

IKA

designed for scientists

IKA ULTRA -TURRAX® Tube Drive P control



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1 EU Declaration of conformity

We declare under our sole responsibility that this product corresponds to the directives 2014/35/EU, 2006/42/EC, 2014/30/EU and 2011/65/EU and conforms with the following standards or normative documents: EN 61010-1, EN 61010-2-051, EN 61326-1, EN 60529 and EN ISO 12100.

A copy of the complete declaration of conformity or further declarations of conformity can be requested at sales@ika.com.

2 Explanation of symbols



General hazard



This symbol identifies information **that is of vital importance for safeguarding your health and safety**. Disregarding this information can lead to health impairment and injuries.



This symbol identifies information **that is of importance for the technically correct functioning of the system**. Disregarding this information can result in damage to the device or to system components.



Risk of hand injury.



Risk of biohazard infection.

3 Safety instructions



For your protection:

- **Read the operating instructions in full before starting up and follow the safety instructions.**
- Follow the safety instructions, guidelines, occupational health and safety and accident prevention regulations.
- Keep the operating instructions in a place where they can be accessed by everyone.
- Ensure that only trained staff work with the appliance.
- The device must be supervised at all times when in operation.



DANGER

When handling infectious or toxic sample materials, do **NOT** touch the sample, mixture or waste with your hands. Wear gloves and lab coat and goggles if necessary.



DANGER

The device must only be operated with a tube attached; with no tube there is a risk of injury from the rotating locating pin.

- Hearing protection must be worn when working with **IKA BMT-20** or **IKA BMT-50** tubes.



DANGER

Wear your personal protective equipment in accordance with the hazard category of the medium to be processed. There is a risk of:

- splashing liquids
 - projectile parts
 - body parts, hair, clothing and jewellery getting caught.
- Set up the device in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.
 - The feet of the device must be clean and undamaged.
 - The device is not suitable for manual operation.

- The device may heat up when in use.
- Check the device and accessories beforehand for damage each time when you use them. Do not use damaged components.
- Ensure that the cover on the tube is screwed on tightly.
- Ensure that the tube is firmly attached to the bayonet lock connector on the drive unit prior to operating the device.
- The tube must only be attached and removed while the motor is stationary.



WARNING

The **IKA** tubes must always be closed when the device is in operation. Switch off the device immediately if any material leaks from the tube. Clean the device.

- Always open the tube carefully after use as the media in the tube may heat up due to transfer of energy during operation, leading to pressurization of the container: risk of material spraying, protective equipment must be worn.
- The temperature of the material must not exceed 40 °C.
- Only use tubes approved by **IKA**.
- Only process media that will not react dangerously to the extra energy produced through processing. This also applies to any extra energy produced in other ways, e.g. through light irradiation.
- Do not use the device in explosive atmospheres, it is not EX-protected.
- With substances capable of forming an explosive mixture, appropriate safety measures must be applied, e.g. working under a fume hood.
- To avoid body injury and property damage, observe the relevant safety and accident prevention measures when processing hazardous materials.
- The device doesn't start up again automatically following a cut in the power supply.
- Safe operation is only guaranteed with the accessories described in the "**Accessories**" chapter.

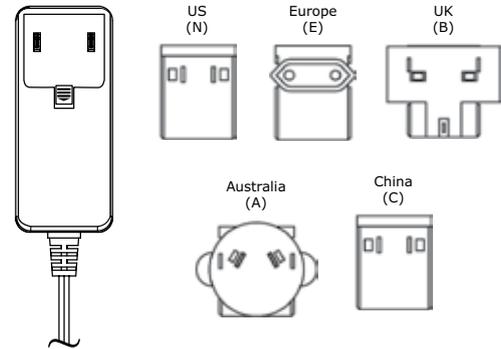
For protection of the device:

- The voltage stated on the name plate must correspond to the mains voltage.
- The device must only be operated with the original plug-in power supply unit.
- Protect the device and accessories from bumps and impacts.
- The device may only be opened by experts.

4 Unpacking

- **Unpacking:**
 - Please unpack the device carefully.
 - Any damage should be notified immediately to the shipping agent (post office, railway network or logistics company).
- **Delivery scope:**
 - **Tube Drive P control**
 - Power supply unit with exchangeable adapters
 - Removal hook
 - Plastic hose
 - Operating instructions
 - A warranty card.

Power supply unit with exchangeable adapters



Additional in the suite-case variant:

- 1 x ST-20
- 1 x DT-20
- 1 x BMT-20-S
- 1 x BMT-20-G

5 Correct use

• Use:

	Application	Volume	Mode
▶ with Tube ST-20...	Mixing	2 - 15 ml	A, B, P1-P9,
▶ with Tube ST-50...	Stirring	15 - 50 ml	Turbo, Rev
▶ with Tube DT-20...	Dispersing	5 - 15 ml	A, B, P1-P9,
▶ with Tube DT-50...	Stirring	15 - 50 ml	Turbo, Rev
▶ with Tube BMT-20...	Crushing	2 - 15 ml	A, B, P1-P9,
▶ with Tube BMT-50...	Mixing wet/dry	15 - 50 ml	Turbo, Rev
▶ with Tube DIS 50...	Crushing	15 - 50 ml	A, B, P1-P9,
▶ with Tube DIS 300... ①	Mixing Dissolving wet	100 - 300 ml	Turbo (for DIS 50 only) Rev

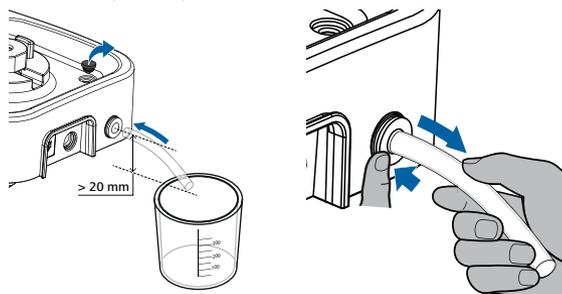
	Application	Volume	Mode
▶ with Tube BMT-20-S-IVD  BMT-20-C-IVD 	Crushing Mixing wet/dry	2 - 15 ml	A, B, P1-P9, Rev

Note: When the DIS 300-S-M tube is used, please remove the drain opening plug and connect the included plastic hose to the drain opening before operation!

Thus, the liquid can be drained out to a suitable vessel (more than 300 ml) in case of leakage of the DIS-300 S-M.

The vessel must be underneath the device and the hose mustn't bend upwards).

For removing the plastic hose, press the flange of the drain opening, meanwhile, pull the plastic hose out.



Note: for **BMT-20-S-IVD/BMT-20-C-IVD:**

max. speed: 4000 rpm

max. timer: 1 min.

• Range of use:

Indoor environments similar to that a laboratory of research, teaching, trade or industry.

The safety of the user cannot be guaranteed:

- If the device is operated with accessories that are not supplied or recommended by the manufacturer
- If the device is operated improperly contrary to the manufacturer's specifications
- If the device is operated improperly contrary to the manufacturer's specifications.

6 Useful facts

Changes in viscosity and volume caused by processing of dispersion media may cause small fluctuations in the speed of the device.

7 Interfaces and outputs

Remote control:

The device can be operated in "Remote" mode via USB interface using labworldsoft® laboratory software. The USB interface is located on the back side on the device and can be connected to a PC using the USB cable.

Note: Please note the system requirements as well as the operating instructions and help section included within the software.

USB Interface:

The Universal Serial Bus (USB) is a serial bus for connecting the device to the PC. Equipped with USB devices can be connected to a PC during operation (hot plugging). Connected devices and their properties are automatically recognized. Use the USB interface in conjunction with labworldsoft® for operation in "Remote" mode and also to update the firmware.

Installation:

First, download the latest driver for **IKA** devices with USB interface from: <http://www.ika.com/ika/lws/download/usb-driver.zip>. Install the driver by running the setup file. Then connect the **IKA** device through the USB data cable to the PC. The data communication is via a virtual COM port. Configuration, command syntax and commands of the virtual COM ports are as described in RS 232 interface.

Command syntax and format:

The following applies to the command set:

- Commands are generally sent from the computer (Master) to the device (Slave).
- The device sends only at the computer's request. Even fault indications cannot be sent spontaneously from the device to the computer (automation system).
- Commands are transmitted in capital letters.
- Commands and parameters including successive parameters are separated by at least one space (Code: hex 0x20).
- Each individual command (incl. parameters and data) and each response are terminated with Blank CR LF (Code: hex 0x20 hex 0x0d hex 0x20 hex 0x0A) and have a maximum length of 80 characters.
- The decimal separator in a number is a dot (Code: hex 0x2E).

The above details correspond as far as possible to the recommendations of the NAMUR working party (NAMUR recommendations for the design of electrical plug connections for analogue and digital signal transmission on individual items of laboratory control equipment, rev. 2.9).

The NAMUR commands and the additional specific **IKA** commands commissioning serve only as low level commands for communication between the tube driver and the PC. With a suitable terminal or communications program these commands can be transmitted directly to the tube driver. The **IKA** software package, labworldsoft, provides a convenient tool for controlling tube driver and collecting data under MS Windows, and includes graphical entry features, for motor speed ramps for example.

The following table summarize the (NAMUR) commands understood by the tube drive control up to Version 2.9.

Abbreviation used:

m = Numbering parameter (integer)
X = 4 Speed

Commands	Function	Remark
IN_NAME	Request designation. Start the Remote control function.	Device Keypad not available except "power" button is pressed, after this command is sent to device. "Remote" symbol is displayed.
RESET	Switch to normal operation	Device Keypad available again, and clear the "Remote" symbol.
IN_PV_X X=4	Read actual speed value	
IN_SP_X X=4	Read target value input	
OUT_SP_X m X=4	Set target speed value, input: rpm	
START_X X=4	Switch on appliance remote function. Start value function with setting.	
IN_SOFTWARE	Request software ID, number, date and version	

8 Commissioning

Pay attention to the ambient conditions listed in the “Technical Data”.



If these conditions are met, the unit is ready for operating when the mains plug has been plugged in.

Fit the tube carefully and ensure it is properly attached.

If above procedures are not followed, safe operation can not be guaranteed and/or the equipment may be damaged.



9 Switching on

Press “Power” button (A) to switch on the device, see Fig. 1.

The start-up screen will be displayed for several seconds. This screen shows the unit designation and the software version.



Then, the system check screen will be displayed for several seconds.

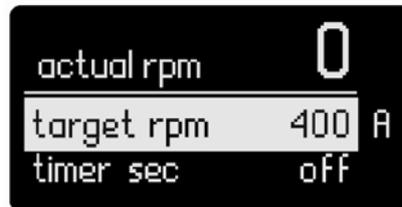
Symbols are shown on the screen, including the working mode setting, the target speed, the maximum rotation speed (rpm) and timer maximum value etc. of the device.



Symbols Explanation

- ① Maximum rotation speed of the device (If “Turbo” function is activated, the maximum rotation speed could reach 8000 rpm).
- ② Rotation symbol (The symbol will change into \curvearrowright or \curvearrowleft if “Rev” function is activated).
- ③ Rotation speed setting.
- ④ Operation mode.
- ⑤ “Timer” maximum value of the device.
- ⑥ “Timer” symbol.

After the system check screen, the working screen will appear and the device is ready for operation.



Note: Figure above shows specified values corresponding to the default settings at delivery.

10 Factory setting

The device is supplied with following factory setting:

Menu Settings:

mode	A	
max rpm	6000	rpm
timer max	30	minute
language	English	

Working Setting:

target rpm	400	rpm
timer sec	off	
rev sec	off	

10.1 Resetting parameters to factory setting

To reset the parameters to the factory settings, proceed as following:

- Pull out main plug from the device.
- Hold the controller buttons “Menu/Back” and “Timer” simultaneously and re-insert main plug in power outlet.
- The unit is now reset to the factory settings.

11 Setting menu parameters

11.1 Operation mode

The device can be operated in mode A, B and P1 to P9. The mode setting will be stored automatically when operation is over, or the device is switched off. User may change the mode setting in the main menu if necessary.

• Operation mode A

In this mode, when current operation is over or the device is switched off, all working settings will not be stored.

• Operation mode B

In this mode, when current operation is over or the device is switched off, all menu and working settings will be stored.

• Operation mode P1 - P9

In mode P1-P9, the user can set and save required parameters, (target speed, timer value and rev value) in program. The parameter settings can only be changed in the menu program. These settings can also be used directly when necessary.

• Setting operation mode between A and B

- ☞ Press the “Menu/Back” button (C) in the main menu.
- ☞ Turn the “Rotating/Pressing” knob (B) to select the “mode” item in the main menu.
- ☞ Press the “Rotating/Pressing” knob (B).
- ☞ Turn the “Rotating/Pressing” knob (B) to select mode A or B in submenu.
- ☞ Press the “Rotating/Pressing” knob (B) again to complete the process.
- ☞ Press the “Menu/Back” button (C) to return to the working screen.

• Setting operation mode between P1 and P9

- ☞ Press the “Menu/Back” button (C) in the main menu.
- ☞ Turn the “Rotating/Pressing” knob (B) to select the “mode” item in the main menu.

- ☞ Press the “Rotating/Pressing” knob (B).
- ☞ Turn the “Rotating/Pressing” knob (B) to select the “mode” item in mode P1 and P9 in submenu.
- ☞ Press the “Rotating/Pressing” knob (B) and enter desired menu program.
- ☞ Turn the “Rotating/Pressing” knob (B) to select desired program item.
- ☞ Press the “Rotating/Pressing” knob (B) .
- ☞ Turn the “Rotating/Pressing” knob (B) to change the value.
- ☞ Press the “Rotating/Pressing” knob (B) again to complete the setting.
- ☞ Press the “Menu/back” button (C) to complete the process, display will return to working screen.

Note: The target speed and timer value in the program should be less than “rpm max” and “timer max” setting in menu. Otherwise, the device will run according to the setting in the menu.

11.2 Operation language

The language can be set to: English, German, Chinese, French, Spanish, Italian and Korean. The language setting will be stored automatically when operation is over or the device is switched off. User can change the language setting in the main menu if necessary.

• Setting operation language

- ☞ Press the “Menu/Back” button (C) in the main menu.
- ☞ Turn the “Rotating/Pressing” knob (B) to select the “language” item in the main menu.
- ☞ Press the “Rotating/Pressing” knob (B) to confirm “language”.
- ☞ Turn the “Rotating/Pressing” knob (B) to select a language.
- ☞ Press the “Rotating/Pressing” knob (B) again to complete the setting.
- ☞ Press the “Menu/Back” button (C) to return to the working screen.

11.3 Maximum rotation speed (max rpm)

The default setting “max rpm” is 6000 rpm in the device. User can change the setting to the range of 400 to 6000 rpm in the main menu.

The “max rpm” setting will be stored automatically when operation is over or the device is switched off.

• Setting “max rpm”

- ☞ Press the “Menu/Back” button (C) in the main menu.
- ☞ Turn the “Rotating/Pressing” knob (B) to select the “max rpm” item in the main menu.
- ☞ Press the “Rotating/Pressing” knob (B).
- ⇒ A mark ▶ will appear to indicate the activated item.
- ☞ Turn the “Rotating/Pressing” knob (B) to adjust the value.
- ☞ Press the “Rotating/Pressing” knob (B) again to complete the process.
- ☞ Press the “Menu/Back” button (C) to return to the working screen.

Note: The speed „max rpm” can be adjusted with the “Rotating/Pressing” knob (B) in a range between 400 to 6000 rpm. This is achieved in magnitudes of 10 rpm. In remote control mode via computer, adjusting magnitude is 1 rpm.

11.4 Timer maximum value (timer max)

The default “timer max” is 30 minutes in the device. User can change the setting in 10 second intervals and up to 30 minutes in the main menu.

The “timer max” setting will be stored automatically when operation is over or the device is switched off.

• Set “timer max”

- ☞ Press the “Menu/Back” button (C) in the main menu.
- ☞ Turn the “Rotating/Pressing” knob (B) to select the “timer max” in the main menu.
- ☞ Press the “Rotating/Pressing” knob (B)
- ⇒ A mark ▶ will appear to indicate the activated item.
- ☞ Turn the “Rotating/Pressing” knob (B) to change the value.
- ☞ Press the “Rotating/Pressing” knob (B) again to complete the process
- ☞ Press the “Menu/Back” button (C) to return to the working screen.

Note: The timer „timer max” can be adjusted with the “Rotating/Pressing” knob (B) in a range from 10 seconds to 30 minutes. This is achieved in magnitudes of 10 seconds. In remote control mode via computer, adjusting magnitude is 1 second.

12 Setting working parameters

12.1 Target speed (target rpm)

Set “target rpm” within “rpm max” range in the working screen by rotating the “Rotating/Pressing” knob (B). Adjustment magnitude is 10 rpm. In remote control mode via computer, adjusting magnitude is 1 rpm.

• Setting “target rpm” in working screen

- ☞ Turn the “Rotating/Pressing” knob (B) to change the value.
- ☞ Press “Rotating/Pressing” knob (B) to start working.
- ⇒ Rotation symbol (C, ↻, ⌚) indicates running.

12.2 Timer function

Set “Timer” within “timer max” range in the working screen by rotating the “Rotating/Pressing” knob (B). Adjustment magnitude is 10 seconds. In remote control mode via computer, adjusting magnitude is 1 second.

If the “Timer” is deactivated when the device is started, the device will automatically count from 0 to 30 minutes and then the unit will stop running.

• Setting “Timer” value (timer sec) in working screen

- ☞ Press “Timer” button (D) to activate the timer setting in the working screen.
- ☞ Turn the “Rotating/Pressing” knob (B) to change the value.
- ☞ Press “Timer” button (D) again to complete the setting.
- ⇒ Current values are stored.

12.3 Reverse (Rev) function

When setting "Rev" value with the "Rotating/Pressing" knob (B), the value can be set from 10 to 60 seconds where adjustment magnitude is 1 second.

Note: If both "Rev" function and "Timer" function are activated, the "Rev" value should be less than "Timer" value. Otherwise, the reverse function will not work.

If the reverse function is activated, press "Rev" button (E) during running, the reverse function will be deactivated. Press "Rev" button (E) again, the reverse function will be reactivated and the screen will indicate "Rev" value setting.

• Setting "Rev" timer (rev sec) in working screen

- ☞ Press "Rev" button (E) to activate the reverse setting in the working screen.
- ☞ Turn the "Rotating/Pressing" knob (B) to change the value.
- ☞ Press "Rev" button (E) again to complete the setting.
- ⇒ Current values are stored.

12.4 Turbo Function

The rotation speed can increase to 8000 rpm in several seconds by pressing down „Turbo“ button (F) during operating. For tube protection, Turbo function can only last 60 seconds at most if you press down „Turbo“ button (F). Several seconds later, Turbo function can be activated again after symbol has disappeared.

• Activate and hold "Turbo" function in working screen:

- ☞ Press down „Turbo“ button (F) over 2 seconds when the device is working, to activate Turbo function.
- ⇒ The Turbo mark  appears and changes alternately to indicate that the Turbo function is activated and rotation speed will increase to 8000 rpm in a short time.
- ☞ Release "Turbo" button (F).

- ⇒ Turbo function will be stopped and rotation speed will return to original setting. A symbol  appears to indicate that the Turbo function is stopped. Before this symbol disappears, turbo function can not be activated again.

13 Error codes

Any malfunction during operation may be identified by an error message on the display.

Proceed as follows in such cases:

- ☞ Switch off device using the power switch
- ☞ Carry out corrective measures
- ☞ Restart the device.

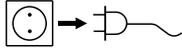
Error code	Cause	Effect	Solution
Error 3	Inside temperature is too high	motor off	- Switch off the device and let it cool down. - Restart the device.
Error 4	Motor can't run normal (can't start or not reach the target speed)	motor off	- Switch off the device. - Check the structure for possible blockades
Error 47 Error 48	Overload	motor off	- Switch off the device - Decrease the speed setting or the load
Error 50	Tube is protected in order to avoid overload	motor off	- Check the tube condition - Decrease the speed setting or the load

If the actions described fails to resolve the fault or another error code is displayed then take one of the following steps:

- Contact the service department
- Send the device for repair, including a short description of the fault.

14 Maintenance

The device is maintenance-free. It is only subject to the natural wear and tear of components and their statistical failure rate.



For cleaning disconnect the main plug.

Only use cleansing agents which have been recommended by **IKA**: Water (containing surfactant) and isopropyl alcohol.

Wear protective gloves during cleaning the instruments.

Electrical instruments may not be placed in the cleansing agent for the purpose of cleaning.

Do not allow moisture to get into the instrument when cleaning.

Before using another than the recommended method for cleaning or decontamination, the user must ascertain with **IKA** that this method does not destroy the instrument.

Spare parts order:

When ordering spare parts, please give:

- machine type
- manufacturing number, see type plate
- item and designation of the spare part, see **www.ika.com**, spare parts diagram and spare parts list.

Repair:

Please send in device for repair only after it has been cleaned and is free from any materials which may constitute a health hazard.

For this, you should request the "Decontamination Certificate" from **IKA**, or use the download printout of it from the **IKA** website **www.ika.com**.

If you require servicing, return the device in its original packaging. Storage packaging is not sufficient. Please also use suitable transport packaging.

15 Accessories

See more accessories on **www.ika.com**.

16 Warranty

In accordance with **IKA** warranty conditions, the warranty period is 24 months. For claims under the warranty please contact your local dealer. You may also send the machine direct to our works, enclosing the delivery invoice and giving reasons for the claim. You will be liable for freight costs.

The warranty does not cover wearing parts, nor does it apply to faults resulting from improper use or insufficient care and maintenance contrary to the instructions in this operating manual.

17 Technical data

Power supply unit		
Input	VAC A Hz	100 ... 240 1.0 50 / 60
Output	VDC	24 40 W.LPS (limited power source)
Protection class		2 (double insulated) 
Tube Drive		
Operating voltage	VDC mA	24 1500
Power consumption, normal operation	W	36
Power consumption, standby operation	W	2
Power output	W	28
Drive		EC flat motor
Speed range	rpm	400 ... 8000 infinitely adjustable, adjustment magnitude 10 rpm
Turbo speed		up to 8000
Mode A		up to 6000
Mode B		up to 6000
Mode P1-P9		up to 6000
Speed setting		rotating/pressing knob
Speed display		digital
Timer		10 seconds ... 30 minutes
Reverse timer		10 ... 60 Seconds
Display-timer		digital
Perm. ambient temperature	°C	+ 5 ... + 40
Perm. rel. humidity	%	80
Protection to EN 60529		IP 20

Contamination level		2
Overvoltage category		II
Operation at a terrestrial altitude level	m	max. 2000
Dimensions (W x D x H) without tube	mm	122 x 178 x 54
Weight	kg	1.3

Subject to technical changes!