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IKA® KS 130 basic



KS 130 basic

IKA® KS 130 control



KS 130 control

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IKA®-Werke, Germany
Reg. No. 504343

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Safety instructions

In order to be able to use the appliance properly and safely, every user must first read the operating instructions and observe the safety instructions contained therein. Take care of these operating instructions and keep them in a place where they can be accessed by everyone. Only staff who have been trained accordingly, know the appliance and are authorised to carry out work in this field should use this appliance. The machine may only be opened by trained specialists - even during

repairs. The machine is to be unplugged from the mains before opening. Live parts inside the machine may still be live for some time after unplugging from the mains.



Covering or parts that are capable of being removed from the unit without accessory equipment have to be reattached to the unit for safe operation in order to prevent, for example, the ingress of fluids, foreign matter, etc. .

When working with the shaking unit, the user must select and wear his personal protective equipment according to the mixing hazard category. Defective or inadequate protective equipment can expose the user to the risk of spurting liquids, projectile parts or being pulled in at the shaking table or support.



Never touch moving parts (risk of crushing, impact and cutting, see fig. 1: Danger zones).

Ensure that parts of the body, hair or items of clothing cannot be trapped by the motion parts.

Please follow the relevant safety instructions and guidelines, and occupational health and safety regulations for use in the laboratory.

Beware of the high dead weight of the appliance when transporting. Ensure that your fingers do not get crushed when setting down the appliance.

Always install the appliance on a flat, stable non-slip base.

Before use, please ensure that the knob for setting the shaking rate is at the left stop as the appliance starts up at the last shaking rate which was set. Pay attention to the vessels on the shaking table when setting the shaking rate. This will prevent any of the medium to be shaken from spurting out of the sample vessels.

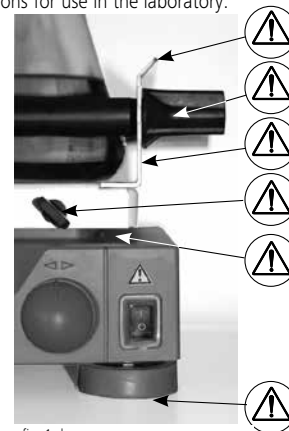


fig. 1 danger zones

All accessories and vessels in place for the shaking process must be firmly secured.

Shaking vessels which are not properly secured could get damaged or be projected out, thus causing injury. It is essential to regularly check that the vessels to be shaken and the attachments are firmly secured, especially before using the appliance again.

If you notice that the device is not running smoothly, the speed must always be reduced until no more unevenness occurs in the operation.

Because of improper loading and the position of the center of gravity, dynamic forces may arise during the agitation process that cause the shaker to move about on the table. For limits on the load or the weight placed on the agitation table at high shaking frequencies, please refer to the diagram in the section "Weight placed on the table" (just before the list of spare parts).

After an interruption in the power supply during an agitation procedure, the device will not start running again by itself.

Additional hazards to the user may occur if inflammable materials are used during the shaking operation.

Furthermore, the shaking unit may only be used to stir those materials or material mixtures that the user knows will not react dangerously to the extra energy produced by the stirring. This also applies to extra energy by means of solar radiation during the shaking procedure.

The shaker may not be used in explosive atmospheres, for mixing dangerous substances or under water.

Accessories may only be assembled once the plug has been disconnected.

The safety of the user cannot be guaranteed if the appliance is operated with accessories that are not supplied or recommended by the manufacturer or if the appliance is operated improperly, contrary to the manufacturer's specifications.

The original **IKA**[®] cable layout must be restored following servicing! If the target value of the speed is changed too rapidly, the machine will turn itself off automatically. Avoid allowing objects to push or strike

the agitation table.

Even small undetectable damage may result in serious damage to the motor bearing. Careful handling will guarantee safe work and a long service life of the machine.

Proper use

The KS 130 basic and KS 130 control are suitable for usage in various attachments for mixing liquids in bottles, flasks, test tubes and bowls for a maximum supported weight of 2 kg.

It is designed for use in laboratories. The motion of the agitation table or of the containers placed on it is approximately circular.

For usage in accordance with requirements, the machine must be standing on a stable, even surface that is as slip-free as possible. In addition, care must be taken that objects in the vicinity are a sufficient distance away from the agitator and that they will not come too close to the agitator while it is in operation.



Unpacking

Please unpack the equipment carefully and check for any damages. It is important that any damages which may have arisen during transport are ascertained when unpacking. If applicable a fact report must be sent immediately (post, rail or forwarder).

The delivery scope covers:

A KS 130 basic or KS 130 control, for attachment screws, a single-head spanner, a connection cable and operating instructions.

Useful facts

With the purchase of this device, you have acquired a high-quality product. The design of the unit and its special shape ensure ease of handling and problem-free work. The materials used and an exact designation of them will significantly facilitate and simplify recycling and reuse of parts.

The speed-controlled external rotor asynchronous motor allows for infinite speed adjustment in the range from 0 to 800 rpm. Electronic motor control holds the set speed constant even if the weight of the material on the surface increases. The heat given off by the motor can be used to heat up the holding surface for the agitation containers.

The Control variant of the device is equipped with a locking device. This makes it possible to fasten the agitation table in a defined position. For example the device can be integrated into a system or screwed with a table. In addition, the rubber feet must be unscrewed from the base plate so that the exposed threaded hole (M6) can be used to secure the device. Make certain that the maximum depth of 5 mm for inserting the screws is not exceeded.

The Control variant of the device can be delivered with a reverse operating mode (clockwise / counterclockwise motion) for the vibration table on request. However, the reverse operation mode can only be used by means of the serial interface in combination with a PC (for example with labworldsoft®).

If the device is not operated on a serial interface, it behaves like a Control device without reverse operation mode.

It is easy to exchange the various attachments.

The Control device variant is equipped with a serial interface that makes it possible to control the device through the PC (for example with labworldsoft®).

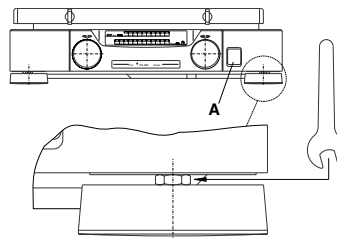
Commissioning

Check whether the voltage specified on the type plate matches the mains voltage available. The power socket used must be earthed (protective earth conductor contact). If these conditions are met, the device is ready to operate after plugging in the mains plug. If these procedures are not followed, safe operation cannot be guaranteed and/or the equipment may be damaged.

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

When you turn on the basic device variant, the turn button for the time setting must be in the middle setting (not activated).

If the mounting surface is not even, you can improve the safety level of the device in reference to how it stands with the adjustable feet. To do this, turn the appropriate device foot downward with the wrench (included with delivery) until the device is standing securely on the surface.



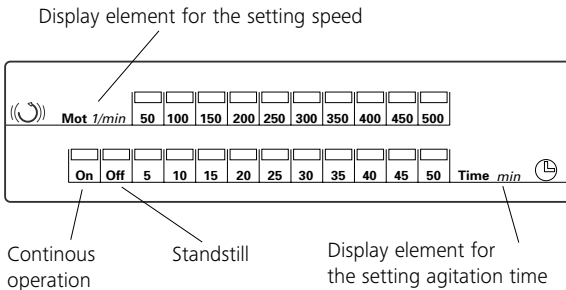
To prevent the foot of the device from coming loose by itself, hold down the foot with one hand and tighten the opposite hexagonal nut with the other hand until it is finger tight.

Switching on

The device can be turned with the flip switch **A** on the front side of the unit. After you have turned on the power switch to position **I**, all light diodes of the basic variant will light up for a brief time in the display windows as a self-test that follows. The red light diode in the TIME LED line and the OFF mode of the device light (audio signal). For the control unit, all elements of the display will flash briefly and the selftest operation will be shown on the display. All important safety functions will be tested. The appliance is operable after this check.

Display

Description of the LED-Display - KS 130 basic



The basic model of the device can be used in continuous or timed mode depending on the option you select. The right turn button is used to make the setting.

Continuous operation: The device does not interrupt the agitation sequence (On-LED is lit).

Time operation:

The device interrupts the agitation process after a set amount of time (max. 50 minutes).

The speed required for the agitation process can be adjusted before or after the operating mode is selected.

The KS 130 basic is adjusted so that after you press the power switch, the agitation process (speed) and time mode is turned off (Off-LED lights up).

Description of the LCD-Display - KS 130 control



SV = Set Value
(Rated value)

PV = Process Value
(Real value)

= = Locking

Mode of operation A: Star out
Mode of operation B: Star on
Mode of operation C: Star flash

e.g. phys. unit
mode of operation,
error code

Operating modes

Setting the operation mode (control model only)

The Control device model can be operated in the modes described below:

Operation mode A:

The KS 130 control is switched into operating mode **A** when it leaves the factory. After the device is turned on with the power switch (flip switch), the agitation and time expiration functions are turned off. The set target values are stored and are displayed digitally. They are adopted when the corresponding functions are turned on. The set target values can be varied. After the power has been turned off and back on, both functions must be started again. The upper speed limit can only be set or changed in operating mode **A**. You can recognise operating mode **A** by the factual no star is displayed in the menu bar display of the time setting.

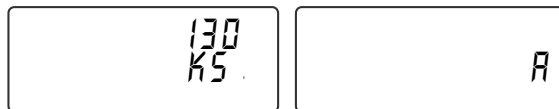
After the power has been interrupted, the device will no longer automatically start up in operating mode **A** by itself any more.

After you have selected the operating mode and turned on the device, the following process will be shown on the display.

- a.) All display elements in the digital displays are activated for about 2 seconds.



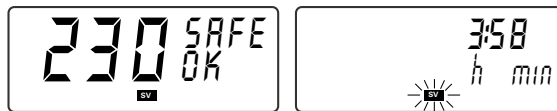
- b.) The device type (left display) and operating mode (right display) are displayed for about 2 seconds.



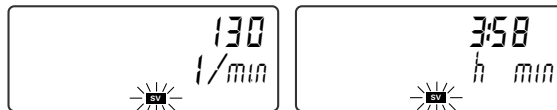
- c.) After this, the set (ore stored) upper speed limit of the agitator is shown in the left display with **SAFE**, the unit of measure rpm and flashing **[SV]** for about 2 seconds. As long as the display is flashing with **[SV]**, it is possible to change the upper speed limit by pressing the turn button and turning at the same time.



- d.) If the upper speed limit is fixed, the unit **1/min** in the left display changes to **OK**. The new time target value that is set or stored in the right display (for example **3:58**) is displayed with an indication of **h min** and a flashing **[SV]**.



- e.) The new speed target value that has been set or stored in the left display (for example **130**) is then shown with the unit **1/min** and flashing **[SV]**.



- f.) By pressing the left or the right turn button, you can place the agitator in operation with the stored value or the one that has just been set. The actual speed and time values are then shown in large format on the display. The actual value of the time setting must be understood from this point onward as the time remaining for the agitation process. If the remaining has reached zero, the agitator stops its motion.



Operating mode B:

When the device is turned on, target values for speed and time setting are adopted before the device is turned off (power OFF). The upper speed limit that has been set is taken over from operating mode **A** when this operating mode is selected and cannot be modified.

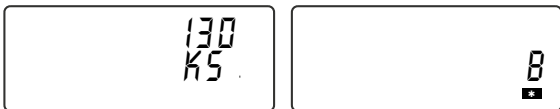
When you turn on the device with the power switch, a **B** is shown on the display for operating mode **B** along with in the right display. After the power has been turned off, the device will no longer automatically start up in operating mode **B** by itself.

After you have selected operating the mode and turned on the device, the following process will be shown on the display.

a.) All display elements in the digital displays are activated for about 2 seconds.



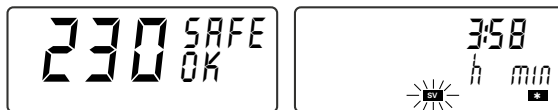
b.) The device type (left display) and operating mode (right display) displayed for about 2 seconds.



c.) After this, the set (or stored) upper speed limit of the agitator is shown in the left display with **SAFE** and **OK** for about 2 seconds. As long as the upper speed limit is being displayed, it is **not** possible to change the upper speed limit.

The stored time target value or the one that has just been set (for

example **3:58**) is shown in the right display with the indication **h min** and a flashing . The user can recognize that operating mode **B** is active by the star in the display for the time setting.



d.) The new speed target value has been set or just stored in the left display (for example **130**) is shown in the unit **1/min** and flashing .



e.) By pressing the left or right turn button, you can place the agitator in operation with the stored value or the one that has just been set. The speed and time values are then shown in large format on the display. In addition, the text is shown on the display instead of . The actual value of the time setting must be understood from this point onward as the time remaining for the agitation process. If the time remaining has reached zero, the agitator stops its motion.



Operating mode C:

The upper speed limit that has been set is taken over from operating mode **A** when this operating mode is selected and cannot be modified. The target values from operating mode **A** or **B** are adopted for speed and time and cannot be modified. When you turn on the device with the power switch, a **C** is shown on the display for operating mode **C** along with in the display.



After the power has been turned off, the device will automatically start up in operating mode **C** by itself.



After you have selected operating the mode and turned on the device, the folling process will be shown on the display.

a.) All display elements in the digital displays are activated for about 2 seconds.



b.) The device type (left display) and operating mode (right display) are displayed for about 2 seconds.



c.) The set time target value (for example **3:58**) is displayed with the indication **h min** and **[SV]**. The set (or stored) upper speed limit from operating mode **A** is displayed with **SAFE** and **OK** for about 2 seconds. The display upper speed limit cannot be modified by pressing and turning the turn button.

d.) The new speed target value that has been set or just stored in the



left display (for example **130**) from operating mode **A** or **B** is then shown with the unit **1/min** and flashing **[SV]**.



e.) By pressing the left or right turn button, you can place the agitator in operation. The speed and time values are then shown in large format on the display. In addition, the text **[PV]** is shown on the display instead of **[SV]**.

The actual value of the time setting must be understood from this point onward as the time remaining for the agitation process. If the time remaining has reached zero, the agitator stops its motion.



Switching the operation mode:

The following steps are required to switch the operating mode:

- Turn off the device with the power switch.
- Hold down both turn buttons and turn on the device with the power switch. After about 1 second, you can let go of the turn buttons.
- It is not possible to switch between operating modes **A**, **B** and **C** in any order.

Instead, you can only switch by repeating the steps above

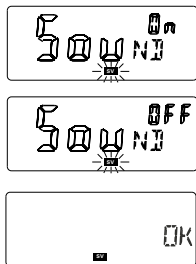
A - step a.) + b.) > **B** - step a.) + b.) > **C** - step a.) + b.) >

A - step a.) + b.) >

Setting the audio time expiration signal

The following steps are required to activate the audio time expiration signal:

- Turn off the device with the power switch.
- Hold down the right turn button and turn on the device with the power switch. Let go of the turn button after about 5 seconds.
- You can activate (**SOUND ON**) or deactivate (**SOUND OFF**) the audio signal indicating that time has expired by pressing the right turn button.



Note: If the time expiration signal has been activated, expiration of the set time is indicated by a sequence of signals (3 times 5 short tons at intervals of about 10 seconds).

Adjusting the lock function



Note: All devices with the abbreviation „NOL“ in the model name (power rating plate) do not have a lock function.

The lock function of the agitation table can be activated or deactivated with a direct connection to the setting of the audio time expiration signal.

The following steps are required to activate or deactivate the function:

- Turn off the device with the power switch.
- Hold down the right turn button and turn on the device with the power switch. Let go of the turn button after about 5 seconds. After you have run through the Sound **On/Off** routine, it is possible to activate or deactivate the lock function.
- You can activate (Lock **On**) or deactivate (Lock **Off**) the lock function by pressing the right turn button.



The activated lock function is displayed by the  icon in the right display. If you cannot see the  icon in the right display, the lock function of the agitation table is turned off.



ATTENTION! After a power failure, the unlocked (freely movable) agitation table will continue to perform a circular motion until the lock function can fasten the agitation table in place.

Setting the agitation time

Basic model

The amount of time required for the agitation process can be set with the aid of the right turn button. A distinction is made for the agitation time setting between timed mode and continuous operation. If continuous mode is selected (On LED is lit), the agitator can continue its agitation function for any amount of time with the previously set speed. If timed mode is selected, the agitation process can last for a maximum of 50 m. The set time is displayed by the LED line. The flashing LED shows the amount of time currently remaining. After all LED's have gone out in timed mode, the device switches off into the Off operating mode and the agitation process comes to an end.

Note: The currently set time can be modified at any time. If the time setting is set to the right beyond 50 minutes, the LED bar goes out and the LED in the On operating state (continuous mode) starts to light up. If you continue to hold down the turn button, the device first jumps to the Off operating mode (standstill) and then back into timed operation. The same applies in the opposite order if the turn button is held down beyond a certain amount of time and moved to the left. After the power failed, the set time (timed mode or continuous mode) is erased and the device switches into Offline operating mode (standstill).

Control mode

The amount of time required for the agitation process can be adjusted with aid of the right turn button and is shown on the right display. If a target time (max. 9 h 59 min) is set in the right display or has been saved from previous agitation processes, you can activate or terminate the agitation process with the left turn button while setting the target speed. You can exit timed mode and interrupt the agitation process by pressing on the right turn button.



ATTENTION! After a power failure, the device will not automatically start up in operating mode **A** or **B** by itself. In operating mode **C**, the device automatically starts up by itself.

Setting the speed

Basic model

You can adjust the speed (max. 800 rpm) by turning the left turn button. When you do this, you should note that the agitator does not begin to run until continuous mode or time mode is active. For the user this means that it is possible to set a speed in the Off operating mode that will be required for continuous operation or for several agitation processes in timed mode.



Time mode in mode of operation A



Continuous mode in mode of operation A



Display after power failure in mode of operation A

NOTE: After the power has failed, the set time is erased and the device switches into Offline operating mode (standstill). The set speed stays adjusted.

Control model

The target speed and upper speed limit (max. 800 rpm) required for the agitation process can be set with the aid of the left turn button and are shown on the right display. Continuous mode is activated by pressing the left turn button. If a target time is set in the right display in continuous mode or is saved from previous agitation processes, the agitation process can be continued in continuous mode by pressing the right turn button. The agitation process can be terminated by pressing the left or the right turn button.



ATTENTION! After a power failure, the device will not automatically start up in operating mode **A** or **B** by itself. In operating mode **C**, the device automatically starts up by itself.



Time mode in mode of operation A



Continuous mode in mode of operation A



Display after power failure in mode of operation A

Attachments

Attachments recommended by IKA® must be connected to the agitation table to ensure safe and secure operation. In addition, the usable weight and speed ranges shown in the diagrams (hatched areas) must not be exceeded.

AS 130.1 Universal attachment

Universal, steplessly adjustable clamping cylinders make it possible to adjust to any container shape.

The universal attachment consists of:

AS 1.30	basic suspension	1x	Dimension WxHxD
AS 1.5	fastening screw	4x	in mm
AS 1.31	clamping cylinder	3x	260 x 90 x 235

ATTENTION! The base suspension of the universal attachment is secured in place by four lateral clamping screws on the agitation table.

AS 130.2 Holding bracket adapter

With additional holding brackets (AS2.1, AS2.2, AS2.3, AS2.4 and AS2.5) the holding bracket adapter is suitable for working with round flasks, measuring flasks and Erlenmeyer flasks.

Recommended / maximum fitting

AS 2.1	Holding bracket	12 / 12	Dimension WxHxD
AS 2.2	Holding bracket	8 / 9	in mm
AS 2.3	Holding bracket	5 / 8	230 x 24 x 235
AS 2.4	Holding bracket	4 / 4	
AS 2.5	Holding bracket	2 / 4	

ATTENTION! The holding bracket adapter is secured in place by four lateral clamping screws on the agitation table.

AS 130.3 Dish attachment

For gentle agitation at low speed, for example for Petri dishes or culture flasks. The dish attachment is equipped with an anti-slip sheet that prevents the dish from moving around during the agitation process.

Dimension WxHxD
in mm
420 x 33 x 270

ATTENTION! The dish attachment is secured in place by four lateral clamping screws on the agitation table.

AS 130.4 Reactant glass adapter

For intensive agitation of tubes, reactant bottles, cuvettes and centrifuge tubes. Clamping range from $\varnothing 10\text{mm}$ to $\varnothing 16\text{mm}$ for a maximum of 64 tubes.

Dimension WxHxD
in mm
228 x 95 x 234

ATTENTION! The reactant glass adapter is secured in place by four lateral clamping screws on the agitation table.

After vessels with a large diameter have been agitated for a long time and the equipment is readjusted for vessels with a smaller diameter, the clamping straps must be bent back carefully to ensure that they clamp securely.

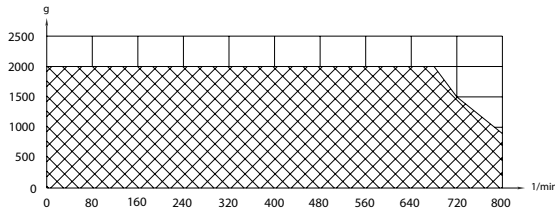
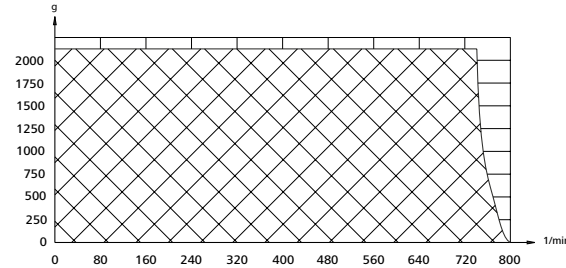
Supported weight (load)

In order to ensure safe and secure operation, the agitator must only be operated within the range of usable weight and speed (see diagram - hatched area). Please make certain that the holding surface on which the agitator is placed is clean and level. Otherwise the working range shown in the diagram (the hatched area) cannot be used.

If the agitator is screwed together with an adjacent piece of equipment (i.e. if it is integrated into a system) it should be noted during operation that dynamic forces may arise as a result of unfavorable loading circumstances and the position of the center of gravity. This may cause the adjacent equipment to vibrate or may cause the table to vibrate uncontrollably. If you notice that the device is running unevenly, the speed must in any case be reduced until the running irregularities no longer occur.

Make certain that individual agitation vessels are placed in the middle of the agitation table and multiple agitation vessels are placed evenly on the agitation table, and that all vessels are securely fastened in place.

Basic error codes:
AS 130.1 Universal attachment



Error codes

ATTENTION! If an error code is encountered, an audio warning signal is generated and the red Off signal light goes on in the display field. First, please try to continue operation by turning the device off and back on again. If it is still not possible to eliminate an error after an extended wait, please contact our service department. If you do so, you should always tell us what error code has been encountered. This simplifies the process of tracking down the error and makes it possible to form a preliminary opinion.

Error code	Error	Cause of the error
Off - LED (red) 1x flash / 2 sec pause	The potentiometer for the speed is not assigning any target value	- Too rapid a change in the speed target value - Internal device error
Off - LED (red) 2x flash / 2 sec pause	Permissible motor temperature exceeded	- Permissible supported weight exceeded - Permissible ambient temperature exceeded
	Motor locked	- Agitation table is being hindered in this stroke motion by an outside effect
	Read fork signal not available	- Internal device error
Off - LED (red) 3x flash / 2 sec pause	Maximum adjustable speed of the device exceeded	- Resonance behavior of the experiment setup
Off - LED (red) 4x flash / 2 sec pause	Motor standstill for device switch-on procedure (safety confirmation not ensured)	- When turning on the device, you must ensure that the motor is not performing any rotational motion
Off - LED (red) 5x flash / 2 sec pause	Safety relay cannot be activated	- Internal device error
Off - LED (red) 6x flash / 2 sec pause	The switch for the TIME function is not assigning any target value	- Internal device error
Off - LED (red) 7x flash / 2 sec pause	Problem with the power supply	- The device is being operating with under voltage or overvoltage (for permissible voltage range, see technical data)
Off - LED (red) 8x flash / 2 sec pause	Triac cannot be activated	- Internal device error

Control error codes:

ATTENTION! If an error code is encountered, an audio warning signal is generated and the red Off signal light goes on in the display field. First, please try to continue operating by turning the device off and back on again. If it is still not possible to eliminate an error after an extended wait, please contact our service department. If you do so, you should always tell us what error code has been encountered. This simplifies the process of tracking down the error and makes it possible to form a preliminary opinion.

Error code	Error	Cause of the error
Er 2	No communication between PC and control device in remote operation with active watchdog function in Mode 1	- Interface not connected - PC is not sending any data within the amount of time set by the watchdog
Er 3	Internal device temperature too high	- Permissible ambient temperature exceeded
Er 4	Motor locked or overloaded, Problem with read fork signal	- Agitator table is being hindered in its stroke motion - Internal device error
Er 9	Error while reading stored values.	- BLP Logik
Er 41	Triac defective	- Internal device error
Er 42	Safety relay defective	- Internal device error
WD	No communication between PC and control device in remote operation with active watchdog function in Mode 1	- Interface not connected - PC is not sending any data within the amount of time set by the watchdog

Interface and outputs

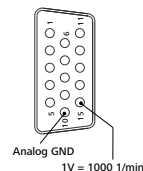
(KS 130 control version only)

The KS 130 control is equipped with a 15-pin SUB-D connector on the rear side of the device. The pins are assigned in operation with analog and serial signals.

Analog output

Voltage values for the speed measurement quantify are present on the analog pins.

- (10) Analog GND
- (15) Speed measurement value 1VDC / 1000 rpm

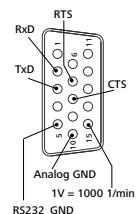


RS 232 C serial interface

The serial assignment of the socket can be used to control the device externally by means of a PC and a suitable application program.

Configuration of the serial RS 232 C interface

- The function of the interface line between the laboratory device and the automation system is a selection of the signals specified in EIA Standard RS 232 C, corresponding to DIN 66020 Part 1.
- Standard RS 232 C applies to the electronic properties of the interfaces and the assignment of signal states in accordance with DIN 66259 Part 1.



- Transmission procedure: Asynchronous character transmission in start-stop mode
- Type of transmission: full duplex
- Character format: Character creation according to the data format in DIN 66022 for start-stop mode. 1 start bit; 7 character bits; 1 parity bit (even); 1 stop bit.
- Transmission speed: 9600 baud
- Data flow control: RTS/CTS hardware handshake
- RTS: (Pin 7) LOW (positive tension) / PC may send
- RTS: (Pin 7) HIGH (negative tension) / PC may not send

- CTS: (Pin 8) LOW (positive tension) / PC recipient
- CTS: (PIN 8) HIGH (negative tension) / PC not recipient
- Access method: Data communication from laboratory instrument to processor is only possible on demand of the processor.

Instruction Syntax

Note the following:

- The instructions are generally sent from the processor (master) to the laboratory instrument (slave).
- The laboratory instrument exclusively sends on demand of the processor. Even error codes cannot be spontaneously communicated from the laboratory instrument to the processor (automatic system).
- Instructions and parameters as well as subsequent parameters are separated by at least one blank. (Code: hex 0x20)
- Each individual instruction including parameters and data as well as each reply are terminated with CR LF (Code: hex 0x0D and 0x0A) and have a maximum length of 80 characters.
- The decimal separator in a floating point number is the point (Code: hex 0x2E).

The above statements largely correspond with the recommendations of the NAMUR-Association. (NAMUR-recommendations for the design of electric plug connections for the analog and digital signal transmission to laboratory- MSR individual units. Rev. 1.1)

Overview of the NAMUR-Instructions

(KS 130 control version only)

Abbreviations:

- X,y = numbering parameter (integer number)
- M = value of variable, integer number
- n = value of variable, floating point number
- X = 4 speed
- X = 6 speed range limit ("safety" speed)

NAMUR Instructions		Function	Display additional
IN_PV_X	X=4	Reading the real-value	
OUT_SP_Xn	X=4	Setting the actual value to n up to a maximum of the set upper speed limit	
IN_SP_X	X=4; 6	Reading the set rated value	
START_X	X=4	Starting the instrument's (remote) function	Remote
STOP_X	X=4	Switching off the instrument function. Variables set with OUT_SP_X are maintained. Contains the instruction MP_STOP	Remote
RESET		Switching off the instrument function	
STATUS		Display of status 1*: A mode of operation 2*: B mode of operation 3*: C mode of operation *0: manual operation without fault *1: automatic operation Start (without fault) *2: automatic operation Stop (without fault) <0: error code: (-1) -2: Er2 / WD -3: Er3 -4: Er4 -9: Er9 -41: Er41 -42: Er42 -83: wrong parity -84: unknown instruction -85: wrong instruction sequence -86: invalid rated value -87: not sufficient storage space	

RMP_IN_X	X=4	Reading the real segment number of ramp. With ramp not started: 0	
RMP_IN_X_y	X=4	Reading the accumulated value and the ramp segment duration (hh:mm:ss) of ramp segment y.	
RMP_OUT_y n hh:mm:ss	X=4	Setting the accumulated value (n) and the ramp segment duration (hh:mm:ss) for ramp segment y	
RMP_START_X	X=4	Starting the ramp function, beginning with ramp segment No. 1. (Only possible after prior START_X.) After RMP_STOP_X START_X is not necessary.	
RMP_STOP_X	X=4	Switching off ramp function. Rated value=0 (Ramp is maintained, that means , ramp can be restarted with RMP_START_X.	
RMP_PAUSE_X	X=4	Stopping the ramp function. Freezing of real rated value and real ramp segment time	
RMP_CONT_X	X=4	Continuation of ramp function (After prior RMP_PAUSE_X).	
RMP_RESET_X		Switching off ramp functions and deleting of all set ramp segments	
RMP_LOOP_SET_X	X=4	To work off the ramps in one loop	
RMP_LOOP_RESET_X	X=4	Ending of ramp loop	
IN_TYPE		Requiring identification of laboratory instrument	
IN_NAME		Requiring the designation name	
OUT_NAME name		Output of designation name (max.6 characters, default: IKA®_S_)	
OUT_WD1@m		Watchdog mode 1: If the WD1 result occurs, the agitation process is turned off and Er2 is displayed. The watchdog time is set to m (10...1800) sec with echo of	

		the watchdog time. This command starts the watchdog function and must always be sent within the time set by the watchdog.	
OUT_WD2@m		Watchdog mode 2: If the WD2 result occurs, the target speed is set to the WD target safety speed that has already been set. The warning WD is displayed. The WD2 result can be reset with OUT_WD2@0. The watchdog time is set to m (10...18000) sec with echo of the watchdog time. This command starts the watchdog function and must always be sent within the time set by the watchdog.	
OUT_SP_42@n		Sets the WD target speed with echo of the value set.	WD

Communication between laboratory instrument and PC

(KS 130 control version only)

PC 5.1 Adaptor IKA® - Control

The Adaptor PC 5.1 splits the analog and serial signals. The analog output signals are allotted to a 7-polar coupling according to the Namur-recommendation; the serial signals to a 9-polar Sub-D-bushing plug (RS 232 C).

PC 1.5 Cable

This cable is required to connect the 7-pin connector to a PC (25-pin connector)



PC 2.1 Cable

This cable is required to connect the 9-pin connector to a PC.

PC 1.2 Adaptor

This adaptor is required to connect the 9-pin connector to an 8-way serial interface (25-pin plug).

AK 2.1 Cable

This cable is required to connect the 7-pin connector to a chart recorder (4mm pin plug).

AK 2.2 Cable

This cable is required to connect the 15-pin connector to a chart recorder (4mm pin plug).

Motor protection / safety device

If the motor is locked or if a load is placed on it resulting in a higher temperature than is permitted, the device is turned off automatically by the safety circuit and the control light flashes. To eliminate the error, the weight of the material must be reduced. Allow the device to cool off.

The device must be turned off and back on again.

The motor is turned off immediately in the event of a malfunction by a safety circuit. A malfunction occurs if the safe and secure functionality of the device cannot be guaranteed. A malfunction is displayed for the Basic model by the red Off signal light coming on and flashing, and for the Control model by the error message being shown on the display of the speed indicator (see the section "Error Codes").

Maintenance and cleaning

The KS 130 basic and KS 130 control are maintenance-free. It is subject only to the natural wear and tear of components and their statistical failure rate.

When ordering spare parts, please give the manufacturing number shown on the type plate, the machine type and the name of the spare part.

Please send in equipment for repair only after it has been cleaned and is free from any materials which may constitute a health hazard. Use only cleansing agents which have been approved by **IKA®** to clean **IKA®** devices. To remove use:

Dyes	isopropyl alcohol
Construction materials	water containing tenside / isopropyl alcohol
Cosmetics	water containing tenside / isopropyl alcohol
Foodstuffs	water containing tenside
Fuels	water containing tenside

- Do not allow moisture to get into the appliance when cleaning.
- Wear protective gloves when cleaning the devices.
- Please consult with **IKA®** before using any cleaning or decontamination methods, other than those recommended here.

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

Repair

Please send instrument in 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.

Return the instrument in its original packaging. Storage packaging is not sufficient. Also, please use suitable shipping package materials.

Accessories

AS 130.1	Universal attachment
AS 130.2	Holding bracket adapter
AS 130.3	Dish attachment
AS 130.4	Reactant glass adapter
STICKMAX	Adhesive mat

(KS 130 control version only)

PC 5.1	Adapter IKA® - Control		
PC 1.5	Cable		
PC 2.1	Cable	AK 2.1	Cable
PC 1.2	Adapter	AK 2.2	Cable

Technical data

Design voltage	VAC	230±10%
or	VAC	115±10%
Design frequency	Hz	50/60
Input power	W	45
Speed range	rpm	0 - 800
Perm. duration of operation	%	100
Perm. ambient temperature	°C	+5 to +50
Perm. relative humidity	%	80
Protection class acc. to DIN EN 60529		IP 21
Protection class		I
Overvoltage category		II
Contamination level		2
Operation at a terrestrial altitude	m	max. 2000 above sea level
Drive		Speedcontrol asyn- chronous motor
Protection at overloaded		Temperature sensor in motor winding

Fuses on apparatus plug	A	2x T1A 250V
Radius of the orbit	mm	2
Shaking motion		approximately circular amplitude
Max. load	kg	2
Dimensions (B x H x T)	mm	270 x 98 x 316
Weight (... basic)	kg	7,7
Weight (... control)	kg	8,8

KS 130 basic

Speed setting		Analog (infinitely variable)
Rotary knob on front side left		
Speed display		10 LED's with scale in 80 rpm steps
Max. speed deviation from idle:	%	±10
Time setting		three indexing positions / key button 10 steps from
Rotary knob on the front side right		5 - 50 min in 5 min steps
Time display		10 LED's with scale in 5 min steps
Max. time deviation from idle	%	±1

KS 130 control

Speed setting		Digital
Rotary knob on the front side left		(1 step = 10 1/min)
Speed display		LCD - Display
Max. speed deviation from idle	%	±1
Time setting		Digital
Rotary knob on the front side right		(1 step = 1 rpm)
Time display:		LCD - Display max. 9 h 59min
Max. time deviation from idle Interface	%	±1 RS 232 C / analog

Subject to technical changes!