SFA-RM

SF6
Gas Insulated
Switchgears

36-40.5kV
RMU

SFA ELECTRIC

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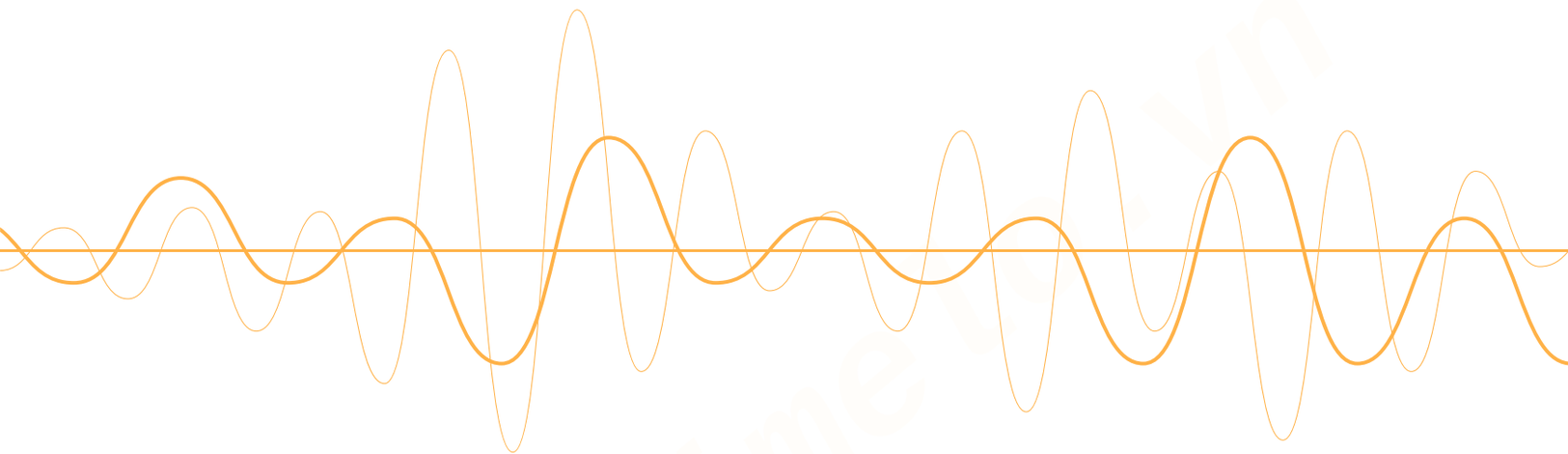


Welcome

SFA ELECTRIC

CORPORATE

About Us

SFA Electromechanical Electricity Industry and Trande Inc. (shortly SFA ELECTRIC) operate in the electromechanical sector. The company's founding partners have more than 40 years of experience in the sector and the company carries out its production activities in the factory located in Ankara Sinca Organized Industrial Zone on an area of 17.500m2

SFA ELECTRIC develops its products in R & D department to the relevant national/international standards and technical specifications. The developed products are taken to the serial production stage after passing the relevant type tests in accredited laboratories. ISO Quality Standards are observed in production.

SFA ELECTRIC; as an international firm, it has a rapid growth trend and has succeeded to be among the top 100 in the sector ranking with its export in 2017. Achieving higher levels in this ranking with new products and new markets is among the targets of the Company.

Mission

As SFA ELECTRIC , our mission is to provide medium-voltage switchgear to users in a cost-effective way by producing the highest quality..

Vision

It is to be a dynamic, innovative and differentiating brand in the global market for the development and production of medium voltage switchgear used in electricity transmission and distribution.

Environmental Policy

As a company that is responsible and responsible for its values, we promise to protect the environment and to comply with ISO 14001 standards.

In this context, we have constructed our business in a way that is more efficient and more useful to humanity and our world in the examination of the energy of societies.

We support environmentally friendly products and the reduction of carbon dioxide emissions.
In this sense, we follow the rules and support activities that reduce global warming.
In this context, we donate to TEMA and VWF institutions for every order we receive in accordance with our understanding of giving back to nature and our corporate strategy.

SFA ELECTRIC
PRODUCTS

01 > Sf6 Gas Insulated Switchgears And Controlgears (Cubicles) (36-40.5kV)

02 > Switching Devices

- Vacuum Circuit Breakers,
- Circuit Breakers with SF6,
- Switch-Disconnectors with SF6,
- Switch+Fuse Combinations with SF6,
- Earthing switches

03 > Air Insulated Metal Enclosed Switchgears And Controlgears (Cubicles)

04 > Seperable Cable Connectors

05 > Concrete Enclosure Compact Transformer Substatıons (≤ 1600 kVA)

- Concrete Enclosure
- Metal Sheet Steel Enclosure,

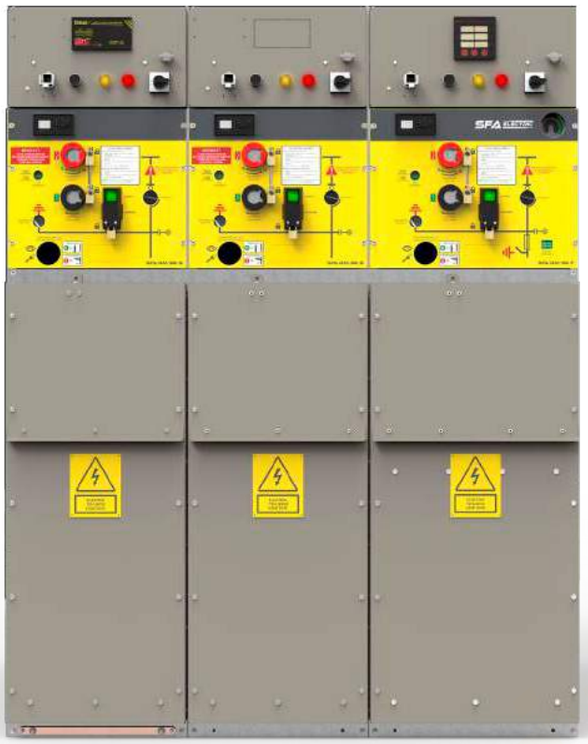
06 > Private Products

- Mobile Substations
- Invertör Kiosks (Concrete Enclosure)
- Invertör Kiosks (Container type)

CONTENTS

01

36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
GENERAL



Brief Features;

- Compact design and type tested,
- High level operator safety, high level operating reliability,
- Less filling SF6 gas pressure (1,1 bar, abs.), less minimum operating SF6 gas pressure (1,05 bar. abs.)
- Hermetically sealed pressure system, less than leakage rate % 0.1 year,
- Resistant to pollution, insensitive to humudity and altitude,
- Modular and compact type (extensible and non-extensible)
- The less maintenance the less maintenance cost
- Suitable for remote control and monitoring,
- Comply with relevant IEC and EN standarts

Safety;

- Wihtstand to internal arc due to durable design against thermal and dynamic effects,
- After operation, it is possible to check that if the earthing switch is closed or not via a surveliance window by eyes on the mechanism compartment.
- Continuouis interlocking systems prevent incorrect operation. Access to the cable compartment and fuse compartment is only possible if the related earthing switch is on the earthed position.

Fields Of Major Application;

- Secondary Electricity Distrubution networks
- MV/LV Distrubution Transformer Substation,
- Wind Power Plants,
- Sun Power Plants,
- Areas where industrial pollution is considerable
- High humudity areas
- Holiday villages, shopping centers

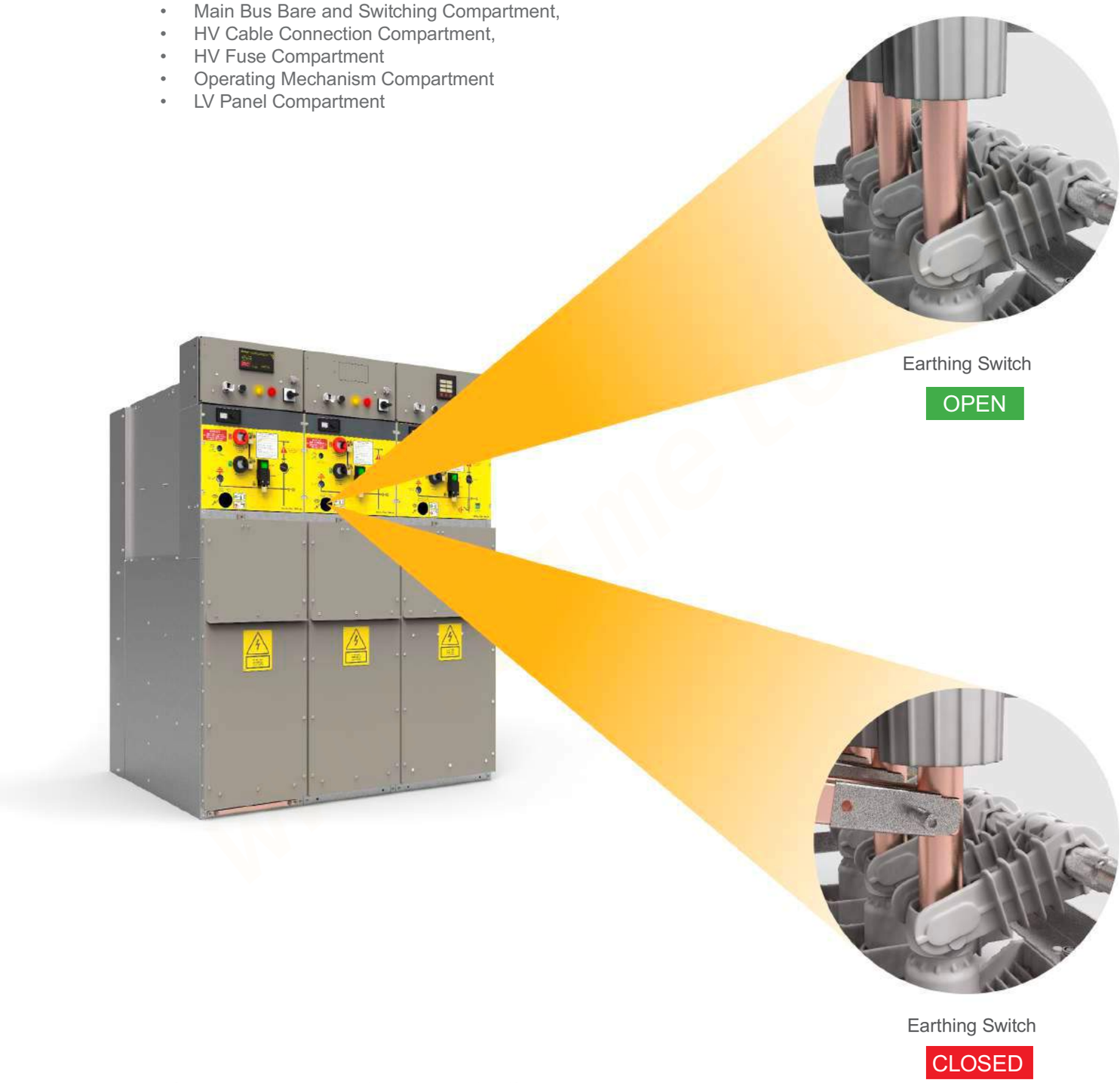
COMPACT type RMU's can be manufactured extensible either both side or left/right side.

Applied standard	:	**IEC 62271-200**
Loss of the Service Continuty	:	**LSC2**
Partition	:	**PM**
Internal arc	:	**IAC A (FL)**
		IAC A (FLR)*

*for modular types

SFA-RM36/ SFA-RM40.5 Cubicles consist of five compartments, mainly.

- Main Bus Bare and Switching Compartment,
- HV Cable Connection Compartment,
- HV Fuse Compartment
- Operating Mechanism Compartment
- LV Panel Compartment



Earthing Switch

OPEN

Earthing Switch

CLOSED

After operation, it is possible to check that if the earthing switch is closed or not via a surveliance window by eyes.

TYPES
COMPACT TYPE RING MAIN UNIT [SFA-RM36.SSF/ SFA-RM40.5.SSF]

Standard Equipments

2 (two) pcs feeder with switch-disconnector;

- Switch-disconnector
  (three-positioned, OPEN-CLOSED-EARTHED)
- Integrated capacitive voltage presence ındicator system (VPIS),
- Operating mechanism (typed M019)
- Plug-in bushings
  (Interface: C, Contact type: Bolted, Current: 630 A)

1 (one) pc feeder with switch+fuse combination;

- Switch-fuse combination,
- Integrated capacitive voltage presence indicator system (VPIS),
- Operating mechanism (typed M019)
- Plug-in bushings
  (Interface: B/C, Contact type: Sliding, Current: 400 A)
- Transformer Alarm Set

SF6 Gas Pressure Manometer (hermetic and double contact)
Main busbare, earthing bare and field configurators
Operating handle (anti-reflex)
HV Cable supporters
Survelliance window (for observing earthing switch position)
Pad locking facility
LV Panel
Motor + Geared set

For Extensible Type Compacts Rmu's

- Main Busbare Bushings,
- Connection bare and screened insulator
- Dumy plug

Optional Equipments

- Operating mechanism (typed M018)
- Earth Fault Relay,
- Remote OPENING and CLOSING operation with cable (ROCO)
- HV FUSE integrated with thermal cut-out and striker
  (medium type)
- More depth HV Cable Compartment (aiming to connect two T type connectors back to back on the same phase) *
- Complying to SCADA
- HV Fuse (

* The depth of the cable connection compartment which can be connected to the same phase two "T" type connectors (back-to back) is greater than 77 mm.

COMPACT TYPE RING MAIN UNIT [SFA-RM36.SSB/ SFA-RM40.5.SSB]

Standard Equipments

2 (two) pcs feeder with switch-disconnector;

- Switch-disconnector (three-positioned, OPEN-CLOSED-EARTHED)
- Integrated capacitive voltage presence ındicator system (VPIS),
- Operating mechanism (typed M019)
- Plug-in bushings (Interface: C, Contact type: Bolted, Current: 630 A)

1 (one) pc feeder with Vacuum Circuit Breaker;

- Vacuum circuit Breaker,
- Disconnector with earthing switch,
- Over current relay,
- Current Transformer
- Integrated capacitive voltage presence ındicator system (VPIS),
- Operating mechanism
- Plug-in bushings (Interface: C, Contact type: Bolted, Current: 630 A)
- Transformer Alarm Set (in case of usage as a transfomer protection)

SF6 Gas Pressure Manometer (hermetic and double contact)
Main busbare, earthing bare and field configurators
Operating handle (anti-reflex)
HV Cable supporters
Survelliance window (for observing earthing switch position)
Pad locking facility
LV Panel
Motor + Geared set (for switch-disconnector)

For Extensible Type Compacts Rmu's

- Main Busbare Bushings,
- Connection bare and screened insulator
- Dumy plug

Optional Equipments

- Operating mechanism (typed M018)
- Earth Fault Relay,
- Remote OPENING and CLOSING operation with cable (ROCO)
- More depth HV Cable Compartment (aiming to connect two T type connectors back to back on the same phase) *
- Self Protection Relay
- Complying to SCADA

There is no need Auxilary Service Voltage to trip Circuit Breaker if Self Powered Relay is used.

* The depth of the cable connection compartment which can be connected to the same phase two "T" type connectors (back-to back) is greater than 77 mm.

TYPES
CUBICLE WITH SWITCH-DISCONNECTOR [SFA-RM36.S/ SFA-RM40.5.S]

Standard Equipments

- Switch-disconnector
  (three-positioned, OPEN-CLOSED-EARTHED)
- Integrated capacitive voltage presence ındicator system (VPIS),
- Operating mechanism (typed M019)
- Plug-in bushings
  (Interface: C, Contact type: Bolted, Current: 630 A)
- SF6 Gas Pressure Manometer (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- Operating handle (anti-reflex)
- HV Cable supporters
- Survelliance window (for observing earthing switch position)
- Pad locking facility
- LV Panel
- Motor + Geared set
- Main Busbare Bushings,
- Connection bare and screened insulator
- Dumy plug

Optional Equipments

- Operating mechanism (typed M018)
- Earth Fault Relay,
- Ampermeter
- Remote OPENING and CLOSING operation with cable (ROCO)
- HV FUSE integrated with thermal cut-out and striker
  (medium type)
- More depth HV Cable Compartment
  (aiming to connect two T type connectors back to back on the same phase) *
- AC/DC Battery Rectifier Set
- Outer Cone Plug-in Bushing for lateral incoming
- Complying to SCADA

Outer Cone Plug-in Bushing for lateral incoming
(EN 50181, Interface: C, bolted, 630 A)

* The depth of the cable connection compartment which can be connected to the same phase two “T” type connectors (back-to back) is greater than 77 mm.

CUBICLE WITH SWITCH-FUSE COMBINATION [SFA-RM36.F/ SFA-RM40.5.F]

Standard Equipments

- Switch-fuse combination,
- Integrated capacitive voltage presence ındicator system (VPIS),
- Operating mechanism (typed M019)
- Plug-in bushings (Interface: B/C, Contact type: Sliding, Current: 400 A)
- Transformer Alarm Set
- SF6 Gas Pressure Manometer (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- Operating handle (anti-reflex)
- HV Cable supporters
- Survelliance window (for observing earthing switch position)
- Pad locking facility
- LV Panel
- Motor + Geared set
- Main Busbar Bushings,
- Connection bare and screened insulator
- Dumy plug
- HV Fuse enclosure (epoxy)
- Earthing switch (1 kA)

Optional Equipments

- Remote OPENING and CLOSING operation with cable (ROCO)
- HV FUSE integrated with thermal cut-out and striker (medium type)
- More depth HV Cable Compartment (aiming to connect two T type connectors back to back on the same phase) ✱
- Complying to SCADA
- AC/DC Battery Rectifier Set
- Outer Cone Plug-in Bushing for lateral incoming

Outer Cone Plug-in Bushing for lateral incoming
(EN 50181, Interface: C, bolted, 630 A)

TYPES
CUBICLE WITH VACUUM CIRCUIT BREAKER [SFA-RM36.B/ SFA-RM40.5.B]

Standard Equipments

- Vacuum circuit Breaker,
- Disconnector with earthing switch,
- Integrated capacitive voltage presence ındicator system (VPIS),
- Plug-in bushings (Interface: C, Contact type: Bolted, Current: 630 A)
- Over current relay,
- Current Transformer
- SF6 Gas Pressure Manometer (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- HV Cable supporters
- Survelliance window (for observing earthing switch position)
- Pad locking facility
- LV Panel
- Main Busbare Bushings,
- Connection bare and screened insulator
- Dumy plug

Optional Equipments

- Earth Fault Relay,
- Remote OPENING and CLOSING operation with cable (ROCO)
- Transformer Alarm Set
  (in case of usage as a transfomer protection)
- More depth HV Cable Compartment (aiming to connect two T type connectors back to back on the same phase) *
- Self Protection Relay
- Outer Cone Plug-in Bushing for lateral incoming
- Complying to SCADA

Outer Cone Plug-in Bushing for lateral incoming
(EN 50181, Interface: C, bolted, 630 A)

* The depth of the cable connection compartment which can be connected to the same phase two “T” type connectors (back-to back) is greater than 77 mm.

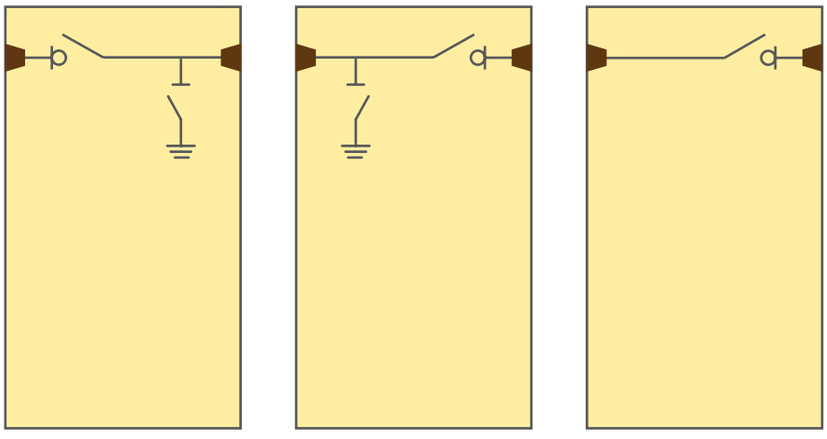
CUBICLE WITH BUS BAR COUPLING [SFA-RM36.C/ SFA-RM40.5.C]

Standard Equipments

- Switch-disconnector
  (three-positioned, OPEN-CLOSED-EARTHED)
- Operating mechanism (typed M019)
- SF6 Gas Pressure Manometer
  (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- Operating handle (anti-reflex)
- Survelliance window
  (for observing earthing switch position)
- Pad locking facility
- LV Panel
- Motor + Geared set
- Main Busbare Bushings,
- Connection bare and screened insulator

Optional Equipments

- Operating mechanism (typed M018)
- Remote OPENING and CLOSING operation with cable (ROCO)
- Switch-disconnector without earthing switch
  (in case there is no Survelliance Window)
- AC/DC Battery Rectifier Set
- Complying to SCADA

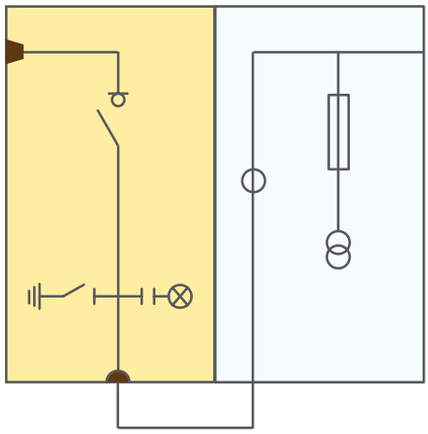


TYPES

METERING (CT+VT) GROUPE WITH SWITCH-DISCONNECTOR
[SFA-RM36.M[S]/ [SFA-RM40.5.M[S]

SFA - RM36.M (S)/ SFA - RM40.5.M (S)

SFA - RM36.M/ SFA - RM40.5.M



Standard Equipments

SF6 Gas Insulated switch-disconnector cubicle with lateral incoming (SFA-RM36.S/ SFA-RM40.5.S)

- Switch-disconnector (three-positioned, OPEN-CLOSED-EARTHED)
- Integrated capacitive voltage presence indicator system (VPIS),
- Operating mechanism (typed M019)
- Plug-in bushings (Interface: C, Contact type: Bolted, Current: 630 A)
- SF6 Gas Pressure Manometer (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- Operating handle (anti-reflex)
- HV Cable supporters
- Survelliance window (for observing earthing switch position)
- Pad locking facility
- LV Panel
- Motor + Geared set
- Main Busbare Bushings,
- Connection bare and screened insulator
- Optional: Outer Cone Plug-in Bushing for lateral incoming

Air Insulated Metering (CT+VT) Cubicle (SFA - RM36.M/ SFA - RM40.5.M)

- Busbare,
- Current Transformers
- Voltage Transformers
- Voltmeter and Voltmeter Commutater
- Active/Reactive Power Meter
- HV Fuses for Voltage Transformers

HV Connection Cable Between Cubicles
(equipped with cable terminations)

Optional Equipments

- Power analyser,
- Power Quality Recorder
- AC/DC Battery Rectifier Set
- Complying to SCADA

METERING (CT+VT) GROUPE WITH VACUUM CIRCUIT BREAKER
[SFA-RM36.M[B]/ [SFA-RM40.5.M[B]

Standard Equipments

SF6 Gas Insulated Vacuum Circuit Breaker cubicle with lateral incoming (SFA-RM36.B/ SFA-RM40.5.B)

- Vacuum circuit Breaker,
- Disconnector with earthing switch,
- Integrated capacitive voltage presence ındicator system (VPIS),
- Plug-in bushings (Interface: C, Contact type: Bolted, Current: 630 A)
- Over current relay,
- Current Transformer
- SF6 Gas Pressure Manometer (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- HV Cable supporters
- Survelliance window (for observing earthing switch position)
- Pad locking facility
- LV Panelv
- Main Busbare Bushings,
- Connection bare and screened insulator
- Optional: Outer Cone Plug-in Bushing for lateral incoming

SFA - RM36.M (B)/ SFA - RM40.5.M (B)

Air Insulated Metering (CT+VT) Cubicle (SFA - RM36.M/SFA - RM40.5.M)

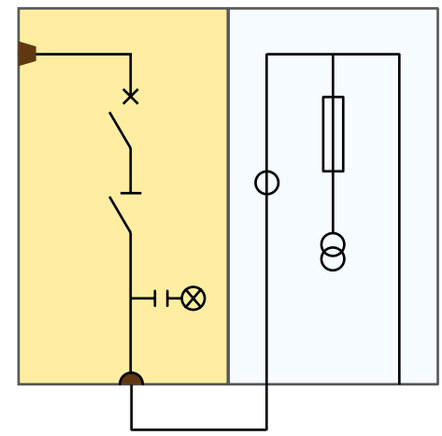
- Busbare,
- Current Transformers
- Voltage Transformers
- Voltmeter and Voltmeter Commutater
- Active/Reactive Power Meter
- HV Fuses for Voltage Transformers

SFA - RM36.M/ SFA - RM40.5.M

HV Connection Cable Between Cubicles
(equipped with cable terminations)

Optional Equipments

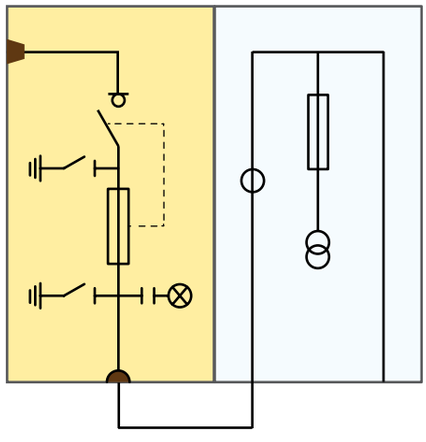
- Power analyser,
- Power Quality Recorder
- AC/DC Battery Rectifier Set
- Complying to SCADA



METERING (CT+VT) GROUPE WITH SWITCH-FUSE COMBINATION
[SFA-RM36.M[F]/ [SFA-RM40.5.M[F]

SFA-RM36.M (F)/ SFA-RM40.5.M (F)

SFA - RM36.M/ SFA - RM40.5.M



Standard Equipments

SF6 Gas Insulated Switch-Fuse Combiantion cubicle with lateral incoming (SFA-RM36.F/ SFA-RM40.5.F)

- Switch-fuse combination,
- Integrated capacitive voltage presence indicator system (VPIS),
- Operating mechanism (typed M019)
- Plug-in bushings
  (Interface: B/C, Contact type: Sliding, Current: 400 A)
- Transformer Alarm Set
- SF6 Gas Pressure Manometer (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- Operating handle (anti-reflex)
- HV Cable supporters
- Survelliance window (for observing earthing switch position)
- Pad locking facility
- LV Panel
- Motor + Geared set
- Main Busbar Bushings,
- Connection bare and screened insulator
- HV Fuse enclosure (epoxy)
- Earthing switch (1 kA)
- Optional: Outer Cone Plug-in Bushing for lateral incoming

Air Insulated Metering (CT+VT) Cubicle (SFA - RM36.M/ SFA - RM40.5.M)

- Busbare,
- Current Transformers
- Voltage Transformers
- Voltmeter and Voltmeter Commutater
- Active/Reactive Power Meter
- HV Fuses for Voltage Transformers

HV Connection Cable Between Cubicles
(equipped with cable terminations)

Optional Equipments

- Power analyser,
- Power Quality Recorder
- AC/DC Battery Rectifier Set
- Complying to SCADA
- HV Fuses for switch fuse combination

VOLTAGE METERING GROUPE WITH SWITCH-DISCONNECTOR
[SFA-RM36.V[S]/ [SFA-RM40.5.V[S]

Standard Equipments

Sf6 Gas Insulated switch-disconnector cubicle (SFA-RM36.S/ SFA-RM40.5.S)

- Switch-disconnector
  (three-positioned, OPEN-CLOSED-EARTHED)
- Integrated capacitive voltage presence ındicator system (VPIS),
- Operating mechanism (typed M019)
- Plug-in bushings (Interface: C, Contact type: Bolted, Current: 630 A)
- SF6 Gas Pressure Manometer (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- Operating handle (anti-reflex)
- HV Cable supporters
- Survelliance window (for observing earthing switch position)
- Pad locking facility
- LV Panel
- Motor + Geared set
- Main Busbare Bushings,
- Connection bare and screened insulator
- Optional: Outer Cone Plug-in Bushing for lateral incoming

SFA-RM36.V (S)/ SFA-RM40.5.V (S)

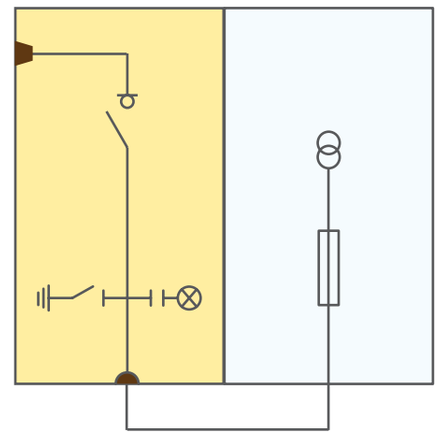
Air Insulated Metering (VT) Cubicle (SFA - RM36.V/ SFA - RM40.5.V)

- Busbare,
- Voltage Transformers
- Voltmeter and Voltmeter Commutater
- HV Fuses for Voltage Transformers

HV Connection Cable Between Cubicles
(equipped with cable terminations)

Optional Equipments

- Power analyser,
- Power Quality Recorder
- AC/DC Battery Rectifier Set
- Complying to SCADA



TYPES

CABLE RISING CUBICLE [SFA-RM36.CR]/ [SFA-RM40.5.CR]

Standard Equipments

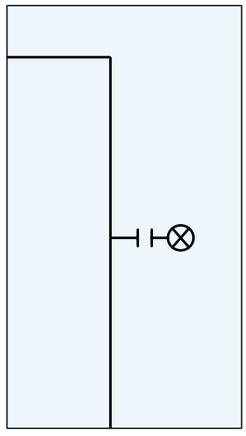
- Integrated capacitive voltage presence ındicator system (VPIS),
- HV Cable supporters

Optional Equipments

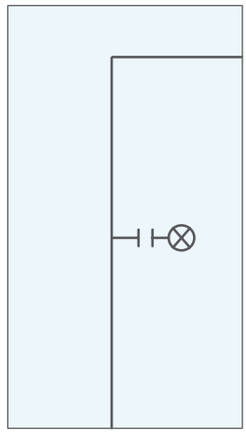
- HV Connection Cable
  (both side equipped with Cable Terminations)

Outer cone plug-in bushing to be connected XLPE cable should be met the EN 50181 and having interface “C”.

Outer Cone Plug-in Bushing for lateral incoming
(EN 50181, Interface: C, bolted, 630 A)



LEFT side connection

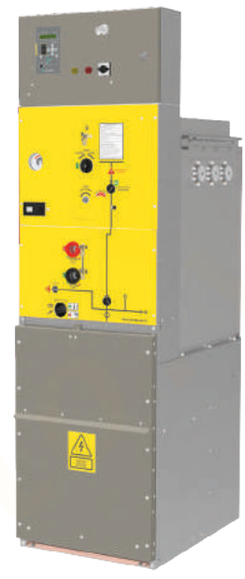


RIGHT side conection

CUBICLE WITH VACUUM CIRCUIT BREAKER EQUIPPED WITH CT+VT
[SFA-RM36.B[CV]/ [SFA-RM40.5.B[CV]

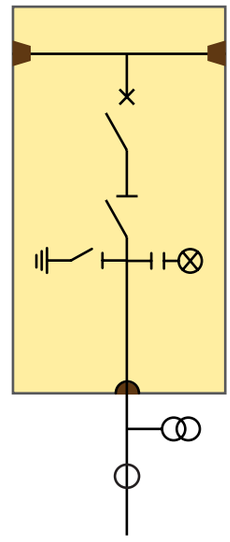
Standard Equipments

- Vacuum circuit Breaker,
- Disconnector with earthing switch,
- Integrated capacitive voltage presence ındicator system (VPIS),
- Plug-in bushings (Interface: C, Contact type: Bolted, Current: 630 A)
- Over current relay,
- Current Transformer,
- Voltage Transformers,
- SF6 Gas Pressure Manometer (hermetic and double contact)
- Main busbare, earthing bare and field configurators
- HV Cable supporters
- Survelliance window (for observing earthing switch position)
- Pad locking facility
- LV Panel
- Main Busbare Bushings,
- Connection bare and screened insulator
- Dumy plug



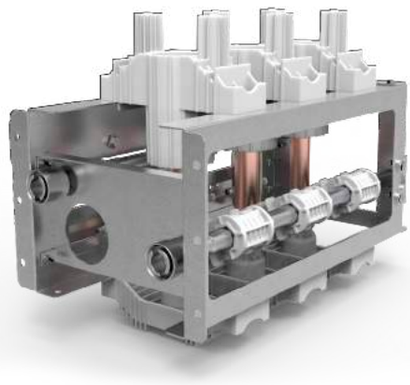
Optional Equipments

- Earth Fault Relay,
- Remote OPENING and CLOSING operation with cable (ROCO)
- Transformer Alarm Set
  (in case of usage as a transfomer protection)
- More depth HV Cable Compartment (aiming to connect two T type connectors back to back on the same phase)
- Self Protection Relay
- Outer Cone Plug-in Bushing for lateral incoming
- Complying to SCADA



Outer Cone Plug-in Bushing for
lateral incoming
(EN 50181, Interface: C, bolted, 630 A)

MV terminal bushings of Voltage Transformer should be met EN 50181, plug-in typed and having interface “C”.



SWITCH-DISCONNECTOR (with earthing switch)

- Comply to IEC 62271-103,
- Three-phased, three positioned (OPEN-CLOSE-EARTHED)
- Load current is interrupted in the SF6
- Electrical endurance class: E3,
- Mechanical endurance class: M1

OPERATING MECHANISM OF THE SWITCH-DISCONNECTOR

For earthing switch;

- Electrical endurance class: E2,
- Mechanical endurance class: M1

Operating Mechanism;

- Stored energy operation
- Standart mecahanisim: typed M019 (with coil), optional mechanism: Typed M018 (twisted type)
- Independent of the operator operation,
- Comply to motor and without motor

M018 Typed Mechanism

- Opening and Closing operation takes place at one stage. The state changes (closing, opening and earthing operation) is performed manually by the Operating Handle. For motorized types, mentioned operation is performed via geared motor.

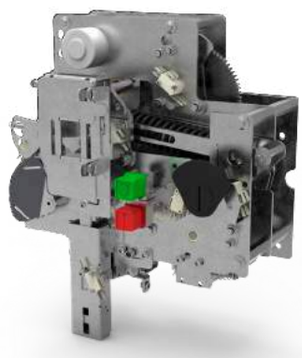
M019 Typed Mechanism

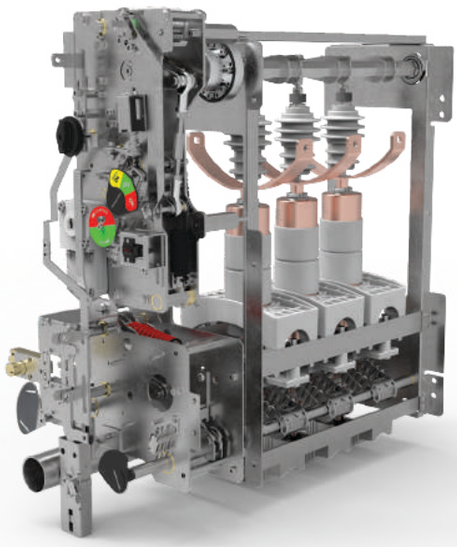
- Energy storage is performed by the operator using by Operating Handle or via geared motor (for motorized mechanism)

Relasing of the energy is performed;

- By operator with using push button (mechanically)
- By shunt coils coils (electrically)
- By striker pin on the switch-fuse combination (mechanically)

Operating Handle





VACUUM CIRCUIT BREAKER+DISCONNECTOR WITH EARTHING SWITCH UNIT

Vacuum Circuit Breaker;

- Applied standard: IEC 62271-100
- Electrical Endurance Class: E2 (for which are used in the cable network)
- Mechanical Endurance Class: M1 (2000 times)

Disconnector;

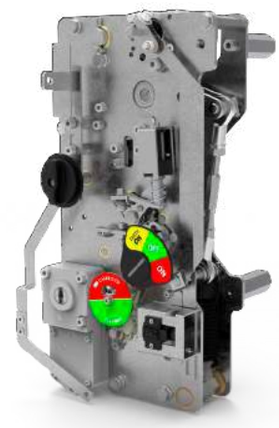
- Applied standart: IEC 62271-102
- Three-phased, three positoned (OPEN-CLOSED-EARTHED)
- Mechanical Endurance Class: M1 (1000 times)

Earthing switch;

- Applied standart: IEC 62271-102
- Electrical Endurance Class: E2 (5 times makingon short circuit)
- Mechanical Endurance Class: M1 (1000 times)

OPERATING MECHANISM OF THE VACUUM CIRCUIT BREAKER;

- Operating mecahanism is based on Stored Energy within a spring. Storing of Energy is provided with either geared MOTOR (electrically) or operating handle (manualy). Relasing of energy is provided with either push button on the panel (manualy) or shunt coil (electricaly)
- Opening spring is charged during the closing operation. So, it is ready for tripping.
- Suitable for rapid re-closing.
- Suitable for Self Powered Relay application



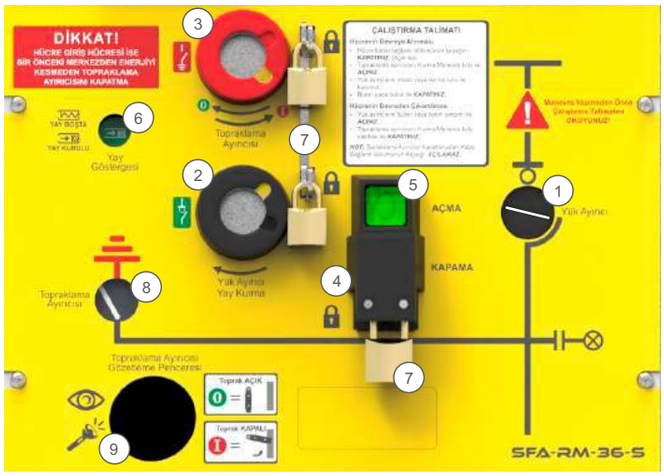
AUXILARY SERVICE VOLTAGES

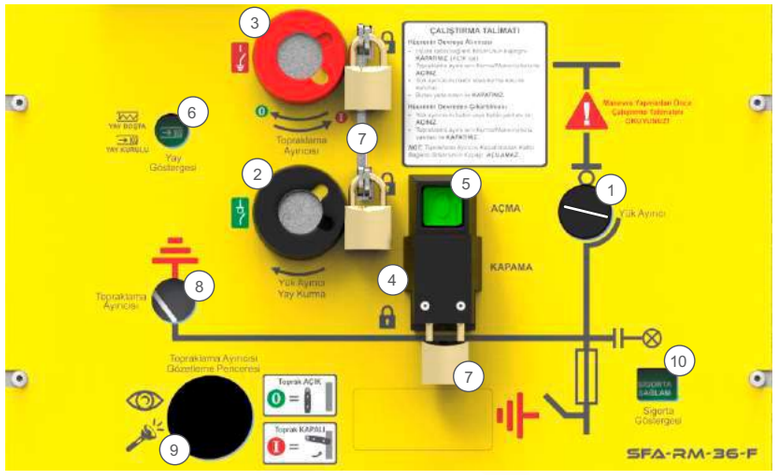
	VOLTAGE*
Motor	220 VAC; 220 VDC; 110 VDC; 24 VDC; 48 VDC
Coil	24 VDC; 48 VDC, 110 VDC

*Contact with SFA ELECTRIC if different service voltage is desired.

05

36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
CONTROL PANEL



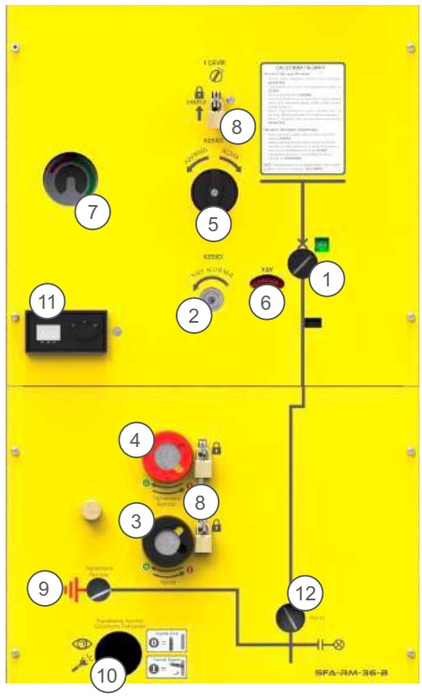


FOR CUBICLE WITH SWITCH-DISCONNECTOR (for M019 typed mechanism)

1. Position indicator for switch-disconnector
2. Operating Handle Shaft for switch-disconnector
3. Operating Handle Shaft for earthing switch
4. Push Button for closing operation of switch-disconnector (mechanically)
5. Push Button for opening operation of switch-disconnector (mechanically)
6. “Spring Charged” or “Spring Discharged” indicator for switch-disconnector
7. Padlocking
8. Position indicator for earthing switch
9. Survialance window (for earthing switch contact position)

FOR CUBICLE WITH SWITCH FUSE COMBINATION (for M019 typed mechanism)

1. Position indicator for switch-disconnector
2. Operating Handle Shaft for switch-disconnector
3. Operating Handle Shaft for earthing switch
4. Push Button for closing operation of switch-disconnector (mechanically)
5. Push Button for opening operation of switch-disconnector (mechanically)
6. “Spring Charged” or “Spring Discharged” indicator for switch-disconnector
7. Padlocking
8. Position indicator for earthing switch
9. Survialance window (for earthing switch contact position)
10. HV Fuse indicator

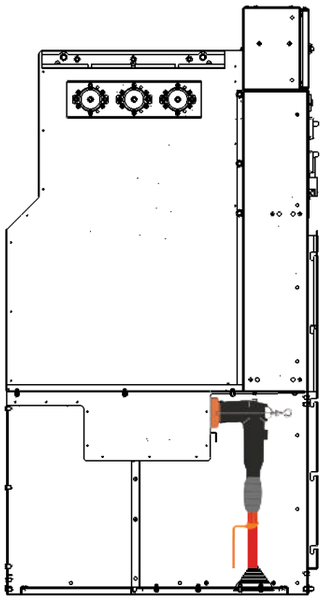


FOR CUBICLE WITH VACUUM CIRCUIT BREAKER

1. Position indicator for Circuit Breaker
2. Operating Handle Shaft for charging spring
3. Operating Handle Shaft for disconnector
4. Operating Handle Shaft for earthing switch
5. Thump knot for OPENING and CLOSING
6. “Spring Charged” or “Spring Discharged” indicator for switch disconnector
7. SF6 Gas Indicator
8. Padlocking
9. Position indicator for earthing switch
10. Survialance window (for earthing switch contact position)
11. Voltage Presence Indicator
12. Position indicator for disconnector

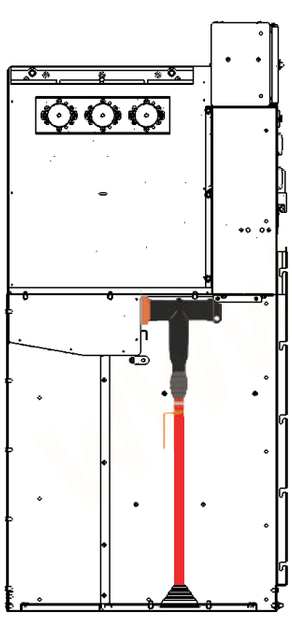
36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
SIDE EXTENSIONS

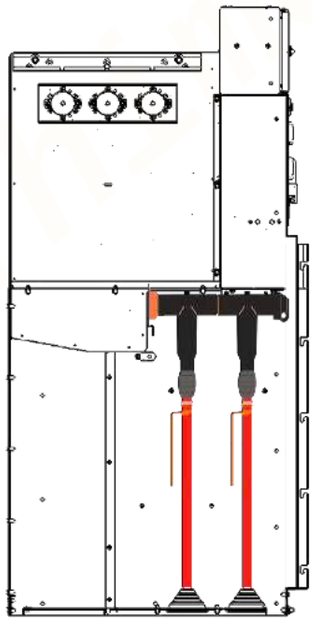
Cable Connection of the SFA-RM.36 is done in the Cable Connection Compartment which is located at the front of the cubicle by using Seperable Cable Connectors.



Separable Connector type : “L” type
/ Separable Connector type : “T” type

Contact type : Sliding
Rated Current : 400 A
Interface :B/C



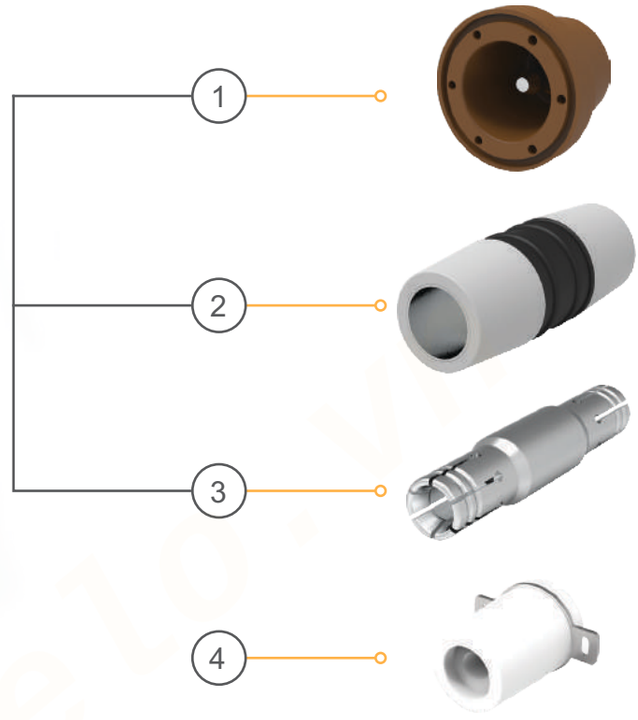


Separable Connector type : “T” type

Contact type : Bolted
Rated Current : 630 A
Interface :C

WARNING!

1. Separable Connectors to be used should have type test reports/certificates according to the related standards.
2. The Installation Instructions of the manufacture must be followed.
3. Metal screen of the HV cable should be connected to the earthing bare of the cubicle.



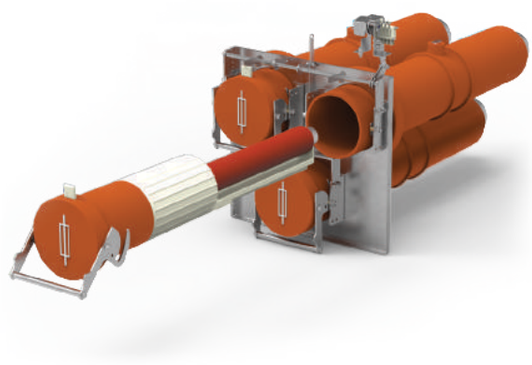
Extension Kit	
1	Side Bushing
2	Screende insulator
3	Busbar
4	Dumy plug

Desired functional unit are connected side by side by using Extension Kit. Unused side should be covered by dumy plug.

Extension Kit equipment;

- Type tested,
- Pre fabricated
- Withstand to rated voltage and rated short time withstand current of the cubicles.

36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
HV FUSE



HV Fuses to be used in SFA-RM36/ SFA-RM40.5 should be integrated thermal cut-out type and with striker (medium).

VOLTAGE	DIMENSIONS (mm)	
	A	D
17.5kV	33	367
24kV	33	442
36-40.5kV	33	537

Rated Voltage (kV)	36-40.5 kV						
Rated Power (kVA)	250	400	630	800	1000	1250	1600
% Uk	4,5			6			
İnterteknik (Tip: ACT)	16A	16A	20A	25A	31,5A	40A	50A
Güral	16A	16A	20A	25A	30A	40A	50A

In case of using except 36 kV voltage level, please contact with SFA ELECTRIC to determine correct HV Fuse.

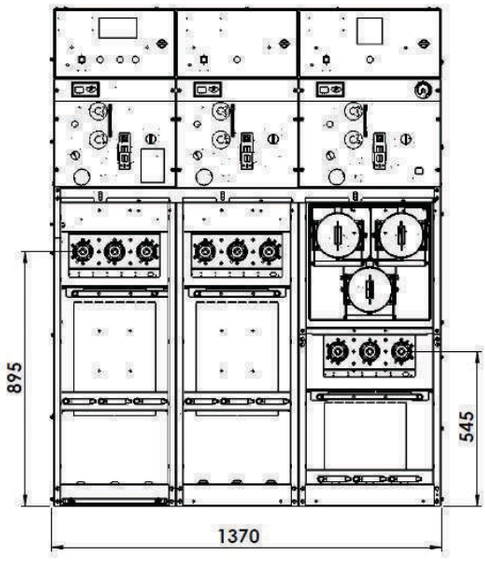
ACCESSIBILITY AND COMPLIANCE WITH STANDARDS

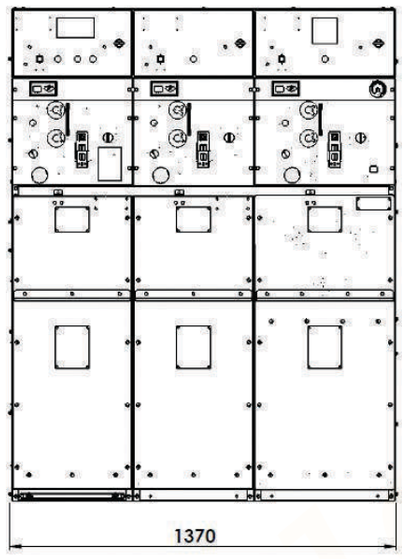
	STANDARDS	CLASSIFICATION	
SFA-RM 36/ SFA-RM 40.5	TS EN 62271-200	Partition	PM
		Loss of Service Contuinity	LSC 2
		Internal arc (for compact type)	A (FL) 16:20 kA-1s
		Internal arc (for modular type)	A (FLR) 16:20 kA-1s
SWITCH-DISCONNECTOR	TS EN 62271-103	General purpose, M1, E3	
SWITCH-FUSE COMBINATION	TS EN 62271-105		
CIRCUIT BREAKER	TS EN 62271-100	M1, E2 (for cable network)	
DISCONNECTOR	TS EN 62271-102	M1, E0	
EARTHING SWITCH	TS EN 62271-102	M1, E2	
VOLTAGE DETECTION SYSTEM	TS EN 61243-5	Voltage Presence Indicating System (VPIS)	
PLUG-IN BUSHINGS	TS EN 50181	Outer cone plug-in bushing	

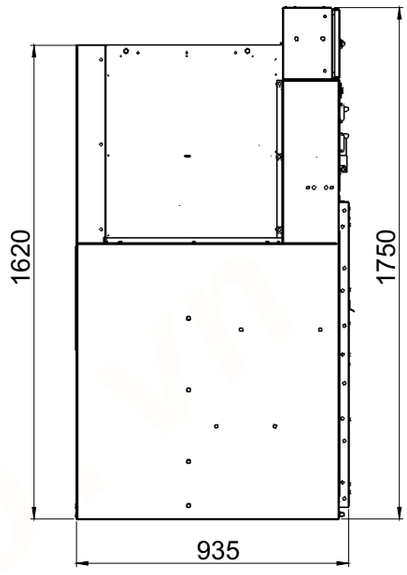
	IP CLASS	ACCESSIBILITY	INTERLOCKINGS
SWITCHING COMPARTMENT	IP 67	NON-ACCESSIBLE	-
HV CABLE CONNECTION COMPARTMENT	IP2X	ACCESSIBLE	Unless the earthing switch is earthed, the cover of the compartment can not be opened.
HV FUSE COMPARTMENT	IP3X	ACCESSIBLE	Unless the up and down-stream earthing switchs are earthed, the cover of the compartment can not be opened.
OPERATING MECHANISM COMPARTMENT	IP2X	ACCESSIBLE	Accessible with tool.
LV PANEL COMPARTMENT	IP3X	ACCESSIBLE	-

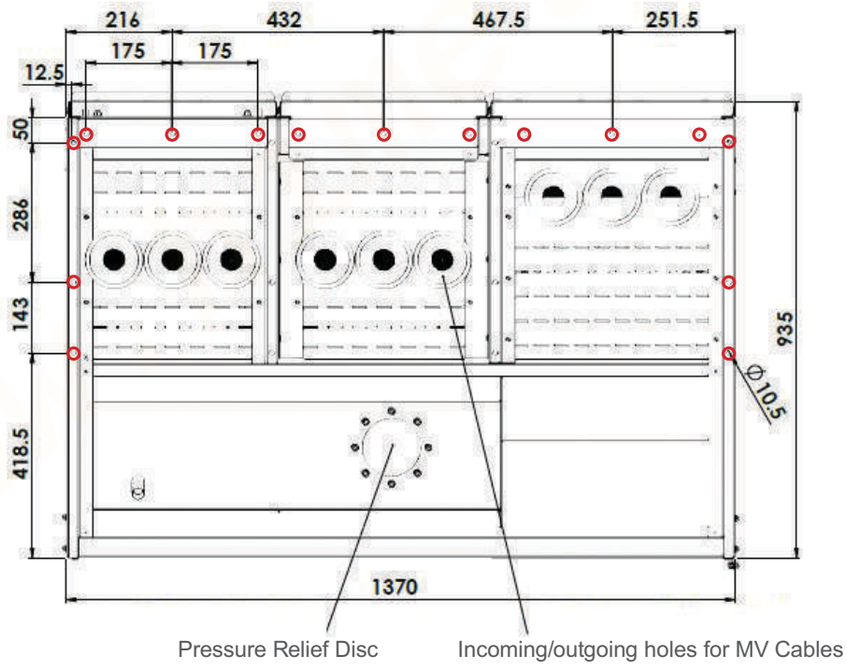
DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

01. COMPACT RING MAIN UNIT [SFA-RM36.SSF]/ [SFA-RM40.5.SSF]

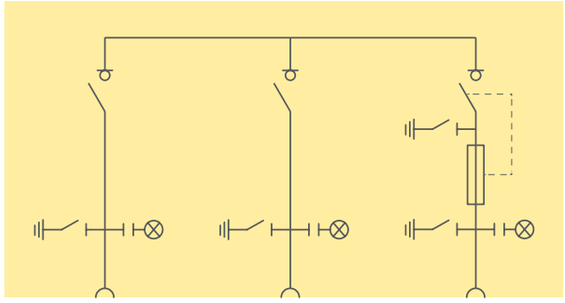








Single Line

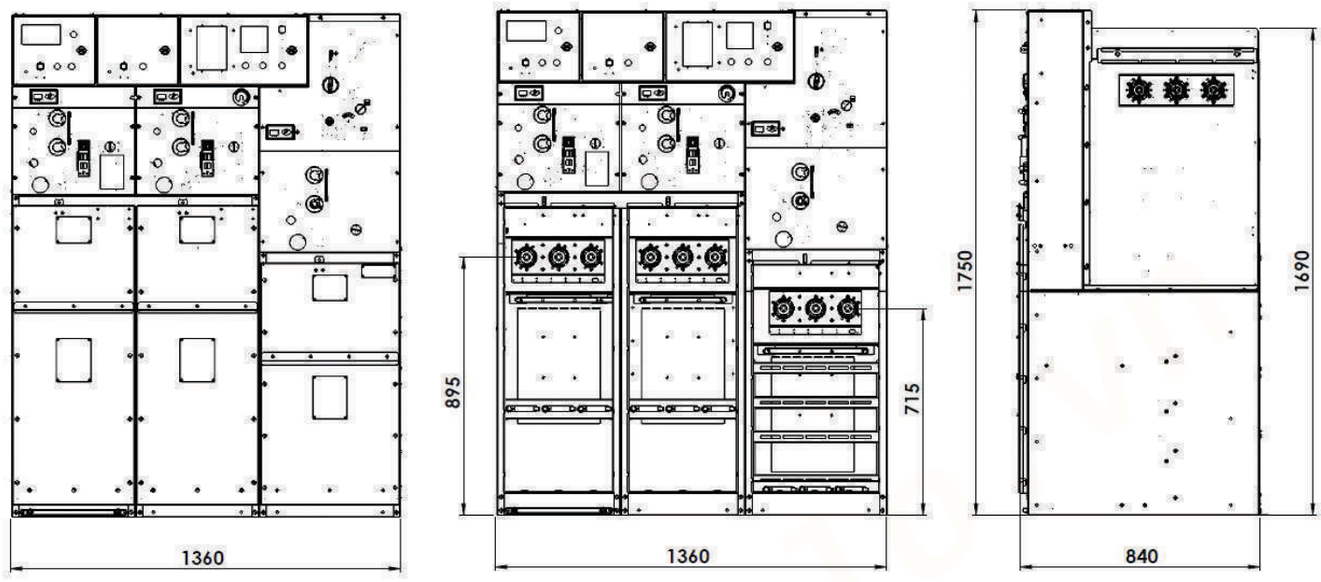


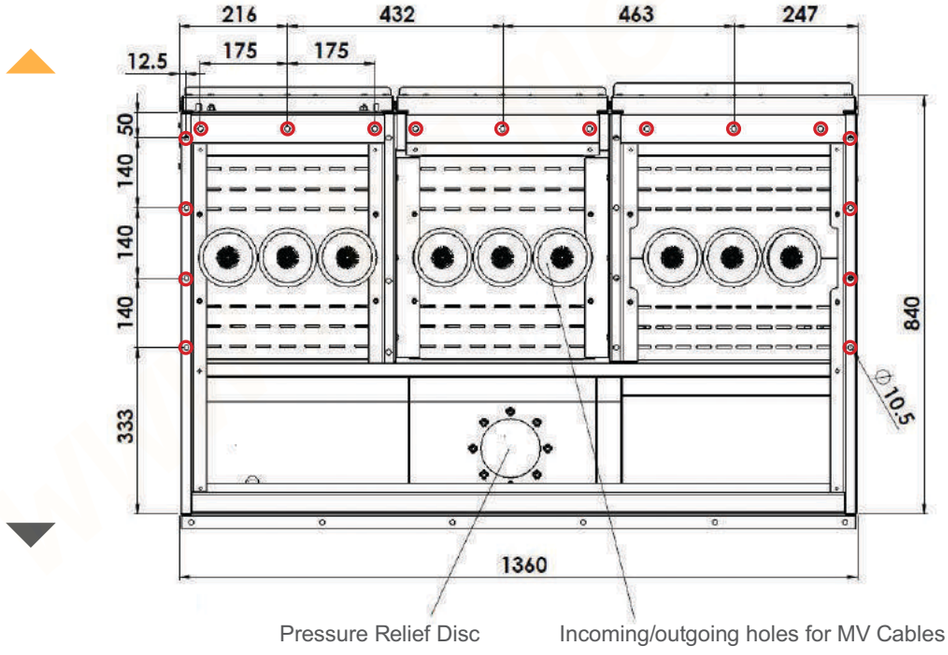
- Fixing points
- Front
- Rear

The depth of the cable connection compartment which can be connected to the same phase two "T" type connectors (back-to back) is greater than 77 mm.

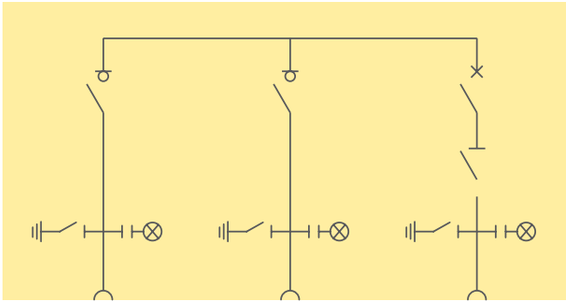
DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

02. COMPACT RING MAIN UNIT [SFA-RM36.SSB]/ [SFA-RM40.5.SSB]





Single Line

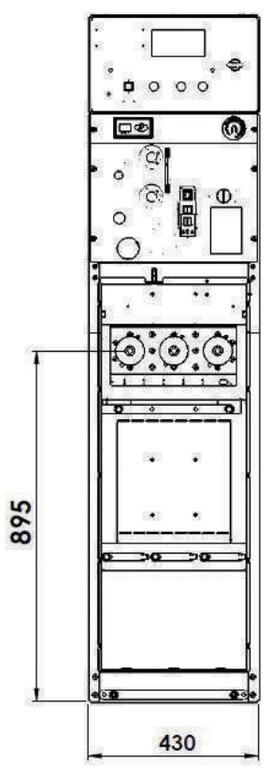


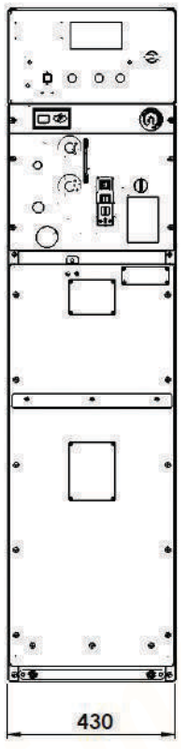
- Fixing points
- Front
- Rear

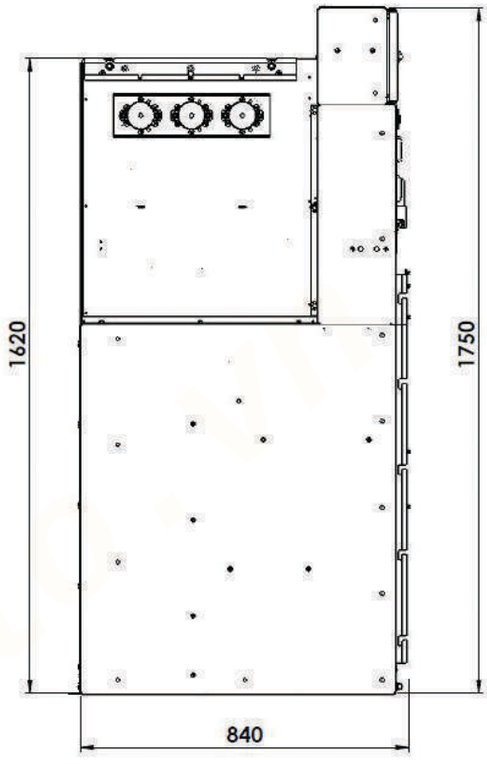
The depth of the cable connection compartment which can be connected to the same phase two “T” type connectors (back-to back) is greater than 77 mm.

DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

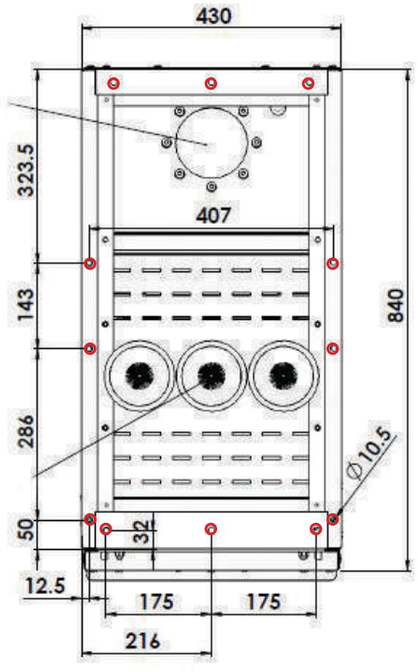
03. CUBICLE WITH SWITCH-DISCONNECTOR [SFA-RM36.S]/ [SFA-RM40.5.S]



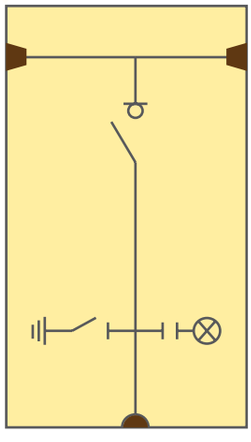




✱ The depth of the cable connection compartment which can be connected to the same phase two “T” type connectors (back-to back) is greater than 77 mm.



Single Line



Incoming/outgoing holes for MV Cables

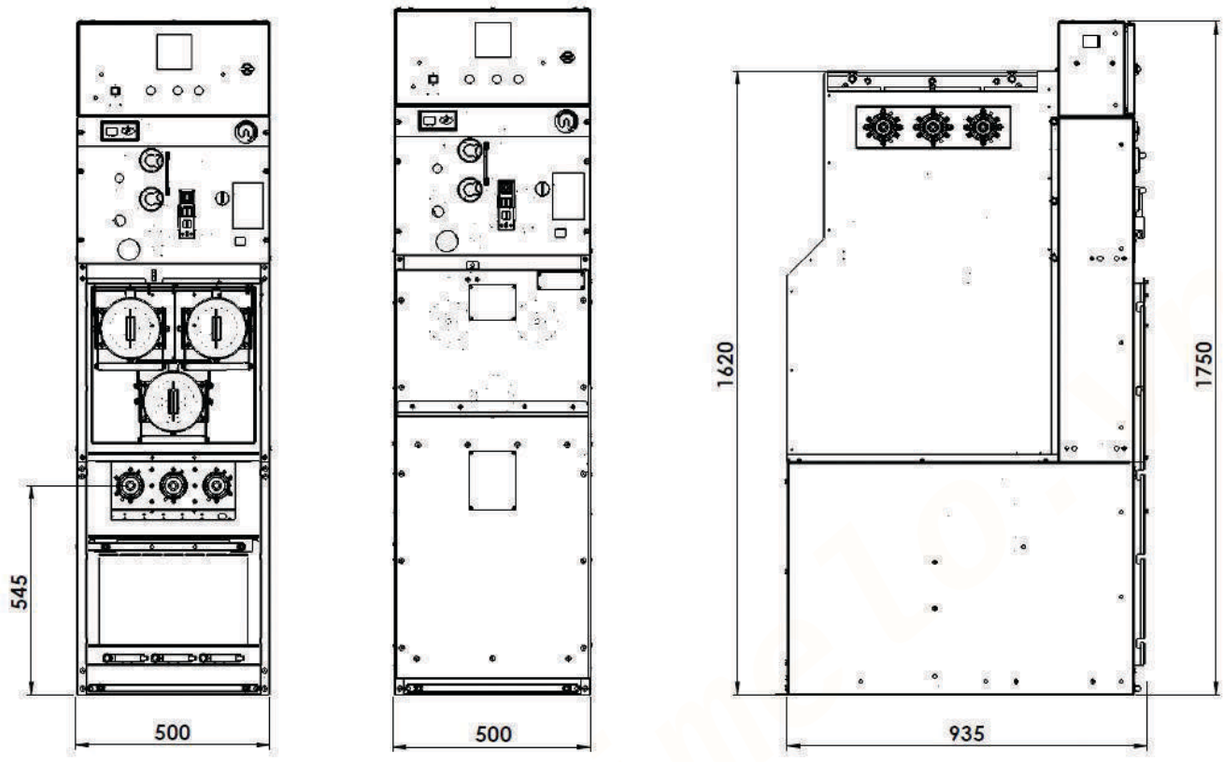
○ Fixing points

▲ Front

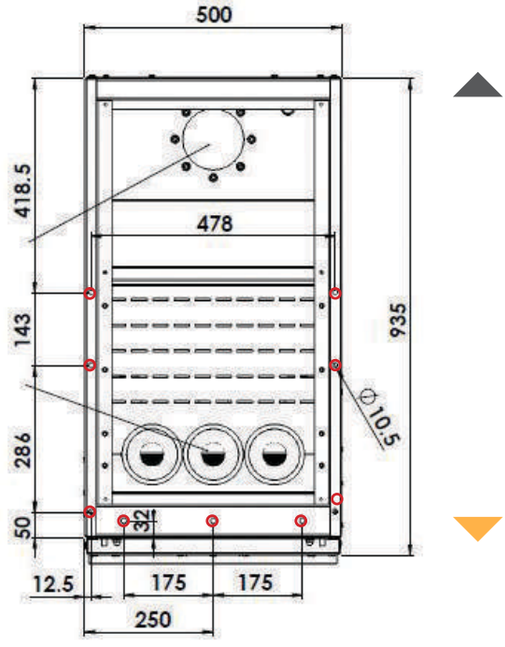
▼ Rear

DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

04. CUBICLE WITH SWITCH-FUSE COMBINATION FOR TRANSFORMER [SFA-RM36.F]/ [SFA-RM40.5.F]



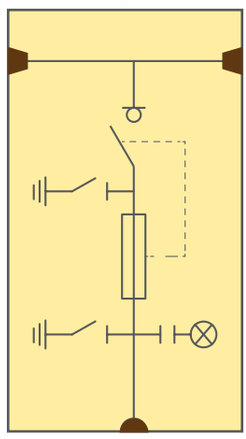
The depth of the cable connection compartment which can be connected to the same phase two “T” type connectors (back-to back) is greater than 77 mm.



Pressure Relief Disc

Incoming/outgoing holes for MV Cables

Single Line



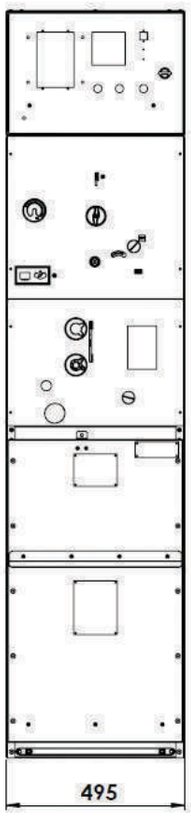
Fixing points

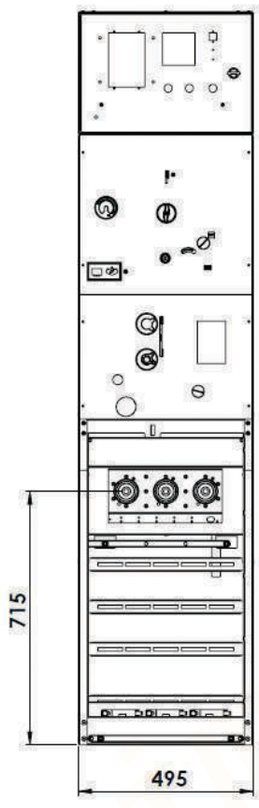
Front

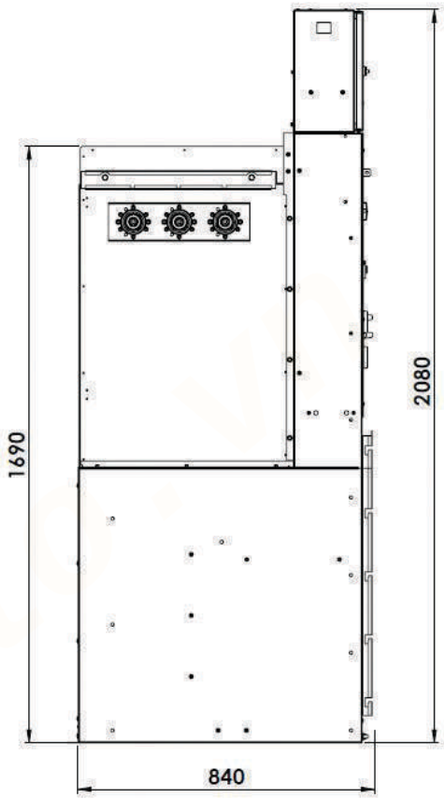
Rear

DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

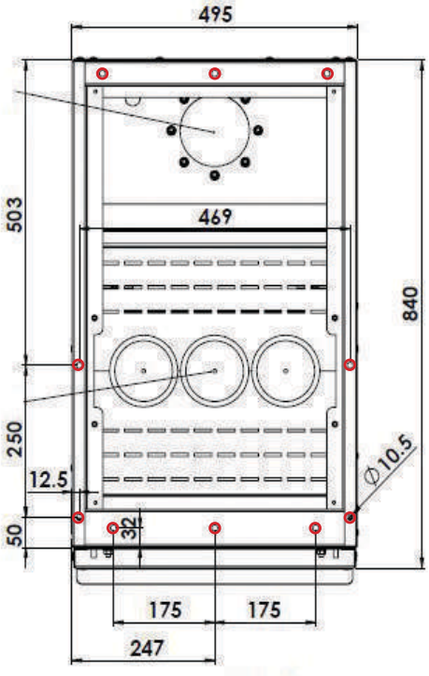
05. CUBICLE WITH VACUUM CIRCUIT BREAKER [SFA-RM36.B]/ [SFA-RM40.5.B]







The depth of the cable connection compartment which can be connected to the same phase two “T” type connectors (back-to back) is greater than 77 mm.

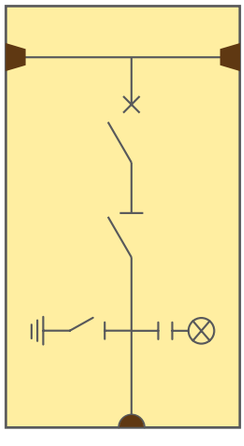


Fixing points

Front

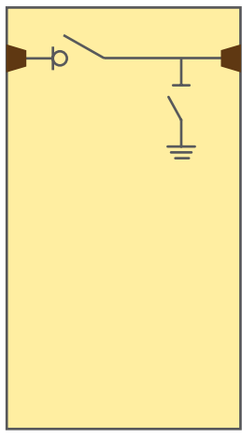
Rear

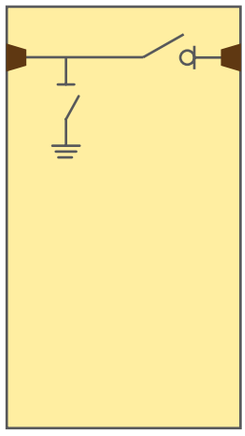
Single Line



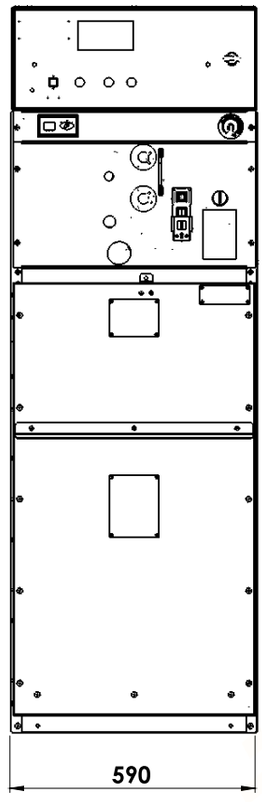
DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

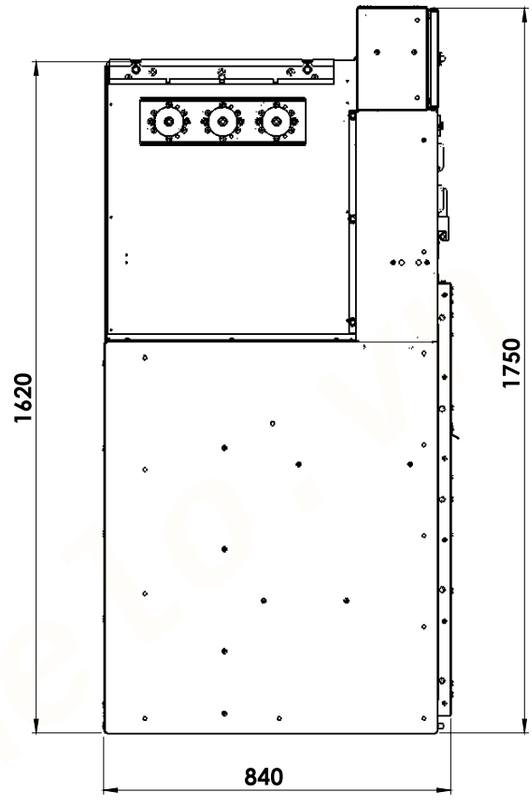
06. CUBICLE WITH BUS-BAR COUPLING [SFA-RM36.C]/ [SFA-RM40.5.C]

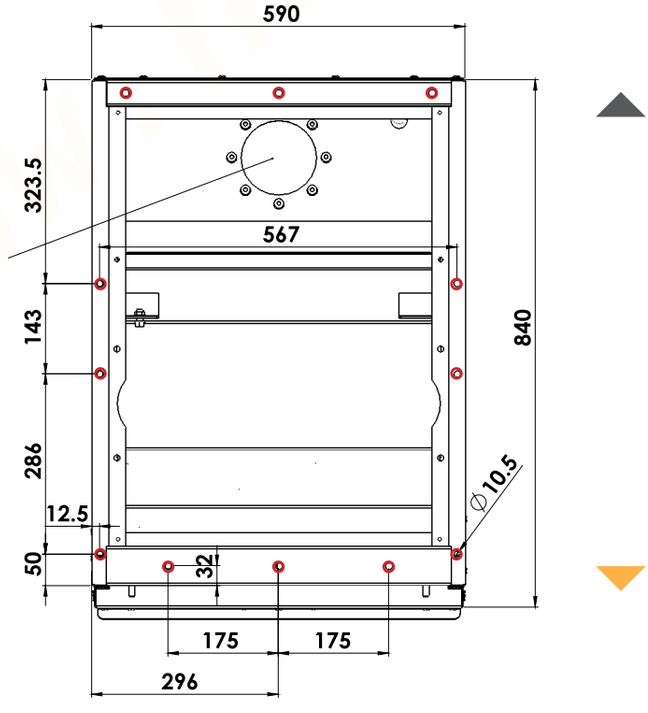




Single Line







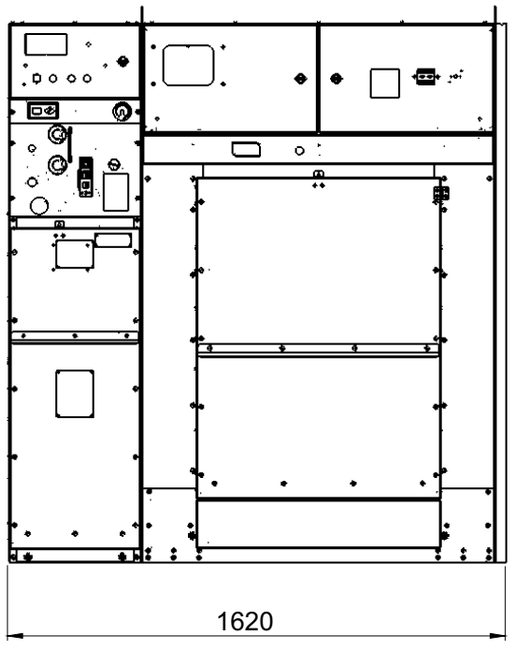
Fixing points

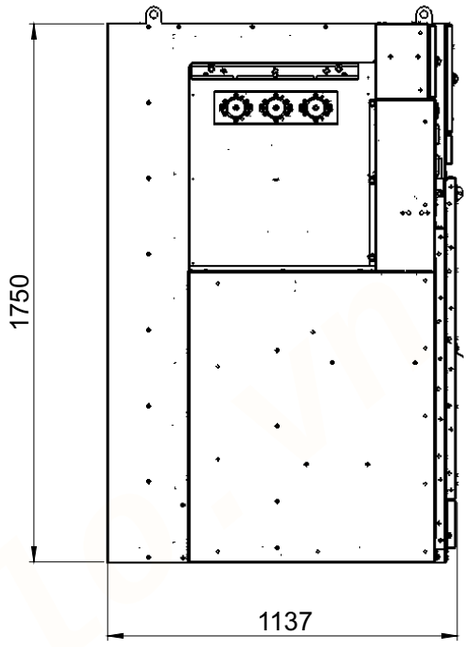
Front

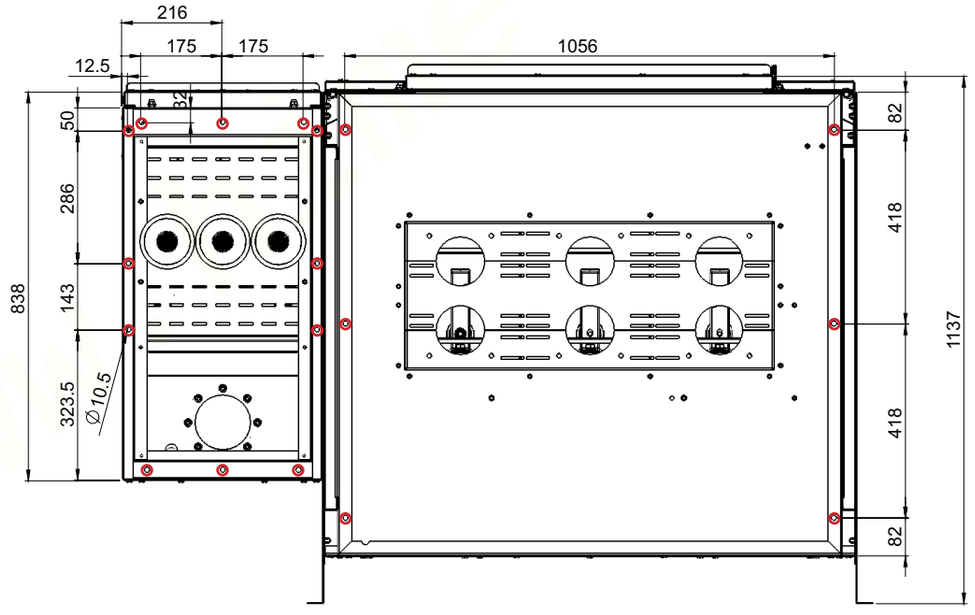
Rear

DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

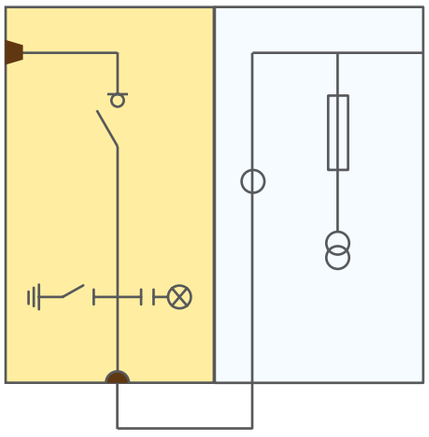
07. METERING (CT+VT) CUBICLE WITH SWITCH-DISCONNECTOR [SFA-RM36.M[S]/ [SFA-RM40.5.M[S]







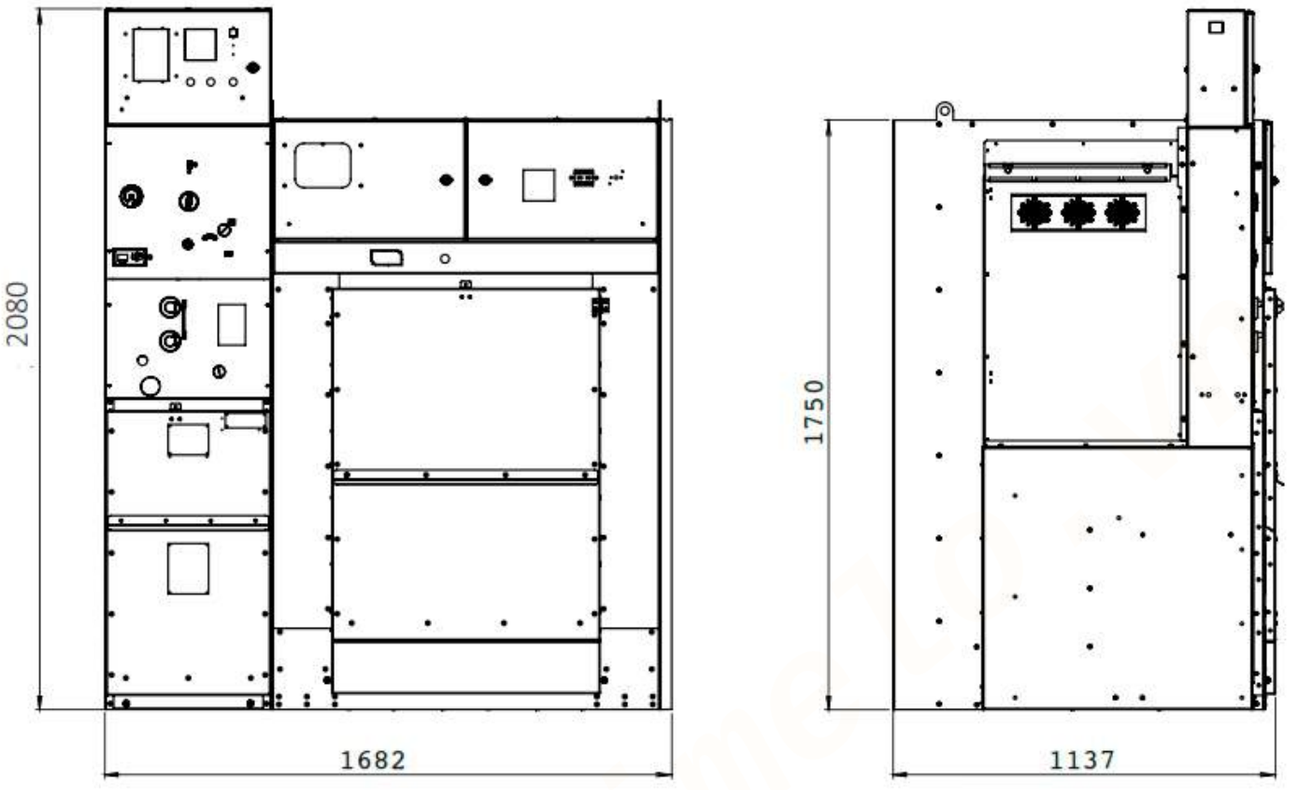
Single Line

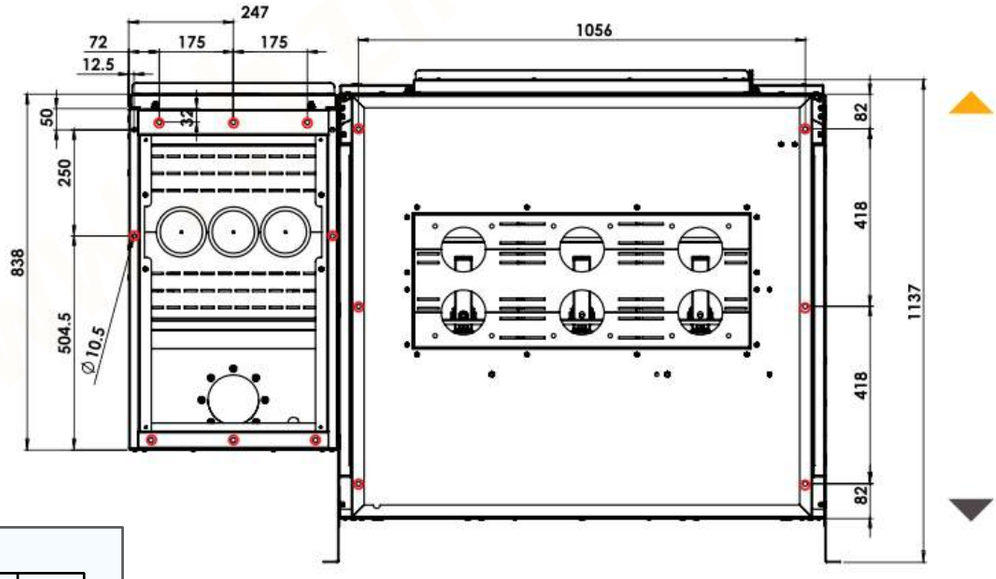


Fixing points
Front
Rear

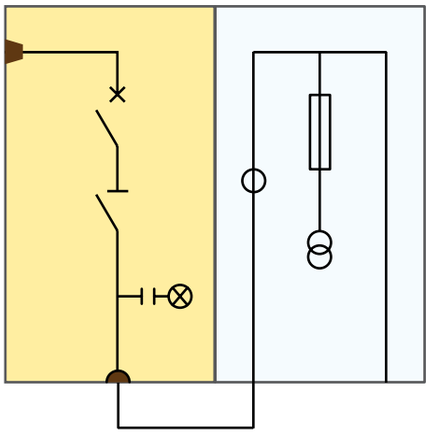
DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

08. METERING (CT+VT) CUBICLE WITH VACUUM CIRCUIT BREAKER [SFA-RM36.M[B]/ [SFA-RM40.5.M[B]





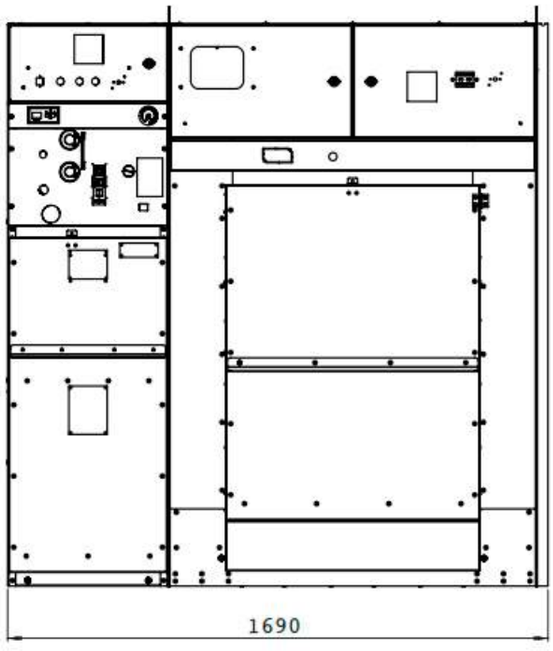
Single Line

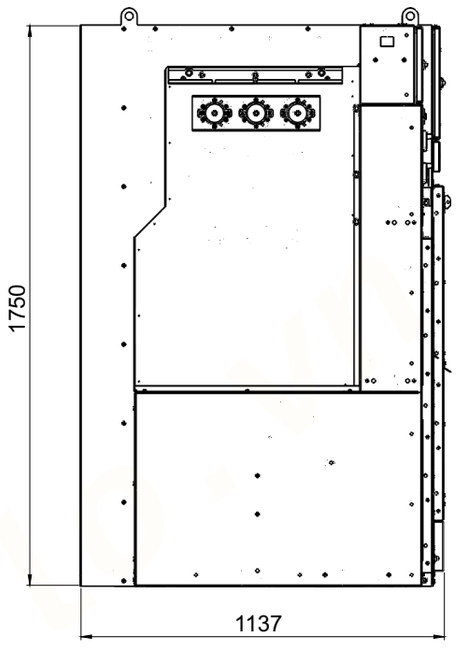


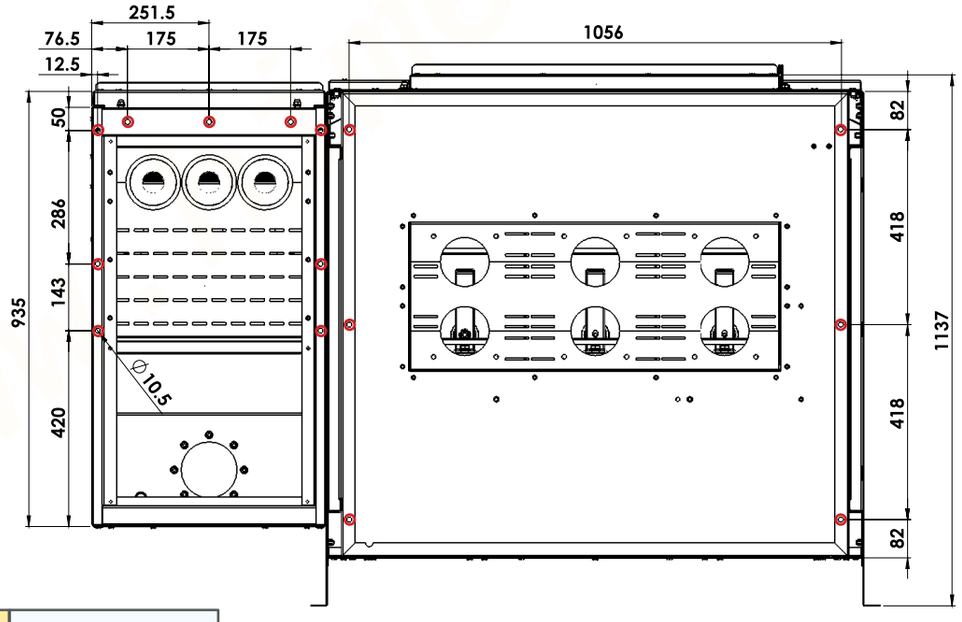
Fixing points
Front
Rear

DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

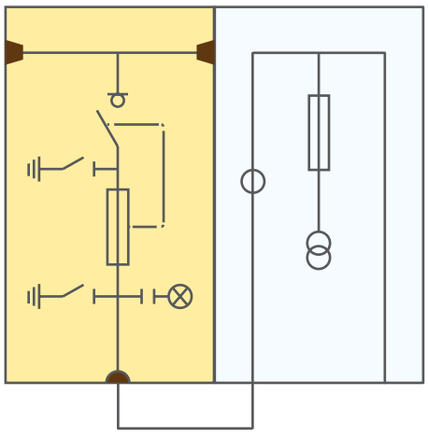
09. METERING (CT+VT) CUBICLE WITH SWITCH-FUSE COMBINATION [SFA-RM36.M[F]/ [SFA-RM40.5.M[F]







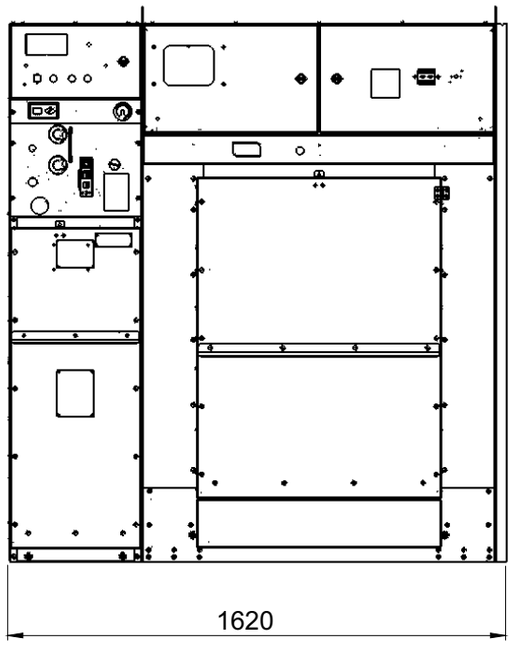
Single Line

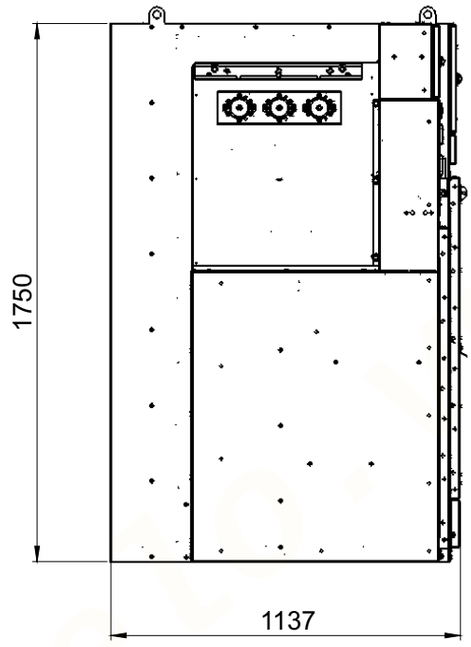


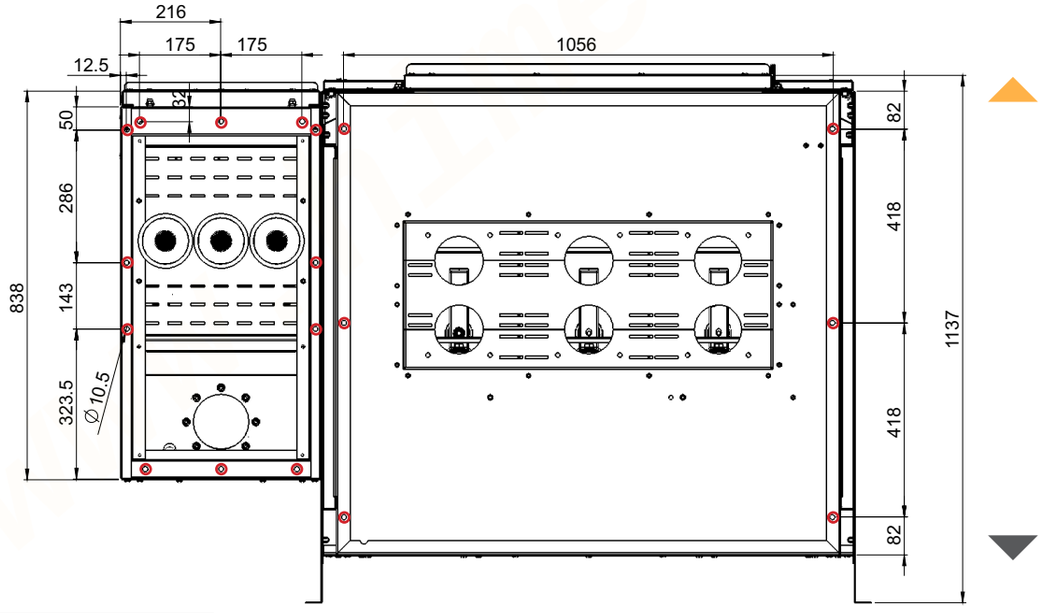
Fixing points
Front
Rear

DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

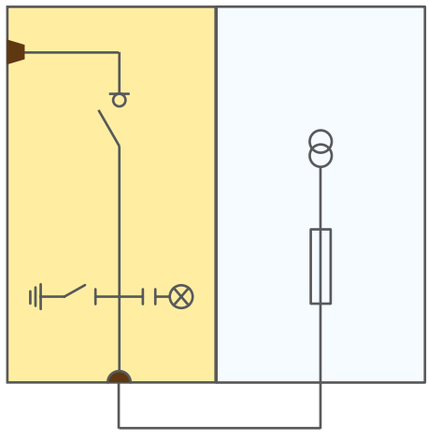
10. VOLTAGE METERING CUBICLE WITH SWITCH-DISCONNECTOR [SFA-RM36.V[S]/ [SFA-RM40.5.V[S]







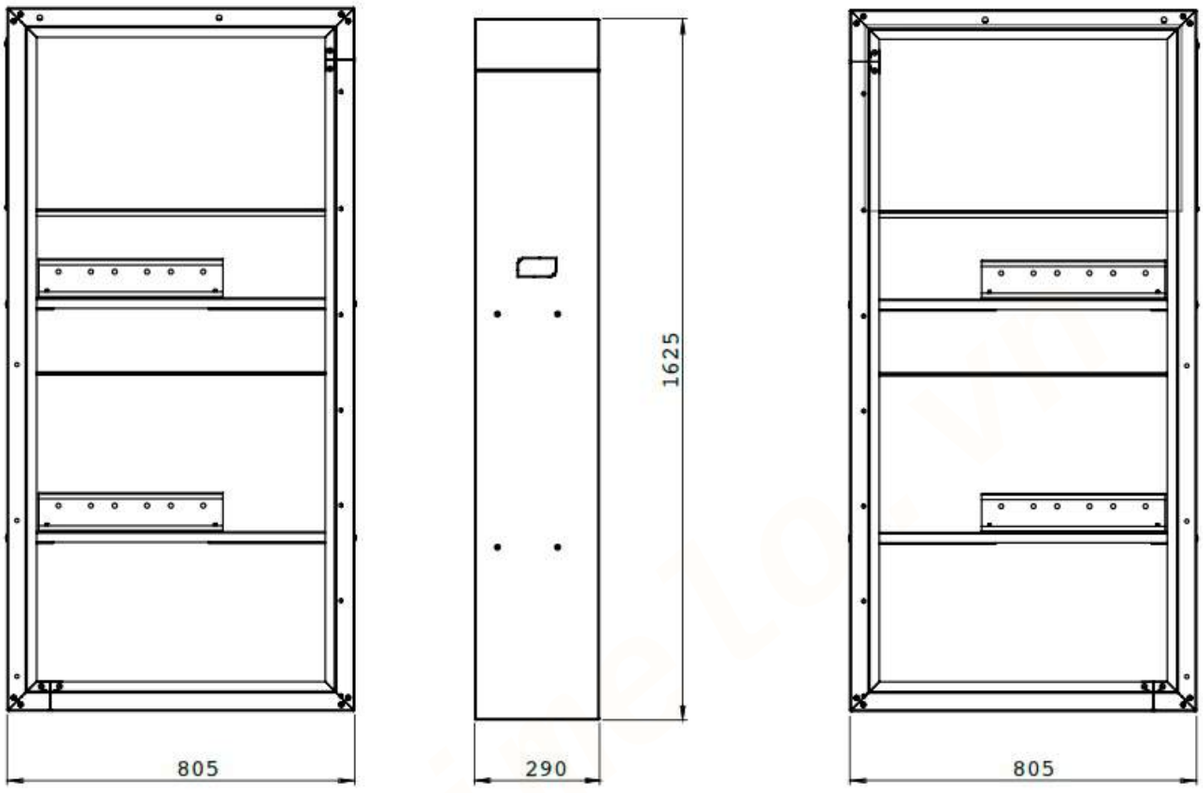
Single Line

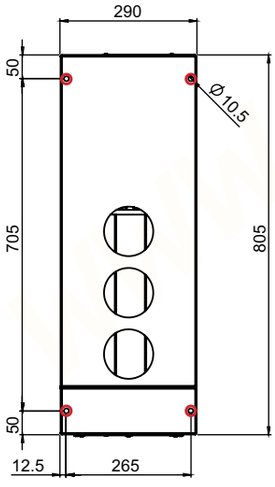


Fixing points
Front
Rear

DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

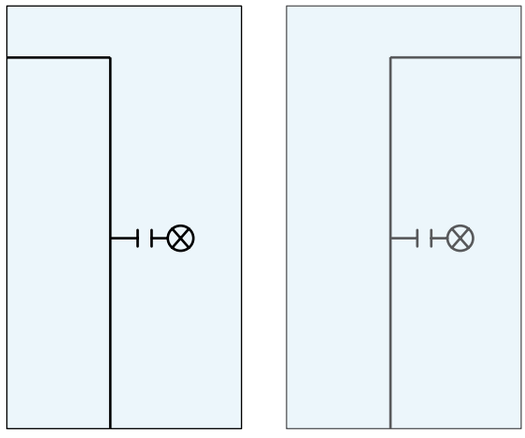
11. CABLE RISING CUBICLE [SFA-RM36.CR]/ [SFA-RM40.5.CR]





○ Fixing points

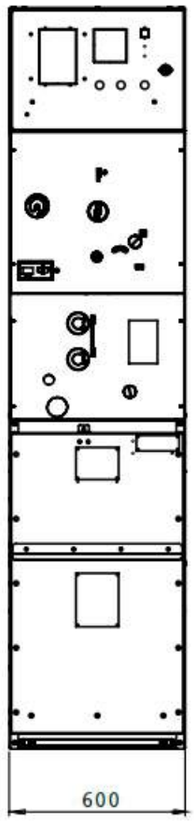
Single Line

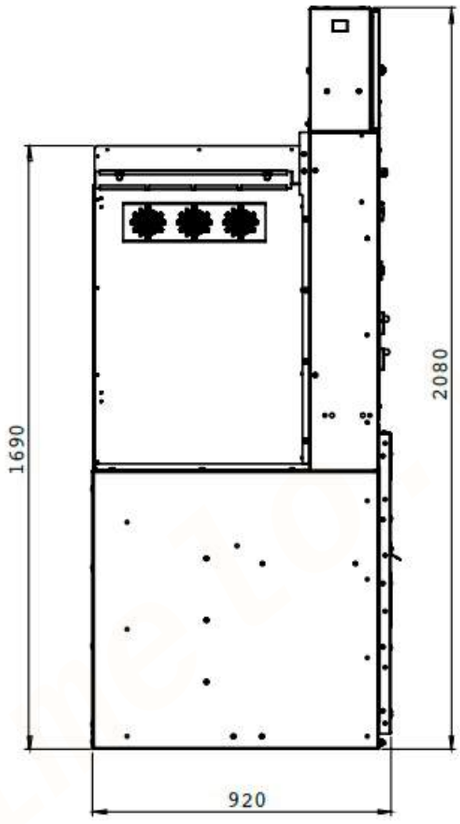


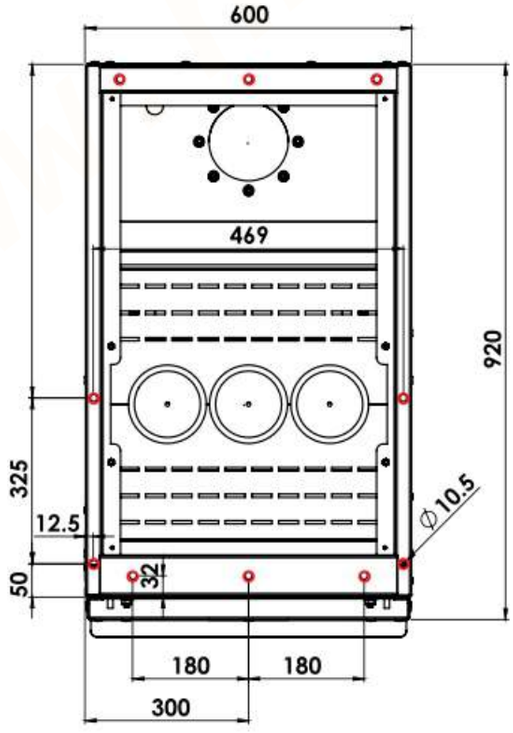
DIMENSIONS, SINGLE LINE DIAGRAMS AND VIEWS

12. CUBICLE WITH VACUUM CIRCUIT BREAKER (CT+VT)

SFA-RM36.B[CV]/ SFA-RM40.5.B[CV]





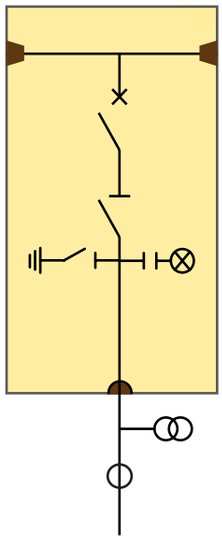


Fixing points

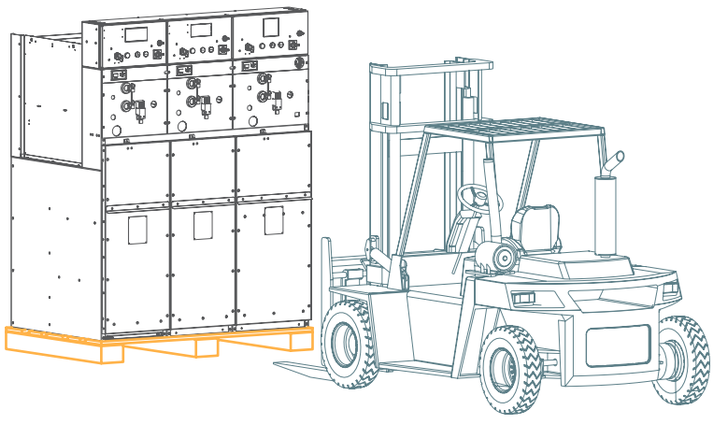
Front

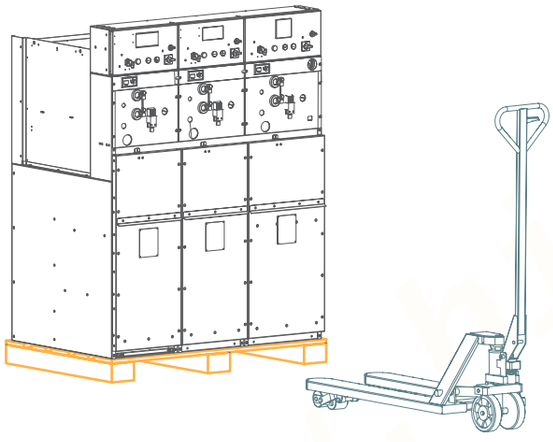
Rear

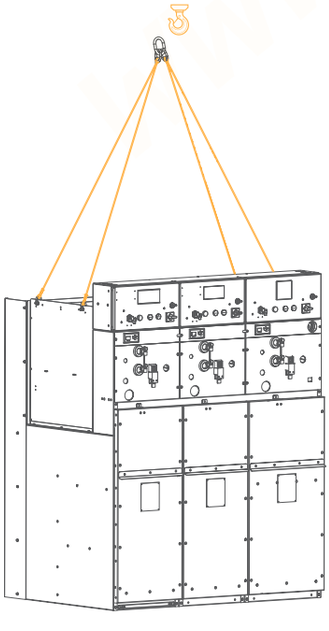
Single Line

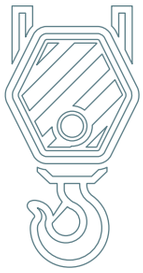


36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
PACKING AND TRANSPORT









PACKING:
Unless otherwise is stated;

- For railway and highway transporation; cubicle is fixed on the wooden pallets and covered with plastic.
- For air and sea transportation; cubicle is packed by using shrink-wrap in wooden crate and put desiccant bags against humidty.

HANDLING:

- Package can be transported with lifted truck or fork,lift truck (for only with pallet)

Crane transport with lifting eyes.
Cubicles can be lifted and transported by four lifting eyes at the top. Be sure that lifting capacity of the rope is proper for the weight of the cubicle.

WARNING!

- **Never tip the crates over.**
- **Avoid slipping and tilting**

STORAGE:

The followings should be recommended for a smooth storage;

- Keep the equipment in its original package during the storage,
- The storage area should be protected against rain, water, water vapor, saline atmosphere and pollution.
- Storage area temparatue is advised not below than -25 C
- altında olmamalıdır.

Before mountage;

- Be sure that there is no damage on the equiment during the transporattion,
- Be sure that the indicator of the SF6 Gas Manometer is on the GREEN area.
- Be sure that there is nothing any missing parts of the cubicle.(Operating handle, extension kits, etc.)

SFA-RM36/ SFA-RM40.5 cubicles should be installed indoor.

A	B	C
Maximum 50 mm	**50 mm**	**640 mm (± 25)**

WARNING!

- The floor to be fixed on should be well- levelled. Other wise cover of the compartment does not work properly and some faliures can be done on the extension bare.
- The distances of the rear side and walls should be taken into consideration.

36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
DESIGN

SFA-RM36/ SFA-RM40.5 type SF6 Gas Insulated Swicthgears have been designed and developed in the R§D Center of SFA ELECTRIC.

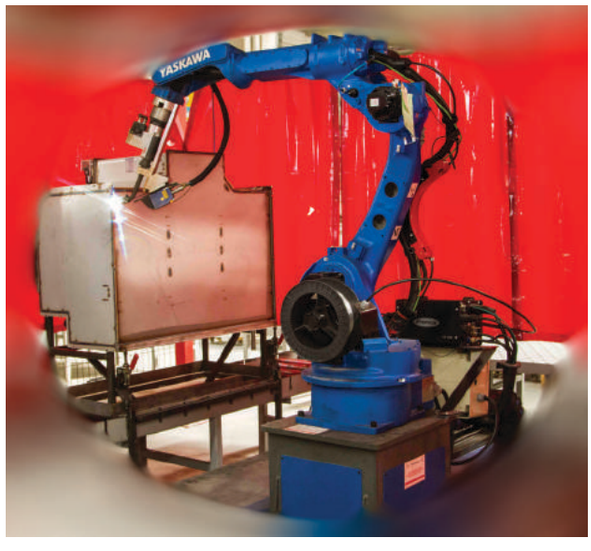
Special features to SFA-RM36/ SFA-RM40.5;

- Less SF6 Gas Filling Pressure (1,10 bar/abs.)
- Less Minimum Operating Pressure (1,05 bar/abs.)
- Less Gas Leakage Ratio
- The visible of the contact position of the earthing switch from outside of the cubicle.

Stainless steel tank filled with SF6 gas, is sealed to the atmosphere with “Sealed Pressure” method.

Gas tightness test is done for everyone unit as a routine. Helium is used as a tracer gas during the leakage test. Leakage test and SF6 gas filling are fulfilled inside the vacuum chamber.

Expected life is more than 30 years for SFA-RM36/ SFA-RM40.5 RMU’s.



Welding robot have been used for stainless steel tank welding. With this method, it is aimed to minimize production errors caused by human factor.

QUALITY CONTROL:

Type tests of SFA-RM36/ SFA-RM40.5 were carried out in the accrediated Labs.

Following tests are applied to each units.

- Power frequency withstand test,
- Measurement of the main circuit,
- Gas Leakage test,
- Mechanical operating test,
- Visual controls,
- Electricaly functional tests

QUALITY MANAGEMENT STYTEM:

All products in SFA ELECTRIC, have been manufactured by applying Quality Systems as defined in all departmants.

Conformity of the production with Quality Management Systems is certified by Bureau Veritas.

ISO 9001
BUREAU VERITAS
Certification

ISO 9001:2015
Quality Management System

ISO 14001
BUREAU VERITAS
Certification

ISO 14001:2004
Enviromental Managament System

OHSAS 18001
BUREAU VERITAS
Certification

OHSAS 18001
Worker's Health and Work Safety

36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
TECHNICAL FEATURES

FEEDER WITH SWITCH-DISCONNECTOR (General)

Rated Voltage	kV	36	40.5
Rated normal current (main busbar)	A	630	630
Rated power frequency withstand voltage			
§ Phase to earth, between the phases	kV-etken	70	95
Across the ısolating distance	kV-etken	80	110
Rated lightning impulse withstand voltage			
§ Phase to earth, between the phases	kV-tepe	170	185
Across the ısolating distance	kV-tepe	195	215
Rated frequency	Hz	50	50
Rated short-circuit withstand current	kA	16;20	16;20
Duration of short-circuit	s	1;3	1;3
Rated filling level for insulation	bar (Mpa)	1,1 (0,110)	1,1 (0,110)
Minimum functional level for insulation	bar (Mpa)	1,05 (0,105)	1,05 (0,105)
Internal arc classification (IAC)		A (FL) 16:20 kA-1s	A (FL) 16:20 kA-1s
Loss of the Service Contiunity		LSC 2	LSC 2
Mechanical Impact Class (IK)	Joule	IK10 (20J)	IK10 (20J)
Prtocetion Class (IP)			
* Switching Copartment		IP 67	IP 67
* HV Cable Connection Compartment		IP 2X	IP 2X
* Mechanism Compartment		IP20	IP20
* LV Panel Compartment		IP30	IP30

SWITCH-DISCONNECTOR

Type of switch		General, Three positioned (OPEN-CLOSE-EARTH) switch-disconnector
Type		SFA-RM-630A - 16:20kA LBS
Rated normal current	A	630
Rated short-circuit withstand current and duration	kA	16:20 kA-1s
Rated peak withstand current	kA-tepe	40:50
Short –circuit making current (peak)	kA-tepe	40:50
Electrical endurance class	E3	E3
Mechanical endurance class	M1	M1

EARTHING SWITCH

Type		SFA-RM-16:20kA ES
Rated short-circuit withstand current and duration	kA	16:20 kA-1s
Rated peak withstand current	kA-tepe	40:50
Short –circuit making current (peak)	kA-tepe	40:50
Electrical endurance class		E2
Mechanical endurance class		M1

NORMAL SERVICE CONDITIONS

Ambitient temparature		
* Maxiumum	° C	40
*Avarage	° C	35
*Minimum	° C	-25
Indoor/Outdoor Instalation		Indoor
Altitude		up to 2000 m
Relativ humudity		maximum % 96

36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
TECHNICAL FEATURES

FEEDER WITH SWITCH+FUSE COMBINATION (General)

Rated Voltage	kV	36	40.5
Rated normal current (main busbar)	A	630	630
Rated power frequency withstand voltage			
§ Phase to earth, between the phases	kV-rms	70	95
Across the ısolating distance	kV-rms	80	110
Rated lightning impulse withstand voltage			
§ Phase to earth, between the phases	kV- peak	170	185
Across the ısolating distance	kV- peak	195	215
Rated frequency	Hz	50	50
Rated short-circuit withstand current	kA	16:20	16:20
Duration of short-circuit	s	1;3	1;3
Rated filling level for insulation	bar (Mpa)	1,1	1,1
Minimum functional level for insulation	bar (Mpa)	1,05	1,05
Internal arc classification (IAC)		A (FL) 16:20 kA-1s	A (FL) 16:20 kA-1s
Loss of the Service Contiunity		LSC 2	LSC 2
Mechanical Impact Class (IK)	Joule	IK07 (2J)	IK07 (2J)
Prtocetion Class (IP)			
* Switching Copartment		IP 67	IP 67
* HV Cable Connection Compartment		IP20	IP20
* HV Fuse Compartment			
* Mechanism Compartment		IP20	IP20
* LV Panel Compartment		IP30	IP30
Rated Transfer Current	A	470	470

SWITCH-DISCONNECTOR

Type of switch		General, Three positioned (OPEN-CLOSE-EARTH) switch-disconnector
Type		SFA-RM-630A - 16:20kA LBS
Rated normal current	A	200
Rated short-circuit withstand current and duration	kA	16:20 kA-1s
Rated peak withstand current	kA-peak	40:50
Short –circuit making current (peak)	kA-peak	40:50
Electrical endurance class	E3	E3
Mechanical endurance class	M1	M1

EARTHING SWITCH (on up-stream side)

Type		SFA-RM-16:20kA ES
Rated short-circuit withstand current and duration	kA	16:20 kA-1s
Rated peak withstand current	kA-peak	40:50
Short –circuit making current (peak)	kA-peak	40:50
Electrical endurance class		E2
Mechanical endurance class		M1
Electrical endurance class	E3	E3
Mechanical endurance class	M1	M1

EARTHING SWITCH (on down-stream side)

Type		SFA-RM-1kA ES
Rated short-circuit withstand current and duration	kA	1 kA-1s
Rated peak withstand current	kA-peak	2,5
Short –circuit making current (peak)	kA-peak	2,5
Electrical endurance class		E2
Mechanical endurance class		M1

NORMAL SERVICE CONDITIONS

Ambitient temparature		
* Maxiumum	° C	40
*Avarage	° C	35
*Minimum	° C	-25
Indoor/Outdoor Instalation		Indoor
Altitude		up to 2000 m
Relativ humudity		maximum % 96

36-40.5kV
SFA-RM
SF6
GAS INSULATED RING MAIN UNITS
TECHNICAL FEATURES

FEEDER WITH VACUUM CIRCUIT BREAKER (General)

Rated Voltage	kV	36	40.5
Rated normal current (main busbar)	A	630	630
Rated power frequency withstand voltage			
§ Phase to earth, between the phases	kV-rms	70	95
Across the ısolating distance	kV-rms	80	110
Rated lightning impulse withstand voltage			
§ Phase to earth, between the phases	kV- peak	170	185
Across the ısolating distance	kV- peak	195	215
Rated frequency	Hz	50	50
Rated short-circuit withstand current	kA	16; 20	16; 20
Duration of short-circuit	s	1; 3	1; 3
Rated filling level for insulation	bar (Mpa)	1,1 (0,110)	1,1 (0,110)
Minimum functional level for insulation	bar (Mpa)	1,05 (0,105)	1,05 (0,105)
Internal arc classification (IAC)		A (FL) 16:20 kA-1s	A (FL) 16:20 kA-1s
Loss of the Service Contiunity		LSC 2	LSC 2
Mechanical Impact Class (IK)	Joule	IK10 (20J)	IK10 (20J)
Prtocetion Class (IP)			
* Switching Copartment		IP 67	IP 67
* HV Cable Connection Compartment		IP20	IP20
* Mechanism Compartment		IP20	IP20
* LV Panel Compartment		IP29	IP29
* AG Kumanda Panosu		IP30	IP30

VACUUM CIRCUIT BREAKER

Vacuum ınterrupter		EATON
Rated normal current	A	630
Rated short circuit breaking current	kA	16:20
Rated short-circuit withstand current and duration	kA	16:20 kA-1s
Rated peak withstand current	kA-peak	40:50
Short –circuit making current (peak)	kA-peak	40:50
Rated Operating Sequence		O-0.3 s -CO-3 min-CO
Electrical endurance class		E2
Mechanical endurance class		M1
Capacitive breaking current class		C2

DISCONNECTOR

Type		36BV-0000
Rated normal current	A	630
Rated short-circuit withstand current and duration	kA	16:20 kA-1s
Rated peak withstand current	kA-peak	40:50
Electrical endurance class		E0
Mechanical endurance class		M1

EARTHING SWITCH

Type		SFA-RM-16:20 kA ES
Rated short-circuit withstand current and duration	kA	16:20 kA-1s
Rated peak withstand current	kA-peak	40:50
Short –circuit making current (peak)	kA-peak	40:50
Electrical endurance class		E2
Mechanical endurance class		M1

NORMAL SERVICE CONDITIONS

Ambitient temparature		
* Maxiumum	° C	40
*Avarage	° C	35
*Minimum	° C	-25
Indoor/Outdoor Instalation		Indoor
Altitude		up to 2000 m
Relativ humudity		maximum % 96

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