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What does SELV mean for Power Supplies?

SELV stands for **S**afety **E**xtra **L**ow **V**oltage. Some AC-DC power supply installation manuals contain warnings concerning SELV. For example, there may be a warning about connecting two outputs in series because the resulting higher voltage may exceed the defined SELV safe level, which is less than or equal to 60VDC. In addition, there may be warnings about protecting the output terminals and other accessible conductors in the power supply with covers to prevent them from being touched by operating personnel or accidentally shorted by a dropped tool, etc.

UL 60950-1 states that a SELV circuit is a "secondary circuit which is so designed and protected that under normal and single fault conditions, its voltages do not exceed a safe value." A "secondary circuit" has no direct connection to the primary power (AC mains) and derives its power via a transformer, converter or equivalent isolation device.

Most switchmode low voltage AC-DC power supplies with outputs up to 48VDC meet the SELV requirements. With a 48V output the OVP setting can be up to 120% of nominal, which would allow the output to reach 57.6V before the power supply shuts down; this would still conform to the maximum 60VDC for SELV power.

In addition, an SELV output is achieved through electrical isolation with double or reinforced insulation between the primary and secondary side of the transformers. Moreover, to meet SELV specifications, the voltage between any two accessible parts/conductors or between a single accessible part/conductor and earth must not exceed a safe value, which is defined as 42.4 VAC peak or 60VDC for no longer than 200 ms during normal operation. Under a single fault condition, these limits are allowed to go higher to 71VAC peak or 120VDC for no longer than 20 ms.

Don't be surprised if you find other electrical specs that define SELV differently. The above definitions/descriptions refer to SELV as defined by UL 60950-1 and other associated specs regarding low voltage power supplies.

Posted by [Power Guy](#)