

EZ Wire 120 General Operation and Troubleshooting Guide

Normal Operation:

The EZ120/1600 is a rectifier and bulk charge regulator for the H40 and H80. The reg set point is set by a selector switch on the front cover, and the scale is in volts/ cell (Example for 24V system: 2.40 Volts/Cell x 12 cells in a 24V bank = 28.8V regulation setting, and so on). When the control circuit decides that the batteries are charged according to the set-point, the LED indicator light comes on as the circuit signals a FET switch assembly that serves as a relay to divert power to the external, resistive dump load.

IMPORTANT: The turbine, the solar input to the EZ (if there is any), and the battery bank itself is ALL diverted to dump load during regulation. As such, it's important that this controller be set higher than any other charge controllers that are on the same battery bank lest it try and suck whatever other charge sources the system has when it regulates.

The dump load is rated at 1600 W, hence, EZ120/1600. The turbine will peak at about 1200 W, which gives you headroom for only about 400 W of solar that you can wire through the unit without using an alternative solar controller. We tend to discourage customers from using the "solar" option in the EZ120 as there is quite a variety of superior, three-stage solar controllers out there, and the EZ120 is really a pretty crude bulk charger. It was a bell or whistle (I forget which) that Elliott thought he'd throw into the design.

Common Faults/ Causes:

There are basically only 4 systems that need service on the EZ120. The rest of the unit is a box, wire, and a terminal block. There is a set of three caps in there to stabilize voltage, but these are not particularly prone to failure.

1) Diode Bridge (PN EZA10)

We use three bridge-rectifier diodes with forward and reverse diodes included. They're located just above the wire-way inside the right half of the EZ enclosure.

Problem: When they fail, they usually fail short like any other diode.

Symptom: Jittery, unevenly loaded spinning of the turbine or slow-motion of the turbine like a "brake" is on. Often shudders and produces little to no power.

How to Identify: A resistance check phase-to-phase across each of the three phases usually reveals a shorted diode but doesn't necessarily eliminate a short at the stop switch or in the cap wiring. Resistance or diode check on each will show if it's the diode.

2) Control Circuit (PN EZD59)

A simple comparator circuit for regulation, and the driver for the different functions of the LED meter. All of the problems below require replacement of the circuit.

Problem: Fails to regulate,

Symptom: Battery voltage too high, LED indicator light does not light regardless of voltage setting.

Problem: Fails to stop regulating

Symptom: Dump load constantly hot, LED indicator on regardless of voltage setting.

Problem: Won't power LED meter.

Symptom: LED meter display is dark, 1/4A fuse on back of circuit is blown

How to Identify: try a different meter, if it lights, then the problem is with the LED meter, not the circuit

Problem: Causes erratic readings on the LED meter

How to Identify: Try a different meter. If the readings settle down, the problem is with the LED meter, not the circuit.

Problem: Function selector switch is faulty

Symptom: Erratic readings on LED display.,

How to Identify: If jiggling the selector switch causes values to jump around on LED meter, the circuit needs to be replaced.

3) LED Meter (PN EZA30)

This off-the-shelf multi-function meter has its own driver that needs to be calibrated with control circuit. The circuit (above) and the meter can have a lot of the same symptoms

Problem: LED display is dark.

Symptom: LED meter display is dark

How to Identify: Try a different meter, if it does not light, then the problem is with the circuit, not the LED meter.

Problem: Erratic readings on the LED meter

Symptoms: Missing characters or parts of characters on the display, "weird alien symbols" (no joke!), values jumping around.

How to Identify: Try a different meter. If the readings don't settle down, the problem is with the circuit, not the LED meter.

4) FET Block Assembly (PN WHVD02)

Located in the upper, right-hand corner of the inside of the enclosure, this relay is a paralleled set of 6 FET's soldered to copper and aluminum barstock pieces. The purple wire carries the signal from the circuit board to close the gate. All power is then diverted through the secondary side of the FET assembly to the dump load resistor.

Problem: Won't stop dumping

Symptom: LED indicator light is not lit. Power will not stop dumping to dump load.

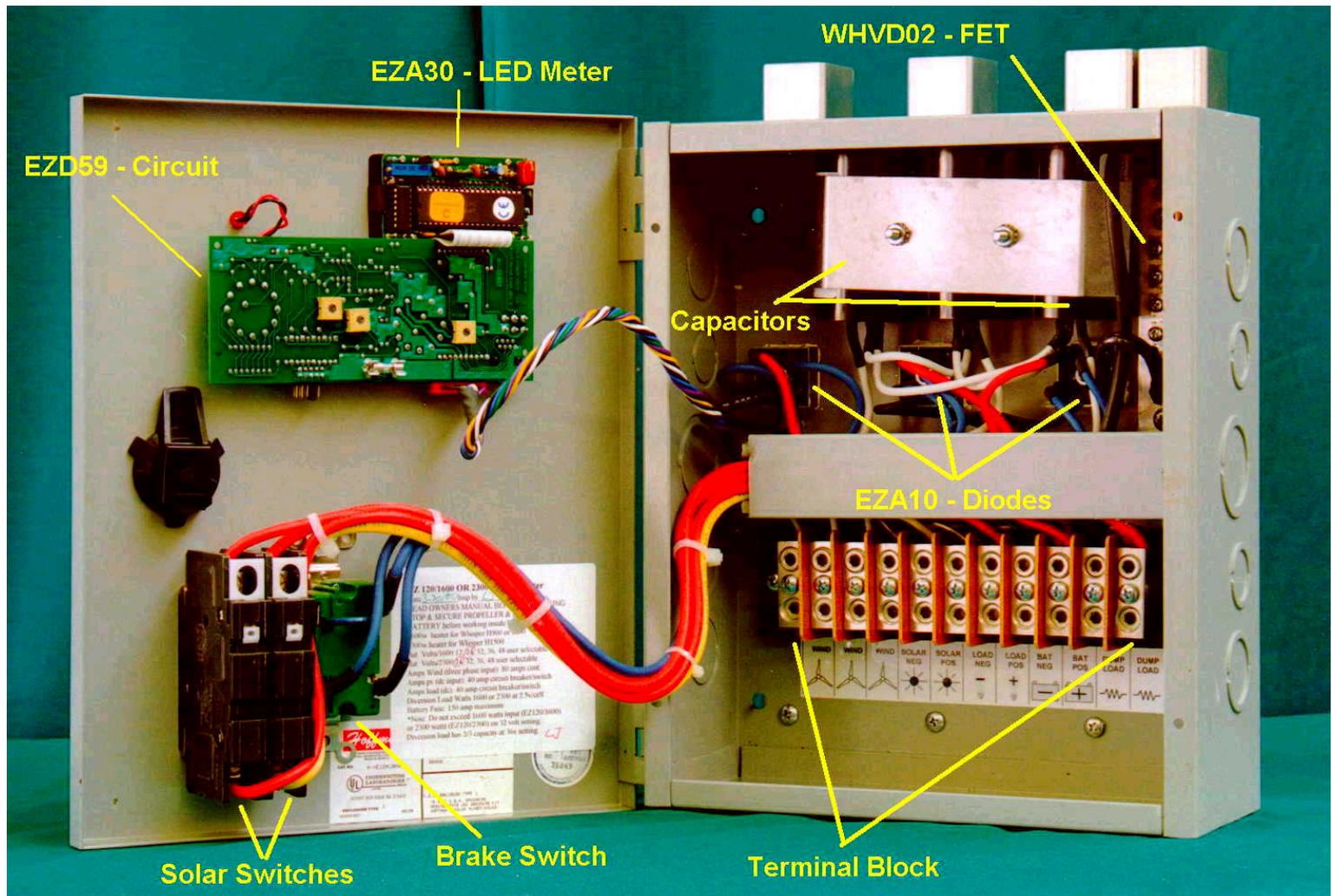
How to identify: Carefully visually inspect the FET's on the assembly. Any marred areas, white spots, or melted spots on the tops of the FET's indicate that FET has overheated and is likely in short circuit. Measure for resistance between the aluminum and copper barstock pieces of the FET assembly. Any reading of less than 1kOhm in either direction indicates a short circuit of the FET assembly. Measure for resistance between the insulated hold-down screw in the aluminum barstock of the FET assembly and the aluminum barstock itself. Any reading below 1kOhm in either direction indicates a short circuit of the FET block to the case of the EZ120. NOTE: In the latter case, the problem may be solved by removing and reinstalling the FET block. Inspect the area under the FET for perforations of the insulator or burrs of steel that were previously drawn up from the hold-down screw holes in the case of the EZ. Always replace the insulator when replacing the FET assembly. Use copious amounts of heat-sink paste.

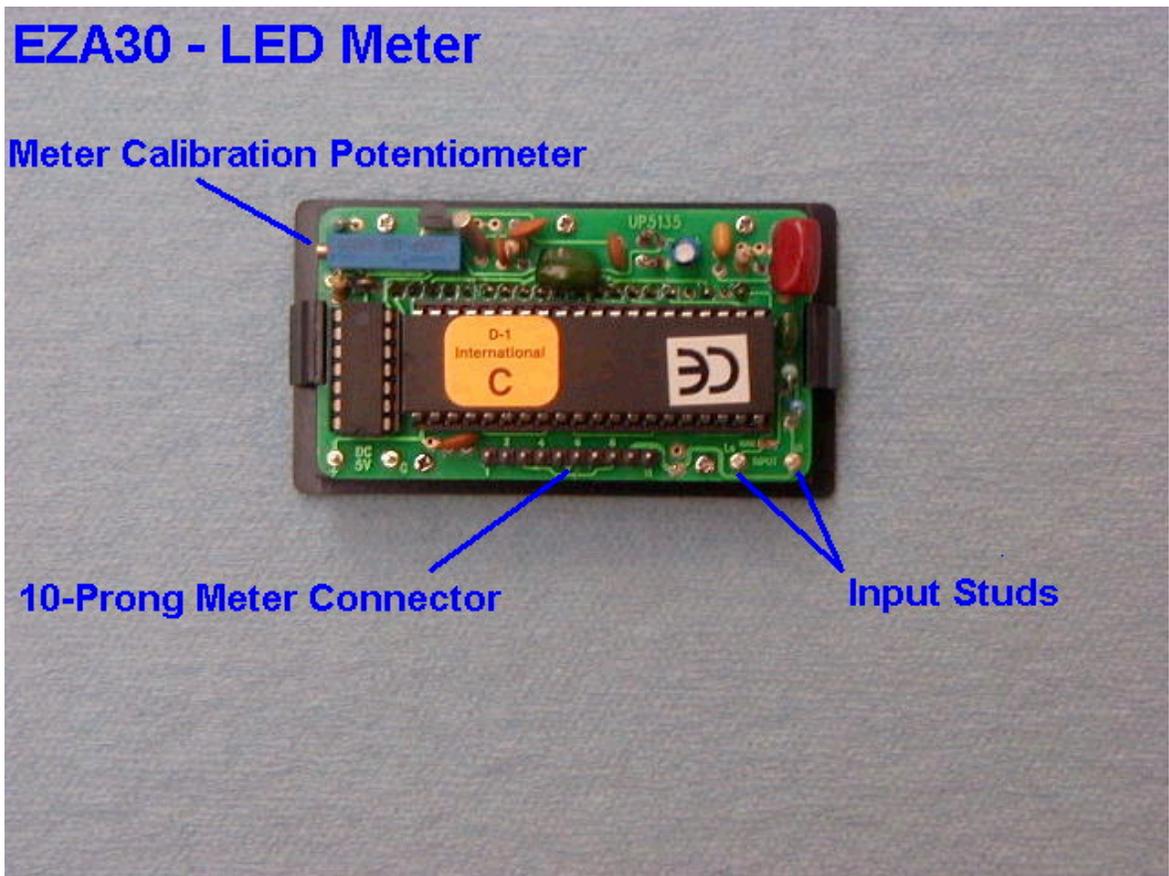
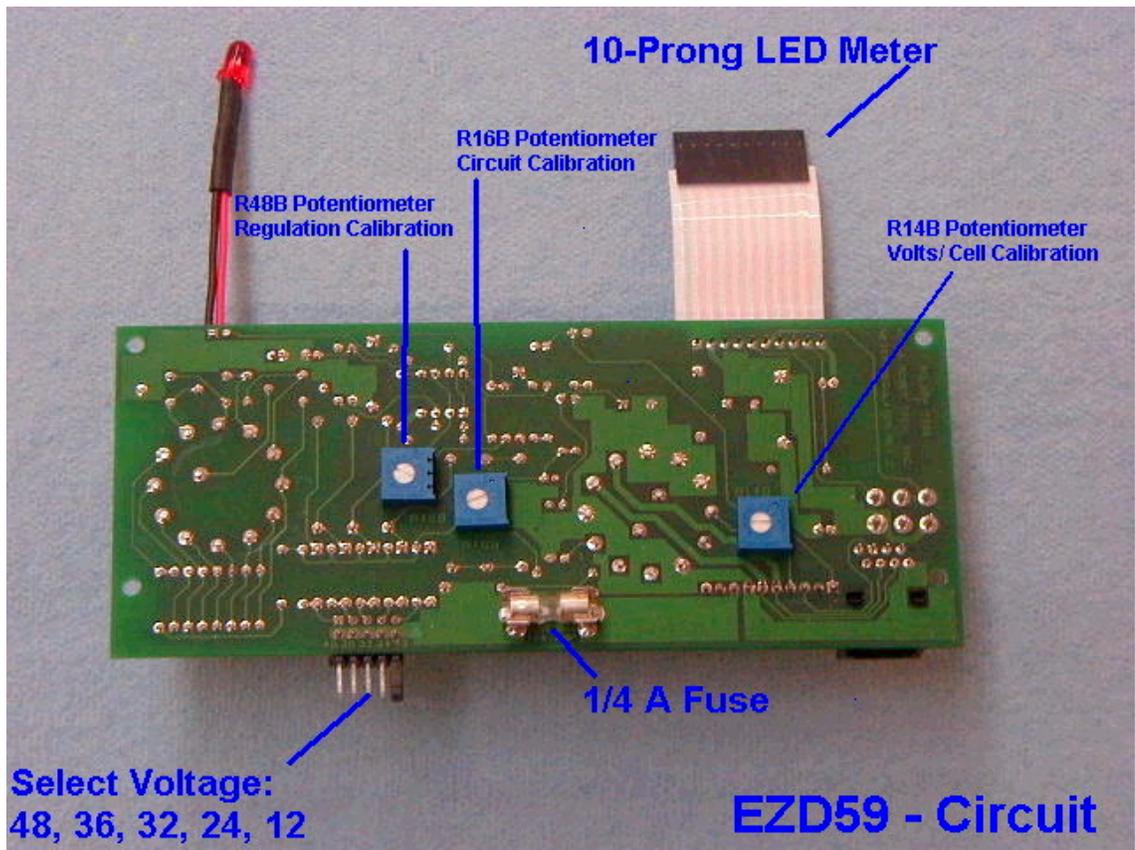
Problem: Fails to dump.

Symptom: Battery voltage too high

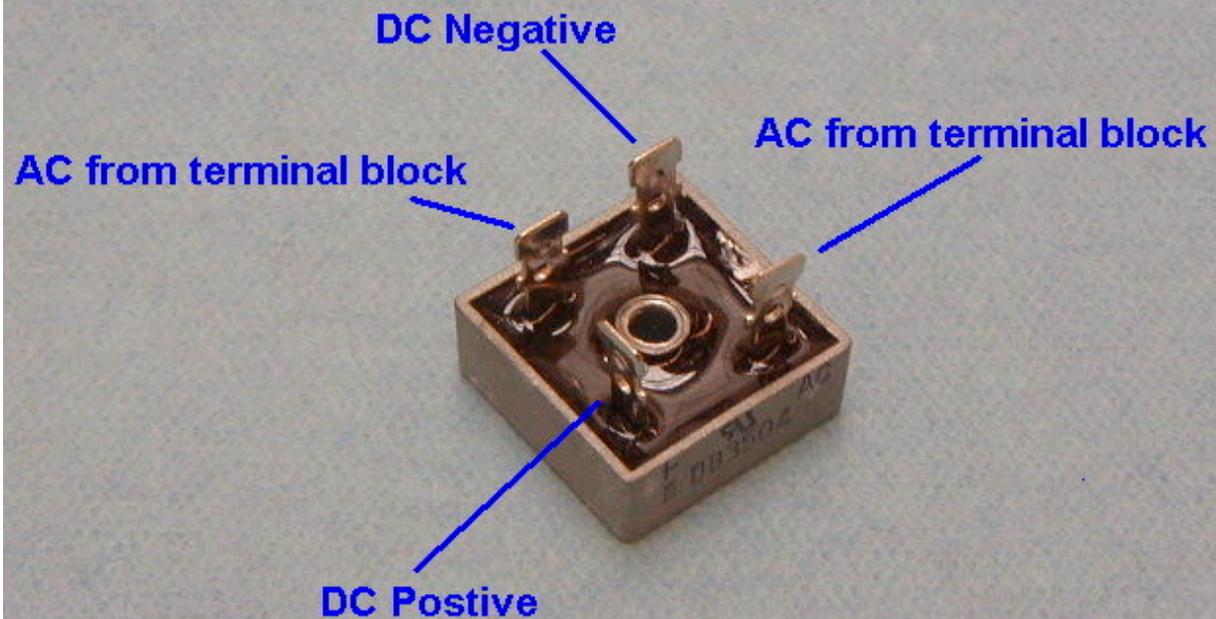
How to Identify: If the the FET assembly has failed open, you'll know it. It likely originally failed short and burned so badly that now the circuit is open. There will be burned, melted, and exploded FETS along the assembly as well as an awful smell.

Reference Pictures





EZA30 - Bridge Rectifier Diode



WHVD02 - FET Assembly

