Contents

CE - Declaration of conformity

We declare under our sole responsibility that this product corresponds to the regulations 2006/42/EEC and 2004/108/EEC and conforms with the standards or standardized documents: DIN EN IEC 61 010-1, -2-051; DIN EN ISO 12 100-1, -2; DIN EN IEC 61 326-1und EN 60 204-1.

Explication of warning symbols

General hazard

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

ATTENTION!

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

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.
- Wear your personal protective equipment in accordance with the hazard category of the medium to be processed. Otherwise there is a risk of:
  - spraying and vapourisation of liquids
  - body parts, hair, clothing and jewellery getting caught.
- The device must be wired by a qualified technician before first use in order to prevent risk of electric shock!
- Use a safety cutout for height adjustable stands!
- 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 agitated vessels used for stirring have to be secured. Consider on a good stability of the entire structure.
- Secure the stirring vessel against twisting.
- Glass vessels must always be secured with a clamp to prevent them spinning. When working in glass vessels, the dispersion tool must not come into contact with 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.
- There may be electrostatic discharges between the medium and the dispersing instrument shaft which could pose a direct danger. In some circumstances, the region between medium and drive shaft, or between rotor and stator, can become electrostatically charged, and ignite an explosive atmosphere caused by evaporation of the medium. In addition, with advanced evaporation of the medium, the slide ring seal can overheat to such an extent that it would lead to an ignition or combustion of the medium. For this reason, no inflammable or combustible materials must be processed with the dispersion unit.
- Rapid temperature change (thermal shock!) can destroy the hard metal sealing surfaces.
- Check that the turning handles are secure and tighten if necessary.
- If the emergency stop switch of the dispersion unit is not within reach when the unit is operating, an additional emergency stop switch must be installed within easy reach, in the working area.
- Before commissioning, the correct direction of rotation of the motor must always be ensured (test run without dispersion tool: motor rotation as indicated on the arrow plate, or clockwise rotation, looking down on motor). The wrong direction of rotation can lead to the rotor or stator coming off the shaft.
- If the unit is operated in different locations with a 5-pin plug, the direction of rotation must be checked before commissioning, with no dispersion tool fitted.
- 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.
- Ensure that the shaft of the dispersing instrument is immersed in the medium to the appropriate depth for that instrument (see "Technical Data") in order to prevent splashing.
- The distance between the dispersion tool and the vessel bottom should not be less than 30 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.
- Do not touch rotating parts during operation!
- Please note that the dispersing element and the journal bearings can become extremely hot during use.

- Never cover the ventilation slots or cooling fins on the motor as these are needed for cooling the drive system.
- Meter powder not too close to the flange. Powder can be blown away by air turbulences of the drive.
- Abrasion of the dispersion equipment or the rotating accessories can get into the medium you are working on.
- Process pathogenic materials only in closed vessels under a suitable extractor hood. Please contact **IKA®** if you have any questions.
- Do not operate the appliance in explosive atmospheres, with hazardous substances or under water.
- Do not process any flammable or combustible 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.
- 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.
- After an interruption in the power supply, or a mechanical interruption during a dispersing process, the unit does not automatically restart.

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 detailed report must be set immediately (post, rail or forwarder)

- **Delivery scope**
  Disperser T 65 D ULTRA-TURRAX®
  - Disperser T 65 D ULTRA-TURRAX®
  - Threepart tool set for dispersion tools serie S 65....
  - Operating instructions

Correct use

- **Use**
  When used in combination with one of our recommended dispersing elements, 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

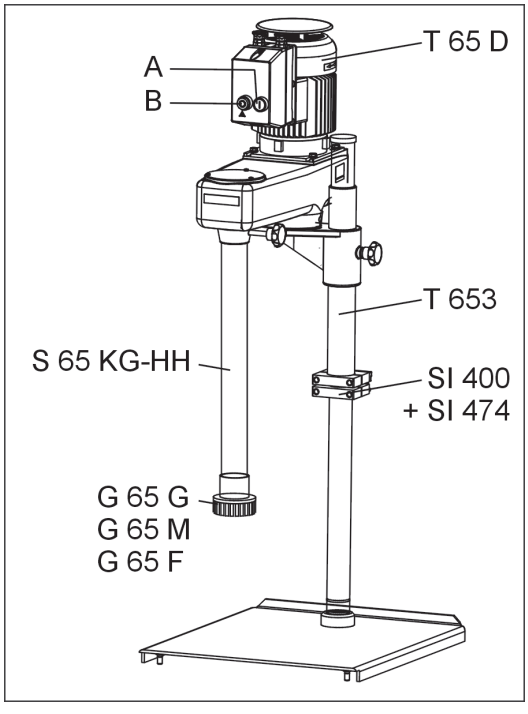
  Operating modes:
  - On stand

- **Range of use**
  - Laboratories
  - Pharmacies
  - Technical colleges
  - Small-scale production

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 or if the appliance or the printed circuit board are modified by third parties.

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

The drive shaft - driven by a Poly-V-belt – has a fixed speed of 7200 rpm. and, in turn, drives the rotor. As a result, the S 65.... range of dispersion tools that can be used achieve tip speeds of 21.9 m/sec. These tip speeds lead to optimal dispersing or emulsifying results in batch operation.



For operation, the T 65 D ULTRA-TURRAX® dispersion unit must be mounted on the **IKA**® T 653 telescopic stand. It must only be operated with the S 65 KG-HH shaft and the dispersion tools from the S 65 range (G 65 G, G 65 M, G 65 F). The unit is switched on and off by pressing the ON button (A) and the emergency stop button (B). If the emergency stop switch of the dispersion unit is not within reach, an additional emergency stop switch must be installed within easy reach, in the working area.

ATTENTION!

Safety disconnection device

If the telescopic stand is moved upwards when the unit is operating, the dispersion unit must switch off. To facilitate this, the telescopic stand must be equipped with a safety disconnection device. For this purpose, we recommend the installation of the SI 400 safety limit switch together with the SI 400 mounting support (see "Accessories").

Wiring by skilled worker

The unit is supplied without connecting cable, as the installations on the user's premises do not permit a standard cable length, because of the different accommodating spaces. The layout of connections is shown in the wiring diagram (see "Wiring diagram"), for the information of skilled workers.

Motor protection

The AC motor runs in ball bearings and is maintenance-free. In its attached control cabinet, it has a special safety device for operation on overcurrent and undervoltage (undervoltage trip), to permanently switch the motor off and avoid any thermal damage. The unit can only be put back in service when the power supply required for the motor is restored.
The basic connection and performance data for the motor can be obtained from the motor rating plate.

The connection facility for the **IKA**® SI 400 safety limit switch is also provided in the motor control cabinet.

The unit heats up in service. The generously-proportioned cooling surfaces on the motor achieve an even distribution and emission of the heat.

With small quantities, a rapid heating-up of the medium must be expected, because of the high motor power, which is mainly converted into heat.

If the viscosity of the material to be processed is too high (above about 5 Pas.), or the vapour pressure of the liquid is very high, the flow is unable to follow the rapid accelerations of the generator, and breaks down. This leads to dry running, and hence to destruction of the sealing surfaces. Such substances must be fed to the generator by force. Use a continuous flow unit (i.e. IKA® Laborpilot) for this, and/or an additional pump.

Telescopic stand T 653

In conjunction with the **IKA**® T 653 telescopic stand, the T 65 D dispersion unit can also be used for tall mixing vessels.

For information on this product, please refer to the operating instruction "Telescopic stands".

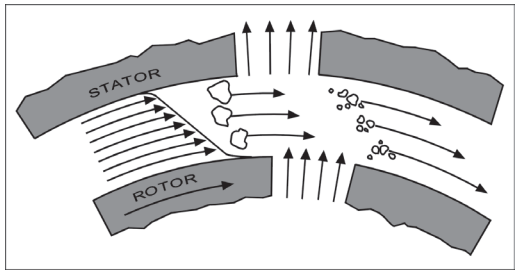
The rotor/ stator priciple

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.

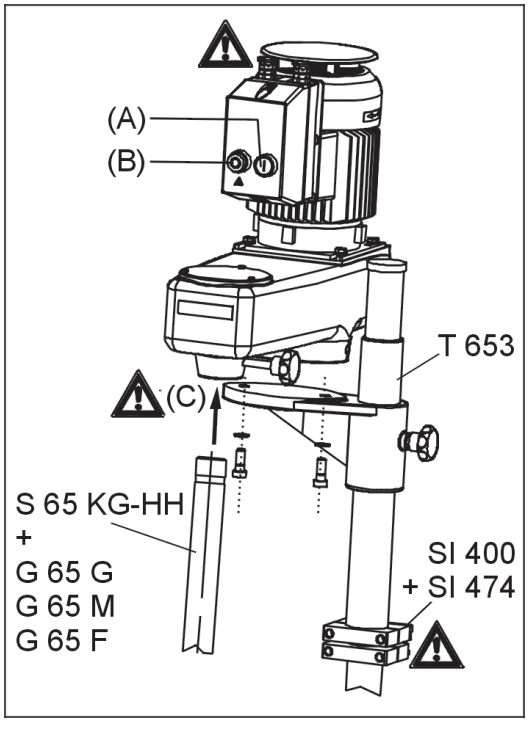
The dispersion effectiveness is heavily dependent on the product of the shear gradient and the time the particles spend in the shear zone. The optimum range for the circumferential velocity of the rotor/stator arrangement is 1 to 24 m/s.

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



Set-up and commissioning

Assembly and electrical installation of the dispersion unit



As shown in the diagram, the dispersion unit is mounted on the T 653 telescopic stand with two M12 hexagon socket head (Allen) screws and toothed lock washers. The screws and toothed lock washers are included in the delivery package of the stand. An assistant is required for screwing on the dispersion unit.

The telescopic stand must be installed such that it does not tilt or slide about. It must not move about when the unit is operating.

Particular danger points, such as crushing/ trapping positions, rotating parts, locking screws for the stand column, are identified by an exclamation mark in the "Dispersion unit assembly" diagram. Particular regard should be paid to these danger points when the unit is in service!

The electrical connections of the dispersion unit must be made by a skilled worker in accordance with the wiring diagram (see "Wiring diagram").

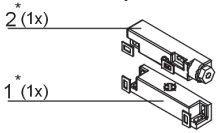
Mounting the safety limit switch

There is a danger of trapping between the safety limit switch, switch contact and the end stop!

Mount the SI 400 safety limit switch together with the SI 474 mounting support on the T 653 telescopic stand. For this, follow the mounting instructions "Safety limit switch" on the following page.

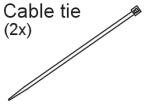
Delivery package:

SI 400 - safety limit switch



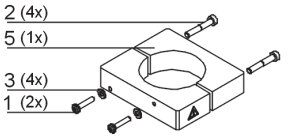
Cable tie base (2x)

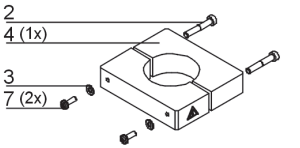
Cable tie (2x)



Delivery package

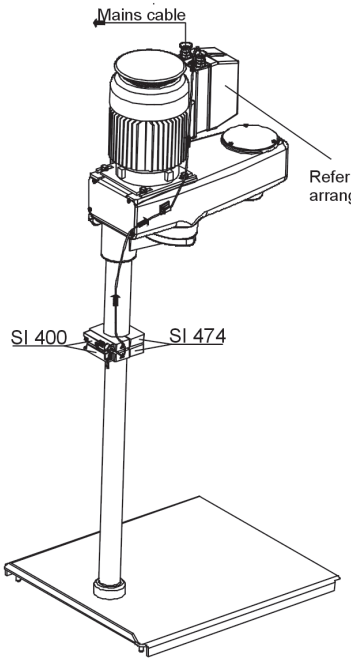
SI 474 - support holder





Assembly instructions „safety limit switch“:

Fixing the SI 400 safety limit switch with the SI 474 support holder on the T 653 telescopic stand



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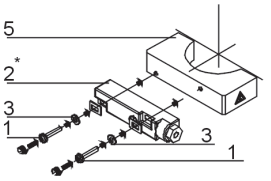

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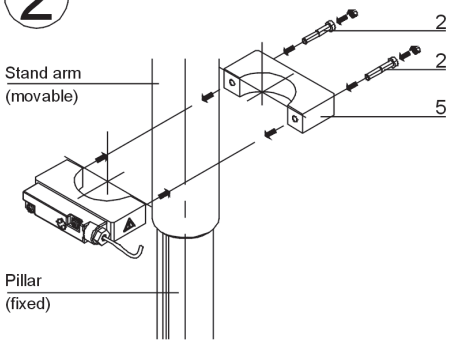

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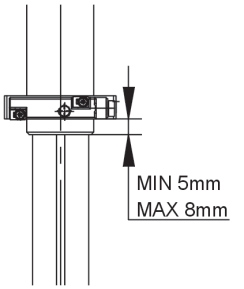

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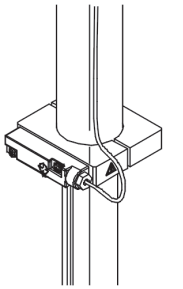

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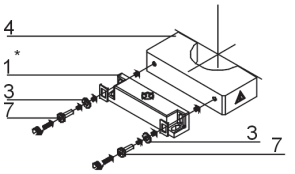

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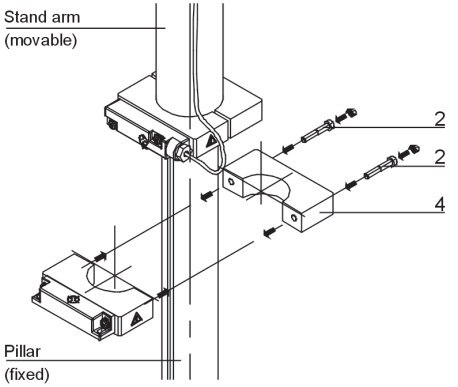

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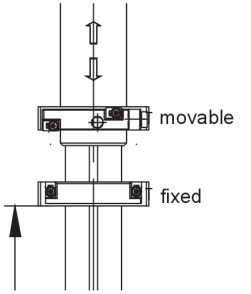
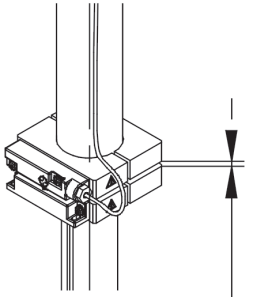


Fix item 4 on the stand pillar for the desired switch-off height

8



Before commissioning, check:
- the cable routing
- the installation clearances
- the bolted connections

Switching the unit on

ATTENTION!

Check that the voltage stated on the rating plate matches the available mains supply voltage. The socket used must be earthed (protective earth contact). If these condition are fulfilled, the unit is ready for service, after the mains plug is inserted. Otherwise, safe operation cannot be guaranteed, or the unit can be damaged.

Before switching the unit on, the dispersion tool must be immersed to the minimum immersion depth in the medium (see "Technical data"). Because of the suction effect, the clearance to the base of the vessel must not be less than 30 mm.

The dispersion tool must be brought into the vessel off-centre, to avoid rotational turbulence (vortexing).

For safety's sake, the vessel must always be well secured.

When operating with the SI 400 safety limit switch, the unit is only ready for service when it has been locked in position at the planned working height and the switch contact operates the safety limit switch.

The unit is started by pressing the ON button (A).

The unit is stopped by pressing the EMERGENCY STOP button (B).

Permitted Dispersion tools

Dispersion tools serie S 65 ....

The T 65 D ULTRA-TURRAX® dispersion unit must only be operated with dispersing elements from the S 65 .... range!

A dispersion tool serie S 65....consists of a shaft and a generator (stator/rotor). The shaft carries the marking S 65 KG-HH, where KG stands for the ball bearing and HH for a slide ring seal made of hard metal. The seal prevents liquid rising up the shaft and destroying the ball bearing. The top end of the shaft is in the form of a plug-in coupling. The bottom end of the shaft carries a thread for mounting the stator. The shaft – running in ball bearings- carries the rotor.
For the S 65 range, there are three types of generator, designated G 65 G, G 65 M, G 65 F, where the prefix G stands for generator and the suffices G for coarse, M for medium and F for fine.

ATTENTION!

The appropriate generator must be used according to the medium. When the starting material is too coarse for the generator, the generator can clog up and hence become ineffective. In addition, the sealing surfaces run dry, so that they are damaged.

The generators are suitable for solids components with the following grain sizes:

Generator type	Grain size
G 65 G	40 mm
G 65 M	8 mm
G 65 F	1 mm

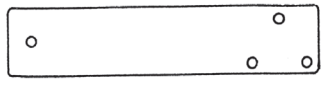
It can often be helpful to process a medium with all three generators in sequence, starting with generator G 65 G. Although it is easy to change the generators, in such cases, it is worth buying three shafts, that can then be changed with fewer manipulations.

Pre-assembly of dispersion tools

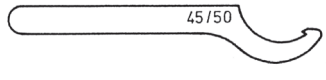
Before the dispersion tools are connected to the dispersion unit, the shaft and generator are pre-assembled. The following tools (set of tools included in the T 65 D ULTRA-TURRAX® delivery package) are required to change the generator:

The slide ring seal must be correctly fitted before pre-assembly of the shaft and generator.

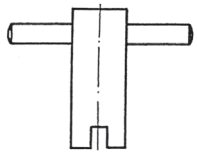
Rotor wrench



Hook wrench

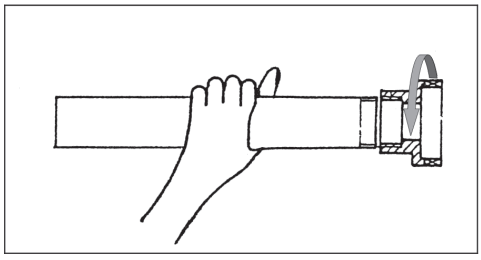


Shaft wrench

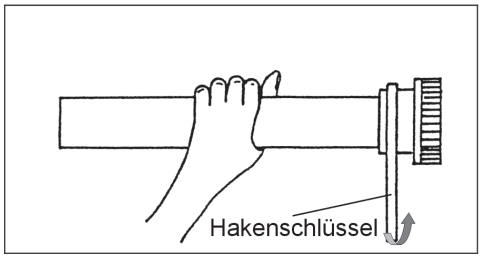


Assemble the generator on the shaft as follows:

1. Screw the stator on to the stator tube counterclockwise by hand. Note the left-hand thread!

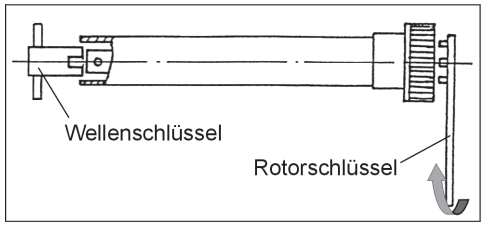


2. Gently tighten the stator with the hook wrench. The stator is turned in the same direction later, by the flow pressure of the rotor, and hence cannot come loose.



ATTENTION!

3. Screw the rotor clockwise on to the shaft (right-hand thread). To do this, hold the shaft with the shaft wrench at the coupling section and tighten the rotor with the rotor wrench. With the G 65 G generator, the rotor wrench is inserted between the teeth of the stator and turned.



Mounting the dispersion tool on the unit

STOP

The dispersion tool must only be mounted on the dispersion unit when the mains plug is pulled out and the drive shaft is stationary.

The pre-assembled element, consisting of shaft and generator, is now connected to the T 65 D ULTRA-TURRAX® dispersion unit. To do this, insert the pre-assembled dispersion tool in the dispersion tool receptacle (C) and secure it with the handwheel bolt. Make sure that the shaft is inserted right up to the stop in the receptacle. It can be helpful to turn the shaft lightly as it is inserted. The tool is locked in position by tightening the handwheel bolt. Make sure that the handwheel bolt is securely tightened, and also check the tightness frequently when the unit is in service.

Cleaning the shaft and generator

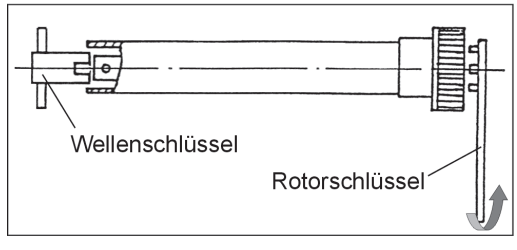
The shaft must be cleaned immediately after the unit has been used. This prevents any substance residues adhering to the rotor and stator threads, or bacteria cultures forming in undesired places.

Run the dispersion tool in a solvent which will dissolve substance residues but not harm the seals. As a result, because of the high flow speeds, the rotor and stator will then only be lightly soiled.

Do not put the dispersion tool in a vessel containing solvent to dissolve substance residues. The seals are mainly dynamic-acting, and quickly start to leak when stationary.

Clean the dispersion tools and shaft as follows:

1. With the drive switched off, dismount the dispersion tool from the drive by slackening the handwheel bolt.
2. Unscrew the generator from the shaft. The disassembly procedure is the reverse of the assembly procedure (see "Pre-assembly of dispersion tool").



The stator can be very tightly seated on the shaft tube, particularly when working with viscous substances, or when cleaning has been neglected, or when medium has penetrated into the thread between shaft tube and stator. In this case, the shaft tube can be held in a vice with soft jaws to crack the thread. Note the left-hand thread!

3. Rinse all threads and clean them with a brush if necessary.

ATTENTION!

The shaft and dispersion tool can now be pre-assembled again, ready for use.

Sterilization and disinfection

Wet chemical methods are permissible for sterilization and disinfection of the dispersion tools. Many instances of disinfection can be solved by means of bactericidal solutions. It is important that the remains of the disinfectant are subsequently removed with sterilized water.

ATTENTION!

No moisture must be allowed to enter the ball bearing, so, basically, the upper end of the shaft tube must be sealed (e.g. with silicone plugs).

Other sterilization methods (e.g. moist heat 120 °C at 2 bar, or killing the bacteria with hot air at 160 °C to 190 °C) are not allowed.

Maintenance

The correct functioning of the generator essentially depends on the sharpness of the edges of the tooth crests on the rotor and stator. The edges can wear with abrasive media, reducing the effectiveness of the dispersion.

ATTENTION!

The correct functioning of the generator essentially depends on the sharpness of the edges of the tooth crests on the rotor and stator. The edges can wear with abrasive media, reducing the effectiveness of the dispersion.

Spare parts order

When ordering spare parts, please give:
- Machine type
- Manufacturing number, see type plate
- Item and designation of the spare part, see **www.ika.com**, spare parts diagram and spare parts list

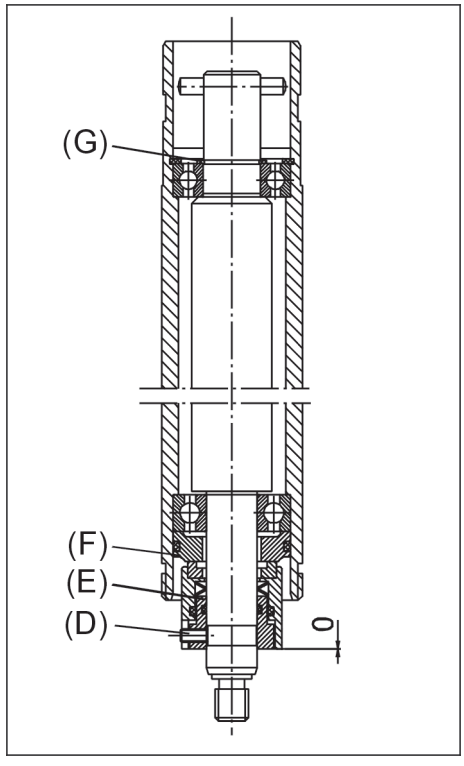
Repair

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

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

Changing the slide ring seal

To prevent damage to the unit, the slide ring seal must only be changed by a skilled mechanical person.



Change the slide ring seal as follows:

1. Slacken off the three grubs crews (D) and pull the drive shaft downwards until the counter-ring (F) becomes free. The lower part of the slide ring seal (E) can then be easily removed.
2. To dismount the drive shaft, it may be necessary to remove the upper retaining ring (G) using retaining ring pliers, particularly where there is heavy soiling. To avoid any damage, do not strike the drive shaft.
3. When refitting, adjust the bearing pressure of the two sealing surfaces. The correct bearing pressure is obtained when the lower part of the slide ring seal (E) is inserted far enough – before being secured - so that it is aligned with the upper external part (F).

Technical data

S 65 KG-HH-	G 65 G	G 65 M	G 65 F
Working range	2 l - 50 l	2 l - 40 l	2 l - 30 l
Stator diameter	65 mm	65 mm	65 mm
Rotor diameter	58 mm	58 mm	58 mm
Circumferential speed	21,9 m/s	21,9 m/s	21,9 m/s
Min./ Max. immersion depth	90 mm / 450 mm	80 mm / 450 mm	80 mm / 450 mm
Shaft length	520 mm	510 mm	500 mm
Materials in contact with medium	FFPM / SIC, 1.4571	FFPM / SIC, 1.4571	FFPM / SIC, 1.4571
pH range	2 - 13	2 - 13	2 - 13
Suitable for solvents	yes	yes	yes
Suitable for abrasive substances	no	no	no
Max. temperature	180 °C	180 °C	180 °C
Sterilization methods	wet chemical	wet chemical	wet chemical
Working range vacuum	1 mbar	1 mbar	1 mbar
Working range pressure	6 bar	6 bar	6 bar
Ultimate fineness, suspensions	25 µm - 75 µm	20 µm - 50 µm	5 µm - 20 µm
Ultimate fineness, emulsions	5 µm - 25 µm	5 µm - 15 µm	1 µm - 10 µm
Slide ring seal	Tungsten carbide + 6 % cobalt	Tungsten carbide + 6 % cobalt	Tungsten carbide + 6 % cobalt
O-rings	FKM	FKM	FKM
Other parts	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571

Subject to technical changes!

Quantity details

The quantities processed are limited, in particular, by the viscosity of the medium:

Viscosity	Volume
0,001 Pas	max. 30 l
0,1 Pas	max.10 l
1,0 Pas	max. 5 l
5,0 Pas	max. 3 l

At higher viscosities, a breakdown of the flow and dry-running conditions for the seal must be expected.

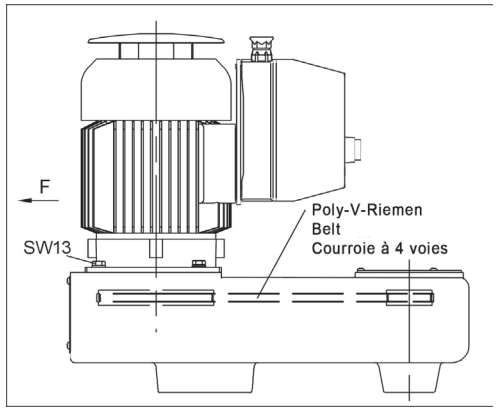
Consideration of flow anomalies

The quantity details given above apply for Newtonian fluids. Processing of substances with thixotropic or dilatant (shear thickening) behaviour is possible, but the particular volumes must always be determined by trials.

Maintenance and cleaning

ATTENTION!

The Poly-V-belt should be retightened after about 50 operating hours. To do this, proceed as follows:



1. Slacken off the four hexagon head bolts near the motor using a 13 mm a/f wrench.
2. Pull the motor in direction F with a force of about 100 N, as shown in the diagram.
3. Retighten the bolts whilst still applying the force.

Apart from this, the T 65 D ULTRA-TURRAX® operates maintenance-free.

Spare parts order

When ordering spare parts, please give:
- Machine type
- Manufacturing number, see type plate
- Item and designation of the spare part, see **www.ika.com**, spare parts diagram and spare parts list

Repair

In case of repair the device has to be cleaned and free from any materials which may constitute a health hazard.
If you require servicing, return the appliance in its original packaging. Storage packaging is not sufficient. Please also use suitable transport packaging.

Only clean **IKA**® appliances using these **IKA**® approved cleaning agents:

Dirt	Cleaning agent
Dyes	Isopropanol
Building materials	Water containing detergent, Isopropanol
Cosmetics	Water containing detergent, Isopropanol
Food	Water containing detergent,
Fuels	Water containing detergent,
Other materials	Please consult **IKA**®

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

Accessories

T 653	Telescopic stand
SI 400	Safety limit switch
SI 474	Support holder
S 65 KG-HH	Shaft
S 65 KG-HH-G 65 G	Dispersion tool coarse
S 65 KG-HH-G 65 M	Dispersion tool medium
S 65 KG-HH-G 65 F	Dispersion tool fine

Technical data

Motor data

Rated voltage [VAC]	3 x 400 Y	3 x 230 Δ	3 x 400 Y	3 x 230 Δ
Rated frequency [Hz]	50	50	60	60
Motor speed [rpm]	2880	2850	3520	3520
Power consumption [W]	1943	1943	2381	2381
Power output [W]	1500	1500	1800	1800

Additional data

Speed	rpm	7200
Peripheral speed (generators serie S 65....)	m/s	21.9
Perm. On- time	%	100
Protection acc. DIN EN 60529		IP 54
Overvoltage category		II
Protection class		I
Contamination level		2
Protection on overload		Overcurrent and undervoltage switch on the AC motor
Perm. ambient temperature	°C	+ 5 bis + 40
Perm. humidity	%	80
Operating position		On the stand, dispersion tool vertically downwards
Drive		Vane-cooled AC motor with Poly-V-belt drive transmission stage
Stand mounting		Flange in lower section of housing
Housing material		Aluminium
Noise level (without disp. tool)	dbA	75
Dimensions (WxDxH)	mm	190x580x380
Weight	kg	28
Operation at a terrestrial altitude	m	max. 2000

Subject to technical changes!

Warranty

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

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