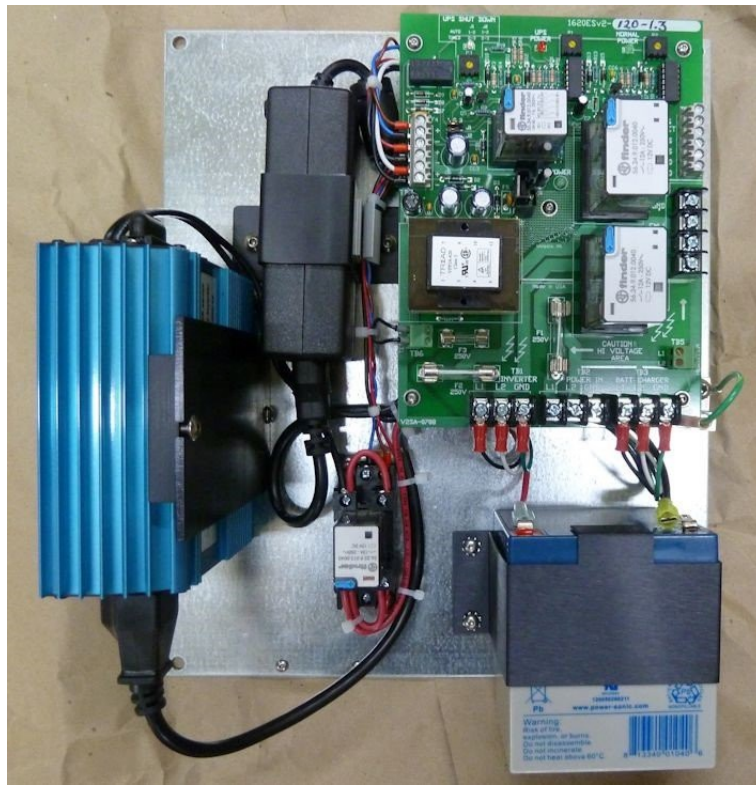


# **Resurge Failsafe Unit**

## **1620ESv2 SERIES**



## **Operation and Maintenance Manual**

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# **1620ESv2 Resurge Failsafe Unit**

## **1. - Introduction**

Congratulations on the purchase of the **Resurge Series1620ESv2 Failsafe**, this unit was designed specifically for your System. Please follow the instructions outlined on these next few pages to put your system on line.

In general, a UPS (Uninterrupted Power Supply) or Failsafe unit delivers emergency power in the event of regular source power failure or interruption. This Failsafe unit was designed to open or close one or more actuators after a power failure, if more than one actuator is to be controlled by this system the unit will remain ON until the last controlled actuator has reached the failsafe position.

Your Failsafe unit is housed in a NEMA Enclosure, and ships with two complete sets of drawings, one set has been attached to the inside door and an extra set is supplied for your files.

Your Failsafe unit features sophisticated electronic circuitry. It provides high peak power output to start and run devices requiring high current for short duration. This high current is referred to as **locked rotor amperage**. Once interfaced with your system, the unit will operate automatically during power failure.

## **2. - Unpacking the Failsafe unit**

Upon receiving your Failsafe unit, you should check the contents of your package. First, inspect the shipping container for any indications of mishandling. If there is any evidence of damage to the container you should report it to your carrier, a representative of Resurge Failsafe, or to Resurge Failsafe LLC directly. Next, inspect the control cabinet and the internal controls and if anything appears to be abnormal or damaged report it at once.

This Failsafe unit was manufactured by:

**RESURGE FAILSAFE LLC.**

**P.O. Box 984**

**Windham, Maine 04062**

**Phone # (207) 939-8112**

### 3. - Installation

#### **Caution !!!**



The installation, maintenance and operation of this unit should be performed **BY QUALIFIED PERSONNEL ONLY**. Resurge Failsafe LLC, its representatives or affiliates accept no responsibility for damages or injuries resulting from the improper installation, maintenance or operation of its equipment. Personnel responsible for the installation and operation of this unit must read and understand this manual fully before proceeding. If you do not understand the installation or operation procedures of this unit completely **STOP**, and contact either Resurge Failsafe or an affiliate for further instructions. Technicians are available to answer your questions.

- Use extreme caution when working inside the Failsafe unit. Insure that all electrical power has been turned **OFF** before attempting installation, or maintenance of this unit.
- Never short or bridge the two DC terminals at the Battery, or the DC input terminals at the Inverter.
- **DO NOT** allow anything to come in contact with these terminals during Failsafe operation, or during service or installation. You must insulate these terminals to help protect against accidental short circuits.
- Failure to properly ground the Failsafe to earth ground may result in a lethal electrical shock hazard.
- Serious injury to personnel and / or property can result from failure to follow correct procedures.

Before you proceed with the installation of this Failsafe unit, ensure that the switch located on the inverter inside the Failsafe unit is **OFF**; this will prevent an accidental activation of the unit during installation.

**Disconnect all power** to the equipment to be controlled by the Failsafe unit, and read the instructions and connection drawings provided by the actuator manufacturer before proceeding with the installation.

All the connections between the Failsafe unit and field equipment are provided for by the customer, unless a specific agreement has been reached with Resurge Failsafe or its affiliates to provide such installation.

The Failsafe enclosure may be punched or drilled for conduit attachments in any of the four sides of the enclosure, however the conduit entry point must be at least 3” from the internal back panel to allow room for wires to clear all internal components. **Do not make connections through the back of the control box.** All connections and conduit hubs must be of the type which will maintain the correct NEMA rating of your unit.

All connections are to be made directly to the terminal block located inside the Failsafe unit; these terminals are clearly marked and assigned on the electrical drawings attached to the door.

Make all the connections between the actuators and the Failsafe unit. When connecting the **limit switches** be sure that you have selected a set of contacts that will **close** when the actuator has reached a **FULLY OPENED** or **FULLY CLOSED** position after power failure. Failure to select the correct set of contacts will prevent the Failsafe unit from automatically disconnecting after the actuators have reached the failsafe position.

### 3.1. – AUTO / TIMED UPS shut down

The 1620ESv2 series includes an option that allows the system to be shut down in **AUTO** or **TIMED** mode.

**AUTO MODE** requires that a Limit Switch from the valve actuator be connected to the controller for the system to shut down automatically after a power failure.

**TIMED MODE** should be used only when the valve actuator does not have an available limit switch.

To enable this option, jumpers **J1** and **J2** must be moved from pins **1-2** to pins **2-3**. Once enabled, the time available for a shutdown after a power failure is selected with the potentiometer **P3**, the minimum time is factory set at 1.5 minutes (P3 set fully to the left) and the maximum possible time to select is about 2.5 minutes (P3 set fully to the right). Longer times are available and should be requested when ordering.



Regardless of the mode selected, this controller has an **LED** above **P3** that will be ON when the failsafe has been shut down after a power failure, and it will remain ON until normal power is restored.

The battery included with this Failsafe unit was sized to operate a specific system for a specific amount of time. If it is not disconnected from the power inverter it will fully discharge the battery after activation.

Ensure that all the electrical connections are made according to the drawings and schematics provided by the actuator's manufacturer. If more than one actuator is to be controlled by the Failsafe, each one should be connected to the assigned terminal block inside the Failsafe unit.

**CAUTION!!!! Never connect two actuators to the same terminal block.**

No external controls are provided with standard Failsafe units. All manual switch/controls are to be provided by the customer, and should be connected according to the electrical drawing, or drawings provided with the Failsafe unit and the switch/control manufacturer. Wiring must comply with all Federal, State, and local codes.

If your Failsafe unit is controlling a modulating actuator (**4/20 ma signal**), regardless of the source of the signal, the Failsafe unit will cut the (**4/20 ma signal**) to the actuator and drive it down to zero (**0 ma**). This will force the actuator to move to its failsafe position. For this type of operation, the signal wires should be connected as follows:

1. - Connect the negative (-) wire from the 4 /20 ma source to the terminal labeled signal (-) at the actuator.
2. - Connect the positive (+) wire from the 4 / 20 ma source to one of the terminals labeled **MOD** in the Failsafe unit.
3. - Connect the other terminal labeled **MOD** on the Failsafe unit, to the terminal labeled signal (+) in the actuator.
4. - Connect the normally open Limit Switch wires from the Actuator to the terminals labeled **ALS** in the Failsafe unit
5. - Connect the motor from the Actuator to the Failsafe according to the drawings supplied with the unit.
6. - Connect Power to the unit, make sure you connect a solid ground to the Failsafe
7. - Connect the Red wire from the Battery to the terminal labeled **TB8 BATTERY (+)**
8. - The Controller offers the option to connect a **REMOTE SWITCH** for testing purposes. This terminal block **TB6** is shipped with a jumper installed from the factory, if you wish to install the remote switch, remove the jumper and connect a normally close maintained type selector switch.

To test the Failsafe, activate the selector switch. **This simulates a Normal Power Failure!** The failsafe will react and perform the transfer of power, according to the controller settings. Upon completion of the transfer the Actuator should go to its failsafe position and the Failsafe unit should automatically be turned off.

To return the actuator to normal operation place the selector switch to the normal position.

## **WARNING !**

**Resurge Failsafe LLC does not recommend the use of any of its Failsafe units in life support systems or in any life threatening applications where a malfunction or failure of the unit could cause failure of these applications.**

### **4. - Failsafe Operation**

This Failsafe unit was designed to perform automatically upon power failure.

During normal operation the Failsafe will be in the STAND-BY mode, the battery is disconnected from the power inverter and the battery charger is trickle charging the battery.

During a power failure the battery charger will stop charging, and the power inverter will be automatically switched to the battery. The Failsafe will be turned ON. Once all of the actuators are in the failsafe position the unit will cut the power and disconnect the battery from the inverter to maintain maximum battery charge.

The Failsafe will remain OFF until normal power is restored to the system, reestablishment of normal power will restart the Failsafe unit in the STAND-BY mode and the battery charger will be activated again.

If the actuator is the modulating type, after power failure it will go to the failsafe position. This will be **OPENED** or **CLOSED** depending on customer selection. Once normal power is restored to the unit, the actuator will return to its original position and resume normal operation.

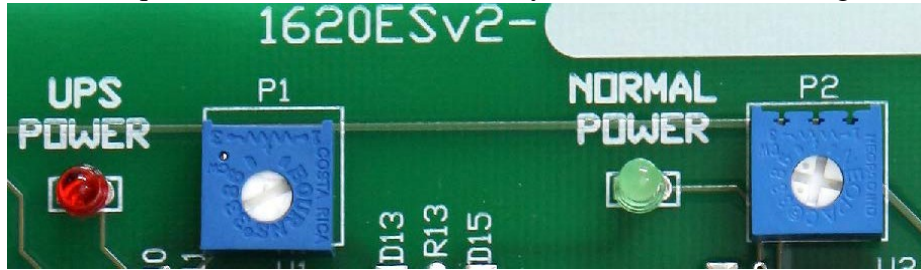
If an **OPEN-CLOSE** switch has been interfaced between the Failsafe unit and the actuator, ensure that the actuator will go to the failsafe mode (open or close) regardless of the position of the switch. Follow the wiring diagram provided with the Failsafe.

The Failsafe has built-in protection against overload. Should the unit become overloaded or if a major electronic failure occurs, the circuit breaker on the inverter will trip. This will help to protect the inverter and your equipment from damage. Please wait 1 minute to allow components to cool before the circuit breaker is reseted automatically.

The Electronic Control Board has two timers that control how fast the Failsafe reacts upon power failure and power return. These timers are controlled by two potentiometers, **P1=UPS Power** and **P2=Normal Power**. Turning the potentiometer to the left, decreases the time delay, turning the potentiometer to the right increases the time delay for the transfer. If instant transfer is required turn the potentiometers fully to the left.

**P1** controls the time required for the Inverter to supply emergency power to the actuator after a Power Failure.

**P2** controls the time required to RESET the Failsafe system to normal working condition.



These potentiometers provide the customer with extra buffer time between transfers, preventing unnecessary activation of the Failsafe if a loss of power is less than a few seconds. In some cases, Emergency Generators are expected to get online after a Power Failure, if this is your case, you may set the potentiometers somewhere in the middle to get extra time before activating the Failsafe. If the generator goes online before the timer times out the Failsafe will return to “Normal Condition”. If the Generator fails to go online the Failsafe will transfer to Emergency Power sending the Actuator to its failsafe position.

The Controller incorporates LED lights that show the type of power that the actuator is receiving; these lights will be ON only when either Power has been applied to the actuator terminal block.

**Green NORMAL POWER LED** = When lit actuator is receiving Normal Power.

**Red UPS POWER LED** = When lit actuator is receiving UPS power.

**Green POWER LED** = When lit Normal Power is present.

## 5. - Maintenance

The Failsafe unit requires minimum maintenance, but should be kept dry and clean at all times, periodically check all cable connections, both at the inverter and the battery, clean and tighten these as necessary.

At least once a month test the system to make sure that the unit is in good condition and to exercise the batteries.

**Caution:** blown fuses are an indication of a fault in the system or its connections. Such as short circuits, overloads, etc. Locate the source of the problem and fix it before replacing the fuse.

The Failsafe unit operates at high efficiency and generates minimal heat during use. This efficiency rating is maintained throughout the inverter’s load range, diminishing moderately at maximum output. Since the inverter is merely a converter of electrical energy from one type to another, its AC output voltage will be proportional to its DC input voltage. As the voltage of the battery connected to the inverter begins to drop off, the output of the inverter will decrease accordingly.



To ensure that you will always get the maximum output from the Failsafe unit, periodically verify that the battery is fully charged.

## **6. - Additional Features**

### **TEST SWITCH**

Test the Failsafe unit once a month, cut the power supply to the Failsafe unit or use a remote test switch. Allow the actuator or actuators to move to their failsafe position, once they are in failsafe mode reconnect power to the unit and check that all the relays are working properly, this is also a good time to verify that the battery charger is working, the charging light should remain ON until the battery reaches a fully charged condition.

You may check the condition of the battery with an Industrial sealed battery load tester, when testing follow the instructions supplied with the battery load tester unit.

A quick test may be performed to check the condition of the battery, connect a voltmeter to the battery terminals, disconnect power to the Failsafe unit and allowed the actuator to go to the failsafe position, during all this time check the reading of the voltmeter, if the voltage do not drop below 11 Vdc. The battery is holding charge as expected, if the voltage drops below 11 Vdc. You need to perform a test with a battery load tester.

### **UPS RESET**

### **CAUTION!**

**This option is provided for emergency only and it must be activated by a qualified electrician, if the system is left active for a long period of time the inverter will automatically shut down due to low battery charge and it may require to connect an external battery charger to elevate the voltage of the batteries before the inverter takes control of the charging system.**

**Due to the many different ways that a valve actuator can be connected we suggest that you contact us to learn how this feature can help you.**

## 7. - Troubleshooting Guide

<b>SYMPTOM</b>	<b>PROBLEM</b>	<b>CORRECTIVE ACTION</b>
Failsafe does not provide AC Output (DC Input Present)	Battery discharged	Recharge or replace battery before attempting to use Failsafe
Inverter does not provide AC Output (DC Input Present)	Circuit Protection is tripped	Wait a few minutes to allow Circuit Breaker to reset
	Operating Mode Switch is set to "OFF"	Set Operating Mode Switch to "ON"
	Control Power Relay is Faulty	Check Relay, replace if necessary
	Excessive Battery Discharge	Check Battery Condition
Battery Charger will not charge the Battery (AC Input Present)	Connected Battery is dead.	Check and Replace Old Batteries
	Battery Fuse is Blown	Check and Replace Fuse
	Battery cabling is loose or degraded	Check and tighten or replace cabling
	Battery Charger system Failure	Replace Battery Charger or contact Resurge Failsafe LLC, Customer Service.
Failsafe shuts down shortly after starting	Faulty Battery / Overloaded system	Replace battery / make sure proper load is applied