

DPS

Heavy-duty industrial digital AC UPS system

DC BUS 110, 220, 360 V_{dc}

Lead acid or NiCd batteries

3Ph/1Ph or 3Ph/3Ph configuration and output power from 5 up to 200 kVA

DPS model is the state-of-art LEVER digital UPS, specifically designed to supply critical loads which require high quality of AC voltage sinewave and the 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
- Flexible approach to provide tailored solution: the DPS is an **engineered product, fully customizable** and with a wide range of options, to comply with **Client's technical specifications**
- LEVER DPS can be supplied in redundant N+1 configuration



Applications

LEVER DPS is designed and developed for a wide range of applications in the most demanding industrial environments

- **Oil & Gas** (petrochemicals offshore, onshore, pipelines)
- **Energy & Power Generation** (power plant, transmission, distribution)
- **Water** (desalination, treatment)
- **Instrumentation & Process control** (chemical, mining, steel, paper)
- All the **industrial** applications

Compliance

LEVER DPS is type-tested by **CESI SpA** and 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

- Output voltage 1Ph 115, 230 V_{ac}, 3Ph 400 V_{ac}
- Output power from 5 to 200 kVA
- Output AC voltage **THD lower than 1%** (linear load)
- Clean and stable battery DC voltage with **ripple voltage <1% RMS**
- Digital technology with **double microprocessor** control (one for the rectifier and one for the inverter) to improve reliability
- Inverter IGBT-based semiconductor technology with PWM control logic to obtain pure sinusoidal output waveform
- Compatibility with **lead acid** VRLA, AGM, Gel and **NiCd** batteries
- **Active mimic diagram** on graphic display
- Three programmable levels of charge: floating charge, boost charge and commissioning charge
- Designed to withstand the harshest environmental conditions (55°C, 95% humidity)
- Efficiency >90%
- Optical isolation on the logic and interface boards
- Battery charger voltage compensated in relation with temperature to extend the battery life

Main technical characteristics

Construction design

The standard cabinet protection degree is IP20 with closed door, it is painted with **RAL 7035** oven-dried polyester epoxy powder and it is natural ventilated.

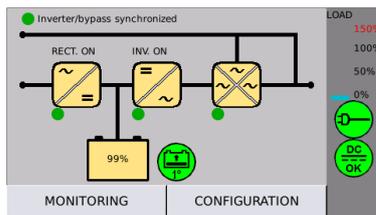
The cable entry is in the bottom and the overall layout is designed to allow an easy connection of the power cords and the signals cables.

Rectifier bridge is based on **thyristor** 6-pulse or 12-pulse technology, the inverter is **IGBT**-based with PWM control. The bypass logic is implemented automatically through a SCR static switch or manually through a breaker

Display interface HMI and mimic diagram

The UPS is provided with a **4.3" HMI touch screen display**, which shows the measurements, the alarms and the system mimic diagram. The display can store the list of the alarms and the history of the events.

Many UPS settings can be adjusted through the HMI display as well



Mimic diagram on HMI display

Standard electrical and electronic components

- Thyristor 6-pulse total controlled rectifier bridge
- IGBT full bridge inverter
- Input isolation transformer
- Input terminals blocks (3F+N+PE)
- Input power breaker (MCB or MCCB)
- Fast fuse for rectifier bridge protection
- Double digital control system
- Standard PVC cables H07V-K(FS17)
- Modbus communication interface (over RS232)
- Dry contacts SPDT module
- HMI display 4.3"
- L-C filter
- Output transformer

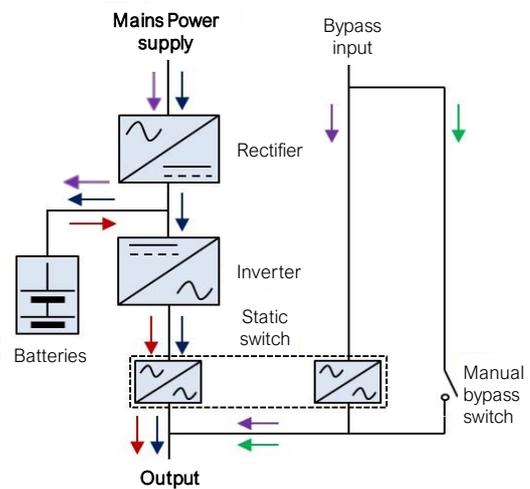
Standard mechanical components

- Floor mounted cabinet
- Cabinet protection degree IP20
- Colour RAL 7035 – powdered textured painting
- Cabinet with natural cooling
- Bottom side cable entry
- Standard cable marking

DPS inverter operation logic

The DPS UPS has the following factory-set operating modes:

- the **"online mode"**, where the rectifier keeps the battery charged and the inverter is in operation, supplying power to the load. The emergency mains may be present or not
- the **"line interactive"** mode, where the output voltage is supplied by the emergency mains through the bypass. The rectifier keeps the battery charged
- the **"manual bypass"** mode, normally used for maintenance activities



- Online mode
- Battery mode
- Line interactive mode
- Manual bypass mode

Main options

- 12-pulse rectifier bridge for input current THD reduction
- Protection against battery reversed polarity
- Kit IP31 or IP42 cabinet protection degree
- DC Earth Fault Relay
- Redundant parallel configuration
- Alarms and LED signalizations customizable
- Input/Output analog voltmeter and ammeter
- Other cabinet RAL colours
- FALCON battery monitoring system
- PC Boards tropicalization
- Kit internal light and power outlet
- Modbus communication interface (over RS485)
- Ethernet connectivity
- Up to 6 NTC temperature probes
- DCDB on the cabinet with up to 8 MCBs
- DCDB in a separated cabinet as per Client Specifications

Technical data

Input

Rated input voltage	3Ph 400 V _{ac}
Voltage tolerance	±10% (full operating capacity), +15%/-20% (with performances derating)
Frequency	50-60 Hz
Frequency tolerance	±5%

Output

AC rated output voltage	1Ph 115 V _{ac} , 1Ph 230 V _{ac} , 3Ph 400 V _{ac}
AC waveform	Sinewave with voltage THD <1%
Ripple on DC voltage	<1% RMS without batteries connected
Output power	From 5 to 200 kVA

Charging characteristics

As required by IEC 478-1

Battery

Type	Lead acid and NiCd (all types)
Battery Voltage	110, 220, 360 V _{dc}
Back-up time	As required (from few minutes to several hours)

Output performances

Static stability	<1% (on-line mode)
Dynamic stability	As per IEC 62040-3 Curve 1
Overload admitted	100-110% for 2 hours, 110-125% for 10 min, 125-150% for 10s
Short-circuit capability	165% for 3s
Efficiency at 100% load	>90%

Power electronics technology

Rectifier type	Thyristor 6-pulse/12-pulse total controlled bridge
Inverter type	IGBT full bridge with PWM control logic
Rectifier and inverter cooling	Forced, two levels fan speed

THD in input

6-pulse rectifier bridge	<26%
12-pulse rectifier bridge	<12%

Instrumentation

HMI display	4.3" LCD panel
Visual alarms and indications	Up to 20 signalizations on HMI
Communication interfaces	Modbus, Ethernet, dry contacts SPDT module

Static switch SCR

Max overload current for 10 ms	10 x I _N
Transfer time	<2 ms

General data

Acoustic noise at 1 m	<65 dBA
Maximum altitude	1000 m
Cabinet cooling	Natural (standard), forced (optional)
Cabinet IP degree	IP20 (standard), IP31 and IP42 (optional)
Cabinet type	Standard modular cabinet RAL7035 2200mm high
Metal standard thickness	2.5 mm (frame), 2.0 mm (door)
Humidity range	From 10% to 95% not condensated
Operating temperature	From 0°C up to +55°C
Storing temperature	From -20°C to +70°C (battery excluded)
UPS classification	VFI-SS-111
Relevant IEC	IEC 62040-1, IEC 62040-2, IEC 62040-3, IEC 62040-4 – Type tested by CESI SpA