

**Instruction Manual  
Fisher Scientific  
Isotemp® Economy Incubators  
500 Series**

*Model 525D (Small)*  
*Cat. No. 11-690-525D & -526D*

*Model 537D (Medium)*  
*Cat. No. 11-690-537D & -538D*

*Model 550D (Large)*  
*Cat. No. 11-690-550D & -551D*



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## *Introduction*

Fisher Isotemp 500 Series Economy Incubators are available in three sizes: small (Model 525D), medium (Model 537D) and large (Model 550D). All models provide analog, on/off control at operating temperatures ranging from 30 °C (86°F) to 75 °C (167 °F).

Inlet air enters through a port located under the incubator floor. Heat generated convection then gently moves the air in a vertical circulation pattern. Exhaust air is vented through a port at the incubator top.

The Model 525D accommodates a maximum of five shelves. The Model 537D holds eight shelves, while the 550D holds up to eleven.

Isotemp incubators incorporate a variety of safety features. A safety backup is built into the controller: if the primary heater control fails, the Backup will maintain control at 3 °C above the set point. An alarm LED Then indicates that the backup controller is operating the incubator. A circuit breaker protects the incubator from power surges.

The glass door is designed to meet specification without a door gasket to provide maximum viewing of the interior.

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## Installation

### Selecting a Location

Choose a location for the incubator which will provide an area approximately 2 ft x 2 ft. The bench selected must be capable of supporting at least 120 lbs for the Model 525D, 130 lbs for the Model 537D, or 135 lbs. for the Model 550D. Appropriate electrical power must be available. Locate the incubator within three feet of the power outlet so that no extension cord is required.

### Unpacking

Fisher Isotemp<sup>®</sup> incubators 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. In the event of shipping damage, retain the shipping material and file a claim with the final carrier.

#### Item

##### Incubator Assembly

Model 525D (small)

Cat.# 11-690-525D 120 V, 50/60 Hz

Cat. # 11-690-526D 240 V, 50/60 Hz

Model 537D (medium)

Cat.# 11-690-537D 120 V, 60/50 Hz

Cat.# 11-690-538D 240 V, 50/60 Hz

Model 550D (large)

Cat.# 11-690-550D 120 V, 60/50 Hz

Cat.# 11-690-551D 240 V, 50/60 Hz

##### Shelves

Models 525D & 537D (one provided)

Model 550D (two provided)

##### Shelf Supports

Models 525D & 537D (two provided)

Models 550D (four provided)

##### Instruction Manual

## Preparing the Incubator

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

1. Install the shelf.
2. Make certain all packing material has been removed from incubator chamber.
3. Connect the line cord to an appropriate electrical outlet.

**Caution:**

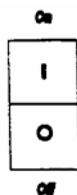


See data plate on incubator for voltage, current and line frequency specifications. Check that the power requirements of the incubator will not overload the circuit to which it will be connected.

4. The incubator 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 500 Series incubators feature a front panel mounted power switch which is a combination power switch and circuit breaker, eliminating the need for separate fusing. The circuit breaker will interrupt power in the event of a heater malfunction.



Press the I (upper) half of the rocker-type power switch to the in position to turn the incubator on. Press the O (lower) half to the in position to turn off incubator power. To reset the breaker, first place the switch to the off position, then return it to the on position.

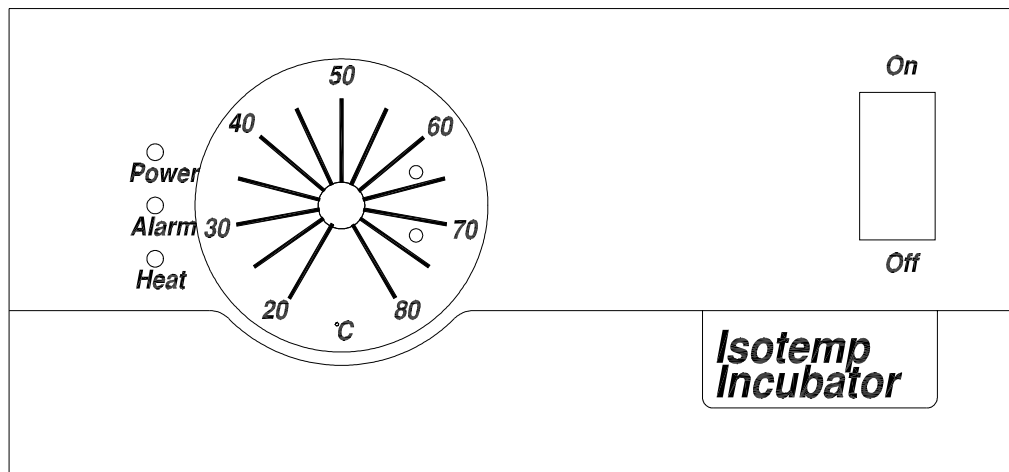
## Convenience Outlet

The 500 Series incubators feature a convenience electrical outlet located inside the incubator, at the lower right of the back panel. This outlet is rated at the same voltage as the incubator itself and is limited to a maximum current of 5A *for all models*. If the current limit is exceeded, the circuit breaker will trip. For safety, the integrity of the electrical ground should always be maintained.



## Controls

The 500 Series controller features three LED's which indicate, respectively, that power is being applied to the incubator heaters, an alarm condition exists or that incubator power is on. A temperature dial, marked in five degree increments, serves to set the incubator temperature.



- |                         |  |
|-------------------------|--|
| <b>Temperature Dial</b> | Sets the incubator operating temperature in degrees Celsius ( $^{\circ}\text{C}$ ).  |
| <b>Heat Indicator</b>   | Lights when power is being supplied to the incubator heater.   |
| <b>Alarm Indicator</b>  | Lights if the actual incubator temperature exceeds the alarm temperature. The alarm temperature is factory-adjusted to be $3^{\circ}\text{C}$ above the set temperature. |
| <b>Power Indicator</b>  | Lights when the power is on.   |



## Safety Precautions



**Before Operating the oven, 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, which may ignite such materials.

Fumes and spillage from acidic solutions cause corrosion of the stainless chamber. Care should be taken to maintain a neutral pH at all times.

- Wear insulated gloves.
- Use tongs.
- Never stand in front of an open oven.
- Use safety goggles.

## Operation

The 500 Series incubators maintain a set temperature until that set temperature is changed.

To achieve a set temperature, perform the following:

1. Rotate the temperature dial full counter-clockwise.
2. Place the power switch in the ON position. The Power indicator will come on.
3. Rotate the temperature dial to the desired set temperature. The Heat indicator will then come on.
4. When the actual temperature approaches the set temperature, the Heat indicator will cycle on and off, maintaining the set temperature.

**NOTE:** 1. After controlling at a given temperature, if the temperature dial is rotated CCW, the alarm indicator will come on. This is normal operation.

2. Since this is an analog control with 5 degree increments. The user may choose to add a thermometer and make minor adjustments to reach a more precise temperature setting.

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## ***Limit Alarms***

The 500 Series controllers feature a deviation alarm which alerts the operator and interrupts heater power whenever the actual incubator temperature differs from the set temperature by more than 3 °C. This set limit cannot be adjusted by the operator.

If the actual temperature exceeds the alarm limit, the alarm indicator LED will light.

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

### ***Example:***

If the set temperature is 40 °C, the alarm will trip at 43 °C. If the set temperature is changed to 50 °C, the alarm will follow the set temperature and trip at 53 °C.

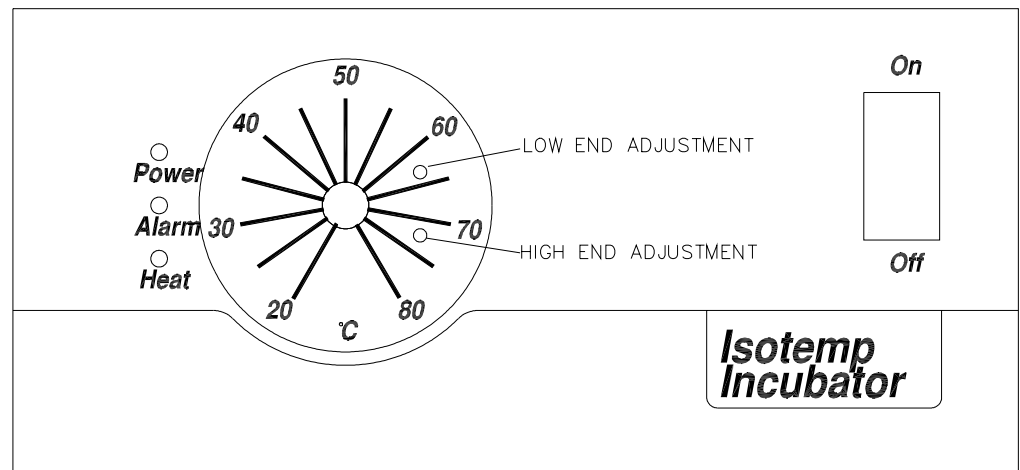
Changing the set temperature to a value more than 3 °C below the present incubator temperature will trip the alarm. Power is removed from the heaters when an alarm condition occurs.

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## Calibration

The 500 Series controllers are factory calibrated near the center of the incubator's operating range and will usually remain reasonably accurate over a long period of usage. However, should the accuracy diminish with time, or should the user require greater accuracy at a particular temperature setting, the controller may be recalibrated.

The temperature controller has high and low temperature range adjustments located under the skirt of the set temperature dial.



To recalibrate the controller, perform the following procedures:

1. Place a calibrated thermometer (preferably traceable to NIST standards) in oven chamber.
2. Rotate temperature dial full counter-clockwise (CCW).
3. The dial line should point to 20 °C. if not, loosen the set screw holding the dial on its shaft. Rotate shaft until dial line points to 20 °C
4. Press incubator Power switch to ON (1) position.
5. Rotate temperature dial to 40 °C. Heat indicator will COM on full, then begin to cycle on/off as incubator approaches final temperature.
6. After the Heat indicator begins cycling, allow an additional 30 minutes for the incubator to achieve a final, stable temperature.

7. Carefully remove the temperature dial knob without rotating it.
  8. Use a thin blade screwdriver to calibrate Low Adjust. Check thermometer reading. If reading is less than 39 °C, rotate Low Adjust slightly to turn heater off at lower temperature. After each adjustment allow sufficient time for incubator temperature to re-stabilize. Repeat until thermometer reading is 40 °C ± 1°C.
  9. Replace temperature dial knob with pointer at 40 °C, then tighten set screw, being careful not to rotate the dial shaft.
  10. Set temperature dial to 70 °C
  11. After the Heat indicator begins cycling on/off, allow an additional 30 minutes for incubator to reach a final, stable temperature. If thermometer reads 70 °C +/- 1 °C, calibration is complete. Otherwise continue with the following steps.
  12. Carefully remove the temperature dial knob without rotating it.
  13. Use a thin blade screwdriver to calibrate High Adjust. Check thermometer reading. If reading is less than 69 °C, rotate High Adjust slightly to turn heater off at lower temperature. After each adjustment, allow sufficient time for incubator temperature to re-stabilize. Repeat until thermometer reading is 70 °C +/- 1 °C.
  14. Replace temperature dial knob with pointer at 70 °C, then tighten set screw, again being careful not to rotate the dial shaft.
  15. Set the temperature to 60 °C. The Alarm indicator should come on if calibration is correct.
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## **Service**

The following sections describe procedures for servicing the 500 Series incubators. Replacing or adjusting the Glass Door should be within the capabilities of most users and does not expose the operator to live voltages (wiring). All other Service procedures involve potential exposure to line voltage. These procedures should be undertaken only by qualified service personnel. The next section, *Accessing the Electronics Compartment*, describes procedures required of subsequent service sections and is referenced by these later sections when required.

For Technical Assistance call: 1 (800) 926-0505

For Field Service Division Assistance call: 1 (800) 395-5442

**Caution:**



*Service procedures involve exposure to line voltage and should be done only by qualified service personnel. Disconnect incubator from power source before attempting repairs.*

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## Replacing The Glass Door

The Isotemp 500 Series incubators feature a glass door to allow the chamber to be viewed with minimal heat loss. Should the glass door become damaged, it may be replaced by following the procedures below.

**Caution:**

Allow incubator to cool to ambient temperature before attempting repair.

1. Loosen the set screws on outside of upper and lower hinges of the glass door.

**Caution:**

While loosening hinge set screws, continue to grasp the glass door. When the set screws are loosened, the door is freed and will fall out if not held.

2. Remove old glass door and set aside.
3. Generally reverse steps above to install replacement glass door. Adjust hinge position until gap between door and frame is roughly equal on all sides.

## Accessing the Electronics Compartment

To access the electronics compartment, proceed as follows:

1. Disconnect power cord from the electrical outlet.

**Caution:**



*Allow incubator to cool to ambient temperature before attempting repair.*

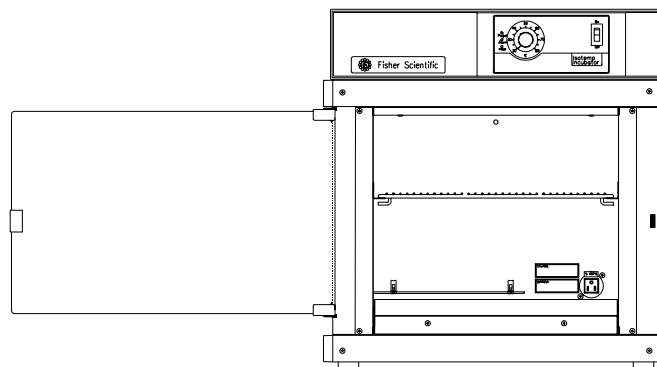
**Caution:**



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

2. Remove two screws from top of incubator securing bezel to cover.
3. Grasp bezel and pull top outward. The bezel bottom will disengage from the fascia.
4. Rotate bezel upward and lay face back on top of incubator.

Bezel screws on top



Heater Cover

**Caution:**

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

## ***Replacing the Heater***

To replace a defective heater, proceed as follows:

1. Disconnect power cord from the electrical outlet.

**Caution:**

*Allow incubator to cool to ambient temperature before attempting repair.*

2. Remove the two screws that secure the heater cover. Remove the cover by lifting and sliding it forward. It may be necessary to use a flat-blade screwdriver to assist in lifting the cover upward. Set heater cover aside.
3. Remove the two nuts and lock washers securing the heater leads, then pull the lead terminals off the heater studs.
4. 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
5. Install replacement heater and reassemble incubator by generally reversing the steps above.



## Replacing the Controller

**Caution:**

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

To replace a defective controller, proceed as follows:

1. Complete the procedures discussed in *Accessing the Electronics Compartment*.
2. Remove temperature dial knob.
3. Locate three push-on terminals at right hand side of controller board (heater wire, two power wires). Disconnect the three lead wires by pulling up an doff terminals. Note connections for later re-assembly.
4. Remove four screws w3hich mount the controller board to the bezel. Lift out board.
5. Loosen set screws in two-position terminal at front of controller board and disconnect thermocouple wires.
6. Install replacement controller by generally reversing the steps above. Check switch DSI setting:

**Caution:**

When replacing the temperature dial, first rotate the dial shaft full counter-clockwise. Then replace knob with pointer at the 20 degree mark.

**Caution:** Service procedures requiring access to the electronics compartment involve exposure to line voltage and should be done by qualified service personnel. Disconnect incubator from power before attempting Repairs.



## Replacing the Control Thermocouple

To replace a defective control thermocouple, proceed as follows:

1. Complete the procedures discussed in *Accessing the Electronics Compartment*.
2. Remove thermocouple wires from 2-terminal connector on circuit board by loosening two securing screws.

**Note:** Observe position in terminal for each lead. When re-connecting, be certain to observe polarity. Compare with polarity indication on controller housing. For thermocouples, the red wire is negative and yellow positive.

3. On lower back wall of incubator, locate two clips which hold the thermocouple in place. Remove thermocouple from clip.
4. Pull defective thermocouple forward into incubator 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 masking 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. Generally reverse the above steps to complete installation of new thermocouple and reassemble incubator.
9. Align thermocouple in clips such that tip of thermocouple sheath is positioned over the edge of the third hold in the heater cover, counting from the left.

## Trouble-Shooting Table

This table is intended to assist in the resolving incubator problems by relating symptoms to their likely causes. 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.
Incubator temperature erratically high	Defective control thermocouple	Replace control thermocouple
Failure to heat	Set temperature less than actual temperature	Refer to <i>Operation Section</i>
	Defective control thermocouple	Replace control thermocouple
	Poor heater connections	Tighten connections at terminal strip
	Defective heater element	Check heater resistance on schematic at back of manual. Replace heater unless approximately same as schematic.
	Defective controller	Replace controller
Alarm LED stays on and control is higher than set temperature	Set temperature has been changed to a value less than the high alarm limit	Wait for actual temperature to cool to the set temperature
	Defective control thermocouple	Replace control thermocouple
	Defective controller	Replace controller

## **Replacement Parts**

Replacements for incubator parts may be ordered, by part number, from Fisher Sales/Parts @ 1-800-766-7000.

<b>Item</b>	<b>Part Number (ref)</b>
Line Cord and Plug	
Models 525D, 537D, & 550D (120 V)	SPN 06643 (LINE)
Models 525D, 537D, & 550D (240 V International)	SPN 95704
Temperature Controller	
120 V	SPN 95913 (CTRL)
240 V	SPN 95914
Thermocouple Assembly	SPN 95603 (TC)
Shelf Fits All Models)	13-247S
Shelf Support (Need Two per Shelf)	SPN 95635
Heater Assembly	
Models 525D & 537D (120 V)	SPN 95693 (HTR)
Models 525D & 537D (240 V)	SPN 95734
Model 550D (120 V)	SPN 95694
Model 550D (240 V)	SPN 95735
Circuit Breaker	
Single-Pole (120 V)	SPN 95764 (S1)
Double Pole (240 V)	SPN 95766

## **Performance Characteristics**

Operating Range	30 to 70 °C	
Average Uniformity @ 37 °C*	+/- 1 °C	
Resolution	0.5 °C	
Recovery Time @ 37 °C (door open 30 seconds)		
Model 525D	1 minute	
Model 537D	1 minute	
Model 550D	3.5 minutes	
BTU/hr Output	@ 37 °C	@ 75 °C
Model 525D	55	290
Model 537D	75	360
Model 550D	95	430

\*Performed as per ASTM E - 1292

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## ***Specifications***

### **Electrical Requirements**

Model 525D		
Cat No. 11-690-525D	120 V, 50/60Hz	
Cat No. 11-690-526D	240 V, 50/60 Hz	
Model 537D		
Cat No. 11-690-537D	120 V, 50/60 Hz	
Cat No. 11-690-538D	240 V, 50/60 Hz	
Model 550D		
Cat No. 11-690-550D	120 V, 50/60 Hz	
Cat No. 11-690-551D	240 V, 50/60 Hz	

### **Power Requirements    Chamber Volumes**

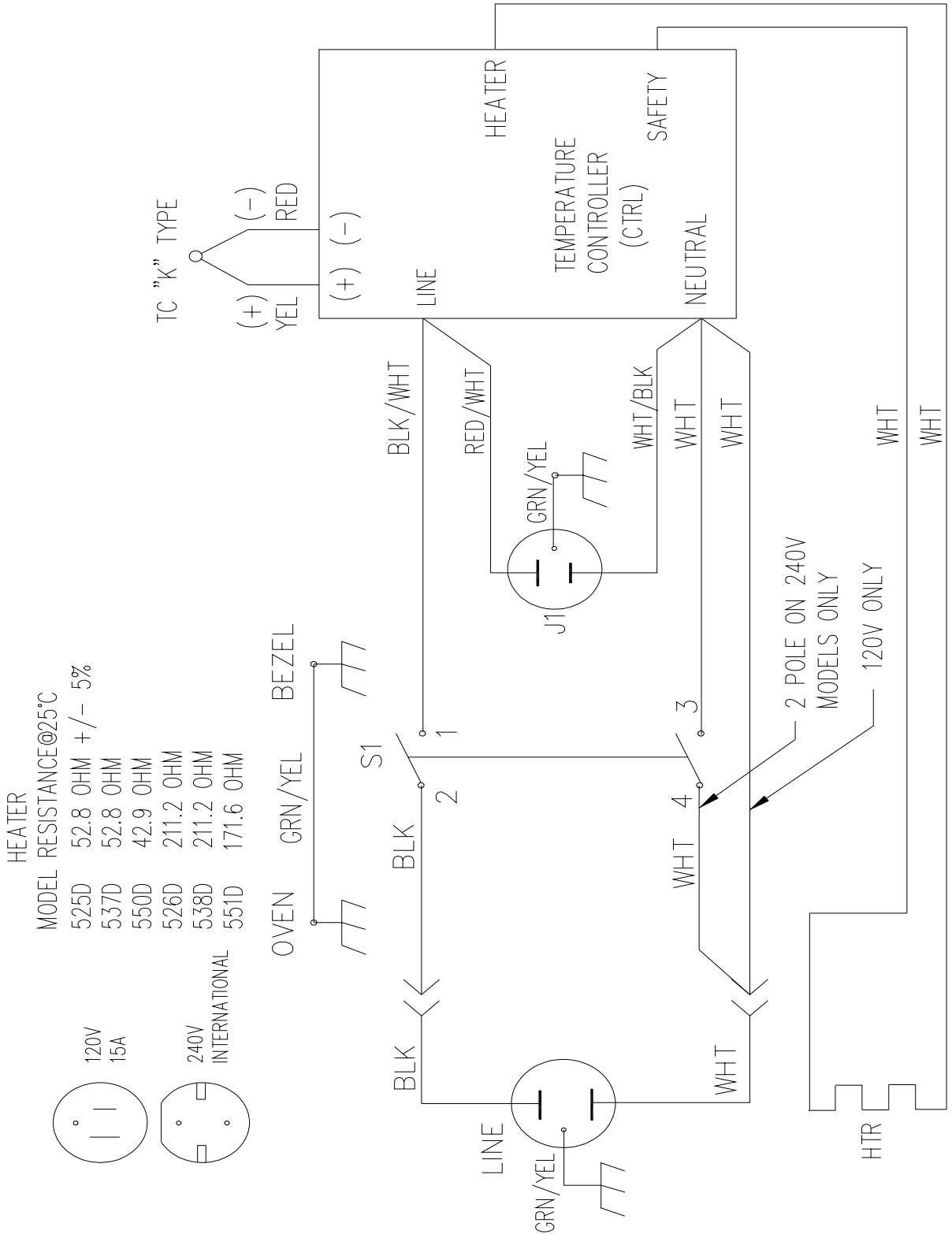
Model 525D	260 W	2.5 cu ft
Model 537D	260 W	3.8 cu ft
Model 550D	320 W	5.0 cu ft

### **Chamber Dimensions (W x D x H)**

Model 525D	18 x 18 x 13.5 in
Model 537D	18 x 18 x 20 in
Model 550D	18 x 18 x 26.5 in

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# Electrical Schematic



**Fisher Technical Support: 1-800-926-0505**

**Fisher Service Dept.: 1-800-395-5442**

**Fisher Sales/Parts: 1-800-766-7000**

Part No. 95586 Rev. G

**500 Series Economy Incubators**

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