thermoscientific

Thermo Scientific Environmental Chamber

Model 3962
Operating Manual

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Safety Notes

Basic Operating Precautions

These operating instructions describe environmental chambers.

The environmental chamber has been manufactured to the latest state of the art and have been tested thoroughly for flawless functioning prior to shipping. However, the environmental chamber may present potential hazards, particularly if it is operated by inadequately trained personnel or if it is not used in accordance with the intended purpose.

Therefore, the following must be observed for the sake of accident prevention:

- Never step into the unit.
- The environmental chamber must be operated by adequately trained and authorized professional personnel.
- The environmental chamber must not be operated unless these operating instructions have been fully read and understood.
- The present operating instructions, applicable safety data sheets, plant hygiene guidelines and the corresponding technical rules issued by the operator shall be used to create written procedures targeted at personnel working with the subject matter device, detailing:
    - The decontamination measures to be employed for the environmental chamber and the accessories used with it.
    - The safety precautions to be taken when processing specific agents.
    - Wearing protective equipment when handling e.g. microbiological and biological samples.
    - The measures to be taken in case of accidents.
- Repair work on the environmental chamber must be carried out only by trained and authorized expert personnel.
- Disconnect the unit from all power sources before cleaning, troubleshooting, or performing other maintenance on the product or its controls. To disconnect power supply to the environmental chamber, unplug the supply cord at the back of the environmental chamber. Note that turning the main switch on the front control panel to the Off position is not sufficient to disconnect power.
- The contents of these operating instructions are subject to change at any time without further notice.
- Keep these operating instructions close to the environmental chamber so that safety instructions and important information are always accessible.

- Drying time after decommissioning.

Humidity After transport or storing under humid conditions a drying-out process must be performed. During the drying-out process the equipment cannot be assumed to meet all the safety requirements of the IEC 61010-2-010 standard. The drying-out period is 2 hours.

- Should you encounter problems that are not detailed adequately in these operating instructions, please contact Thermo Electron LED GmbH immediately for your own.

Operational Safety Rules

The following rules must be heeded when working with environmental chambers:

- Observe the sample weight limits specified for your environmental chambers, whole and its shelving in particular; see “Specifications” on page 11-1.
- Arrange the samples evenly throughout the work space, making sure not to place them too closely to the interior walls to ensure a uniform temperature distribution.
- Do not load your environmental chambers with substances that exceed the capabilities of the available lab apparatus and Personal Protection Equipment to provide sufficient degrees of protection to users and third parties.
- Check the door seal every 12 months for proper sealing performance and possible damage.
- Do not process any samples containing hazardous chemical substances that may be released into the ambient air through defective seals or may cause corrosion or other defects on parts of the environmental chamber.
- The user is responsible for carrying out appropriate decontamination procedures when hazardous materials are spilled on or inside the environmental chamber.
- If the environmental chamber is not used in the manner specified in this operating manual, the protection provided by the equipment design may be impaired.

Warranty

Thermo Fisher Scientific warrants the operational safety and functions of the environmental chambers only under the condition that:

- The environmental chamber is operated and serviced exclusively in accordance with its intended purpose and as described in these operating instructions.
- The environmental chamber is not modified.
- Only original spare parts and accessories that have been approved by Thermo Scientific are used (third-party spares without Thermo Scientific approval void the limited warranty).
- Inspections and maintenance are performed at the specified intervals.
- An operation verification test is performed after each repair activity.

Explanation of the Safety Information and Symbols

Safety Notes and Symbols Used Throughout These Operating Instructions

Indicates a hazardous situation which, if not avoided, will result in death or serious injuries.

Indicates a hazardous situation which, if not avoided, could result in death or serious injuries.

Indicates a situation which, if not avoided, could result in damage to equipment or property.

NOTE
Is used for useful hints and information regarding the application.

Additional Symbols for Safety Information

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.

WEEE Compliance: Thermo Fisher Scientific has contracted with companies for recycling/disposal in each EU Member State. For further information, send an email to weee.recycle@thermofisher.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.

Intended Use

The environmental chamber is a laboratory device intended for

- Stability testing,
- Shelf life studies, packaging testing,
- Cultivation of: cells, tissue, microorganism cultures, insects, plants etc.,
- Long term storage of cells substances and samples.

The devices employ:

- Precision temperature control - above or below and above temperature, depending on model.

Unintended Use

The appliance is not explosion-proof. To avoid the risk of explosion do not load the environmental chamber with tissue, material, or liquids that:

- are easily flammable or explosive,
- release vapor or dust that forms combustible or explosive mixtures when exposed to air,
- release poisons,
- release dust,
- exhibit exothermic reactions,
- are pyrotechnical substances,
- Cultivation of: human cells for diagnostics of diseases.

Refrain also from pouring any liquids onto the internal base plate.

Standards and Directives

- IEC EN 61010-1, IEC EN 61010-2-010
- Low Voltage Directive 2014/35/EC
- EMC Directive 2014/30/EC
- China EEP Hazardous Substances Information
  http://www.thermofisher.com/us/en/home/technical-resources/rohs-certificates.html
- Compliant with REGULATION (EU) No 517/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on fluorinated greenhouse gases. This product contains Foam blown with Fluorinated greenhouse gas, R-245FA.

If the environmental chamber is not used in the manner specified in this operating manual, the protection provided by the equipment design maybe impaired.

Delivery of the environmental chamber

Packaging

The environmental chambers are delivered in a rugged packaging box. All packaging materials can be separated and are reusable:

Packaging materials

Packaging carton:	Recycled paper
Foam elements:	Styrofoam (CFC-free and HFC-free)
Pallet:	Chemically untreated wood
Packaging film:	Polyethylene
Packaging ribbons:	Polypropylene

Acceptance Inspection

After the environmental chamber has been delivered, check the delivery immediately for:

- Completeness
- Possible damage

If components are missing or damage is found on the environmental chamber or the packaging, in particular damage caused by humidity and/or water, please notify the carrier as well as Thermo Scientific Technical Support immediately.

Risk of Injury

Should sharp edges have formed in damaged areas or elsewhere on the device, take all necessary precautions to protect personnel handling the environmental chamber. For example, have them wear protective gloves and other personal protection equipment.

Scope of Delivery

Part	Amount
Environmental chamber	1
Shelves and shelf channels	5 and 10

Transport Information

Moving the model 3962

The models have a total weight of approx. 500 lbs / 226.8 kg.

After unpacking, the unit is designed to be moved on even surfaces, in a laboratory, to its operating position only.

Installation

Ambient Conditions Location requirements

The environmental chamber must only be operated in a location that meets all of the ambient condition requirements listed below:

- Installation location indoors in dry areas free from drafts.
- The dust burden may not exceed the contamination category 2 based on EN 61010-1. Using the environmental chamber in an atmosphere with electrically conductive dust is prohibited.

Intermediate Storage

When the chamber is placed in intermediate storage, which is permissible for a maximum of four weeks, make sure that the ambient temperature is between 20°C to 60°C (68°F to 140°F) and the maximum relative humidity does not exceed 90%, non-condensing.

Install the Unit

Unit must be installed against a wall or similar structure. Maintain a minimum six inch clearance behind the environmental chamber for electrical connections. In addition, a minimum six inch ventilation clearance is needed on each side.

Locate the environmental chamber away from exterior doors and windows as changes in outdoor temperatures and contact with direct sunlight can affect the anti-condensation functions of the unit.

Position the door opening away from forced air heating and cooling ducts as these can carry dust, dirt, and other contaminants into the environmental chamber, as well as negatively affect the door opening recovery time.

Locate the unit on a firm level surface capable of supporting the unit's weight of approximately 500 lbs.

This environmental chamber weighs approximately 500 lbs. Have sufficient personnel available when moving.

- The operating room must be equipped with appropriate ventilation. Solid, level, fire-proof surface; no flammable materials opposite to the rear panel of the environmental chamber.
- The electrical circuitry of the environmental chamber has been designed for an operating height of up to 2000 m above sea level.
- If a high-voltage test is to be performed on the unit, it must first be heated for around 30 minutes at 50°C.
- The ambient temperature must be within 16 °C - 32°C (61 °F - 90 °F).

- Devices that produce excessive amounts of heat must not be placed near the environmental chamber.
- Power line voltage variations must not exceed ±10% of the nominal voltage.
- Transient surges must lie within the range of levels that normally occur in the power supply system. The impulse withstand voltage based on surge category II of IEC 60364-4-443 shall be applied at the nominal voltage level.
- Relative humidity up to 80%, non condensing.
- Should condensation exist, wait until the moisture has evaporated completely before connecting the environmental chamber to a power source and powering up.

See the serial tag on the side of the unit or the Specification section for electrical specifications.

Power Connection

Connect the environmental chamber to a grounded, dedicated circuit. The power cord connector is the mains disconnect device for the environmental chamber. Position the environmental chamber to allow unobstructed access to the power cord so that it can be easily disconnected in case of an emergency.

Plug the provided power cord into the power inlet connector on the back of the cabinet, then into the grounded, dedicated electrical circuit.

Model 3962 also has an internal outlet located on the right side of the interior back wall. The outlet is to provide power (1A maximum) to accessory equipment. Do not use this outlet when the temperature is above 40 °C.

Install the Shelves

The shelves may be installed at any level in the environmental chamber.Install a shelf channel on each side. With the tabs pointing up, attach the channel by locating the rivet into a slotted hole, far end first. Pull the channel toward the front and slide the front rivet on the channel into the slotted hole and press down. Make sure that the channels are opposite each other so that the installed shelf will be level.

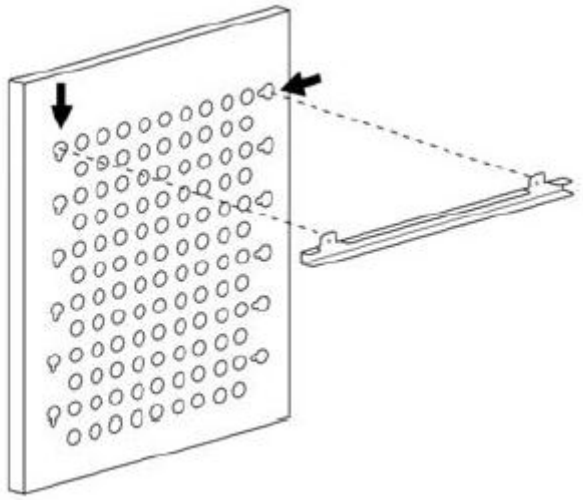


Figure 4-1 Shelf Channel on Side Duct

Level the Unit

Place a bubble-type level on a shelf inside the environmental chamber. Adjust the feet as needed; counterclockwise to lengthen or clockwise to shorten. Level the unit front-to-back and left-to-right.

Product Description

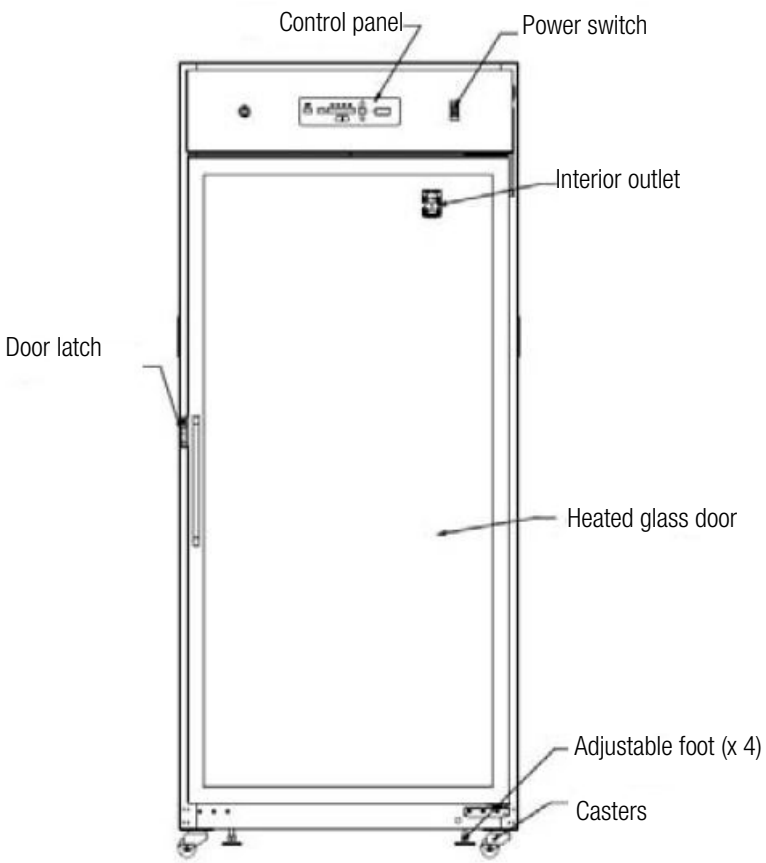


Figure 5-1 Front View

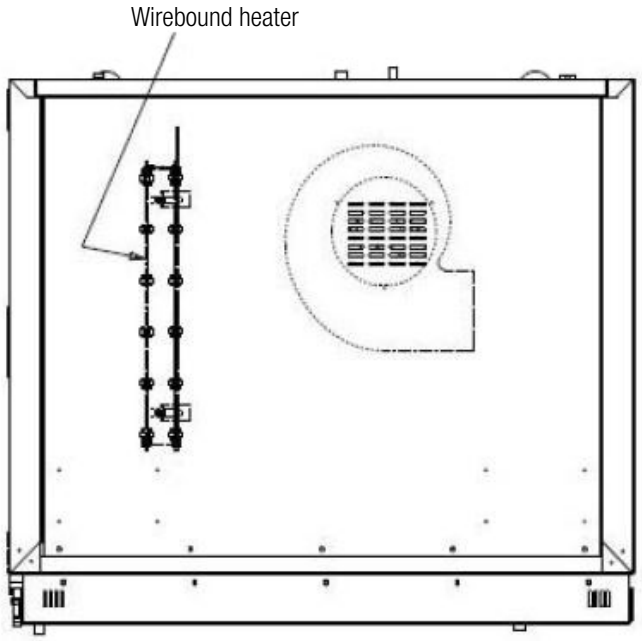


Figure 5-2 Top View

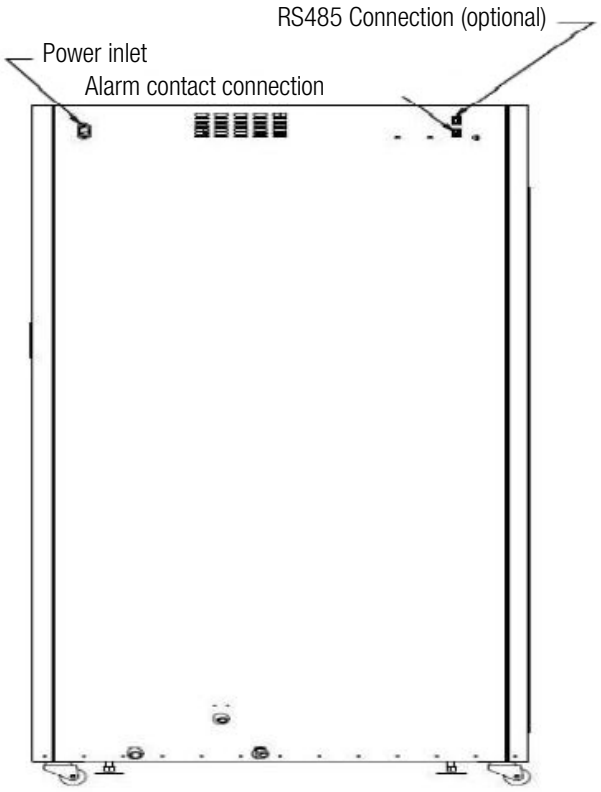


Figure 5-3 Back View

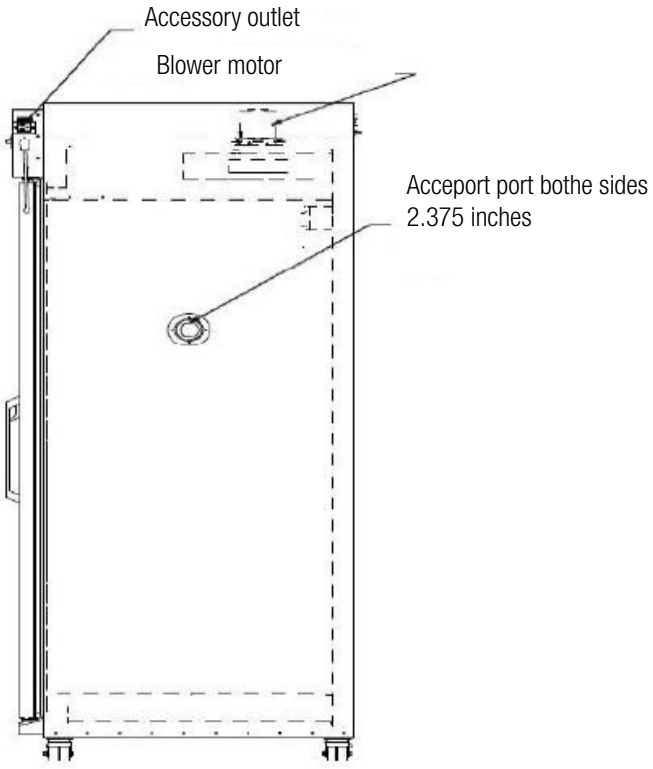


Figure 5-4 Side View

Factory Installed Options

Connect the Remote Alarm Contacts

A set of relay contacts is provided to monitor alarms through a RJ-11telephone style connector on the back of the unit. Refer to Figure 5-5 on page 5-3 for the location of the alarm connector. The 12-foot telephone cord (P/N 190388) and RJ11-to-screw terminal conversion box (190392) are available through the Technical Services department.

The remote alarm provides a NO (normally open) output, an NC (normally closed) output and COM (common). Refer to Figure 5-4 on page 5-2.

The alarm contacts will trip on a power outage or an over temperature condition. The contacts may also be programmed to trip or not trip on temperature arms and CO_2 alarms. See “Configuration” on page 7-6.

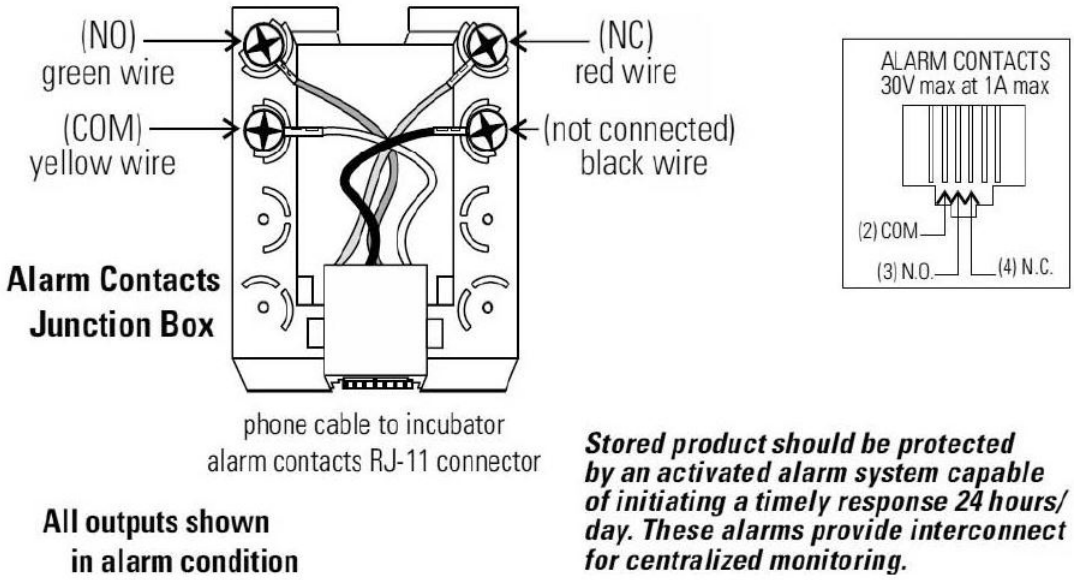


Figure 5-5 Remote Alarm Outputs

NOTE
After connecting the environmental chamber to the external alarm system, verify proper alarm operation by simply placing the environmental chamber power switch to its off position to simulate a power outage condition.

Connect the RS485 Interface

The Model 3962 can be purchased with the RS485 communications option (190523). This option allows the environmental chamber to be directly connected to a Model 1535 alarm system without the use of a communications module. A junction box is provided with each RS485 option. Refer to Figure 5-6 on page 5-4 for wiring details. Figure 5-7 on page 5-4 shows the location of the RS485 connector on the back of the environmental chamber.

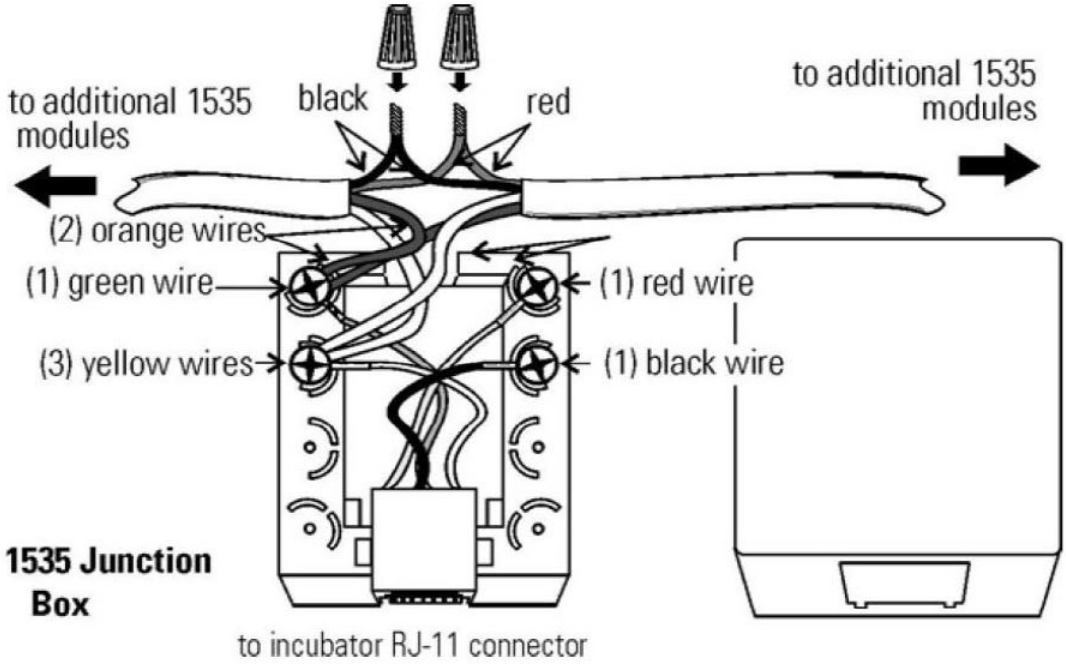


Figure 5-6 Wiring Details

CAUTION

Contains parts and assemblies susceptible to damage by Electrostatic Discharge (ESD).

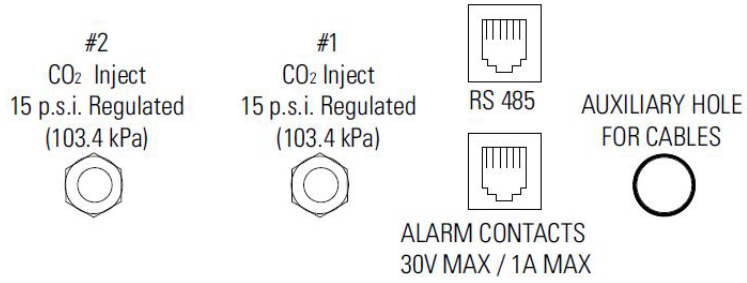


Figure 5-7 Location on Back

Connect the Analog Output Boards

The analog output board is an option (190512, 190543, 190544) that allows the environmental chamber to output analog signals representing the air temperature of the environmental chamber interior. There are three different analog output board options available: 0-1V, 0-5V or 4-20mA signals.

Refer to Table 5-1 for output specifications of the three boards.

CAUTION

Contains parts and assemblies susceptible to damage by Electrostatic Discharge (ESD).

Connect the Analog Output Boards (cont.)

	190512 4-20 mA Output Scaling 4-20 mA Equals	190544 0-1 V Output Scaling 0-1 V Equals	190543 0-5 V Output Scaling 0-5 V Equals
Temperature	0.0-100.0 °C	0.0-100.0 °C	0.0-100.0 °C
CO_2	0.0-100.0%°CO_2	0-100.0%°CO_2	0-100.0%°CO_2

Table 5-1 Analog Output Board Specifications

Negative display readings will output 0V. The outputs do not have isolated grounds.

To wire in the analog output board, a shielded 22 gauge, 3-conductor wire, Part # 73041, is recommended.

WARNING

The electronics area contains hazardous voltages. Opening the drawer and/or wiring in an analog board should be performed by qualified personnel only. If the unit has been in service, disconnect the power cord from both the unit and the power source, turn off all gas regulators, and disconnect all tubing and any other connections from the rear of the electronics drawer.

1. To access the analog board, remove the top of the environmental chamber.
2. Locate the Analog Output board.
3. Strip the ends of the conductor and wire it to the appropriate terminals of connectors J_2 on the analog board. Refer to Figure 5-8 on page 5-6.

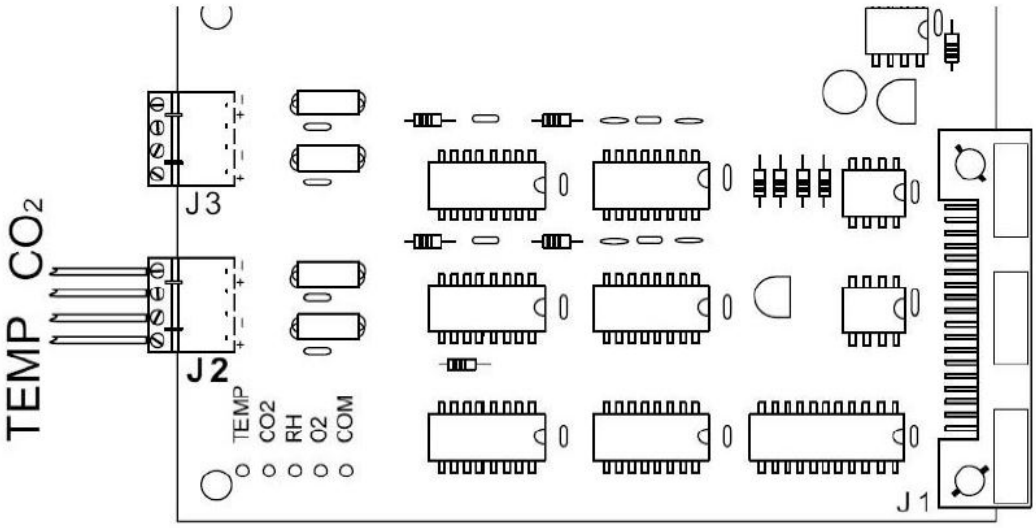


Figure 5-8 Connectors on Board

4. Route the wires through the auxiliary hole located on the back of the unit. See Figure 5-8 on page 5-6 for the location of this hole and Figure 5-9 on page 5-6 for routing details.

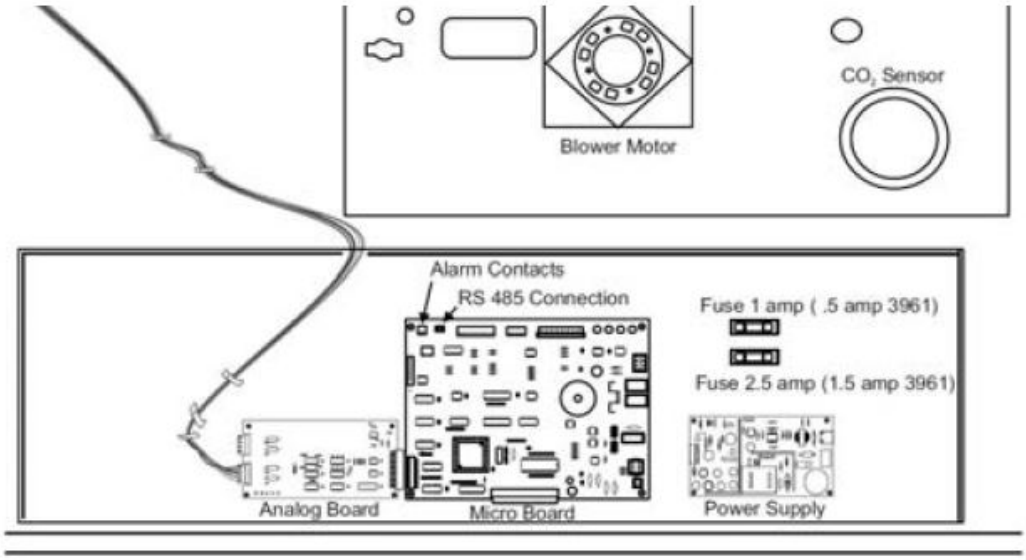


Figure 5-9 Board Location in Drawer

5. When wiring is completed, re-install the unit top.

NOTE
Accuracy of the analog outputs measured at the circuit board terminal strip with respect to the environmental chamber display is ±1 unit. There is no calibration of the analog outputs by the environmental chamber, so the instrument(s) connected to the analog outputs must be calibrated to match the environmental chamber display before returning to service.

Inner Doors

Align the shelves and shelf channels with each of the inner doors to facilitate introduction and removal of trays. Clean these doors with the same care as the single door.

Shaker Support Shelves

Shaker support shelves are reinforced and secured to the environmental chamber walls. They have a load limit of (1) shaker or 200 pounds per shelf, one shelf being the floor of the unit. The shaker platform limit is 50 pounds. Shakers must not exceed 250 rpm when used inside this environmental chamber. For shaker power connection, an internal outlet in the upper right corner of the back wall is installed. Casters are installed at the factory for moving the cabinet to the desired location. After the unit is in place and prior to operation, the casters must be removed. The large rubber vibration feet, factory installed, are positioned correctly for operation. Do not adjust.

CAUTION

Any equipment placed inside the chamber must be rated for unit operating temperature.

Access Port

At the left side of the unit is one access port to feed-in cables to the inner chamber. To minimize the opening cone shaped inserts are available. If not in use the inside and outside openings can be closed using the 2 plugs supplied with the unit.

Figure 5-10 Access ports

NOTE
Check the access ports for condensation and wipe dry if necessary. At least every 3 months.

CAUTION

Door opening/closing

To avoid sample damage by vibration do not roughly open or close the glass and solid door.

To avoid slipping due to a water puddle in front of the unit caused by condensed water dropped down on the door, do not roughly open or close the solid door.

Pinch of body parts

To avoid pinching of fingers or hand, e.g. on hinge side between door and top box, close the solid door only with the handle.

Solid Door

The Solid Door, with an optional inner glass door, replaces the standard glass door. The solid door has a heater built in to reduce condensation.

Figure 5-11 Model 3962 with solid door and inner glass door

The drains for condensed water are in the solid door

Figure 5-12 Solid door drain

and the front frame

Figure 5-13 Solid door drain

The condensed water is drained off to the rear side.

If water leaks the unit, clean up the water immediately to avoid slipping. Check for the cause of the leakage and eliminate before continuing operation.

Inner glass door

The inner glass door is optional.

It is for enabling operators to view or inspect the inner chamber without disturbing the chamber atmosphere.

For cleaning see section “Clean the Glass Doors” on page 8-2 in chapter “Cleaning and Disinfection” on page 8-1.

Operation

Preparing the environmental chamber

The environmental chamber must not be released for operation before all major start-up activities have been completed.

Device Check

Prior to starting operation, the following environmental chamber components must be checked for their correct function:

- The door seal in the front frame must not be damaged.
- The glass door must not be damaged.
- The shelving components must be installed safely.
- Disinfecting the work space.

Preliminary Cleaning and Disinfecting

Disinfect all interior surfaces with a general-use laboratory disinfectant, such as quaternary ammonium, to remove any residues which may remain from production of the environmental chamber. Rinse thoroughly with sterile distilled water, then 70% alcohol. Dry with a sterile cloth as needed.

Disinfect the shelf channels and shelves, then rinse with distilled water before installing.

Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

Start-Up

With the environmental chamber properly installed and connected to power, system setpoints can be entered. The following setpoints can be entered in Set Mode: Temperature and Overtemperature. To enter Set Mode, press the Mode key until the Set indicator lights. Press the right and/or left arrow keys until the proper parameter appears in the message display center. See Figure 7-3 on page 4 for more detail.

It is the responsibility of the user to validate the proper operation of each environmental chamber in their specific application(s) with respect to unit location, operating environment, and settings.

Handling and Control

Control Panel Keys, Displays & Indicators

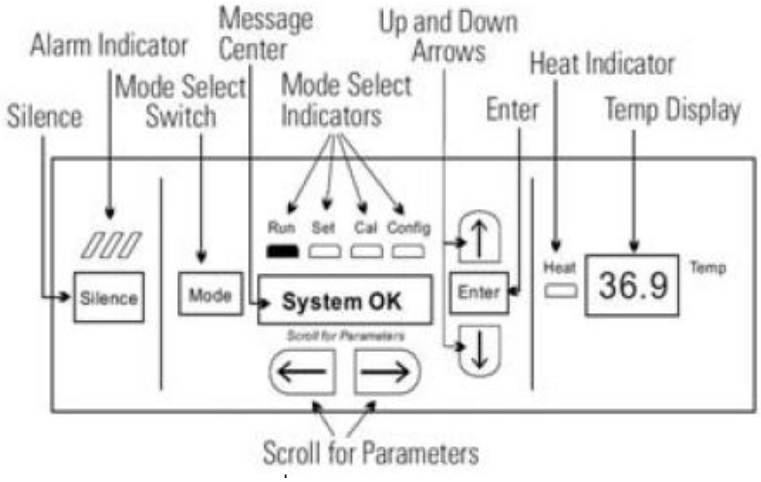


Figure 7-1 Control Panel

Silence - Press to mute the audible alarm.

Alarm Indicator - Light pulses on/off during an alarm condition in the unit.

Mode Select Switch - Used to select Run, Setpoints, Calibration and System Configuration Modes.

Message Center - Displays system status.

Mode Select Indicators -

- Run: Run Menu
- Set: Set Points Menu
- Cal: Calibrate Menu
- Config: Configuration Menu

Up and Down Arrows - Increases/decreases or toggles the parameter values that have been selected in the SET, CAL, and CONFIG Modes.

Enter - Press Enter key to save to memory all changed values.

Heat Indicator - Lights when power is applied to the heaters.

Temp Display - Displays temperature continuously

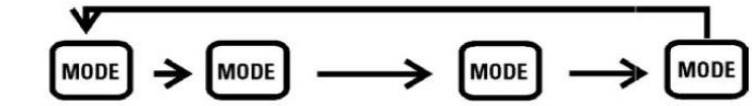
Scroll for Parameters Arrows - Steps the operator through the parameters of SET, CAL and CONFIG Modes. The right arrow goes to the next parameter, the left arrow returns to the previous.

Keypad Operation

The Model 3962 Series environmental chamber has four basic modes that allow environmental chamber setup: Run, Setpoints, Calibration and System Configuration.

- Run is the default mode during normal operation.
- Set is used to enter system setpoints.
- Calibration is used to calibrate various system parameters.
- Configuration allows for custom setup of various options.

The chart below shows the selections under each of the modes.



RUN	SETPOINT	CALIBRATION	CONFIGURATION
Default Mode	Temperature	Temp Offset	Audible
	Overtemp		Access Code
			Temp Lo Alarm
			Temp Relay
			RS485 Address

Figure 7-2 Modes

Set the Operating Temperature

This environmental chamber has an operating temperature setpoint range of 5.0 °C above ambient to 60.0 °C. It is shipped from the factory with a temperature setpoint of 10.0 °C. At this setting, all heaters are turned off.To change the operating temperature setpoint:

1. Press the Mode key until the Set indicator lights.
2. Press the right arrow until “TEMP XX.XC” is displayed in the message center.
3. Press up/down until the desired temperature setpoint is displayed.
4. Press Enter to save the setpoint.
5. Press the Mode key until the Run indicator lights for Run mode or press the right/left arrow keys to go to next/previous parameter.

Set the Overtemp Setpoint

Any equipment placed inside chamber must be rated for unit operating temperature.

In the event that the heaters are permanently locked on as a result of a failure in the main temperature control, the independent overtemp system is designed as a safety to protect the environmental chamber only. It is not intended to protect or limit the maximum temperature of cell cultures or customer's equipment inside the environmental chamber if an overtemp condition occurs.

The environmental chamber is equipped with an independent circuit that monitors the air temperature in the cabinet. Should the main temperature control fail, the overtemp circuit will disconnect power to all heaters when the chamber temperature reaches the Overtemp setpoint. When the chamber temperature falls below the Overtemp setpoint, the overtemp circuit will reconnect power to all heaters. An environmental chamber operating in the overtemp condition will maintain the chamber temperature approximately 1 °C around the Overtemp setpoint.

The overtemp setpoint is set by the factory (default) at 40 °C. However, the overtemp can be changed over a range from 0.5 °C above the operating temperature setpoint to 65 °C.

If the environmental chamber's operating temperature setpoint is set above the overtemp setpoint, the overtemp setpoint will automatically update to 1 °C above the temperature setpoint. It is recommended that the overtemp setpoint be maintained at 1 °C over the operating temperature setpoint.

To set the Overtemp setpoint:

1. Press the Mode key until the Set indicator lights.
2. Press the right arrow until OTEMP XX.XC is displayed in the message center.
3. Press the up or down arrow until the desired Otemp setpoint is displayed.
4. Press Enter to save the setting.
5. Press the Mode key until the Run indicator lights, or press the right or left arrow to go to the next or previous parameter.

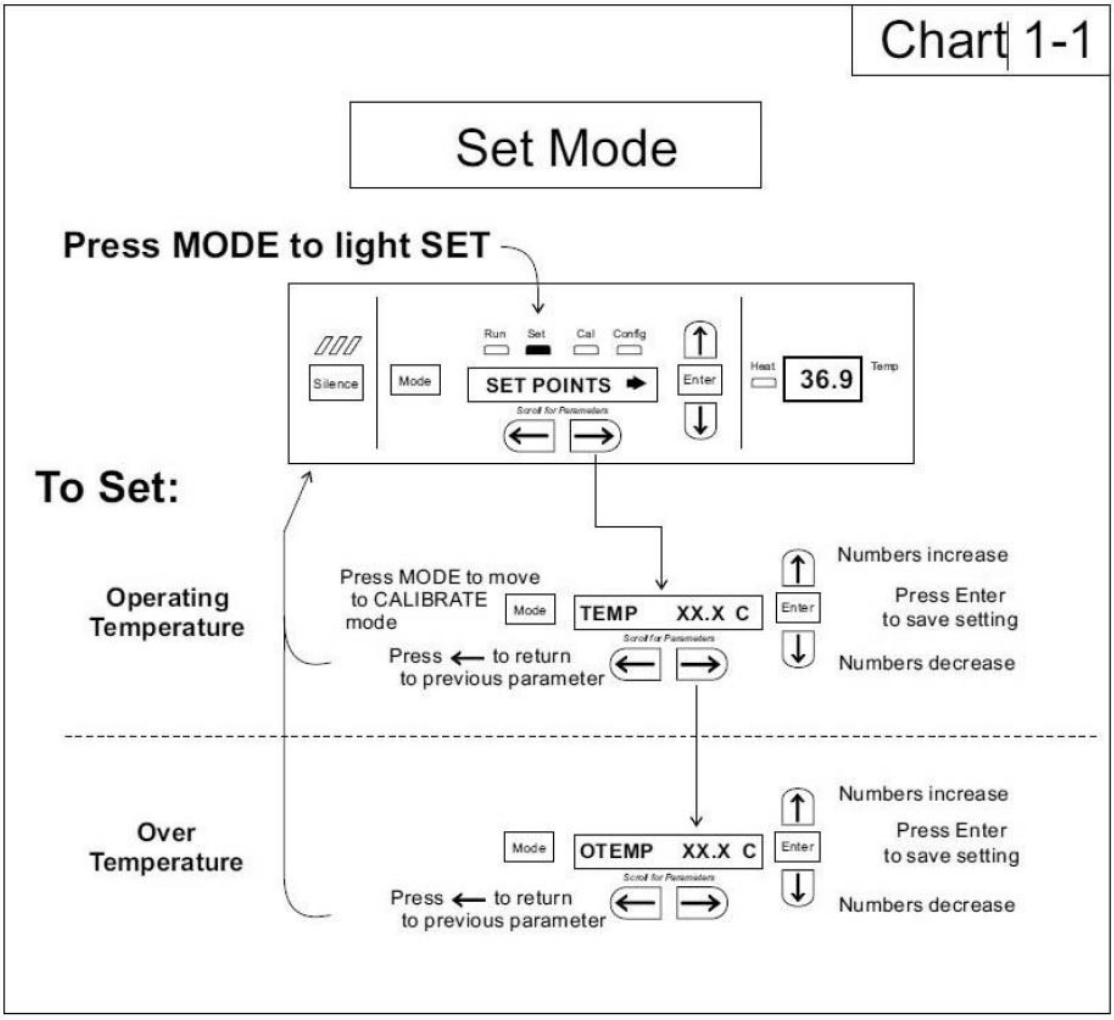


Figure 7-3 Set Mode

Calibration

After the unit has stabilized, the air temperature can be calibrated to reference instruments. To access Calibration mode, press the Mode key until the Cal indicator lights. Press the right and/or left arrow until the proper parameter appears in the message center. See Figure 7-4 on page 7-6 at the end of this section for more detail.

Calibration frequency is dependent on use, ambient conditions and accuracy required. A good laboratory practice would require at least an annual calibration check. On new installations, all parameters should be checked after the stabilization period.

Prior to calibration, the user should be aware of the following system functions. While the unit is in Calibration mode, all system control functions are stopped so the unit remains stable. Readout of the system being calibrated will appear on the message center. If no keys are pressed for approximately five minutes while in Calibration mode, the system will reset to Run mode so control functions are reactivated.

Before making any calibration or adjustments to the unit, it is imperative that all reference instruments be properly calibrated. Read and understand all reference instrument operating manuals before use. Double-check all values entered into the environmental chamber for accuracy before completing calibration and returning unit to service.

Calibrate the Temperature

Before calibration, allow the cabinet temperature to stabilize. Place the calibrated instrument in the center of the chamber. The instrument should be in the airflow, not against the shelf.

Start-Up - Allow 12 hours for the temperature in the cabinet to stabilize before proceeding.

Presently Operating - Allow at least 2 hours after the display reaches setpoint for temperature to stabilize before proceeding.

1. Press the Mode key until Cal indicator lights.
2. Press the right arrow until “TEMPCAL XX.X” appears in the message center.
3. Press the up/down arrow to match the display to the calibrated instrument.
4. Press Enter to store calibration.
5. Press the Mode key to return to Run or the right/left arrow to go to next/previous parameter.

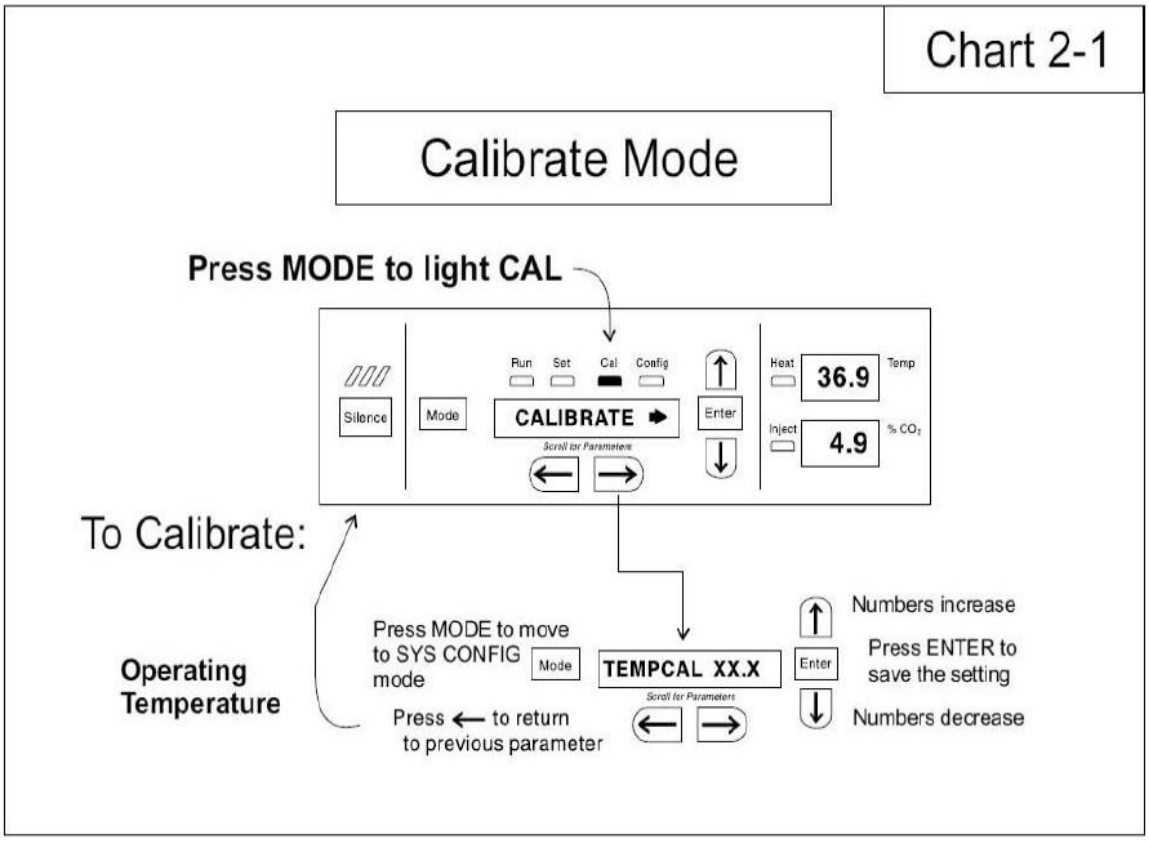


Figure 7-4 Calibrate Mode

Configuration

Several features available in the Configuration Mode allow custom setup of the environmental chamber. These features are listed and described below. All features may not be necessary in all applications, but are available if needed. To enter Configuration mode, press the Mode key until the Config indicator lights. Press the right and/or left arrow until the appropriate parameter appears in the message center. See Figure 7-5 on page 7-8 at the end of this section for more detail.

Turn All Audible Alarms On/Off

The audible alarms can be turned on or off. The factory setting is ON.

1. Press the Mode key until the Config indicator lights.
2. Press the right arrow until AUDIBLE XXX is displayed in the message center.
3. Press up/down arrow to toggle AUDIBLE ON/OFF.
4. Press Enter to save the setting.
5. Press the Mode key to return to run mode or right/left to go to next/previous parameter.

Set an Access Code

A 3-digit Access Code can be entered to avoid unauthorized personnel from changing the setpoints, calibration, or configuration. A setting of 000 will bypass the access code. The factory setting is 000.

1. Press the Mode key until the Config indicator lights.
2. Press the right arrow until ACC CODE XXX is displayed in the message center.
3. Press up or down arrow to change the access code.
4. Press Enter to save the access code.
5. Press the Mode key to return to the Run mode or right/left to go to next/previous parameter.

Set Low Temp Alarm Limit (Tracking Alarm)

The low temp alarm limit is the deviation from the temperature setpoint, which will cause a low temp alarm. The low temp alarm is variable from 0.5° below setpoint to 5.0° below setpoint. The factory setting is 1.0° below setpoint. A minus sign in the display indicates that the alarm setting is below the setpoint.

1. Press the Mode key until the Config indicator lights.
2. Press the right arrow until TMP LO XX.XC is displayed in the message center.
3. Press up/down arrow to change the low temp alarm limit.
4. Press Enter to save the low temp alarm limit.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

Enable Temp Alarms to Trip Relay Contacts

The temperature alarms can be programmed to trip the remote alarm contacts. A setting of ON will cause this, a setting of OFF will not allow temperature alarms to trip the contacts. The factory setting is ON.

1. Press the Mode key until the Config indicator lights.
2. Press the right arrow until TMP RLY XXX is displayed.
3. Press the up/down arrow to toggle the setting ON/OFF.
4. Press Enter to save the setting.
5. Press the Mode key to return to Run or the right/left arrow key to go to next/previous parameter.

Communications Address - RS485

On units that have the RS485 option, direct communication with the Model 1535 alarm system can be established. Each piece of equipment connected to the 1535 must have a unique address. An address of 0-24 can be entered for the environmental chamber. A setting of 0 is an invalid address that the 1535 will ignore. The factory setting for the RS485 address is 0.

1. Press the Mode key until the Config indicator lights.
2. Press the right arrow until 485 ADDR XX is displayed in the message center.
3. Press up/down arrow to change the RS485 address.
4. Press Enter to save the RS485 address.
5. Press the Mode key to return to Run mode or right/left to go to next/previous parameter.

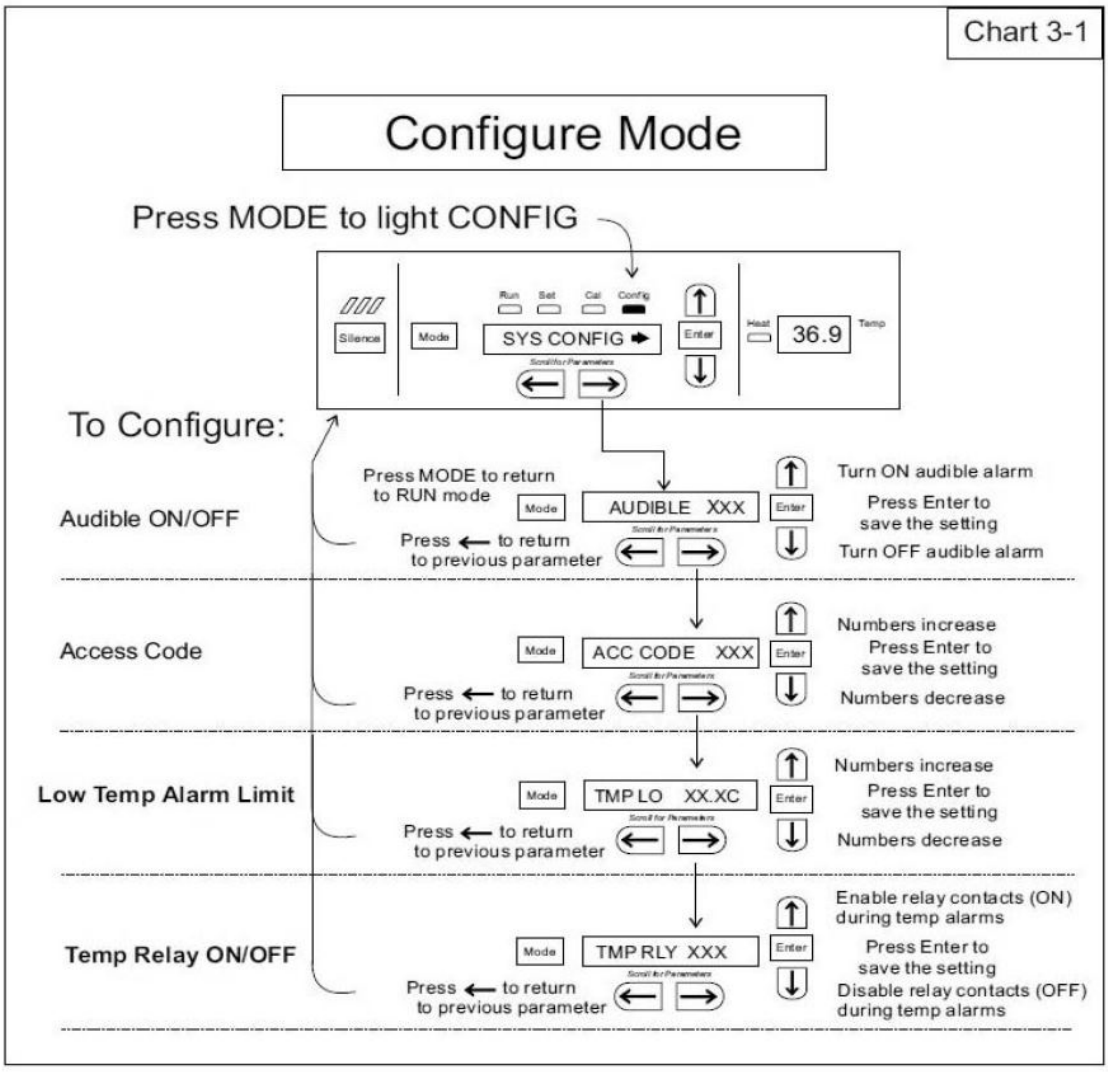


Figure 7-5 Configure Mode

Alarms

The Model 3962 Series environmental chamber is equipped with a system which notifies the user of an alarm condition inside the environmental chamber. All alarms are displayed in the control panel message center. The following table contains information on all possible systems alarms.

To avoid alarms going off in day-to-day use, some alarms are equipped with a time-delay feature. For this to function correctly, the alarm condition must exist for the specified length of time before the message center will display the alarm. This allows for interruptions, such as door openings, to occur without the environmental chamber going into a continuous state of alarm.

When an alarm condition exists, the Silence key can be pressed to temporarily mute the audible alarm. The message center will continue to show the alarm condition. If the alarm condition is not corrected within a specified length of time, the alarm will sound again or "ring back" to remind the user.

When multiple alarm conditions occur, active messages are displayed in the display center one at a time, updating at 5-second intervals. Pressing Silence during multiple alarms causes all active alarms to be muted and to ring back in 15 minutes.

The temperature alarms are disabled when the Temp set point is 10 °C.

Description	Message Code	Delay	Ring back	Relay
No alarm condition exists	SYSTEM OK	-----	-----	-----
Temp > Otemp Set point	SYS IN OTEMP	0 min.	15 min.	Yes
Air Temp Sensor Fault	AIR SNSR ERR	0 min.	15 min.	No
Temperature Controller Failure	TMP CTRL ERR	0 min.	15 min.	Yes
Door is Open	DOOR IS OPEN	15 min.	15 min.	Yes
Temp < Temp Low Tracking Alarm	TEMP IS LOW	15 min.	15 min.	Programmable

Table 7-1 Systems Alarms

Sensor Fault Alarms

The microprocessor in Model 3962 environmental chambers continually scans all available sensors to ensure that they are operating properly. Should an error be detected, the environmental chamber will sound an alarm and display the appropriate message. If such an alarm occurs, contact your local distributor or the Technical Services department.

Cleaning and Disinfection

If the unit has been in service, disconnect the power cord from both the unit and the power source. Allow the unit to cool before proceeding with any maintenance.

Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method would not damage equipment.

It is the responsibility of the user to immediately clean up after all accidental spills of hazardous materials. Be certain to follow local EHS policies with regards to personal protective equipment, cleaning, and disposal.

Cleaning

The chamber interior may be cleaned with a general-use laboratory disinfectant, such as quaternary ammonium, or alcohol.

The cabinet exterior may be cleaned with soap and water or any nonabrasive commercial glass cleaner.

Alcohol, even a 70% solution, is volatile and flammable. Use it only in a well ventilated area that is free from open flame. If any component is cleaned with alcohol, do not expose the component to open flame or other possible hazards. Allow the alcohol to fully dry before turning power on.

Do not use strong alkaline or caustic agents. Stainless steel is corrosion resistant, not corrosion proof. Do not use solutions of sodium hypochlorite (bleach) as they may cause pitting and rust.

Clean the Glass Doors

The chamber glass door and the optional independent inner doors may be cleaned using the same disinfectant as used on the environmental chamber interior. It is imperative that they be rinsed with sterile distilled water to remove the disinfectant residue. The doors should then be dried with a clean soft cloth.

Some precautions in the cleaning and care of the environmental chamber glass doors:

Moisture leaches alkaline materials (sodium, Na) from the surface of the glass. Evaporation of the moisture concentrates the alkaline and may produce a white staining or clouding of the glass surface. Cleaning chemicals with a pH above 9 accelerate the corrosion process. Therefore, it is very important to rinse and dry the glass doors after cleaning.

There is no simple method for repairing corroded glass. In most cases, the glass must be replaced.

Do not use chlorinated solvents on stainless steel as they can cause rusting and pitting.

Do not use volatile or aromatic solvents for cleaning inside the cabinet as their residue can contaminate the cabinet environment.

The glass door may be cleaned with commercial glass cleaner or with a solution of ammonia and water.

Health hazard

The surfaces of the workspace may be contaminated. Contact with contaminated cleaning liquids may cause infections. Disinfectants may contain harmful substances.

When cleaning and disinfecting, always observe the safety instructions and hygiene regulations!

- Wear safety gloves.
- Wear safety goggles.
- Wear mouth and respiratory system protection gear to protect your mucous membranes.
- Observe the safety instructions of the disinfectant's manufacturer and the hygiene supervisor.

Incompatible cleaners

Some device components are made of plastic. Solvents can dissolve plastics. Strong acids or caustic solutions can cause to become brittle of the plastic. For cleaning plastic components and surfaces, do not use solvents that contain hydrocarbons, solvents with an alcohol content of more than10% or strong acids or caustic solutions!

Decontamination or cleaning agents

The "Thermo or Forma" company or their agent is to be consulted if there is any doubt about the compatibility of decontamination or cleaning agents.

Moisture-sensitive components!

Sensitive components!

Do not spray cleaning agent onto the controllers of the device. When wiping the device clean, always make sure that moisture does not enter into these components.

Cleaning exterior surfaces

1. Thoroughly remove dirt residues and deposits using a solution of tepid water and dish washing agent.
2. Wipe the surfaces clean using a clean cloth and clear water.
3. Then, wipe the surfaces dry using a clean cloth.

Cleaning operation panels

The operation panels are moisture-sensitive.

Do not spray or wipe with cleaner.

Clean using a dry cloth of 100% micro fibre.

Wipe/spray disinfection

The manual wipe/spray disinfection is carried out in three stages:

- Predisinfection
- Cleaning
- Final disinfection

- **Alcoholic disinfectants!**

Disinfectants having an alcohol content of more than 10% may form, in combination with air, easily combustible and explosive gas mixtures.

When using such disinfectants, avoid open flames or exposure to excessive heat during the entire disinfection process!

- **Use such disinfectants only in adequately ventilated rooms.**
- **After the disinfectant has been allowed to react, wipe the cleaned device components thoroughly dry.**
- **Observe safety regulations to avoid fire and explosion hazard caused by alcohol-containing disinfectants.**

Chloride-containing disinfectants

Do not use chloride-containing disinfections!

Predisinfection

Remove all samples from the work space and store them in a safe place.

Spray disinfectant onto the surfaces of the work space and of the accessories or wipe the surfaces clean using disinfectant.

Risk of injury caused by breaking of the glass panel

The glass panel may only be removed by properly trained and authorized personnel. The glass panel must be held by two persons.

Allow time for disinfectant to act as specified by the manufacturer.

NOTE
Disinfecting hard-to-reach components
Spray the sensor and hard-to-reach components with disinfectant!

Cleaning the workspace

Thoroughly remove dirt residues and deposits using a solution of tepid water and dish washing agent.

Wipe the surfaces clean using a clean cloth and plenty of clear water.

Remove the cleaning liquid and wipe all surfaces of the workspace thoroughly dry.

Final disinfection

Spray the surfaces of the workspace, the shelving system and the parts removed with disinfectant one more time and wipe dry.

Allow the disinfectant to act as specified by the manufacturer.

Reinstall the shelf system and the removed components.

Maintenance

De-energize all potential sources of energy to this unit and lockout/tagout their controls. (O.S.H.A. Regulation, Section 1910-147.)

The continued cleanliness of the stainless steel used in this unit has a direct effect on the appearance and operation of the unit. Use the mildest cleaning procedure that will do the job effectively. Clean the outside of the environmental chamber with soap and water or with any non-abrasive commercial spray cleaner. Clean the inside of the chamber with alcohol and/or soap and water. Disinfect the interior panels with a general use laboratory disinfectant, diluted according to the manufacturer's instructions. Rinse the surface thoroughly after each cleaning and wipe the surfaces dry. Always rub in the direction of the finish polish lines.

Preventive Maintenance for Environmental Chambers

Your equipment has been thoroughly tested and calibrated before shipment. Regular preventive maintenance is important to keep your unit functioning properly. The operator should perform routine cleaning and maintenance on a regular basis. For maximum performance and efficiency, it is recommended that the unit be checked and calibrated periodically by a qualified service technician. We have qualified service technicians, using NIST traceable instruments, available in many areas. For more information on Preventive Maintenance or Extended Warranties, contact Technical Services.

The following is a condensed list of preventive maintenance requirements. See the specified section of the instruction manual for further details. Cleaning and calibration adjustment intervals are dependent upon use, environmental conditions and accuracy required.

Tips for all environmental chamber:

- Do NOT use bleach or any disinfectant with high chlorine content.
- Avoid spraying cleaner on the CO_2 sensor.
- Use water with characteristics as described in 'Connect Water Inlet'.
- Do not use powdered gloves for tissue cultures.

See Manual Section	Action	3 Months	Yearly
--	Inspect door latch, hinges and door gasket seal		✓
6	Perform a complete decontamination procedure. Wipe down interior, shelves, side panels with disinfectant.Rinse everything well with sterile water.		Between Experiments more frequent decontamination may be required, depending on use and environmental conditions.
7	Verify and document all calibrations, at minimum.		✓
--	Electrical safety test according to national regulations.		✓
5	Check access ports for condensation, wipe dry, if applicable. At least every 3 Months.	✓	

*Qualified service personnel only ~ Regular monitoring routines of the various levels in your unit is encouraged.

Discarding/ Removing environmental chamber from Service

Federal regulations require that doors be removed from environmental chamber before units are removed from service or discarded.

Returns for Repair

Prior to returning any materials, please contact our Customer Service Department for a “Return Materials Authorization” number (RMA). Material returned without an RMA number will be refused.

Contamination Hazard

The environmental chamber may have been used for treating and processing infectious substances, which may have caused contamination of the environmental chamber and its components.

Prior to disposal, it is therefore mandatory that all environmental chamber components be properly decontaminated.

- Clean the environmental chamber components thoroughly, then disinfect or decontaminate them (depending on application).
- Fill in and attach a declaration of decontamination with details on decontamination activities performed to the items that are to be repaired.

Disposal

Contamination Hazard

The environmental chamber may have been used for treating and processing infectious substances, which may have caused contamination of the environmental chamber and its components.

Prior to disposal, it is therefore mandatory that all environmental chamber components be properly decontaminated.

Clean the environmental chamber components thoroughly, then disinfect or decontaminate them (depending on application).

Fill in and attach a declaration of decontamination with details on decontamination activities performed to the items that are to be disposed of.

Specifications

		Model
Parameter	**Unit**	**3962**
Chamber volume	L / cu ft	821 / 29
Chamber temperature range	°C (°F)	ambient +5 - 60 (ambient +9 - 140)
Chamber humidity range	% RH	--

		Model
Unit dimensions	**Unit**	**3962**
Internal dimensions W x H x D	mm/in	787 x 1524 x 686 / 31.00 x 60.00 x 27.00
External dimensions (without feet / casters) W x H x D*	mm/in	965 x 2032 x 838 / 38.00 x 80.00 x 33.00
Footprint	m2 / ft2	0.809 / 8.71
Number of Shelves: standard / maximum		5 / 26
Number of shelf positions		26
Shelf material		Solid stainless steel reinforced
Shelf size (W x D)	mm/in	778 x 656 / 30.62 x 25.81
Shelf surface area	m2 / ft2	0.5 / 5.4
Max. shelves surface area per chamber	m2 / ft2	13.5 / 145.8
Loading capacity per shelf, stationary	kg/lbs	13.6 / 30
Loading capacity of unit	kg/lbs	136 / 300
Weight of unit without accessories	kg/lbs	226.8 / 500
Weight of unit accessories incl packaging	kg/lbs	330 / 727.5
External dimension incl packaging W x H x D	mm/in	1270 x 2160 x 1170 50 x 85 x 46
Access ports with blanking plug		2x access port at the left & right side 2x blanking plug each at out- side
Access port diameter	mm/in	61 / 2.4

		Model
Temperature Performance without Humidity Control (at ambient temperature 22°C +/-3°C)	**Unit**	**3962**
Temperature stability, temporal mid of work space according to DIN12880 at 20 °C to 37 °C (68 °F to 99 °F)	°C	≤ ± 0.1
Temperature uniformity between 25°C to 37°C, spatial according to DIN12880 at typical value / max. value	°C	± 0.4 at 30°C (86°F) ± 0.3 at 37°C (98.6°F) ± 0.5 at 45°C (113°F)

		Model
Electrical Data	**Unit**	**3962**
Power line voltage (+/-10%)	V	230
Power line frequency	Hz	50/60
Power rating without options, measured at ambient temperature of 32°C / 90°F	W	1150
Max current without options, measured at ambient temperature of 32°C / 90°F	A	5.0
Power Cord / Plug		230V: CEE 7/7
Earthing system (e.g. 1/N/PE)		1/N/PE AC (PE-connected)
IP protection system		IP 20
Protection class		I
Overvoltage category according to IEC 60364-4-443		II
Pollution degree		2

		Model
Ambient conditions	**Unit**	**3962**
Ambient Temperature Range	°C (°F)	16 - 32 (61 - 90)
Max. rel. humidity in service at or below 32°C, non condensing	% r.F.	55
Storage temperature range	°C (°F)	20 - 60 (68 - 140)

		Model
Ambient conditions	**Unit**	**3962**
Max. humidity in storage, non condensing	% r.F.	90
Post-transport acclimation time	h	2
Noise level (measuring point: device-distance of the front side, 1.0 m, height=1.6m)	dB(A)	--
Heat load to the environment	W / BTU hour	150 / 510

		Model
Site conditions	**Unit**	**3962**
Maximum altitude above sea level	m/y NN	2000/2187
Minimum side clearance	mm/in	150 / 5.9
Minimum front clearance	mm/in	1100 / 43.3
Minimum back wall clearance	mm/in	150 / 5.9
Minimum top clearance	mm/in	250 / 9.8

Service

CAUTION

Service must be performed by qualified service personnel only!

Replace the Power Fuses

WARNING

De-energize all potential sources of energy to this unit and lockout/tagout the controls. (O.S.H.A. Regulation, Section 1910-147.)

WARNING

High voltage is present behind control panel. The remote overtemp alarm system should be installed only by qualified electrical service personnel.

There are only two replaceable fuses in the environmental chamber.

1. Turn off the environmental chamber's power switch and unplug the power cord.
2. Remove the top of the unit to access the fuses.
3. Refer to Figure 12-1 on page 12-1 for the location of the two fuses.
4. Install the top cover and return the unit to service. If the fuse(s) blow after restoring power to the environmental chamber, contact the Technical Services Department.

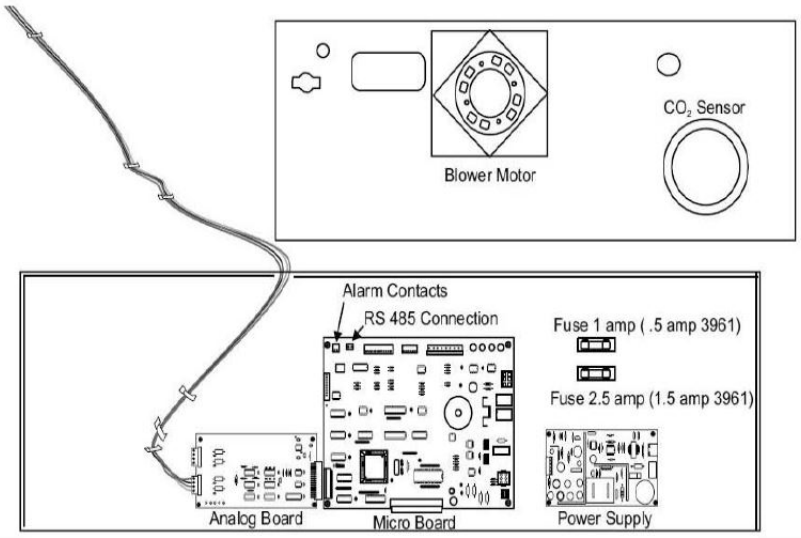


Figure 12-1 Fuse Locations

Fuse Voltage and Application	Manufacturers Part #	Amp Rating	Rupture Speed	IEC Letter Code
230 VAC Accessory Outlet	GMC-1A	0.5 Amp	Time-Lag	T
230 VAC Interior Outlet	GMC-500mA	1.5 Amp	Time-Lag	T
115 VAC Interior Outlet	GMC-2.5A		Time-Lag	T
230 VAC Interior Outlet	GMC-1.5A		Time-Lag	T

Table 12-1 Fuse Replacement

Information

Contact

Postal address USA:
Thermo Fisher Scientific LLC
401 Millcreek Road, Box 649
Marietta, OH 45750

Direct 1-740-373-4763
Toll Free, U.S. and Canada1-800-438-4851
FAX 1-877-213-8051
Internet http://thermoscientific.com
Technical Support service.led.marietta@thermofisher.com
Certified Service Web Page www.unitylabservices.com

EMEA
Postal Address Germany:
Thermo Electron LED GmbH
Robert-Bosch-Straße 1
D - 63505 Langenselbold

Sales Toll free 0800 1 536 376
or +49 6184 90 6940
Service Toll free 0800 1 112110
or +49 6184 90 6940
E-Mail info.labequipment.de@thermofisher.com

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