

IKA

designed for scientists

IKA T25 easy clean digital IKA T25 easy clean control



Operating instructions

EN

Device setup/Dangerous parts

Device setup

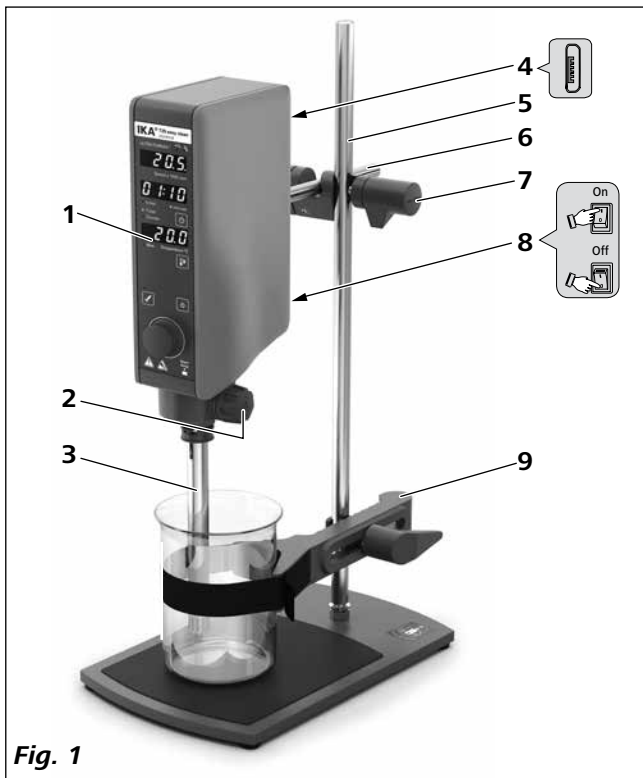


Fig. 1

Item Designation

- | Item | Designation |
|------|----------------------------|
| 1 | Operator panel and display |
| 2 | Turning knob |
| 3 | Dispersion tool |
| 4 | USB port |
| 5 | Stand |
| 6 | Extension arm |
| 7 | Cross sleeve |
| 8 | Power switch |
| 9 | Strap clamp |

Dangerous parts

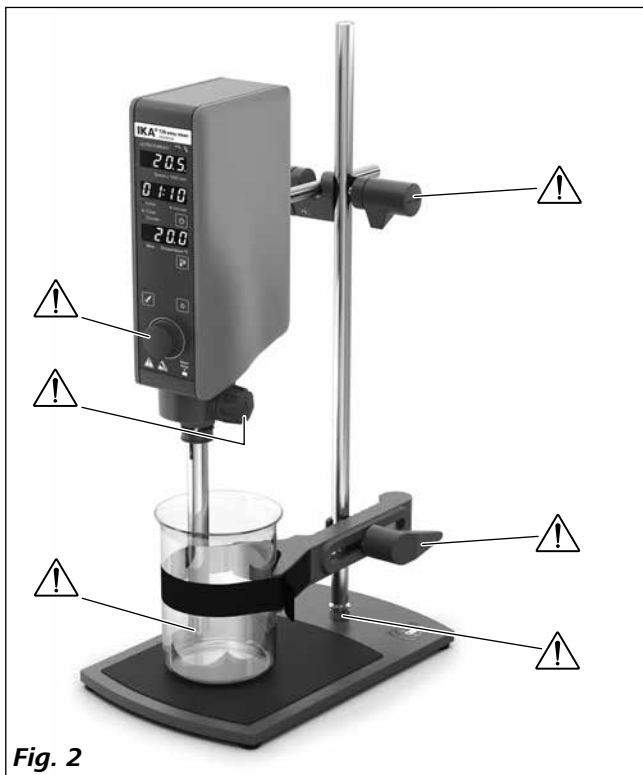


Fig. 2

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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 6010-2-051, EN 61326-1, EN 60529 and EN ISO 12100.

Bluetooth® module (for **T25 easy clean control**):

Directive: 2014/53/EU

Standards: EN 60950-1, EN 300328, EN 301489-1, EN 301489-17

A copy of the complete EU Declaration of Conformity can be requested at sales@ika.com.

Explication of warning symbols



indicates a hazardous situation which, if not avoided, will result in death or serious injury.



indicates a hazardous situation which, if not avoided, could result in death or serious injury.



used with the safety alert symbol, indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.



is used to address practices not related to personal injury.



Indicates crushing risk to fingers/hand.



Indicates hazards arising from a hot surface.

Safety instructions

General information:

- **Read the operating instructions in full 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.



Please pay attention to the dangerous parts of the equipment in Fig. 2.

Beware of the risk of:

- flammable materials
- glass breakage
- sharp edges on the dispersing tool.



Wear your personal protective equipment in accordance with the hazard category of the media to be

processed. There is a risk from:

- splashing and evaporation of liquids
- body parts, hair, clothing and jewellery getting caught.

- The device must only be used in a technically perfect condition.
- Do not cover the ventilation slots on the drive in order to ensure adequate cooling of the drive.
- The voltage stated on the type plate must correspond to the power voltage.
- Abrasion of the dispersion equipment or the rotating accessories can get into the medium you are working on.

Device setup:



The power switch of the IKA device must be accessed immediately, directly and without risk at any time.

If access to the power switch cannot be ensured, an additional emergency stop switch that can be easily accessed must be installed in the work area.



Make sure that the unit is stably mounted. The vessel used for dispersing must be secured.



Set up the stand in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.

- Ensure that the dispersion tool is securely properly into the drive unit.
- All screw connections must be properly tightened.
- Check that the turning knobs are secure and tighten if necessary.
- Glass vessels must always be secured with a clamp to prevent them spinning.

- Before switching on the dispersing device make sure that the dispersion tool shaft is immersed in the medium. Observe the operating instructions of the dispersion tools.
- The distance between the dispersion tool and the vessel bottom should not be less than 10 mm.
- Use the dispersion tool always inside the dispersing vessel.
- Do not use the device without a dispersion tool.

Working with the device:



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.

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.

The device is not suitable for hand-held operation.

Switch off the device at the power switch (item 8) or pull out the mains plug when changing or handling the dispersing tool.



Do not touch rotating parts during operation!



The dispersing tool and the coupling flange can become hot during the operation.

If a dispersion tool is not inserted into the drive flange as far as the mark it can become extremely hot in operation and thus suffer damage.



Be aware that the unit starts with the set speed, which is shown on the display. If uncertain start with the lowest speed and increase it gradually.

Reduce the speed if the medium splashes out of the vessel because the speed is too high.

If the interaction between the medium and dispersing element or working with dispersing tools with a stator diameter ≥ 18 mm and a speed of more than 20000 rpm, makes a loud noise, be sure to wear your personal protective equipment.



NOTICE

Covers or parts that can be removed from the device without tools must later be refitted to ensure safe operation. This will prevent the infiltration of foreign objects, liquids and other contaminants.

Never run dispersion tools dry, as the gasket and bearings will be destroyed if the tools are not cooled by the medium.

- In the event of unbalance or unusual noises, switch off the device immediately. Replace the dispersion tool. If there is no difference after the change of the dispersion tool, return it to the dealer or the manufacturer along with a description of the fault.
- Ensure that the stand does not start to move.
- Meter powder cannot be placed too close to the flange. Powder can be blown away by air turbulences of the drive.
- There may be electrostatic discharges between the medium and the dispersing device shaft which could pose a direct danger.

Power supply / Switching off the device:

- The device can only be disconnected from the power supply by pulling out the power plug or the connector plug.
- Always disconnect the plug before fitting accessories or cleaning.
- The socket for the power cord must be easily accessible.
- The device does not start up again automatically following a cut in the power supply.
- The device must only be opened by trained specialists, 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.

Accessories:

- Protect the device and accessories from bumps and impacts.
- Check the device and accessories beforehand for damage each time you use them. Do not use damaged components.
- Only dispersion tool approved by **IKA** may be used.
- Safe operation is only guaranteed with the accessories described in the "Accessories" chapter.

Disposal of the device:

- The device must be disposed of in accordance with national regulations

Intended use

Use:

When used in combination with one of our recommended dispersion tools, the drive unit is a high-speed dispersing and emulsifying unit capable of handling free-flowing and liquid media in batches.

Production of:

Emulsions

Dispersions

Wet crushing

Intended use: on stand (dispersion tool points down)

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 or contrary to the manufacturer's specifications
- If the device or the printed circuit board are modified by third parties.

Unpacking

Unpacking:

- Unpack the device carefully.
- Any damage should be notified immediately to the shipping agent (post office, railway network or logistics company).

Delivery scope:

- IKA T 25 easy clean digital or IKA T 25 easy clean control
- Extension arm
- Hexagon socket screw
- Screwdriver DIN 911
- USB 2.0 cable (A – micro B)
- User guide
- Warranty card.

Useful information

Dispersion is the dissolution and diffusion of a solid, liquid or gaseous phase in a liquid that is not consolute with that phase.

The rotor/stator principle:

Due to the high rotation speed of the rotor, the medium to be processed is automatically drawn axially into the dispersion head and then forced radially through the slots in the rotor/stator arrangement. The high accelerations acting on the material produce extremely strong shear and thrust forces. In addition, high turbulence occurs in the shear gap between rotor and stator, which provides optimum mixing of the suspension.

The dispersion effectiveness is heavily dependent on the product of the shear gradient and the time the particles spend in the shear zone. The optimum range for the circumferential velocity of the rotor/stator arrangement is 6–24 m/s.

A processing time of a few minutes is usually sufficient to produce the desired fineness. Long processing times bring only insignificant improvements in the obtainable fineness; the energy expended serves merely to increase the temperature of the medium.

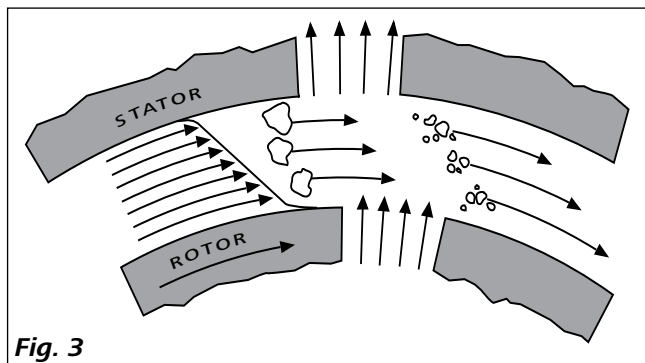


Fig. 3

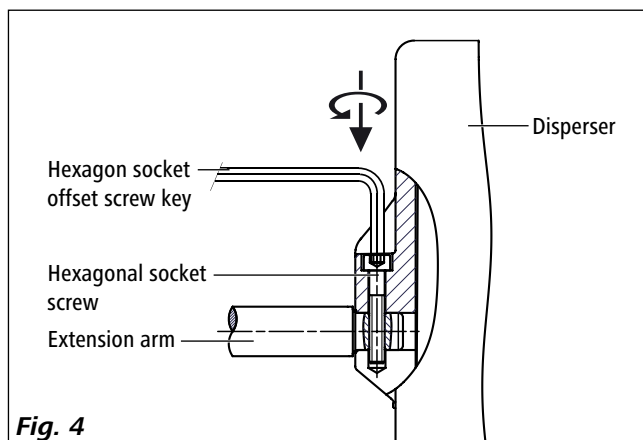
Drive

The drive unit opens up a wide range of possibilities for dispersion technology in the conventional laboratory with a respective performance output of approximately 400 watts at 25000 rpm.

The speed is set by using the operating knob. The motor speed can be read from the LED display. For example, a value of 13.6 corresponds to 13600 rpm.

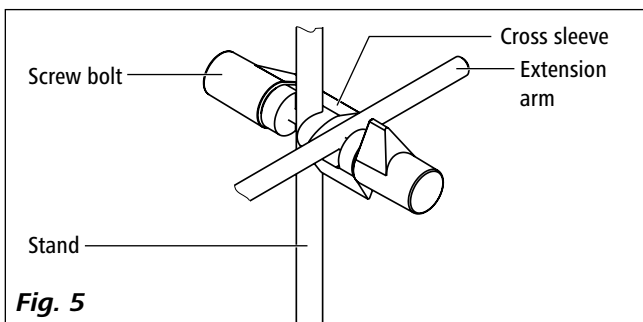
Securing

Securing the extension arm to the disperser:



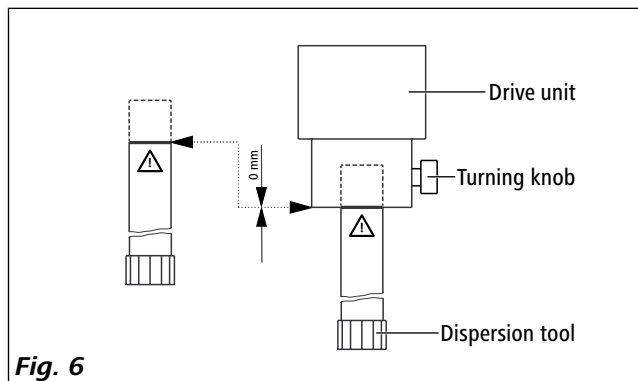
Ensure that the extension arm is fitted securely. Vibration may cause the screw to become loose. It is therefore necessary for safe use to regularly check that the extension arm is attached securely. Tighten the hexagonal bolt as required.

Securing the disperser to the stand:



Check that the disperser is held in position firmly prior to each use and also at regular intervals. The position of the disperser must only be adjusted when the equipment is stationary and the power supply is disconnected.

Securing the dispersion tool:



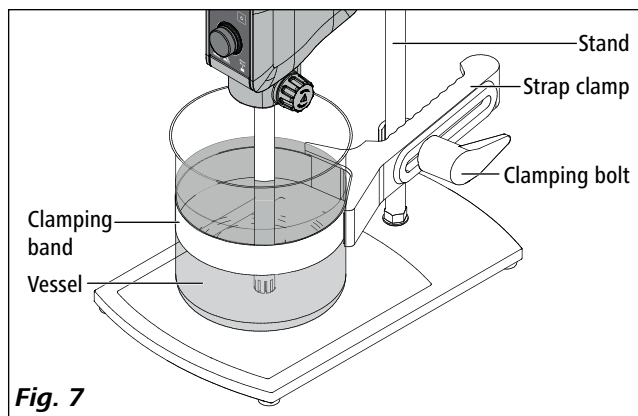
Open the turning knob so that the thread does not protrude into the hole.

Insert the dispersion tool from the bottom into the drive unit as far as the stop. The shaft tube will audibly click into place when a small amount of force is applied.

The dispersion tool is fitted correctly when the marking on the dispersing element is aligned with the bottom edge of the drive unit.

Now secure the dispersion tool by screwing the turning knob tightly.

Securing the dispersing vessel to the stand:



Operator panel and display

T25 easy clean digital:

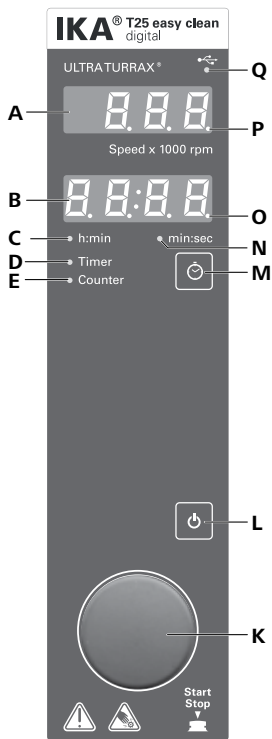


Fig. 8

Item	Designation	Function
A	"Speed" display:	Display the "Speed" value (x 1000 rpm).
B	"Timer/Counter" display:	Indicate the "Timer/Counter" value.
C	"h:min" indicator:	Indicate the "Timer" or "Counter" is in hour/minute [h:min] mode.
D	"Timer" indicator:	Indicate the "Timer" function is activated.
E	"Counter" indicator:	Indicate the "Counter" function is activated.
K	"Start/Stop" knob:	Set the speed. Set the timer when "Timer" setting is activated. Start/stop dispersing function.
L	On/off button:	Switch on/off the device.
M	"Timer" button:	Switch between the setting of speed and timer.
N	"min:sec" indicator:	Indicate the "Timer" or "Counter" is in minute/second [min:sec] mode.
O	"Timer" setting indicator:	Indicate the "Timer" can be set.
P	"Speed" setting indicator:	Indicate the speed can be set. When the device is controlled by Labworldsoft and tries to change the speed of the device, the display show PC (P E).
Q	USB indicator:	Indicates the device is connected to a PC with USB port.

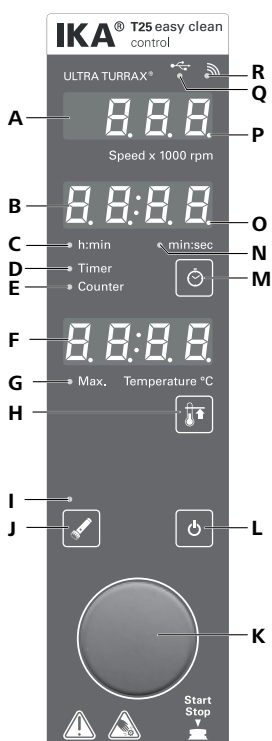


Fig. 9

Item	Designation	Function
A	"Speed" display:	Display the "Speed" value (x 1000 rpm).
B	"Timer/Counter" display:	Indicate the "Timer/Counter" value.
C	"h:min" indicator:	Indicate the remaining time to maintenance. When device is controlled by a WiCo , the display show rC (r C).
D	"Timer" indicator:	Indicate the "Timer" or "Counter" is in hour/minute [h:min] mode.
E	"Counter" indicator:	Indicate the "Timer" function is activated.
F	"Temperature" display:	Indicate the "Counter" function is activated.
G	"Max. Temperature" indicator:	Display the actual temperature value/set max. temperature value of the medium with the S 25 EC-T... tool.
H	"Max. Temperature" button:	If a tool other than the S 25 EC-T... is used, the display show ---.
I	S 25 EC-T... dispersion tool indicator:	Indicate the "Max. Temperature" of the dispersing medium that can be set.
J	S 25 EC-T... dispersion tool button:	Display the max. temperature setting in running status.
K	"Start/Stop" knob:	Active the setting function on "Max. Temperature" of the dispersing medium.
L	On/off button:	Indicate the S 25 EC-T... dispersion tool is inserted.
M	"Timer" button:	Display the remaining time to maintenance of S 25 EC-T... tool.
N	"min:sec" indicator:	Activate the reset of the maintenance time.
O	"Timer" setting indicator:	Set the speed value by rotating the knob.
P	"Speed" setting indicator:	Set the timer value by rotating the knob when "Timer" setting is activated.
Q	USB indicator:	Start/stop the running of the device by pressing the knob.
R	Bluetooth indicator:	Switch on/off the device.

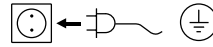
Commissioning and operating

Refer to the operating instructions for the filling level of the medium and the immersion depth into the dispersion tool used.

If a dispersion tool is not inserted into the drive flange as far as the mark it can become extremely hot in operation and thus suffer damage.

So as to avoid unintentional ingress of air into the medium due to excessively turbulent rotation, the whole unit can be placed a little off center in the dispersing vessel.

Check whether the voltage given on the type plate corresponds to the available power voltage.



The socket used must be earthed (fitted with earth contact).

If these conditions have been met, the machine is ready to operate when the power plug is plugged in.

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

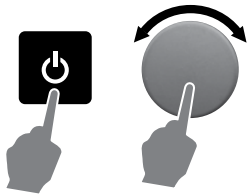
Switching on:

After switching on the power switch (8) of the device, all LED segments light up during self test.

Then, "Timer" display (B) shows the software version.

After that, the device enters standby status and "Speed" setting indicator (P) keeps lighting.

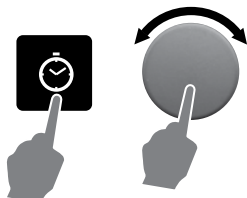
Setting speed:



- ☞ Activate the device by pressing on/off button (L).
- ⇒ After a beep, the "Speed" setting indicator (P) lights up.
- ☞ Change the speed setting by rotating the "Start/Stop" knob (K).
- ⇒ The speed value shows on the display (A), e.g.: 3.2 means the speed is 3200 (3.2 x 1000) rpm.
- ☞ Start the device by pressing the "Start/Stop" knob (K).

Note: After starting, actual speed value flashes until reach the set value.

Setting timer:



- ☞ Activate the timer setting by pressing timer button (M).
- ⇒ Timer setting indicator (O) lights up.
- ☞ Change the timer setting by rotating the "Start/Stop" knob (K).
- ⇒ When the timer is set to over 00:00, the timer function is activated and timer indicator (D) lights up.
- The "min: sec" indicator (N) and "h:min" indicator (C) show the unit of the timer value.
- ☞ Start the device by pressing the "Start/Stop" knob (K).
- ⇒ When the time reach 00:00, the device stops running and the display (A) and (B) show last settings.

Note: While running, the timer setting can be checked by pressing the timer button (K).

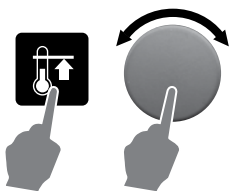
Activating the counter function:



- ☞ Set the timer to 00:00 [min:sec] by rotating the "Start/Stop" knob (K).
- ⇒ The counter function is activated and counter indicator (E) lights up.
- ☞ Start the device by pressing the "Start/Stop" knob (K).

For T25 easy clean control with S 25 EC-T... dispersion tool only:

Setting the "Max. Temperature":



- ☞ Activate the setting function of maximum temperature of the dispersing medium by pressing "Max. Temperature" button (H).
- ⇒ "Max. Temperature" setting indicator (G) lights up.
- ☞ Change the setting by rotating the "Start/Stop" knob (K).
- ☞ Start the device by pressing the "Start/Stop" knob (K).

Note: When the dispersing medium reaches the set temperature, the device stops and a warning message is shown on display (A) and (B): hot tool (see section "Warning message").

While running, the "Max. Temperature" setting can be checked by pressing the "Max. Temperature" button (H).

Checking the tool maintenance time:

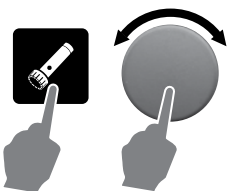


- ☞ To check the tool maintenance time of **S 25 EC-T...** by pressing **S 25 EC-T...** dispersion tool button (J).
- ⇒ Display (B) shows the tool maintenance time about 2 seconds.
The "min: sec" indicator (N) or "h:min" indicator (C) show the unit of the time value.
S 25 EC-T... dispersion tool indicator (I) flashes twice.
- ⇒ Display (B) switches to show the timer value.

Note: The tool maintenance time can be checked in either stop or running status.
When the tool maintenance time is less than 30 minutes, the **S 25 EC-T...** dispersion tool indicator (I) changes from green to red color.
When the tool maintenance time reaches 0, the value (00:00:00) flashes and meanwhile the indicator LED (I) is red and flashes.

Resetting the tool maintenance time:

The default maintenance time of **S 25 EC-T...** dispersion tool is 20* hours. We recommend to check and carry out necessary maintenance (e.g. replacing the bearing) to the dispersion tool when the service time elapse.
When the tool maintenance time reach 0, the device will not stop, but we recommend a maintenance of the tool as soon as possible. After the maintenance in a **IKA** service workshop the maintenance time will be reset from the service team. In all other cases it is possible to reset the maintenance time with the device. Description see below.



- ☞ Activate the setting function on the tool maintenance time of **S 25 EC-T...** dispersion tool by pressing **S 25 EC-T...** dispersion tool button (J) 3 seconds.
- ⇒ Display (B) switches to tool maintenance time.
- ⇒ The **S 25 EC-T...** dispersion tool indicator (I) flashes.
- ☞ Press the "Start/Stop" knob (K) to reset the tool maintenance time.

* **Note:** The maintenance time of **S 25 EC-T...** dispersion tool can be set between 4 to 40 hours according to the request of your application by rotating the "Start/Stop" knob immediately after resetting the tool maintenance time. The new value has to confirm by pressing the "Start/Stop" knob. This new value will be the resetting value when the tool will reset the next time.

Interfaces and outputs

Remote control:

The device can be connected to a PC using a USB cable and be operated in "Remote" mode via USB port using labworldsoft® laboratory software.

The device software can also be updated with a PC via the USB port.

Note: Please observe the system requirements together with the operating instructions and help section included with 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. The USB port can also be used to update firmware.

USB device drivers:

First, download the latest driver for **IKA** devices with USB port 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.

Device software update:

For device software update, visit **IKA** website www.ika.com and enter the "Service" menu. Download and run the Firmware Update Tool.

Find and click the Firmware Update Tool in your PC after installation. Register your E-mail and password.

Connect the device to your PC via the USB cable. Then, you can update the device software according to instructions of the Firmware Update Tool.

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 0x0d 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 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.

Commands	Function
IN_NAME	Read device name.
RESET	Switch to normal operation mode
IN_PV_4	Read current speed value
IN_SP_4	Read rated value
OUT_SP_4 X (X = 3000 ... 25000)	Adjust the rated speed value
START_4	Start the motor
STOP_4	Stop the motor
IN_SOFTWARE	Read software ID and version

Accessories

R 1825	Plate stand
R 1826	Plate stand
R 1827	Plate stand
R 182	Cross sleeve
RH 3	Strap clamp

BC 1000	Beaker cap
Silentstream	
T 25 easy clean control WiCo	(for T25 easy clean control only)

See more accessories on www.ika.com.

Permitted dispersion tools

Dispersion tools series S 25...

Abbreviations:

S 25:	suitable for device T 25...
N:	PTFE bearing
KV:	Ball bearing with axial face seal (suitable for vacuum up to 1 mbar, 6 bar excess pressure)
D:	Without seal
KD:	Ball bearing with PTFE bearing with seal
T:	Temperature
C:	Ceramic bearing
KS:	Synthetic material
ST:	Saw tooth
EC:	easy clean

8G, 10G, 18G, 14G, 25G, 25F:

Stator / shaft tube diameter

G: Coarse

F: Fine

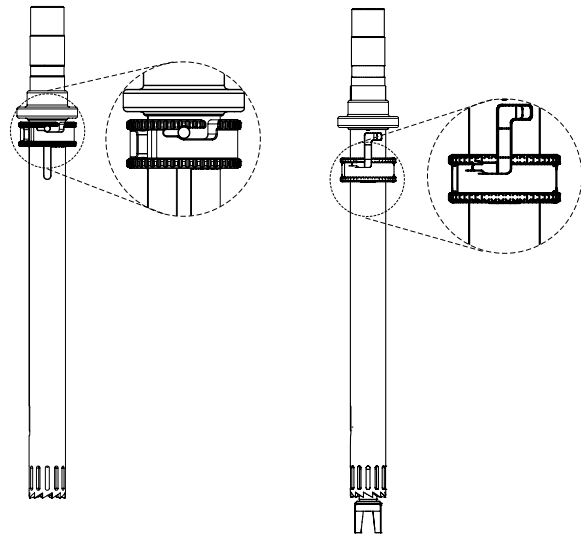
Speed range: up to 25000 rpm

Designation

S 25 N - 8G	Stainless steel
S 25 N - 10 G	Stainless steel
S 25 N - 18 G	Stainless steel
S 25 N - 25 G	Stainless steel
S 25 N - 25 F	Stainless steel
S 25 N - 8G - ST	Stainless steel
S 25 N - 10 G - ST	Stainless steel
S 25 N - 18 G - ST	Stainless steel
S 25 N - 25 G - ST	Stainless steel
S 25 KV - 18 G	Stainless steel
S 25 KV - 25 G	Stainless steel
S 25 KV - 25 F	Stainless steel
S 25 D - 10 G - KS	Synthetic material
S 25 D - 14 G - KS	Synthetic material
S25 KD - 18 G	Stainless steel
S25 KD - 25 G	Stainless steel
S25 KD - 25 F	Stainless steel
S25 KD - 18 G - ST	Stainless steel
S25 KD - 25 G - ST	Stainless steel

S 25 EC - C - 18G - ST ①	Stainless steel
S 25 EC - T - C - 18G - ST ①	Stainless steel
(S 25 EC only suitable for T25 easy clean digital or T25 easy clean control. Full functionality of the S 25 EC-T ... only with the T25 easy clean control).	

① Note below dispersing status and cleaning status!



Dispersing status

Cleaning status



For applications and further information, please see the operating instructions of the dispersion tools.

Only use the dispersion tools listed and observe the operating instructions of the dispersion tool.

Warning message

Any malfunction during operation may be identified by a warning message on the display.

Proceed as follows in such cases:

Warning code	Cause	Effect	Solution
 no tool	The dispersion tool is not secured properly.	motor off	- Secure the dispersion tool properly. - Restart the device by pressing the "Start/Stop" knob (F).
 hot tool	The medium temperature exceeds the maximum temperature setting. (only for S 25 EC-T...).	motor off	- Switch off the device using on/off button (L). - Switch on the device again using on/off button (L). - Let the medium and dispersion tool cool down or set higher maximum temperature. - Restart the device by pressing the "Start/Stop" knob (K).

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
E 3	Inside temperature is too high	motor off	- Switch off the device and let it cool down. - Restart the device.
E 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 blockage
E 25 E 86	Internal hardware failure	motor off	- Send the device for repair.
E 47 E 48	Overload	motor off	- Switch off the device - Decrease the speed setting or the load

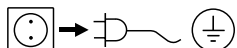
If the actions described fails to resolve the fault or another error code is displayed then take one of the following steps:

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

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 main plug!

Use only cleaning agents which have been approved by **IKA** to clean **IKA** devices: 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
- manufacturing number, see type plate
- item and designation of the spare part see www.ika.com
- software version.

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 repair, please request the “**Decontamination Certificate**” form **IKA** or use the download printout of it from **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.

Technical data

		T25 easy clean digital	T25 easy clean control
Operating voltage	VAC	220 ... 240 ± 10 % 100 ... 120 ± 10 %	
Frequency	Hz	50 / 60	
Motor rating input	W	500	
Motor rating output	W	400	
Volume range (H ₂ O)	l	0.001 ... 2	
Maximum viscosity	mPa·s	5000	
Speed range	rpm	3000 ... 25000	
Speed deviation		± 2% of current speed	
Speed display		LED	
Speed adjustment		stepless	
Noise without dispersion tool	dB (A)	≤ 70	
Extension arm (Ø x L)	mm	13 x 160	
Temperature display		no	LED
Temperature display resolution	°C	-	0.1
Timer function		yes	
Timer display		LED	
Permit on time	%	100	
Dimension (W x D x H)	mm	89 x 161 x 270	
Weight	kg	3.0	
Permissible ambient temperature	°C	+ 5...+ 40	
Permissible relative humidity	%	80	
IP code according to EN 60529		IP 30	
Interface		USB	USB, bluetooth
Operation at a terrestrial altitude	m	maximum 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.

IKA

designed for scientists

IKA-Werke GmbH & Co. KG

Janke & Kunkel-Straße 10, 79219 Staufen, Germany

Phone: +49 7633 831-0, Fax: +49 7633 831-98

eMail: sales@ika.de

USA

IKA Works, Inc.

Phone: +1 910 452-7059

eMail: usa@ika.net

KOREA

IKA Korea Ltd.

Phone: +82 2 2136 6800

eMail: sales-lab@ika.kr

BRAZIL

IKA Brazil

Phone: +55 19 3772 9600

eMail: sales@ika.net.br

MALAYSIA

IKA Works (Asia) Sdn Bhd

Phone: +60 3 6099-5666

eMail: sales.lab@ika.my

CHINA

IKA Works Guangzhou

Phone: +86 20 8222 6771

eMail: info@ika.cn

POLAND

IKA Poland Sp. z o.o.

Phone: +48 22 201 99 79

eMail: sales.poland@ika.com

JAPAN

IKA Japan K.K.

Phone: +81 6 6730 6781

eMail: info_japan@ika.ne.jp

INDIA

IKA India Private Limited

Phone: +91 80 26253 900

eMail: info@ika.in

UNITED KINGDOM

IKA England LTD.

Phone: +44 1865 986 162

eMail: sales.english@ika.com

VIETNAM

IKA Vietnam Company Limited

Phone: +84 28 38202142

eMail: sales.lab-vietnam@ika.com

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