BioShake XP

Operating Manual

QINSTRUMENTS
A BICO COMPANY

Version: 012.3 | valid for model with serial no > 11900

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1. CONVENTIONS USED IN THIS MANUAL

Symbols used in this manual have the following meaning

WARNING: This signal word indicates a possibly imminent danger, which can result in slight to severe injuries or even death.

CAUTION: This signal word indicates a possibly imminent danger, which can result in slight to serious injuries.

Information of special interest: All sections / passages that are marked with this symbol describe procedures and / or conditions that could damage or lead to a malfunction of the device. Therefore the user should pay particular attention.

2. SAFETY

The device is designed with safety in mind and no danger is known if the device is intact, installed and operated as described in the manual. Only use the device in the way as it is described in the intended use.

Independent investigations from TÜV services and CE certifications guarantee the highest security standards.

The most important prerequisites for use, operation, and safety are explained to ensure smooth operation. No warranty or liability claims will be covered if the instrument is used in ways other than those described or if the necessary prerequisites and safety measures are not observed.

The instrument may only be operated by persons who read the manual and following the safety instructions.

General safety notes

CAUTION: Electrical shock

While connected to the power the electric parts in the device can give the user an electric shock.

- Do not open the device.
- Make sure that no liquids run into the device.
- Only use the delivered power supply or one that meets all electrical specifications.
- Use a mains outlet and if required an extension lead with grounding.

CAUTION: Risk of injury due to rotating elements

Parts of device can move at high frequencies. The rotating device parts itself and mounted elements can cause injuries when touched while moving.

- Do not impede the platform motion during operation.
- Always stop device before any personal interaction.
- Never move or carry the unit while shaking.
- Operate the unit in a designated environment with appropriate safety measurements.

	**CAUTION:** Risk of injury due to sling away of parts or liquids Parts of device can move at high frequencies which leads to a rotational force to all elements that are connected to this parts. If the devices is not used properly this can lead to injuries due to sling away of parts or liquids. ▸ Ensure sound fastening of rotating elements. ▸ Only use accessories recommended by QINSTRUMENTS and standard qualitative tubes, microplates or vials. ▸ Ensure liquid vessels are closed or the liquid fill level is low enough so no liquid is spilled. Pay special attention when working with hazardous, toxic and pathogenic samples ▸ Never move or carry the unit while shaking. ▸ Wear personal safety gear (gloves, clothing, glasses, ...) and ensure the device is operated in a designated environment with appropriate safety measurements.

	**WARNING:** Magnetic fields can influence active medical devices (like pacemaker, defibrillator) that can cause severe injuries up to death Strong permanent magnets in the device can influence active medical devices (like pacemaker, defibrillator) that can cause severe injuries up to death if hold up close. ▸ Do not open the device or conduct any maintenance tasks that require this, if you are wearing active medical device.

3. PRODUCT DESCRIPTION

3.1 INTENDED USE

The BioShake XP is a shaker used for microplates, tubes and vials for lab bench purposes. It is intended to be used in a laboratory environment by trained laboratory employees. The device is not intended to be used in environments with an aggressive or explosive atmosphere. It is required that the user ensures that not such environment is created due to the usage of the device.

It is required that the user qualifies the performance of the device in regard to his specific circumstances and demands.

3.2 FEATURES

INNOVATION FOR SMART LABORATORIES

The BioShake XPis a high-speed lab shaker that lets you perform all your standard runs with a minimum of adjustments, and offers outstanding performance to handle a wide range of applications across biotechnology, pharmaceutical and academic research.

The simple yet powerful device control via a state-of-the-art keypad enables fast realization of simple task and defining multiple step programs intuitively.

BEST IN CLASS FEATURE PERFORMANCE

Superior mixing

The BioShake XP is designed for reliable mixing of vials, tubes and microplates. The unique and patented technique of planar orbital motion offers an ultra-efficient, 2-dimensional shaking process with a constant orbit of 2.0 mm. In that way the sample is mixed gentle but thoroughly in a fraction of time of competing systems.
Fully adjustable from **200 up to 3.000 rpm**, it guarantees optimal mixing results for samples in **96 to 384-well plates**.

ADAPTABLE TO YOU NEEDS

Exchangeable adapters for a wide range of vial, tubes and microplates are available from stock. Perfect shaped adapters allow an optimal fit for standard tubes, lysis tubes, glass vials and other sample vessels.
The **replacement of the adapters is straightforward**. Especially in applications with frequently changes of the sample container this feature provides unmatched benefits.

SECURE and STYLISH

The first-class finished, stylish aluminum housing gives the BioShake XP its essential functionality.
It sealed housing provides a high amount of security, device stability, protects mechanical and electronic components and therefor ensures a **long service-free lifetime**.

MADE IN GERMANY

A perfectly harmonious blend of high-tech and handmade is what we strive for. "Made in Germany" has always been a recipe for success for QINSTRUMENTS. That is why 100% of QINSTRUMENTS development and production takes place in Germany.

The company focus is on human diligence combined with an environmental friendly approach to deliver outstanding constant high-qual-

ity products. For more than 15 years we have used only high-quality materials to ensure sustainable production, applied innovative thinking and undertaken research in a future-oriented way.

Join QINSTRUMENTS - "Join the Bio-convergence revolution"

3.3 TECHNICAL SPECIFICATION

Adapter plates for different labware	
Description	An adapter is required for fixation of tubes and vials and recommended for some microplates. The adapter needs to be purchased separately and can be exchanged by the user.
Microplates	All microplates according ANSI-SLAS format 4-, 6-, 8-, 12-, 24-, 48-, 96-, 384-, and 1536-well microplates, deep well plates, PCR plates
Tubes and Vials	0.2, 0.5, 1.5, 2.0 ml standard tubes | 2.0, 4.0, 6.0, 8.0, 10.0 ml cylindrical shaped vials
Others	Custom made adapter on request

Mixing	
Mixing frequency range	200 to 3000 rpm with 50 rpm increment resolution
Maximum frequency*	< 80 g: 3000 rpm < 120 g: 2500 rpm < 150 g: 2200 rpm < 300 g: 1800 rpm < 500 g: 1500 rpm > 500 g: 1000 rpm
Mixing orbit	constant 2.0 mm diameter
Mixing regulation accuracy	± 25 rpm
Short-Mix function	Yes

** Feasible frequency heavily depends on load weight **and** height. **Always** start with low frequencies and iterate upwards.*

Device control	
Operation control	Device control is realized via a 8 button keypad. The parameters Time | Mixing frequency can be set directly.
Display	2x 16 digits blue LCD with backlight
Status	All status information are shown on the LCD
Timer setting	1 min - 99 h | audible alarm at process end
Programming	2 separate programs with 3 steps each can be defined and saved in the internal memory

Electrical	
Operating voltage	24 V DC | Imax: 3.1 A | Peff: 15 Watt | Pmax: 75 Watt
Power supply	Input: 100 - 240 V AC | 50 - 60 Hz Output: 24 V DC | Imax: 5.0 A | Pmax: 120 Watt External power supply unit (CE/UL/CSA approved, 85-264 V AC, 47-63 Hz, IEC/EN60320-1 C14 | Degree of protection: IP20)
Power connection*	Barrel connector ID 2.5 mm x OD 5.5 mm

** Only use the device with the delivered power cord. If another power cord is used ensure the wire diameter is adequate.*

General properties	
Housing material	Aluminum anodized
Degree of protection	IP20 (Protected against solid objects up to 12 mm |No protection against water)
Pollution degree	1 (no contamination or only dry, non-conductive contamination, whereby the contamination has no influence)
Airborne sound emission	< 70 db (A)

Operating, transport and storage conditions	
Operating range	5 °C - 45 °C (41 - 113 F) | 10 - 80 % RH | up to 2000 m above sea level | non-condensing
Floor base requirements	stable (resonance free) | horizontal | dry | inside buildings | even
Transportation and storage	-10 °C - 60 °C (14 - 140 F) | 10 - 80 % RH | non-condensing

Dimension and weight	
Dimensions	(W x D x H) 142 x 169 x 88 mm | 5.59 x 6.65 x 3.46 inch
Weight	2.7 kg | 5.95 lbs
Packaging size	(W x D x H) 347 x 252 x 131 mm | 13.66 x 9.92 x 5.16 inch | cardboard box
Packaging weight	3 kg | 6.61 lbs

Drawing

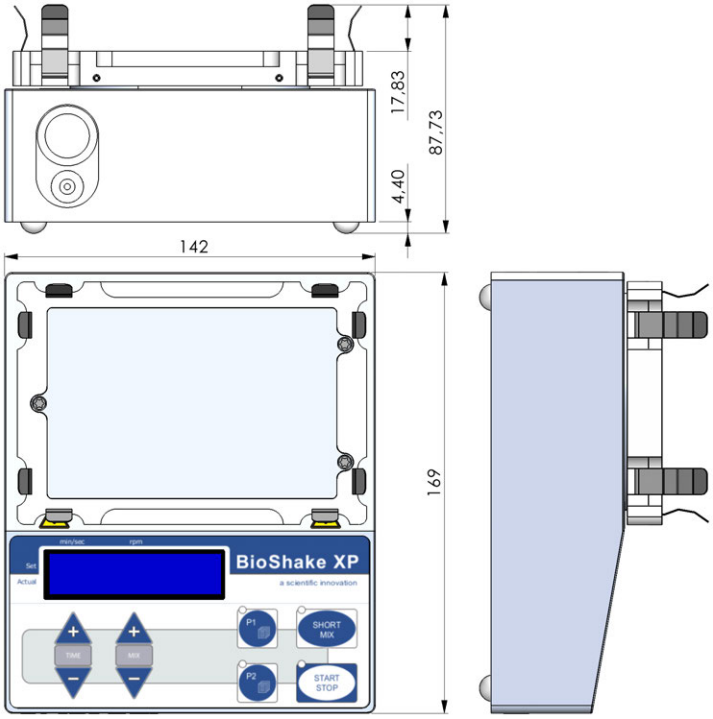


Figure 1 Technical drawing of device

Technical specifications are subject to change.

3.4 DELIVERY PARTS

Figure 2 Image showing the delivery parts

Part 1	BioShake XP*
Part 2	External power supply 24 V DC, 120 W *(CE/UL/CSA approved, 85-264 VAC, 47-63 Hz, IEC/EN60320-1 C14)*
Part 3	Power cords Europe & US *(IEC/EN 60320-1 C13)*
Add. parts	Calibration certificate, Operating Manual

3.5 DEVICE DESCRIPTION

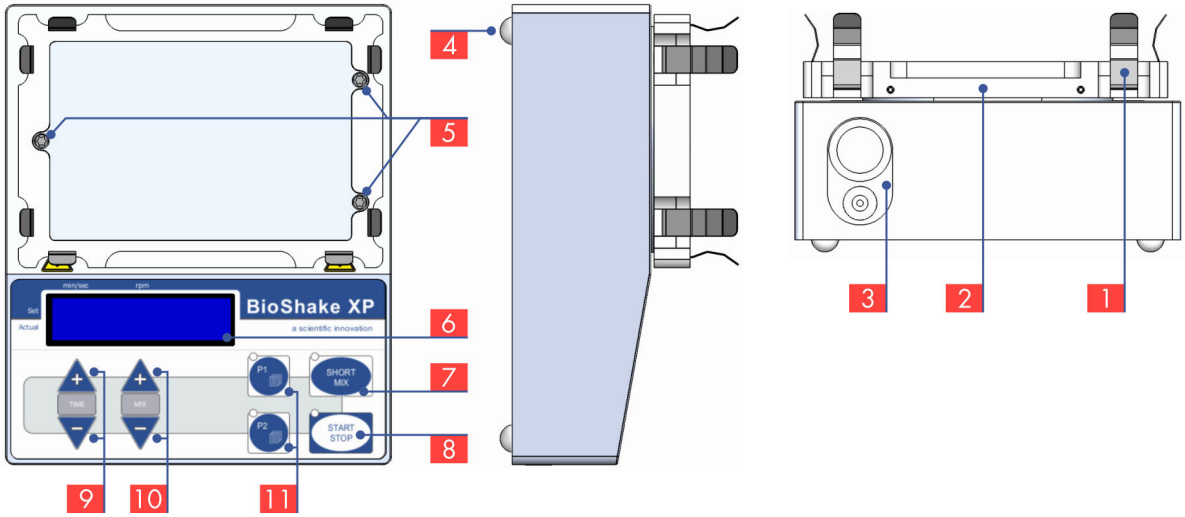


Figure 3 Device image which highlights important device elements

1 8x Universal spring clamps for microtiter plates
Easy fixation from skirted microplates up to deep well plates holding the microplate in place even at highest mixing frequencies. For flexible and deformable PCR plates we recommend using of the related PCR adapter.

2 Tablar - shaking desk and plate holder
Further information: "Mixing Process" on page 14

3 On / Off switch and Power supply socket

4 4x Rubber pads
Reduce transfer of device vibrations and ensure safe and slippery free positioning.

5 3x M3 Thread to mount adapters
Further information on adapter installation: "Adapter" on page 23

6 LCD
For all settings and status information the display is used. Further information: "Operation" on page 14

7 Keypad Button: SHORT MIX
Simple on-button control for short mixing procedures. Further information: "Mix with device settings" on page 18

8 Keypad Button: START - STOP
Start/stop a program or mixing with set parameters. Further information: "Mix with device settings" on page 18

9 Keypad Buttons: + TIME | - TIME
Increase / Decrease time parameter [sec | min]

10 Keypad Buttons: + MIX | - MIX
Increase / Decrease mixing speed parameter [rpm]

11 Keypad Buttons: P1 | P2
Select or define program 1 and 2. Further information: "Mix with Program" on page 18

3.6 MAINTENANCE AND CLEANING

The device is maintenance-free for standard use purposes.

Cleaning should be done with a wet but not soaked cloth using a mild soap solution and water or an alcohol-based disinfectant in the following steps:

- Disconnect the power cord

	**CAUTION:** Ignition While connected to the power the electric parts could have a malfunction that could lead to an ignition when a inflammatory cleaning solution is used. ▸ Disconnect the power cord ▸ Do not use inflammable cleaning solution if not required

- When cleaning the device make sure no liquid enters the device.

	**CAUTION:** Electronic malfunction Cleaning solution that enters the device can damage the device electronics and lead to an electronic malfunction. ▸ Use a wet cloth

- Make sure all surfaces are dry before continue to use the device
- Connect device to power

If you have any questions about cleaning please contact your distributor or directly QINSTRUMENTS. Should it become necessary to repair the equipment, it should be returned to an authorized servicing agent. The equipment must be clean and free from harmful substances. Always ship the shaker well-packed, preferably in the original shipping container in order to avoid damages.

4. INSTALLATION

4.1 DEVICE

Unpack and carefully check the instrument. Report any damage or missing items to your distributor. The device should be mounted on a:

- horizontal, even surface
- sufficient stable (resonance free) table

Before the first run it is mandatory to mount an adapter on the device (see next chapter).

Plug the external power supply into the 24 V barrel socket at the rear side of the device and plug the power cable into the wall socket. Use the On/Off button at the rear side to switch on the instrument.

The instrument will do a self test and the LCD will show the current parameter values when the device is ready and free of errors. Now the instrument is ready to accept commands.

It is advisable to carry out a short test run to ensure that the device does not move while mixing. Further information on mixing and how to proceed are available at "Mixing Process" on page 14

4.2 ADAPTER

All adapters for all lab bench devices (BioShake iQ and XP) are mounted in the same way and use the same interface.

If the security cover plate or an adapter plate is already mounted, please remove it first!

Heavier blocks may limit the mixing speed. See chapter "Mixing Process" on page 14 for more details.

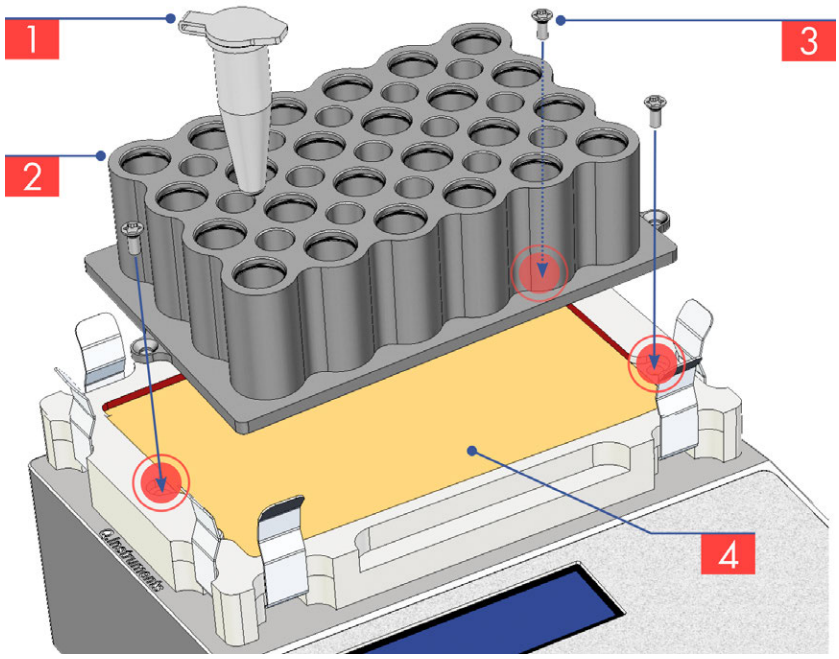


Figure 4 Illustration of adapter installation

Step	Instruction
1	Switch OFF the power supply of the instrument
2	Remove all sample carries (tubes, vials, microplates etc.) [1]
3	Loosen (rotate left) the three torx screws [3] by using the supplied screwdriver (Torx size 8) and take off the current mounted adapter [2]or if its the initial installation, the 2.0 mm thick safety cover, straight up and put it on a clean, soft surface.
4	Ensure the mounting area [4] on the device and the downside of the adapter are clean and particle free.
5	Insert the new adapter plate straight into the impression of the mounting area [4] and check if the adapter reached a fixed horizontal position.
6	Fix all three torx screw using clockwise rotation  Take care to realize a uniform tightening of the screws to ensure a good fit.
7	Ready to apply the proper sample carriers (tubes, vials, microplates etc.). Only use the fitting carriers to ensure a tight fit.
8	Turn on the power supply of the instrument.
9	The device will recognize and display the recognized adapter category. See: "Device settings" on page 16

5. OPERATION

5.1 INTRODUCTION

In the next chapters the available operations that the device is designed to execute are described. It is intended to give the user an understanding of some underlying principles and is therefore advised to be read before using the device. With the information the user should be able to reasonably evaluate how to optimally use the device and if the device is used in its given specifications.

It is required to test the device under the specific circumstances of implementation and assay demands to ensure that the expected outcome and performance is meet.

5.2 MIXING PROCESS

Introduction

Please keep in mind that the applications, test setups and environmental conditions in which the devices are used differ immensely. This means for example that it is not always the goal to realize the most intense mixing in the fluid. This is however mostly the intention of the described activities in the following explanation. It is hereby assumed that the user has an understanding of the needs of his process and the ability to evaluate the impact of the mixing parameters. It is strongly encouraged to invest time in optimizing the mixing process. This section is also meant to sensitize the user for the amount and complexity of parameters that might have an impact on the mixing result.

It is strongly recommended to initially evaluate the desired mixing frequency. This could be done by using the pure buffer or water and raising the frequency step by step until the desired mixing behavior is observed. Using the desired liquid for this initial experiment is advised as the surface tension has a major impact on the fluid movement in the well. Depending on the buffer that is used, water could show a significantly different mixing behavior. Additionally, to the liquid movement the mechanical limits of the device are related to the mixing frequency. Overloading with inappropriate mixing frequencies will damage the device and will lead to errors.

Because the impact of all parameters can not be estimated easily it is recommended to start with a low frequency and iterate upwards towards a satisfying result.

Device parameters

Parameter	Notes
Frequency	The frequency or speed of mixing is the foremost important parameter. It defines the amount of liquid in motion in the well. The amount of liquid in motion should normally be maximized. If the frequency is to low no real turbulence appears in the fluid and the consequences will be bad and also not reproducible results. It can however happen that the frequency is to high. In this case the fluid can not follow the moving vessel and will chaotically move in the well. This will probably lead to not reproducible results and spilling of fluid is more likely.
Time	The mixing time heavily depends on the process. Identifying the required time for a process step is crucial and is related to the settings of the other two parameters

Influencing factors

The given list is not complete but only shows the common factors that should be taken into account when setting the device parameters. Depending on the process further parameters for example temperature or beads in the fluid can have a major impact.

The weight and type of load is the most important factor in regard to limiting the maximal speed of mixing. Although the device is normally not damaged if the frequency is to high a proper result will not be achieved without a constant shaking movement.

Overloading is not detected by the device.

Defects resulting from overloading are not covered from the warranty.

Param: Load

Besides the actual weight of the load the height is important. With increasing height the center of mass rises, which leads to a rising force, generated from the rotating load.

Recommended maximum frequencies

Max. weight [g]	Maximal mixing frequency [rpm]					
	1,000	1,500	1,800	2,200	2,500	3,000
80						X
120					X	
150				X		
300			X			
500		X				
> 500	X					

Param: Well

The well diameter plays an important role on mixing efficiency. With small diameters the surface tension has more influence on the mixing behavior and it gets harder to set the fluid in motion. Smaller diameters will need higher frequencies for proper mixing.

The well height sets the limit for the maximal fluid height while mixing. Together with the working volume it limits the frequency.

	Diameter[mm]	Height[mm]
96-Well plat	6.9	10.67
384-Well plate	3.8	8
1536-Well plate	1.5 - 1.7	4.8

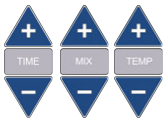
Param: Sample

The sample has many properties that are influencing its mixing behavior. A great impact is related to the sample density, viscosity, and surface tension.

	Density [kg/m^3]	Viscosity [mPa*s]	Surface Tension [mNm]
Ethanol	789	1.19	22.5 at 20°C
Aqua	999.75	0.89	72.3 at 20°C
Glycerin	1260	1480	-

5.3 DEVICE SETTINGS

Time and Speed value



Use the TIME and MIX keypad buttons to set the desired operation time, speed. The set parameters are displayed in the first/upper line of the LCD.

When the shaker starts to run the actual values for time, speedwill be shown in the second/lower line of the display.

If no time is set, pressing START STOP will cause a continuous operation of the shaker.

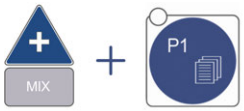
Speed limitation due to adapter category

All QINSTRUMENTS adapters are automatically detected after mounting on the instrument. The detection result is shown in the display. The allocation of the adapter to a particular category determines the properties.

Figure 5 LCD showing the result of the adapter detection after mounting

Adapter Category	Max. speed [rpm]	Available adapters Order no.	Description
Cat 01	3,000		A) Without adapter (heating function not available)
			B) All non classified adapter (heating function not available)
Cat 02	1,800	1808-1061	Adapter for tubes - 24x 2.0 ml or 15x 0.5 ml
		1808-1062	Adapter for tubes - 24x 1.5 ml or 15x 0.5 ml
		1808-1063	Adapter for tubes - 40x 0.5 ml or 28x 0.2 ml
		1808-1067	Adapter for lysis vials - 35x 0.5-2.0 ml
		1808-1069	Adapter for cylindrical vials - 35x 2.0 ml Ø 10.8 mm
		1808-1071	Adapter for cylindrical vials - 30x 2.0 ml Ø 12 mm
		1808-1072	Adapter for cylindrical vials - 20x 4.0 ml Ø 15 mm
		1808-1073	Adapter for cylindrical vials - 20x 4.0 ml Ø 17 mm
		1808-1074	Adapter for cylindrical vials - 20x 6.0 ml Ø 19 mm
		1808-1085	Adapter - 24x Alere® ArrayTubes 1.5 ml
		1808-1121	Adapter for Deep Well Plate . Eppendorf® 96/1000 µl
		1808-1131	Adapter for Deep Well Plate . Eppendorf® 96/500 µl
		1808-1141	Adapter for Deep Well Plate . BRAND® 96/1100 µl U-bottom
		1808-1151	Adapter for Deep Well Plate . NUNC® Axygen® 96/2000 µl
		1808-1161	Adapter for Deep Well Plate . Axygen® 96/0.6 ml, 96/2 ml
		1808-1171	Adapter for Storage Plate . Abgene® 96/2.2 ml, 96/0.8 ml
		1808-1181	Adapter for Mega Block . Sarstedt® Megablock 96/2.2 ml
		1808-1191	Adapter for Storage Plate . HJ-Bioanalytik® 96/1.2 ml low profile
		1808-1201	Adapter for Storage Plate . Corning® 96/320 µl V-bottom
		1808-1211	Adapter for Masterblock . Greiner® 96/1.0 ml U-bottom
Cat 03	2,200	1808-1041	Microplate adapter - 96 well standard PCR plate, universal
		1808-1064	Adapter for tubes - 96x 0.2 ml
Cat 04	3,000	1808-1021	Microplate adapter - Flat bottom standard
		1808-1022	Microplate adapter - Flat bottom High Base
		1808-1024	Microplate adapter - Flat bottom Low Base
		1808-1023	Adapter - Alere ArrayStrip (12 stripes), flat bottom
		1808-1031	Microplate adapter - 96 well round bottom, type 1
		1808-1032	Microplate adapter - 96 well round bottom, type 2
Cat 05	1,000	1808-1093	Adapter for Falcon® tubes . 4x 50 ml
		1808-1094	Adapter for Falcon® tubes . 12x 15 ml
Cat 07	2,500	1808-1051	Microplate adapter - 384 well standard PCR plate, universal
Cat 10	1,800	1808-1081	Adapter - Alere ArrayStrip (5 stripes)

Change time unit

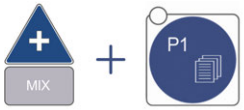
OPEN MENU		Press: **MIX (+)** and **P1** and hold for at least 3 seconds, to open the menu	
CHANGE VALUE		Press: **TIME(+)** or **TIME(-)** to change the TUnit value and switch between **min** and **sec**	
SAVE & EXIT MENU		Press: **P1** and **MIX (+)** and hold for at least 3 seconds, to save and close the menu	

After the time unit was changed it is necessary to newly define the programs.

Change time counting mode

The time counting mode defines when the countdown of the time, that is defined in a program or set for the START STOP operation, starts. Two time counting modes are available.

Time mode	Time counting begins immediately when START STOP button is pressed, respectively a step of a program starts.
Temp mode	The Temp control mode is the standard mode. Time counting starts when the nominal temperature value has been reached.

OPEN MENU		Press: **MIX (+)** and **P1** and hold for at least 3 seconds, to open the menu	
CHANGE VALUE		Press: **TIME(+)** or **TIME(-)** to change the TCMo value and switch between **Temp** and **Time**	
SAVE & EXIT MENU		Press: **P1** and **MIX (+)** and hold for at least 3 seconds, to save and close the menu	

After the time counting mode was changed it is necessary to newly define the programs.

5.4 MIX WITH DEVICE SETTINGS

Continues mixing

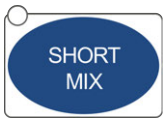
By pressing the START STOP button, the shaker will start to mix with the set parameters for time and speed. If the shaker is running the START STOP button will stop the shaker immediately.

When the shaker starts to run the actual values for time and speed will be shown in the second/lower line of the display.

If a time is set, the shaker will mix for the defined time and stop automatically. At the end 3 buzzer signals chime.

If no time is set, pressing START STOP will cause a continuous operation of the shaker.

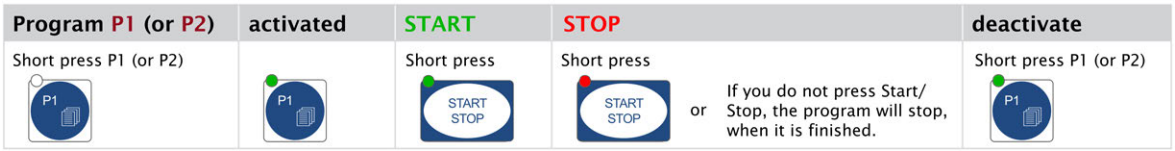
Short mixing



By pressing the SHORT MIX button, the shaker starts with the set parameters. Releasing the SHORT MIX button stops the shaker.

5.5 MIX WITH PROGRAM

Selecting and starting a defined program is simple and is described in the following flow diagram.

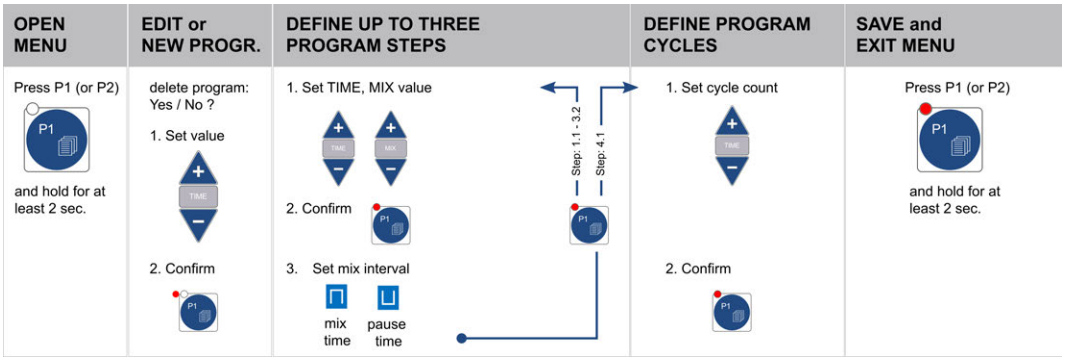


At the end of the program the BioShake will stop automatically and emit 3 buzzer signals.

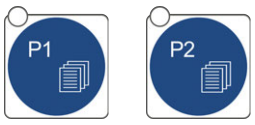
5.6 DEFINE A PROGRAM

OVERVIEW

With the BioShake XP it is possible to define two programs that run automatically. The features of both programs are the same. A schematic overview of how to define a program is shown below. The steps are described in detail below.



OPEN MENU



The menu for defining a program is opened by pressing and holding the P1| P2 (Px where x = 1 or 2) button for at least 3 seconds.

EDIT or NEW PROGRAM

Initially the user needs to decide if he wants to define a new program from scratch (yes) or change the parameters of the current definition of the program (no).

DEFINE UP TO THREE PROGRAM STEPS

Program Menu navigation basic

- The definition of the parameters for a program is separated in pages. One page is one LCD view. Each page has a number which is displayed in the second LCD row.
- In total there are 8 pages defining the whole program.
  The page numbers are: 1.1 | 1.2 | 2.1 | 2.2 | 3.1 | 3.2 | 4.1 | 4.2
- By pressing the Px button the next page is shown and the settings are saved. At the end of all pages the first page will be shown again. So if you forgot or missed a parameter in one page, press Px as long as the page that was missed appears again.
- The Program Menu can be closed every time by pressing and holding the Px button for at least 3 seconds.
- If there are program parameters that are not set when leaving the Program Menu the default values will be used. The default values define a step where nothing happens.

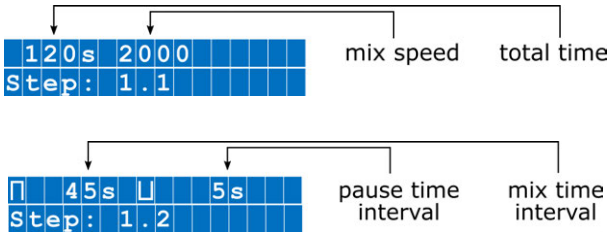
Program definition basics

- A program has 3 steps
- In each step the total step time | speed value can be changed.
- As an option the total step time for each step can be divided into **mix intervals**.
  For an interval the **interval mixing time** (Symbol: ⊓) and the **interval pause** (Symbol: ⊔)needs to be defined.
- It is required to define all 3 steps. The device, when executing a program, always goes through all 3 steps.

- To use less than 3 steps, set the time value of step 3 and/or step 2 to 0 seconds. This means nothing happens in this step.

Define a program step

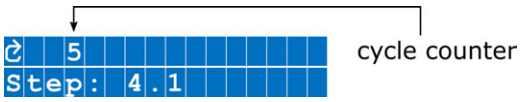
- One program step is defined in 2 pages. On the first page the mixing speed and time for the step is set. On the second page the optional definition of the interval is defined.
- The interval is defined by the interval mix time and interval pause time. The mix interval feature provides the option to apply an additional alternation between mixing and pause, during the total time span one step. Therefore, the interval mix time defines the time for the mixing activity, which is followed by a period of non-mixing, defined by the interval pause time.



- All three steps are defined in consecutive pages

DEFINE PROGRAM CYCLES

After the pages for the three steps (1.1 - 3.2), another page (Step: 4.1.) with one further parameter, the cycle counter, opens.
The **cycle counter parameter** defines how often the 3 steps should be repeated. If the cycle counter is set to 1, the program is executed once. Any other number will result in the successive execution of the program accordingly to the set amount.



No configuration can be done in step 4.2.

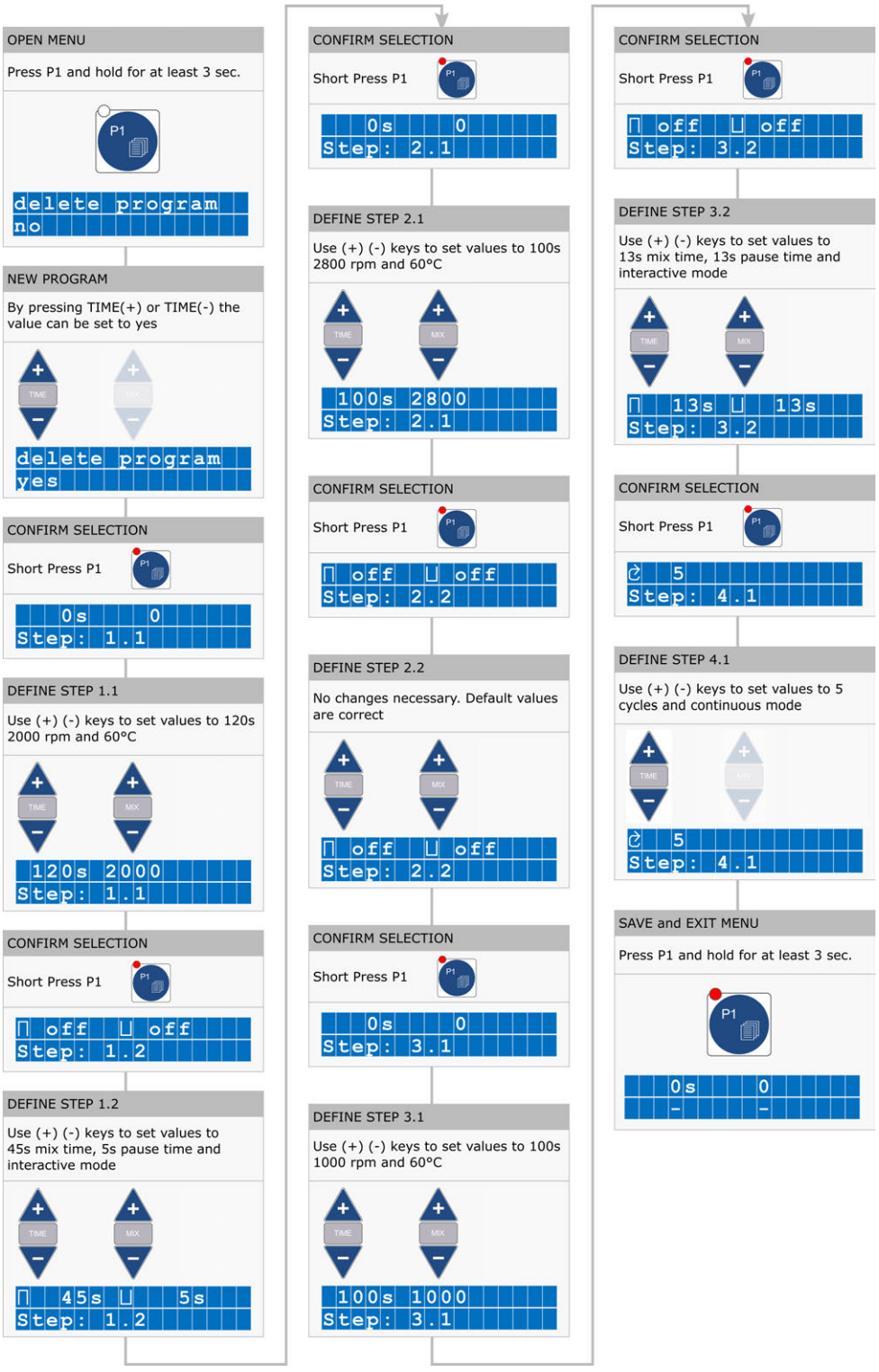
SAVE and EXIT PROGRAM MENU

The menu for defining a program is closed by pressing and holding the P1| P2 (Px where x = 1 or 2) button for at least 3 seconds.

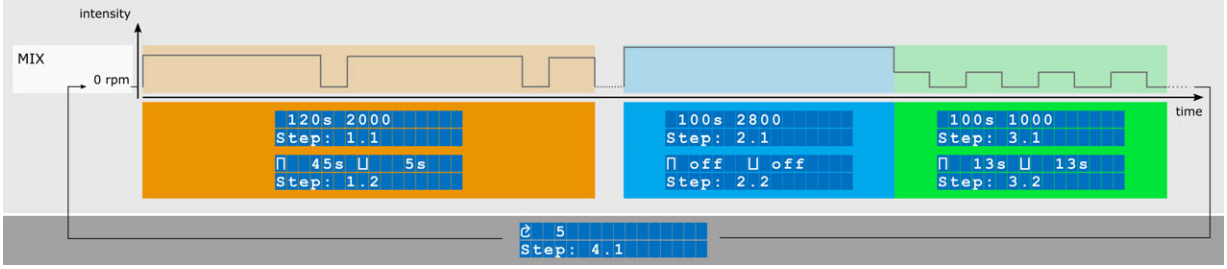
EXAMPLE

In the following step-by-step description, a P1 program with three steps is created. The steps have the following parameters.

- The first step will take 120s and mix with 2000 rpm. During the 120s mixing period the mixing will switch on and off. 45s on, at 2000 rpm followed by a 5s pause without mixing
- The second step will take 100s and mix with 2800 rpm
- The third step will also take 100s with a mix interval of 13s mix time and 13s pause time. The mixing speed is set to 1000 rpm.
- The 3 step program will run 5 times.



In a schematic overview the program will result in the following process.



5.7 ERROR HANDLING

To provide process stability and prevent the unit from damages smart sensors for monitoring and controlling operating parameters are integrated.

Intelligent algorithms continuously track power, voltage and current from all modules and actuators, as well as a range of statistical indicators to detect suboptimal performance or events that require intervention or maintenance.

Any detected errors will be shown on the LCD.

6. ACCESSORIES

6.1 ADAPTER

QINSTRUMENTS offers high precision adapter plates with a perfect fit and optimal thermal performance for all kinds of tubes, vials, microplates, and other different disposables, from stock.

We are also offering to produce custom made adapters, that exactly meet the specifications of your sample container. You will receive your **custom shaped adapter** plate within short period.

Only use the original accessories recommended by QINSTRUMENTS. QINSTRUMENTS does not honor any warranty or accept any responsibility for damage resulting from using 3rd party accessories.

Order no.	Description
Thermo adapter for micro well plates & PCR plates	
1808-1021	Adapter for micro well plate . Flat bottom standard . e.g. Nunc® #269620, Greiner® #781101
1808-1022	Adapter for micro well plate . Flat bottom High Base . e.g. Greiner® HiBase #78407x, 78410
1808-1024	Adapter for micro well plate . Flat bottom Low Base . e.g. Aurora® storage plate, Alere ArrayStrip®
1808-1032	Adapter for micro well plate . 96 well round bottom . e.g. Greiner®, NUNC®, Matrix® plates
1808-1041	Adapter for PCR Plate . 96 well . e.g. Eppendorf twin.tec® #0030-128.672
1808-1051	Adapter for PCR Plate . 384 well . e.g. Eppendorf twin.tec® #0030-128.532
Thermo adapter for deep well plates & storage plates	
1808-1121	Adapter for Deep Well Plate . Eppendorf® 96/1000 µl . #0030-503.209
1808-1131	Adapter for Deep Well Plate . Eppendorf® 96/500 µl . #0030-501.101
1808-1141	Adapter for Deep Well Plate . BRAND® 96/1100 µl U-bottom . #701350
1808-1151	Adapter for Deep Well Plate . NUNC® 96/2000 µl . #278743, 278752
	Adapter for Deep Well Plate . Axygen® 96/2.0 ml round bottom . #P-DW-20-C
1808-1161	Adapter for Deep Well Plate . Axygen® 96/0.6 ml V-bottom . #P-DW-500-C
1808-1171	Adapter for Storage Plate . Abgene® 96/2.2 ml MARK II square well . #AB-09032
1808-1181	Adapter for Mega Block . Sarstedt® Megablock 96/2.2 ml . #82.1972.002
1808-1201	Adapter for Storage Plate . Corning® 96/320 µl V-bottom . #3342, 3347, 3357, 3363, 3894-3898
1808-1211	Adapter for Masterblock . Greiner® 96/1.0 ml U-bottom . #78020x, 78026x
Thermo adapter for deep well plates & storage plates	
1808-1061	Adapter for tubes . 24x 2.0 ml or 15x 0.5 ml
1808-1062	Adapter for tubes . 24x 1.5 ml or 15x 0.5 ml
1808-1063	Adapter for tubes . 40x 0.5 ml or 28x 0.2 ml
1808-1064	Adapter for tubes . 96x 0.2 ml
1808-1067	Adapter for lysis tubes . 35x 0.5-2.0 ml, Ø 10.2 mm
1808-1093	Adapter for FALCON® tubes . 4x 50 ml or 2x 15 ml
1808-1094	Adapter for FALCON® tubes . 12x 15 ml
1808-1069	Adapter for glass vials . 35x 2.0 ml, Ø 10.8 mm
1808-1071	Adapter for glass vials . 35x 2.0 ml, Ø 12 mm
1808-1072	Adapter for glass vials . 20x 4.0 ml, Ø 15 mm
1808-1073	Adapter for glass vials . 20x 4.0 ml, Ø 17 mm
1808-1074	Adapter for glass vials . 20x 6.0 ml . Ø 19 mm

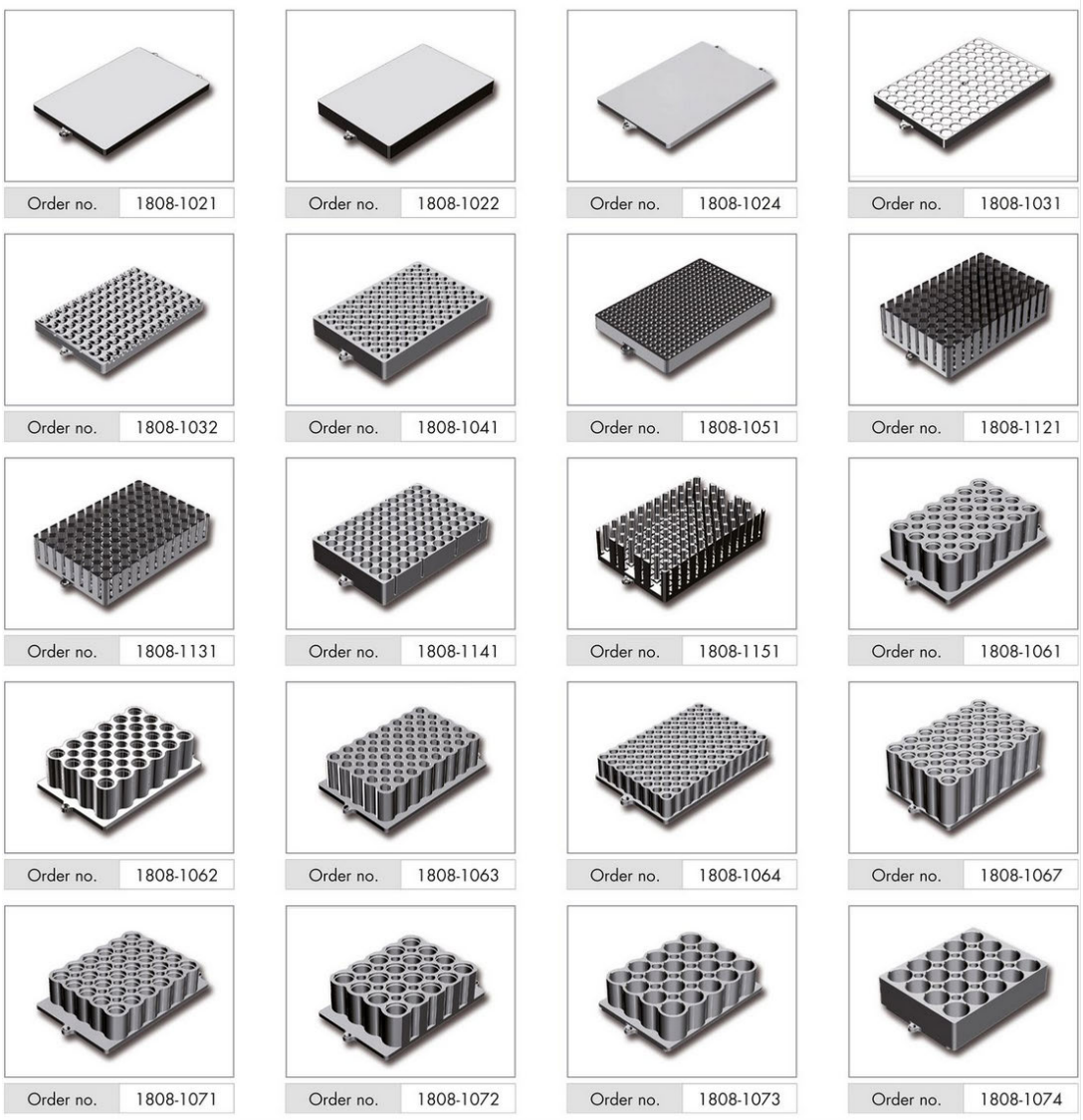


Figure 6 Example images of adapters

7. WARRANTY

QINSTRUMENTS warrants products manufactured by it to be free from defects in material or workmanship under normal use and service for a period of 2 years from date of shipment.

This warranty is specifically limited to the replacement or repair of any such warrantable defects, without charge, when the complete product is returned to QINSTRUMENTS, freight prepaid, at the address shown above. Contact the factory at the address above for a Return Material Authorization (RMA) number before returning the product.

QINSTRUMENTS shall be the sole judge of the warrant ability of alleged product defects. Products that are returned for warranty examination and that are found to be non-warrantable are chargeable and are returned freight collect. A copy of a purchase order with the amount of the charge must be received by QINSTRUMENTS, either by mail or by FAX, before any equipment is returned. Warrantable products are repaired or replaced at no charge and returned freight prepaid.

THIS EXPRESS WARRANTY EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PURPOSE. QINSTRUMENTS GMBH SHALL NOT BE LIABLE FOR WARRANTY IN ANY AMOUNT EXCEEDING THE PURCHASE PRICE OF THE GOODS. QINSTRUMENTS SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT, OR OTHERWISE.

The buyer acknowledges that he / she is not relying on the seller's skill or judgment to select or furnish goods suitable for any particular purpose and that there are no warranties that extend beyond the description on the face hereof.

This warranty extends only to the original purchaser and shall not apply to any products or parts that have been subject to misuse, neglect, accident, or abnormal conditions or operations. Claims for damage in transit are directed to the freight carrier upon receipt.

QINSTRUMENTS will only accept parts / devices for return that do not pose a threat to the health of our staff. In particular, the devices may not have been used in Biosafety Level 3 and 4 environments or have been exposed to radioactive or radiation materials. Such devices will not be accepted by QINSTRUMENTS for return.

Please use the online form for registration of your appliance and service:

www.qinstruments.com/service/

Your completed data will serve as registered certificate of guarantee for our extended guaranteeing and will assure optimal service.

Please keep your sales slip for a possible warranty case which must be presented then. Your personal data will not be given to third persons

8. EUROPEAN DECLARATION OF CONFORMITY

QINSTRUMENTS
A BICO COMPANY

QINSTRUMENTS GmbH
Loebstedter Str. 101 . 07749 Jena . Germany
info@QInstruments.com +49 3641 5543-0
www.QInstruments.com

EUROPEAN DECLARATION OF CONFORMITY

Manufacturer name: QINSTRUMENTS GmbH
Address: Loebstedter Str. 101 . 07749 Jena . Germany

We hereby explain that those corresponds to below designated products in its conception and design as well as in circulation meets the basic protection requirements relating to electromagnetic compatibility Directive and the Directive on the restriction of the use of certain hazardous substances.
In the case of a change of the product not coordinated with us this explanation loses its validity.

Product type: Shaker for lab bench

Product name: BioShake XP **with part no:** 1808-0505, 2016-0505

In accordance with relevant EC directives/standards:

2014/30/EU – The Electromagnetic Compatibility Directive
2011/65/EU – Restriction of Hazardous Substances Directive
2015/863/EU amending Annex II to Directive 2011/65/EU
EN 61326-1:2013-07
DIN EN 61010-1:2020-03
DIN EN 61010-2-051:2016-02
EN 55011:2017-03
EN IEC 63000:2018

CE was at first applied: 2011

Released by: Olaf Simmat
Position: Managing Director

Date of issue: January 1st, 2023
Place of issue: Jena, Germany

QINSTRUMENTS A BICO COMPANY
QINSTRUMENTS GmbH
Loebstedter Str. 101 • 07749 Jena • GERMANY
+49 3641 55430 • info@QInstruments.com

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Signed by Olaf Simmat

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9. NOTES

10. SUPPORT

We provide a range of technical material (e.g., application notes, poster, bulletin, data sheets) that describes our products and key applications in detail. All of our technical documents are available on our web page in the corresponding product pages. Technical Data Sheet, Operation manual, 2D and 3D drawings and Software can be found in the download area of each product.

Please use the following link to our support form (https://www.qinstruments.com/service/support/) in case service or support for your product is needed. Please ensure to provide the serial number, as it is an important information for our support team. Direct contact via phone or email is also possible.

Online	QINSTRUMENTS.com
E-Mail	support@qinstruments.com
Phone	+49 3641 55430
Address	QINSTRUMENTS GmbH **A BICO COMPANY** Loebstedter Strasse 101 07749 Jena Germany

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