DPS (TT 3Ph)

Heavy-duty AC UPS for industrial applications

DC BUS 110, 220, 360 V_{dc} (depends on UPS size)
Lead-Acid, NiCd and SMC batteries
3F/3F and output power from 10 to 600 kVA

The LEVER DPS digital UPS is specifically designed to supply power to critical loads requiring high AC voltage quality and maximum service reliability

- LEVER DPS ensures its compatibility with the **most demanding applications** and can withstand a high short-circuit current, in order to guarantee the selectivity of the downstream protections
- The logic is implemented through **digital microprocessor**, which controls the power conversion, supervises the operations and modifies the system parameters in case of component failure to ensure power supply to the load
- **Fully customisable engineering product** featuring a wide range of **options**, to comply with the Client's technical specifications
- The DPS system can also be supplied **in dual redundant configuration**

Applications

The DPS has been designed and developed for a wide range of applications in the most demanding industrial environments, under the most severe operating conditions

- **Oil & Gas** (offshore, onshore, pipeline petrochemical plants)
- **Utilities & Power Generation** (power, transmission, distribution stations)
- **Water treatment** and **desalination** plants
- **Process control** (chemical industry, mining, steel mills, paper mills)
- All **industrial** applications

Compliance

The DPS has been type-tested to complies with the following standards:

- IEC 62040-1 (Safety requirements)
- IEC 62040-2 (Electromagnetic compatibility)
- IEC 62040-3 (UPS performance and test requirements - VFI-SS-111)
- IEC 62040-4 (UPS environmental aspects: requirements and reporting)

Key features

- In/Out voltages 400/440/480 V_{ac} (3F)
- Output power from 10 to 600 kVA
- **THD** of AC output voltage **less than 1%** (with linear load)
- Stable, clean DC output voltage with **<1% RMS ripple**
- Digital **dual microprocessor** technology to increase system reliability
- Inverter in IGBT technology with PWM control logic to ensure a pure sinusoidal output waveform
- Compatible with **VRLA**, **AGM** and **Gel** lead-acid batteries, **NiCd** batteries and **SMC** Technology
- **Synoptic panel** available on the **HMI display**
- Three programmable charge levels: floating charge, boost charge and commissioning charge
- Designed for use in the harshest environmental conditions (55°C, 95% humidity)
- Efficiency >90%
- Optical isolation on interface and logic boards
- Programmable compensation of battery charging voltage with temperature

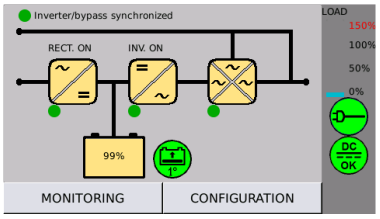
Main technical features

➢ Construction details

The cabinet has a standard protection rating of IP20 with the door closed, is painted with **RAL 7035** dried epoxy resin powder >60micron
The rectifier is based on **thyristor** technology with a 6 Pulse or 12 pulse, while the inverter is an **IGBT** type with PWM control. The bypass logic is implemented automatically via static SCR switch and manually via special switch

➢ HMI and synoptic display

The DPS features a **4.3" touch screen** display, which shows the measurements, alarms and synoptic diagram of the system. The display can store the alarm list and event history.
A wide variety of UPS parameters can also be modified and calibrated via the HMI display



System synoptic image on HMI display

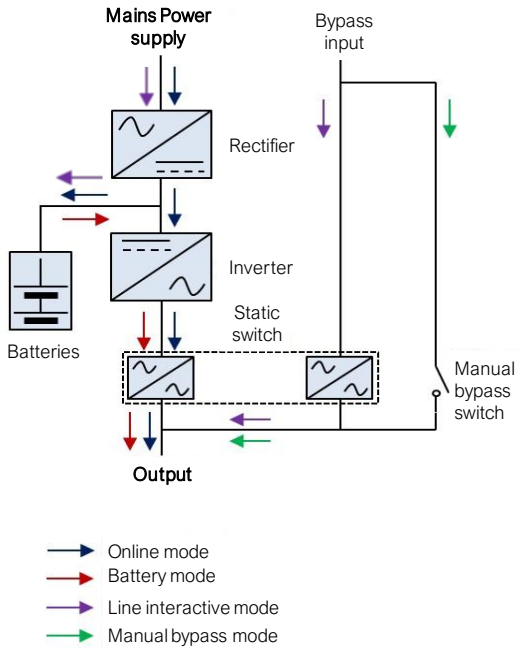
➢ KEY Features

- Thyristor rectifier bridge
- Full bridge IGBT inverter
- Input Power isolation transformer (standard for DC BUS with 110 and 220Vdc and optional for DC bus 360Vdc)
- Input/Output terminal block
- Automatic magneto thermic input breaker
- Full Digital control boards with double Dual Core Microprocessor
- Standard cables (FG17) 600/1000V
- Modbus interface (RS232), TCP/IP
- SPDT dry contacts alarm
- 4.3" HMI display touchscreen with pages
- Output power transformer (in all range)
- Backfeed protection
- EPO (Emergency Power Off)
- Black-start from batteries (option)
- Tropicalized PCBs boards to ensure to work in a polluted environment
- Maintenance from the front

DPS inverter operating logic

The DPS features the following operating modes, according to the factory settings:

- "**On-Line mode**", where the rectifier keeps the batteries charged while the inverter is running and supplies power to the load (the bypass line can be either running or not)
- "**Line interactive mode**", where the output voltage is provided by the bypass line. The rectifier keeps the batteries charged



Main options

- 12 Pulse rectifier bridge
- Battery polarity reversal protection
- IP31 or IP42 cabinet protection kit
- Earth fault Detector
- Dual Redundant Configuration
- Customisation of alarms and LED signals
- Analogue instruments (voltmeter and ammeter) for input and output measurements
- Other RAL colours for the cabinet
- FALCON battery monitoring system
- Topicalization of electronic boards
- Interior light kit and socket
- Ethernet connectivity
- Battery temperature probe
- Distribution Panels Board
- Static or electromechanical AVR in the by-pass line
- By-pass isolation Power Transformer
- Upper Charger able to recharge a big bank of batteries designed for a long back-up time

Datasheet

Input	
Rated voltage	400, 440, 480V_{ac} 3Ph
Voltage tolerance	±10% (with rated operation), +15%/-20% (with performance degradation)
Frequency	50-60 Hz
Frequency tolerance	±5%
Output	
Nominal AC output	400, 440, 480V_{ac} 3Ph +N
AC waveform	Sinusoidal with voltage THD <3%
Ripple in DC	<1% RMS without batteries connected
Output power	From 10 to 600 kVA (depends in the DC Bus voltage)
Charging modes	
	'IU, IUT, I1I2U, U1U2I (DIN 41773)
Batteries	
Type	Lead Acid, NiCd, SMC (all types)
Battery voltage	110, 220, 360 V_{dc}
Autonomy	As per customer request (several minutes to several hours)
Output performance	
Static stability	<1% (online mode)
Dynamic stability	As per IEC 62040-3 Curve 1
Permissible overload	100-110% for 2 hours, 110-125% for 10min, 125-150% for 10s
Short-circuit capability	165% for 3s
Efficiency at full load in On-Line mode	>90%
Efficiency at full load in Line interactive mode	>98%
Power electronics technology	
Rectifier	Fully controlled 6Pulse or 12Pulse thyristor bridge
Inverter	Full bridge IGBTs with PWM control logic
Rectifier and inverter ventilation	Forced, two levels of ventilation speed
Input THD	
6Pulse rectifier bridge	<30%
12Pulse rectifier bridge	<15%
Instrumentation	
HMI display	4.3" LCD panel
Visual alarms and warnings	Up to 20 on the HMI display
Communication interfaces	Modbus, Ethernet, SPDT dry contact module
Static switch SCR	
Maximum overload current for 10 ms	10 x I_N
Transfer time	<2 ms
General data	
Acoustic noise at 1 m	<70 dBA
Maximum altitude	1000 m
Cabinet IP rating	IP20 (standard), IP31 and IP42 (optional)
Cabinet type/colour	Standard modular cabinet, RAL 7035
Door thickness	2.0 mm
Protection rating against external mechanical impacts	IK10
Permissible humidity range	10% to 95% non-condensing
Operating temperature	0°C to +55max °C
Storage temperature	-20 °C to +70 °C (excluding batteries)
UPS classification	VFI-SS-111
Reference Standards	IEC 62040-1, IEC 62040-2, IEC 62040-3, IEC 62040-4 - Tested by CESI SpA
MTBF	20 years