Valcom Failsafe Unit

1620APS SERIES

Operation and Maintenance Manual

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Valcom Failsafe Unit

1. - Introduction

Congratulations on the purchase of the **Valcom Failsafe unit, Series1620APS** 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 is shipped 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 (LRA)**. 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 Valcom, or to Valcom 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:

Valcom div. of Tooling Research Inc.
81 Diamond St.
Walpole, MA 02081
Phone # (508) 668-5583
Fax # (508) 668-5203

3. – Installation

Warning !!!

The installation maintenance and operation of this unit should be performed BY QUALIFIED PERSONNEL ONLY. Valcom, it's representatives or affiliates accepts 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 Valcom 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 Fail-safe 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 Valcom or its affiliates to provide such installation.

The Failsafe enclosure may be punched or drilled for conduit attachments on 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.

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 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** at 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 Orange/Black wire from the battery to the terminal labeled **TB5 BATTERY (+)**

8. - The controller offers the option to connect a REMOTE SWITCH for **UPS TEST** 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 !

Valcom 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 STAND-BY mode, power will be supplied through the inverter and the battery charger is trickle charging the battery.

During 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 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, Re-establishment of normal power will restart the Failsafe unit in the STAND-BY mode and the battery charger will be activated again.

If the needs arises to reset UPS power to the actuator during a power failure and only after the actuator has been sent to the failsafe position, it is possible to reset the failsafe with a normally open momentary contact switch. This switch must be connected to the TB5 **"UPS RESET"** terminals. This switch will be active only after the Failsafe has completed the first cycle after power failure. Before you reset the UPS POWER disconnect one of the wires connected to **TB6 "ALS."**

Once the wire has been disconnected press the UPS RESET switch, power will be present after a few seconds and it will remain active until the wire is reconnected to **TB6 ALS** and the actuator has moved back to the failsafe position.

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.

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 needs. 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 resetting the circuit breaker.

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 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.
Yellow UPS CYCLE DONE LED = When lit Actuator has reached its failsafe position.
Green POWER LED = When lit Normal Power is present.

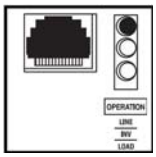
4.1 – Inverter Switch Modes

AUTO/REMOTE: Switch to this mode when you need constant, uninterrupted AC power for connected equipment. The Inverter/Charger will continue to supply AC power to connected equipment and to charge your connected batteries while utility- or generator-supplied AC power is present. Since the inverter is ON (but in Standby) in this mode, it will automatically switch to your battery system to supply AC power to connected equipment in the absence of a utility/generator source or in over/under voltage situations. (AVR or Automatic Voltage Regulator on selected models)

CHARGE ONLY: Switch to this mode when you are not using connected equipment in order to conserve battery power by disabling the inverter. The Inverter/Charger will continue to supply AC power to connected equipment and charge connected batteries while utility or generator supplied AC power is present. However, since the inverter is OFF in this mode, it WILL NOT supply AC power to connected equipment in the absence of a utility/generator source or in over/under voltage situations

OFF: Switch to this mode to shut down the Inverter/Charger completely, preventing the inverter from drawing power from the batteries, and preventing utility AC from passing through to connected equipment or charging the batteries. Use this switch to automatically reset the unit if it shuts down due to overload or over-heating. First remove the excessive load or allow the unit to sufficiently cool (applicable to your situation). Switch to “OFF”, then back to AUTO/REMOTE” or “CHARGE ONLY” as desired. If unit fails to reset, check the motor load or allow unit to cool further and retry.

4.2- Inverter Indicator Lights



The Inverter is equipped with a simple, intuitive, user-friendly set of indicator lights. These easily-remembered “traffic light” signals will allow you, shortly after first use, to tell at a glance the charge condition of your batteries, as well as ascertain operating details and fault conditions

LINE Green Indicator: If the operating mode switch is set to “AUTO/REMOTE,” this light will ILLUMINATE CONTINUOUSLY when your connected equipment is receiving continuous AC power supplied from a utility/generator source.

If the operating mode switch is set to “CHARGE ONLY,” this light will FLASH to alert you that the unit’s inverter is OFF and will NOT supply AC power in the absence of a utility/generator source or in over/under voltage situations.

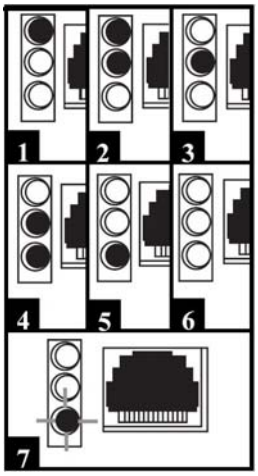
INV (Inverting) Yellow Indicator: This light will ILLUMINATE CONTINUOUSLY whenever connected equipment is receiving battery-supplied, inverted AC power (in the absence of a utility/generator source or in over/under voltage situations). This light will be off when AC power is supplying the load. This light will FLASH to alert you if the load is less than the Battery Charge Conserver (Load Sense) setting.

LOAD Red Indicator: This red light will ILLUMINATE CONTINUOUSLY whenever the inverter is functioning and the power demanded by connected equipment exceeds 100% of load capacity. The light will FLASH to alert you when the inverter shuts down due to a severe overload or over-heating. If this happens, turn the operating mode switch “OFF”; check the load of the motor and let the unit cool. You may then turn the operating mode switch to either “AUTO/REMOTE” or “CHARGE ONLY” after it has adequately cooled. This light will be off when AC power is supplying the load.

BATTERY Indicator Lights: These three lights will illuminate in several sequences to show the approximate charge level of your connected battery bank and alert you to two fault conditions:

4.2.1- Approximate Battery Charge Level Lights*

LED’s Illuminated	**Battery Capacity** (Charging/Discharging)
1 - Green	91% - Full
2 - Green & Yellow	81% - 90%
3 - Yellow	61% - 80%
4 - Yellow & Red	41% - 60%
5 - Red	21% - 40%
6 - All three lights OFF	1% - 20%
7 - Flashing red	0% - (Inverter Shutdown)



** Charge levels listed are approximate. Actual conditions vary depending in battery conditions and load.*

4.2.2- Fault Condition Lights

LED's Illuminated	Fault Condition
1 - All three lights flash slowly*	**Excessive discharge (Inverter Shutdown)**
2 - All three lights flash quickly**	**Overcharge (Charger Shutdown)**

** Approximately ½ second ON, ½ second OFF. ** Approximately ¼ second ON, ¼ second OFF. May also indicate a battery charger fault exists. See troubleshooting section in both cases.*

4.3 - Resetting Your Failsafe/Charger to Restore AC Power

Your Inverter/Charger may cease supplying AC power or DC charging power in order to protect itself from overload or to protect your electrical system. To restore normal functioning:

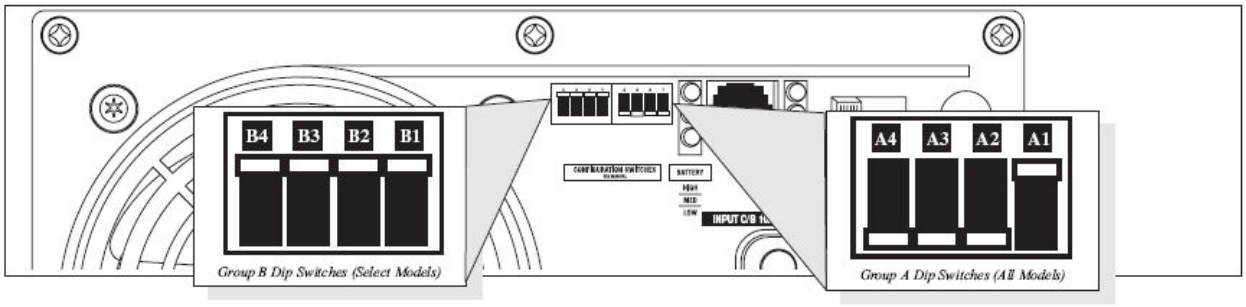
Overload Reset: Switch operating mode switch to "OFF" and remove some of the connected electrical load (i.e.: turn off some of the AC devices drawing power which may have caused the overload of the unit). Wait one minute, then switch operating mode switch back to either "AUTO/REMOTE" or "CHARGE ONLY."

Output Circuit Breaker Reset: Alternatively, check output circuit breaker(s) on the unit's front panel. If tripped, remove some of the electrical load, then wait one minute to allow components to cool before resetting the circuit breaker. See Troubleshooting for other possible reasons AC output may be absent.

4.4 - Set Configuration DIP Switches

Warning!

These DIP SWITCHES have been configured at the factory according to the options included in your specific system. Changing the configuration will cause the system to malfunction and possibly permanent damage to the inverter system and the batteries.



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. 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.

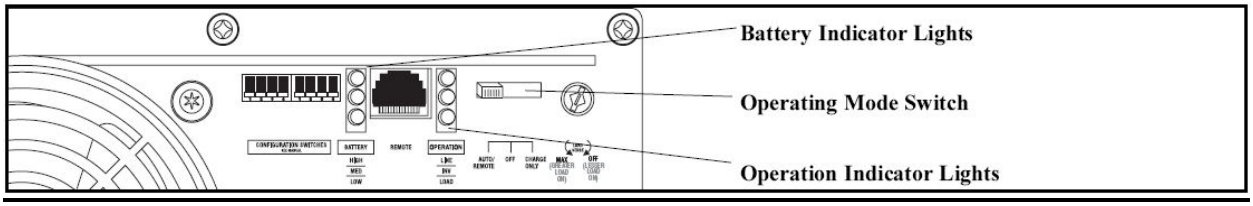
Caution: blown fuses are an indication of a fault in the system or its connections. Such as short circuits, overloads etc. Locate the source of the problem before replacing the fuse.

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 there 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 perform to check the condition of the battery, connect a volt-meter 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 volt-meter, if the voltage do not drop bellow 11 Vdc. the battery is holding charge as expected, if the voltage drops bellow 11 Vdc. you need to perform a test with a battery load tester.

6. - <u>Troubleshooting Guide</u>



SYMPTOM	PROBLEM	CORRECTIVE ACTION
No AC Output (All Indicator Lights Are OFF)	Unit is not properly connected to utility power.	Connect unit to utility power
	Operating Mode Switch is set to **"OFF"** and AC input is present.	Set Operating Mode Switch to **"AUTO/REMOTE"** or **"CHARGE ONLY."**
	This is normal when the Operating Mode Switch is set to **"CHARGE ONLY"** and AC input is absent	No correction is required. AC output will return when AC input returns. Set Operating Mode Switch to **"AUTO/REMOTE"** if you require AC output.
	Circuit breaker is tripped.	Reset circuit breaker.
	Unit has shut down due to battery overcharge (preventing battery damage). The problem may be with connected auxiliary chargers, if any, or with the unit's charger.	Disconnect any auxiliary chargers. Reset by moving Operating Mode Switch to **"OFF."** Wait 1 minute and switch to "**AUTO/REMOTE"** or **"CHARGE ONLY."** If unit remains in shutdown mode after several attempts to reset, contact Valcom Div. of TRI.
	Unit has shut down due to excessive battery discharge.	Use an auxiliary charger* to raise battery voltage. Check external battery connections and fuse. Unit automatically resets when condition is cleared.
	Unit has shut down due to overload.	Check load. Reset by moving Operating Mode Switch to **"OFF."** Wait 1 minute. Switch to "**AUTO/REMOTE**' or "**CHARGE ONLY."**
Battery not recharging (AC Input Present)	Connected batteries are dead.	Check and replace old batteries.
	Battery fuse* is blown	Check and replace fuse.*
	Battery Cabling is loose	Check and tighten or replace cabling.
	Unit has shut down due to battery overcharge (preventing battery damage). The problem may be with connected auxiliary chargers, if any, or with the unit's charger.	Disconnect any auxiliary chargers. Reset by moving Operating Mode Switch to **"OFF."** Wait 1 minute and switch to **"AUTO/REMOTE"** or **"CHARGE ONLY."** If unit remains in shutdown mode after several attempts to reset, contact Valcom Div. of TRI.

	Input circuit breaker is tripped.	Reset circuit breaker.
All Three Battery Indicator Lights Are Slowly Flashing (1/2 Second Flashes)	Battery is excessively discharged	Use an auxiliary charger* to raise battery voltage. Check external battery connections and fuse. Unit automatically resets when condition is cleared.
All Three Battery Indicator Lights Are Rapidly Flashing (1/4 Second Flashes)	Battery is overcharged. Unit will shut down to prevent battery damage. The problem may be with connected auxiliary chargers, if any, or with the unit's charger	Disconnect any auxiliary chargers. Reset by moving Operating Mode Switch to **"OFF."** Wait 1 minute and switch to **"AUTO/REMOTE"** or **"CHARGE ONLY."** If unit remains in shutdown mode after several attempts to reset, contact Valcom Div. of TRI.
Red **"LOW"** Battery Indicator Light is Flashing	Battery voltage is low. Unit will shut down after 5 seconds to protect battery from damage.	Make sure that AC power is present in order to recharge batteries. Reset by moving Operating Mode Switch to **"OFF."** then to **"AUTO/REMOTE"** or **"CHARGE ONLY."**
Red **"LOAD"** Operation Indicator Light is Flashing	Inverter is overloaded. Unit will shut down after 5 seconds.	Check load. Reset by moving Operating Mode Switch to **"OFF."** Wait 1 minute. Switch to **"AUTO/REMOTE'** or **"CHARGE ONLY."**
Green **"BOOST'** or **"CUT"** Indicator lights (available in selected models) Flashing.	This is a normal function	No action required on the user's part.

* User-supplied.