



ENSTO

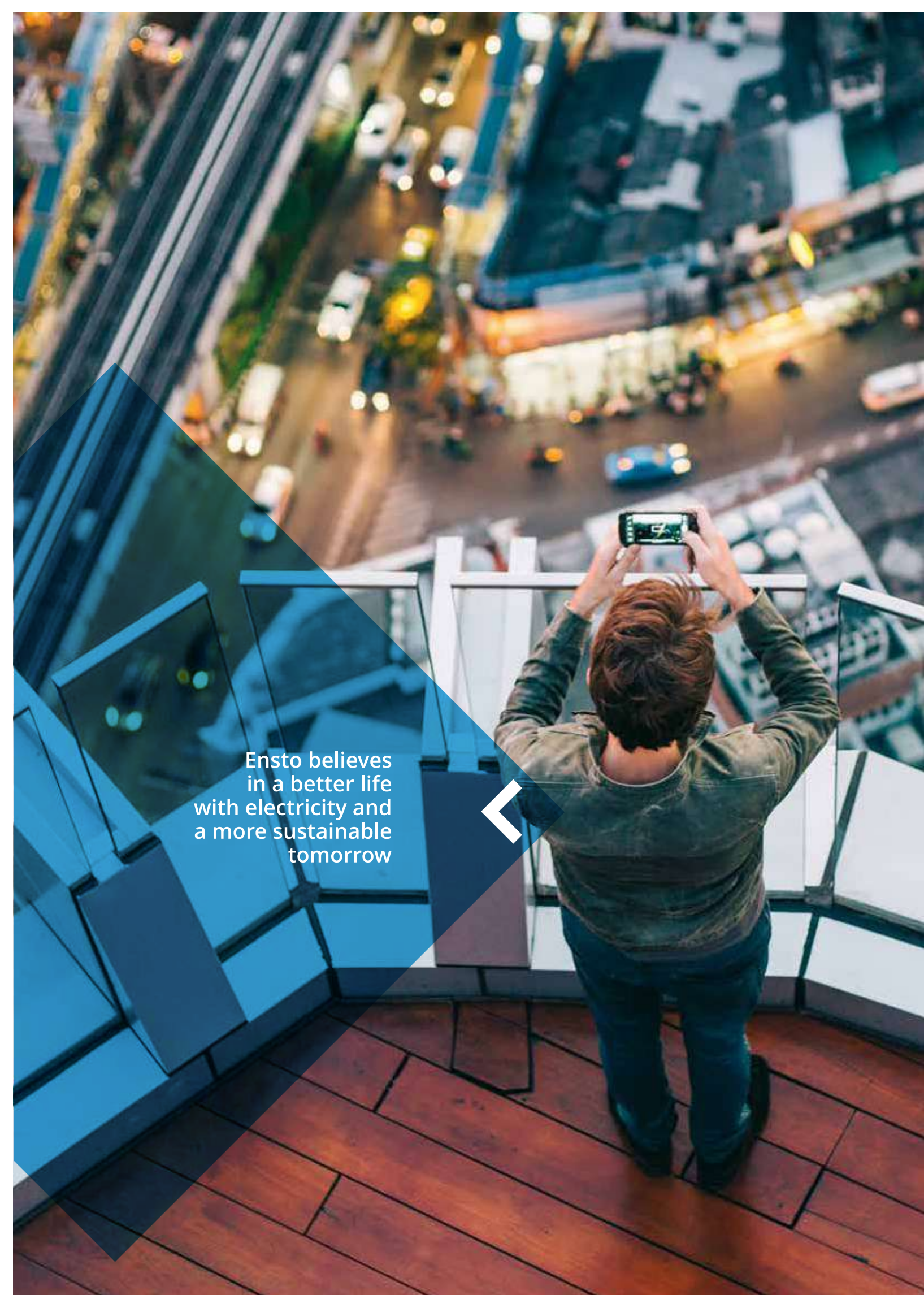
Electrical Solution Provider

Reliability & efficiency

Better life.
With electricity.

Ensto provides smart and reliable solutions with long life-cycle to ensure the electricity distribution in all circumstances.

ensto.com



Ensto believes
in a better life
with electricity and
a more sustainable
tomorrow



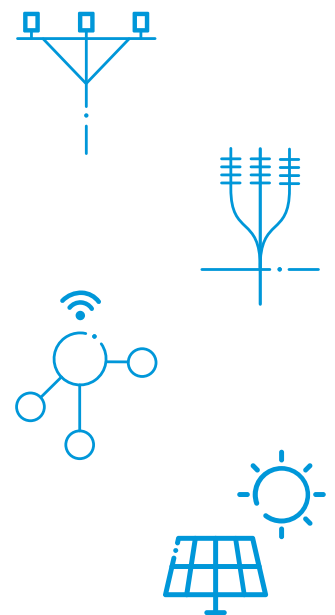


Electrical solutions for better tomorrow

Ensto designs and provides innovative and reliable electrical solutions and expertise for electricity distribution system operators

Ensto is an international, growth-oriented family business and technology company, which has dedicated to electricity with a long-term and human-centric approach for over 60 years. Our aim is to become a leading expert for distribution system operators and help them to succeed and create a more sustainable tomorrow. We offer innovative and reliable, long life-cycle overhead lines, underground networks, network automation and new

smart technology products and solutions for electricity distribution networks. Our own R&D, manufacturing and laboratories give us the expertise to continually innovate and serve our customers on an individual level. We are bound by our common purpose: making life better with electricity Sustainably.



Overhead line products

Proven to last decades



For over 60 years, Ensto has manufactured full sets of accessories for building low and medium voltage overhead lines.

With installations in the cold north, hot deserts, salty coasts, and deep jungles, our accessories are proven to be reliable, installer friendly, and long-lasting.

Ensto offers insulators, tension, and suspension clamps, arc protection devices, current limiting devices, connectors, bird protectors, cross arms, and tools for building low- and medium-voltage networks. Ensto's polymer-housed, metal oxide surge arresters are available for medium and high voltage.



Waterproof insulation piercing connectors, SLIW series

Our connectors are designed to resist corrosion and bimetallic electrochemical reactions and to endure varying mechanical tensions and other forces detrimental to the connection.



Suspension and dead end clamps

Ensto's product range for suspending and anchoring conductors is very wide. High quality is assured by long field experience and thorough testing.



Pole fuse switch disconnectors

Pole fuse switches include separate terminal covers for in-coming and outgoing conductors, thus making installation safer. With the operating stick, you can easily operate from the ground.

Full covered conductor solution (FCCS)

Provides even more complete protection for the line



Full covered conductor solution is developed to improve reliability of the distribution of electricity.

Time has assured the Covered Conductor solution to be extremely functional and reliable. Faults caused by snow, ice or storms have decreased remarkably. Full Covered Conductor Solution provides even more complete protection for the line.

Full Covered Conductor Solution (FCCS) allows space savings e.g. 40% narrower clearances for line corridors through forested areas, compared to a standard bare line. With parallel line structure, the space saving is even bigger. Ensto accessories for medium voltage FCCS are tested according to the EN 50397-2 standard which, compared to earlier national standards, is substantially more demanding and covers the accessories designed for such solutions more extensively. This brings a whole lot of reliability for the FCCS. Ensto's accessories to Full Covered Conductor lines are electrically and mechanically designed for the best performance and safety.



Suspension and tension clamps

Suspension and tension clamps contain a waterproof insulation piercing part that eliminates electrical potential differences between conductor and the clamp. The insulation piercing part can also be used for overvoltage protection.



Current limiting devices

A current limiting device (CLD) is used to protect the conductors as well as other network components. With CLD, it is possible to achieve disruption-free distribution of electricity, a major benefit to the consumer.



Insulation piercing connectors

The connectors form the most essential group of the network's accessories. They are suitable for the most common conductor types and have the watertight shear head bolt connector.



Insulators

The Ensto line insulator products meet most requirements for medium voltage line construction. Our FCCS selection includes composite tension insulators and suspension insulators.

Underground cable products

Guarantee uninterrupted electricity distribution



Our product development is steered by rigorous testing in our own laboratory. We perform accredited-type testing to our products according to various international standards.

A well designed underground cable network guarantees uninterrupted electricity distribution.

Ensto's type-tested underground cable joints and terminations employ silicone rubber technology for cold shrink use and multilayer crosslinked polyolefin for heat shrink.

The range taking mechanical connectors with shear head screws are tin coated, to be used with copper and aluminum conductors. They are designed for low- and medium-voltage networks and comply with the applicable EN and IEC standards. Our accessories are not only sold individually, we also offer complete kits for a variety of cable types.



Lugs and connectors

Our cable lugs and connectors have been designed to make installation as easy and effortless as possible. Our mechanical connectors and cable lugs have been equipped with shear-head bolts, which guarantee a reliable and uniform end result without the need for special tools.



Heat shrink joints and terminations

Ensto heat shrink products cover 12–36kV indoor and outdoor terminations and joints. The selection includes separate accessories for both plastic and paper insulated cables and for transition joints.



Cold shrink joints and terminations

Cold shrink accessories enable working in places where hot work permits are difficult to obtain or where hot work is otherwise not possible.

Network automation

For more effective limitation of power cuts



Invest in smart grid – reduce the duration of delivery interruptions.

Network automation improves the quality of service and SAIDI/SAIFI indicators by remote control or automatic sectionalizing of the network. Weather-proof load break switches and reclosers for medium-voltage overhead lines are durable and reliable to operate in any environment. Fast payback of the automation investment is generated by fewer interruptions, less-affected customers, and faster repairs.

A surge arrester for every application

We offer also medium-voltage and high-voltage surge arresters based on metal oxide varistor and silicone rubber technologies. They provide total control of residual voltage based on insulation coordination rules, thus considerably improving the level of protection.



Auguste load break switch

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).



Smartcloser

Our smart pole-mounted reclosers detect faults as they occur and then attempt to restore the line to its normal status automatically.



Pole mounted circuit breaker

The protection and management of MV/LV transformers requires the use of specific circuit breakers adapted to significant load imbalances and thus guarantees the total use of the installed power even in unbalanced conditions.



Surge arresters

Surge arresters have been designed with respect to sustainable development, by limiting consumption of resources at the manufacturing stages and for easier dismantling at the end of life.



Tools

Designed to fit the needs of network installers



Our tool selection includes products that are especially designed to the needs of network installers.

Ensto's tool selection comprises products especially designed for the needs of network installers. Our tools make the work easier and guarantee a safe installation.

Safe and easy installation

Ensto's tools selection consists of high-quality cable preparation tools for medium and low voltage underground cables, installation tools for both underground cable and overhead line accessory installation and various measuring equipment. When installers use tools that are designed for their work, a reliable installation can be made safely. A well-made installation has great impact on the service life and reliability of the network.

Our most important product lines are live line tools, cable pulling equipment, pole climbing irons and earthing devices. We have also a wide selection of underground cable tools. Our tools selection includes both Ensto's own tools and our suppliers' products.



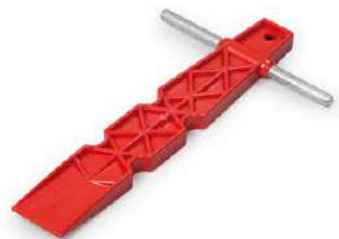
Tightening tool CT42

Tightening tool CT42 is a special tool which is used for tightening the steel band COT37.



Wire stringing wheel ST26.1

Used for pulling in overhead cables. ST26.1 is used for straight lines and small angles up to 30 degrees.



Wedge ST192

During the installation of connectors the phase conductors of an insulated overhead cable can be separated by using wedges. The wedge can also be used when installing suspension clamps.

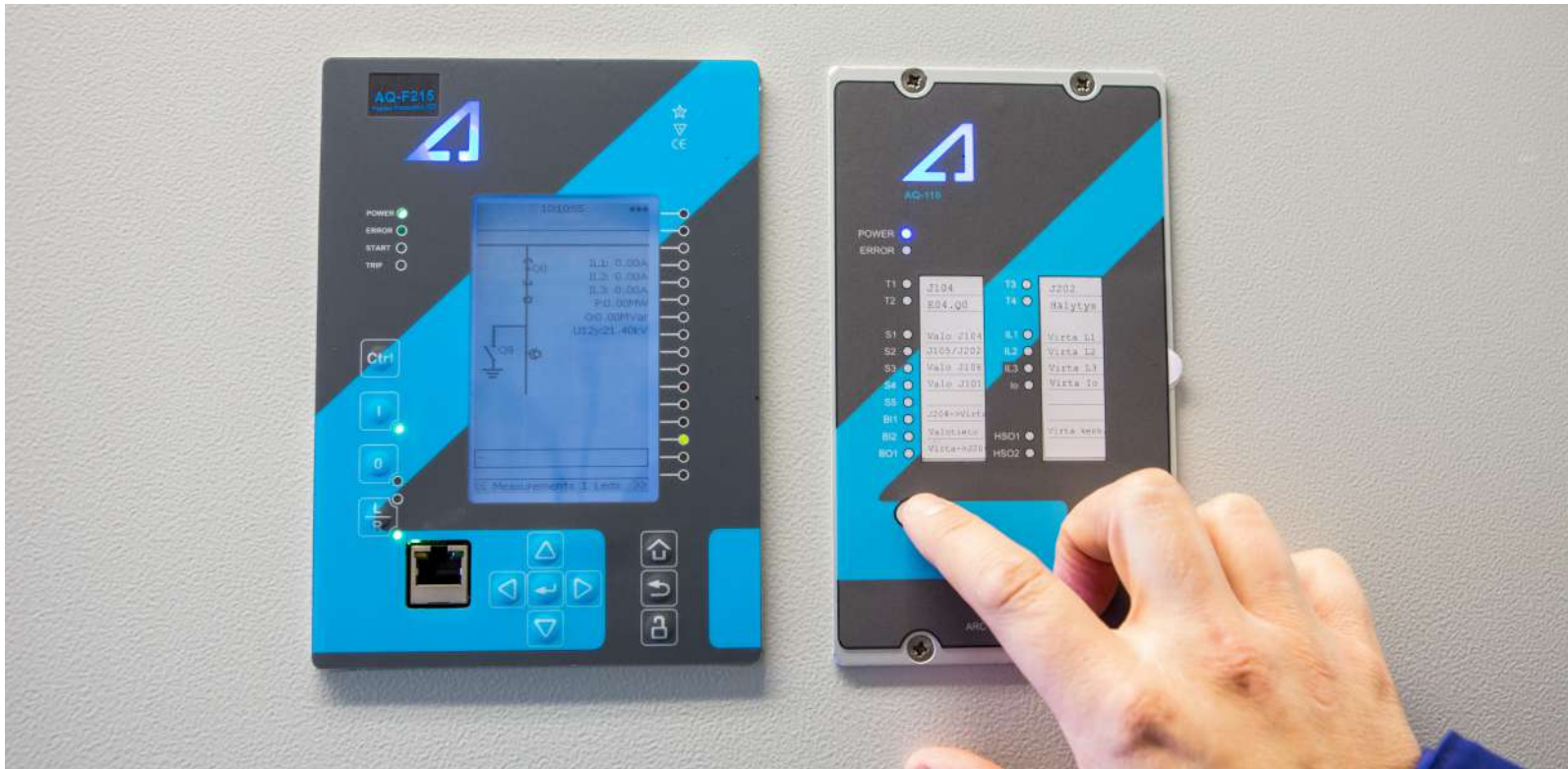


Ratchet wrench CT164

For installation of connectors and suspension fittings. The wrench body is made of steel and the grip of oil resistant rubber. The wrench is double-sided 13 and 17 mm.

Arc protection solutions

Designed using top-of-the-line technology



Arcteq is the pioneer in arc flash protection and known for making the best protection relays in the world.

Arcteq is a part of Ensto Group and designs, markets, sells and supports protection relays, arc flash protection systems and measuring and monitoring equipment for electrical utility, traditional and renewable power generation, industrial, offshore, marine, institutional and commercial users.

Our services can include everything from the selection of the suitable protection device to the setting and commissioning the system. We are using the latest software commercially available like PsCad, ETAP and MatLab additionally to the calculation programs build by us which are specifically tailored to Arcteq relays. For commissioning we are using Omicron with added capability for Line differential testing with GPS synchronized tests sets.



Distribution Utilities (DSO)

With the use of transformers distribution substations connect to the transmission system and lower the transmission voltage to medium voltage (2 kV – 35 kV).

Transmission Utilities (TSO)

Transmission line operations require reliable, accurate and fast operation of the protection IED.



Protection Relay

Arcteq's AQ-200 and AQ-300 series of protection IEDs are developed to cover any application in transmission or distribution network protection and control.



Arc Flash Protection

The AQ-100 product line is designed using top-of-the-line technology, with a focus on simplicity while maintaining both flexibility and function.

Fault detection solutions

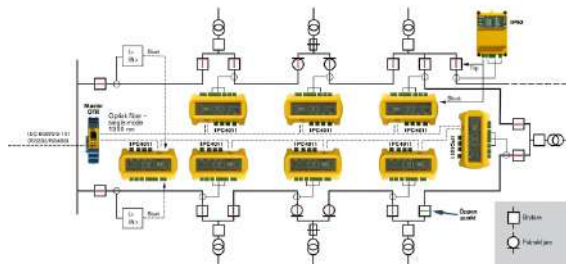
With relay performance



All detector products are based on Protrol's well proven and patented method for detection of earth faults.

Protrol's products are designed for performance monitoring, control and fault detection in secondary substations. The products are based on patented technology. Expert services are also available within several fields, with a special focus on protection and control for primary substations, high voltage direct current and connection of new power sources.

Our society's dependence on reliable power supply is steadily increasing, thereby also the demands on power distribution companies. Power outages are expensive - both directly and indirectly. The governing authorities underline their demands on distributors by measuring SAIFI or SAIDI. These demands will hardly decrease. Investment in fast fault detection and disconnection will therefore give return, regardless of how you calculate.



Distribution Grid Automation

Protrol offers many levels of automation, with and without communication to the control centre. From local indication to pass-through faults to fully automatic fault disconnection and power restoration.



Fault Detector/ RTU's

Protrol's products have been developed for cost-efficient and reliable fault detection and grid supervision.

SASensor

Totally integrated protection and control.



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