

Powerful
Stirring



Betriebsanleitung
Operating instructions
Notice d'instructions

Hei-TORQUE Expert
Hei-TORQUE Ultimate

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research made easy

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About this document

These operating instructions describe all the functions and operation of the Hei-TORQUE Expert and Hei-TORQUE Ultimate type overhead stirrers. The operating instructions are an integral part of the delivery.

Typographic conventions

Standardized symbols, signal words and highlighting elements are used in this document to warn of hazards and to identify important information or rather special text contents.



Symbol	Signal word / explanation
	<p>Warning symbols in combination with a signal word indicate dangers:</p> <p>DANGER Indicates an immediate dangerous situation. Failure to respect the indications will result in death or serious injury.</p> <p>WARNING Indicates a potential danger. Failure to respect the indications will result in serious injuries.</p> <p>CAUTION Indicates a potential hazard which, if not avoided, damage to property and minor to moderate injuries can occur.</p>
	<p>Mandatory signs are used to indicate important and useful information on handling a product.</p> <p>This information is used to ensure operational safety and to maintain the value of the product.</p>
	<p>The arrow indicates specific instructions to be followed to ensure operational safety when handling the product.</p>

Copyright protection

This document is protected by copyright and is intended for use by the purchaser of the product only.

No transfer to third parties, reproduction in any form, including excerpts, and by any means, as well as utilization and/or disclosure of the contents is permitted without the prior written consent of Heidolph Instruments GmbH & Co. KG. Any violation is subject to compensation for damage.

Directives applied, product certification

	<p>CE marking</p> <p>The product complies with the following standards:</p> <ul style="list-style-type: none"> • Machinery Directive 2006/42/EE • EMC Directive 2014/30/EU
	<p>NRTL certification</p> <p>The product has been tested in accordance with the following standards:</p> <ul style="list-style-type: none"> • UL 61010-1 :2012/R2:2016-04 CAN/CSA C22.2 No. 61010-1:2012/U2:2016-04 • UL 61010-2-051:2015 CAN/CSA C22.2 No. 61010-2-051:2015

California Residents

Important information for California residents regarding Prop 65. Please visit www.P65Warnings.ca.gov for more information.

Residual risk

The device has been designed and manufactured in accordance with the state-of-the-art technical standards and the recognized safety regulations at the time of the development. Nonetheless, there are certain residual risks associated with the product described during its setup and use, as well during maintenance, repair and cleaning work. These are identified and described at the appropriate points in this document.

Intended use

The Hei-TORQUE Expert and Hei-TORQUE Ultimate overhead stirrers are specifically designed for the following tasks: Stirring, mixing, gassing and degassing, emulsifying, suspending.

The Hei-TORQUE Expert and Hei-TORQUE Ultimate overhead stirrers are suitable for use in the following areas: Chemical, pharmaceutical, biology, environmental analysis, basic research, research laboratories.

Any other use of the described device is not considered as intended!

Due to its design, in the as-delivered condition, use in the food, cosmetics, and pharmaceutical industries as well as other comparable industries that manufacture products intended for consumption by humans or animals, or for use on humans or animals is only permitted in analytical processes or under laboratory-like conditions.

Compliant use

The user is generally responsible for evaluating the conformity of his application and, if necessary, for taking additional measures.

Reasonably foreseeable misuse

Additional measures may be necessary, and/or specific directives and safety regulations may have to be observed for use under conditions or for purposes deviating from the intended use (see, for example, section „Other regulations“ on page 48). Corresponding requirements must be evaluated and implemented by the operator in each individual case.

Compliance with and implementation of all relevant directives and safety measures for the respective field of application is the sole responsibility of the operator. All risks resulting from improper use are borne solely by the operator.

The described product may only be operated by authorized and instructed personnel. Training and qualification of the operating personnel as well as ensuring that the product is operated with responsibility are the sole responsibility of the operator!

Transportation

During transportation, avoid strong vibrations and mechanical stresses that can cause damage to the product. Keep the original packaging in a dry and protected place for later use.

Storage

Always store the device in its original packaging. To protect against damage and excessive material aging, store the device in an environment that is as dry, temperature-stable and dust-free as possible.

Acclimatization

After each transportation and after storage under critical climatic conditions (e.g. high temperature difference between inside and outside), allow the product to acclimatize at room temperature for a minimum of two hours to prevent possible damage from condensation before putting it into operation in the place of use. If necessary, extend the acclimatization phase if the temperature differences are very high.

Make all supply connections only after the product has been acclimatized!

Permissible ambient conditions

The device is designed for indoor use only. The device is **NOT** suitable for outdoor use! The device is **NOT** suitable for use in potentially explosive areas!

When used in corrosive atmospheres, the service life of the device may be reduced depending on the concentration, duration and frequency of exposure.

General safety instructions

Before commissioning and using the device, familiarize yourself with all the safety regulations and occupational safety guidelines applicable at the place of use and observe them at all times.

Only operate the device if it is in faultless technical condition. In particular, ensure that there is no visible damage on the device itself and, where applicable, on connected devices or the supply connections.

If there is missing or misleading information on the device or regarding occupational safety, contact the responsible safety specialist or our technical service.

Only use the device in accordance with the regulations on intended use.

Electrical safety

Before connecting the device to the power supply, ensure that the voltage indicated on the rating plate matches the specifications of the local power utility company.

Ensure that the power supply circuit provided is protected by means of a residual-current device (RCD).

Always use the power supply cord provided with the device.

Prior to use, check that the device and the power supply cord are free of visible damage.

Have repairs and/or maintenance work on the device carried out exclusively by an authorized electrician or by the technical service department of Heidolph Instruments.

Always disconnect the device from the power supply system before carrying out any maintenance, cleaning or repair work.

Operational safety

Operate the device under a closed ventilated fume hood when working with potentially hazardous substances (see EN 14175 and DIN 12924).

Do not make any unauthorized changes or modifications to the device!

Only use genuine spare parts and accessories, or those expressly approved by the manufacturer!

Rectify malfunctions or faults on the device immediately.

Switch off and disconnect the device from the power supply, preventing reconnection, if it is not possible to eliminate the malfunction or rectify the fault immediately.

Observe all other applicable regulations such as laboratory and workplace guidelines, recognized safety technology rules and special local regulations.

Occupational safety

Always use the prescribed personal protective equipment (PPE) such as protective clothing, safety goggles, protective gloves, safety shoes, etc.

Do not operate any other devices in the immediate vicinity of the device ...

- which can generate electromagnetic fields in the frequency range between 9×10^3 Hz to 3×10^{11} Hz,
- which generate emission or radiation sources in the frequency range 3×10^{11} Hz to 3×10^{15} Hz (in the optical spectral range wavelengths from 1,000 μm to 0,1 μm),
- which generate ultrasonic or ionizing waves.

Do not operate the unit when adiabatic compression or shock waves may occur (pressure wave ignition).

Do not process any substances/materials that could release energy in an uncontrolled manner (exothermic reaction, spontaneous ignition).

Only use the stirrer tools approved by the manufacturer.

Route all cables free of kinks and outside the operating and hazardous area.

Avoid excessive pressure on the device display.

Keep the base unit dry during operation.

Ensure adequate safety distance: Do not store objects in the working and hazardous area of the device during operation.

Operate the device under a closed ventilated fume cupboard when working with potentially hazardous substances/materials (see EN 14175 and DIN 12924).

Personal protective equipment (PPE)

The operator must determine and provide the necessary PPE, depending on the respective area of use and substances/materials used.

The evaluation of appropriate measures, their implementation, and instructing the responsible personnel is the sole responsibility of the operator!

Environmental protection

When processing environmentally hazardous substances, take appropriate measures to avoid hazards to the environment.

The evaluation of corresponding measures such as the marking of a hazardous area, their implementation, and the training of the relevant personnel is the sole responsibility of the operator!

Biohazard

When processing biohazardous substances, take appropriate measures to prevent hazards to persons and the environment, including:

- Instruction of the personnel regarding the necessary safety measures.
- Provision of personal protective equipment (PPE) and instruction of the personnel in its use.
- Marking the device with a biohazard warning symbol.

The evaluation of corresponding measures such as the marking of a hazardous area, their implementation, and the training of the relevant personnel is the sole responsibility of the operator!

Other regulations

In addition to the notes and instructions in this document, observe all other applicable regulations such as laboratory and workplace guidelines, hazardous substances ordinances, recognized rules of safety engineering and occupational medicine as well as particular local regulations!

Noncompliance will invalidate any warranty claims against Heidolph Instruments.

The operator is generally liable for all damage resulting from unauthorized changes or modifications to the device, from the use of unapproved or non-genuine spare parts and accessories, or from disregarding the safety instructions and hazard warnings or the manufacturer's instructions!

Overview of the Hei-TORQUE Expert overhead stirrer



1 Display

2 Mode button gear stage (only Hei-TORQUE Expert 400)

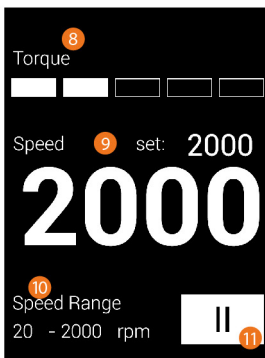
3 Speed controller

4 Swipe field [Stirrer on/off]

5 On/Off switch

6 Retaining ring

7 Quick-action chuck



8 Torque indicator

9 Set and actual rotation speed value

10 Speed range (only Hei-TORQUE Expert 400)

11 Gear stage (only Hei-TORQUE Expert 400)

Overview of the Hei-TORQUE Ultimate overhead stirrer



- | | |
|----|--|
| 1 | Display |
| 2 | Control panel |
| 3 | Hei-TORQUE Ultimate 400:
Selection gear stage |
| 3 | Hei-TORQUE Ultimate 100/200:
Control panel progress display |
| 4 | Speed controller |
| 5 | Swipe field (Stirrer on/off) |
| 6 | On/Off switch |
| 7 | Retaining ring |
| 8 | Quick-action chuck |
| 9 | Position display: Switch between timer/speed |
| 10 | Set value timer |
| 11 | Actual value timer |
| 12 | Set value speed |
| 13 | Actual value speed |
| 14 | Torque indicator |
| 15 | Hei-TORQUE Ultimate 400: Selection gear stage
– function button [Range] |
| 15 | Hei-TORQUE Ultimate 100/200: Progress
display – function button [Graph] |
| 16 | Function button [Open menu] |
| 17 | Function button [Calibrate torque] |

Control elements

Hei-TORQUE Expert speed controller

The rotational speed of the stirring tool can be increased or reduced using the push-and-rotary control of the Hei-TORQUE Expert type device:

- Turn the push-and-rotary control clockwise to increase the rotational speed.
- Turn the push-and-rotary control counterclockwise to reduce the rotational speed.

Hei-TORQUE Ultimate push-and-rotary control

The push-and-rotary control of the Hei-TORQUE Ultimate type devices can be used to call up and adjust all settable values/device parameters within the menu structure.

- Turn the push-and-rotary control clockwise or counterclockwise to select a menu item/ value/parameter.
 - The selected menu item/value/parameter switches from white to orange.
- Press the push-and-rotary control to confirm the selection.
- Turn the push-and-rotary control clockwise or counterclockwise within two seconds to select a menu option or to increase or reduce a displayed value.
- Then press the push-and-rotary controller again to confirm the selection or to confirm and accept a changed value.

Control panels

Hei-TORQUE Expert 400

The control button of the Hei-TORQUE Expert 400 type devices is used to select the gear stage:

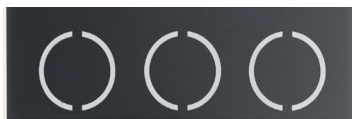


- Select gear stage I for the speed range from 10 – 400 rpm.
- Select gear stage II for the speed range from 20 – 2000 rpm.

The selected gear stage is shown on the display.

Hei-TORQUE Ultimate

The control panels of the Hei-TORQUE Ultimate type devices are used to directly select the respective function assigned at the bottom edge of the display:



Stirrer on/off swipe field

The [Stirrer on/off] swipe field is used to start and stop the rotational movement at the switched on device:



- Swipe a finger from left to right or from right to left over the field to start and re-stop the rotational movement.



Starting and stopping the rotational movement does not have any effect on the device's [on/off] operating state, i.e. stopping the rotational movement merely stops the stirrer tool, the device remains switched on.

The direction of the swipe movement on the swipe field does not have any influence on the rotational direction of the stirrer tool.

Interfaces

The Hei-TORQUE Ultimate type devices provide two serial interfaces at the back of the housing:

- 1 × USB Micro type AB
- 1 × RS232 SUB D9

Use these interfaces to connect the device to a PC for external activation.

WARNING

If the voltages at the connection sockets are too high and insulation is inadequate, voltage can be applied to metallic parts such as the housing in case of a fault.

Extra-low voltage inputs and outputs above 25 V AC or 60 V DC respectively must be disconnected safely according to EN 61140 or must be protected by doubled or increased insulation in accordance with EN 60730-1.

Only use shielded connection cables and connect the shielding to the connector housing.

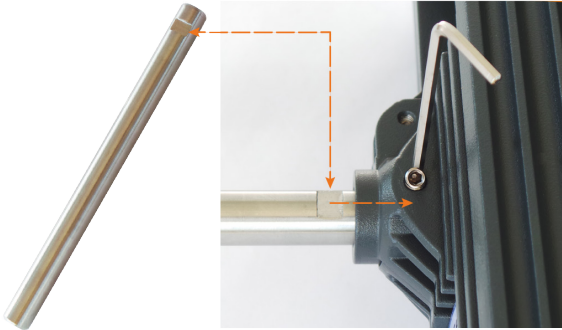
Make sure that the interface connections at the back of the device are secured by the covers provided.



Mounting the support rod

The supplied support rod is used to fit the stirrer on a stand or a wall grid.

Insert the support rod in the receiving hole at the back of the stirrer so that the screwed-in grub screw presses on the flat area of the support rod and thus fixes it securely:



- Turn the grub screw clockwise to fix the support rod.



Tighten the grub screw by hand only and with the help of the hex wrench supplied.

Make sure that you do not overtighten the grub screw, as this damages the thread.

- Turn the grub screw counterclockwise to loosen and dismantle the support rod.
- Then fix the fitted support rod to an adequately load-bearing wall grid or a stand with the help of suitable clamps (for suitable accessories, see www.heidolph.com).

Set up the device

The described overhead stirrers can be mounted on a stand or on a wall grid. Any necessary mounting materials are available as accessories, see www.heidolph.com.

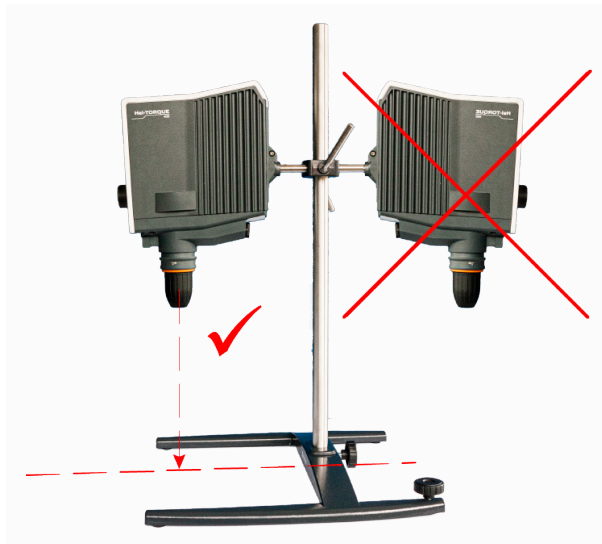
WARNING

If assembled improperly, the device can also fall or tip over when unloaded!

If the overhead stirrer is mounted on a wall grid, ensure that the wall grid and all mounting elements have sufficient self-protection and load capacity!

When mounting the overhead stirrer on a stand, make sure that the setup is sufficiently stable.

- The stand may only be set up on a stable surface.
- When mounting on a stand, follow the specific setup instructions for the stand.
- Always align the overhead stirrer so that the quick-action chuck vertically faces the notional centerline between the **long** stand base bars, see following figure:



After assembly of the overhead stirrer, check all screw connections / clamping screws for tight fit.

Quick-action chuck (Quick Chuck)



WARNING

Before mounting/dismantling the quick-action chuck, switch off the device and disconnect it from the power supply to prevent unexpected starting-up of the device!

The quick-action chuck is pre-fixed on the stirrer shaft with a grub screw so that it cannot turn and is locked on the stirrer by the safety ring (marked by the hatching in the following figure).

- Push the safety ring upwards to open the locking (figure left: safety ring in upper position):
 - If the locking is open and the grub screw is loosened, the quick-action chuck can be removed or inserted.



Inserting and locking the quick-action chuck

- Push the quick-action chuck onto the stirrer shaft so that the screwed-in grub screw engages in the assembly hole of the stirrer shaft and the quick-action chuck can thus be fixed securely (above figure, right).
- Use the hex wrench supplied to turn the grub screw clockwise, in order to fix the quick-action chuck.
- Push the safety ring downwards to lock the quick-action chuck.



Tighten the grub screw by hand only and with the help of the hex wrench supplied.

Make sure that you do not overtighten the grub screw, as this damages the thread.

Undoing and pulling off the quick-action chuck

- Push the safety ring upwards to release the locking of the quick-action chuck.
- Secure the quick-action chuck with one hand and use the hex wrench supplied to turn the grub screw counterclockwise, in order to loosen the quick-action chuck.
- Pull the quick-action chuck off the stirrer shaft.

Clamping/removing stirrer tools



WARNING

If necessary, stop the rotational movement (see section „Stirrer on/off swipe field“ on page 52) and before clamping/removing stirrer tools, switch off the device to prevent it from starting up unexpectedly!

Proceed as follows to clamp/remove stirrer tools:

- Turn the safety ring (marked by hatching in the following figure) counterclockwise until it stops to unlock the quick-action chuck.
- Pull the safety ring downward until it stops, so that you can open the quick-action chuck (turn the quick-action chuck clockwise):



locked, closed

unlocked, closed

unlocked, open

- Insert the stirrer tool into the quick-action chuck. Make sure that the working height is as required!
- Hold the stirrer tool in the middle, where possible, and close the quick-action chuck by turning it counterclockwise carefully until you can feel resistance.
- Align the stirrer tool vertically if necessary, and with the middle of the quick-action chuck and then continue turning the quick-action chuck counterclockwise against the resistance until three clear latching noises can be heard. In this way, the quick-action chuck is locked and the clamped stirrer tool is fixed securely.
- Push and turn the safety ring back into the initial position (figure, far left), to secure and lock the quick-action chuck.
- Before starting the rotational movement, check the clamped stirrer tool for tight fit and correct true running (concentricity).



The quick-action chuck can be overturned by excessive force applied on opening! In this case, the quick-action chuck can no longer be closed normally and a latching noise can be heard on turning it in the closing direction.

Remedial action: Turn the quick-action chuck again in the opening direction, beyond the latching point.

The quick-action chuck can then be operated normally again.

Power supply

The device has an appliance outlet with locking system for the power supply. A suitable three-pole power supply cord is included in the scope of delivery.



DANGER

The device may only be supplied with the required line voltage via a grounded power socket.

Power cords without a locking system can become loose during operation due to vibrations. In the event of an uncontrolled shut-down of the stirrer tool, there is a risk of production downtime and / or property damage, e.g. due to an uncontrolled restart!



For reasons of operational safety, only use the supplied power supply cord with locking system!

Connect the power supply cord

- Before connecting the power supply cord, make sure that the main switch of the device is in the [off] position (see following section „Switching the device on/off“ on page 58).
- Connect the cable coupling of the cord to the IEC appliance inlet [2] on the back of the device [1]. Make sure that the locking system [3] engages correctly.



- Connect the power supply cord to a properly secured power socket.

Disconnecting the power supply cord

- Switch **OFF** the device at the main switch before disconnecting the power supply cord (see following section „Switching the device on/off“ on page 58).
- Disconnect the power supply cord from the power socket.
- Press in the locking lever on the cable coupling and disconnect the power supply cord from the IEC appliance plug on the back of the device.

Switching the device on/off

To switch the device on and off, use the main switch on the front of the device below the control panel:



- Press the main switch once until it locks into place.
 - The display is switched on automatically.
 - The welcome screen appears.
 - The main menu is opened (Hei-TORQUE Ultimate only).
- Press the main switch again to switch off the device.
 - The main switch is released and jumps back to the original position.

Automatic restart

This function can be used to set the device so that the stirrer is restarted automatically in the following cases, and the speed is run up to the last set value:

- on switching on the device, if it was switched off before hand without actively stopping the rotational movement using the [Stirrer on/off] swipe field (see section „Stirrer on/off swipe field“ on page 52);
- when the power is restored after a system power supply outage.



CAUTION

Always activate or deactivate the automatic restart function as required before the actual process start!

Pay attention to the safety symbols on the device for signaling the functional status for all process sequences.

If the automatic restart function is active, secure the device with an information sign if necessary (in the appendix to this document).

Proceed as follows to activate/deactivate the automatic restart function:

Hei-TORQUE Expert restart function

- Switch on the device and use the speed controller to set the rotational speed value to [213 rpm]: Value has white background field.
- Wait for approx. six (6) seconds until the value is accepted: Value is displayed without background field.
- Then use the speed controller to set the rotational speed values in chronological order to [214 rpm], [215 rpm], [216 rpm] and [217 rpm] and wait each time until the value is accepted.

- As soon as the last value [217 rpm] has been accepted, the status change is completed:
 - On activating the function, the [restart on] notice is displayed briefly.
 - In operation with active automatic restart, a white warning symbol is shown at the top edge of the screen.
 - On deactivating the function, the [restart off] notice is displayed briefly.
 - As soon as the automatic restart function is deactivated, the warning symbol at the top edge of the screen goes out.



On restarting an Hei-TORQUE Expert after a power interruption, a [Rotation] warning triangle appears on the display briefly, a white warning symbol at the top edge of the screen then flashes until the rotational movement is stopped normally.

A power interruption that occurs during unsupervised operation can be identified by the flashing function.

Hei-TORQUE Ultimate restart function

- Switch on the device and, if applicable, use the push-and-rotary control to select the [Speed] parameter on the device display (value is displayed in orange font). Press the push-and-rotary control to confirm.
- Use the push-and-rotary control to set the rotational speed value to [213 rpm] and wait briefly until the value is accepted (value is displayed continuously).
- To activate/deactivate the function, press and hold the push-and-rotary control and then press the [Cal] function button.
 - On activating the function, a white separating line appears between the header and the central area.
 - On deactivating the function, the white separating line between the header and the central area is hidden.



On restarting an Hei-TORQUE Ultimate after a power interruption, a [Rotation] warning triangle appears on the display briefly, the separating line between the header and the central display area then flashes red until the rotational movement is stopped normally.

A power interruption that occurs during unsupervised operation can be identified by the flashing function.

Setting the rotation speed

The settable speed range lies between 10 – 2,000 rpm. Proceed as follows to set the required speed (for function of the speed and push-and-rotary control, see section „Control elements“ on page 51):

Hei-TORQUE Expert

- Turn the speed controller clockwise to increase the (rotational) speed.
- Turn the speed controller counterclockwise to reduce the (rotational) speed.

Hei-TORQUE Ultimate

- Use the control panel menu button to open Main menu.
- Use the push-and-rotary control to activate the [Speed] function.
- Turn the push-and-rotary control clockwise to increase the (rotational) speed.
- Turn the push-and-rotary control counterclockwise to reduce the (rotational) speed.



The rotational speed cannot be adjusted while working through a favorite or profile!

Selecting the gear stage

This function is only available to Hei-TORQUE Expert 400 and Hei-TORQUE Ultimate 400 type devices. By selecting the suitable gear stage, a stable rotational speed can be achieved even with large viscosity fluctuations.

- Speed range, gear stage I: 10 rpm – 400 rpm
- Speed range, gear stage II: 20 rpm – 2,000 rpm



The gear stage can only be changed if the motor is stopped!
On changing the gear stage, the rotational speed is set to the lowest number of revolutions per minute of the selected range automatically.

Hei-TORQUE Expert 400

- Stop the rotational movement.
- To switch between gear stage I and II, press the function button on the control panel, see also section „Control elements“ on page 51:



- The set gear stage is shown on the display.

Hei-TORQUE Ultimate 400

- Stop the rotational movement.
- To switch between gear stage I and II, press the [Stage II] function button on the control panel:



- The set gear stage is shown on the display.



When working through a profile/favorite the gear stage is selected automatically.

Starting/stopping rotation

WARNING

Risk of injury due to glass break and leaking medium

- Select the diameter of the laboratory vessel so that the stirrer tool turns inside the vessel without touching it.
- After clamping the stirrer tool and before the process starts, check the stirrer tool and the chuck for smooth running.
- Never start up stirrer tools or chucks that have an imbalance, and replace them immediately.



Risk of injury on rotating parts

- Never grip turning parts.
- Always wear close-fitting clothing when working with the device.
- Do not wear any accessories such as ties, scarves, shawls, pieces of jewelry, etc. when working with the device.
- When working with the device, tie back long hair or wear a cap or hair net.



Damage to property, loss of production

- Adjust the start-up behavior of the device to the specific properties of the sample to be processed to avoid overflowing/ejection of the sample or overloading of the stirrer tool (safety settings!).
- Follow the specific safety instructions for the substances to be processed (refer to the safety data sheets if applicable).
- Always wear the required individual personal protective equipment (PPE).

Start and stop the rotational movement at the switched on device using the [Stirrer on/off] swipe field (see also section „Stirrer on/off swipe field“ on page 52):



- Swipe a finger from left to right or from right to left over the field to start and re-stop the rotational movement.



After a process, stop the rotational movement actively with the swipe field as described above.

Otherwise the device behaves as described in section „Automatic restart“ on page 58 and possibly restarts automatically!

Enhanced Hei-TORQUE Ultimate functions



The functions described in the following sections are only implemented in Hei-TORQUE Ultimate type devices!

Timer function

The timer function of the Hei-TORQUE Ultimate type devices can be used to preselect a required operating period.

Set the timer as follows:

- Use the push-and-rotary control to select the [Timer] option on the Start screen (font color changes to orange).
- Press the push-and-rotary control to confirm.
- Use the push-and-rotary control to set the required duration:
 - Adjustment range: 1 min – 24 h
- Press the push-and-rotary control to confirm.
- The timer is started on starting the rotational movement.



If the timer is running, the preset time is shown on the display to the nearest minute and the expired time is shown to the nearest second. At the same time, an alarm clock/timer symbol appears at the top left edge of the screen.

The timer must be reset to [0] to deactivate it.

The rotational movement can be stopped at any time, even while the timer is running!

Calibrating the torque

To adjust to the individual environmental conditions on site and for precise display in the process, the Hei-TORQUE Ultimate type devices provide the option of calibrating the device's torque. The following options are available:

- Relative zero point: the zero point of the torque with immersed stirrer tool is determined here, i.e., the value results from the resistance of the sample.
- Absolute zero point: the zero point on the load-free rotating stirrer tool is determined here.



Before the calibration the device must warm up for 15 – 30 minutes to compensate for the temperature-dependent resistance of the gear unit.

Calibrate the torque as follows:

- Make sure that the device has warmed up sufficiently.
- Start the rotational movement and then tap the [Cal] function button on the control panel:



- The calibration process is completed as soon as the Torque calibrated message appears on the display. The [MEM] symbol is shown on the display continuously.
- The [MEM] symbol is hidden on stopping and restarting the rotational movement.

Reset the torque as follows:

- Stop the rotational movement and press the [Cal] function button to reset the calibration value to the factory setting.
- The device is reset as soon as the [MEM] symbol disappears.



On calibration to a relative zero point, the torque is displayed with a positive or negative sign during the course of the process. This depends on the change in viscosity after the calibration.

On calibration to an absolute zero point, the torque is generally displayed with a positive sign during the course of the process. This depends on the actual viscosity of the sample.

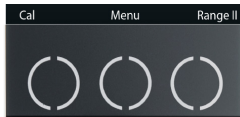
The torque changes depending on the rotational speed, i.e. recalibration is generally necessary after a speed adjustment.

The calibration value is reset to the factory setting automatically on switching off the device.

Device menu

The Hei-TORQUE Ultimate type devices offer a range of setting options that can be called up via the Device menu.

- Use the [Menu] function button on the control panel to open the Device menu:



- Turn the push-and-rotary control to select the required menu item or value in the open submenu (font color changes to orange).
- Press the push-and-rotary control to confirm an input.

Menu structure
















The following submenus are available in the Device menu:

Menu	Function/Options
Graph	The trend graph of the currently completed profile can be opened here. The graph shows the course of the past approx. 3.5 minutes.
Favorites mode	Profiles saved as favorites can be opened, edited and started here, see also section „Favorites“ on page 67.
Edit profile.	User-defined profiles can be created and edited here, see also section „Profiles“ on page 66.
Settings	User-specific adjustments to different system settings can be made here: <ul style="list-style-type: none"> ▪ [Time] menu item: set the system time here. ▪ [Language] menu item: select the required menu language here (German/English). ▪ [Tone] menu item: here you specify whether the button tones of the device are audible or remain muted. ▪ [Rotational direction] menu item (Hei-TORQUE Ultimate 100 and 200 only): here you specify the required direction of rotation for the stirrer tool. If you select clockwise direction of rotation, a rotational direction symbol appears at the top edge of the screen.
Start time	The start time for working through a favorite or working through a sample with the currently set parameters can be specified here.
Safety	User-specific adjustments to different safety settings can be made here: <ul style="list-style-type: none"> ▪ [Start-up speed] menu item: use the Soft start parameter to specify a suitable start-up behavior for the respective sample (fast, moderate, slow; factory setting: moderate). ▪ [Max. speed] menu item: here you set a suitable maximum speed for the respective sample if necessary. ▪ [Max. torque] menu item: here you set a suitable maximum torque for the respective stirrer tool if necessary.



The selected safety settings are not reset automatically and remain saved and active even if the device is switched off!

Symbols of the graphic user interface

Symbol	Name /function
	Main menu: Return to the Device menu
	Back: Return to the higher-level menu
	Save: Confirm and save value/setting
	Ramp mode: Increase/reduce the rotational speed abruptly to a set value
	Ramp mode: Increase/reduce the rotational speed gradually to a set value
	Correction: delete last input
	Delete: Remove profile
	Continuous operation: Working through the profile in continuous loop
	Select Activate
	Select Deactivate
	Profile active status display
	Profile active in continuous operation status display
	Start time active status display
	Clockwise rotational direction display
	Control via PC status display, see Hei-CONTROL software operating instructions

Profiles

The Hei-TORQUE Ultimate type devices provide the option of storing multiple consecutive process steps (ramps) as a profile in the system memory. Open the Edit profile submenu from the Device menu to create or edit user-defined profiles.

The signs and symbols used on the user-interface are explained in detail in section „Symbols of the graphic user interface“ on page 65, the function of the push-and-rotary control is explained in section „Hei-TORQUE Ultimate push-and-rotary control“ on page 51.

Each ramp is defined by the Time, Rotation and Ramp parameters, example:

1. step:	Time = 00:02 Rotation = 200 Ramp = gentle	Gradual rise in speed to 200 rpm within 2 minutes
2. step:	Time = 00:03 Rotation = 400 Ramp = gentle	Gradual rise in speed to 400 rpm between minute 2 and 3
3. step:	Time = 01:00 Rotation = 400 Ramp = jump	Constant stirrer speed of 400 rpm from minute 3 until minute 60



The [Time] parameter is defined in minutes and relates to the start time of the profile, i.e., the specified time for a following process step must always be at least one minute later than that of the current step.
Exception: Profile end.

Creating a profile

- Determine the required gear stage, see section „Selecting the gear stage“ on page 60.
- Open the [Edit profile] submenu from the Device menu (see section „Device menu“ on page 63).
- Use the push-and-rotary control to set the rotational period of the first ramp (the active value is displayed in an orange font, format: 00:00) and press the push-and-rotary control to confirm your input.
- The display switches to the rotational speed automatically: use the push-and-rotary control to set the required speed and press the push-and-rotary control to confirm the input.
- The display switches to Ramp mode automatically. Use the push-and-rotary control to specify the required ramp mode: gradual or abrupt, see also section „Symbols of the graphic user interface“ on page 65.
- The display switches to the next ramp automatically. Determine the values for this ramp in the described way.

Saving a profile

As soon as all required ramps have been defined the profile can be saved:

- Use the push-and-rotary control to select the [Save] symbol at the bottom edge of the display.
- Press the push-and-rotary control to open the screen keyboard.

- Enter a profile designation here:
 - Use the push-and-rotary control to select the individual letters/numbers one after the other.
 - Confirm each selection by pressing the push-and-rotary control.
 - Correct incorrect inputs with the [Correction] button.
 - Then confirm the new designation with [Save].

Saving another profile with the same gear stage:

- Press the Back button to switch back to the higher-level menu to create further profiles with the same gear stage.
 - The last stored profile is offered as a template by default.
 - Adjust the existing values as required and save the profile as described above.
- Then press the [Home] button to switch back to the Device menu.

Saving another profile with a different gear stage:

To create other profiles with a different gear stage, proceed as follows:

- Follow the instructions to create a profile up to the input of the profile designation (see previous section).
- After confirming the profile designation, if the last stored profile is offered as a template, confirm with [Delete].
 - With this selection, all the template's ramp data are deleted.
- Use the [Home] button to switch back to the Device menu.
- Determine the required gear stage, see section „Selecting the gear stage“ on page 60.
- Open the [Edit profile] submenu.
- Create a new profile with changed gear stage.

Favorites

Hei-TORQUE Ultimate type devices provide the option of storing multiple consecutive process steps (ramps) as a profile in the system memory (see section „Profiles“ on page 66).

The stored profiles can be displayed and started, adjusted and deleted from the system via the [Favorites] menu.

- Open the [Favorites] menu from the Device menu:
 - All stored profiles are listed on the display.
- Select the required profile and press the push-and-rotary control to confirm.

Options

- Select [Display], to display all the profile's data.
- To start the profile, select the Activate or Continuous operation at the bottom edge of the display and then press the push-and-rotary control to confirm.
 - If [Activate] is selected the profile is worked through once and then the stirrer stops
 - If [Continuous operation] is selected the profile is worked through in a continuous loop until the stirring movement is stopped manually
- Select [Edit] to open the profile and use it as a template for a new profile. After calling up the profile, follow the instructions in section „Creating a profile“ on page 66.
- Select [Delete] to remove the profile from the system memory.

Device activation via PC



WARNING

- If the device is activated via a connected PC, note the possibility of a start-up unexpected by third parties!
- Ensure that any contact with rotating parts is prevented effectively even when activated devices are at a standstill.
- Secure the device accordingly with a clearly visible warning sign and take further ambient-specific protective measures if necessary.

The Hei-TORQUE Ultimate type devices provide two serial interfaces at the back of the housing:

- 1 × USB Micro type AB (according to USB 2.0 spec. only up to max. 500 mA)
- 1 × RS232 SUB D9

Use each of these interfaces to connect the device to a PC for external activation. A PC can be used to activate up to four overhead stirrers.



Use the 1 m long USB interface cable supplied. If a longer cable is used there is a risk of transmission errors!

For external activation of the overhead stirrer, the freely available Hei-CONTROL software must be installed on the used PC. The application can be downloaded from our homepage: <https://heidolph-instruments.com/en/service/downloads/software>.

→ [www.heidolph-instruments.com / Service / Downloads / Software](https://www.heidolph-instruments.com/Service/Downloads/Software)

A detailed description of the software and driver installation and all information on the system requirements can be found in the Hei-CONTROL operating instructions, ref. 01-005-005-69; download: <https://heidolph-instruments.com/en/service/downloads/operation-manuals>

→ [www.heidolph-instruments.com / Service / Downloads / Betriebsanleitungen](https://www.heidolph-instruments.com/Service/Downloads/Betriebsanleitungen)

Connection setup

- Ensure that all software and driver components on the PC are installed correctly and that the PC is switched on.
- Switch on the overhead stirrer. The software detects the device automatically.
- As soon as the communication connection between the PC and overhead stirrer is made, the overhead stirrer operates in remote mode. Make the necessary operating settings in the software.



In remote mode the overhead stirrer is controlled via the software on the connected PC.

On the overhead stirrer, only the swipe field for stopping the rotational movement and the main switch are actively switched!

Troubleshooting

The following table shows possible faults and solutions:

Error (message)	Possible cause, remedy
Display remains dark after switching on	Power supply failure, check that the power plug is correctly connected Electronic defect, contact technical service!
Rotation cannot be started	Profile is active, deactivate profile Circuit board defective, contact technical service
[Overload]	Motor or power supply unit is overloaded, torque is too high or blade is blocked Rotation stops automatically, remove blockage cause and switch rotation back on again
[Overheating]	Motor too hot, motor overheat protection has tripped: Automatic shutdown. Allow the motor to cool and switch the device back on
[Do not change during operation!]	Non-permissible change during operation, stop process if applicable
[Favorite already exists!]	Designation already assigned in the system, rename profile or delete existing profile
[No data available!]	In case of Activate profile: Profile data were deleted before activating or have not yet been entered. In case of Save profile: No profile data entered, enter profile information.
[Safety ring is not fixed]	Safety ring not closed correctly: Check the chuck, close the safety ring
[All memory slots are assigned!]	Favorites memory is full: Delete no longer required profiles from the system

If a fault cannot be rectified with the described suggestions, please contact an authorized sales representative or our technical service (see „Contact details“ on page 76).

Technical specifications

General data

Rated voltage	100 – 240 V AC; 50/60 Hz
Protection class	IP54 (IEC 60529)
Protection class	I ⊕ (IEC 61140)
Overvoltage category	II
Degree of pollution	2
Sound pressure level (dB(A))	< 50 (based on IEC 61010)
Drive	EC motor
Motor protection	KTY temperature monitoring
Overload protection	Automatic cut-out with display
Speed accuracy (%)	± 1
Speed control	electronic
Stirrer shaft (∅ in mm)	2.5 – 10.5
Permissible duty cycle	suitable for continuous operation
Permissible ambient conditions:	
Operating temperature	5 °C – 31 °C at up to 80 % rel. humidity 32 °C – 40 °C at up to 50 % rel. humidity (decreasing linearly)
Installation altitude	up to 2,000 m asl

Device-specific data

	Expert 100	Expert 200
Power input (W)	90	120
Volume H2O max. (L)	50	
Viscosity up to (mPa s)	60.000	100.000
Max. torque (Ncm)	100	200
Number of gear stages	1	
Rotation	clockwise	
Speed range (rpm)	10 - 2.000	
Dimensions (W × H × D)	86 × 350 × 247 mm	
Weight (kg)	4,4	5,1

Device-specific data	Ultimate 100	Ultimate 200
Power input (W)	90	120
Volume H2O max. (L)	50	
Viscosity up to (mPa s)	60.000	100.000
Max. torque (Ncm)	100	200
Number of gear stages	1	
Rotation	clockwise/counterclockwise	
Speed range (rpm)	10 - 2.000	
Dimensions (W × H × D)	86 × 350 × 247 mm	
Weight (kg)	4,4	5,1

Device-specific data	Expert / Ultimate 400
Power input (W)	150
Volume H2O max. (L)	100
Viscosity up to (mPa s)	250.000
Max. torque (Ncm)	400
Number of gear stages	2
Rotation	clockwise
Speed range (rpm)	10 - 400 rpm at gear stage I 10 - 2.000 rpm at gear stage II
Dimensions (W × H × D)	93 × 350 × 247
Weight (kg)	5,3

Recommended speeds

Stirrer tool	Maximum rpm
Blade impeller: BR 10, BR 11, BR 12,	≤ 2,000
Blade impeller: BR 13, BR 14	≤ 800
Half-moon impeller: H 18	≤ 800
Pitched-blade impeller: PR 39, PR 33	≤ 800
Pitched-blade impeller: PR 30, PR 31, PR 32	≤ 2,000
Radial-flow impeller: TR 20, TR 21	≤ 2,000
Anchor-type impeller: AR 19	≤ 800
VISCO JET® stirring system: VISCO JET® 60-120, VISCO JET® CRACK 80-120	≤ 500

RS232 interface assignment

SUB-D9 connector	→	SUB-D9 socket
RXD (2)	→	(2) RXD
TXD (3)	→	(3) TXD
GND (5)	→	(5) GND

Interface commands

* Command to the stirrer	Feedback from the stirrer	Meaning
r\r\n	RPM: xxx\r\n	Display actual speed value (rpm)
s\r\n	SET: xxx\r\n	Display set speed value (rpm)
m\r\n	NCM: xxx\r\n	Display the torque (Nmm)
f\r\n	FLT: No Error!\r\n	No fault
	FLT: Motor Error!\r\n	Motor error
	FLT: Motor Temperature!\r\n	Motor overheating, restart device
	FLT: Stopped Manually!\r\n	Stirrer stopped manually
	FLT: overload!\r\n	Motor overloaded
T\r\n	HT:100P\r\n	Hei-TORQUE 100 Ultimate connected
	HT:200P\r\n	Hei-TORQUE 200 Ultimate connected
	HT:400P\r\n	Hei-TORQUE 400 Ultimate connected
Rxxx\r\n	Rxxx\r\nSET:xxx\r\n	Execute set speed xxx (rpm)
ROOOO\r\n	ROOOO\r\nSet:O\r\n	Stop stirrer, set speed is retained
A\r\n	A direction\r\nB direction\r\n	Switch on gear stage II
B\r\n	A direction\r\nB direction\r\n	Switch on gear stage I
C\r\n	Clear Error\r\n	Delete "overload" error status
D\r\n	Direct control\r\n	Switch off connection: <ul style="list-style-type: none"> - Remote operation is switched off - The device can again be operated manually
N\r\n	Null reference\r\n	Set the torque actual value to zero: <ul style="list-style-type: none"> - Torque is calibrated
F\r\n	F\r\n	Check the connection between the PC and the stirrer (The stirrer is switched off after 60 seconds without command input)
M\r\n	M\r\n	Identify device: <ul style="list-style-type: none"> - Display of the tripped device begins to flash
t\r\n	TMP: xxx\r\n	Display temperature
z\r\n	zSET: xxx\r\nzACT: hhmss\r\n	Display the set rotation period and remaining time

*RS 232 interface parameters: 9600 baud, no parity, 8 bit, 1 stop bit



Do not send commands in the package, pause between them at least 0.1 s.

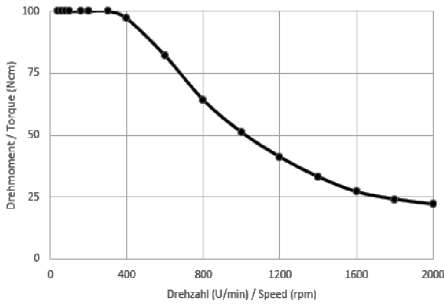
The M, F, T and z commands do not function with the RZR overhead stirrer.

xxxx stands for a one to four-digit number.

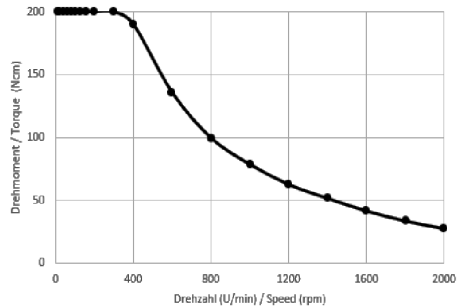
\n can appear in the answer multiple times consecutively.

Performance range

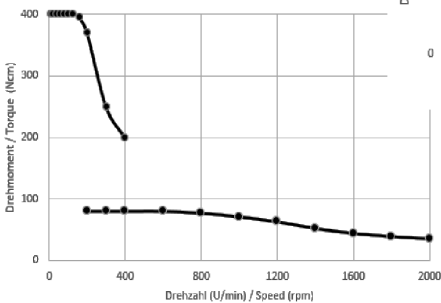
Hei-TORQUE 100



Hei-TORQUE 200



Hei-TORQUE 400



Scope of delivery

Component	Variants	Quantity	Product number
Hei-TORQUE	Expert 100*	1	501-61011-00
	Expert 200*	1	501-62011-00
	Expert 400*	1	501-64011-00
	Ultimate 100*	1	501-61021-00
	Ultimate 200*	1	501-62021-00
	Ultimate 400*	1	501-64021-00
Support rod		1	22-02-14-01-41
USB cable for Hei-TORQUE Ultimate		1	14-007-040-61
Operating instructions		1	01-005-005-55
Warranty registration		1	01-006-002-78
Power supply cord		1	country-dependent



Further information, particularly on the available accessories can be found on our website at www.heidolph.com!

Device service



DANGER

Switch the device's main switch off and disconnect it from the power supply before carrying out maintenance work, cleaning, or repairs.

When cleaning, avoid the penetration of liquids.

Before replacing the fuses, switch off the device and disconnect the power supply.

Always replace the two device fuses in pairs with original manufacturer fuses. Further information on available accessories can be found on our website at www.heidolph.com!

After fuse replacement, check the device for a safe condition according to IEC 61010-1.

General cleaning instructions



CAUTION

Clean the device's surfaces with a soft, lint-free and only slightly moistened cloth.

Never use any aggressive or abrasive cleaning agents or aids.

Repairs - device return

Repairs to the device may always only be carried out by authorized experts! Unauthorized repairs during the warranty period will result in the loss of the warranty claim. The owner is generally liable for damage caused by unauthorized repairs, regardless of any warranty claims.

- If repairs are required and before returning your device, please contact our technical service using the following e-mail address:
 - service@heidolph.de.
- In your message, please let us know an error description and the following information:
 - Item number
 - Serial number

The required data can be found on the type plate of the device.

A service technician will contact you as soon as possible to arrange the further procedure.

In case of a return, please add a completed certificate of decontamination per device, see „Certificate of decontamination“ on page 77.

Maintenance

The device contains no user-serviceable components. If necessary (in the event of abnormal operating behavior such as excessive noise or heat generation, for example), contact our technical service, see „Contact details“ on page 76.

Disposal



- When disposing of the device, observe the provisions of the WEEE Directive 2012/19/EU and its transposition into national law in the country of use.
- When disposing of portable batteries, observe the provisions of the European Battery Directive 2013/56/EU and their implementation in national law in the country of use.
- Check the device and all components for residues of substances that are hazardous to health, the environment and biohazardous before disposal.
- Properly remove and dispose of residues of substances that are hazardous to health, the environment and biohazardous!

Warranty statement

Heidolph Instruments GmbH & Co. KG provides a three-year warranty for material and manufacturing defects.

Glass and wear parts, transportation damage, and damage resulting from improper handling or non-intended use of the product are excluded from the warranty.

The warranty period for registered products begins on the date of purchase. Register the product with the enclosed warranty card or on our homepage www.heidolph.com.

For non-registered products, the warranty period begins with the date of the serial production (to be determined by the serial number).

In the event of material or manufacturing defects, the product will either be repaired or replaced free of charge within the warranty period.

Contact details



Heidolph Instruments GmbH & Co. KG

Technischer Service

Walpersdorfer Straße 12

D-91126 Schwabach/Germany

Email: service@heidolph.de

Representations

To find your local Heidolph distributor please visit www.heidolph.com

Certificate of decontamination

Enclose the certificate of decontamination, duly completed, with your device return.
Submissions without a certificate of decontamination cannot be processed!

CERTIFICATE OF DECONTAMINATION

IN CASE OF RETURNS



Please fill in the required fields.

Note: The sender must package the goods properly and appropriately for transport.

Heidolph Instruments GmbH & Co. KG
Walpersdorfer Straße 12
91126 Schwabach, Germany
Phone: +49 (0) 9122 9920-380
Fax: +49 (0) 9122 9920-19
Email: service@heidolph.de

SENDER

Name _____ First name _____
Company/institution _____ Department _____
_____ Workgroup _____
Address _____
ZC/City _____
Country _____ Phone _____
Email _____

DEVICE DETAILS

Article number _____ Serial no. _____

Ticket number _____

Reason for sending in _____

Has the device been cleaned, decontaminated/disinfected? Yes No (Please mark as applicable)

If yes, which measures were carried out?

Does this device pose a risk to people and/or the environment due to the processing of substances that are hazardous to health, the environment and/or are biohazardous? Yes No (Please mark as applicable)

If yes, with which substances did the device come into contact?

LEGALLY BINDING DECLARATION

The principal/consignor is aware that they are liable to the agent/consignee for losses or damage incurred due to incomplete and incorrect information.

_____ Date _____ Signature _____ Company stamp _____