

Railway Energy System

Mobile substations



Mont-Ele has been working in the sectors of energy, transport, industry, services and research since 1972,

having among its main customers companies as RFI, Ferrovienord, MM, ATM, SNBC, GTT, TT, ANSALDO STS and Regional Railways for which carried out, with clients' trust and satisfaction, electromechanical, plant, system, civil and maintenance engineering for main fixed and mobile SSs for the Italian and International markets, classifying Mont-Ele as one of the leader companies in fixed and mobile conversion substations supply (from 3,69kV up to 575V).

The high level of qualification and the experiences of Mont-Ele in the engineering sector, assures high quality of mobile SS, meeting all applicable international standards.



The Railway Division

is the branch of the Mont-Ele company specialised in engineering, assembling, and sales of the electrical equipment for conversion substations at 360°, according to customer requests and needs.

The Mobile Conversion substations

The Mobile Conversion substations consist of a building or metal enclosure, containing all the substation-related elements, including the Medium Voltage cubicles, rectifier transformer, auxiliary service transformer, DC switchboards, low voltage distribution board, automation and control system battery charger and other auxiliary devices, entirely factory built and tested according to the International Electrotechnical Commission, which can be installed in a rapid manner.



The mobile SSs Applications

Railway, metro, tramway, trolleybus

The mobile SSs associated to their reliability, compactness, mobility and high quality, ensure a good solution for:

- Emergency power unit, in case of equipment failure
- Temporary power unit, in case of emergency situations, for the supply of vital energy for transport
- Maintenance power unit, in case of maintenance or repair activities
- Construction power units, in case of modernization of an existing SS
- Stand-by units for peak-load periods
- Source of power in isolated areas
- Turn-key delivery of SS with the minimum time and with the most rigorous standards of quality and shorter installation and commissioning times.

Mobile substations

THE MOBILE SSS

ADVANTAGES

The customer is supported from the offer phase to the construction.

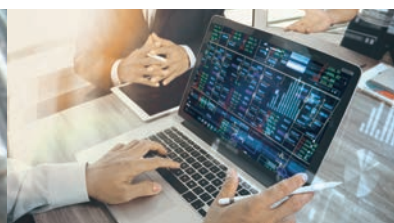
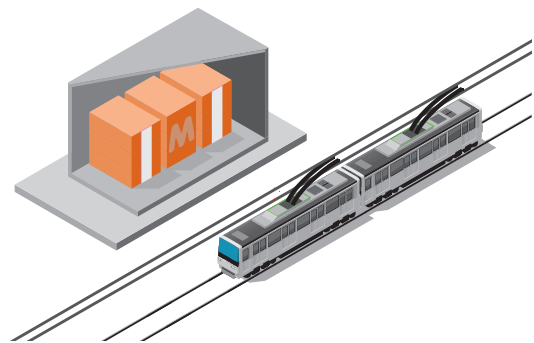
These substations are produced, assembled, wired and tested entirely in factory, ensuring uniform quality and reducing any on-site construction and assembly processes.

- High mobility
- Flexibility
- Short delivery time
- Totally assembled and tested in factory
- Rapid integration into the network
- Easy transport (no need of special permits or escort vehicles)
- Reduced civil works
- Easy installation - Plug & play philosophy
- Customised configuration

ENGINEERING

We use the most updated technologies to design a compact and lightweight mobile substation contributing to the mobility of the SS, meeting the local road transport regulations, increasing the manoeuvrability and adapting the SS for transport and service situations.

Mont-Ele provides the clients with complete products and solutions starting from engineering (basic, detailed, as-built), to supply optimized solutions, technical documents, project management, procurement of Medium Voltage equipment; construction of rectifier unit, DC switchboards, automation and SCADA system, low voltage auxiliary cubicles, assembling, tests and commissioning.



EQUIPMENT

The SS can be composed by:

- Medium voltage switchboard
- Rectifier transformer
- Rectifier / Controlled rectifier / Inverter
- DC switchboard
- Automation and Control System (substation control and RTU connection)
- Auxiliary Transformer
- Low voltage AC/DC distribution panel
- Lighting and Socket System
- Battery and Battery Charger



INSTALLATION

The accurate design makes its installation easy and fast.
With the cranes it is just necessary to unload the SS from the truck and positioning it on the basement and connect the power and auxiliary cables.

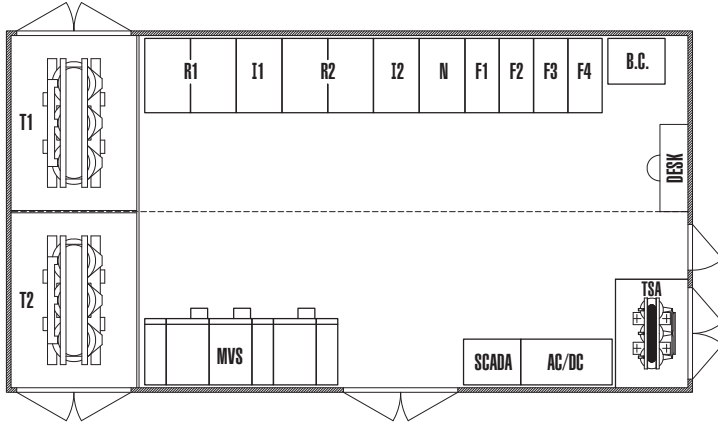
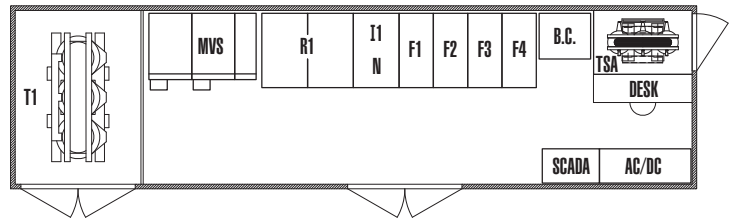
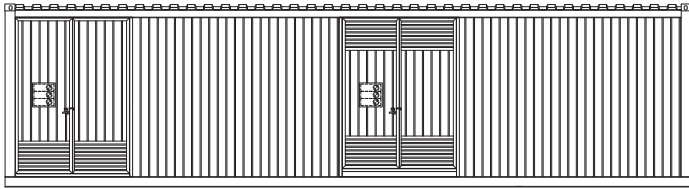


The mobile SSs Applications samples

Railway, metro, tramway, trolleybus



CONFIGURATION



- T1-T2 : RECTIFIER TRANSFORMERS
- MVS : MEDIUM VOLTAGE SWITCHGEAR
- R1-R2 : RECTIFIER UNITS
- I1-I2 : INCOMING FROM RECTIFIER UNIT
- N : NEGATIVE RETURN UNIT
- F1-F2-F3-F4 : FEEDER UNITS
- B.C. : BATTERY & BATTERY CHARGER
- AC/DC : AC/DC DISTRIBUTION PANEL
- SCADA : AUTOMATION & CONTROL SYSTEM

Typical Technical characteristics

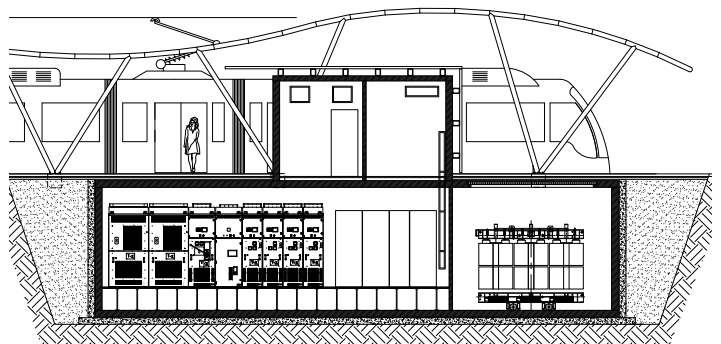
• Main voltage supply AC	12-15-20-23-36 kV *	
• Output voltage DC	750-1500 V	3600 V
• Rated power	up to 4500 kW each unit	2000-3600-5400-6600 kW
• Overload capabilities (EN 50328-IEC 60146)	Duty class V-VI	
• Number of rectifier units	1-2	
• Number of DC feeders	2-10	
• A.C. auxiliary services	127 V-230 V-400 V 50/60 Hz	
• D.C. auxiliary services	48-110-125-132-220 VDC	

* available also H.V. supply with separate skid

The SS, thanks to its configuration, can be moved, so in case of need, the SS can be relocated easily. Thanks to their low weight and their compact size, the transportable SS are very versatile and easy to be transported all over.



The prefabricated container conversion substation can be installed in various locations. The standard versions are for above ground installation, but are available also for complete or partially underground installation, in concrete solution.

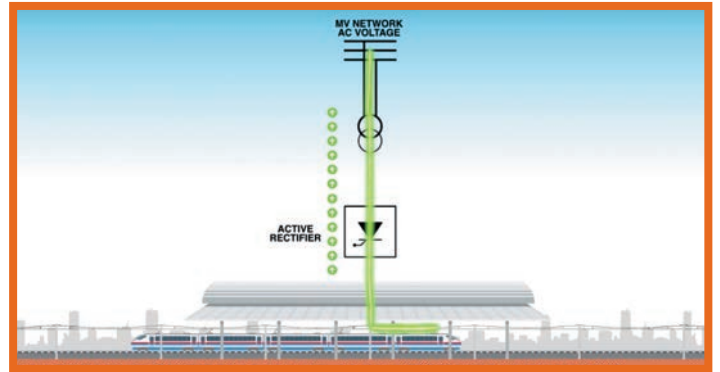


Moving Energy

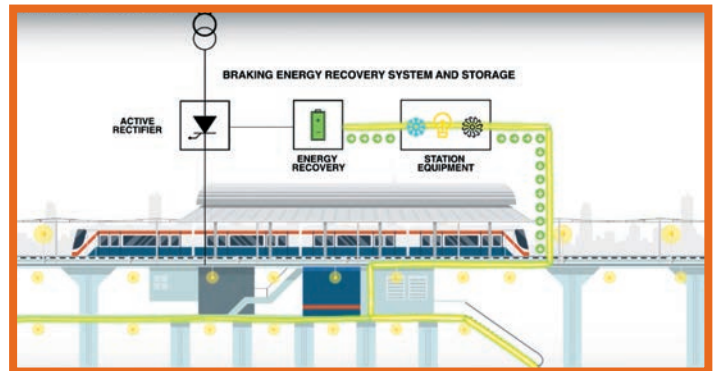
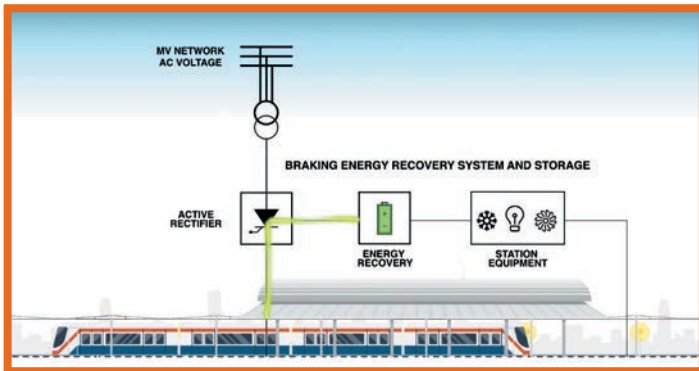
The mobile substation can contain many systems for voltage regulation and for energy recovery:

- Braking energy recovery system
- Braking energy recovery system and storage system
- Active rectifier for DC voltage network regulation
- Booster system

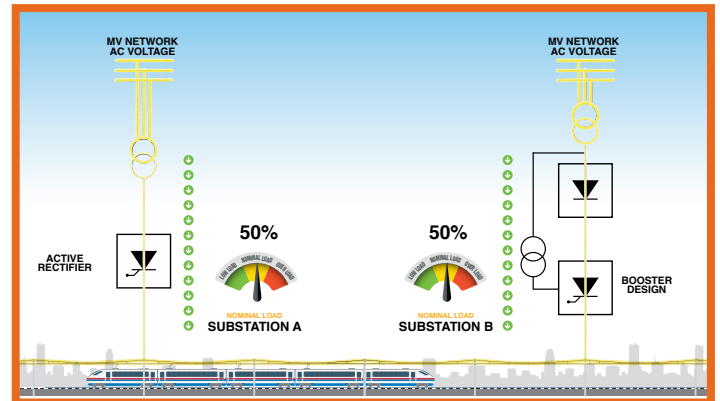
The Mont-Ele systems save and recover energy



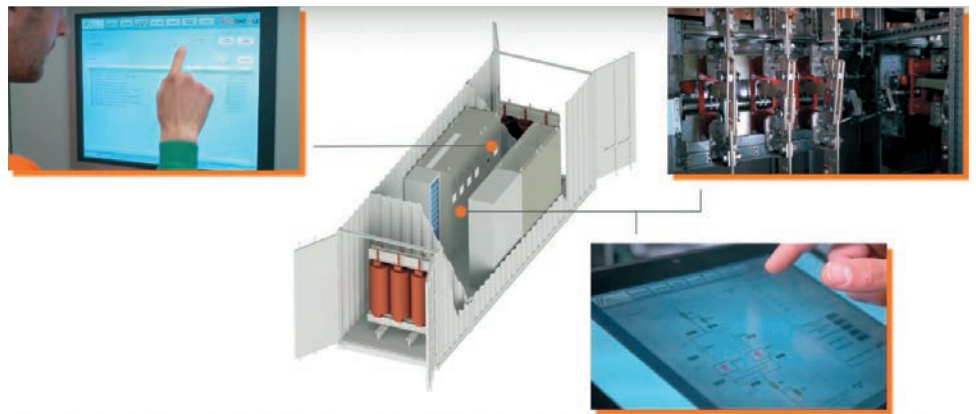
- Recover into M.V. supply network



- Store in supercapacitors and used for station services



- Voltage regulation with active rectifier and Booster system



APPLICATIONS



RAILWAY



UNDERGROUND



URBAN TRASPORTAZIONE

Automation and Remote Control

The automation and control system allows full management of the Substation with the latest control technologies.

The key word is complete integration among local compartment automation and the mimic panel of the Substation and the remote central control room.

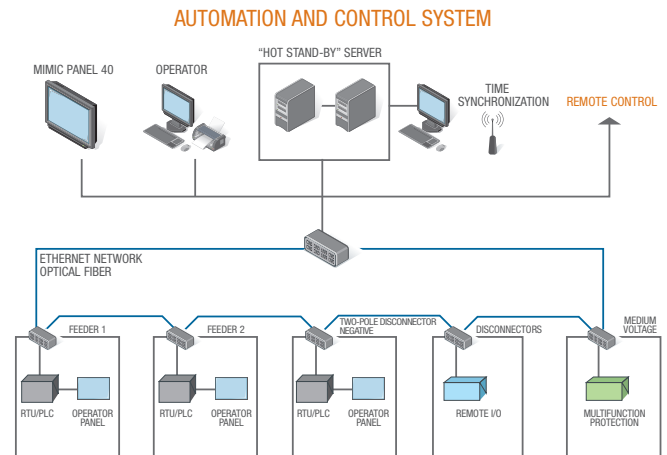
Integration means not only simplification of the wiring but an exchange of complete and rich informations for a more efficient plant management and effective planning of maintenance.

The integration starts from the local compartment where PLC / RTU are installed for local acquisition and local control, connected to a Substation local network that allows data transmission to the station control system. Also IED devices are interconnected to the system.

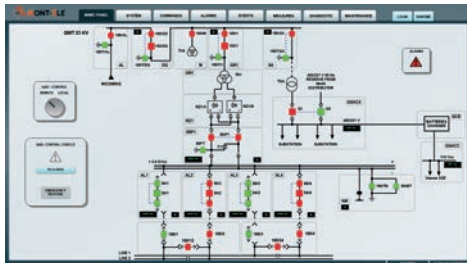
SYSTEM

Integration provides a hierarchy of control:

- Local Compartment-data are collected directly on the switchboard
- Substation - the informations are concentrated in the Substation supervision system that controls the plant
- Remote control - directly via software are sent signals, alarms and received commands
- Typical architecture of an automation and control system for a Substation:



SUPERVISION AND DIAGNOSTIC



The diagnostic and supervision system consists of a SCADA application installed on server machines dedicated to the data acquisition and registration, interface with the operator.

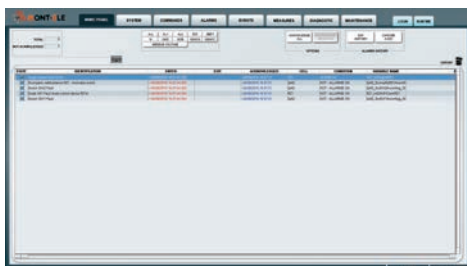
The typical architecture provides Hot-Stand by servers that are the front-end to the field and the client computer for the operator interface.



The deep level of detailed information obtained from each local compartment, allows to identify with high accuracy a possible failure in order to keep under control the whole plant

The main functions carried out are:

- Plant mimic panel and sections of detail
- Substation interlocks and logics
- Alarms visualization and registration
- Historical record of events
- Trends and measures
- Control command page
- Event/plant equipment diagnostic
- Automation and control system diagnostic
- Plant maintenance
- Web access
- Direct interaction with remote control



REMOTE CONTROL

Through networking technologies and SCADA software is created a remote control system that collects data from each substation using standard protocols, in order to realize a remote control system aimed at controlling not only plants but also diagnostics and maintenance activities.

The rich informations obtained from any Substation allow a deep diagnostic and reporting, in case of failure, of the problem identified in order to better organize the maintenance activities. The use of mobile technologies such as cell phone, PDA or laptop, allows maintenance operators to stay connected to the remote control system even during operations, in order to have under control the entire system.



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The information in this document contains general description of the technical options which do not always have to be present in individual cases. Therefore, the required performance characteristics must be defined in individual cases during conclusion of the contract.

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Cod. SSE-01