

Vacuum Circuit Breakers ISM15/25

Data sheet



Maintenance free

The switching module's robust design guarantees up to 50,000 rated current and 100 full rated short circuit CO operations with no maintenance required.



Continuous self-supervision

The whole trip and close circuit supervision come in a single package with any VCB. In the event of a malfunction, it will be indicated locally with LED and remotely via relay contacts.



Most compact dimension and weight

With a weight starting from 33 kg, Tavrída Electric's circuit breakers are the lightest in their class which significantly simplifies the installation process.



Any spatial orientation

Adjustment and mounting flexibility for the optimization of switchgear design, which allows to define how to make primary and secondary connections, saving even more space.



High operational speed

Opening and closing times as low as 12 ms and 24 ms respectively, enabling the implementation of fast transfer switching, arc flash mitigation or fault current limitation.



Single phase option

The perfect match for applications like transformers or generators with neutral earthing, server rooms and point on wave switching.

Tavrída Electric is a world-class manufacturer of medium voltage switchgear such as Vacuum Circuit Breakers & Automatic Circuit Reclosers. The ISM series circuit breaker is the result of extensive R&D efforts to provide outstanding performance for compact switchgear designs, retrofit programs, and special applications.

After nearly 30 years on the market, the VCB install base has exceeded 500,000 units worldwide continuing to resolve most ambitious customer problems.



Design and operation

- 1 Tavrída Electric manufactures compact vacuum interrupters with high interrupting performance and an extraordinarily long mechanical and electrical lifespan.
- 2 The close/open operations are performed by the opening and contact springs, which are parts of the linear motor drive. The patented design of the linear motor drive 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 linear motor drive is not dependent on the auxiliary power supply quality. The design enables both local and remote operation. It can be opened and closed with a handheld closing device operated either manually or with the AA battery pack. The trip push-button is provided to safely open the VCB in case of an emergency.
- 5 The energy for switching operations is stored in the CM16. This reduces the auxiliary power supply need 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 a 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 in the LV compartment.

Certificates

Tavrída Electric VCBs are designed and manufactured to strictly comply with the latest version of IEC 62271-100.

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 tests
- Extended mechanical operation tests
- Short-circuit current making and breaking tests
- Single and double earth fault tests
- Shortline fault tests
- EMC tests for control electronics
- Extended electrical endurance tests
- Capacitive currents switching tests

ROUTINE TESTS

- Dielectric test on the main circuit
- Tests on auxiliary and control circuits
- Measurement of the resistance of the main circuit
- Design and visual checks
- Mechanical operating tests



Technical parameters

Type of ISM	ISM15_LD_1	ISM15_Shell_2	ISM15_HD_1	ISM25_LD_1	ISM25_Shell_2
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Rated data

Rated voltage (Ur)	≤ 12 kV	≤ 17.5 kV	≤ 17.5 kV	≤ 24 kV	≤ 24 kV
Rated normal current (Ir)	≤ 1250 A	≤ 2000 A	≤ 3150 A	≤ 1250 A	≤ 2000 A
Rated power frequency withstand voltage (Ud)	42 kV	42 kV	42 kV	50 kV	50 kV
Rated lightning impulse withstand voltage (peak) (Up)	95 kV	95 kV	95 kV	125 kV	125 kV
Rated short-circuit breaking current (Isc)	≤ 20 kA	≤ 31.5 kA	≤ 31.5 kA	≤ 16 kA	≤ 25 kA
Rated peak withstand current (Ip)	≤ 52 kA	≤ 82 kA	≤ 82 kA	≤ 40 kA	≤ 64 kA
Rated short-time withstand current (Ik)	≤ 20 kA	≤ 31.5 kA	≤ 31.5 kA	≤ 16 kA	≤ 25 kA
Rated duration of short circuit (tk)	4 s				
Rated frequency (fr)	50/60 Hz				

Switching performance

Mechanical life (CO-cycles)	50,000	30,000	30,000	30,000	30,000
Operating cycles, rated breaking current (CO-cycles)	100	50	50	100	50
Closing time	≤ 42 ms	≤ 32 ms ¹	≤ 37 ms	≤ 47 ms	≤ 42 ms
Opening time	≤ 27 ms	≤ 20 ms ¹	≤ 20 ms	≤ 27 ms	≤ 20 ms
Break time	≤ 37 ms	≤ 30 ms ¹	≤ 30 ms	≤ 37 ms	≤ 23 ms
Rated breaking current operating sequence	O-0.3s-CO-15s-CO				

General information

Overall dimensions H/W/D in mm	475/440/265	560/445/247	632/570/280	510/560/265	560/565/247
Resistance of main circuit	≤ 40 μOhm	≤ 18 μOhm	≤ 15 μOhm	≤ 40 μOhm	≤ 17 μOhm
Weight	34-36 kg	51-55 kg	70-72 kg	35-38 kg	50-51 kg
Weight of single phase ISM	13 kg ²	-	-	14 kg ³	-
Temperature range	-40°C ... +55°C	-40°C ... +55°C	-40°C ... +55°C	-40°C ... +55°C	-40°C ... +55°C
Altitude above sea level	≤ 3000 m ⁴				
Relative humidity, non condensing	≤ 98 %				
Degree of protection according to IEC 60529	IP 40				
Type of driving mechanism	Linear motor ⁵				
Number of available auxiliary contacts	6 NO + 6 NC (2 NO + 2 NC for single-phase ISM)				

Control module

Weight of CM	1 kg
Overall dimensions of CM	190x165x45 mm
Rated range of supply voltage of CM_16_1(60)	24V to 60V DC
Rated range of supply voltage of CM_16_1(220), CM_16_2(220)	110V to 220V AC/DC
Operating range (80-120%) of CM_16_1(60)	19V to 72V DC
Operating range (80-120%) of CM_16_1(220), CM_16_2(220)	85V to 265V AC/DC
Charging the close/trip capacitors of CM_16_1(60)	≤ 25 W
Charging the close/trip capacitors of CM_16_1(220), CM_16_2(220)	≤ 42 W AC / ≤ 37 W DC
Standby power consumption of CM_16_1(60)	≤ 5 W
Standby power consumption of CM_16_1(220), CM_16_2(220)	≤ 7 W AC / ≤ 5 W DC

¹ Special configuration available with opening time of 12 ms and closing time of 24 ms.

² Single phase VCB type ISM15_LD_3.

³ Single phase VCB type ISM25_LD_3.

⁴ For installations in altitudes above 1000 m, the external insulation is calculated as multiplication of rated insulation with Ka in accordance with IEC 62271-1.

⁵ Designed to meet the requirements for vacuum circuit breakers with a spring charging motor.



Control module Electromagnetic Compatibility (EMC)

PARAMETER	APPLICABLE STANDARD	RATED VALUE
EMC parameters		
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 $\pm 20\%$ 10 sec

Tavrída Electric worldwide

ESTONIA

AS Tavrída Electric Export

14, Visase str.,
Tallinn 11415 Estonia

Tel.: +372 606 47 57
Fax: +372 606 47 59

E-mail: export@tavrída.eu
Web: www.tavrída.com

POLAND

Tavrída Electric Poland sp. z o.o.

Graniczna 44,
43-100 Tychy Poland

Tel.: +48 (32) 3271986
Fax: +48 (32) 3271987

E-mail: telp@tavrída.pl
Web: www.tavrída.com

ROMANIA

SC Energobit Tavrída SRL

Romania 400221 Cluj Napoca,
Industrial Park Tetarom I,
Tăietura Turcului str., 47/11

Tel.: +40 264 207 583 / 584
Fax: +40 264 207 555

E-mail: paul.pandrea@energobit.com
Web: www.tavrída.com

EGYPT

Tavrída Electric North And East Africa S.A.E

Building Number 476,
Street Number 9, D area,
Mokattam, 11571, Cairo, Egypt

Tel.: (+202) 25079317
Fax: (+202) 25079319

E-mail: mmh@tavrída.eu
Web: www.tavrída.com

OMAN

Tavrída Electric Commercial Representative Office

Ocean Business Center,
Al Maha street, Bausher, Muscat

Tel.: +968 7116 8395

E-mail: gks@tavrída.eu
Web: www.tavrída.com