POLARIS

Instruction Manual

Pre-heating Furnace

SUNNY THERM

Contents

Dear Customer

We thank you for your selectivity and trust in purchasing domestically produced products, and we are pleased that after continuous efforts, we have been able to manufacture Sunny therm device and put it at your disposal.

This product has been designed by our technical and engineering team of experienced and committed people in the fields of mechanical, electronics and computer engineering, and by utilizing updated technology and building upon 25 years of experience in manufacturing dental equipment, this product has reached production of export index quality.

In designing the product, three principles of accuracy, reliability and safety performance and also user friendly have been considered, so in order to correctly and completely utilize product features, we ask you to read the instruction manual carefully and if you have any questions or you need more information, contact the after-sales unit.

The instruction manual is a comprehensive reference for the efficient and safe use of the product. Following the instructions of this manual has a great role in reducing consumable costs, avoiding risks and ultimately increasing product life. The instruction manual should always be kept near the product and the user should periodically read it.
Please impart us with your constructive guidance, so that we can benefit from your comments, recommendations, and gain knowledge about your needs.

We hope that you will find using Sunny Therm to be an enjoyable and successful experience,
Polaris Engineering and Manufacturing

POLARIS Sunny Therm

Introduction

(1-1) How to use the manual

This manual presents the instructions about use, installation, and maintenance of Sunny Therme made by Polaris Co. It should be noted that:

• The product should be used according to the instructions of this manual. Thus, all parts of it should be read carefully before starting and installing the tool. Special attention should be paid to the highlighted parts. (see section 2-1).

• Observing the instructions of the manual assures the health and safe operation of the tool.

• Manual is an integral part of the product. Thus, it should always come with the product and should be used optimally as a reference for use during the operation of the product. It should be available even during the sale of the product, or even when it is not used.

• In case of losing or damaging the manual, get a replacement one from the after-sales service department of Polaris.

The following are explained in detail in this manual:
• Installation and start-up of the product
• Operation details of the product and its parts
• Maintenance program
• Primary safety and preventive details

(1-2) Terminology and signs

Knowledge of signs meanings is of great importance. A list of signs has been introduced in the following for initial recognition and reference to them if necessary.

Danger!
Indicates compulsory warnings.

Warning!
Indicates functional recommendations.

Forbidden!
Indicates forbidden activities.

Caution!
Refers to user instructions of the tool.

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General Information

(2-1) Company liabilities

Polaris Co. is not liable for any problem involving the following: Failure to follow the instructions of this manual (incorrect use of the product), repair by an unauthorized person and part replacement without coordination with the after-sales service department, failure due to power fluctuations.

(2-2) Guarantee

Guarantee of this product includes repairs, supply, and replacement. If used appropriately, the guarantee of Polaris Co will cover all main parts of the device for 18 month.

Following cases and parts are not covered by guarantee:
- power fluctuations
- incorrect transportation of device
- inappropriate and frequent use of device despite having obvious flaws
- not observing the maintenance instructions
- installation by unauthorized persons
- any repair or replacement by unauthorized persons.
- power cable
- power and keyboar buttons

Commutation fees of company representatives to install or repair during guarantee period will be received from buyer at site.

User is a representative from the buyer and the necessary instructions should be conveyed to him by the installation team. Generally, activities of a user consist of the following: working with the device according to user manuals, maintenance, and periodic inspections, registration and recording incorrect functions and notifying the after the sales unit.

Before completing the installation and ensuring the accuracy of productive components, the device is not ready to use.

It is strongly recommended that operator should be relatively dominant to the content of this manual. The cases of incorrect function in the device operation should be recorded and the after-sales department be notified by operator.

• Authorized representatives of Polaris Co.
These persons are endorsed by the company to work on the device under any operational circumstances. They are also authorized to do any electrical and mechanical adjustment/ repair, maintenance program and authorized parts replacement.

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Device Introduction

Preheating furnace is useful for all of the thermal operations on dental molded gypsum including removable prosthesis (cobalt chromium) and fixed prosthesis (porcelain), also in the other laboratory and industrial uses (other than dentistry) are applied.
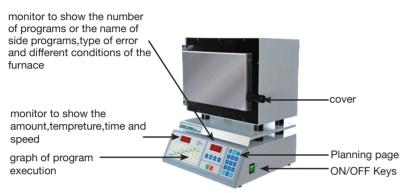
This electric furnace which is able to be planned and computerized control is used in order to plan controllable thermal cycles in thermal speed and adjustable temperature maintenance time and to prevent any unscientific function.

In many cases, it can be seen that after the completion of the work, plaster mold cracked or its precision has been missed. This is due to the lack of accurate and programmable furnace so that thermal shocks hit the mold. By using cylinder furnace, the size and shape of the mold will not be changed either.

Advantages of the device:

1 Programmable system and controllable with computer
2 Controlling of temperature, time and speed of heating in 3 steps
3 High speed and precision
4 Setting the machine and the program will be performed in idle time (programming the timer and performing the program after 100 hours)
5 Equipped with a warning system and technical violation detector
6 Equipped with an alarm system in different stages of performance during programing
7 Having10 memories for planning and implementing thermal cycles. The information of the system would not be missed in case of a power failure and power outages.
8 Showing of working stages with digital display and thermal curves
9 Potential for quick and easy service

(3-1) Main parts description

monitor to show the number of programs or the name of side programs,type of error and different conditions of the furnace

cover

monitor to show the amount,tempreture,time and speed

graph of program execution

Planning page

ON/OFF Keys

(3-2) Introducing the main components of the instrument panel

(3-2-1) display panel:

This is the most important part of the device for planning.

(3.2.2) the thermal graph:

Temperature Graph contains 10 parameters as follow:

1 Timer: This parameter determines the time of starting the furnace after finishing the intended time of the program from the start which is adjustable in minutes and seconds.

2 Heat Rate1: This parameter shows the warming speed from the initial temperature to Temp1 (It means that the furnace temperature will be increased at a rate of several degrees in °C or F in minute.) So that whenever the number becomes larger, the temperature speed will be faster.

3 Temp 1: Adjustable and programmable temperature for the first stage of heating or the final tempreture which is defined according to different materials of different companies.

4 Hold Time 1: The stop duration at temp1 which is adjustable in minutes and seconds.

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5 Heat Rate2: This parameter is the heat increase rate of the furnace temperature from Temp1 to Temp2.

6 Temp 2: the programmable temperature for the second stage of heating

7 Hold Time 2: The stop duration at temp2

8 Heat Rate3: This parameter is the heat increase rate of the furnace from Temp2 to Temp3.

9 Temp 3: the programmable temperature for the third stage of heating

10 Hold Time 3: Duration of a stop at temp3

(3.2.3) function keys:

POWER: To connect and disconnect the electric current. (besides the device)

ON / Off: The ON key is to turn on and the Off key is to turn off the device.

C° ⚲ F°   C / F: To convert temperatures from Celsius to Fahrenheit and vice versa.

PRG NO   PROGRAM NUMBER: To select the program number from 0 to 9.

PRG EDIT   PROGRAM EDIT: To view the parameters of the program and to change and modify them.

CLEAR   CLEAR: To erase the wrong values that they have been entered by mistake and to be used to turn off the alarm.

5   Key numbers: These keys are used to enter numbers and the parameter values.

ENTER ENTER: To record the entered numbers and parameter of the programs.

TIME TIME: To display the remaining time.

IDLE IDLE: To select the IDLE program. IDLE program is an adjustable program that is configured for pre-heating the furnace.

TONE TONE: To enable and disable the key sounds.

(3-2-4) Device Monitors:

Graphical Monitors: Actually, this curve is a thermal graph at three stages. The process of planning and executing a thermal cycle (heat functions) is shown on the monitor (by LED lights).

Digital Monitors: digital monitors on the left are to display the values of temperature, time and speed of warming.And the right monitor is to display the status of the furnace, the number of programs, types of errors or defects (alarms).

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Technical Features

POLARIS Sunny Therm Pre-heating Furnace

Technical specifications of the device

Dimensions of the Device:	
Cylinder Furnace I Cylinder Furnace II	445 mm (width) * 375 mm (Depth)* 490mm(height) 475 mm (width) * 425 mm (Depth)* 540 mm(height)
Chamber dimensions:	
Cylinder Furnace I Cylinder Furnace II	162 mm (width) * 164 mm (Depth)* 102 mm(height) 178 mm (width) * 225 mm (Depth)* 115 mm(height)
Maximum Temperature:	1150 ° C (2100 F)
Net Weights:	
Cylinder Furnace I Cylinder Furnace II	25 Kg 36 Kg
Cylinder Numbers:	
Cylinder Furnace I Cylinder Furnace II	4 6
Maximum power consumption:	1800 W (Sunny therm I) 2000 W (sunny therm II)
Functional Voltage	210-240 VAC 50/60 Hertz

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Transportation and installation

Upon receiving the product, make sure it is intact. If there is any damage or shortage of parts, inform Polaris Company and its carrier.

It is recommended that the original box is kept because it is needed for transporting the furnace safely. Also the box ensures the claim that a safe box has been used during transporting which prevents damage to the device.

Installation and Set up the Device

1 Take out the device carefully from its package. To do this, all of the surrounding protectors (EPS) are removed. Then, bring it out by taking the "bottom" of the furnace.Put it on the quite stable, flat and standard laboratory table. It is better to be a minimum 20 cm of empty space around the furnace. Note that the base or the surface of the table should not be made of metal.

If the base of the table is made of metal and in contact with the ground, There will be a risk of electric shock. So make sure your furnace is placed on a wooden or fiberglass table one or make sure that the earth wire is connected to the installation area.

2 Make sure of the resistance of the surface below the device against the heat. The surfaces sensitive to heat may lose their color by heat.

3 when there is not earth well, the earth wire of the device can be connected to the nearest heater tube (if it is made of metal) or water tube (if it is made of metal).

4 Keep the device away from direct sunlight.

5 Do not put objects or flammable substances next to the device.

6. While the device is working, do not put any object on the firing chamber.

7. Put the device in an appropriate place in order to prevent any problem in turning on and off the device.

8. The device is designed for indoor usage.

9. The permissible environmental conditions: temperature 15-40° C (59° F to 104° F), with a maximum rate of 75% humidity.

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Device Application

(6.1) Definition of 10 functional program

Put the rings inside the furnace.
Note: rings , cylinders or any substances or objects that you put in the furnace chamber, should not be too near or clung to the inside body of the thermal chamber (element wires).

Press the POWER button to turn on the device.

As mentioned before, SUNNY THERM (cylinder) is able to define and store ten independent programs.

For programming each of ten programs, please perform these stages as follow:

Before programming, the furnace should be at normal mode. So the right side monitor shows the word" Idle" and the left one shows the temperature of the furnace. For this purpose only click the STOP button.

• Click on Key PRG NO once
  Enter desired program number (0-9) by the number keys
• Click on the key PRG EDIT button

By chart or graphics display, insert the thermal cycle's stages as follows.

Timer: This parameter is used to activate the device timer. This parameter is based on time (hours & minutes). It can be programmed for a maximum of 100 hours (99:59). It means that after passing a preset time, the furnace will be automatically activated then will do the other steps. So enter the desired time and then press ENTER key.

Note: If you want to start the furnace immediately, enter zero for this time

Heat Rate 1: This parameter refers to the heating rate of furnace to reach the first temperature (STAGE 1). The furnace temperature will be increased at a rate of several degrees in ° C or F in min.). The maximum permissible value for this parameter

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is 15° C per minute or 59° F and at least one degree in a minute. Use the number keys to adjust the Parameter and then press ENTER.

Note: The actual Heat Rate is achieved through the dynamic structure of Muffle and the AC level. With the current dynamics of the furnace and 220V electricity, the maximum Heat Rate up to a temperature of 500° C is about 15° C per minute and up to 800° C is about 10° C to per minute and above the 800° C is about 5° C per minute.

STAGE 1: It is the temperature of the first stage. For example, enter 300° C and then click ENTER.

HOLD TIME 1: Duration of a stop at the first stage that is adjustable from 0 to 1:30 (GMT). For example, for drying the cylinder plaster enter 40 minutes.

Heat Rate 2: It is the speed of heating the furnace for increasing the temperature from the first heat to the second heat.

STAGE 2: It is the temperature of the second stage. Most of the time, it is used for removing wax (Burn out). For example, enter 500° C.

HOLD TIME 2: Duration of the stop at the second stage. For example, enter 45 to 60 minutes for the duration of the furnace stop at second heat.

HEAT Rate 3: It is the speed of heating the furnace for increasing the temperature from the second heat to the third heat. For example, enter 10.

STAGE 3: It is the final temperature and is for doing the PRE-HEATING, therefore increases the temperature for performing CASTING. For example, enter 900° C.

HOLD TIME3: Duration of the stop at the last stage. For example, enter the duration of 30 minutes (00:30).

Now, the programming has been done and by clicking the Start button it can be run automatically.

If you look at the left side of the graph, you can see that by implementing each phase of the program, a small flicker of lights shows the status and stage of the running program.
For example, if the furnace is warming to reach Stage1, a small light blinks Heat Rate1.

After reaching the final stage STAGE3 temperature and elapsing Hold Time3, for 10 seconds the alarm is heard, it shows that the work is ready.

Therefore, for using the cylinder and performing CASTING, furnace temperature will be automatically on the final heat for 60 min in order to let the operator enough time to perform the operation, in this while and every 15 minutes a voice will be heard and after passing 60 minutes the light of Cycle Complete turns on and the furnace temperature starts cooling down. It should be noted that the final stage of 60 minutes can be hindered and stopped by pressing the Stop button.

In order not to use the first and second stage of the two stages zero can enter numbers
As a result, the furnace will work with the third stage. Therefore, in the third step should be taken STAGE 3 However, the parameters of both the first and second zero can be entered.

(6-2) Idle program

This program is for heating the furnace temporary or drying the Muffle of the device. For this purpose, it is sufficient to follow the blow:

The word Idle means unemployment and it is used for keeping the furnace warm in the time of unemployment. The duration of implementing this program completely is 10 minutes. For furnace planning in Idle phase, first press the Idle key and then by pressing

PRG EDIT key, it goes into the memory. Please enter the temperature (up to 1000 ° C). Then press the ENTER button to let your number enter into the memory and to run by pressing the key STRAT.

Note: The speed of heating the HEAT RATE of this program has been set based on the maximum capacity of the furnace. Just press the STOP button to end the IDLE.

(6-3) Errors and Alarms of the System

Note: the operating and programming errors are always displayed in your device as Err, but, technical defects along with the sound of the alarm and AL words are displayed on the screen.

(6-3-1) Announced Errors during Programming:

ERR 1: If you do not register the program and want to run it, this message appears.

ERR 2: If you assign a number for a parameter that is not in the range of furnace operation, by pressing the ENTER key (to record it), this message will be displayed and the number will not be accepted.

To avoid facing with Error 2, the entered numbers and parameters should be in authorized range which is mentioned in listed on page 21. In case of error Err2 you can re-enter the correct number and press the Enter key.

If you enter the wrong number by mistake, press the Clear key or zero several times, therefore, the wrong number will be deleted.

 If you press the CLEAR key several times, you can

reversely move on the parameters curve of the program which is being edited. The reverse of this action can be done by pressing the STEP key.

(6-3-2) Announcing alarms during operation:

T-C:Occurs at the time of thermocouples failure or lack of proper connection in connector wires of thermocouples.

nUFL: occurs at the time of muffle burning or disconnection in the connector wire of thermocouple.

(6-4) Authorized range of the parameters

As it was noted before, the entered values for programming parameters should be within the authorized ranges. They are listed in the table below:

Parameter	Minimum	Minimum
Temperature	100° C	1100° C (2012° F)
Hold Time	0	(100 Hours) 99.59
Timer	0	(100 Hours) 99.59
Heat Rate	1	15° C 59° F

It is obvious that if these ranges are violated, the Err2 will appear on the display and your program will no longer be executable.

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Safety

(7-1) general safety

Polaris Co. makes use of high-quality raw materials for advanced production processes to promote the safety level. In addition to this, the device is tested repeatedly before shipment and is provided for the customer after the confirmation of the quality control unit.

> Before using the machine, be sure about the accuracy of all parts installation. The device should not be used in case of defects.

Following these instructions will increase the lifetime of the device:
- In case of power fluctuations or weak electricity, use an auto matic 2.5 KW transformer.
- It is recommended to use an independent 2 by 2 cable to supply the furnace.
- Avoid turning on/off the furnace frequently and in short spans of time.
- If the furnace doesn't turn on for any reason, wait for at least 1 minute, then press the Power button again.
- Read the operating instructions of the device before using the device.
- Technicians and those who are not trained to use this device are not authorized to use it and Polaris Co. won't be held liable for the wrong operation of the device ant resulting con- sequences.
- the consumer should waer suitable fireproofing gloves while using the device.

Don't clean the device with cleaning solutions while it is ON. Remove the rear cord when cleaning the device. Use common cleaning solutions. Never keep the panel surface wet for more than 1minute.

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Maintenance

(8-1) cleaning

To keep the device body clean, please use a dry cloth. Wet the cloth with little water or a non-greasy solution, if needed (only for body cleaning).

Users should make sure the device is kept clean and free of dust,water and other unexpected solutions.

At the end of each operation and when the device is on OFF mode and stable, cleaning should be done.

Only use dry clothes to clean the device.

Before cleaning of the external part of the device, always unplug the device.

When using the wind (air compressor) for cleaning, please use eye protection and face masks. In these circumstances do not allow anyone to stand near the device, because of the possibility of damage by particle there.

(8-2) periodic maintenance

Inspection and periodic cleaning of the device depends on the operation level. It is suggested for the user to inform the company experts about the workflow through consultation after installation and learn the appropriate time for an inspection and periodic cleaning from them. If the user detects any damage or exhaustion during periodic inspections, he/she should contact the after-sales department, so that measures are taken for maintenance and compulsory service.

Periodic service should be determined by the user and is performed by the after-sales service department. It is suggested that the maximum time interval for periodic repairs be 12 months.

If a user detects any defects or problems on the device, he/she should place a warning sign on the device to indicate that it is being maintained and it should not be used (EC warning signs can be purchased at the associated stores).

Cleaning, periodic maintenance and appropriate use of the device are important factors in lifetime and safety of it.

⊘ When any defect is seen in the device operation, it is forbidden to use the device before solving that defect.

⊘ Safety and protective parts of the device should never be removed from the device unless for repair and maintenance purposes.

(8-3) technical points of maintenance

According to the below image there is a 15A fuse related to the main power at the back of the device. if damaged,you can change it with a new fuse according to the information available on the device.

How to change the fuse of the sunny therm funace

Calling the aftersales services Unit of Polaris Co.

Tel: `+49 (0) 21033373500`   Fax: `+49 (0) 21033373550`

Web: `www.polarisgmbh.com`

Email: `Service@polarisgmbh.com`