

Product Description

The SP960.481-S is a DIN rail mountable single-phase-input power supply, which provides a floating, stabilized and galvanically separated SELV/PELV/ES1 output voltage.

Intended Use

This device is designed for installation in an enclosure and is intended for commercial use, such as in industrial control, process control, monitoring and measurement equipment or the like.

Do not use this device in equipment where malfunction may cause severe personal injury or threaten human life without additional appropriate safety devices that are suited for the end-application.

If this device is used in a manner outside of its specification, the protection provided by the device may be impaired.

Installation Instructions

The enclosure of this built-in device provides a degree of protection of IP20 and has no protection against spilled liquids. Install the device in an enclosure providing protection against electrical, mechanical and fire hazards. The device is designed for a pollution degree 2 indoor environment. Condensation or frost are not allowed. For outdoor use, install the device in an outdoor enclosure. For dimensioning the input feed, a maximum input current of 13.2A for AC 100V, 10.8A for AC 120V and 5.3A for AC 230V mains is possible. This is the input current at the max. allowed continuous output power and 90% of the rated input voltage.

Install the device onto a DIN rail according to EN 60715 with the input terminals on the bottom of the device. Other mounting orientations require a reduction in output current.

Make sure that the wiring is correct by following relevant local and national codes. Use appropriate copper cables that are designed for a minimum operating temperature of 60°C for ambient temperatures up to +45°C, 75°C for ambient temperatures up to +60°C and 90°C for ambient temperatures up to +70°C. Ensure that all strands of a stranded wire enter the terminal connection. Use ferrules for wires on the input terminals. Unused screw terminals should be securely tightened. The isolation of the device is designed to withstand impulse voltages of overvoltage category III according to IEC 60664-1.

The device is designed as "Class of Protection I" equipment according to IEC 61140. Do not use without a PE (Protective Earth) connection.

The device is suitable to be supplied from TN-, TT- and IT mains networks. The voltage between the L or N terminal and the PE terminal must not exceed 264Vac continuously.

A disconnecting means shall be provided for the input of the device.

The device is designed for free convection cooling and does not require an external fan. Do not obstruct airflow and do not cover ventilation grid!

The device is designed for altitudes up to 5000m. Above 2000m a reduction in output current and overvoltage category is required.

Keep the following minimum installation clearances: 40mm on top and bottom, 5mm at left and right side. Increase from 5mm to 15mm in case the adjacent device is a heat source. When the device is permanently loaded with less than 50%, no lateral clearances are required.

The device is designed, tested and approved for branch circuits up to 32A (IEC) and 30A (UL) without additional protection device. If an external input protection device is utilized, do not use one lower than 16A B- or C-Characteristic to avoid a nuisance tripping.

The maximum surrounding air temperature is +70°C. The operational temperature is the same as the ambient or surrounding air temperature and is defined 3cm below the device.

The device is designed to operate in areas between 5% and 95% relative humidity.

Installation Instructions for Hazardous Location Areas

The device is suitable for use in Class I Division 2 Groups A, B, C, D locations and for use in Group II Category 3 (Zone 2) environments.

Classification: EPS 25 ATEX 1 144 U, II 3G Ex ec nC IIC and IECEx EPS 25.0040U

The devices meet the requirements for temperature class T4 when installed and operated according to the instructions. Compliance must be checked in the end device. Proof can be provided by measuring the temperature at component V100, which must be less than 115°C.

WARNING EXPLOSION HAZARDS!

Use only in standard vertical mounting orientation with the terminals on bottom of the unit.

Substitution of components may impair suitability for this environment.

Do not connect or disconnect the device or operate the voltage adjustment unless power has been switched off or the area is known to be non-hazardous.

A suitable, tool secured, enclosure must be provided for the end product, which has a minimum protection of IP54 and fulfils the requirements of the EN 60079-0.

Functional Description

The output is galvanically isolated from the input voltage. The output is electronically protected against no-load, overload and short circuit. In case of a protection event, audible noise may occur. The device is designed to supply resistive, capacitive or inductive loads. Capacitive loads larger than 5F can result in an intermittent mode of the device. At heavy overloads (when output voltage falls below 26V), the device delivers continuous output current for 2s. After this, the output is switched off for 18s before a restart attempt with 2s is automatically performed. This cycle is repeated as long as overload exists.

The device is equipped with a "Parallel Use" feature, which enables load sharing between power supplies when they are connected in parallel. The "Parallel Use" mode regulates the output voltage in such a manner that the voltage at no load is approx. 4% higher than at nominal load.

Do not apply return voltages from the load to the output higher than 63V.

The output voltage can be adjusted with a small flat-blade screwdriver on the front of the unit.

A green DC LED reports an output voltage above 90% of the adjusted voltage of a running device and is independent of a return voltage from a unit which is connected in parallel.

A red DC LED reports an output voltage below 90% due to overload or output short circuit.

The DC OK relay monitors the output voltage and the contact is closed when the DC LED is green. Max. 0.3A for resistive loads. The sum of output and applied DC OK voltage must not exceed 60Vdc. The device is equipped with an over-temperature protection. In case of over-temperature, the output shuts down and restarts automatically after cooling off.

Devices can be paralleled to increase the output power. The ambient temperature for parallel use is not allowed to exceed +60°C (+55°C for AC 100V mains). The output voltage of all devices shall be adjusted to the same value (±100mV) with the same load conditions on all units, or the devices' factory settings can be used. After the adjustments, link pin 4.3 and pin 4.4 on all units to set the unit in "Parallel Use" mode. Energize all units at the same time. It also might be necessary to cycle the input power after output overload or short circuit. If more than three devices are connected in parallel, a diode, fuse or circuit breaker with a rating of 30A or 32A is required on each output.

Same devices can be connected in series for higher output voltages. It is allowed to connect as many devices in series as needed, providing the sum of the output voltage does not exceed 150Vdc.

In case of an internal defect, a redundant circuit limits the maximum output voltage to 60V. The output switches off and performs three restart attempts. If the failure continues, the output shuts down. Cycle input power to reset.

Technical data

All values are typical figures specified at 230Vac 50Hz input voltage, 48V 20A output load, single-use mode, 25°C ambient temperature and after a 5 minutes run-in time unless otherwise noted.

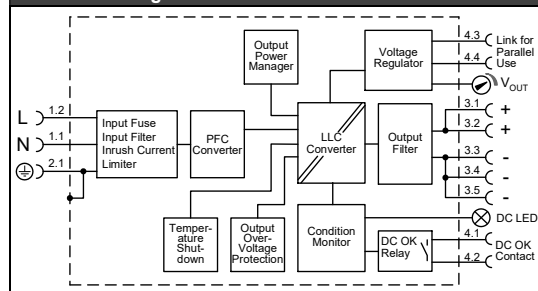
Output voltage	DC 48V	Nominal
Adjustment range	48 – 56Vdc	Factory setting 48.0V
Output current	Continuous for AC 120 – 240V mains	
	24 – 20.6A	Below +45°C ambient
	20 – 17.1A	Below +60°C ambient
	15 – 12.9A	At +70°C ambient
	Derate linearly between +45°C and +70°C	
	Continuous for AC 100 V mains	
	24 – 20.6A	Below +40°C ambient
	20 – 17.1A	Below +55°C ambient
	15 – 12.9A	At +70°C ambient
	Derate linearly between +40°C and +70°C	
	Short-term for AC 100 – 240V mains	
	30 – 25.7A	Short-term, up to 5s

30A represents a case with 1.5 times the nominal output current for up to 5s. The allowed time may be significantly longer depending on the short-term and previously drawn current. See datasheet for details.

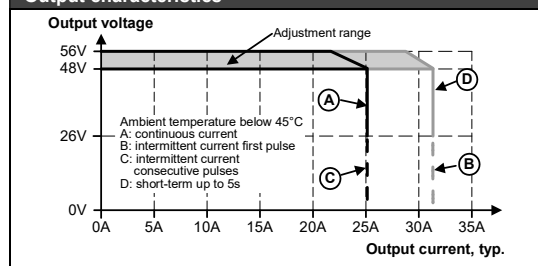
The average output power must NOT exceed the continuous output power.

Input voltage AC	AC 100V	±10%
	AC 120 - 240V	-15%/+10%
Mains frequency	50 – 60Hz	±6%
Input current AC	8.5 / 4.4A	At 120 / 230Vac
Power factor	0.99 / 0.99	At 120 / 230Vac
Input inrush current	14 / 8A peak	At 120 / 230Vac
Efficiency	95.1 / 96.5%	At 120 / 230Vac
Power losses	49.5 / 34.8W	At 120 / 230Vac
Hold-up time	28 / 28ms	At 120 / 230Vac
Temperature range	-25 to +70°C	
Max. wire size (litiz wire)	4mm ²	Input terminals
Wire size AWG	AWG 20-10	Input terminals
Max. wire diameter	2.8mm	Input terminals
Wire stripping length	7mm	Input terminals
Tightening torque	1Nm	Input terminals
Max. wire size (litiz wire)	10mm ²	Output terminals
Wire size AWG	AWG 22-8	Output terminals
Max. wire diameter	5.2mm	Output terminals
Wire stripping length	12mm	Output terminals
Tightening torque	2.3Nm	Output terminals
Max. wire size (litiz wire)	1.5mm ²	Signal terminals
Wire size AWG	AWG 24-16	Signal terminals
Max. wire diameter	1.6mm	Signal terminals
Wire stripping length	7mm	Signal terminals
Size (wxhxd)	96x124x132mm	Without DIN rail
Weight	1700g	

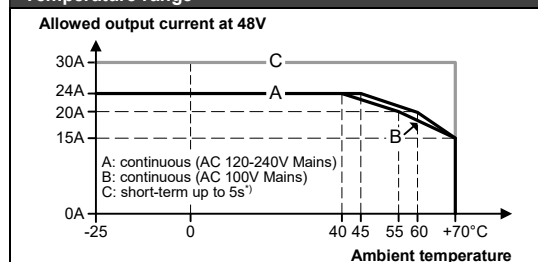
Functional diagram



Output characteristics



Temperature range



*) The curve C represents 30A load current for up to 5s. The allowed time may be significantly longer depending on the short-term and previously drawn current. See datasheet for details. The average output power must NOT exceed the continuous output power.