SO-LOW
ENVIRONMENTAL EQUIPMENT COMPANY

UL LISTED

UCR, UCF REFRIGERATOR / FREEZER

INSTRUCTIONS

USER MANUAL

WARNING: READ BEFORE CONTINUING	
To reduce the risk of fire, electric shock or injury to persons using this freezer, read all instructions and follow basic safety precautions before using the unit, including the following:	
⚠	Do not modify the plug provided with the unit. If it will not fit the outlet, have a proper outlet installed by a qualified electrician.
⚠	Do not position equipment so it is difficult to disconnect from the power supply.
⚠	While under warranty, do not attempt to repair or replace any part of the freezer for servicing without first contacting the So-Low Service Department.
⚠	**BEFORE CALLING THE MANUFACTURER'S TECHNICAL SUPPORT DEPARTMENT** Please have the model number of the unit, box identification number, and serial number ready as well as the problem description. The model, serial number and box id number can be found on the serial tag, which is located on the interior left upper wall, or back of the unit.
SAVE THESE INSTRUCTIONS	

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For parts replacement:
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For technical support:
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CONTENTS

MODEL	VOLTAGE	AMPERAGE	PLUG
MV4-2UCRDA MV4-2UCRGDDA MV4-6UCRDA MV4-6UCRGDDA MV20-2UCF MV25-4UCF MV30-4UCF MV40-4UCF DHK4-10GD DHK4-10SD DHK30-10SD DHK20-20MDP DH-9RFDA	**115 VOLTS** 60 HERTZ 1 PHASE (SUPPLY VOLTAGE SHOULD NOT VARY MORE THAN 5% FROM SERIAL PLATE RATINGS.)	**15 AMP** **DEDICATED LINE**	 NEMA 5-15 (Unit pre-wired at factory includes cord and plug set.)

CLEARANCE AND PLACEMENT INSTRUCTIONS

PRE-INSTALLATION INFORMATION

RANGE OF ENVIRONMENTAL CONDITIONS FOR WHICH THIS EQUIPMENT IS DESIGNED

- Climatic Class 4 (30°C, HR%=55%)
- Ambient temperature operating range: 10°C~40°C
- Humidity: 40% maximum, non-condensing.
- Electrical Supply: 110~127V/60Hz
- Altitude: 300 Meters MSL (Mean Sea Level)
- Usage: This product is intended for use indoors only

PLEASE READ ALL REQUIREMENTS BEFORE USING THIS EQUIPMENT

1) **Ambient Temperature** - Unlike a household refrigerator, this equipment is designed for scientific / medical application. Many components are heavy duty and extra sized, to meet the ultimate temperature performance. Therefore, the sounds generated from its operation may not be accepted by everyone in the room. Please take the operations sound factor into consideration and locate this refrigerator accordingly. Please ensure the ambient temperature is climate controlled between 65°F to 80°F to achieve the ultimate temperature performance.

2) **Floor Load -** The floor on which the unit is located must be even and level, free from vibrations, and strong enough to support the combined weights of the unit and maximum product load.

3) **Ventilation** - Grille area at front must be free and clear of any object or wall.

4) **Power Outlet** - Dedicated power outlet is located within the length of the unit's power cord. This is a cord-connected unit and must be connected to its own dedicated power supply. Check the data plate on the unit to confirm the voltage and per the data plate use the correct fuses or HACR circuit breakers.

5) **Power Cord -** This 115-volt model is equipped with a cord and 5-15P plug. Unit pre-wired at factory and include cord and plug set. If the power cord becomes damaged, it must be replaced with the identical cord. This Unit Must Be Grounded.

CAUTION

DO NOT CONNECT TO GFI / GFCI OUTLETS. CONNECTION TO THAT TYPE OF OUTLET CAN RESULT IN PRODUCT LOSS DUE TO UNSAFE CABINET TEMPERATURE WHEN GFI DEVICE TRIPS FROM MOISTURE.

DO NOT USE EXTENSION CORDS AND DO NOT DISABLE OR BY-PASS GROUND PRONG ON ELECTRICAL PLUG

STARTING INSTRUCTIONS

1. Move the unit to an indoor location and plug the unit into an appropriate outlet with an adequate power supply. Consult your maintenance department for additional information on the proper electrical configuration for this unit.

2. Once plugged in, the compressor(s) will start to operate and pull down to the setpoint on the temperature control. (Factory setpoint is 4°C Refrigerator, -25°C Freezer)

3. Allow the unit to reach the setpoint temperature.
   Depending on the size of the unit, this may take up to 1-2 hours.

4. Product can now be loaded into the unit for storage.

RELEASE OF LIABILITY

IF THIS EQUIPMENT IS BEING USED TO STORE IRREPACEABLE AND / OR HIGH VALUE PRODUCTS, YOU (THE USER) MUST TAKE PROPER PRECAUTIONS TO ENSURE THAT PRODUCT IS NOT LOST.

SO-LOW WILL NOT BE ACCOUNTABLE FOR, CONSENT TO HAVE OBLIGATION TO, OR INHERIT RESPONSIBILITY OF PRODUCTS STORED INSIDE THE FREEZER / REFRIGERATOR REGARDLESS OF WARRANTY STATUS. THIS PERTAINS TO ANY DIRECT OR INDIRECT LOSSES (PHYSICAL OR ECONOMIC). PLEASE CONSULT THE WARRANTY OF THIS PRODUCT FOR ADDITIONAL CLARIFICATION.

Before this Refrigerator / Freezer can be placed into operation, complete all of the applicable tasks listed below. You may need to consult your own departments for additional assistance with these tasks.

1) Connect your company remote alarm contacts system, or auto dialer, to the alarm system of the unit. If your model does not have an alarm system, you can install your 3rd party alarm into the access porthole.

2) Develop an emergency backup plan, and designate a separate back-up refrigerator, freezer, or similar appropriate device to store your product, if this equipment has an unforeseen issue.

MOISTURE DURING THE SUMMER SEASON

Due to the increase in ambient humidity in most locations during the summer season; the amount of moisture, condensation, or high humidity related issues may increase during this period.

Please note that in most cases, seasonal humidity related issues will resolve on their own when the ambient humidity levels around the unit reach under 40%.

Also, please note that the refrigeration system does not generate moisture; but instead condenses the moisture that is already in the chamber from the humidity in the air.

To prevent excess seasonal humidity related issues, please see the following;

1) Keeping the unit in an air conditioned, low humidity space.

2) Check that the door gasket is sealing properly and limit the frequency of door openings.

3) Make sure the porthole cover is installed even if it is not in use.

GENERAL SPECIFICATIONS

ELECTRICAL PLUG

- PLUG THE UNIT INTO THE PROPER OUTLET WITH AN ADEQUATE POWER SUPPLY.
- THIS UNIT REQUIRES A DEDICATED ELECTRICAL LINE.
- UNIT PRE-WIRED AT FACTORY AND INCLUDE CORD AND PLUG SET.

DO NOT store any unsealed chemical material in this refrigerator or freezer. Corrosive fumes from chemical material can linger inside of the chamber and cause serious damage to the refrigeration coils. Storing unsealed chemical material in this equipment will void the factory product warranty.

DO NOT store or use gasoline, or flammable liquid in this refrigerator or freezer. This equipment is not rated to be flammable material storage.

DO NOT operate this equipment in the presence of explosive fumes. This equipment is not rated to be hazardous locations refrigerator or freezer.

We offer flammable material storage and hazardous locations refrigerators, and/ or freezers for your application. Please contact your So-Low sales representative for more information.

DOOR GASKET REPLACEMENT

1. Remove existing gasket from mounting track.
2. Verify mounting track is free of any remaining gasket material.
3. Align new gasket with mounting track and press firmly in place.
4. Open and close door, checking for proper gasket seal without pinching against refrigerator.

MONITOR PROBE FOR FIELD INSTALLATION

Each refrigerator or freezer is equipped with a 1/2” probe access port hole for your independent probe installation. The port hole is generally located in the back of your refrigerator or freezer. Simply remove the black cap, run your probe through, and seal the hole with black cap, or electrical putty to prevent air from getting into chamber.

DO NOT RUN YOUR PROBE THROUGH THE DOOR GASKET
Doing so, may cause serious condensation or frozen evaporator issue.
The port hole is specifically designed to allow you to install the monitor probe.

This refrigerator or freezer is factory set to run at its ultimate temperature performance. There should be no need to adjust the temp settings. If you feel the temp settings must be adjusted, please refer to temperature adjustment section in the manual for details.

MAINTENANCE PROCEDURES

BEFORE PERFORMING MAINTENANCE

To reduce the risk of fire, electric shock or injury to persons using this unit, read all instructions and follow basic safety precautions.

CAUTION

DISCONNECT THIS UNIT FROM THE POWER SUPPLY BEFORE PERFORMING MAINTENANCE ON THE UNIT.

CLEANING PROCEDURE

- Wipe down the exterior of the unit with a soft cloth and spray type polish.
- If excessive ice builds up in the evaporator, the unit can be defrosted (see below).

DEFROST PROCEDURE

1. Remove any product in the unit and store it in a back-up unit or elsewhere.
2. Unplug the unit and open the front door.
3. The evaporator drain pan will catch the water that drips from the evaporator and funnel it to the drain pan. (The drain pan may overflow depending on the amount of ice buildup.)
4. Air out the unit for 8-12 hours with the door open, allowing the unit to reach room temperature.
5. Take a rag and wipe up all the excess water in the unit.
6. After the defrost plug your unit back in.
7. Once the desired temperature is reached, add product back into the unit.

TEMPERATURE CONTROL

EACH LED FUNCTION IS DESCRIBED IN THE FOLLOWING TABLE

LED	MODE	FUNCTION
	ON	Compressor enabled
	Flashing	Anti-short cycle delay enabled
	ON	Defrost enabled
	Flashing	Drip time in progress
	ON	Fans enabled
	Flashing	Fans delay after defrost in progress.
	ON	An alarm is occurring
	ON	Continuous cycle is running
	ON	Energy saving enabled
°C/°F	ON	Measurement unit
°C/°F	Flashing	Programming phase

ALARM SIGNALS / OTHER MESSAGES

MESSAGE	CAUSE
P1	Air probe failure
P2	Glycol probe failure
HA	Maximum temperature alarm
LA	Minimum temperature alarm
dA	Door open
Pon	Keyboard unlocked
PoF	Keyboard locked

CONTROL PROGRAMMING

CONTROL ADJUSTMENTS

HOW TO CHANGE UNITS FROM °C to °F

1. Press and hold the key to change units from °C to °F.

HOW TO SEE THE MININMUM (MIN) TEMPERATURE

1. Press and release the **(DOWN)** key.
2. The "Lo" message will be displayed followed by the minimum temperature recorded.
3. By pressing the **(DOWN)** key again or by waiting 5s the normal display will be restored.

HOW TO SEE THE MAXIMUM (MAX) TEMPERATURE

1. Press and release the **(UP)** key.
2. The "Hi" message will be displayed followed by the maximum temperature recorded.
3. By pressing the **(UP)** key again or by waiting 5s the normal display will be restored.

HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

1. Hold press the **SET** key for more than 3 seconds, while the max. or min temperature is displayed.
2. To confirm the operation, the "**rSt**" message starts blinking and the normal temperature will be displayed.

MAIN FUNCTIONS

HOW TO VIEW THE SETPOINT

1. Push and immediately release the **SET** key: the display will show the Set point value.
2. Push and immediately release the **SET** key or wait for 5 seconds to display the probe value again.

HOW TO CHANGE THE SETPOINT

1. Push the SET key for more than 2 seconds to change the Set point value.
2. The value of the set point will be displayed and the "°C" or "°F" LED starts blinking.
3. To change the Set value push the **(UP)** or **(DOWN)** arrows within 10s.
4. To memorize the new set point value push the **SET** key again or wait 10s.

HOW TO START A MANUAL DEFROST

1. Push the **(DEFROST)** key for more than 2 seconds and a manual defrost will start.

HOW TO CHANGE A PARAMETER VALUE

To change the parameter's value, operate as follows:

1. Enter the Programming mode by pressing the Set + **(DOWN)** keys for 3s (the "**C**" or "**F**" LED starts blinking).
2. Select the required parameter. Press the **SET** key to display its value
3. Use **(UP)** or **(DOWN)** arrows to change its value.
4. Press **SET** to store the new value. Once **SET** is pressed the display will move to the next parameter.
5. To exit, press **SET** + **(UP)**, or wait 15 seconds without pressing a key.

NOTE: The set value is stored even when the procedure is automatically exited by time-out.

LOCKING / UNLOCKING KEYBOARD

1. To lock the keyboard, hold down both the **(UP)** or **(DOWN)** arrows for more than 3 seconds.
2. The "**POF**" message will be displayed, and the keyboard will be locked.

NOTE: At this point it will be possible only to see the set point or the MAX or MIN temperature stored.

3. If a key is pressed more than 3s the "POF" message will be displayed.

4. To unlock the keyboard, hold down both the **(UP)** or **(DOWN)** until the "**Pon"** is displayed.

CONTROL CALIBRATION PROCEDURE

DIXELL SENSOR CALIBRATION FOR SCIENTIFIC AND LAB REFRIGERATORS AND FREEZERS

All units are calibrated at the factory during the testing process. However, the equipment should be re-calibrated in the field once the unit has been in place and running. Calibration is a simple and quick process which does not require any refrigeration experience. Any in-house personnel with basic knowledge of the electronic controller is able to perform the re-calibration. Please follow the below procedure for assistance in completing the calibration process.

- To accomplish calibration, you will need a calibrated thermometer of your own.
- Place an additional thermometer as close as possible to the glycol bottle in the cabinet.
- Let the unit run for about 15-20 minutes with the door closed.

1. While waiting for 15-20 minutes, verify the set point of the cabinet by pressing the **SET** key once. When you do this, the controller will display the running temperature that has been selected.

If you decide to change the setpoint temperature, hold the **SET** key down until the °C symbol begins flashing. Once flashing, let go of the **SET** key and use the **(UP)** ⌃ or **(DOWN)** ⌄ arrows to modify the setpoint to your desired temperature.

2. Press the **SET** key once to save your change and the entire display will flash confirming your change. Nothing more is required, and the display will return to showing internal temperature condition summarily. If the set point is changed, however, the unit will have to run for a period of time to stabilize.

3. To begin calibration procedure:
   - Check the set point by pressing **SET** key.
   - Confirm the temperature showing on the thermometer you placed near the glycol bottle inside the cabinet is within an acceptable range* of the temperature showing on the control.
     *Note; your company will be responsible for defining what is an “acceptable range”.

***** IF THERE IS NO DIFFERNCE IN TEMPERATURE, DO NOT PROCEED FURTHER *****

4. If there is a significant difference between your thermometer and the control, follow the below instructions below to re-calibrate your equipment to the correct temperature:

   - Press and hold both the **(DOWN)** ⌄ arrow and **SET** keys until **LOD** appears.
   - Release the keys.
   - Press and hold both the **(DOWN)** ⌄ arrow and **SET** keys until **PR2** appears and starts flashing.
   - Release the **(DOWN)** ⌄ arrow and **SET** keys. **HY** will appear on the display.
   - Press and release the **(UP)** ⌃ arrow three times; or until you get to setting **Ot**.
   - Press the **SET** key to access the **Ot** setting (temperature control sensor calibration).
     Input the difference between your thermometer and the set point temperature into this screen.
     Press and release the **(UP)** ⌃ or **(DOWN)** ⌄ arrows to adjust the value to the desired value.
     - If the unit is too warm inside, put a positive number in **Ot**.
     - If the unit is too cold inside, put a negative number in **Ot**

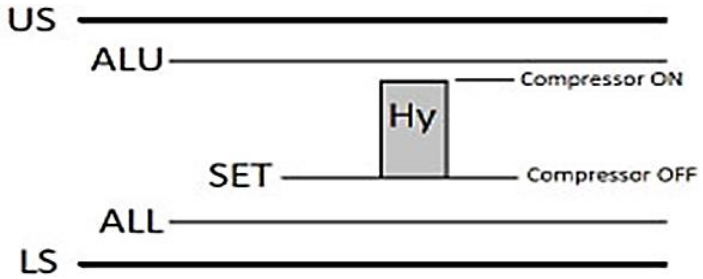
   - Press and release the **SET** key to save your changes.
     The entire display will flash confirming your change.

     The calibration procedure is now complete.
     This correction will make the unit run at the desired set point.

CONTROL SETTINGS

BASIC CONTROL SETTINGS

DESCRIPTION	DEFAULT SETTINGS REFRIGERATOR	DEFAULT SETTINGS FREEZER
FACTORY TEMPERATURE SETPOINT	4°C (38°F)	-25°C (-13°F)
TEMPERATURE ALARM DELAY (SETTING ALD)	5 Min	5 Min
ALARM – HIGH TEMPERATURE (SETTING ALU)	10°C (50°F)	-10°C (14°F)
ALARM – LOW TEMPERATURE (SETTING ALL)	1°C (34°F)	-30°C (–22°F)



ADVANCED SETTINGS

ATTN: THIS SECTION IS FOR SERVICE TECHNICIANS OR EXPERIENCED USERS ONLY.
Modification of values or intervals between defrost and or Hysteresis settings can result in malfunction, or inaccurate temperature readouts, and could void your warranty**. Proceed at your own risk.**

DESCRIPTION	DEFAULT SETTINGS REFRIGERTOR	DEFAULT SETTINGS FREEZER
DISPLAY CALIBRATION - (SETTING **Ot**)	0.0	0.0
HYSTERESIS – (DIFFERENTIAL)	2.0°C (4.0°F)	2.0°C (4.0°F)
MAXIMUM RANGE LIMIT- (SETTING US)	10°C (50°F)	0°C (0°F)
MINIMUM RANGE LIMIT – (SETTING LS)	1°C (34°F)	-25°C (-13°F)

AIR AND GLYCOL TEMPERATURE DISPLAY

The controller has the capability to display either the air or glycol temperature readout. For the normal operations, the Glycol simulated temperature **(P2)** is displayed to provide users the product temperature. For the actual operation, the air temperature **(P1)** is used to control the compressor's cycle.

FOR THE TRAINED SERVICE TECHNICIAN

- During the normal operation, the refrigerator's (or freezer's) compressor will cycle on and off, to maintain the cold temperature in the storage chamber.

- During operation of this controller, the point where the compressor is cut off is called "**SET POINT".** The point where the compressor is turned on is calculated by adding the value of "**SET POINT**" and "**Hy**" (temp differential). For example, if you wish to maintain the operation temperature between 2°C and 8°C, you will program **SET** = 4°C, and **Hy** = 2°C. The unit would then run between 4°C and 6°C.

- **ALU** is the high temp alarm point, and **ALL** is the low temp alarm point.
  Both alarm settings will alert users when the refrigerator's (or freezer's) temp is out of range, via visual & audible alarm, and remote alarm contact.

- **US** is the upper setting limit, and **LS** is the lower setting limit.
  Both limit settings will prevent users accidentally adjust **SET**, **ALU**, or **ALL** outside the range.

HIDDEN MENU / ADVANCED OPERATIONS

THE HIDDEN MENU INCLUDES ALL THE PARAMETERS OF THE INSTRUMENT

DO NOT CHANGE PARAMETERS IN THE HIDDEN MENU UNLESS INSTRUCTED TO DO SO BY THE SO-LOW SERVICE DEPARMENT

HOW TO ENTER THE HIDDEN MENU

1. Enter the Programming mode by pressing the **SET** + **(DOWN)** arrow keys for 3 seconds.
   - The °**C** or °**F** LED will then start blinking.
2. Released the keys, then push again the **SET** + **(DOWN)** arrow keys for more than 7 seconds.
   - The **Pr2** label will be displayed immediately followed from the **HY** parameter.

NOW YOU ARE IN THE HIDDEN MENU.

3. Select the required parameter.
4. Press and release the **SET** key to display its value.
5. Press and release the **(UP)** or **(DOWN)** arrow keys to change its value.
6. Press and release the **SET** key to store the new value and move to the following parameter.

TO EXIT, press **SET** + **(UP)**, or wait 15 seconds without pressing a key.
NOTE: The set value is stored even when the procedure is automatically exited by time-out.

QUICK TROUBLESHOOTING GUIDE

QUICK TROUBLE SHOOTING GUIDE – Check these items before calling for service.

PROBLEM	POSSIBLE CAUSE / SOLUTIONS:
UNIT DOES NOT RUN	• Electrical circuit is not 110-120V 60Hz. • The power cord is not plugged in. • No power to the electrical outlet. make sure the breaker is not tripped or fuse is not blown. (The **MUST NOT** be plugged into a GFCI type of outlet or power strip.)
UNIT DOES NOT MAINTAIN THE PROPER TEMPRATURE	• Make sure the Refrigerator or Freezer is placed in an air-conditioned room between 65°F to 85°F. if the room temperature is too warm, the unit may not be able to maintain the interior temperature at the proper range. • The door is not closed properly. • The amount of product stored is overloaded. • Product placements are pushed against back wall and sides of the unit affecting the air circulation of the chamber. For proper air circulation, place the products evenly on each shelf. Do not push against the unit's rear or side walls. • Evaporator is blocked by frost or ice. (if this occurs, Remove the products, unplug the unit, crack the door open, and allow the unit to defrost overnight. If the issue remains after following the defrost procedure, call for service if your unit is under warranty or contact a local service company if it is no longer under warranty.
MOISTURE COLLECTS INSIDE OR ON OUTSIDE SURFACE	• Door gasket not sealing properly. Check for debris, cracks. (Make sure you are using the porthole to run any 3rd party probe or monitoring system.) • The unit is facing a doorway or is underneath of air conditioning vent. Relocate the unit or redirect the air vent. • Too many door openings. Minimize the time the door is open. • Hot and Humid weather increases condensation. (The refrigeration system does not generate moisture; but instead condenses the moisture that is already in the chamber from the humidity in the air.) • As humidity decreases, moisture will disappear.

CLEANING

PART	CLEANING AGENTS	TIPS AND PRECAUTIONS
INTERIOR AND DOOR LINERS	Soap and water, baking soda and water	Use 2 tablespoons of baking soda in 1 quart or warm water Be sure to wring the excess water out of sponge or cloth before cleaning around controls, light bulb or any electrical parts.
DOOR GASKETS	Soap and water	Wipe gaskets and their seating surfaces with a clean, soft cloth.
SHELVES	Soap and water	Do not wash removable shelves in dishwasher
EXTERIOR	Soap and water, Non-Abrasive glass cleaner	Do not use commercial household cleaners, ammonia, or alcohol to clean handles.
GLASS	Mild detergent and water	Use a soft cloth or sponge. Rinse with water and wipe dry.

TEMPERATURE TO RESISTANCE CHART NTC THERMISTOR

Temp C	Temp F	Resistance Ohms
- 50	- 58	329.5
- 45	- 50	247.7
- 40	- 40	188.5
- 35	- 31	144.1
- 30	- 22	111.3
- 25	- 12.5	86.43
- 20	- 4	67.77
- 15	5	53.41
- 10	14	42.47
- 5	23	33.9
0	32	27.28
5	41	22.05
10	50	17.96
15	59	14.69
20	68	12.09
25	77	10.00
30	86	8.313
35	95	6.94
40	104	5.827
45	13	4.911
50	122	4.160
55	131	3.536
60	140	3.020
65	149	2.588
70	158	2.228
75	167	1.924
80	176	1.668
85	185	1.451
90	194	1.266
95	203	1.108
100	212	0.9731
105	221	0.8572
110	230	0.7576
All Resistance is k or (x1000)		