Heidolph
Research made easy

SilentCrusher S

Betriebsanleitung

Instruction Manual

Mode d'Emploi

Instrucciones de Empleo

Instruzioni per l'uso

E

SUMMARY

 **Important Notices**

 **Connection Instructions / Power Connection**

 **Caution, must be observed**

 **Caution, Fire or Explosion Hazard**

 **Repair / Maintenance Instructions**

 **Instructions for personal protection**

 **Caution: Risk of Combustion, Hot Surfaces**

COMPONENTS SUPPLIED AND ACCESSORIES

Components supplied

Description	Quantity	Part Number 100 - 230 V / 50/60 Hz
SilentCrusher S eu (European plug) or	1	595-05000-00
SilentCrusher S us (US plug)	1	595-05000-01
Power Supply (unit)	1	11-001-595-11
European Power Connection cable or	1	14-007-003-81
US Power Connection cable	1	14-007-003-89
Operating Manual	1	01-005-004-45
level plates	3	23-03-04-10-38
O-ring 23 x 2mm (spare part)	3	23-08-06-03-17

Accessories (Optional)

Description	**Part Number**
Dispersion Tool 3 F including 10 Eppendorf PP – 1,5ml reaction vessels and 2 PTFE bearings and spare part set	596-03010-00
Eppendorf PP – 1,5ml reaction vessels, 100 units	596-00003-00

Dispersion Tool 5 F including 10 PP – 5ml test tubes and 2 PTFE bearings and spare part set	596-05010-00
PP – 5ml Test Tubes, 100 units	596-00005-00
Dispersion Tool 7 F including 10 PP – 20ml test tubes and 2 PTFE bearings and spare part set	596-07010-00
PP – 20ml test tubes; 100 units	596-00007-00

GENERAL INFORMATION

Please unpack the device carefully.

Check for any damage and report damage or missing parts to the supplier immediately.

Read the operating instructions thoroughly and attentively and ensure that every operator of the device has read the operating instructions carefully before start-up.

Please keep the operating instructions in a location accessible to everyone.

The device is equipped with a EUROPEAN plug in accordance with the standards (DIN 49441 EEC 7/VII 10/ 16 A 250 V).

For North America with a US STANDARD plug (NEMA Pub. No. WDI.1961 ASA C 73.1. 1961 page 8 15A 125V).

If you wish to use the device in a country with a different electrical outlet system, you must use an adapter or have the plug supplied with the equipment replaced by a technician with an approved plug suited for this power supply system.

The device is grounded when delivered. If the original plug is changed, you must make absolutely sure that the protective ground wire is connected to the new plug.

SAFETY INSTRUCTIONS

Please follow all safety and accident prevention provisions in effect in the laboratory.

Before plugging the device into the power supply circuit, ensure that the mains voltage matches the data on the rating plate.

Repairs may be made only by a Heidolph Instruments authorized technician.

Caution when used near easily inflammable and explosive materials. Please read the safety data sheets. The motors are designed to operate without sparking but the device is not protected from explosion.

Connect the disperser to a grounded mains socket only.

Make sure the device is placed on a stable surface.

When operating, wear suitable clothing and eye protection.

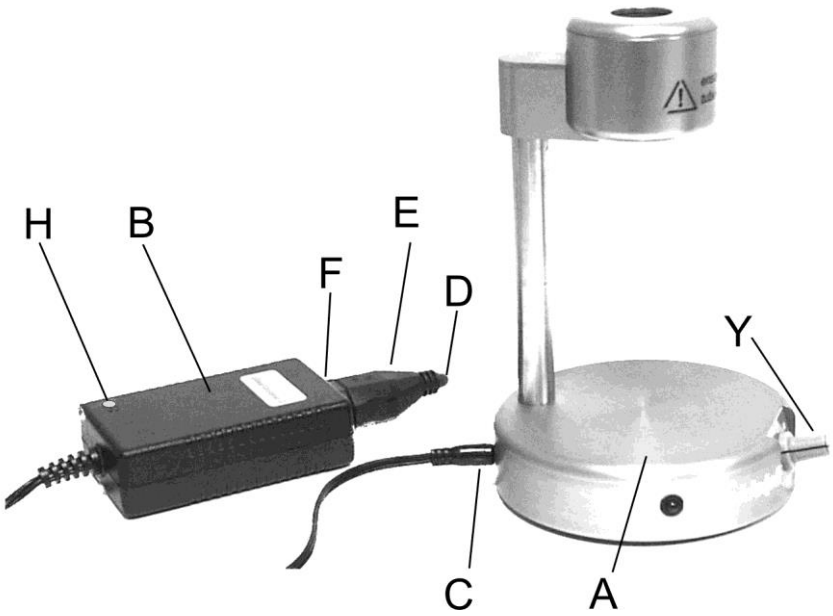
Caution: The tool and fluid for dispersion are heated by the energy input.

ASSEMBLY

Caution: Never operate the SilentCrusher S with dispersion tool when the dispersion tool is not immersed in fluid. Operating the device dry will destroy the PTFE bearing (Q, see Chapter 6.2-Cleaning and Maintenance) and the rotor (O, see Chapter 6.2-Cleaning and Maintenance).

Place the drive unit (A) on the laboratory table. Connect the power supply (unit) (B) to the small coaxial plug (C) on the drive unit (A).

Connect the power connection cable (D) to the receptacle (F) using the plug (E).



SERVICE AND OPERATION

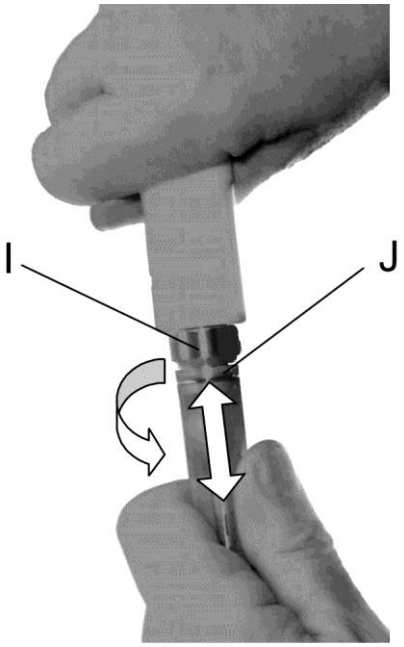
1 Start-up

> Caution: Never operate the SilentCrusher S with dispersion tool when the dispersion tool is not immersed in fluid. Operating the device dry will destroy the PTFE bearing (Q, see Chapter 6.2-Cleaning and Maintenance) and the rotor (O, see Chapter 6.2-Cleaning and Maintenance).

Connect the power connection cable (D) to the power supply. The green control light (H) on the power supply (unit) (B) will light. The device is now ready to operate.

> Due to its low power consumption, the device does not have a mains switch. If the device is connected to the mains voltage (standby), the device consumes only 3 Watts.
>
> To disconnect the device from the power supply system, unplug the mains plug.

2 Dispersing with Tools 3 F, 5 F, 7 F



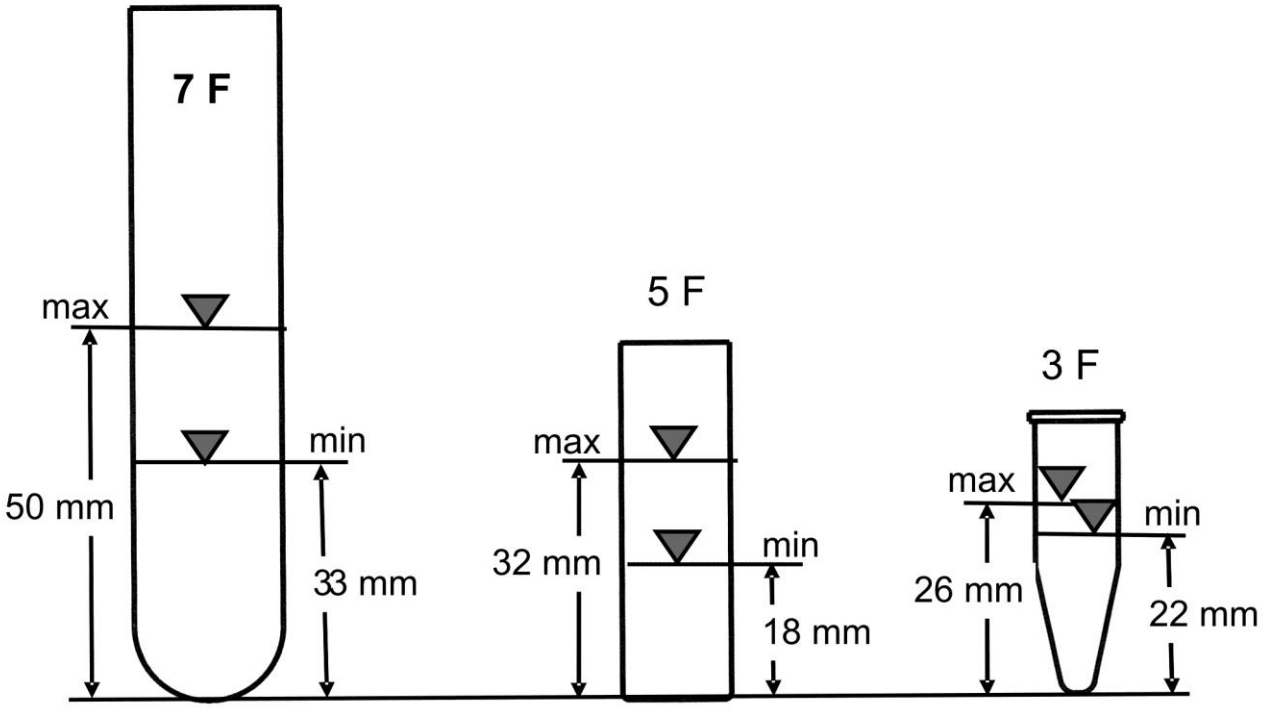
Now remove the test tube from the dispersion tool with a slight clockwise rotation and pull downward. Fill the test tube with the sample to be dispersed (Note: for filling quantities, see below).

Then reinsert the filled test tube with a slight counterclockwise rotation and press upward on the dispersion tool until it reaches the stop.

Filling Table:

Tool	Min. Fill Quantity	Max. Fill Quantity
3 F	0.8 ml	1 ml
5 F	2 ml	4 ml
7 F	6 ml	10 ml

⚠ Attention: Never homogenize with either to high or to low liquid level in test tube. PTFE bearing (Q, see chapter 6.2-Cleaning and Maintenance) and the rotor (O, see chapter 6.2-Cleaning and Maintenance) could become damaged.



The elastomer O ring (J) integrated into the test tube retainer (I) ensures a secure fit for the test tube.

⚠ Always hold dispersion tool and test tube upright to prevent spilling the sample.

Always store dispersion tool and test tube upright!

The preparation is complete. You can disperse the material.

For dispersion, the dispersion tool with the test tube is inserted into opening (K) in the drive until it reaches the stop (1). Via integrated sensors, the drive unit recognizes the dispersion tool and starts the dispersion process automatically (2). (An elastomer O ring (V) attaches the dispersion tool to the drive unit.). Speed can be adjusted with knob (Y).

⚠ Always insert the dispersion tool down to the stop.

To end the dispersion process, simply remove the dispersion tool from the opening (K) of the drive unit.

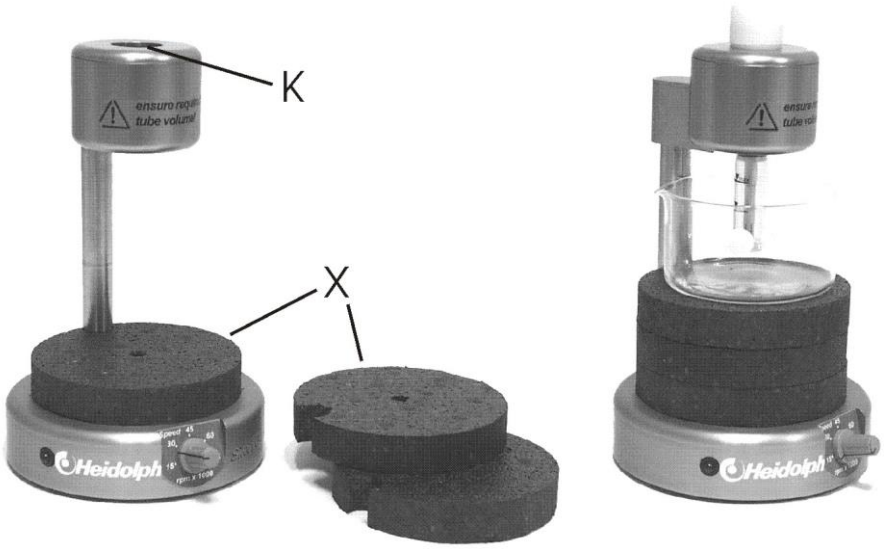
☞ For the 3 F dispersion tool, use your finger to press the test tube cap onto the vessel and thus it can be inserted into the opening (K) in the drive unit together with the cap.

As described above, remove the test tube with the dispersed sample from the dispersion tool with a slight clockwise rotation and pull downward.

☞ During the dispersion process, the PTFE bearing is lubricated by the fluid to be dispersed. The fluid level in the test tube is therefore slightly lowered during the dispersion process. This fluid flows back after the dispersion process.

3 Cooling of vessel

For better heat transfer during dispersion process, vessel can be cooled e.g. with ice water in a beaker. For hight adjustment of beaker use vessel height supports (X).



4 Length of Operation

The drive unit and dispersion tool are not designed for constant operation. In particular, the PTFE bearing (Q) could be damaged by the high rotational speeds of 75000 rpm.

⚠ Maximum length of a dispersion process: 1.5 minutes. The dispersion process will be cut off automatically after that. The red control light (U) in the base of the drive unit will turn on.

The device is reset by removing the dispersion tool; the red control light will go out, and the device is ready to operate again.

The electronics and coil in the drive unit are also monitored by temperature sensors. If the permissible temperature is exceeded, the drive switches off. The red control light (U) in the base of the drive unit will blink.

After cooling (about 5 min.), this control light will go out and dispersion can be continued.

When the PTFE bearing in the dispersion tool becomes worn, it must be replaced. See the Cleaning and Maintenance chapter.

Wear can be recognized from the increased play between the rotor (O) and the PTFE bearing (Q) or the increased level of noise.

Caution: The tool and fluid for dispersion are heated by the energy input.

CLEANING AND MAINTENANCE

5 Drive Unit

For **cleaning,** you can wipe down the housing and surface of the device with a moist cloth (mild soap solution).

Note:

Never use chlorine bleach, chlorine-forming cleansers, abrasives, ammonia, steel wool or cleaning agents with metal particles. They can damage the surface of the device.

The device is maintenance-free. Any repairs required must be performed by a Heidolph Instruments authorized technician. Contact your Heidolph Instruments dealer or a representative of Heidolph Instruments (see page 39).

6 Dispersing Tool

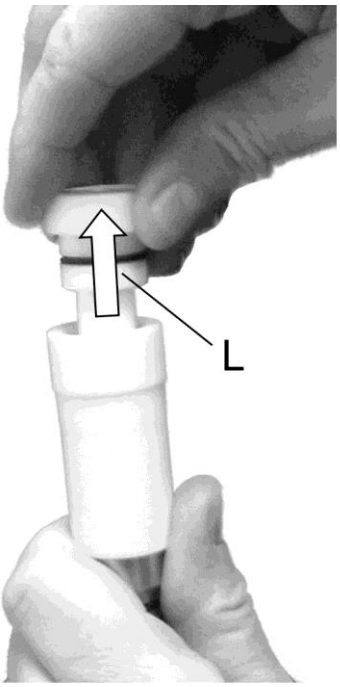
To avoid contamination, the dispersing tool must be cleaned after every dispersing process.

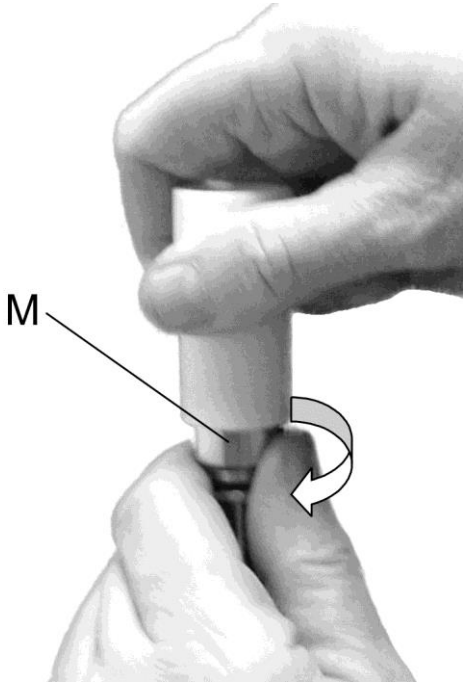
6.1 Cleaning

Clean the dispersion tool with a suitable cleaning fluid (depending on the medium processed). Run the dispersing tool in the cleaning fluid so that the internal parts are also cleaned. If the tool is extremely dirty, the dispersing tool can be disassembled for cleaning.

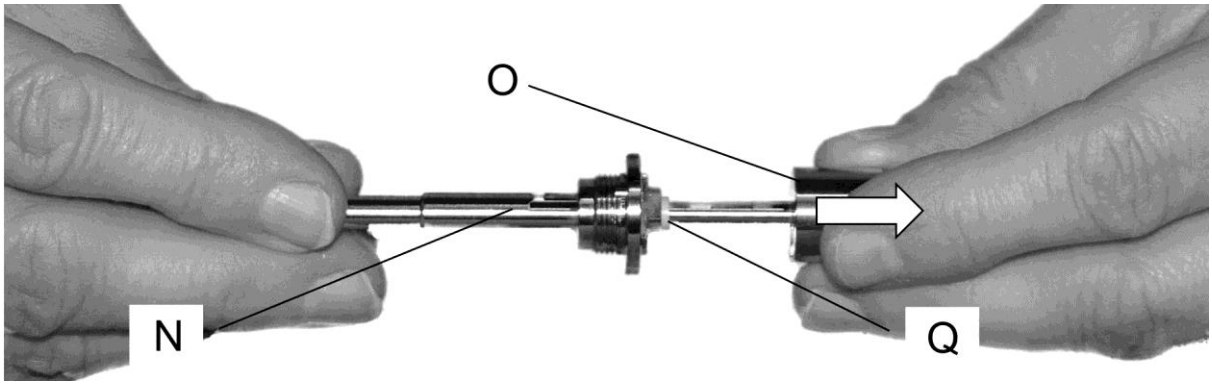
6.2 Disassembly and Bearing Replacement

Pull off top (L). Remove retainer (M) by rotating clockwise.





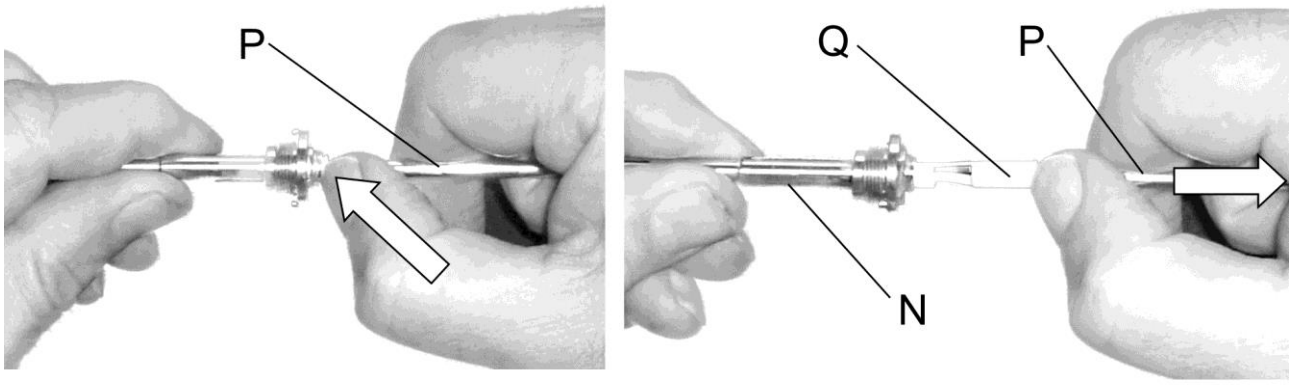
Remove stator tube (N) plus rotor.



Remove rotor (O).

If the tool is extremely dirty, the PTFE bearing (Q) can also be removed.

Introduce the auxiliary tool (P) (included) a few mm into the PTFE bearing (Q) and clamp and withdraw the upper collar of the PTFE bearing (Q) with your thumbnail.



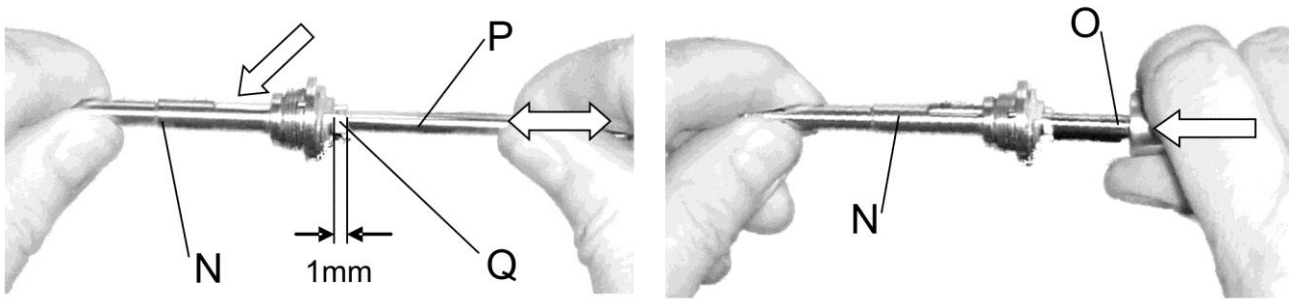
6.3 Sterilization

The dispersing tool can be sterilized as follows:

By steam sterilization or wet chemicals at temperature up to 130°C; dry up to 180°C.

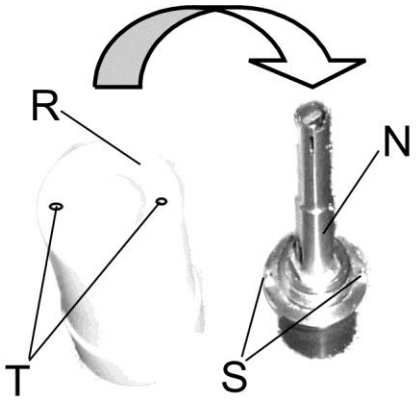
6.4 Assembly

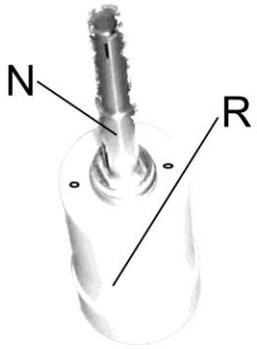
Insert the PTFE bearing (Q) into the stator tube (N) up to the stop. Be careful that the slits in the PTFE bearing (Q) are congruent with the slits in the stator tube (N). When the PTFE bearing (Q)



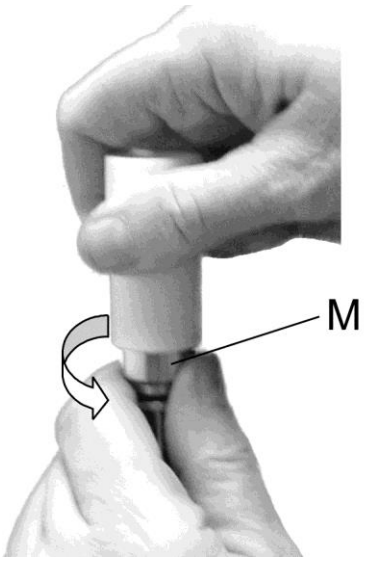
is assembled correctly, it projects app. 1 mm over the stator tube (N). Now the auxiliary tool (P) must absolutely be inserted, with the flat side facing forward, into the PTFE bearing (Q) up to the stop, and then withdrawn. This will expand the PTFE bearing (Q) and thus ensure friction-free operation of the rotor. Now insert rotor (O) into the stator tube (N).

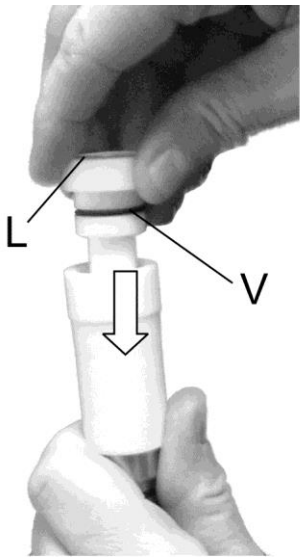
Then hold the stator tube (N) with the head up and put the base (R) over it. The two pins (S) of the stator tube (N) must penetrate into the two recesses (T) in the base (R).





Make sure the pins stay in the in the recesses. Now connect the retainer (M) via the stator tube (N) and screw it on clockwise. Press seal (L) on again. The seal is fixed with an elastomer O ring (V).





SPARE PARTS AND WEAR PARTS

Number	Description	Part Number
V	**O Ring (Tool Retainer)**	**23-08-06-03-17**
X	**height supports**	**23-03-04-10-38**

Dispersing Tool 3 F

Q	**PTFE Bearing 3 F**	**25-05-01-03-03**
N	**Stator Tube 3 F**	**22-02-06-01-41**
O	**Rotor 3 F**	**22-02-06-01-44**
L	**Seal**	**23-09-02-02-83**
V	**O Ring Seal (Viton)**	**23-08-06-03-15**
M	**Retainer 3 F**	**22-02-06-01-47**
J	**O Ring Retainer 3 F (Viton)**	**23-08-06-03-13**
R	**Base 3 F / 5 F**	**23-09-02-02-84**
P	**Auxiliary Tool (4 Ø x 90)**	**04-06-01-21-11**

Dispersing Tool 5 F

Q	**PTFE Bearing 5 F / 7 F**	**25-05-01-03-04**
N	**Stator Tube 5 F**	**22-02-06-01-42**
O	**Rotor 5 F**	**22-02-06-01-45**
L	**Seal**	**23-09-02-02-83**
V	**O Ring Seal (Viton)**	**23-08-06-03-15**
M	**Retainer 5 F**	**22-02-06-01-48**
J	**O Ring Retainer 5 F (Viton)**	**23-08-06-03-14**
R	**Base 3 F / 5 F**	**23-09-02-02-84**
P	**Auxiliary Tool (4 Ø x 90)**	**04-06-01-21-11**

Dispersing Tool 7 F

Q	**PTFE Bearing 5 F / 7 F**	**25-05-01-03-04**
N	**Stator Tube 7 F**	**22-02-06-01-43**
O	**Rotor 7 F**	**22-02-06-01-46**
L	**Seal**	**23-09-02-02-83**
V	**O Ring Seal (Viton)**	**23-08-06-03-15**
M	**Retainer 7 F**	**22-02-06-01-49**
J	**O Ring Retainer 7 F (Viton)**	**23-08-06-03-15**
R	**Base 7 F**	**23-09-02-02-85**
P	**Auxiliary Tool (4 Ø x 90)**	**04-06-01-21-11**

DISASSEMBLY, TRANSPORT AND STORAGE

Disassembly

Remove the mains plug and disconnect the connecting socket from the Power Supply (unit) to the drive unit.

Remove the dispersing tool from the drive unit.

Transport and Storage

1. **The device and its parts should be stored preferably in the original packaging or in another suitable container, to prevent damage during transport. The best material to seal the packing is adhesive tape.**
2. **Keep the device in a dry location.**

Warning

Avoid shaking and shocks to the device during transport.

DISPOSAL

Dispose of used or defective devices properly in a collection location.

Separate recyclable material into metal, glass, plastic, etc.

Dispose of the old packing material in an environmentally friendly manner (material separation).

TROUBLESHOOTING

- **The device does not disperse**
  - Check electrical connections (power supply system und power supply (unit))
  - Dispersing tool not inserted into drive unit up to stop
  - Maximum dispersion time reached, red control light goes on (see Service and Operation)
  - Permissible temperature exceeded for drive unit, red control light blinking (see Service and Operation)
- **Rotor not mounted in tool**
  - Rotor sluggish (check PTFE bearing, see Cleaning and Maintenance)
- **Loud noise when dispersing**
  - PTFE bearing worn, must be replaced (see Cleaning and Maintenance)

- **Attrition (PTFE particles) at bearing**
  - Tools were operated without or with too little liquid; clean tool, if necessary exchange bearing. Please note the filling quantities of test tubes (p. 23).

If malfunctioning occurs that cannot be corrected with the above instructions, please inform your authorized Heidolph Instruments dealer immediately.

TECHNICAL DATA

SilentCrusher S

Characteristics	Values
Connection Voltage	100 – 240 V / 47 - 63 Hz
Power Consumption (Rated Output)	24 W
RPMs	15.000 – 75.000 rpm (referred to water)
Operating Mode	Short-term operation, 1.5 minutes, automatic shut-off, red control light indicates shut-off. Reset by removing dispersing tool.
Drive Protection	Overheating protection switches drive unit off in case of overheating; blinking red control light indicates this condition. Reset by removing dispersing tool.
Control Light for "Device On"	Control light (green) on power supply
Dimensions (in mm) Drive Unit	Width 125; height 197; depth 125
Dimensions (in mm) Power Supply	Width 106; height 30; depth 65
Total weight	1.1 kg
Operating Temperature	0 – 40 °C
Storage Temperature	- 20 to + 80 °C
Relative Humidity	85 % (without condensation)
Type of Protection according to EN 60529	IP 30
Safety Class according to VDE 0100	I

Dispersing Tool 3 F

Characteristics	Values
Part Number	596-03010-00
Stator Diameter [mm]	3.3
Rotor Diameter [mm]	2.0
Gap Width Stator /Rotor [mm]	0.3
Width of Slit [mm]	0.6
Total Shaft Length [mm]	26
Immersion Depth max. [mm]	23
Immersion Depth min. [mm]	17
Volume [ml]	0.8 – 1
liquid level max. in test tube [mm]	26
liquid level min. in test tube [mm]	22
Peripheral Speed [m/sec]	1.6 – 7.85
Initial Particle Size [mm]	< 0.4
Material	PTFE / 1.4435
Vessel	Eppendorf PP Reaction Vessel 1.5ml
Internal Vessel Diameter [mm]	Ø9
Vessel Length [mm]	38.5
Sterilization	Up to 130°C with wet chemicals; up to 180°C dry

Dispersing Tool 5 F

Characteristics	Values
Part Number	596-05010-00
Stator Diameter [mm]	5.0
Rotor Diameter [mm]	3.2
Gap Width Stator /Rotor [mm]	0.4
Width of Slit [mm]	0.6
Total Shaft Length [mm]	38
Immersion Depth max. [mm]	31
Immersion Depth min. [mm]	14
Volume [ml]	2 - 4
liquid level max. in test tube [mm]	32
liquid level min. in test tube [mm]	18
Peripheral Speed [m/sec]	3.9 - 11.8
Initial Particle Size [mm]	< 0.4
Material	PTFE / 1.4435
Vessel	PP – 5ml test tube
Internal Vessel Diameter [mm]	Ø13.7
Outer dimensions [mm]	Ø15 x 50
Sterilization	Up to 130°C with wet chemicals; up to 180°C dry

Dispersing Tool 7 F

Characteristics	Values
Part Number	596-07010-00
Stator Diameter [mm]	7.0
Rotor Diameter [mm]	3,9
Gap Width Stator /Rotor [mm]	0.55
Width of Slit [mm]	0.6
Total Shaft Length [mm]	55
Immersion Depth max. [mm]	44
Immersion Depth min. [mm]	23
Volume [ml]	6 - 10
liquid level max. in test tube [mm]	50
liquid level min. in test tube [mm]	33
Peripheral Speed [m/sec]	5.5 - 17.7
Initial Particle Size [mm]	< 0.4
Material	PTFE / 1.4435
Vessel	PP – 20ml test tube
Internal Vessel Diameter [mm]	Ø 18.3
Outer dimensions [mm]	Ø21 x 96
Sterilization	Up to 130°C with wet chemicals; up to 180°C dry

WARRANTY, LIABILITY AND COPYRIGHTS

Warranty

Heidolph Instruments warrants the products described here (except for wear parts) for three years from delivery from the manufacturer's warehouse. This warranty covers defects in materials and manufacturing.

Transportation damages are excluded.

For warranty claims, contact Heidolph Instruments (Tel.: (+49) 9122 - 9920-68) or your Heidolph Instruments dealer. If it involves a defect in materials or manufacturing, the device will be repaired or replaced under the warranty, free of charge.

Heidolph Instruments does not cover damage caused by improper handling.

Heidolph Instruments must confirm any change in this warranty in writing in each individual case.

Disclaimer of Liability

Heidolph Instruments does not accept any liability for improper handling and use of this device. Consequential damages are excluded.

QUESTIONS / REPAIRS

If, after reading this operating manual, you still have **questions** about the installation, operation or maintenance of your device, please submit them to the following address.

For **repairs,** first call Heidolph Instruments directly (Tel.: (+49) 9122 - 9920-68) or your authorized Heidolph Instruments dealer.

Note:

You will receive approval for sending your defective item to the following address:

Heidolph Instruments GmbH & Co. KG
Vertrieb Labortechnik
Walpersdorfer Str. 12
D-91126 Schwabach / Deutschland
Tel.: +49 – 9122 - 9920-68
Fax: +49 – 9122 - 9920-65
E-Mail: sales@heidolph.de

Note:

If you are based in the United States of America, please contact Heidolph US:

Heidolph Instruments, LLC
Lab Equipment Sales
2615 River Rd.
Cinnaminson, NJ 08077
Phone: 856-829-6160 Fax: 856-829-7639
E-Mail: heidolph@snip.net

Safety Warning

When returning equipment for repair that has been in contact with hazardous materials, please indicate:

The most accurate possible *material data* on the corresponding medium

Protective measures required for safe handling by our receiving and maintenance personnel

Coding on the packing pursuant to the Hazardous Materials Ordinance.

VDE
Reg.-Nr. 7141/QM/10.2001
QM-System-Audit
DIN EN ISO 9001:2000

Service Tel.: 00800-43 43 65 74
3 Jahre Garantie
3 Years Warranty
Service Tel.: (+49)-9122-992068

CE-DECLARATION OF CONFORMITY

We declare that this product meets the following standards and normative documents:

EMC-Directive (89/336/EEC)**:**

EN 61326: 1997 + A1:1998 + A2:2001
EN 61000-3-2:2000
EN 61000-3-3:1995
EN 61000-4-2:1995
EN 61000-4-3:1996
EN 61000-4-4:1995
EN 61000-4-5:1995
EN 61000-4-6:1996

Low Voltage Directive (73/23/EEC)**:**

EN 61010

01-005-004-45-2 06.03.2013