CYPRESS
ENVIROSYSTEMS

Wireless Freezer Manual

User Manual

Doc # 152-10103-01
Revision 1.2
November 2009

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1.0 Introduction

Thank you for purchasing this Wireless Freezer Monitor, WFM. Please read this guide thoroughly before using the WFM.

The WFM is not a stand-alone product. See Section 3.4, Related Products, for details.

2.0 Safety Precautions

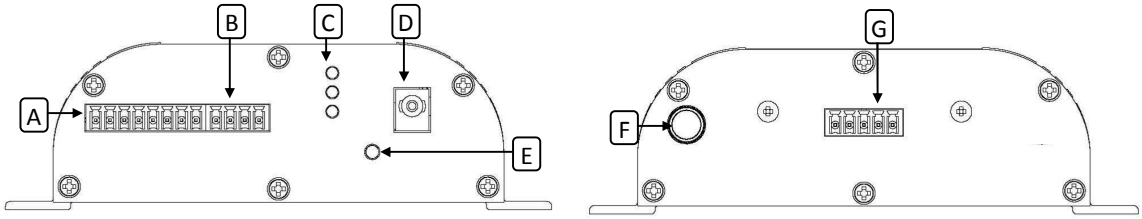
- Do not immerse the WFM in water.
- Always wear personal protective equipment appropriate to the system the WFM is being installed on.
- Do not try to repair yourself as it contains no user-serviceable parts. Contact a qualified service technician for repairs. See Section 10.0, Support, for details.

3.0 Description of the WFM

The Cypress Envirosystems Wireless Freezer Monitor, WFM, is designed to monitor the operating condition of a freezer. This is achieved by monitoring compressor amperage, chamber temperature, and door switch status of a freezer and transmitting the data to a PC, or data acquisition system. The WFM can be either AC or DC powered. Installation is designed to be minimally invasive.

Figure 1. Wireless Freezer Monitor

The following diagram describes the various components of the WFM.



WFM Front Panel

WFM Back Panel

A. Sensor input terminal strip
B. External power terminal strip
C. LED Indicators
D. 5V-48V barrel jack input, 5.0mm x 2.1mm
E. Function Button
F. Radio 1 antenna connector
G. Programming/Expansion port

Figure 2. WFM Schematic

3.1 Connections

The WFM has four pre-defined channels for data collection.

- Channel 1 monitors the low stage compressor amperage.
- Channel 2 monitors the high stage compressor amperage (if present).
- Channel 3 monitors freezer temperature.
- Channel 4 monitors the freezer door switch status.

Data on all four channels are recorded at the same time for data correlation.

The inputs to the WFM are pre-configured at the factory and cannot be interchanged during use.

3.2 Sample Collection

Samples are collected one of three ways.

Manual instantaneous reading. The user can physically collect a reading at the WFM.

Routine data collection. A routine sampling interval between 1 and 65000 seconds can be programmed into the WFM. When the WFM is on, this is the default sampling interval that data will be collected.

The door switch will also trigger an increased sampling rate. When the door switch is activated, the sampling rate will change to a 30-second interval for a 2-minute period. This increased rate is intended to monitor conditions more frequently when the freezer door is open. At the end of the 2-minute interval, the programmed sampling interval will resume.

Pre-programmed short term data collection intervals. Each WFM comes with two pre-programmed data collection intervals. These are short term intervals of data collection that override the routine data collection rate. They are intended to be used for troubleshooting, or during known events when the user might want to change the sampling rate for a short period of time.

See Section 5.0, Operation, for detailed instructions for setting sample collection rates.

The readings are then transmitted wirelessly as part of the overall Cypress Envirosystems Monitoring System.

3.3 Cypress Envirosystems Monitoring System

The Cypress Envirosystems Wireless Freezer Monitor is part of the Cypress Envirosystems Monitoring System. This system can be setup one of two ways:

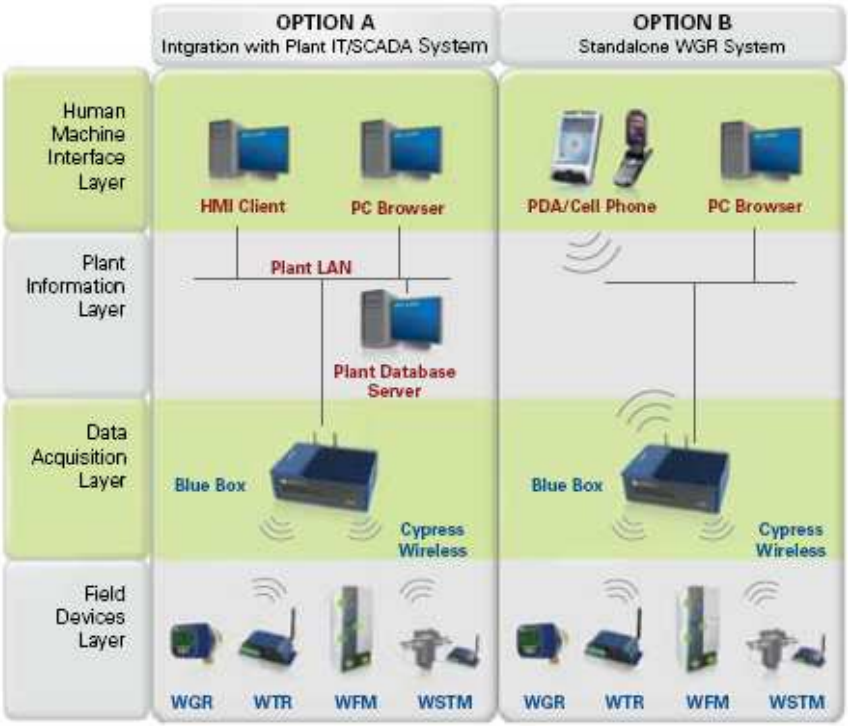


Figure 3. Cypress Envirosystems Monitoring System Setup Options

3.4 Related Products

The WFM sends data to the Cypress Envirosystems Blue Box Server, which stores the data in a SQL server. The WFM can communicate directly to the Blue Box Server, or through Wireless Range Extenders.

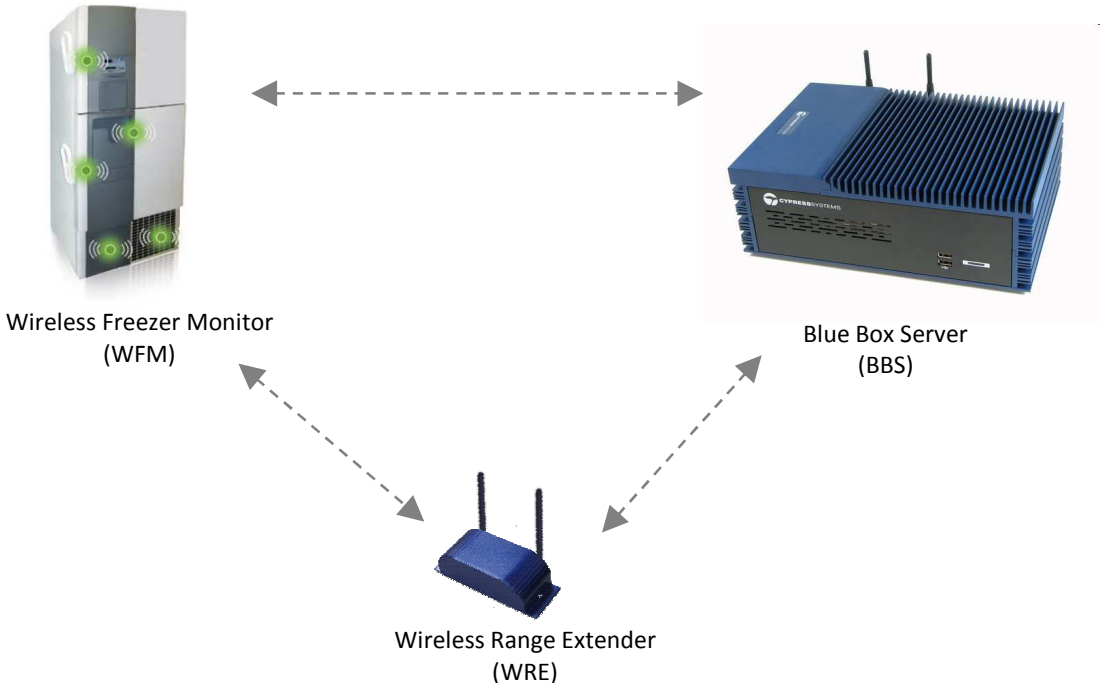


Figure 4. Cypress Envirosystems Monitoring System Overview

4.0 Setup

4.1 Components

The WFM comes with the following components:

WFM

Antenna, with cable

Power cord (optional)

Thermocouple

External power connector

Sensor input connector

Clamp-on ammeter

Crimp connector

4.2 Installation Overview

To install a WFM, mount the unit in the mechanical space of the freezer, or on the side of the freezer.
Connect the ammeters to the power cords of the compressors with the low stage compressor current connected to Opt 1 and the high stage compressor current connected to Opt 2 on the WFM
Connect the thermocouple wire to Channel 1 and insert the end into the freezer chamber.
Connect the door switch signal to Channel 2 using the crimp connector.
Connect the antenna to the WFM and position the antenna at the top of the freezer.

Connections between the WFM and the analog output sources should be made with 22AWG stranded, shielded cable.

Please note, installation of the WFM should be performed by a qualified technician. Channel 3 + is Opt 1 and Channel 3 – is the gnd connection on the WFM. Channel 4 + is Opt 2 and Channel 4 – is the gnd connection on the WFM.

For safety reasons, connection of the ammeters and door switch monitors should be performed with the freezer unplugged. This power interruption should last approximately 5 minutes.

5.0 Operation

5.1 Configuration

Configuration of the WFM must be performed by a qualified technician. See Section 10.0, Support, for details.

5.2 Turning the WFM On and Off

To turn on a battery powered WFM, connect the external power terminal connector. To turn off a battery powered WFM, disconnect the external power terminal connector.

To turn on a 110/240 VAC powered WFM, plug in the power cord and connect the barrel jack input. To turn off a 110/240 VAC powered WFM, unplug the power cord and disconnect the barrel jack input.

5.3 Setting Sampling Rates

Manual instantaneous reading. To take a one-time reading, press the Function button for less than 2 seconds. The green LED light will flash to indicate that data has been collected.

Routine data collection. Whenever the WFM is on, it samples based on the routine data collection rate. This rate is between 0 and 65535 seconds, or approximately 18 hours. This value is defined by the user, but can only be changed using the Handheld Configuration Tool.

Preprogrammed short term data collection intervals. In addition to the routine data collection rate, there are two pre-programmed short term data collection intervals associated with the WFM.

FAST
The FAST sample mode collects data at a 5-second interval for a 5-minute duration. The WFM can be placed into the FAST sample mode using the Function button.

1. Depress the Function button. The green LED will illuminate.
2. Hold the Function button until the yellow LED illuminates.
3. Release the Function button.

To cancel the FAST sample mode once it has been initiated, press the Function button. The yellow LED will flash, to indicate that the sample mode has been cancelled.

MEDIUM
The MEDIUM sample mode collects data at a 30-second interval for an 8-hour duration. The WFM can be placed into the MEDIUM sample mode using the Function button.

1. Depress the Function button. The green LED will illuminate.
2. After two seconds, the yellow LED will also illuminate.
3. Hold the Function button until the red LED illuminates.
4. Release the Function button.

To cancel the MEDIUM sample mode once it has been initiated, press the Function button. The yellow LED will flash, to indicate that the sample mode has been cancelled.

5.4 WFM Configuration Mode

The Configuration mode is primarily restricted and for use by qualified service technicians to configure and install the WFM.

The WFM can be placed into the Configuration mode using the Function button.

1. Depress the Function button. The green LED will illuminate.
2. After two seconds, the yellow LED will illuminate.
3. After an additional two seconds, the red LED will illuminate.
4. After an additional two seconds, all three LED lights will flash.
5. Then release the Function button. The green LED light will continuously flash.

To exit from the Configuration mode, press the Function button. The LED lights will no longer flash.

6.0 Care and Maintenance

6.1 Calibration

The WFM is calibrated during installation and initial configuration. Routine calibration can be performed by a qualified service technician, but is not required. See Section 10.0, Support, for details.

6.2 Battery Life

If you are using a battery powered WFM, the battery status of the WFM can be monitored through the web console. Battery change-out must be performed by a qualified service technician. See Section 10.0, Support, for details.

The battery life of the WFM is dependent on the sampling frequency. Typical ranges are listed below.

Sampling Frequency	Estimated Battery Life
1 sample per 1 minute	1.5+ years
1 sample per 15 minutes	2.5+ years
1 sample per hour	3+ years
1 sample per day	3+ years

7.0 Troubleshooting

My reading on the web console does not match the freezer display.
Please verify that the min and max values were set properly on the Cypress Envirosystems Web Console.

If you have any additional problems, please contact us. See Section 10.0, Support, for details.

8.0 Technical Specifications

Analog Data Inputs:	User-configurable: Typically internal temperature, door switch, high side compressor current, low side compressor current
Number of Inputs:	Up to four inputs per WFM
Data Capture Rate:	User-configurable
Thermocouple:	Type K, -328°F to 482°F (-200°C to 250°C)
Current Sensor:	Standard: Split core, 0-20A DC. Other current sensors available upon request.
Wireless Frequency:	2.4GHz Direct Sequence Spread Spectrum, 100mW peak output
Wireless Range:	Up to 1600 ft (488 m), high interference immunity, extendable with repeaters
Wireless Protocol:	Cypress Semiconductor's highly optimized industrial DSSS radio and protocol. Integrates robust security, antenna and frequency diversity, optional encryption and minimal interference with existing wireless systems (for additional details, please see FAQ at www.cypressenvirosystems.com)
Approvals:	FCC Class B compliant, RoHS, ETSI compliant
Power Supply:	Standard 110-240VAC or battery powered
Battery Life:	>3 years (approximate)
Humidity:	10-99%RH, non-condensing
Operating Temperature:	-4°F to 158°F (-20°C to 70°C)
Storage Temperature:	-40°F to 185°F (-40°C to 85°C)
Enclosure:	Rugged extruded aluminum industrial chassis (optional NEMA4/IP66 enclosure)
Dimensions:	5.7” x 2.2” x 1.6” (145mm x 57mm x 42mm)
Weight:	0.51 lbs (230g)

9.0 Product Disposal

The WFM is recycled by Cypress Envirosystems. Contact a service technician or Cypress Envirosystems headquarters to recycle the WFM. See Section 10.0, Support, for details.

10.0 Support

For additional support, including configuration, maintenance, and troubleshooting, please contact us.

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11.0 Warranty Information

Every product comes with a full one-year parts and labor warranty. Cypress Envirosystems monitoring of battery status, product status, and potential communications packets are included during this period, so that proactive service can be provided to our customers.