

Scientemp Corp.

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OPERATING AND INSTALLATION MANUAL MODEL 40-21B

This cabinet has passed the
QUALITY CONTROL INSPECTION
and meets the high standards at Scientemp Corp.
This inspection includes the complete refrigeration
system, cabinet construction and finish.

CONTACTING FACTORY

For reference and when contacting the factory, please have your freezer information ready:

MODEL NUMBER: _____

SERIAL NUMBER: _____

DATE SHIPPED: _____

PURCHASED FROM: _____

The Model Number and Serial Number can be found on the data plate attached to the cabinet on the back upper left corner.

**SCIENTEMP CORP.
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IMPORTANT! Do not discard the blue foam sublids from inside the chest freezer. The sublids are necessary to maintain correct temperature, moisture control and economy of operation.

Before you get started, please take a few minutes to read through this manual.

1. MOVING YOUR FREEZER

The refrigeration system of the cabinet is designed to operate with the cabinet located on a flat surface. **Do not tilt the cabinet more than 30° to any side.** If the cabinet must be tilted on an angle for handling or moving purposes allow it to sit in an upright position for two (2) hours prior to starting.

2. SAFETY PRECAUTIONS

In this manual, the words **WARNING** and **CAUTION** mean the following:

***WARNING:** a potentially hazardous situation, which if not avoided, could result in serious injury or death.

***CAUTION:** a potentially hazardous situation, which if not avoided, may result in minor or moderate injury or damage to equipment.

Before installing, using or maintaining this product, please be sure to read this manual carefully. Failure to follow these instructions may cause this product to malfunction, which could result in injury or damage.

Below are important safety precautions that apply to this product:

- Use this product only in the manner described in the product literature and in this manual. Before using it, verify that this product is suitable for its intended use.
- Do not modify system components.
- The cabinet must be properly grounded in conformity with national and local electrical codes. Never connect the unit to overloaded power sources.
- Disconnect the unit from all power sources before cleaning, troubleshooting or performing other maintenance on the cabinet.

3. CHOOSING A LOCATION

3.1 Air Circulation

The cabinet should be situated to allow proper air circulation in a well ventilated room. Provide at least 3” of space around the freezer for ventilation. Avoid placing the freezer in locations exposed to direct sunlight, heat registers or any other heat sources.

***NOTE:** The cabinet must be installed on a sturdy, solid, level floor resting firmly on all four mounting points.

3.2 Ambient Temperature

Do not place cabinet in sunlight, near heating diffusers, radiators or other sources of heat. Drafts from fans, air conditioning or open doors can also affect the product temperature. The ambient temperature range at the location must be 59 to 90°F (15 to 32°C).

***Warning:** This unit is not a “rapid-freeze” device. Freezing large quantities of liquid or high water content items will temporarily increase the compressors to operate for prolonged periods of time. Attempting to utilize this

freezer improperly may jeopardize safety or cause undue stress or damage to the refrigeration compressors.

Avoid opening the door for extended periods of time since chamber air will escape rapidly. Room air, which is higher in humidity, will replace chamber air and may cause frost to develop in the chamber more rapidly.

4. CABINET INSTALLATION START-UP

Once the cabinet has been placed in its permanent location and the proper power and grounding have been provided, the following items must be checked or completed:

1. Check for traces of oil in the compressor area, which could mean a broken or leaking refrigeration line.

***CAUTION: UNDER NO CIRCUMSTANCES SHOULD THE COMPRESSOR BE STARTED WHEN OIL IS PRESENT UNTIL INSPECTED BY A SERVICE TECHNICIAN.**
2. Inspect the factory wiring for terminals that might have vibrated loose in shipping. Tighten all screw-type terminals.
3. Check the refrigeration lines to insure that they do not rub and no damage was done during shipping of the cabinet.
4. Check fan blade(s) for “free” operation.
5. When freezer is plugged in and the compressor starts, the voltage should be checked at the compressor terminals to determine if there is proper voltage to the compressor. The voltage should not exceed the 10% above or below the rated compressor voltage.

After reading and completing the Safety Considerations, Installation and Operation section of this manual, you are now ready to plug in the freezer.

1. Check for obstructions with fan blades.
2. Cabinet should not be loaded with product until the cabinet has operated for 24 hours at the correct temperature.

Do not exceed the electrical and temperature ratings printed on the data plate located on the upper left backside of the cabinet.

***CAUTION:** Improper operation of the cabinet could result in dangerous conditions. Follow all instructions and operate within the design limits noted on the data plate.

Now that your cabinet has been trouble checked, run the cabinet down to storage temperature before loading product.

4.1 Lid Seal

If the lid gasket does not seal along the front edge, relieve the compression of the gasket along the back edge by loosening the hinge screws where they attach to the cabinet. Raise the lid slightly and then retighten the screws.

4.2 Interior Compartment Temperature

The temperature is controlled by a CAL 9500 digital temperature controller. Set the control to the desired set point. To view the set point temperature, press the * and the UP arrow keys together. To decrease the set point temperature, press the * and the DOWN arrows keys together.

Freezers are shipped from the factory with the indicating digital control programmed for proper operation. All but the temperature settings may be adjusted. The temperature sensor is a type “T” thermocouple located on the front wall of the inner-liner.

4.3 Sonalarm

The Sonalarm should be kept in the “OFF” position until the cabinet temperature has reached the appropriate setting. When the temperature has been reached, the temperature alarm should be switched to the “ON” position and is now ready to operate. It will monitor “temperature rise” and “power-failure”. The control is factory set to operate the Sonalarm at approximately 10°F (6°C) above the set temperature. No further adjustment is necessary unless a spread other than this is desired. In the event a temperature spread of more or less than factory set is desired, refer to your digital temperature control manual.

5 ELECTRICAL CONNECTIONS

5.1 Wiring

The cabinet must be plugged into a properly grounded electrical outlet. Electrical connection should be made in compliance with local codes.

We suggest a separate circuit with a fused disconnect be installed. To avoid the possibility of an accidental disconnect you may want to consider a direct connection to the electrical source. No less than a No. 14 gauge wire should be used for the electrical connection. **Follow your country’s electric codes.**

The electrical outlet should not be controlled by a wall switch, which might be turned off accidentally.

This cabinet is equipped with a three-prong (grounding) plug for your protection against shock hazards. The cabinet should be plugged directly into a properly grounded three-prong receptacle.

Where a two-prong wall receptacle is encountered, it must be replaced in accordance with the National Electronic Code and local codes and ordinances. A licensed electrician must do the work.

***WARNING: Do NOT under any circumstances cut or remove the round grounding prong from the cabinet plug.**

***CAUTION:** Incorrect voltage can result in severe damage to the equipment.

***CAUTION:** For personal safety and trouble-free operation, this cabinet must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not plug in the cabinet to overloaded power lines.

****Your freezer must be electrically grounded to prevent electric shock.**

Consult a licensed electrician if you have ANY doubt about the grounding of your wall receptacle. Only a licensed electrician can determine the polarization of your wall receptacle.

6 USING YOUR LOW TEMPERATURE FREEZER

Any temperature below 0° Centigrade or 32° Fahrenheit provides a potential condition to cause freezing of water or material containing water. Material containing water solutions of salt or sugar will freeze at a slightly lower temperature, depending on the content of the solution.

Because all warm-blooded creatures are composed of a great percent of water with salinity, they are subject to freezing whenever the body cells, parts or extremities reach temperatures below freezing. Therefore, it behooves the use of caution whenever you use a freezer or handle a frozen product that is at temperatures below 0° Centigrade or 32° Fahrenheit.

6.1 When Skin Freezes

When your skin is exposed to subfreezing temperatures for an extended amount of time, it can freeze. Your blood vessels constrict in response to dropping temperatures. This

reduces the flow of blood and, therefore, the amount of oxygen to the tissues. When water in these tissues freezes and forms ice crystals, cell structure is destroyed.

Tissue damage from cell death interrupts circulation in the smallest blood vessels. Blood clots form and blood flow is further diverted away from the frozen tissue. At this point, your skin temperature drops and the injured area grows even colder.

The first sign of frostbite may be a slightly painful tingling sensation, which often is followed by numbness. Your skin may look pale, and feel hard, cold and numb.

In the event of frostbite, warming is vital. Carefully warm frostbitten areas gradually. Place your hands directly on the skin of warmer areas of your body. If possible, immerse your hands in water that is slightly above normal body temperature (about 100°F or 37.8°C), or which feels warm to someone else, until your normal color returns. Do not use direct heat. Seek medical attention as quickly as you can.

6.2 After Thawing

Frostbitten areas will turn red and throb, or burn with pain, as they thaw. Even with mild frostbite, normal sensation may not return immediately. When frostbite is severe, the area will probably remain numb until it heals completely.

Severe frostbite damages nerves and can permanently change your sense of touch in the affected area.

***CAUTION: Wear protective clothing while either handling or coming in contact with inside of freezer. Hands should be dry and protected by using gloves. Insulated gloves are best for extended use when handling frozen product. Sleeves or arm-length insulated gloves should protect arms. Coats, insulated aprons, etc should protect other parts of the body that may be exposed to the cold.**

Frozen packages are hard and often slippery, therefore foot protection should be considered such as hard-toed shoes or foot guards in the event that a package would be dropped.

7 ABOUT YOUR SCIENTEMP FREEZER

7.1 Refrigeration System

The refrigeration system of a Scientemp freezer is hermetically sealed. It requires no maintenance. However, in areas where excessive dust and dirt collects, the condenser must be kept clean. To clean the condenser, remove power to freezer. Remove the guard on the back of the freezer. Use

forced air and a vacuum to clean dirt and debris from the condenser and refrigeration compartment periodically.

7.2 Fan

The fan motor has lifetime lubrication. It requires no maintenance.

7.3 Frost removal

1. While the freezer is running the frost may be removed with a plastic or wooden scraper or spatula. Do not use metal or sharp objects such as an ice pick, as this will cause serious damage to the finish of the inner-liner of the freezer. The frost and ice may be collected in a pan, towel or any device to prevent it from falling to the bottom of the freezer or onto the material stored in the freezer. Most of the frost and ice collects near the top edge and is easily removed.
2. In the case where the freezer is not loaded, frost and ice may be removed by disconnecting the power until the frost and ice thaw. After defrosting, dry the freezer compartment interior and turn on the power.

It is recommended to keep the freezer operating at a temperature below freezing rather than turning the freezer off and on.

8 SONALARM SIGNAL SYSTEMS

SCIENTEMP Sonalarm signal system is a dependable, compact unit designed to audibly alert you for temperature rise and power failure. The Sonalarm is an audible and visual signal-warning system. It produces a penetrating, repeating sound and has alternate flashing lights.

The Sonalarm, used in conjunction with a SCIENTEMP low temperature cabinet, will monitor “power-on”, “temperature-rise” and “power-failure”.

1. Power on is indicated by a small amber light, which is lit whenever power is available.
2. Temperature rise is indicated by alternate flashing lights accompanied by a repeating audible signal in the form of beep-beep-beep.
3. Power failure is indicated by alternate flashing lights accompanied by a repeating audible signal with the “power-on” light off.

The Sonalarm is powered by four (4) “D” sizes, 1-½ volt dry-cell batteries. It is important that the batteries be placed

correctly in the holders for the proper polarity. (Positive “+” of the battery to “+” of the holder.) We recommend batteries be replaced once a year to assure performance of the son alarm.

The lamps are readily changed from the front by unscrewing the red and amber lenses. Always use a No. 1850 lamp when making replacements. These are bayonet-base lamps and may be removed by slightly pressing in and turning one quarter of a turn to the left.

Press the “**test button**” for frequent checks on battery life and performance. If the Sonalarm fails to operate properly, it may be due to a weak battery or burned out lamps, which should be checked first.

8.1 Testing the Sonalarm

Switch the Sonalarm to the “**ON**” position. To simulate “temperature-failure”, lower the set point temperature on the controller to trigger the alarm. In normal operation the “power-on” light will be lit. Once in operation, pressing the “**TEST**” button may make frequent checks for battery life and performance.

9 REMOVING & INSTALLING CABINET LID

***CAUTION:** HINGES ARE SPRING LOADED

1. Remove the two top and one-bottom screws holding the lower portion of the hinge to the cabinet.
2. While applying pressure to hold the hinge to the cabinet, remove the remaining bottom screw. Carefully let the spring tension lift the hinge from the cabinet.
3. Remove the lid from the cabinet and remove the four screws holding the upper portion of the hinge to the lid.
4. To reinstall the lid, reverse the above procedure.
5. Check the lid for alignment and the gasket for a proper seal. Use the slotted hinge holes to make any required adjustments.

10 DIGITAL TEMPERATURE CONTROLLER REPLACEMENTS

Remove the following items in order shown:

1. Remove the instrument panel, which is held in place by four (4) screws.
2. Remove the wires from the controller.
3. Remove the mounting brackets on the controller.
4. Remove the controller from the instrument panel.
5. Insert new controller into instrument panel, reverse procedures. When rewiring use

enclosed wiring diagram.

11 CHANGING THERMOCOUPLE (T/C)

1. Disconnect power and let freezer warm up.
2. Remove stainless steel corner slips from front two corners.
3. Remove white plastic breaker by pulling up and out on edge next to inner liner.
4. Lift insulation and remove hard board sub breaker.
5. Remove instrument panel (4 screws) and lay in front of freezer face down.
6. Remove T/C wires from terminals.
7. Remove 3/4" rubber grommets from cabinet bottom & inner liner.
8. Remove clips over T/C
9. Tape bulb of new T/C securely to control end of old T/C.
10. From the top, reach into insulation and pull old T/C up through insulation bringing new T/C up with it.
11. Remove tape and old T/C.
12. Feed new T/C through 3/4" hole and secure inside inner liner the same as old T/C. Coil excess in insulation.
13. Replace breaker, sub breaker and grommets using reverse procedure.
14. Secure T/C wires to CAL 9500 control.
15. Reposition control panel.

INSTRUMENT PANEL FEATURES

! This page can be photocopied and used as a visual aid and bookmark when working in other parts of the manual.

Green LED:

Setpoint 1 output indicator

Green Display:

Process variable or
Function/Option

Upper Red LED:

Setpoint 2 output
indicator

Lower Red LED:

Setpoint 3 output
indicator



Right Red LED:

Program Holdback
indicator

Orange Display:

Setpoint value or
program selection

ADJUSTMENTS

To enter or exit **program mode**:

To scroll through **functions**:

To change **levels** or **options**:

To view setpoint units:

To increase setpoint:

To decrease setpoint:

To reset latched alarm or tune fail:

To run or Hold a program:

Press ▲ ▼ together for 3 seconds

Press ▲ or ▼

Press * ▲ together or * ▼ together

Press *

Press * ▲ together

Press * ▼ together

Press ▲ ▼ together briefly

Press * ▼ together for 3 seconds

Notes: If in difficulty by becoming "lost" in program mode, press ▲ and ▼ together for 3 seconds to return to display mode, check the INSTRUMENT ADJUSTMENTS above and try again.

When in program mode, after 60 seconds of key inactivity the display will revert to either *inPt : nonE* or, if the initial configuration has been completed, the measured value. Any settings already completed will be retained. During Program Configuration it is recommended that this feature is inhibited. Select *ProG StAY* in Level 4.

Cal 9500 Configuration Data

Level 3

SP1.d – rly

SP2.d – rly

Burn – uP.SC

rEV.d – 1d.2r

rEV.L – 1i2n

SPAn – 0.0

Zero – 3 (Note: Only Change this parameter if calibrating unit, value may vary.)

ChEk – off

rEAd - Var

tECh – CtA

Ver – 953

rSET – none

Level 2

SP1.P – 0

hAnd – off

PL.1 – 100

PL.2 – 100

SP2.A – Dv.hi

SP2.b – none

di SP – 0.1

hi .SC – 100

Lo. SC – -100

in Pt – tc t

unit – C

Level 1

tune – off

band – 0.3

int.t – off

dEr.t – off

dac – 0.5

cyc.t – on.of

ofSt – 0.0

SP.Lk – off

SPrr – 0

SPrn – off

SoAk – --

Set.2 – 6 (alarm deviation)

bnd.2 – 0.1

Cyc.2 – on.of

Level P

Prog – 1

Run - OFF

REFRIGERATION SYSTEM

- **REFRIGERATION SYSTEM**

The refrigeration system consists of a hermetically sealed compressor, cold wall evaporator and air cooled condenser.

- **DRIER**

The drier is installed in the system just before the capillary tube. Its purpose is to trap minute particles of foreign material and absorb any moisture in the system.

- **LIQUID CONTROL AND HEAT EXCHANGE**

Liquid refrigerant control to the evaporator of the system is accomplished by the use of a capillary tube. This capillary tube is soldered to the suction line to form a heat exchanger, which sub cools the liquid refrigerant to maintain high efficiency within the system.

- **REFRIGERATION SERVICE EVACUATION**

Moisture in a refrigeration system is directly or indirectly the cause of more problems and complaints than all other factors combined. When large amounts are present, system freeze ups will occur. Even in minute amounts, moisture will combine with refrigerants to form an acid. The corrosive action of this acid forms sludge which will plug the lines and the drier. Since most field type vacuum pumps cannot pull a low enough vacuum to remove moisture from the system, it is recommended that the system be triple evacuated, breaking each time with dry refrigerant. Use care to purge the air from the system

- **CHARGING REFRIGERATION SYSTEM**

Since capillary tube systems have small critical refrigerant charges, we recommend that a field charge either be weighed in or put in from a portable charge cylinder. After maximum vacuum has been obtained as detailed above, attach charging cylinder to the suction line making sure to purge air from hose with refrigerant. With the unit running, allow refrigerant to run slowly into the system until the desired charge is reached.

OVERCHARGE: When the cabinet has pulled down to operating temperature an indication of an overcharge is that the suction line will be cooler than normal with the compressor running. Running time will be higher than normal. Suction line will sweat or frost. Reclaim excessive refrigerant from the system very carefully in small amounts waiting several minutes for the system to balance.

UNDERCHARGE: An undercharge or shortage of refrigerant will result in any of the following:

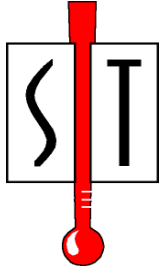
1. Lower than normal head pressure.
2. Lower than normal suction pressure.
3. Excessive or continuous operation of compressor.
4. Higher than normal cabinet temperature.

SERVICE AND ANALYSIS CHART

REFRIGERATION SYSTEM

MALFUNCTION	POSSIBLE CAUSE	SOLUTION
Compressor will not start - no hum.	<ol style="list-style-type: none"> 1. Line cord not plugged in. 2. Control stuck in open position. 3. Wiring improper or loose. 	<ol style="list-style-type: none"> 1. Plug in line cord. 2. Repair or replace control. 3. Check wiring against diagram.
Compressor will not start- hums but trips on overload protector	<ol style="list-style-type: none"> 1. Improperly wired. 2. Low voltage to unit. 3. Starting capacitor defective. 4. Compressor motor has a winding open or shorted. 	<ol style="list-style-type: none"> 1. Check wiring against diagram. 2. Determine reason and correct. 3. Determine reason and replace. 4. Determine reason and correct, replace if necessary.
Compressor starts but does not switch off of start winding.	<ol style="list-style-type: none"> 1. Low voltage to unit 2. Relay failing to open. 3. Run capacitor defective. 4. Compressor motor has a winding open or shorted. 	<ol style="list-style-type: none"> 1. Determine reason and correct. 2. Determine reason and correct replace if necessary. 3. Determine reason and replace. *4. Replace the compressor.
Compressor starts and runs, but short cycles on overload protector.	<ol style="list-style-type: none"> 1. Additional current passing through overload protector. 2. Low voltage to unit. 3. Overload protector defective. 4. Run capacitor defective. 5. Excessive discharge pressure. 6. Compressor too hot-return gas hot. 	<ol style="list-style-type: none"> 1. Check wiring diagram. Check for added fan motors, pumps, etc. connected to wrong side of protector. 2. Determine reason and correct. 3. Check current, replace protector. 4. Determine reason and replace. *5. Check ventilation, restrictions in cooling medium, restrictions in refrigeration. *6. Check refrigerant charge (fix leak if necessary)
Run capacitor open, shorted or blown	<ol style="list-style-type: none"> 1. Improper capacitor. 2. Excessively high line voltage 	<ol style="list-style-type: none"> 1. Determine correct size and replace. 2. Determine reason and correct.
Relay defective or burned out.	<ol style="list-style-type: none"> 1. Incorrect Relay 2. Line voltage too high or too low. 3. Relay influenced by loose vibrating mounting 	<ol style="list-style-type: none"> 1. Check and replace 2. Determine reason and replace. 3. Remount rigidly.
Space temperature too high	<ol style="list-style-type: none"> 1. Improper overcharge. 2. Inadequate air circulation. 	<ol style="list-style-type: none"> *1. Recover refrigerant and recharge with proper charge. 2. Improve air movement.
Unit noisy	<ol style="list-style-type: none"> 1. Loose parts or mountings 2. Tubing rattle 3. Bent fan blade causing vibration. 4. Fan motor bearings worn. 	<ol style="list-style-type: none"> 1. Find and tighten 2. Reform to be free of contact. 3. Replace blade. 4. Replace motor.

*** ALL SERVICING MUST COMPLY WITH STATE AND FEDERAL REQUIREMENTS.
 FEDERAL LAW REQUIRES THAT SOME REFRIGERANT BE RECOVERED PRIOR TO SERVICING.**



ScientempTM

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Standard Warranty

Applies Only Within the Continental United States

SCIENTEMP WARRANTS TO THE ORIGINAL PURCHASER

FIRST 18 MONTHS – The cabinet and all of its parts shall be free of defects in material and workmanship under normal use and service for a period of 18 months from the date the unit has been shipped from our facility. Scientemp's sole obligation under this warranty shall be limited, at its option, to either repairing or replacing any part of the cabinet determined by an authorized service agent to be defective. Scientemp reserves the right to repair the freezer at our facilities.

THE SCIENTEMP STANDARD WARRANTY DOES NOT COVER

TRANSPORTATION COSTS – Scientemp shall not be responsible for transportation or incidental costs incurred in connection with the repair or replacement of a cabinet or any of its parts.

ABUSE, MISUSE, ACCIDENTS – Scientemp shall not be responsible for parts or assemblies which upon inspection are determined by an authorized Scientemp Service Agent to have been subjected to misuse, neglect, alteration, accident, abuse, damage during transit or delivery, or by fire or flood.

CONSEQUENTIAL DAMAGES – IN NO EVENT SHALL SCIENTEMP CORP BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, PRODUCT LOSS OR PRODUCT SPOILAGE CLAIMS, NOR FOR ANY DELAY IN THE PERFORMANCE OF THIS WARRANTY DUE TO CAUSES BEYOND ITS CONTROL.

GENERAL

The standard warranty and any service contract related to the STANDARD WARRANTY shall apply only to the products sold and used within the boundaries of the Continental United States.

Users may file warranty claims either directly with Scientemp Corp, 3565 S. Adrian Hwy, Adrian, MI 49221, or with the seller from whom the cabinet was purchased. All claims must be supported by information concerning the alleged defect and specifically identified by the Serial Number of the cabinet.

THERE ARE NO OTHER WARRANTIES EXPRESS, IMPLIED, OR STATUTORY, EXCEPT THIS WARRANTY, WHICH IS IN LIEU OF ALL OTHER WARRANTIES INCLUDING TO THE EXTENT PERMITTED BY LAW, ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

DO NOT DRILL HOLES IN CABINET

Refrigeration tubing and wiring is routed through the cabinet walls. Leaks, wet insulation or electrical problems caused by drilling holes are not covered by warranty.

CASCADE WIRING DIAGRAM-CAL 9500 CONTROLLER, RECORDER, ALARM

230 VOLTS/60HZ/50HZ

