Application Notes

Power Supply Status Signals and Controls

Status signals and controls provide the user with the ability to remotely monitor the condition of certain parameters within a power converter and to remotely control the power converter using signal level instructions. Signals provide information and have no influence on the function of the power supply. Controls allow for changes in parameters or function.

Common status signal outputs include power fail or AC OK, DC OK or power good, fan fail, fan speed and over-temperature. Interfaces include remote enable, remote inhibit, current share, voltage programming and voltage margining.

Power Fail (PF) or AC OK

This signal indicates the condition of the input voltage. It is most useful at mains failure as it is normally set to change condition several milliseconds prior to the output falling from specification, allowing data save routines to be carried out. These signals often require the converter to be running as they can be generated on the secondary side of the main power transformer.

DC OK or Power Good

Used to indicate that the output voltage is within a set tolerance. Normally only of interest at start-up because it does not warn of impending failure. Typical use of this signal is to ensure that a voltage rail is within tolerance and stable before enabling a load, or to detect unit/output failure in redundant applications.

This signal can be used in combination with a PF or AC OK signal to enable a warning period prior to the output falling from tolerance in case of a mains failure. This is often used in critical applications such as VME and is known as system reset (SRS).

Remote On/Off, Inhibit and Enable

Used to turn a power converter on and off using a signal level control, without switching off the input supply. This removes the need for large and expensive switch gear, has no inrush current the second time, and also ensures faster response at the output on switch-on. On many configurable multiple output power supplies each output can be controlled independently, enabling control of output sequencing.

An Inhibit interface requires that the user intervenes to inhibit or switch off the unit. An Enable interface requires that the user intervenes to enable or switch the unit on. Where a converter is fitted with an enable signal, the output will not be present when the input power is applied until the user intervenes.

Signals can be active high or low and often open or short circuit to allow for simple relay control.

Common Topologies for Signals

Signal outputs can be presented in a number of topologies, the most common ones are TTL compatible, open collector and volt free opto-couplers and relay contacts.

TTL Compatible Signals

These signals interface directly with TTL logic circuits. They provide a signal output of 0VDC or 5VDC and can be active high or active low. These signal outputs follow the rules for TTL circuits where a low signal is

<0.8V and a high signal is >2.8V. A standard TTL signal will sink and source a minimum of 16mA. The TTL signal output is typically formed from a signal transistor with a pull up resistor to an internal, auxiliary 5V rail.
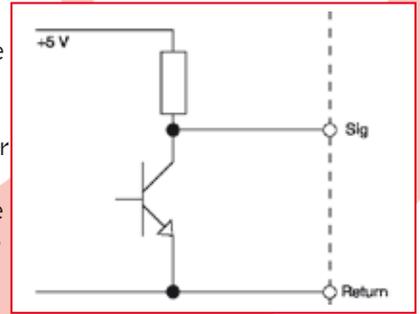
Open Collector Signals

Open collector signals provide a signal transistor with its emitter connected to the zero volt output of the converter and the collector left floating.
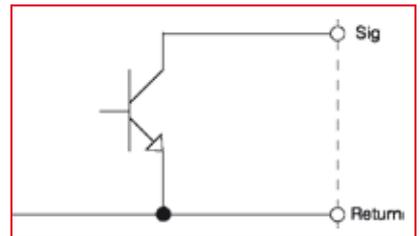
This allows the user to connect the signal as the application demands using external components, the limit being the voltage and current ratings of the transistor used.

Isolated Signal Outputs

Isolated signal outputs are provided with opto-coupler transistors or relay contacts. These signals allow the user to configure the signals as either high or low as the application demands. Relays also provide easy interface with industrial processor loop controllers (PLC) and the inhibit interfaces of downstream DC/DC converters. Relay interfaces are typically small signal relays able to switch up to 1A at 24VDC and 0.5A at 120VDC.

Relay Signal Output

Opto-coupler Signal Output
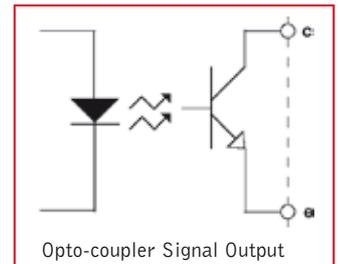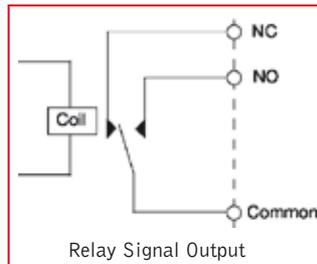
Another benefit of isolated signals is that multiple converters can be used in series or parallel combinations allowing the user to create combined series or parallel signal outputs, regardless of positive or negative output configuration.