

### | General description:

The SPH 80 power supply system is intended for uninterruptible supply of 230Vac loads by alternating current. The construction of the system using cooperation of FUH 230/2,5 inverters and batteries.

### | General description:

- + telecommunication and teletransmission;
- + IT systems;
- + industrial automation systems.

### | Features:

- + modular - parallel operation of inverters allows easy extension of the system;
- + modern inverters generate noise-free sinusoidal voltage;
- + manual bypass system allows to choose emergency or service operation mode, disconnecting the loads from the inverters and disconnect the inverters from the AC mains;
- + inverter has built-in calable system to ensure zero time of switching the output voltage between the AC mains supply voltage and DC voltage;
- + easy installation of inverter (replacement or extension) during normal operation status (hot-swap);
- + easy and full safe operation;
- + very high efficiency (96% in EPC mode and 91% on-line mode);
- + wide range of power factor of loads;
- + sinusoidal current consumption from the AC mains regardless of the type of load;
- + continuous control of system's operation and fast reporting of alarm states;
- + immunity to short-circuits and overloads of output circuits;
- + immunity to electromagnetic interferences.

### | Inverters:

Modular, single-phase FUH 230/2,5 inverters with a rated power output of 2500VA are intended for convert direct current to alternating current in the parallel mode. FUH Inverter is built based on innovative design solutions allowed to achieve very high efficiency at small size.

The inverter offers EPC mode, where energy from the AC mains is buffered and then converted to alternating voltage output. This mode is characterized by very high efficiency and zero switching time.

EPC mode offers additional saving - lower required output power of DC power supply system. DC power supply system serves only to recharge the battery with a capacity necessary to provide required back-up time. When AC mains is available AC loads are supplied from energy coming from AC mains not from DC system or battery.

### | Power supply of the system:

Depending on the operation mode, the SPH system is powered from:

- 48VDC DC as the main source of supply the load during on-line operation mode,
- single-phase or three phase AC voltage as the main source of power in the EPC mode.

### | Design of the system:

In its standard version the power supply system is designed as stand-alone cabinet.

SPH 80 system is available in two versions with different power:

- + SPH 80 single-phase – for supply single-phase loads of maximum power up to 80kVA;
- + SPH 80 three-phase – for supply three -phase loads of total power up to 750kVA,
- + SPH 80 with multiple single-phase groups – for supply single-phase loads of total power up to 80kVA (single-phase loads are separated into maximum 6 single-phase groups supplied from single-phase or three-phase AC mains).

The standard version the power supply system consists:

- + AC distribution with manual service bypass;
- + Set of cassettes 19" 2U for installation of inverters FUH (max 4/cassette);
- + DC input protections;
- + AC load protections – max 18szt. one-pole MCBs or - max 11 pcs. one-pole Tytan MCBs or - max 9pcs. two-pole MCBs or RCD;
- + Alarm contacts indicating an emergency state of the inverters (optional, if there is no PI1 control unit in the system);
- + manual service bypass;
- + LEDs signaling current operation status of inverter module;
- + PI1 control unit (option).

### | 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.



## Basic parameters of the system:

### Input parameters:

Input nominal voltage	Vdc	48
Range of phase input voltage changes	Vdc	40 ÷ 60

### Output parameters:

Nominal voltage	Vac	230 or 3x230/400
Range of voltage regulation	Vac	200 ÷ 240
Stabilization of output voltage	%	± 2
Frequency	Hz	50/60
Overload capacity	%	110 (continuous), 150 (15s) 1000 (20ms)
Range of power factor	-	0 ind. – 1 – 0 cap.
Crest factor	-	< 3,1

### General data:

Range of operating temperature	°C	0 ÷ +50
Cooling	-	forced
Efficiency – inverter module	%	91 (online mode) 96 (EPC mode)
Ingress protection		IP20
System dimensions (WxSxG)	mm	1000 / 1300 / 1800 / 2000 / 2200 x 600 x 600
Inverter dimensions FUH 230/2,5 (WxSxG)	mm	88 (2U) x 103 x 435
System weight 20kVA 8xFUH		≈ 145
System weight 30kVA 12xFUH	kg	≈ 170

## Basic functions of the system:

- + controlling values of:
  - input voltage,
  - output power and current,
  - output voltage frequency;
- + LED signalization of inverters working status and their current load;
- + automatic reporting of alarm states and sending alarm status as potential-free relay contact.

## Extended functions of the system:

Optional SPH system is equipped with a PI1 control unit which gives following possibilities:

- + Supervision of the system, readout and setting of parameters on the OLED screen
  - power, output AC voltage and current,
  - input AC voltage and current,
  - input DC voltage and current,
  - actual operation mode (on-line, EPC),
- + readout alarm states of the inverters:
  - LOW input voltage,
  - HIGH input voltage,
  - LOW output voltage,
  - HIGH output voltage,
  - HIGH output current,
  - HIGH internal temperature;
- + optional remote computer monitoring of the system by WinCN software and selected Communications medium:
  - Ethernet,
  - fixed network (telecom modem),
  - mobile network (GSM/GPRS).