

English



# POWER PROTECTION SOLUTIONS FOR RAILWAY APPLICATIONS



# YOUR POWER SOLUTION PARTNER.

Borri has been developing and building uninterrupted power systems since 1932 and is a global provider of power electronics systems and solutions for harsh industrial and demanding critical power requirements.

— Borri is a brand of Legrand, a publicly traded company and a global specialist in electrical and digital infrastructures, offering high-value-added products and solutions for commercial, residential and industrial buildings.

— Borri's R&D vast expertise in all facets of firmware, power electronics and mechanical design provides innovative solutions for tomorrow's problems in Industrial and Critical Power applications.

— The company prides itself on its first-class service and superior engineering disciplines. To ensure sustained quality, Borri manages all its processes in house from feed studies to design, production and after sales service technology.

— Based in Bibbiena, Italy with over 15,000m<sup>2</sup> production area, Borri operates across all five continents with subsidiaries in USA, Canada, UAE, India and Malaysia.

— Our strong trained and certified distributor network in every continent is able to provide on-site service support and technical guidance indicative of our own capabilities.



**BORRI**

## Industrial Power Solutions

Designing, engineering and building customised AC and DC power supply systems for harsh industrial applications.



## Critical Power Solutions

Designing and building mission critical UPS's 1- and 3-Phase up to 21 MW.



## Service

Borri team of experts support you to the highest standards no matter where you are in the world.



# RELIABLE AND SECURE POWER PROTECTION SOLUTIONS FOR RAILWAY INFRASTRUCTURES.



## AC UPS

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**1-Phase AC UPS**  
from 5 to 200 kVA

**3-Phase AC UPS**  
from 5 to 600 kVA

**Modular AC UPS 1-Phase and 3-Phase**  
from 20 to 120 kW



## DC UPS

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**1-Phase Rectifier/Battery Charger**  
24 - 110 Vdc, from 50 to 100 A

**3-Phase Rectifier/Battery Charger**  
24 - 220 Vdc, from 50 to 2000 A

**Modular Rectifier/Battery Charger**  
24 - 220 Vdc, from 15 to 1500 A



Reliable, robust and versatile power protection solutions to meet railway safety requirements and guarantee full operation of the whole infrastructure.



**SIGNALING SYSTEMS**



**TRAFFIC MANAGEMENT**



**TRACKSIDE SUBSTATIONS**



**BUILDINGS AND PASSENGER SERVICES**



### **CATENARY UPS SYSTEMS**

1-phase and 3-phase UPS  
with Dual AC input 16 2/3 and 50 Hz  
from 10 to 32 kW



### **EMERGENCY CENTRAL UPS SYSTEMS**

1-Phase and 3-Phase UPS  
Emergency Central Systems  
EN 50171 Compliant  
from 10 to 500 kVA

# Guaranteeing continuity in the railway industry

For more than 90 years, Borri has been delivering reliable solutions in many different critical conditions and harsh environments. In the railway industry, power continuity has an unparalleled role guaranteeing uninterrupted operation in different applications.

Whether it be a trackside substation or emergency lighting, a signaling system or passenger service, the railway industry is undergoing a major updating in its technology and systems with main focus on safety requirements, power continuity and risk reduction.

Any downtime in providing transport control systems is simply unacceptable for a modern and efficient infrastructure, causing potential risks to passengers' mobility and safety.



**STANDARD AND CUSTOMIZED SOLUTIONS**



**RELIABLE AND AVAILABLE SYSTEMS**



**ENERGY-EFFICIENT POWER PROTECTION**



**DESIGNED FOR EASY INSTALLATION AND SERVICEABILITY**

## AC UPS

Borri offers a complete range of products adaptable to most applications in the railway industry. From standard AC UPS solutions to rugged, customized systems designed to work in the most challenging of installation conditions (such as high temperature, dusty environment, fluctuating power supply, etc.).

## DC UPS

With decades of experience in industrial applications, Borri rugged rectifiers are designed and built to provide high reliable power supply and battery charging capability. Borri DC UPSs are particularly suitable for trackside and underground substations to provide control systems with continuous, stable and reliable power.

## CATENARY UPS SYSTEMS

Borri has developed robust and highly reliable solutions supplied both at traction network and public mains frequency. The UPS combines the two supplies to guarantee an additional level of redundancy. The system is designed to withstand railway electrical disturbances.

# Delivering secure power to all major rail environments.

Borri has been working with some of the main railway and metro companies around the world, delivering robust solutions in different applications. From traction supply to powering safety and emergency systems, from electrical substations to signaling systems, Borri extensive experience in the rail industry is a guarantee of excellence for our customers worldwide.

## HIGHLIGHTED EXECUTED PROJECTS



### METRO

**Customer:**  
**METRO COMPANY  
IN MIDDLE EAST**

#### Solution

UPS systems, EN 50171 certified, for powering safety and emergency equipment in the underground stations, passenger services, railway controls and signaling devices. Borri supplied 140 3-phase AC UPSs from 20 to 300 kW in redundant parallel configuration and 190 DC UPSs from 25 to 100 A, 110 Vdc in double configuration, all with Ni-Cd batteries for autonomies up to 8 hours.



### RAILWAY

**Customer:**  
**RAILWAY COMPANY  
IN NORDIC COUNTRIES**

#### Solution

AC/DC power supply systems installed along the railway line, used to power the signaling and control devices required by the European ERTMS/ETCS standard. The system integrates a dual input UPS, 16 2/3 Hz, up to 32 kVA. AC/DC converters with reinforced insulation and distributions are also installed on the 230 Vac UPS line.



### RAILWAY

**Customer:**  
**ITALIAN RAILWAY  
COMPANY**

#### Solution

110 Vdc systems installed in electrical substations, used to power measurement and control relays and substation auxiliary devices. Double branch configuration 2 x 50 A to guarantee independent power supply to services and battery, with automatic parallel in the event of a fault.

<b>Building and passenger services for a regional rail network</b>	50 x AC UPS 15-60 kVA EN 50171 25 x DC UPS 48-110 Vdc, 5-15 kW EN 50171	Italy
<b>Substations for high-speed rail sections</b>	DC UPS 110-144 Vdc	Italy
<b>Signaling systems for a local metro</b>	AC UPS 3-6 kVA	Italy
<b>Substations for a local metro</b>	DC UPS 50-150 A, 110 Vdc	Greece
<b>Substations for a local light rail line</b>	51 x DC UPS 50-100 A 400 Vac/110 Vdc 5 x AC UPS 2 kVA	Malaysia
<b>Traffic management for a regional rail line</b>	41 x AC UPS 5 kVA, 277 Vac	Mexico

# Standard and customized solutions for typical rail applications

Borri solutions for railway applications have been designed to fulfill any customer's requirements. We are committed to deliver transport managers, infrastructure engineers and passengers safe and efficient systems. Borri standalone and modular solutions can be adapted to any rail operating environment, guaranteeing 24/7 continuity to mobility and infrastructure services.

## MAIN APPLICATIONS

- Signaling systems
- Communication systems
- Lights
- Level crossings
- Rail switches
- Electrical substations
- Catenary systems
- Traffic control rooms
- Passenger information systems
- Building automation systems
- Emergency lighting
- Fire detection system

## MAIN FEATURES

- Protection degree up to IP 54
- Tropicalised electronic cards
- Front access for easy maintenance
- Flame retardant and low smoke emission cable (LSOH)
- Can operate with different battery technologies
- EMC: IEC EN 62040 and IEC EN 50121
- RAMS evaluation available on request
- CE-Marked & UL Optional



## STANDARD/CUSTOMIZED

# AC UPS

**CONVENTIONAL UPS**

- Power rating:
  - from 5 to 200 kVA 3/1-phase
  - up to 600 kVA 3/3-phase
- Built-in manual bypass switch for maintenance
- Input voltage up to 690 Vac
- Input/Output galvanic isolation
- Operating temperature: 0°C to 40°C (up to 55°C with derating)
- EN 50171 compliant solutions
- High protection degree

**MODULAR UPS**

- Power rating up to 120 kW
- Up to 96% efficiency in double conversion
- Input voltage up to 690 Vac
- Operating temperature: 0°C to 40°C
- Easy maintenance and low MTTR
- High protection degree



▲ Modular UPS

## CUSTOMIZED

# DC UPS

**CONVENTIONAL RECTIFIER**

- Power rating: from 24 to 220 Vdc, 50 to 2000 A 3-phase input
- Power rating: from 24 to 110 Vdc, 50 to 100 A 1-phase input
- Input isolation transformer
- Input voltage up to 690 Vac
- Operating temperature: 0°C to 40°C (up to 55°C with derating)
- High protection degree

**MODULAR RECTIFIER**

- 1-phase or 3-phase input
- From 24 to 220 Vdc output
- Input voltage up to 690 Vdc
- Operating temperature: 0°C to 40°C (up to 55°C with derating)
- Easy maintenance and low MTTR
- High protection degree



▲ Modular rectifier

## CATENARY

# UPS SYSTEMS

- Power rating: from 10 to 32 kW
- Dual AC input 16 2/3 and 50 Hz
- Built-in manual bypass switch for maintenance
- Input voltage up to 690 Vac
- Input /Output galvanic isolation
- Operating temperature: 0°C to 40°C (up to 55°C with derating)
- Easy maintenance and low MTTR
- High protection degree



▲ Catenary Modular UPS System

# Maintenance and Service

Borri always prioritizes the customer's expectation, from early analysis of the project requirements to worldwide commissioning and service. Many thousands of systems have been successfully installed and maintained globally, with continuous support from a highly trained team of expert certified technicians and engineers. From the professional set-up of Borri's training center or on site, the service team stands ready to support and contribute to tailored training. You can be assured of the highest levels of support from Borri, no matter where in the world you are located.



## Planning, installation, commissioning

Borri assists you in every single step of your project. Our R&D team can analyze and develop solutions to a wide range of edge system requirements.



## Analytical tests

Borri undertakes a series of analytical tests in order to guarantee higher efficiency and continuity to your system operation.



## Repair & spare parts

All spare parts supplied by Borri are original, tested and guaranteed to be fully compliant with Borri solutions.



## Maintenance

Preventive maintenance guarantees uninterrupted operations and optimized system efficiency.



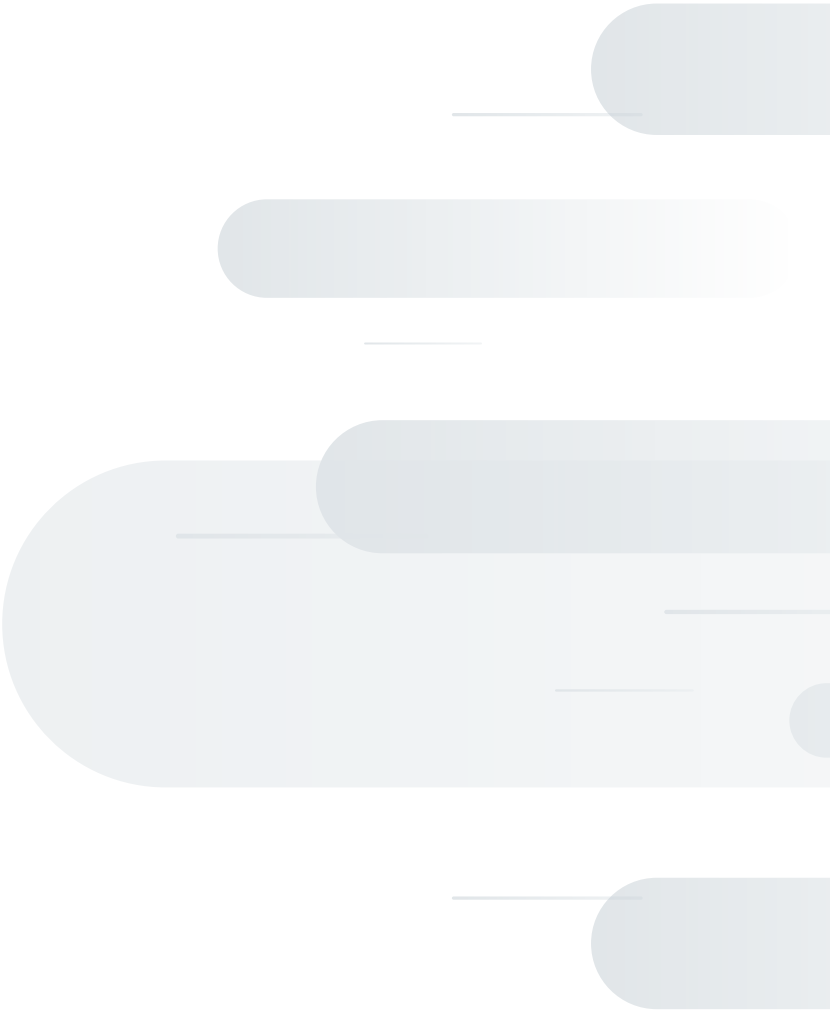
## Battery tests

Batteries have a limited time life and their proper maintenance is of high importance to guarantee efficiency to the UPS and avoid potential failures. Borri delivers high quality and performing batteries to assure smooth operations.



## Training

Borri offers distributors and customers a service training structured in 3 levels. Courses can be held in Borri training centres or on-site.







[www.borri.it](http://www.borri.it)

**BORRI HEADQUARTERS  
AND FACTORY**

**Borri S.p.A**

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