

SME

Heavy-duty industrial DC rectifier - battery charger

Lead acid or NiCd batteries

Output voltage 24, 48, 110, 220V_{dc} and output current from 60A to 2500A

SME model is the LEVER state-of-the art rectifier, specifically designed to ensure the maximum power availability in the most demanding industrial environments

- **LEVER SME** rectifier supplies continuous DC loads and keeps the batteries charged, ensuring the full continuity of the services
- The **battery charging cycle** is managed in a completely **automatic way**, as per IEC 478-1
- The batteries are permanently connected to the DC loads, the system therefore can respond immediately to impulsive loads, such as electric motors, MV/HV circuit breaker release coils, etc
- **Engineered product, fully customizable** and with a wide range of **options**, the LEVER SME can be supplied in a **single** or **redundant configuration**, with a **change-over** system designed as per Client technical specifications



Applications

LEVER SME is designed and developed for all the DC applications **requiring strong technical and environmental requirements**

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

Compliance

LEVER SME is type-tested by **CESI SpA** and complies with the following standards:

- IEC 62040-1 (Safety requirements)
- IEC 62040-2 (Electromagnetic compatibility)
- IEC 62040-4 (Environmental aspects)
- IEC 62040-5-3 (DC UPS performance & requirements)

Key features

- Output voltage: 24, 48, 110, 220V_{dc}
- Output current from 60A to 2500A
- **Thyristor 6-pulse or 12-pulse** total controlled rectifier bridge
- System digitally controlled
- Clean and stable output DC voltage with **ripple voltage <1% RMS** without batteries connected
- Flexible approach to provide tailored solution: fully customizable to comply with Client technical specifications
- Designed to withstand the harshest environmental conditions (55°C, 95% humidity)
- Compatibility with **lead acid** VRLA, AGM, Gel and **NiCd** batteries
- Efficiency 92÷94%
- 3 automatic charging modes, 3 adjustable recharge voltage levels and manual charging mode
- Dry contacts, signalizations, alarms and adjustable time delay thresholds
- Battery charger voltage compensated in relation with temperature to extend the battery life

Main technical characteristics

➤ Construction design

The cabinet is **IP31 protection degree** with closed door and it is painted with **RAL 7035** oven-dried polyester epoxy powder. The system has a natural ventilated top. The cable inlet is on the bottom and a handy shaft leads to the terminal board. The internal layout is designed to allow an easy connection of power cords and the cables for the remote signals and controls

➤ Display interface HMI and mimic diagram

A human machine interface ensures the access to all the parameters. A **4.3" graphic display** in the front side gives the perfect overview of the measures and the alarms. A **mimic diagram**, with up to 20 adjustable signalizations, is available to give real-time information of the battery charger state

➤ Standard system

The SME rectifiers have been pre-configured with the most commonly requested features built-in as standards, with the necessary user documentation

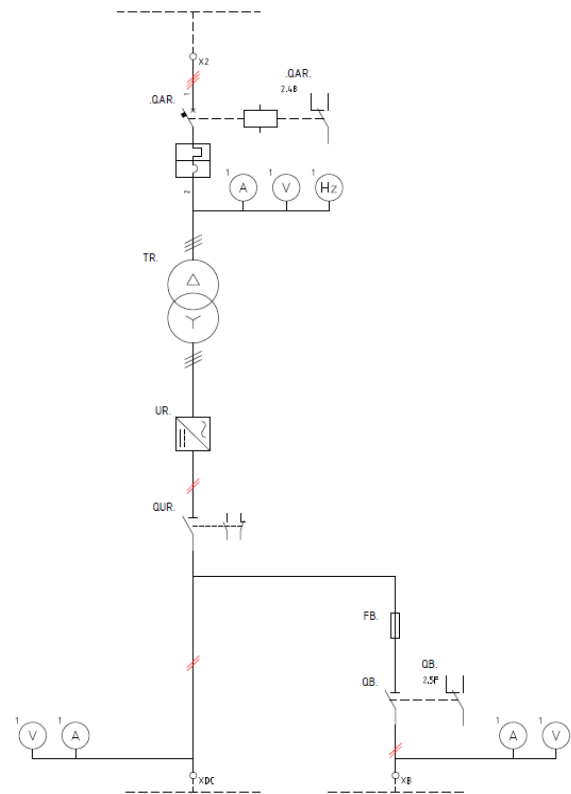
➤ Standard electrical and electronic components

- Thyristor 6-pulse/12-pulse total controlled bridge (the bridge is natural cooled for models up to 250A)
- Input isolation transformer
- Input terminals blocks (3W+PE)
- Input power breaker (MCB or MCCB)
- Fast fuse for rectifier bridge protection
- Digital Control system
- L-C filter
- Standard PVC cables H07V-K(FS17)
- Modbus RTU interface (over RS485)
- Modbus TCP interface (over Ethernet)
- Dry contacts SPDT module
- HMI display 4.3"

➤ Standard mechanical components

- Floor mounted cabinet
- Cabinet protection degree IP31 with closed door
- Cabinet protection degree IP20 with open door
- Colour RAL 7035 – powdered textured painting
- Cabinet with natural cooling
- Bottom side cable entry
- Standard cable marking
- Copper earth bar

SME indicative single line drawing



Main options

- Blocking Diode
- Drop cell
- Battery MCCB with reversed polarity protection
- Kit IP42 cabinet protection degree
- DC Earth Fault protection
- Redundant configuration with change-over system
- Tailored alarms, LEDs and dry contacts signalizations
- Input/Output analog voltmeter and ammeter
- Other cabinet RAL colours
- FALCON battery monitoring system
- Boards tropicalization
- Kit for internal light and power outlet
- Profibus DP interface (over RS485)
- Customizable battery and ambient temperature management
- DC distribution with up to 8 MCBs in the rectifier cabinet
- DC distribution 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

Rated output voltage	24, 48, 110, 220 V _{dc}
Rated output current	From 60 A to 2500 A
Ripple on DC voltage	<1% RMS without batteries connected

Charging characteristics

As required by IEC 478-1

Battery

Type	Lead acid and NiCd (all types)
Back-up time	As required (from few minutes to several hours)

Voltage regulation

Static voltage regulation	±0,5% under the conditions: at floating charge, 0-100% DC load variation, input voltage ±10%, input frequency ±5%, temperature from 0-40°C
Dynamic voltage regulation	As per IEC 62040-5-3

Rectifier technology

Type	Thyristor 6-pulse/12-pulse total controlled bridge (SCR)
Rectifier bridge cooling	Output current ≤250A: natural; output current ≥250A: forced

THD in input

6-pulse rectifier bridge	~30%
12-pulse rectifier bridge	~10%

AC/DC efficiency at 100% load

92÷94% (depending on the output power range)

Instrumentation

HMI display	4.3" LCD panel
Visual alarms and indications	Up to 20 signalizations
Relays alarms	4 (standard), up to 8 (optional)
Communication interfaces	Modbus, Ethernet, dry contacts SPDT

General data

Acoustic noise at 1 m	<60 dBA
Maximum altitude	1000 m
Cabinet cooling	Natural
Cabinet IP degree	IP20 open door, IP31 closed door (standard), IP42 closed door (optional)
Cabinet type	Standard modular cabinet 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)
Outgoing protection	Overload and short circuit, high voltage, current limitation, thermal protection
Relevant IEC	IEC 62040-1, IEC 62040-2, IEC 62040-4, IEC 62040-5-3 – Type tested by CESI SpA