



# **INSTRUCTION MANUAL**

## Portable Medical Refrigerator Units

### MODEL BF-35-MIL-UPSD-100AHR

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**PLEASE READ ENTIRE INSTRUCTION MANUAL BEFORE USING THE BIOFRIDGE UNIT**

## SECTION 1

### Introduction

The BF-35-MIL-UPSD-100AHR has been designed to provide more flexibility, and therefore more options, for those who work within the requirements and protocol of cold-chain transport.

The Units can be used in the following manner and will run 24/7:



In any mode of transportation, including vehicles, boats, etc., Units can be plugged into a 12VDC to 28VDC supply (for example, a vehicle's cigarette lighter).



In a clinical setting, including temporary clinics or established hospitals, Units can be plugged into a 110VAC 60 Hz/240 VAC 50 Hz supply (a standard wall outlet).



In any setting, when the Unit is connected to the Detachable Battery Backup System (DBBS) and the primary power source becomes lost, the Unit will automatically draw from the DBBS 12VDC supply. (DBBS must be pre-connected to the Unit.)

- Overview video: <https://www.youtube.com/watch?v=30Arv608xpE>

### WARNING



*BioFridge portable refrigerators and freezers are powered by electric current; not taking proper steps to ensure safety can potentially injure or kill. ANY installation, cleaning, or troubleshooting must be conducted with the electrical power source disconnected from the BioFridge Unit. (110VAC, 12VDC)*



## SECTION 2

### Operation

- To turn on the BioFridge, connect the unit to a power source. Power source options are a regular 110V wall outlet, 12v “cigarette lighter” or the DBBS. <https://youtu.be/Oo70dWgFJ-4>

- To connect to the DBBS, use the umbilical cord, to connect the unit to the DBBS port.



- When connected to power, the thermostat touch screen will turn on.
- To set the temperature, press the SP button in the bottom left and enter the temperature. You can also go to Menu-Refrigeration Settings where you can enter the variance. <https://youtu.be/BrguMMs8K08>
- The snowflake logo on the right of the screen will light up when the compressor is on. When the temperature reaches the set point, the compressor will turn off and you will see the snowflake light turn off.
- To set the alarm, press L for the lower alarm setting and U for the upper alarm setting. Also, go to Menu-Refrigeration settings and toggle the alarm button to make sure it is on. The alarm bell will turn green and the LED light on the top right will turn green. [https://youtu.be/WOI\\_hcJ31Zc](https://youtu.be/WOI_hcJ31Zc)
- When the alarm goes off, either the L or U will light up red to indicate where the temperature is out of range. You can press the Alarm Bell on the main screen to silence the alarm. The LED light will turn red.
- Using the Data Logger, connect via Bluetooth to the BioFridge unit. Go to Menu – Communication settings and click on Data Logger Mode. Activate Bluetooth on the Data Logger and press the BioFridge app on the Main screen of the Data Logger. Look for the Bluetooth logo in the top left of the screen.



- Connect the Data Logger to the BioFridge by syncing up with the sensor ID. The drop-down arrow on the app will show BioFridge units in the area and confirm the sensor ID on the unit you are connecting. You can look at the serial number sticker or go to Menu-Info to view the Sensor ID. Then press Connect on the app. <https://youtu.be/nsksNH3K1M8>
- While on the BioFridge app, you can download the temperature data and send the .csv file via email. On the App press Data Logger on the bottom and then Stored Data on the bottom right. Then when the log appears, press the Share button, and then press on the Gmail app to email the data. <https://youtu.be/USKmXg244sQ>
- The BioFridge unit can connect to WiFi and to the Cloud. On the Menu select Communication Settings. Then under Mode press Connected Mode. The screen will reset. Then go back to Communication settings and press Wifi, select your Wifi, and enter your password. Then on the Menu press Connect to Cloud. On the front screen, in the top corner, you will see the Wifi and Cloud logo light up. Also, the middle LED light will turn blue. Connecting to the Cloud allows BioFridge to send software updates. <https://youtu.be/Vxg9it0JHtk>
- To start a trip, press Start Trip on the front screen and name your Trip. This is meant for tracking the temperature over a period of time that is supplemented by a report. The Min (coldest) and Max (warmest) temperature readings show during the trip what was the coldest and warmest unit's temperature. When you are finished, press End Trip on the front screen and go to Menu – Trip to see your report. <https://youtu.be/RXtlKoUBj2g>

## Extra Tips

- After receiving the BioFridge unit from the shipper, **please wait 24 hours before turning it on.** The oil in the compressor needs time to settle. Ensure unit is upright and out of the box.
- Never operate the BioFridge unit at a tilt exceeding 30 degrees for an extended period of time. The oil reservoir will not lubricate the compressor motor properly at angles above 30 degrees and damage may result to the compressor.
- On the serial number sticker on the back of the unit, the number will start with BFKF-35 or BFK-35. BFKF is a Freezer and BFK is a Refrigerator. A freezer can still be run as a refrigerator, but a refrigerator can only get to -12C.

- **When the BioFridge is plugged into the Detachable Battery Backup System (DBBS) and running on the DBBS's 12VDC system, the Unit will operate between 80 to 90 hours as a portable refrigerator, and for up to 18 to 22 hours as a portable freezer.**
- **To get a full charge on the battery, plug in the DBBS for 8 hours.**
- Whenever possible, pre-cool the refrigerator and its contents in advance using a 110-volt AC power source (a typical wall outlet in the USA and Canada) before taking it off the AC power grid (unplugging it from the wall outlet).
- BioFridge units are equipped with a battery monitor to check the percentage of the battery life.
- At least 4 inches of ventilation space around a BioFridge unit is recommended to properly dissipate heat. Keeping the unit well-ventilated will improve performance.
- Avoid operating the BioFridge unit in direct sunlight; doing so will decrease the unit's efficiency.
- Many factors can affect the efficiency of the Unit. Factors include:
  - the ambient temperature outside the Unit
  - the ventilation area around the Unit
  - the number of items inside the unit
  - the starting temperature of the items put in the unit.

Placing warm items inside the unit in hot ambient temperatures, and leaving the lid open, will negatively affect the performance.

- **Using the Unit is the best way to learn its capabilities.**

## SECTION 3

### Cleaning

- The recommended way to clean the BioFridge is with a container of warm water, a sponge, and a bottle of all-purpose cleaner. Never submerge a BioFridge unit in water.
- If the BioFridge is used as a freezer for long periods of time (approximately 2-3 months) the Unit should be periodically defrosted with its contents removed.
- Never empty water out of the Unit by turning it upside down. Doing so can cause water to collect in the top of the cowl. Remove excess water with a sponge.

### Storing

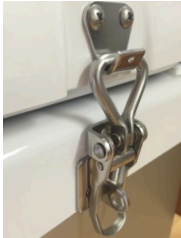
To store the Unit:

1. Ensure DBBS is plugged into the 110VAC (or wall outlet).
2. Charge the battery 8 hours to get a full charge.
3. Unplug the umbilical cord (between the BioFridge and DBBS).
4. Open the lid to defrost and vent the Unit.
5. Once defrosted, remove excess water with a sponge.
6. Flip the kill switch on the DBBS to preserve battery life.
7. <https://youtube.com/shorts/j1CaEQCvx5M>

## SECTION 4

### Troubleshooting

| Observation                   | Probable Cause<br>(Work Down the List)                                                                                   | Remedy                                                                                                  | Part<br>Description<br>& Number |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>AC power does not work</b> | 1. No Power from 110-volt AC outlet (standard wall outlet)                                                               | Confirm that the main Room switch is on, the 110-volt outlet has power, and that AC input is plugged in |                                 |
| <b>DC power does not work</b> | Blue connector not secured properly<br> | Twist blue plug clockwise until it snaps into place                                                     |                                 |
|                               | 3. Blown fuse in DBBS DC circuit (in DBBS enclosure)                                                                     | Replace inline fuse                                                                                     | ATC-15 amps<br>E-123            |
|                               | 4. Blown internal fuse in DC circuit inside fridge (inside compressor compartment)                                       | Replace internal fuse                                                                                   | ATC-15 amps<br>E-123            |
|                               | 5. Loose connections at battery terminals in DBBS                                                                        | Tighten all terminals                                                                                   |                                 |
| <b>Internal Fan not on</b>    | 1. Fan only turns on when compressor is on                                                                               | Normal Operations                                                                                       |                                 |
|                               | 2. Fan Blocked with debris<br>       | Clean Fan                                                                                               |                                 |
|                               | 3. Fan connections loose (inside compressor compartment)                                                                 | Replace crimp connectors (inside compressor compartment)                                                | 12v internal fan<br>E193        |

| Observation                                   | Probable Cause<br>(Work Down the List)                                             | Remedy                                                                  | Part<br>Description<br>& Number |
|-----------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------|
| <b>Refrigerator not getting cold</b>          | 1. Incorrect thermostat set-point                                                  | On the main screen, press SP, and change to the correct temperature.    |                                 |
|                                               | 2. Latch not secured completely                                                    | secure                                                                  |                                 |
|                                               |   |                                                                         |                                 |
|                                               | 3. Ambient temperature too high                                                    | Move Unit to lower ambient temperatures, and away from direct sunlight. |                                 |
|                                               | 4. DC power source low voltage                                                     | Recharge DBBS                                                           |                                 |
|                                               | 5. Worn lid seal                                                                   | Replace lid seal                                                        | Seal G-107                      |
|                                               | 6. Refrigerant Leak                                                                | Factory Repair:<br>Call (760) 233-8847                                  |                                 |
| <b>Refrigerator getting too cold (cont'd)</b> | 1. Very little load inside                                                         | Put in 1 to 2 water bottles to help buffer cycling interval             |                                 |
| <b>Not connecting to Bluetooth</b>            | 1. Move from Data Logger Mode to Connected Mode and then back to Data Logger Mode. |                                                                         |                                 |
|                                               | 2. Make sure Bluetooth is activated on the Data Logger.                            |                                                                         |                                 |



## SECTION 5

### Detachable Battery Backup System (DBBS)

When the DBBS and BioFridge are connected to each other and each is connected to the 110VAC (wall outlet), the BioFridge has two power sources to draw from. The primary source will be the 110-volt AC from the wall outlet. The secondary source will be the 12-Volt DC from the DBBS System. The BioFridge will run exclusively on 110-Volt AC until the power is interrupted (for example, by black or brownouts). When AC power is interrupted, the BioFridge will automatically switch to draw from the DBBS.

|                       |           |              |
|-----------------------|-----------|--------------|
| <b>DBBS Capacity:</b> | 12 VDC    | 80 Amp Hours |
| <b>Output:</b>        | 11.5 VDC  | 13.8 VDC     |
| <b>Input:</b>         | 110V 60Hz | 240V 50Hz    |

Ambient Temperature Range: -18°C to 55°C

Note: The capacity of the DBBS may be reduced in extremely low ambient temperatures. For example, -18°C Celsius ambient DBBS capacity will be reduced by 40%.

Service Life of DBBS = 2 years

#### Charging the DBBS

1. To charge the DBBS, insert a 110VAC cord into the input AC receptacle (standard wall outlet.)
- 2. From a full discharge, the DBBS will take approximately 8 hours to recharge.**

#### Connection of the DBBS to the BioFridge

1. Place the BioFridge on top of the DBBS. (Note: the control end of the BioFridge must be in the same orientation as the control end of the DBBS.)

2. Fasten all 3 over-center latches from DBBS to BioFridge. Ensure latches are tight (adjust if necessary).
3. Using the 12VDC umbilical cord, connect one end to the **input DC receptacle on DBBS**. Connect the other end of the umbilical to the **input DC on the BioFridge**.
4. BioFridge is now powered by DBBS.
5. **The DBBS will operate the unit for up to 80 to 90 hours as a portable refrigerator depending on the set temperature and ambient conditions, and up to 18 to 22 hours as a portable freezer.**

### **Using the BioFridge DBBS as a secondary power supply**

1. Attach the BioFridge to the DBBS.
2. Connect the 12VDC umbilical cord from DBBS into BioFridge.
3. Connect one 110VAC cord to the AC input receptacle on BioFridge.
4. Connect one 110VAC cord to the AC input receptacle on DBBS.
5. The BioFridge will run off the 110VAC supply (wall outlet).
6. The DBBS will charge from the 110VAC supply and remain at 100% charge.
7. If the AC power source is lost (for example in a black or brownout), the BioFridge will automatically switch to the 12VDC supply from the Detachable Battery Backup System.
8. Once the 110VAC supply has been restored, the BioFridge will automatically switch back to drawing from the 110VAC supply.
9. No disconnection of AC or DC cords is required. AC and DC cords can stay connected to the BioFridge and DBBS.

## SECTION 6

### YouTube Training Videos

Here is a list of all the YouTube training Videos. They are in the manual above and can be found in the Help section of the BioFridge App. These videos are unlisted on YouTube and can only be viewed by clicking the links.

Overview:

<https://youtu.be/30Arv608xpE>

Power options:

<https://youtu.be/Oo70dWgFJ-4>

Set Temperature:

<https://youtu.be/BrguMMs8K08>

Set Alarm:

[https://youtu.be/WOl\\_hcJ3lZc](https://youtu.be/WOl_hcJ3lZc)

Connect Datalogger to BioFridge:

<https://youtu.be/nsksNH3K1M8>

Download Data from Data Logger:

<https://youtu.be/USKmXg244sQ>

Connecting to Cloud:

<https://youtu.be/Vxg9it0JHtk>

Creating a Trip:

<https://youtu.be/RXtlKoUBj2g>

Kill Switch for Storing DBBS:

<https://youtube.com/shorts/jlCaEQCvx5M>

## SECTION 7

### Individual Model Specifications

#### BioFridge BF-35-MIL-UPSD-100AH Refrigerator Model

|                                             |                                                                  |
|---------------------------------------------|------------------------------------------------------------------|
| Primary Electrical Input (AC)               | 110 Volt AC 60Hz/240 VAC 50 Hz                                   |
| Secondary Electrical Input (DC)             | 12 VDC / 24-28 VDC                                               |
| Power Consumption                           | 80 watts Maximum                                                 |
| Payload Capacity                            | 35 Liters                                                        |
| Payload Temperature Range<br>(Programmable) | 10°C to -12°C Refrigerator Mode<br>10°F to -20°C Freezer Mode    |
| Max. Operating Ambient Temperature          | 40°C (or 104°F) Refrigerator Mode<br>32°C (or 90°F) Freezer Mode |
| Dimensions of Storage Space                 | 14"Lx11"Wx15"H                                                   |
| Dimensions of Refrigerator                  | 29"Lx16"Wx19"H                                                   |
| Dimensions of Refrigerator + DBBS           | 29"Lx16"Wx26"H                                                   |

#### DBBS SPECIFICATIONS:

|                       |                            |
|-----------------------|----------------------------|
| Electrical Input (AC) | 90.VAC -250.VAC 50/60 1-13 |
| Output AMPS           | 10 Amps 12.VDC             |
| Battery Capacity      | 100 Amp Hour               |
| Voltage Output        | 11.5 v-13.2V               |
| Max. Voltage Cut-In   | 13.2VDC                    |
| Min. Voltage Cut-Out  | 11.5VDC                    |