



VWR® Collection Model 89508-420

Refrigerated 6.1 cu ft Incubator

Operating and Maintenance Manual 7003734 • Rev. 0

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Important Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

Caution All internal adjustments and maintenance must be performed by qualified service personnel. ▲

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Important operating and/or maintenance instructions. Read the accompanying text carefully.



Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.



Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.



Hot surface(s) present which may cause burns to unprotected skin, or to materials which may be damaged by elevated temperatures.



Marking of electrical and electronic equipment, which applies to electrical and electronic equipment falling under the Directive 2002/96/EC (WEEE) and the equipment that has been put on the market after 13 August 2005.



This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the WEEE symbol. VWR International has contracted with one or more recycling/disposal companies in each EU Member State European Country, and this product should be disposed of or recycled through them. Further information on VWR's compliance with this directive, the recyclers in your country and information on VWR products will be available at www.vwrsp.com.

- ✓ Always use the proper protective equipment (clothing, gloves, goggles, etc.)
- ✓ Always dissipate extreme cold or heat and wear protective clothing.
- ✓ Always follow good hygiene practices.
- ✓ Each individual is responsible for his or her own safety.

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Section 1 Introduction

Thank you for selecting VWR for your equipment needs.

The Refrigerated 6.1 cu ft Incubator offers 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. Features include:

- Spacious 6.1 cu ft chamber accommodates up to 114 standard BOD bottles or similar containers
- Under the counter model with reversible door
- Two removable adjustable shelves (17.5”x 20.5”, 50 lbs. weight load.)
- Three molded door shelves (18.5”x 2.75”)
- Microprocessor-based temperature controller with temperature read-out to 0.1°C
- Solid state relay for heater
- Over/undertemperature safety relay and alarm LED
- Overtemperature thermostat
- Cooling control modes:
 - 1) High precision with cooling (100% mode)
 - 2) High precision without cooling (00% mode)
 - 3) Frost-free with variable cooling (50% mode)
- Compressor relay for energy conservation
- Compressor overload relay
- RTD temperature probe
- Protected setpoint mode to avoid accidental change
- Convenience outlet inside chamber, 2 amp (115V)

Section 2 Safety Information

These instructions contain important operating and safety information. The user must carefully read and understand these instructions before using the refrigerated incubator. Your unit has been designed to optimize function, reliability, safety and ease of use. It is the user's responsibility to install the incubator in conformance with local electrical codes.

Warnings

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity. Check the nameplate on the back of the unit for voltage and current rating. This equipment must be earth grounded for safe operation.
2. Maximum ratings of accessories that may be plugged into convenience outlet: load current 2A at 115VAC, leakage current 250 microamps.
3. Disconnect unit power cord from the power supply prior to maintenance and servicing.
4. When operating at 100% cooling, the unit should be defrosted periodically, especially during times of high humidity. The customer will be responsible for any repair work done caused by evaporator ice build up. See "Defrosting" section of this manual.
5. 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.
6. This equipment must be used only as specified in these instructions. If used in a manner other than as specified, the protection provided by the equipment may be impaired.

Section 3 Specifications

Power Requirements:

Catalog #89508-420120V, 9.5A, 60Hz
. . .including 2A for internal convenience outlet.

Dimensions:

Height:34.5 in (87.6cm)
Width:24 in (61cm)
Depth:24.5 in (62.2cm)
Volume:6.1 cu ft (0.173m³)
Shelf Data: . . 2 chamber (50 lbs. weight capacity, 3 door)
Capacity:114 BOD bottles
Shipping Weight:126 lb. (57 kg)

Operating Environment:

Indoor Use Only
Temperature Range:10°C to 40°C
Humidity Range: . . . 0% to 90% RH Non-Condensing
Maximum Altitude:6600 ft (2 km)
Air Clearances:Front and back, 3" minimum
Overvoltage Category II (IEC664)²
Pollution Degree 2 (IEC664)

Performance Characteristics:

Operating Range:-10° to +60°C
Uniformity:±1.0°C¹
Stability:±0.2°C¹
Display Readability:0.1°C

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

² Voltage supply fluctuation not to exceed ±10% of rated voltage

Section 4 Unpacking and Installation

The refrigerated incubator is shipped in a single carton. When unpacking the unit, check each loose item against the list below. Should a shortage exist, notify Technical Services.

If there is shipping damage, keep the entire shipment intact, retining the carton and all packing material and file a claim with the final carrier. Usually, the firm will send an investigator to ascertain liability.

Unpacking

Use the list below when unpacking to verify that the complete unit has been received. Do not discard packing materials until all items are accounted for.

The following items are included in the shipment:

Qty	Item
1	Refrigerated incubator (89508-420 catalog number)
1	Leg leveler instructions
1	Latching duct (used for door reversal)
1	End cap for duct (in bag with J clamps)
3	J clamps (used for door reversal, in bag with end cap)
1	Plastic bag containing 4 feet
1	Door handle with 2 mounting screws

Leg Leveler Installation

Use the adjustable feet to level the incubator.

1. Tip unit backwards so there is one foot of clearance on front of the unit. Have someone assist in tilting the unit, to prevent the incubator from falling while installing the leg levelers.
2. Screw front two leg levelers in until snug.
3. Tip the unit forward to screw in the back two leg levelers. Have someone assist in tilting the unit, to prevent the incubator from falling while installing the leg levelers. Leg leveler installation is complete.
4. If floor conditions do not allow the unit to sit level, adjust leg leveler(s) by turning the required leveler counterclockwise to increase the height and clockwise to reduce the height.

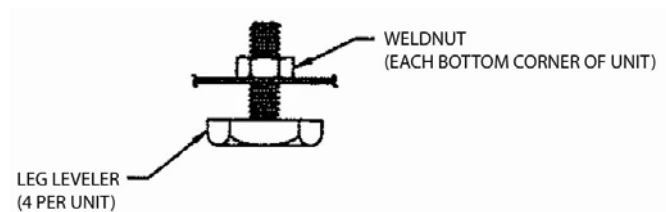


Figure 4-1. Leg Levelers

Installation

The Refrigerated Incubator should be installed on a level, stable floor.

Caution Do not place unit on its top, side, back, or front. If unit is accidentally placed in any position other than right side up, the unit must remain in upright position for at least 24 hours before connecting to power. ▲

Locate the unit so that area in front of door and kick grille is clear. 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 Refrigerated Incubator is not to be used out-of-doors or where excessive moisture or contamination could cause degrading of mechanical or electrical components.

Installation (continued)

1. Remove all protective tape from doors and shelves.
2. Clean interior and exterior with warm soap and water. Shipping tape residue can be removed using isopropyl alcohol.
3. 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.
4. Record serial number from unit on front cover of owner/operator manual.

Door Reversal (if necessary)

1. Disconnect unit from power source. On inside of door, directly behind controller, open snapped conduit and remove controller cable.
2. Remove screw that secures cable clamp holding controller cable, then replace screw.
3. Remove controller cable from anchors and ties that run along inside chamber side and back walls.
4. Place 3 provided adhesive-backed mounting anchors at approximately the same spacing (on opposite side) as existing anchors.
5. While supporting door with one hand, remove screw securing door to upper hinge, then lift door off bottom hinge.
6. Remove the three screws securing each hinge to chassis.
7. Remove three plug screws covering holes on left side, then install them in holes on right side.
8. Install hinges on left side using screws removed in Step 6. Position hinge with door screw on bottom.
9. Position door on hinge, then insert screw previously removed in Step 5.
10. Attach supplied latching duct to inside on door, in line with controller cable toward opposite side on door from other duct.
11. Route cable using mounting anchors, ties and latching duct.
12. Remove screw on left front of enclosure and install cable clamp with removed screw.
13. Adjust size of loop in cable where door is hinged to ensure door can fully open and close without interference.

Door Handle Installation

1. Push the handle down over the top of door on left side until it bottoms out. See Figure 4-2A.
2. While holding the handle in place, tighten the screws with a 1/4" nut driver until they are tight against the top inner-side of the door. **DO NOT OVERTIGHTEN. SCREWS DO NOT GO INTO THE DOOR.**

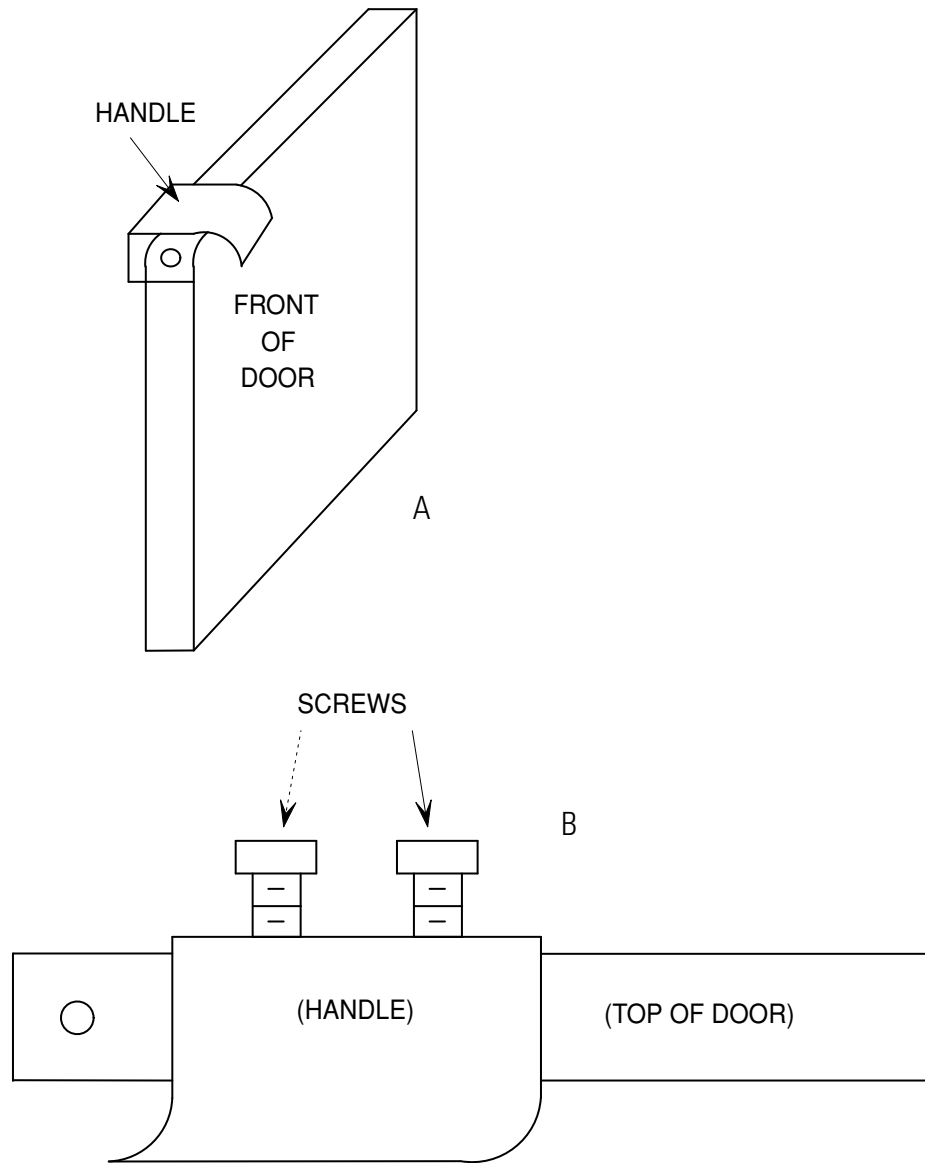


Figure 4-2. Installing the Door Handle

Section 5 Operation

Control descriptions are listed below.

Power ON/OFF Switch:

Located inside chamber area, is used to turn power (I) ON or (O) OFF to entire unit.



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' to change dipswitch setting as required. ▲

Figure 5-1. Power Switch

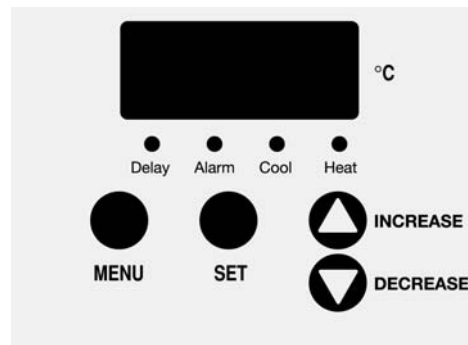
Keys located on front panel:

MENU - Used to access menus

SET - Used to display setting

▲ - INCREASE setting

▼ - DECREASE setting



Display (on front panel):

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

Figure 5-2. Front Panel

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 is first turned off.

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

COOL: Lights when cooling compressor is on.

HEAT: Lights when controller demands heat.

General Functional Checks

1. Turn power on to unit by placing the Power ON/OFF Switch to I (ON) position. The Controller (mounted on front of door) will display S , then, 88.8 (to test display), then actual chamber temperature.
2. After 3 seconds, the alarm LED on the controller should extinguish and the safety relay should close, applying power to the heater, fan, compressor relay and convenience outlet.
3. Press and hold MENU key, after 3-5 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 up or down arrow keys while pressing SET to change the setting.
4. The DELAY LED will be lighted 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 a minimum of 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 time.

Controller

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 Temp 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 second after the SET key is released.
3. To change the setpoint temperature, press and hold SET while pressing the up or down arrow keys to change the setting. (Note that when either up or down arrow 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.

Note Frost build-up is normal when unit is being operated below 35°C, with cooling set to 100% mode. ▲

The Refrigerated Incubator has an internal 2 amp convenience outlet inside the 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 parameters, press and hold the SET key. To change the parameter, use the up or down arrow keys.

Note Once a menu parameter has been accessed, if no keys are pressed within 8 to 10 seconds, the controller will automatically revert back to the home display (measured control temperature). ▲

Accessing Controller Menus (continued)

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

100% Mode (-10°C to 60°C) - Compressor runs continuously which provides high precision control ($\pm 0.2^\circ\text{C}$ Stability) over entire temperature range. Requires manual defrost.

Note All units are factory preset to 100%. ▲

50% Mode (15°C to 60°C) - Compressor runs approximately half the time, which conserves power and also reduces the amount of frost buildup on the evaporator. This method greatly reduces the frequency of manual defrosting but provides less temperature stability ($\pm 1.5^\circ\text{C}$).

00% Mode (35°C to 60°C) - 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 maintain the advertised stability. No defrosting required.

Pro (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 00 to 02.

00 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 $> (\text{setpoint} + 3)$.

Note All units are factory preset to 00. ▲

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 $\pm 1^\circ\text{C}$.

Accessing Controller Menus (continued)

01 Mode - Same as 00 Mode, except that the setpoint is locked and can't be changed.

02 Mode - Setpoint is locked, plus, the ALARM will activate and the safety relay will open as follows: chamber < (setpoint -3) or chamber > (setpoint +3)

In order to use this mode of protection, modes 00 or 01 will have to be used to reach the setpoint temperature. Once the chamber temperature reaches the setpoint and is stable, protection mode 02 can be set.

This mode can only be used if the door is to remain shut and other disturbances don't effect the chamber temperature.

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

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. ▲

Section 6 Maintenance

Warning To reduce risk of electric shock, disconnect unit from power source before servicing. ▲

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

Cleaning

Disconnect incubator from power source. 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.

Defrosting

Periodic defrosting may be necessary. The time between defrosts depends on operating temperature, ambient humidity and moisture from samples. Time between defrosts may be from 30 days to years. Defrosting may be necessary when operating at 50% mode as well, especially for control temperatures less than 15.0°C.

Suggested Defrost Methods

Method I: For control setpoint 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).

Suggested Defrost Methods (continued)

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 the 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 in 100% cooling mode and allow 2 hours for stabilization.
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 up or down 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.

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 remove old controller.
5. Locate switch DS1 on lower left corner of new controller and set the switches as follows:

Set DS1-1 (A) to off (up).

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 Temperature Sensor

1. Disconnect incubator from power source.
2. Refer to Replacing Temp. Controller, but only remove sensor wires from TB2.
3. Open incubator door, remove Sensor on door 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 screws from lower back panel, then tilt back panel out.
3. Locate device to be replaced on back panel, then remove mounting screws.
4. Unplug quick connect terminals, noting positions.
5. Place quick connects on new device and mount on back panel.
6. Replace back panel, then apply power.
7. Refer to General Functional Checks to ensure that new device is operating.

Replacing FAN2, THM1, HTR1

1. Disconnect incubator from power source.
2. Remove shelves from chamber area.
3. Remove heater cover at top back of chamber by removing 2 screws on either side.
4. Replace the THM1 or HTR1, if necessary, then coat electrical connections with RTV102 or other electrical insulator. To replace fan, remove HTR1, then remove 4 screws that hold enclosure, then replace fan.
5. Re-assemble in opposite order as previously described.
6. Apply power, refer to General Functional Checks to ensure that new device is operating.

VWR International, LLC
Radnor Corporate Center, Building One, Suite 200
100 Matsonford Road
Radnor, Pennsylvania 19087
United States

(610) 386-1700

www.vwrsp.com