



POWER for GENERATING STATIONS

Custom Engineered Industrial UPS Systems

5kVA to 150kVA with single phase output
and 10kVA to 300kVA with three phase output

This series of custom engineered Industrial Uninterruptible Power Supply systems is based on a well proven design concept to which custom features are added to meet the specification of the purchaser. The control logic uses discrete section circuit boards dedicated for the rectifier, inverter and static bypass. The rectifier, inverter and bypass sections can be operated as individual elements, the inverter can also be started from the battery without the rectifier operating.

The UPS is designed to start and run without a battery connected, the inverter output is via a static interrupter and not via a low cost electro-mechanical contactor as used by a number of competitors. The analogue control logic is housed in a shielded "logic box" and enables the systems to operate in the most contaminated and arduous environmental conditions.

This rugged, heavy duty industrial product is designed to operate continuously for at least 20 years in an environment where there is a presence of stray field electromagnetic radiation and high levels of harmonics present in power generating stations, high voltage Grid transformer sub-stations and in the power plants supplying plasma physics and nuclear research laboratories.

These environmental conditions often contaminated with airborne carbon dust, and suffer from power line disturbances from adjacent installed old technology electronics equipment. Radiated and conducted emissions and plasma discharges are well recognised contributors to the operational instability, unreliability and ultimate failure of microprocessor based control logic as used in the commercial type of UPS systems and other power conversion systems.

Our custom engineered grade (CEG) UPS systems, rectifiers, inverters or frequency converters do not rely upon the use of microprocessors in the control logic design.

The high standard of engineering mechanical construction, ingress protection and thermal management of air flow through the magnetics and heat sinks within this type of UPS enclosure enables our power systems to operate safely in high ambient temperature humid conditions and in an environment where conductive dust and vapours are present in the cooling air.

This product range can also be supplied with a Seismic qualification for installation in Nuclear Power Stations



and in locations where there is the risk of shock, vibration and in earthquake zones.

The custom engineered rectifiers, inverters, power conversion systems and UPS systems have been developed and evolved from extensive operational duty experience in many UK and overseas power generation stations including for more than 15 years on numerous very essential safety systems of British Energy Nuclear Power Station Reactors.



Our product range has also been used over the past 25 years in the Middle East, North American and Asia in power stations, high voltage substations and power Grid load despatch centres and is "Vendor Approved" by many power Utilities.

The topology of this UPS product range is active on line double conversion where the output is totally isolated from the input, the PWM inverter produces a closely regulated output voltage and frequency at all times regardless of the quality and stability of the input power source.

The standard configuration of the input stage is using a 6 pulse rectifier or can be supplied with the optional 12 pulse rectifier or 24 pulse rectifier systems in the higher kW sizes.

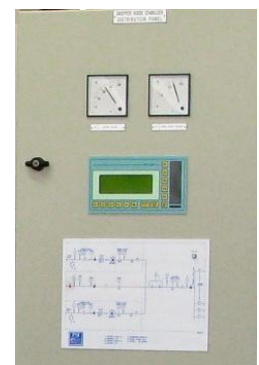
The UPS systems are available with three phase input and single phase output up to 150kVA (E21), and with three phase input and three phase output in sizes up to 400kVA (E23). The standard single phase output is 230V AC 50Hz or 110V AC 50Hz or 60Hz. The standard three phase output is 400V AC 50Hz, or 480V AC 60Hz, however, other voltages or frequencies are available to customer order.

Our inverter designs are based upon the long established pulse width modulation (PWM) wave form generation technology using the latest IGBT power semiconductor devices. The use of PWM inverters ensures a precise ability to synchronise with the mains or with other inverters to operate in load sharing parallel or in hot standby as well as providing good performance, with a high efficient use of energy handling high crest factor non-linear loads.

For cooling and ventilation of the system enclosures, we avoid the use of high velocity and noisy fans mounted in the roof top of UPS enclosures. This principle of providing cooling air produces excessive air movement and unwanted dust into the enclosures.

Our products have redundant fans fitted on the heat sinks to provide the cooling air exactly where the heat is generated from the power semiconductor switching devices.

The CEG UPS systems have a galvanic isolation between the battery and the output, with optional galvanic isolation at the input. The UPS system can be supplied with DC bus voltages from 110V to 600V and typically 240V for the power station batteries or can be supplied according to the customer's currently installed battery or specification of preferred battery type. The rectifier has float, boost and equalise facilities and is designed for use with any type vented, valve regulated lead acid batteries or vented and gas recombination NiCd batteries.



A small PD Cam display panel mounted on the front door provides digital metering, operational status, alarms, event recording and diagnostics using a simple menu accessed by the keypad.

For the power station and certain Defence applications where such LCD displays are not permitted, we fit direct reading analogue meters that operate without the control logic being energised.

The power flow status is shown on an engraved aluminium mimic panel fixed to the front door of the UPS system. The mimic panel uses high brightness LED's to indicate the status of the rectifier, inverter and bypass and battery.

Alarms are shown on the mimic panel with audible as well as visual indication, there is also an EPO (emergency power off) and an alarm cancel and test facility on the mimic panel.

- **Features available**

- **6 pulse or 12 pulse rectifiers**
- **Data-logger and battery test data**
- **Volt free contacts for remote alarms**
- **RS485 Port for remote data monitoring**
- **SNMP Adaptor for remote monitoring via LAN**
- **Battery earth leakage monitoring**
- **Temperature compensation for battery charging**
- **Low battery voltage disconnect**
- **Rectifier input isolation transformer**
- **Inverter output isolation transformer**
- **AC output earth leakage protection**
- **Ingress protection IP31, IP42, IP54**
- **Analogue metering**
- **Engraved mimic panel with LED power flow status**



POWER SYSTEMS INTERNATIONAL LIMITED

Chiltern House, High Street, Chalfont St.Giles, Buckinghamshire, England HP8 4QH
Telephone +44 (0)1494 871544 Fax +44(0)1494 873118

Email info@powersystemsinternational.com Website www.powersystemsinternational.com

The header by courtesy of Goesgen Nuclear Power Station Switzerland

Power for generating stations industrial UPS systems bpwvgn18082011d©2011Copyright Power Systems International limited all rights reserved