



## Troubleshooting POWER SERIES

### Line Alarms

Line Alarms are the most common problem encountered when utilizing a Power Series controller. The causes and solutions of line alarms are listed here.

#### **NO VOLTAGE** supplied to line input terminals –

1) When the electronics are powered separately from the line-input terminals and the main contactor is not energized, a line alarm will occur. This will store line alarms in memory that are not real problems.

A simple solution is to power the electronics from a control transformer that is powered on by the main contactor, or to use an auxiliary contact on the main contactor to power the electronics.

2) On a Multi-Zone Power Series, the reference jumpers must be connected to the other side of the phase being controlled.

3) Caused by an open fuse. Check the fuses for continuity.

**UNDER VOLTAGE** - Check the “Base Line” voltage in set up. On a “B” (voltage rating) unit, the base line voltage is factory set for 480 volts. If the Power Series is to be used on 208 or 240 volts, it will alarm unless the base line voltage is set properly.

When operating in the Phase Control mode, it can start ramping up, then shut down, flash “Line Alarm”, and then re-start, to do it again. The actual alarm flashes by so fast that you may not see the reason displayed. To find out what happened, go to the Factory Page, arrow down to Diagnostics, and right arrow over until “L1A1” appears in the bottom display. The top display will be the most recent alarm that was stored. Right arrow again and “L1A2” will appear with the alarm prior to the last one being on top. Right arrow again and “L1A3” will appear with the first alarm stored. If it is a three-phase or multi-zone unit, the next controlled leg will be “L2A1, L2A2, & L2A3”. The third leg will be “L3A1, L3A2, & L3A3”.

The Power Series stores the last three alarms for each phase or zone used. To clear out old alarms, remove power from the electronics.

The alarms that may show up in diagnostics are:

<u>uVoL</u>	Under Voltage, when input is less than one half of base line voltage.
<u>A.Cr</u>	Extra zero cross.
<u>n.Cr</u>	No zero cross, or missing half cycle
<u>POL</u>	Polarity
<u>FrE9</u>	Frequency
<u>HCYC</u>	Load half cycle not symmetrical

Alarm codes can help locate the problem when a Power Series is not functioning properly.

**uVoL** Under voltage is usually an incorrect base line voltage setting or a loose connection ahead of the Power Series.

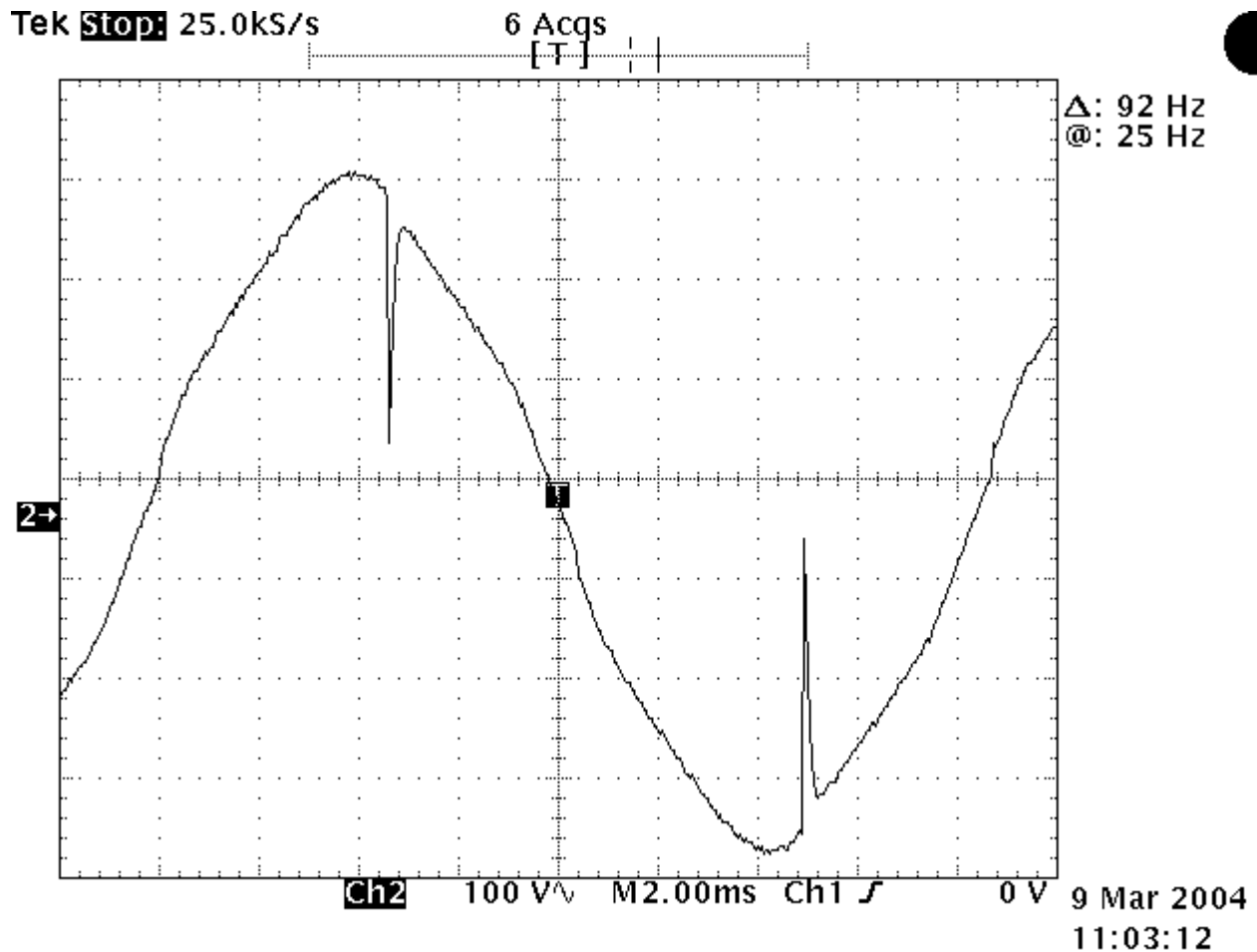


**WATLOW**

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Random combinations of A .Cr, n .Cr, POL, and sometimes FrE9 indicate line notching. Line notching is a universal problem related to phase angle controls. When the load is turned on into the sine wave, the instantaneous current is very high and the line sudden drops in value producing voltages much less than expected. A loose connection, inadequate wire gauge, or inadequate transformer sizing feeding the system can cause line notching.





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Typical cures for are:

1. Resolve loose connections. An Infrared Pyrometer can help find a loose connection. A loose connection will generate heat due to resistance.
2. Correct wire sizing.
3. Add power factor capacitors to stiffen the voltage source.
4. Add inductors in series with the heater to reduce the delta current / delta time (DI/DT) ratio.

HCYC Is a load alarm, and is only available if heater diagnostics are part of the Power Series. It signals that the upper and lower half cycles in the load have different currents by at least 20%. This usually means that the secondary of the transformer being controlled has a burned out heater, or the load is unbalanced.

The HCYC alarm can be turned off, if the Power Series is not controlling a transformer. Consult the factory for directions.

Err HCYC An error will occur if five consecutive half cycle alarms appear in a row. This is to keep from putting DC into a transformer due to an unbalance. The error will shut the system down, and will require that you re-boot the electronics of the Power Series.