



# Instructions for Use

For MIHM-VOGT Laboratory Furnaces  
with Program Control Unit M3





# Working instruction

for

## MIHM-VOGT laboratory furnace

with controller M3

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Dear customer,

we thank you for your decision to buy a high-quality MIHM-VOGT furnace. It will support you with your work many years, because it was developed and built using the latest technology.

Improper use can cause damage, therefore we ask you to read through this working instruction and to follow it.



The CE-sign confirms that MIHM-VOGT laboratory furnaces correspond to the governing regulations of the EC guidelines.

### 1. Delivery Form

Each laboratory furnace is delivered with a M3-controller, a ceramic tray, a PtRh-Pt thermocouple and an exhaust tube.

The furnace can also be equipped with the folling accessories:

- Exhaust fan DG2 (Art. N° 7202)
- Catalyzer KN1 (Art. N° 7300)
- Catalyzer for speed-investments KN2 (Art. N° 7320)

Spareparts	Order n°:					
	KM3	SLM3	GLM3	BLM3	TLM3	XLM3
Ceramic tray	20020	30020	40020	50020	50020	2 x 40020
Thermocouple	20100	30110	30110	30110	30110	30110
Door filling (without ventilator)	20351	30301	30301	30301	60301	61301
Door filling (with ventilator)	20351	30301	30301	30301	60301	61301
Heating muffle (without ventil.)	20010	30010	40010	50010	60010	60018
Heating muffle (with ventilator)	20015	30015	40015	50015	60015	61015

### 2. Use area

The laboratory furnace is used for eliminating wax and preheating of the dental casting ring. The heating muffle is made of a high-quality ceramic and is heated evenly on four sides. The low electric burden guarantees a high lifespan of the heating wire. The heating element is constructed to ensure a long life span.

The rear of the furnace there are two sockets provided for an exhaust fan or a catalyzer and a ventilating air hood to be connected. A furnace adapter (Type OA3, OA31, OA4,

OA41) can also be used to connect several MIHM VOGT furnaces to one ventilating air hood.

The furnace door is equipped with a switch, that interrupts the heating current when opening the door. The M3-controller is equipped with a thermocouple circuit breaker so that the furnace doesn't overheat if the thermocouple is defective. The type of the furnace is listed on a label at the rear of the furnace.

### 3. Technical data

Ofentyp:	KM	SL	GL	BL	TL	XL
Outside dim.:	40 x 48 x 40	43 x 58 x 45	48 x 58 x 52	54 x 60 x 55	54 x 65 x 55	54 x 70 x 69
w x h x d (cm)	40 x 48 x 45	43 x 58 x 51	48 x 58 x 59	54 x 60 x 62	54 x 65 x 62	45 x 70 x 76
Heating chamber: w x h x d (cm)	15 x 10 x 17	18 x 11 x 19	20 x 11 x 25	25 x 11 x 28	25 x 17 x 28	25 x 22 x 40
Capacity:	4 Stck. 6x	4 Stck Ø 8 cm	6 Stck Ø 8 cm	9 Stck Ø 8 cm	18 Stck Ø 8 cm	56 Stck Ø 8 cm
Temperature maximum:	1150 °C 1100 °C	1150 °C 1100 °C	1150 °C 1100 °C	1150 °C 1100 °C	1150 °C 1100 °C	1150 °C 1100 °C
Power rating:	1,6 kilowatts 1,6 kilowatts	1,8 kilowatts 2,1 kilowatts	2,3 kilowatts 2,6 kilowatts	3,5 kilowatts 3,7 kilowatts	4,5 kilowatts 4,8 kilowatts	6,8 kilowatts 7,0 kilowatts
Tension:	230 V~	230 V~	230 V~	230/400 V~ (2/N)	230/400 V~ (2/N)	230/400 V~ (2/N)
Preheating times:	60 min. 900 °C  90 min.s 1050 °C	60 min. 800 °C  90 min. 1100 °C				
Weight:	32 kg 36 kg	63 kg 70 kg	75 kg 80 kg	90 kg 95 kg	96 kg 104 kg	119 kg 127 kg

furnaces with circulating air

### 4. Safety Warning



- The MIHM-VOGT laboratory furnace is exclusively for eliminating wax and preheating of casting. We are not liable for damages due to another use. The sockets on the rear are exclusively for MIHM-VOGT ventilating air hood, a MIHM-VOGT exhaust fan or a MIHM-VOGT catalyzer.
- The MIHM-VOGT - laboratory furnace must be serviced exclusively by technicians, who know the content of this manual. Labels and stickers on the laboratory furnace must always be maintained in legible condition. They must not be removed.

#### 4. Safety Warning (cont.)

- The MIHM-VOGT laboratory furnace should be set up only in dry areas and should not be in contact with liquids. In the area of the furnace, furniture and other objects cannot consist of explosive, combustible or easily-inflammable materials. In the installation area of the furnace, no easily inflammable or combustible gases or liquids are allowed to be stored.
- Modifications of the MIHM-VOGT laboratory furnace can only be made after prior written agreement from us. We are not liable for damages caused by your modifications. Before every maintenance, the appliance is to be turned off and the power-supply plug is to be pulled out.
- The furnaces type KM, SL, GL must always be connected to a plug protected by a 15/16 Amp fuse. The furnaces type BL, TL, XL are to be connected to a CEKON plug (230 / 400 V, AC).
- The hot furnace door should be only touched at the grip, the hot muffles should only be touched with sufficiently long tongs. Because of the wax fumes and the steam from casting ring, the furnace should be equipped with an exhaust fan or catalyzer and placed under a ventilating air hood. The fumes are to be extracted outside.
- The ceramic tray is to be used to protect the heating muffle. The furnace must never be used without the ceramic tray. Cracked or damaged ceramic trays must be replaced immediately.
- The transportation protection from the heating muffle must be taken off before the first use.

#### 5. Installation and electrical connection

The laboratory furnace is to be positioned in a dry area in accordance with the safety warnings and is to be connected to a separated circuit secured with 15/16 Amp. The transportation protection is to be removed from the heating muffle. The laboratory furnaces type KM, SL and GL are to be connected to an earthed plug 230 V, the laboratory furnaces type BL, TL, XL are to be connected to a CEKON plug 230/400 V AC. If necessary, the exhaust fan DG2 or the catalyzer KN / KN2 are installed on the furnace rear. They are to be connected into the socket marked „Gebläse“.

#### 6. Start-up

##### 6.1 Start-up

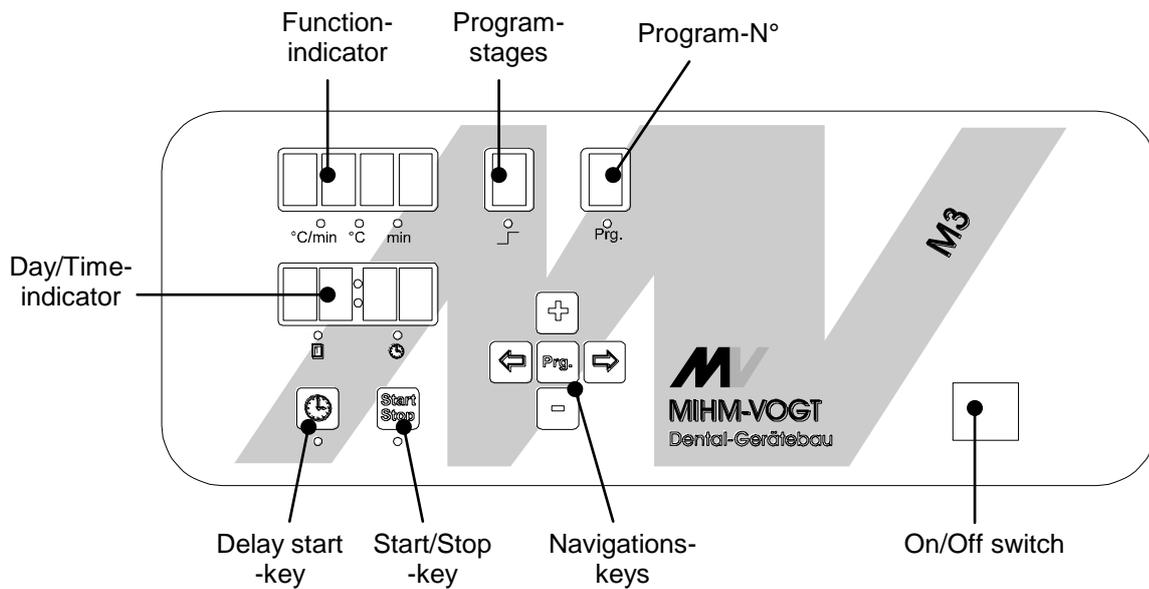
Prior the first use, the muffle must be heated up on 1050°C 90 minutes. This way, the necessary oxide layer is formed on the heating wire.

## 6.2 Loading

The casting muffles are to be put on the ceramic tray. They should not come in contact with the lateral walls.

## 6.3 Service of the controller

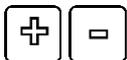
The time-schedule controller is equipped with the most modern microprocessor technology, that allows the heating process, to go through a wide variety of programs with precision. The furnace is programmed on a menu-driven keyboard with LED indicators. The following functions are available:



### 6.3.1 Function keys



jump to the next / ad values



increases / decreases the value



enter programs by continued pressure



start / stop the current program



start / stop the delay start feature (finishing time)

### 6.3.2 Program indicators

Function indicator: shows the heating speed (°C/min), the hold temperature (°C) or the holding time (min). The current temperature as well as the remaining holding time are shown.

- Program stage: shows the current program step (1-4) during programmings and the program stage during the heating process.
- Program N°: shows the current program number (1-9) during programmings and the program number during the heating process.
- Day/Time indicator: shows the Stand-by - business current day (Mo=1, Tu=2, We=3... Su=7), and Time (hh:mm). The delay start feature (ready time) is shown during the heating process. The ready time can be put in in the delay start mode.
- Delay-start key: LED Light on indicates delay start mode is on.
- Start / Stop: LED Light on indicates heating process is on.

### 6.3.3 Setting of a program

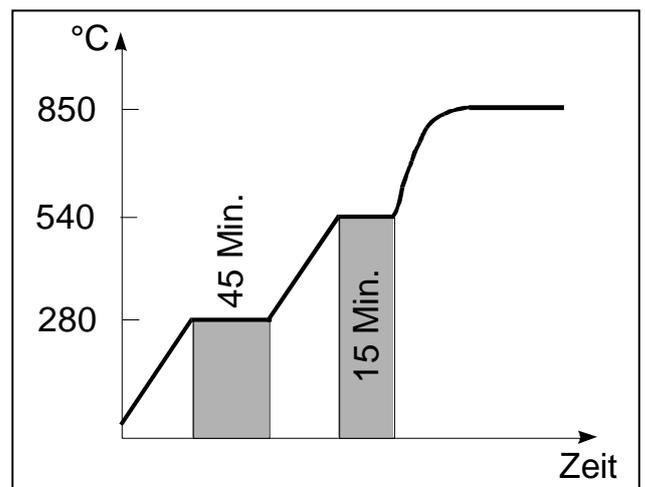
Put the LED under the indicator "Prg." with the „↔“ or „⇄“ – key. Select the desired program number with the „+“ and „-“ key ( the first time, program number 1). Continued pressure of the „Prg.“ – button begins the programming mode.

The heating speed (°C/min), the hold temperature (°C) and the holding time (min) can be put in beginning with the step 1 with the „+“ and „-“ key. Use the „↔“ or „⇄“ to jump to the next step. Choose the next step (step 2) set the value with the „+“ and „-“ key. This step is programmed as for step 1 (values: „°C/min“; „°C“; „min“). Program the step 3 and 4 the same way.

Stop the programming mode by continued pressure on the „Prg.“ – key. The entered program is stored simultaneously. The next program can be inputed the same way by selecting the next program number.

*Programming example: 3-step heating:*

	<i>Heating speed</i>	<i>Temperature</i>	<i>Holding time</i>
	°C/min.	°C	Min.s
<i>Step 1:</i>	4	280	45
<i>Step 2:</i>	6	540	15
<i>Step 3:</i>	0	850	60



- 1.) Selection of the program number, for example No 1,: Press the „↔“ or „⇄“ button until the LED under the Prg. -indicator lights up and select „1“ with the „+“ and this „-“ key.
- 2.) Activate the programming mode by continues pressure on the „Prg.“ key

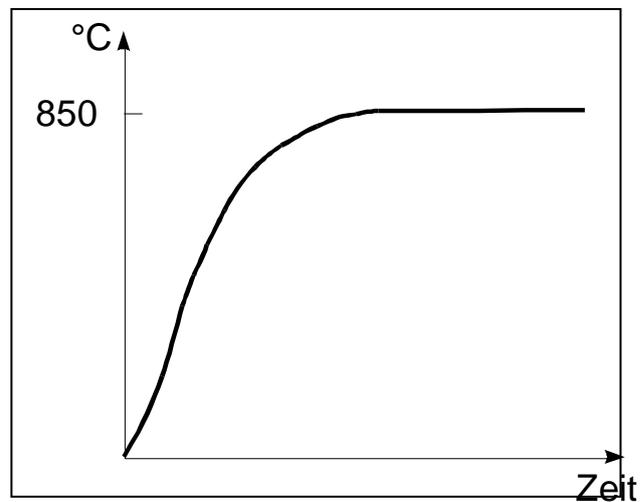
3.) Programming of the steps 1-3 with following values ( Select the value with the the „↵“ or „⇨“ key and change it with the „+“ and „-“ key):

	Heating speed	Temperature	Holding time	Remark:
	°C/min.	°C	min	
Step 1:	4	280	45	4 °C/min. = normal value
Step 2:	6	540	15	
Step 3:	0	850	60	0 °C/min. = max. speed

4.) The programming mode is stopped by continuous pressure on the "Prg" key. The program is stored consequently.

Programming example: Speed-heating

Step	Heating .speed	Temp.	Holding time
	°C/min.	°C	Min.
1	0	850	0
2	0	0	0
3	0	0	0



- 1.) Selection of the program number, for example No 2,: Press the „↵“ or „⇨“ – key until the light-emitting-diode under the Prg. - indicator lights up and select „2“ with the „+“ and this „-“ key.
- 2.) Activate the programming mode by continuous pressure on the „Prg.“ - key
- 3.) Programming of the step 1 with following values ( select to the value with the the „↵“ or „⇨“ key and change it with the „+“ and „-“ key):

	Heating speed	Temperature	Holding time	Remark:
	°C/min.	°C	min	
Step 1:	0	850	0	0 °C/min. = max. speed
Step 2:	0	0	0	
Step 3:	0	0	0	

4.) The programming mode is stopped by continuous pressure on the "Prg. " - key. The program is stored consequently.

**WARNING: check that all values are „0“ for step 2 and 3 !**

*The controller beeps after the furnace reaches the end-temperature. The beeps stops when the door is opened.*

### 6.3.4 Start of a program

Place the LED under the "Prg."-indicator with „←“ or „⇒“ key. Select the desired program number with the „+“ or „-“ key. Press the „Start/Stop“-key, the program starts running and the furnace starts heating. By pressing the „Start/Stop“ - key again the program is stopped. During the run, the current temperature as well as the current holding time are shown in the function-indicator display. The programmed temperature / holding time can be checked by pressing the „←“ or „⇒“ keys.

The finishing time is shown on the day/time-indicator.

### 6.3.5 Starting a program with the delay start feature

The delay start mode is activated through pressure on the „⊕“- key after the selection of the program as in point 6.3.4 described. Select the day (Monday = 1, Tuesday = 2,... Sunday = 7), with the „+“ and this „-“ key. The time is selected with the „⇒“ key, at first the hours, (hh:--) and then the minutes (--:mm) after renewed pressure on „⇒“ key. By pressing on the „⇒“ key completes the setting of the delay start mode (finishing time).

The program start time can now be checked with the "Start/Stop" - key.

### 6.3.6 End Temperature Program Changes

If casting muffles for different final temperature, for example for 750 C and 850 °C are to be preheated together, set the temperature for the 3<sup>rd</sup> step on 750°C as described under 6.3.3. The program is changed through a long pressure on the „Prg.“ - key after completion of the first program. The temperature in the 3<sup>rd</sup> step can now be raised, for example 850 °C. The new value is taken over after a renewed long pressure on the „Prg“ - key and the furnace repeats the last step.

**WARNING:** The program **must not be** interrupted. through a pressure on the „START/STOP“ - key

## 7. Special functions

### 7.1 Information

When switching on, following information is shown on the regulator for 3 seconds:

Program-N°: deposited parameters (1 = KM3, 2 = SLM3 ... XLM3)

Function indicator: Serial number of the regulator

Day/time-indicator: Version number of the regulator software, 02:81 = version 02.81)

## 7.2 Setting the furnace parameters

The parameter level of the furnace is accessed by pressing on the „Prg.“ -key and switching on the furnace at the same time. The individual parameters have following functions:

P1: selection 24 h and 12 h

P2: current day (1 = Monday, 2 = Tuesday, ... 7 = Sunday)

P4: current time (hour)

**WARNING:** the parameter „P4“ must be altered with summer/winter time change!

P5: current time (minute)

P6: acoustic signal at program end on (= 1) or off (= 0) [standard = 1 (on)]

P7: Selection °C and °F

P8: switch off temperature for socket „Gabl.“ [Standard = 950 °C]

P9: switch off temperature for socket „Dunst“ [Standard = 950 °C]

It can be navigated between the individual parameters with the „←“ or „→“ key. The alterations of the parameters are stored through leaving the parameter level, „→“ key after the parameter P9.

**WARNING:** If speed-investments are used and an exhaust fan, a catalyzer or an air hood are connected, the switch off temperature P8 and P9 should be approximately 20 °C higher than the programmed final temperature for the speed-investment. (Example: final temperature for speed-investment 850 °C: P8 and P9 should be on 870°C ). The above designed appliances run this way continuously when the furnace is switched on.

## 7.3 Correction program

All finishing times are calculated by the microprocessor, using 230V as the voltage value. Times may vary according to local voltage values. Variations in voltage will also affect times when setting the delay start program.

The correction program is to run to callibrate the furnace with the local voltage values.

The correction program is accessed by pressing the "Start/Stop"-key and switching on the furnace. A „P“ appears in the „Prg“ - indicator display.

**WARNING:** the program lasts approximately 8 hours!

## 7.4 Regulator initialization (Furnace KM3)

In order to guarantee an optimal performance with the different laboratory furnaces , different parameters are set in the regulator. The regulator is reset to factory settings with following keystroke and the respective parameter is activated:

 +  + SWITCH ON parameters for furnace type KM3

## 7.5 Regulator initialization (Furnace SLM3 ... XLM3)

In order to guarantee an optimal performance with the different laboratory furnaces , different parameters are set in the regulator. The regulator is reset to factory settings with following keystroke and the respective parameter is activated:

 +  + SWITCH ON parameters for furnace type SLM3... XLM3

## 8. Error signals

### 8.1 Error messages of the electronics

Error:	Cause:	Elimination:
Er01, Er02, Er03	Thermocouple defective, Thermocouple connections loose, Intensifier electronics to the thermocouple defective.	Change the thermocouple, tighten screw thermocouple connections, replace regulator, call customer service if necessary
Er04	Thermocouple is incorrectly attached,	shift thermocouple connections
Er05	Thermocouple short-closed or heating muffle defective	Measure the resistance of the heating muffle. If it is defective, replace it, otherwise check the connections of the thermocouple. Call customer service if necessary.
Er06	Furnace heats although no impulse is sent from the regulator	Electronics defective. Call customer service if necessary.

### 8.2 Further Errors and their causes

Errors:	Cause:	Elimination:
Wrong time in the regulator	Wrong time in the regulator.	correct time in accordance with point 7.2
Change to end temperature doesn't work	'Start/Stop' was pressed inadvertently.'	write a new program with only the desired final temperature.
Auto start program run, the furnace has not started to heat.	Power out during the auto start program	Ensure power is left on during the auto start program
Regulator shows in the time display "--:--", (door open), when the door is closed	Door-switch sticks or is defective.	check door-switch, call Customer service.
Light-emitting-diode at the regulator shows heating; furnace doesn't not heat	Heating muffle defective (measure the resistance of the heating muffle with ohm meter [ $R_{0,k} = 18 \dots 30 \Omega$ ])	Heating muffle is defective. Exchange it. Call customer service if necessary.
	Regulator is defective	Change the regulator. Call customer service if necessary.
	Power-part (furnace type BLM3, TLM3) is defective.	Change power-part. Call customer service if necessary.
Regulator "forgets" the stored programs	Regulator is defective.	Change the regulator. Call customer service if necessary.

Regulator "forgets" the time	Regulator is defective.	Change the regulator. Call customer service if necessary.
All displays not working. On/Off-switch visible	Protection fuse of the furnace is defective.	Turn off the furnace, wait 30 seconds, switch on again. If this does not help, change the regulator
All displays not working. On/Off-switch not visible	no main voltage existing	Check fuses in the circuit breaker box, check connection management. Call customer service if necessary.

## 9. Maintenance and care

### 9.1 Care

- The chamber area should be kept clean. The ceramic tray is to be used and must not be cracked.
- The muffles are to be put into the furnace so that no contact with the walls exists.
- The furnace is to be heated up empty on 1050 °C before the first use and this temperature is to be held 1,5 hours (= 90 minutes). This process should be repeated, especially if the furnace is used to burn out wax, every 14 days in the first three business months. Later, repeat this process every four weeks.
- If the furnace is used to burn out wax, it is recommended to use an exhaust unit or a catalyst to evacuate the wax steams.

### 9.2 Maintenance

**WARNING:** Turn off the furnace and pull out the power-supply plug before every maintenance!



#### Attention:

The laboratory furnace insulation (lining) contains ceramic fibre / aluminium silicate fibre particles. According to the EU classification of 5 December 1997, this fibre must be declared as "carcinogen category 2 according to EU Directive 97/69/EC" (substances to be regarded as carcinogenic for humans). Animal experiments have shown that high exposure to dust can cause diseases of the lung or pleura in the form of fibrosis or cancer. These findings have **not** been confirmed in human studies. Critical health impairment is unlikely if the recommended instructions for use and valid limit values are observed.

Examples for European limits:

Country	Limit	Origin
Germany	0,5 F/ml	TRGS 900
France	0,6 F/ml	Circulare DRT nr. 95-4 du 12.01.95
England	2,0 F/ml	HSE - EH40, maximum Exposure limit

It is unlikely that these limit values will be reached during servicing of the laboratory furnace. It is nevertheless recommended that respiratory masks type FFP2 be worn on a voluntary basis.

### 9.2.1 How to change the thermocouple

- **Pull the power-supply plug out!**
- Only for furnace with circulating air: unscrew the protection covering the motor of the ventilator.
- Loosen the connections of the thermocouple head. Screw the thermocouple from the rear wall and take it out.
- Insert the new thermocouple and screw it on the rear wall. Connect the new thermocouple correctly: red cable at +, white cable at -!

### 9.2.2 How to change the heating muffle

- **Pull the Power-supply plug out!**
- Only for furnace with circulating: unscrew the protection covering the motor of the ventilator. Take out the ventilator as under 9.2.6 described.
- Unscrew upper and low rear wall. Loose the connection of the heating wires in the sub box.
- Take out the insulating material carefully. Extract the heating muffle carefully.
- Put the new heating muffle, (IMPORTANT: For BL-furnace type, put the ceramic tray in the heating muffle before introducing the heating chamber!). Connect the new heating muffle.
- Put the isolating material back and screw the upper and lower wall again.
- For furnace with circulating air only: montage of the ventilator as under 9.2.6 described. Screw on the covering of the ventilator.

### 9.2.3 How to change the door-stone

- Loose the cross slit screw and remove the hold sheet metal. Take out the door stone

### 9.2.4 How to replace the regulator

- **Pull the power-supply plug out!**
- Loose the cross slit screws from the front electronic and take it out.
- Remove plugs and plug-in strips at the regulator. Loose the thermocouple connections-wire. Proceed accordingly in reverse to put in the new front electronic unit. Do not reverse the thermocouple connections (red = „+“, white = „-“).

### 9.2.5 How to replace the power element (only for furnace type BLM3, TLM3, XLM3)

- **Pull the power-supply plug out!**
- Secure the ceramic tray (so that it does not fall), put the furnace on the side, unscrew the ground metalplate.
- Remove the plug-in strip at the power part, unscrew it.
- Proceed accordingly in reverse for the remounting.

### 9.2.6 How to change the ventilation air circulating

- **Pull the power-supply plug out!**

#### Laboratory furnace type KM:

- Unscrew the cover of the ventilator.
- Unscrew the montage sheet metal with the ventilator from rear wall. Take those and the heating muffle out.
- Reverse the procedere to remount the air circulating ventilator. Propeller should not be overtightened. It must be able to run freely. File the hole if necessary.

#### Laboratory furnace type SL... XL:

- Unscrew the cover of the ventilator. Extract the protection basket in the heating chamber.
- Hold tightly the motor of the ventilator and unscrew the propeller in the heating muffle from the motor axle. **WARNING: left-hand screw threads!** If Propeller axle should be stuck, spray it with penetrating oil and let work. Call customer service if necessary.
- Unscrew the ventilator motor.
- Reverse the procedere to remount the air circulating ventilator. Propeller should not be overtightened. It must be able to run freely. File the hole if necessary.

## Warranty

1. Mihm-Vogt guarantees under the following conditions that its dental appliances are free of defects in accordance with the latest technological findings for the appliance in question for a period of 12 months from delivery of the appliance by the specialist dealer, provided that this occurs no later than six months after delivery from the factory.
2. The warranty covers only the repair of the dental appliance free of charge by a Mihm-Vogt specialist dealer. The parts incorporated in the appliance during the repair will be subject to the same warranty as that of the appliance itself until expiry of said warranty in accordance with No. 1. Replaced parts will become the property of Mihm-Vogt.
3. Guarantee claims are to be submitted with the invoice to a Mihm-Vogt specialist dealer, who will carry out the repair.
4. Wear and tear, particularly to wear parts such as heating elements, bulbs, fans and thermo-elements, are not covered by the warranty.
5. Guarantee claims will not be accepted if a defect is connected with
  - a) the effect of external mechanical or chemical influences on the appliance
  - b) improper or excessive use of the appliance
  - c) repair, maintenance or servicing by a third party whom the end user knows not to be a Mihm-Vogt specialist
  - d) incorporation in the appliance of parts whose use has not been approved by Mihm-Vogt or which change the appliance in a way not approved by Mihm-Vogt
  - e) failure to observe the instructions by Mihm-Vogt on the handling, servicing and care of the appliance (e.g. operating instructions), in particular if the scheduled services are not carried out
  - f) failure by the end use to notify a defect and have it repaired as described in No. 3 immediately in the case of defects that were apparent at the time of delivery of the appliance or immediately on detection in the case of defects that became apparent later.
6. Recommendations for use, irrespective of whether they are given orally, in writing or during practical instruction, are based on experience and tests by Mihm-Vogt and can therefore be regarded as guidelines only. Mihm-Vogt products are subject to ongoing development. Mihm-Vogt therefore reserves the right to make changes in design and composition.
7. All guarantee claims expire at the end of the warranty period defined in No. 1. For claims made but not rectified during the warranty period, the expiry date is extended until the defect has been rectified. In this case the warranty expires at the latest two months after the last repair or statement by the Mihm-Vogt specialist dealer that the defect has been remedied or did not exist.
8. Claims by the purchaser against the supplying dealer are unaffected by this warranty.

MIHM-VOGT GmbH & Co. KG  
October 2009

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