DC power supply system SDJ 2600

The SDJ power supply system

General description:

The SDJ 2600 power supply system is intended for uninterruptible supply of 48Vdc loads by direct current in direct full-float operating mode. The construction of the system using cooperation of high-efficient PDJ 48/73-3500W rectifiers and batteries under control of advanced PI1 controller.

Application:

+ telecommunication and teletransmission;
+ IT network systems;
+ data centers.

Features:

+ modular design – separated cabinets for rectifier modules and cabinets for load and battery protections;
+ possibility of installing large number of loads protections by using dedicated distribution cabinets;
+ modern, constant power rectifiers;
+ easy installation of rectifier (replacement or extension) during normal operation status (*hot-swap*);
+ continuous control of system's operation and fast reporting of alarm states by means of controller;
+ easy and full safe operation;
+ high efficiency, **up to 96,7%**;
+ immunity to short-circuits and overloads of output circuits;
+ Rectifier Power Management - redundant modules are switched off to ensure the operation of the system at the highest possible efficiency;
+ immunity to electromagnetic interferences;
+ Battery voltage stabilization at a level corresponding to their full charge;
+ galvanic isolation of DC loads circuit form AC power supply line;
+ wide range of optional equipment.

Rectifiers:

Constant power rectifier PDJ 48/73-3500W with nominal output power 3500W is equipped with microprocessor card controlling its work's parameters. The digital communication between rectifiers and control unit, gives operator the possibility of remote supervision on individual rectifiers of the system.
The PDK rectifier design is based on high-frequency energy conversion technology with DSP (Digital Signal Processor) function. This feature means less number of parts, optimized price & performance, better power distribution between rectifiers. In addition, the rectifier is equipped with a PFC provides sinusoidal current consumption from the mains.

Power supply of the system:

The SDJ 2600 system is supplied from three-phase AC supply line 3x230/400 Vac.

Design of the system:

In its standard version the power supply system is in form of stand-alone cabinets. Depending on the configuration it may be composed by the following modular cabinets:

The rectifier-distribution cabinet CPJ 2600 contains:
+ space for installing up to 36 pcs. of PDJ 48/73-3500W rectifiers;
+ space for installing up to 5 pcs. of PDT 48\50-2900W rectifiers, output power 2900W, output voltage up to 65Vdc (optional separated charging set);
+ AC distribution panel;
+ microprocessor control unit PI1 with OLED display, control buttons and USB port for PC connection;
+ battery current measurement;
+ 7 alarm outputs in the form of potential-free relay contacts (10 alarm outputs – option).

Cabinets for load and battery protections:
RBG 2600-01, width 600 mm;
RBG 2600-02, width 900 mm;

+ Cabinets are prepared for installation of distribution and battery modules for maximum currents: 1500A, 1000A, 600A, 300A, 150A, and the separated charging module;
+ Optionally, each distribution and battery module can be equipped with a shunt for current measurement of this module or the LVD contactor;
+ All 4 battery circuits are equipped with current measurement;
+ easy handling of the battery cables either from a raised floor and from the top.

Each type of cabinet may be equipped with adjustable legs. The systems composed from more than one cabinet are equipped with additional roof structure which increases the height of the system by 300mm.

Safety and Environmental aspects:

During the system design process following aspects related to environmental protection have been taken into consideration:

+ compliance with the European Union's directive RoHS - restrict the use of certain hazardous substances,
+ compliance with the European Union's directive WEE regarding waste of electrical and electronic equipment,
+ compliance with the European Union's directives LVD and EMC - electrical safety and electromagnetic compatibility,
+ reduce of used electrical energy as the result of high efficiency,
+ reduce the amounts of used materials and wastes as a consequence of system dimensions minimization and high reliability.

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Basic parameters of the system:

Input parameters:		
Input voltage	V_{AC}	3 x 230/400
Input phase voltage changes range	V_{AC}	260÷530
Frequency	Hz	45÷65
Supply network configuration	-	3W +PE
Nominal phase current (for 36x PDJ 48/73-3500W)	A_{AC}	680
Power factor λ		~ 1
Output parameters:		
Range of voltage	V_{DC}	48÷58
Characteristic	-	IPU
Stabilization of output voltage	%	±1
Maximum output current	A_{DC}	2600
Maximum output power	kW	126
Output voltage ripples (psophometric value)	mV	< 2
General data:		
Range of ambient temperature	°C	+5÷+40
Cooling	-	fan-cooled
Rectifier module efficiency	%	96,7% (peak)
Protection class		IP20
Electromagnetic compatibility	-	EN 300 386-2 class B
Safety	-	in accordance with PN-EN 60950
Dimensions of the system: (HxWxD) CPJ 2600 RBG 2600-01 RBG 2600-02	mm	 2000x600x600 2000x600x600 2000x900x600 (+300 on top for interconnection)
Weight: CPJ 2600 cabinet (without rectifiers) RBG 2600-02 cabinet	kg	 ~190 ~ 340
Dimensions of the rectifier unit (HxWxD)	mm	132 x 85.3 x 287
Weight of the rectifier	kg	3,5

Basic functions of the control unit:

+ measurement and control of output voltage – setting of alarm thresholds for: high voltage, low voltage, rectifiers blocking voltage;
+ summary battery current measurement
+ measurement of rectifier's current;
+ measurement of battery temperature;
+ measurement of ambient temperature (option);
+ temperature compensation of float voltage;
+ automatic battery charging;
+ monitoring of battery asymmetry;
+ alarm states visualization;
+ status control of battery protections;
+ status control of load protections;
+ sending alarm signals;
+ automatic reporting of alarm states to WinCN supervisory system;
+ possibility of configuration by:
  - locally by PC with USB port or local user interface (OLED screen and keyboard),
  - remote by: Ethernet or PSTN;
+ possibility of alarm mapping on any relay contact or sending this as information to WinCN supervisory system.

Extended functions of the control unit:

+ remote supervision of the system by means of WinCN software with using:
  - PSTN (dial-up modem),
  - Ethernet (TCP/IP);
+ separated battery charging by rectifiers allocated from the system (up to five pcs. Of PDT 48\50-2900W rectifiers) - option;
+ individual battery current measurement;
+ events history with occurrence date and time (event history module)
+ monitoring of 10 input analog-digital signals and 7 output signals (potential-free contact of relay) with possibility of their configuration (required MWW module).

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