



Advanced Test Equipment Corp.

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Isotemp[®] Programmable Ovens 800 Series

Model 825F (Small)

Catalog # 13-247-825F & -825FC - Domestic

Catalog # 13-247-826F & -826FC - International

Model 838F (Medium)

Catalog # 13-247-838F & -838FC - Domestic

Catalog # 13-247-839F & -839FC - International

Model 851F (Large)

Catalog # 13-247-851F & -851FC - Domestic

Catalog # 13-247-852F & -852FC - International

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Introduction

Fisher Isotemp 800 Series forced air, programmable ovens are available in three sizes: small (Model 825), medium (Model 838) and large (Model 851). All models provide PID microprocessor control at operating temperatures ranging from 50°C (122°F) to 325°C (617°F).

The system microprocessor permits the user to customize one to four programs, each containing up to 24 steps. The user can program ramps, soaks or jumps between steps. The programs are stored in non-volatile memory to preserve their contents.

Temperature readouts and control parameters are shown on 7-segment, red, light-emitting diode (LED) displays. Two additional LEDs indicate when heater power is being applied or an over temperature condition is encountered.

The Model 825 accommodates a maximum of five shelves. The Models 838 and 851 hold eight and eleven shelves, respectively.

Isotemp ovens incorporate a variety of safety features. A safety backup is built into the controller software. If the primary heater control fails, the backup will maintain control at 5°C above the set point. A circuit breaker protects the oven from power surges.

Specifications

Performance Characteristics

Operating Range	50 to 325°	
Average Uniformity @ 200°*	±2°C	
Resolution	1°C	
Control Sensitivity	±0.25°C	
Recovery Time @ 200°C		
Model 825	1.5 minutes	
Model 838	1.5 minutes	
Model 851	3.5 minutes	
Average Rise Time to 325°C		
Model 825	60 minutes	
Model 838	40 minutes	
Model 851	40 minutes	
Air Exchanges		
Model 825	61/hr	
Model 838	41/hr	
Model 851	31/hr	
BTU/hr Output	@ 100°C	@ 200°C
Model 825	1085	2650
Model 838	1355	3380
Model 851	1690	3950

*as per ASTM E-145

Power Requirements

Models 825	1800 W
Models 838	3300 W
Models 851	3300 W

Chamber Volumes

Models 825	2.5 cu ft
Models 838	3.8 cu ft
Models 851	5.0 cu ft

Chamber Dimensions (W x D x H)

Models 825	18 x 18 x 13.5 in
Models 838	18 x 18 x 20 in
Models 851	18 x 18 x 26.5 in

Electrical Requirements

Model 825		
Cat. No. 13-247-825F/FC	120 V, 50/60 Hz	
Cat. No. 13-247-826F/FC	240 V, 50/60 Hz	
Model 838		
Cat. No. 13-247-838F/FC	240 V, 50/60 Hz	
Cat. No. 13-247-839F/FC	240 V, 50/60 Hz	
Model 851		
Cat. No. 13-247-851F/FC	240 V, 50/60 Hz	
Cat. No. 13-247-852F/FC	240 V, 50/60 Hz	

Installation

Selecting a Location

Choose a location for the oven that will provide an area of approximately four square feet (2 ft x 2 ft). The bench or table selected must be capable of supporting at least 115 lbs for the Model 825, 120 lbs for the Model 838, or 130 lbs for the Model 851. A minimum 2 inch air space is needed around the unit. Appropriate electrical power must be available. Locate the oven within three feet of the power outlet so that no extension cord is required.

Unpacking

Fisher Isotemp® Ovens are shipped in a single carton. After unpacking, locate each item shown in the list below. Report any missing items, by name and part number, to your Fisher branch or representative. In the event of shipping damage, retain the carton and packing material and file a claim with the final carrier.

Item

Oven Assembly

- Models 825 (small)
 - 120 V (domestic)
 - 240 V (international)
- Models 838 (medium)
 - 240 V (domestic)
 - 240 V (international)
- Models 851 (large)
 - 240 V (domestic)
 - 240 V (international)

Shelves

- Models 825 and 838 (one provided)
- Models 851 (two provided)

Shelf Supports

- Models 825 and 838 (two provided)
- Models 851 (four provided)

Instruction Manual

Warranty Card

**Caution**

See data plate on oven for voltage, current and line frequency specifications. Check that the power requirements of the oven will not overload the circuit to which it will be connected.

Preparing the Oven

To prepare the oven for operation, perform the following procedures:

1. Install the shelf(ves).
2. Make certain all packing material has been removed from oven chamber.
3. Connect the line cord to an appropriate electrical outlet.
4. The oven is now ready for operation. No preliminary adjustments or calibrations are required. Depending on the customer application and customer laboratory procedures an initial calibration may be done at this point.

Power Switch

The 800 Series ovens feature a front panel mounted power switch which is a Switch combination power switch and circuit breaker, eliminating the need for separate fusing. The circuit breaker will interrupt power in the event of an oven heater malfunction. Press the I (upper) half of the rocker-type power switch to the in position to turn the oven on. Press the 0 (lower) half to the in position to turn off oven power. To reset the breaker, first place the switch to the off position, then return it to the on position.

Controls

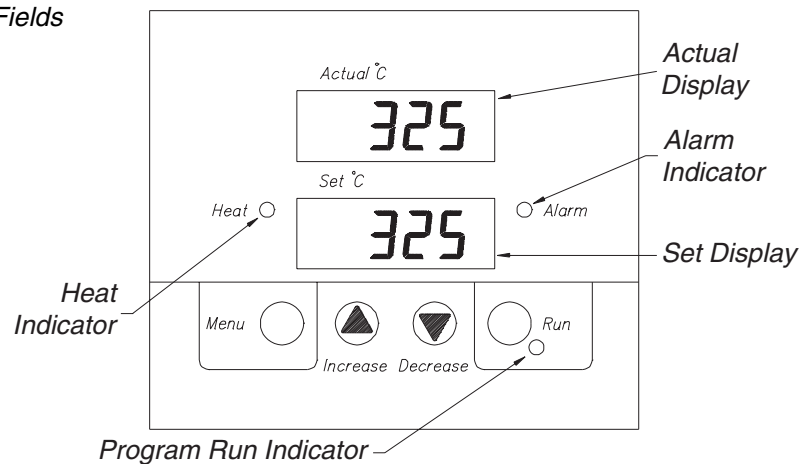
Display

The Fisher 800 Series Programmable Ovens are equipped with a digital PID control routine that gives precise temperature controllability. The control is capable of storing multiple 24-step programs for ramp and soak profiling.

The following sections briefly describe the locations and functions of various display fields and keypad controls. More detailed descriptions are provided, when required, in the operating sections of the manual.

The 800 Series controller features two bright, one-half inch, 7-segment LED displays used in setting up the oven program or reading oven temperature. Two smaller LEDs indicate, respectively, an alarm condition or when power is being applied to the oven heaters. Each display field is discussed separately below.

Figure 1: Display Fields



Set Display In the Control and Ramp and Soak modes, shows the oven set temperature. During setup and programming, indicates control parameters to be set.

Actual Display In the Control and Ramp and Soak modes, shows the actual oven temperature. During setup and programming, indicates the numerical value assigned to the currently displayed control parameter.

Heat Indicator Lights when power is being supplied to the oven heater.

Alarm Indicator Lights if the actual oven temperature exceeds the alarm temperature. The alarm temperature is factory-adjusted to be 5°C above the set temperature.

Run Indicator Indicates a ramp and soak program is running. This indicator is off during control or program editing modes.

Keypad

The 800 Series incorporates a four-key, tactile keypad (see Figure 1). The function of each key is discussed individually below.



During programming or setup, successively pressing the Menu Key causes the controller display to sequentially step through menu selections.



In Control mode, pressing the Up Arrow Key increases the oven set temperature, as indicated on the Set Display. During programming or setup, used to step through menu options.



In Control mode, pressing the Down Arrow Key decreases the oven set temperature, as indicated on the Set Display. During programming or setup, used to step through menu options.



Alternates oven operation between the Control and Program Run modes. See *Running Stopping or Resuming a Program* for instructions on using this feature.

Operation

Safety Precautions

Before operating ovens, always observe the following safety precautions:

- **This unit is not explosion proof.** Do not use in the presence of flammable or combustible materials; Fire or explosion may result. Unit contains components that may ignite such materials.
- Fumes and spillage from acidic solutions cause corrosion of the stainless steel chamber. Care should be taken to maintain a neutral pH at all times.
- The heater for the unit is in the bottom of the unit. Surface temperatures at the bottom cover of the unit may be higher than set point temperature. For example: A plastic container on the heater cover may become hot enough to melt/burn the container at settings below the melting point of plastic. **Do not place items on the heater cover.**
- Wear insulated gloves.
- Use tongs.
- Never stand in front of an open oven.
- Use safety goggles.

The 800 Series ovens feature two operating modes:

- Control
- Ramp and Soak

Each is discussed separately in the following sections.

Control Mode

In Control mode operation, the oven maintains a set temperature until that set temperature is changed. The Actual and Set Displays will indicate current chamber temperature and the temperature set point, respectively. To set a temperature and initiate Control mode operation, perform the following:

1. Place the power switch in the ON position.
2. If the Run indicator is lit or blinking, press the Run Key Pad until the indicator remains off.



Note

To rapidly increase or decrease the set temperature **press and hold** the appropriate arrow key. To slowly increment or decrement the set temperature one degree at a time, **press and immediately release** the arrow key.

3. Observe the set temperature in the Set Display window.
4. To decrease the set temperature, press the Down Arrow Key.
5. To increase the set temperature, press the Up Arrow Key.

Ramp and Soak Mode

In Ramp and Soak mode of operation, the oven executes a sequence of ramps and soaks programmed by the operator. The controller is capable of providing up to 4 separate ramp/soak programs, each containing up to 24 steps. During a ramp period, the oven temperature is controlled to increase at a linear rate set by the operator. During a soak period, the oven maintains a constant temperature for a time interval selected by the operator.

Program Steps

A program consists of a sequence of operations or “steps” which the oven controller may be set up to perform. There are 24 program “steps” in each of the 4 available programs. The programmed operations are executed in the order entered: step 1, step 2, step 3, etc. A program may have a maximum of 24 steps, or as few as two (one must be an End).

Each program may consist of any of the four basic operations described below, except in step #1, which cannot be a jump command. The corresponding LED display for each operation is shown at the left.

StPt

A Set Point program step causes the oven set temperature (shown in the Set Display) to be linearly increased or decreased (“ramped”) at a selected rate. The StPt operation begins at the current oven temperature and finishes at the programmed Set Point temperature.

Soak

Soak causes the final set temperature from the preceding step to be held for a time interval of up to 23 hours, 59 minutes and 59 seconds. This duration may be extended by adding further Soak steps or using a Jump Loop (see below).



A Jump Loop operation causes program execution to jump to another designated program step. Each program step, up to the Jump Loop, is then sequentially repeated. Use of a Jump Loop allows a programmed temperature cycle to be repeated up to 100 times. A Jump Loop cannot be used as the first step in a program.



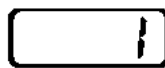
Program execution proceeds sequentially through each program step until an End is encountered, or until all 24 program steps have been completed. An End may be set up to cause the oven to maintain the final set temperature indefinitely or simply to turn off heater power.

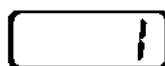
If no End is used, all 24 program steps will be completed, then the oven will maintain the final programmed set temperature.

**Note**

During programming, the MODE key serves as an "enter" key to select a value shown on the Actual Display for a corresponding parameter shown on the Set Display.








Creating a Ramp and Soak Program

Creating a program consists of constructing a sequence of the four basic operations (Set Point, Soak, Jump Loop and End) to produce a desired temperature cycle. For each operation selected, several options also must be specified. To enter a ramp and soak program, perform the following procedures:

1. Verify the Run LED is off. If it is on, press the Run Key. If it is blinking, press the Menu Key then the Run Key twice.
2. Press the Menu Key. The "No Program" display should appear as shown on the left. NOTE: If no key is pressed for one minute, the display automatically reverts to Control mode.
3. Press the Up Arrow Key once to present the program entry menu selection. The Actual display will change from no Program to 1 Program, indicating entry into program #1.
4. Press the Menu Key to initiate entry of the first program step. The display will then indicate the first step number for program editing.

OPERATION

SP	Soak
StYP	StYP
End	JL
StYP	StYP

HoLd	OFF
End	End

25
SP

5. Press the Menu Key to edit step #1, or use the Up or Down Arrow Key to change the step number to the desired step for editing before pressing the Menu Key.
6. The Set Display then indicates “StYP” to signify that step type must be selected from a menu of four operations being shown in Actual Display. The four menu selections are Set Point, Soak, End or Jump Loop as shown to the left. Use the Up/Down Arrow Keys to change the Actual Display to the desired step type. Press the Menu Key to enter the desired step type. NOTE: For step 1 in a program, the jump loop option is not available.
7. **If the desired program step is an End**, press the Menu Key to select it when End is in the Actual Display. Otherwise, skip to step 10.
8. The display shows one of the two options for an End step. To view the selections, press either the Up or Down Arrow Key. The End command signifies the final step in a program.
9. If the final temperature is to be held indefinitely at the end of the ramp and soak program, press the Menu Key when “HoLd” is displayed on the Actual Display. If heater power is to be turned off at the end of the program, press the Menu Key when Actual Display indicates “OFF”. Skip to step 22.
10. *If the desired program step is a ramp to a Set Point*, press the Menu Key to select it when the Actual Display reads “SP.” Otherwise, skip to step 13.
11. If a ramp to a Set Point is selected, the Set Display first indicates “SP” to signify that the operator must select a final target temperature, or set point. Use the Up or Down Arrow Key to adjust the Actual Display to indicate the desired final temperature for the ramp. Press the Menu Key to enter the selected set point temperature.



12. The Set Display then indicates “rAtE” to prompt the operator to select a desired heating or cooling rate in degrees/min. Press and hold or until the desired rate is shown in the Actual Display. Press the Menu Key to enter the selected rate. Proceed to step 20.

13. *If the desired program step is a Soak*, press the Menu Key to select it when the Actual Display shows “SoAH.” Otherwise, skip to step 17.



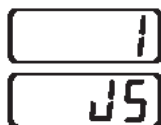
14. If a Soak is selected, the Set Display first indicates “HOuR” to signify that the operator must select the number of hours that the current set temperature will be maintained. Use the Up or Down Arrow Key to adjust the Actual Display to indicate the desired number of soak hours (maximum of 23). Press the Menu Key to enter the selected number of soak hours.

15. The Set Display then shows “Min” to indicate that the operator must select the number of additional minutes for which the current set temperature will be held. Use the Up or Down Arrow Key to set the Actual Display to the desired number of soak minutes (maximum of 59). Press the Menu Key to enter the selected number of soak minutes.



16. The Set Display then shows “SEC” to indicate that the operator must select the number of additional seconds for which the current set temperature will be held. Use the Up or Down Arrow Key to adjust the Actual Display to indicate the desired number of soak seconds (maximum of 59). Press the Menu Key to enter the selected number of soak seconds. Proceed to step 20.

17. *If the desired program step is a Jump Loop*, press the Menu Key to select it when the Actual Display shows “JL.”



18. If a Jump Loop is selected, the Set Display first indicates “JS” to signify that the operator must select the step number destination for the jump. Use the Up or Down Arrow Key to adjust the

Actual Display to indicate the desired step number to jump to. Press the Menu Key to enter the jump step. NOTE: The jump step number must be lower than the current step number. The jump cannot be to the current step or a higher step.



19. The Set Display then shows “JC” to indicate that the operator must select the number of times the jump loop is to be repeated. Press the Menu Key to enter the jump count.



20. The displays indicate “no rtn”. *If further steps are to be programmed*, press the Menu Key to continue at the “no return” prompt. This will advance program editing to the next step number. Continue setting up the program at step 5 of this procedure.

21. *If no further program steps are required*, press the Up or Down Arrow Key. The “yes return” prompt will appear. Press the Menu Key to return to Control mode operation.



22. *When program editing is complete* the controller will then prompt to save the program, “1 Save”. Press the Menu Key to save the program, or use the Up or Down Arrow Key to change the Actual Display to NO, which will leave the current program as it was found.

To initiate the program, see *Running a Program*.

Running, Stopping or Resuming a Program

Prior to running the program in memory, first make certain that the current set temperature is the temperature from which the program is to start. For example, a program intended to ramp the oven temperature from ambient to 250°C, if started with the current set temperature at 300°C, will actually ramp the temperature down from 300°C to 250°C.

To run a program currently in memory, perform the following steps:

1. Press the Run Key once. The Run indicator light begins to flash and the displays indicate which program in memory is ready to run. To change program numbers, press the Up or Down Arrow Key.

2. Press the Menu Key when the desired program number is shown in the display. The display will next prompt for the user to enter the program step to begin the program run (usually step #1).
3. Use the Up or Down Arrow Key to change the programs starting point. When the desired starting step is displayed, press the Run Key to begin. The program is running when the Run LED is lit.

To stop a running program, press the Run Key. Oven operation then returns to the Control mode, with the set temperature at the last value achieved by the program.

To resume a stopped program, perform the following steps:

1. Press the Run Key. The Run LED begins to flash and the display indicates "1 Prog".
2. Press the Menu Key twice. The resume program command should appear on the displays. The Actual Display will show the program number that was most recently run.
3. Press the Run Key again. The controller will continue running the program at the point it was terminated. The Run LED will again be lit.

While a ramp and soak program is running, the status of the current program step may be viewed. With the Run LED lit to indicate the program is running, successively press the Menu Key. Each control parameter associated with the current program step then is displayed sequentially. The parameter type is indicated in the Set Display, while the value for the parameter appears in the Actual Display. A final press of the Menu Key returns the displays to tracking the actual and set temperatures.

The specific control parameters displayed in any instance depend upon whether the current step is a Set Point or a Soak operation. The sequence of control parameters displayed in each case, and the corresponding Set Display messages, is as follows:

Ramp Step

EnSP	End Set Point	Target final temperature at the completion of the ramp.
RtE	Rate	Rate of change of temperature, in °C or °F/min, for the ramp.
EJC	Jump Count	If a Jump Loop is in progress, indicates the number of times the loop has been repeated.
STEP	Step	Current program step.

Soak Step

EnSP	Soak Point	The soak temperature.
Hour	Hour	Hours remaining in soak step.
Min	Mins	Minutes remaining in the soak step.
SEC	Sec	Seconds remaining in the soak step.
EJC	Jump Count	If a Jump Loop is in progress, indicates the number of times the loop has been repeated.
STEP	Step	Current program step.

An Example Program

Implementing the following program provides a good example of how to program the 800 Series ovens for ramp/soak operations.

Step 1: Ramp from ambient to 200°C at 8.0°C/min.

Step 2: Ramp from 200°C to 325°C at 4 °C/min.

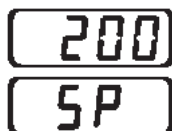
Step 3: Soak at 325°C for two hours

Step 4: Turn off power to the heaters and allow to oven cool.

To set up and run this program, perform the following procedures.

Programming Step 1:

1. Verify the Run LED is not lit.
2. Press the Menu Key. The displays should show (“no Prog”).
3. Press the Up Arrow Key to indicate which program to edit. Press the Menu Key to edit program #1 (“1 Prog”).
4. Press the Menu Key again to begin editing at step #1 (“1 Step”).
5. Use the Up Arrow Key to display the ramp to a Set Point operation. (“SP StyP”). Press the Menu Key to select a Set Point operation as the new program step 1.
6. Use the Up Arrow Key to adjust the Actual Display to indicate the final temperature for the first ramp, namely 200°C. Press the Menu Key to enter the value.
7. The display will next prompt for the ramp rate. Use the Up or Down Arrow Key to change the Actual Display to 8.0 (8°/min). Press the Menu Key to enter the ramp rate.



200
SP



8.0
RATE

325
SP

Programming Step 2:

8. Press the Menu Key again. The displays will indicate the next program step for editing ("2 Step"). Press the Menu Key to enter the step.
9. Use the Up or Down Arrow Key to select the step type for step #2. Press the Menu Key when the displays indicate "SP StyP". This will enable the second ramp step.
10. Adjust the set point to 325°C using the Up Arrow Key. When the displays indicate the new set point, press the Menu Key to save it.
11. The display will next prompt for the ramp rate. Use the Up or Down Arrow Key to change the Actual Display to 4.0 (4°/min). Press the Menu Key to enter the ramp rate.

4.0
RATE

SoAh
StYP

Programming Step 3:

12. Press the Menu Key to continue programming. Press the Menu Key again to initiate programming the third step ("3 StEP").
13. Use Up or Down Arrow Key to change the display to the Soak operation ("SoAh StyP"). Press the Menu Key to select a constant temperature soak period.
14. Use the Up or Down Arrow Key to adjust the Actual Display to indicate the desired soak hours, namely 2. ("2 HOUrS"). Press the Menu Key to enter the soak hours.
15. Use the Up or Down Arrow Key to set the delay minutes ("0 Min"). Press the Menu Key to enter the minutes.
16. Use the Up or Down Arrow Key to set the desired soak seconds ("0 SEC"). Press the Menu Key to enter the seconds.
17. Press the Menu Key to continue programming. ("no rtn").

2
Hour

0
Min

0
SEC

End
StYP

oFF
End
1
SAVE

Programming Step 4:

18. Press the Menu Key to initiate programming the fourth program step ("4 StEP").
19. Use the Up or Down Arrow Key to adjust the Actual Display to indicate the End operation ("End StyP"). Press the Menu Key to select End.
20. Use the Up or Down Arrow Key to select the OFF command at the End of the program ("oFF End"). Press the Menu Key to enter the command.
21. Press the Menu Key at the Save prompt to save program 1 ("1 SAVE") into memory.

To verify the program was entered correctly, repeat the above steps (1-21) using the Menu Key to accept the values previously entered. Follow the procedure under Running, Stopping or Resuming a Program to verify proper operation.

Menu Items

The 800 Series Controller permits the operator to customize some of the operating parameters available. The following section describes those parameters and how to set them to fit the needs of the operator.

The Temperature Offset is a value that is algebraically added to the Actual Chamber Temperature, as measured by the control thermocouple, in order to make the Actual Chamber Temperature more accurate. In other words, the temperature shown on the Actual Display will be the actual oven temperature (measured at the control thermocouple) plus or minus the display offset selected.

Functionally, the offset feature permits the operator to measure and calibrate such that the display will indicate the temperature at a specific point or zone within the oven.



Note

The ovens are factory calibrated before shipping.

To enter a Temperature Offset, carry out the following steps:

1. With the oven in Control Mode, press the Menu Key twice. This will bypass the program edit mode and bring up the Temperature Offset ("0 CAL") display.
2. To change the offset value, use the Up Arrow Key (to increase) or Down Arrow Key (to decrease).
3. Press the Menu Key when the appropriate value is shown in the Actual Display.
4. Further menu items will begin to appear. Press the Menu Key three additional times for the controller to again display the Set and Actual temperatures (control mode).

Once the Temperature Offset is changed, the actual display will reflect it. Allow the oven additional time to stabilize. Compare the Actual Temperature display to the reference temperature. The displayed temperature is the result of algebraically adding the actual temperature to CAL value.

Thus, if a CAL value of 3 degrees is being used, a measured temperature of 50 degrees will be displayed as 53 degrees. Repeat steps 1 through 4 above if necessary.

Units (°C/°F)

The next menu item selects the desired temperature units. The controller will display and program in units of °C or °F. To determine the current units or to change the current units follow the instructions below:



5. With the oven in Control Mode, press the Menu Key three times. This will bypass the program edit and temperature offset calibration mode and bring up the Units ("C C_F") display.
6. Use the Up or Down Arrow Key to change the temperature units from °C to °F or vice versa. Press the Menu Key when the desired units are in the Actual Display.

- Further menu items will begin to appear. Press the Menu Key two additional times for the controller to again display the Set and Actual temperatures (control mode).

Power Loss Options

In the event of a power loss during program execution, the controller will react in one of three ways:

- Continue with program execution when power is restored.
- Hold the last set temperature upon return of power.
- Abort program execution with the heaters shut off until control is manually reset.

The power loss options can be set up as follows:

- With the oven in Control Mode, press the Menu Key four times. This will bypass the program edit mode, temperature offset and units displays. The Power Out menu should be displayed ("Cont Pout").
- Using the Up or Down Arrow keys, the power-out options can be viewed.
- Pressing the Menu Key when the Actual Display indicates "Cont" will cause the oven to continue program execution upon power restoration.
- Pressing the Menu Key when the Actual Display indicates "Hold" will cause the oven to hold the last set point upon power restoration.
- Pressing the Menu Key when the Actual Display indicates "Abrt" will cause the oven to abort program execution upon power restoration and keep the heaters off.
- When one of the three power-out options are entered, press the Menu Key one more time to return to Control Mode.

Cont

Pout

Hold

Pout

Abrt

Pout



Note

The controller serial communications is unidirectional. The controller will only output to an adaptable communicating device.

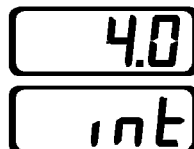
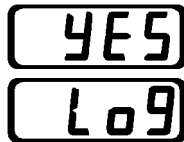
Serial Communications

The final menu item is for serial communications enable. The communications feature will only work on the following ovens:

13-247-825FC	13-247-826FC
13-247-838FC	13-247-839FC
13-247-851FC	13-247-852FC

The controller communicates using an RS232 serial port located on the lower-left side of the oven base, in the center of the ventilation screen. The connector type is a 9-pin type “D” subminiature. The user must supply an adaptable cable between the oven connector and the communicating device (PC). **This should only be done by qualified service personnel.**

Before the oven can communicate, two communication parameters need to be set. To set the communication parameters, perform the following operations:



1. With the oven in Control Mode, press the Menu Key repeatedly until the Set Display shows “Log”.
2. Use the Up or Down Arrow Key to set the Actual display to “Yes”. Press the Menu Key to enter the data log set up mode.
3. The controller will prompt for the baud rate. There are four values (1200, 2400, 4800, and 9600) available for communicating. Press the Up or Down Arrow Keys to cycle through the baud rates. Select a baud rate that will match that of device you wish to communicate with.
4. When the desired baud rate is displayed, select it by pressing the Menu Key.
5. The second communications parameter is the logging interval. Using the Up or Down Arrow Keys, display a value in the Actual Display for the time delay, in minutes, between data loggings. **Logging intervals may be set from 0 to 60 minutes in 0.1 minute intervals.**

6. Enter the value by pressing the Menu Key. The controller will automatically return to the Control Mode.

When the above parameters are set equal to that of the communicating device, the control will immediately begin logging. The control logs data in the following format:

Actual Temperature, Set Temperature, Units, Alarm State
 Example: 148, 150, C, Off

High Alarm

The 800 Series controller features a deviation alarm which alerts the operator and interrupts heater power whenever the actual oven temperature exceeds the set temperature by more than 5°C (9°F).

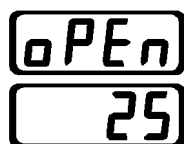


If the actual temperature exceeds the alarm limit, the alarm indicator will light and the Set Display will flash “HI.”

The reference point for the alarm is the set temperature (Set Display). Any change in the set temperature will cause a corresponding shift in the alarm temperature.

The alarm will continue to activate until the actual temperature drops to within 2°C (4°F) of the set temperature or until the set temperature is increased to within 2°C (4°F) of the actual temperature.

Open Sensor



During control or program run mode, if the Actual Display indicates “oPEn” the control is experiencing an open thermocouple condition. **The oven will not heat in this condition.** To clear this condition, determine if the thermocouple is disconnected or bad. To replace a thermocouple, see the section on *Replacing the Thermocouple*.

Service



Warning

Service procedures requiring access to the electronics compartment involve exposure to line voltage and should be done only by qualified service personnel. **Disconnect oven from power source before attempting repairs.**

The following sections describe procedures for servicing the 800 Series ovens. The first procedure, *Replacing the Door Gasket*, and the last, *Replacing the Handle and Hinges*, may be performed by most users. However, all other service procedures involve possible exposure to line voltage. Only qualified service personnel should undertake these procedures. The second section, *Accessing the Electronics Compartment*, describes procedures required for subsequent service sections and is referenced by these later sections when required.

In the event service is required beyond that available by the customer, or for warranty service, contact Fisher Service Dept. at 1-800-395-5442.

For technical assistance call 1-800-926-0505.

Replacing the Door Gasket

The Isotemp 800 Series ovens incorporate a durable, fiberglass door gasket to minimize heat loss. Should the gasket become defective or be damaged, it may be replaced by following the procedures below.

1. Set the power switch to the off position and open chamber door.
2. Remove the screws securing the stainless steel inside door panel.
3. The gasket is attached to the inner door panel by screws passing through the gasket lip and the sandwich of the inner panel and door.
4. Remove the old gasket and position the new gasket lip under the stainless steel inner panel. Push the screws through the gasket and replace the inner panel. Trim gasket length as necessary.



Warning

Allow oven to cool to ambient temperature before attempting repair.

**Warning**

Service procedures requiring access to the electronics compartment involve exposure to line voltage and should be done only by qualified service personnel. **Disconnect oven from power source before attempting repairs.**

**Warning**

Allow oven to cool to ambient temperature before attempting repair.

Accessing the Electronics

To access the electronics compartment, proceed as follows:

1. Disconnect power cord from the electrical outlet. Slide the oven forward until the front feet are at the edge of the bench top.
2. Prop up the oven front by placing a shim under each front foot. Use shims between one and one-half and two inches in thickness.

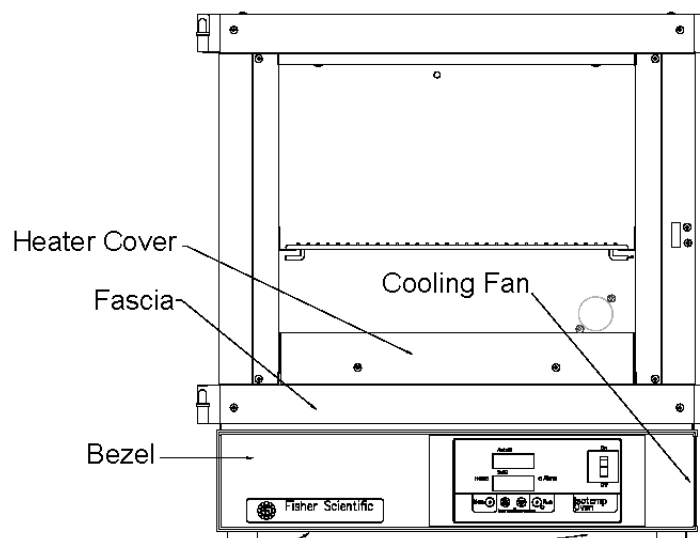


Figure 2 Bottom Screws

3. Remove the screws securing the bezel from bottom of oven.
4. Grasp bezel and pull bottom outward. Bezel will disengage from fascia. Lay bezel aside on bench top. Oven electronics are inside the bezel.

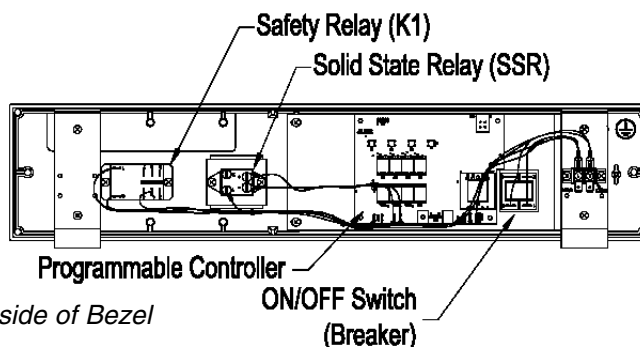


Figure 3 Inside of Bezel



Warning

Allow oven to cool to ambient temperature before attempting repair.



Warning

Service procedures requiring access to the electronics compartment involve exposure to line voltage and should be done only by qualified service personnel. **Disconnect oven from power source before attempting repairs.**



Note

When installing the replacement fan, make certain air flow arrow molded into fan housing points **into** the oven chassis.

Replacing the Heater

To replace a defective heater, proceed as follows, refer to Fig. 2:

1. Disconnect power cord from the electrical outlet.
2. Remove the two screws that secure the heater cover. Lift and slide it forward. It may be necessary to use a flat-blade screwdriver to assist in lifting the cover upward. Set heater cover aside. Remove the two nuts and shake proof washers securing the heater leads, then pull the lead terminals off the heater studs.
3. Remove the two screws securing heater to cabinet. Slide heater forward to disengage back heater clips, lift back of heater up, then slide heater back and lift out.
4. Install replacement heater and reassemble oven by generally reversing the steps above.

Replacing the Cooling Fan

To replace a defective cooling fan, proceed as follows:

1. Complete the procedures discussed in *Accessing the Electronics Compartment*, noting all caution statements.
2. Remove the two fan power wires from push-on terminals located on fan housing.
3. Remove the three mounting screws holding the fan in place.
4. Install replacement fan and reassemble oven by generally reversing the steps above.

**Warning**

Sheet metal in this area is sharp.
Work carefully.

Replacing the Circulating Fan Motor

To replace a defective circulating fan motor, proceed as follows:

1. Complete the procedures discussed in *Accessing the Electronics Compartment* and *Replacing the Heater* steps 1 & 2 (remove the heater cover). Note and observe all Caution statements.
2. Using an Allen wrench, loosen set screw holding the fan blade onto the motor shaft. Observe the shaft has a flat side to prevent the set screw from turning on the shaft.
3. Locate the two electrical leads from the fan motor. Remove the leads from the push-on terminal strip located in the front of the oven bezel.
4. Lay the oven on its back with the oven bottom facing forward.
5. Detach the controller housing (oven bottom) by removing the eight screws which fasten it to the cabinet. Two screws are located on each side of the oven and four on the bottom of the oven.
6. Locate the two access holes for the motor mounting nuts located in the oven floor, in front of and in back of the motor shaft.
7. Push an 11/32-in nut driver through the front access hole, gently pushing aside the oven insulation until the nut driver reaches the front motor mounting nut.
8. Remove front nut and washer, then repeat process using back access hole to remove back motor mounting nut and washer.
9. Remove the fan motor by sliding it out.
10. Install replacement fan motor by generally reversing the steps above. Note: A Star lock washer is used at the factory. Field operations could use Loc-tite on the nut.



Caution

The programmable controller contains static sensitive parts which may be damaged if not handled correctly. Be sure the installer is properly grounded before handling controller.



Warning

Verify the yellow thermocouple conductor is under the (+) tab and the red thermocouple conductor is under the (-) tab.

Replacing the Controller

To replace a defective controller, proceed as follows:

1. Complete the procedures discussed in *Accessing the Electronics Compartment*, noting all caution statements.
2. Remove the all wires from the defective controller by carefully prying the terminals off the controller tabs (see Fig. 3).
3. Press down the connector tabs which secure the thermocouple to the controller and remove the thermocouple connection.
4. Remove four screws holding the controller to the controller mounting plate.
5. Place the new controller in the bezel aligning the screw holes and all display windows. Fasten using four screws removed in step 4.
6. Replace the wire terminals according to the schematic diagram. **Observing polarity**, insert the thermocouple into the thermocouple connector.
7. Generally reverse the steps above to reassemble oven.

Replacing the Solid State Relay

To replace a defective solid-state relay, proceed as follows:

1. Complete the procedures discussed in *Accessing the Electronics Compartment*, observing all caution statements.
2. Consult the schematic and locate the solid state relay mounted on bezel (see Fig. 3).
3. Remove four lead wires from their screw-down terminals.
4. Remove two Phillips screws which mount the solid state relay to the bezel.

5. Lift out the solid state relay. Put new solid state relay in place, making certain that the thin, conductive pad remains between the solid state relay and the bezel.
6. Generally reverse the steps above to reassemble oven.

Replacing the Safety Relay

To replace a defective safety relay, proceed as follows:

1. Complete the procedures discussed in *Accessing the Electronics Compartment*, observing all caution statements.
2. Consult the schematic and locate the safety relay (mounted on Bezel, see Fig. 3).
3. Remove four lead wires from their push-on terminals.
4. Remove two Phillips screws, which mount the safety relay to the bezel.
5. Lift out the safety relay.
6. Generally reverse the steps above to install the replacement safety relay and reassemble oven.

Replacing the Thermocouple

To replace a defective control thermocouple, proceed as follows:

1. Complete the procedures discussed in *Accessing the Electronics Compartment*, observing all caution statements.
2. Remove thermocouple wires from push tab terminals on back of controller.
3. On roof of oven, locate clip which holds thermocouple in place. Remove thermocouple from clip.



Warning

Verify the yellow thermocouple conductor is under the (+) tab and the red thermocouple conductor is under the (-) tab.

4. Pull thermocouple forward into oven chamber, exposing roughly a 6-inch section of the thermocouple wire.
5. Cut the thermocouple wire to remove the thermocouple sheath.
6. Securely loop together the cut end of the defective thermocouple with the two leads of the replacement thermocouple. Wrap tape over the length of the loops to secure them.
7. Gently pull the defective thermocouple out through the electronics compartment while guiding (“fishing”) the replacement thermocouple into place.
8. Consult schematic at end of this manual. Then, generally reverse steps 1 through 3 to complete installation of new thermocouple and reassemble oven.



Warning

Allow oven to cool to ambient temperature before attempting repair.

Replacing the Door Hinges

To replace a defective door hinge, perform the steps below:

1. Remove chamber door by opening it and lifting it off the hinges.
2. Remove the two mounting screws securing the defective hinge.
3. Remove defective hinge and mount new hinge by replacing the mounting screws.
4. Put door back onto hinges.

**Warning**

Allow oven to cool to ambient temperature before attempting repair.

Replacing the Handle

To replace a defective door handle, perform the steps below:

1. Remove the two mounting screws holding latch cover in place.
2. Remove the two mounting screws holding defective handle in place.
3. Mount the replacement handle using two screws.
4. Adjust bottom nut (13/16) from end of shaft.
5. Secure latch cover in place with two screws.

Adjusting the Door Cam

Due to handling in shipment or to heat distortion with use, the door cam may require adjustment. To facilitate proper closing and sealing of door, steps 1 through 6 may have to be performed concurrently. NOTE: See Warning above!

To adjust the door cam, perform the following:

1. Open door and remove screws holding latch cover in place.
2. Locate nuts securing tongue on cam shaft.
3. Loosen but do not remove outside nut.
4. Adjust inside nut, one full turn clockwise draws door 1/16" closer to cabinet when door is closed.
5. Secure cam tongue in place by tightening outside nut.
6. Secure latch cover in place with two screws.

Troubleshooting

This table is intended to assist in resolving incubator problems by relating symptoms to their likely cause. The service discussed below is beyond the scope of most users and should be performed by qualified and trained personnel.

Symptom	Probable Cause	Action
No power.	Unit not plugged in or turned on.	Plug in or turn on.
	Defective circuit breaker.	Replace circuit breaker.
	Open wire.	Repair/replace wire.
	Defective control board.	Replace control board.
Oven temperature erratically high.	Defective control thermocouple.	Replace control thermocouple.
	Defective controller.	Replace controller.
Failure to heat.	Set temperature less than actual temperature.	Refer to <i>Operation</i> . (Ambient needs to be cooler than set temperature.)
	Defective thermocouple.	Replace thermocouple.
	Defective heater.	Replace heater.
	Defective solid state relay or safety relay.	Refer to schematic and replace relay.
	Poor heater connections.	Tighten connections at terminal strip (check resistance from control board out.)
	Defective controller.	Replace controller.
Set display flashes HI	Set temp has been changed to a value greater than 5°C below actual temp.	Change the set temp or allow oven to cool. When within 2°C alarm will reset.
	Defective solid state relay or safety relay.	Refer to schematic and replace relay.
	Defective controller.	Replace controller.
Actual Display shows "oPEn"	Open thermocouple circuit.	Verify thermocouple is attached properly and/or replace thermocouple.
Temperature off from independent thermometer.	Calibration offset needs to be adjustment.	Begin by setting offset to 0. (See Display Offsets.)

Replacement Parts

Replacements for oven parts may be ordered, by part number, from Fisher Customer Service at 1-800-766-7000.

Item	Part Number
Line Cord and Plug Model 825 (120 V)	SPN 83903
Models 838 & 851 (240 V Domestic)	SPN 95774
Models 825, 838 & 851 (240 V International)	SPN 95704
Temperature Controller (120/240 V)	SPN 103995(CTRL)
Cooling Fan 120 V	SPN 83915
240 V	SPN 83916
Circulating Fan Motor 120 V	SPN 95788 (MTR)
240 V	SPN 95789
Thermocouple Assembly	SPN 95603 (TC)
Door Handle	SPN 104976
Shelf (Fits All Models)	13-247S
Shelf Support (Need Two per Shelf)	SPN 95635
Heater Assembly Model 825 (120 V)	SPN 95696
Model 825 (240 V)	SPN 95737
Models 838 & 851 (240 V)	SPN 95697
Door Gasket Model 825	SPN 95782
Model 838	SPN 95783
Model 851	SPN 95784
Dart Clips (for Securing Door Gasket)	SPN 95753
Solid State Relay	SPN 83917 (SSR)
Safety Relay	SPN 102260(K1)
Circuit Breaker 825 (120V model only)	SPN 95766 (S1)
Model 826 to 852 (240V models)	SPN 95786

Warranty

Laboratory instruments and equipment manufactured by Fisher Scientific Company L.L.C. – Laboratory Equipment Division (hereinafter called “the Company”) are warranted only as stated below.

Subject to the exceptions and upon the conditions specified below, the Company agrees, at its election, to correct by repair, by replacement, or by credit to the purchaser, any defect of materials or workmanship which develops within one year (13 months for refrigerator and freezer products) from the date of purchase by the original purchaser by the Company or by an authorized dealer of the Company provided that investigation or factory inspection by the Company discloses that such defect developed under normal and proper use

The exceptions and conditions mentioned above are the following:

- a. The Company makes no warranty concerning components or accessories not manufactured by it, such as tubes, batteries, etc. However, in the event of the failure of any component or accessory not manufactured by the Company, the Company will give reasonable assistance to the purchaser in obtaining from the respective manufacturer whatever adjustment is reasonable in the light of the manufacturer’s own warranty.
- b. The Company shall be released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own service personnel or authorized dealer personnel unless such repairs by others are made with the written consent of the Company.
- c. **THE COMPANY MAKES NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, EITHER IN FACT OF BY OPERATION OF LAW,...STATUTORY OR OTHERWISE.**
- d. The above warranty and the above obligations to repair, replace, or credit are complete and exclusive and the Company expressly disclaims liability for lost profits or for special, indirect, incidental, consequential, or exemplary damages of any nature whether attributable to contract, warranty, negligence, strict liability, or otherwise even if the Company has been advised of the possibility of such damages.
- e. Representations and warranties made by any person, including dealers and representatives of the Company, which are inconsistent or in conflict with the foregoing warranty shall not be binding upon the Company unless reduced to writing and signed by an officer of the Company.



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