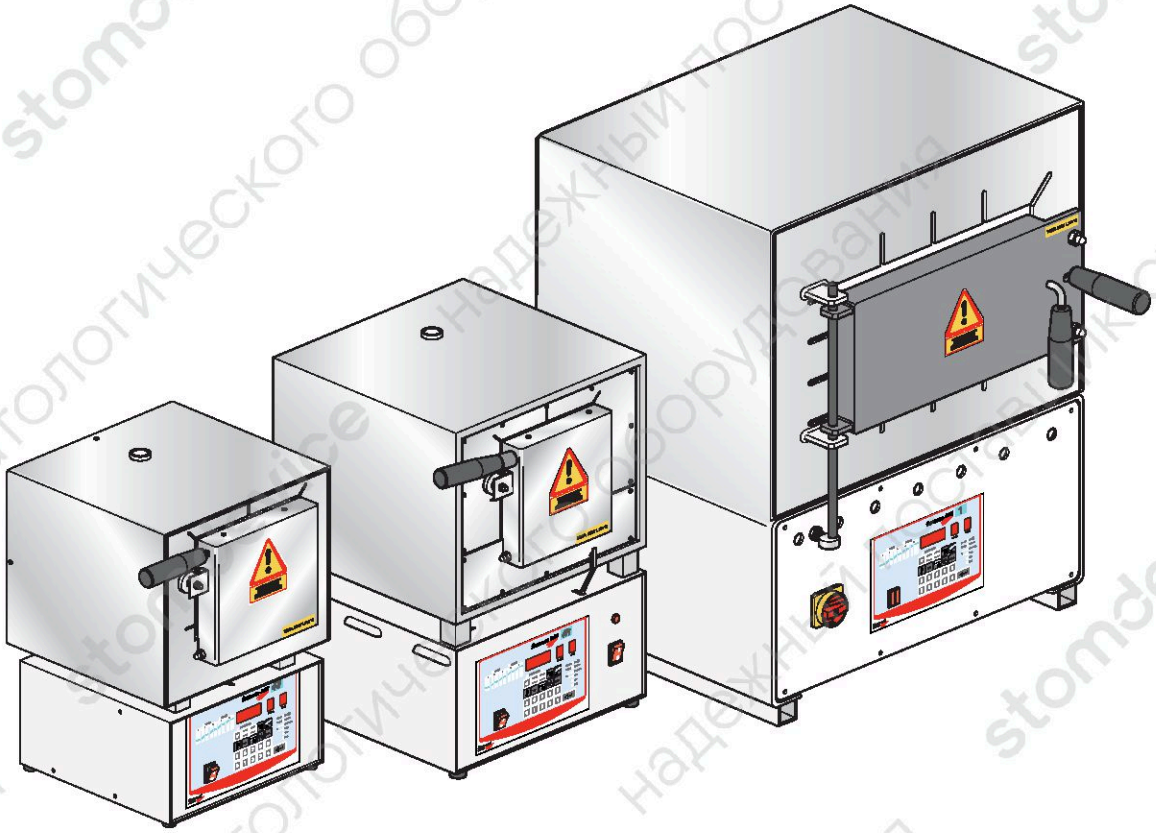
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furnace DM



User Manual

Preheating furnaces

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The data given in this manual may be modified without prior notice.

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CHAPTER 1: INTRODUCTION

HOW TO READ AND USE THE MANUAL 1.1

This Use and Maintenance Manual provides information on the utilisation, installation and maintenance of the ***DM series ovens*** (versions ***furnace DM30, furnace DM40, furnace DM50; furnace DM4R; furnace DM1; furnace DM1G***), manufactured by ***Zhermack S.p.A.***

• The equipment must be used in accordance with the instructions in this manual: it is therefore recommended that you read it carefully prior to installation and start-up. Make sure that you read the entire manual and pay particular attention to messages written in bold type or items highlighted by boxes and/or symbols: the symbols are designed to highlight situations involving danger or requiring caution (see paragraph 1.2).

• Observance of standards and regulations shown in this manual will ensure that the equipment is used properly and that maintenance work is carried out safely.

• This Use and Maintenance Manual is an integral part of the equipment: it should therefore be kept together with the equipment so that it can be consulted as and when necessary (keep the booklet in a secure dry place away from sunlight, atmospheric agents, etc.). It must be available for consultation throughout the working life of the equipment even when the equipment is sold or finally dismantled.

• It is recommended that you keep this manual constantly updated by integrating any amendments, additions or modifications made by the Manufacturer. Any notes or comments should be made on the blank pages at the rear of the booklet (see Appendices: Notes).

• Use the manual properly so that it is not damaged in any way.

• Do not remove, tear or write on any part of the pages.

• If the manual is lost or damaged and its contents become illegible you can request a replacement copy from the Manufacturer.

The purpose of this Use and Maintenance Manual is to provide users with information on how to operate the equipment properly. The manual contains all the information needed to use the device as intended: in particular the manual includes instructions and information on the following:

• correct installation of the equipment;
• Detailed description of how the equipment works and its components;
• Initial start-up;
• Scheduled maintenance;
• Basic Safety and Accident Prevention info.

This manual contains nine chapters each of which covers a specific argument.
The appendices at the rear of the manual are a useful complement to these chapters.

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1.2 TERMINOLOGY AND SYMBOLS

It is important that you understand the following symbols and their significance as they highlight important information such as critical situations, practical advice, or straightforward information.
If you have any doubts as to the significance of a symbol always consult this page.

• Tasks for which failure to observe instructions or tampering with equipment parts may put personnel in serious danger are highlighted by the symbol:



DANGER!
This symbol refers to safety standards which must be observed at all times in order to protect both workers and equipment.

• Critical situations concerning dangerous areas or tasks in which failure to observe the instructions may render the warranty null and void, or cause damage to equipment, connected components or the surrounding area, are highlighted by the symbol:



WARNING!
This symbol refers to safety standards which must be observed carefully in order to guarantee your safety, other people's safety and prevent damage to the equipment.

• Any work that fails to comply with instructions in this manual, or any tampering which might automatically render the warranty null and void, is highlighted by the following symbol:



FORBIDDEN!
This symbol refers to actions which must never be carried out (i.e. forbidden actions).

• Any general information and/or advice which may be useful at any time is highlighted by the following symbol:



NOTE!
This symbol highlights information and/or useful advice.

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CHAPTER 2: GENERAL INFORMATIONS

RESPONSABILITY 2.1

Failure to observe the instructions in this Use and Maintenance Manual exonerates the Manufacturer from any liability whatsoever.
For any matters not covered by this manual or about which you have any doubts please contact the Manufacturer directly:

Zhermack S.p.A.
Via Bovazecchino, 100
45021 Badia Polesine • RO • Italy
Tel. +39 0425 597 611 • Fax +39 0425 53 596
http://www.zhermack.com e-mail: info@zhermack.com

If equipment maintenance work fails to comply with instructions or is done in such a way as to compromise equipment integrity or modify its characteristics *Zhermack S.p.A.* shall be exonerated from any liability as regards worker safety and/or equipment performance.

WARRANTY: GENERAL INSTRUCTION 2.2

Included in the Appendices to this Use and Maintenance Manual you will find the Warranty certificate and the ID Form which must be filled out in full.
In general the Warranty is rendered null and void by the following:
• Improper equipment use.
• Incorrect installation.
• Serious negligence of maintenance schedules.
• Modifications to or work on the equipment which has not been authorised by the Manufacturer (especially on safety devices).
• Use of non-original spare parts.

Zhermack S.p.A. **cannot, as of this moment, be held liable if the equipment is modified or tampered with without prior written consent from the Manufacturer. Consequently, any repairs made by unauthorised personnel, use of non-original spare parts or failure to comply with the installation standards specified in this manual shall immediately render the Warranty null and void.**

AUTHORIZED PERSONNEL 2.3

Personnel may be divided into the following categories:
• *Operator-user:*
Person trained to use the equipments. He/she may carry out all the tasks needed to operate the equipments: these tasks include starting/stopping the equipment, carrying out routine inspections and any other tasks linked to everyday equipment use.

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The operator-user must only use the equipment when it is fully assembled and the safety devices are working properly as described in this manual.

Before using this inspections or carrying out any work on it, the operator must read the entire contents of this manual. This manual has been drawn up to provide the user with essential information on rational, safe utilisation of the equipment. The user must comply with the information given at all times. Furthermore, the user must use the work sheets enclosed with this manual so as to keep a record of maintenance/component replacement work as well as make notes on any equipment malfunctions.

• *Zhermack S.p.A. authorised maintenance technician:*
Person authorised to carry out work on the equipment under all operating conditions and all safety levels. He/she is also authorised to carry out any mechanical or electrical repairs/adjustments, scheduled maintenance and any component replacement work.

2.4 GENERAL SAFETY REGULATIONS

The operator must read the advice and warnings given below and comply with such regulations at all times: doing so will ensure safe, long-lasting equipment performance.
The oven that you have purchased is a source of danger owing to the high temperatures occurring both in its interior and on its exterior. The following precautions must therefore be observed at all times:
• the oven must only be used at the rated voltage indicated on the oven ID plate.
• Do not allow untrained personnel to use this equipment.
• The equipment is not supplied with pincers, gloves or protective glasses; however, the operator must be in possession of these items in order to utilise the equipment.
• The cylinders must be introduced and removed from the preheating chamber using suitable pincers.
• The door must only be opened by way of the handle: this is made of special insulating material to prevent burns.
• The oven must be installed in a protected area (see section 6.3), using guards equipped with systems that allow only frontal access (gates, shutters etc.).
• The oven must be positioned on non-flammable supports and tops only; no highly flammable materials, whether solid, liquid or gaseous, may be stored or used in the vicinity of the oven.
• The equipment must remain fully protected both during heating and for at least six hours after it has been switched off.
• An info plate reading “WARNING: HOT PARTS” must be placed by the equipment (see section 3.7.1).
• Take measures to ensure that you are not distracted when using the equipment.
• Never use a malfunctioning equipment and always inform the Maintenance Manager of any faults.
• Extractor fans connected to an outdoor outflow pipe must be used when mixtures using solvents harmful to operators’ health are used.

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• Do not open compartments containing electrical parts.
• Have the equipment inspected by the Manufacturer and/or Authorised Dealer at least one every 12 months.
• Do not replace the power lead or tamper with the supplied plug.
• It is forbidden to use the equipment on items other than those for which it has been specifically designed.
• Before doing any cleaning, routine and/or unscheduled maintenance work make sure that the equipment has been unplugged from the mains socket.
• Make sure that there are no foreign objects inside the work area as these could damage the equipment and/or injure personnel.
• Do not use petrol or flammable solvents as detergents; use only non-flammable, non- corrosive, and non-toxic substances (see paragraph 8 .1).
• Do not used compressed air to clean small pieces; if you do so you should protect your eyes with goggles that provide lateral protection and limit air pressure to a maximum of 2 bar.

Zhermack S.p.A. **cannot be held liable for any damage to persons or objects caused by incorrect maintenance carried out by unqualified personnel or maintenance work that does not comply with the instructions in this manual.**
Zhermack S.p.A. **is, as of this moment, exonerated from any liability concerning injury to persons or damage to objects that may result from using this equipment in a way other than that described in this manual.**



This equipment has electrical parts: therefore, in the event of a fire, no matter how small, use only powder-type extinguishers. Never attempt to put out an electrical fire with water.



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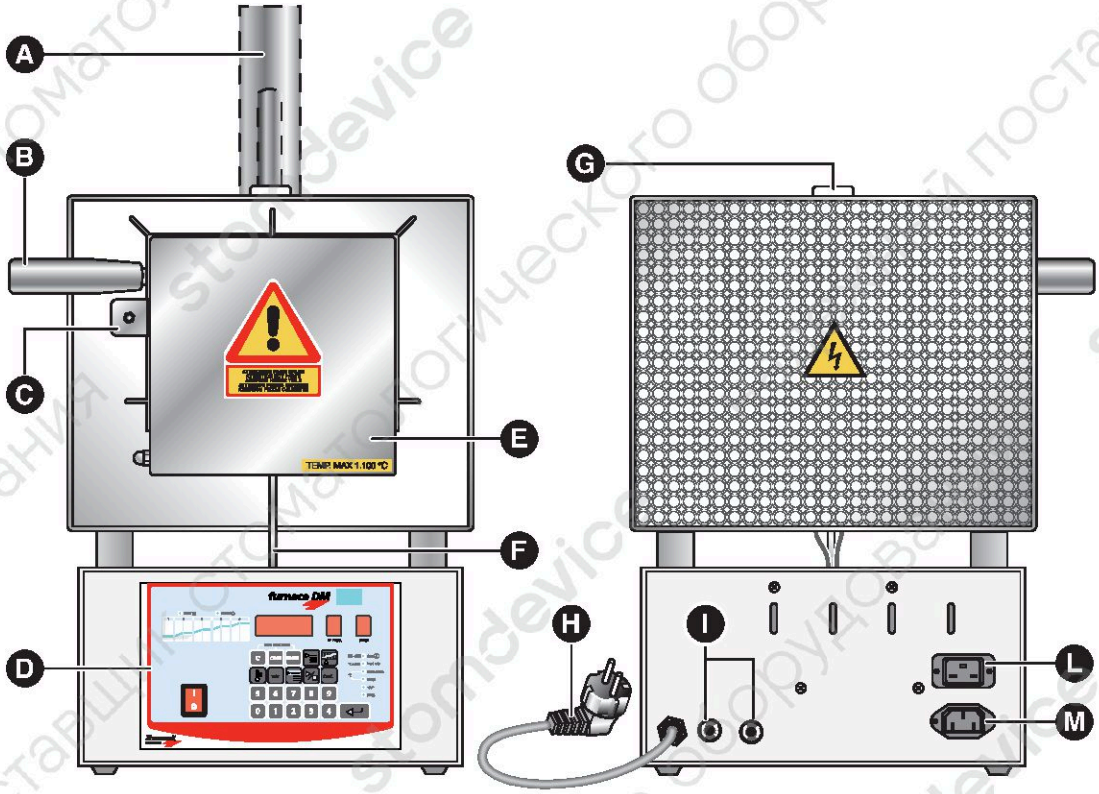
CHAPTER 3: DESCRIPTION OF THE EQUIPMENT

3.1 GENERAL DESCRIPTION OF THE EQUIPMENT

The ***DM series ovens*** have been designed to fire and/or melt the lining cylinders used in odontotechny. The ***DM*** series of ovens consists of:

- ***DM30, DM40, DM50,*** ready for aspiration tube insertion.
- ***DM4R*** with rotation pan as standard, ready for insertion of aspiration tube.
- ***DM1, DM1G*** for the melting of special skeleton cylinders, fitted with one or two aspiration tubes respectively.

3.2 TABLE OF THE COMPONENTS DM30, DM40, DM50





furnace DM50 *furnace DM40* *furnace DM30*

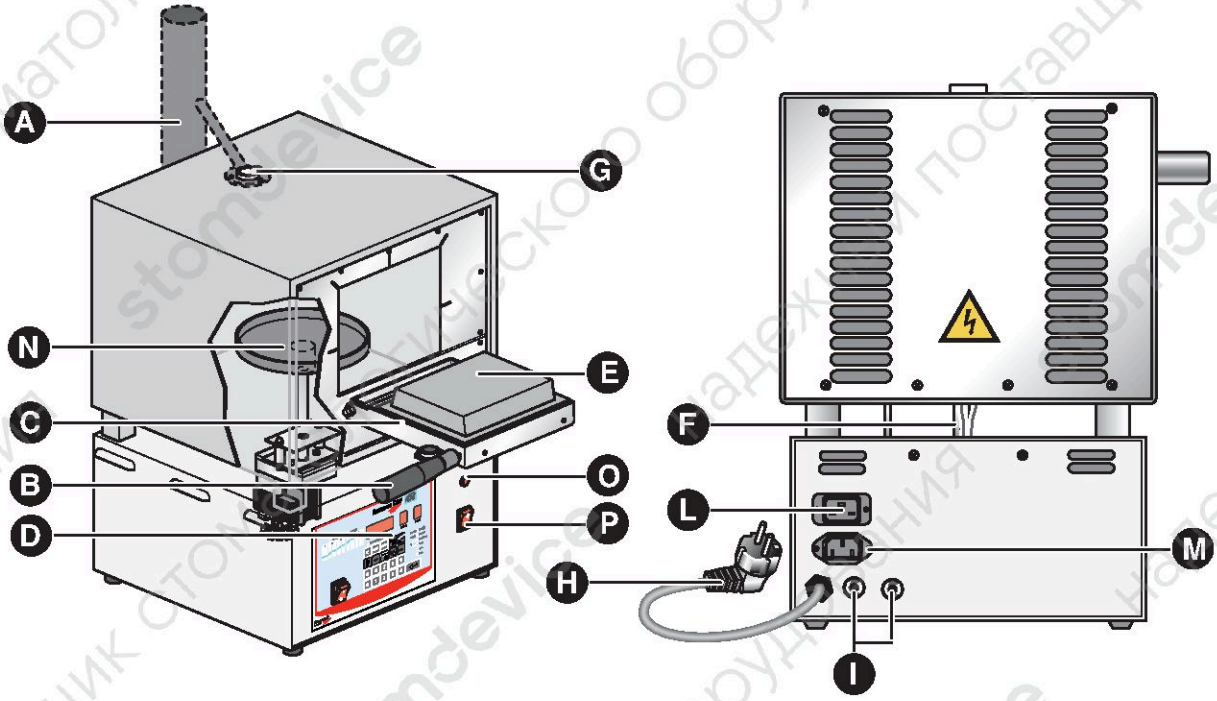
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Description of the components 3.2.1

A. Aspirator (optional Code C305319)
B. Door open/close handle
C. Magnetic closure
D. Control panel (see section 3.5)
E. Oven chamber door
F. Door microswitch
G. Ceramic air bleeder
H. Power lead
I. Fuses
L. Hood socket
M. Aspirator socket

TABLE OF THE COMPONENTS DM 4R 3.3



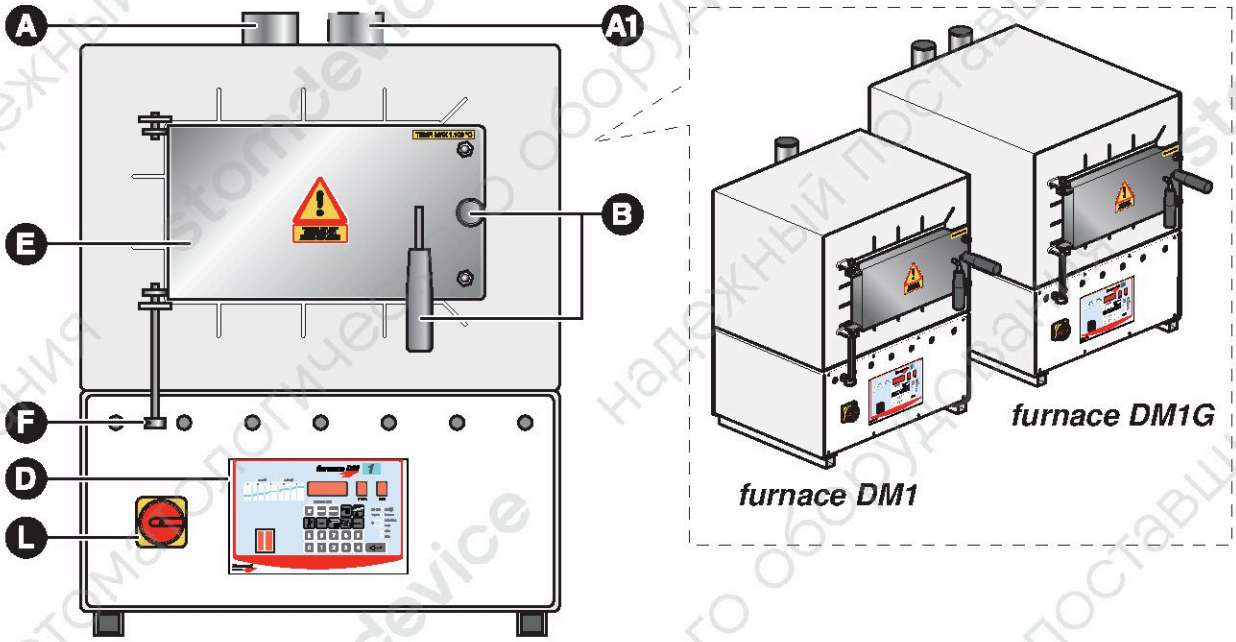
Description of the components 3.3.1

A. Aspirator (optional Code C305320)
B. Door open/close handle
C. Magnetic closure
D. Control panel (see section 3.5)
E. Oven chamber door
F. Door microswitch
G. Ceramic air bleeder
H. Power lead
I. Fuses
L. Hood socket
M. Aspirator socket
N. Rotation pan
O. Led
P. On/off switch

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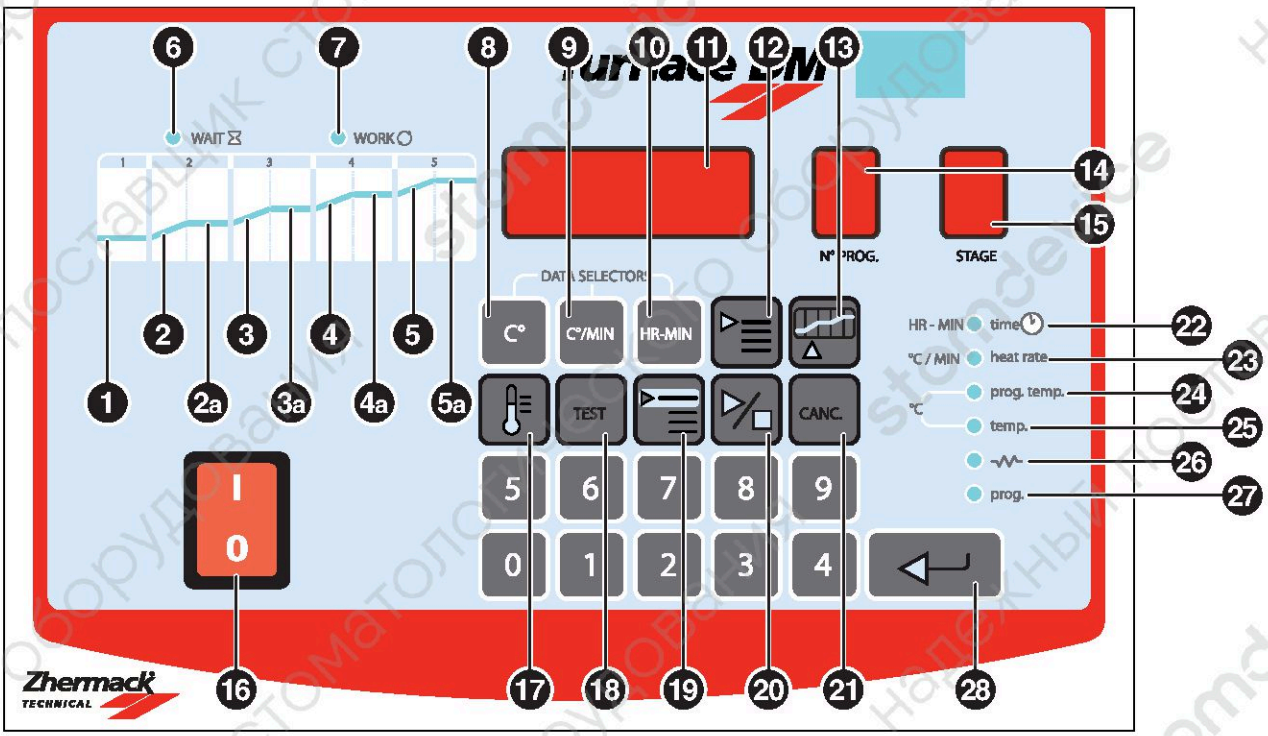
3.4 TABLE OF THE COMPONENTS DM 1, DM 1G



3.4.1 Description of the components

A. First aspiration tube (version ***DM 1***)
A1. Second aspiration tube (version ***DM 1G***)
B. Door open/close handle
D. Control panel (see section 3.5)
E. Oven chamber door
F. Door microswitch
Q. Main switch

3.5 CONTROL PANEL



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Control panel structure/functions are the same on all ***DM*** ovens.
To aid comprehension during the programming phase too the display panel table is shown both on the facing page and in the fold-out Appendix A.5 at the end of this Use and Maintenance Manual.

Description of control panel components 3.5.1

1.	Phase 1	Horizontal segment – Delayed start phase
2.	Phase 2	Oblique segment - Increase phase
2a.	Phase 2	Horizontal segment - Holding phase
3.	Phase 3	Oblique segment - Increase phase
3a.	Phase 3	Horizontal segment - Holding phase
4.	Phase 4	Oblique segment - Increase phase
4a.	Phase 4	Horizontal segment - Holding phase
5.	Phase 5	Oblique segment -Increase phase
5a.	Phase 5	Horizontal segment -Holding phase
6.	Wait LED	Wait/delayed start on
7.	Work LED	Work/oven running
8.	°C	Shows temperature setting on display
9.	°C/MIN	Shows temperature increase rate setting on display
10.	HR-MIN	Shows remaining holding time
11.	Data display	
12.	PROG. SELECT.	Selects programmes 0-9
13.	PHASE	Selects phases 1 - 5
14.	Selected program n° display	
15.	Phase n° display	
16.	Main switch	(on DM1-DM1G there is an on/off light)
17.	TEMP.	Shows in-chamber temperature
18.	TEST	Checks the board functions
19.	PROG.	Access to programmes
20.	START/STOP	Start/stop work
21.	ERASE	Cancels data on display (11)
22.	LED TIME	Programming and time (hours and minutes) reading
23.	LED SLEW RATE	Programming and fast reading of rate in °C per minute
24.	LED STO TEMP	Programming and temperature stop reading (in °C)
25.	LED TEMP	In-chamber temperature on display (in °C)
26.	LED --------	Element on
27.	LED PROG.	Programming LED
28.	ENTER	Saves (confirms) on-display data (11)

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3.6 DESCRIPTION OF THE PHASES MAKING UP A PROGRAM

PHASE 1: programmed start.
The oven can be programmed to come on at a set time even when no members of personnel are in the laboratory.
The delay interval can be set anywhere between a minimum of 1 minute and a maximum of 7 days.
Use of the delayed start feature is not, of course, necessary for proper oven operation.

PHASE 2, PHASE 3, PHASE 4: temperature increase and holding time.
In each PHASE three (3) data items are entered in the following order:
- ***Temperature:***
  Minimum: ambient temperature
  Maximum: 1,100°C.
- ***Increase rate in °C/minute:***
  Minimum: 1°C per minute
  Maximum: the maximum power rating for each model in the DM series (see section 4.1.1).
- ***Holding (temperature stabilisation) time in hours and minutes:***
  Minimum: 1 minute
  Maximum: 20 hours.

This parameter begins when the oven reaches the set temperature.

PHASE 5
Temperature, increase rate and holding time need to be set for ***PHASE 5*** too. The main difference with respect to the preceding phases is that the holding time expires and the end of the program is signalled by an acoustic warning signal (buzzer) lasting 30 seconds.
From that moment on the oven maintains the final temperature setting until the operator switches the oven off.
After setting ***PHASE 5*** program data it is also possible to set the aspirator switch-off temperature (see section 7.4).

Not all work phases need be used on all programs; the number of phases employed depends, in fact, on the desired results. However, its is important that all programs conclude with PHASE 5.

Special techniques for the melting of specific linings also exist. These techniques allow oscillating temperature patterns to be used (i.e. lowering the temperature and then raising it again).
For example:
- PHASE 2 - Temperature 250°C - Increase rate 6°C/min - holding time 20 minutes.
- PHASE 3 - Temperature 750°C - Increase rate 10°C/min - holding time 30 minutes.
- PHASE 4 - Temperature 600°C - Increase rate 10°C/min - holding time 30 minutes.
- PHASE 5 - Temperature 850°C - Increase rate 12°C/min - holding time 1 hour.

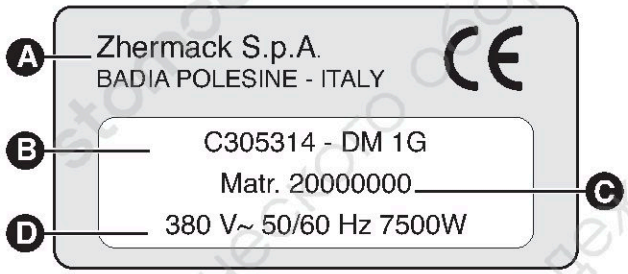
It is also necessary to set an increase rate of 10°C in PHASE 4 where the temperature has to drop from 750°C to 600°C: doing so stops the oven dropping below the 600°C setting.

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IDENTIFICATION DATA 3.7

The equipment described in this manual has an ID platelet giving information about both the equipment and the manufacturer:



A. Name and address of manufacturer
B. Equipment code and model
C. Serial number
D. Power supply information

The equipments has been built in compliance with the EC directives listed in the enclosed "EC declaration of conformity". When requesting spare parts, information or assistance from your Authorised Servicing Centre always quote the data on the ID plate.
Should the ID plate deteriorate and become illegible, even partially, order a replacement plate from the manufacturer: remember to quote the relevant data.

Do not remove and/or damage the plate as you must be able to read the data at all times.



On-equipment labels and symbols 3.7.1

The following symbols are applied on the equipment:

ATTENZIONE! DANGER OF AN ELECTRICAL CURRENT. DO NOT OPEN DOORS OR REMOVE PROTECTION BEFORE YOU HAVE DISCONNECTED THE PLUG FROM THE ELECTRICAL SOURCE.



WARNING! HOT PARTS. EXTREME DANGER.
USE PINCERS, EYE GOGGLES AND HEAT-INSULATED GLOVES.



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CHAPTER 4: TECHNICAL CHARACTERISTICS

4.1 TECHNICAL CHARACTERISTICS AND OPERATING START

Zhermack S.p.A. designs and manufactures work instruments that provide cutting-edge technology and first-rate quality. They are specially designed to provide made-to-measure solutions that offer long-lasting performance every single day of their working life.
In making these products ***Zhermack S.p.A.*** makes use of the latest design tools, thus ensuring that all finished equipment is as functional as possible. Use of only top-quality materials and thorough testing aimed at providing maximum user safety are an ***Zhermack S.p.A.*** constant, making our products safe and internationally competitive.

The ***DM*** ovens work by melt-firing the alloy linings used in odontotechny and allow users to employ special techniques for both variable-temperature melting of specific linings and the melting of special skeleton linings (***DM1*** and ***DM1G***).
The various ***DM*** oven versions differ mainly in terms of technical characteristics; however, computerisation is governed by a board having the same characteristics on each model.
Programming is explained in detail in Chap. 7.
DM series ovens are characterised by:
• computerised operation with a 10-program (0-9) memory.
• 5 phases per program plus a special 8-phase program feature.
• digital controls.
• protection against accidental data cancellation.
• large-size luminous displays for easy, user-friendly data reading during both programming and work.
• function buzzers.
• cut-out fuses.
• thermocouple cut-out signal and automatic deactivation of element.
• door with magnetic closure.
• safety microswitch connected to door: when the latter is opened this switch cuts the power to the oven chamber.

4.1.1 Technical data

MODEL:	DM 30	DM 40	DM 50
Dimensions (cm)	L33 x P32 x H45	L39 x P37 x H49	L39 x P47 x H49
Interchamber dimensions (cm)	L12 x P16 x H9,5	L17 x P16 x H11	L17 x P16 x H11
Weight (kg)	15	26	30
Aspirator dimensions (cm)	L12 x P15 x H65	L12 x P15 x H65	L12 x P15 x H65
Aspirator weight (kg)	3	3	3
Cylinder capacity	4-3x 2-9x	6-3x 4-9x	11-3x 6-9x
Min. increase time to 700°C	30 °C	30 °C	40 °C
Max absorbed power (watt)	1550	2000	2400
Power supply	230V~ 10% 50/60Hz	230V~ 10% 50/60Hz	230V~10% 50/60Hz
Protection rating IP	IPX0	IPX0	IPX0

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MODEL:	DM 4 R	DM 1	DM 1 G
Dimensions (cm)	L44 x P47 x H58	L63 x P65 x H86	L63 x P82 x H86
Interchamber dimensions (cm)	Ø 17,5	L30 x P23 x H18	L30 x P40 x H18
Weight (kg)	43	90	120
Aspirator dimensions (cm)	L12 x P15 x H65	-	-
Aspirator weight (kg)	3	-	-
Cylinder capacity	7-3x 3-9x	12-9x	24-9x
Min. increase time to 700°C	30 °C	-	-
Max absorbed power (watt)	2200	5000	7500
Power supply	230V~ 10% 50/60Hz	230V~ 10% 50/60Hz	380V~ 10% 50/60Hz
Protection rating IP	IPX0	IPX0	IPX0

Standard accessories and accessories available on request 4.1.2

In addition to this Use and Maintenance Handbook the machine ***DM 30, 40, 50*** comes complete with:

COMPONENTS	QUANTITY	ORD. CODE*
Ceramic air bleeder	1	XI0030030
Scored refrac. plate for Series 30	1	XI0030070
Scored refrac. plate. for Series 40-50	1	XI0030073
Chamber base refractory tube Series 30	2	XB0030370
Chamber base refractory tube Series 40-50	2/3	XB0030180
Door open/close handle	1	XI0031010
Fuse	2	
Hood socket	1	XE9900140
Aspirator (for Series DM 30,40,50)		C305319
Aspiratore (for Series DM 4R)		C305320

While ovens in the ***DM 1*** and ***DM 1G*** series are supplied complete with:

COMPONENTS	QUANTITY	ORD. CODE*
Bakelite handle	1	XI0031010
CE 32 A plug	1	XE990160

* Please quote the order code when ordering a spare part. You may order parts from your local Authorised Servicing Centre.

TEMPERATURE TOLERANCES 4.2

Temperature tolerances on ***DM*** preheating ovens are **± 10 %** with respect to the maximum temperature limits given in section 4.1.1.

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CHAPTER 5: TRANSPORT AND MOUNTING

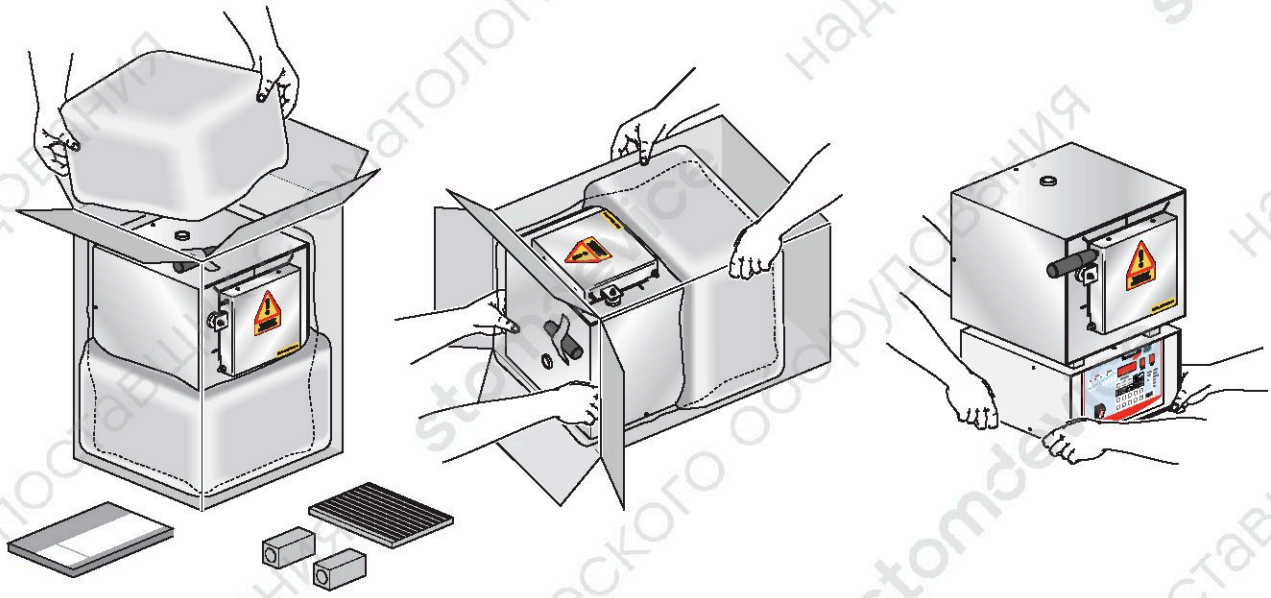
5.1 WARNING

To prevent any injury to persons or damage to things always proceed with the utmost care and attention when handling the equipment. Observe all the precautions and instructions contained in the following paragraphs.

5.2 PACKING AND UNPACKING

All the material is thoroughly checked by the Manufacturer prior to shipment. When you receive the goods make sure they have not been damaged during transit and that no-one has tampered with the packaging and removed any of the parts contained therein.
Should you note any damage or missing parts please inform your Dealer and the shipping carrier immediately: take photographs and send them on to both dealer and carrier.

The packaging, consisting of a cardboard box with internal expanded plastic padding, contains:
- ***DM*** series oven;
- standard equipment for each model (see section 4.1.2);
- this Use and Maintenance Manual.



The equipment is not supplied with pincers, gloves or protective glasses; however, the operator must be in possession of these items in order to utilise the equipment.

It is recommended that you keep the original packaging so that, if necessary, it can be re-utilised; doing so ensures that you do not use unsuitable packaging materials during transport and handling which might lead to accidental damage (see section 5.3).

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TRANSPORT AND MOUNTING 5.3

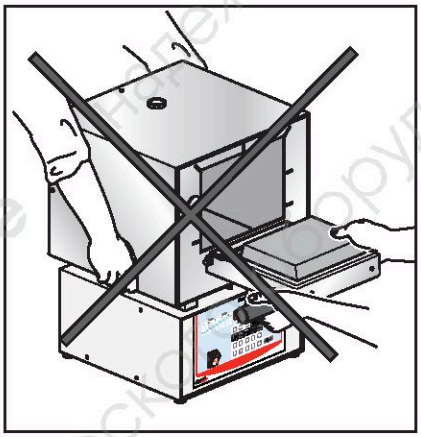
Should the oven you have purchased need to be moved it must first be fully disconnected from the power supply and then left to cool completely. Proceed as follows:

1. close the oven chamber door;

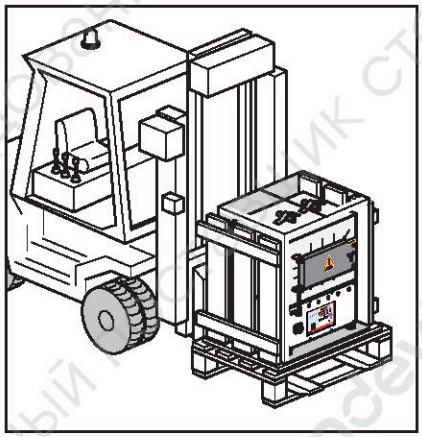
2. gather all its accessories together;
Equipment handling for transport and/or packaging purposes must be carried out in compliance with a few essential rules. These are as follows:



a. To handle and/or move the equipment there must be at least 2 (two) workers: they must grip the unit securely under its base.



b. Handling and/or moving the equipment by gripping its protective screen is strictly forbidden.



c. Handle and/or move the heaviest models with the aid of suitable lifting gear.

3. Pack the equipment in its original box or, if this is not possible, take all the necessary precautions to protect the equipment against knocks or drops, in that the goods are transported at the owner's risk.
Proceed cautiously, bearing in mind the size and weight of the unit (see section 4.1.1), so as to prevent any accidents that might be caused by failure to evaluate such factors.

Failure to observe the above exonerates the Manufacturer from any liability concerning equipment malfunction and consequently renders the Warranty null and void.

When shipping/delivering the equipment to your Authorised Servicing Centre always enclose a copy of the purchase document and a copy of the properly compiled ID form.

If the unit is to be transported by courier, the postal service or rail it is recommended such shipments be insured.

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5.4 ELIMINATION / DISMANTLING

When disposing of the ***packaging materials*** the user must comply with the standards in force in his/her country regarding the following materials:
• Wood/paper: non-polluting materials, but must be recycled properly;
• Polystyrene/plastic: pollutants which must not be burnt (toxic fumes) nor dispersed into the environment, but disposed of in compliance with the standards in force in the country of use.

If the equipment is to be ***dismantled*** the user must, in compliance with EC directives and the laws in force in the country of use, effect elimination and recycling of the following materials:
• Plastic and glass parts, insulated electrical wiring, rubber parts;
• There are no toxic or corrosive parts.



This product must not be disposed of as household waste but rather, when no longer used, must be collected separately according to EC Directive 2002/96.

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CHAPTER 6: INSTALLATION AND FIRST-TIME USE

WARNINGS AND PRECAUTIONS 6.1

Before proceeding with installation make sure that all relevant safety conditions prevail and follow the instructions below carefully.

So as to provide greater clarity the numbers given in the diagrams in this chapter correspond exactly to the numbering in the Components Table (Ch. 3).

PERMITTED AMBIENT CONDITIONS 6.2

Unless stated otherwise at the time of order the equipment will be configured to operate properly under the following ambient conditions:

Place of Use	Indoors
Altitude	Up to 2000 m
Working temperature	From 5°C to 40°C
Humidity	Max 80%

Ambient conditions other than those listed above may cause malfunctions or sudden breakdowns. Lighting in the installation area must be sufficient to provide good visibility at every single point on the equipment.
More specifically, luminosity must not be less than 200 lux, lighting must be as uniform as possible and there must be no reflected light as this could dazzle the operator.

The equipment must not be used in workplaces having an atmosphere which is explosive and/or at risk of fire as it has not been designed for use in such areas. Nevertheless, should a fire accidentally break out follow the procedure described in paragraph 2.4.

Work area lighting is an important factor in both personnel safety and the ultimate quality of the work being done. In Italy lighting must comply with a Ministerial Decree Law that clearly defines minimum lighting requirements. In other countries lighting requirements form part of the accident prevention and workplace hygiene standards.

REQUIRED WORK SPACE 6.3

Choosing a good workplace with an appropriate amount of space available for equipment installation is an essential factor in personnel safety, the quality of the work and proper maintenance. This zone must not only be spacious enough to allow for optimum equipment operation but must also be well illuminated, aired, not dusty and not exposed to direct sunlight. Note also that the unit must be positioned so the connection plug can be handled/manipulated with ease.

The equipment must rest on non-flammable supports and tops only.
It is strictly forbidden to store any solid, liquid or gaseous flammable substances in the vicinity of the equipment.

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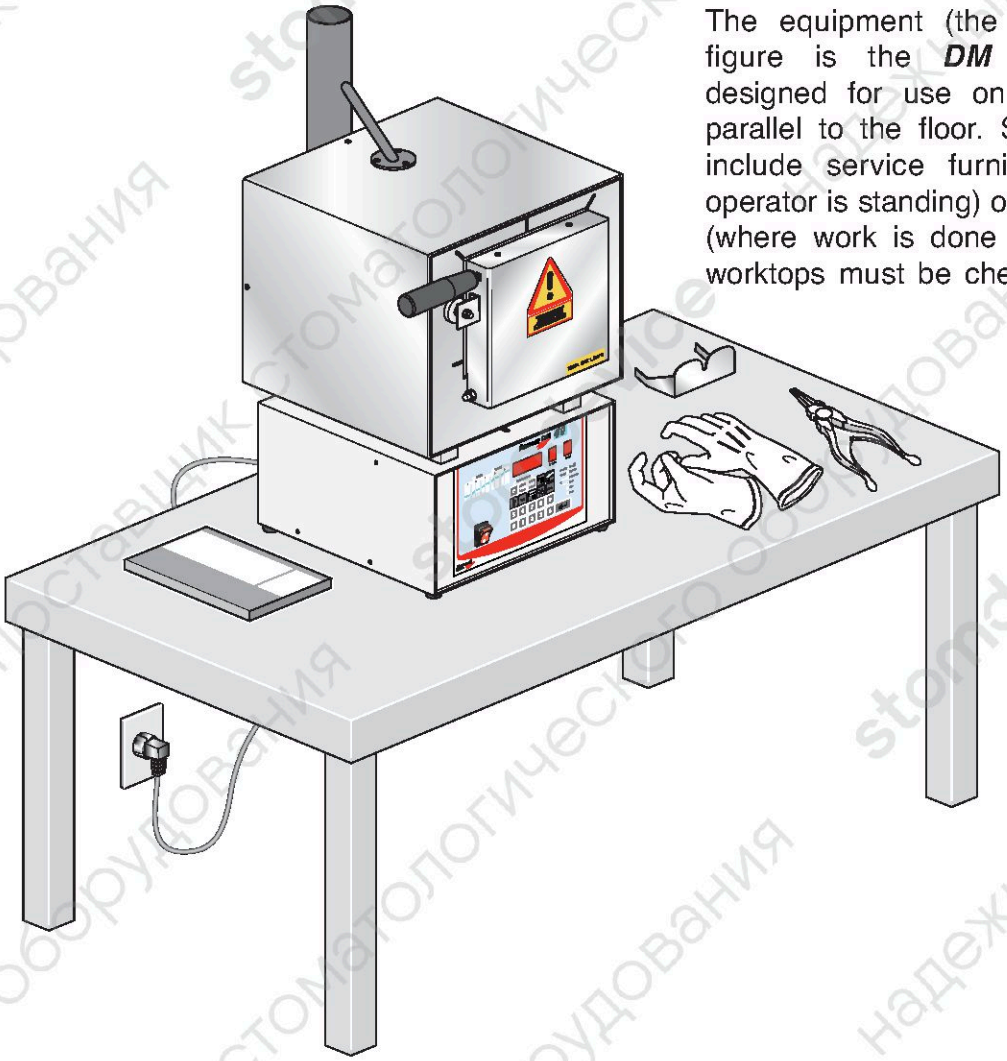
The oven must be installed in a protected area using guards equipped with systems that allow only frontal access (gates, shutters etc.).

Position the equipment so that the fan flue is beneath the mobile hood aspiration tube.

The aspiration fan flue must be free and must not be connected to other tubes or hood ducts.

Should the above-described connection be necessary it is essential that no elbows or bends be created as combustion fumes and gases would no longer be drawn outwards.

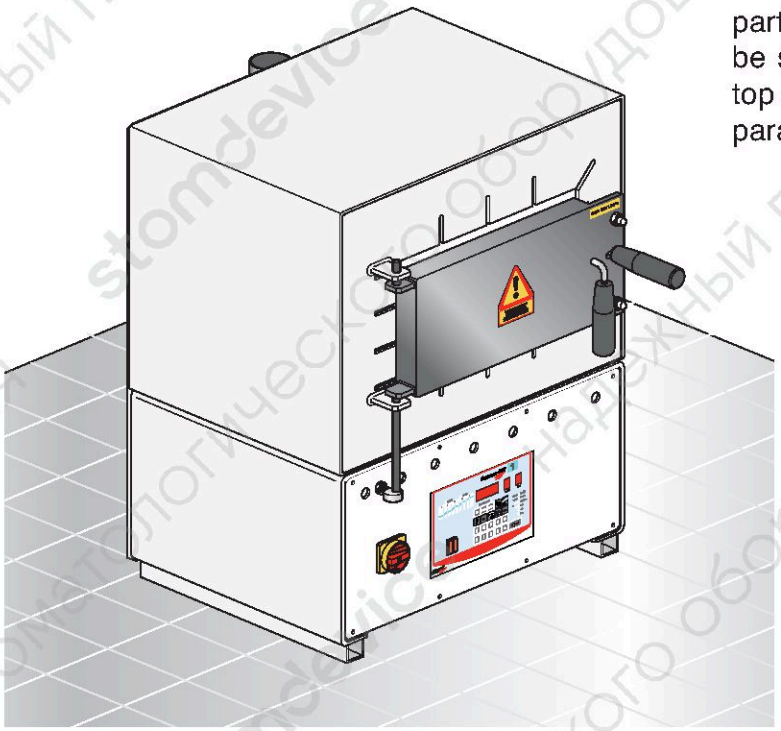
6.3.1 Worktops



The equipment (the example in the figure is the ***DM 40***) has been designed for use on a rigid worktop parallel to the floor. Suitable worktops include service furniture (where the operator is standing) or modelling tables (where work is done sitting down). All worktops must be checked for stability.

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Since models ***DM1*** and ***DM1G*** are particularly heavy and bulky they must be set down on the ground or on a low top of appropriate load-bearing strength parallel to the ground.

CONNECTING UP TO THE POWER SUPPLY 6.4

The user must provide a power connection with relative socket near the equipment installation point. The user must also install an adequate electrical circuit breaker upstream from the socket as well as efficacious overload/indirect contact safety devices.
Connection is effected via the safety plug (16A - 32A for DM1/DM1G, in compliance with European standards) at the end of the power lead: this must be inserted in the mains socket.
When connecting check:
• that mains voltage and frequency are as indicated on the identification plate (incorrect power supply voltage may damage the equipment);
• that the mains supply has a proper, efficient earth connection.

It is forbidden to tamper with the power lead and its plug. When replacing them owing to damage and/or wear please contact an Authorised Service Centre.

A proper earth connection is compulsory. Should it temporarily be necessary to use an extension lead the latter must comply with the standards in force in the country of use.

Should power surges occur while the equipment is working, or when it is any case connected to the mains, proceed as explained in section 7.14.

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6.4.1 Connecting up the aspiration unit (optional for DM 30-40-50, DM 4R)

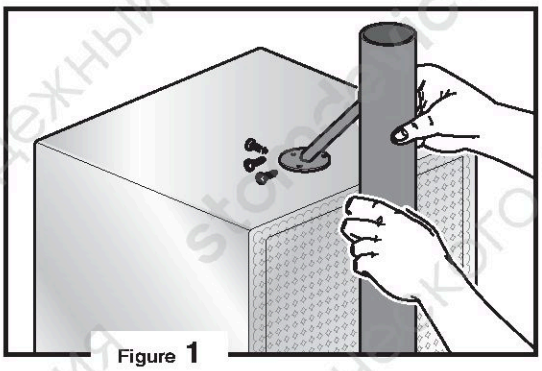


Figure 1

Fig. 1 : Remove the bleeder from its seat and connect up the aspirator using the screws supplied with the aspirator itself.

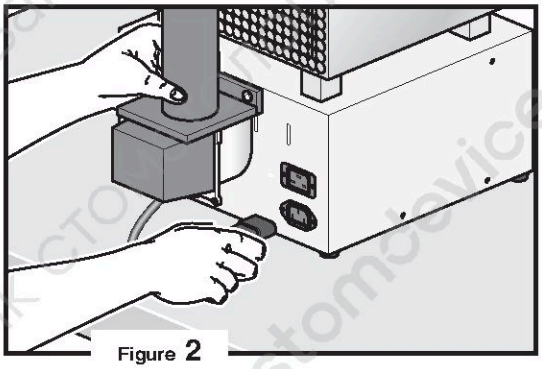


Figure 2

Fig. 2 : Finally, insert the aspirator plug in the socket on the rear panel of the oven base.

6.5 STARTING UP THE EQUIPMENT

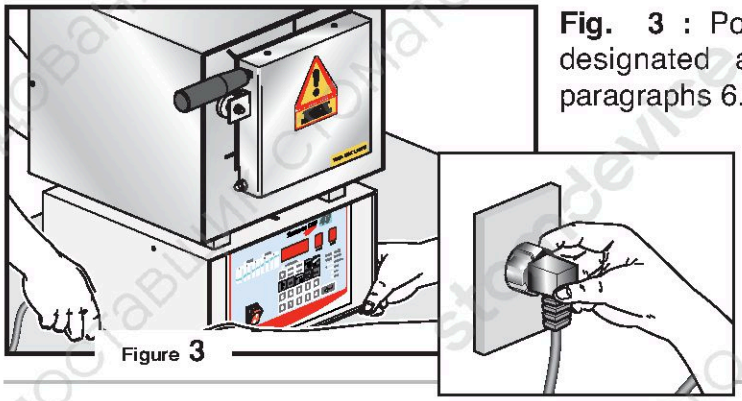


Figure 3

Fig. 3 : Position the equipment correctly in the designated area, observing the instructions in paragraphs 6.3 and 6.3.1.

Connect the lead to the mains power socket: follow the instructions in section 6.4 carefully.

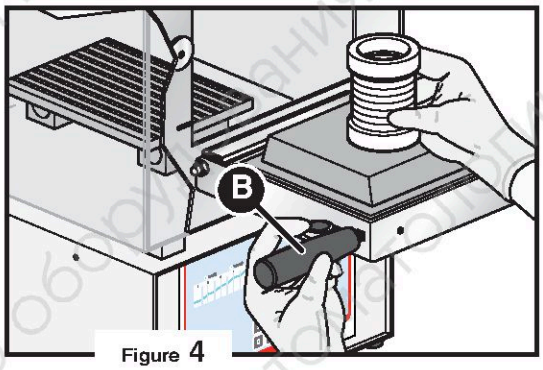


Figure 4

Fig. 4 : Open the oven door using the handle (**B**).

After placing the grooved plate and the refractory supports (see diagram) inside the oven, insert the firing cylinders and close the door properly.

Even when the *DM* oven is at ambient temperature it is still advisable to use protective gloves during handling.

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Fig. 5 : On ***DM 1*** and ***DM 1G*** ovens act on the main switch by turning the dial clockwise.

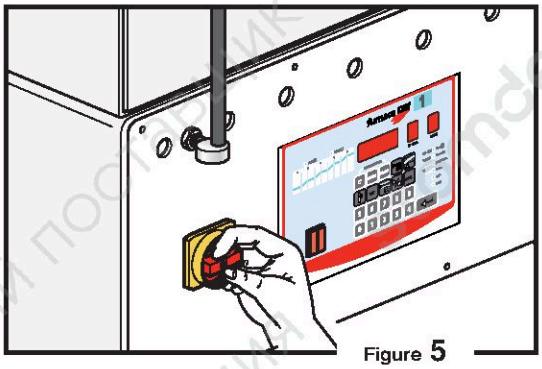


Figure 5

Fig. 6 : Press the main switch (**16**) positioned on the display: the switch will light up.
- the word OFF appears on the display (**11**)
- the program number appears on the display (**14**)
- the number "**1**" appears on the display (**15**).

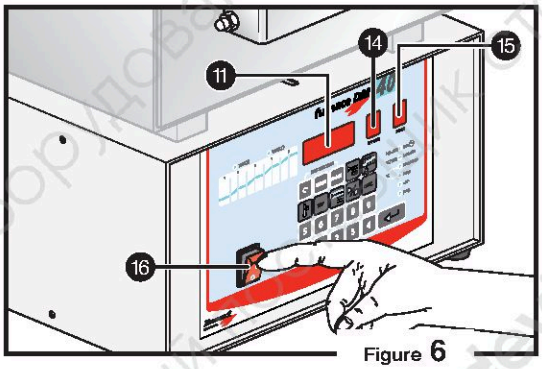


Figure 6

If the control panel is already on and there are four numbers on the display (11) press the START-STOP key (20) immediately and the word OFF will appear on the display (11).

Failure to observe any of the above equipment installation instructions may lead to malfunctions and render the warranty null and void.

PURPOSE OF THE EQUIPMENT / IMPROPER AND FORBIDDEN USE 6.6

The ovens of the ***DM*** series have been designed to effect the firing and/or fusion of lining cylinders used in odontotechny.

Using the equipment for any purpose other than that described in this Manual shall be considered improper and thus forbidden.

The equipment must not be used to fire materials that generate smoke (e.g. waxes, resins, plastics etc.).

Improper use renders the Warranty null and void and *Zhermack S.p.A.* shall not be liable for any damages to objects, workers or third parties.

The main reasons for which the Warranty may be rendered null and void are given in section 2.2 and in the "Warranty Certificate" enclosed with this Manual.

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CHAPTER 7: USING THE EQUIPMENT

7.1 WARNING

The equipment must not be used with any of its parts disassembled: before using the equipment make sure that all its components are properly in place.

To ensure that work is done in absolute safety always make sure that you follow the described procedures with caution.

To provide greater clarity the numbers given in the diagrams in the following paragraphs correspond exactly to the numbering in Chapter 3 in the "Equipment Description" section.

7.2 SAFETY SYSTEMS

Operator safety is guaranteed by automatic control and safety devices.
The above-cited safety systems control oven start/stop; in particular:

A. If, during a melting cycle, the operator opens the oven door, the latter will trip a microswitch (**F**) positioned centrally beneath the aperture of the door itself.
Pressure on this pin automatically cuts electrical power to the elements, deactivating them.
- the word "**Door**" appears on the display (**11**).
- re-closure of the door results in restoration of the electricity supply powering the elements.
- real-time in-chamber temperature re-appears on the display (**11**).

B. Once the work cycle is complete remember to press **START/STOP** (**20**) so as to turn the control panel off before switching off the oven via the main switch (**16**).

To ensure long-lasting oven performance it is advisable to avoid using it for prolonged periods and at maximum temperature.

C. The oven is equipped with a safety system that provides protection should the set temperature be exceeded.
If, between 500°C and 600°C, set temperature is exceeded by more than 100°C for at least one minute the following occurs:
- the flashing legend "**tEmP**" appears on the display (**11**).
- an overheating warning buzzer sounds.
- the cycle in progress is automatically cancelled.

The above also happens if, beyond 600°C, the set temperature is exceeded by just 50°C for at least one minute.

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Pressing **START/STOP** (**20**) deactivates the alarm and the word "**OFF**" appears on the display (**11**). It is advisable to run a check on the programmed data.
You can now re-start the interrupted program.
If, of course, the cause of the alarm is not removed the same problem will occur as soon as the oven is put back in use.

D. If the thermocouple breaks the following occurs:
• the flashing legend "**tEmP**" appears on the display (**11**).
• an overheating warning buzzer sounds.
• the elements are switched off.
In this event the thermocouple must be changed.

Should even just one of the control and safety devices fail to operate properly proceed – as far as is possible – as described in section 9.2 and contact you nearest Authorised Servicing Centre.

Maximum temperature increase rate 7.2.1

To ensure that the oven cycle ends in accordance with the duration displayed at the end of **PHASE 5** during programming, the operator must observe the maximum in-oven temperature increases (expressed in °C/MIN) shown in the table below:

	TEMPERATURE RANGE		
OVEN SERIES:	*FROM 0°C TO 300°C*	*FROM 301°C TO 600°C*	*FROM 601°C TO 900°C*
DM 30 with heating tubes	30 °C/min	25 °C/min	10 °C/min
DM 40 with heating tubes	30 °C/min	25 °C/min	8 °C/min
DM 50 with heating tubes	30 °C/min	25 °C/min	8 °C/min
DM 4 R	30 °C/min	25 °C/min	10 °C/min
DM 1	30 °C/min	25 °C/min	8 °C/min
DM 1 G	30 °C/min	25 °C/min	10 °C/min

DATA PROGRAMMING 7.3

Entering data into program n.1 7.3.1

A. The oven is **OFF**, as shown on the display (**11**).
The **PHASE** display (**15**) shows the number "**1**".

B. Press **PROG. SELECT**. (**12**). The letter "**P**" appears on the display (**11**). Press key "**1**".
The number "**1**" appears on the display (**14**).

C. Press **PROG.** (**19**).
The legend "**Pro**" appears on the display (**11**).
The green **PROG. LED** (**27**) starts flashing and continues to flash as long as the operator remains in Data Programming mode.

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(Conclusion of data entry for each program is, nevertheless, shown on the display by the appearance of the word "**OFF**").
The number "**2**" appears on the **PHASE** display (**15**).

D. Press **ENTER** (**28**). On the control panel the following appears:
- the legend "**tEmP**" appears on the display (**11**) for one second.
- four numbers appear on the display (**11**) (these might even be 0000).
- the green **STO-TEMP LED** (**24**) come on.
- segment (**2A**) comes on.

Now enter the first temperature using the numerical keypad. Example: 250°C
Press keys 2 - 5 - 0.

E. Press **ENTER** (**28**) to save the temperature data. The following appears on the control panel:
- the green **°C/min SLEW RATE LED** (**23**) comes on.

The legend "rate" appears on the display (**11**) for one second. Now enter the increase rate (in °C/min) that will be used to reach the just-set temperature. Do this via the numerical keypad.
Example: 6°C/min. Press key number 6.

F. Press **ENTER** (**28**) to save the rate data. The following then appears on the control panel:
- the green **HR-MIN/TIME LED** (**22**) comes on.
- the horizontal green segment (**2B**) comes on.

A second "time" appears on the display (**11**). Now insert the holding time via the numerical keypad. Example: 20 minutes. Press keys 2 and 0.

G. Press **ENTER** (**28**) to save the data. Doing this completes **PHASE 2** and brings the operator to **PHASE 3**. The following then appears on the control panel:
- the green **STO-TEMP LED** (**24**) comes on again.
- the legend "**tEmP**" appears on the display (**11**).
- the green oblique segment (**3A**) comes on.
- the number "**3**" appears on the **PHASE** display (**15**).

H. Program **PHASES 3** and **4** according to the procedure used in **PHASE 2** as described above.

I. In **PHASE 5**, after inserting the parameters as per the previous phases, the aspiration fan cut-out temperature can be programmed (see section 7.4) by pressing the **ENTER** key (**28**):
- the legend "**Fan**" **300** appears for a fraction of a second on the display (**11**) (Aspiration Fan).
- the legend "**U**" appears on the display (**15**).

L. Press **ENTER** (**28**):
- "**t**" appears on the display (**15**).
- the program duration, expressed in hours and minutes, appears on the display (**11**).

M. Press **ENTER** (**28**) for the last time to exit Data programming mode:
- the word **OFF** re-appears on the display (**11**).

7.3.2 Entering data into remaining programmes

To enter the data in the remaining programs, proceed as described in section 7.3.1 by keying in the desired program number (0-9) during Program Selection (see 7.3.1, point B).

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USING THE ASPIRATION UNIT 7.4

As regards aspirator positioning and connection, observe the instructions in sections 6.3 and 6.4.1. carefully.



Routine mode 7.4.1

The switched-on aspirator (optional) starts/stops automatically during oven operation / shutdown. The operator can, nevertheless, program aspirator shutdown temperature during Data Programming (see section 7.3.1 point l).
In fact, once the third parameter (holding time) of **PHASE 5** has been entered press **ENTER** (**28**) to save the data that will then be set.
The display (**11**) shows "**FAn**" **300**.
The figure "**300**" indicates the temperature (in °C) at which the fan automatically stops working.
This data is entered by technicians at ***Zhermack S.p.A.*** during final oven testing. Should the operator so desire, he/she may vary this setting between a minimum of 0°C and a maximum of 700°C.
As a guideline, this setting should not be any higher than 400°C because, while air flow from the melting chamber is only minimal, it is good practice to prevent withdrawal of heat as this delays attainment of high temperatures.

Programming of the fan shutdown temperature is only effected, of course, where the oven has an aspirating flue.



"Fast" mode 7.4.2

To fire fast linings the suction unit needs to be set up in a special way.
When setting the program, after setting the 5 firing phases, the word "**Fan**" appears on the display followed by 4 zeros. If, in this phase, a temperature higher than **700°C** is set the word "**Fast**" appears on the display to indicate operation of suction unit with fast linings. During execution of the program, when the set temperature is reached and the material is inserted in the oven, closing the door automatically activates the suction unit for about 30 minutes so as eliminate any fumes that develop in the chamber.
The set temperature will nevertheless be guaranteed.

EXTRACTION FAN 7.4.3

The extraction fan comes on at the beginning of phase 2 and goes off when the power supply to the oven is cut.

DELAYED START 7.5

Delayed oven start must be programmed after the melting program has been set (see section 7.3).

A. With the oven **OFF**, press **START-STOP** (**20**). The word "**tImE**" appears on the display (**11**).

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B. Press **ENTER** (**28**). The current day of the week appears on the display (**11**).

C. Key in the desired day (1: Monday, 2: Tuesday, 3: Wednesday, 4: Thursday, 5: Friday; 6: Saturday, 7: Sunday).
• The relevant day appears on the display (**11**).

D. Press **ENTER** (**28**):
• for a fraction of a second the legend "hh.nn" appears on the display (**11**). This is followed by the current time.

E. Program the time for the selected day by keying in the relevant numbers.



The two numbers on the left-hand side of the display (11) give the hour while the two numbers to the right show the minutes.
If, for example, you wish to enter the time 08.30 key in 0 – 8 – 3 - 0 so that the number 8 remains on the left-hand side of the display (11).

F. Press **ENTER** (**28**) to save the data:
• the oven start day remains on the display (**11**).
To check the start time press "**HR.MIN**" (**10**).



24 hours prior to the start of oven heating the start time appears on the display (11). 1 hour before heating a flashing countdown of the remaining minutes appears on the display (11).
If a delay time of less than 24 hours is set the heating start time is shown on the display (11).

7.6 IMMEDIATE START

There are two different ways of starting the oven:

A. With the oven **OFF**, press **START-STOP** (**20**). The legend "**tImE**" appears on the display (**11**).
• Press **ENTER** (**28**). The current day of the week appears on the display (**11**).
• Press **ENTER** (**28**). The "hh.nn" legend appears on the display (**11**) for a fraction of a second followed by the current time.
• Press **ENTER** (**28**) and the oven will start working.

B. With the oven **OFF**, press **PHASE** (**13**). The legend "**F**" appears on the display (**15**).
Press **START-STOP** (**20**) and the oven starts working.

To modify the clock from daylight saving time to summer time and vice versa proceed as follows:
• with the oven **OFF** press the **HR-MIN** key (**10**).
• the legend "**tImE**" appears on the display (**11**).
• press **ENTER** (**28**). The display (**11**) shows **SOL** (= daylight saving time) or **LEG** (= summer time).
• press **PROG.** (**19**) to change the time.
• press **ENTER** (**28**): for a fraction of a second the "hh.nn" legend appears on the display (**11**), followed immediately by the current time.
• press **ENTER** (**28**) and the oven returns to OFF mode.

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CREATING AN 8-PHASE WORK CYCLE 7.7

DM series ovens provide users with cycles having up to 8 work phases. This is made possible by uniting programs 8 and 9.
Proceed as follows:

A. With the oven **OFF** press key 9.
- the display (**11**) shows: "8 9 normal functions" or "8 9 combined 8-phase mode".

If the display (**11**) shows 8 9, press the **PROG** key or key 9 again.
- 8 – 9. appears on the display (**11**).
- press **ENTER** to save.

B. Now set program 8.
After setting the holding time in phase 5 of program 8 the oven automatically goes to phase 2 of program 9.

C. Now set the data for program 9.

D. After setting the fan shutdown temperature and confirming the data by pressing **ENTER**, the duration of the combined program appears on the display (**11**).

E. Press **ENTER** again:
- OFF appears on display (**11**)
- 9 appears on display (**14**)
- 1 appears on display (**15**).

F. Now recall program 8 by proceeding as follows:
- press the **PROG. SELECT**. key (**12**).
- "**P**" appears on display (**14**).
- press key "8" on the numerical keypad.

If you wish to return program 8 to its standard 4-phase operating mode, proceed as follows:
- with the oven **OFF**, press key 9.
- 8 - 9 appears on the display (**11**).
- press key 9 again or press **PROG**.
- 8 9 appears on the display (**11**).
- press **ENTER**.

CHOOSING A PROGRAM 7.8

To recall the desired program proceed as follows:

A. With the oven **OFF** press **PROG. SELECT** (**12**). The letter "**P**" appears on the display (**14**).

B. Press the number (0 - 9) relevant to the program you wish to enter.

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7.9 OPERATION: GENERAL NOTES

After entering all the necessary data, the operator can render the set melting programs operative by proceeding as follows:

A. Carry out the operations described in paragraph 7.3.

B. Press **START-STOP** (**20**). Set the oven start time to begin melting operations.

C. Where the delayed start function is used the control panel displays the following:
- the yellow **WAIT LED** (**6**) comes on.
- the horizontal green segment (**1**) comes on.
- the set day or time appears on display (**11**).
- the activated program number is visible on display (**14**).
- the number 1 appears on display (**15**).
- the green **HR.MIN/TIME LED** (**22**) comes on.

If, instead, the delayed start function is not in use the control panel simultaneously displays the following:
- the green **WORK LED** (**7**) comes on.
- a green oblique segment comes on (**2.A, 3.A, 4.A or 5.A**) as a function of the first work phase setting.
- the in-chamber temperature, expressed in °C, appears on the display (**11**).
- the number of the program in use appears on the display (**14**).
- the number of the phase corresponding to the illuminated green oblique segment appears on the display (**15**).
- the yellow **TEMP LED** (**25**) comes on.
- the yellow **_-_-_-_- LED** (**26**) flashes every time the in-chamber heating elements are powered. A brief acoustic signal accompanies the above legend.

D. When the oven starts heating the temperature increase is shown on the display (**11**).

E. Once the first temperature level is reached the holding (temperature stabilisation) time begins. The display simultaneously shows the following:
- the green horizontal segment comes on as a function of the set work phase.
- the yellow **LED _-_-_-_** (**26**) keeps on flashing.

Once the set holding time has expired, a brief acoustic signal informs the operator that the work phase has ended and that the next one is beginning.

F. The oven will then repeat the above-described sequence until the last temperature is reached and the relative stabilisation time (**PHASE 5**) is over. Once this last holding time has expired a buzzer sounds for 30 seconds to inform the operator that the program has ended, after which, however, final temperature is maintained. The technician can thus decide on the most appropriate moment in which to carry out fusion tasks.

G. Once fusion operations are over proceed as follows:
- press **START-STOP** (**20**): the word **OFF** appears on the display (**11**).
- press the main switch (**16**) and the oven is switched off.

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NOTES ON LINING FUSION SYSTEM 7.10

It may be necessary to fire more than one cylinder containing the same or different linings simultaneously, but at different temperatures (e.g. 3 C & B resin cylinders at 700°C, 2 ceramic alloys cylinders at 850°C).
In this situation, we believe that the best way to proceed is to enter the melting data by occupying two programs. Example:

PROGRAM N°. 1

	Temperature	*Increase rate*	*Holding time*
Phase 2	•	•	•
Phase 3	•	•	•
Phase 4	250 °C	6 °C/min	20 minutes
Phase 5	700 °C	10 °C/min	30 minutes

• *Completely data-free.*

PROGRAM N°. 2

	Temperature	*Increase rate*	*Holding time*
Phase 2	•	•	•
Phase 3	•	•	•
Phase 4	•	•	•
Phase 5	850 °C	10 °C/min	1 hour

• *Completely data-free.*

The above-described data is purely indicative and does not refer to any particular fusion lining available on the market. The numbers of phases used in Program n°1 may also vary depending on technical needs.
The above is simply designed to illustrate a method that is both possible and at the same time secure, simple and extremely practical.
The validity of this system lies in the fact that, after the 30-second buzzer informs the operator of the end of Phase 5/Program n°1, the in-chamber temperature of 700°C is stabilised until fusion operations for the first 3 C & B resin alloy cylinders are complete.
Afterwards, to exit Program n°1 and start Program n°2 to raise the temperature to 850°C, proceed as follows:

A. press **START-STOP** (**20**); **OFF** reappears on the display (**11**).

B. press **PROG. SELECT.** (**12**); "**P**" appears on the display (**14**).

C. press n°2 on the numerical keypad; the number 2 appears on the display (**14**).

D. press **PHASE**; **F** appears on the display (**15**).

E. press n°2 on the numerical keypad; the number 2 appears on the display (**15**).

F. press **START-STOP** (**20**) again and the oven will immediately recommence working and proceed towards 850°C.

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7.11 CORRECTING DATA ON A PROGRAM THAT IS RUNNING

If for some reason the operator decides to change the data once the program has already been launched, he/she must proceed as follows:

A. Press **START-STOP** (**20**): the word **OFF** appears on the display (**11**).

B. Press **PROG.** (**19**): the legend "**Pro**" appears on the display (**11**).

C. Press **ENTER** and the following occurs on the control panel:
- the green horizontal segment of the recalled phase comes on.
- the first of the three parameters (i.e. temperature) (**11**) appears.
- the number of the recalled phase appears on the display (**15**).
- the green **PROG. LED** (**27**) flashes.

D. Change/cancel one or more of the phase data items.

E. Save all changes by pressing **ENTER**.

F. Press **START/STOP** (**20**) to return to the display (**11**): **F** appears.
Key in the number of the phase from which you wish to begin.

G. Press **START/STOP** (**20**).

7.12 CHANGING THE PROGRAM IN PROGRESS

If an undesired program is launched by mistake, proceed as follows:

A. Press **START-STOP** (**20**): **OFF** reappears on the display (**11**).

B. Press **SELECT/PROG.** (**12**): "**P**" appears on the display (**14**).

C. Press the correct program key: the corresponding number appears on the display (**14**).

D. Set the oven start time as described in Chapter 4 "Programming Oven Start Time".

7.13 CHECKS DURING WORK

Several checks can be run while the oven is working:

A. ***During phase 1 / Delayed start on***
1. Pressing **TEMP.** (**17**) on the display (**11**) causes the current in-chamber temperature to appear.
- after a few seconds the display returns to its previous state.

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B. ***During temperature increase in phases 2/3/4/5 (oblique green segment illuminated)***

1. Pressing the red "°C" key (**8**) on the display (**11**) causes the temperature setting for the phase in progress at the time of checking to be displayed.

• after a few seconds the display returns to its previous state.

2. Pressing the red "**°C/MIN**" key (**9**) on the display (**11**) causes the temperature slew rate (expressed in °C/min) for the phase in progress at the time of checking to be displayed.

• after a few seconds the display returns to its previous state.

3. Pressing the red "**HR.MIN**" key (**10**) on the display (**11**) causes the holding (temperature stabilisation) time for the phase in progress at the time of checking to be displayed.

• after a few seconds the display returns to its previous state.

C. ***During the holding time in work phases 2/3/4/5 (horizontal green segment illuminated)***

1. Pressing the two red keys (**8**) and (**9**) causes that which is described in points B./1.2. to occur.

2. Pressing the red "**HR.MIN**" key (**10**) shows the hours and/or minutes remaining before the end of the current holding time.

NO ELECTRICAL POWER 7.14

A. ***During Phase 1 of delayed start***

If there is a mains power failure while the delayed start feature is functioning the buffer battery immediately comes on line so as to power the clock and thus prevent any postponement of operation.

The oven will, of course, only be able to come on and operate at the set time if, in the meantime, mains power has been restored.

If, instead, the timer comes to the end of its countdown and the mains power is still out, the oven will go to standby and begin the work cycle as soon as the mains power comes back on.

B. ***During temperature increase in phases 2, 3, 4, 5.***

If there is a mains power failure while the oven is working and heating in any of the four work phases the oven will recommence work starting from the work phase that was reached at the time of the power failure.

The oven will heat up to compensate for the drop in temperature that occurred during the blackout and will then run through the rest of its cycle.

C. ***During the holding time in work phases 2, 3, 4, 5***

If the power failure occurs during temperature stabilisation the following will occur once the power is restored:

1. if the power blackout has been brief and the melting chamber has not lost heat the oven will immediately start re-running the entire holding time.
2. if, instead, in-chamber temperature has dropped with respect to the setting the oven will reheat back to that temperature and then re-run the entire holding time.

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7.15 PROGRAMMING MODE FOR DM 4R OVENS

The programming mode for the ***DM 4R*** oven is exactly the same as on the ***DM*** oven.

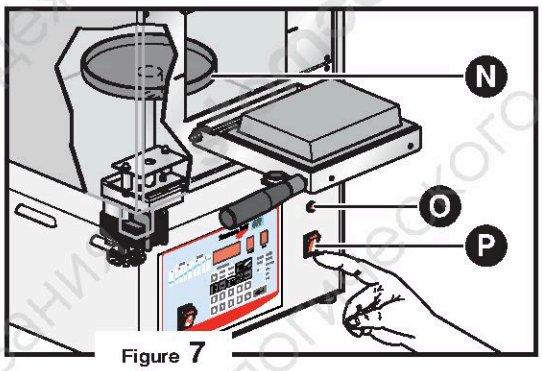


Figure 7

Fig. 7 : Make sure that the switch (**P**) to the right of the panel is turned downwards to position 0. This ensures that when the oven goes to Phase 2, the pan (**N**) starts turning and the red LED (**O**) comes on.

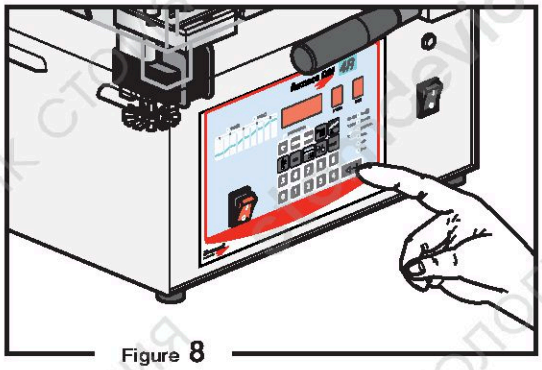

Figure 8

Fig. 8 : When the door is opened the pan stops. To bring it into the desired position act on the **ENTER** k e y .

7.16 RESIDUAL RISK

Residual risk is:
• a danger that cannot be completely eliminated through design and application of safety devices.
• a potential danger which cannot be highlighted.
DM series ovens reach very high temperatures and thus allow specific odontotechny materials to be fired; the residual risks thus consist of:
• accidental contact (and/or caused by a safety system fault) with the materials or the equipment itself, during and after the melting phase (risk of serious burns to limbs).
• inhalation of fumes or combustion gas caused by backflow from an incorrectly positioned aspiration tube.
• work carried out on the equipment interior by unauthorised personnel.

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The *DM* series oven is a equipment that could potentially cause an explosion or fire where users fails to observe the instructions given in this manual. Should you have any doubts or queries please do not hesitate to get in touch with the Manufacturer or an Authorised Servicing Centre.



The above-mentioned dangers are indicated by special labels attached to the equipment, as described in sub-section 3.7.1.

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CHAPTER 8: MAINTENANCE

8.1 CLEANING

The equipment exterior can normally be kept clean just by wiping it with a dry cloth.
If necessary, wet the cloth just a little water or use a non-degreasing detergent.
The operator must ensure that the equipment is kept clean and free from any foreign bodies such as dirt, water, non-conducting liquids etc.
The equipment must be cleaned at the end of every work session to remove all residues.
Cleaning must be done with the equipment at standstill and positioned in a stable manner.

Before cleaning the equipment exterior always turn the main switch to OFF. It is strictly forbidden to clean the equipment while it is connected to the mains power supply.

Never use inflammable, corrosive, alkaline or toxic liquids when cleaning the equipment.

Eye goggles and a face mask must be worn when using compressed air for cleaning purposes. Do not allow any persons near the equipment as they could be hit by flying dust.

8.2 ROUTINE MAINTENANCE

Once the equipment has been cleaned (see section 8.1) the operator must check for worn, damaged or loose parts. If any such anomalies are discovered contact your Authorised Servicing Centre.

Should any of the above anomalies be discovered it is strictly forbidden to restart the equipment before such faults have been set right.

More precisely, should the operator note any defects or problems of any kind whatsoever he/she must place a warning sign on the equipment indicating that maintenance work is in progress and that using the equipment is forbidden (EC-compliant signs can be purchased from the relevant suppliers).

Routine maintenance, cleaning and proper equipment use are essential factors in guaranteeing long-lasting equipment performance and safety.

Never use a naked flame to see what you are doing during checks or maintenance operations.

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Equipment safety devices/guards must never be removed except for repair and maintenance purposes.
Such items must be replaced as soon as the situation which led to their removal no longer exists and in any case before the equipment is used again.

UNSCHEDULED MAINTENANCE 8.3

All electrical and mechanical work must only be carried out by an authorised *Zhermack S.p.A.* maintenance technician.

Modifications which alter the equipment characteristics from a safety and risk prevention viewpoint may only be made by the Manufacturer who shall then issue a certificate stating that the equipment conforms to safety standards. Therefore any modification or maintenance tasks not actually described in this manual are to be considered forbidden. If the equipment is modified, tampered with or repaired by unauthorised personnel or non-original spare parts are used the manufacturer is relieved of all responsibility. If a maintenance task is required but is not described in this manual you must contact an Authorised Servicing Centre.

RESTARTING AFTER A LONG PERIOD OF INACTIVITY 8.4

Should the equipment be used after remaining idle for a long period proceed as described in Chap. 6 (start-up) and, if necessary, re-enter the data as described in Chap. 7.
If there are any faults or malfunctions proceed as described in Chapter 9 (Troubleshooting). If the problem persists or is not covered by the information in this chapter contact your Authorised Servicing Centre immediately.

REQUESTING TECHNICAL ASSISTANCE 8.5

To obtain technical assistance choose one of the following options:
1. contact your Authorised Servicing Centre.
2. telephone the ***Zhermack S.p.A.*** Customer Assistance Service on the number **+39 0425.597.611** and proceed as follows: give personal data (e.g. address and telephone n.), state the information on the equipment ID plate (see paragraph 3.3) and explain the problem clearly.
3. fax all the above information and a properly filled out ID Form (see Appendix 2) to **+39 0425.53.596**.

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CAPITOLO 9: TROUBLESHOOTING

9.1 WARNING

Should any of the anomalies described below occur try setting the situation right, as far as is permissible, by following the instructions contained in this handbook. Should the problem persist contact your Authorised Servicing Centre.

9.2 PROBLEMS, CAUSES AND REMEDIES

PROBLEM	CAUSE	REMEDY
After powering the equipment via the main switch the on-key LED fails to come on.	**1.** Plug is not connected to the mains socket. Power lead is damaged. **2.** Fuse blown.	**1.** Connect the plug to the mains socket properly. Have the power lead replaced by an Authorised Servicing Centre only. **2.** Change the fuse, using one of identical characteristics. Contact an Authorised Servicing Centre only.
Insufficient aspiration of combustion fumes and gases.	**1.** Aspirating fan full of dust or clogged.	**1.** Clean the aspiration fan or have it changed. Contact an Authorised Servicing Centre only.
Combustion fumes or gas exits aspiration fan flue or the mobile hood.	**1.** Obstruction in the oven aspiration fan flue or mobile hood is clogged.	**1.** Clear any obstruction from flue.
The legend “Door” appears on the display.	**1.** The door has accidentally been opened.	**1.** Re-close the door.
The buzzer sounds and the legend “tEmP” flashes on the display.	**1.** Temperature setting exceeded (see section 7.2 point B.). **2.** Thermocouple broken.	**1.** Reset the work cycle data. **2.** Change the thermocouple. Contact an Authorised Servicing Centre only.

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APPENDICES

CE DECLARATION OF CONFORMITY A.1

WARRANTY CERTIFICATE AND IDENTIFICATION FORM A.2

MAINTENANCE AND REPAIR WORKSHEET A.3

AUTHORIZED SERVICE PARTNERS A.4

NOTES A.5

CONTROL PANEL A.6

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A.1 DECLARATION OF CONFORMITY CE

The Manufacturer:

Zhermack S.p.A.
Via Bovazecchino, 100
45021 Badia Polesine • RO • Italy
Tel. +39 0425 597 611 • Fax +39 0425 53 596

Declares that the equipment described below:

furnace DM30 , furnace DM40 , furnace DM50 ,
furnace DM 4R , furnace DM 1 , furnace DM 1G

Conforms to the legislative dispositions established in the following laws:

· EC Directive 2004/108 EC (EMC Directive) and subsequent amendments.

· EC Directive 2006/95 (Low Voltage Directive) and subsequent amendments.

Please note that manufacturer's liability for damages caused by a defective product expires 10 years from the date in which the manufacturer put such product on the market and that such liability is transferred to the user as stated in EC Directive 85/374.

Badia Polesine, 16/01/2007

Tiziano Busin
Managing Director



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WARRANTY CERTIFICATE AND IDENTIFICATION FORM A.2

1. This document certifies that the Manufacturer has built the product correctly using only top quality materials, carried out all the necessary tests and that the product complies with EC directives. This product Warranty is valid for 12-months as from date of delivery to the customer. Proof of such date shall be provided by a purchase document or the completed identification form. These documents must be handed over together with the equipment to the Servicing Centre. Persons wishing to make use of warranty coverage must make the fault known within eight days of its discovery as per Italian civil code art. 1495. Warranty cover is limited to replacement or repair of individual components or pieces with manufacturing defects and does not cover costs related to transfer of technical personnel, transport, packing etc. Breakdowns, faults or damages which derive from poor maintenance, incorrect power supply, negligence, inexperience and other causes not imputable to the Manufacturer and parts subject to normal wear are not covered by the Warranty. The Warranty does not cover breakdowns caused by failure to carry out routine maintenance or customer negligence.
This Warranty does not provide for any awards for direct or indirect damages of any kind caused to persons or things by any equipment inefficiency.
2. The Warranty is instantly rendered null and void if the equipment is repaired, modified or tampered with by the purchaser or any unauthorised third parties.
Responsibility for damages caused by defective products expires 10 years after the Manufacturer puts them on the market: after such time damages are the user's responsibility, as stated in EC Directive 85/374.
3. To have work carried out under Warranty the purchaser must only contact the retailer, the Manufacturer-authorised servicing centres, or the Manufacturer.
The Warranty entitles the purchaser to free replacement of defective parts. It does not entitle the purchaser to replacement of the entire equipment.
4. In the event of disputes over application of the Warranty, the quality or condition of the equipment, the purchaser shall not suspend payment or delay payment of the price or price instalment.
5. The purchaser shall not be entitled to damages for any loss of production.
6. The Warranty is rendered null and void if:
- **a.** the equipment is damaged by a fall, exposed to fire, spilt liquids, lightning, natural disaster or any other cause not imputable to the Manufacturer.
- **b.** installation has not been carried out properly.
- **c.** power supply is incorrect (e.g. rated mains voltage incorrect). Erroneous mains connection (rated mains voltage incorrect), or failure to install proper protection devices.
- **d.** the serial number has been removed, cancelled out or altered.

7. Any components to be replaced under the terms of the Warranty shall be sent back to ***Zhermack S.p.A.*** which shall then send the appropriate spare parts. Should the changed part not be replaced it shall be charged to the person who ordered it.
8. The Manufacturer and the Dental Deposit are not required to provide replacement equipments while repairs are carried out.
9. Spare parts shall, for tax purposes, only be provided under warranty where the relevant limitations set out in the terms and conditions of the warranty are observed.
10. For any other eventuality not provided for by this Warranty Certificate and the regulations consult the Italian Civil Code.
11. Labour, travel and call-out invoices must be paid for on their receipt.
12. The manufacturer and the dealer shall comply with all data processing laws, including proper observance of data security standards in compliance with the specifications given in the data processing information sheet.

IDENTIFICATION FORM

EQUIPMENT MODEL:	**EQUIPMENT SERIAL NUMBER:** .....
PURCHASER:	**ADDRESS:** .....
TOWN / POSTCODE:	**TEL:** .....
TAX CODE / VAT NUMBER RETAILER:	**RETAILER:** .....
	PURCHASER'S SIGNATURE: .....

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A.3 MAINTENANCE AND REPAIR WORKSHEET

DATE	DESCRIPTION OF WORK	SIGNATURE

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AUTHORIZED SERVICE PARTNERS A.4

Please visit the page:

http://www.zhermack.com/Technical/Equipment/Authorized_service_partners.kl

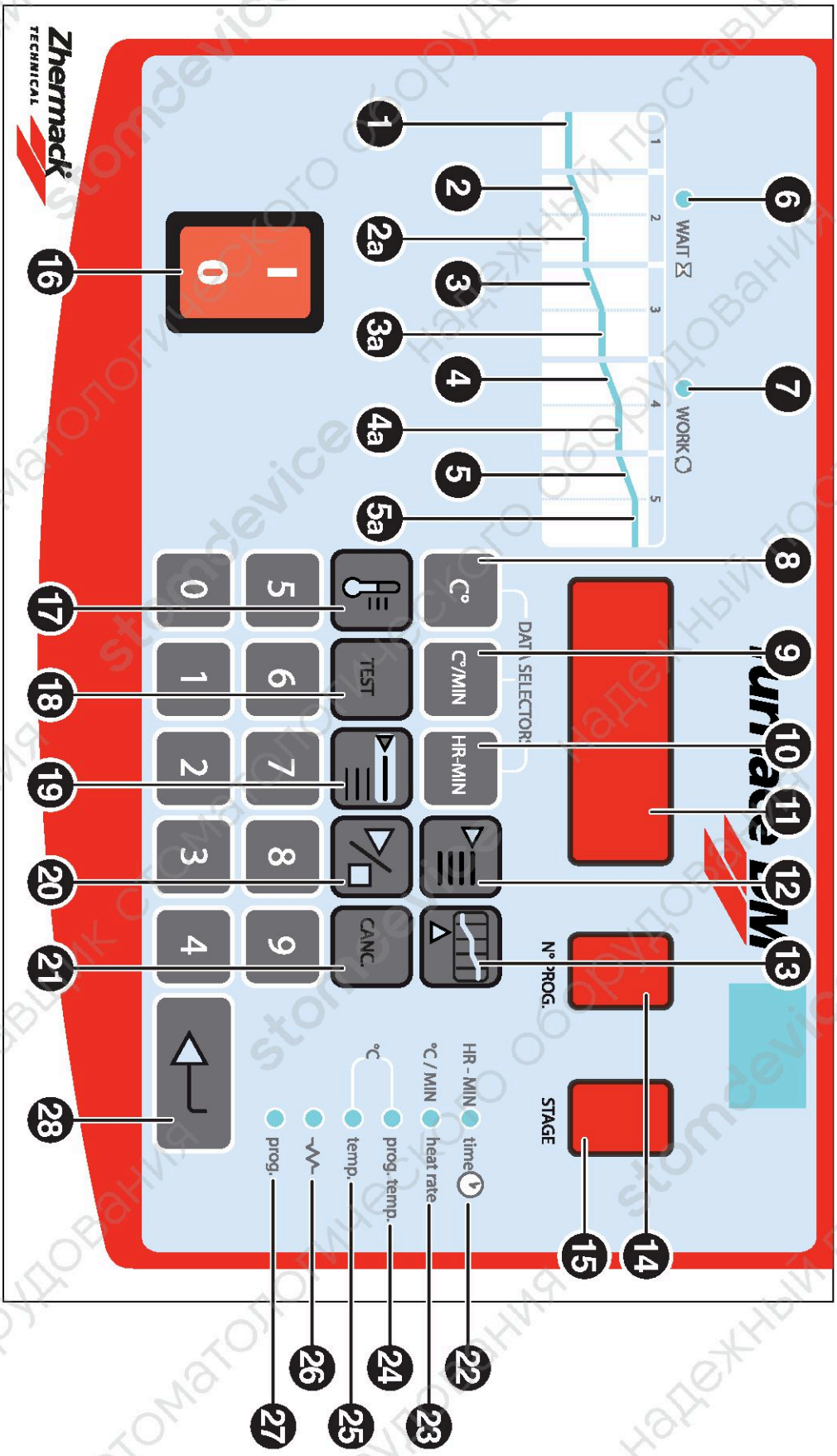
to check all the updated telephone numbers and addresses of the Authorized service partners.

NOTES A.5

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A.6 CONTROL PANEL



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www.tecnomedia.biz

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