

Constraints on Load Characteristics for the PF600-1

In this application note, you will find information regarding constraints on the load characteristics for the PF600-1.

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Constraints on Load Characteristics for the PF600-1 Ripple Rejection, Start Delay, and more

There are specific constraints on the load characteristics of the equipment powered by the PF600-1 that need to be considered in the application design phase. Though not restrictive for its intended application, there will be other applications for which the PF600-1 is not suitable.

RIPPLE

There is a few percent low-frequency ripple at the output of the PF600. Its magnitude is easily calculable. See the “Ripple Voltage” section of Application Note ACAN-10. The loop bandwidth of the downstream converters must adequately reject this ripple, unless it is acceptable in the final output.

START DELAY

It is preferable that the powered equipment not draw full current immediately. Although the PF600-1 is tested for its ability to start into a large capacitive-resistive load, its fold-back characteristic and time-limited overload make it preferable that the overload protection is not normally invoked.

Further, when first starting, the initial output voltage rise is slower than when recovering from an overload trip. Consequently, a system that starts when first switched on may fail to recover from an overload event. This means that the powered units should either provide for a short delay after the voltage is applied to them but before their outputs turn on, or they should be controlled with their shutdown inputs in order to achieve this. Most DC-DC converter units will have a degree of starting delay, because internal housekeeping

supplies must be established before output current can be delivered; many also have a shutdown or inhibit input. See ACAN-20 for suggestions on using the Output Monitor signal from the PF600-1 for this purpose.

Perhaps the ideal arrangement would allow some parts of the powered equipment to start immediately, while others are delayed by the Output Monitor signal. A two-staged start sequence may be achieved this way.

OPERATING FREQUENCY

The PF600-1 operates at about 300kHz. Any sensitive equipment that uses signals near this frequency or its harmonics may be affected by interference. Special care with screening and filtering may be required in such applications.

OVERTEMPERATURE PROTECTIVE ACTION

The overtemperature trip may not drop the output voltage instantly to zero, nor restart from zero to full voltage. This is in part a function of the load, but should multiple rapid or incomplete restarts occur, damage or confusion could be caused to the application circuits, unless checked for tolerance of this behavior.

OVERCURRENT PROTECTIVE ACTION

As with the overtemperature protection, and depending on the nature of the load, it is possible following an overload event that the automatic restart results in repeated tripping. In this case, the PF600-1 will retry about every two seconds until the fault is cleared and restarting succeeds. Ensure that these repeated restart attempts do not harm the powered equipment.

OUTPUT VOLTAGE

The output voltage specification of the PF600-1 is wide, on the assumption that the application equipment will regulate it. From about 5% to full load, the voltage changes by about 2V.

Further, the zero-load voltage is clamped by a 56V zener diode, and often stands at 53 to 55V. The specified maximum is 60V. Downstream equipment must tolerate this.

Following loss of input power, the voltage may fall to below 36V before the output is turned off. It is assumed that the equipment can regulate this in order to exploit the holdup time. Note, however, that if full power is sustained at a reduced voltage, the current must rise, and may reach current limit if the system is already operating near full power. Either part of the load should be switched off before this happens, or a margin should be allowed in the load budget.