



MADE IN ITALY



Heavy-duty solutions  
for critical applications

Oil & Gas

Utilities

Industrial

AC UPS  
DC UPS – DC CHARGERS  
DC/AC INVERTERS



**LEVER**<sup>®</sup>

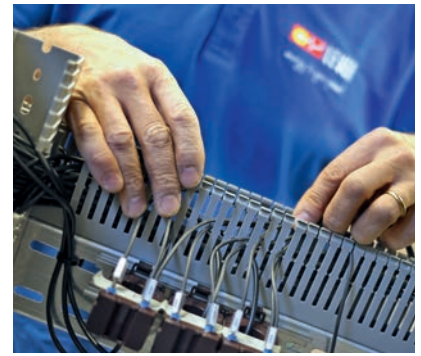
*power solutions*  
since 1973

# Who we are:

LEVER is a global leader in power solution technologies for critical applications, i.e. Oil & Gas, Utilities and Industrial. Based in Verona, Italy, the Company was founded in 1973 and nowadays operates worldwide, with focus on Europe, Middle East, Russia, Africa and South America. We offer a complete range of solutions, covering various electrical applications in different areas of business:

- DC Chargers/DC UPS, output current from 5 A to 2500 A with 24, 48, 110, 125, 220 Vdc output voltage
- Customized AC UPS, mainly for Oil & Gas applications, input 3Ph, output power from 5 to 600 kVA
- AC and DC distribution boards
- BMS, battery monitoring system
- NiCd and Lead Acid battery
- Battery steel racks and battery cabinets
- ATEX/Ex explosion-proof battery disjunction box
- Engineering, Testing & Commissioning and After Sales Service

LEVER's success has been driven by a strong focus on research and development: the Company maintains its research center in Verona and has been continuously investing in R&D. The result is a long track record of innovation. Many of the technologies that underlie our modern society, from industrial AC UPS to DC rectifiers battery chargers, were engineered and commercialized by LEVER. Today, LEVER stands as one of the main manufacturers of industrial AC UPS and DC Chargers, recognized by some of the most important EPCs and End Users all over the World.



*Innovation & Experience*



*Production*



*Custom-made solutions*

## LEVER world presence



- TOP LEVER MARKET
- RELEVANT LEVER MARKET



>30% GRADUATES



>5% OF ANNUAL REVENUES IN R&D



>3000m<sup>2</sup> BUILDING AREA



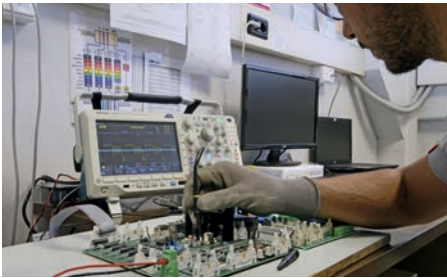
ITALIAN ENGINEERING AND MANUFACTURING



PRODUCTS APPROVED BY THE MOST REPUTED END-USERS IN EUROPE AND MIDDLE EAST

# Project-Oriented organization for EPC contractors

In LEVER, during the order execution, each internal process is monitored to ensure either that the final product will be exactly as agreed with the Customer, as well as the deadline given by the customer is respected. We pay a lot of efforts to ensure the documents availability at any time of the process, per specific needs of the job or of the Client. All the activities are made following a Project Plan, agreed with the Customer. Documents for approval, Manufacturing clearance, Factory Acceptance Test (FAT), Delivery, Testing & Commissioning, Site Acceptance Test (SAT), drawings as built and final book are usually managed by LEVER.



R&D – Engineering and Technical Department



FAT, Start-up & Commissioning



Training center

## After Sales Service



Our Service team is composed by experts and skilled engineers, trained to provide a high level technical support and very efficient after-sales service. LEVER's Service team supports Clients with:

- direct contact with LEVER Service organisation. Service personnel is always available and ready to provide advices and assistance regarding systems installation and maintenance
- fast on-site interventions, guaranteed by using advanced technologies and the professionalism of our Service personnel and Authorised Assistance Centers. LEVER Service guarantees that all the spare parts are original, tested and will come on time.
- offshore interventions: our personnel attended International Maritime Organization STCW/95 training courses and this enables us to work on offshore platforms.
- full assistance during the systems installation, start-up and commissioning, including on-site personnel training. Technical Service engineers can also verify site's safety and suitability.
- maintenance contracts, to minimise the risks and costs connected with UPS breakdowns. Several types of maintenance contracts are available, going from periodic inspections to comprehensive cover, including labour and materials.
- technical training courses, provided to the Client and to the Authorised Assistance Centre technicians, at the LEVER Training Centre.

## Environment Safety and Quality

LEVER's solutions and services are designed according to the Client's requirements and centred around improving reliability and increasing industrial productivity, while lowering environmental impact. We are 100% committed into minimizing environmental impact of our technologies and products, transferring this expertise also to our Clients and Suppliers and, at the same time, we aim to ensure that our manufacturing processes are safe and energy-efficient. Some of LEVER's efforts toward a cleaner world consists in reducing the use of energy and raw materials, phasing out hazardous materials, designing eco-efficient products and enhancing Suppliers' performance. LEVER ensures all manufacturing facilities and processes are **certificated ISO 9001:2015, ISO 14001:2015, ISO 45001:2018** international Standards on the management of quality, environment, health and safety risks.



# HIGH FREQUENCY RECTIFIER

LEAD ACID BATTERIES OR NICD OUTPUT VOLTAGE 24, 48, 110, 125, 220VDC AND CURRENT FROM 15A A 500A

## MIR

### HEAVY-DUTY MODULAR INDUSTRIAL RECTIFIER



The MIR model is the LEVER rectifier able to guarantee the maximum in the most demanding industrial environments with the modular **N + 1 solution**

- MIR rectifier supply the loads in DC and at the same time keeps the batteries correctly charged, guaranteeing full continuity of service
- MIR uses power modules which, when suitably configured, generate high power systems and N + 1 solutions
- **AC/DC modules available:**
  - 24Vdc - 400W
  - 48Vdc - 4kW
  - 110Vdc - 4,4kW
  - 220Vdc 4,4kW
- The batteries are permanently connected in parallel to the DC loads, thus making the system highly reactive to impulse loads such as motors, medium / high voltage switchgears as coils, etc.
- **MIR modular technology is full Hot-swappable**



# SCR INDUSTRIAL RECTIFIER

OUTPUT VOLTAGE 24-48-110-125-220 VDC, OUTPUT CURRENT 30 A - 2500 A

## SME

### HEAVY-DUTY INDUSTRIAL DC UPS/ DC BATTERY CHARGER



#### Applications:

- Oil & Gas onshore and offshore
- Refineries and petrochemical plants
- Utilities & Power Generation
- Transportations
- Water desalination and treatment
- Energy stations for SCADA Remote Terminal Units
- All the industrial and process control applications

#### Performances, flexibility and top reliability for critical applications

SME model is LEVER DC UPS/DC Charger designed to ensure the maximum power availability in the industrial environments requiring top performances.

The core of SME is the thyristors-based 6-pulse or 12-pulse total controlled rectifier bridge, which ensures a stable output DC voltage. The models with output current up to 250 A are completely naturally cooled.

It can be supplied in a single or redundant configuration, with change-over system designed as per Client's Technical Specifications. Furthermore, the system is highly customizable, from the alarms to the LED signalizations and threshold levels, and it can be enhanced by the addition of many engineering options and accessories (e.g. blocking diode, drop cells, analog measurements, special cabinet IP protection degree, etc.)

The SME DC Charger complies with IEC 60146-1-1 and IEC 62040 Standards, including the recent IEC 62040-5-3, and it has been accordingly type-tested by CESI SpA, Italy.

#### Technical Features

- Output voltage: 24, 48, 110, 125, 220 Vdc
- Output current from 30 A to 2500 A
- Input voltage: 3Ph 400 - 440 - 480 Vac
- Clean and stable output DC voltage with voltage ripple <1% RMS
- Rectifier thyristor SCR-based, 6 or 12-pulse total controlled bridge
- Provided with input isolation transformer
- Natural cooling for models up to 250 A
- Three programmable levels of charge: floating, boost and commissioning charge
- Protection degree closed door up to IP54
- Equipped with a 4.3" HMI display, featuring an accurate overview of the system status, alarms, measurements and allowing settings adjustments
- Wide range of communication interfaces: Ethernet, Modbus, Profibus, dry contact SPDT board
- Modular floor standing cabinet 2200mm high
- Compatibility with lead acid VRLA, AGM, Gel and NiCd batteries
- Back up time: as required, from few minutes to several hours



# CUSTOM INDUSTRIAL AC UPS

OUTPUT POWER 5 KVA - 200 KVA, INPUT 3PH, OUTPUT 3PH OR 1PH - DCBUS 110V-220-360 VDC

## DPS

### ONLINE HEAVY-DUTY INDUSTRIAL DIGITAL AC UPS SYSTEM



#### Applications:

- Oil & Gas onshore and offshore
- Refineries and petrochemical plants
- Utilities & Power Generation
- Transportations
- Water desalination and treatment
- All the industrial and process control applications

#### High flexibility and maximum industrial reliability

DPS model is LEVER digital online AC UPS, specifically designed to power critical loads which require high quality of AC voltage waveform and the maximum reliability in harsh environmental conditions.

Fully digital technology-based with double microprocessor control, one for the rectifier unit and one for the inverter unit, LEVER DPS is fully custom-made, with a wide range of options to comply with Client's Technical Specifications and it can be supplied in redundant N+1 configuration.

DPS features two main operating modes: "On-Line", where the inverter unit is in operation and supplies power to the loads, and "Line-Interactive", where the output voltage is supplied by the emergency mains through the bypass to increase the efficiency of the system.

DPS is classified VFI-SS-111, it complies with IEC 62040 Standards and it has been accordingly type-tested by CESI SpA, Italy.

#### Technical Features

- Output power from 5 to 200 kVA
- Input voltage: 3Ph 400 - 440 - 480 Vac
- Output voltage: 1Ph 115 - 230 Vac, 3Ph 400 - 440 - 480 Vac
- Pure sinewave output AC voltage with THDv < 1%
- Clean and stable battery DC voltage, with voltage ripple < 1% RMS
- "On-Line", "Line-interactive" (inverter unit in hot stand-by) and "Manual" operating modes
- Rectifier thyristor SCR-based, 6 or 12-pulse total controlled bridge
- IGBT-based full bridge technology inverter unit
- Thyristor SCR-based static bypass switch, < 2 ms transfer time
- Equipped with a manual switch for maintenance without disconnecting the load
- Provided with input and output isolation transformers
- Natural cooling
- Three programmable levels of charge: floating, boost and commissioning charge
- Equipped with a 4.3" HMI display, featuring an accurate overview of the system status, alarms, measurements and allowing system settings adjustments
- Wide range of communication interfaces: Ethernet, Modbus, dry contact SPDT board
- Modular floor standing cabinet 2200mm high
- Compatibility with lead acid VRLA, AGM, Gel and NiCd batteries
- Back up time: as required, from few minutes to several hours



# CUSTOM INDUSTRIAL DC/AC INVERTER

OUTPUT 3PH OR 1PH, OUTPUT POWER 5 KVA - 200 KVA

## INV

### INDUSTRIAL DIGITAL DC/AC INVERTER



#### Applications:

- Oil & Gas onshore and offshore
- Refineries and petrochemical plants
- Utilities & Power Generation
- Water desalination and treatment
- All the industrial and process control applications

#### Industrial DC/AC inverter to supply critical loads

LEVER INV model offers a wide range of 1Ph and 3Ph inverters with IGBT-based inverter bridge. The system has been designed to continuously supply extra-low harmonics AC current to critical loads.

Fully digital technology-based, INV features two main operating modes: "On-Line", where the inverter unit is in operation and supplies power to the loads, and "Line-Interactive", where the output voltage is supplied by the emergency mains through the bypass to increase the efficiency of the system.

#### Technical Features

- Output power from 5 to 200 kVA
- Input voltage: 110 Vdc, 220 Vdc
- Output voltage: 1Ph 115 Vac, 1Ph 230 Vac, 3Ph 400 Vac
- Pure sinewave output AC voltage with THDv < 1%
- IGBT-based full bridge technology inverter unit
- Static bypass switch, < 2 ms transfer time
- "On-Line", "Line-interactive" (inverter unit in hot stand-by) and "Manual" operating modes
- Equipped with a 4.3" HMI display, featuring an accurate overview of the system status, alarms, measurements and allowing settings adjustments
- Wide range of communication interfaces: Ethernet, Modbus, dry contact SPDT board
- Modular floor standing cabinet 2200mm high
- Compatibility with lead acid VRLA, AGM, Gel and NiCd batteries
- Easy integration with the DC Chargers already installed

## BATTERY CIRCUIT BREAKERS

# BATTERY DISJUNCTION BOX

Battery circuit breakers for safe and hazardous area.



## CUSTOM INDUSTRIAL DISTRIBUTION BOARDS

# LOW VOLTAGE DISTRIBUTION BOARDS



## BATTERY MONITORING SYSTEM

# FALCON BMS

Based on its experience and high technological know-how, LEVER has engineered FALCON, a versatile equipment allowing to monitor the main functional parameters of industrial battery.





















FALCON provides a valuable support for the preventive maintenance operations and for the immediate identification of failures.

- Easy installation
- Accurate measurements of battery voltages, currents and temperatures
- Provided with a display and dry contact SPDT board
- It can be installed inside a battery cabinet or on wall (for batteries on rack)
- Alarms recording included
- Compatibility with lead acid VRLA, AGM, Gel and NiCd batteries
- It can be integrated to all LEVER AC UPS, DC Chargers and DC/AC inverters



# Main Recent Project

PROJECT	COUNTRY	APPLICATION	NUMBERS OF UNITS	AC UPS	DC UPS	INVERTER
Battery chargers for plant TRANSGRID	 AUSTRALIA	Utilities & Power Plant	2		✓	
C.T. E. "Alessandro Volata" Montalto di Castro (VT)	 ITALY	Utilities & Power Plant	11	✓	✓	✓
Neste Rotterdam Site Development	 NETHERLANDS	Cogeneration	12	✓	✓	
Baleine Phase 1 Surf	 IVORY COAST	Oil & Gas	2	✓		
Dahshour Compression Station Unit No 5&6	 EGYPT	Oil & Gas	3	✓	✓	
New Naphtha Complex Project - 076971C	 GREECE	Oil & Gas	5	✓	✓	
Butterfly Project UPS ITB 090	 GERMANY	Industry	4	✓	✓	
Project N15907 - Water Transmission Scheme from Taweelah to Ajban	 UAE	Utilities & Power Plant	14	✓	✓	
DC Charger for KOC Substation at Gathering Centre-15	 KUWAIT	Oil & Gas	1		✓	
Al-Ahdab oil field to Al-Zubaydia power station project	 IRAQ	Oil & Gas	2	✓		
ENI Bolgiano MV Substations	 ITALY	Oil & Gas	6		✓	
Emergency systems for Eni Porto Torres I Solar Power Plant	 ITALY	Oil & Gas	4	✓	✓	
Rolling Mill Plant Ukraine	 UKRAINE	Steel Plant	2		✓	
UPS for Cape Town Airport I	 SOUTH AFRICA	Airport	50	✓		
Antirio, Petalas, Aloina and Molikeyo substations	 GREECE	Utilities & Power Plant	3		✓	
Tempa Rossa Project	 ITALY	Oil & Gas	1	✓		
Rectifiers for Savona Port	 ITALY	Port	4		✓	
MEW Shadadiya 400/132 kV and 132/11 kV Substation	 KUWAIT	Utilities & Power Plant	15		✓	
Industrial UPS and rectifiers for Airport of Jakarta	 INDONESIA	Airport	12	✓	✓	
Geothermal plant Cerro Pabellon project	 CHILE	Utilities & Power Plant	14		✓	✓
Zadco Temporary AC industrial system	 UAE	Oil & Gas	1	✓		
ENI Clara NW offshore platform	 ITALY	Oil & Gas	1	✓	✓	
HVDC interconnection Montenegro-Italy	 ITALY  MONTENEGRO	Utilities & Power Plant	7	✓	✓	✓

PROJECT	COUNTRY	APPLICATION	NUMBERS OF UNITS	AC UPS	DC UPS	INVERTER
Odidi Node project	 NIGERIA	Oil & Gas	3	✓		
Hyosung Sonelgaz Algeria Project	 ALGERIA	Utilities & Power Plant	1		✓	
Khor Al Zubair Project	 IRAQ	Oil & Gas	4	✓		
Rectifiers for Vietnam Navy	 VIETNAM	Military	2		✓	
Industrial Ac Ups For North Sea Tolmount Offshore Platform	 UNITED KINGDOM	Oil & Gas	1	✓		
Project Maida And Selargius Substations	 ITALY	Utilities & Power Plant	12		✓	✓
Project Tuba Depot Iraq	 IRAQ	Oil & Gas	1	✓		
Dpc Industrial Ii And Dahariz Projects	 OMAN	Utilities & Power Plant	2		✓	
Project Abu Dhabi Umm Al Nar Power And Desalination Plant	 UAE	Utilities & Power Plant	6		✓	
Emergency System For The Offshore Platform In North Field Bravo	 QATAR	Oil & Gas	2	✓	✓	
Ac Ups For Taranto Refinery	 ITALY	Oil & Gas	2	✓		
Project Abu Dhabi Al Taweelah Desalination Plant	 UAE	Utilities & Power Plant	4		✓	
Dc Chargers For Scada Remote Terminal Units In The Burgan Oil Field	 KUWAIT	Oil & Gas	22		✓	
Hvdc Interconnection Italy And France Piosasco Substation	 ITALY	Utilities & Power Plant	6		✓	✓
Emergency Systems For Petrochemical Plant In Ferrara (Italy)	 ITALY	Oil & Gas	7	✓	✓	
Dc Chargers For The Barakah Nuclear Power Plant	 UAE	Utilities & Power Plant	6		✓	
Dc Chargers For 132/11Kv Substations In Dubai	 UAE	Utilities & Power Plant	12		✓	
Project Val D'agri (Pz) Oil Field	 ITALY	Oil & Gas	6	✓	✓	
Dc Chargers For Saudi Electrical Substations	 KSA	Utilities & Power Plant	4		✓	
Emergency Systems For Burgas Refinery	 BULGARY	Oil & Gas	12	✓	✓	



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The data and photos in the document are purely indicative for commercial purposes