

Low to medium voltage distribution
M2L integrated power distribution system



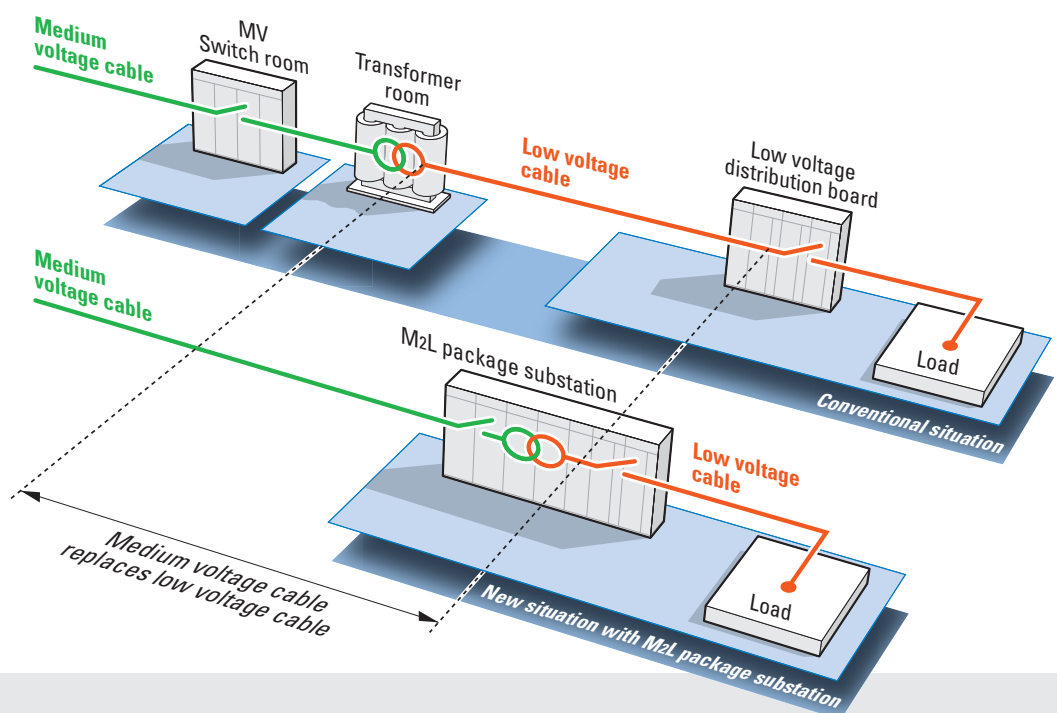
A compact, integrated solution for
medium voltage connection, transformer
and low voltage distribution



Powering Business Worldwide

Turnkey solution medium to low voltage

Eaton plays an important role in the electrical network between the power plant and consumers. Eaton's solutions from the Holec® productseries guarantee a safe and continuous power supply within this entire process. Eaton has power distribution products from medium voltage down to low voltage level. The M2L electrical distribution system integrates these products into a complete factory build solution, which combines the medium voltage connection and the low voltage distribution, including transformer. A turnkey solution which offers significant benefits, in terms of investment and usage, for installers and end customers.



M2L package substation

What is the Eaton M2L electrical distribution system? It is a combined electrical distribution system containing a medium voltage switchgear, a transformer and a low voltage distribution board in a single housing.

Hence the name *Medium voltage to Low voltage*: M2L.

The entire system is prefabricated under controlled conditions at Eaton's assembly facilities in Hengelo and can be installed and connected at the construction site in a very short space of time.

An Eaton M2L substation consists of the following tailor-made components:

- Medium voltage switchgear system (type Xiria or SVS).
- Transformer (cast resin insulated).
- Low voltage distribution installation (type Capitole 20, 40 or CX).



M2L package substation with double transformer.

What are the benefits of the M2L package substation?

Minimise expensive low voltage cables

Use of the M2L distribution system enables the transformer to be placed much closer to where the power is needed (the centre of gravity of load). This eliminates the need for long and relatively expensive low voltage cables or busbar systems. When using the M2L package substation, a proportionately longer medium voltage cable is sufficient.

Limit power losses in the cables

The power losses in the longer medium voltage cables are only a fraction of the losses in low voltage cables or busbar systems. Use of the M2L substation considerably lowers the operating losses of the electrical installation since the transport of large quantities of power at low voltage level is associated with significant losses. These losses are limited at medium voltage level. This results in cost savings each year on the energy bills of end customers.

Limit assembly costs

The integrated solution results in considerable savings on assembly costs and limits the numbers of terminations. Instead of assembling a heavy package of low voltage cables or busbar systems, the M2L package substation only requires a single medium voltage cable to be connected. The connection with the transformer has already been preterminated and tested.

Save on building costs for the technical room

The M2L package substation can be installed in a general MV switch room without problems. This eliminates the need for the construction of medium voltage and/or transformer rooms. The M2L electrical distribution system can easily be installed in a factory, basement or on a landing. This results in considerable savings on building costs.

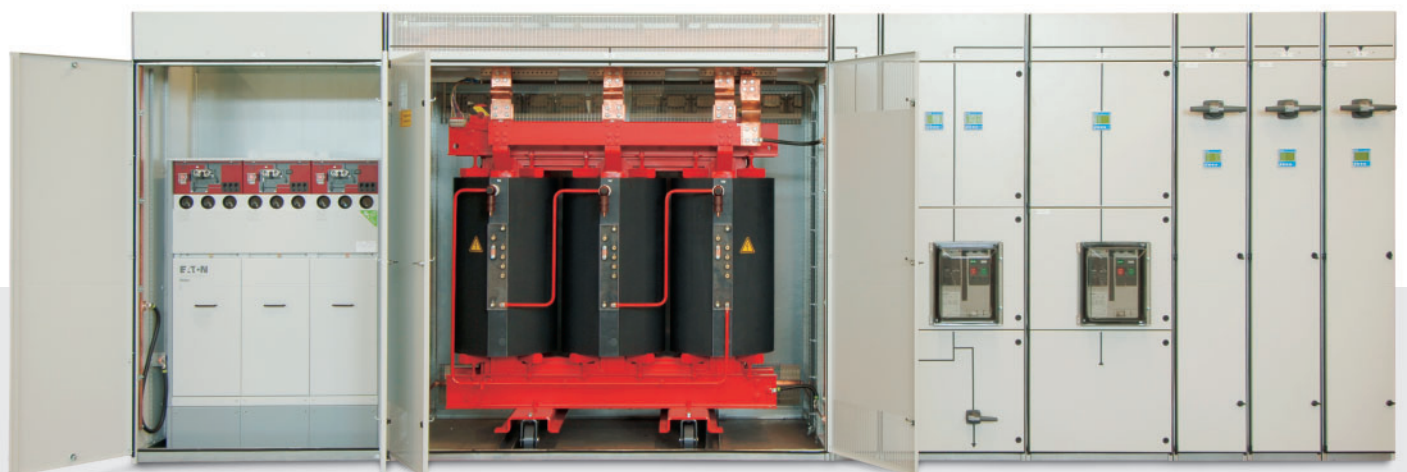
By using dry-type or cast resin transformers, M2L reduces the five hazards associated with traditional fluid-filled transformers.

Very short assembly time

M2L are pre-assembled and tested in an ISO 9001 certified production line. It only takes an average of two working days to set up and test the system on the site.

Tested ex-factory

The M2L distribution system is a proven concept; the construction of medium voltage connection, transformer and low voltage distribution is fully guaranteed and certified by Eaton when performed by Eaton's service organisation.



Medium voltage switchgear

Transformer

Low voltage distribution board

Tailor-made solutions with reliable components

Medium voltage systems

M2L package substations can be equipped with the following medium voltage systems:



Xiria, ring main units 3.6 - 24 kV

Xiria ring main units are extremely compact. Xiria units are supplied in two, three, four or five-panel versions. Both the primary part of the unit and the mechanisms are housed in a fully enclosed housing. The ring main unit can be fitted with:

- A vacuum load break switch for ring cable connections.
- A vacuum circuit breaker with integrated protection to protect mains transformers and cable connections.



SVS, modular switching system 3.6 - 24 kV

The SVS cast resin insulated switching system is a compact modular system developed for the medium voltage range up to 24 kV. SVS panels are available with:

- Fixed vacuum circuit breakers.
- Vacuum load break switches.
- Vacuum load break switch/fuse units.
- Metering panels.

Transformers up to 6 MVA



M2L package substations use dry-type transformers. As a result, no additional fire safety or insurance requirements apply. Eaton can supply M2L package substations with transformers from top quality manufacturers, in capacities up to 6 MVA

Eaton's medium voltage installations are SF₆-free as they are based on environmentally friendly vacuum switchgear technology and solid insulation, and optionally combined with air insulation. See <http://www.greenswitching.com>



Low voltage distribution systems



Capitole 20.



Capitole 40.

Capitole 20, 40 and CX, main distribution systems up to 6300 A

For several years now, Eaton has been supplying Capitole systems as a solution for main distribution systems.

Eaton's distribution package consists of the Capitole 20 and 40 and type CX systems. Capitole 40 and Type CX are also available as a Motor Control Centre (MCC).

	Rated current	Short-circuit value	Outgoing panels
Capitole 20	up to 3200 A	up to 65 kA	Plug-in
Capitole 40	up to 6300 A	up to 100 kA	Withdrawable/Plug-in/Fixed
Type CX	up to 4000 A	up to 100 kA	Withdrawable/Plug-in/Fixed

Capitole distribution systems have proven to be safe and reliable. The systems are designed for safety of personnel and have an ergonomic innovative design. There is optimum internal separation between the feeder panels and outgoing panels: up to Form 4 in accordance with EN-IEC 61439-1.

Outgoing panels are connected to the vertical distribution busbars using plug-in contacts. The Capitole 40 and Type CX offer the option of fixed or withdrawable outgoing panels.



The Type CX is reliable in operation and has a reliable mechanical test position. The system has full internal separation of all functional units (Form 3b or 4b).

Type CX.

Optional: Intelligent metering

Naturally, M2L electrical distribution systems can be equipped with an intelligent communication and energy management system.

Cost example

An organisation is involved in a new-build project and requires a medium voltage connection, medium voltage transformer and low voltage distribution board. The total cable length between the installations is 100 metres.

In the cost example below, we compare the differences in cost between a conventional solution and an M2L package substation. Both versions are based on a Capitole 40 low voltage distribution board and a Xiria

medium voltage installation. Use of the M2L package substation results in a cost saving in this fictitious example of 20% compared to the conventional solution.

The figures specified provide an indication of the possible cost savings that can be made by using the M2L package substation. The actual savings will naturally depend on the specific business situation.

Costs	Conventional solution	With M2L package substation	Differences	Information
Investment costs				
Low voltage installation	£ 43,000	-		Capitole 40
Medium voltage installation	£ 9,000	-		Xiria
Transformer	£ 25,000	-		1,600 kVA
M2L package substation	-	£ 109,000		Capitole 40 / Xiria / Transformer including installation and assembly on location
Building costs				
Technical room	£ 25,000	-		
Medium voltage cable	£ 4,000 (50 metres)	£ 8,000 (100 metres)		£ 80 per metre
Low voltage cable	£ 16,500 (50 metres)	-		£ 330 per metre
Installation & assembly costs				
Installation costs	£ 4,200	-		Already included in the price for the M2L package substation
Assembly costs	£ 10,000	-		Already included in the price for the M2L package substation
LV termination costs	£ 800	-		
MV termination costs	£ 1,300	£ 1,300		
Operating costs	£ 9,000	-		Difference in power loss based on 10 years in operation
Total	£ 147,800	£ 118,300	£ 29,500	

Tailor-made advice for the M2L package substation

The savings you can make by using the M2L package substation and the choice of combination best suited to you is something we will be happy to discuss with you in person. We can put together a suitable solution based on your wishes and requirements. Customisation and good communication regarding requirements usually result in significant cost savings on the entire project.

We would be happy to perform a cost calculation with you for your specific situation based on your company profile and your specific cost factors (purchase prices, hourly rates etc). This will enable us to show you the cost advantages you can achieve by using the M2L package substation.

Maintenance and management

Eaton can take complete care of the required maintenance and management of the M2L package substation. In addition, Eaton offers the option of a network study for optimum fine-tuning of the component settings to the total network configuration.

Reliable and proven technology

Eaton has more than 20 years' experience of installing these systems. The M2L power distribution board is a proven concept. This combination of medium voltage, transformer and low voltage is fully guaranteed and certified by Eaton.

Frequently Asked Questions

Our website contains a list of frequently asked technical questions.

- Should an M2L package substation always be installed in a technical room?
- Does the building need to meet additional requirements if an M2L package substation is installed?
- Who is responsible for earthing the M2L package substation?

Download the complete FAQ list at www.eaton.com/uk



Eaton's Electrical Sector is a global leader in power distribution, power quality, control and automation, and monitoring products. When combined with Eaton's full-scale engineering services, these products provide customer-driven PowerChain™ solutions to serve the power system needs of the data center, industrial, institutional, public sector, utility, commercial, residential, IT, mission critical, alternative energy and OEM markets worldwide.

PowerChain™ solutions help enterprises achieve sustainable and competitive advantages through proactive management of the power system as a strategic, integrated asset throughout its life cycle, resulting in enhanced safety, greater reliability and energy efficiency. For more information, visit www.eaton.com/electrical.

Eaton Electric Limited
Grimshaw Lane
Middleton
Manchester M24 1GQ
United Kingdom

Customer Support Centre
Tel.: +44 (0)8700 545 333
Fax: +44 (0)8700 540 333
E-mail: ukcommorders@eaton.com