# Service manual

## Multimat 2
## *Touch/Touch & Press*


Last modified: 27 Sept 2004

**DeguDent GmbH**

D- 63404 Hanau

**Chapter**

**Chapter**

Service and repairs must be performed only by service technicians authorized by DeguDent and Dentsply.

The Multimat 2 *Touch*, *Touch & Press* furnace must be operated using original replacement parts and accessories only. This is the only way to ensure that the performance data outlined in the Instructions for Use are met and that the device can be operated safely.

**The furnace must be completely disconnected from mains when service or repair work is performed!**

Exception:
The furnace can be in operative condition when performing setting or adjustment tasks.
These tasks must be performed with the utmost caution, as there is a risk of touching live components.

The insulation material used inside the furnace contains ceramic fibres. Fibre dust can be released on exchanging the muffle or the insulation.
Ceramic dust has been shown to be carcinogenic in animal experiments. Make sure to observe the precautionary measures listed in the pertinent EU Material Safety Data Sheet (MSDS).
If ceramic fibres are used at temperatures above 900 °C for a longer period, silicogenic substances (cristobalite) may form.
In certain cases, such as when exchanging the firing muffle, dust emissions may occur that may cause irritations of the skin and eyes and of the respiratory tract.
When a firing muffle has to be exchanged, always proceed as follows:

- Instruct the staff to wear long-sleeved clothing. Heads must be covered and eye protection and gloves worn.
- Connect a dust vacuum aspirator at the source of the dust. If that is not possible, provide the staff with a dusk mask of grade FFP3 or comparable.
- Upon completion of the procedure, any adhering dust must first be rinsed off the unprotected skin using cold water. Only then can you wash off any residue with water and soap. Wash work clothes separately from other clothes.

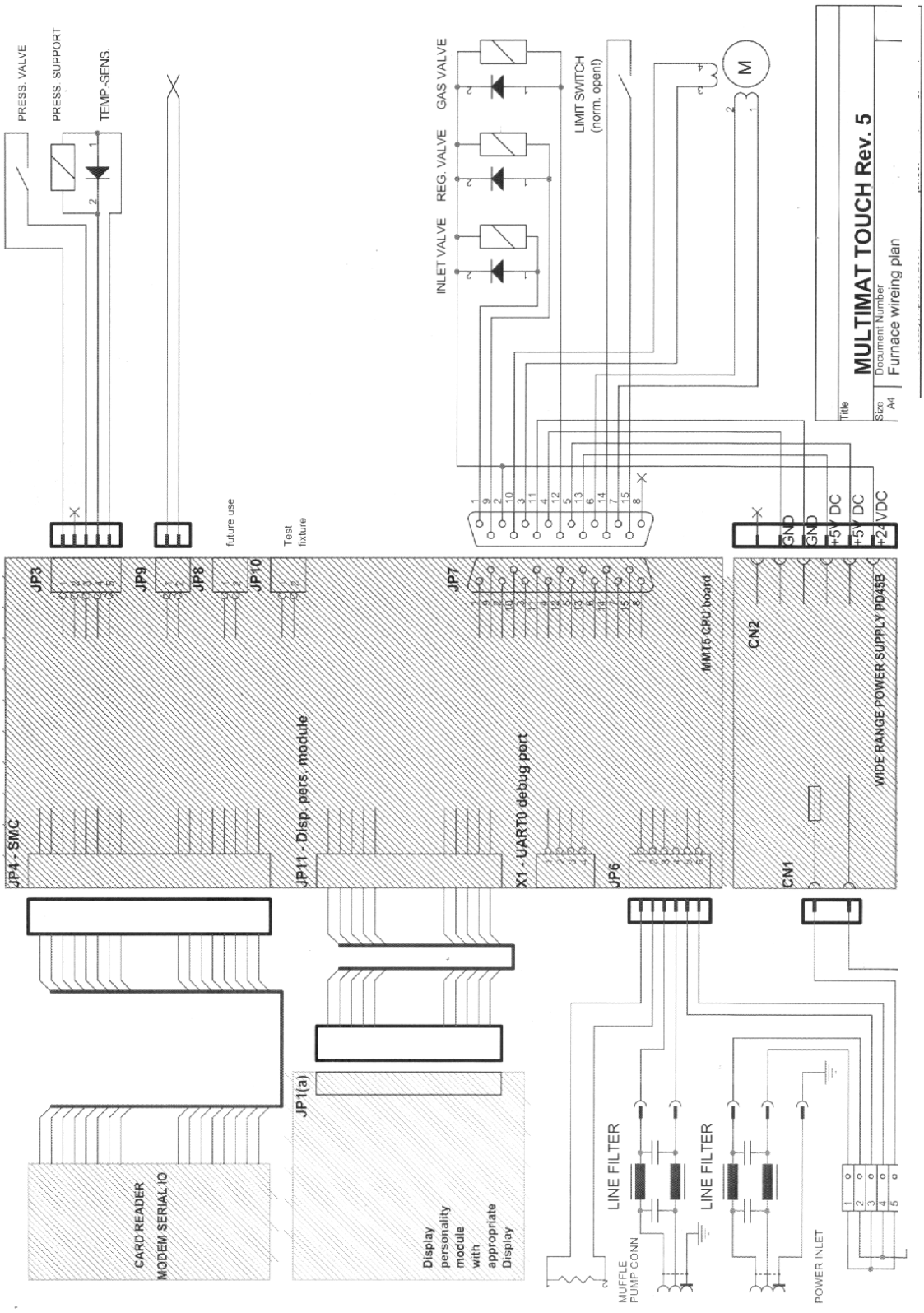
Before touching any electrical components, touch a piece of blank metal to discharge any electrostatic charge.
We recommend the use of a **grounding bracelet** when working on electronic components. Store and ship PCBs only wrapped in antistatic material (such as aluminium foil).
Use the original packaging material if possible.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**The following items are required for servicing the Multimat 2 *Touch/Touch & Press*:**

| Tools: | Used for: | Obtained from: |
|---|---|---|
| Silver wire test calibration kit | Checking the temperature of the chamber | Can be ordered as a spare part:<br>Order Code 03 532 803 |
| Smart Media card | Storing the programs of the Multimat 2 *Touch/ Touch &Press* | Can be ordered as a spare part:<br>Order Code 54 6023 0100 |

| DeguDent A Dentsply International Company | **Wiring diagram 100–240 V**<br>**Multimat 2 Touch & Press**<br>**Chapter 2.1** | **Page** 1 of 1<br>**Rev. Index** 0<br>**Rev. Date** 27 Sept 2004 |
|---|---|---|



The following information is intended to assist in recognizing and evaluating problems and errors and in taking appropriate measures for resolving them.
An error message, the possible cause and possible corrective action(s) are shown in the display in abbreviated form. Confirm the message by touching the **C** button.
Additional information about the cause of the error will be displayed on touching the **?** button.
The error messages are listed under their leading alphanumeric codes for ease of retrieval.

| No. | Error message | Possible cause | Action(s) |
|---|---|---|---|
| | Display remains dark; green mains LED is not lit. | Defective display.<br>Defective mains fuses. | Disconnect furnace from mains. Replace defective fuses.<br>If the display remains dark, check power supply. If 5 V and 24 V voltages are present, replace control unit. |
| E 01 | Time limit for introducing the object has been exceeded. | The 15-minute time limit for introducing the pressing mould has been exceeded. | Insert pressing mould more quickly. |
| E 02 | Normal pressure is not restored, chamber does not open. | Magnetic valve is defective. | Ventilation valve defective.<br>Check and if necessary replace the magnet coil.<br>Clean valves. |
| E 03 | position switch not closed. | Transport lock or foreign matter caught between the upper and lower parts of the furnace.<br><br>Terminal position switch out of adjustment or defective. | Remove transport lock or foreign matter.<br><br>Readjust or replace terminal position switch. |
| E 04 | Excessive control unit temperature.<br>Program terminated, continuous alarm tone. | Extremely high standby temperature with the chamber open. | Disconnect mains plug and allow furnace to cool for approximately 5 minutes. Restart furnace after successful cooling. |
| E 05 | Selected vacuum level not attained.<br>Program terminated. | Moisture in chamber insulation<br><br>Vacuum system leak.<br><br><br><br><br>Vacuum pump suction too low. | Start dehumidifying program #476 with vacuum pump or #474 without vacuum pump.<br><br>Start vacuum testing program (from the **Furnace Parameters** menu). Watch indicated pressure level. Seal off vacuum line after 1 minute (by kinking). If the vacuum drops rapidly, the leak is inside the furnace (seals, magnetic valves, tubing etc.).<br>Moisture in the chamber.<br><br>If the vacuum does not drop, the pump has insufficient suction. Check pump as per the manufacturer's instructions (test vacuum performance). |

| Nr. | Error message | Possible cause | Action(s) |
|---|---|---|---|
| E 06 | Rapid cooling not completed. | The pre-heating temperature has not been reached.<br><br>The stand-by temperature has not been reached. | Wait until the stand-by temperature has been reached or terminate rapid cooling by touching the **C** button. |
| E 07 | Mains failure has occurred. | Short-term mains supply failure during firing. | Check firing result.<br>Have in-house wiring checked if required. |
| E 08 | Defective heating circuit.<br>Program terminated. | Defective muffle, wires or triac. | Replace muffle, wires or control unit. |
| E 09 | Error on thermo couple or on connecting wire of the thermo couple.<br>Program terminated. | Thermo couple or connecting wire of the thermo couple disconnected.<br><br>Incorrect polarity of thermo couple. | Replace thermo couple or connecting wire of the thermo couple.<br><br>Reconnect with correct polarity. |
| E 10 | Battery low. | Battery on control unit PCB almost empty. | Replace battery.<br>Battery is located in a battery holder on control unit PCB. |
| E 11 | Excessive temperature. | Actual temperature exceeds set temperature by 25 °C or more. | Replace control unit. |
| E 12 | Maximum pressing path reached.<br>Program terminated. | Not enough ceramic material in the pressing mould.<br><br>Pressing cylinder position sensor is positioned incorrectly or defective. | Use sufficient ceramic material.<br><br>Readjust pressing cylinder position sensor or replace if defective. |
| E 13 | Pressing cylinder position sensor not recognized. | Pressing cylinder position sensor is positioned incorrectly or defective. | Readjust pressing cylinder position sensor or replace if defective. |
| E 17 | Defective temperature reference sensor. | Components on control unit PCB defective. | Replace control unit. |
| E 20 | Smart *Media* Card is not readable | Smart *Media* Card inserted incorrectly.<br><br>Defective card reader. | Correct insertion path.<br><br>Replace I/O PCB. |
| E 21 | Smart *Media* Card is empty | Smart *Media* Card containing no data was inserted. | Save data to card. |
| E 22 | Smart *Media* Card contains invalid data | Data incorrectly written to Smart *Media* Card. | Format Smart *Media* Card and repeat writing data. |
| E 23 | Not enough furnace memory. | Furnace does not have enough memory to accommodate any additional programs. | Delete any programs that are not required. |

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

**This test is used to check the temperature of the chamber, not to adjust the temperature to the ceramic material fired.**

This test requires the silver wire test calibration kit, Order Code D 03 532 803.

**The furnace must be pre-heated at 600 °C for at least one hour.**
The easiest way to do this is setting the idle temperature in the **Basic Set Up** to 600 °C, changing to a different menu and closing the chamber.

**Note:** Before calibrating the temperature, the temperature offset in the **Furnace Parameters** menu *must* be reset to zero. To do so, touch the **M** button, open the **Furnace Parameters** menu and select the **Temp. offset** command, then confirm the reset to zero by touching the **C** button.
The furnace must be connected to the pressurized air supply for the pressing rod to be in its upper position. This position is required to ensure reproducibility of the temperature test.
**Use the touch firing base for the purposes of this test.**
Once the furnace has been pre-heated, start the special silver wire test program.
This is done either by touching **Porcelain Type – Special Programs – Silver wire calibration** or by calling the silver wire test directly by touching the **R** button and entering **475**.

- Open the chamber.
- Insert the silver wire into the wire carrier and place it in the middle of the firing base.
- Start the silver wire test program.
- If the upper half of the silver wire shows signs of melting in the upper third, i.e. if a bead of molten silver has formed on the surface of the wire, the temperature is correct to within ±2°C.
- If the surface of the silver wire does not show any signs of melting, the firing temperature is too low. In this case you would repeat the testing program while increasing the chamber temperature by 3 C at a time until the desired melting effect is seen on the surface of the silver wire.
- If the silver wire has melted to a clump, the firing temperature is too high. In this case you would repeat the testing program with new silver wide and while decreasing the chamber temperature by 3 °C at a time until the desired melting effect is seen on the surface of the silver wire.
- Once the correct melting temperature has been reached, touch the **Silver** field. The temperature offset is stored in memory.
- This completes the adjustment of the chamber temperature.

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

## Vacuum test

Used to check the furnace for leaks.

**Note:** The firing base must be located inside the chamber.

- Touch the **M** button.
- Touch **Furnace Parameters**.
- Touch **Vacuum test**.
- The position of the chamber is of no consequence. The chamber will close, and the vacuum pump will start operating.
- The vacuum should be brought down to 40 hPa, whereupon the vacuum pump will be turned off.
- The vacuum will be held, and the *Test successfully completed* message will appear in the display.
- Confirm the message by touching the **C** button.
- If the required vacuum level is not attained, detach the pump's vacuum line at the furnace, shorten it by 1 cm and reattach it.
- Repeat the vacuum test.
- Watch the vacuum on the display. If it still is not brought down to 40 hPa, completely kink in the vacuum line so that the pressure cannot be decreased. Watch the display.
- If the existing vacuum is maintained, the vacuum pump is not strong enough to create the required vacuum.
- If the pressure increases, there is a leak inside the furnace.
- Clean the firing base carrier seal or replace as appropriate.
- Check the magnetic valve and clean or replace as appropriate (see 6.11, *Replacing the magnetic valve*).
- Replace the seals of the connecting bolts (thermo couple and heating muffle).
  Disassembly is described in Chapter 6.5, *Replacing the firing muffle*.

## Setting and checking the toothed belt tension

Simple instructions for accessing and adjusting the toothed belt tension in Multimat 2 *Touch*/*Touch & Press* furnaces in which the toothed belt tension set screw is freely accessible rather than being covered by a label.

The furnace should be in a cold condition:

- Move the upper part of the furnace to the upper terminal position.
- Remove the firing base from the firing base carrier.
- Use a vacuum cleaner to remove any ceramic dust from the firing base carrier.
- Detach all connections to the furnace.
- Lay the furnace on its back.
- Move the upper part of the furnace against the upper stop to release the tension on the toothed belt.
- With light finger pressure, press one side of the toothed belt from the outside inward. If the belt has the right tension, it should be possible to press it inward by about 10 mm. If this is not possible, the tension of the toothed belt is too high. In this case, proceed as described below.
- Use the enclosed internal hex key to turn the toothed belt tension set screw counterclockwise until it is possible to push the cog belt from the outside inward by about 10 mm.
  Note:
  The toothed belt tension set screw may be secured with a locking varnish. In this case, turning the set screw can be somewhat difficult.
  The correct toothed belt tension has now been restored.
- To mark the new position of the toothed belt tension set screw, draw a short line across the column cover plate and the set screw. This lets you check the setting whenever you want.
- Restore function in reverse order, see Chapters 6. 5. 4 and 2.

*Column cover plate*

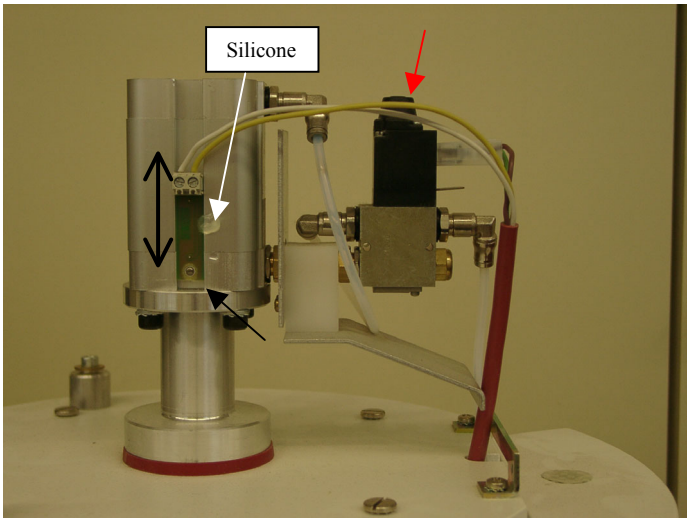
*If the cylinder screw is detached from the belt tension sheet, use a screwdriver to press the toothed lock washer toward the screw from below.*

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

After this exchange, the position sensor on the pressing cylinder will have to be readjusted.

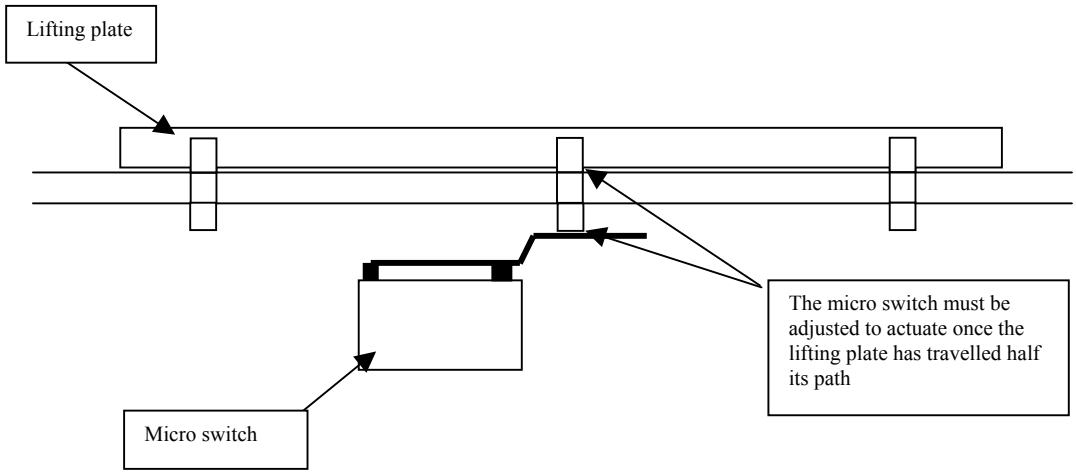



- The position sensor consists of a Reed switch actuated by a magnet on the cylinder.
- Slide the new position sensor about halfway into the groove on the cylinder.
- Connect an ohmmeter to the two connectors of the position sensors.
- Connect the furnace to the pressurized air supply.
- Use a screwdriver to press on the magnetic valve from above, and hold. The cylinder will move to the lower position.
- Move the position sensor down to the point where the ohmmeter safely changes to 0 ohms from infinity.
- Arrest the position sensor in this position using the small headless screw and secure the screw with a drop of silicone.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in Chapters 1.1 and 6.1!

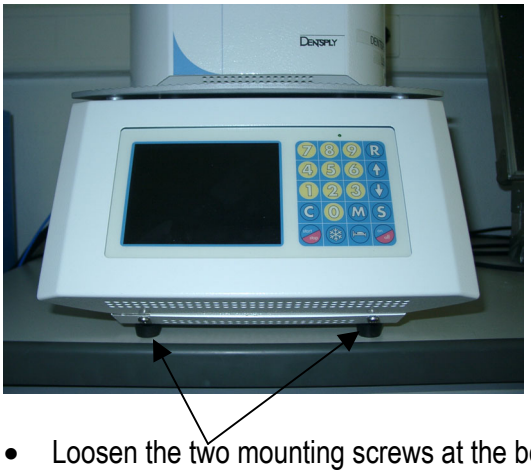


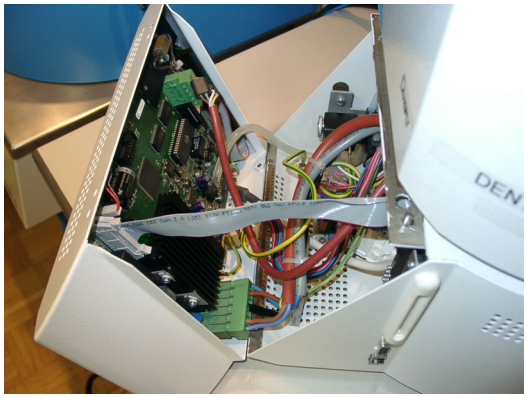

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Before performing each disassembling step, note the location and order of all components in order to facilitate seamless reassembly.**

**To service the furnace as described in the next chapters, open it as follows:**
**Front area:**
Once the control unit has been removed, all the components in the lower part of the furnace can be accessed.

- To remove the control unit, lift up the chamber and support it.

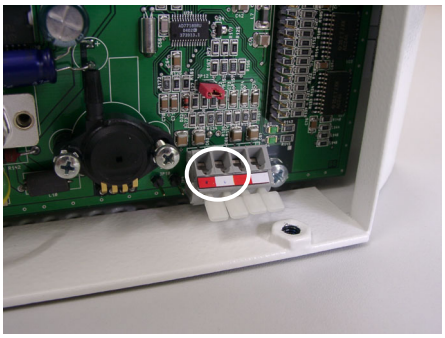


- Loosen the two mounting screws at the bottom of the unit.
- Lift the control unit and pull it forward and away from the furnace.
- Disconnect the contacts and remove the vacuum line from the sensor.
- The control unit may now be set aside.

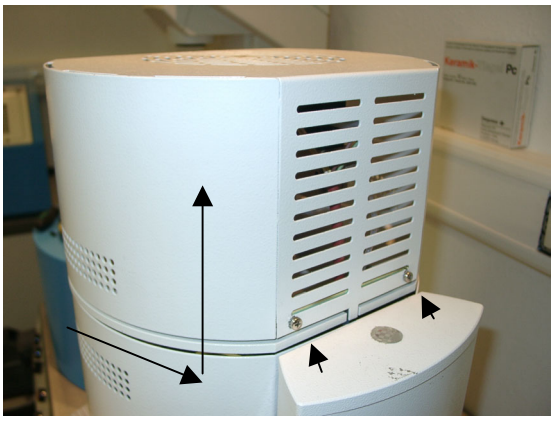
- Reassemble in reverse order.

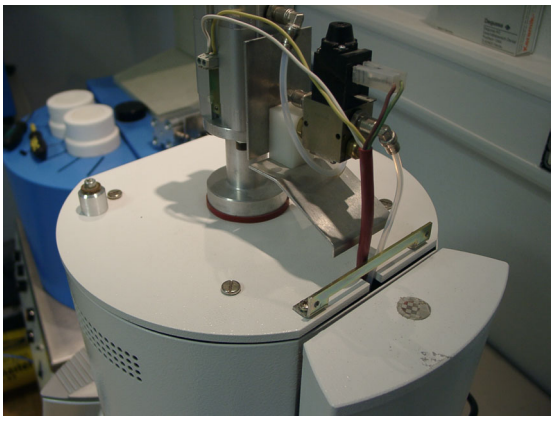
**Caution!** Watch for correct polarity of the connecting wires of the thermo couple.



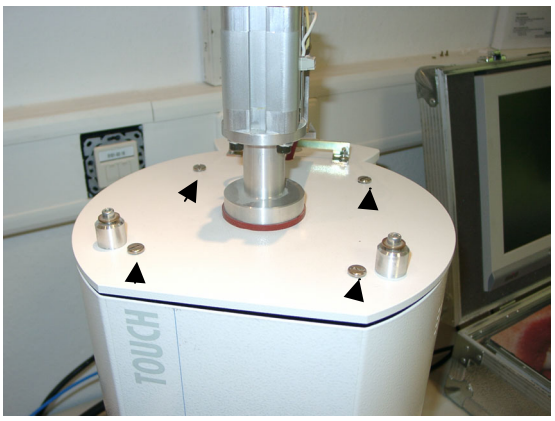
The two terminals next to the vacuum sensor must be connected.

## Firing chamber:





- Loosen the two rear mounting screws.
- Slide the top cover backward and lift it away upward.
- The pressing mechanism can now be accessed.
- To open the chamber, disconnect the wires at the cylinder and position sensor connectors.
- Remove the pressurized-air line. To do so, press against the angular connector and pull the outward.




- Once the four lid screws are removed, the top cover with the pressing mechanism can be lifted.
- Reassemble in reverse order.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

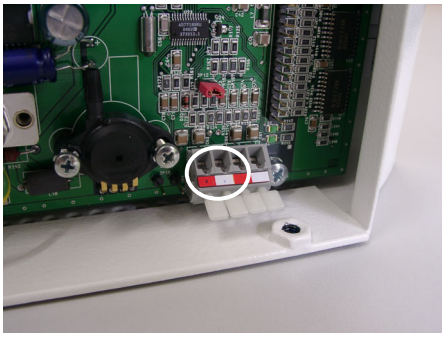
**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

**Caution!**
Both the user-specific data and the device data are lost when the control unit is replaced. Any modified programs should be backed up on a backup card (Smart Media Card) before replacing the control unit.

- Disconnect the furnace from mains.
- Lift the top portion of the furnace and support it with a suitable object.
- Remove the two Phillips screws below the control unit.
- Lift up the control unit.
- Disconnect the vacuum line and all connectors.
- Disconnect the thermo couple wires.
- Disconnect the protective earth wire on the control unit.
- Reinstall the new control unit in reverse order.

**Caution!** Watch for correct polarity of the connecting wires of the thermo couple.



The two terminals next to the vacuum sensor must be connected.

**Perform a temperature test using the silver sample, as described in Chapter 4.1.**

**Note:** When transporting the furnace, the touch screen display of the control unit must be protected with a suitable material.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- Disconnect the furnace from mains.
- Lift the top part of the furnace and support it with a suitable object.
- Remove the two screws below the control unit.
- Lift up the control unit.
- Disconnect the flat-ribbon cable of the I/O PCB from the control unit.
- Turn the control unit to the left-hand side for the I/O PCB to become accessible.
- Remove the two bolts on the outside of the RS232 interface connector.
- Remove the two mounting screws of the I/O PCB.
- Remove the I/O PCB.
- Reinstall the PCB in reverse order.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- Disconnect the furnace from mains.
- Lift the top portion of the furnace and support it with a suitable object.
- Remove the two screws below the control unit.
- Lift up the control unit.
- Disconnect the flat-ribbon cable of the I/O PCB from the control unit.
- Turn the control unit to the left-hand side for the power supply to become accessible.
- Pull off the three connectors of the power supply.
- Remove the four mounting screws at the corners of the power supply.
- Remove the power supply from the furnace.
- Install the new power supply in reverse order.
- Restore the control unit to its position.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

**Deinstallation:**
**Multimat 2 *Touch &Press***

- **Observe the dust protection precautions listed in Chapter 1.1.**
- Disconnect the furnace from mains.
- Turn off the pressurized air supply.
- Screw off the pressing hood, pull it slightly to the back and remove it.
- Disconnect all connectors from the magnetic valve.
- Disconnect the pressurized-air line from the magnetic valve by pulling the locking ring upward while at the same time pulling on the pressurized-air hose.
- Disconnect the position sensor.

**Multimat 2 *Touch***
- Screw off lid and lift it off upward (for *Touch &Press:* to the point that the pressing rod is free).
- Remove the protective-earth wire from the lid.

**Removing the heating muffle:**
- Remove the insulation disk(s).
- Disconnect the thermo couple from the two rear terminal bolts.
- Remove first the thermo couple with its perforated rod and then the terminal insulation.
- Disconnect the ends of the muffle's heating wires from the two front terminal bolts. (To prevent the bolds from turning freely, use a 12-mm open-end wrench. Use a 7-mm open-end wrench to loosen the hex screw).
- Remove the muffle from its insulating bed.
  If the furnace is still hot, grab the muffle carefully by the ends of the heating wires.

**Installation:**

**Caution!**

**Wear textile gloves when installing a new muffle in order to prevent the quartz tube from getting in contact with any sweat or grease.**

- Install the new muffle in reverse order.

**Warning!**

**Ensure that the wire ends have no contact with the metal jacket of the upper part of the furnace. Re-connect the protective-earth wire to the lid!**

**Check for correct polarity when reinstalling the thermo couple!**

**Perform a temperature test using the silver sample, as described in Chapter 4.1.**

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

**Multimat 2 *Touch &Press***

- **Observe the dust protection precautions listed in Chapter 1.1.**
- Disconnect the furnace from mains.
- Turn off the pressurized-air supply.
- Screw off the pressing hood, pull it slightly to the back and remove it.
- Disconnect all connectors from the magnetic valve.
- Disconnect the pressurized-air hose from the magnetic valve by pulling the locking ring upward while at the same time pulling on the pressurized-air hose.
- Disconnect the position sensor.

**Multimat 2 *Touch***

- Screw off lid and lift it off upward (for *Touch &Press:* to the point that the pressing rod is free).
- Remove the protective-earth wire from the lid.

**Removing the thermo couple:**

- Remove the insulation disk(s).
- Disconnect the thermo couple from the two rear terminal bolts.
- Remove the thermo couple.

Install the new thermo couple in reverse order.

**Note:** When installing the new thermo couple, make sure that the two wires of the thermo couple do not make a short circuit.

**Check for correct polarity when reinstalling the thermo couple!**

**Perform a temperature test using the silver sample, as described in Chapter 4.1.**

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- Disconnect the furnace from mains.
- Lift the top part of the furnace and support it with a suitable object.
- Remove the firing/pressing base from the chamber.
- Remove the two screws below the control unit.
- Lift up the control unit.
- Disconnect the vacuum hose and all connectors.
- Disconnect the thermo couple wires.
- Disconnect the protective-earth wire from the control unit.
- Carefully set the control unit aside.
- Remove the two bolts on the outside of the RS232 interface connector.
- Remove the two mounting screws of the I/O PCB.
- Remove the I/O PCB.
- Disconnect the motor cable.
- Set the furnace aside.
- Slightly loosen the counter-bearing of the gear axis.
- While holding the motor in position, remove the two motor mounting screws.
- Carefully pull the motor out of the counter-bearing and remove it from the furnace.
- Remove the polyamide spacer from the gear axis and attach it to the new motor.
- Reinstall the gear motor in reverse order.

**Note:**
After the gear motor has been placed inside the toothed belt, the axis of the gear motors must be inserted into the counter-bearing as far as it will go. Fasten gear motor in centre position.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- Disconnect the furnace from mains.
- Remove the control unit, I/O PCB and gear motor, See Chapter 6.2, *Replacing the control unit* , Chapter 6.3, *Replacing the I/O PCB* and Chapter 6.7, *Replacing the gear motor*.
- Loosen the internal hex screw (covered with a round protective label) of the column cover plate.
- Support the upper part of the furnace so it cannot tilt forward.
- Pull the column cover plate with its precision steel shafts up and out.
- Tilt the upper part of the furnace slightly forward and support it so it stays in place.
- Pull the driving plate and gripping plate to the right and remove them together with the toothed belt gripping plate.
- Remove the gripper ring from the cylinder pin and pull out the cylinder pin.
- Remove the tooth lock washer with the two spacers from inside the toothed belt gripping plate.
- Remove the toothed belt.
- Loosen the driving plate and gripping plate.
- Install the new toothed belt in reverse order.
- Tighten the toothed belt as described in Chapter 4.3.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- Disconnect the furnace from mains.
- Remove the control unit. See instructions in Chapter 6.2, *Replacing the control unit*.
- Loosen the microswitch.
- Use a short screwdriver to loosen the mounting screws of the firing base carrier in the lower part of the furnace.
- Remove the pressure spring.
- Install the firing base carrier in reverse order.
- Readjust the microswitch as described in Chapter 5.4.

Note: Any washers located between the compression springs and the top of the lower part of the furnace will have to be reinstalled as well.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- Disconnect the furnace from mains.
- Remove the control unit. See instructions in Chapter 6.2, *Replacing the control unit*.
- Remove the mounting screws of the micro switch.
- Remove the micro switch and disconnect the wires.
- Install the micro switch in reverse order.
- Adjust the micro switch as described in Chapter 5.2, *Adjusting the micro switch for the lifting drive*.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- Disconnect the furnace from mains.
- Remove the control unit. See instructions in Chapter 6.2, *Replacing the control unit*.
- Remove the Teflon tube and the silicone tube.
- Loosen the mounting screws of the valve support.
- Remove the magnetic valve from the valve support.
- Install the new magnetic valve block on the valve support.
- Move the cable from the old to the new valve block.
- Fasten valve support.
- Reinstall the control unit.
- Perform the vacuum test as described in Chapter 4.2.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- **Observe the dust protection precautions listed in Chapter 1.1.**
- Disconnect the furnace from mains.
- Turn off the pressurized-air supply.
- Loosen the two screws of the pressing hood on the back of the furnace.
- Push the pressing hood slightly to the back and lift it upward and out.
- Disconnect the pressurized-air hose from the magnetic valve by pulling the locking ring into the angle while at the same time pulling on the pressurized-air hose.
- Loosen the connectors on the magnetic valve (parallel terminals).
- Disconnect the wires from the position sensor.
- Loosen the mounting screw of the position sensor and pull the sensor upward and out.
- Loosen the four internal hex screws under the pressing cylinder and carefully pull the cylinder upward and off.
- Remove the attached components (double nipple with multiway valve and angular connectors).
- Remove the pressing die housing from the compact cylinder.
- Install the new pressing cylinder in reverse order.
- Before installing the pressing hood, connect the pressurized-air hose and manually actuate the pressing cylinder on the magnetic valve. No grinding noise must be present. If a grinding noise is present, loosen the four internal hex screws and move the cylinder to the point where the noise disappears. Tighten screws and re-check for presence of grinding noise. Install and fasten the pressing hood.
- Install the pressing hood.

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

- **Observe the dust protection precautions listed in Chapter 1.1.**
- Disconnect the furnace from mains.
- Disconnect the pressurized-air supply.
- Loosen the two screws of the pressing hood on the back of the furnace.
- Push the pressing hood slightly to the back and lift it upward and out.
- Disconnect the pressurized-air hose from the magnetic valve by pulling the locking ring into the angle while at the same time pulling on the pressurized-air hose.
- Loosen the connectors on the magnetic valve (parallel terminals).
- Disconnect the wires from the position sensor.
- Loosen the four internal hex screws under the pressing cylinder and carefully pull the cylinder upward and off.
- Remove the mounting screws of the pressing cylinder.
- Remove the mounting screws on the magnetic valve toward the pressing cylinder.
- Lock the double nipple between the white plastic block and the magnetic valve in place and remove the magnetic valve.
- Remove the components attached to the old magnetic valve and reattach them to the new magnetic valve.
- Install the new magnetic valve on the cylinder and fasten it with the appropriate screws.
- Install the mounting screws of the pressing cylinder.
- Install the mounting screws on the magnetic valve toward the pressing cylinder.
- Connect the blue pressurized-air hose to the magnetic valve and adjust the pressure (max. **2.7 bar**).
- Actuate the magnetic valve manually (see Fig. 1).
- The crosshead of the cylinder must take at least **2 s** to move upward and **1 s** to move downward. (This can be adjusted using the throttle screws, see Fig. 2).
- Turn off the pressurized air supply.
- Remove the pressurized-air hose.
- Install the pressing cylinder.
- Install the pressurized-air hose and the wires.
- Before installing the pressing hood, connect the pressurized-air hose and manually actuate the pressing cylinder on the magnetic valve. No grinding noise must be present. If a grinding noise is present, loosen the four internal hex screws and move the cylinder to the point where the noise disappears. Tighten screws and re-check for presence of grinding noise. Install and fasten the pressing hood.
- Install the pressing hood.

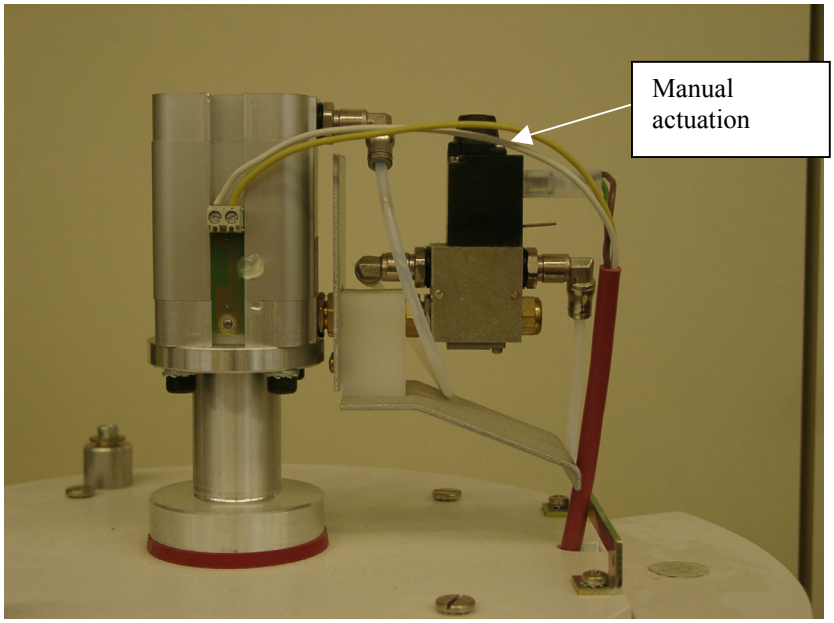



Fig. 1

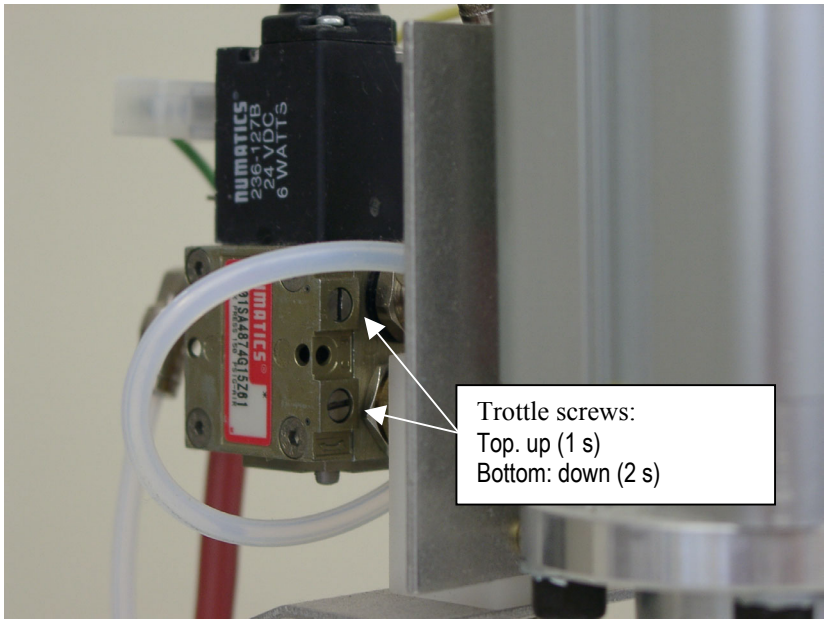



Fig. 2

**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**

| DeguDent A Dentsply International Company | **Testing protocol**<br>**Multimat 2 Touch & Press**<br>**Chapter 7.1** | Page 1 of 1<br>Rev. Index 0<br>Rev. Date 27 Sept 2004 |
|---|---|---|

Unit No.: _____

Repair No.: _____

O *Touch* O *Touch & Press*

**1. Visual inspection**

| | | | |
|---|---|---|---|
| Serial Number | Visual inspection | Passed | Not passed |
| Chamber seal | " | Passed | Not passed |
| Supply cables | " | Passed | Not passed |
| Connectors | " | Passed | Not passed |

**2. Electrical test**

| | | | |
|---|---|---|---|
| Insulation resistance ≥ 2 MΩ | | | Not passed |
| Protective earth resistance ≤ 0.3 Ω | | | Not passed |
| Leakage current ≤ 3.5 mA | | | Not passed |

**3. Function test**

| | | | |
|---|---|---|---|
| Turn unit on, perform function test | | Passed | Not passed |
| Lift and lower the muffle | Mechanical test | Passed | Not passed |
| Chamber is slowly deposited on plate | " | Passed | Not passed |
| Test toothed belt tension | " | Passed | Not passed |
| No vibration noise when opening/closing the chamber | " | Passed | Not passed |
| Touch screen display function | | Passed | Not passed |
| Smart media card function | | Passed | Not passed |
| **Run dehumidifying program** | | | |
| Perform vacuum test | | Passed | Not passed |
| Run calibration program (silver wire test) | Offset temperature | | Not passed |
| Furnace operating hours | | | |
| Muffle operating hours | | | |
| Pump operating hours | | | |
| Lifting cycles | | | |
| Firing cycles | | | |
| | | | |

Comments: _____

Date/Signature: _____

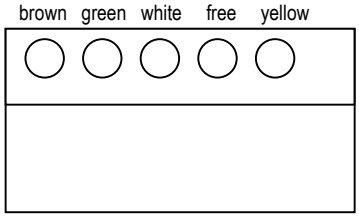
**Procedure:**

Observe the precautions listed in chapters 1.1 and 6.1.

The pressing module upgrade kit (Order Code D03050010) is used to upgrade the Multimat 2 *Touch* to a Multimat 2 *Touch & Press*. The kit contains all the components required for this upgrade. The upgrading process is described below.

- **Observe the dust protection precautions listed in Chapter 1.1.**
- Move the upper part of the furnace to the upper terminal position and remove the firing base.
- Disconnect the furnace from mains.
- Unscrew the lid of the vacuum vessel and disconnect the protective earth wire from the lid.
- Loosen the lower mounting screws of the vacuum vessel (four slotted cylinder screws and the two front hexed cylinder screws.
- Slightly loosen the third and central hexed cylinder screw so it protrudes somewhat.
- Tilt the vacuum vessel slightly backward while pulling it forward. This will pull the vacuum vessel off the bolt.
- Lift the vacuum vessel and disconnect the vacuum hose, muffle, thermo couple, and protective earth.
- Lift the vacuum vessel out of the upper part of the furnace.
- Remove the control unit. See instructions in Chapter 6.2, *Replacing the control unit*.
- Remove the I/O PCB. See instructions in Chapter 6.3, *Replacing the I/O PCB (interface)*
- Cover the power supply PCB with a cloth so no filings can fall on or into the PCB. Consider removing the power supply PCB. See instructions in Chapter 6.4, *Replacing the power supply*.
- Break out the aperture for the pressurized-air connector (directly above the vacuum hose connector). Clean the edges and remove any flash.
- Install the connection hardware for the pressurized-air inlet. The respective fastener nut is located on the outside of the lower part of the furnace.
- Attach the “max. 2.7 bar” label above the pressurized-air inlet.
- Thread the control wire for the pressing module through the left support hole, from top to bottom, so that 45 cm of the control wire (with connector) remain in the upper part of the furnace.
- Thread the pressurised-air hose for the pressing module through the right support hole, so that 33 cm of the hose remain in the upper part of the furnace. Connect the control wire and pressurised-air hose to the existing lines/tubes using a cable tie.

- Cut open one cable tie each on the two front main connection spots of the cable harness.
- Place the new wire alongside the existing wires and connect them to the existing wires with small cable ties right next to the existing cable ties.
- Connect the new wire to the two main connection spots of the cable harness together with the existing wires. Use large cable ties for the cable harness.
- Connect the multi- contact plug to the control wire of the pressing valve.




Top of connector

- Insert the pressurized-air hose into the connection hardware installed earlier.

**Convert the vacuum vessel:**

**Observe the dust protection precautions listed in Chapter 1.1.**

- Remove the isolating disc.
- Disconnect the thermo couple.
- Remove the thermo couple from the upper terminal insulation.
- Remove the existing upper terminal insulation.
- Insert the upper terminal insulation for *Touch & Press*.
- Insert and connect the thermo couple.
- Insert the vacuum vessel into the upper part of the furnace and fasten it.
- Connect the vacuum hose, muffle, thermo couple, and protective earth.
- Place the insulation disk with the hole centrally on the upper terminal insulation.
- Run the new wire so they exit centrally at the top of the upper part of the furnace and fixate temporarily with tape.

**Installing the pressing module:**

- Detach and remove the pressing hood from the pressing module.
- Attach the pressing module to the lid using the appropriate seals and spacers.
- Insert the pressing module vertically from above, crosshead first, into the guide sleeve of the upper terminal insulation. Connect the protective earth wire to the lid and thread the new wire and hose through the rear groove.
- Align the lid. Make sure that the protective earth wire is not lodged between the vacuum vessel and the lid.
- Fasten lid using the four lid screws. Tighten opposite screws first.
- Insert the pressurized-air hose into the mounting screws of the pressing valve.
- Connect the yellow/white wires to the position sensor.
- Connect the blue/green wires to the parallel connectors of the magnetic valve.

**Testing the pressing function:**

- Connect the pressure control valve with the blue pressurized-air hose to the furnace.
- Connect the pressure control valve to the pressurized-air supply and set it for 2.7 bar of pressure.
- Manually actuate the pressure valve at the upper end of the magnet coil of the magnetic valve. The pressing cylinder with the crosshead will move downward. No grinding noise must be present. If necessary, loosen the lid of the vacuum vessels or pressing cylinder again and correct until no more grinding noise is heard. Reconnect and tighten everything.
- If necessary, adjust the cylinder speed using the two throttle screws of the valve.

**Final assembly:**

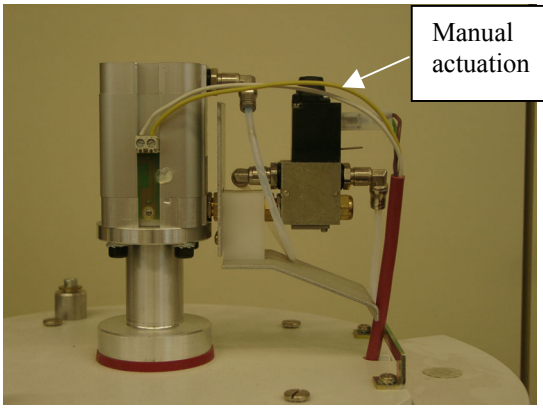
- Install the pressing hood.
- Install power supply if needed or remove cloth and filings. Clean the lower part of the furnace using a vacuum cleaner.
- Install the I/O PCB.
- Insert and connect the control unit. Connect the multi-contact plug of the pressing control line with the multi-contact socket of the control unit.
- Place the *Multimat(2) Touch & Press* ID tag on top of the existing ID tag.
- Perform testing pursuant to DIN VDE 0701 (measure protective earth, insulation resistance, leakage current).

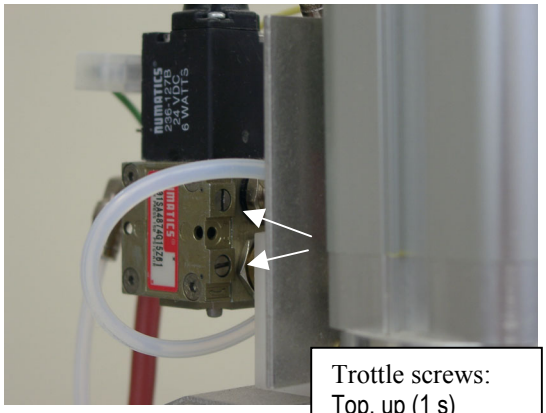
.

**Configuration**

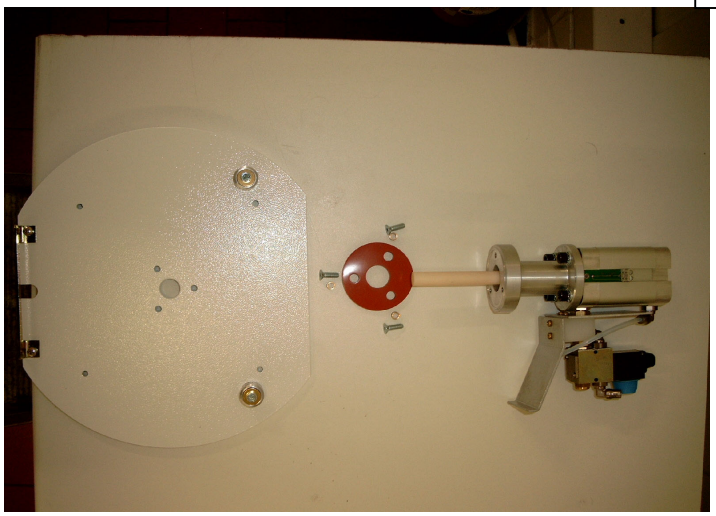
- Connect the furnaces to mains.
- When the Dentsply logo appears on the display, touch the **S** button.
- If the function test was passed, touch the **M** button.
- Touch **Configuration**.
- Touch **Furnace** so it says **Press**.
- Touch one of the arrow buttons until the basic set up display appear.
- Pull the mains plug, wait for five seconds and reconnect.
- Place the firing base on the firing base carrier.
- Pre-heat the furnace at 600 °C for at least one hour.
- Calibrate the temperature.
  See instructions in Chapter 4.1, *Silver wire test*.

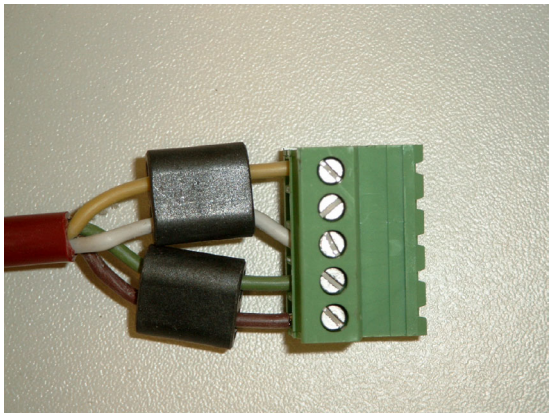
**On completion of any service or repair work, the furnace must be tested as per the testing protocol outlined in Chapter 7.1.**




Trottle screws:
Top. up (1 s)
Bottom: down (2 s)





Pin assignment

Yellow

Free

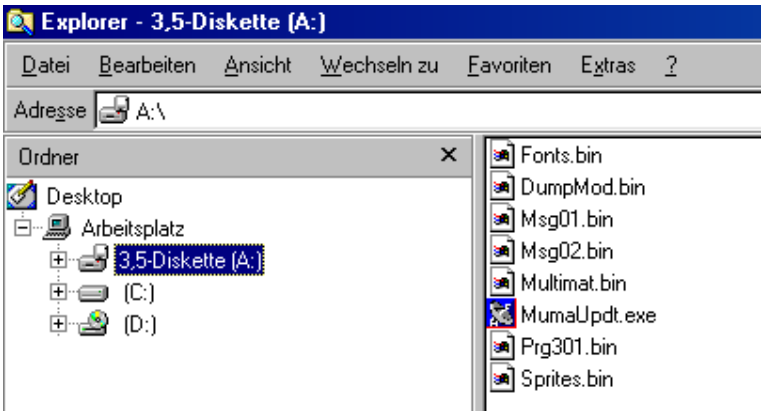
White

Green

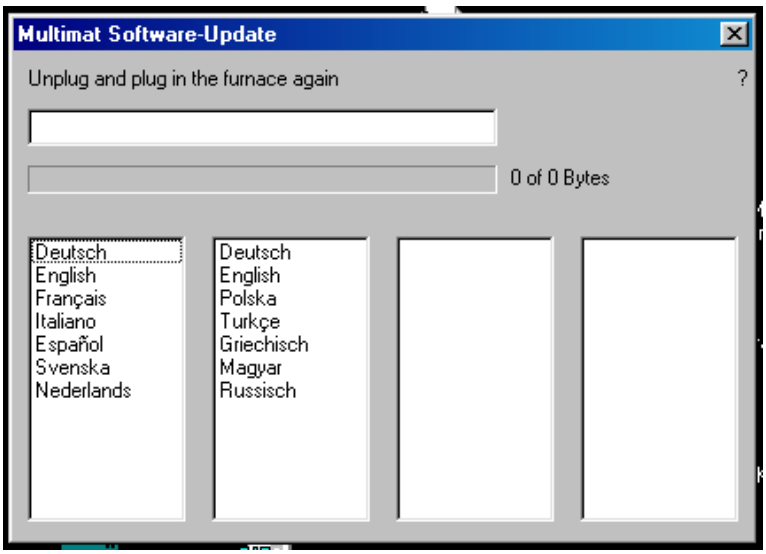
Brown

## Installing new furnace software

- Disconnect the furnace from mains by pulling the plug.
- Connect the furnace and the PC using a serial cable.
- Insert a disk containing the most current program version. Start the **MumaUpdt.exe** program.

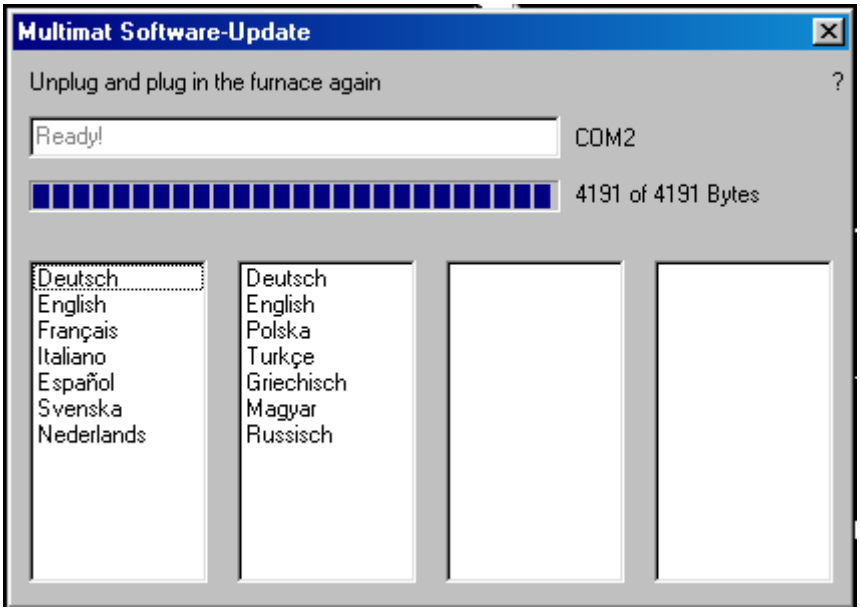



- The following dialog box appears:




- Use the mouse to select the language version
  (left (German to Dutch, includes English) or right (German to Russian)).

- Connect the furnaces to mains and watch the progress bar.
- If the following message appears ( Ready! ), terminate the program by clicking the **×** symbol in the top right corner of the dialog box.




- Disconnect the furnaces from mains again.
- Remove the serial cable.
- To complete the software update, reconnect the furnace with mains.
- A language selection menu appears. Select the desired language.
- After the self-test has been run successfully, the furnace is once again ready for use.

**To enter service mode, proceed as follows:**

- Disconnect the furnace from mains by pulling the plug.
- Reconnect to mains after three or four seconds.
- Touch the **S** button while the welcome screen with the Dentsply logo is displayed.
- Start the furnace self-test.

**The following functions are available in service mode:**

Swapping program mode

Required after replacing the control unit and after upgrading a *Touch* furnace to a *Press* furnace.

- Touch the **M** button to select the main menu.
- Select **Configuration** from the menu shown.
- In the right column, the **Furnace** parameter can be change from *Touch* to *Press* or vice versa.

Resetting the lifting cycle counter

After every 15000 lifting cycles, a warning message appears in the furnace display. The furnace must be inspected by a service technician. This inspection includes checking the toothed belt tension. To ensure seamless operation, we also recommending changing the wires that lead to the chamber. To reset the counter to zero after inspection, you will need this function.

- Touch the **M** button to select the main menu.
- Select **Furnace parameters** from the menu shown.
- Touch **Lift cycles**.
- Enter **6070** on the numeric keypad.
- Touch **Lift cycles** again
- Touch the **C** button to set the counter to zero.

**Terminating service mode:**

- Disconnect the furnace from mains by pulling the plug.
- Reconnect to mains after three or four seconds.
- The furnace is now back in normal mode.

**Procedure:**

**To locate intermittent errors, the continuous testing function allows you to repeat any program automatically.**

- Disconnect the furnace from mains.
- Reconnect the furnaces to mains.
- When the Dentsply logo appears on the display, touch the **S** button. The furnace will now automatically perform self testing.
  If the test was performed successfully and after touching **OK**, the screen displays the basic settings.
- Touch the **M** button.
- Touch **Furnace parameters**.
- Touch **Continuous program**.
- Enter **6070** on the numeric keypad
- Touch **Continuous program** again.
- Touch one of the arrow buttons until the basic settings appear.
- Select the program to be repeated an start it.

**Cancelling continuous program**

- Disconnect the furnace from mains.
- Reconnect the furnaces to mains.

**Testing programs are designed to check device function in the event of program errors. If the testing program is executed without errors, the error is probably an application error.**

The following testing programs have been pre-programmed:

| Program name: | Program # |
| --- | --- |
| DeTrey testing program | 471 |
| Ceramco testing program | 472 |
| External testing program | 473 |

**Notes on testing the pressing function**

Check the position and function of the pressing function through the chamber using a mirror. Check the cylinder function by actuating the cylinder valve manually. To do so, use a thin object such as a small screwdriver to actuate the valve through the cooling ribs on the top of the pressing hood. No grinding noise must be present when the crosshead is moving. Correct the lid position if necessary.

## Technical information

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## Spare part orders

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