

Temperature setting range	+25°C ... +60°C
Temperature control range	+5°C above ambient... +60°C
Temperature setting resolution	0.1°C
Temperature stability	±0.1°C
Temperature uniformity at +37°C	±0.25°C
Temperature calibration coefficient range	0.936...1.063 (± 0.063)
Heating	Patented two–side microplate heating
Speed control range	250–1200 rpm (increment 10 rpm)
Digital time setting	1 min–96 hrs / non–stop (increment 1 min)
Timer sound signal	+
Orbit	2 mm
Display	LCD, 16 x 2 signs
Maximum continuous operation time	168 h
Max. height of microtest plate	18 mm
Number of microtest plates	4
Platform dimensions (w x d)	290 x 210 mm
Overall dimensions (W×D×H)	380 x 390 x 140 mm
Weight	8.8 kg
Input current/power consumption	12 V DC, 4.15 A / 50 W
External power supply	Input AC 100–240 V; 50/60 Hz; Output DC 12 V

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PST-100HL, Plate Shaker-Thermostat

Premium Product Class

DESCRIPTION

Plate Thermo–Shakers are designed for shaking and thermostating 2 standard 96–well microplates.

A multisystem principle, used in design of the Thermo–Shaker, allows operating it as 3 independent devices:

- Incubator;
- Microplate shaker;
- Thermo–Shaker.

A distinctive feature of Biosan Plate Thermo–Shakers is the**patented by the company Two–Side Microplates Heating**, which allows to achieve full correspondence of the set and actual temperature in the microplate wells.

Thermo-shaker **PST-100HL** with the ability to stabilize the temperature up to 100 ° C is specially designed for the hybridization reactions.

Plate Shaker–Thermostat provides:

- Soft or intensive sample shaking
- Rotation speed regulation, stabilization and indication
- Even rotation amplitude throughout the Thermo-Shaker platform
- Required operation time setting and indication
- Automatic stopping of the platform movement after expiration of the set time
- Setting and indication of the required temperature on the platform

Application fields:

- Cytochemistry — for in situ reactions
- Immunochemistry — for immunofermentative reactions
- Biochemistry — for enzyme and protein analysis
- Molecular biology — for micro array analysis

CAT. NUMBER

BS-010142-AAI	230VAC 50/60Hz Euro plug
BS-010142-AAQ	230VAC 50/60Hz UK plug
BS-010142-AA4	230VAC 50/60Hz AU plug
BS-010142-AAJ	100VAC 50/60Hz US plug, 120VAC 60Hz US plug
BS-010142-AK	IQ OQ document
BS-010142-BK	PQ document

SPECIFICATIONS

Temperature setting range	+25°C ... +100°C
Temperature control range	+5°C above ambient ... +100°C
Temperature setting resolution	0.1°C
Temperature stability	±0.1°C
Temperature uniformity at +37°C	±0.2°C
Temperature calibration coefficient range	0.936...1.063 (± 0.063)
Heating	Patented two–side microplate heating
Speed control range	250–1200 rpm (increment 10 rpm)
Digital time setting	1 min–96 hrs / non–stop (increment 1 min)
Timer sound signal	+
Orbit	2 mm
Display	LCD, 16 x 2 signs
Maximum continuous operation time	168 h
Max. height of microtest plate	18 mm
Number of microtest plates	2
Platform dimensions (w x d)	250 x 150 mm
Overall dimensions (W×D×H)	270 x 260 x 125 mm
Weight	5.9 kg
Input current/power consumption	12 V, 5 A / 60 W
External power supply	Input AC 100–240 V; 50/60 Hz; Output DC 12 V

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TS-100C Smart, Thermo-Shaker with cooling for microtubes and PCR plates

Smart Plus Product Class

DESCRIPTION

Thermo–Shaker **TS-100C Smart** provides intensive mixing and temperature control of samples in microtest tubes or PCR plate. This model of Thermo–Shaker differs from TS-100 with a possibility of cooling samples down to +4°C and with control up to 7 units from PC via Bluetooth® technology. Features of **TS-100C Smart** meet the highest expectations of users according to many parameters:

1. Fast reaching of specified mixing speed and maintenance of equal amplitude of rotation throughout the Thermo–Shaker block;
2. Stability of maintaining the preset temperature in a wide range throughout the Thermo–Shaker's block surface;
3. LCD display indicates preset and current values of temperature, speed and time of operation;
4. Quiet motor operation, compact size, prolonged service life.

Functions of heating and mixing can be performed both simultaneously and independently.

There are five heating and cooling blocks available, including a block with a plastic lid for the PCR-plates. All blocks are mutually interchangeable and can be easily installed on Thermo–Shaker.

The instrument is applicable in:

- Genetic analysis — in extraction of DNA, RNA and further sample preparation;
- Biochemical study of enzymatic reactions and processes;
- Extraction of metabolites from cellular material.

Temperature Calibration Function
With the help of the temperature calibration function the user can calibrate the unit approx. ±6% of the selected temperature to compensate differences in the thermal behaviour of tubes from different manufacturers.

TS-100C Smart software features

- Rotation speed
- Temperature
- Time
- Sound signal
- Creating Profiling programs using controlled parameters
- Visualization of temperature vs time and speed vs time graphs
- Data export to Excel and CSV formats
- Error messages/Fault diagnostics

CAT. NUMBER

	Software included, without thermoblock
BS-010171-A01	230VAC 50/60Hz Euro plug
BS-010171-A02	230VAC 50/60Hz UK plug
BS-010171-A03	230VAC 50/60Hz AU plug
BS-010171-A04	100-240VAC 50/60Hz US plug

SPECIFICATIONS

Temperature setting range	+4°C ... +100°C
Temperature control range	15°C below ambient ... +100°C
Temperature setting resolution	0.1°C
Temperature stability	±0.1°C
Temperature accuracy at +37°C	±0.5°C
Average heating speed from +25°C to +100°C	5°C/min
Average cooling speed from +100°C to +25°C	5°C/min
Average cooling speed from +25°C to +4°C	1.8°C/min
Temperature uniformity over the block at +4°C	±0.6°C
Temperature uniformity over the block at +37°C	±0.1°C
Temperature uniformity over the block at +100°C	±0.3°C
Temperature calibration coefficient range	0.936...1.063 (± 0.063)
Speed control range	250–1400 rpm
Digital time setting	1 min–96 hrs / non–stop (increment 1 min)
Timer sound signal	+
Orbit	2 mm
Display	LCD, 16 x 2 signs
Microprocessor controlled temperature, mixing speed and operation time	+
Maximum continuous operation time	168 h
PC system requirements	Intel/AMD Processor, 1 GB RAM, Windows Vista/7/8/8.1/10/11, USB, Bluetooth
Overall dimensions (W×D×H)	220x240x90 mm
Weight	3.7 kg
Input current/power consumption	12 V, 4.9 A / 60 W
External power supply	Input AC 100–240 V; 50/60 Hz; Output DC 12 V

ACCESSORIES

SC-18C
BS-010143-AK
block

20 × 0.5 ml + 12 × 1.5 ml microtubes

SC-18/02C
BS-010143-CK
block

20 × 0.2 ml microtubes + 12 × 1.5 ml microtubes

SC-24NC
BS-010143-GK
block

24 x 1.5 ml microtubes

SC-24C
BS-010143-EK
block

24 × 2 ml microtubes

SC-96AC
BS-010143-FK
block

96-well unskirted or semi-skirted microplate (0.2 ml) for PCR or 12 × 8 - 0.2ml strips or 96 tubes of 0.2 ml.

VP-8/5C
BS-010176-SK
block

8 × 5 ml conical tubes

VP-4C
BS-010176-GK
block

4 × 50 ml conical tubes

VP-8/15C
BS-010176-HK
block

8 × 15 ml conical tubes

VP-32C
BS-010176-JK
block

32 × 0.5 ml microtubes

VP-CV-20C
BS-010176-IK
block

20 × 10mm cuvettes

VP-CL-24C
BS-010176-KK
block

24 × 3.6–4.5 ml cryotubes

VP-CS-24C
BS-010176-LK
block

24 × 1–1.8 ml cryotubes

VP-20C
BS-010176-TK
block

20 × ø12 mm round bottom tubes

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TS-100, Thermo-Shaker for microtubes and PCR plates

Premium Product Class

DESCRIPTION

Thermo–Shaker **TS-100** provides intensive mixing and temperature control of samples in microtest tubes or PCR plate. Functions of heating (up to +100°C) and mixing can be performed both simultaneously and independently, i.e. the unit implements three devices in one:

1. Shaker;
2. Dry–block Thermostat;
3. Thermo–Shaker.

TS-100 is used for DNA analysis sample preparation, for extraction of proteins, polysaccharides, lipids and other cellular components. Features of **TS-100** meet the increased requirements of the user, including:

- Quickly reaches the set mixing speed and maintains same amplitude of rotation around the block;
- Stable maintenance of the temperature of a wide range over the entire surface of the block;
- LCD display shows the set and actual temperature, speed and time;
- Quiet engine operation, compact size, long service life.

Heating source is a printed heating board (12 V). Mixing is provided by movement of orbital type.

The instrument is applicable in:

- Genetic analysis — in extraction of DNA, RNA and further sample preparation;
- Biochemical study of enzymatic reactions and processes;
- Extraction of metabolites from cellular material.

Temperature Calibration Function

With the help of the temperature calibration function the user can calibrate the unit approx. ±6% of the selected temperature to compensate differences in the thermal behaviour of tubes from different manufacturers.

CAT. NUMBER

Without thermoblock	Without thermoblock
BS-010120-AAI	230VAC 50/60Hz Euro plug
BS-010120-AAQ	230VAC 50/60Hz UK plug
BS-010120-AA4	230VAC 50/60Hz AU plug
BS-010120-AAJ	100VAC 50/60Hz US plug, 120VAC 60Hz US plug
BS-010120-HK	IQ OQ document
BS-010120-IK	PQ document

SPECIFICATIONS

Temperature setting range	+25°C ... +100°C
Temperature control range	+5°C above ambient ... +100°C
Temperature setting resolution	0.1°C
Temperature stability	±0.1°C
Temperature accuracy at +37°C	±0.5°C
Average heating speed from +25°C to +100°C	4°C/min
Temperature uniformity over the block at +37°C	±0.1°C
Temperature uniformity over the block at +100°C	±0.2°C
Temperature calibration coefficient range	0.936...1.063 (± 0.063)
Speed control range	250–1400 rpm
Digital time setting	1 min–96 hrs / non–stop (increment 1 min)
Timer sound signal	+
Orbit	2 mm
Display	LCD, 16 x 2 signs
Microprocessor controlled temperature, mixing speed and operation time	+
Maximum continuous operation time	168 h
Overall dimensions (W×D×H)	220x240x90 mm
Weight	3.7 kg
Input current/power consumption	12 V, 3.5 A / 42 W
External power supply	Input AC 100–240 V; 50/60 Hz; Output DC 12 V

ACCESSORIES

SC-18
BS-010120-AK
block

20 × 0.5 ml + 12 × 1.5 ml microtubes

SC-18/02
BS-010120-CK
block

20 × 0.2 ml microtubes + 12 × 1.5 ml microtubes

SC-24N
BS-010120-GK
block

24 x 1.5 ml microtubes

SC-24
BS-010120-EK
block

24 × 2 ml microtubes

SC-96A
BS-010120-FK
block

96-well unskirted or semi-skirted microplate (0.2 ml) for PCR or 12 × 8 - 0.2ml strips or 96 tubes of 0.2 ml.

VP-8/5
BS-010175-SK
block

8 × 5 ml conical tubes

VP-4
BS-010175-GK
block

4 × 50 ml conical tubes

VP-8/15
BS-010175-HK
block

8 × 15 ml conical tubes

VP-32
BS-010175-JK
block

32 × 0.5 ml microtubes

VP-CV-20
BS-010175-IK
block

20 × 10mm cuvettes

VP-CL-24
BS-010175-KK
block

24 × 3.6–4.5 ml cryotubes

VP-CS-24
BS-010175-LK
block

24 × 1–1.8 ml cryotubes

VP-20
BS-010175-TK
block

20 × ø12 mm round bottom tubes

Premium
Product Class

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on www.biosan.lv/classes-en

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Medical–Biological
Research & Technologies

TS-100 & TS-100C
Thermo-shakers
for microtubes and PCR plates

User instructions

Contents

1. About this edition of the user instructions

1.1. The current edition of the user instructions applies to following models:

- **TS-100** version V.6AW
- **TS-100C** version V.7AW

2. Safety precautions

Caution! Make sure you have fully read and understood the present user instructions before using the equipment. Please pay special attention to sections marked by this symbol.

Caution! Hot surface! Platform surface becomes very hot during use. Always use protective cotton gloves to install or remove samples when the temperature is set higher than 60°C.

GENERAL SAFETY

- The protection provided can be ineffective if the operation of the appliance does not comply with the manufacturer's requirements.
- Save the unit from shocks or falling.
- Store and transport the unit in a horizontal position (see package label) at ambient temperatures between -20°C and +60°C and maximum relative humidity of 80%.
- After transportation or storage keep the unit under room temperature for 2-3 h before connecting it to the electric circuit.
- Use only original parts and accessories, provided by manufacturer for this product.
- Before using any cleaning or decontamination methods except those recommended by the manufacturer, check with the manufacturer that the proposed method will not damage the equipment.
- Do not make modifications to the design of the unit.

ELECTRICAL SAFETY

- Connect only to the external power supply with voltage corresponding to that on the serial number label.
- Use only the external power supply provided with this product.
- Ensure that the power switch and external power supply are easily accessible during use.
- Do not plug the unit into an ungrounded power socket, and do not use an ungrounded extension lead.
- Disconnect the unit from electric circuit before moving.
- If liquid penetrates into the unit, disconnect it from the external power supply and have it checked by a repair and maintenance technician.
- Do not operate the unit in premises where condensation can form. Operating conditions of the unit are defined in the Specifications section.

DURING OPERATION

- Do not leave the operating unit unattended.
- Do not impede the platform motion.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures. Please contact manufacturer for possible operation of the unit in specific atmospheres or with dangerous materials.
- Do not operate the unit if it is faulty or has been installed incorrectly.
- Do not use outside laboratory rooms.
- Do not check the temperature by touch. Use a thermometer.

ALARM SOUND SIGNALS

- Frequently repeating short notes after finishing the operation (see **5.6.3**).
- Infrequently repeating short notes if an error occurred (see **9.5**)

BIOLOGICAL SAFETY

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

3. General information

TS-100 and TS-100C thermo-shakers are designed for intensive mixing of samples in microtest tubes or PCR plates in a temperature-controlled environment. The TS-100C model of thermo-shaker differs from TS-100 in the possibility of cooling samples down to +4°C. Features of thermo-shakers meet the highest expectations of users according to many parameters:

- Fast reaching of specified mixing speed and maintenance of equal amplitude of rotation throughout the thermo-shaker block;
- Stability of maintaining the set temperature in a wide range throughout the block surface of thermo-shakers;
- With the help of the temperature calibration function, the user can calibrate the unit approximately ±6% of the selected temperature to compensate differences in the thermal behaviour of tubes from different manufacturers;
- LCD display indicates pre-set and current values of temperature, speed and time of operation;
- Quiet motor operation, compact size, prolonged service life;
- Sensor error handling and diagnostics;

Functions of heating and mixing can be performed either simultaneously or independently, that allows using the unit as three independent devices:

1. Thermostat;
2. Shaker;
3. Thermo-shaker.

We offer five heating and cooling blocks for each model, including a block with a plastic lid for PCR-plates. Within one model of thermo-shaker, the blocks are mutually interchangeable and can be easily installed.

The devices are applicable in:

- genetic analyses – in extraction of DNA, RNA and further sample preparation;
- biochemistry – for studying of enzymatic reactions and processes;
- cellular biology – extraction of metabolites from cellular material.

4. Getting started

4.1. **Unpacking**. Remove packing materials carefully and retain for future shipment or storage of the unit. Examine the unit carefully for any damage incurred during transit. The warranty does not cover in-transit damage. Warranty covers only units transported in the original package.

4.2. **Complete sets**.

4.2.1. TS-100

- TS-100 thermo-shaker for microtubes and microplates ..... 1 pce
- External power supply ..... 1 pce
- Power cable ..... 1 pce
- Spare rubber belt ..... 2 pcs
- Operating manual, declaration of conformity ..... 1 pce
- SC-18 thermoblock for microtubes ..... on request
- SC-18/02 thermoblock for microtubes ..... on request
- SC-24 thermoblock for microtubes ..... on request
- SC-24N thermoblock for microtubes ..... on request
- SC-96A thermoblock for microplate and hex-key ..... on request

4.2.2. TS-100C

- TS-100C thermo-shaker with cooling for microtubes and microplates ..... 1 pce
- External power supply ..... 1 pce
- Power cable ..... 1 pce
- Spare rubber belt ..... 2 pcs
- Operating manual, declaration of conformity ..... 1 pce
- SC-18C thermoblock for microtubes ..... on request
- SC-18/02C thermoblock for microtubes ..... on request
- SC-24C thermoblock for microtubes ..... on request
- SC-24NC thermoblock for microtubes ..... on request
- SC-96AC thermoblock for microplate and hex-key ..... on request

SC-18

SC-18/02

SC-24

SC-24N

SC-96A

SC-18C

SC-18/02C

SC-24C

SC-24NC

SC-96AC

4.3. Setup.

- Place the unit upon even horizontal stable non-flammable surface 30 cm away from any flammable materials, and clear 20 cm around the device on all sides for ventilation.
- Remove protective film from the display;
- Plug the external power supply into the socket at the rear side of the unit;
- Connect the power cable to the external power supply.

4.4. Thermoblock installation (if a thermoblock is not installed).

Caution! Thermoblock installation and replacement have to be performed only when the **Power** switch is turned off and external power supply is disconnect from the device.

Caution! Thermoblocks for TS-100 and TS-100C are **not** interchangeable! Installing a thermoblock from different model will irreversibly damage both the unit and the thermoblock! TS-100C thermoblocks have an additional sticker.

- Choose the thermoblock, connect the plug to the contact terminal according to the scheme on fig. 1/1 on the underside of the thermoblock. Make sure that the connector is mounted tightly.
- Align the thermoblock so that the warning label ⚠ is facing the front of the unit (fig. 2).
- Secure with the four knurled screws (fig. 2/1) or four hex screws.

4.5. Changing blocks.

- Disconnect the external power supply from the device.
- Remove the four knurled screws or four hex screws (in microplate thermoblocks).
- Lift the block without damaging the cable and disconnect the plug (fig. 1/1).
- Select the new thermoblock and install it according to **4.4**.

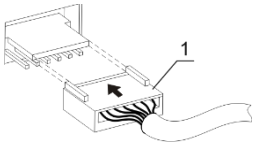

Figure 1. Thermoblock connection

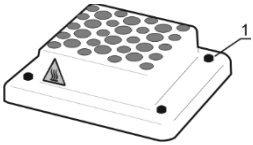

Figure 2. Thermoblock setup

5. Operation

Recommendations during operation

- Please check the tubes/microplates before using, be sure that tubes and micro plates are heat-resistant. Do not heat the microplates over the melting point of the material they are made of.
- We recommend filling tubes and plate wells up to 75% of rated volume for efficiency.

Caution! Platform surface becomes very hot during use. Please, take necessary care and use protective cotton gloves to install or remove test samples when set temperature is higher than 60°C.

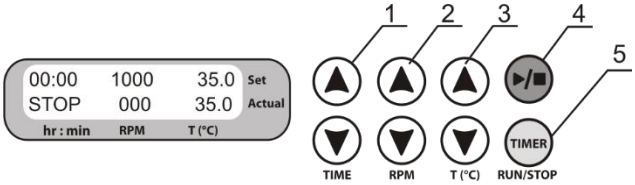

Figure 3. Control Panel

5.1. Connect external power supply to a grounded power socket and set the power switch, located on the rear panel of the unit, to position I (ON).

5.2. The display will turn on with the upper line (Set) showing time, speed and temperature set earlier and the lower line (Actual) showing current status: STOP indication, 000 rpm speed and platform temperature in °C.

5.3. If a temperature is set, then the platform temperature automatically changes to that temperature. The time of temperature stabilization depends on the room temperature. If the heating of is turned off by setting the temperature below 25°C (TS-100) or 4°C (TS-100C), top line shows indication OFF.

5.4. **Setting the parameters.** Use the readings in the upper line of the display (Set), while setting the required parameters. Pressing the key for more than 3 s will increase the increment rate. Speed and temperature can be changed during operation.

5.4.1. **Setting time (TIME).** Using the ▲ and ▼ **TIME** keys (fig. 3/1) set the required working time interval in hours and minutes (increment 1 min).

5.4.2. **Setting speed (RPM).** Using the ▲ and ▼ **RPM** keys (fig. 3/2) set the required speed (increment 10 rpm).

5.4.3. **Setting temperature (T, ºC).** Using the ▲ and ▼ **T, ºC** keys (Fig. 3/3) set the necessary temperature (increment 0.1°C).

Caution! Heating/temperature maintenance process does not stop when the timer is finished. Platform thermal regulation can be turned off only by setting the required temperature below 25°C (TS-100) or 4°C (TS-100C), top line shows indication OFF. In this mode, thermo-shaker can be used in the cold rooms as a mixing device without thermoregulation.

5.5. **Program execution.** After the thermal stabilization of the thermo-shaker, i.e. when the set and current temperature readings become the same:

5.5.1. Place samples on the platform.

Caution! Do not fill microtubes or microplates directly inside the unit.

5.5.2. Press the **►/■ RUN/STOP** key (fig. 3/4). The platform will start rotating 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 **►/■ RUN/STOP** key will start the timer but the platform will not move.

5.5.3. After finishing the program (after the set time elapses) the platform motion will stop and the timer will show the flashing reading STOP accompanied by the repetitive sound signal until the **►/■ RUN/STOP** key is pressed.

5.6. If the working time is not set (or is reset) and the timer indicator in the upper line shows 00:00, pressing the **►/■ RUN/STOP** key will start continuous operation of the device with countdown timer in the lower line (Actual) until the **►/■ RUN/STOP** key is pressed again.

5.7. If required, there is possibility to restart the timer when it is running. Press the **TIME RUN/STOP** key once (fig. 3/5) to stop the timer. Press the **TIME RUN/STOP** key again to restart the timer.

5.8. The platform motion can be stopped at any time by pressing the **►/■ RUN/STOP** key. In this case the program realization and the platform motion will stop and the timer will switch into the STOP mode saving previously set time. Press the **►/■ RUN/STOP** key to repeat the operation with the same time and speed.

Caution! 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 using the **▼ T, °C** key (Fig. 3/3 - lower key) till the OFF sign appears in the upper line (Set) of the display

Caution! The platform remains hot after use. Please, take necessary care and use protective cotton gloves to install or remove test samples when set temperature is higher than 60°C.

5.9. After finishing the operation, set the **Power** switch, located on the rear panel of the unit, in position **O** (Off) and disconnect the external power supply from electric circuit.

6. Calibration

6.1. The device is precalibrated at the factory (calibrating coefficient is 1.000) for operation with temperatures measured by a sensor in the heating block.

6.2. To change the calibration coefficient, hold the **TIME RUN/STOP** key pressed for more than 8 s to activate calibration mode. The calibration coefficient appears on the display (figure 4).

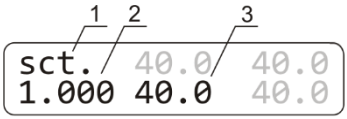

Figure 4. Display in calibration mode: 1. Calibration mode indicator; 2. Calibration coefficient; 3. Temperature with current coefficient

Note. Values marked in grey on figures 4 and 5 are not used in calibration and are meant for service engineers.

6.3. **Restoring factory settings.** Set 1.000 value using the ▲ and ▼ **T, °C** keys as shown on fig. 4/1 to restore the factory settings. Press the ►/■ **RUN/STOP** key once to save the changes and exit the calibration mode.

Note. Coefficient value changes are recommended after the unit has reached 30°C temperature.

6.4. **Calibration procedure**. To calibrate the unit, use an independent sensor with 0.5°C accuracy, which can fit in the cell of a microplate on the platform.

6.4.1. Install the sensor into a celll of the microplate.

6.4.2. Set the required temperature in operation mode (e.g. 40°C).

6.4.3. After the unit reaches the set temperature (when the set and current temperature readings equal), leave the unit for 30 min for thermal stabilization.

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

6.4.5. Hold the **TIME RUN/STOP** key pressed for more than 8 s to activate calibration mode (figure 4).

6.4.6. Using the ▲ and ▼ **T, °C** keys, change the calibration coefficient (fig. 5/1) so that the new temperature value (fig. 5/2) corresponds to the independent sensor temperature. In our example, the calibration coefficient will be 0.974.

Note. Calibration coefficient can be changed in range from 0.936 to 1.063 (±0.063), with increment of 0.001. This calibrating coefficient will correct temperature through all the operation range.

Note. Coefficient value changes are recommended after the unit has reached 30°C temperature.

6.4.7. Press the ►/■ **RUN/STOP** key once to save the changes and exit the calibration.

6.5. The display will show calibrated temperature as shown on fig. 6/1 and the unit will continue thermal stabilization according to the previously set temperature.

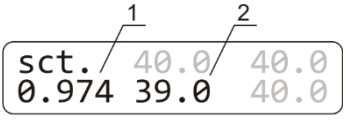

Figure 5. Changing the coefficient: 1. Calibration coefficient; 2. Temperature with current coefficient

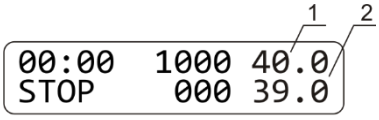

Figure 6. Display after calibration: 1. Set temperature; 2. Current calibrated temperature

7. Specifications

The unit is designed for operation in cold rooms, incubators (excluding CO_2 incubators) and closed laboratory rooms at ambient temperature from +4°C to +40°C in a non-condensing atmosphere and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C. Operating altitude above sea level is up to 2000 m.

Biosan is committed to a continuous programme of improvement and reserves the right to alter design and specifications of the equipment without additional notice.

Temperature parameters		**TS-100**	**TS-100C**
Setting range		+25°C to +100°C	+4°C to +100°C
Control range		5°C above RT[1] to +100°C	15°C below RT[1] to +100°C
Setting resolution		0.1°C	
Stability[2], at +37°C		±0.1°C	
Maintaining accuracy[2], at +37°C		±0.5°C	
Uniformity over the platform[2],	at +4°C	–	±0.6°C
	at +37°C	±0.1°C	±0.1°C
	at +100°C	±0.2°C	±0.3°C
Average heating speed from +25°C to +100°C		4°C/min	5°C/min
Average cooling speed	from +100°C to +25°C	–	5°C/min
	from +25°C to +4°C	–	1.8°C/min
Calibration option		yes	
Calibration coefficient range		0.936...1.063 (± 0.063)	

General parameters		**TS-100**	**TS-100C**
Speed range		250–1400 rpm	
Speed setting resolution		10 rpm	
Maximal speed deviation	for 250 rpm	2%	
	for 1400 rpm	0.7%	
Orbit		2 mm	
Digital time setting		1 min - 96 h	
Time setting and countdown resolution		1 min	
Maximal continuous operation time[3]		168 h	
Display		16x2 symbols, LCD	
Dimensions	Without thermoblock, LxWxH	220x240x90 mm	
	With thermoblock, $LxWxH_{max}$	220x240x130 mm	

Electrical parameters	**TS-100**	**TS-100C**
Overvoltage category	II	
Pollution degree	2	
Input voltage and current / power consumption	12 V, 3.5 A / 42 W	12 V, 5.0 A / 60 W
External power supply	in AC 100-240 V, 50/60 Hz, out DC 12 V	
Weight[4]	3.7 kg	4.8 kg

[1] Room temperature

[2] Data for 75% filled tubes or microplates

[3] Recommended interval between prolonged operation sessions not less than 1 hour

[4] Accurate within ± 10%.

8. Ordering information

8.1. Models and versions available:

Model	Version	Description	Catalogue number
TS-100	V.6AW	100-240 V, 50/60 Hz	BS-010120-AAI
TS-100C	V.7AW	100-240 V, 50/60 Hz	BS-010143-AAI

8.2. To inquire about or order the optional accessories or the replacement parts, contact Biosan or your local Biosan representative.

8.2.1. Optional thermoblocks for TS-100:

Model	Description	Weight[1], kg	Catalogue number
SC-18	For 20x0.5 ml + 12x1.5ml tubes	0.5	BS-010120-AK
SC-18/02	For 20x0.2 ml + 12x1.5ml tubes	0.5	BS-010120-CK
SC-24	For 24x2.0 ml microtubes	0.4	BS-010120-EK
SC-24N	For 24x1.5 ml microtubes	0.5	BS-010120-GK
SC-96A	For 96-well microplate for PCR, w/o skirt, with half skirt, low and high profile	0.5	BS-010120-FK

8.2.2. Optional thermoblocks for TS-100C:

Model	Description	Weight[5], kg	Catalogue number
SC-18C	For 20x0.5 ml + 12x1.5ml tubes	0.7	BS-010143-AK
SC-18/02C	For 20x0.2 ml + 12x1.5ml tubes	0.7	BS-010143-CK
SC-24C	For 24x2.0 ml microtubes	0.6	BS-010143-EK
SC-24NC	For 24x1.5 ml microtubes	0.7	BS-010143-GK
SC-96AC	For 96-well microplate for PCR, w/o skirt, with half skirt, low and high profile	0.7	BS-010143-FK

Caution!

Thermoblocks for TS-100 and TS-100C are **not** interchangeable! Installing a thermoblock from different model will irreversibly damage both the unit and the thermoblock! TS-100C thermoblocks have an additional sticker.

8.2.3. Universal replacement parts for TS-100 and TS-100C

Replacement part	Description	Catalogue number
Rubber belt	122x6x0.6 mm	BS-000000-S18

[1] Accurate within ± 10%.

9. Care and maintenance

9.1. **Service**.

9.1.1. If the unit is disabled (e.g., no platform motion, no heating, no reaction to key presses, etc) or requires maintenance, disconnect the unit from the mains and contact Biosan or your local Biosan representative.

9.1.2. All maintenance and repair operations (except listed below) must be performed only by qualified and specially trained personnel.

9.1.3. Operating integrity check. If the unit follows the procedure described in sections **5. Operation** and **6. Calibration**, then no additional checks are required.

9.1.4. **Cleaning and disinfection**. Cleaning and decontamination may be necessary as a safeguard when laboratory heating equipment and any accessories are maintained, repaired, or transferred. We recommend keeping a checklist of completed tasks, with dates and additional information, as the means of confirmation. The instructions state that the RESPONSIBLE BODY must ensure that:

- appropriate decontamination is carried out if hazardous material is split onto or into the equipment;
- no decontamination or cleaning agents are used which could cause a HAZARD as a result of a reaction with parts of the equipment or with material contained in it;
- the manufacturer or his representative is consulted if there is any doubt about the compatibility of decontamination or cleaning agents with parts of the equipment or with material contained in it.

9.1.5. Use mild soap and water with a soft cloth or sponge for cleaning the exterior. Rinse remaining washing solution with distilled water. Wipe dry the excess water with clean, soft cloth or sponge.

9.1.6. To disinfect the exterior plastic parts, use 75% ethanol or DNA/RNA removing solution (e.g., Biosan PDS-250). After disinfecting, wipe dry the surfaces.

9.1.7. The unit and its accessories are not autoclavable.

9.2. **Disposal**. Disposal of the appliance requires special precautions and must be carried out at an appropriate disposal site, separate from normal household waste. To prevent pollution of the environment, all waste resulting from the disposal of the product must be collected and disposed of in the country of use, in accordance with the applicable requirements for the handling of electronic waste.

9.3. **Rubber belt replacement**. For maintenance of reliable operation of the device, the manufacturer recommends replacing rubber belts after 1.5 years or 2000 hours of operation time.

- Disconnect the external power supply from the device.
- Remove 4 fixation screws on the device bottom and remove the bottom plate.
- Replace the rubber belt (fig. 7).
- Reassemble the device.

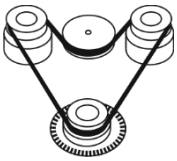

Figure 7. Rubber belt replacement

9.4. **Power failure.** In the event of the power failure, on restoring power, unit restarts thermal stabilisation. Shaking and timer are reset and must be restarted manually.

9.5. **Error codes in case of a defect**. Some malfunctions trigger an error code to appear on display, accompanied by a sound signal every 8 s. Press the **►/■ RUN/STOP** key to turn off the signal. Error code format is letters ER and a single digit. Disconnect the unit from the electric circuit and report the error code to Biosan or your local Biosan representative.

10. Warranty

10.1. The manufacturer guarantees the compliance of unit with the requirements of specifications, if the customer follows the operation, storage and transportation instructions.

10.2. The warranted service life of unit from date of delivery to the customer is 24 months. For extended warranty, register the unit, see **10.5**.

10.3. Warranty covers only the units transported in the original package.

10.4. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment report shall be compiled, certified and sent to the local distributor address. To obtain the claim form, visit section **Technical support** on our website at link below.

10.5. Extended warranty. For **TS-100** and **TS-100C**, the *Premium* class models, one year of extended warranty is available free of charge after registration, during 6 months from the date of sale. Online registration form can be found in section **Warranty registration** on our website at the link below.

10.6. Description of the classes of our products is available in the **Product class description** section on our website at the link below.

Technical support

biosan.lv/en/support

Warranty registration

biosan.lv/register-en

Product class description

biosan.lv/classes-en

10.7. The following information will be required in the event that warranty or post-warranty service comes necessary. Complete the table below and retain for your records.

Model	Serial number	Date of sale
TS-100 / TS-100C Thermo-shaker for micro-tubes and microplates		

11. Declaration of conformity

11.1. Thermo-Shakers **TS-100** & **TS-100C** are in conformity with the following relevant Union legislations:

LVD 2014/35/EU	**LVS EN 61010-1:2011 + A1:2019** Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements. **LVS EN 61010-2-010:2020** Particular requirements for laboratory equipment for heating of materials. **LVS EN 61010-2-051:2021 + A11:2021** Particular requirements for laboratory equipment for mixing and stirring.
EMC 2014/30/EU	**LVS EN 61326-1:2021** Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements.
RoHS3 2015/863/EU	Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
WEEE 2012/19/EU	Directive on waste electrical and electronic equipment.

how to choose
A PROPER SHAKER, ROCKER, VORTEX

biosan
Medical–Biological Research & Technologies

Sample volume 10^3 ... 10^2 ml
Erlenmeyer flask and Cultivation flask

PSU-20i, Orbital Shaker

ES-20/80, Orbital Shaker-Incubator

Applications:
- *Microbiology*
- *Extraction*
- *Cell cultivation*

PSU-10i, Orbital Shaker

ES-20, Orbital Shaker-Incubator

Applications:
- *Agglutination*
- *Gel staining/destaining*

MR-12, Rocker-Shaker

Sample volume 10^1 ml
Petri dishes, vacutainers and tubes up to 50 ml

Multi Bio RS-24, Programmable rotator

Multi RS-60, Programmable rotator

Bio RS-24, Mini-Rotator

Applications:
- *Microbiology*
- *Extraction*
- *Cell cultivation*
- *Hematology*

V-1 plus, Vortex

RTS-1 and RTS-1C, Personal bioreactor

MSV-3500, Multi Speed Vortex

MR-1, Mini Rocker-Shaker

Multi Bio 3D, Mini Shaker

Applications:
- *Agglutination*
- *Extraction*
- *Blot hybridisation*
- *Gel staining/destaining*

Sample volume 10^0 ... 10^{-3} ml
PCR plates, microtest plates and Eppendorf type tubes

PST-100HL, Thermo-Shaker

PST-60HL-4, Thermo-Shaker

TS-DW, Thermo-Shaker for deep well plates

PST-60HL, Thermo-Shaker

Applications:
- *ELISA Analysis*
- *Genomic Analysis*
- *Hybridization*
- *Immunology*

Applications:
- *Nucleic acid Analysis*
- *Molecular Analysis*
- *Protein Analysis*
- *Genomic Analysis*

MPS-1, Multi Plate Shaker

PSU-2T, Mini-Shaker

CVP-2, Centrifuge vortex for PCR plates

TS-100, TS-100C, Thermo-Shakers

V-32, Multi-Vortex

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E-mail: marketing@biosan.lv, www.biosan.lv
Phone:+37167426137

TS-DW, Thermo–Shaker for deep well plates

Premium Product Class

DESCRIPTION

TS-DW Thermo–Shaker is designed for shaking and incubating deep well plates.

A multisystem principle, used in the design of the Thermo-Shaker, allows operating it as 3 independent devices: Incubator, Plate shaker and Thermo–Shaker.

TS-DW provides excellent temperature uniformity across the plate due to patented two-sided heating of the block and the lid, contour heating of the block and close proximity of heating elements to plate walls.

There is a number of interchangeable blocks to suit different plates such as Eppendorf® 96/1000 µ l, Sarstedt® Megablock 96/2200 µl, Porvair® 96/2000 µl, Axygen® 96/2200 µl. Also we can manufacture a customized block on request.

Deep Well Plate Thermo–Shaker provides:

- Soft or intensive sample shaking
- Rotation speed regulation, stabilization and indication
- Even rotation amplitude throughout the Thermo-Shaker platform
- Exceptional temperature uniformity across the plate
- Required operation time setting and indication
- Automatic stopping of the platform movement after expiration of the set time
- Setting and indication of the required temperature on the platform
- A variety of changeable blocks that can accommodate most popular deepwell plates
- Automatic fault diagnostics (temperature sensor, platform heating, lid heating etc.)

Application fields:

- Cytochemistry — for in situ reactions
- Immunochemistry — for immunofermentative reactions
- Biochemistry — for enzyme and protein analysis
- Molecular biology — for nucleic acid extraction

Separate blocks to accommodate different deepwell plates will be released. For example:

Deep Well Plates NUNC® 96/2000 µl
Deep Well Eppendorf® 96/0.5 ml

The block for deepwell plate is mountable, thus a custom plate module can be manufactured on request

Temperature Calibration Function

With the help of the temperature calibration function the user can calibrate the unit approx. ±6% of the selected temperature to compensate differences in the thermal behaviour of plates from different manufacturers.

CAT. NUMBER

Without thermoblock	Without thermoblock
BS-010159-A02	230VAC 50/60Hz Euro plug
BS-010159-A03	230VAC 50/60Hz UK plug
BS-010159-A05	230VAC 50/60Hz AU plug
BS-010159-A04	100VAC 50/60Hz US plug, 120VAC 60Hz US plug
BS-010159-GK	IQ OQ document
BS-010159-HK	PQ document

SPECIFICATIONS

Temperature setting range	+25°C ... +100°C
Temperature control range	5°C above ambient ... +100°C
Temperature setting resolution	0.1°C
Temperature uniformity at +37°C	±0.1°C*
Temperature accuracy at +37°C	±0.5°C*
Time of platform heating from +25°C to +37°C	6 min*
* for B-2E thermoblock	-
Temperature calibration coefficient range	0.936...1.063 (± 0.063)
Speed control range	250–1400 rpm
Digital time setting	1 min–96 hrs (1 min increment)
Timer sound signal	+
Orbit	2 mm
Display	LCD, 16 x 2 signs
Overall dimensions (W×D×H)	240 x 260 x 160 mm
Weight	5.1 kg
Input current/power consumption	12 V, 4.8 A / 58 W
External power supply	Input AC 100–240 V; 50/60 Hz; Output DC 12 V

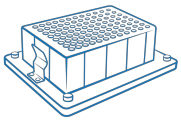
ACCESSORIES

B-PCR
BS-010159-YK
block

Block for one 96-well unskirted, skirted or semi-skirted PCR plate

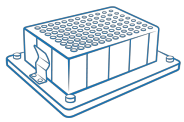
B-2E
BS-010159-AK
block

Block for one deep-well plate Eppendorf® 96/1000 µl - Cat.No. 0030505204, 0030506200, 0030502205



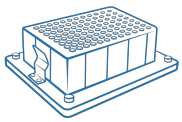
B-05E
BS-010159-QK
block

Block for one deep-well plate Eppendorf® 96/500 µl - Cat.No. 0030501101



B-2A
BS-010159-FK
block

Block for one deep-well plate Axygen® 96/2200 µl - Cat.No. P-2ML-SQ-C

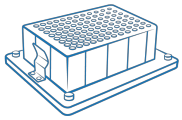


B-06A
BS-010159-KK
block

B-06A block for one deep-well plate Axygen® 96/600 µl - Cat.No. P-DW-500C

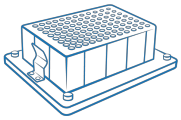
B-2S
BS-010159-CK
block

Block for one deep-well plate Sarstedt® Megablock 96/2200 µl - Cat.No. 82.1972.002



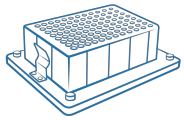
B-08AB
BS-010159-MK
block

Block for one Abgene™ Storage Plate 96/800 µl - Cat.No. AB0765, AB0859



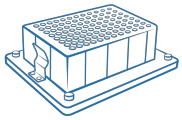
B-12AB
BS-010159-SK
block

Block for one deep-well plate Abgene™ 96/1200 µl - Cat.No. AB0564, AB0787



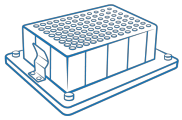
B-2P
BS-010159-EK
block

Block for one deep-well plate Porvair® 96/2000 µl - Cat.No. 219009



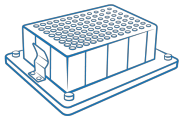
B-1R
BS-010159-UK
block

Block for one deep-well plate Riplate® 96/1000 µl - Cat.No. 43001-0101



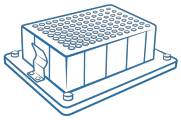
B-2R
BS-010159-TK
block

Block for one deep-well plate Riplate® 96/2000 µl - Cat.No. 43001-0103



B-05PO
BS-010159-OK
block

Block for one deep-well plate PlateOne® 96/500 µl - Cat.No. S1896-5000

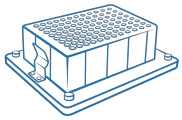


B-2PO
BS-010159-NK
block

Block for one deep-well plate PlateOne® 96/2000 µl - Cat.No. S1896-2000

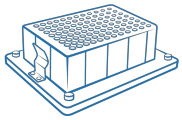
B-2N
BS-010159-DK
block

Block for one deep-well plate Nunc® 96/2000 µl - Cat.No. 278743, 278752



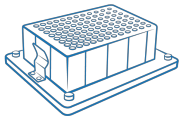
B-2SL
BS-010159-IK
block

Block for one deep-well plate Starlab® 96/1200 µl - Cat.No. E2896-0120



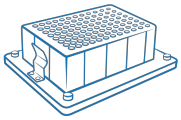
B-2M
BS-010159-RK
block

Block for one deep-well plate KingFisher™ Deepwell 96 Plate - Cat.No. 95040450



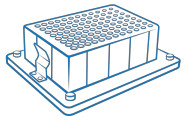
B-2SD
BS-010159-PK
block

Block for one deep-well plate Slicprep™ 96 - Cat.No. AB0932



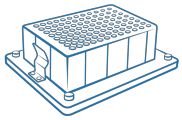
B-2KF
BS-010159-LK
block

Block for one deep-well plate PowerMag® Glass Bead Plate 96 - Cat.No. 27600-4-KF-BP



B-2BBI
BS-010159-JK
block

Block for one deep-well plate cluster SSI Bio - Cat.No. 703B00, 713B00



B-2V
BS-010159-BK
block

B-2V block for one deep-well plate Vector-Best® 96/1000 µl