

Self-Powered Dummy Load Checks Out Multiple-Output Power Supplies

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This spartanly simple, adjustable, active current load for the 20-mA to 20-A range is powered by the very current it controls. A benchtop box with two to four of these loads makes an excellent instrument for checking out multiple-output power supplies. Such power supplies would include those with floating outputs, in which the loads are electrically independent of one another.

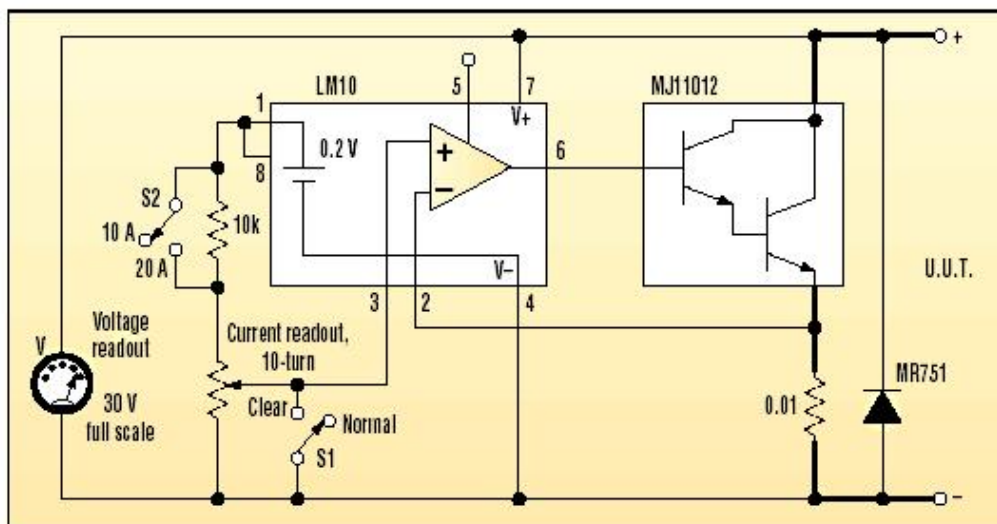
The current through the load is set by a ten-turn potentiometer via a turns-counting dial, which provides a direct readout to the user. The voltage across the load is displayed on an analog panel meter. In this way, it's easy to visually monitor several dummy load channels simultaneously.

To operate the load, start with the dials set to draw reasonable currents from the various outputs of the power supply under test. Then slowly increase the load current on one channel until any one of the voltages drop, indicating overload on the corresponding channels (in a multi-output supply, the maximum current available on one output typically depends on how much current is drawn from the other outputs). Switch S1 is used to momentarily clear the load. Otherwise, in case of fold-back current-limiting, the dials would need to be turned all the way down to allow the power supply to recover, and then back up again to resume testing.

The entire circuit consists of a power Darlington transistor (the MJ11012), which acts as the current "faucet," a 0.01- Ω resistor for current sensing; the ten-turn potentiometer for the current setpoint; and an LM10 voltage reference/op amp. The pot scales down the 0.2-V reference voltage. This target voltage then is compared with the voltage on the sensing resistor by the op amp, whose output directly drives the transistor.

With switch S2 off, the ten-turn dial reads 0 to 10 A. With the switch on, the reading is scaled up by 2 (i.e., 0 to 20 A). The Darlington transistor must be provided with adequate heat sinking. Power diode MR751 simply protects the load from the accidental application of reverse voltage.

Of course, if the power-supply output drops below a certain threshold, the actual load current will no longer be able to track the dial setting. With our self powered approach, this threshold is about 3 V, which is usually well below the range for most testing.



This ultrasimple, self-powered active-load, which serves the load current flowing through the main loop (bold line) to the control-panel pot setting, is useful for specifying and testing multiple-output power supplies.