

Operating instructions

TRISON

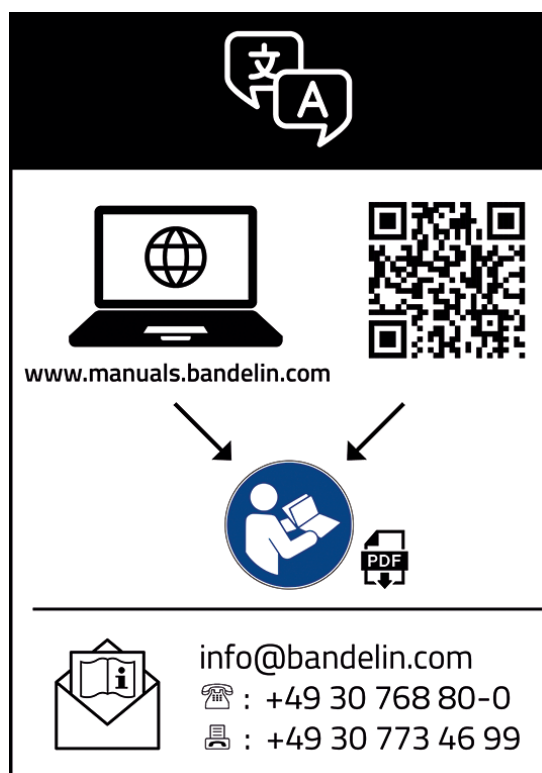
High-performance ultrasonic bath



Valid for:

TRISON 4000.2

SONOBOARD TRISON R/L



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Certified to ISO 9001 and ISO 13485

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Table of contents

1	About these operating instructions	5
2	Safety	6
2.1	Using the unit	6
2.2	Obligation to report serious incidents	8
2.3	Avoidance of cross-contamination and infections	8
2.4	Keep out of reach of children	8
2.5	Risk of electric shock	8
2.6	Damage to health due to ultrasonic noise	9
2.7	Danger due to high temperatures	9
2.8	Danger due to ultrasound	10
2.9	Danger due to the agents used	10
2.10	Disposing of sonication fluid	10
2.11	Erosion of the oscillating tank	11
2.12	Interference with wireless communication	11
3	Construction and function	12
3.1	Overview	12
3.2	Oscillating tank	12
3.3	Ultrasonic generator	13
3.4	TRISON Base control unit	13
3.5	TRISON Lift	14
3.6	TRISON Twist	14
3.7	TRISON Rack	16
3.8	Xi spacer	16
3.9	Icons and buttons	17
4	Preparing for operation	18
4.1	Presettings (initial commissioning)	18
4.2	Rinsing the oscillating tank	19
4.3	Switching the ultrasonic bath on and off	19
4.4	Changing settings on the TRISON Base	19
4.5	Attaching and removing the TRISON Lift	21
4.6	Attaching and removing the TRISON Twist	22
5	Operation	23
5.1	Preparing for ultrasonic cleaning	23
5.1.1	Sonication fluid	23

5.1.2	Filling with sonication fluid	24
5.1.3	Degassing sonication liquid	25
5.1.4	Testing adapters for MIS instruments	25
5.2	Cleaning instruments	27
5.2.1	Cleaning Si instruments	27
5.2.2	Cleaning Xi instruments	28
5.2.3	Cleaning rinsable MIS instruments	29
5.2.4	Cleaning standard instruments	31
5.3	After ultrasonic cleaning	32
5.3.1	Emptying the oscillating tank	32
5.3.2	Rinsing the ultrasonic bath	32
5.3.3	Disinfecting the ultrasonic bath	33
5.3.4	Cleaning and disinfecting the TRISON Lift, TRISON Twist and TRISON Rack	33
5.3.5	Rinsing the filter	34
5.3.6	Storing logs	34
5.4	Troubleshooting	36
5.4.1	Malfunctions	36
5.4.2	Warning and error screens	37
6	Maintenance	40
6.1	Cleaning and care for the ultrasonic bath	40
6.2	Testing	41
6.3	Changing the adapter seals	43
6.4	Performing a foil test	44
6.5	Repairs	47
6.6	Maintenance	48
7	Disposal	49
8	Information about the device	50
8.1	Technical specifications	50
8.2	Ambient conditions	53
8.3	CE conformity	53
9	Accessories	54
10	Process diagram	56
11	Servicing lists	58

1 About these operating instructions

These operating instructions contain information that is necessary and useful in order to use the device safely and efficiently.

- Read these operating instructions before using the device.
- Pay particular attention to Chapter **2 Safety**.
- If you pass this device on to someone else, provide these operating instructions with it.
- Should these operating instructions leave any questions unanswered, please contact your specialist dealer or BANDELIN. Notes on service can be found in Chapter **6.5 Repairs**.

In the event that the translation cannot be understood, the German original version of BANDELIN must be followed.

BANDELIN assumes no responsibility or liability for damage caused by improper handling or use.

Illustrations are exemplary and not to scale. Decorations not included with delivery.

2 Safety

2.1 Using the unit

The TRISON ultrasonic bath uses the physical action of high-performance ultrasound in aqueous liquids to clean rinsable and non-rinsable medical instruments.

The TRISON ultrasonic bath is a Class I medical device per Regulation (EU) 2017/745.

EMDN nomenclature: Z12011302

Cleaning is carried out with water and an ultrasound-compatible agent.

Use of the TRISON ultrasonic bath is indicated for:

- support during manual pre-cleaning in the context of the automatic reprocessing of medical devices; and
- support during manual pre-cleaning and cleaning in the context of manual reprocessing of medical devices.

Instruments must not be placed on the bottom of the oscillating tank. They must be placed in the sonication fluid with a TRISON twist, in a TRISON rack, or in an insert basket with a basket holder. An overview of suitable accessories can be found in Chapter **9 Accessories**.

The TRISON ultrasonic bath must not be operated unattended.

Intended use

The TRISON ultrasonic bath can be used for the following purposes:

Purpose (cleaning objective)	Required accessories
Sonication as well as alternating pressure rinsing of the instrumentshafts and suction rinsing of the instrument heads, with movement of the instrument tools, of da Vinci Si type robotic instruments	TRISON Twist Si Right-hand variant or left-hand variant
Sonication as well as alternating pressure rinsing of the instrumentshafts and suction rinsing of the instrument heads, with movement of the instrument tools, of da Vinci Xi type robotic instruments	TRISON Twist Xi Right-hand variant or left-hand variant
Cleaning da Vinci Xi EndoWrist Stackers 45	Additional Xi spacer
Sonication and simultaneous suction rinsing of the shafts of MIS instruments with external diameters of 3 to 10 mm	TRISON Rack TR 3001 Right-hand variant or left-hand variant
Sonication of standard instruments	Insert basket and basket holder Right-hand variant or left-hand variant
Sonication as well as alternating pressure rinsing of the instrument shafts and suction rinsing of the instrument heads of Hugo™ RAS System robotic instruments	Hose set for Hugo™ RAS System and TRISON Rack TR 4000
Sonication as well as alternating pressure rinsing of the instrument shafts and suction rinsing of the instrument heads of Versius® Surgical Robotic System robotic instruments	Hose set for Versius® Surgical Robotic System and TRISON Rack TR 4000

Contraindications/exclusions

- Optical equipment, camera systems, lighting circuits, mirrors, and objects made from or involving elastic materials (e.g., catheters, functional parts of ventilator systems, flexible endoscopes) are not suitable for sonication, or are only suited for it to a limited extent. The specifications from the relevant manufacturer provide information about suitability for ultrasonic cleaning.
- The TRISON ultrasonic bath is not suitable for cleaning and disinfecting contact lenses.
- Sonication of flammable liquids is not permitted in the TRISON ultrasonic bath.
- Indirect sonication is not permitted in the TRISON ultrasonic bath.

Possible side effects/restrictions

- Ultrasound does not disinfect. However, processes such as chemical disinfection can be accelerated in the ultrasonic bath.
- Surfaces can be mechanically attacked by cavitation erosion, and coatings can become detached.

Intended users

The TRISON ultrasonic bath is intended for use in health facilities, e.g., in a Central Sterile Services department (CSSD). It is to be used by trained personnel.

Operation of the ultrasonic bath does not pose any danger to pregnant women.

2.2 Obligation to report serious incidents

Report serious incidents to BANDELIN electronic GmbH und Co. KG and the competent authority.

2.3 Avoidance of cross-contamination and infections

To avoid cross-contamination, regularly clean and disinfect the surfaces of the ultrasonic bath with a surface disinfectant that at least has bactericidal, levurocidal and limited virucidal properties. Regularly reprocess accessories such as hoses, basket holders and insert baskets in a cleaning disinfection device.

Disinfect the hoses regularly with the TRISON disinfection programme.

At higher temperatures, vapours and aerosols contaminated with introduced impurities can rise from the ultrasonic bath. This can lead to infections and illnesses. Avoid bath temperatures above 40 °C. If necessary, use a lid, a suction device, or protective equipment.

2.4 Keep out of reach of children

Children may not detect hazards emanating from the device. Therefore, keep the device away from children.

2.5 Risk of electric shock

The ultrasonic bath is an electrical device. Failure to follow safety rules may result in a life-threatening electric shock.

- Do not allow the ultrasonic bath to become damp or wet. Keep the surface and touchscreen clean and dry.
- Only transport the ultrasonic bath when it is empty.
- Do not shower the ultrasonic bath, immerse it in water, or expose it to splash water.
- Only connect the device to an earthed socket whose earthing contact matches the earthing contact of the device's plug.



WARNING

Note for unit with type E+F jack:

Combination with K-type sockets (especially common in Denmark) is not permitted.

- Ensure that there are no leakages.
No moisture may be allowed to get onto the generator or the mains connector of the generator.
- If you discover a defect in the ultrasonic bath, disconnect the mains plug immediately. Do not connect an ultrasonic bath to the mains if it is defective.
- Only have repairs carried out by qualified, authorised personnel or by the manufacturer. See Chapter **6.5 Repairs**.
- Position the ultrasonic bath so that it is possible to disconnect the mains connection without difficulty.

2.6 Damage to health due to ultrasonic noise

The typical ultrasonic noise produced during a procedure can be perceived as very unpleasant. Remaining within a radius of 2 m for a long period of time may cause you to suffer damage to your health.

- Wear suitable hearing protection.
- Use a lid to reduce noise.

2.7 Danger due to high temperatures

The ultrasonic bath, the sonication fluid and the instruments may become hot during operation. Touching them may cause burns.

Ultrasound heats the sonication fluid even without additional heating. Very high temperatures can occur during prolonged ultrasound operation.

- Observe the treatment times recommended by the manufacturer of the ultrasonic agent. Do not leave the ultrasound on for longer than necessary.
- Do not reach into the sonication liquid by hand. Remove instruments with the TRISON Twist, the TRISON Rack, the insert basket, or forceps.
- Allow instruments to cool before touching them.

Non-aqueous fluids can heat up many times faster than water. A possible flashpoint can be reached, and exceeded, after a very short period of sonication. In the case of fluids with high boiling points, the bath temperature can rise to over 120 °C due to the energy supplied by the ultrasound. This can lead to fires and severe burns.

- The lid used must not completely seal the oscillating tank – steam must be able to escape.

2.8 Danger due to ultrasound

The strong ultrasound in the unit destroys cell structures. If a body part is immersed in the sonication fluid during operation, this can lead to skin damage, but also to internal tissue damage. The fingers' periosteum can become damaged.

- Do not reach into the sonication fluid during operation.
- Never expose living things to ultrasound.

2.9 Danger due to the agents used

The agents used in the device can be toxic or corrosive. They can irritate eyes, skin and mucous membranes. The vapours and aerosols can also be dangerous.

- Wear gloves and goggles when handling hazardous agents.
- Do not ingest the agents, and avoid bringing them into contact with eyes or skin. Avoid bending over very close to the device in order to avoid vapours coming into contact with your eyes or inhaling the vapours.
- Place a cover on the device during operation. In the event of dangerous vapours, use an extraction system.
- Observe the information on the label and in the safety data sheet of the agent.
- Keep agents away from children and untrained persons.

2.10 Disposing of sonication fluid

Dispose of the sonication fluid according to the instructions of the manufacturers of the ultrasonic agents used. The recommended ultrasonic agents of the TICKOPUR, TICKOMED and STAMMOPUR product series from DR. H. STAMM GmbH are biodegradable in accordance with the provisions of Regulation (EC) No. 648/2004 (Detergents Regulation). If necessary, the sonication fluid must be neutralised before disposal.

Depending on the type of contamination, substances hazardous to water, e.g., oils or heavy metal compounds, may have been introduced into the sonication fluid during cleaning. If the limit values for these substances are exceeded, the sonication fluid must be treated or disposed of as hazardous waste.

Observe local sewage regulations.

2.11 Erosion of the oscillating tank

The surface of the oscillating tank is subject to erosion. How quickly this erosion takes place depends on the use of the ultrasonic bath. The erosion leads to leakage points in the oscillating tank. Bath fluid can thus enter the interior of the ultrasonic bath. Moisture on electrical components can cause an electric shock or fire.

- Do not use the ultrasonic bath if you notice a leak. Disconnect the mains plug immediately. Empty the oscillating tank.

You can extend the lifespan of the oscillating tank by observing the following instructions:

- Replace sonication liquid that is visibly contaminated by particles.
- Only use demineralised water (deionised/DI water) with an ultrasound-compatible agent.
- Do not use chemicals that contain or release chloride ions in the ultrasonic oscillating tank. This is the case with some disinfectants, household cleaners and dishwashing detergents. Chloride ions cause corrosion on stainless steel.
- Only use the ultrasonic bath with accessories that are suitable for the ultrasonic bath and the instruments. Do not place instruments directly on the bottom of the oscillating tank. An overview of suitable accessories can be found in Chapter **9 Accessories**.

2.12 Interference with wireless communication

The device may interfere with other wireless communication devices in close proximity, such as:

- Mobile phones
- Wi-Fi devices
- Bluetooth devices

If a wireless device malfunctions, increase its distance from the device.

The unit complies with the requirements for Class B devices according to EN 55011.

3 Construction and function

3.1 Overview

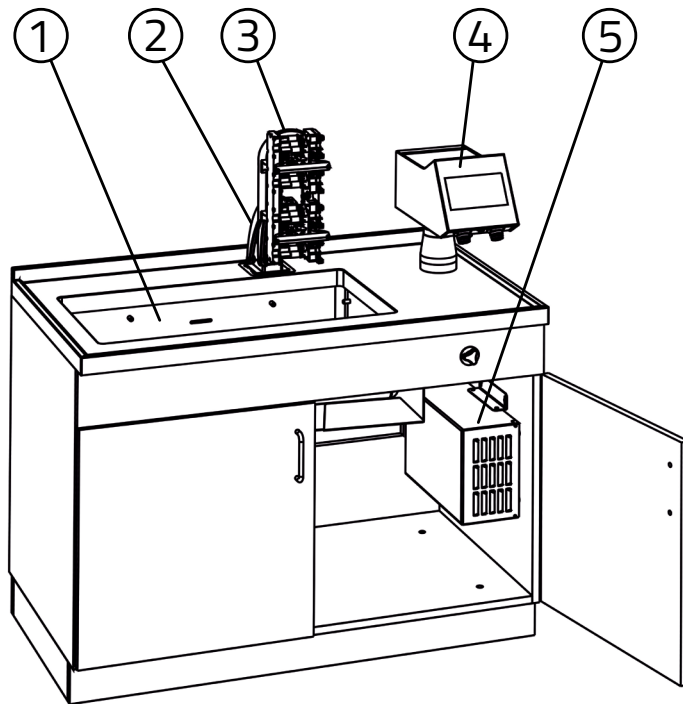


Fig. 1 TRISON ultrasonic bath installed in the SONOBOARD functional cabinet (functional cabinet optional)

- 1 Oscillating tank
- 2 Pivot-mounted arm TRISON Lift
- 3 Moving device TRISON Twist
- 4 Control unit TRISON Base
- 5 Ultrasonic generator

3.2 Oscillating tank

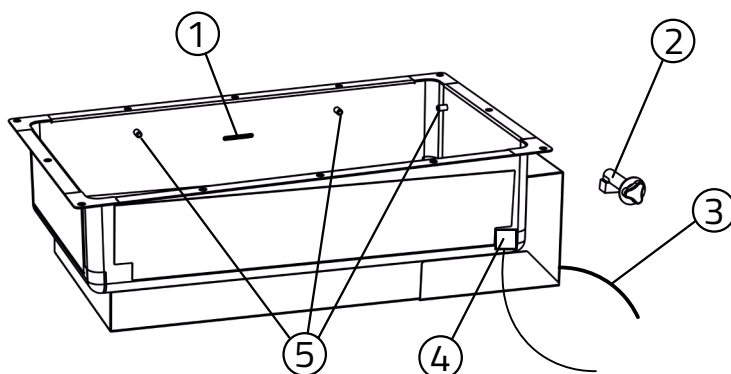


Fig. 2 Oscillating tank

- 1 Filling level mark
- 2 Turning knob of the outlet
- 3 HF cable
- 4 Temperature sensor
- 5 Basket mounts

3.3 Ultrasonic generator

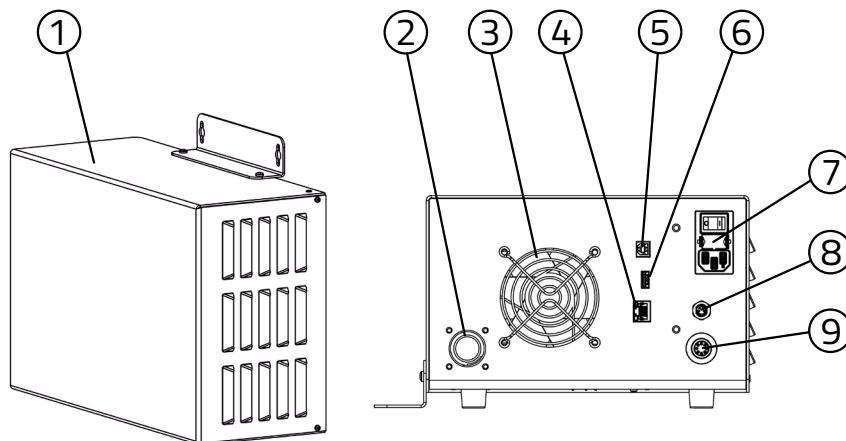


Fig. 3 TRISON Generator, including rear view

- 1 Generator
- 2 HF connecting socket
- 3 Fan
- 4 Ethernet interface
- 5 USB B interface
- 6 USB A interface (for TRISON Base)
- 7 Built-in socket with fuse holder and On/Off switch
- 8 Connection for temperature sensor
- 9 Connection for TRISON Base

3.4 TRISON Base control unit

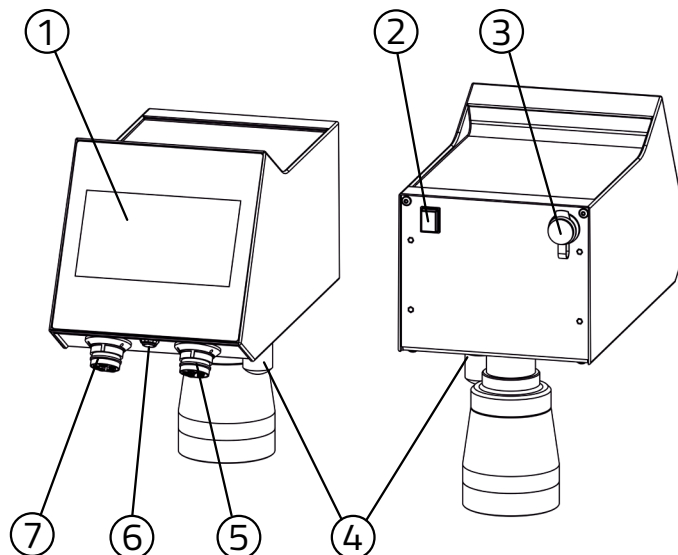


Fig. 3 TRISON Base

- 1 Touchscreen
- 2 Mains switch
- 3 USB A interface
- 4 Filter
- 5 Right coupling connection
- 6 Connection for Twist
- 7 Left coupling connection

3.5 TRISON Lift

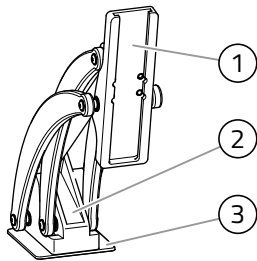


Fig. 4 TRISON Lift (optional)

- 1 Connector for attaching a TRISON Twist
- 2 Base
- 3 Base plate for attaching to the work plate

The TRISON Lift can be used to swivel the TRISON Twist moving device up and down to clean robotic instruments. The TRISON Lift is mounted on the work surface behind the oscillating tank.

3.6 TRISON Twist

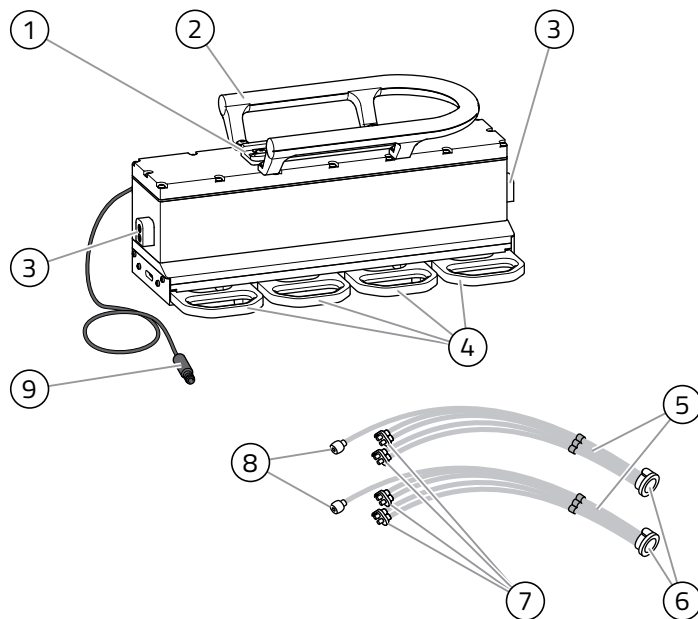


Fig. 5 TRISON Twist TT 4000 Si for Si instruments (optional)

- 1 Connector for attaching to the TRISON Lift
- 2 Handle
- 3 Mounts for the oscillating tank
- 4 Sliding handles
- 5 Hose sets
- 6 Hose couplings
- 7 Rinsing plug
- 8 Return flow hoses
- 9 Jack for connecting to the TRISON Base

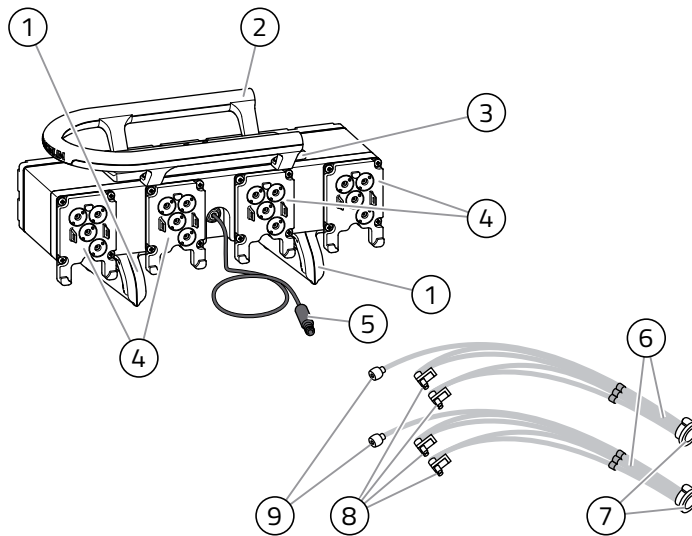


Fig. 6 TRISON Twist TT 4000 Xi for Xi instruments (optional)

- 1 Feet
- 2 Handle
- 3 Connector for attaching to the TRISON Lift
- 4 Holding fixtures
- 5 Jack for connecting to the TRISON Base
- 6 Hose sets
- 7 Hose couplings
- 8 Rinsing plug
- 9 Return flow hoses

The TRISON Twist is used to clean up to four robotic instruments at the same time or an Xi stacking instrument. The TRISON Twist is available as a left or right variant; see Chapter **9 Accessories**.

During the process, the instrument tips are moved so that even hard-to-reach hinges and cavities are cleaned. Instruments that are not rinsable will be displayed on the touch screen after cleaning.

3.7 TRISON Rack

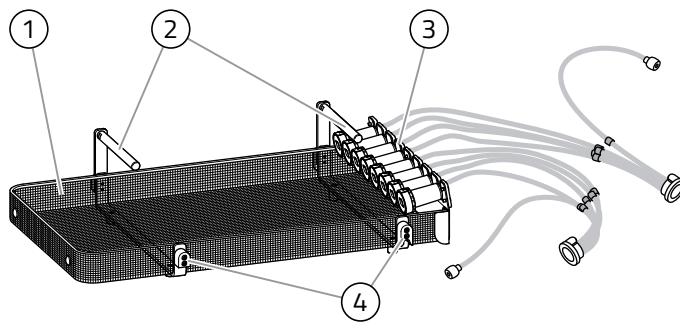


Fig. 7 TRISON Rack (optional)

- 1 Basket tray
- 2 Handles
- 3 Comb bar for 8 adapters
- 4 Mounts for the oscillating tank

The TRISON Rack is used to clean up to 8 rinsable MIS instruments at the same time. The TRISON rack is available as a left or right variant; see Chapter **9 Accessories**.

The instruments are connected to the corresponding adapters, rinsed from the inside and individually checked for flow. Instruments that are not rinsable will be displayed on the touch screen after cleaning.

3.8 Xi spacer

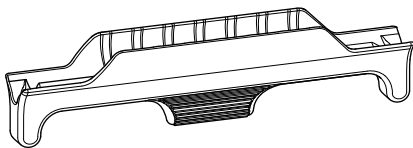


Fig. 9 Xi spacer (optional)

The Xi spacer is clipped onto the TRISON Twist TT 4000 Xi for cleaning Xi stackers.

3.9 Icons and buttons



Home screen



Next/OK



Back



Cancel



Start



Help button – Tap to get more information about the current screen



Shortcut button – All can be selected at the same time by tapping



Ultrasound active



Flow rate during treatment



Instrument channel currently being rinsed



Temperature during cleaning



Remaining time during treatment



Selection inactive or off – if a key is highlighted in grey, it is inactive



Selection active or on – if a key is highlighted in blue, it is active



Green: Instrument permeable to the fluid; cleaning is complete.
Red: Instrument clogged; cleaning must be repeated.

4 Preparing for operation

4.1 Presettings (initial commissioning)

After switching on the TRISON Base for the first time, you will be automatically guided through the menus for the presettings.

Here you can set your preferences, which will then be saved automatically.

The following menus are passed through:

- Language
 - Here, you can select one of the displayed languages for your device.
- Time/date
 - Please set the current time and date.
- Institution
 - In the lines shown, you can input, for example, your company or the name of the institution and the address. To do this, select a row and click on "Edit". The information entered is listed in the process logs.
- Programme selection
 - By default, all programmes are selected (highlighted in blue). You can deselect individual ones here.
- Time setting function
 - You can enter the desired process times, which are then to run in the ongoing programme, in the relevant submenus.
 - Robotics
 - Soak
 - MIS
 - Rinse
 - Disinfect
- Temperatures
 - Minimum and maximum temperatures can be defined here.
- Documentation
 - You can disable or enable the documentation by pressing the switch.
- Network
 - The network settings can be entered here. By default, DHCP is preset. Please have this checked by your administrator if necessary.
- Exit
 - At the end, you will be informed that the presets have been completed and that you will now automatically exit the menu.

4.2 Rinsing the oscillating tank

Thoroughly rinse the oscillating tank of the unit with water before using for the first time.

4.3 Switching the ultrasonic bath on and off

Switching the ultrasonic bath on

To use for the first time, switch the ultrasonic bath on using the on/off switch on the back of the generator.

Then switch on the display with the mains switch on the back of the TRISON Base.

After a few seconds, the home screen will appear on the touch screen.

If the home screen has not appeared after a long time, see **5.4 Troubleshooting**.

Switching off the ultrasonic bath

The on/off switch on the generator can remain permanently switched on. It is sufficient to switch the mains switch on or off on the back of the TRISON Base when operation is ongoing.

For longer shutdowns, we recommend that you also switch off the mains switch on the generator.

4.4 Changing settings on the TRISON Base

Adjusting screen brightness

1. On the home screen, select "Settings".
2. Select "System".
3. Select "Brightness".
4. Select the desired brightness using the "+" or "-" buttons.

Setting the date and time

1. On the home screen, select "Settings".
2. Select "System".
3. Select "Time/date".
4. Set the desired details.



Information

The time does not automatically adjust to daylight saving time. At the start and end of the daylight saving time period, you must reset daylight saving time.

Changing settings for cleaning of robotics instruments

For robotic instruments, a soaking time of 0 minutes and a cleaning time of 15 minutes are preset. The soaking and cleaning times can be changed.

1. On the home screen, select "Settings".
2. Select "Process data".
3. Enter the password "Bandelin" when prompted.
4. Select "Time".
5. Select the soaking and cleaning time for the robotics programme.

Changing settings for cleaning of MIS instruments

For MIS instruments, a cleaning time of 15 minutes is preset. You can adjust the cleaning time.

1. On the home screen, select "Settings".
2. Select "Process data".
3. Enter the password "Bandelin" when prompted.
4. Select "Time".
5. Select the cleaning time for the MIS programme.

Changing settings for cleaning of standard instruments and for rinsing and disinfection programmes

You can adjust the times.

1. On the home screen, select "Settings".
2. Select "Process data".
3. Enter the password "Bandelin" when prompted.
4. Select "Time".
5. Select the times.

Selecting the language

1. On the home screen, select "Settings".
2. Select "System".
3. Select "Language".
4. Select your desired language by clicking on it.

Selecting key tones

1. On the home screen, select "Settings".
2. Select "System".
3. Select "Option".
4. Here, you can switch the key tones on or off or enter the service menu (password-protected).

4.5 Attaching and removing the TRISON Lift

Slide the base of the TRISON Lift backwards in the guide of the base plate until the TRISON Lift clicks into place.

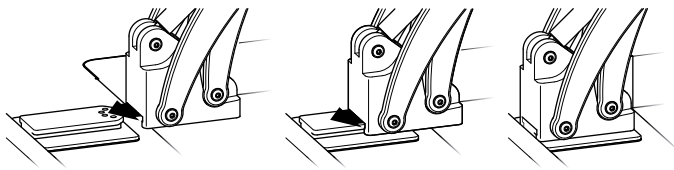


Fig. 10 Attaching the TRISON Lift

Do not remove the TRISON Lift before the TRISON Twist has been removed. Pull the base part on the base plate forward until the TRISON Lift can be removed.

4.6 Attaching and removing the TRISON Twist

Attaching the TRISON twist

NOTICE

- The jack of the TRISON Twist is not waterproof. Make sure that it does not come into contact with the sonication liquid. If the jack does come into contact with liquid, allow the jack to dry completely before plugging it in. You can blast the jack with compressed air.
- Do not twist the jack or insert it by force. This can lead to damage to the jack and consequential damage to the electronics.

Requirements

- The TRISON Lift is mounted.
- There are no instruments on the TRISON Twist.

Procedure

1. Hold the jack of the TRISON Twist and make sure that it does not come into contact with the sonication liquid.
2. Grasp the handle of the TRISON Twist and slide it down in the TRISON Lift guide until the TRISON Twist clicks into place.
3. Connect the jack of the TRISON Twist to the TRISON Base.

Removing the TRISON Twist

Requirements

- All instruments on the TRISON Twist have been removed.
- The hose couplings on the TRISON Base have been removed.

Procedure

1. Disconnect the jack of the TRISON Twist from the TRISON Base. Hold the jack firmly and make sure that it does not come into contact with the sonication liquid.
2. Grasp the handle of the TRISON Twist and pull it upwards in the TRISON Lift guide until the TRISON Twist can be removed.

5 Operation

5.1 Preparing for ultrasonic cleaning

5.1.1 Sonication fluid

A solution made of water and a special ultrasonic specimen is used as the sonication fluid. Drinking water or fully demineralised water (aqua purificata) can be used as water. Water without any additive is unsuitable for sonication. Use of demineralised water without an ultrasonic agent leads to increased erosion of the oscillating tank.

Do not leave the instruments in the sonication fluid for too long after cleaning. This can damage the instruments.

The ultrasonic agent used must be cavitation conducive, biodegradable, easy to dispose of, material protecting and long-lasting.

BANDELIN recommends using the ultrasonic agents STAMMOPUR DR 8 and STAMMOPUR R from DR. H. STAMM GmbH for cleaning.

- Telephone advice: +49 30 76880-280
- Website: www.dr-stamm.de

Observe the instructions from the manufacturer of the ultrasonic agent regarding dosing. You can calculate the quantities yourself analogously to the following example.

35 l of ready-to-use solution, 2.5%

Calculation of the agent:
$$\frac{35 \text{ l} \times 2,5 \%}{100 \%} = 0,875 \text{ l}$$

Calculation of the water quantity: $35 \text{ l} - 0,875 \text{ l} = 34,125 \text{ l}$

You can also see the dosage in the following table:

Operating volume [l]	Dosage Water + agent				
	1%	2%	3%	5 %	10%
35.0	34.65 l + 0.35 l	34.3 l + 0.7 l	33.95 l + 1.05 l	33.25 l + 1.75 l	31.5 l + 3.5 l

5.1.2 Filling with sonication fluid



CAUTION

Risk of scalding

- Do not fill the oscillating tank with hot water.
- Maximum filling temperature: 50 °C.

NOTICE

Damage to the ultrasonic bath due to condensate

At high humidity, condensation forms on the outside of the oscillating tank when it is filled with cold water.

- Do not fill the oscillating tank with cold water at high humidity.

NOTICE

Damage to the oscillating tank

If you are using an agent in powder form, do not put it directly into the oscillating tank.

- Mix any powder agents in another container before placing them in the oscillating tank.
- Do not put the agent in the oscillating tank until it has dissolved completely.

NOTICE

Damage to the device

Too low a filling level leads to damage to the ultrasonic bath.

Requirements

- The outlet must be closed.
- The ultrasound bath must be switched off.

Procedure

1. Fill 1/3 of the oscillating tank with water.
2. Dose the agent into the oscillating tank. See Chapter **5.1.1 Sonication fluid**.
3. Fill with water up to the filling level mark, avoiding foaming.

5.1.3 Degassing sonication liquid

Sonation fluid that has been freshly poured in or that has remained in the oscillating tank for a long time must be degassed before use. Degassing the sonication liquid increases the effect of the ultrasound.

Procedure

1. Put on the oscillating tank's lid, if available.
2. Select the "Degassing" programme on the TRISON Base.
3. Fill the oscillating tank if necessary; see Chapter 5.1.2 **Filling with sonication fluid**.
4. Select "START" to start degassing.



Information

During degassing, the ultrasonic noise becomes quieter. This means that the ultrasound effect is increasing.

5.1.4 Testing adapters for MIS instruments

Adapter testing is only to be carried out when using the TRISON Rack.

To perform, select "Tests" and then "Adapter test". Follow the instructions on the subsequent screens.

Testing adapters for MIS instruments

The seals in the adapters for MIS instruments are subject to wear as a result of opening, closing and the influence of ultrasound. Therefore, check the tightness of the adapters before each cleaning process for MIS instruments.

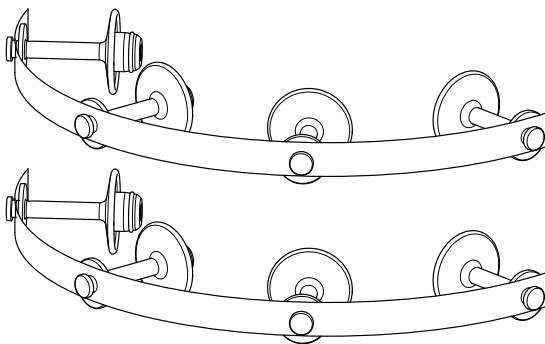


Fig. 11 Adapter testing strips

Requirement

- The oscillating tank has been filled.

Procedure

1. Remove the adapters from the TRISON Rack. Check that the adapter seals are fully open. If an adapter seal is not fully open, pull on the swivel of the adapter and let the swivel snap back. It will turn slightly to the left in the process. Repeat this step until the adapter seal is fully open.

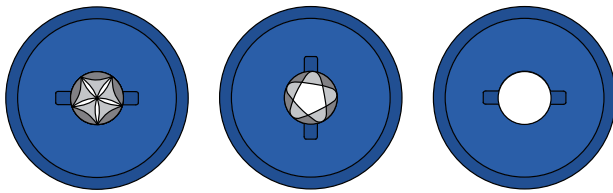


Fig. 12 Adapter seal fully closed, partially closed, and fully open

2. Plug all test plugs into the adapter openings.

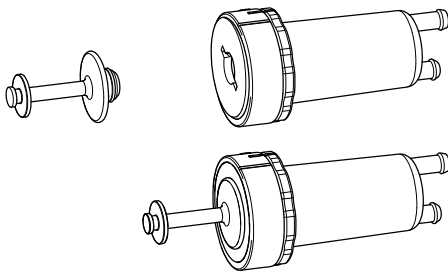


Fig. 13 Inserting the adapter test plug

3. Put the adapters back in the TRISON Rack.
4. Place the TRISON Rack in the oscillating tank so that the adapters are completely immersed in the sonication liquid.
5. Connect the two hose couplings to the TRISON Base. Make sure that the hose couplings click properly into place.
6. On the touchscreen, select the rinsing pipes to be tested.
7. Select "START" to start the adapter test.

Result

- » The test status, with progress bar, will be displayed on the touchscreen.

5.2 Cleaning instruments

5.2.1 Cleaning Si instruments

Requirements

- The TRISON Lift and the TRISON Twist TT 4000 Si are mounted.
- The oscillating tank has been filled.
- The sonication liquid has been degassed.

To carry out the test, select "Robotics" and then select "Guided Start" or "Quick Start"

Procedure

1. Grasp the TRISON Twist by the handle and swivel it upwards.
2. If necessary, open a push handle and place an Si instrument on the holding fixture on the TRISON Twist.
Close the push handle to fix the Si instrument in place.
3. Plug the rinsing plugs into the Si instruments. Press the plugs on firmly.
4. Grip the TRISON Twist by the handle and swivel it down so that the Si instruments are fully immersed in the sonication liquid.
5. Connect both hose couplings to the TRISON Base. Make sure that the hose couplings click properly into place.
6. Loosely place the ends of the two return flow hoses into the sonication liquid.
7. Connect the jack of the TRISON Twist to the TRISON Base.
8. Select the "Robotics" cleaning programme on the TRISON Base.
9. On the touchscreen, select the smallest diameter of the connected instruments.
10. On the touchscreen, select the rinsing pipes of the connected instruments.
11. Select "START" to start the cleaning programme.
 - » Depending on the presetting, cleaning begins with a soaking phase without ultrasound and without movement of the instruments. A progress bar is displayed on the touch screen.
 - » Once the cleaning has been completed, information about all instruments will appear.
Check on the display whether the instruments have been rinsed or are clogged; see below.
12. Once the cleaning is finished, grip the TRISON Twist by the handle and swivel it upwards.
13. Remove the robotics instruments and rinse them with water to remove the residues of the sonication liquid.



Green: Instrument permeable to the fluid; cleaning is complete.
Red: Instrument clogged; cleaning must be repeated.

5.2.2 Cleaning Xi instruments

Requirements

- The TRISON Lift and the TRISON Twist TT 4000 Xi are mounted.
- The oscillating tank has been filled.
- The sonication liquid has been degassed.

To carry out the test, select "Robotics" and then select "Guided Start" or "Quick Start"

Procedure

1. Grasp the TRISON Twist by the handle and swivel it upwards.
2. Carefully insert the Xi instruments into the holding fixtures of the TRISON Twist.
3. Grip the TRISON Twist by the handle and swivel it down without immersing the Xi instruments in the sonication liquid.
4. Plug the rinsing plugs into the Xi instruments and press them on firmly.
5. Grip the TRISON Twist by the handle and swivel it down so that the Xi instruments are fully immersed in the sonication liquid. When cleaning Xi stackers, the TRISON Twist must be standing on the feet of the spacer.
6. Connect both hose couplings to the TRISON Base. Make sure that the hose couplings click properly into place.
7. Loosely place the ends of the two return flow hoses into the sonication liquid.
8. Connect the jack of the TRISON Twist to the TRISON Base.
9. Select the "Robotics" cleaning programme on the TRISON Base.
10. On the touchscreen, select the smallest diameter of the connected instruments.
11. On the touchscreen, select the rinsing pipes of the connected instruments.
12. Select "START" to start the cleaning programme.
 - » Depending on the presetting, cleaning begins with a soaking phase without ultrasound and without movement of the instruments. A progress bar is displayed on the touch screen.
 - » Once the cleaning has been completed, information about all instruments will appear.
Check on the display whether the instruments have been rinsed or are clogged; see below.
 - » Stacker instruments are slower moving than other robotic instruments, which means that the shaft or distal end of the Xi stacker moves only to a limited extent during cleaning.
13. Once the cleaning is finished, grip the TRISON Twist by the handle and swivel it upwards.
14. Remove the robotic instruments and rinse them with water to remove the residues of the sonication liquid.



Green: Instrument permeable to the fluid; cleaning is complete.
Red: Instrument clogged; cleaning must be repeated.



Information

Xi stackers can also be cleaned on the TRISON Twist TT 4000 Xi. The Xi spacer is required for this, which must be ordered separately; see chapter **9 Accessories**. Click the spacer onto the feet of the TRISON Twist. Due to the larger dimensions, only one Xi stacker can be cleaned at a time. The Xi stacker must be connected to one of the TRISON Twist's central holding fixtures.

5.2.3 Cleaning rinsable MIS instruments

Requirements

- The adapters have been tested for leaks; see Chapter **5.1.4 Testing adapters for MIS instruments**.
- The oscillating tank has been filled.
- The sonication liquid has been degassed.

To perform the test, select "MIS" and then select "Guided Start" or "Quick Start"

Procedure

1. Check that the adapter seals are fully open. If an adapter seal is not fully open, pull on the swivel of the adapter and let the swivel snap back. It will turn slightly to the left in the process. Repeat this step until the adapter seal is fully open.

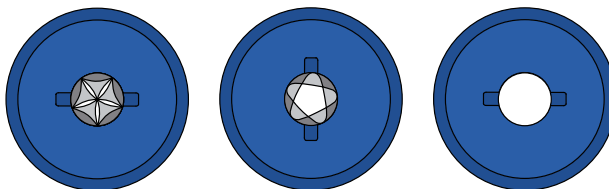


Fig. 14 Adapter seal fully closed, partially closed, and fully open

2. Carefully slide the closed MIS instruments into the adapters so that the moving instrument tip is completely visible in the sight glass. Be sure to insert the instruments straight so as not to damage the adapter seals.

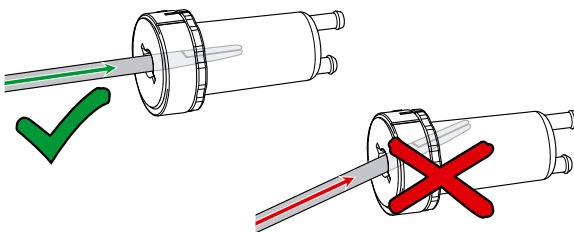


Fig. 15 Sliding an MIS instrument into the adapter

3. Close the adapter seals by turning the outer swivel three lock-in positions clockwise.
 - » A click can be heard at every lock-in position.

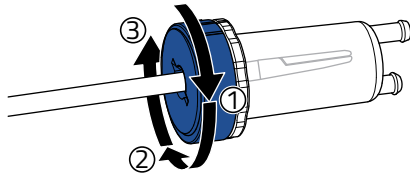


Fig. 16 Closing the adapter seal

Notice! Only turn the outer swivel clockwise by three lock-in positions. If the swivel is rotated too far, the adapter seal may get damaged.

4. Open the instrument tips.
5. Place the TRISON Rack in the oscillating tank so that the instruments are completely immersed in the sonication liquid.
6. Connect both hose couplings to the TRISON Base. Make sure that the hose couplings click properly into place.
7. Loosely place the ends of the two return flow hoses into the sonication liquid.
8. Select the "MIS" cleaning programme on the TRISON Base.
9. On the touchscreen, select the rinsing pipes of the connected instruments.
10. Select "START" to start the cleaning programme.
 - » Cleaning begins. A progress bar is displayed on the touch screen.
 - » Once the cleaning has been completed, information about all instruments will appear.
 Check on the display whether the instruments have been rinsed or are clogged; see below.
11. Once the cleaning has finished, remove the TRISON Rack from the sonication liquid.
12. Open the adapter seals by pulling three times on the swivel of the adapter and letting the swivel snap back.
13. Close the instrument tips. Remove the MIS instruments from the adapters. Rinse the instruments with water to remove the residues of the sonication fluid.



Green: Instrument permeable to the fluid; cleaning is complete.

Red: Instrument clogged; cleaning must be repeated.

5.2.4 Cleaning standard instruments

Requirements

- The basket holder is inserted into the oscillating tank.
- The insert basket for standard instruments is ready.
- The oscillating tank has been filled.
- The sonication liquid has been degassed.

To perform the test, select "Standard" and then select "Guided Start" or "Quick Start"

Procedure

1. Distribute the instruments in the insert basket.
Do not overload the insert basket.
Make sure that the instruments are open and disassembled if applicable. Place the more heavily soiled side downwards.
2. Place the insert basket on the basket holder in the oscillating tank so that the instruments are immersed in the sonication liquid.
3. Select the "Standard" cleaning programme on the TRISON Base.
4. On the touchscreen, select the sonication duration.
5. Select "START" to start the cleaning programme.
 - » Cleaning begins. A progress bar is displayed on the touch screen.
6. Once the cleaning has finished, remove the insert basket from the sonication liquid.
7. Rinse the instruments with water to remove the residues of the sonication liquid.

5.3 After ultrasonic cleaning

5.3.1 Emptying the oscillating tank

Dirt on the bottom of the oscillating tank reduces the ultrasonic power. Empty and clean the oscillating tank if there is any visible contamination of the sonication fluid.

Please also note the information provided by the manufacturer of the ultrasonic agent regarding the service life of the sonication fluid.

Fully replace used sonication fluid. Do not replenish it by topping it up.

Procedure

1. On the touchscreen of the TRISON Base, select "Care" and then "Empty".
2. Open the outlet.
3. Select "START" to start emptying.
4. Connect both hose couplings to the TRISON Base and place the rinsing plugs or the adapters and the ends of the return flow hoses loosely in the oscillating tank.
5. Then thoroughly rinse the oscillating tank with water; see Chapter **5.3.2 Rinsing the ultrasonic bath**.

5.3.2 Rinsing the ultrasonic bath



Information

If an ultrasound preparation without disinfectant properties was used for cleaning, you must disinfect the ultrasonic bath instead of just rinsing it with water; see chapter **5.3.3 Disinfecting the ultrasonic bath**

Procedure

1. Close the outlet.
2. Place the TRISON Twist or the TRISON Rack in the oscillating tank.
3. On the touchscreen of the TRISON Base, select "Care" and then "Rinse".
4. Fill the oscillating tank with water.
5. Connect both hose couplings to the TRISON Base and place the rinsing plugs or the adapters and the ends of the return flow hoses loosely in the oscillating tank.
6. Select "Next" to start the rinsing process.
7. Empty the oscillating tank completely after rinsing; see Chapter **5.3.1 Emptying the oscillating tank**.

5.3.3 Disinfecting the ultrasonic bath

If an ultrasonic agent without disinfectant properties was used for cleaning, you must disinfect the ultrasonic bath instead of just rinsing it with water.

Procedure

1. Close the outlet.
2. Place the TRISON Twist or the TRISON Rack in the oscillating tank.
3. On the touchscreen of the TRISON Base, select "Care" and then "Disinfect".
4. Fill the oscillating tank with water and a suitable agent for disinfection.
5. Connect both hose couplings to the TRISON Base and place the rinsing plugs or the adapters and the ends of the return flow hoses loosely in the oscillating tank.
6. Select a treatment time and select "START" to start the process.
7. Empty the oscillating tank completely after disinfection; see Chapter **5.3.1 Emptying the oscillating tank**.
8. Rinse the ultrasonic bath with water; see Chapter **5.3.2 Rinsing the ultrasonic bath**.

5.3.4 Cleaning and disinfecting the TRISON Lift, TRISON Twist and TRISON Rack

Clean and disinfect the TRISON Lift, TRISON Twist and TRISON Rack regularly. You can place them in the oscillating tank when cleaning and disinfecting the oscillating tank; see chapter **5.3.2 Rinsing the ultrasonic bath** and chapter **5.3.3 Disinfecting the ultrasonic bath**.

5.3.5 Rinsing the filter

The filter can be back-washed and reused.

After cleaning robotic instruments or MIS instruments, the filter must be rinsed daily and checked for damage. In the event of damage, it must be replaced.

Requirements

- The ultrasound bath is not active.

Procedure

1. Unscrew the transparent filter housing at the bottom of the TRISON Base and rinse it with water.
2. Remove the filter.
3. Dispose of or clean the filter by rinsing the contamination under running water.
4. Insert the new or cleaned filter with the opening facing upwards. Make sure that it is inserted straight. If the filter is inserted at an angle, it may get damaged.
5. Check whether the sealing ring is present in the filter housing and screw the filter housing on.

5.3.6 Storing logs

If the log function is enabled, a log is created after each completed cleaning process, which summarises important information about the cleaning process. It is managed and stored in the internal memory.

The logs can be transferred to a computer with a USB stick or using an existing Ethernet connection.

If the log feature is disabled, no logs will be saved.

Retrieving logs via the USB interface

Procedure

1. On the home screen, select "Settings", then "Documentation".
2. Open the USB interface on the back of the TRISON Base and insert a USB stick.
 - » The detected hardware will be displayed in the top-left corner.
3. Select "Send log" to transfer the log file to the USB stick.
 - » The log file will have the name shown above. If you want to change it, you can tap on it and enter your desired name using the keyboard.
4. Once the log file has been transferred, unplug the USB stick and close the USB interface.
 - » The log file can then be deleted from the internal memory of the TRISON Base by selecting "Delete".

Emailing logs

Procedure

1. On the home screen, select "Settings", then "System", then "Email Settings".
2. Enter your email sender information from your email provider, as well as the desired destination address.
3. Activate the "Send Logs" setting to have the log file automatically sent to the entered email address after each cleaning process.
4. Enter the desired interval after which the device status should be sent to the email address entered.

5.4 Troubleshooting

5.4.1 Malfunctions

Error	Possible causes	Troubleshooting
Too little ultrasound effect, loud noises	▪ Sonication liquid contains gases	▪ Degas the sonication liquid; see Chapter 5.1.3 Degassing sonication liquid .
	▪ Transducer or ultrasonic generator defective	▪ Carry out a foil test; see Chapter 6.4 Performing a foil test .
		▪ Contact the manufacturer; see Chapter 6.5 Repairs .
Irregular sounds	▪ Incorrect filling level in the oscillating tank	▪ Slightly change the filling level of the sonication liquid in the oscillating tank. Pay attention to the minimum filling level and to correct dosing of the agent.
		▪ Wait until the sonication liquid is no longer moving.
The TRISON Base cannot be switched on (touchscreen remains dark)	▪ TRISON ultrasonic bath not connected properly	▪ Check the mains connection.
	▪ Mains switch is switched off	▪ Switch on the mains switch.
	▪ Fuses defective	▪ Replace the fuses; see Chapter 8.1 Technical specifications .
Touchscreen not responding	▪ Touchscreen is defective	▪ Contact the manufacturer; see Chapter 6.5 Repairs .
The TRISON Base permanently displays the welcome screen	▪ The TRISON Base switches on and off too quickly	▪ Switch off the TRISON Base and switch it on again after at least 10 seconds.
Progress bar is not progressing	▪ Software or hardware defective	▪ Switch off the TRISON Base and switch it on again after at least 10 seconds.
		▪ Contact the manufacturer; see Chapter 6.5 Repairs .

Error	Possible causes	Troubleshooting
Repeats negative process result on the same channel or on all channels	<ul style="list-style-type: none"> ▪ Instruments not covered with sufficient sonication liquid 	<ul style="list-style-type: none"> ▪ Fill up to the filling level mark with water and a suitable ultrasonic agent; see Chapter 5.1.2 Filling with sonication fluid.
	<ul style="list-style-type: none"> ▪ Hose couplings not correctly connected 	<ul style="list-style-type: none"> ▪ Loosen and reconnect the hose couplings.
	<ul style="list-style-type: none"> ▪ Hose set clogged, rinsing circuit of the TRISON Base clogged 	<ul style="list-style-type: none"> ▪ Connect instruments to other positions. If the result is negative again, the instrument is clogged. ▪ Use a new hose set; see Chapter 9 Accessories.
		<ul style="list-style-type: none"> ▪ Contact the manufacturer; see Chapter 6.5 Repairs.
Insufficient cleaning result	<ul style="list-style-type: none"> ▪ Sonication liquid not degassed 	<ul style="list-style-type: none"> ▪ Degas the sonication liquid; see Chapter 5.1.3 Degassing sonication liquid.
	<ul style="list-style-type: none"> ▪ Unsuitable detergent 	<ul style="list-style-type: none"> ▪ Repeat the cleaning with a suitable detergent.
	<ul style="list-style-type: none"> ▪ Instruments stored in a contaminated state for too long 	<ul style="list-style-type: none"> ▪ Clean the robotic instruments or MIS instruments again; extend the sonication duration for standard instruments.

5.4.2 Warning and error screens

Warning and error screens

Warning screen	Causes	Measures
Cancel process?	Ongoing process was cancelled	<ul style="list-style-type: none"> ▪ BACK undoes the cancel command ▪ OK aborts the process. After the process has been cancelled, the home screen will be displayed.
Temperature too high <i>E9: Temperature outside the permissible range! Please correct immediately.</i>	Temperature of the sonication liquid is above the set temperature. Protein coagulates at 45 °C.	<ul style="list-style-type: none"> ▪ Allow the sonication liquid to cool or replace it ▪ Cancel aborts the process. After the process has been cancelled, the home screen will be displayed. ▪ OK continues the process.

Warning screen	Causes	Measures
Temperature too low <i>E9: Temperature outside the permissible range! Please correct immediately.</i>	Temperature of the sonication liquid is below the set temperature.	<ul style="list-style-type: none"> Replace all or part of the sonication liquid Degas the sonication liquid again; see 5.1.3 Degassing sonication liquid Cancel aborts the process. After the process has been cancelled, the home screen will be displayed. OK continues the process.
Twist not detected <i>E16: TRISON Twist not connected Cleaning only without movement.</i>	The robotics programme was started, but no TRISON Twist was connected	<ul style="list-style-type: none"> Attach TRISON Twist; see 4.6 Attaching and removing the TRISON Twist Cancel aborts the process. After the process has been cancelled, the home screen will be displayed. OK continues the process without the moving function.
Servicing required	Servicing required at the manufacturer	<ul style="list-style-type: none"> Contact the manufacturer; see 6.5 Repairs. OK displays the "Information" screen, with contact details and information about the ultrasonic bath. Cancel closes the message. After the process has been cancelled, the home screen will be displayed.
Filter clogged. <i>E13: Pressure switch 1 triggered. Change the filter.</i>	<ul style="list-style-type: none"> Filter clogged or not correctly installed Pressure sensor defective 	<ul style="list-style-type: none"> Replace or rinse the filter; check how it is installed; see Chapter 5.3.5 Rinsing the filter. Contact the manufacturer; see Chapter 6.5 Repairs.

Error codes

Error code	Text	Measures
E1:	No temperature sensor present!	Connect the temperature sensor.
E2:	Pressure switch 2 triggered!	Check the hose connections for kinks. Restart the device; if the message appears again, contact the manufacturer; see 6.5 Repairs .
E9:	Temperature outside the permissible range! Please correct immediately.	Correct the temperature of the bath liquid.
E10:	Generator error: ultrasound inadequate	Check that the plug connection between the generator and the tank is plugged in.
E13:	Pressure switch 1 triggered. Change the filter.	Restart the device; if the message appears again, contact the manufacturer; see 6.5 Repairs .
E14:	Pressure switch 2 triggered!	

Error code	Text	Measures
E16:	TRISON Twist not connected Cleaning only without movement	Connect the TRISON Twist.
E17:	Valve actuator 1 defective!	Restart the device; if the message appears again, contact the manufacturer; see 6.5 Repairs .
E18:	Valve actuator 2 defective!	
E19:	Valve actuator 3 defective!	
E20:	Valve actuator 4 defective!	
E21:	Valve actuator 5 defective!	
E22:	Valve actuator 6 defective!	
E23:	Valve actuator 7 defective!	
E24:	Valve actuator 8 defective!	
E25:	Suction pressure toggle switch defective!	
E26:	Power module defective!	
E27:	I/O module defective!	
E28:	Channel selector defective!	
E29:	Communication module defective!	
E31:	Fan in the generator has malfunctioned!	

6 Maintenance

6.1 Cleaning and care for the ultrasonic bath

Cleaning the TRISON Base, ultrasonic generator and SONOBOARD

- Wipe the surfaces with a damp cloth. Wipe them dry with a soft cloth.
- Do not use abrasive cleaning agents; only use care products that are free from abrasive additives.
- If necessary, disinfect the surfaces with a suitable surface disinfectant.

Caring for the oscillating tank

Impurities in the oscillating tank accelerate its wear, can lead to corrosion, and reduce the ultrasound effect. Please therefore observe the following instructions:

- Rinse the oscillating tank thoroughly with water after each use. Wipe it dry with a soft cloth.
- Remove edges and residues with a stainless steel cleaning product free from abrasive additives.
- Do not use steel wool, scratches or scrapers to clean the oscillating tank.
- Metal parts and rust particles in the oscillating tank cause corrosion. Please therefore avoid leaving any metal parts in the oscillating tank. If rust stains are visible, remove them immediately with a soft cloth and a stainless steel cleaning product without abrasive additives.

6.2 Testing

NOTICE

Damage to the ultrasonic bath

- Only carry out tests on the ultrasound bath when it is filled.

If one of the tests does not lead to the desired result, contact the service team. See Chapter **6.5 Repairs**.

Checking the power of the ultrasound

The power can be checked with a wattmeter between the mains plug of the ultrasonic bath and the socket.

Requirement

- The oscillating tank has been filled with water.

Procedure

1. Select the "Standard" cleaning programme on the TRISON Base. Select "START" to start the ultrasound.
2. Take the power reading.
3. Stop the ultrasound again.
4. Compare the readings with the technical specifications. See Chapter **8.1 Technical specifications**.

The measured values may deviate from the values in the technical specifications by a maximum of 20%.

Checking the ultrasound effect

Check the effect of the ultrasound with a foil test during initial putting into service and at regular intervals. Testing is recommended every 3 months. See Chapter **6.4 Performing a foil test**.

Checking the rinsing and moving function

NOTICE

Risk of damage to robotic instruments

- If you test the rinsing and moving function with a robotic instrument, do not touch the tip of the instrument.

Requirements

- The TRISON Lift and a TRISON Twist are mounted.
- The oscillating tank has been filled with water.

Procedure

1. If necessary, connect a robotic instrument to the TRISON Twist to better test the moving function.
2. Connect the two hose couplings to the TRISON Base. Make sure that the hose couplings click properly into place. Place the ends of the return flow hoses loosely in the sonication liquid.
3. Connect the jack of the TRISON Twist to the TRISON Base.
4. Select the "Robotics" cleaning programme on the TRISON Base.
5. On the touchscreen, select the diameter "8 mm".
6. Select all rinsing pipes by selecting the icon at the top of the touchscreen.
7. Start the cleaning programme and skip the soaking phase by selecting "START" immediately.
8. Check whether any leaking water is visible on the hoses.
A flow of approximately 350 ml/min should be displayed on the touchscreen.
9. Check that the tip of the robotic instrument is moving.
If you have not connected a robotic instrument, check that the four drivers on each holding fixture of the TRISON Twist rotate.



6.3 Changing the adapter seals

The adapter seals on the TRISON Rack must be replaced every four weeks and in the event of leakage; see chapter 5.1.4 **Testing adapters for MIS instruments**.

To change the adapter seal, the adapter must be disassembled and then reassembled. The supplied assembly chip is required for this.

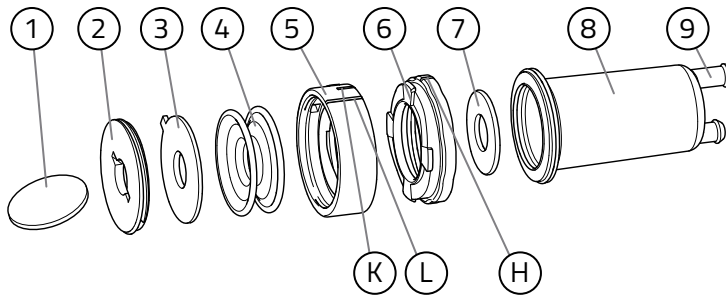


Fig. 17 Individual parts of the adapter

- 1 Assembly chip
- 2 Clamping disc
- 3 Thrust washer
- 4 Adapter seal
- 5 Swivel
- 6 Retaining ring
- 7 Punched disc
- 8 Sight glass
- 9 Nozzle for hose connection

Removing the adapter seal

Procedure

1. Remove the adapter from the comb bar of the TRISON Rack and remove the hose from the sight glass (8).
2. Unscrew the clamping disc (2) with the assembly chip (1).
3. Remove the thrust washer (3).
4. Unscrew the swivel (5) and the retaining ring (6) together from the sight glass.
5. Pull the defective adapter seal (4) out of the swivel and the retaining ring.
6. Turn the swivel towards the retaining ring until the mark "L" on the swivel and the mark "H" on the retaining ring are opposite each other. Pull the swivel and the retaining ring apart.
7. Remove the punched disc (7) from the sight glass.

Result

- » All individual parts can now be thoroughly rinsed with water.

Installing the adapter seal

Procedure

1. Push the punched disc into the sight glass until it clicks into place.
2. Connect the swivel to the retaining ring. When the "H" mark on the retaining ring and the "L" mark on the swivel are facing each other, squeeze the swivel and the retaining ring together.
3. Insert the new adapter seal.
To do this, insert the adapter seal halfway through the hole of the two rings (swivel and retaining ring). The adapter seal should sit loosely in this position and not tilt.
4. Now screw the two rings together with the adapter seal on the sight glass.
5. Rotate the swivel so that the "K" mark on the swivel is opposite the "H" mark on the retaining ring. Hold the retaining ring together with the swivel so that they do not twist against each other. Insert the thrust washer and tighten the clamping disc with the assembly chip.
6. Plug the hose onto the sight glass. Insert the adapter back into the comb bar of the TRISON Rack.

Result

» The TRISON rack is ready for use again for cleaning rinsable MIS instruments.

6.4 Performing a foil test

Select "Tests" and then "Foil test"

A foil test should be carried out before the first use and at regular intervals, e.g., every 3 months. This serves to ensure a consistent effect on the part of the ultrasound. The frequency of implementation is your responsibility.

The foil test is a simple method for displaying the intensity and distribution of cavitation in an ultrasonic bath. For this purpose, an aluminium foil stretched on a foil test frame is inserted. Depending on the duration of sonication, this is perforated or destroyed to a certain extent by cavitation.

In order to be able to compare results, it is **important that the conditions of the foil test are always the same:**

- Filling the ultrasonic oscillating tank up to the filling level mark
- Temperature of the sonication fluid
- Duration of degassing
- Positioning of the frame
- Foil type (brand, thickness)
- Sonication duration
- Type and concentration of the ultrasonic specimen

Fluid for the foil test

In order to obtain sufficiently strong cavitation, the boundary surface tension of the water used must also be reduced for the foil test with the help of surfactant preparations.

We recommend the following ultrasound preparations:

- TICKOPUR R 33
- TICKOPUR R 30
- TICKOPUR TR 7
- TICKOMED 1
- STAMMOPUR R
- STAMMOPUR DR 8

If none of these agents are available, a neutral or mildly alkaline, non-aluminium-destroying agent should be used. The agent must be approved by the manufacturer for use in an ultrasonic bath.

Test result and documentation

While always maintaining the same test conditions, the test result must be assessed based on the perforated area of the foils. The perforated surfaces of the foils should always have approximately the same expanse and distribution – they are never exactly congruent. Only through regular foil tests is it possible to perform a constant process check, e.g., for reprocessing medical devices.

You can download a documentation template here for documenting the test results:

<https://bandelin.com/folientest/>

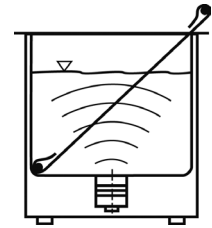
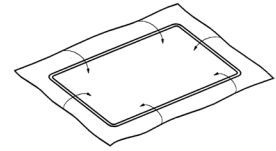
You will also find an application video there.

The foils can also be archived in a suitable way (scan, photo, etc.). This makes it possible to compare the foils at any time.



Performance of the foil test

1. Fill the oscillating tank with water and a suitable ultrasonic agent in the dosage specified by the manufacturer up to the filling level mark.
2. Degas the sonication liquid.
3. Clamp the aluminium foil (household foil 10 µm to 25 µm thick) onto the foil test frame. Depending on the size of the tank, the frame may protrude. It is sufficient to cover the part of the foil test frame that is covered by the sonication fluid.
4. Place the covered foil test frame diagonally in the middle of the oscillating tank. If necessary, fix it in place.
5. Switch on the ultrasound. Sonicate the foil for at least 1 minute until visible perforation or pitting occurs. For more stable foils (thicker or coated), the duration of sonication can be up to 3 minutes. Make a note of the duration of your test.
6. Switch off the ultrasound. Take out the foil test frame. Remove the aluminium foil from the foil test frame and allow it to dry.
7. The foil must be perforated. If not, it is recommended that the device be checked by the service department of BANDELIN electronic GmbH & Co. KG.
8. Archive the foil with the test date and serial number of the ultrasonic bath, as well as the previously selected conditions and duration. The documentation template for the foil test can also be filled in and archived.
9. Rinse the oscillating tank thoroughly to remove loose foil particles.



Suitable foil test frames can be ordered from BANDELIN electronic GmbH & Co. KG. The foil test frames are designed for a wide range of tank dimensions. Aluminium foil is also required for the test procedure; this is not included in the scope of delivery.

Type	Codeno.	for
FT 42	3224	TRISON (TE 4000)

6.5 Repairs

Contact the specialist dealer or the manufacturer during the warranty period.

Only have repairs carried out by qualified personnel authorised by the manufacturer or by the manufacturer itself.

The manufacturer assumes no liability for unauthorised interventions on the device.



WARNING

Health hazard due to contaminated device

- Decontaminate the device before shipping if it has come into contact with hazardous substances.
-

If you need to send the device to the manufacturer, clean and decontaminate it and its accessories before shipping.

The "Certificate of decontamination" serves the occupational safety and health of our employees in accordance with the German "Infection Protection Act" and the Accident Insurance Regulations (UVV) of the employers' liability insurance associations.

Before returning them for inspection/repair, the equipment and accessories must be cleaned in accordance with applicable laws and regulations and, if necessary, disinfected surface disinfectant that is listed by the VAH (Association for Applied Hygiene).

Please understand that we can only start work once this certificate is fully completed.

Download the "Certificate of decontamination" form here:

<https://www.bandelin.com/downloads>



Fill out the form and attach it so as to be clearly visible on the outside of the packaging. Acceptance will be refused without a completed form.

Send the unit to the following address:

BANDELIN electronic GmbH & Co. KG
Heinrichstr. 3–4
12207 Berlin
Germany

+49 30 76880-2674
service@bandelin.com

6.6 Maintenance

Carry out maintenance in line with the indicated intervals. Document the performance of maintenance.

The specified maintenance intervals assume daily use of the TRISON ultrasonic bath.

Activity	Daily	Monthly	Every 2 years
Rinse the filter; see chapter 5.3.5 Rinsing the filter .	x		
TRISON Rack: change adapter seals; see chapter 6.3 Changing the adapter seals .		x	
Replace hose sets; see chapter 9 Accessories .			x
Maintenance of the ultrasonic bath: contact the manufacturer; see chapter 6.5 Repairs .			x

7 Disposal



WARNING

Health hazard due to contaminated device

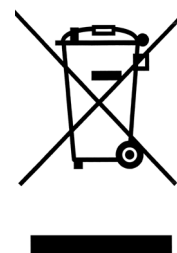
- Decontaminate the device before disposal if it has come into contact with hazardous substances.
- Also decontaminate accessories before disposal.

Dispose of the device properly as electrical waste if it can no longer be used. Do not dispose of the device in the household waste. Observe local regulations for the disposal of electrical waste.

The TRISON Base control unit contains a lithium metal battery.

The oscillating elements contain sintered ceramics made of lead zirconium titanate.

- EC no. 235-727-4
- CAS no. 12626-81-2



This use is permitted in accordance with RoHS Directive 2011/65/EU, Annex III, Exception 7c. I.

Dispose of accessories as metal scrap or as plastic waste according to the material used.

8 Information about the device

8.1 Technical specifications

TRISON Base control unit

Type:	TB 4000.2
Rinsing pressure:	~ 1 bar
Temperature monitoring:	16 ... 45 °C
Protection class:	II
Degree of protection:	IP 32
Back-up battery:	3V lithium metal battery CR2032
External dimensions with swivel base (length x width x height):	370 x 200 x 360 mm
Weight:	9 kg
Connections:	2 lines for connection to the generator 1 x USB-A

Ultrasonic generator

Type:	GT 4000
Mains supply:	230 V~ (±10%) 50/60 Hz Alternatively: 100–115 V (±10%) 50/60 Hz
Ultrasonic peak power/ultrasonic nominal power:	3040 W/760 W
Current consumption:	At 230 V: 3.5 A At 100–115 V: 8.3 A
Fuses:	At 230 V: 2 x F 6.3 A; 5 x 20 mm (d x l) At 100–115 V: 2 x F 10 A; 5 x 20 mm (d x l)
Protection class:	I
Degree of protection:	IP 20
Ultrasonic frequency:	38 kHz
Dimensions (length x width x height):	400 x 260 x 170 mm
Weight:	6 kg
Connections:	1 x device socket for mains cable (IEC socket) 1 x HF connecting socket 1 x temperature sensor socket 1 x Ethernet 1 x USB-A 1 x USB-B

Oscillating tank

Type:	TE 4000
Material:	Stainless steel, welded
Internal dimensions (Length × width × height, tilted tank bottom):	770 × 420 × 165 ... 190 mm
External dimensions (Length × width × height, tilted tank bottom):	900 × 480 × 245 ... 275 mm
Operating volume:	35.0 l
Protection class:	I
Degree of protection:	IP 20
Weight:	24.0 kg
Outlet:	G 1 ½
Connections:	2 lines for connection to the generator 1 × HF cable 1 × temperature sensor

Moving device TRISON Twist

Type:	TT 4000 Si R/TT 4000 Si L	TT 4000 Xi R/TT 4000 Xi L
Rotation speed:	approx. 6 rpm	approx. 6 rpm
Degree of protection:	IP 68*	IP 68*
Material:	Stainless steel, POM and PU**	
Dimensions (Length x width x height):	405 × 205 × 190 mm	345 × 160 × 175 mm
Weight:	approx. 5 kg	approx. 4 kg

* The jack is not waterproof and must not be submerged.

** Max. bath temperature 50 °C (not suitable for thermal disinfection or sterilisation.)

Pivot-mounted arm TRISON Lift

Type:	TL 4000
Material:	Stainless steel, POM and PU*
Dimensions (length x width x height):	240 × 95 × 350 mm
Weight:	approx. 3.0 kg

** Max. bath temperature 50 °C (not suitable for thermal disinfection or sterilisation.)

Special basket TRISON Rack TR 3001

Type:	TR 3001 R/TR 3001 L
Material:	Stainless steel and POM*
External dimensions (length x width x height):	640 × 405 × 150 mm
Weight:	3.1 kg
Max. load-bearing capacity:	10 kg

** Max. bath temperature 50 °C (not suitable for thermal disinfection or sterilisation.)

Special basket TRISON Rack TR 4000

Type:	TR 4000
Material:	Stainless steel and POM*
External dimensions (length x width x height):	670 x 405 x 150 mm
Weight:	3.3 kg
Max. load-bearing capacity:	10 kg

** Max. bath temperature 50 °C (not suitable for thermal disinfection or sterilisation.)

Xi spacer

Material:	PUR*
Dimensions (length x width x height):	138 × 23 × 32 mm
Weight:	21 g

* Max. bath temperature 50 °C (not suitable for thermal disinfection or sterilisation.)

SONOBOARD functional cabinet

Type:	FS 1200 TR/TL
Material:	Stainless steel
External dimensions with rollers (length × width × height):	1200 × 700 × 930 mm
Weight complete with TRISON 4000:	180 kg

8.2 Ambient conditions

Overvoltage category:	II
Degree of contamination:	2
Permissible ambient temperature:	5... 40 °C
Permissible relative humidity up to 31 °C:	80% (non-condensing)
Permissible relative humidity up to 40 °C:	50% (non-condensing)
Altitude:	< 2000 m above sea level
Only for indoor operation	

8.3 CE conformity

The device is a medical device and fulfils the CE marking criteria of the European Union:

- 2017/745/EU – MDR
- 2011/65/EU – RoHS Directive

The declaration of conformity can be requested from the manufacturer, stating the serial number.

9 Accessories

TRISON Twist TT 4000 Si R – order number 7820

Moving device for Si instruments, suitable for right-sided TRISON Base

TRISON Twist TT 4000 Si L – order number 7920

Moving device for Si instruments, suitable for left-sided TRISON Base

TRISON Twist TT 4000 Xi R – order number 7821

Moving device for Xi instruments, suitable for right-sided TRISON Base

TRISON Twist TT 4000 Xi L – order number 7921

Moving device for Xi instruments, suitable for left-sided TRISON Base

TRISON Lift TL 4000 – order number 7930

Pivot arm for TRISON Twist

TRISON Rack TR 3001 R – order number 7631

Special basket for MIS instruments with comb bar on the right, suitable for right-sided TRISON Base

TRISON Rack TR 3001 L – order number 7731

Special basket for MIS instruments with comb bar on the left, suitable for left-sided TRISON Base

TRISON Rack TR 4000 – Code no. 7632

Special basket for Hugo™ RAS System or Versius® Surgical Robotic System robotic instruments

Silicone knob mat SM 1000 MC – Code no. 3313

for gentle storage of sensitive instruments, permeable to ultrasound, suitable for TRISON Rack

Silicone knob mat SM 29 – order number 178

for gentle storage of sensitive instruments, permeable to ultrasound, suitable for insert basket K 29 EM

Insert basket K 29 EM – order number 688

made of stainless steel, mesh size 5 × 5 mm, for standard instruments

Basket holder KT 3000 Z R – order number 7761

made of stainless steel with handles, for insert basket K 29 EM, suitable for right-sided TRISON Base

Basket holder KT 3000 Z L – order number 7661

made of stainless steel with handles, for insert basket K 29 EM, suitable for left-sided TRISON Base

Lid D 4000 A-R – order number 7955
made of plastic, suitable for right-sided TRISON Base

Lid D 4000 A-L – order number 7956
made of plastic, suitable for left-sided TRISON Base

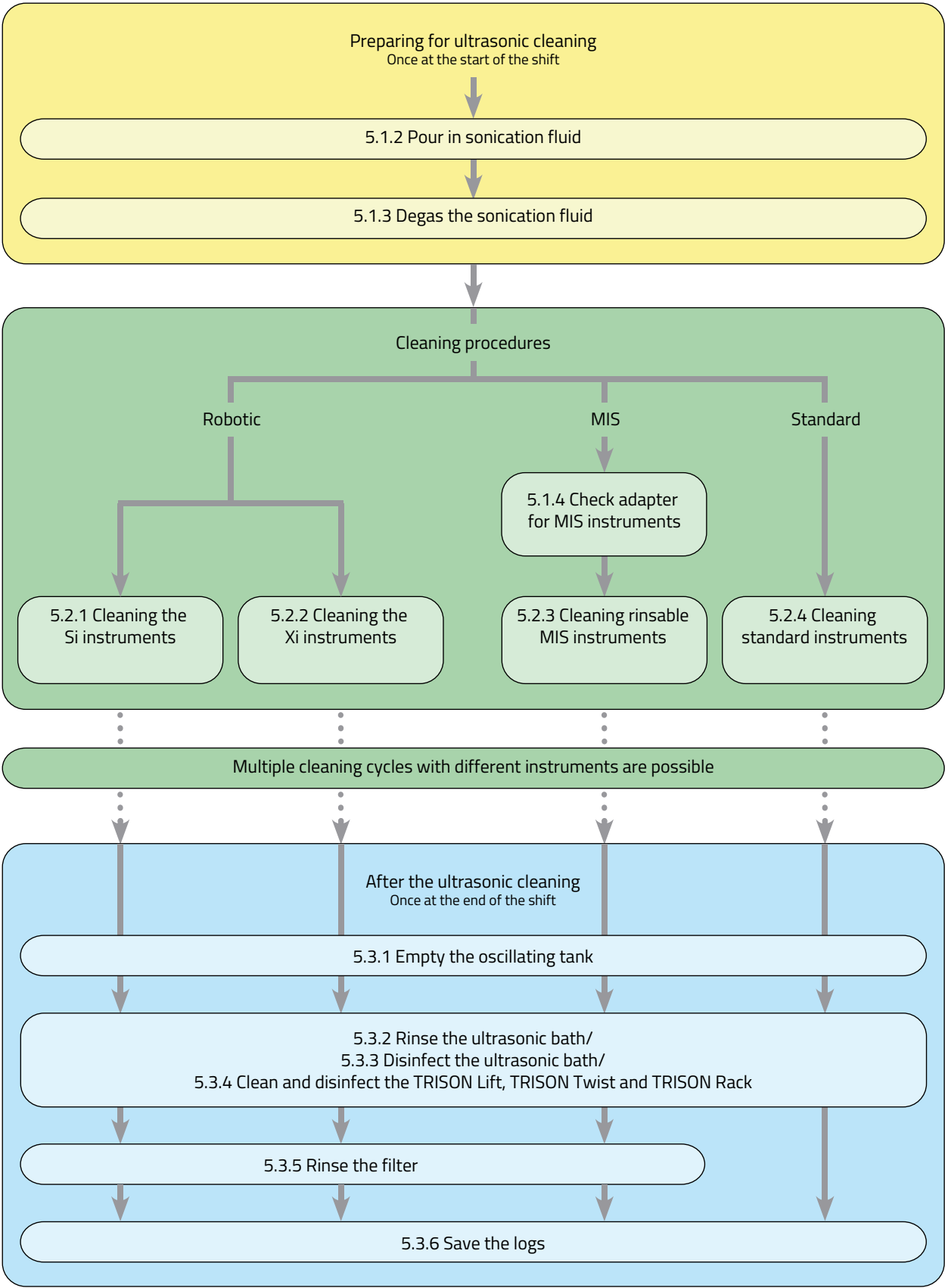
Xi spacer – order number 7763
for cleaning Xi stackers

Foil test frame FT 42 – order number 3224
stainless steel

Consumables

Designation	Units	Code no.
Filter EF 1001, for TRISON Base	30 pieces	3365
	100 pieces	3366
Adapter seals AD 1000, for TRISON Rack	8 pieces	3361
	24 pieces	3354
Adapter ADT 1000, for TRISON Rack	1 piece	7770
	8 pieces	3359
Hose set SLS 3000 TT, for TRISON Twist Si	1 piece	3363
Hose set SLS 4000 TT, for TRISON Twist Xi	1 piece	3362
Hose set SLS 3000 TR, for TRISON Rack	1 piece	3364
Adapter testing strip APB 3000, for TRISON Rack	1 piece	7771
Hose set with couplings for Hugo™ RAS System SLS 4000 Medtronic Hugo	1 piece	33642
Hose set with couplings for Versius® Surgical Robotic System SLS 4000 CMR	1 piece	33641

10 **Process diagram**



11 Servicing lists

Servicing list/daily

- Check the filter on the TRISON Base and rinse or change it if necessary

[illegible]

Servicing list/monthly

- Check the adapter seals on the TRISON Rack and replace them if necessary

Date	Name	Signature

Servicing list/every 2 years

- Servicing of the ultrasonic bath by the manufacturer
- Replace the hose set on the TRISON Twist and/or TRISON Rack

Date	Name	Signature

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