Switching to a brighter future

TMSec

TYPE TESTED MEDIUM VOLTAGE SWITCHGEAR

Up to 24kV

TMSec

The TMSec metal enclosure switchgear is designed and manufactured with advanced technology. It has undergone comprehensive and successful type testing by the ASTA organization to meet the IEC 62271-200 standard. With a rated voltage of up to 24kV and rated current ranging up to 1250A.

TMSec is equipped with load breaker switches and vacuum circuit breakers (VCB) from TRUONG GIANG ELECTRIC, SCHNEIDER ELECTRIC, ABB, and can be adapted with various VCBs depending on customer demands. Designed for indoor applications, it is particularly suitable for utility power, industry, marine, mining, oil and gas, infrastructure, etc.

This switchgear is typically used in power plants and substations, providing control and protection for transformers, capacitors, and motors. With its flexible design, TMSec can be directly connected to various panels such as ABB, Siemens, LS, etc., without the need for a linked panel.

Therefore, it offers numerous benefits, conveniences, and economic advantages for customers looking to extend, replace, or upgrade.

TMSec

Table of Contents

Benefits

Compact dimensions

Compact dimensions

• Suitable for small space installation
• Reduced civil works costs

Flexibility

Flexibility

• Comply with IEC standards
• Fully type-tested equipment
• Limited maintenance with vacuum interrupters

Safety

Safety

• The main and earthing contacts are clearly visible from the inspection window
• Interlock prevents incorrect operations
• Heat shrink insulation on busbars reduces the internal fault possibility.
• Installed under difficult ambient conditions

Easy to install and operate

Easy to install

• Transport and installation are simplified by the small size and light weight
• Easy solutions busbar to cable connection

Easy to operation

• Simple operations.
• Local and remote operation and operation from front view

Reduce maintenance

Reduces maintenance

• TMSec's long life cycle and high mechanical endurance
• High electrical endurance when breaking
• Low maintenance cost

Services and training

Services and training

• Local services
• TGE technical support helps you choose the best solution for your request
• Training for installation and maintenance

Standard

Conformity with international standard

Switchgear	TMSec	IEC 62271-1
		IEC 62271-200
Devices	Circuit breaker	IEC 62271-100
	Vacuum contactor	IEC 60470
	Disconnector	IEC 60265-1
	Earthing switch	IEC 62271-102
	HV, HRC fuses	IEC 60282
	Voltage detecting systems	IEC 61243-5
	Relay	IEC 60255
Degree of protection		IEC 60529
Insulation		IEC 60071
Instrument transformer	Current transformer	IEC 61869-2 (IEC 60044-1)
	Voltage transformer	IEC 61869-3 (IEC 60044-2)
Installation		IEC 61936-1
Voltage Indication		IEC 61958

Certification

TMSec products are certified by ASTA, a reputable organization with over 70 years of experience. The type test certificates guarantee that the products have been rigorously tested according to standard procedures at ASTA's approved laboratories.

TMSec's metal enclosure switchgear undergoes all necessary tests to meet international (IEC) and local standards. Each unit is subjected to routine factory tests before delivery to ensure functionality based on its specific characteristics.

Technical data

Rated Voltage	kV	7.2	12	17.5	24	36
Lighting impulse withstand voltage between phases and towards the ground	kV	60	75	95	125	170
Lighting impulse withstand voltage across the isolating distance	kV	20	28	38	50	70
Power frequency withstand voltage between phases	kV	20	28	38	50	70
Rated frequency	Hz	50 60				
Rated current	A	400-630-1250				630-1250
Rated short time withstand current Ik	kA	16-20(1)-25				12.5-16-20-25(2)
Rated peak time withstand current Ip (Making capacity)	kA	IP = 2.5 Ik				
No load transformer breaking current	A	16				
Cable charging breaking current	A	31.5				50
Internal Arc	kA	Standard: 12.5/1 s, IAC: A-FL Enhanced: 16/1s, IAC: A-FLR & A-FL				16/1s, IAC: A-FL
Rated current of main equipment	A					
Disconnector		400-630-1250				630-1250
LBS kit with fuse		200				63
LBS kit		400-630-1250				630-1250
SF1		400-630-1250				630-1250
SFset		400-630-1250				630-1250
Vacuum circuit breaker Evolis		400-630-1250				630-1250
Vacuum circuit breaker – VD4		400-630-1250				
Degree of protection	IP	3X				
Between compartment	IP	2XC				
Cubicle protection	Ik	8				
Protection loss of services continuity classes		LSC2A				
Altitude	m	2000				
Ambient at temperature	°C	– 5 to + 40				

Notice:

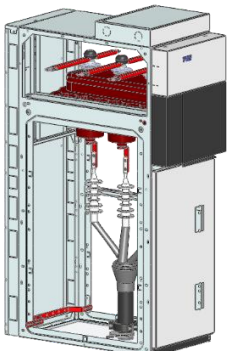
N/A: Non Available

(1) : 60kV peak for the CRM unit

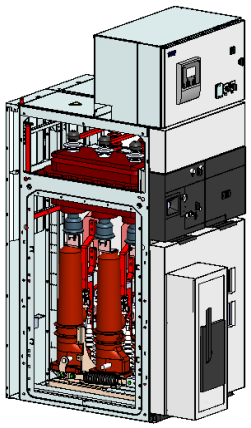
(2): In 1250A, 25kA/1s

Products range overview

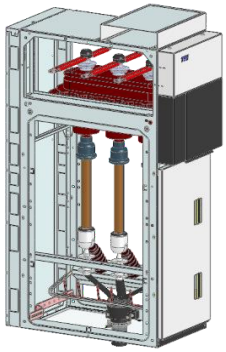
Panel designation	Application	Panel type	Panel width
Ring-main panel	Feeder	SF	375
	Feeder	SF1	500
	Transfer	SFT	375
Transformer panel	Feeder	TF	375
	Feeder	TF1	500
	Transfer	TFT	375
Transformer panel c/w VTs		STF	500
Cable panel	Feeder	FC	375
Cable panel 1250	Feeder	FC1	500
Cable panel, with earth-switch	Feeder	FCE	375
Cable panel 1250, with earth-switch	Feeder	FCE1	500
Circuit-breaker panel, fixed	Feeder	CBFF	750
	Transfer	CBFT	750
Circuit-breaker panel, removable	Feeder	CBDF	750
	Transfer	CBDT	750
Circuit-breaker panel, vacuum	Feeder	CBVF	750
	Transfer	CBVT	750
Bus sectionaliser panel		BC	750
Bus sectionaliser panel, with circuit breaker		BC1	750
Bus sectionaliser panel, with cable connection		BC2	750
Bus sectionaliser panel, with cable connection and transfer		BC3	750
Metering panel	Standard	ME	750
	Transfer	MET	750
Busbar earthing panel		BE	375
Bus riser panel		BF	375



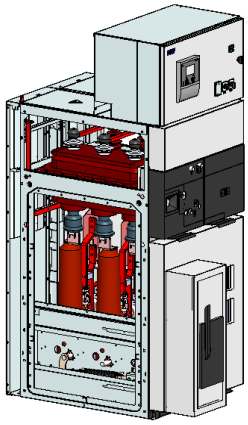
Ring-main panel
Type SF



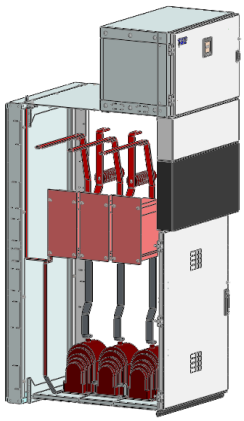
Circuit breaker panel
Type CBFF



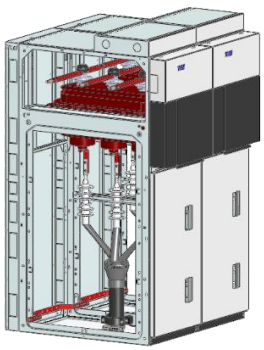
Transformer panel
Type TF



Circuit breaker removable panel
Type CBDF



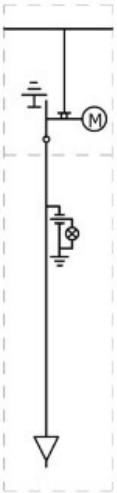
Metering panel
Type ME



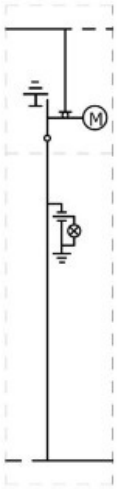
Bus sectionaliser panel
Type BC2

Products range detail

Ring-main panel



Type SF



Type SFT

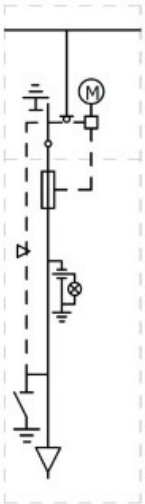
Standards:

- Switch and earthing switch
- Three-phase busbars
- CI1 operating mechanism
- Voltage presence indicator
- Connection pads for dry-type cables
- Heater
- Operation counter
- Three-phase bottom busbars for outgoing line (right or left) (*)

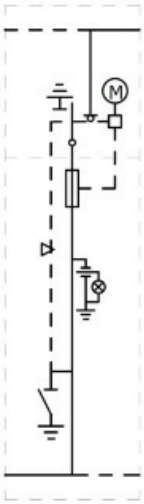
Options:

- Motor for operating mechanism
- Auxiliary contacts
- Key-type interlocks
- Release units (coil)
- 1250 A three-phase upper busbars
- Pressure indicator device for 24kV
- Enlarged low-voltage control cabinet for 24kV
- Cable connection by the top for 24kV (no internal arc withstand if selected)
- Fault indicators
- Digital ammeter
- Surge arresters (in 500 mm wide cubicle)

Transformer panel



Type TF



Type TFT

Standards:

- Switch and earthing switch
- Three-phase busbars
- CI1 operating mechanism
- Voltage presence indicator
- Connection pads for dry-type cables
- Heater
- Operation counter
- Equipment for three DIN striker fuses
- Mechanical indication system for blown fuses
- Downstream earthing switch, 25kA rms making capacity
- Three-phase bottom busbars for outgoing line (right or left) (**)

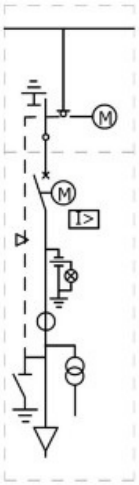
Options:

- Motor for operating mechanism
- Auxiliary contacts
- Key-type interlocks
- Release units (coil)
- 1250 A three-phase upper busbars
- Pressure indicator device for 24 kV
- Enlarged low-voltage control cabinet
- Cable connection by the top for 24 kV (no internal arc withstand if selected)
- Fault indicators
- Connection pads for two dry-type single-core cables
- Digital ammeter

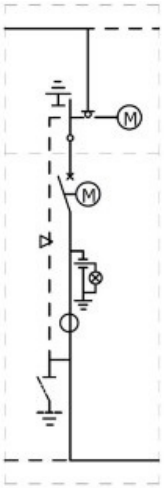
(*) For SFT cubicle only
(**) For TFT cubicle only

Products range detail

Circuit-breaker panel



Type CBFF



Type CBFT

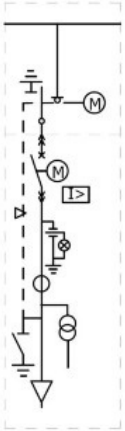
Standards:

- SF1 disconnector-earthing switch
- Three-phase busbars
- Circuit breaker operating mechanism: RI
- Disconnector operating mechanism: CS
- Voltage presence indicator
- 3 current transformers
- Auxiliary contacts
- Mechanical interlock between disconnector and breaker
- Connection pads for dry-type cables
- Heater
- Operation counter
- Downstream earthing switch
- 2 kA rms making capacity at 630 A and 25 kA rms making capacity at 1250 A
- Three-phase bottom busbars for outgoing line (right or left) (*)

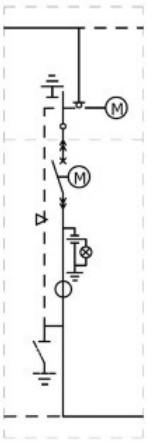
Options:

- Motor for operating mechanism
- Release units (coils) and auxiliary contacts on the disconnector
- Protection relay
- Key-type interlocks
- 3 voltage transformers
- 1250 A three-phase upper busbars at In 630A
- Enlarged low-voltage control cabinet for 24 kV
- Top cable connection for 24 kV (no internal arc withstand if selected)
- Connection pads for two dry-type, single-core cables for 24 kV
- Surge arresters (for 630 A and 24 kV only)
- Current sensor

Removable circuit breaker panel



Type CBDF



Type CBDT

Standards:

- Withdrawal disconnector and earthing switch SF1
- Three-phase busbars
- Circuit breaker operating mechanism : RI
- Disconnector operating mechanism : CS
- Voltage presence indicator
- 3 Current Transformers
- Auxiliary contacts
- Mechanical interlock
- Connection pads for dry-type cables
- Heater
- Operation counter
- 25 kA rms making capacity
- Three-phase bottom busbars for outgoing line (left or right) (**)

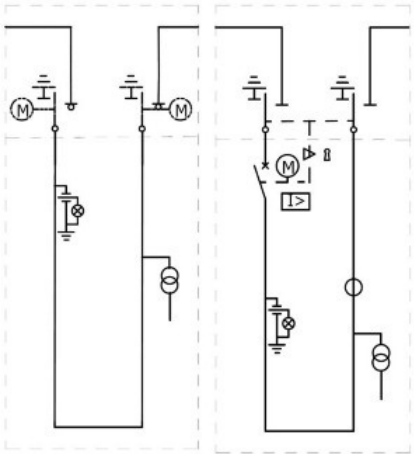
Options:

- Motor for operating mechanism
- Auxiliary contacts
- Key-type interlocks
- Release units (coil)
- 1250 A three-phase upper busbars
- Pressure indicator device for 24kV
- Low-voltage control cabinet for 24kV
- Cable connection by the top for 24 kV (no internal arc withstand if selected)
- Fault indicators
- Connection pads for two dry-type single-core cables for 24kV
- Digital ammeter

(*)For CBFT cubicle only
(**) For CBDT cubicle only

Products range detail

Bus sectionaliser panel



Type BC Type BC1

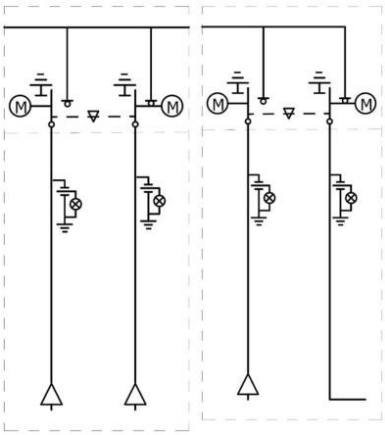
Standards :

- Switch and earthing switch
- Three-phase busbars
- Disconnector operating mechanism
- Voltage presence indicator
- Connection pads for dry-type cables
- Heater
- Operation counter
- Mechanical interlock
- 3 Current Transformers(*)
- Circuit breaker operating mechanic RI(**)
- SF1 disconnectable circuit breaker(*)

Options:

- Motor for operating mechanism
- Auxiliary contacts
- Key-type interlocks
- Release units (coil)
- 1250 A three-phase upper busbars
- Pressure indicator device for 24kV
- Enlarged low-voltage control cabinet for 24kV
- Cable connection by the top for 24 kV (no internal arc withstand if selected)
- Fault indicators
- Connection pads for two dry-type single-core cables for 24kV
- Control and monitor
- Protection using relay(**)

Bus sectionalised panel



Type BC2 Type BC3

Standards:

- Switch and earthing switch
- Three-phase busbars
- CI1 operating mechanism
- Voltage presence indicator
- Connection pads for dry-type cables
- Heater for 24kV:50W
- Operation counter
- Mechanical interlock
- Three-phase bottom busbars for outgoing line (right or left)(**)

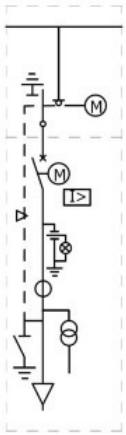
Options:

- Motor for operating mechanism
- Auxiliary contacts
- Key-type interlocks
- Release units (coil)
- 1250 A three-phase upper busbars
- Pressure indicator device for 24kV
- Enlarged low-voltage control cabinet for 24kV
- Cable connection by the top for 24 kV (no internal arc withstand if selected)
- Fault indicators
- Connection pads for two dry-type single-core cables for 24kV
- Control and monitor

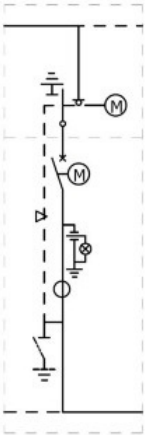
(*) For CBVT cubicle only
(**) For BC3 cubicle only

Products range detail

Vacuum circuit- breaker panel



Type CBVF



Type CBVT

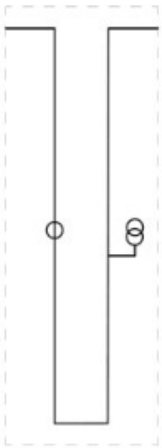
Standards:

- Vacuum circuit breaker
- Disconnector and earthing switch
- Three-phase busbars
- Circuit breaker operating mechanic RI
- Disconnector operating mechanic CS
- Voltage presence indicator
- 3 Current Transformers
- Auxiliary contacts on circuit breaker
- Mechanical interlocking between circuit breaker and disconnector
- Connection pads for dry-type cables
- Heater
- Operation counter
- Downstream and 25 kA rms making capacity
- Three-phase bottom busbars for outgoing line (right or left)(*)

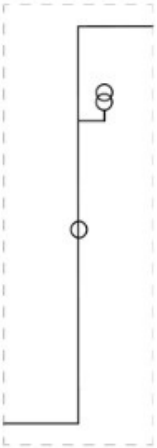
Options:

- Motor for operating mechanism
- Release units (coil)
- Auxiliary contacts on the disconnector
- Protection using relay
- Key-type interlocks
- 3 Voltage Transformers
- 1250A three-phase upper busbars at Ir630A
- Enlarged low-voltage control cabinet for 24kV
- Cable connection by the top for 24 kV (no internal arc withstand if selected)
- Connection pads for two dry-type single-core cables for 24kV
- Surge arresters (only for 630A and 24kV)
- Current sensor

Metering panel



Type ME



Type MET

Standards:

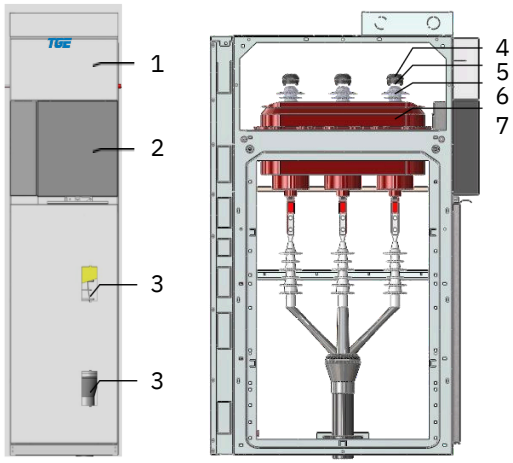
- Three-phase busbars
- 3 Current Transformers
- 3 Voltage Transformers
- Heater
- Three-phase busbars (right or left)(**)

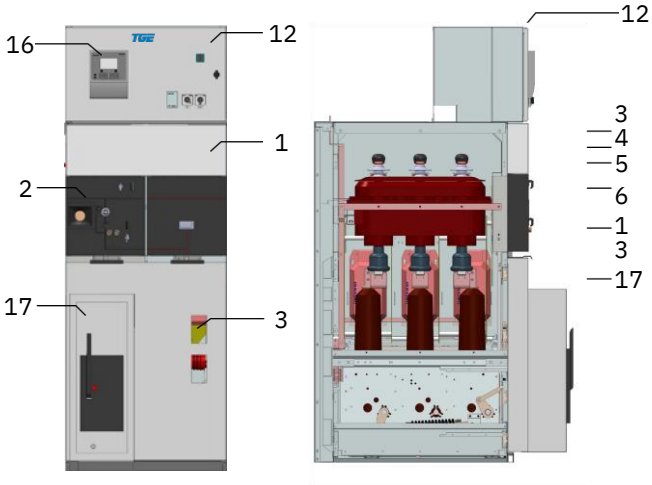
Options:

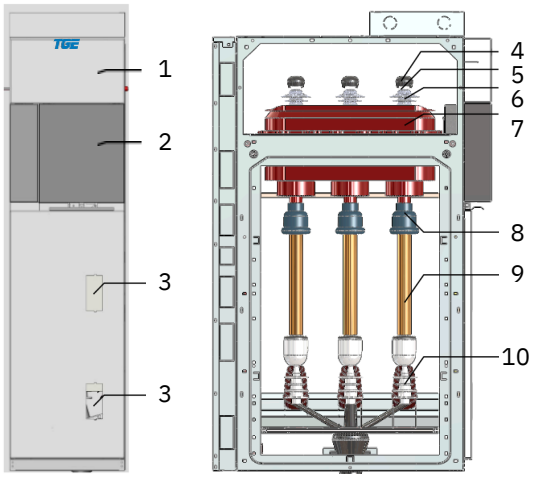
- Enlarged low-voltage control cabinet for 24kV
- Surge arresters (only for 630A and 24kV)

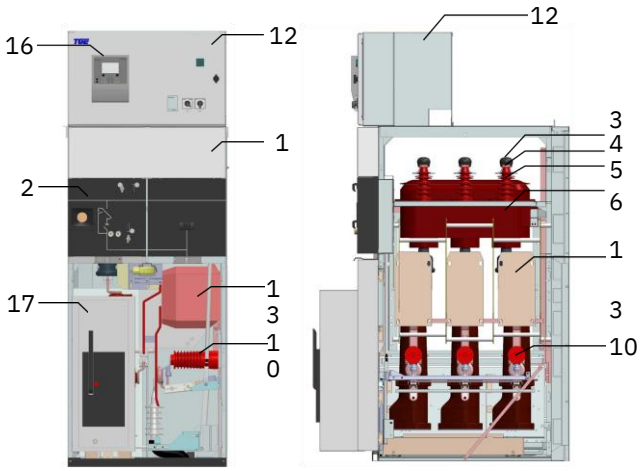
(*) For CBVT cubicle only
(**) For MET cubicle only

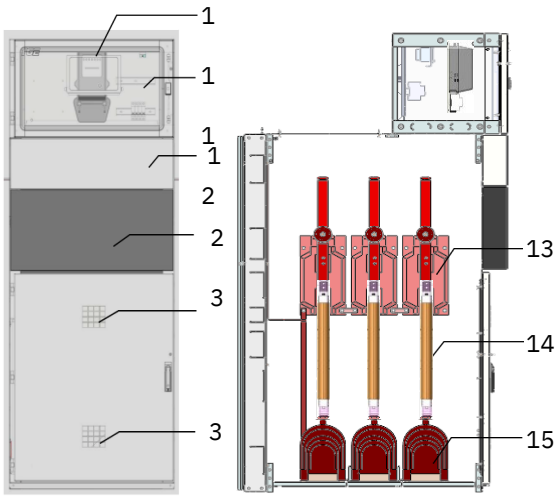
Panel design



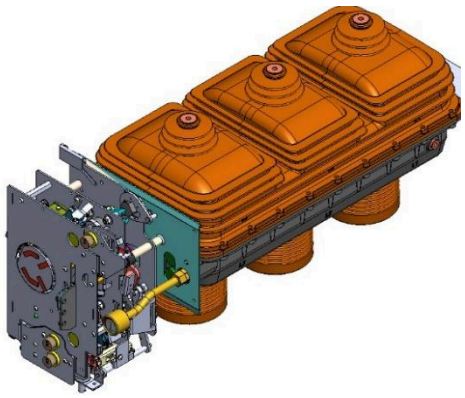




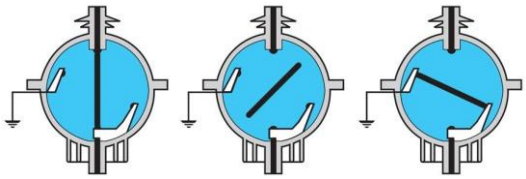




1. Low voltage compartment
2. Operating mechanism
3. Inspection window
4. Insulating cap on busbar
5. Busbar
6. Insulator of busbar
7. Three-position switch-disconnector
8. Insulating sleeve
9. Cylinder fuse
10. Post insulator
11. Power counter
12. Option low voltage compartment
13. Current transformer
14. Fuse for voltage transformer
15. Voltage transformer
16. Protection relay
17. Circuit breaker



Three position switch



Closed Open Earthed

Gas tightness

- The three rotating contacts are enclosed in a gas-filled chamber at a relative pressure of 0.4 bar (400 hPa) for 24 kV applications. It meets "sealed pressure system" requirements with factory-checked seals guaranteed to leak less than 0.1%.

Operating safety

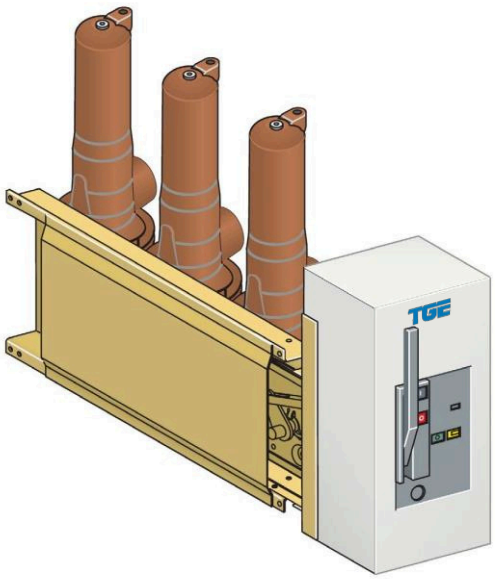
- The switch offers three positions: "closed", "open" and "earthed" providing a natural interlocking system to prevent incorrect operation. A fast-acting mechanism independently drives moving-contact rotation, and the device combines breaking and disconnection functions.
- The earthing switch within the SF6 enclosure boasts short-circuit making capacity compliant with relevant standards.
- Any accidental overpressure is eliminated by a safety membrane that directs gas away from the operator towards the unit's back.

Insensitivity to environment

- Parts are designed to achieve optimal electrical field distribution.
- The metallic cubicle structure is designed to withstand harsh environments and prevent access to energized parts during operation.

General characteristics

Rated voltage (Ur)	kV	7.2	12	17.5	24
Insulation level					
Insulation (50 Hz in 1 min - rms)	kV	20	28	38	50
Isolation (50 Hz in 1 min - rms)	kV	23	32	45	60
Isulation (1.2/50 ms - peak)	kV	23	32	45	60
Isolation (1.2/50 ms - peak)	kV	60	75	95	125
Short-time withstand current		70	85	110	145
Rate current of LBS and disconnector	A	630-1250			
Rated short time withstand current Ik	kA/s	12.5-16-20-25			
Maximum breaking capacity					
Transfomer off load	A	16	16	16	16
Cables off load	A	31.5	31.5	31.5	31.5
Fuse switch rate current	A	630	630	630	630
Fuse switch breaking capacity	kA	25	25	20	20
Standards					
Standard of disconnector		IEC 62271-102			
Standard of switch and fuse switch		IEC 62271-103			
Standards of voltage presence indicating systems		IEC 62271-206			



Gas SF6 circuit breaker up to 24kV

Vacuum circuit breaker up to 24kV

General characteristics

Rated voltage (Ur)	kV	12	17.5	24
Insulation voltage				
Power frequency withstand, 50 Hz in 1 min - rms (Ud)	kV	28	38	50
Lightning impulse withstand, 1.2/50 ms - peak (Up)	kV	75	95	125
Rated current (Ir)	kV		400-630-1250	
Short-time withstand current		85	110	145
Short circuit current (Isc)	A	25	12.5-20-25	12.5-16-20-25
Short time withstand current (Ik/tk)	kA/3s	25	12.5-20-25	12.5-16-20-25
Short-circuit making current (Ip)	kA	62.5	3 1.5-50-62.5	3 1.5-50-62.5
Rated switching sequence				
O-3 min-CO-3 min-CO		X	X	X
O-0.3 s-CO-3 min-CO		X	X	X
O-0.3 s-CO-3 min-CO		X	X	X
Operating times Opening	ms		< 50	
Breaking	ms		< 60	
Closing	ms		< 65	
Number of switching operations			10000	
Standards			IEC 62271-100	

Components

Current and voltage transformers

TMSec can be suitable with other voltage transformer such as Emic, Esitas, Dalian, etc.

Technical data

Operating voltage (Um)	kV	3.6	7.2	12	17.5	24
Rate power frequency withstand in 1 min (Ud)	kV	10	20	28	38	50
Rate impulse test (1.2/50 ms) pulse wave (Up)	kV	40	60	75	95	125
Rate frequency (Hz)	kV	50-60				
Secondary voltage	kV	100/S3; 110/S3; 120/S3; 100/3; 110/3; 120/3				
Rate burden max, in class 0.2	VA	30	30	30	50	50
Rate burden max, in class 0.5	VA	100	100	100	120	120
Rate burden max, in class 1.0	VA	200	200	200	250	250
Rate burden for protection purpose in class 3P	VA	100				
Insulation class	A	E				
Ambient temperature	°C	-25...+40				
Altitude	A	1000				
Standards		IEC 60044-2 (IEC 61869-3)				

TMSec can be suitable with other current transformer such as Emic, Esitas, Dalian, etc.

Technical data

Operating voltage (Um)	kV	3.6	7.2	12	17.5	24
Rate power frequency withstand in 1 min (Ud)	kV	10	20	28	38	50
Rate impulse test (1.2/50ms) pulse wave (Up)	kV	40	60	75	95	125
Rate frequency (Hz)	kV	50-60				
Rate Primary current	A	Up to 1250A				
Secondary current	VA	1 or 5				
Mettering classes	VA	0.2 - 0.2S/0.5 - 0.5S/1 -3- 5				
Protection classes	VA	5P; 10P; GI:PX				
Rate short-time thermal current	kA/s	max Ith = 200 x In				
Rate dynamic current (Idyn)	A	Idyn = 2.5 x Ith				
Insulation class	A	E				
Altitude	A	-25...+40				
Altitude	A	1000				
Standards		IEC 60044-1 (IEC 61869-2)				

Vacuum type contactor

Vacuum type contactor

Vacuum tightness

Vacuum contactors consist of three poles mounted on a structure with a control mechanism. Each pole encloses active parts within a vacuum-sealed insulator.

Gas pressure indicator

Gas pressure indicator (option for 24 kV)

- The switch is a sealed pressure system with open and close contacts rated for 0 bar relative pressure SF6.
- To monitor internal pressure, we offer either a pressure switch or an analog manometer on the switch, both installable without modification. They are temperature-compensated and compatible with main contact visibility upon request.

Voltage presence indicator

Voltage presence indicator

This device has integrated VPIS (Voltage Presence Indicating System) lights for checking voltage presence on cables.

Relay types used in TMSec such as ABB, Schneider Sepam, Easergy P3, Toshiba, Siemens and others as required.

Toshiba protection relays

ABB protection relays

Schneider protection relays

Siemens protection relays

Numerical relays protect and meter for machines and electrical distribution networks in industrial and utility substations at all voltage levels.

Protection functions

Functions	ANSI code
Phase under / overvoltage	27/59
Negative phase sequence overcurrent	46
Negative sequence overvoltage	47
Thermal overload	49
Earth overcurrent / Sensitive earth fault	50N/51N
3 Phase overcurrent	50/51
Circuit breaker failure	50BF
Restricted earth fault	64
Earth fault directional overcurrent	67N
3 phase directional overcurrent	67P
Auto reclose	79
Under / overfrequency	81U/O
Rate of change of Frequency	81R
Lockout relay	86
And more as required	...

Internal Arc

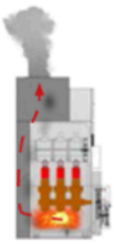
TMSec has two internal arc solutions

Solution with gas exhausted downwards

Installation solution with direct arc discharge to the outside in the below the switchgear.

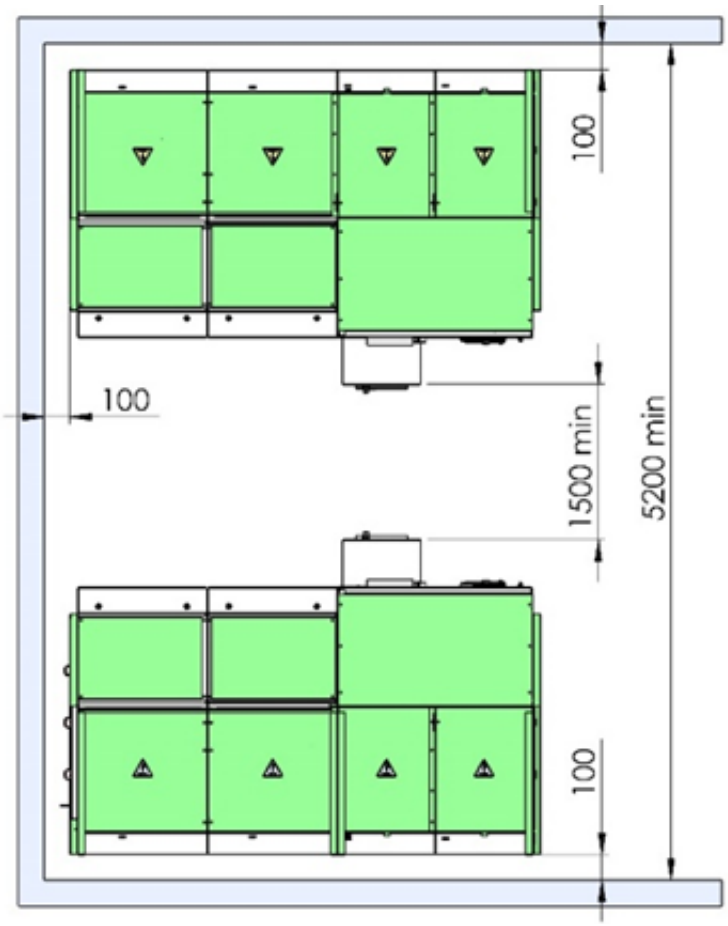
Solution with gas exhausted upwards

Installation solution with direct arc discharge to the outside in the above the switchgear.

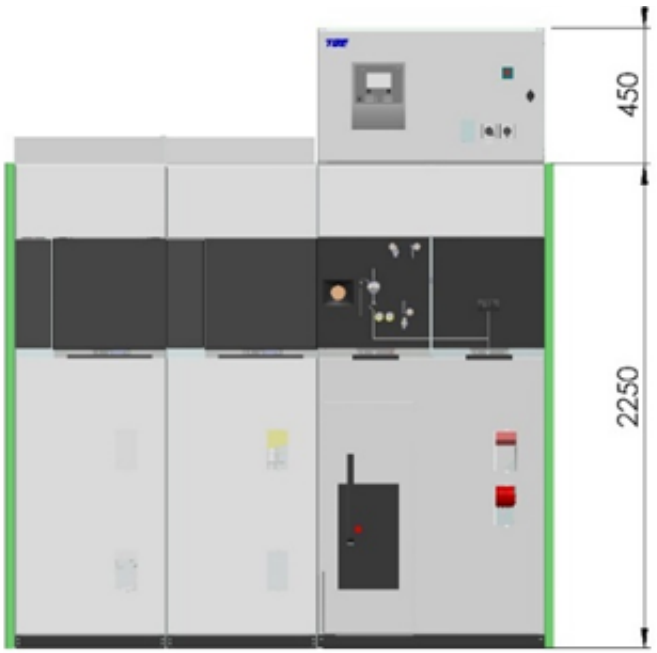
Internal Arc busbar	Internal Arc breaker	Internal Arc Cable Co.		
			Exhaust gases are canalized directly in the atmosphere	Upwards exhausted
			Exhaust gases are canalized through a flap device	
			Exhaust gases are canalized directly in the atmosphere	Downwards exhausted

Up to 24kV

Top view



Front view



Switching to a brighter future

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