TAVRIDA ELECTRIC

Excellence in Engineering

PRODUCT CATALOGUE

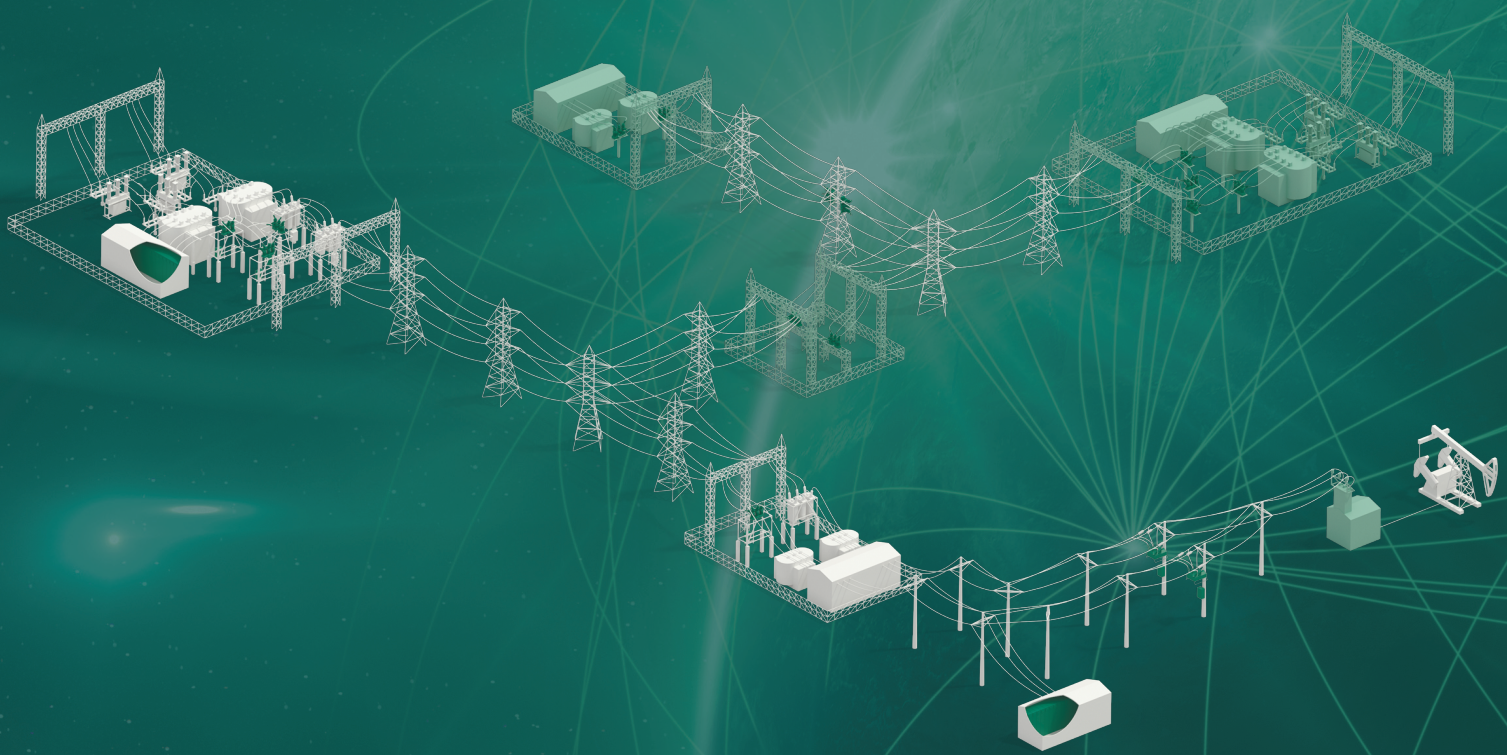
TAVRIDA ELECTRIC

Excellence in Engineering

TAVRIDA ELECTRIC IS A GROUP OF COMPANIES THAT SPECIALIZES IN THE DEVELOPMENT AND MANUFACTURE OF INNOVATIVE SWITCHGEAR PRODUCTS FOR INDOOR AND OUTDOOR APPLICATIONS IN MEDIUM VOLTAGE (MV) SMART GRIDS. TAVRIDA ELECTRIC CONDUCTS EXTENSIVE RESEARCH AIMED AT DEVELOPING NEW SWITCHING AND CONTROL TECHNOLOGIES, WITH A PRIMARY FOCUS ON RESOLVING CUSTOMER PROBLEMS NOT MET BY CURRENT PRODUCTS ON THE MARKET.

ADVANTAGES

- MAINTENANCE FREE
- MOST COMPACT DIMENSIONS AND WEIGHT
- HIGH OPERATIONAL SPEED
- EASE OF USE AND OPERATOR'S SAFETY
- ENVIRONMENTAL SAFETY



PRODUCT CATALOGUE

VACUUM CIRCUIT BREAKERS

High performance vacuum circuit breakers for compact switchgear designs, existing plant refurbishment/retrofit programs and special applications.

AUTOMATIC CIRCUIT RECLOSERS

Automatic circuit recloser for substation automation, distributed generation and important load connections. Suitable for ring, radial and meshed overhead lines. A core element of contemporary smart grid networks.

OUR WORLDWIDE PROJECTS

Tavrida Electric solutions ensure reliable power system operation in more than 80 countries.

UNITED KINGDOM
Transformer mounted switch for Arc Suppression Coil (Petersen coil) bypass.

USA
Massachusetts Solar fields grid connection points.

USA
Texas Oil fields power distribution network automation.

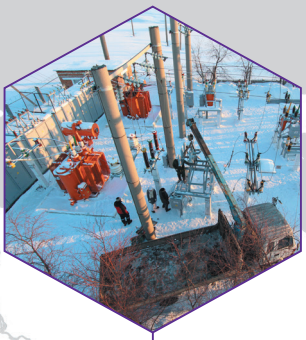
ITALY
Circuit breakers for largest European utility — ENEL.

MEXICO
Mexico city distribution network automation.

- Distribution
- Industry
- Generation
- Commercial buildings and enterprises
- Oil and Gas
- Mining
- Distributed generation

- Vacuum circuit breakers
- Automatic circuit reclosers

BRAZIL
FIFA 2014 stadium power supply — Arena Corinthians in Sao Paulo.



RUSSIA
Power supply quality improvement projects.

CHINA
Oil fields power distribution network automation.

EGYPT
Great Pyramids lighting power supply.

INDIA
Power supply quality improvement projects.

SOUTH AFRICA
Motor feeders at deepest in the world mines Tau-Tona and Mponeng.

Vacuum Circuit Breakers VCB15/25

SIMPLICITY IS PERFECTION

Gears, springs, bearings, levers and other rotating parts are the most often causes of conventional circuit breaker failure. Luckily Tavrida Electric breakers are better than conventional. Tavrida Electric has simplified its breaker design — completely removing all components prone to failure. As the result VCB has 20 times the reliability of conventional circuit breakers and furthermore doesn"t require any maintenance in service.

- ANY SPATIAL ORIENTATION
- LIGHTEST IN THE WORLD
- MOST COMPACT DIMENSIONS
- MAINTENANCE FREE
- CONTINUOUS SELF-SUPERVISION
- SINGLE PHASE OPTION
- 30,000 CLOSE OPEN OPERATIONS

YOUR SWITCHGEAR, DEFINED AND DESIGNED IN ACCORDANCE WITH YOUR VISION

You know your switchgear best; you know how to optimize its design and how it should operate. That's why the Tavrida Electric VCB series circuit breaker is so revolutionary — because it puts the design control in your hands. With the smallest dimensions on the market and ANY circuit breaker orientation, you are free to optimize your switchgear design, define how to make primary and secondary connections, and lay your secondary circuits. That means you can guarantee the optimal use of space and convenient access to the control elements without having the need to compromise on something. Want even higher flexibility? Weighing just 33 kg, the Tavrida Electric's circuit breaker is the smallest and lightest circuit breaker in the world. Impress your customers with unique switchgear designs no-one else can copy.

Application

OEM Solutions & VCBs for Retrofit

Tavrida Electric cooperates with more than 400 switchgear manufacturers and retrofit solutions providers. Over many years of cooperation, Tavrida Electric VCBs have proved versatile and easy-to-use for both new and existing switchgear panel designs, as well as for retrofit solutions. They are the smallest and lightest solution on the market, work regardless of orientation and are easy to install.

Special Application Circuit Breakers

FAST TRANSFER SWITCHES
With transfer times as fast as 2 cycles. Such quick operational times allow very sensitive loads to operate without interruption in the case of a main power source loss. The fast transfer switch solution:
- Eliminates costly downtime,
- Reduces production equipment stress,
- Ensures quick return on investment.

ARC FLASH MITIGATION
With interruption in one period. That quick interruption time:
- Increases operational safety,
- Reduces switchgear restoration time and loss of productivity,
- Reduces costly downtime,
- Limits switchgear damage and repair costs.

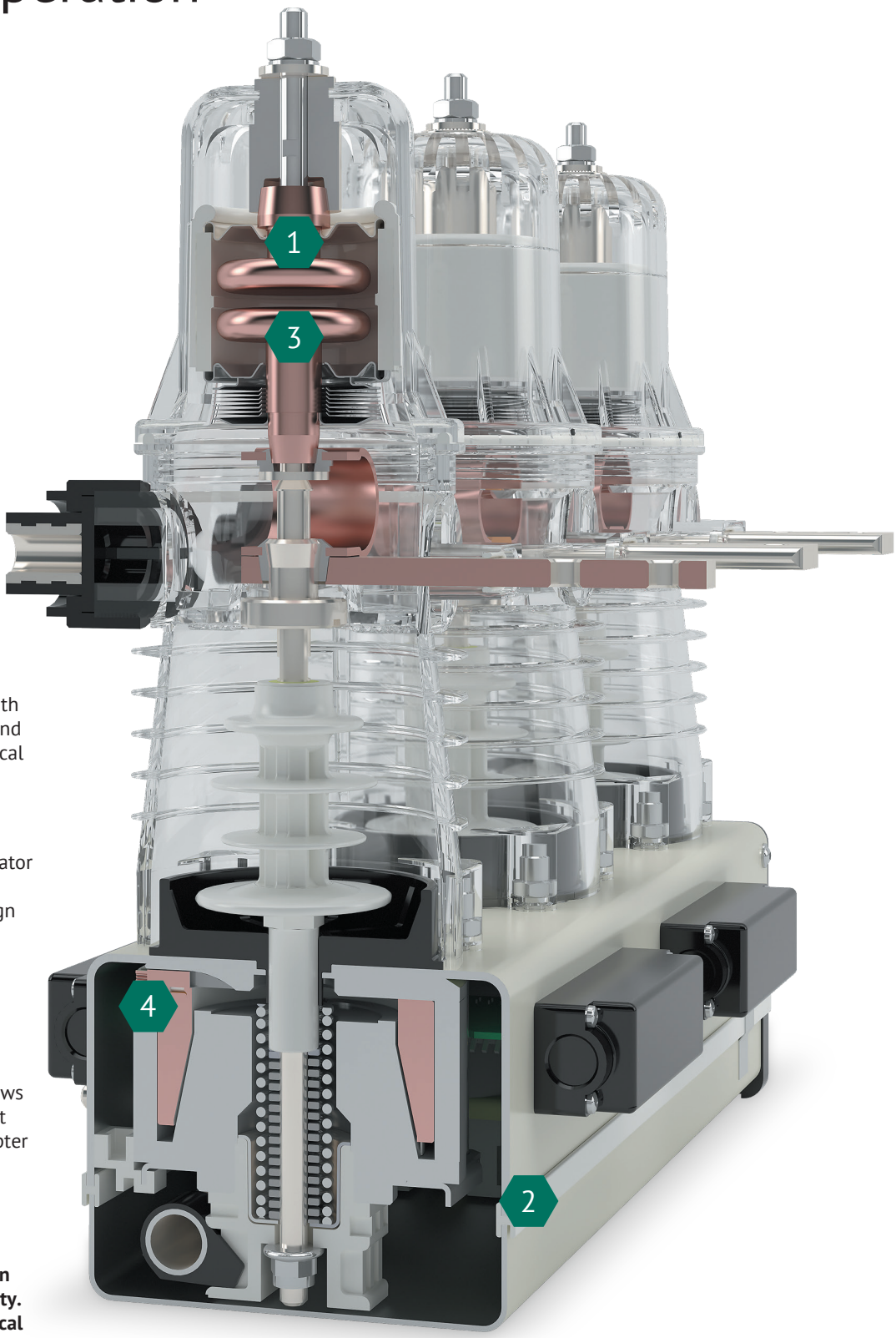
FAULT CURRENT LIMITER
Sub period interruption time limits short circuit current effectively by quickly disconnecting distributed generation sources from the grid.

- Allows more distributed generation, to be connected to the grid,
- Limits fault current,
- No operational losses,
- Enables automatic distributed, generation sources reconnection.

Single Phase Circuit Breakers

Tavrida Electric's circuit breakers are the perfect match for applications like transformers or generators with a neutral earthing, server rooms and point on wave switching. The circuit breakers weigh less than 14 kg, meaning they can be installed quickly and cost effectively even in the smallest designs.

Design and Operation



1. Tavrida Electric manufactures compact vacuum interrupters with high interrupting performance and an extraordinarily long mechanical and electrical lifespan.

2. The patented design of the actuator allows it to be installed directly underneath each pole. The design is optimal in terms of **reliability, dimensions, weight and ease of installation.**

3. The use of robot welded steel discs as opposed to folded bellows eliminates the main failure point of conventional vacuum interrupter designs and maintains **a high vacuum for its entire lifetime.**

4. The actuator **is not dependent on the auxiliary power supply quality.** The mechanism enables both **local and remote operation.**

Control Module CM_16

The Control Module is an intelligent circuit breaker driver that provides energy for circuit breaker operation. It controls and optimises main contacts movement in the manner that prolongs circuit breaker life and continuously monitors circuit breaker trip and close circuits.

CONTINUOUS SELF-SUPERVISION

Vacuum circuit breakers equipped with the CM16 control module continuously monitor and control switching modules, functional wiring and auxiliary power supply quality. The CM16 eliminates the necessity of additional trip and close coils, charging mechanisms and all related wiring supervision. The whole trip and close circuit supervision comes in a single package with any Tavrida Electric VCB. The CM16 allows the user to forget about scheduled trips and close wiring inspections — as in the event of malfunction a notification will be sent to the operator using one of the inbuilt output relays and indicated by LEDs inbuilt into the control module.

LOW POWER CONSUMPTION

Vacuum circuit breakers equipped with the CM16 control module need less than 42 W — just 10% of what the best alternatives available on the market need! Such low power consumption finally solves the problem of auxiliary power supply — a much less powerful source and UPS can now provide substation auxiliary equipment with the required power.

EASE OF USE AND ROBUSTNESS

CM16 type control modules are connected with the circuit breaker they control and supervise by means of simple wires. This allows the CM installation to be located at any position convenient for the OEM, system integrator or end-user location. Very compact dimensions and low weight further simplify the process. The CM16 has a robust design, enclosed in an aluminium housing it provides a high EMC level confirmed by KEMA test laboratories.

5 The energy for switching operations is stored in the Control Module (CM). This reduces **the auxiliary power supply needs to 1/10 of a conventional circuit breaker** and enables significant savings on Substation UPS and auxiliary equipment.

6 Embedded intelligence —The CM's **continuous self-supervision** function monitors control, switching modules, functional wiring and auxiliary power supply quality. In the event of malfunction, a notification will be sent to the operator and indicated by inbuilt LEDs.

7 The CM can be conveniently installed at a distance from the circuit breaker and connected by means of flexible leads. It significantly simplifies the installation and allows the CM to be installed with other low voltage devices.

MAINTENANCE FREE

CONTINUOUS SELF-SUPERVISION

MOST RELIABLE

MOST COMPACT DIMENSIONS AND WEIGHT

THE FASTEST ON THE MARKET

Light Duty

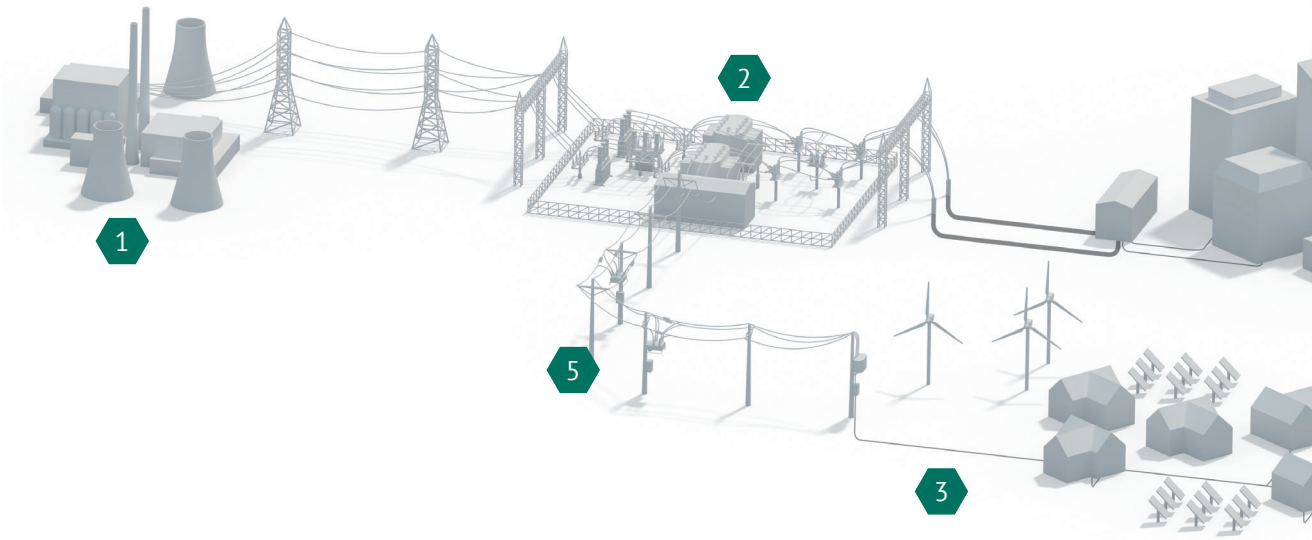
LD series vacuum circuit breakers for rated continuous current up to 800 A. Available in three-phase and single phase configurations and for rated voltages up to 24 kV.

Single Phase Vacuum Circuit Breaker

Tavrida Electric's circuit breakers are the perfect match for applications like transformers or generators with a neutral earthing, server rooms and point on wave switching.

APPLICATION:

1. Generation plant: generator neutral earthing.
2. Transformer substation: transformer neutral earthing.
3. Distributed generation: generator or transformer neutral earthing.
4. Building and enterprises: single phase loads switching.
5. Distribution: single phase switching.
6. Distribution substations: auxiliary power transformer circuit breaker.



MAINTENANCE FREE

CONTINUOUS SELF-SUPERVISION

MOST RELIABLE

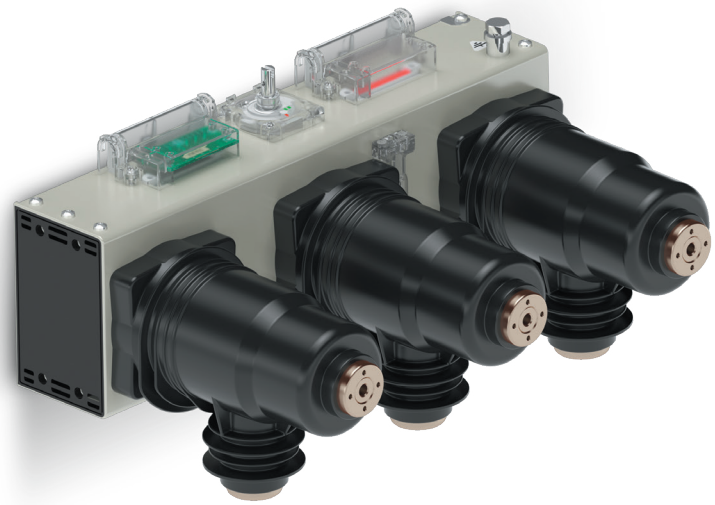
MOST COMPACT DIMENSIONS AND WEIGHT

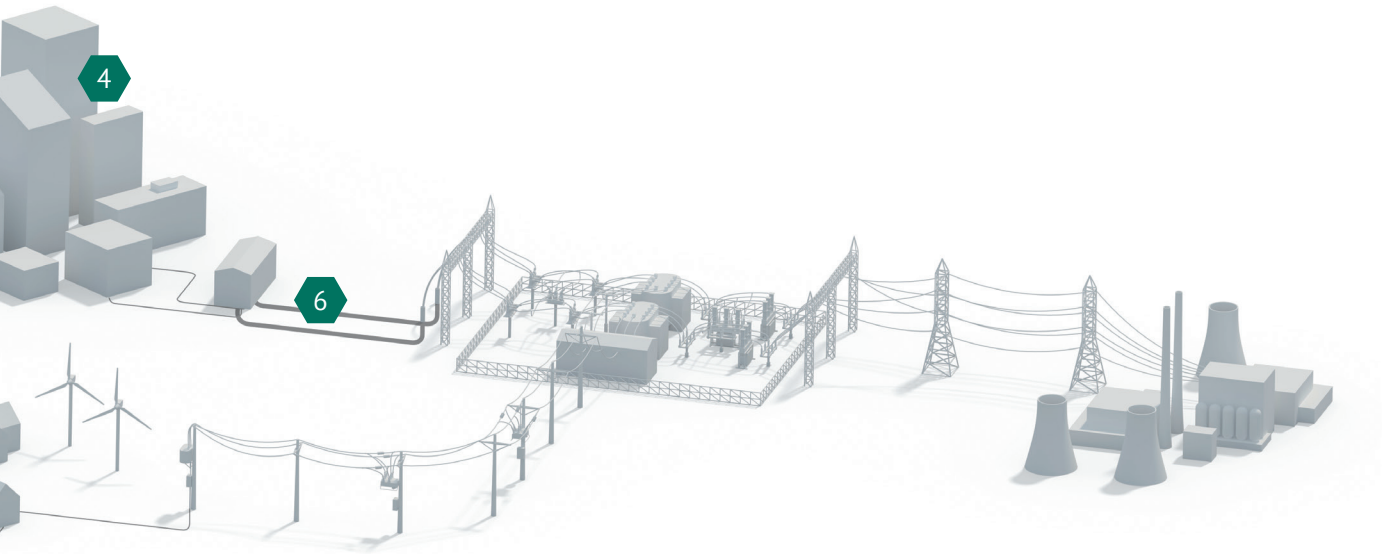
THE FASTEST ON THE MARKET

Medium Duty

A brand new vacuum three-phase and single-phase circuit breakers type for rated continuous currents up to 1250 A and rated voltages up to 17.5 kV with extraordinarily small size and weight.

Using the same single-axis design philosophy as the LD series, the MD series brings even more innovation in a compact package. At a height of only 35 cm, and as narrow as the LD type, the MD circuit breaker handles currents as high as 1250 A continuous and 31.5 kA short-time and interrupting. Together with any spatial orientation capability, the MD series circuit breaker is second to none in terms of switchgear design optimization and mounting simplicity.





MAINTENANCE FREE
CONTINUOUS SELF-SUPERVISION
MOST RELIABLE
MOST COMPACT DIMENSIONS AND WEIGHT
THE FASTEST ON THE MARKET

Shell series

Shell vacuum circuit breakers are designed for applications with high rated continuous currents up to 2000 A.

The exceptional shell-type design insulates the phases from each other, with multiple mounting points incorporated to allow for installation in flexible orientations (vertical or inverted). It is not only robust and durable to high ratings but it is also the fastest circuit breaker on the market with an ability of sub-period current interruption.

The Shell series simplifies interlocking functionality using an integrated manual trip lever at the rear to block the unit both electrically and mechanically.

Heavy Duty

Heavy Duty series breakers are the most endurant across our product range and designed for rated continious currents up to 3150 A. HD finally brings all advantages of the best secondary distribution circuit breakers by Tavrida Electric to a primary distribution class. Never before VCBs with such high ratings were so compact and applicable for the most confined panels.

MAINTENANCE FREE

CONTINUOUS SELF-SUPERVISION

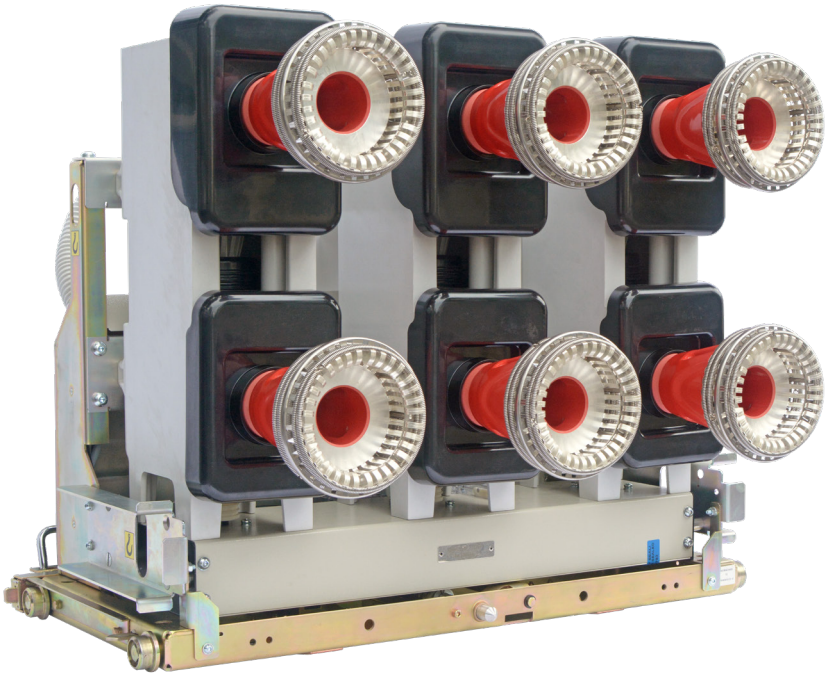
MOST RELIABLE

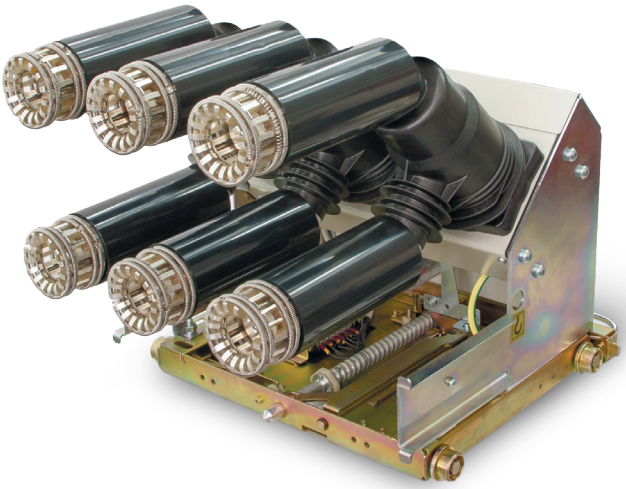
MOST COMPACT DIMENSIONS AND WEIGHT

THE FASTEST ON THE MARKET

Draw-Out Units

Medium duty and Heavy duty vacuum circuit breakers are now also available in withdrawble design with rack-in cassette, guide-arms and tulip contacts. Tavrida Electric draw-out units are fully compatable with industry standard interfaces. The personel safety is brought to a maximum level with embedded mechanical and electrical interlocking.





Specification

VCB Technical Parameters


VCB15_LD1


VCB15_MD1


VCB15_SHELL2

PARAMETER	VCB15_LD1	VCB15_MD1	VCB15_SHELL2
Rated voltage (Ur)	⩽ 12 kV	⩽ 17.5 kV	⩽ 17.5 kV
Rated normal current (Ir)	⩽ 800 A	⩽ 1250 A	⩽ 2000 A
Rated power frequency withstand voltage (Ud)	28 (42) kV*	38 (42) kV*	38 (42) kV*
Rated lightning impulse withstand voltage (peak) (Up)	75 kV	95 kV	95 kV
Rated short-circuit breaking current (Isc)	⩽ 20 kA	⩽ 31.5 kA	⩽ 31.5 kA
Rated peak withstand current (Ip)	⩽ 50 kA	⩽ 82 kA	⩽ 82 kA
Rated short-time withstand current (Ik)	⩽ 20 kA	⩽ 31.5 kA	⩽ 31.5 kA
Rated duration of short circuit (tk)		4 s	
Rated frequency (fr)		50/60 Hz	
Mechanical life (CO-cycles)	50,000	30,000	30,000
Operating cycles, breaking current (CO-cycles)	100	50	50
Closing time	⩽ 70 ms	⩽ 60 ms**	⩽ 60 ms**
Opening time	⩽ 35 ms	⩽ 35 ms**	⩽ 35 ms**
Break time	⩽ 45 ms	⩽ 45 ms**	⩽ 45 ms**
Rated operating sequence		O-0.3s-CO-15s-CO	
Resistance of main circuit	⩽ 40 μOhm	⩽ 17 μOhm	⩽ 18 μOhm
Weight (depending on Pole centre distance)	34–36 kg	33–35 kg	51–55 kg
Weight of single phase ISM	13 kg	13 kg	–
Overall dimensions	475/440/265 mm	354/445/279 mm	560/445/247 mm
Temperature range		-25°C ... +55°C	
Altitude above sea level		1000 m	
Relative humidity in 24 hours		⩽ 95 %	
Relative humidity over 1 month		⩽ 90 %	
Degree of protection according to IEC 60529		IP40	
Type of driving mechanism		Monostable magnetic actuator	
Number of available auxiliary contacts for three-phase ISM		6 NO + 6 NC	
Number of available auxiliary contacts for single-phase ISM		2 NO + 2 NC	
Weight of CM		1 kg	
Overall dimensions of CM		190x165x45 mm	
Charging the close and trip capacitors of CM_16_1(60_x_x)		⩽ 25 W	
Charging the close and trip capacitors of CM_16_1(220_x_x)		⩽ 42 W AC / ⩽ 37 W DC	
Standby power consumption of CM_16_1(60_x_x)		⩽ 5 W	
Standby power consumption of CM_16_1(220_x_x)		⩽ 7 W AC / ⩽ 5 W DC	

* Value in brackets - tested in accordance with GB1984-2003

** Special configuration available with opening time of 12 ms, closing time of 24 ms (29 ms for VCB15_HD) and breaking time of 22 ms.

VCB15_HD1

VCB25_LD1

PARAMETER	VCB15_HD1	VCB25_LD1
Rated voltage (Ur)	⩽ 17.5 kV	⩽ 24 kV
Rated normal current (Ir)	⩽ 3150 A	⩽ 800 A
Rated power frequency withstand voltage (Ud)	38 (42) kV*	50 kV
Rated lightning impulse withstand voltage (peak) (Up)	95 kV	125 kV
Rated short-circuit breaking current (Isc)	⩽ 31.5 kA	⩽ 16 kA
Rated peak withstand current (Ip)	⩽ 82 kA	⩽ 40 kA
Rated short-time withstand current (Ik)	⩽ 31.5 kA	⩽ 16 kA
Rated duration of short circuit (tk)	4 s	
Rated frequency (fr)	50/60 Hz	
Mechanical life (CO-cycles)	30,000	30,000
Operating cycles, breaking current (CO-cycles)	50	100
Closing time	⩽ 60 ms**	⩽ 70 ms
Opening time	⩽ 35 ms**	⩽ 35 ms
Break time	⩽ 45 ms**	⩽ 45 ms
Rated operating sequence	O-0.3s-CO-15s-CO	
Resistance of main circuit	⩽ 15 μOhm	⩽ 40 μOhm
Weight (depending on Pole centre distance)	70–72 kg	35–38 kg
Weight of single phase ISM	–	14 kg
Overall dimensions	632/570/280mm	510/560/265 mm
Temperature range	-25°C ... +55°C	
Altitude above sea level	1000 m	
Relative humidity in 24 hours	⩽ 95 %	
Relative humidity over 1 month	⩽ 90 %	
Degree of protection according to IEC 60529	IP40	
Type of driving mechanism	Monostable magnetic actuator	
Number of available auxiliary contacts for three-phase ISM	6 NO + 6 NC	
Number of available auxiliary contacts for single-phase ISM	2 NO + 2 NC	
Weight of CM	1 kg	
Overall dimensions of CM	190x165x45 mm	
Charging the close and trip capacitors of CM_16_1(x_60.1_x_x_x)	⩽ 25 W	
Charging the close and trip capacitors of CM_16_1(x_220.1_x_x_x)	⩽ 42 W AC / ⩽ 37 W DC	
Standby power consumption of CM_16_1(x_60.1_x_x_x)	⩽ 5 W	
Standby power consumption of CM_16_1(x_220.1_x_x_x)	⩽ 7 W AC / ⩽ 5 W DC	

* Value in brackets - tested in accordance with GB1984-2003
** Special configuration available with opening time of 12 ms, closing time of 24 ms (29 ms for VCB15_HD) and breaking time of 22 ms.

Control Module EMC Parameters

PARAMETER	APPLICABLE STANDARD	RATED VALUE
Electromagnetic compatibility (emc) requirements		
Electrostatic discharge	IEC 60255-26 IEC 61000-4-2	8 kV contact 15 kV air
Radiated EM field immunity	IEC 60255-26 IEC 61000-4-3	80 MHz – 3 GHz Sweep & spot AM 1 kHz 80% 10 V/m
Fast transient burst immunity	IEC 60255-26 IEC62271-1 IEC 61000-4-4	4 kV common mode
Surge immunity	IEC 60255-26 IEC 61000-4-5	4 kV common mode 2 kV differential mode
Conducted disturbance induced by radio frequency fields	IEC 60255-26 IEC 61000-4-6	150 kHz – 80 MHz AM 1 kHz 80 % 10 V
Power frequency magnetic field	IEC 60255-26 IEC 61000-4-8	100 A/m continuously 1000 A/m 1 sec
Pulse magnetic field	IEC 61000-4-9	1000 A/m
100 kHz damped oscillatory magnetic field	IEC 61000-4-10	100 A/m
1 MHz damped oscillatory magnetic field	IEC 61000-4-10	100 A/m
AC voltage dips and interruptions	IEC 60255-26 IEC 61000-4-11	ΔU 30 % 1 period ΔU 60 % 50 periods ΔU 100 % 5 periods ΔU 100 % 50 periods
Power frequency disturbance voltage	IEC 60255-26 IEC 61000-4-16	300 V common mode 150 V differential mode
100 kHz and 1 MHz damped oscillatory wave immunity	IEC 60255-26 IEC 62271-1 IEC 61000-4-18	2.5 kV common mode 1 kV differential mode
Ripple on DC power supply	IEC 60255-26 IEC 61000-4-27	10% of Supply voltage, 100 Hz
DC voltage dips and interruptions	IEC 60255-26 IEC 62271-100 IEC 61000-4-29	ΔU 30 % 2 sec ΔU 60 % 2 sec ΔU 100 % 0.3 sec ±20 % 10 sec

Circuit Breaker Selection Guide

VCB15_LD1

Three Phase Light Duty Circuit Breakers

VCB15_LD1_16.F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9
Customization	Without customization	1								
Rated voltage	12 kV		1							
Rated short circuit breaking current	20 kA			1						
Rated normal current	800 A				1					
Pole center distance	150 mm					1				
	180 mm					2				
	210 mm					3				
Main low terminal design	One main lower terminal if PCD is 150 mm						1			
	One main lower terminal if PCD is 180 mm						2			
	One main lower terminal if PCD is 210 mm						3			
	Two main lower terminals if PCD is 150 mm						4			
CM settings	Basic circuit breaker functionality							1		
	Without CM							2		
Rated auxiliary supply voltage	24-60 V DC								1	
	110-220 V AC/DC								2	
	Without CM								3	
Language	English (for 24-60 V DC auxiliary supply voltage)									1
	English (for 110-220 V AC/DC auxiliary supply voltage)									2
	English (Without CM)									3
	Spanish (for 24-60 V DC auxiliary supply voltage)									4
	Spanish (for 110-220 V AC/DC auxiliary supply voltage)									5
	Spanish (Without CM)									6
	Portuguese (for 24-60 V DC auxiliary supply voltage)									7
	Portuguese (for 110-220 V AC/DC auxiliary supply voltage)									8
	Portuguese (Without CM)									9

VCB25_LD1

Three Phase Light Duty Circuit Breakers

VCB25_LD1_16.F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9
Customization	Without customization	1								
Rated voltage	17.5 kV		1							
	24 kV		2							
Rated short circuit breaking current	16 kA			1						
Rated normal current	800 A				1					
Pole center distance	210 mm for 17.5 kV rated voltage					1				
	210 mm for 24 kV rated voltage					2				
	275 mm for 17.5 kV rated voltage					3				
	275 mm for 24 kV rated voltage					4				
Main low terminal design	One main lower terminal						1			
CM settings	Basic circuit breaker functionality							1		
	Without CM							2		
Rated auxiliary supply voltage	24-60 V DC								1	
	110-220 V AC/DC								2	
	Without CM								3	
Language	English (for 24-60 V DC auxiliary supply voltage)									1
	English (for 110-220 V AC/DC auxiliary supply voltage)									2
	English (without CM)									3
	Spanish (for 24-60 V DC auxiliary supply voltage)									4
	Spanish (for 110-220 V AC/DC auxiliary supply voltage)									5
	Spanish (without CM)									6
	Portuguese (for 24-60 V DC auxiliary supply voltage)									7
	Portuguese (for 110-220 V AC/DC auxiliary supply voltage)									8
	Portuguese (without CM)									9

Single Phase Light Duty Circuit Breaker

VCB15_LD3

VCB15_LD3_16.F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9
Customization	Without customization	1								
Rated voltage	12 kV		1							
Rated short circuit breaking current	20 kA			1						
Rated normal current	800 A				1					
Pole center distance	Not applicable					1				
Main low terminal design	One main lower terminal						1			
CM settings	Basic circuit breaker functionality							1		
	Without CM							2		
Rated auxiliary supply voltage	24-60 V DC								1	
	110-220 V AC/DC								2	
	Without CM								3	
Language	English (for 24-60 V DC auxiliary supply voltage)									1
	English (for 110-220 V AC/DC auxiliary supply voltage)									2
	English (without CM)									3
	Spanish (for 24-60 V DC auxiliary supply voltage)									4
	Spanish (for 110-220 V AC/DC auxiliary supply voltage)									5
	Spanish (without CM)									6
	Portuguese (for 24-60 V DC auxiliary supply voltage)									7
	Portuguese (for 110-220 V AC/DC auxiliary supply voltage)									8
	Portuguese (without CM)									9

Single Phase Light Duty Circuit Breaker

VCB25_LD3

VCB25_LD3_16.F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9
Customization	Without customization	1								
Rated voltage	24 kV		1							
Rated short circuit breaking current	16 kA			1						
Rated normal current	800 A				1					
Pole center distance	Not applicable					1				
Main low terminal design	One main lower terminal						1			
CM settings	Basic circuit breaker functionality							1		
	Without CM							2		
Rated auxiliary supply voltage	24-60 V DC								1	
	110-220 V AC/DC								2	
	Without CM								3	
Language	English (for 24-60 V DC auxiliary supply voltage)									1
	English (for 110-220 V AC/DC auxiliary supply voltage)									2
	English (without CM)									3
	Spanish (for 24-60 V DC auxiliary supply voltage)									4
	Spanish (for 110-220 V AC/DC auxiliary supply voltage)									5
	Spanish (without CM)									6
	Portuguese (for 24-60 V DC auxiliary supply voltage)									7
	Portuguese (for 110-220 V AC/DC auxiliary supply voltage)									8
	Portuguese (without CM)									9

Three Phase Medium Duty Circuit Breaker

VCB15_MD1

VCB15_MD1_16.F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9
Customization	Without customization	1								
Rated voltage	17.5 kV		1							
Rated short circuit breaking current	31.5 kA			1						
Rated normal current	1250 A				1					
Pole center distance	150 mm 210 mm					1 2				
Main low terminal design	One main lower terminal						1			
CM settings	Basic circuit breaker functionality Without CM							1 2		
Rated auxiliary supply voltage	24-60 V DC 110-220 V AC/DC Without CM								1 2 3	
Language	English (for 24-60 V DC auxiliary supply voltage) English (for 110-220 V AC/DC auxiliary supply voltage) English (without CM) Spanish (for 24-60 V DC auxiliary supply voltage) Spanish (for 110-220 V AC/DC auxiliary supply voltage) Spanish (without CM) Portuguese (for 24-60 V DC auxiliary supply voltage) Portuguese (for 110-220 V AC/DC auxiliary supply voltage) Portuguese (without CM)									1 2 3 4 5 6 7 8 9

Single Phase Medium Duty Circuit Breaker


VCB15_MD3

VCB15_MD3_16.F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9
Customization	Without customization	1								
Rated voltage	17.5 kV		1							
Rated short circuit breaking current	31.5 kA			1						
Rated normal current	1250 A				1					
Pole center distance	Not applicable					1				
Main low terminal design	One main lower terminal						1			
CM settings	Basic circuit breaker functionality							1		
	Without CM							2		
Rated auxiliary supply voltage	24-60 V DC								1	
	110-220 V AC/DC								2	
	Without CM								3	
Language	English (for 24-60 V DC auxiliary supply voltage)									1
	English (for 110-220 V AC/DC auxiliary supply voltage)									2
	English (without CM)									3
	Spanish (for 24-60 V DC auxiliary supply voltage)									4
	Spanish (for 110-220 V AC/DC auxiliary supply voltage)									5
	Spanish (without CM)									6
	Portuguese (for 24-60 V DC auxiliary supply voltage)									7
	Portuguese (for 110-220 V AC/DC auxiliary supply voltage)									8
	Portuguese (without CM)									9

Three Phase Shell Circuit Breaker

VCB15_SHELL2

VCB15_SHELL2_16.F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9
Customization	Without customization	1								
Rated voltage	12 kV 17.5 kV		1 2							
Rated short circuit breaking current	31.5 kA			1						
Rated normal current	1250 A 2000 A				1 2					
Pole center distance	150 mm 210 mm (if rated voltage 12 kV and normal current 1250 A) 210 mm (if rated voltage 17.5 kV and normal current 1250 A) 210 mm (if rated voltage 12 kV and normal current 2000A) 210 mm (if rated voltage 17.5 kV and normal current 2000A) 275 mm (if rated voltage 12 kV and normal current 1250 A) 275 mm (if rated voltage 17.5 kV and normal current 1250 A) 275 mm (if rated voltage 12 kV and normal current 2000A) 275 mm (if rated voltage 17.5 kV and normal current 2000A)					1 2 3 4 5 6 7 8 9				
Main low terminal design	One main lower terminal						1			
CM settings	Basic circuit breaker functionality Without CM							1 2		
Rated auxiliary supply voltage	24-60 V DC 110-220 V AC/DC Without CM								1 2 3	
Language	English (for 24-60 V DC auxiliary supply voltage) English (for 110-220 V AC/DC auxiliary supply voltage) English (without CM) Spanish (for 24-60 V DC auxiliary supply voltage) Spanish (for 110-220 V AC/DC auxiliary supply voltage) Spanish (without CM) Portuguese (for 24-60 V DC auxiliary supply voltage) Portuguese (for 110-220 V AC/DC auxiliary supply voltage) Portuguese (without CM)									1 2 3 4 5 6 7 8 9

Three Phase Heavy Duty Circuit Breaker

VCB15_HD1

VCB15_LD3_16.F		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9
Customization	Without customization	1								
Rated voltage	12 kV		1							
Rated short circuit breaking current	20 kA			1						
Rated normal current	800 A				1					
Pole center distance	Not applicable					1				
Main low terminal design	One main lower terminal						1			
CM settings	Basic circuit breaker functionality							1		
	Without CM							2		
Rated auxiliary supply voltage	24-60 V DC								1	
	110-220 V AC/DC								2	
	Without CM								3	
Language	English (for 24-60 V DC auxiliary supply voltage)									1
	English (for 110-220 V AC/DC auxiliary supply voltage)									2
	English (without CM)									3
	Spanish (for 24-60 V DC auxiliary supply voltage)									4
	Spanish (for 110-220 V AC/DC auxiliary supply voltage)									5
	Spanish (without CM)									6
	Portuguese (for 24-60 V DC auxiliary supply voltage)									7
	Portuguese (for 110-220 V AC/DC auxiliary supply voltage)									8
	Portuguese (without CM)									9

Control Module

CM_16_1

	CM_16_1	Par1	Par2	Par3	Par4	Par5
Language	English Spanish Portuguese	1 2 3				
Rated supply voltage and CM hardware version	24-60 V DC , version 1 110-220 V AC/DC, version 1		1 2			
Firmware functionality	Basic circuit breaker functionality			1		
ISM driver firmware used in CM and protection setting(1)	ISM15_LD_1, ISM15_LD_6 and without protection ISM15_LD_3 and without protection ISM15_MD_1 and without protection ISM15_MD_3 and without protection ISM15_Shell_2 and without protection ISM15_HD_1 and without protection ISM25_LD_1, ISM25_LD_2 and without protection ISM25_LD_3 and without protection				1 2 3 4 5 7 9 10	
Factory configurable settings	Relay 1 - Switching module position functionality; Relay 2 - Ready functionality; Relay 3 - Malfunction or Loss of auxiliary supply functionality; Trip by dry contacts close command Close by dry contacts close command					1

1. ISM trip in case of auxiliary power supply loss protection is available. please approach local sales contact for assistance.

Draw-Out Units Selection Guide

VCB15_MD1

Draw-Out Unit with Medium Duty Circuit Breaker

VCB15_MD1_16D		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9	Par10	Par11	Par12
Customization	Without customization	1											
Rated voltage	17.5 kV		2										
Rated short circuit current	31.5 kA			1									
Rated normal current	1250 A				1								
Phase center distance	150 mm 210 mm					1 2							
Terminal center distance	205 mm						1						
Lower terminal height	260 mm if PCD is 150 mm 260 mm if PCD is 210 mm							1 2					
CM settings	Basic circuit breaker functionality Without CM								1 2				
Rated auxiliary supply voltage	24-60 V DC 110-220 V AC/DC Without CM									1 2 3			
Auxiliary circuits plug	Plastic plug Metal plug										1 2		
Optional interlock	Without optional interlocks Interlock against VCB rack in\out without auxiliary voltage - 220 V AC/DC											1 2	
Language	English (for 24-60 V DC auxiliary supply voltage) English (for 110-220 V AC/DC auxiliary supply voltage) English (without CM) Spanish (for 24-60 V DC auxiliary supply voltage) Spanish (for 110-220 V AC/DC auxiliary supply voltage) Spanish (without CM) Portuguese (for 24-60 V DC auxiliary supply voltage) Portuguese (for 110-220 V AC/DC auxiliary supply voltage) Portuguese (without CM)												1 2 3 4 5 6 7 8 9

VCB15_HD1

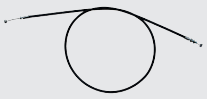
Draw-Out Unit with Heavy Duty Circuit Breaker

VCB15_HD1_16D		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9	Par10	Par11	Par12
Customization	Without customization	1											
Rated voltage	17.5 kV		2										
Rated short circuit current	31.5 kA			1									
Rated normal current	2000 A				1								
	1250 A				2								
Phase center distance	210 mm					1							
	275 mm					2							
Terminal center distance	310 mm						1						
Lower terminal height	260 mm if PCD is 150 mm							1					
	260 mm if PCD is 210 mm							2					
CM settings	Basic circuit breaker functionality								1				
	Without CM								2				
Rated auxiliary supply voltage	24-60 V DC									1			
	110-220 V AC/DC									2			
	Without CM									3			
Auxiliary circuits plug	Plastic plug										1		
	Metal plug										2		
Optional interlock	Without optional interlocks											1	
	Interlock against VCB rack in\out without auxiliary voltage - 220 V AC/DC											2	
Language	English (for 24-60 V DC auxiliary supply voltage)												1
	English (for 110-220 V AC/DC auxiliary supply voltage)												2
	English (without CM)												3
	Spanish (for 24-60 V DC auxiliary supply voltage)												4
	Spanish (for 110-220 V AC/DC auxiliary supply voltage)												5
	Spanish (without CM)												6
	Portuguese (for 24-60 V DC auxiliary supply voltage)												7
	Portuguese (for 110-220 V AC/DC auxiliary supply voltage)												8
	Portuguese (without CM)												9

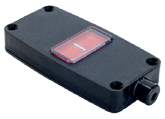
VCB Accessories and spare parts

Manual generator
The manual generator is used to charge the CM_16_1 in cases where the main auxiliary power supply is not available

Interlocking kits
The kit attaches to the ISM Interlocking shaft and serves as a manual trip / lockout accessory



Release and indication cables
The flexible release and indication cables are used for interlocks or ISM position indicator connection to the ISM

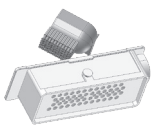


Position indicator
The position indicator used together with CBcomp_RelCable_1 to indicate the ISM main circuit position

Insulation kits
The insulation kits provide compliance with declared BIL level (125 kV / 95 kV)

Mounting kit
The kit is used with the ISM15_HD_1 only. The kit attaches to the ISM required mounting points to provide 95 kV BIL

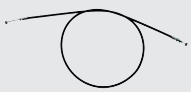
Connector
The kit is used to provide Switchgear fixed contact counterpart for DOU main circuits connection



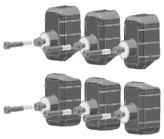
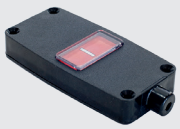
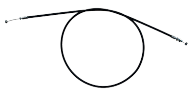
Plug
The kit is used to provide counterpart for draw-out unit (DOU) auxiliary circuits connector in the switchgear panel

Draw-out unit interlocking kit
The interlock blocks DOU rack in/out functionality in case auxiliary voltage (provided for solenoid installed on DOU plate) is absent

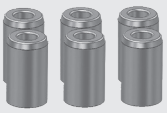
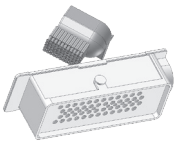
Indoor switching module and control module
Indoor switching module and control module can be ordered separately as spare parts

FIXED TYPE VCB ACCESSORIES/SPARE PARTS		APPLICABILITY PER UNIT									
		VCB15							VCB25		
		LD1	LD3	MD1	MD3	HD1	Shell2		LD1		LD3
							12 kV	17.5 kV	17.5 kV	24 kV	
Manual generator 	CBunit_ ManGen_1 for CM_16_1(220_Par2_Par3)	•	•	•	•	•	•	•	•	•	•
	CBunit_ ManGen_2 for CM_16_1(60_Par2_Par3)	•	•	•	•	•	•	•	•	•	•
Interlocking kit 	CBkit_Interlock_1	•	•[1]						•	•	•[1]
Interlocking kit 	CBkit_Interlock_3(Par1) (rotary switch type)			•	•	•	•[2]	•[2]			
Interlocking kit 	CBkit_Interlock_4(Par1) (key switch type)			•	•	•	•[2]	•[2]			
Interlocking kit 	CBkit_Interlock_5(Par1) (push button type)			•	•	•	•[2]	•[2]			
Release cable 	CBcomp_ RelCable_1(Par1) Relcable is included in the CBkit_Interlock_3/4/5 package			•	•	•	•	•			
Mounting kit 	CBmount_ISM15_1					•					

1) Accessory or spare part is installed or included in the delivery.
2) CBkit_Interlock3/4/5 can be used with Shell2 VCBs only with the additional CBkit_Interlock_8 – approach local sales contact for assistance.
3) 150pcs version of VCB15_Shell2 is supplied with CBkit_Shell15 insulation kit.
4) ISM and CM are selected in accordance with the Circuit breaker version – approach local sales contact for assistance.

FIXED TYPE VCB ACCESSORIES/SPARE PARTS		APPLICABILITY PER UNIT									
		VCB15							VCB25		
		LD1	LD3	MD1	MD3	HD1	Shell2		LD1		LD3
							12 kV	17.5 kV	17.5 kV	24 kV	
Insulation kit 	CBkit_Ins_3								•	•[1]	•[1]
Insulation kit 	CBkit_Ins_4			•	•						
Insulation kit 	CBkit_Shell15_1						•[3]	•[1]			
Position indicator 	CBkit_PosInd_1			•[1]	•[1]	•[1]	•[1]	•[1]			
Indication cable 	CBcomp_ IndCable_1(Par1)			•[1]	•[1]	•[1]	•[1]	•[1]			
ISM and CM 	ISM15_XX[4]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]			
	ISM25_XX[4]								•[1]	•[1]	•[1]
	CM_16_1	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]

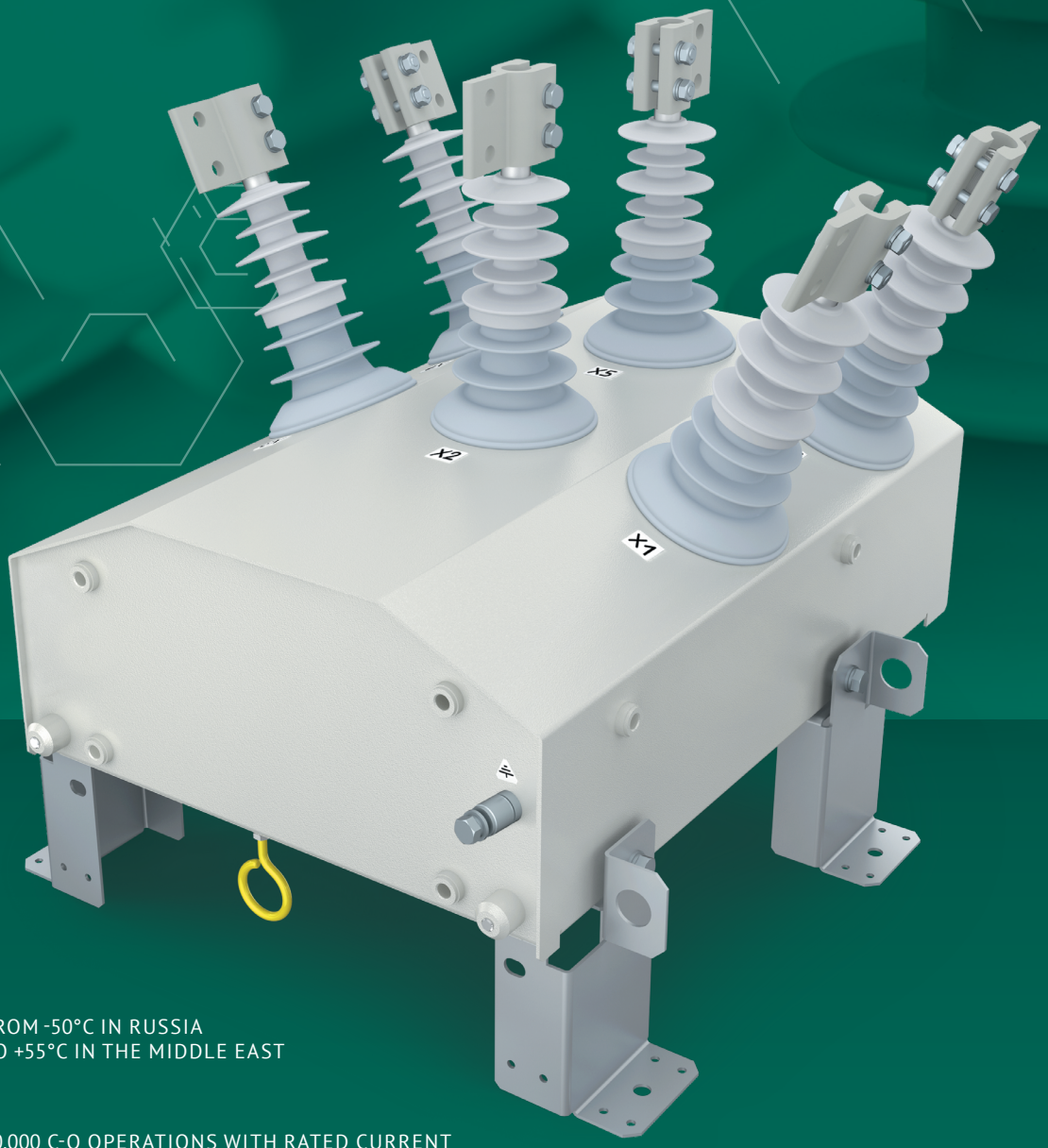
1) Accessory or spare part is installed or included in the delivery.
2) CBkit_Interlock3/4/5 can be used with Shell2 VCBs only with the additional CBkit_Interlock_8 – approach local sales contact for assistance.
3) 150pcs version of VCB15_Shell2 is supplied with CBkit_Shell15 insulation kit.
4) ISM and CM are selected in accordance with the Circuit breaker version – approach local sales contact for assistance.

DRAW-OUT UNIT ACCESSORIES/SPARE PARTS		APPLICABILITY PER UNIT	
		VCB15	
		MD1_D	HD1_D
Manual generator 	CBunit_ ManGen_1 for CM_16_1(220_Par2_Par3)	•	•
	CBunit_ ManGen_2 for CM_16_1(60_Par2_Par3)++	•	•
Connector 	SGkit_Connector_1(Par1_Par2)	•	•
Plug 	CBkit_Plug_(Par1)	•	•
Interlocking kit 	CBkit_Interlock_6(Par1)	•	•
ISM and CM 	ISM15_XX**	•*	•*
	CM_16_1	•*	•*

* Accessory or spare part is installed or included in the delivery.
** ISM and CM are selected in accordance with the Circuit breaker version – approach local sales contact for assistance.

Automatic Circuit Reclosers Rec15/25

Designed and built to last, the Tavrida Electric recloser combines the best of the Tavrida Electric vacuum circuit breaker's features: innovative insulation materials, high precision sensors and sophisticated numerical control.



FROM -50°C IN RUSSIA
TO +55°C IN THE MIDDLE EAST

30.000 C-O OPERATIONS WITH RATED CURRENT
OR 200 OPERATIONS WITH FULL SHORT-CIRCUIT
BREAKING CURRENT

Application Areas

Feeder Automation

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.

LOOP RECLOSER
A loop recloser further improves the reliability of a power supply by automatically
- Isolating faulty sections
- Reconfigures the network to minimize the amount of customers without power supply

Loop reclosers are the best option to maximize reliability performance indicators of your distribution network.

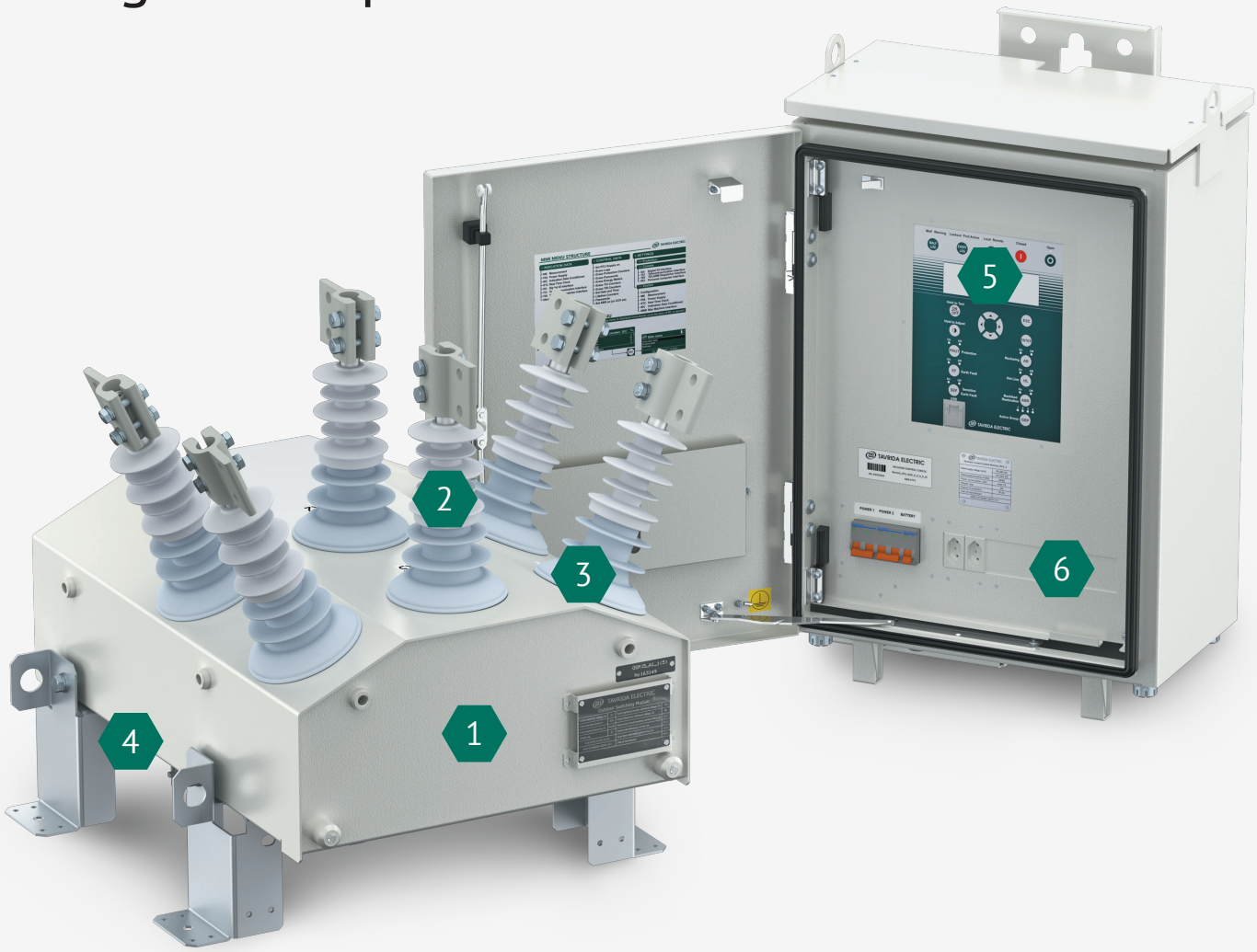
Substation Automation

The Tavrida Electric recloser can be used to quickly build a cost-effective unmanned structure mounted outdoor substation. Providing full protection and automation functionality required at the substation.

Distributed Generation

The Tavrida Electric recloser is perfectly suited as the intertie between the distributed generation site and the utility grid. Tavrida Electric's experience with solar and other renewables has led to a variety of solutions that address the nuances of renewable generation requirements.

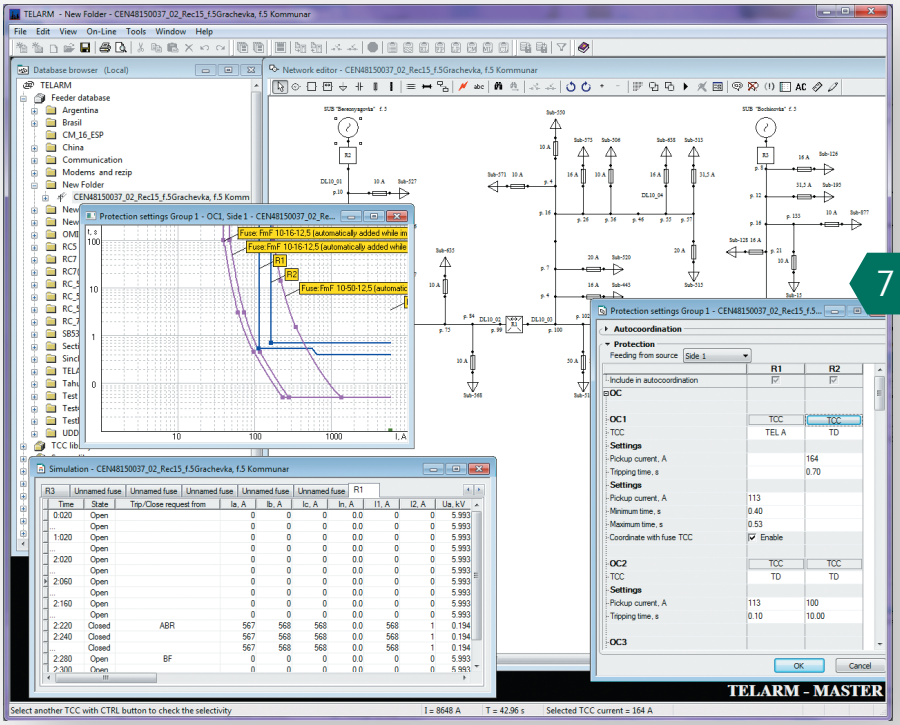
Design and Operation



1. The air insulated, **corrosion-resistant** tank incorporates a solidly insulated circuit breaker, sensors and auxiliary mechanisms.
2. Each of the six bushings are made of UV stable, hydrophobic polymer, that guarantees reliable performance in heavily polluted areas. Confirmed by environmental testing in KIPTS*.
3. The 6x current and 6x voltage high accuracy sensors. Voltage sensors allow measurements to be taken from either side of the recloser.
4. Mechanical trip hook for OSM manual operation. For **superior linesman safety,** the hook in the downwards position electrically isolates the actuator's circuit to prevent the possibility of any unintended recloser operation.
5. The recloser protects the network against overcurrent, earth faults, over- and under-voltage, over- and under-frequency, current and voltage imbalances, and many other problems. The control box has an embedded RTU that provides communication with SCADA over various communication protocols: DNP3, Modbus, IEC-104.
6. The control cubicle has an inbuilt large battery and smart battery charger to improve battery life. The battery allows 48 hrs of operation with no auxiliary power supply present.
7. TELARM**® user software allows local and remote device control and configuration, downloading loads, fault and load profiles and oscillogram. TELARM® is the first recloser software that allows automatic protection settings coordination, various failure modes simulation, devices configuration and remote control in single package!

* Koeberg Insulator Pollution Test Station (KIPTS) is known internationally as a severe environmental testing facility run by ESKOM, in South Africa

**Tavrida Electric Automated Relay Manager



BEST VALUE FOR THE MONEY

With a maintenance-free design rated to perform 30,000 open and close operations, Tavrida Electric reclosers keep expenses to a minimum over their entire lifespan. They are installed on typical overhead feeders, significantly improving a network's key performance indicators and their use results in a quick return on investment.

SOPHISTICATED CONTROL AND 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. The embedded RTU and metering ensures the reclosers are SCADA-ready with no additional expenses.

TELARM® DISPATCHER AND DUAL-SCADA

TELARM® Dispatcher is a proprietary remote control and monitoring system that works as a standalone SCADA and/or in parallel with an existing SCADA system, acting as a back-up method of controlling and monitoring reclosers. TELARM® Dispatcher offers a number of features not available with most conventional SCADA systems, such as remote access to system logs, fault and load profiles and the remote control of protection settings.

REZIP PROTECTION AND AUTOMATION ALGORITHM

Rezip algorithm allows to automate various networks where traditional time and current grading is impossible. It can be used in very long feeders, ring schemes and highly meshed networks. Any number of Rezip reclosers can be connected in series.

Recloser Control – RC5

PROTECTION
The recloser protects against overcurrent, earth faults, over- and under-voltage, over- and under-frequency, current and voltage imbalances and many other problems.

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. Key measurement data can be logged.

COMMUNICATIONS
The control cubicle has various communication interfaces and can be connected with any third party modem via RS-232/RS-485 or the Ethernet using various communication protocols, including Modbus, DNP3 and IEC-104.

LARGE BATTERY
48hrs operation battery, charged by smart battery charger and maintenance free for up to 10 years.

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

CONTROL CUBICLE
- The recloser control cubicle is made from lightweight powder-coated anodized aluminum,
- The control panel has a graphical LCD for clear event indication, comprising six-lines of 40-characters.

USER SOFTWARE
The Tavrida Electric Automated Relay Manager (TELARM) is designed for the specific needs of electricity distribution networks. It allows:
- Downloading of logs, profiles, oscillograms, settings, etc.
- Uploading protection, communication and systems settings,
- Recording of logs (event, malfunction, communication etc) and detailed fault profiling,
- The customising of a control signal map for a customer's SCADA applications.

* please consult local representative for additional information on these services.

Recloser Control Cubicle

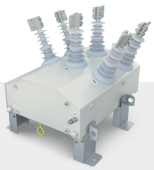
Protection and automation functions

Function	ANSI function code	IEC function designation
Overcurrent	50/51	I>, I>>, I>>>
Earth Fault	50N/51N	I0>>, I0>>>, I0>>>>
Sensitive Earth Fault	50/51SEF	I0>/SEF
Auto-Reclose (4 shots)	79	AR
Automatic Backfeed Restoration	ABR	ABR
Undervoltage	27	U<
Voltage unbalance	47	U2/U1
Current unbalance	46	I2/I1
Underfrequency	81U	f<
Hot Line (live line)		
Overvoltage	59	U>
Overfrequency	81O	f>
Cold Load Pickup restrain		
Inrush filter	68	
Switch on to fault	50 SOTF	
Lockout	86	
Close Condition Verifier		
Sectionalizer functionality		
Fault locator		
User defined logic	PSL	
Controller self-supervision		
Circuit breaker supervision		

Communication			
Interfaces		Protocols	
RS-232	Bluetooth	IEC 60870-5-104	Modbus
RS-485	Ethernet	DNP3	TELARM® Protocol
Wi-Fi	USB		
GPRS	Optic fiber		

Specification

Recloser Technical Parameters


REC15


REC25

PARAMETER	OSM15_AL_1	OSM25_AL_1
Rated maximum voltage (Ur)	15.5 kV	27 kV
Rated continuous current (Ir)	630 A	630 A
Rated short-duration powerfrequency withstand voltage (Ud), 1 min dry	50 kV	60 kV
Rated short-duration powerfrequency withstand voltage, 10 sec wet	45 kV	50 kV
Rated lightning impulse withstand voltage (peak) (Up)	110 kV	125 (150) kV*
Rated short-circuit breaking current (Isc)	16 kA	12.5 kA
Rated peak withstand current (Ip)	41.6 kA	32.5 kA
Rated short-time withstand current (Ik)	16 kA	12.5 kA
Rated duration of short circuit (tk)	4 s	4 s
Rated cable-charging current switching	10 A	25 A
Rated line-charging current switching	2 A	5 A
Rated frequency (fr)	50/60 Hz	
Mechanical life (CO cycles)	30,000	
Operating cycles, rated current (CO cycles)	30,000	
Electrical endurance, breaking current (O-CO cycles)	50	
Closing time, not more than	77 ms	
Opening time for overcurrent protection according to IEC 62271-111/C37.60, not more than (at I>2xIp)	43 ms	
Clearing time for overcurrent protection according to IEC 62271-111/C37.60, not more than (at I>2xIp)	51 ms	
Rated operating sequence	O-0.1s-CO-2s-CO-2s-CO	
Main circuit resistance	< 85 µOhm	< 95 µOhm
Weight	68 kg	72 kg
Altitude	2000 m (derating according to ANSI C37.60 applied above 1000 m)	
Solar radiation	⩽ 1.1 kW/m^2	
Temperature range	-40 °C ... +55 °C	
Degree of protection	IP 65	
Pollution level	very heavy (as per IEC 60815)	

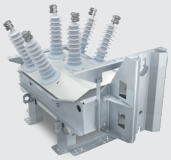
POWER SUPPLY CHARACTERISTICS

PARAMETER	VALUE
Supply voltage range, V	85 ÷ 265 AC, 110 ÷ 220 DC**
Rated power consumption, VA, not more	40
Maximum power consumption, VA, not more	75
Duration of operation without auxiliary supply, hours	48

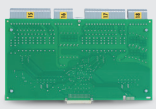
* Across the vacuum gap, value in brackets - closed contacts

** Note that additional DC circuit breakers are required.

Accessories



Pole Mounting Kits
Hot-dip galvanized steel mounting kits for Rec15/25 frontal and lateral pole installation. Mounting kits are applicable for all types of wooden, concrete or metal single poles and H-pole structures. Kits include accessories for control cubicle pole mounting and up to two voltage transformers installation

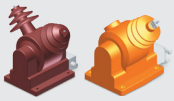


Input/Output Modules
The RC5 can be supplied with an IOM on request to provide control and indication functions. IOM has 12 galvanically isolated digital inputs and 12 digital outputs with normally open and normally closed contacts

Substation Mounting Kit
Hot-dip galvanized steel mounting kit for Rec15/25 installation at outdoor substation. It can be installed at newly erected substation or as a retrofit to old outdoor circuit breakers

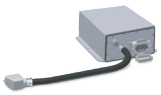
Interface Test Sets
Custom designed tools for primary and secondary injection testing of Rec15/25 protection and automation functions

Primary Line Connectors
A wide range of terminals to provide a reliable primary line connection. Two-hole, four-hole and clamp type aerials options are available



Voltage Transformers
Two-pole and single-pole auxiliary voltage transformers intended to supply control cubicle with low voltage

Bird guards
Custom designed bird guards to provide a protection against wildlife and aggressive environment



Interface Box
OSM–RC Interface Box is required to connect OSM switching modules with conventional CTs to RC5 series control cubicles

Power Cables and Earthing Accessories
Common type wires and terminals to provide a connection between auxiliary VT and RC5 and to organize earthing scheme

Batteries
Rechargeable battery to provide the RC5 with backup auxiliary power when the main auxiliary power source is not present

Bluetooth Module
Provides a wireless connection between the RC5 control cubicle and personal computer for local control and firmware update

Parametric Rec15/25 Selection Guide

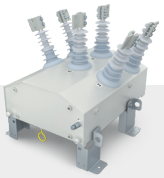
REC15/25_AL1_5P	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20

PARAMETER	PARAMETER DESCRIPTION	APPLICABLE OPTIONS	CODE
P1	Customization	Default	1
		Other – Contact Tavrida Electric representative	...
P2	OSM type	OSM with Rogowski coils and 220V actuator coil, version 5	1
P3	Language	According to customization – contact Tavrida Electric representative	1
		English MMI, stickers, nameplates for RC and OSM	2
		Portuguese MMI, stickers, nameplates for RC and OSM	3
		English MMI, stickers	4
		Portuguese MMI, stickers	5
		Spanish MMI, stickers	6
		Spanish MMI, stickers, nameplates for RC and OSM	7
P4	Controller type	Recloser control cubicle RC5_4	1
P5	Firmware version	2.72.027	1
P6	OSM mounting kit	Without mounting kit	1
		Standard mounting kit without pole interface part	2
		Mounting kit with pole interface part for M16 studs	3
		Mounting kit with pole interface part for M20 studs	4
		Mounting kit with pole interface part for M20 studs for through the pole installation	5
		Mounting kit with M16 interface bracket for around the pole installation with 500 mm U-profiles fixed with 450 mm M16 studs	6
		Mounting kit with M20 interface bracket for around the pole installation with 700 mm U-profiles fixed with 450 mm M20 studs	7
		Mounting kit with M16 interface bracket for around the pole installation with 500 mm U-profiles bolted to interface bracket and 450 mm M16 studs	8
		Mounting kit with M20 interface bracket for around the pole installation with 700 mm U-profiles bolted to interface bracket and 450 mm M20 studs	9
		Substation mounting kit with adjustable height	A
P7	AT mounting kit	Without	1
		Holder for cast resin VT	2
		Holder for cast resin VT for around the pole installation with two 500 mm U-profiles and M16 studs	3
		Holder for cast resin VT for around the pole installation with two 700 mm U-profiles and M20 studs	4
		Two holders for cast resin VT for around the pole installation with two 500 mm U-profiles and M16 studs	5
		Two holders for cast resin VT for around the pole installation with two 700 mm U-profiles and M20 studs	6
		Two holders for cast resin VT for around the pole installation with four 500 mm U-profiles and M16 studs	7

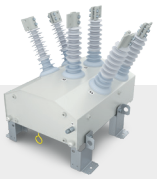
PARAMETER	PARAMETER DESCRIPTION	APPLICABLE OPTIONS	CODE
P7	AT mounting kit	Two holders for cast resin VT for around the pole installation with four 700 mm U-profiles and M20 studs	8
		Cast resin VT installation kit for substation mounting kit	9
		Oil power transformer installation kit for substation mounting kit	A
		Cast resin CT installation kit for substation mounting kit	B
		Holder for cast resin VT for through the pole installation with base holder for M20 studs and 700 mm U-profile	C
		Holder for cast resin VT for through the pole installation with base holder for M20 studs, 700 mm U-profile and two M20 studs	D
		Two holders for cast resin VT for through the pole installation with base holder for M20 studs and two 700 mm U-profile	E
		Two holders for cast resin VT for through the pole installation with base holder for M20 studs, two 700 mm U-profile and M20 studs	F
P8	Control cable	5 meters	1
		7 meters	2
		12 meters	3
		20 meters	4
P9	Primary connector type	Without	1
		Two hole NEMA connector	2
		Two hole Burndy® connector	3
		Four hole NEMA connector	4
		Clamp type aerial connector with bird protection	5
		Two hole NEMA connector with bird protection	6
		Four hole NEMA connector with bird protection	7
P10	Earthing accessories	Without	1
		According to customization – contact Tavrida Electric representative	2
		Two cross pressure terminals for 25–70 mm^2 wire	3
P11	Power cable	Without	1
		According to customization – contact Tavrida Electric representative	2
		5 meters double core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	3
		7 meters double core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	4
		12 meters double core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	5
		20 meters double core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	6
		Two 5 meters double core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	7
		Two 7 meters double core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	8
		Two 12 meters double core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	9
		Two 20 meters double core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	A
		4.5 meters triple core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	B
		11 meters triple core 1.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	C
		5 meters triple core 2.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	D
		7 meters triple core 2.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	E
		12 meters triple core 2.5 mm^2 cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	F

PARAMETER	PARAMETER DESCRIPTION	APPLICABLE OPTIONS	CODE
P11	Power cable	20 meters triple core 2.5 mm² cable with 6 mm ring lug at VT side and crimp sleeve lug at RC side	G
		5 meters triple core 2.5 mm² cable with 6 mm ring lug at VT side and Cnlinko® YM20 connector at RC side	H
		7 meters triple core 2.5 mm² cable with 6 mm ring lug at VT side and Cnlinko® YM20 connector at RC side	J
		12 meters triple core 2.5 mm² cable with 6 mm ring lug at VT side and Cnlinko® YM20 connector at RC side	K
		20 meters triple core 2.5 mm² cable with 6 mm ring lug at VT side and Cnlinko® YM20 connector at RC side	L
P12	RC mounting kit	Without	1
		According to customization – contact Tavrida Electric representative	2
		800 mm U-profiles fastened to RC with M20 fasteners for around the pole installation with 1000 mm M16 studs	3
		RC installation kit for substation mounting kit	4
		500 mm U-profiles fastened to RC with M20 fasteners for around the pole installation with 450mm M16 studs	5
		2x M20 studs	6
P13	Battery type	Without	1
		Battery ready	2
		–25 degrees rated battery	3
		–40 degrees rated battery	4
P14	Input-output module	Without	1
		12–60 VDC	2
		110–250 VDC	3
P15	Ethernet	Without	1
		Wired Ethernet (RJ45 interface)	2
P16	Local wireless access	Without	1
		Bluetooth	2
P17	Power outlet	Socket wiring without socket holder cover	1
		Socket wiring with blank socket holder cover	2
		EU socket connected to AC1 power input	3
		Two NBR sockets	4
		Socket wiring with associated plate for two NBR sockets	5
P18	Cabinet light	Without	1
		LED strip	2
P19	Internal door additional equipment	Without	1
		According to customization – contact Tavrida Electric representative	2
		Blank plate	3
P20	Bottom interface plate	Without	1
		According to customization – contact Tavrida Electric representative	2
		Blank plate	3
		Plate with two glands for d = 4.5–10 mm	4
		Plate with two glands for d = 4.5–10 mm and wireless adapter plug	5
		Plate with two Cnlinko® YM20 connectors	6
		Plate with two Cnlinko® YM20 connectors and wireless adapter plug	7

Legacy Rec15/25 Selection Guide



REC15



REC25

REC15/25_AL1_5S		Par1	Par2	Par3	Par4	Par5	Par6	Par7	Par8	Par9	Par10
Language	Portuguese	PT									
	English	EN									
Primary connector type	Aerial		A								
	Two hole NEMA		NEMA2								
Bird protection	Without			0							
	With corresponding to connector type			1							
Input/Output Module (IOM)	Without				0						
	12–60 V DC				60						
	100–250 V DC				220						
Ethernet connection	Without					0					
	RJ45 interface					E					
Local wireless connection	Without						0				
	Bluetooth						BT				
Umbilical length	7 metres							7			
Mounting bracket	Standard main mounting bracket								10		
	Standard main mounting bracket with pole interface bracket								10M		
	Other — Contact Tavrida Electric representative								...		
Mounting bracket fastening accessories	Without pole interface fasteners									0	
	Without pole interface fasteners but with VT holder									0-VT	
	With interface fasteners around the pole									Ar	
	With interface fasteners around the pole and VT holder									Ar-VT	
	With interface fasteners through the pole									Th	
	With interface fasteners through the pole and VT holder									Th-VT	
Customization	Default										0
	Other— Contact Tavrida Electric representative										...

Certificates

"DEKRA Certification B.V." auditors praised the "Tavrida Electric" quality management system and noted attention and active involvement of managers and staff at all levels in the continuous improvement of the company's operations.

ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007

Tavrida Electric Vacuum Circuit Breakers

Tavrida Electric VCBs are designed and manufactured to strictly comply with the latest revision of IEC 62271-100. World known independent Laboratories STL liaison members.

Each assembled VCB is subjected to routine testing in accordance with IEEE C37.60/IEC 62271-100 at the factory

TYPE TESTS

- Dielectric tests
- Measurement of the resistance of the main circuit
- Temperature rise test
- Short-time withstand current and peak withstand current test
- Extended mechanical operation test
- Short-circuit current making and breaking test
- Single and double earth fault test
- Shortline fault test
- EMC tests for control electronics
- Extended electrical endurance test
- Capacitive currents switching test

ROUTINE TESTS

- Visual check and functionality tests
- Dielectric withstand test
- Measurement of the resistance of main circuit
- Mechanical operation test

Tavrida Electric Reclosers

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

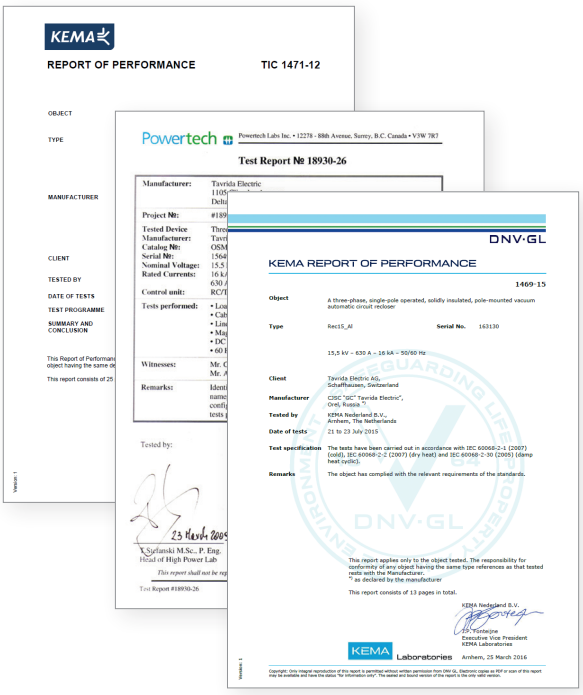
Each assembled Rec series recloser is subjected to routine testing in accordance with IEEE C37.60/IEC 62271-111 at the factory

TYPE TESTS

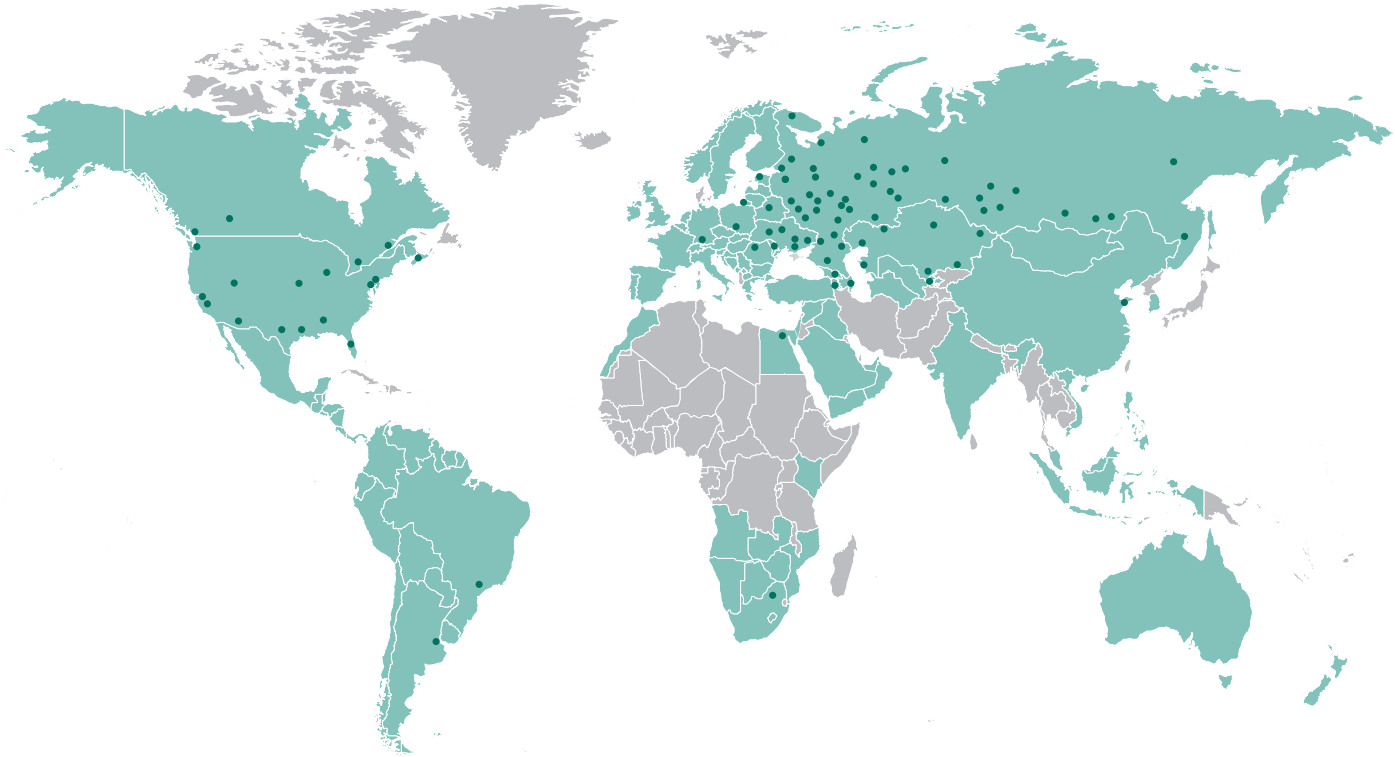
- Dielectric tests
- Measurement of the resistance of the main circuit
- Temperature rise test
- Short-time withstand current and peak withstand current test
- Extended mechanical operation test
- Short-circuit current making and breaking test
- EMC tests for control electronics
- Capacitive currents switching test

ROUTINE TESTS

- Visual check and functionality tests
- Dielectric withstand test
- Measurement of the resistance of main circuit
- Reclosing and overcurrent calibration
- Mechanical operation test
- Partial discharge test



If you would like to obtain more detailed information about our solutions or become one of our local partners, please feel free to contact us



EUROPE

Tavrida Electric GmbH
Im Leimen 14, 88069
88069 Tettnang,
Germany
Phone: +49 7542 94 678 51
Fax: +49 7542 94 678 61
E-mail: info@tavrida.de

BRAZIL

Tavrida Electric do Brasil
Av. Ireno da Silva Venâncio, 199
GP04A - Protestantes
18111-100, Votorantim / SP, Brazil
Phone: +55 (15) 3243-2555
Fax: +55 (15) 3243-4233
E-Mail: info@tavrida.com.br

NORTH AMERICA

Tavrida Electric North America Inc.
1105 Cliveden Ave.
Delta, BC V3M 6G9
Canada
Phone: +1 (866) 551-8362
Fax: +1 (604) 540-6604
E-Mail: info@tavrida-na.com

SOUTH AMERICA

Tavrida Electric Argentina
Av. Hipólito Yrigoyen 9183/5, 9 piso dpto.
B. Lomas de Zamora,
1832, Provincia de Buenos Aires, Argentina
Phone: +54 (11) 4243-9373
Phone: +54 (9 11) 4026-8563
E-Mail: info@tavrida.com.ar

SOUTH AFRICA

Tavrida Electric Africa (Pty) Ltd.
Unit 8, N12 Industrial Park,
188 Dr Vosloo Road, Bartlett,
Boksburg, 1459 South Africa
Phone: +27 (11) 9142-199
Fax: +27 (11) 9142-323
E-Mail: support@tavrida.co.za

REST OF THE WORLD

Tavrida Electric AG
Bahnhofstrasse 27, 6300
Zug, Switzerland
Phone: + 49 7542 9467851
E-mail: TES_SM@tavrida.ch

TAVRIDA ELECTRIC
Excellence in Engineering

facebook

Instagram

LinkedIn