

# DPS (TM 1Ph)

## Heavy-duty AC UPS for industrial applications

DC BUS 110, 220, 360 V<sub>dc</sub> (depends on UPS size)  
Lead-acid, NiCd and SMC batteries  
3F/1F output power from 5 to 160 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 UPS has been type-tested by 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

- Output voltages 115/230 V<sub>ac</sub> (1F)
- Output power from 5 to 160 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

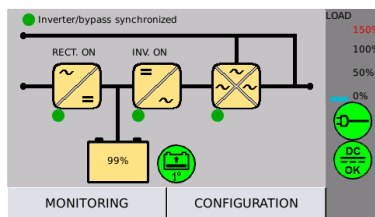
The cabinet has a standard protection rating of IP20 with the door closed, is painted with **RAL 7035** dried epoxy resin powder >60micron

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 UPS 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

### ➤ Standard electrical and electronic components

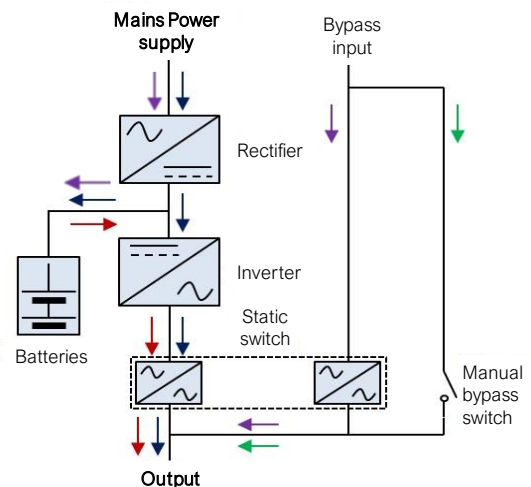
#### ➤ KEY Features

- 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 model 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



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

## 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 <sub>ac</sub> 3Ph
Voltage tolerance	±10% (with rated operation), +15%/-20% (with performance degradation)
Frequency	50-60 Hz
Frequency tolerance	±5%

### Output

Nominal AC output	1F 115 V <sub>ac</sub> , 230 V <sub>ac</sub> (1Ph)
AC waveform	Sinusoidal with voltage THD <3%
Ripple in DC	<1% RMS without batteries connected
Output power	<b>From 5 to 160 kVA</b>

### Charging modes

'IU, IUT, I1I2U, U1U2I (DIN 41773)

### Batteries

Type	Lead acid, NiCd, SMC (all types)
Battery voltage	110, 220, 360 V <sub>dc</sub>
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 6P or 12P 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 <sub>N</sub>
Transfer time	<2 ms

### Generic data

Acoustic noise at 1 m	<70 dBA
Maximum altitude	1000 m
Cabinet IP rating	IP20 (standard), IP31 and IP42 (optional)
Cabinet type/colour	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