Bi **Barnstead**International

Type F62700
Furnace
OPERATION MANUAL
AND PARTS LIST
Series 1276

Model No.	Voltage	Control	Display
F62730	220-240V	Single Set Point	°C
F62730-80	220-240V	Programmable	°C
F62730-33	220-240V	Single Set Point	°C
F62730-33-80	220-240V	Programmable	°C
F62734	100V	Single Set Point	°C
F62735	120V	SIngle Set Point	°C
F62735-80	120V	Programmable	°C

Table of Contents

IMPORTANT INFORMATION
This manual contains important operating and safety information. The user must carefully
read and understand the contents of this manual prior to the use of this equipment.

Safety Information

Alert Signals

 Warning
Warnings alert you to a possibility of personal injury.

 Caution
Cautions alert you to a possibility of damage to the equipment.

 Note
Notes alert you to pertinent facts and conditions.

 Hot Surface
Hot surfaces alert you to a possibility of personal injury if you come in contact with a surface during use or for a period of time after use.

This manual contains important operating and safety information. The user must carefully read and understand the contents of this manual prior to the use of this equipment.

Your Barnstead Thermolyne furnace has been designed with function, reliability, and safety in mind. It is the user's responsibility to install it in conformance with local codes. For safe operation, please pay attention to the alert signals throughout the manual.

Warnings

To avoid electrical shock, this furnace must:
1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.

2. Disconnect from the power supply prior to maintenance and servicing.

3. Have the door switch operating properly.

To avoid burns, this furnace must:
Not to be touched on the exterior or interior surfaces during use or for a period of time after use.

To avoid personal injury:
1. Do not use in the presence of flammable or combustible materials; fire or explosion may result. This device contains components which may ignite such materials.

2. Refer servicing to qualified personnel.

Please note the following WARNINGS:

WARNING

This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate preexisting respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

The insulating materials can be located in the door, the hearth collar, in the chamber of the product or under the hot plate top. Tests performed by the manufacturer indicate that there is no risk of exposure to dust or respirable fibers resulting from operation of this product under normal conditions. However, there may be a risk of exposure to respirable dust or fibers when repairing or maintaining the insulating materials, or when otherwise disturbing them in a manner which causes release of dust or fibers. By using proper handling procedures and protective equipment you can work safely with these insulating materials and minimize any exposure. Refer to the appropriate Material Safety Data Sheets (MSDS) for information regarding proper handling and recommended protective equipment. For additional MSDS copies, or additional information concerning the handling of refractory ceramic products, please contact the Customer Service Department at Barnstead International at 1-800-553-0039.

Introduction

Intended Use

The Type F62700 furnace is a general laboratory and heat treating furnace. For optimum element life, it is suggested that this furnace be used for applications requiring temperatures from 400°F (204°C) to 1600°F (871°C) for continuous use, or temperatures from 1600°F (871°C) to 1832°F (1000°C) for intermittent use. Continuous use is operating the furnace for more than 3 hours and intermittent use is operating the furnace for less than 3 hours.

The unit consists of: 1) muffle heating chamber, 2) a microprocessor control and 3) a door interlock relay for user safety.

General Usage

Do not use this product for anything other than its intended usage.

Principles of Operation

The furnace chamber incorporates a heating element that is embedded into the side walls and top and back of heating chamber. The ceramic fiber oval muffle with four heating surfaces creates even heat distribution within the chamber. The temperature is controlled by a microprocessor control with a type K Chromel/Alumel Thermocouple. A fan is provided in the furnace to provide forced air cooling for the temperature controller. A door safety switch removes power to the heating elements whenever the furnace door is opened.

General Specifications

MODEL NUMBER		F62730, F62730-80	F62730-33 F62730-33-80	F62734	F62735, F62735-80
OVERALL	**WIDTH**	23-1/2 (59.7 CM)	23-1/2 (59.7 CM)	23-1/2 (59.7 CM)	23-1/2 (59.7 CM)
DIMENSIONS	**HEIGHT**	16-1/4 (41.3 CM)	16-1/4 (41.3 CM)	16-1/4 (41.3 CM)	16-1/4 (41.3 CM)
IN. (CM)	**DEPTH**	18-3/4 (47.6 CM)	18-3/4 (47.6 CM)	18-3/4 (47.6 CM)	18-3/4 (47.6 CM)
CHAMBER	**WIDTH**	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)
DIMENSIONS	**HEIGHT**	7-1/2 (19.1 CM)	7-1/2 (19.1 CM)	7-1/2 19.1 CM)	7-1/2 19.1 CM)
IN. (CM.)	**DEPTH**	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)	11-1/2 (29.2 CM)
WEIGHT	**LBS. (KG)**	55 LBS (25 KG)	55 LBS (25 KG)	55 LBS (25 KG)	55 LBS (25 KG)
ELECTRICAL	**VOLTS**	220-240	220-240	100	120
RATINGS	**AMPS**	6.2	6.2	14.8	12.4
	WATTS	1488	1488	1488	1488
	FREQ. PHASE	50/60 1	50/60 1	50/60 1	50/60 1
MAXIMUM OPERATING TEMP.	**INTERMITTENT**	1832°F (1000°C)	1832°F (1000°C)	1832°F (1000°C)	1832°F (1000°C)
	CONTINUOUS	1600°F (871°C)	1600°F (871°C)	1600°F (871°C)	1600°F (871°C)

Environmental Conditions

Operating: 17°C - 27°C; 20% to 80% relative humidity, non-condensing. Installation Category II (over-voltage) in accordance with IEC 664. Pollution Degree 2 in accordance with IEC 664.

Altitude limit: 2,000 meters.

Storage: -25°C to 65°C; 20% to 80% relative humidity.

Declaration of Conformity

(for -33 models only)

Barnstead International hereby declares under its sole responsibility that this product conforms with the technical requirements of the following standards:

EMC:	EN 6100-3-2	Limits for harmonic current emissions
	EN 6100-3-3	Limits for voltage fluctuations and flicker
	EN 61326-1	Electrical equipment for measurement, control, and laboratory use; Part I: General Requirements
Safety:	EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use; Part I: General Requirements
	EN 61010-2-010	Part II: Particular requirements for laboratory equipment for the heating of materials

per the provisions of the Electromagnetic Compatibility Directive 89/336/EEC, as amended by 92/31/EEC and 93/68/EEC, and per the provisions of the Low Voltage Directive 73/23/EEC, as amended by 93/68/EEC.

The authorized representative located within the European Community is:

Electrothermal Engineering Ltd.
419 Sutton Road
Southend On Sea
Essex SS2 5PH
United Kingdom

Copies of the Declaration of Conformity are available upon request.

Unpacking

Visually check for any physical damage to the shipping container. Inspect the equipment surfaces that are adjacent to any damaged area. Open the furnace door and remove packing material from inside the furnace chamber. Vacuum the chamber prior to use to remove the insulation dust due to shipping.

The furnace is supplied with two hearth plates. Place the hearth plates on the bottom of the chamber.

Install ceramic sleeve into top vent hole on furnace case.

Retain the original packaging material if re-shipment is foreseen or required.

Installation

Caution
Be sure ambient temperature does not exceed 104°F (40°C). Ambients above this level may result in damage to the controller. Allow at least six inches of space between the furnace and any combustible surface. This permits the heat from the surface case to escape so as not to create a possible fire hazard.

Warning
Do not use in the presence of flammable or combustible chemicals. Fire or explosion may result; this device contains components which may ignite such materials.

Warning
To avoid burns, this furnace must not be touched on the exterior or interior furnace surfaces during use or for a period of time after use.

Site Selection
Install furnace on a sturdy surface and allow adequate space for ventilation.

The electrical specifications are located on the specification plate on the back of the furnace. Consult Barnstead International if your electrical service is different than those listed on the specification plate. Prior to connecting your Type F62700 furnace to your electrical supply, be sure the front power switch is in the "OFF" position.

General Operation

General Operation of Furnace

To avoid electrical shock, this furnace must:
1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.

2. Disconnect from the power supply prior to maintenance and servicing.

3. Have the door switch operating properly.

To avoid personal injury:
1. Do not use in the presence of flammable or combustible materials; fire or explosion may result. This device contains components which may ignite such material.

2. Refer servicing to qualified personnel.

3. Please note the following WARNINGS:

WARNING
This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate pre-existing respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

The insulating materials can be located in the door, the hearth collar, in the chamber of the product or under the hot plate top. Tests performed by the manufacturer indicate that there is no risk of exposure to dust or respirable fibers resulting from operation of this product under normal conditions. However, there may be a risk of exposure to respirable dust or fibers when repairing or maintaining the insulating materials, or when otherwise disturbing

them in a manner which causes release of dust or fibers. By using proper handling procedures and protective equipment you can work safely with these insulating materials and minimize any exposure. Refer to the appropriate Material Safety Data Sheets (MSDS) for information regarding proper handling and recommended protective equipment. For additional MSDS copies, or additional information concerning the handling of refractory ceramic products, please contact the Customer Service Department at Barnstead International at 1-800-553-0039.

Power Switch

Switch power switch to the "I" position. The switch will illuminate when power is on.

Fan

The fan located in the rear of the control section will run continuously as long as power is supplied to the furnace, even when the furnace power switch is OFF. This serves to remove residual heat after the furnace is turned OFF so the heat does not cause damage to sensitive electronic components.

Caution
If the power supply must be disconnected from the furnace at any time, be sure the chamber temperature is 500°C or less before doing so.

Cycle Indicator

The amber cycle light will illuminate whenever the power is being applied to the elements.

Door Safety Switch

The door safety switch removes power from the heating elements when the door is opened. Open and close door a few times, note that the amber cycle light will go out while the door is open. If this condition is not true, consult the troubleshooting section before proceeding.

Caution
To avoid electrical shock, this furnace must have the door switch operating properly.

Digital Readout

The Digital Readout continuously displays the chamber temperature.

Single Setpoint Model w/OTP

Output 1   Output 2   Temperature Display

Manual

Display Window

PAGE Button

UP ARROW Button

SCROLL Button   DOWN ARROW Button
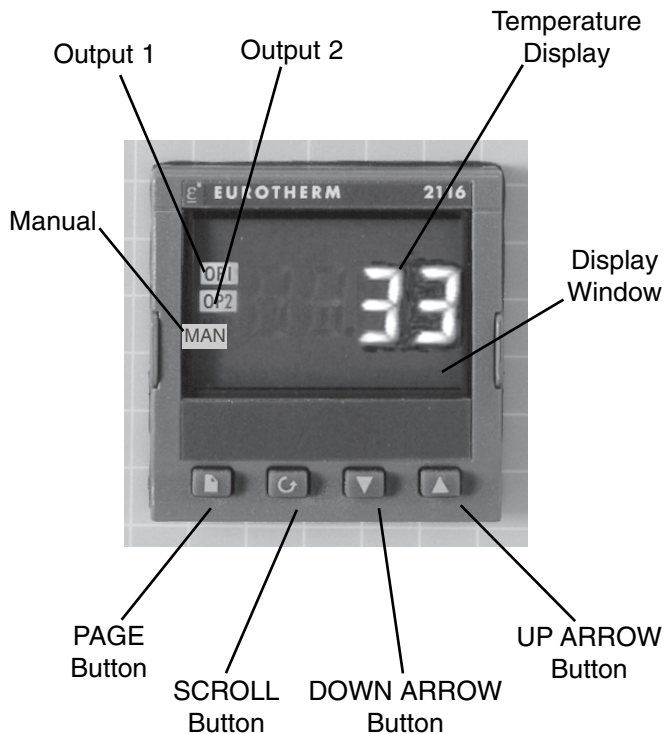
Single Setpoint Models

Note
If at any time you want to return to the HOME DISPLAY, simultaneously press PAGE and SCROLL buttons.

The **single setpoint model w/OTP** furnace controller is a single setpoint controller which provides a single digital display to indicate the current chamber temperature or setpoint temperature. This temperature controller features sensor break protection, self-tuning capability and over temperature protection (OTP) with an additional OTP relay device.

Basic Operation
When the controller is turned ON it will perform a short self-test and then display the measured value (process value) in the HOME DISPLAY.

Buttons and Indicators
OP1 (Output 1): Illuminates when the logic output is ON.

OP2 (Output 2): Illuminates when the relay output is ON (will go out during an alarm situation).

PAGE button: Allows you to select a new list of parameters.

SCROLL button: Allows you to select a parameter within a list of parameters.

DOWN button: Allows you to decrease a value.

UP button: Allows you to increase a value.

To View or Change the Setpoint
To view the setpoint, press and release the UP or DOWN buttons. If you want to change the setpoint, continue pressing until the desired setpoint value is displayed and then release the button. A few seconds after the button is released, the controller will accept the new value and revert to the HOME DISPLAY.

To View the Display Units
From the HOME DISPLAY press the SCROLL button. The display will show the temperature units in °C/F/K and then return to the HOME DISPLAY. (Call Customer Service if you require a different temperature unit.)

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To View the % Output Power

From the HOME DISPLAY press the SCROLL button twice. Press and release the UP or DOWN button to view the % output power. This value is a read-only value and cannot be changed.

Controller Parameters

Home display

°**C:** Temperature units in Celsius. Temperature units can not be changed without entering the configuration. Contact Customer Service if a different temperature unit is required.

OP: % output power demand.

IdHi: Deviation high alarm.

AI List

IdHi: Deviation high alarm.

Atun List

tunE: One-shot autotune enable.

Pid List

Pb: Proportional band (in display units).

ti: Integral time in seconds.

td: Derivative time in seconds.

ACCS List Code: Access code (Code needed to enter or change the other configuration parameters which are not normally accessible.) Not accessible.

Note
The following alarm messages are factory default settings and may vary if you have changed the configuration of your controller:

IDHi = 50°C
2FSH = 1025°C

Alarms
The controller will flash an alarm message in the home display if an alarm condition is detected.

2FSH: Measured value full scale high alarm.

IdHi: Measured value deviation high alarm.

S.br: Sensor break: check that sensor is connected correctly.

L.br: Loop break: check that the heating circuits are working properly.

Ld.F: Heater Circuit fault: indication of either an open or short solid state relay, a blown fuse, missing supply or open circuit heater.

Sensor Break Protection
This controller provides sensor break protection in the event the thermocouple opens. If an open thermocouple condition occurs, the digital display will blink "S.br" and the power to the heating element will be shut OFF (Cycle light will extinguish).

Over-Temperature Protection (OTP)
The OTP will be in effect during any alarm condition when the temperature of the furnace has deviated beyond the limit. The "Deviation High" alarm is the only alarm value which can be changed. To change it, press the SCROLL button until "IdHi" appears on the display. Press the UP or DOWN button to select the OTP value you desire. We recommend a value of 20° above your working temperature to provide protection for your workload.

In addition to over-temperature protection, units containing a single setpoint controller w/OTP feature a mechanical OTP relay device which disconnects power from the elements in an alarm condition.

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Note
Start tuning with the process at ambient temperature. This allows the tuner to calculate the low cutback and high cutback values more accurately.

Note
"Stat" and "Sp.rr" in Sp list must be set to OFF or "tunE" will not initiate.

Tuning

This controller incorporates a self-tuning feature which determines the optimum control parameters for the best temperature accuracy with your load and setpoint. Use this feature the first time you use your furnace and each time you change either your setpoint or the type of load you are heating. Barnstead|Thermolyne recommends you use this feature to provide the best temperature accuracy the controller can attain. To use the tuning feature:

1. Adjust the setpoint to your desired value.

2. Press the PAGE button until display reads, "Atun."

3. Press the SCROLL button. Display will read, "tunE."

4. Press the UP or DOWN button to select, "on."

5. Simultaneously press the PAGE and SCROLL buttons to return to the HOME DISPLAY. The display will alternately flash between "tunE" and the HOME DISPLAY while tuning is in progress.

6. The controller will then turn the heating on and off to induce an oscillation. When the measured value reaches the required setpoint the first cycle will end.

7. Tuning will be complete after two oscillation cycles and then the tuner will turn itself off.

8. Normal control function will resume after the controller calculates tuning parameters.

Single Ramp & Dwell

Note
These instructions are used with the Single Setpoint models with OTP only (See models listed on front page).
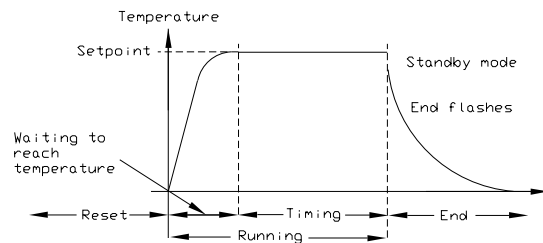
Mode 1 (Opt. 1)
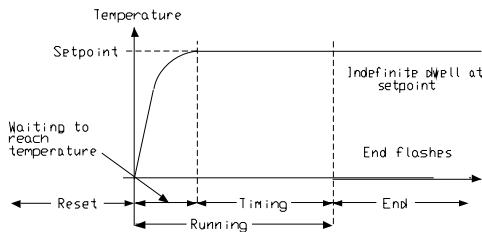
Mode 2 (Opt. 2)
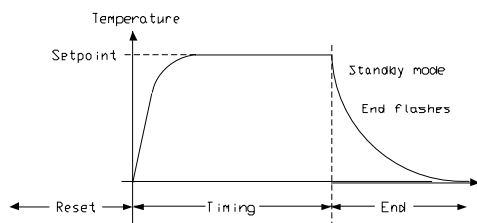
Mode 3 (Opt. 3)
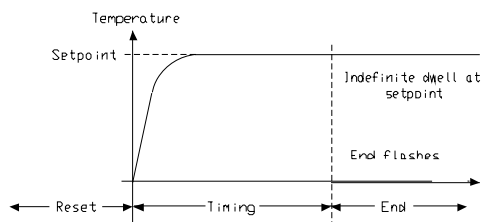
Mode 4 (Opt. 4)
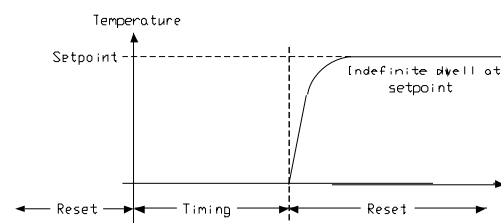
Mode 5 (Opt. 5)

Functions

This type of controller has single ramp and dwell programming capabilities. The Ramp and Dwell can be configured to five different modes.

1. Mode 1 (Opt. 1) is a Ramp (if needed) to the Setpoint temperature, a Dwell, and then a cool down.

2. Mode 2 (Opt. 2) is the same as mode 1, except the controller continues to heat at the Setpoint after the Dwell has completed. (This mode does not cool down.)

3. Mode 3 (Opt. 3) is the same as mode 1, except the Dwell time includes the Ramp (if needed).

4. Mode 4 (Opt. 4) is the same as mode 2, except the Dwell time includes the Ramp (if needed).

5. Mode 5 (Opt. 5) is a Dwell (delay time) before the controller Ramps (if needed) to the Setpoint temperature.

Program Overview

•   A program mode can be set by changing the "tm.OP" variable to "Opt. 1, Opt. 2, Opt. 3, Opt. 4, or Opt. 5.

•   A Ramp rate may be set by changing the "SPrr" variable to a value. The Ramp rate units are in degrees per minute.

•   The Dwell time can be set by changing the "dwEll" variable to the desired value. Dwell time units are in minutes.

•   The program Status can be set by changing the "StAt" variable to "run" or "oFF." This variable will start or stop the program.

Note
The program must be stopped and the controller must be displaying the actual temperature before beginning the Setup.

Program Setup

1.   Press the PAGE button until the "SP" is displayed.

2.   Press the SCROLL button once, "SPrr" (Ramp Rate) will be displayed, set the desired Ramp rate with the UP or DOWN buttons, if the ramp to setpoint feature is needed. If the Ramp rate is not needed, then set to "OFF" with the UP or DOWN buttons.

3.   Press the SCROLL button once, "tm.OP" (Ramp & Dwell mode) will be displayed, select the desired mode with the UP or DOWN buttons. (Opt. 1, Opt. 2, Opt. 3, Opt. 4, Opt. 5)

4.   Press the SCROLL button once, "dwEll" will be displayed, set the desired Dwell time with the UP or DOWN buttons. (Dwell in minutes.)

5.   Press the PAGE button until the Actual temperature is displayed.

Running the Program

1.   Press the SCROLL button until "StAt" is displayed, set to "run" with the UP or DOWN buttons.

2.   Press the PAGE button to display Actual temperature.

Stopping the Program

Press the SCROLL button until "StAt" is displayed, set to "oFF" with the UP or DOWN buttons.

Clearing the Flashing End

Press the PAGE and SCROLL buttons at the same time.

Verifying a Running Program

Press the SCROLL button until "StAt" is displayed. The display will show "run" if the program is running, or "oFF" if it is not running. Press the PAGE button to display Actual temperature.

8 Segment Programmable Model w/OTP

Note
The controller will return to the HOME DISPLAY if left idle for more than a few seconds.

Note
Once the desired parameter has been selected, depressing either the UP or DOWN button will change the parameter value. In all cases, the value shown on the display is the current working value of that parameter.

The **8 segment programmable** controller consists of a microprocessor based three-mode PID (Proportional, Integral, Derivative), programmable temperature controller with over-temperature protection and appropriate output switching devices to control the furnace. The digital readout continuously displays chamber (upper display) and setpoint (lower display) temperatures unless the SCROLL or PAGE button is depressed. The programmable controller can be used as a single setpoint controller or as a programmable controller. The 8 segment digital model enables eight segments of programming.

Basic Operation
When the controller is turned ON, it will perform a short self-test and then change to the HOME DISPLAY. The HOME DISPLAY shows the measured temperature (process value) in the upper display and the desired value (setpoint) in the lower display.
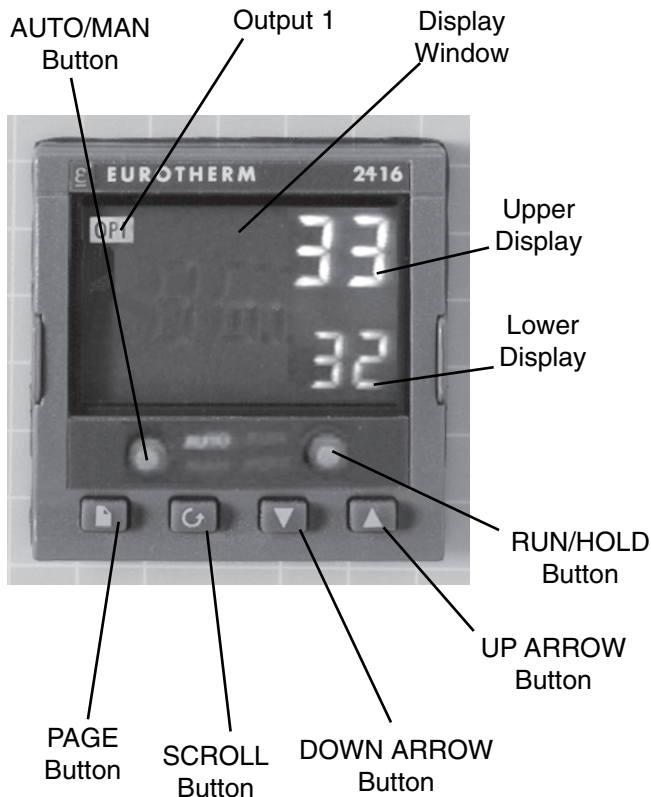
To Change the Setpoint
If you want to change the setpoint, press the UP or DOWN button until the desired setpoint value is displayed in the lower display and then release the button.

To View Display Units
From the HOME DISPLAY press the SCROLL button. The display will briefly show the temperature units in °C/F/K and then return to the HOME DISPLAY. (If you require a different temperature unit call Barnstead International Customer Service.)

To View the % Output Power
From the HOME DISPLAY press the SCROLL button twice. Press the UP or DOWN button to display the value. This value is a read-only value and cannot be changed.

AUTO/MAN Button
Output 1
Display Window
Upper Display
Lower Display
RUN/HOLD Button
UP ARROW Button
DOWN ARROW Button
SCROLL Button
PAGE Button

8 Segment Programmable Models with OTP

Buttons and Indicators

OP1 (Output 1): illuminates when the heating output of the temperature controller is on.

AUTO/MAN: (Auto/Manual Mode): when the controller is in the automatic mode the output automatically adjusts to keep the temperature or process value at the setpoint. The "AUTO" light will illuminate. The manual mode has been disabled through factory configuration. Call Customer Service for further information.

RUN/HOLD (Run/Hold button):
*   Starts a program when pressed once—RUN light illuminates.

*   Holds a program when pressed again—HOLD light illuminates.

*   Cancels hold and continues running when pressed again—HOLD light is off and RUN light illuminates.

*   Exits a program when the button is held down for two seconds—RUN and HOLD lights are off.

*   At the end of a program the RUN light will flash.

*   During holdback the HOLD light will flash.

PAGE button: allows you to choose a parameter from a list of parameters.

SCROLL button: allows you to choose a parameter within a list of parameters.

UP button: allows you to increase the value in the lower display.

DOWN button: allows you to decrease the value in the lower display.

Controller Parameters

Home Display

°C: measured temperature in Celsius. Temperature units cannot be changed without entering the configuration. Contact Customer Service if a different temperature unit is required.

OP: % output power demand; displayed in lower display (cannot be changed).

C.id: Controller identification number.

IdHi: Deviation High Alarm

tunE: One-shot autotune enable.

run LiSt (Program Run List)

StAt: Displays the program status [OFF, run (running active program), hoLd (program on hold), HbAc (waiting for process to catch up), End (program completed)] in the lower display. The controller will default to "OFF."

FASt: Fast run through program (no/YES). The controller will default to "no."

SEG.d: Flash active segment type in the lower display of the home display (no/YES). The controller will default to "no."

ProG LiSt (Program Edit List)

Hb: Press the UP or DOWN ARROW to select the hold-back type [OFF (disables holdback), Lo (deviation low holdback), Hi (deviation high holdback) or bAnd (deviation band holdback)] for the entire program. The controller will default to "OFF."

Hb.U: Press the UP or DOWN ARROW to select the holdback value (in display units).

rmP.U: Press the UP or DOWN ARROW to toggle between ramp units (SEc, min or Hour). Controller will default to "SEc."

dwL.U: Press the UP or DOWN ARROW to toggle between dwell units (SEc, min or Hour). Controller will default to "SEc."

Cyc.n: Press the UP or DOWN ARROW to set the number of program cycles (1 to 999 or cont). The controller will default to "cont."

SEG.n: Press the UP or DOWN ARROW to select the segment number (1-8 in 8 segment models).

tYPE: Press the UP or DOWN ARROW to select the segment type [End (end of program), rmP.r = ramp rate (ramp to a specified setpoint at a set rate), rmp.t = ramp time (ramp to a specified temperature in a set time), dwEll (to maintain a constant temperature for a set time), StEP (climb instantaneously from current to specified temperature). The controller will default to "End." Other parameters used with tYPE include; tGt target setpoint), Rate (rate of temperature increase) and dur (time to target setpoint or time to dwell)].

End.t: End segment type: dwELL (dwell continuous), rSEt (reset) and S OP (End Segment Output power level.
AL LiSt (Alarm List)
IdHi: Deviation High Alarm.

Atun LiSt: (Autotune List)
tunE: One-shot autotune enable.
drA: Adaptive tune enable.

drA.t: Adaptive tune trigger level in display units. Range = 1—9999.

Pid LiSt
G.SP (Gain Setpoint): Is the temperature at which the controller switches from the (SEt 1) PID values to the (SEt 2) PID values.

Pb: Proportional band in display units. (SEt 1)

ti: Integral time in seconds. (SEt 1)

td: Derivative time in seconds. (SEt 1)

Pb2: Proportional band. (SEt 2)

ti2: Integral time in seconds. (SEt 2)

td2: Derivative time in seconds. (SEt 2)

ACCS LiSt (Access List)
Access Code (Code needed to enter or change the other configuration parameters which are not normally accessible.) Call customer service if this configuration is required.

Note
The following alarm messages are factory default settings and may vary if you have changed the configuration of your controller:

IDHi = 50°C
2FSH = 1025°C

Alarms

The controller will flash an alarm message in the home display if an alarm condition is detected.

IdHi: PV deviation high alarm.

2FSH: PV full scale high alarm.

3FSL: PV full scale low alarm.

LCr: Load current low alarm.

HCr: Load current high alarm.

S.br: Sensor break: check that sensor is connected correctly.

L.br: Loop Break: Check that the heating circuits are working properly.

Ld.F: Heater Circuit Fault: indication of either an open or short solid state relay, a blown fuse, missing supply or open circuit heater.

SSr.F: Solid state relay failure indications in a solid state relay: indicates either an open or short circuit in the SSR.

Htr.F: Heater failure: Indication that there is a fault in the heating circuit: indicates either a blown fuse, missing supply or open circuit heater.

Sensor Break Protection

This controller provides sensor break protection in the event the thermocouple opens. If an open thermocouple condition occurs, the digital display will Blink "S.br" and the power to the heating element will be shut OFF (Cycle light will extinguish).

Over-Temperature Protection (OTP)

The OTP will be in effect during any alarm condition when the temperature of the furnace has deviated beyond the limit. The "Deviation High" alarm is the only alarm value which can be changed. To change it, press the SCROLL button until "idHi" appears on the display. Press the UP or DOWN button to select the OTP value you desire. We recommend a value of 20° above your working temperature to provide protection for your workload.

To Operate the Controller as a Single Setpoint Controller

1. Switch the circuit breaker to the "ON" position. The setpoint temperature presently set in the controller will appear in the lower display. (The upper display indicates the actual chamber temperature.)

2. To change the setpoint, press the UP or DOWN button until the desired setpoint value is displayed; then release the button.

3. The furnace will begin to heat if the new setpoint temperature is higher than the present chamber temperature.

Programming the Controller

The controller is capable of varying temperature or process value with time through programming. A program is stored as a series of segments and can be run once, repeated a set number of times or run continuously. To create a customized program using the controller parameters listed under "Controller Parameters" at the beginning of this section, follow the procedures outlined in the proceeding sections of this manual.

Hb: Holdback

Holdback consists of a value and a type. If the measured value lags behind the setpoint by an undesirable amount during a ramp or dwell, the holdback feature can be used to freeze the program at its current state (the HOLD light will flash). The program will resume when the error comes within the holdback value.

OFF: holdback is disabled.

Lo (Deviation Low Holdback): holds the program back when process variable deviates below the setpoint by more than the holdback value.

Hi (Deviation High Holdback): holds the program back when process variable deviates above the setpoint by more than the holdback value.

bAnd (Deviation Band Holdback): combines the features of the high and low deviation holdback in that it holds the program back when the process variable deviates above or below the setpoint by more than the holdback value.

Note
The value set in this parameter is always for the entire program.

To set the holdback type:
1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "Hb."

3. Press the UP or DOWN button to toggle between "bAnd, Hi, Lo and OFF."

Hb U: Holdback Value
To set the holdback value:
1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "Hb.U."

3. Press the UP or DOWN button to enter a holdback value.

rmP.U: Setting Ramp Units

Ramp units are time units which are used in "rmP.r" segments (ramp to a setpoint at degrees per second, minute or hour) and "rmP.t" segments (ramp to setpoint in a specific amount of time). See "Setting the Segment Type" for an explanation on how to set a ramp segment.

1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "rmP.U."

3. Press the UP or DOWN button to toggle between seconds, minutes and hours.

dwL.U: Setting Dwell Units

Dwell units are time units which are used in "dwELL" segments (amount of time to remain at a specific temperature). See "Setting the Segment Type" for an explanation on how to set a dwell segment.

1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "dwL.U."

3. Press the UP or DOWN button to toggle between seconds, minutes and hours.

CYC.n: Setting the Number of Cycles

Set the number of times a group of segments or programs are to be repeated by following the steps listed below.

1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "CYC.n."

3. Press the UP or DOWN button to select the number of cycles you want to run or, press the DOWN button to select "cont." so the program will run continuously.

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Note
The program ramp rate is designed to reduce the heatup rate or cooling rate that the furnace normally exhibits. When not using this feature, the furnace will operate at its maximum heating and cooling capability.

Note
When the program ramp has ended or has been reset, the furnace will continue to maintain setpoint temperature. It will not cool to ambient temperature unless the setpoint is set to ambient temperature by the program or by the operator.

Setting the Segment Type
There are five segment types. Proceed with the following steps according to the type of segment you have selected.

rmP.r (Ramp)
To ramp linearly at a set rate to a specified temperature:
1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "tYPE."

3. Press the UP or DOWN button until display reads, "rmP.r."

Steps 4 and 5 are used in the 4 program model only. If you are using an 8 segment program, skip to step 6.

4. Press the SCROLL button until display reads "Hb."

5. Press the UP or DOWN button to toggle between "bAnd, Hi, Lo and OFF."

6. Press the SCROLL button until display reads, "tGt."

7. Press the UP or DOWN button to set a target setpoint.

8. Press the SCROLL button until display reads, "rAtE."

9. Press the UP or DOWN button to select a value in ramp units (seconds, minutes or hours; set in the "rmP.U" parameter).

rmP.t
To ramp to a specified temperature at a set time:
1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "tYPE."

3. Press the UP or DOWN button until display reads, "rmP.t."

4. Press the SCROLL button until display reads, "tGt."

5. Press the UP or DOWN button to set a target setpoint.

6. Press the SCROLL button until display reads, "dur."

7. Press the UP or DOWN button to select a time in ramp units (seconds, minutes or hours; set in the "rmP.U" parameter.

dwEll
To maintain a constant temperature for a specified time:

1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "tYPE."

3. Press the UP or DOWN button until display reads, "dwEll."

4. Press the SCROLL button until display reads, "dur."

5. Press the UP or DOWN button to select a time in dwell units (seconds, minutes or hours; set in the "dwL.U" parameter).

StEP
To climb instantaneously from the current temperature to a specified temperature.

1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "tYPE."

3. Press the UP or DOWN button until the display reads, "StEP."

4. Press the SCROLL button until display reads, "tGt."

5. Press the UP or DOWN button to set a target setpoint.

End
To end or repeat a program:
1. Press the PAGE button until you reach the program list (ProG LiSt).

2. Press the SCROLL button until display reads, "tYPE."

3. Press the UP or DOWN button until display reads, "End."

4. Press the SCROLL button until display reads, "End.t."

5. Press the UP or DOWN button to toggle between "dwEll" (an indefinite dwell), "S OP" (End Segment Output Power) and "rSET" (reset).

Running a Program (8 Segment Programmable Models)
To run a program, press the RUN/HOLD button. (The RUN light will illuminate.)

Holding a Program
To put a running program on hold, press the RUN/HOLD button. (The HOLD light will illuminate.)

Cancelling a Program
To cancel a program, hold the RUN/HOLD button down until the RUN and HOLD lights go off.

Note
Display will flash "tu.ER" if an error occurs during tuning. To clear the error and restart tuning, simultaneously press the PAGE and SCROLL buttons and follow the steps outlined in "Autotuning."

Note
To stop the tuning function, simultaneously press the PAGE and SCROLL buttons.

Tuning

The purpose of tuning your furnace is to match the characteristics of your controller to the characteristics of the process being controlled. Good control is evidenced by: stable, straight-line control of the setpoint temperature with no fluctuations; No overshoot or undershoot of the setpoint temperature; rapid restoration of the setpoint temperature when external disturbances cause deviations from the setpoint.

This controller has automatic tuning features which install optimum tuning parameters to give the best temperature accuracy. No manual loading of tuning parameters is needed. We recommend that you tune the furnace to your specific application to obtain the best results. To provide the best temperature accuracy possible, use these features when you install your furnace and whenever you change your application or procedure.

Tuning Error

The display will flash "tu.ER" if an error occurs during tuning. To clear the error and restart tuning, simultaneously press the PAGE and SCROLL buttons and follow the steps outlined in "Autotuning."

G.SP: Gain Scheduling

Gain scheduling is the automatic transfer of control between two sets of PID values. The controller does this at a presettable process value. Gain scheduling is used for difficult control processes which show large changes in their response time or sensitivity at high or low temperatures, or when heating or cooling.

The G.SP gain schedule setpoint is factory set at 700° C. The G.SP must be adjusted to 200°C from the desired setpoint temperature when tuning.

Setting the Transfer Point

If gain scheduling has been enabled, "G.SP will appear at the top of the PID list. This sets the value at which the transfer will occur. When the process value is below this level, PID1 will be active and when it is above, Pid2 will

be active. Set a value between the control regions that show the greatest change to achieve the best point of transfer.

Tuning

The two sets of PID values can be manually set or automatically tuned. To tune automatically you must tune above and below the transfer point G.SP. If the process value is below the transfer point G.SP, the calculated values will automatically be inserted into the (SEt 1) set and if the process value is above G.SP, the calculated values will automatically be inserted into the (SEt 2).

Note
Start tuning with the process at ambient temperature. This allows the tuner to calculate the low cutback and high cutback values more accurately.

Autotuning

The Autotune feature automatically sets up the PID values in the control parameters to suit new process conditions.

To tune your furnace using autotuning:

1. Load your furnace with a load similar to your normal load and close the door.

2. Set the setpoint temperature.

3. Press the PAGE button until the display reads, "Atun LiSt."

4. Press the SCROLL button until "tunE OFF" is displayed.

5. Press the UP or DOWN button to select "on."

6. Simultaneously press the PAGE and SCROLL buttons to return to the HOME DISPLAY. The display will flash "tunE" while tuning is in progress.

Adaptive Tuning

Adaptive tuning continuously evaluates tuning parameters. Adaptive tuning automatically installs new values if better accuracy is possible. Adaptive tuning should be used when the characteristics of a process change due to load or setpoint changes or, in a process that can not handle the oscillation caused by a one-shot tune.

To tune your furnace using adaptive tuning:

1. Load your furnace with a load characteristic of those you intend to heat in it.

2. Press the PAGE button until display reads, "Atun LiSt."

3. Press the SCROLL button until "drA OFF" is displayed.

4. Press the UP or DOWN button to select "on."

5. Press the SCROLL button until "drA.t" is displayed.

6. Press the UP or DOWN button until the desired trigger value is achieved.

Furnace Loading

Caution
Do not overload your furnace chamber. If the load is to be heated uniformly it should not occupy more than the center two-thirds of the furnace chamber. Failure to observe this caution could result in damage to furnace components.

1. For best results use only the center 2/3 of the furnace chamber.

2. If you are heating a number of small parts, spread them throughout the center two-thirds of the furnace chamber.

3. Keep objects away from thermocouple.

4. Use insulated tongs and mittens when loading and unloading furnace.

5. Always wear safety glasses.

6. Use the hearth plates supplied to protect bottom of chamber. Part # PH421X1.

7. Do not exceed a load of 25 lbs. in the furnace chamber.

Preventative Maintenance

Please note the following WARNINGS:

WARNING

This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate pre-existing respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

The insulating materials can be located in the door, the hearth collar, in the chamber of the product or under the hot plate top. Tests performed by the manufacturer indicate that there is no risk of exposure to dust or respirable fibers resulting from operation of this product under normal conditions. However, there may be a risk of exposure to respirable dust or fibers when repairing or maintaining the insulating materials, or when otherwise disturbing them in a manner which causes release of dust or fibers. By using proper handling procedures and protective equipment you can work safely with these insulating materials and minimize any exposure. Refer to the appropriate Material Safety Data Sheets (MSDS) for information regarding proper handling and recommended protective equipment. For additional MSDS copies, or additional information concerning the handling of refractory ceramic products, please contact the Customer Service Department at Barnstead International at 1-800-553-0039.

This unit is equipped with a venting system on the top of the furnace. This is for the removal of fumes from the chamber of the unit. Contamination is a major cause of element failure, therefore, when possible remove the fume forming material before heating. (e.g., cleaning cutting oil from tool steel.)

Housekeeping is vital to your electric furnace - KEEP IT CLEAN. Run your furnace up to 871°C empty occasionally to burn off the contamination that may exist on the insulation and elements. Maintain 871°C for at least 4 hrs.

⚠ **Warning**
Disconnect from the power supply prior to maintenance and servicing. Refer servicing to qualified personnel.

to insure complete ashing of foreign materials.

Element life is reduced somewhat by repeated heating and cooling. If the furnace is to be used again within a few hours, it is best to keep it at the operating temperature or at a reduced level such as 260°C.

General Cleaning Instructions

Wipe exterior surfaces with lightly dampened cloth containing mild soap solution.

Troubleshooting

The Troubleshooting section is intended to aid in defining and correcting possible service problems. When using the chart, select the problem category that resembles the malfunction; then proceed to the possible causes category and take necessary corrective action.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The power light does not illuminate.	The furnace is not connected to power supply.	Check furnace connection to power source.
	ON and OFF power switch defective.	Replace power switch.
Fan does not operate.	The furnace is not connected to the power supply.	Check furnace connection to power source.
	Blown fuses.	Replace fuses.
The furnace does not heat.	No power.	Check power source and fuses or breakers.
	Thermocouple is open or thermocouple leads reversed.	Replace thermocouple or check thermocouple connections.
	Controller malfunction.	Verify and correct all parameters and configuration values. If malfunction persists, replace control.
	Element burned out.	Replace muffle (element).
	Solid state relay defective.	Replace solid state relay.
	Door switch malfunction.	Re-align or replace door switch.
Slow heatup.	Low line voltage.	Install line of sufficient size and proper voltage. (Isolate furnace from other electrical loads.)
	Heavy load in chamber.	Lighten load in chamber to allow heat to circulate.
	Wired improperly.	Check wiring diagram for correct wiring of your furnace.
	One side of element is burned out on 120V or 100V unit.	Replace muffle (element).

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Furnace doesn't stop heating when the door is opened.	Door switch is malfunctioning.	Re-align or replace door safety switch.
	Mechanized relay is malfunctioning.	Replace relay.
Repeated element burnout.	Heating harmful materials.	Clean up spills in and on chamber. Ventilate chamber by leaving top vent slightly open when heating known harmful reagents.
	Wrong element.	Install proper element.
	Oxidized thermocouple.	Replace thermocouple.
	Contamination present from previous burnout.	Clean and/or replace insulation material.
	Wired improperly.	Check wiring diagram for correct wiring of your furnace.
Inaccurate temperature readout.	Oxidized or contaminated thermocouple.	Replace thermocouple.
	Poor thermocouple connection.	Tighten connections.
	Solid state relay malfunction.	Replace solid state relay.
	Improper loading procedures.	Use proper loading procedures.
	Poor ventilation of base or cooling fan failed.	Clear area around furnace base or replace cooling fan.
	Control out of calibration.	Contact Barnstead International.
	Thermocouple connections reversed.	Reconnect thermocouple correctly.
	P.I.D. values invalid.	Re-tune control.
	Control malfunction.	Verify and correct all parameter and configuration values. If malfunction persists, replace control.

Maintenance and Servicing

Please note the following WARNINGS:

WARNING

This warning is presented for compliance with California Proposition 65 and other regulatory agencies and only applies to the insulation in this product. This product contains refractory ceramic, refractory ceramic fiber or fiberglass insulation, which can produce respirable dust or fibers during disassembly. Dust or fibers can cause irritation and can aggravate pre-existing respiratory diseases. Refractory ceramic and refractory ceramic fibers (after reaching 1000°C) contain crystalline silica, which can cause lung damage (silicosis). The International Agency for Research on Cancer (IARC) has classified refractory ceramic fiber and fiberglass as possibly carcinogenic (Group 2B), and crystalline silica as carcinogenic to humans (Group 1).

The insulating materials can be located in the door, the hearth collar, in the chamber of the product or under the hot plate top. Tests performed by the manufacturer indicate that there is no risk of exposure to dust or respirable fibers resulting from operation of this product under normal conditions. However, there may be a risk of exposure to respirable dust or fibers when repairing or maintaining the insulating materials, or when otherwise disturbing them in a manner which causes release of dust or fibers. By using proper handling procedures and protective equipment you can work safely with these insulating materials and minimize any exposure. Refer to the appropriate Material Safety Data Sheets (MSDS) for information regarding proper handling and recommended protective equipment. For additional MSDS copies, or additional information concerning the handling of refractory ceramic products, please contact the Customer Service Department at Barnstead International at 1-800-553-0039.

Warning
Disconnect from the power supply prior to maintenance and servicing. Refer servicing to qualified personnel. Replace fuses with the same type and rating.

Note
Perform only maintenance described in this manual. Contact an authorized dealer or our factory for parts and assistance.

Note
Make sure yellow thermocouple lead wire is connected to terminal V+ on back of the controller. Make sure red thermocouple lead wire is connected to terminal V- on back of the controller. Make sure the exposed section of the T/C lead wires are not contacting each other.

Fuse Replacement

a. Disconnect from power supply.

b. Set furnace on its door.

c. Remove (one piece) top, back and bottom cover.

d. Replace fuses.

Thermocouple Replacement (Type K)

a. Disconnect from power supply.

b. Set furnace on its door.

c. Remove (one piece) top, back and bottom cover.

d. Remove retaining clip from the thermocouple and pull the thermocouple straight out from the chamber.

e. Disconnect thermocouple lead ends from back of the controller and remove the thermocouple.

f. Reinstall thermocouple by reversing steps A through E.

Muffle (Heating Element) Replacement

a. Disconnect from power supply.

b. Set furnace on its door.

c. Remove (one piece) top, back and bottom cover.

d. Disconnect element lead wires from relays. (Note placement and connection of.)

e. Remove clip from thermocouple and pull thermocouple out of muffle.

f. Remove metal retaining band from defective muffle.

g.   Loosen top adjustment bracket and remove defective muffle.

h.   Insert new muffle with vent hole facing the top of unit.

i.   Readjust top bracket to fit snugly up against muffle. Make sure muffle is laying flush against front case section.

j.   Reinstall metal retaining band and tighten until muffle seats firmly into case section.

k.   Reconnect element lead wires.

On the 120V or 100V muffle there are three element lead wires. Connect the front and the back element lead wires to the mechanical relay. Connect the middle element lead wire to the solid state relay.

On the 230V and 240V muffles there are two element lead wires. Connect the front element lead wire to the mechanical relay. Connect the back element lead wire to the solid state relay.

l.   Reinstall the thermocouple and the retaining clip.

m.   Reinstall the cover section.

n.   Set the furnace upright and test the operation of the furnace.
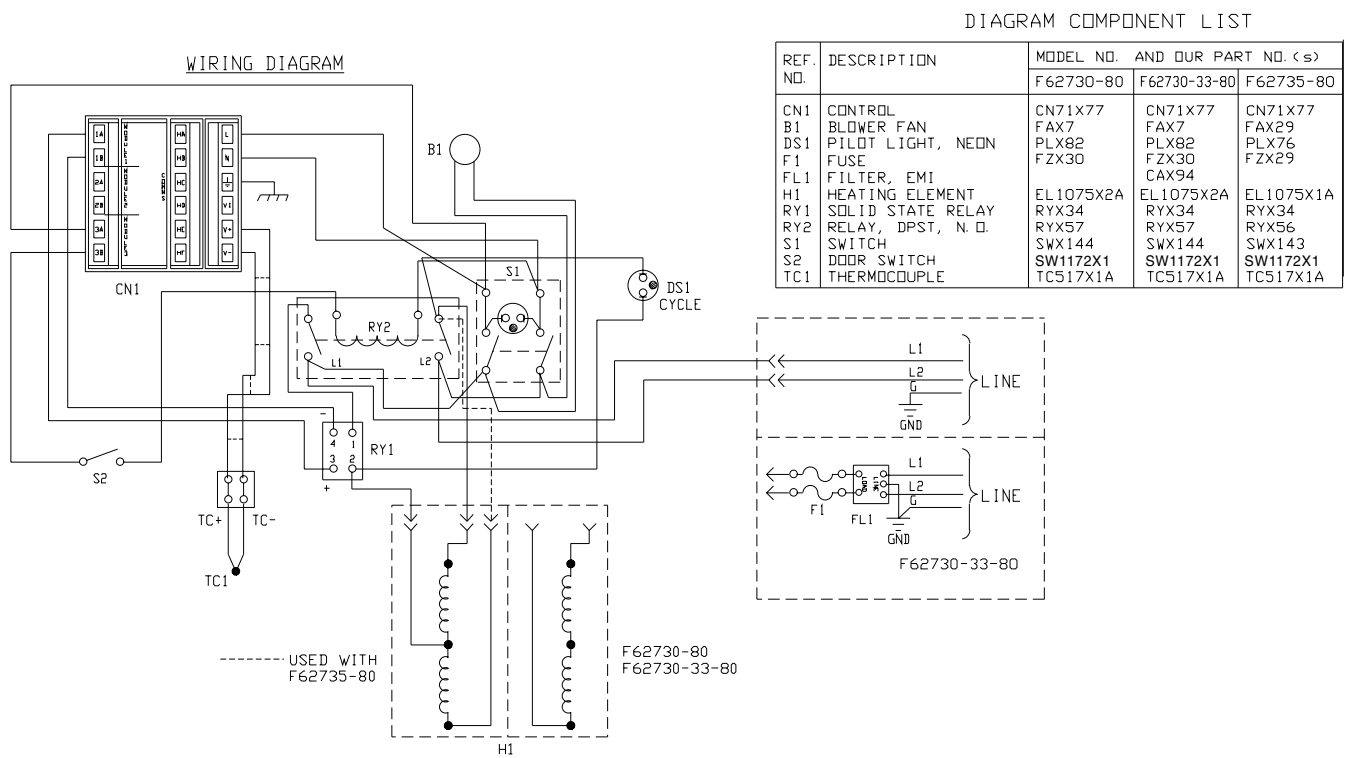
Note
Make sure the black insulation sleeving covers the exposed portion of the element lead wires.

Note
Make sure the exposed section of the T/C lead wires are not contacting each other.

Wiring Diagrams

Single Setpoint w/OTP Control

WIRING DIAGRAM

DIAGRAM COMPONENT LIST

REF. NO.	DESCRIPTION	MODEL NO. AND OUR PART NO. (s)			
		F62730	F62730-33	F62734	F62735
CN1	CONTROL	CN71X76	CN71X76	CN71X76	CN71X76
B1	BLOWER FAN	FAX7	FAX7	FAX29	FAX29
DS1	PILOT LIGHT, NEON	PLX82	PLX82	PLX76	PLX76
F1	FUSE	FZX30	FZX30	FZX29	FZX29
FL1	FILTER, EMI		CAX94		
H1	HEATING ELEMENT	EL1075X2A	EL1075X2A	EL1075X3A	EL1075X1A
RY1	SOLID STATE RELAY	RYX34	RYX34	RYX34	RYX34
RY2	RELAY, DPST, N. O.	RYX57	RYX57	RYX56	RYX56
S1	SWITCH	SWX144	SWX144	SWX143	SWX143
S2	DOOR SWITCH	SW1172X1	SW1172X1	SW1172X1	SW1172X1
TC1	THERMOCOUPLE	TC517X1A	TC517X1A	TC517X1A	TC517X1A

8 Segment Programmable Control

WIRING DIAGRAM

DIAGRAM COMPONENT LIST

REF. NO.	DESCRIPTION	MODEL NO. AND OUR PART NO.(s)		
		F62730-80	F62730-33-80	F62735-80
CN1	CONTROL	CN71X77	CN71X77	CN71X77
B1	BLOWER FAN	FAX7	FAX7	FAX29
DS1	PILOT LIGHT, NEON	PLX82	PLX82	PLX76
F1	FUSE	FZX30	FZX30	FZX29
FL1	FILTER, EMI		CAX94	
H1	HEATING ELEMENT	EL1075X2A	EL1075X2A	EL1075X1A
RY1	SOLID STATE RELAY	RYX34	RYX34	RYX34
RY2	RELAY, DPST, N. O.	RYX57	RYX57	RYX56
S1	SWITCH	SWX144	SWX144	SWX143
S2	DOOR SWITCH	SW1172X1	SW1172X1	SW1172X1
TC1	THERMOCOUPLE	TC517X1A	TC517X1A	TC517X1A

CN1

B1

S1

DS1 CYCLE

RY2

L1 L2

S2

RY1

TC+ TC-

TC1

USED WITH F62735-80

H1

F62730-80 F62730-33-80

L1
L2
G
GND
LINE

F1 FL1
L1
L2
G
GND
LINE

F62730-33-80

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Replacement Parts

Listed below are the common replacement parts for all models of the F62700 furnace.

PART	PART NO.
Temperature Control (Single Set Point Models)	CN71X76
Temperature Control (8 Segment Programmable Models)	CN71X77
Muffle Heating Element 100V	EL1075X3A
Muffle Heating Element 120V	EL1075X1A
Muffle Heating Element 220-240V	EL1075X2A
Solid State Relay	RYX34
Mechanical Relay 120V, 100V	RYX56
Mechanical Relay 220-240V	RYX57
On/Off Switch 120V	SWX143
On/Off Switch 220-240V	SWX144
Fan 120V, 100V	FAX29
Fan 220-240V	FAX7
Door Switch	SW1172X1
Thermocouple	TC517X1A
Door Insulation	JC517X1
Hearth Plate (2 required)	PH421X1
Pilot light, 100V & 120V	PLX76
Pilot light, 220-240V	PLX82
Door Assembly, with Insulation	DR1075X1A
Fuses, Type Non-Time lag, 250 Volt, 10 Amp (F62730 Models)	FZX30
Fuses, Type Non-Time lag, 250 Volt, 20 Amp (F62734, F62735 Models)	FZX29

⚠ **Warning**
Replace fuses with the same type and rating.

Ordering Procedures

Please refer to the Specification Plate for the complete model number, serial number, and series number when requesting service, replacement parts or in any correspondence concerning this unit.

All parts listed herein may be ordered from the **Barnstead International** dealer from whom you purchased this unit or can be obtained promptly from the factory. When service or replacement parts are needed we ask that you check first with your dealer. If the dealer cannot handle your request, then contact our Customer Service Department at 563-556-2241 or 800-553-0039.

Prior to returning any materials to **Barnstead International**, please contact our Customer Service Department for a "Return Materials Authorization" number (RMA). Material returned without an RMA number will be refused. Minimum invoice: $25.

Material Safety Data Sheet

Thermal Ceramics
Material Safety Data Sheet

Date Revised: 7/2/91

PRODUCT IDENTIFICATION

Trade Name(s):   CERAFIBER
Generic Name: REFRACTORY CERAMIC FIBER INSULATION   **CAS #:**   65997-17-3
Chemical Name: ALUMINA SILICA   **Formula:**   MIXTURE
Manufacturer: Thermal Ceramics   **Telephone:** (404) 796-4200
Address: P.O. BOX 923, 2102 Old Savannah Road
City: Augusta   State: Georgia Zip: 30903

PRODUCT INGREDIENTS

Ingredient Name	Cas Number	%	PEL and TLV (except as noted)
REFRACTORY CERAMIC FIBER	**65997-17-3**	**100**	**1 FIBER/CC EXPOSURE GUIDELINE 5mg/M3 -** NUISANCE RESPIRABLE - OSHA 10mg/M3 - NUISANCE TOTAL - ACGIH
CRYSTALLINE SILICA (CRISTOBALITE) WILL FORM "AFTER SERVICE" AT TEMPERATURES >1000°C.	14464-46-1	>20	0.05 mg/M3 - OSHA Respirable Dust

PHYSICAL DATA

Appearance and Odor: WHITE FIBER-NO ODOR.
Boiling Point: NA   **Evaporation Rate (NA = 1):**   NA
Vapor Pressure: NA   **Specific Gravity (water = 1):** 2.6
Water Solubility (%):   NIL   **Melting Point:** >3000°F
Vapor Density (Air= I):   NA   **% Volatile by Volume:** 0

FIRE AND EXPLOSION DATA

Flash Point (Method):   NONFLAMMABLE   **NFPA Flammable/Combustible Liquid**
Classification: NA   **Flammable Limits: LEL: NA %   UEL: NA %**
Auto-Ignition Temperature: NA

HEALTH HAZARDS

Summary/Risks

Summary: EXPOSURE TO DUST FROM THIS PRODUCT SHOULD BE MINIMIZED. ANIMAL INHALATION AND ARTIFICIAL IMPLANTATION STUDIES HAVE REPORTED THE DEVELOPMENT OF TUMORS. BASED ON PRELIMINARY RESULTS, A NOTICE OF SUBSTANTIAL RISK HAS BEEN FILED WITH THE EPA ACCORDING TO SECTION 8(e) OF THE TOXIC SUBSTANCES CONTROL ACT. BASED ON ANIMAL STUDIES, IARC HAS CLASSIFIED RCF AS POSSIBLY CARCINOGENIC FOR HUMANS (2B). DATA FROM HUMAN EPIDEMIOLOGICAL STUDIES IS INSUFFICIENT. THIS SUBSTANCE OR MIXTURE HAS NOT BEEN CLASSIFIED A CARCINOGEN BY NTP OR OSHA.

Medical conditions which may be aggravated: AS WITH ANY DUST, PRE-EXISTING UPPER RESPIRATORY AND LUNG DISEASES MAY BE AGGRAVATED.

Target Organ(s): LUNGS, SKIN AND EYES .

Acute Health Effects: PRODUCT IS A MECHANICAL IRRITANT TO SKIN, EYES AND UPPER RESPIRATORY SYSTEM.

Chronic Health Effects: EXCESSIVE EXPOSURE TO RCF DUSTS AND AFTER SERVICE FIBERS MAY CAUSE LUNG DAMAGE (FIBROSIS). IARC STATES THERE IS SUFFICIENT EVIDENCE IN ANIMALS AND LIMITED EVIDENCE IN HUMANS TO CLASSIFY CRYSTALLINE SILICA AS A PROBABLE CARCINOGEN (2A) AND RCF AS A POSSIBLE CARCINOGEN (2B).

Primary Entry Route(s): INHALATION, SKIN AND EYE CONTACT.

Signs/Symptoms of Overexposure

Inhalation: IRRITATION OR SORENESS IN THROAT & NOSE. IN EXTREME EXPOSURES SOME CONGESTION MAY OCCUR.

Skin Contact: TEMPORARY IRRITATION OR RASH.

Skin Absorption: NA

Ingestion: NOT HAZARDOUS WHEN INGESTED. MAY CAUSE TEMPORARY IRRITATION TO GI TRACT.

Eyes: TEMPORARY IRRITATION OR INFLAMMATION.

First Aid/Emergency Procedures

Inhalation: REMOVE TO FRESH AIR. DRINK WATER TO CLEAR THROAT AND BLOW NOSE TO EVACUATE FIBERS.

Skin Contact: WASH AFFECTED AREAS GENTLY WITH SOAP AND WARM WATER.

Skin Absorption: NA

Ingestion: NA

Eyes: FLUSH EYES WITH COPIOUS QUANTITIES OF WATER. IF IRRITATION PERSISTS CONSULT A PHYSICIAN.

REACTIVITY DATA

MATERIAL IS STABLE.   **HAZARDOUS POLYMERIZATION CANNOT OCCUR.**

Chemical Incompatibilities: HYDROFLUORIC ACID

Conditions to Avoid: NONE IN DESIGNED USE.

Hazardous Decomposition Products: NONE

SPILL OR LEAK PROCEDURES

Procedures for Spill/Leak: VACUUM CLEAN DUST WITH EQUIPMENT FITTED WITH HEPA FILTER. IF SWEEPING IS NECESSARY USE A DUST SUPPRESSANT.

Waste Management: WASTES ARE NOT HAZARDOUS AS DEFINED BY RCRA (40 CFR PART 261). COMPLY WITH FEDERAL, STATE & LOCAL REGULATIONS. METHOD OF DISPOSAL - LANDFILL. RQ - N/A.

SPECIAL PROTECTION INFORMATION

Goggles: GOGGLES OR SAFETY GLASSES WITH SIDE SHIELDS ARE RECOMMENDED.

Gloves: GLOVES ARE RECOMMENDED.

Respirator: <1 F/CC, USE 3M 9900; <10 F/CC, USE MSA COMFO II WITH H FILTER; <50 F/CC, USE MSA ULTRA-TWIN H FILTER; OR EQUIVALENTS. SEE SECTION IX-OTHER.

Ventilation: USE SUFFICIENT NATURAL OR MECHANICAL VENTILATION TO KEEP DUST LEVEL TO BELOW PEL/TLV/WEG (WORKPLACE EXPOSURE GUIDELINE) USE DUST COLLECTION WHEN TEARING OUT.

Other: WEAR LOOSE FITTING, LONG SLEEVED CLOTHING. WASH EXPOSED AREAS WITH SOAP & WARM WATER AFTER HANDLING. WASH WORK CLOTHES SEPARATELY FROM OTHER CLOTHING; RINSE WASHER THOROUGHLY.

Special Considerations for repair/maintenance of contaminated equipment: CRISTOBALITE RESPIRATOR: <10X PEL, USE 3M 9900; <100X PEL, USE MSA ULTRA-TWIN H FILTER; OR EQUIV. SEE SEC IX-OTHER.

SPECIAL PRECAUTIONS

*** ALWAYS SEGREGATE MATERIALS BY MAJOR HAZARD CLASS ***

THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Storage Segregation Hazard Classes: IRRITANT

Special Handling/Storage: KEEP MATERIAL DRY.

Special Workplace Engineering Controls: ADEQUATE VENTILATION TO KEEP DUST LEVEL TO BELOW PEL/TLV/WEG (WORKPLACE EXPOSURE GUIDELINE).

Other: ADDITIONAL INFORMATION ON THE HEALTH AND SAFETY ASPECTS OF REFRACTORY CERAMIC FIBERS IS AVAILABLE.

MSDS/MSD3 FORM REV. 7/2/91

Two Year Limited Warranty

BARNSTEAD INTERNATIONAL ("BARNSTEAD") warrants that a product manufactured by Barnstead shall be free of defects in materials and workmanship for two (2) year from the first to occur of (i) the date the product is sold by BARNSTEAD or (ii) the date the product is purchased by the original retail customer (the "Commencement Date"). Except as expressly stated above, BARNSTEAD MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCTS AND EXPRESSLY DISCLAIMS ANY AND ALL WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF DESIGN, MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

An authorized representative of BARNSTEAD must perform all warranty inspections. In the event of a defect covered by BARNSTEAD's warranty, BARNSTEAD shall, as its sole obligation and exclusive remedy, provide free replacement parts to remedy the defective product. In addition, for products sold by BARNSTEAD within the continental United States or Canada, BARNSTEAD shall provide provide free labor to repair the products with the replacement parts, but only for a period of ninety (90) days from the Commencement Date.

BARNSTEAD's warranty provided hereunder shall be null and void and without further force or effect if there is any (i) repair made to the product by a party other than BARNSTEAD or its duly authorized service repre-sentative, (ii) misuse (including use inconsistent with written operating instructions for the product), mishan-dling, contamination, overheating, modification or alteration of the product by any customer or third party or (iii) use of replacement parts that are obtained from a party who is not an authorized dealer of BARNSTEAD.

Heating elements, because of their susceptibility to overheating and contamination, must be returned to the BARNSTEAD factory and if, upon inspection, it is concluded that failure is due to factors other than excessive high temperature or contamination, BARNSTEAD will provide warranty replacement. As a condition to the return of any product, or any constituent part thereof, to BARNSTEAD's factory, it shall be sent prepaid and a prior written authorization from BARNSTEAD assigning a Return Materials Number to the product or part shall be obtained.

IN NO EVENT SHALL BARNSTEAD BE LIABLE TO ANY PARTY FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR FOR ANY DAMAGES RESULTING FROM LOSS OF USE OR PROFITS, ANTICIPATED OR OTHERWISE, ARISING OUT OF OR IN CONNECTION WITH THE SALE, USE OR PERFORMANCE OF ANY PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CON-TRACT, TORT (INCLUDING NEGLIGENCE), ANY THEORY OF STRICT LIABILITY OR REGULATORY ACTION.

The name of the authorized Barnstead International dealer nearest you may be obtained by calling 1-800-446-6060 (563-556-2241) or writing to:

BarnsteadInternational

Your Lab Starts Here

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