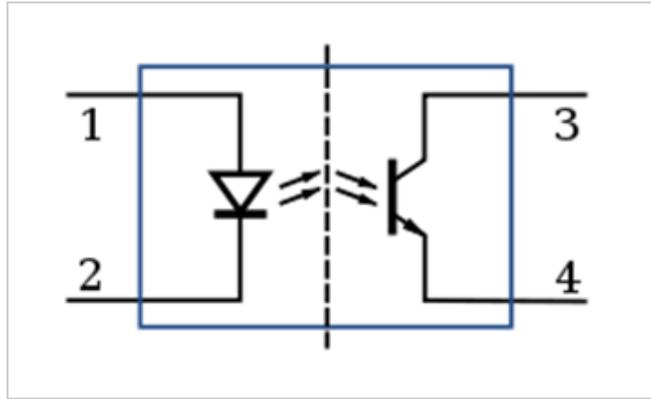


Wednesday, December 5, 2012

How can I use my power supply's alarm signals?

Many power supply alarm signals, such as AC Fail, DC Good, etc., utilize optocouplers or optical isolators as a means of transferring alarm signals from the power supply to the end-users equipment without direct connections. The main purpose of an optocoupler is to prevent noise, ground loops, and/or high voltages from the power supply from damaging the end-equipment to which the signals connect. Below is a typical schematic diagram of an optocoupler that consists of an LED on the input side and a phototransistor on the output side. Signals from power supply activate the LED, which in turn activates the electrically isolated phototransistor.



Typical power supply alarm signals may include AC Fail, DC Good, Over-Temp, and Inverter OK.

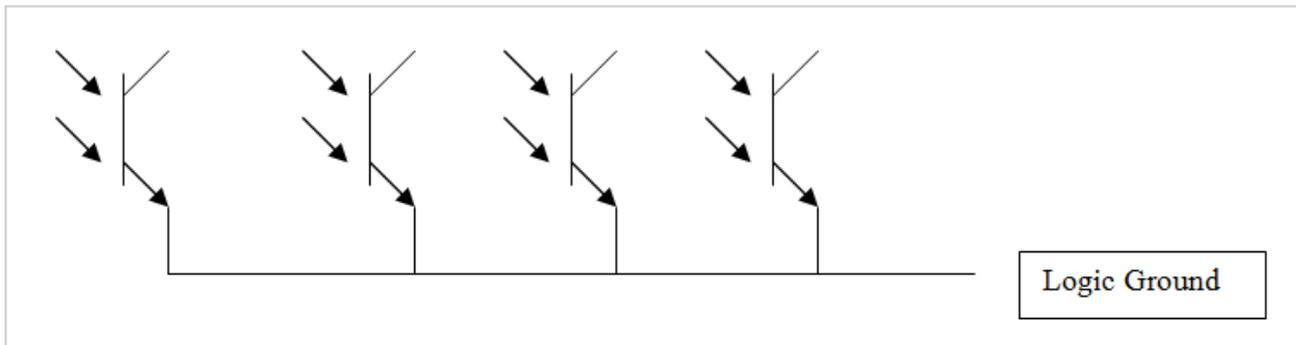


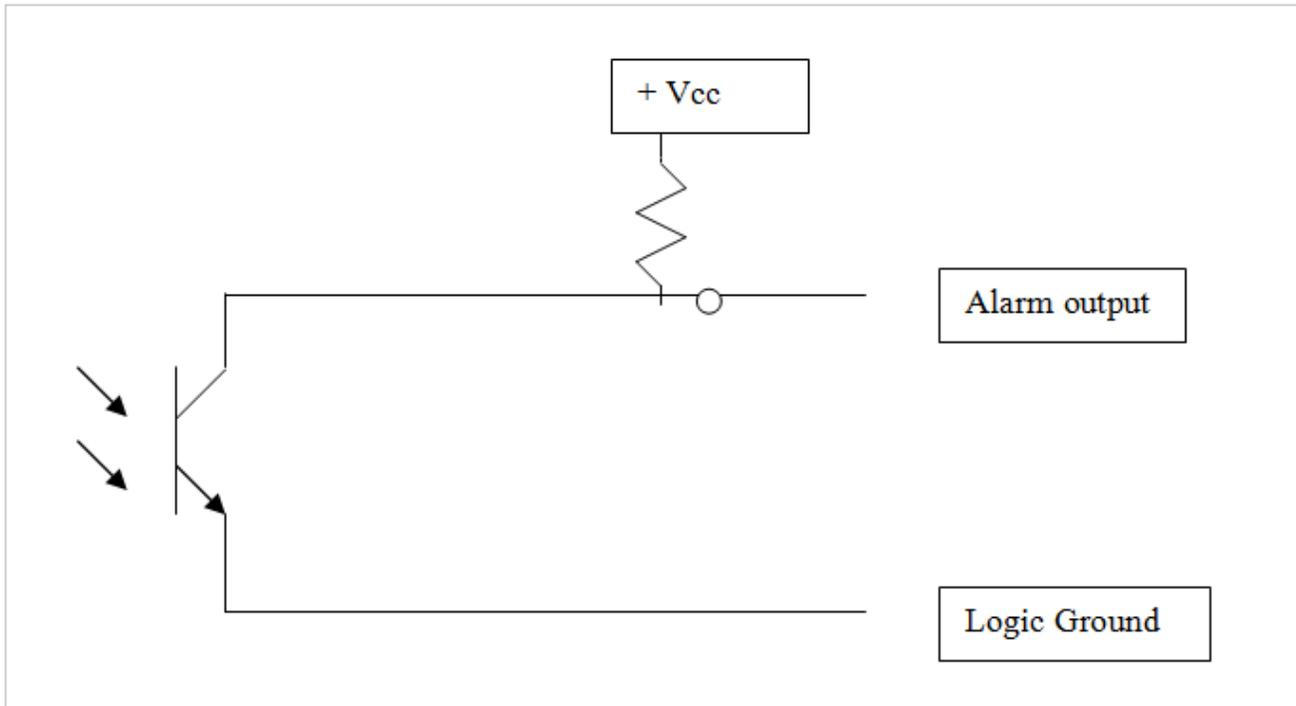
Fig A: These opto-isolated, open-collector alarm signals share a common ground



Fig. B: This opto-isolated alarm signal has a separate output and ground

Pull-Up Resistors - When using open-collector alarm signals an external pull-up resistor is required. This

pull-up resistor needs to be selected and connected between the alarm output (collector) and an external voltage source (+VCC). The purpose of the resistor is to limit the amount of current that flows through the open-collector transistor. For example, in some applications the current should not exceed 10mA, however, always check your power supply manual to confirm the maximum allowable current and maximum +VCC voltage.



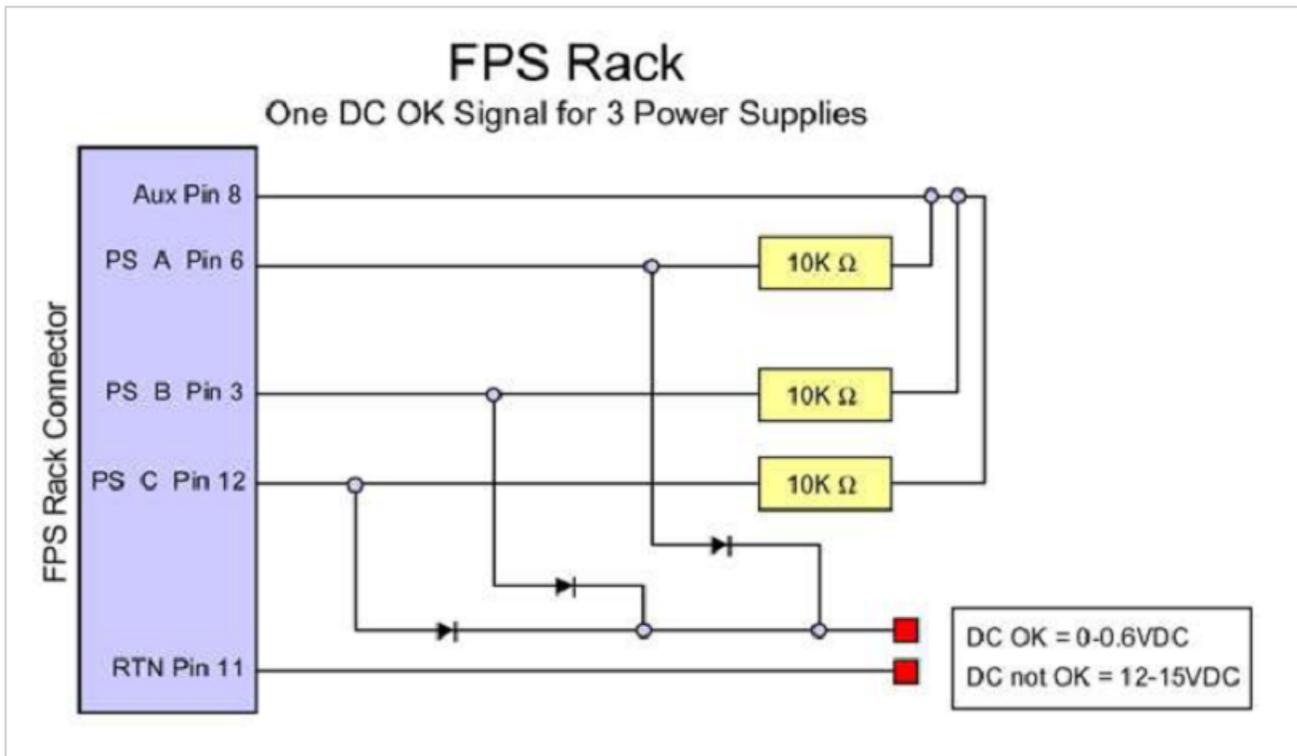
External +VCC – The +VCC voltage that is connected to the pull-up resistor(s) for the alarm signal(s) should come from an external voltage source if maximum isolation is desired. However, in some cases power supplies come with an Auxiliary DC Output, which is always present as long as the AC input voltage is present. In some applications, this Auxiliary DC Output can be used as the +VCC for the alarm signals except for “AC Fail.”

Logic Ground – If an isolated logic ground is present, it usually needs to be tied to either the (-) Vout of the power supply or to the ground of the end-equipment system.

Alarm Signal Levels - In most cases, when an alarm condition is Not present the open-collector transistor output(s) will be On (or logic Low). If an alarm condition should occur, the open-collector output(s) will turn Off (or logic High). But, different supplies can have different alarm logic levels, so you should always check your power supply’s instruction manual to determine the supply’s alarm logic levels, with and without alarm conditions.

Combining Alarm Signals – The diagram below shows an example of how “DC-OK” signals from 3 different power supplies that are mounted in a power system rack can be combined (OR’d) to form a single signal. In this example, the +VCC comes from the Aux DC Output of the power system and is connected to 3 separate pull-up resistors. These pull-up resistors (10K ohm) connect to an open-collector “DC-OK” output from each of the 3 power supplies. And, all open-collector transistors have a common ground connection (similar to Fig A above).

Normally, if all supplies are OK, their DC-OK signals will be in the low state (approx. +0.6Vdc or lower). Should one of the power supply’s output’s fail, its “DC-OK” open-collector transistor will turn off and that output will go high via the pull-up resistor to the +12 to +15Vdc aux supply output. This positive “high” signal will forward bias the diode and cause the combined “DC-OK” alarm output to go high (relative to the Return or Ground line), which indicates that one of the 3 supplies have failed “DC Not OK”. The indicator light on the failed supply will show which supply has failed.



Alternatively, each of the "DC-OK" signals from the individual supplies in this power system could have been connected separately to a monitoring system (without combining them). The advantage of doing this is that the specific failed supply could be identified remotely without viewing the front panel mounted indicators.

Review [Hot Swap/Rack Mount Front End power supplies](#) from TDK-Lambda

Posted by [Power Guy](#)