Ensto Novexia
Electrical equipment for low and medium voltage grids

Better life.
With electricity.

Ensto designs and markets smart electrical solutions to improve the safety, functionality, reliability and effectiveness of Smart Grids, buildings and transport.

ensto.com
For more than fifty years
Ensto has been offering solutions for smart grid optimization globally

Since the 1960s, Ensto has been developing, manufacturing and marketing control and automation equipment for low and medium voltage distribution grids.

**Intelligent energy efficiency solutions**
Since its foundation, Ensto has focused on coming up with the most innovative solutions in overhead, and then underground, grids to reduce the harmful effects of power cuts.
Over the years, therefore, Ensto has become an undisputed expert in medium voltage overhead disconnection equipment, instrumentation and control components for its remote operation and grid protection.
Ensto is now investing a substantial part of its R&D budget in energy performance and sustainable development of its smart grid technologies.

**International partner**
In France, Ensto is a major supplier to Enedis and to electricity utilities and unions.
The company is also an international partner of a large number of power grid operators.

**The Ensto group**
Ensto designs and provides smart electrical solutions to improve the safety, functionality, reliability and efficiency of smart grids, buildings and transportation. Our vision is to build a better life with electricity and a more sustainable tomorrow.

Ensto is established in 20 countries and has production facilities in seven countries: Estonia, Finland, France, India, Italy, Russia and Spain.
Its head office is in Porvoo, Finland.
The group is active in three Smart City ecosystems: Smart Grids, Smart Buildings and Smart Transportation.
Energy distribution reliability is a prerequisite for the Smart Grids. Ensto Network Automation solutions provide global optimisation regardless of the grid configurations.

**Our response to today’s major challenges**

The population growth, along with permanent industrial development, have led to an increase in energy demand in general, and electricity in particular. Energy suppliers are, therefore, required to constantly produce more, by optimising their grids to satisfy their customers, whose demands for the quality and the continuity of service are becoming more strict. Global solutions are thus required to reduce service interruption duration and frequency.

**Distribution reliability indicators**

To improve their performance, energy suppliers monitor specific indicators precisely. The two most frequently used interruption indicators are:

- **SAIDI** (System Average Interruption Duration Index) which measures the average duration of power cuts affecting an end consumer in a recorded period,
- **SAIFI** (System Average Interruption Frequency Index) which measures the average frequency of power cuts affecting an end consumer in a recorded period.

**History:**

Novexia is the result of the merger of the companies Simplex in Villefranche-sur-Saône and IATS Soulé in Bagnères-de-Bigorre.

In October 2010, the Ensto Group acquired Novexia, which became Ensto Novexia, in order to complete its network automation product range and to develop its establishment in France.

In May 2016, Ensto Novexia extended its product range by acquiring the company Tridelta France, a surge arrester manufacturer.
Solutions for medium voltage overhead grids
Guaranteeing the continuity of service

Reliability and expertise
For many years, Ensto has been developing solutions that combine the medium voltage cut-off and monitoring control.
Ensto’s innovative solutions are the outcome of close cooperation with its customers and other interest groups. According to customer feedback the ability of listening to customer needs is of great importance and has a significant impact on the product development. Therefore, Ensto equipment meets an extensive range of customer needs:
- high-quality service
- easy installation
- safe operation
- less losses improved profitability.

Moreover, these durable, easy-to-use solutions have a long service life in the most demanding weather conditions all over the world:
- extreme temperatures (-50°C / +55°C)
- dry climate (deserts) or very damp (tropics)
- corrosive areas (polluted marine or industrial).

The grid operators value the high overall reliability the solutions offer.

Flexibility and adaptability
Ensto’s equipment can be adapted to all configurations in both overhead line and underground cable networks. The overhead line equipment can easily be fitted on all types of poles: wood, concrete, metal and composite. The underground cable grid equipment is designed to be fitted inside the low and medium voltage substations. Lastly, the Plug & Play system means easy integration into grids remotely controlled by a SCADA system.

Customer benefits
- Adaptable to all grids
- Durable
- Reliable operation under extreme weather conditions
Medium Voltage overhead air-break switches
Manual or electric remotely controllable for 24 kV and 36 kV three-phase grids.
- 24 kV switch, 31.5 A to 100 A breaking capacity
- 36 kV switch, 25 A to 80 A breaking capacity
- Ceramic, synthetic or glass insulator

Medium Voltage overhead SF6 load break switches
Manual or electric remotely controllable.
IP68 sealed metal housing, enclosing the MV/LV power transformer or with external transformer.
Can automatically isolate the defective part of the grid following a pre-programmed number of openings of the automatic circuit recloser placed upstream (ADA function).
- Rated voltage: 12/24/36 kV
- Rated current: 630 A
- Breaking capacity: 12,500 A

Vacuum Medium Voltage automatic circuit reclosers
Detect current surges, interrupt the fault currents and re-power the line by automatic reclosing. If a fault is permanent, they isolate the defective section from the rest of the grid.
- Rated voltage: 38 kV
- Rated current: 630 A
- Breaking capacity: 12.5 kA

Monitoring-control units

ITI Controller for Medium Voltage overhead switches
- Measurement: current, voltage, energy and unit power supply
- Detection: current, directional
- Protocols: IEC 60870-5-101, IEC 60870-5-104, Modbus RTU, DNP3 and HNZ
- Communication: Digital or analogue radio, Dedicated lines, GSM, GPRS, Public switched telephone networks (PSTNs), Ethernet, external RTU

Smartcloser controller for Medium Voltage reclosers
- Measurement: current, voltage, energy and unit power supply
- Detection: Power surge ANSI 50, 51, 67, CPL ...
- Protocols: IEC 60870-5-101, IEC 60870-5-104, Modbus RTU, DNP3 and HNZ
- Communication: Digital or analogue radio, Dedicated lines, GSM, GPRS, Public switched telephone networks (PSTNs), Ethernet, external RTU
Solutions for low voltage overhead grids
Efficiently protecting distribution line reliability

To guarantee uninterrupted electricity distribution, Ensto has been protecting low and medium voltage overhead line transformers in rural environments for more than 30 years.

The protection of overhead line transformers is made possible by the use of pole-mounted circuit breakers or fused protection units. These specific products, adapted to significant load unbalances, guarantee total operation of the installed capacity, even in unbalanced states. These solutions protect the network, but also people and assets. The protection is global and optimal, so the operation is carried out safely.

High-quality overhead range
Thanks to its extensive experience, Ensto has deep knowledge of the design and production of equipment for electricity distribution networks. These overhead solutions are safe and long lasting. The purpose of their reliability and resistance is to ensure efficient and fault-free power distribution. These devices are designed to withstand the most severe conditions and are tested in accordance with international standards. These durable products are synonymous with uninterrupted service, reduced maintenance costs and, most importantly, satisfied customers.
Low Voltage Overhead Protection
For 50, 100 and 160 kVA power transformer.

Pole circuit breaker
The pole circuit breaker is designed to protect type H61 pole transformers. It counteracts overloads and short-circuits as well as phase imbalance. Its double-hanging system enables it to trip whilst resetting itself automatically for reclosing (network closing) with no maintenance required.

It is installed outside and fixed to the middle or top of the pole. Its location makes it more difficult to access and less susceptible to vandalism and fraud. It nevertheless remains easy to handle from the ground using its padlockable rod assembly.

It is suitable for both overhead or overhead-underground Low Voltage lines:

Various versions are available:
- with one (up to 165 A) or two (up to 265 A) outputs
- with digital or analogue unit
- depending on three transformer ratings of 50 kVA, 100 kVA or 160 kVA

The analogue tripping unit reproduces the thermal image of the transformer through three thermistors. Each thermistor, powered by the transformer, is crossed by a current proportional to the current that passes through every winding on the transformer. The pole circuit breaker will trip to protect the transformer as soon as the thermal image received is too high.

The digital tripping unit protects three transformer ratings on the pole (50 kVA, 100 kVA and 160 kVA) via a switch used to select the transformer protection rating. It is called “tri-rating”.
A digital micro-controller assesses in real time the presumed temperature of the transformer from currents on the three phases and the outside ambient temperature.

NB: A pole circuit breaker fitted with an analogue unit can easily be upgraded into a pole circuit breaker fitted with a digital unit, because the two tripping units are interchangeable.

PAS fuse protection
The PAS is an IP2X box available with one or two outputs. It is used solely for SPT-type (then put the parentheses behind this, instead of in the middle). It protects the low voltage installations positioned after the fuses.
Located outside, and fixed to the bottom of the pole, it is operated from the ground.
It is suitable for both overhead and overhead-underground low voltage lines.
It is also available in plate form for integration in the new substations.
Underground grid solutions
Providing telecontrol for underground grids

Moving from overhead to underground
Many boards and energy suppliers have opted to replace overhead medium voltage lines with underground cable grids as part of their program to improve energy supply quality. These line-burying programs, initiated in the main cities and then in the suburbs, gradually spread to medium and small towns.

Today, electrical utilities must operate both overhead and underground medium voltage grid.

Underground grids in France normally feature a large number of low and medium voltage distribution substations, medium voltage disconnection cabinets and so-called “simplified” rural transformer substations.

Ensto offers a full range of equipment for fault detection, remote operation of MV/LV sub-station switches (SF6-break medium voltage cells) and low voltage output protection and distribution.

Secure grid
The Ensto expertise in these three areas gives unrivalled know-how in responding to the following needs in the best possible way:

- Energy distribution from multiple low voltage outputs
- Protection of low voltage outputs downstream of a transformer
- Ensuring operational safety of goods and persons.

1 Instrumentation and control solution for medium voltage Ring Main Unit (RMU): ITI underground controller for remote-controlled RMU, LYNX fault passage indicator for non-remote-controlled RMU.

2 Low voltage distribution switchboards, type TUR or TIPI that distribute energy to the various users and protect the low voltage outputs after the transformer.

Installation of Ensto solutions in a low/medium voltage substation
Low Voltage panelboards
Designed for use with low/medium voltage substations, to provide protection for low voltage outputs downstream of 400, 630 and 1000 kVA transformers.

TUR (small urban panelboard)
The TUR board, first generation of boards, has the main functions below:
- Easy distribution of electric energy through reduced, modular configuration (up to 4.5 or 8 low voltage outputs).
- Ensures general cut using a switch of powers up to 1000 kVA.
- Protects low voltage outputs via HRC (high rupturing capacity) fuses.

Configurations:
- 4 outputs + 1 temporary, fitted with a 800 A switch
- 5 outputs + 1 temporary, fitted with a 1200 A switch
- 8 outputs + 1 temporary, fitted with a 1200 or 1800 A switch

TIPI (Power Interface and Information Panelboard)
TIPI, second generation of boards with IP2X protection. It has the main additional features over the TUR board:
- Operating safety (IP2X)
- Connectors to connect replenishment outlets by a back-up unit
- Inclusion of voltage measuring outlets
- Presence of a short-circuiter

Configurations:
- 4 outputs + 1 temporary, fitted with a 500 A switch
- 8 outputs + 1 temporary, fitted with a 1200 or 1800 A switch

Monitoring - Control
ITI - Underground controller
For remote operation of 1 to 8 switches within low/medium voltage substations.
- Measurement: current, voltage and unit power supply
- Detection: current, directional
- Protocols: IEC 60870-5-101, IEC 60870-5-104, Modbus RTU, DNP3 and HNZ
- Communication:
  - Digital or analogue radio, Dedicated lines, GSM, GPRS,
  - Public switched telephone networks (PSTNs), Ethernet, external RTU

LYNX - Fault passage indicator
- Types: Overcurrent or Directional
- Neutral point treatment:
  - Direct to earth or impedance-earthed (Overcurrent)
  - Compensated or isolated (Directional)
- Rated grid voltage: 6 to 36 kV - 50/60Hz
- Power supply: Can be autonomous (supercapacitor or battery) or fitted with a LV power supply with battery backup.

DEIE - Distributed generation controller
Manages the remote control and monitoring of decentralised production facilities (wind generators, thermal power plants, etc.). It is used to exchange data and commands between the medium voltage grid manager and the independent producer.
- Protocols: HNZ (Enedis-specific), IEC 60870-5-104.
- Communication:
  - Digital or analogue radio, Dedicated lines, GSM, GPRS,
  - Public switched telephone networks (PSTNs), Ethernet, external RTU
Overvoltage protection solutions
Ensto surge arresters protect all types of electricity networks

In order to deliver high-quality power, electricity companies must constantly improve the quality of their grids. Over-voltage protection is a key element. Appropriate overvoltage protection is vital when optimizing the continuity of service in a grid. Furthermore, it ensures personal safety and reduces immobilisation costs.

A surge arrester for every application
Designed and manufactured to meet the requirements of the highest quality standards, Ensto’s range of surge arresters ensures years of maintenance-free service in the following fields:

- Overvoltage protection for medium and high voltage networks
- Overvoltage protection for railway networks, either in direct or alternating current
- Overvoltage protection for cable sheathes
- Voltage limitation for non-earthed metal structures.

Based on metal oxide varistor and silicone rubber technologies, our surge arresters provide total control of residual voltage based on insulation coordination rules, thus considerably improving the level of protection.

Surge arresters for railway applications
The availability of a secure railway power supply is critical for operators. This requires, among others, the use of specific surge arresters and voltage limiters suitable to these networks. The protection enable by these devices ensures the safety of people and equipment, thus reducing operating costs.
High voltage source station surge arresters with polymer coating
Compliant with the IEC 60099-4 standard

**VARISIL™ HI** (for grids up to 170 kV)
- 10 kA/Class 2 to 5 at 144 kV
- Creepage distance: 25 mm/kV
- SLL/SSL mechanical strength: 800/1000 N.m

**VARISIL™ HTS** (For grids up to 245 kV)
- 10 kA/Class 3 to 5 at 198 kV
- Creepage distance: 25 mm/kV
- SLL/SSL mechanical strength: 800/1000 N.m

Medium voltage overhead line surge arresters with polymer coating
Compliant with the IEC 60099-4 standard

**VARISIL™ H24 / H36** (For 24 kV or 36 kV grids)
- 10 kA / Class 1
- Creepage distance: 25 mm/kV
- SLL/SSL mechanical strength: 250/300 N.m
- Compliant also with the EDF HN 65-S-40 standard

**VARISIL™ HE** (For grids up to 36 kV)
- 10 kA/Class 1 to 3 at 36 kV
- Creepage distance: 31 mm/kV
- SLL/SSL mechanical strength: 100/125 N.m

**VARISIL™ HE-S** (For grids up to 54 kV)
- 10 kA/Class 1 to 3 at 54 kV
- Creepage distance: 31 mm/kV
- SLL/SSL mechanical strength: 200/250 N.m

Cable sheath surge arresters
Compliant with the IEC 60099-4 standard

**VARISIL™ HC** (For grids up to 18 kV)
- 10 kA / Class 1
- For connection to links earthed at one point

**RNL HC** (For grids up to 6 kV)
- 10 kA / Class 1
- Designed to be fitted into screen permutation units

Surge arresters for rail applications
Compliant with the IEC 60099-4 standard

**VARISIL™ HDC**
- 10 kA / Class 2
- For direct current subways, trains and tramways (1 kV to 4.8 kV)

**VARISIL™ HD/T**
- 10 kA
- For alternating current subways, trains and tramways (36 kV to 42 kV)

**VARISIL™ HDP**
- For direct current rolling stock

**8506**
- 10 kA / Class 3
- For direct current rolling stock (1.5 kV and 3 kV)

**CLS - Low-voltage limiter**
- For alternating and direct current subways, trains and tramways