

# IKA

designed for scientists

## T 18 digital ULTRA-TURRAX®



Operating instructions

EN

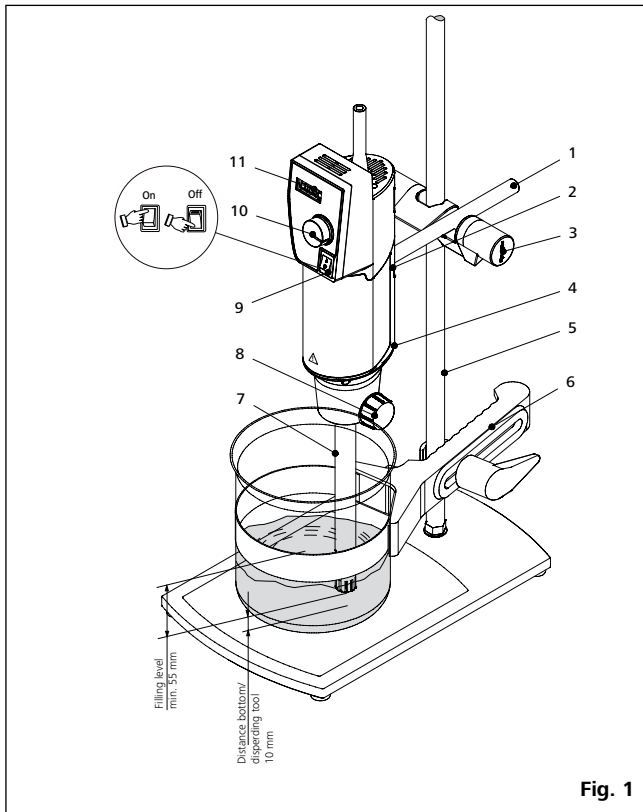


Fig. 1

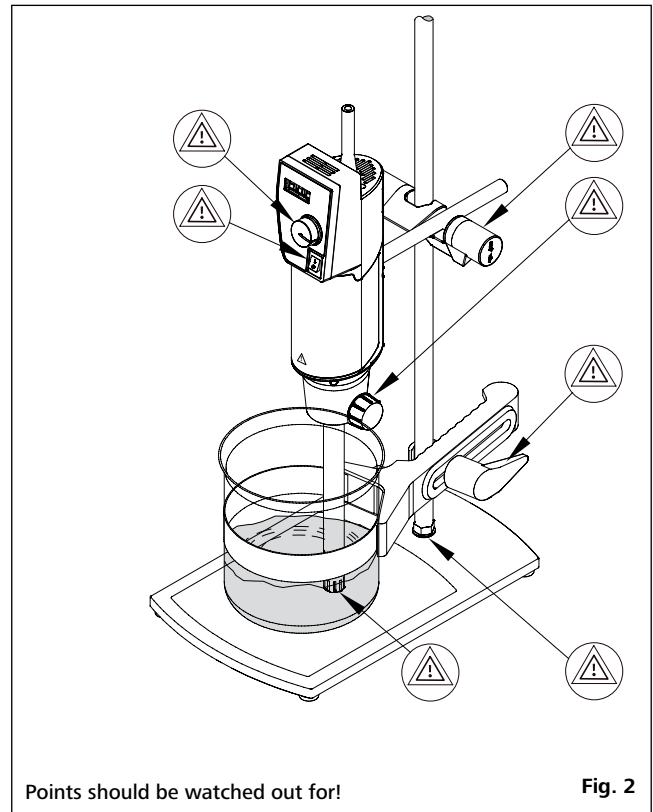


Fig. 2

| Item | Designation          |
|------|----------------------|
| 1    | Extension arm        |
| 2    | Hexagon socket screw |
| 3    | Cross sleeve         |
| 4    | Disperser            |
| 5    | Stand                |
| 6    | Tensioner            |
| 7    | Dispersion tool      |
| 8    | Knurled screw        |
| 9    | On/Off-switch        |
| 10   | Rotary knob „speed“  |
| 11   | LED- Display speed   |

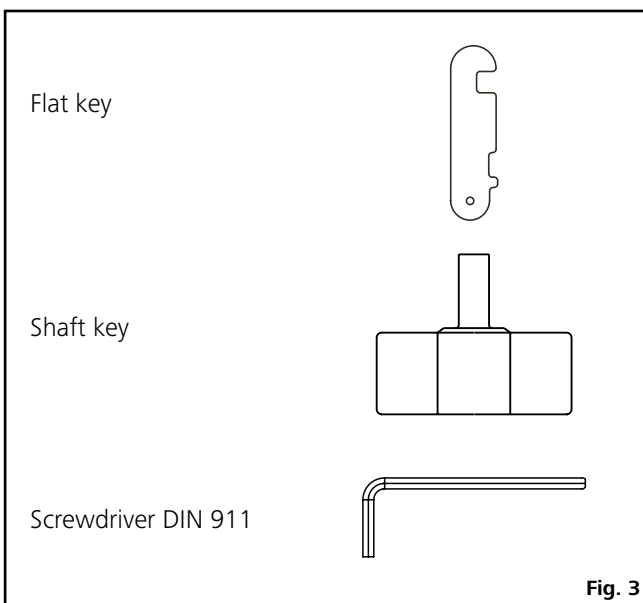


Fig. 3

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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 standards or standardized documents EN 61010-1, EN 61010-2-051, EN 61326-1, EN ISO 12100 and EN 60529.

A copy of the complete EU Declaration of conformity or further declarations of conformity can be requested at [sales@ika.com](mailto:sales@ika.com).

## Explication of warning symbols



Indicates an (extremely) hazardous situation, which, if not avoided, will result in death, serious injury.



Indicates a hazardous situation, which, if not avoided, can result in death, serious injury.



Indicates a potentially hazardous situation, which, if not avoided, can result in injury.



Indicates practices which, if not avoided, can result in equipment damage.

## Safety instructions

### **For your protection:**

- **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 appliance.
- Follow the safety instructions, guidelines, occupational health and safety and accident prevention regulations.

**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
  - body parts, hair, clothing and jewellery getting caught.
- Set up the stand in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.
  - Check the appliance and accessories beforehand for damage each time you use them. Do not use damaged components.
  - The appliance is not suitable for manual operation.
  - The agitation vessels used for dispersing have to be secured. Consider on a good stability of the entire structure.
  - Secure the agitation vessel against twisting.
  - Check that the turning knobs are secure and tighten if necessary.
  - Glass vessels must always be secured with a clamp to prevent them spinning. When working with flasks elastic couplers must be used to prevent fracture of the glass.
  - Note the operating instructions of the dispersing tool and accessories.
  - Only dispersing elements approved by **IKA** may be used.
  - Please observe the permitted speed for the dispersing element. Never set higher speeds.
  - Do not use the appliance without a dispersing element.
  - Use the dispersing tool always inside the stirring vessel.
  - Never run dispersion tools dry, as the gasket and bearings will be destroyed if the tools are not cooled by the medium.

**NOTICE**

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

- Make certain that the unit is set at the lowest speed before commissioning; otherwise, the unit will begin running at the speed last set. Gradually increase the speed.
- Reduce the speed if the medium splashes out of the vessel because the speed is too high.
- Before switching on the dispersing instrument make sure that its shaft is immersed min. 45 mm in the medium to prevent the medium from splashing out.
- The distance between the dispersion tool and the vessel bottom should not be less than 10 mm.
- Ensure that the stand does not start to move.
- In the event of unbalance or unusual noises, switch off the appliance immediately. Replace the dispersing element. If there is no difference after the change of the dispersing tool, return it to the dealer or the manufacturer along with a description of the fault.

**DANGER**

Do not touch rotating parts during operation.

- When in operation, the dispersing element and the coupling flange can become hot.

- Do not cover the ventilation slots on the drive in order to ensure adequate cooling of the drive.

**DANGER**

Beware of the risk of:

- flammable materials
  - glass breakage
  - sharp edges on the dispersing tool.
- Process pathogenic materials only in closed vessels under a suitable extractor hood. Please contact **IKA** if you have any questions.

**DANGER**

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.

- There may be electrostatic discharges between the medium and the dispersing instrument shaft which could pose a direct 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.
- Meter powder not too close to the flange. Powder can be blown away by air turbulences of the drive.
- Safe operation is only guaranteed with the accessories described in the "Accessories" chapter.
- Always disconnect the plug before fitting accessories.
- The appliance can only be disconnected from the mains supply by pulling out the mains plug or the connector plug.
- The socket for the mains cord must be easily accessible.
- The appliance does not start up again automatically following a cut in the power supply.
- Abrasion of the dispersion equipment or the rotating accessories can get into the medium you are working on.

**For protection of the equipment:**

- The appliance may only be opened by experts.
- The voltage stated on the type plate must correspond to the mains voltage.
- Removable parts must be refitted to the appliance to prevent the infiltration of foreign objects, liquids etc..
- Protect the appliance and accessories from bumps and impacts.



## Unpacking

### **Unpacking:**

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

### **Delivery scope:**

- **T 18 digital ULTRA-TURRAX®**
- Extension arm
- Hexagon socket screw
- Flat key
- Shaft key
- Screwdriver DIN 911
- User guide.

## 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 (dispersing tool points down)

### **Range of use:**

Indoor environments similar to that a laboratory of industry area.

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.

## 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.

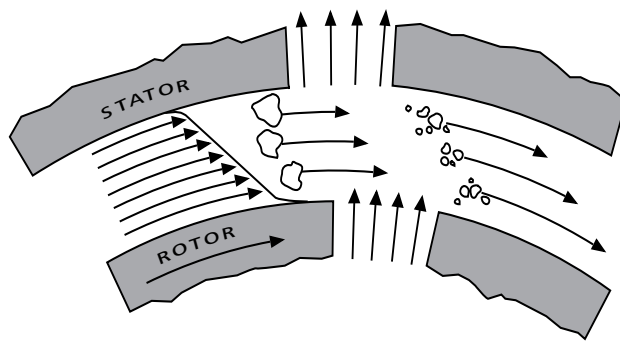


Fig. 4

## 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 300 watts at 25000 rpm.

The speed is set by using the differently adjusting wheel. The motor speed can be read off the LED display. For example, a value of 13.6 corresponds to 13600 rpm.

## Assembly of boom and stand

The delivered extension arm is mounted as follows (overview fig. 1):

- Insert extension arm (item 1) into flange
- Screw in the cheese head screw (item 2)
- Firmly tighten cheese head screw (item 2) using the DIN 911 A/f 4 screwdriver

Vibrations may cause the cylinder head screw (item 2) to loosen. Therefore, for your own safety, periodically check that the extension arm is secure. If necessary, retighten the cylinder head screw (item 2).

To ensure safe operation the driving unit is fastened to the plate stand R 1826 (item 5) by means of a cross sleeve (item 3).

In order to enhance the stability of the mechanical arrangement, the driving unit has to be mounted as close as possible to the stand pillar.

## Working with the unit

Also pay attention to the ambient conditions listed in the "Technical data".

### **Assembling the dispersion tool:**

#### **(Overview Fig. 5)**

- Open the knurled screw (item 3) so that the thread does not protrude into the hole.
- Insert the dispersing element (item 2) from the bottom into the drive unit (item 1) as far as the stop. The shaft will audibly click into place when a small amount of force is applied (sprung ball bearing) - depending on the type of disperser. The dispersing element is fitted correctly if the dispersing element is flush with the bottom edge of the drive unit.
- **Attention:** Now secure the dispersing element by screwing the knurled screw tight (item 3).

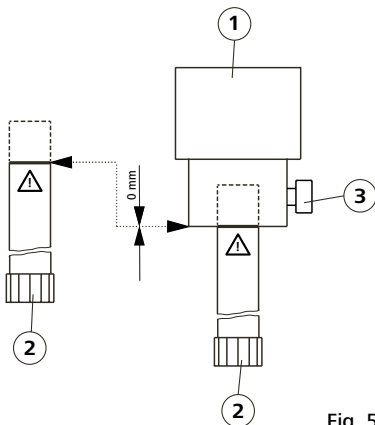


Fig. 5

**Caution: Burns hazard!** If a dispersing element 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 stirring vessel.

By using the turning knob (item 10) the speed may be infinitely varied to meet the requirements of the medium to be processed.

The idle speed for the drive unit can be adjusted in the range 3000 – 25000 rpm; the value will be shown on the LED display.



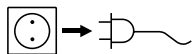
← If these conditions are met the unit is ready for service when the mains plug has been plugged in.

The driving unit is switched on by means of the On/Off-switch (item 9).

## Maintenance and cleaning

The drive unit is maintenance-free but not immune from wear. The motor brushes and the coupling wear out over time.

### Cleaning:



For cleaning disconnect the main plug.

To clean the drive use only water with a water (containing surfactant) or use isopropyl alcohol for stubborn soiling (not for plastic parts).

Dispersion tools: Consider place the manuals associated to the dispersion tools.

- 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.

### 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](http://www.ika.com), spare parts diagram and spare parts list

### Repair:

**In case of repair the device has to be cleaned and free from any materials which may constitute a health hazard.**

For this use the "**Decontamination Certificate**" or download the form from the **IKA** website [www.ika.com](http://www.ika.com).

If you require servicing, return the appliance in its original packaging.

Storage packaging is not sufficient. Please also use suitable transport packaging.

## Accessories

- **R 1825** Plate stand
- **R 1826** Plate stand
- **R 1827** Plate stand

- **R 182** Cross sleeve
- **RH 3** Tensioner

See more accessories on [www.ika.com](http://www.ika.com).

## Permitted dispersion tools

### Dispersing tools serie S 18...

#### Abbreviations:

**S 18:** consistent with dispersing unit T 18

**N:** PTFE bearing

**D:** without seal

**KS:** synthetic material

#### 10G, 14G, 19G:

Stator/shaft tube diameter

**G:** Coarse

**Speed range:** upto 25000 rpm

For applications and further information, please see the operating instructions of the dispersing element.

**Only use the dispersion tools listed in the table and note the according operating instructions of the dispersion tool.**

| Designation | Shaft material |
|-------------|----------------|
|-------------|----------------|

|                 |                 |
|-----------------|-----------------|
| <b>S18N-10G</b> | Stainless steel |
|-----------------|-----------------|

|                 |                 |
|-----------------|-----------------|
| <b>S18N-19G</b> | Stainless steel |
|-----------------|-----------------|

|                    |                    |
|--------------------|--------------------|
| <b>S18D-10G-KS</b> | Synthetic material |
|--------------------|--------------------|

|                    |                    |
|--------------------|--------------------|
| <b>S18D-14G-KS</b> | Synthetic material |
|--------------------|--------------------|

## Error codes

Proceed as follows in case of error:

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

| Error code    | Cause                                                                                                       | Effect                                         | Solution                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Er. 3</b>  | <b>Overtemperature</b><br>Device will switch automatically to cooling mode if operated with excess load     | Motor speed set automatically (not adjustable) | <ul style="list-style-type: none"> <li>- Allow device to cool down.</li> <li>- Allow to continue running in cooling mode.</li> <li>- Switch device off. Switch on again after some time. (Duration depends on the magnitude of the overtemperature)</li> </ul>                                                                                                                                                 |
| <b>Er. 4</b>  | <b>Speed variation</b><br>Speed variation due to blockage, faulty electronics, overload, motor brushes worn | Device off                                     | <ul style="list-style-type: none"> <li>- Switch off device</li> <li>- Eliminate cause of overload or blockage (remove dispersing element)</li> <li>- Replace motor brushes</li> <li>- Switch on device</li> <li>- If the actions described fail to resolve the fault, contact the <b>IKA</b> service department.</li> <li>- Send the device for repair, including a short description of the fault.</li> </ul> |
| <b>Er. 6*</b> | <b>Undervoltage</b><br>Mains voltage failed during operation                                                | Device off                                     | - Switch device off and on.                                                                                                                                                                                                                                                                                                                                                                                    |
|               | Plug in the mains plug if the switch position is "ON"                                                       | Device off                                     | - Switch device off and on.                                                                                                                                                                                                                                                                                                                                                                                    |

\*Before Er. 6 is displayed the software version is shown for approx. two seconds, e.g. 00.9.

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

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

## 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.

## Technical data

|                                       |            |                                                                                                                     |
|---------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------|
| Design voltage                        | <b>VAC</b> | 220 ... 240 ± 10 %<br>100 ... 120 ± 10 %                                                                            |
| Nominal voltage                       | <b>VAC</b> | 230<br>115                                                                                                          |
| Frequency                             | <b>Hz</b>  | 50 / 60                                                                                                             |
| Power consumption                     | <b>W</b>   | 500                                                                                                                 |
| Power output                          | <b>W</b>   | 300                                                                                                                 |
| Speed range                           | <b>rpm</b> | 3000 ... 25000<br>(at nominal voltage 230V / 50Hz and 115V / 60 Hz)                                                 |
| Speed variation on load change        | <b>%</b>   | < 1                                                                                                                 |
| Motor speed display                   |            | 3-digit LED display, displayed value x 1000 = motor speed in rpm                                                    |
| Display resolution                    | <b>rpm</b> | 200                                                                                                                 |
| Permissible ambient conditions        |            | 5 °C to 31 °C at 80 % relative humidity.<br>32 °C to 40 °C decreasing linearly to a maximum 50 % relative humidity. |
| Perm. on time                         | <b>%</b>   | 100                                                                                                                 |
| Protection to DIN EN 60529            |            | IP 20                                                                                                               |
| Contamination level                   |            | 2                                                                                                                   |
| Protection class                      |            | II                                                                                                                  |
| Overvoltage category                  |            | II                                                                                                                  |
| Noise level (without dispersing tool) | <b>dbA</b> | 75                                                                                                                  |
| Dimensions drive (W x D x H)          | <b>mm</b>  | 87 x 106 x 271                                                                                                      |
| Dimensions boom (Φ x L)               | <b>mm</b>  | 13 x 160                                                                                                            |
| Weight                                | <b>kg</b>  | 2.5                                                                                                                 |
| Operation at a terrestrial altitude   | <b>m</b>   | max. 2000                                                                                                           |

*Subject to technical changes!*



designed for scientists

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