

IKA

designed for scientists

IKA KS 501 digital IKA HS 501 digital



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EU Declaration of conformity

We declare under our sole responsibility that this product is in compliance with the regulations 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 EU Declaration of Conformity can be requested at sales@ika.com.

Explication of warning symbols

 DANGER	Indicates an (extreme) hazardous situation, which, if not avoided, will result in death, serious injury.
 WARNING	Indicates a hazardous situation, which, if not avoided, can result in death, serious injury.
 CAUTION	Indicates a potentially hazardous situation, which, if not avoided, can result in injury.
 NOTICE	Indicates practices which, if not avoided, can result in equipment damage.
 CAUTION	Indicates crushing risk of fingers/hand.

Safety instructions


General information:


- **Read the operating instructions completely before starting up and follow the safety instructions.**
- Keep the operating instructions in a place where they can be accessed by everyone.
- Ensure that only trained staff work with the device.
- Follow the safety instructions, guidelines, occupational health and safety and accident prevention regulations.
- Socket must be earthed (protective ground contact).
- The socket for the mains cord must be easily accessible.
- The feet of the device must be clean and undamaged.
- Check the device and accessories for damage before each use them. Do not use damaged components.
- Do not operate the device in explosive atmospheres, with hazardous substances or under water.
- The device may heat up when in use.
- Do not move or transport the device when it is operating or connected to the power supply.
- Safe operation is only guaranteed with the accessories described in the "**Accessories**" chapter.
- Always disconnect the plug before attaching accessories.


- The device can only be disconnected from the mains supply by pulling out the mains plug or the connector plug.
- The device can only be opened by technical experts, even during repair. The device must be unplugged from the power supply before opening. Live parts inside the device may still be live for some time after unplugging from the power supply.


For protection of the user:

 **DANGER** Never touch the moving parts during operation.


 **CAUTION** There is a crushing hazard between the moving shaking table and the casing. Keep your hand away from this area during operation.


 **CAUTION** There is a crushing hazard between the device and the table. Be careful when transporting and installing the device.


 **CAUTION** Because of the heavy weight (26 kg) of the device, at least two persons are needed for carrying the device.

 **WARNING** Wear your personal protective equipment in accordance with the hazard category of the media to be processed. Otherwise there is a risk from:

- splashing and evaporation of liquids
- ejection of parts
- release of toxic or combustible gases
- body parts, hair, clothing and jewelry getting caught.

 **DANGER** 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.


 **DANGER** Process pathogenic materials only in closed vessels under a suitable fume hood. Please contact **IKA** if you have any questions.

 **WARNING** Beware of hazards due to:

- flammable materials
- incorrect container size
- overfilling of media
- unsafe condition of container
- glass breakage as a result of mechanical shaking power.


For protection of the device and accessories:

- Set up the device in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.
- The voltage stated on the type plate must correspond to the mains voltage.
- Removable parts must be refitted to the device to prevent the infiltration of foreign objects, liquids etc..
- Protect the device and accessories from bump and impact.
- Avoid allowing objects to push or strike the shaking table.

 **NOTICE** The weight of the load must not exceed 15 kg. Do not exceed the maximum permissible shaking weight.

- Place the vessels securely on the shaking table or on the chosen mat.
- Firmly secure the accessories and vessels in place, otherwise shaking vessels could be damaged or projected out.
- Position one single shaking vessel in the centre and several shaking vessels so that they are evenly spread out.
- Always load the samples evenly on the device.

Performing trials:

 **NOTICE** Reduce the speed if:

- the medium splashes out of the vessel
- the device is not running smoothly
- dynamic forces start to cause the device and/or the vessels placed on it to move around.

- Make certain that the device is set at the lowest speed (left hand position) before commissioning; otherwise, the device will start to run at the speed set in last operation. Gradually increase the speed
- After an interruption in the power supply or a mechanical interruption during working process, the device will restart automatically.

Correct use

The **KS 501 digital** and **HS 501 digital** is suitable for use in various attachments for mixing liquid in bottles, flasks and test tubes for a maximum supported weight of 15 kg.

KS 501 digital is designed as an orbital shaker for mixing liquid.

HS 501 digital is designed as a horizontal shaker for mixing liquid.

• Use:

- for mixing liquid.

Intend use: Tabletop device

• Range of use (indoor use only):

- Laboratories
- Pharmacies
- Schools
- Universities

This device is suitable for use in all areas except:

- Residential areas.
- Areas that are connected directly to a low-voltage supply network that also supplies residential areas.

The safety of the user cannot be guaranteed:

- If the device is operated with accessories that are not supplied or recommended by **IKA**.
- If the device is operated improperly or in contrary to the **IKA** specifications.
- If the device or the printed circuit board are modified by third parties.

Unpacking

• Unpacking:

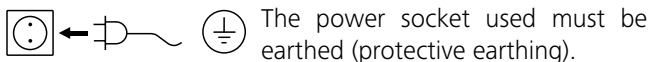
- Please unpack the device carefully.
- In the case of any damage a detailed report must be sent immediately (post, rail or forwarder).

• Delivery scope:

- **IKA KS 501 digital** or **HS 501 digital** according to order
- Mains cable
- USB 2.0 cable A – B
- Operating instructions
- Warranty Card.

Commissioning

Check whether the voltage specified on the type plate matches the mains voltage available.



If above conditions are met, the device is ready for operation after plugging in the mains plug.

If these conditions are not met, safe operation is not guaranteed and the device could be damaged.

Observe the ambient conditions (temperature, humidity, etc.) listed under "Technical Data".

The device can be operated in two modes, "**Continuous mode**" or "**Timer mode**":

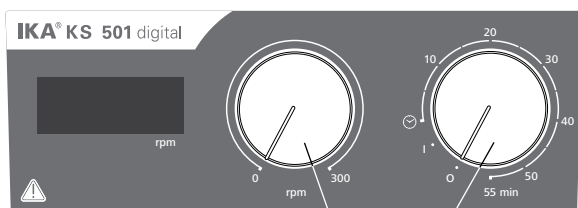


Fig. 3

C

B

Continuous mode:

- ☞ To switch the device on, turn the "**On/Off**" and "**Timer**" rotary knob (**B**, see Fig. 3) clockwise to the "**1**" position.
- ⇒ The device is now running in "**Continuous mode**".
- ☞ To switch the device off, turn the "**On/Off**" and "**Timer**" rotary knob (**B**) to "**0**" position.

Timer mode:

- ☞ To switch the device on, turn the "**On/Off**" and "**Timer**" rotary knob (**B**) clockwise after the "☉" position.
- ⇒ The running time can be adjusted to any value between 0 and 55 minutes.
- ⇒ After the selected time period has elapsed, the switch will automatically return to the "**0**" position and the device will remain switched off.
- ⇒ The time period selected can be adjusted at any time.

Setting the motor speed:

- ☞ Set the motor speed by turning the "**Speed**" rotary knob (**C**, see Fig. 3). The motor speed can be set to between 0 to 300 rpm.

Interface and output

The device can be connected to a PC and operated with the laboratory software *labworldsoft*® through the RS 232 interface (**G**, see **Fig. 2**) or USB interface (**H**, see **Fig. 2**).

Note: Please observe the system requirements as well as the operating instruction and help section of 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.

USB device drivers:

First, download the latest driver for **IKA** devices with USB interface from:

<http://www.ika.com/ika/lws/download/usbdriver.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.

RS 232 interface:

Configuration:

- The functions of the interface connections between the device and the automation system are chosen from the signals specified in EIA standard RS 232 in accordance with DIN 66 020 Part 1.
- For the electrical characteristics of the interface and the allocation of signal status, standard RS 232 applies in accordance with DIN 66 259 Part 1.
- Transmission procedure: asynchronous character transmission in start-stop mode.
- Type of transmission: full duplex.
- Character format: character representation in accordance with data format in DIN 66 022 for start-stop mode. 1 start bit; 7 character bits; 1 parity bit (even); 1 stop bit.

- Transmission speed: 9600 bit/s.
- Data flow control: none.
- Access procedure: data transfer from the device to the computer takes place only at the computer's request.

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. 1.1).

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

Commands:

Commands	Function
IN_NAME	Input description name.
IN_SP_4	Reading the set rated value of rpm.
IN_PV_4	Reading the real value of rpm.
OUT_SP_4 n	Setting the rated value of rpm to n.
OUT_SP_42@n	Setting the WD safety speed with the echo of the set value
OUT_WD1@m	Watchdog mode 1: When a WD1 event occurs, the shaking functions are shut down and message PC 1 is displayed. Set the watchdog time to m (20...1500) seconds, with echo of the watchdog time. This instruction starts the watchdog function and must be sent within the set watchdog time.

OUT_WD2@m	Watchdog mode 2: When a WD2 event occurs, the speed set point will be set to the WD safety set point speed. The PC 2 warning is displayed. The WD2 event can be reset with OUT_WD2@0-resetting also blocks the watchdog function. Set the watchdog time to m (20...1500) seconds, with echo of the watchdog time. This command starts the watchdog function and must be sent within the set watchdog time.
RESET	Switching off the device function.
START_4	Starting the device (remote) function
STATUS_4	Display of status: 10: Manual operation without fault 11: Automatic operation Start (without fault) 12: Automatic operation Start (without fault) < 0: error code: - 1: error 1 - ... (see „ Error codes “ table)

Note: when disconnecting the RS 232 or USB cable while the device is running, the device stays in PC mode. To reset to function without PC, switch the device off and on again.

PC 1.1 Cable:

This cable is required to connect RS 232 interface (**G**) to a PC.

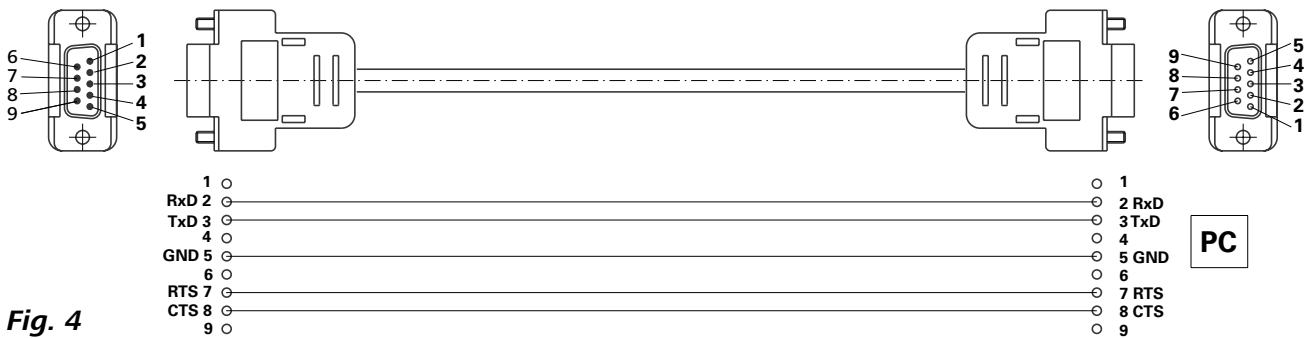


Fig. 4

USB 2.0 cable A - B:

This cable is required to connect USB interface (**H**) to a PC.

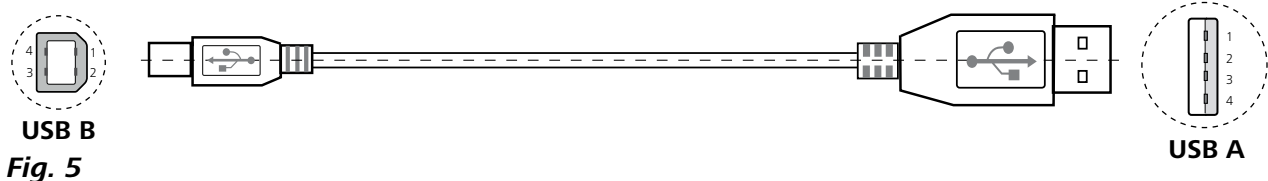
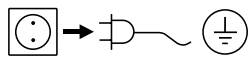


Fig. 5

Maintenance and cleaning

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

Cleaning:



For cleaning disconnect the mains plug!

Use only cleaning agents which have been approved by IKA to clean the device: Water containing surfactant / isopropyl alcohol.

- Wear protective gloves while cleaning the devices.
- Electrical devices may not be placed in the cleansing agent for the purpose of cleaning.
- Do not allow moisture to get into the device when cleaning.
- If a different cleaning or decontamination method than the method defined by **IKA** is planned, the user must ascertain with **IKA** that this method does not damage the device.

Spare parts order:

When ordering spare parts, please give:

- Machine type.
- Serial number, see type plate.
- Item and designation of the spare part, see www.ika.com, spare parts diagram and list.

Repair:

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

For repair, please request the “**Decontamination Certificate**” from **IKA**, or 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.

Error codes

Any malfunctions during operation will be identified by an error message on the display.

Proceed as follows in such cases:

- ☞ Switch off device using the main switch at the back of the device.
- ☞ Carry out corrective measures.
- ☞ Restart device.


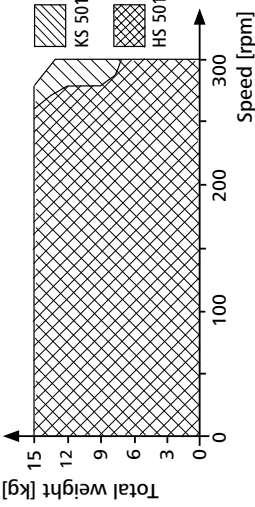

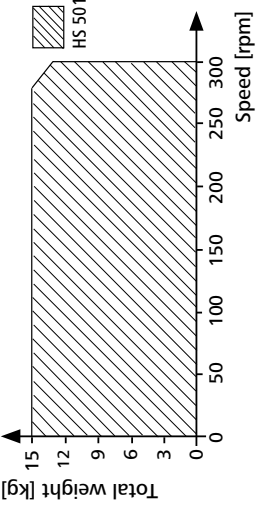


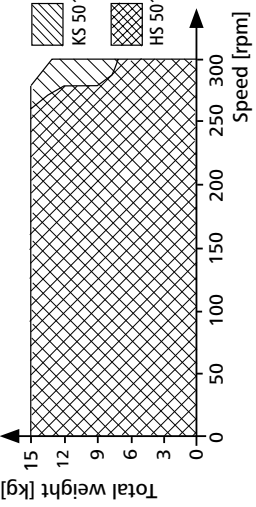
Error code	Effect	Cause	Solution
Err 10	Shaking function doesn't start.	Speed setting signal error.	- Contact IKA service department.
Err 14	Stop shaking or change according to relating setting.	PC communication failure	- Check communication cable.


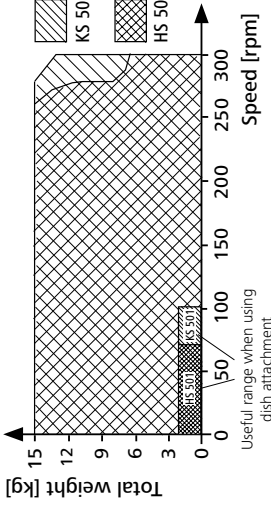


If the actions described fails to resolve the fault or another error code is displayed then take one of the following steps:

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

Accessories

• **Attachments:**

	KS 501	HS 501	Photo	Included with delivery	Useful weight and speed range diagram of attachments	Note
AS 501.1 Universal attachment	•	•		1 x AS 1.10 Basic holder 6 x AS 1.11 Clamping roll 12 x AS 1.6 Fastening screw		
AS 501.2 Separating funnel attachment		•		1 x AS 1.10 Basic holder 6 x AS 1.11 Clamping roll 6 x AS 1.6 Fastening screw 6 x AS 1.7 Clamping device		
AS 501.3 Separating funnel attachment		•		1 x AS 1.10 Basic holder 4 x AS 1.11 Clamping roll 4 x AS 1.6 Fastening screw 4 x AS 1.7 Clamping device		
AS 501.4 Fixing clip attachment	•	•				Accessories: Fixing clips: AS 2.1, AS 2.2, AS 2.3, AS 2.4, AS 2.5 , AS 2.6

	KS 501	HS 501	Photo	Included with delivery	Useful weight and speed range diagram of attachments	Note
AS 501.5 Dish attachment	•	•				
AS 501.6 Separating funnel attachment		•		1 x AS 1.10 Basic holder 4 x AS 1.6 Fastening screw 4 x AS 1.12 Supporting bar 8 x AS 1.13 Ground section holder		
Stickmax	•					

- **Other accessories:**
PC 1.1 Kabel
Labworldsoft®

See more accessories on www.ika.com.

Technical data

		KS 501 digital	HS 501 digital
Operating voltage	VAC	230 ± 10 % 115 ± 10 % 100 ± 10 %	
Frequency	Hz	50 / 60	
Power input	W	70	
Power output	W	19	
Type of movement		orbital	horizontal
Maximum shaking weight (with attachment)	kg	15	
Infinitely adjustable speed range	rpm	0 ... 300	
Speed tolerance		< ± 10 % of maximum speed	
Speed display		LED	
Operating mode		continuous operation and timer	
Timer	min	∞ / 1 ... 55	
Interface		USB, RS 232	
Fuse	A	2 x T4 A 250 V	
Permissible ambient temperature	°C	+ 5 ... + 40	
Permitted ambient humidity	%	80	
Permitted on-time	%	100	
Protection class according to EN 60 529		IP 21	
Dimensions (W x D x H)	mm	505 x 585 x 120	
Weight	kg	26	
Operation at a terrestrial altitude		max. 2000	

Subject to technical changes!

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 factory, enclosing the delivery invoice and giving reasons for the claim. You will be liable for freight costs.

The warranty does not cover worn out parts, nor does it apply to faults resulting from improper use, insufficient care or maintenance not carried out in accordance with the instructions in this operating manual.