This document focuses on how to troubleshoot systems that are not receiving any drive power to the motor voltage terminals (or VM). (Seen in label 9 of figure 2 on the next page).

Signs that you might not have any motor supply voltage includes errors such as "410 X axis(1) position error", "SV_STALL ERROR Reported", "411 X axis(1) full power without motion.", “Stall: job canceled", etc as seen below in Figure 1.

![Figure 1](image)

Figure 1

(Continued on next page)
Explanation of Centroid systems

All Centroid systems have the same basic set-up as seen in the picture below:

1. **AC Power** Single phase, two phase, or three phase AC power enter the system.

2. **Rectifier** AC power enters a AC-to-DC converter known as a rectifier. Sometimes the rectifier is called the “Cap board” because it contains an extremely large reservoir capacitor.

3. **Contactor** The high voltage DC power goes through an E-stop contactor. The E-stop contactor can stop the machine by removing the motor voltage from the drive in the event of an emergency or fault. The E-stop contactor is normally open, requiring power to close the contactor.

4. **E-Stop** During an emergency, an E-stop switch is used by the operator to stop the machine. A double pole single throw (DPST) twist to release E-Stop switch is used. The switch is wired so that it is normally closed when the machine is in its operational state. That way if a wire brakes, the E-stop is tripped.

5. **E-Stop Input** All systems with a PLC will have a E-stop input to tell the software when E-stop has been pressed. On newer systems this is input 11, on older systems this is input 1.

6. **Fault Relay** All Centroid systems have at least one fault relay. If the drive or PLC detects a fault, it is able to stop the machine by removing power from the motors. Depending on your system the fault relays are located on the drive (drive fault relays), PLC (PLC fault relays), or both. If you have multiple products with a fault relay, ALL fault relays are wired in series allowing ANY device with a fault relay to stop the machine.

7. **Contactor Power Supply** The contactor power supply provides the contactor with power. Usually in the form of a step-down AC transformer. 24VAC typical.

8. **DC Input Power Supply** DC Input Power Supply. An external power supply is needed to power the I/O on the PLC. This power supply can be 5, 12, or 24.

9. **VM** The high voltage enters the drive though the motor voltage input or VM. This includes the VM+ and VM- terminals. On some systems VM- may be just labeled “GND” or “Ground”.

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Figure 2
VM Troubleshooting Flow Chart

**Start Here**

Check for blown fuses before starting!
Start the control software, then follow
this flow chart.

**CHECK FOR POWER**

When the E-Stop is released, does each
drive measure between
100 – 340 volts DC on
the VM terminals?

**MEASURE THE RECTIFIER INPUT**

Is the rectifier receiving the correct
AC input voltage?

**INCORRECT POWER WIRING**

The problem is most likely a wiring problem or blown fuse. Power down the system and wait for the reservoir capacitor on the rectifier to discharge. Use the continuity check feature on a multimeter to look for blown fuses and loose or incorrect wiring.

**CHECK THE CONTACTOR**

Toggle E-stop. Does the E-stop contactor engage when
E-stop is released?

**PROBLEMS WITH CONTACTOR?**

Is the contactor receiving voltage?
(usually 24VAC)

**BAD CONTACTOR**

Contactors can stick and the solenoids can fail. Replace contactor.

**INCORRECT POWER WIRING**

Power down the system and wait for the reservoir capacitor on the rectifier to discharge. Use the continuity check feature on a multimeter to look for blown fuses and loose or incorrect wiring.

**MEASURE THE RECTIFIER OUTPUT**

Is the rectifier outputting the correct DC voltage?

**HARDWARE FAILURE**

If the rectifier is not outputting any DC voltage, a hardware failure is the most likely cause. Rectifier or the drive may have shorted out.

**FAULT RELAY**

Is there continuity across the all fault relays?

**TIP:** Most drives have LEDs indicating if the drive fault relay is open (The DF LED).

**IS THE E-STOP INPUT WORKING?**

When the E-stop is pressed, does the
software message window indicate that E-
stop was detected?

**TIP:** On newer PLCs the E-Stop input is INP11, on older systems the input is INP1. Consult your schematic for more details.

**TIP:** On software versions after V8.23, ALT+I on the keyboard can be used to display the I/O. Watch input 11 change from green to red as the E-stop is toggled.

**E-STOP INPUT POWER SUPPLY**

The E-Stop input needs to be supplied with 5, 12, or 24 VDC. Is the E-supply power supply outputting correctly?

**E-STOP INPUT POWER SUPPLY PROBLEM**

Check wiring, and replace
power supply / step-down transformer if necessary.

**INCORRECT E-STOP INPUT WIRING**

Make sure the correct SIPS are used if applicable. Consult your schematic on how to wire the E-stop input.

**CONTACTOR POWER SUPPLY**

Check the power supply for the E-stop contactor. The power supply is usually 24VAC provided by a step-down transformer, but varies from system to system. Is the power supply outputting correctly?

**SOFTWARE / HARDWARE ERRORS**

From the main menu, press F3 (MDI). Is the software showing any errors in the message window? Are the devices themselves physically displaying any error codes?

**TROUBLESHOOT ERRORS**

Troubleshoot the source of the error.

“Full Power Without Motion” or “Position Error” may indicate a serious hardware failure.

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Numbered boxes correspond to the diagram on the previous page.