

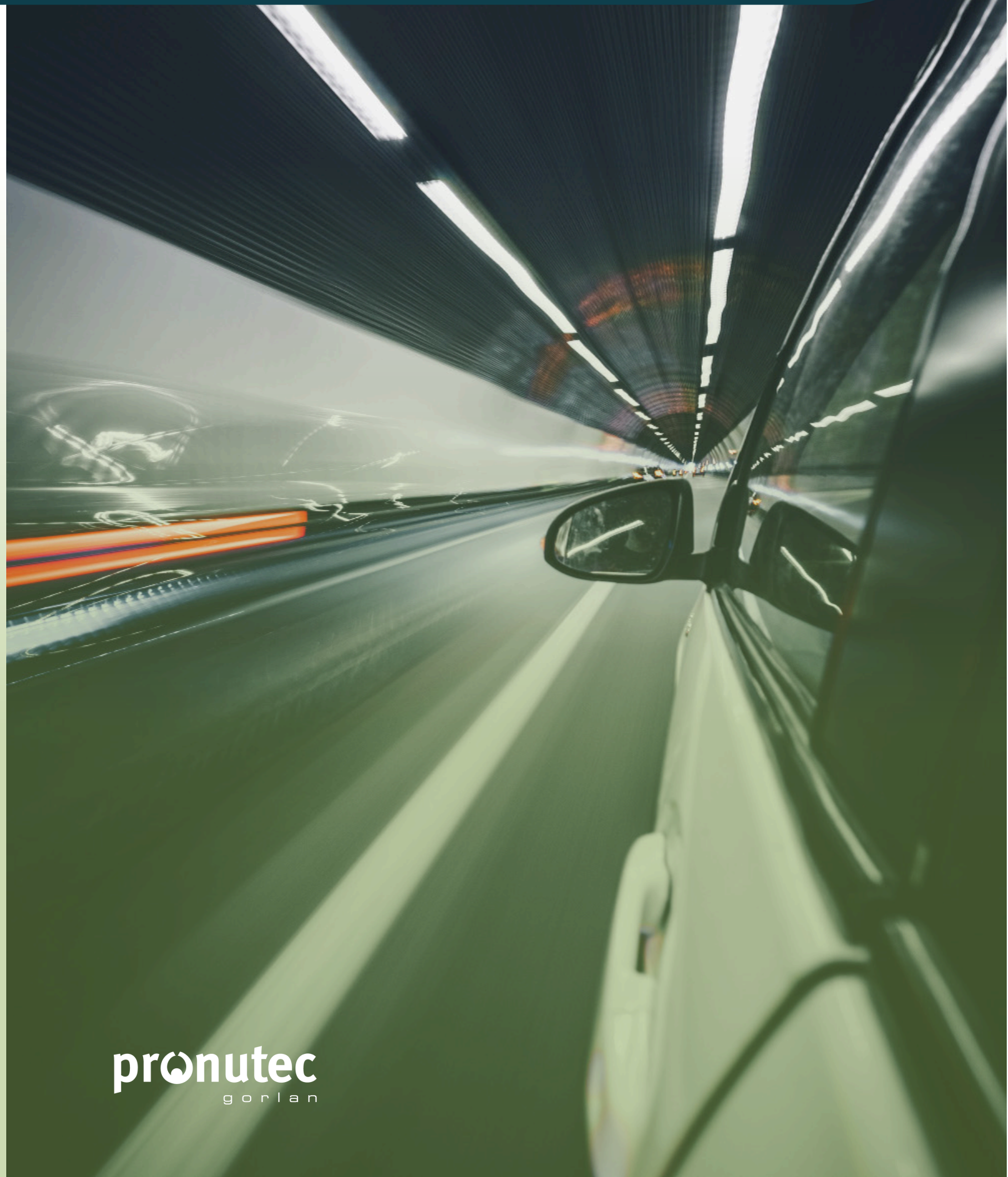


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**LV panels for electric vehicle
charging stations**

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01 Introduction

▶ 01.1 BACKGROUND INFORMATION

There are various types of charging, depending on the power and current required. The power of the charging station determines how quickly an electric vehicle can be charged.

Slow and semi-fast charging systems for domestic use in private homes and collective garages require low power and simple infrastructures.

At the fast and ultra-fast charging systems used at public facilities, e.g. shopping centres and charging stations (service stations with numerous charge points) the infrastructure required is more complex and the high power requirements necessitate more complex switchgear.

▶ 01.2 WHAT ARE THE REQUIREMENTS FOR THESE CHARGING STATIONS?

Fast charging stations generally require a nearby transformer substation with one or more feeder lines dedicated to chargers. The typical electric vehicle charging station is a dedicated transformer substation at which each line

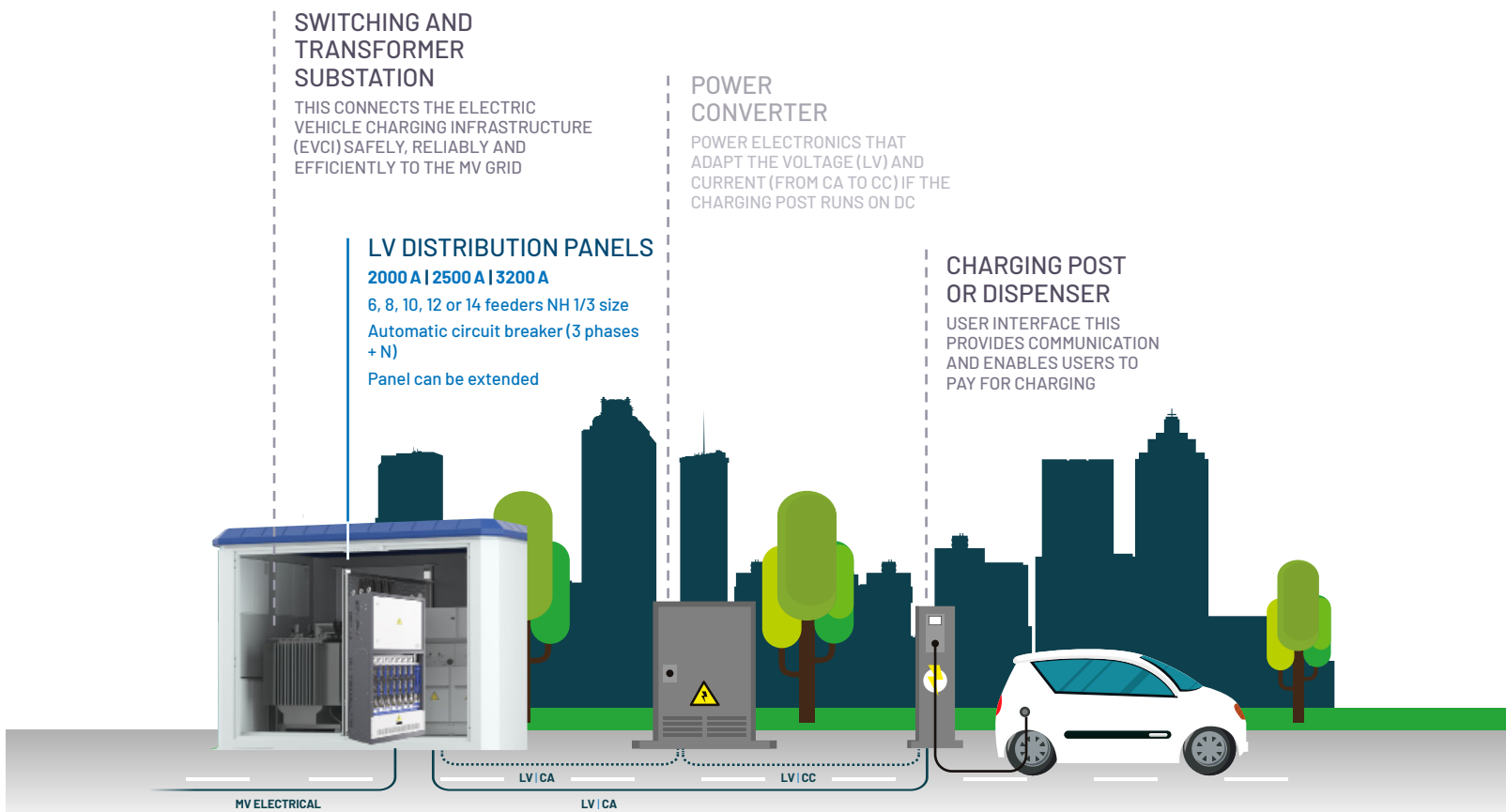
powers one charge point. Each line incorporates a protective device and a control switch to enable the line to be opened and closed. There must also be an AC to DC converter upstream from the charging station.

▶ 01.3 WHAT IS THE FUNCTION OF THE DISTRIBUTION PANEL IN THESE CHARGING STATIONS, AND WHAT ARE ITS COMPONENT PARTS?

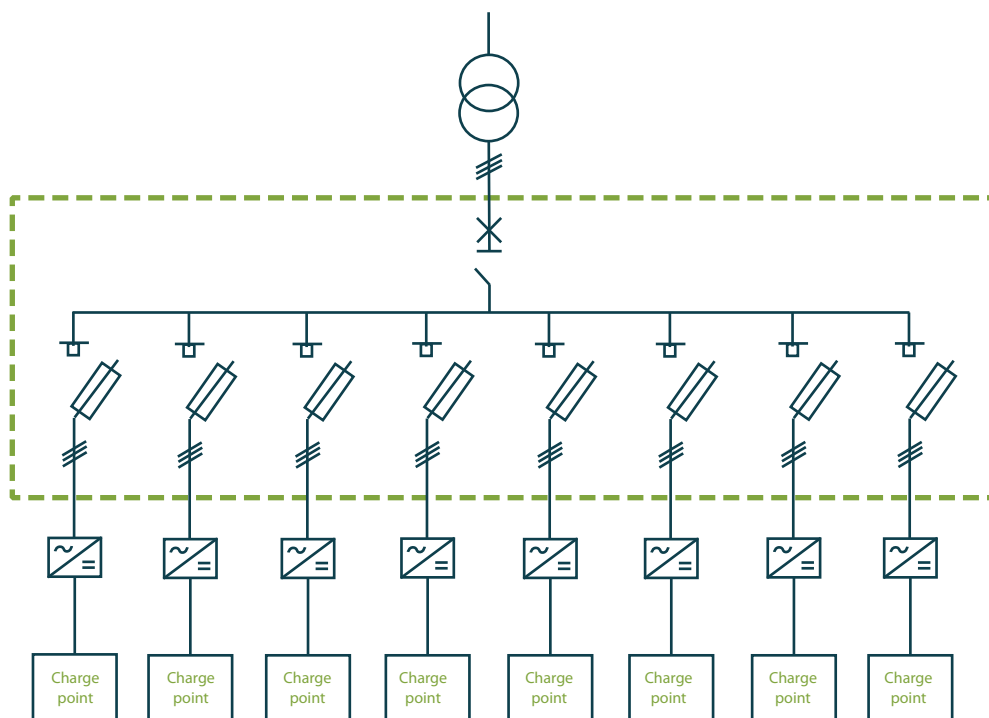
The new range of low-voltage distribution boards for Electric Vehicle charging infrastructures with superchargers is based on vertical design fuse-switchgear technology. This range offers greater safety and performance, and responds to the demanding requirements of this application. The solution proposed by Pronutec is versatile and compact, providing protection against overloads, short circuits and overvoltages. In addition, it offers added value by providing an integrated global solution for energy monitoring on low voltage lines. This includes the monitoring and management of energy demand, enabling efficient management of power and battery peak loads. In other words, this advanced system of control,

monitoring and prediction of data related to low voltage distribution lines allows anticipating possible faults associated with the operation of the electricity grid and the energy demand at each recharge point, improving the efficiency and safety of the system. The new Pronutec panels allow the installation to be expanded to adapt to future demands (growth of the supercharger network). Moreover, it has a high capacity and resistance, with a rated current of 2000 A and upwards and up to 8 feeders, which makes it suitable for high energy demand applications. Therefore, it is able to withstand current peaks at the feeders without compromising its lifetime, ensuring reliable and long-lasting performance.

01.4 MAIN PARTS OF CHARGING STATIONS

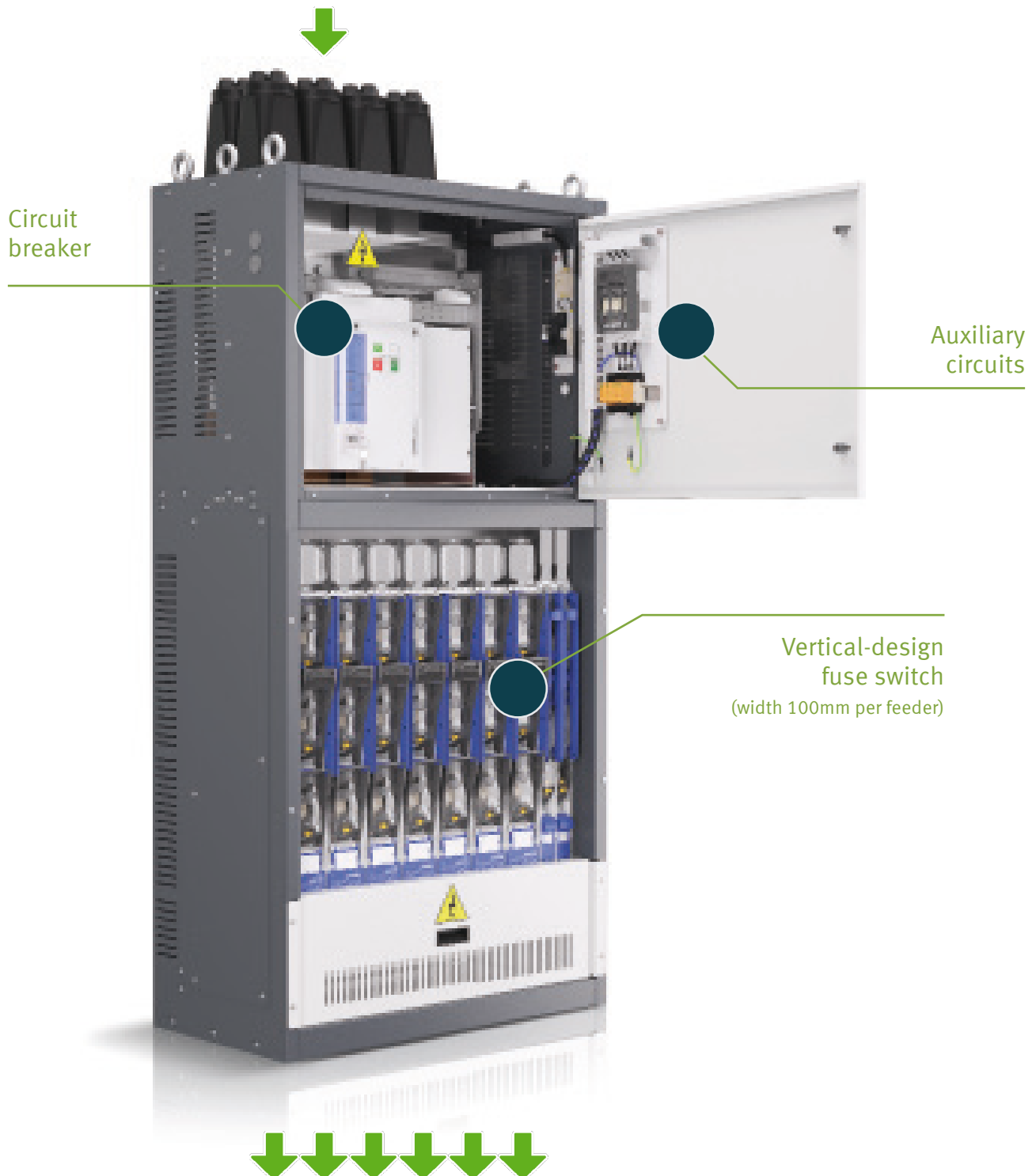


01.5 SINGLE-LINE DIAGRAM OF A INSTALLATION



02 General Characteristics

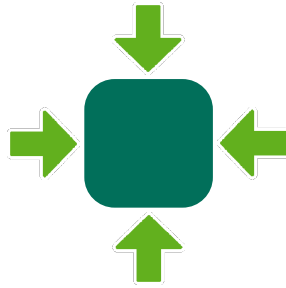
▶ 02.1 MAIN PART OF THE PANEL



▶ 02.2 ADVANTAGES

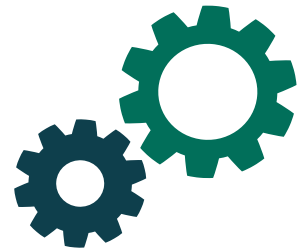
MORE COMPACT

The great advantage of fuse holders is that they take up very little space, which makes for a compact, tidy low-voltage panel design. These distribution panels also use less space than conventional panels with circuit breakers. This means that the transformer substations installed are also more compact.



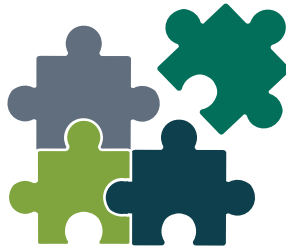
MAXIMUM RELIABILITY

TRIVER vertical fuse switches provide a highly efficient alternative to circuit breakers on distribution panel feeder lines. They act as switches, enabling the line to be controlled while under load. They are available in 3-pole and single-pole phase by phase versions.



EXPANDABLE

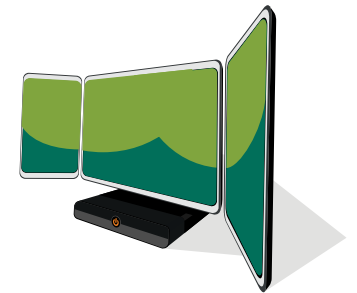
Charging stations are still in their early days, so the scenario may change. One great advantage of our panels is that they can be expanded, so additional posts can be installed with no problems.



The roll-out of charging stations has only just begun and demand is expected to increase in the coming years, so our panels are made to be expandable. If more charge points and therefore more feeder lines are needed in the future, an extension switchboard can be added.

MONITORING

The panels can be supplied with our low-voltage distribution network monitoring and remote supervision systems.



LOWER COSTS

The smaller size of these installations means that costs are lower. With the extension switchboards that we offer as part of the range, service capacity can be increased without enlarging the installation. On the other hand, it should be noted that the use of three-pole fuse switches as protection and distribution elements is more economical than the massive use of circuit breakers per feeder.



03 Product Range

General protection LV panel - Multiple feeder

► 03.1 GENERAL PROTECTION LV PANEL - MULTIPLE FEEDER

Panel intended for the protection of low-voltage lines in indoor transformer substations that supply the different charging points through converters/rectifiers in fast and ultra-fast charging infrastructures for electric vehicles equipped with medium and high power chargers.

It has up to 8 protected feeders with three-pole bases, with an auxiliary feeder to the auxiliary services cabinet with single-phase connection and an Open Frame Circuit Breaker (ACB) in the supply.

Current	2000 A / 2500 A / 3200 A*
General manoeuvre	3P + N main circuit breaker
Incoming	Triver 3-pole vertical fuse switch + NH 00/1/2/3
Type of feeders	BTVC Triver + NH 00/1/2/3
N° of feeders	4/8/12/... with NH 1/2/3 * Expandable
Options	Monitoring/advanced supervision Auxiliary circuits Differential protection Measuring Surge protection
Installation	Inside transformer substation (Metal enclosure)
Dimensions	2131 x 950 x 503 mm

* Consult other values.

** The n° of feeders varies depending on the combination selected from the catalogue of TRIVER+ NH 00/1/2/3 fuse switches.

The extendible panel model can be requested for a larger number of feeders.

Electrical characteristics	Value
Operating voltage (Un)	480/230 Vac
Earthing system	3P+N+PE
Rated insulation voltage (Ui)	1000 Vac
Rated short time withstand current (Icw)	50 kA / 1 seg
Rated impulse withstand voltage (Uimp)	12 kV ; 1,2/50 µs
Rated current (In)	2000 / 2500 /3200* A
Rated frequency (f)	50 Hz.

* Consult other values.



► 03.2 GENERAL PROTECTION LV PANEL - 1 FEEDER

The CBTA Reduced height metal enclosure (1360 mm) has two independent separating doors:

- At the top, the moulded case circuit breaker, control, temporary and transient overvoltage protection device. and differential protection.
- At the bottom, the output connection.

Suitable for transformers from 400 kVA to 1000 kVA.

Current	630 A / 800 A / 1000 A / 1250 A / 1600 A*
General manoeuvre	3P + N main circuit breaker
Incoming	Top mounting: 4 cable 240 mm ² per fase
Type of feeders	Direct form the circuit breaker
N° of feeders	1 feeder direct form the circuit breaker
Options	Auxiliary circuits Differential protection Surge protection Interlocking of the switch by a lock
Installation	Inside transformer substation (Metal enclosure)
N°. of cables for the incoming	For 630 y 800 A: 2 x 240 mm ² For 1000 A: 3 x 240 mm ² For 1250 y 1600 A: 4 x 240 mm ²
Dimensions	1446 x 580 x 290 mm

* Consult other values.

Electrical characteristics	Value
Operating voltage (Un)	480/230 Vac
Earthing system	3P+N+PE
Rated insulation voltage (Ui)	800 Vac
Rated impulse withstand voltage (Uimp)	8 kV ; 1,2/50 µs
Rated permissible short-time withstand current (Icw)	**
Rated current (In)	630 / 800 / 1000 / 1250 / 1600 A*
Rated frequency (f)	50 Hz.

* Consult other values.

** Consult values for each panel type.



▶ 03.3 AUXILIARY SERVICES CABINET

The auxiliary services cabinet can accompany the general protection panel and can be fitted with dry-type isolation transformer with 230/400V supply voltage in the primary and 115/230V in the secondary.

Its purpose is to adapt the voltages in manoeuvre and control applications to provide auxiliary services at outdoor recharging points (lighting and signalling).



Components

Single-phase or three-phase transformer

Magnetothermic circuit breakers

Current circuit breakers

Plug base

Dimensions

766 x 500 x 297 mm



► 03.4 OTHER LV DISTRIBUTION PANELS FOR ELECTRIC VEHICLE CHARGING STATIONS



CBTA M
Low-voltage panel for industry)
Switch disconnector & 8 feeders



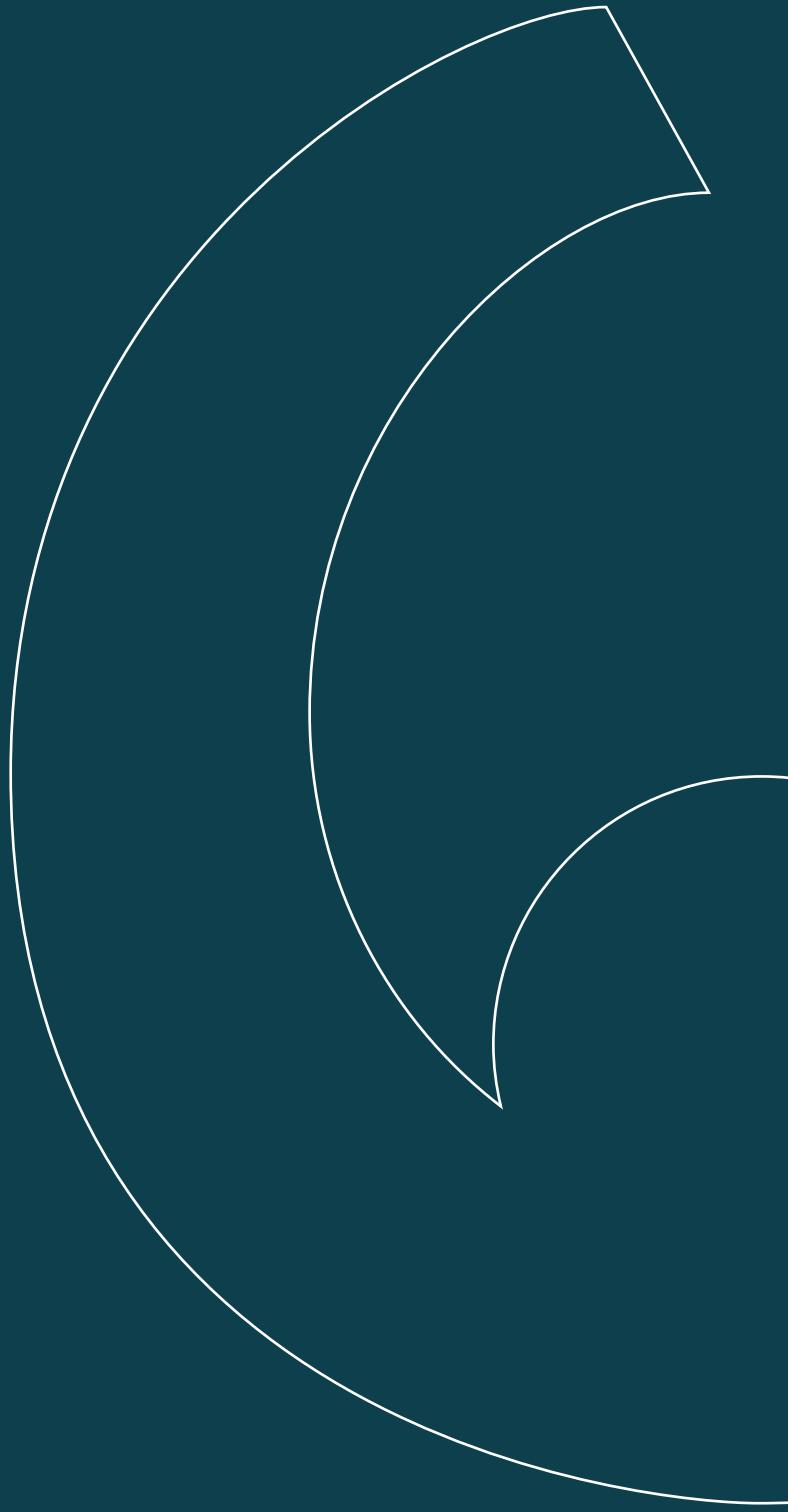
CBTA M
Circuit breaker & 8 feeders



CBTA M
Extension switchboard



CBTA U
Circuit breaker & 4 feeders



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