



Fisher Isotemp[®] Low Temperature Incubator Model 307C Catalog Number 11-679-25C

Fisher Low Temperature Incubator offers laboratories precise temperature control over the -10°C to 60°C range.

Performance meets requirements for the preservation of vaccines, biologicals, incubation of bacterial cultures, and determination of bio-chemical oxygen demand of sewage. The extended operating temperature range also includes temperatures associated with drug stability projects, dairy product evaluation and entomological studies.

The spacious chamber accommodates up to 300 standard BOD bottles, or similar containers. The 5 reinforced shelves can handle up to 60 lbs of sample weight each.

Features include:

- 5 Removable shelves
- 1 Removable storage basket
- 6 Molded door shelves
- Door Lock with key
- Microprocessor based temperature controller, with temperature readout to .1°C
- 3 Cooling control modes: High precision with cooling, High precision without cooling and Frost free with variable cooling
- Solid state relay for heater
- Over/ under temperature safety relay and alarm Over temperature thermostat
- Compressor relay for energy conservation
- Compressor overload relay
- RTD temperature probe
- Protected setpoint mode to avoid accidental change
- Convenience outlet inside chamber, 2 amp
- Interior light with door switch

WARNING

- This manual must be carefully read and thoroughly understood before operating the unit, failure to follow directions or precautionary measures could result in serious adverse effects.
- This equipment must be used only as specified in these instructions.
- This equipment is intended for indoor use only.
- This equipment must be earth grounded for safe operation.
- Maximum ratings of accessories that may be plugged into convenience outlet: Load current 2 Amps. @ 115VAC, Leakage Current 250 micro Amps.

CAUTION

The aluminum evaporator and other portions of these units should not be exposed to the corrosive effects of acidic or caustic materials. Extreme care must be exercised if such materials are stored within to prevent voiding the warranty. This Incubator is NOT suitable for flammable material storage.

SPECIFICATIONS

Power Requirements:

115V, 8.9A, 60 Hz (Including 2 A for convenience outlet)

Dimensions:

Height:	70 in (179cm)
Width:	32 in (81cm)
Depth:	28.5 in (72cm)
Volume:	20.3 cu ft (0.58m ³)
Shelf Data:	5 in chamber, 6 on door, 1 basket
Capacity:	300 BOD bottles

Shipping Weight:

283 lb. (128 kg)

Operating Environment:

Temperature Range:	10°C to 40°C
Humidity Range:	0% to 90% RH
Maximum Altitude:	6600 ft (2 km)
Air clearances:	Back, top and sides 3.0" minimum
Overvoltage Category	II (IEC664)
Pollution Degree 2 (IEC664)	

Performance Characteristics:

Operating Range:	-10° to +60°C
Uniformity:	±0.5°C ¹
Stability:	±0.2°C ¹
Display Readability:	0.1°C

¹ Per ASTM method E 1292-94, cooling modes 00 and 100

PACKING LIST

Qty Item

- 1 Low Temperature Incubator
- 1 Instructions

UNPACKING and INSPECTION

NOTE: If damage is observed, keep the shipment intact (including the carton and all packing material) and file a claim with the final carrier.

INSTALLATION

The Low Temperature Incubator should be installed on a level, stable floor. Use the adjustable feet to level the incubator. Locate the unit so that there is at least 3 inches of clearance around the sides, top and back to ensure sufficient ventilation. Note: When cooling is enabled, heat is dissipated on sides of unit resulting in side temperatures of 35 to 55°C. To prevent heat build up within the unit, do not install it where it will be exposed to strong sunlight, nor near radiators, furnaces, or other sources of heat. Do not install the incubator where flammable or corrosive atmospheres may exist. The Low Temperature Incubator is not to be used out-of-doors or where excessive moisture or contamination could cause degrading of mechanical or electrical components.

1. Unbolt and remove the wooden slats underneath unit.
2. Remove all protective tape from doors and shelves.
3. Clean interior and exterior with warm soap and water. Shipping tape residue can be removed using isopropyl alcohol.
4. Uncoil line cord from rear of unit. Connect the plug to a power outlet that complies with the electrical requirements specified on the unit's label and with proper safety ground connection. If line cord replacement is necessary, use CSA types: SJ, SJO or SJT, 16 GA, 3 cond. or equivalent.

CONTROLS

Power ON/OFF Switch: Located on back wall of chamber, is used to turn power (1) ON or (0) OFF to entire unit.

Alarm Switch:

Located in kick-panel in the front, is used to enable or disable alarm buzzer.

Keys: Located on front panel.

MENU - Used to access controller menus.

SET - Used to display setting.

Δ INCREASE setting.

∇ DECREASE setting.

DISPLAY and INDICATORS

DISPLAY: (On front panel)

Displays chamber and set point temperatures in °C and prompts from menu.

INDICATORS: (On front panel)

DELAY: Lights when delay start timer for compressor is timing. Will begin timing when power is first applied or when cooling compressor is turned off.

ALARM: Indicates that chamber temperature is not within limits and the safety relay is opened.

COOL: Lite when cooling compressor is on.

HEAT: Lights when controller demands heat.

INDICATORS: (In kick-panel grille)

Temperature Alarm:

Indicates alarm is activated.

GENERAL FUNCTIONAL CHECKS

1. Apply power by placing the Power ON/ OFF switch (Located inside chamber) to I (ON) position. The Controller, on front of door, will display L, then, 88.8 (to test display), then begins reading actual chamber temperature.

Note: When power is first applied, if display indicates S instead of L, a switch setting on the controller must be changed. Refer to Replacing Temp Controller TC1.

2. After 3 seconds, the alarm LED on the controller should extinguish and the safety relay will close applying power to the heater, fan, compressor relay and convenience outlet.

3. Press and hold MENU key, after 3 sec. the display will indicate CAL. Release and press MENU again to display Pct, press SET, display should indicate 100. Press and release MENU again to indicate Pro, press SET, display should indicate 00, press and release MENU to return to normal control mode. Press SET to display control setpoint, display should read 25.0. If the control setpoint or any of the other parameters aren't set correctly, use the Δ or ∇ keys while pressing SET to change the setting.

4. The DELAY LED will be lit for 7 minutes after power is first applied, the COOL LED will be out during this delay period. When the DELAY LED goes out, the COOL LED will light and the compressor relay will close starting the compressor.

5. Allow unit to stabilize for 1 hour at 25°C, to ensure that all systems are functioning.

OPERATION

Perform the procedure under General Functional Checks if

incubator is new or hasn't been operated for a long period of time.

Controller operation:

Usually the only controller setting that is necessary to change is the chamber temperature control setpoint. Other parameters of the controller may be changed by accessing them through the menu key, covered later.

Changing Chamber Temperature Control Setpoint

1. The chamber temperature is continuously displayed, unless a key is pressed.
2. To display the setpoint temperature, press the SET key. The setpoint temperature will remain on the display for 1 sec. after the SET key is released.
3. To change the setpoint temperature, press and hold SET while pressing the Δ or ∇ keys to change the setting. (Note that when either Δ or ∇ keys are first pressed, the display will begin to change slowly at first, then increase change rate after a few seconds.)
4. Select the desired chamber setpoint then release all keys. The controller display will revert back to actual chamber temperature after a few seconds. Allow up to an hour for unit to stabilize at the new setpoint temperature.

After the incubator temperature has stabilized, place samples into incubator chamber. For best results, arrange samples evenly throughout the chamber. Liquid samples should be covered to prevent evaporation and eventual frost build up on evaporator coils, particularly when operating below ambient.

The Low Temperature Incubator has an internal 2 amp. convenience outlet inside chamber to operate devices such as: shakers, rotators, photosynthesis lights, recording thermometers etc.

Accessing Controller Menus:

The temperature controller has three menu selections that can be accessed by pressing and holding the MENU key for 3 seconds. To access menu parameter, press and hold the SET key. To change the parameter, use the Δ or ∇ keys.

CAL Menu- Calibration Menu is used to change the temperature offset value to correct for differences in chamber temperature and the displayed temperature. Range -5° to 5°C. See Calibration Procedure.

Pct Menu- (Percent Cooling Menu) Used to select one of three cooling modes:

100% Mode- Compressor runs continuously which provides high precision control (+/- .2°C Stability) over entire temperature range.

50% Mode- Compressor runs approximately half the time which conserves power and also prevents and eliminates frost buildup inside chamber. Stability is +/- 1.5°C in this mode.00% Mode- Compressor is completely off. This mode is ideal for incubating samples at temperatures 10°C or higher above ambient (35°C to 60°C). It provides the greatest power savings yet still maintains the advertised stability.

Pro Menu- Protection Menu - Used to select the Protection

mode of operation that determines when the alarm is activated and if the control setpoint can be changed. Range 0.0 to 0.2.

0.0 Mode- Normal mode that allows the user to change setpoint. Alarm activates if chamber temperature (chamber) and setpoint temperature (setpoint) are as follows: chamber $\leq 15.0^{\circ}\text{C}$ and chamber $< (\text{setpoint} - 3)$ or chamber $\geq 40.0^{\circ}\text{C}$ and chamber $> (\text{setpoint}+3)$

While ALARM is activated, the safety relay is opened interrupting power to the heater, fan, convenience outlet and compressor. When chamber temperature returns to acceptable limits, the ALARM will automatically terminate and power is reapplied. In order to allow changing of setpoint and eliminate nuisance alarms, an alarm by-pass takes effect when the setpoint is changed or when power is first applied. The alarm by-pass works as follows: Present chamber temperature is stored as a nominal alarm temperature (nominal). If chamber $<$ setpoint then alarm temperature (alarm) = nominal -3. If chamber $>$ setpoint then alarm = nominal +3. If chamber should go beyond alarm or < -13 or > 63 then the ALARM will activate.

This alarm by-pass is active until chamber reaches setpoint $\pm 1^{\circ}\text{C}$.

0.1 Mode- Same as 0.0 Mode, except that the setpoint is locked and can't be changed.

0.2 Mode Setpoint is locked, plus, the ALARM will activate and the safety relay will open as follows:

chamber $< (\text{setpoint} - 3)$ or chamber $> (\text{setpoint} + 3)$

In order to use this mode of protection, modes 0.0 or 0.1 will have to be used to reach the setpoint temperature. Once the chamber temperature reaches the setpoint and is stable, protection mode 0.2 can be set.

Note! If the chamber temperature falls outside the setpoint by $\pm 3^{\circ}\text{C}$, the ALARM will activate and safety relay will interrupt power. This mode can only be used if the door is to remain shut and other disturbances don't effect the chamber temperature.

The audible alarm, located in the kick-panel grille, can be turned on or off by using a small rod, such as a plastic pen, to push the switch either ON or OFF. This doesn't effect the safety power relay operation or alarm lights.

As an added safety feature, the incubator has a thermostat in the heater compartment that limits the upper chamber temperature to 65°C .

MAINTENANCE

WARNING

To reduce the risk of electric shock, disconnect from power source before servicing.

Before re-applying power, after maintenance is complete, check to ensure that safety ground is in-tact and making a good connection.

CLEANING

Immediately clean all spilled materials from the incubator and wipe dry. If necessary, moisten a cloth with soap and water and clean inside and out. Do not use any harsh chemical cleaners.

Do not attempt to clean the incubator while the unit is plugged into a power source.

DEFROSTING

Periodic defrosting may be necessary depending on operating temperature, ambient humidity, moisture from samples and cooling mode. Time between defrosts may be from 30 days to years.

Suggested defrost methods.

Method I: For control setpoints down to 10°C , this method is the least disruptive, if samples can withstand temperature stability of $\pm 1.5^{\circ}\text{C}$ for 24 hours. Samples may remain in chamber during this procedure.

1. (Refer to Accessing Controller Menus) Press and hold MENU key until CAL is displayed, then release and press MENU again until Pct is displayed.
2. Select 50 in the Pct menu then press MENU key twice to return control mode.
3. Allow incubator to remain in this mode for about 24 hours or until frost disappears.
4. Use the MENU key to re-establish the previous selection for Pct (i.e. 100).

Method II:

1. Remove any samples that may be damaged by temperatures up to 35°C .
2. Refer to Accessing Menu section of manual and set Pct parameter to 00.
3. Place Setpoint to 35.0°C .
4. Allow temperature to stabilize, for 1 hour.
5. After 1 hour, remove power from unit. Open door and wipe up any excess moisture on floor of chamber with paper towels or sponge.
6. Apply power and set desired operating parameters back into controller. After chamber temperature stabilizes, place samples previously removed back into unit.

CALIBRATION

If it becomes necessary to calibrate temperature controller, perform the following:

1. Place an accurate temperature measuring device in the geometric center of the chamber.
2. Set the controller to the desired operating temperature and allow to stabilize for 2 hours.
3. Note the chamber temperature on the controller display and the temperature at the geometric center.
4. Subtract the chamber display reading from the geometric

center reading.

5. Enter into the Calibration Mode as described in Accessing Menu.
6. Press and hold SET key, using the Δ or ∇ keys, set the calibration parameter to the value determined in step 4.
7. Allow unit to stabilize for 1 hour and check that controller value and geometric center value agree $\pm 0.2^\circ\text{C}$. Repeat calibration if necessary.

TROUBLE SHOOTING and REPAIR

Controller Errors and Alarms

Display	Safety	Alarm	=	Meaning
EEE/99.9	X	X	=	Open Sensor
EEE/99.8	X	X	=	Shorted Sensor
EEE/TEMP	X	X	=	Temp Limit

Temp Limit = Temp ($\pm 3^\circ\text{C}$ or more from setpoint) & ($> 40^\circ\text{C}$ or $< 15^\circ\text{C}$)

Replacing Temp. Controller:

1. Disconnect incubator from power source.
2. Remove front panel bezel by removing four screws in top and bottom of bezel.
3. Remove four screws that mount controller to mounting bracket.
4. Note wire colors and positions on TB1 and TB2, then remove all wires from TB1 and TB2 and old controller.
5. Locate switch DS1 on lower left corner of new controller and set the switches as follows:
Set DS1-1 (A) to on (down) .
Set DS1-2 (B) to off (up).
6. Attach wires previously removed from old controller to new controller.
7. Mount new controller and bezel, then apply power.
8. Refer to Calibration section of this manual, to calibrate new controller.

Replacing RTD Temp. Sensor:

1. Disconnect incubator from power source.
2. Refer to Replacing Temp. Controller, but only remove sensor wires from TB2.
3. Open incubator door and remove screw that holds Temp. Sensor on door shelf bracket.
4. Remove old sensor, then place new sensor on bracket.
5. Connect new sensor wires to controller then mount controller and bezel.
6. Apply power, then refer to Calibration section.

Replacing SSR1, K1, K2 or T1:

1. Disconnect incubator for power source.
2. Remove six screws from back panel then remove back panel.
3. Locate device to be replaced on bottom panel then remove mounting screws.
4. Unplug quick connect terminals, noting positions.
5. Place quick connects on new device and mount on panel.
6. Replace back panel, then apply power.
7. Refer to General Functional Checks to ensure that new device is operating.

Replacing FAN, S1, or THM1:

1. Disconnect incubator from power source.

2. Remove basket and shelves from chamber area.
3. Remove nine screws from heater cover at rear of chamber.
4. Rotate heater cover to right side of chamber.
5. Fan is located on back wall and S1 and THM1 are on switch panel attached to heater cover.
6. Replace desired part, then coat electrical connections with RTV102 or other electrical insulator.
7. Re-assemble in opposite order as previously described. Be sure to install gaskets on either side of heater cover.
8. Apply power, refer to General Functional Checks to ensure that new device is operating.

Replacement Parts:

TC1 Controller	SPN102214
Sensor, RTD	SPN88613
SSR1 Relay	SPN88616
K1 Safety Relay	SPN102260
K2 Comp Relay	SPN102259
T1 Transformer	SPN88678
THM1 Thermostat	SPN88612
FAN1 Motor	SPN46367
S1 Switch	SPN83373

Customer Service: 1-800-766-7000

Technical Assistance: 1-800-943-2006

Fisher Service Division: 1-800-395-5442

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