TAVRIDA ELECTRIC
Excellence in Engineering

REC SERIES AUTOMATIC CIRCUIT RECLOSERS

REC15_AL / REC25_AL

ISO 9001:2015 certification
ISO 14001:2015 certification

Presentation

Introduction

Today Electricity companies across the Globe require increasingly sophisticated equipment to meet the demands of the automation and control of their grids and to ensure a continuous and reliable supply to electricity consumers. Switching equipment installed remotely on outdoor overhead lines should have inbuilt communications capability for data retrieval and a long-lasting uninterruptible performance at low maintenance costs.

Tavrida Electric has accumulated 20 years of experience in solid-insulated recloser technology and is proud to present the Rec series automatic circuit reclosers.

- **Maintenance free**
  The lifetime maintenance free Outdoor Switching Module (OSM) provides 30 000 rated current and 200 full rated short circuit CO operations.
  Tavrida Electric Rec series reclosers are designed to keep utility expenses to a minimum over their entire lifespan. They are installed to significantly improve a network's reliability key performance indicators and their use results in a quick return on investment.
- **Lightweight**
  Tavrida Electric's light weight vacuum circuit breaker and robust aluminum tank result in a total weight of 68 kg for OSM15 rated 15.5 kV and 72 kg for OSM25 rated 27 kV, making it the most lightweight outdoor switching module on the market.
  As a result, shipment, handling, installation and commissioning are fast and simple.
- **Sophisticated measurements system**
  The OSM 15 and OSM25 are equipped with six combined current and voltage sensors built into the bushings. This makes the Rec series reclosers ideal devices for selfhealing loop automation solutions.
- **Advanced control and protection**
  Tavrida Electric reclosers provide protection from various faults, including: short circuits, earth faults, high impedance earth faults, broken wires, islanding, incorrect tap changer operations, network overload and over- or under-generation. Embedded Intelligent Electronic Device (IED), Remote Terminal Unit (RTU) and metering capability ensure that the Rec series reclosers are SCADA-ready with no additional expenses.
- **Advanced user software**
  TELARM® user software provides exceptional management tools for power quality, for protection and for fault simulation along with advanced local and remote communications ability.
  TELSCADA® is the new release of the Tavrida Electric SCADA system that allows real-time monitoring and control of primary and secondary equipment in power distribution systems.
- **Perfect solution for Smart Grids**
  Complex measurement system combined with IED and RTU makes the Rec series recloser the perfect solution for Smart Grids. Tavrida Electric reclosers allow utilities to implement Smart Grid philosophies and deploy advanced self-healing or fault detection, isolation and restoration (FDIR) systems.
- **Environmentally friendly**
  The Tavrida Electric OSM is an air insulated outdoor circuit breaker with a patented combined insulation that makes it the environmentally friendly - no oil or hazardous SF6 despite its compact size.
  An aluminum tank offers excellent protection against corrosion. UV resistant silicon rubber bushings are capable of withstanding temperatures ranging from -40 to +55°C and provide excellent hydrophobicity.
  Design reliability is proven by the most severe climate and heavy pollution tests at the Koeberg Insulator Pollution Test Station (KIPTS) in South Africa.

Typical applications

The fundamental designation of automatic circuit reclosers is to provide consecutive auto-reclosing cycles in order to clear transient faults and minimize network outage time. In addition to reliability improvement and reduction of SAIDI (System Average Interruption Duration Index), SAIFI (System Average Interruption Frequency Index) and MAIFI (Momentary Average Interruption Frequency Index), the Rec series reclosers can be used as a sectionalizer, automated load-break switch or outdoor protection device in substation and distributed energy applications. This flexibility in functionality makes the Rec series reclosers the perfect solution for various medium-voltage applications with rated voltages of up to 27 kV.

Versatile in applications

- **Feeder application: Radial line recloser**
  When a recloser is installed on a radial feeder it automatically clears transient faults and isolates permanent faults. More than one recloser can be installed on a feeder to isolate faults selectively and ensure fewer customers are affected.
- **Feeder application: Loop recloser**
  A loop recloser further improves the reliability of a power supply by automatically reconfiguring a network in the event of a failure.
- **Substation application**
  Tavrida Electric reclosers can be used to quickly build cost-effective unmanned outdoor substations. A recloser provides full protection and automation functionality required at the substations.
- **Distributed energy application**
  The Rec series automatic circuit reclosers offer the capability to easily connect various Distributed Energy Resources (DER) to the grid and enhance the reliability of the electricity supply. The reclosers have the ability to automatically disconnect the DER from the grid in case of power quality issues and to quickly connect it back when the power supply is stable.

Tavrida new approach to FDIR

Rezip - Advanced Fault Detection, Isolation and Restoration Algorithm

Electric utilities are faced with a constant dilemma: SAIDI and SAIFI improve with a number of reclosers, but the greater number of reclosers leads to protection coordination problems. Various vendors offer a range of solutions to tackle this issue, but quite often it leads to other disadvantages and customer frustration:

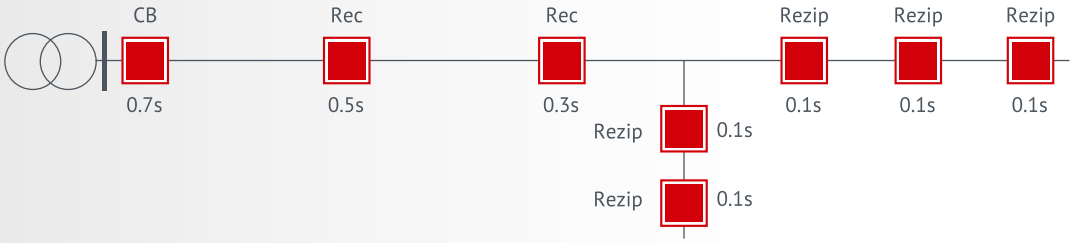
- Overcomplicated system settings and set-up
- Very expensive telecommunication equipment and system
- Lower overall reliability due to communications dependability
- Not scalable or additional services from the vendor required

The Rezip algorithm is Tavrida Electric's original solution for overhead distribution networks automation using Rec15/25 automatic circuit reclosers. It reduces the duration and scale of power outages, providing the distribution grid with self-healing capability in a simple straightforward way and without the need to invest in communication infrastructure.

Rezip application areas:

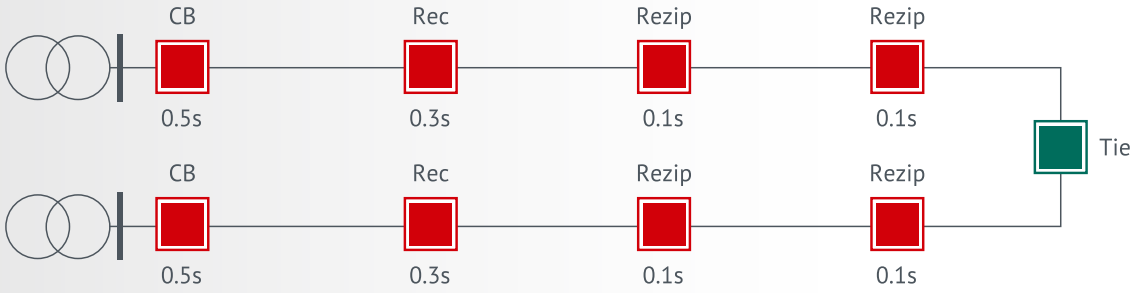
1. Very long feeders

Power supply of distant areas (>50 km) with high fault rates requires to increase the number of sections



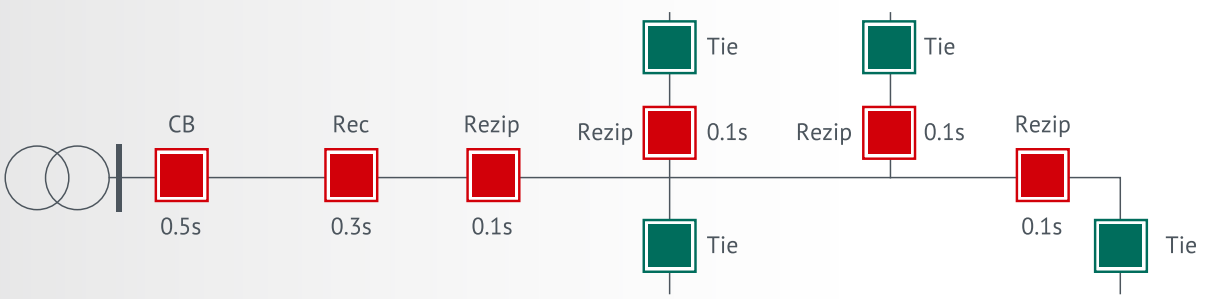
2. Loop schemes

Some feeders existing nearby can be connected into a ring to further increase reliability and Rezip is able to deal with protection coordination problems

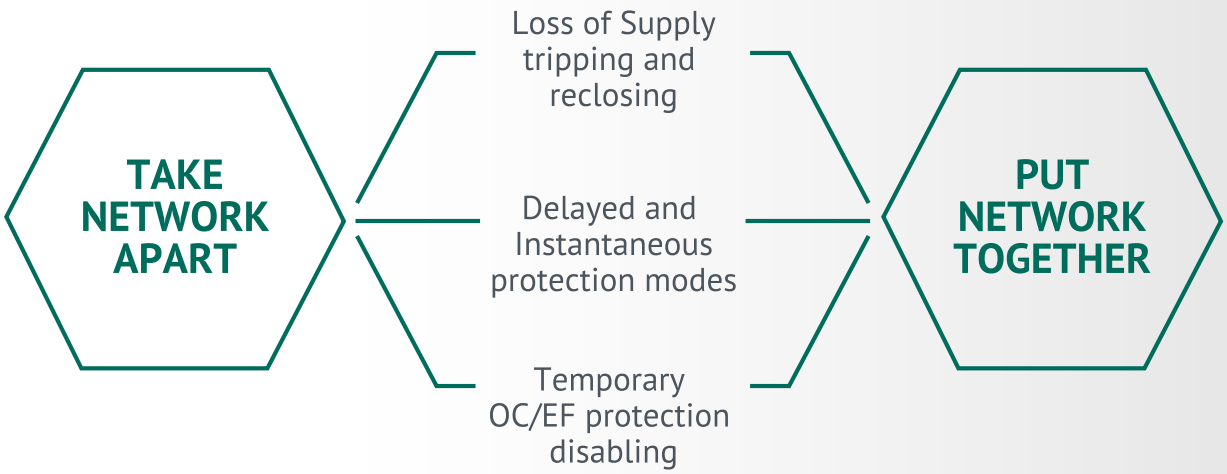


3. Meshed networks

Highly meshed grid topology forces the utilities to use manual control and suffer from permanent economical losses, while Rezip can resolve this in a cost-efficient way



Rezip Algorithm Philosophy



TAKES ONLY FEW SECONDS MAX!

1. The algorithm is initiated by an upstream recloser tripping
2. Once the loss of supply is detected, all Rezip reclosers will trip during upstream recloser dead-time
3. When the recloser closes, it restores supply to the closest Rezip recloser(s)
4. It activates the ARLS timer and after a pre-set time the Rezip reclosers will close restoring the power supply to downstream Rezip recloser(s)
5. Immediately after the closing Rezip recloser(s) are operating in instantaneous protection mode and if any of them detects the fault, it will trip before the upstream protection device will
6. By the time next Rezip recloser is closed by the ARLS, the upstream Rezip OC/EF protection is disabled

Key features:

- No time grading between Rezip reclosers is required
- Any number of Rezip reclosers can be connected in series
- Algorithm correct operation and reliability do not depend on communications
- Easily scalable approach for hassle-free grid modernization
- Cost-effective and future-proof solution
- Up to 80% SAIFI improvement

Rezip presentation at ENERGETAB 2018, Poland


Rezip deployment in Daqing network
Daqing Oilfield Company Limited, China

Outdoor Switching Module – OSM

Introduction

The Rec series automatic circuit reclosers make full use of the advantages of Outdoor Switching Modules enhanced with the application of combined voltage and current sensors providing accurate measurements of voltages and currents (3 phase + residual). Recloser Control Cubicles (RC) have a powerful microprocessor to support protection and communications functionality suitable for radial and ring feeders with various types of neutral earthing arrangements.

Design

OSM15 and OSM25 provide switching and reclosing on power networks. OSMs utilize indoor switching modules (ISM) contained within a sealed tank. ISM incorporates vacuum interrupters (VI) inside a polycarbonate housing. Each VI is embedded in a polymer bushing. This bushing also encases current and voltage sensors to form single and completely solid insulation of each OSM pole. Voltage and current are measured on all six bushings. The bushing insulation is of a multilayer patented design. Polycarbonate provides mechanical support and excellent dielectric strength, while silicon rubber gives UV protection and an extended creepage distance. Being of the same kind, polycarbonate and silicon rubber, when applied together, create solid-state and jointless insulation without air-bubble voids having the life expectancy of 30 years. This multilayer patented insulation with the unrivalled dialectic strength of 31 kV/mm withstands the lighting impulse voltage as high as 150 kV, which is the highest in its class on the market. The field-proven design is applicable for the use in aggressive environment such as sand storms, salt fog, steady downpour or snowfall and intense solar radiation. The tank is made of corrosion proof, powder coated aluminum and provides IP65 protection. This ensures maximum life and reliability with a fully insulated arrangement inside the durable aluminum alloy housing. The ceramic breather is located at the base of the tank to prevent a build-up of condensation. Voltage and current are measured on all six bushings.

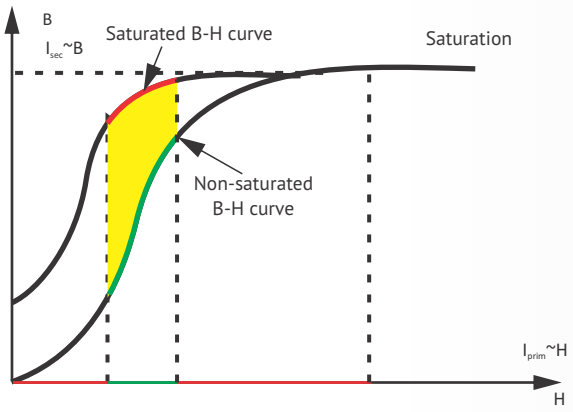
1) Main circuit bushings made from UV-stable polymer and covered with silicone rubber.
2) Rogowski coils for current sensing and voltage sensors for voltage measurement embedded in all six bushings.
3) World's smallest vacuum interrupters with extremely long mechanical and electrical lifespans.
4) Three single-coil actuators linked by a synchronizing shaft.
5) Mechanical trip hook for manual opening of the OSM.

Operation

The OSM mechanism is operated by three separate magnetic actuators, one per pole. These magnetic actuators are mechanically interlocked to guarantee correct a three phase operation. The device is latched into the closed position by magnetic latching. Each magnetic actuator utilizes a single coil which is used for both opening and reclosing operations and is the result of the “fourth generation” development of magnetic actuators by Tavrida Electric.

Current and Voltage Sensing

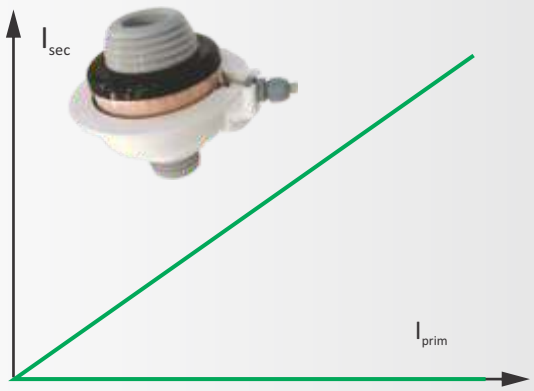
Voltage sensing is carried out by conductive rubber screens that are capacitively coupled to the HV terminals. Current sensing is performed by six Rogowski sensors, one sensor per each HV terminal. Rogowski sensors are current sensors that produce a safe, low voltage output. Three star connected sensor secondaries monitor phase currents and another three delta-connected sensor's secondaries provide residual current measurement. Rogowski sensors are fundamentally air-cored CTs making them unsusceptible to current saturation when exposed to fault currents. Furthermore, Rogowski sensors, unlike conventional current transformers, do not generate potentially hazardous voltages when the secondary is an open circuit, as the absence of an iron core eliminates circuit loading and saturation concerns. As the iron core of the current transformer becomes more saturated, the CT's accuracy declines significantly, which limits the accuracy of its readings. CT's reasonable accuracy is only maintained for currents in the range between 20-120% of rated primary current. This means that conventional transformers are not efficient for identifying low currents where Rogowski sensors provide accurate primary current readings across all ranges and outperform current transformers. Excellent linearity of Rogowski sensors eliminates problems with selection of the CT rating which may need to be specified individually for a certain project.



Current Transformer with Iron Core

Legend:

- High accuracy measurements
- Low accuracy measurements
- Measurement error caused by the core saturation



Rogowski Sensor (Air-Cored Current Transformer)

Benefits of using Rogowski Current Sensors:

- **Wide dynamic range of measurement, giving current readings from milliamps to kA**
- **Excellent linearity (Rogowski coils have no magnetic materials to saturate)**
- **No damage from large overloads & no danger from open circuited secondary windings**
- **Non-intrusive current sensing drawing no power from the main circuit**

OSM technical specification

Parameter	Rated data	
	OSM15	OSM25
Current Sensing	6 x Rogowski Current Sensors	6 x Rogowski Current Sensors
Voltage Sensing	6 x Capacitive Voltage Sensors	6 x Capacitive Voltage Sensors
Rated maximum voltage	15,5 kV	27 kV
Rated continuous current	630 A	630 A
Peak withstand current, kA	40 kA	31,5 kA
Fault break capacity	16 kA	12,5 kA
Full Load Operations	30000	30000
Fault break capacity operations	200	200
Short time current withstand, 4 seconds	16 kA	12,5 kA
Cable charging current	10 A	25 A
Line charging current	5 A	5 A
Lightning impulse withstand test voltage	110 kV	125 kV/150 kV[1]
Power-frequency withstand test voltage (1 min. dry)	50 kV	60 kV
Power-frequency withstand test voltage (10 s. wet)	45 kV	50 kV
Ambient temperature	-40°C to +55°C	-40°C to +55°C
Degree of protection	IP65	IP65
Humidity	0 - 100%	0 - 100%
Altitude[2]	3000 m	3000 m
Weight of the tank	68 kg	72 kg
Dimensions, LxWxH	744x644x649 mm	744x720x730 mm

1. *Provided on request.*
2. *Altitudes above 1000 m should be de-rated in accordance with IEC 62271-111*

Recloser Control cubicle – RC

Introduction

Recloser control cubicles (RC) are microprocessor based controllers that provide advanced protection and automation, instantaneous metering, data logging and RTU for remote control in one single package

RC5_3 control cubicle

The recloser control cubicle RC5_3 is a new generation control box that is the result of more than 20 years of recloser production and service experience.

1) Control Panel Module (CPM)
2) AC socket outlet
3) Door position switch
4) Door holder
5) RTU mounting plate
6) Optional Input/Output module (IOM)
7) Recloser Control Module (RCM)
8) Battery circuit breaker
9) Optional anti-condensation kit
10) Battery
11) Power supply filter module (PSFM)
12) MCB board

The enclosure is made from lightweight powder-coated anodized aluminum and provides an IP65 degree of protection. The control panel has a graphical LCD for clear event indication, comprising six-lines of 40-characters. Heavy duty battery for back-up power supply and smart charger are designed to provide optimum charging and long life of the battery up to 10 years.

Parameter	Rated data
Supply voltage, AC	85 – 265 V
Operating duty cycle	O-0,1-CO-1-CO-1-CO
Degree of protection	IP65
Ambient temperature	- 40°C...+55°C
Weight	41 kg
Dimensions, WxDxH	620x409x835 mm
Operating time after the loss of AC supply	48 hours at 25 °C
Remote control	In-built RTU, I/O module
Door limit switch	Yes
230 VAC socket for laptop	Yes

Protection and automation

Various protection elements: Directional overcurrent, directional sensitive earth fault, earth fault, over- and undervoltage, over- and underfrequency, current and voltage unbalances; separate autoreclosing elements, automatic backfeed restoration, voltage reclose control and many more. Impedance based fault locator (ANSI 21FL) provides fault distance calculation based on measured voltage and current phasors.

Function	ANSI	IEC
Overcurrent	50/51	I>, I>>, I>>>
Earth Fault	50N/51N	I0>>, I0>>>, I0>>>>
Sensitive Earth Fault	50/51/67SEF	I0>/SEF
Admittance / Conductance / Susceptance	21YN	Y0>
Auto-Reclose (4 shots)	79	AR
Undervoltage	27	U<
Overvoltage	59	U>
Neutral Voltage Sequence	59N	U0>
Voltage Unbalance (broken wire)	47	U2/U1
Current Unbalance	46	I2/I1
Underfrequency	81U	f<
Overfrequency	81O	f>
Automatic Backfeed Restoration	-	ABR
Synchro-check	25	SYNC
Loss of supply	-	LS
Hot Line (Live Line)	-	-
Cold Load Pickup Restraint	-	-
Inrush filter	68	-
Switch on to fault	50 SOTF	-
Lockout	86	-
User Defined Logic	PSL	-
Fault Locator	21FL	FLOC
Rezip	-	-
Controller self-supervision	-	-

Measurements

The recloser can measure phase, neutral and sequence currents, phase-to-phase and sequence voltages and three-phase active and reactive power and energy.

6x Rogowski coils, and 6x Capacitive voltage sensors provide:

- Ia, Ib, Ic, I1, I2, I0
- Ua, Ub, Uc, Uab, Ubc, Uca, U1, U2, U0
- Active and reactive power and energy per phase
- Power factor, frequency

Data logging and monitoring

Highly comprehensive, remotely accessible separate log files for load and fault profiles, events, malfunctions, lifetime and change messages.

- Event log; 1000 events , up to 32 oscillography records
- Malfunction log; 1000 events
- Load profile; 9000 readings
- Fault profile; 10 000 readings
- Change messages; 100 records
- Comms log
- Protection counters
- Lifetime counters
- Log filling counters
- SCADA counters

Communications

The control cubicle has various local communication interfaces and can be connected with any third party modem via RS-232/RS-485 or the Ethernet using Modbus, DNP3, IEC 60870-5-104 or TELARM® Protocol.

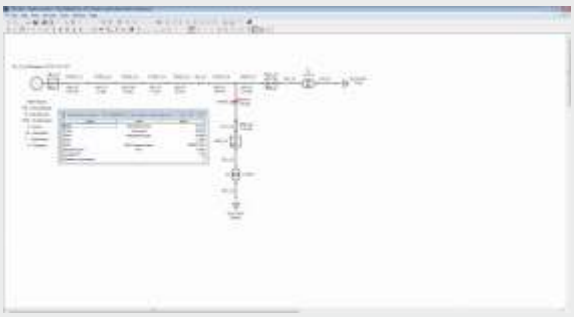
Interfaces		Protocols	
• RS-232 / RS-485 • USB • Ethernet	• Bluetooth • Wi-Fi • GPRS / 3G / 4G	• IEC 60870-5-104 • DNP3 RTU / TCP IP	• Modbus RTU • TELARM® Protocol (TDI)

TELARM® software

The Tavrida Electric Automated Relay Manager (TELARM®) is designed for the specific needs of electrical distribution networks. TELARM® user software provides a user friendly communication interface between RC and PC directly or via remote communications schemes and consists of two main applications:

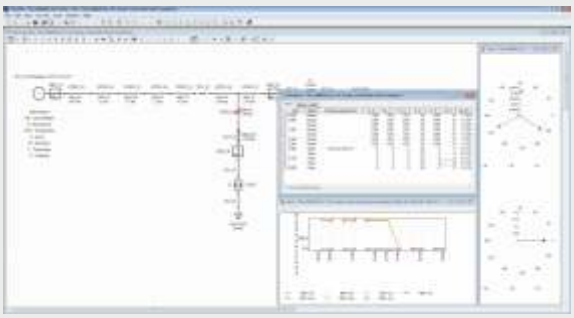
TELARM® Basic gives control and indication functions via a personal computer interface (PCI):

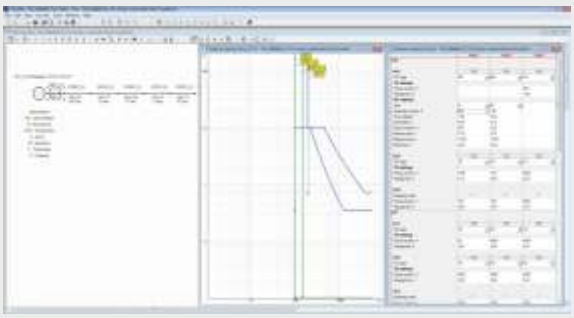
- Downloading of logs, profiles, oscillograms and settings
- Uploading protection, communication and systems settings
- Recording of logs and detailed fault profiles
- Local and remote control functions
- Remote access to logs
- Remote control of protection settings

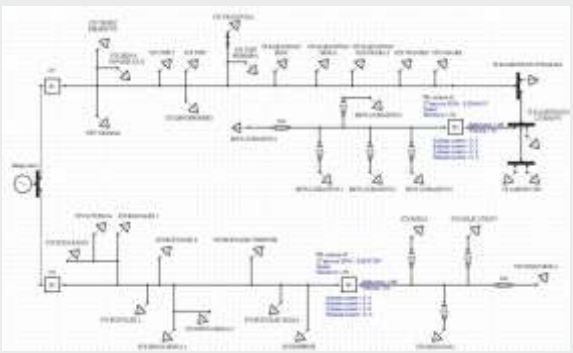


TELARM® Master provides the ultimate engineering tools:

- Off-line system designed with *Network editor* allowing users to make the electrical scheme of a network. Network elements such as lines, sources, reclosers, transformers, fuses, loads etc. with their parameters can be mapped in the scheme. Once the network data have been entered it is possible to find the ideal location of the recloser based on reliability indices (SAIDI, SAIFI, etc.).
- Software *Simulation* of normal or fault regimes on grids. While running simulation the dynamic behavior of all devices (fuses and reclosers) for the particular fault is calculated. Setting different fault types at different locations one can test the correctness of operation.
- Automatic or semi-automatic configuration of protection settings with the aid of Auto-coordination or Auto-correction algorithms. The auto-coordination algorithm takes into account all of the important factors generally considered by protection engineers. At the same time, it significantly reduces the requirements of the qualification of the engineer who is involved in setting calculations. It also allows for the substantial reduction of the number of man-hours required for programming the microprocessor relays.







TELSCADA® software

The TELSCADA® system is designed for real-time monitoring and control of primary and secondary equipment in power distribution systems. It provides all the functionality that is expected from a SCADA system, allowing the operator to safely and effectively interact with protection and control IEDs (Intelligent Electronic Device) achieving the maximized efficiency and reliability of the grid.

TELSCADA® is optimized for managing Tavrida equipment in power distribution systems. However, it is compatible with any IED supporting standard industrial interfaces which enables an electric utility to integrate all its equipment into the same system.

TELSCADA® supports an extensive range of standard communication protocols and open interfaces, such as IEC 60870-5-101/103/104, Modbus RTU/TCP and DNP3.0 RTU/TCP. It also supports OPC DA 2 and OPC UA server and client interfaces which enables easy integration with application specific systems and devices.

- TELSCADA provides constant grid supervision to detect any failures, which reduces the need for scheduled and emergency maintenance.

Reducing maintenance costs

- The advanced distribution automation and management functions reduce outage time from hours to minutes without the involvement of field personnel.

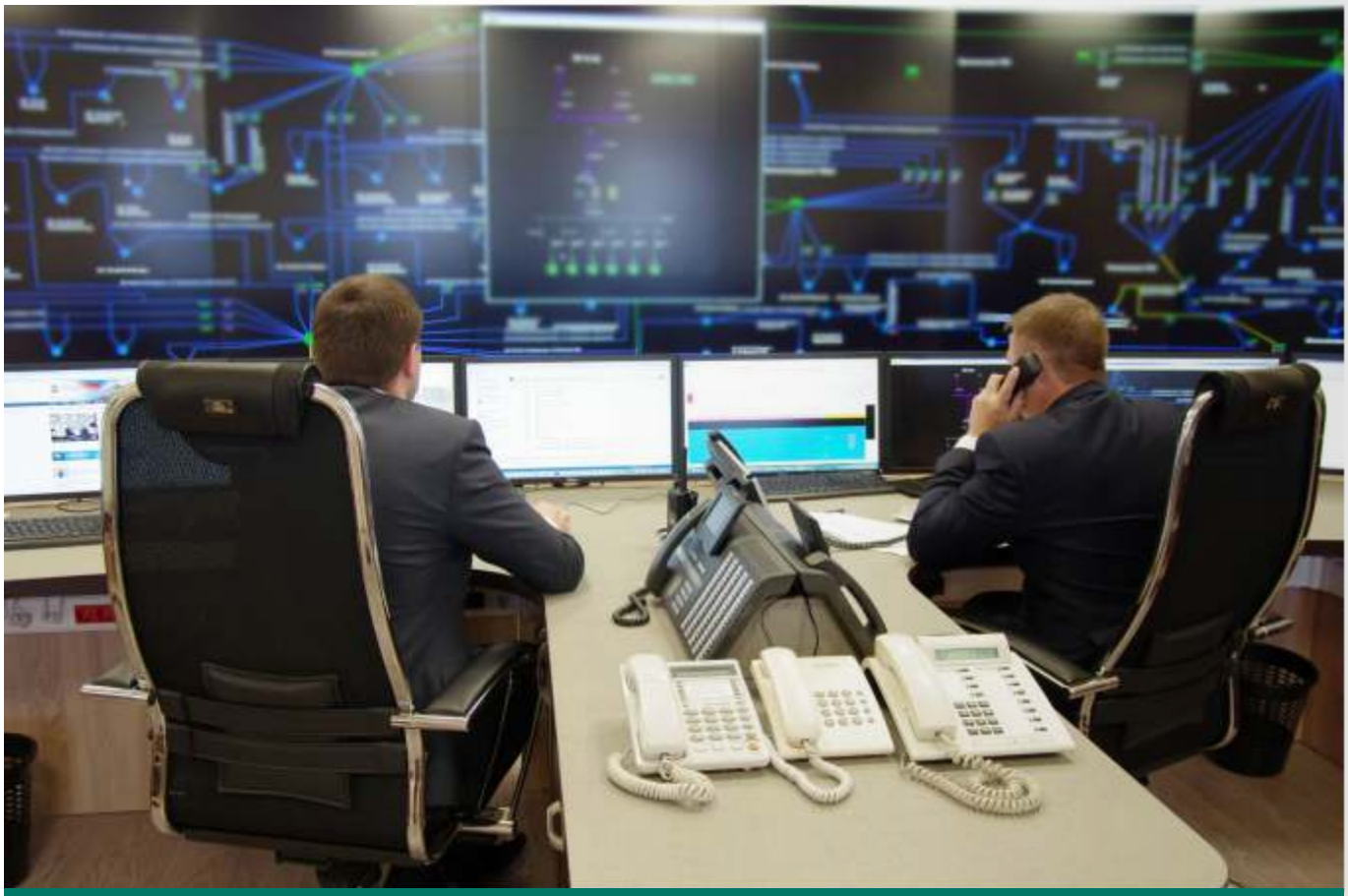
Minimizing outage time

- Redundant architecture enhances availability and increases the reliability of the system. User-friendly and functional interface guarantees safe and error-free operation.

Maximum reliability and ease of use

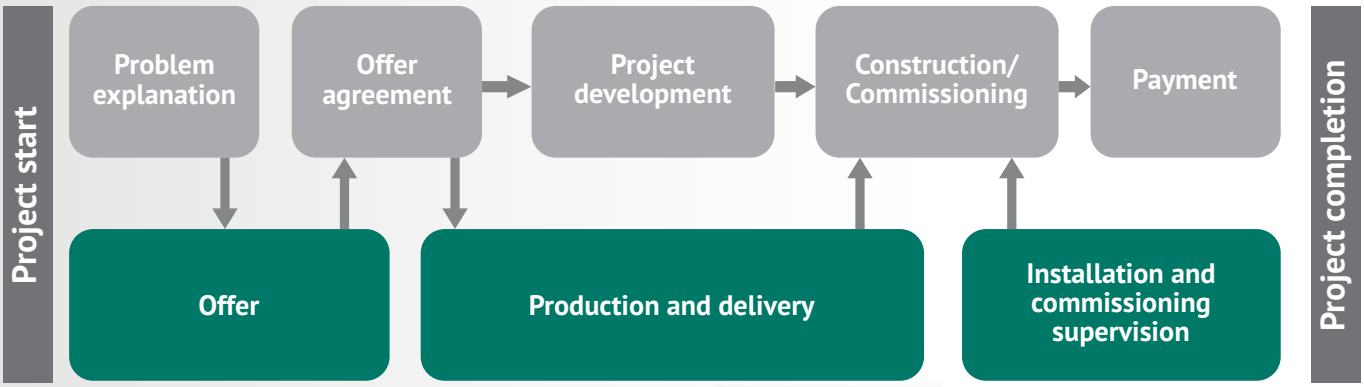
- Developed to meet industrial standards for data communications such as such IEC 60870-5-101/103/104 and cyber security standards such as IEC 62351.

Standards compliance



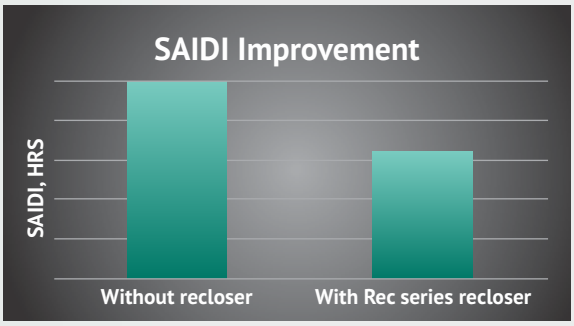
Turnkey approach for distribution automation

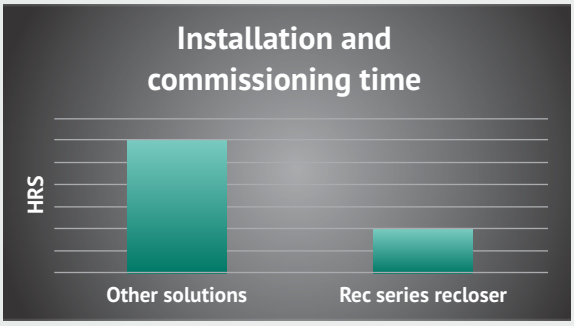
The utilities industry is becoming more and more complex, as Distribution Network Operators (DNOs) adapt to new regulations, integrate distributed generation sources, connect sophisticated intelligent devices and try to meet rising customer demands for smarter grids. The variety of available solutions makes the selection of appropriate equipment for the operators very difficult. Certainly, in the implementation of smart grids, utilities face one serious challenge - inefficient project management. Tavrida Electric provides true simplification for the DNO's. To be the market leader Tavrida Electric provides not only products but also turnkey solutions. Tavrida Electric proposes an ultimate project approach for automation distribution. To ensure that the recloser operates efficiently in the distribution network, Tavrida Electric experts analyze the system, identify the most feasible locations for installation and forecast the expected network performance improvement. To further simplify network automation, Tavrida Electric protection engineers calculate, upload and test protection settings prior to site delivery. As a result, the customer receives a complete Plug & Play solution, minimizing required engineers' man hours and total capital investment.

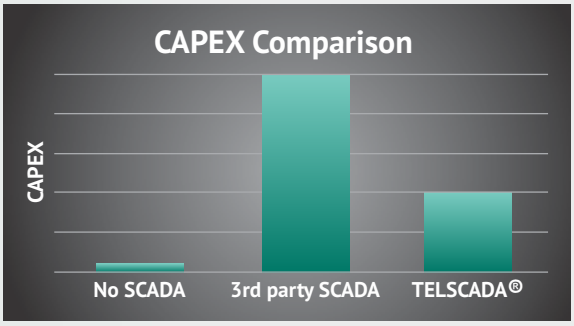


Tavrida Electric project approach provides the following benefits:

- A full scope of services from careful analysis to solution development, project implementation and customer support throughout the equipment lifetime ensures investment efficiency. Tavrida Electric specialists analyze the customer's problem to identify the root cause and engineer the optimal solution to decrease the number of interruptions and power outage time.
- Configured settings and project supervision guarantee high performance and cost-effectiveness by reducing engineers' and maintenance personnel man hours. Saved time allows utilities to focus on greater significance tasks and completing more projects.
- TELARM® and TELSCADA® ensure easy remote control and provides hierarchical information of the power grid. The essential part of Smart Grid solutions is an efficient supervisory control and data acquisition system. This is crucial for operational expenditure and network performance optimization.







Standard compliance

The Rec series automatic circuit reclosers are designed and manufactured to strictly comply with the latest revisions of IEEE C37.60 and IEC 62271-111.

Tavrida Electric autoreclosers' compliance to international standards have been confirmed by the world's largest certified centers, such as KEMA and CESI.

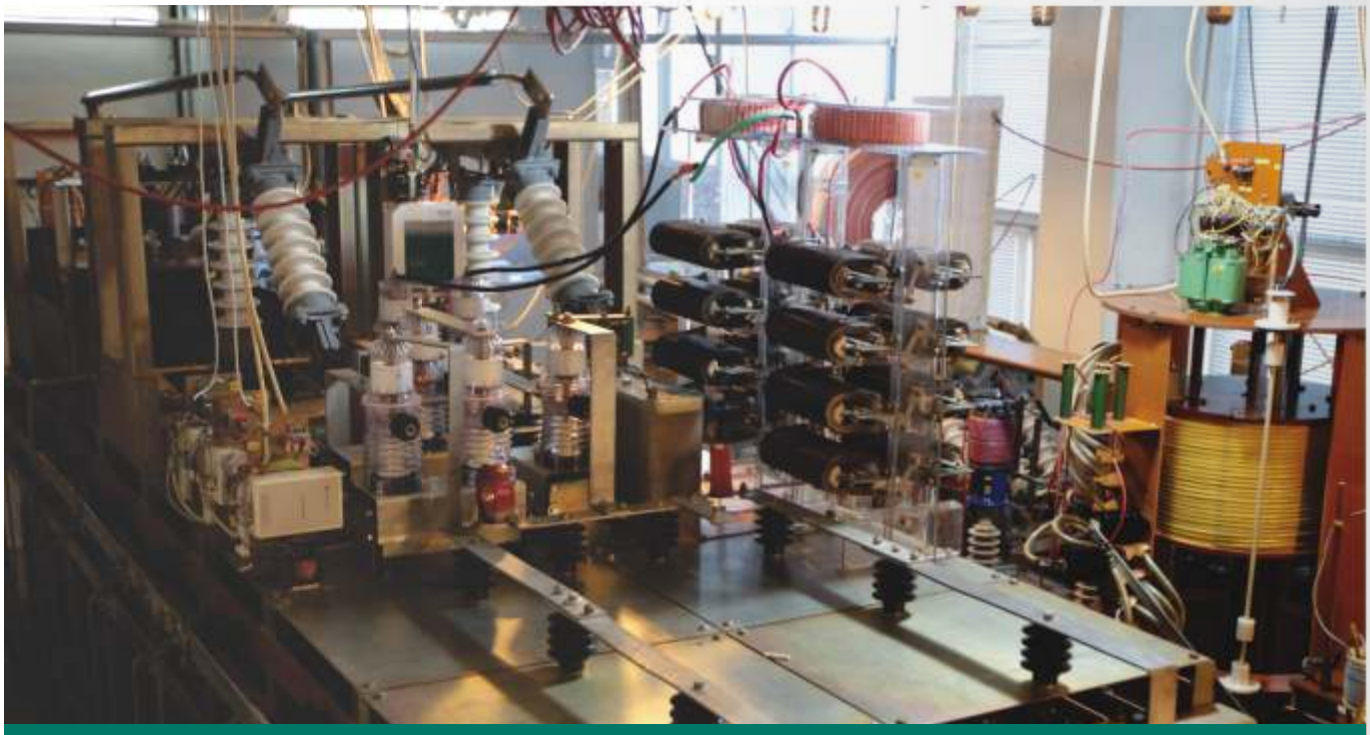
Each assembled Rec series recloser is subjected to routine testing in accordance with IEEE C37.60/IEC 62271-111 at the factory.

TYPE TESTS

- Dielectric tests
- Measurement of the resistance of the main circuit
- Temperature-rise tests
- Short time withstand current and peak withstand current tests
- Verification of the protection
- X-radiation test procedure for vacuum interrupters
- Line charging current and cable charging current interruption tests
- Making current capability
- Rated symmetrical interrupting current tests
- Minimum tripping current tests
- Partial discharge (corona) tests
- Time-current tests
- Mechanical duty test
- Control electronic elements surge withstand capability (SWC) tests

ROUTINE TESTS

- Dielectric test on the main circuit
- Tests on auxiliary and control circuits
- Measurement of the resistance of the main circuit
- Reclosing and overcurrent trip calibration
- Partial discharge test
- Mechanical operations tests



Reference list

>15 years on the market

~30% global market share

>55K installations worldwide

Mexico
Federal Electricity Commission (CFE)

Oman
Mazoon Electricity Company (MZEC)

Poland
TAURON Polish Energy

Egypt
South Delta Electricity Distribution Company

Russia
Rosseti

Portugal
Energias de Portugal (EDP)

Reference letters


Eskom

Date
12 April 2016

Enquiries Louie Blom
Tel +27 21 966 3577

To whom it may concern

RE: CERTIFICATE OF REFERENCE

We hereby certify that Tavrida Electric Africa (Pty) Ltd, located in Bokstvog, South Africa has provided Auto Reclosers to ESKOM HOLDINGS SOC LIMITED for national Eskom Contract No.: 4600040632, for manufacture, test at works and supply of estimated quantities (ZAR288 million excluding Value Added Tax, ROE adjustments and Transport costs) of pole mounted Auto Reclosers for the six year period starting 01 July 2011 and ending 31 June 2017.
The below quantities shows the total units of Auto Reclosers already supplied towards the Eskom National Contract by Tavrida Electric Africa (Pty) Ltd:
Contract No.: 4600040632 2009 units
For any other additional information, please do not hesitate to contact the undersigned.

Yours sincerely

Louie Blom
Senior Procurement Advisor


KLÉBERT RENÉE MACHADO GONCALVES

Translation No. 1480 Book 13/2012 Page No. 131

I, Klébert Renée Machado Gonçalves, Certified Public Translator, duly sworn and registered with the Board of Trade of the Federal District of the Federative Republic of Brazil, Registration No. 04, certify and acknowledge to have received a document in Portuguese for translation into English, which I did faithfully, to the best of my ability, as follows:

CERTIFICATE OF TECHNICAL COMPETENCE


energisa

ATESTADO DE FORNECIMENTO DE MATERIAIS

Vagner Martins Costa
Coord. Corp. Qual., Proc. Supr.


TAURON
DYSTRYBUCJA

TAVRIDA Electric Polska sp. z o.o.
Ul. Granicana 44
43-100 Tychy

LIST REFERENCYJNY

TAURON Dystrybucja S.A. z siedzibą w Krakowie przy ul. Jasnogórskiej 11 otrzymuje zadowalające, bezproblemowe wyłączniki zabezpieczenia KTRZF z zespołami sterowniczymi RC_5 sukcesywnie Tavrida Electric: Rec25_A11_51 wyprodukowane przez Tavrida Electric na instalowanie w sieci dystrybucyjnej w Polsce od 2006 roku.

Od 2010r. do 2015r. Tavrida Electric Polska sp. z o.o. dostarczyła do naszej Grupy Energetycznej 868 szt. reklozerów. Zamontowane reklozery działają prawidłowo.

Wszystkie dostarczone reklozery były wyposażone w układy łączności zdalnej w celu OSM/GPRS różnych producentów, takich jak: Apator – Elkomtech S.A., Mikronika, Spectrum Automation. Reklozery prawidłowo współpracują z systemami SCADA (Supervisory Control ... przez TAURON Dystrybucja S.A.


Date : 11.4.2016
Our Reference : ADM-04/264
TO : Tavrida Electric North and East Africa S.A.E
Mustafa Mansour - Managing Director
Subject : Your request for reference letter MMH/511 for 22 KV switchgear

Dear Mr.Mansour ,

Director of Purchase and supply chain

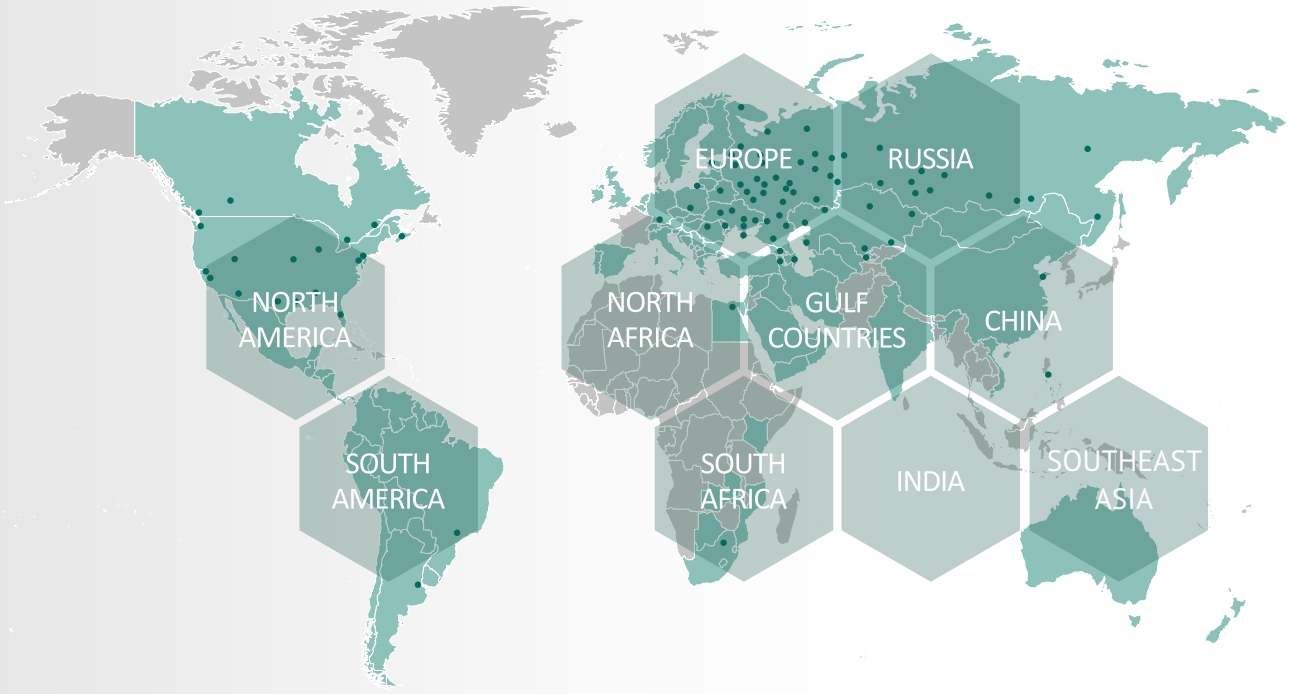
Eng.Adel Madkour


ЕПС ДИСТРИБУЦИЈА

END-USER CERTIFICATION

To: Whom it May Concern

On behalf of „EPS Distribution"



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