Important instructions and warnings

1. For your safety, please read all operating instructions before putting the device into operation.

2. Observe the occupational health and safety regulations of the employer’s liability insurance.

3. Before starting, ensure the supply voltage corresponds to the data on the type plate.

4. Remove the chuck-/service-tools before switching the device on.

5. Provide good lighting, safety glass shields, eye protection and an extraction system at the workplace.

6. The handpiece is intended exclusively for dry grinding.

7. Before using the handpiece, make sure the tool is seated firmly and cannot be pulled out.

8. Use only functional, certified tools (drill bits, milling bits, cutting disks, polishing tools, grinding tools, etc.) and observe the tool manufacturer’s instructions for use (e.g. maximum permissible speed of rotation).

9. Make sure that the handpiece does not start unintentionally or run unsupervised.

10. Operate the handpiece only with a tool or pin locked in the chuck.

11. Do not turn the chuck while the handpiece is rotating.

12. Clean the chuck regularly according to the instructions (never use compressed air for cleaning / see section 2.1).

13. Repair and maintenance work on the electrical part of the equipment may only be performed by an approved or certified repair technician.

14. Electrical devices may not be used in a damp or wet environment.

15. For 115V, use the grounded power cable SVT3x18AWG with IEC socket and grounded plug.

16. Any interruption in the protective ground conductor inside and outside the device or loosening of the protective ground connection can lead to the device posing a threat to the operator. Intentional interruption is not permitted.

17. In case of defects or damage where safe operation is no longer ensured, the device must be secured against unintentional use.

18. This device is not suitable for use in potentially explosive environments or on patients.
0. Introduction
  0.1 Declaration of conformity
  0.2 General notes
  0.3 Scope of delivery K50
  0.4 Commissioning K50
  0.5 Scope of delivery T50
  0.6 Commissioning T50

1. Operation
  1.1 Handling K50 kneecontroller
  1.2 Handling D50 tabletop controller
  1.3 Handling the handpiece

2. Maintenance
  2.1 Changing the fuse in the controller
  2.2 Malfunction
  2.3 Cleaning and replacing the chuck
  2.4 Replacing the motor cable
  2.5 Spindle change is simple
  2.6 Troubleshooting

3. Data
  3.1 Technical data
  3.2 Scope of delivery VARIOstar K50
  3.3 Scope of delivery VARIOstar T50
  3.4 Product overview VARIOstar and Spare parts

4. Safety notes

5. Warranty terms
Thank you!

We are delighted that you have chosen the Zubler VARIOstar D50 and we hope that you will enjoy working with it. The constant further development of our technology is based on cooperation with experienced dental technicians. Our primary goal is to construct dental equipment of maximum quality, flexibility and sustainability. Performance and profitability are the basic prerequisites for this.

In order to ensure trouble-free usage, please read the operation manual carefully.

0.1 Declaration of conformity

We, Zubler Gerätebau GmbH
Buchbrunnenweg 26
89081 Ulm Jungingen

hereby declare that the products

**VARIOstar K50**
**VARIOstar T50**

conform to the regulations of the following EU directives:

2006/42/EC Machinery Directive
2014/35/EU Low Voltage Directive
2014/30/EU EMC Directive

This declaration loses its validity if the products are modified without our agreement.

Kurt Zubler
Chief Executive Officer
0.2 General notes

Functional principle: Thanks to its special brushless design, the VARIOstar K50/T50 handpiece enables smooth, fatigue-free and thus economical working in continuous operation. The device is constantly monitored for overload through microprocessor control. An additional thermal fuse provides the handpiece with increased safety.

0.3 Scope of delivery: VARIOstar K50 knee controller

<table>
<thead>
<tr>
<th>1</th>
<th>Knee controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Handpiece</td>
</tr>
<tr>
<td>3</td>
<td>Table mount</td>
</tr>
<tr>
<td>4</td>
<td>Handpiece stand</td>
</tr>
<tr>
<td>11</td>
<td>On/Off switch</td>
</tr>
<tr>
<td>12</td>
<td>Digital speed display</td>
</tr>
<tr>
<td>13</td>
<td>Socket for handpiece</td>
</tr>
<tr>
<td>14</td>
<td>Socket for data cable</td>
</tr>
<tr>
<td>15</td>
<td>Socket for external display</td>
</tr>
<tr>
<td>16</td>
<td>Power cord connector</td>
</tr>
<tr>
<td>17</td>
<td>Flat spanner</td>
</tr>
<tr>
<td>18</td>
<td>Chuck tool</td>
</tr>
<tr>
<td>19</td>
<td>Knee plate</td>
</tr>
<tr>
<td>20</td>
<td>Power cord</td>
</tr>
<tr>
<td>21</td>
<td>Fixing knob</td>
</tr>
<tr>
<td>22</td>
<td>Assembly diagram</td>
</tr>
</tbody>
</table>

Fig. 2
0.4 Installing the VARIOstar K50 knee controller

Fasten the table mount 3 at your workplace with the help of the assembly diagram 22. You can find the assembly diagram between the knee controller 1 and the table mount 3.

Hook the knee controller 1 into the table mount 3 and push the knee controller 1 into the table mount 3 to the stop; secure the knee controller with the fixing knob 21.

Connecting the handpiece

Connect the VARIOstar handpiece 2 to the socket 13 (align to the notch) and secure the plug by twisting the ring.

Place the motor handpiece 2 in the handpiece stand 4.

Connecting the SL-AP data cable
(Zubler suction only!)

Connect socket 14 with the data socket of your Zubler suction unit (align to notch and secure by turning). The data connection enables a disturbance free working.

If using the data cable SL-AP the power cord 20 must not be plugged into the power socket of the suction unit.

Connecting the power cable

- Compare the voltage specification on the type plate with the mains voltage.
- If they match, plug the power cable into socket 16.
- Then plug the power plug into the main power socket.
0.5 Scope of delivery: Tabletop controller VARIOstar T50

Fig. 5

2 Handpiece
4 Handpiece stand
5 Tabletop controller T50
6 VARIO foot pedal
11 On/Off switch
12 Digital speed display
13 Socket for handpiece
14 Socket for data cable
16 Power cord connector
26 Socket for VARIO foot pedal
20 Power cord
23 Tool tray
24 Speed knob
Installing the VARIOstar T50 desktop controller

Connecting the handpiece
Connect the VARIOstar handpiece 2 to socket 13 (align to notch and secure by turning).

Connecting the knee-/foot-pedal
Connect the VARIOstar Foot Pedal 6 to socket 26 (align to notch and secure by turning).

Connecting the SL-AP data cable (Zubler suction only!)
Connect socket 14 control unit with the data socket of your Zubler suction unit (align to notch and secure by turning). The data connection enables a disturbance free working.

If using the data cable SL-AP the power cord 20 must not be plugged into the power socket of the suction unit.

Connecting the power cable
After comparing the Power Supply data with the Voltage requirement data on the type plate, plug the Power Cord 20 into Power Cord Connection 16, then into the Power Supply or Wall Outlet.
1. Operation

1.1 Operating the VARIOstar K50 knee controller

Turn the controller ON (I) using the mains switch 11.

The speed display 12 indicates the pre-selected speed. You can change the speed with pushbutton T4 (+) or T3 (-).

The handpiece 2 is started by pressing the knee plate 19. Due to the wide range of movement you can control the speed with ease.

Cruise control

The cruise control is enabled by pressing pushbutton T1, LED L1 lights up.

Pressing and holding the knee plate 19 for 3 sec. on the desired speed will activate the cruise control and the handpiece is running even without pressing the knee plate 19.

To stop the handpiece, press the knee plate 19 again or press pushbutton T1 to disable the cruise control, LED L1 is no longer lit.

<table>
<thead>
<tr>
<th>12</th>
<th>Digital speed display</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>LED Automatic Speed Control</td>
</tr>
<tr>
<td>L2</td>
<td>LED safety switch</td>
</tr>
<tr>
<td>L3</td>
<td>LED anticlockwise rotation</td>
</tr>
<tr>
<td>T1</td>
<td>Automatic speed control</td>
</tr>
<tr>
<td>T2</td>
<td>Safety switch</td>
</tr>
<tr>
<td>T3</td>
<td>- pushbutton / counterclockwise rotation</td>
</tr>
<tr>
<td>T4</td>
<td>+ pushbutton / clockwise rotation</td>
</tr>
</tbody>
</table>
**Speed limit**

The VARIOstar K50 is equipped with an adjustable speed limiter to limit the maximum speed (e.g. 10k rpm for cutting disc).

Press pushbutton T2 to deactivate the speed limiter, LED L2 lights up.

Press pushbutton T2 again to activate the speed limiter, LED L2 is no longer lit.

The speed limiter is factory set to 40k rpm.

**Changing the speed limit**

Press and hold pushbutton T2 until LED L2 starts flashing. Adjust the maximum speed with pushbutton T4 (+) or T3 (-). (max. 40k rpm).

To save the setting press pushbutton T2 again, LED L2 no longer flashes.

**Changing the direction of rotation**

**Changing to CCW:**

Switch ON (I) the control unit with the mains switch 11, while pressing and holding pushbutton T3, LED L3 lights up.

**Changing to CW:**

Switch ON (I) the control unit with the mains switch 11, while pressing and holding pushbutton T4, LED L3 is no longer lit.

The rotational direction is factory set to CW.

---

![Fig. 9](image)

**Caution:** Observe the tool manufacturers specified speeds.
1.2 Operating the VARIOstar T50 tabletop controller

Turn the controller ON (I) using the mains switch 11.

The speed display 12 indicates the pre-selected speed. Use the speed knob 24, to set the desired maximum speed.

**Manual Start/Stop (without Foot-/Knee-pedal only!)**

Press the speed knob 24 to start/stop the handpiece manually.

---

**Cruise control (with Foot-/Knee-pedal only!)**

The cruise control is enabled by pressing the speed knob 24, LED L1 lights up.

Pressing and holding the Foot-/Knee-pedal 6 for 3 sec. on the desired speed will activate the cruise control and the handpiece is kept running.

To stop the handpiece press the Foot-/Knee-pedal 6 again shortly or press the speed knob 24 to disable the cruise control, LED L1 is no longer lit.
**Speed limit**

The VARIOstar T50 is equipped with an adjustable speed limiter to limit the maximum speed (e.g. 10k rpm for cutting disc).

Press pushbutton T2 to deactivate the speed limiter, LED L2 lights up.

Press pushbutton T2 again to activate the speed limiter, LED L2 is no longer lit.

The speed limiter is factory set to 40k rpm.

**Changing the speed limit**

Press and hold pushbutton T2 until LED L2 starts flashing. Adjust the maximum speed with speed knob 24. (max. 40k rpm).

Press pushbutton T2 to save the setting, LED L2 stops flashing.

**Changing the direction of rotation**

The rotational direction can be toggled by switching ON (I) the control unit with the mains switch 11, while pressing and holding the speed knob 24. Once the direction is set to CCW, LED L3 lights up.

The rotational direction is factory set to CW.
1.3 Operating the handpiece

**Tool change:**

The chuck on the handpiece is opened or closed by turning the grip 27.

The chuck 30 is opened and the tool can be removed.

After inserting the tools the chuck 30 is closed again by turning the grip 27 in the opposite direction.

An optional 3.00 mm chuck can be used (see 2.1)

---

<table>
<thead>
<tr>
<th>27 Grip</th>
<th>28 Cap</th>
<th>29 Pin</th>
<th>30 Chuck</th>
<th>31 Tip</th>
<th>45 Motor cable</th>
</tr>
</thead>
</table>

---

**Notice:**

Only change the tool with the motor turned off!

Check before using the handpiece that the tool is seated firmly and cannot be pulled out.

In order to avoid deformation of the chuck, a tool or the pin provided must always be inserted in the chuck.
2. Maintenance

2.1 Changing the main fuse

The fuse is located in the fuse drawer in the power input connector 16. Open the drawer and replace the fuse. The fuse value is marked on the type plate.

Reasons for a blown fuse: short-circuit in the device or overvoltage.

Return the device to your distributor for evaluation if the cause is unclear.

2.2 Malfunctions

If the handpiece is overloaded or blocked, the device switches off for safety reasons. Switch the device off and on again. The device is ready for use again immediately.

Zubler accepts no warranty claims if the Micromotor VARIOstar K50/T50 is not operated in accordance with the operation manual.

Repair and maintenance work on the electrical part of the device may only be carried out by technical personnel or by persons trained in the factory who have been instructed about the safety regulations. For maintenance work, disconnect the power cord or isolate the device from the power supply so there is no electrical current.
2.3 Cleaning or replacement of the chuck

2.3.1 Removing the chuck

1. Open the chuck 30 and remove the tool.
2. Push the chuck tool 18 onto the chuck 30.
3. Fix the chuck 30.

4. Turn the chuck 30 with the help of the chuck tool 18 until the flanks of the spindle are visible at the tip 01 and the flat spanner 17 can be inserted.
5. Insert the flat spanner 17 and hold it tight.
6. Open the chuck 30.

7. Turn the chuck tool 18 counter-clockwise to loosen and unscrew the chuck 30.

Screw in the chuck 30 in the clockwise direction up to the end stop and lightly tighten it.
2.3.2 Cleaning the chuck

Remove accumulated dirt if possible using a suitable twist drill (max. 2 mm). Then clean in an ultrasonic bath, repeating if necessary. Dry the chuck well with compressed air!

Also clean the cone before inserting. To do this, dip one end of a Q-Tip in cleaning agent (Vaseline). Ensure that the handpiece opening is held vertically downwards in order to prevent liquid getting into the ball bearing. Clean the cone with rotary movements. Subsequently, dry the cone using the dry end of the Q-Tip.

Do not blow out with air! Lightly grease the chuck all round on the cone and on the thread side and insert in the shaft.

![Fig. 19](image1.png)

The digital display in the handpiece stand, which is available as an accessory, can be connected to the knee controller via socket 15.

The VARIOstar K50 knee controller also includes a data interface/switching signals for controlling an extraction system. To use this function, connect your extraction system to the K50 knee controller via socket 14.

![Fig. 20](image2.png)
2.4 Replacing the Motor Cable

Unscrew the cap 52 from the motor and release the cable by pulling off the handpiece connector 50.

Plug in a new motor cable 45 and secure it with the cap 52. Use only an original motor cable with a new cap 52.

Fig. 21

45 Motor Cable
50 Handpiece Connector
51 Motor Cable Connector
52 Cap

2.5 Spindle change is simple

The instructions for changing the spindle (Order N° 896-1003) are attached to the replacement spindle.
## 2.6 Troubleshooting

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Cause</th>
<th>Remedial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handpiece does not start.</td>
<td>Check whether the controller is switched on and the motor speed display is lit.</td>
<td>Unplug the mains cable 20 and plug it in again; switch on the mains switch 110, see 1.2. Open and close the chuck mechanism.</td>
</tr>
<tr>
<td></td>
<td>Check whether the chuck of the handpiece is closed (check that the tool is firmly seated)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check whether the handpiece is plugged into the controller.</td>
<td>Plug in and secure the handpiece cable (see 0.4 &amp; 0.6). Plug in and secure the foot pedal (see 0.6)</td>
</tr>
<tr>
<td></td>
<td>Check whether the foot pedal is plugged into the controller.</td>
<td></td>
</tr>
<tr>
<td>The speed display on the controller does not show any display</td>
<td>Check whether the controller is switched on (On/Off switch 11)</td>
<td>Unplug the power cable and plug it in again. Switch on the On/Off switch 11.</td>
</tr>
<tr>
<td></td>
<td>Check whether the controller is connected to the mains supply.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check whether the fuse in the controller (mains cable connector) has blown.</td>
<td>Replace the fuse (see 2.4)</td>
</tr>
<tr>
<td>The speed of the handpiece does not increase</td>
<td>The maximum speed of the handpiece must be set with the speed knob (T50).</td>
<td>Adjust the setting with the speed knob 24.</td>
</tr>
<tr>
<td></td>
<td>The maximum speed of the handpiece must be set with the safety switch T2 (K50)</td>
<td>Adjust the safety switch T2 (see 1.1)</td>
</tr>
</tbody>
</table>

Otherwise contact your distributor.
### 3.1 Technical Data:

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>VARIOstar K50</th>
<th>VARIOstar T50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>95mm</td>
<td>180mm</td>
</tr>
<tr>
<td>Height</td>
<td>250mm</td>
<td>140mm</td>
</tr>
<tr>
<td>Depth</td>
<td>310mm</td>
<td>200mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5.6kg</td>
<td>7.1kg</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>AC 230V/115V</td>
<td>AC 230V/115V</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Power consumption (max.)</td>
<td>270W</td>
<td>270W</td>
</tr>
</tbody>
</table>

**VARIOstar Handpiece**

| Speed range                      | 1.000-50,000/min |
| Max. Torque                      | max. 7.8Ncm     |
| Protection class                 | I               |
| Length                           | 162mm           |
| Diameter                         | 30mm            |
| Weight                           | 235g            |

### 3.2 Scope of delivery VARIOstar K50:

<table>
<thead>
<tr>
<th>Knee control unit VARIOstar K50</th>
<th>230V</th>
<th>804-3012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee control unit VARIOstar K50</td>
<td>115V</td>
<td>804-3011</td>
</tr>
<tr>
<td>Table mount</td>
<td>896-1022</td>
<td></td>
</tr>
<tr>
<td>Fixing knob</td>
<td>896-1023</td>
<td></td>
</tr>
<tr>
<td>Assembly diagram</td>
<td>896-1024</td>
<td></td>
</tr>
<tr>
<td>Power cord</td>
<td>896-1020</td>
<td></td>
</tr>
<tr>
<td>Operation Manual</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 3.3 Scope of delivery  **VARIOstar T50:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabletop control unit <strong>VARIOstar T50</strong> 230V</td>
<td>804-3052</td>
</tr>
<tr>
<td>Tabletop control unit <strong>VARIOstar T50</strong> 115V</td>
<td>804-3051</td>
</tr>
<tr>
<td><strong>VARIO</strong> Foot Pedal, standard</td>
<td>804-1016</td>
</tr>
<tr>
<td><strong>VARIO</strong> Rotary Foot Lever</td>
<td>804-1015</td>
</tr>
<tr>
<td><strong>VARIO</strong> Knee Pedal (can be mounted left or right)</td>
<td>804-1017</td>
</tr>
<tr>
<td>Power cord</td>
<td>896-1020</td>
</tr>
<tr>
<td>Operation Manual</td>
<td></td>
</tr>
</tbody>
</table>

![Images of tabletop control units, foot pedal, and knee pedal](image1.png)

### 3.4 Product overview  **VARIOstar and spare parts:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handpiece <strong>VARIOstar</strong> with Chuck Ø2,35mm only</td>
<td>804-3002</td>
</tr>
<tr>
<td>Handpiece <strong>VARIOstar</strong> with Chuck Ø3,00mm only</td>
<td>804-3005</td>
</tr>
<tr>
<td>Handpiece Stand standard</td>
<td>896-1019</td>
</tr>
<tr>
<td>Handpiece Stand with digital speed display K50</td>
<td>896-1021</td>
</tr>
<tr>
<td>Tip</td>
<td>896-1001</td>
</tr>
<tr>
<td>O-ring for tip</td>
<td>896-1002</td>
</tr>
<tr>
<td>Spindle, completely assembled</td>
<td>896-1003</td>
</tr>
<tr>
<td>Chuck, 2.35 mm</td>
<td>896-1004</td>
</tr>
<tr>
<td>Protection pin, 2.35 mm</td>
<td>896-1005</td>
</tr>
<tr>
<td>Chuck, 3.00 mm</td>
<td>896-1006</td>
</tr>
<tr>
<td>Protection, pin 3.00 mm</td>
<td>896-1007</td>
</tr>
<tr>
<td>Ring, red</td>
<td>896-1015</td>
</tr>
<tr>
<td>Motor cable</td>
<td>896-1016</td>
</tr>
<tr>
<td>Flat spanner, tool 1</td>
<td>896-1017</td>
</tr>
<tr>
<td>Chuck holder, tool 2</td>
<td>896-1018</td>
</tr>
</tbody>
</table>
4. Safety notes

Even if you barely remove any material and cannot see dust particles, milling and grinding generates fine dust that is suspended in the air throughout the entire room. The distance between your face and the grinding position is so small that you inhale high concentrations of this dust, even if you consider the grinding amount to be insignificant. The fine components of the dust in particular penetrate deeply into the lungs with ease. Alveolar dust particles with a size of less than 5 µm can settle in the lungs and lead to permanent asthmatic suffering and serious lung diseases.

Remember, it’s your job. You are exposed to this contamination every day!

Dust in dental technology – a great danger!

Dental technicians are especially endangered. According to statistics held by the employer’s liability insurance association, occupationally-related skin and lung diseases are considerably higher here than the average in the industries united in the employer’s liability insurance association for fine mechanics and electrical engineering.

Fine dust in the air is particularly dangerous. Damaging effects on the skin and the respiratory organs have also been found with dental gypsum, embedding compounds and unclassified mixed dusts that are assigned to the general dust limit values.

The Ordinance on Hazardous Substances principally prescribes the extraction of dusts as a legal requirement.

An optimization of the intake systems and the use of modern dust collectors can decrease the dust concentration many times over.

Zubler offers a dust collection solution to suit laboratories of all sizes.
5. Warranty terms

In accordance with its General Terms and Conditions of Business, Zubler Gerätebau GmbH (Zubler) guarantees the perfect function of the equipment and its freedom from material and manufacturing defects for a period of 12 months from the date of purchase certified by the seller.

We give a lifetime guarantee on armature and winding.

In case of valid complaints, from the armature and winding Zubler provides replacement parts or repairs free of charge.

The warranty does not cover defects and their consequences if they are caused or could have been caused by: natural wear and tear; inappropriate treatment, cleaning or maintenance; disregard of the maintenance, operating or connection instructions; corrosion; contamination; chemical or electrical effects that are unusual or impermissible.

The warranty claim will not be accepted if defects or their consequences are due to interference with or modifications to the product. Warranty claims can only be asserted if they are notified without delay to Zubler in writing. A copy of the invoice or delivery note is to be attached to the notification.

In addition to the guarantee, the purchaser’s legal warranty claims apply, wherein the warranty period is 12 months.

Service