

Designing NEC Class 2 Circuits with the PISA11 Protection Module

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The PISA series develops more than ever a universal tool for most applications.

With the PISA11.CLASS2 module, several individual NEC Class 2 power supplies can be replaced by one large and more cost-effective power supply. The distribution into individual NEC Class 2 circuits is handled by the PISA protection module.



PISA is a new and innovative concept for current distribution and protection of branch circuits. It features a comprehensive protection package for 24VDC loads which are supplied by one power supply. The PISA module is clearly superior to traditional miniature circuit breakers and also provides better protection than costly electronic fuses. You can read more on the topic of PISA and how PISA can help you to save costs in your application in the Application Note AN41 "Electronic Fuses to protect 24V DC load Circuits".

NEC Class 2

PISA11 protection units can be used to cost-effectively design four NEC Class 2 branch circuits using just one power supply and one PISA module. If more than four branches are required, multiple PISA modules can be connected to the power supply. For small currents up to 2A, PISA11.401 and PISA11.402 are sufficient. When an output close to the maximum 100W NEC Class 2 limit is required, the specially developed PISA11.CLASS2 is the ideal solution.



All outputs on these three previously mentioned PISA modules are classified as "Limited Power Source" (LPS) circuits according to the IEC/EN 60950-1 and therefore meet the requirements for NEC Class 2 circuits. The PISA modules can be supplied by power supplies of any power class. During the event of an overload or system failure, the maximum current is limited for a specific time, then all four outputs on the PISA module shutdown. The outputs can be turned on again by pressing the push button on the front of the module or by applying an external control voltage. The internal protection mechanism in the PISA modules is redundantly designed, meaning that no hazardous situations can arise even in the event of a single fault or an equipment defect.

With the PISA11.CLASS2 module, the maximum output current is automatically adjusted to the supply voltage. This is necessary to obtain the maximum possible NEC Class 2 compliant output power, independent of whether the supplying power supply is set to 24V, 28V or set at the full clock-wise position of the potentiometer. It is of course essential that any adjustment of the output voltage potentiometer does not contradict the requirements of NEC Class 2.

The PISA11.CLASS2 module allows a maximum 3.7A at 24V and 3.2A at 28V. This ensures that the NEC Class 2 requirements are always met.

NEC Class 2 circuits can also be designed using miniature circuit breakers or fuses.

However, in practice, this often fails because the NEC does not permit a power higher than 250VA when the fuse or miniature circuit breaker is bypassed (measured 60s after the overload has been applied). This limits the choice of power supplies. Standard power supplies with a nominal output current of 10A usually exceed this value. The next lower class of power supplies with 5A is less appropriate to supply multiple NEC Class 2 circuits

simultaneously. Before PISA11, it was usually necessary to use individual NEC Class 2 power supplies for each NEC Class 2 circuit, which is of course an expensive approach. Using a higher wattage power supply together with the PISA11 protection module can achieve NEC Class 2 circuits more costeffectively.

NEC Class 2 power supplies

Individual power supplies which are listed as NEC Class 2 units can be found on the Website of PULS. Go to www. pulspower.com, click on the "Parameter Search" button on the left and choose NEC Class 2 units.

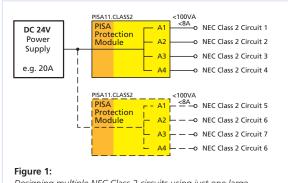
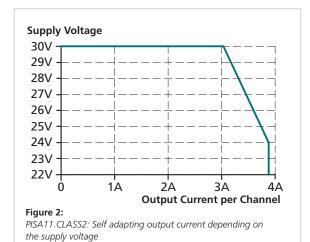


Figure 1:Designing multiple NEC Class 2 circuits using just one large power supply and PISA11.CLASS2 units



NEC Class 2: Power-limited Circuits max. 8A and 100VA.

The NEC (National Electrical Code) is a North American standard, which is regarded as the guideline for all electrical installations in the USA and defines different classes for maximum power and voltage levels.

According to article 725-121 NEC Class 2 circuits are only allowed to be powered from a power source with an output power of lower than 100VA and an output current of lower than 8A. The power source needs to be listed as an UL 1310 power supply device or must be approved as a Limited Power Source (LPS) according to IEC 60950-1. The NEC Class 2 limits need to be fulfilled even under overload or during fault conditions of the unit. Extensive tests and approvals are therefore necessary.

NEC Class 2 circuits are considered to be safe from a fire ignition standpoint and provide an acceptable protection against electric shock. The benefits of using NEC Class 2 circuits are reduced and less expensive requirements regarding wiring methods and over-current protection. Furthermore, the agency testing and approval process of the end-application is much easier.