



PRODUCT INSTRUCTION MANUAL AND TECHNICAL CATALOG





Our of production and quality, together with the experience brought by the knowledge in our business life; By transferring it to the production of High Voltage Switching Products and Compact Transformer Centers, we adopt an innovative approach in the electromechanical manufacturing industry and at the point of sale, and we proudly continue to contribute to our country by directing the sector with certified R&D studies.

Our company, which carries out the production of industrial products required for the production and transmission of electricity in the energy sector by closely following the developing technology, continues to comply with the conditions of Management Systems Standards, within the framework of an understanding that attaches importance to continuous improvement of its effectiveness, and by paying attention to meet customer expectations and needs.

Our national value-based business culture, our business philosophy that encourages continuous improvement, and achieving optional and functional excellence with correct planning are among the factors that play the most effective role in differentiating EFG Elektrik from its competitors.

Our main goal is to offer high quality products to our customers by closely following technological developments, to improve our production capacity and to maximize customer satisfaction with our after-sales service quality. EFG Elektrik, which has all the necessary quality certificates, continues its production with the awareness that the products it produces are used wherever there is electricity. Our expert and technical staff, who attach importance to quality and are open to development, continue their work meticulously with all their strength.

EPOXIES

36 kV ISOLATOR MANUFACTURING

36 kV SF6 GAS CIRCUIT BREAKER POLE MANUFACTURING

36-24 kV VACUUM CIRCUIT BREAKER POLE MANUFACTURING

36-24 kV SF6 GAS-LOAD SWITCH BODY MANUFACTURING

COMPONENTS

SF6 GAS DISCONNECTORS

SF6 GAS LOAD BREAK SWITCHES

EARTHING SWITCHES

SF6 GAS CIRCUIT BREAKERS

VACUUM CIRCUIT BREAKERS

SWITCHING PRODUCTS

AIR INSULATED METAL ENCLOSED MODULAR SWITCHGEAR

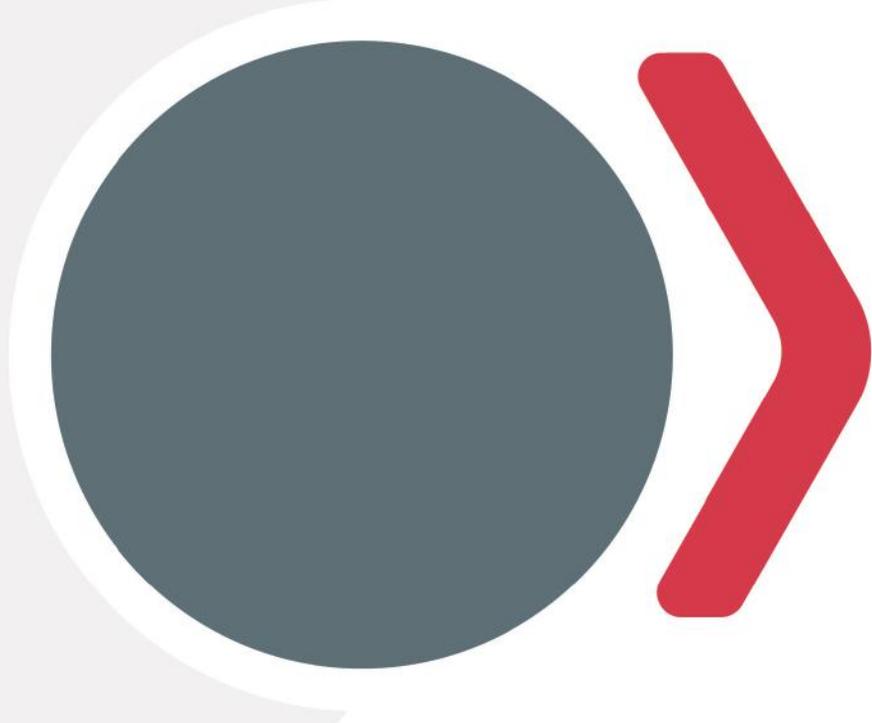
DISTRIBUTION CENTERS

CONCRETE KIOSK DISTRIBUTION AND TRANSFORMER CENTERS

METAL KIOSK DISTRIBUTION AND TRANSFORMER CENTERS

ENERJİYE
YON VERİR

EPOXIES

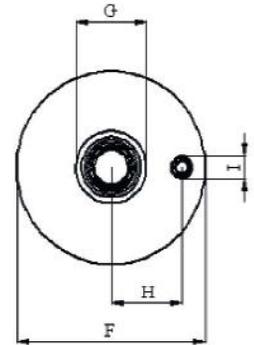
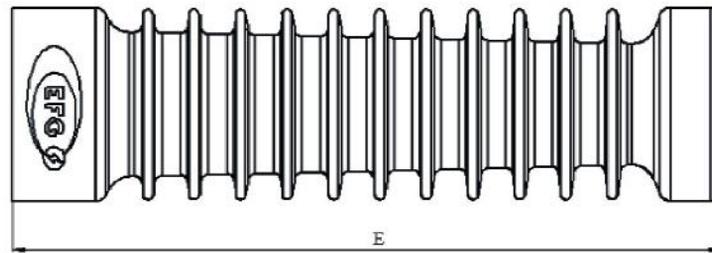
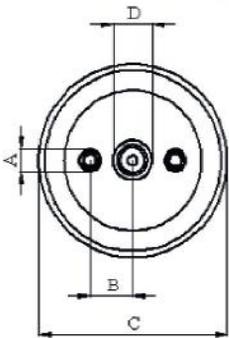


As EFG Elektrik, we have the necessary facilities and infrastructure for the production of epoxy used in the switching products we produce (Disconnectors, Circuit Breakers, Insulators, etc.). Each product is subjected to relevant tests before entering the main assembly line. It provides minimum loss and maximum quality conditions with the latest technology used to manufacture epoxy products. EFG Elektrik, which designs and implements its epoxy facility according to its needs, with an innovative and improvable approach, improves itself day by day with the experience brought by its knowledge.



36 Kv ISOLATOR MANUFACTURING

Capacitive and support type insulators used in modular cells are one of the basic products of the cell. Insulators produced in accordance with the IEC 60273 standard have been tested in accordance with the IEC 60660 standard. It has received the necessary documents through testing carried out in accredited laboratories. Each product produced is subjected to routine tests and production continues with the understanding of maximum quality.



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

F
(mm)

G
(mm)

H
(mm)

I
(mm)

36 kV ISOLATOR

M6

18

Ø80

M12*

300

Ø80

M16*

30

M6

" * " marked information can be determined according to customer request.





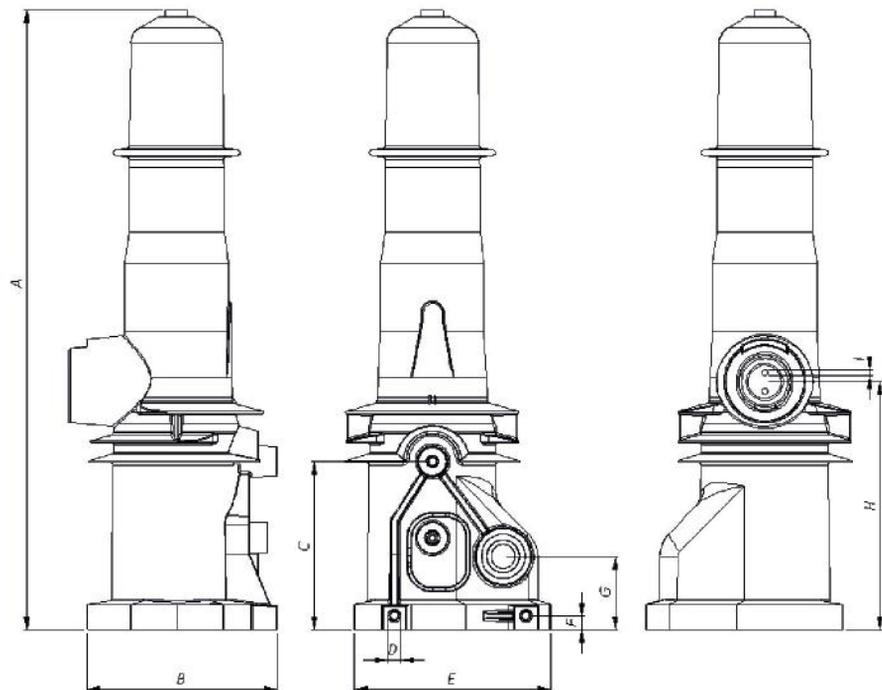
DESCRIPTION	SYMBOL	UNIT	SPEC.
Manufacturer			EFG ELEKTRİK
Product Type			EMI-36-01
Instruction Number			KL-16-01
Standart Number			IEC 60273
Place Of Use			INTERNAL
Environmental Pollution			LESS DIRTY
Nominal Voltage	Ur	kV	36
Insulation Voltage	Ud	kV	70
Lightning Impulse Withstand Voltage	Up	kV	170
Frequency	fr	Hz	50/60
Temperature Class		°C	-5 °C / +40 °C
Product Mass	M	kg	2
Bending Force	P0	N	4000
Bending Force	P50	N	3400
Creeping Distance		mm	500
Capacitor Value (If Any)		pF	15*

* * * marked information can be determined according to customer request.



36 kV SF6 GAS CIRCUIT BREAKER POLE MANUFACTURING

The poles used in SF6 gas circuit breakers are one of the basic products of SF6 gas circuit breakers. These products, which meet all the requirements of the IEC 62271-100 standard, are adapted to the sealed pressure system and are filled with SF6 gas. These products, which contain fixed and movable contacts in their structure, carry out the arc extinguishing process with the help of SF6 gas.



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

F
(mm)

G
(mm)

H
(mm)

I
(mm)

36kV SF6 GAS POLE

674

209

183

M10

216

15

80

270

M8



**24 kV VACUUM
CIRCUIT BREAKER POLE**



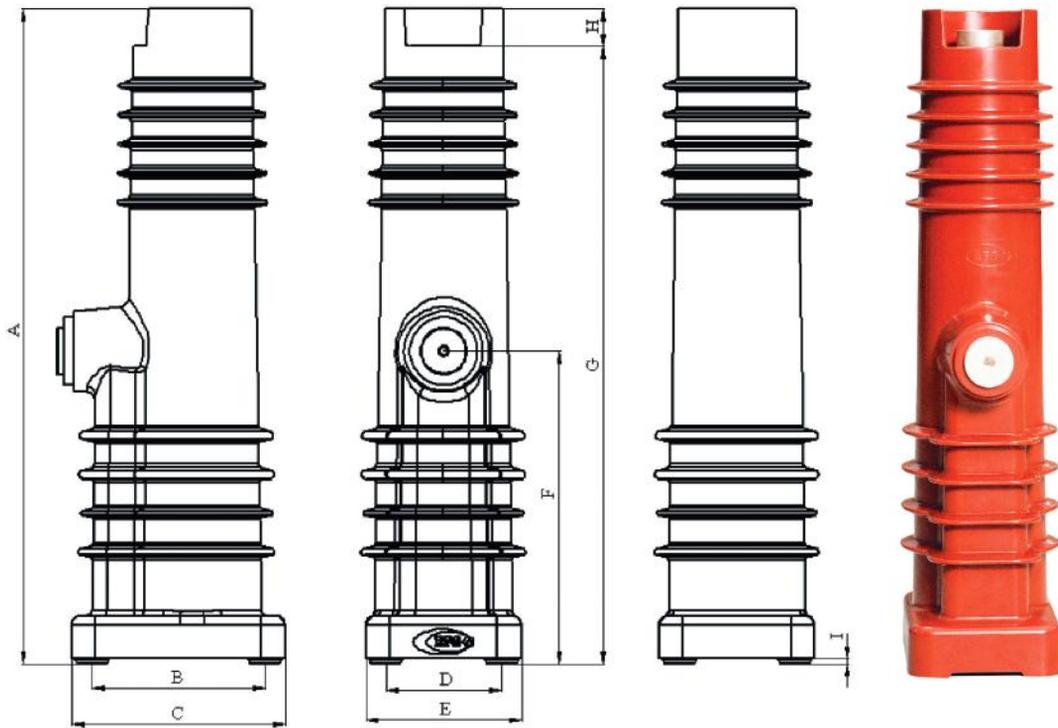
**36 kV VACUUM
CIRCUIT BREAKER POLE**



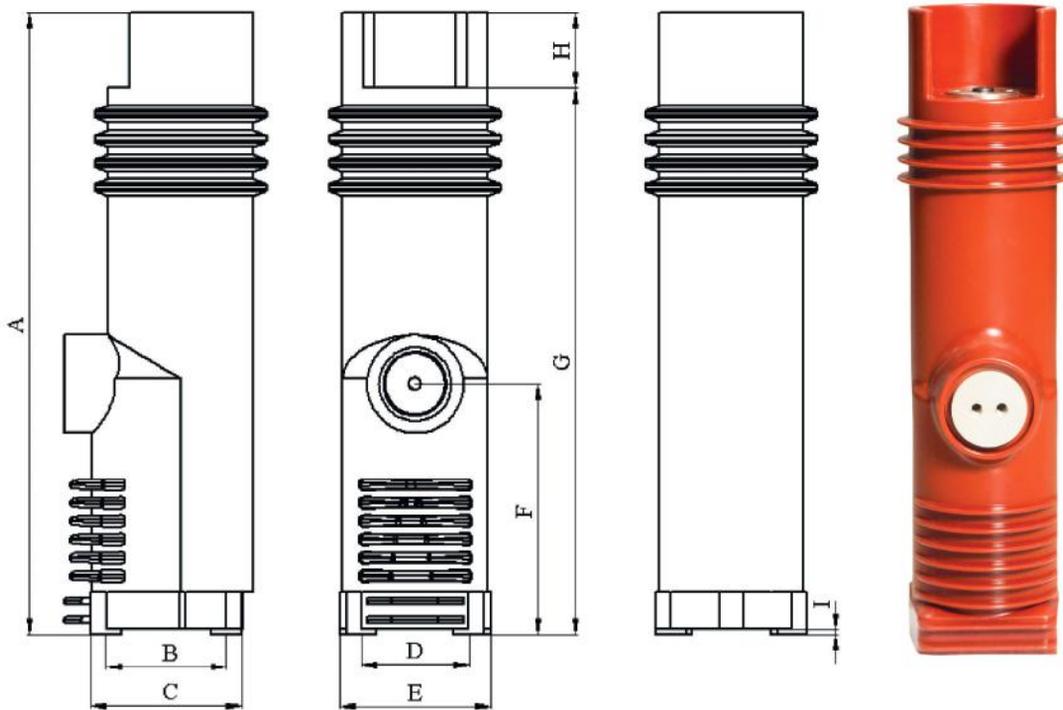
36-24 kV VACUUM CIRCUIT BREAKER POLE MANUFACTURING

Poles used in vacuum circuit breakers are one of the basic products of vacuum circuit breakers. These products, which meet all the requirements of the IEC 62271-100 standard, provide insulation thanks to the vacuum environment. Vacuum bottles located in buried poles carry out the arc extinguishing process in a vacuum environment.





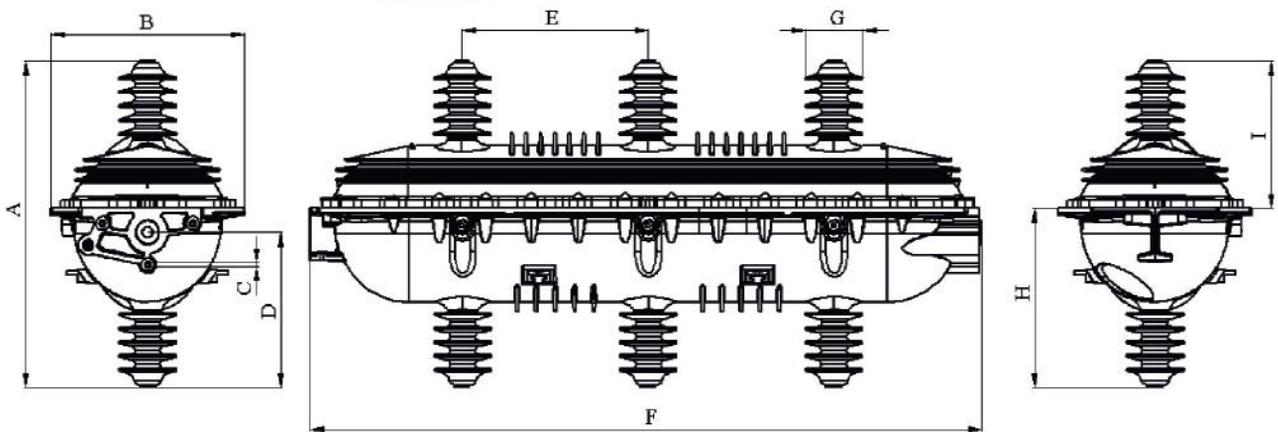
PRODUCT NAME	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)
36kV VACUUM POLE	675	180	222	120	162	322	636	39	5



PRODUCT NAME	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)
24kV VACUUM POLE	510	100	125	89	125	205	448	62	4

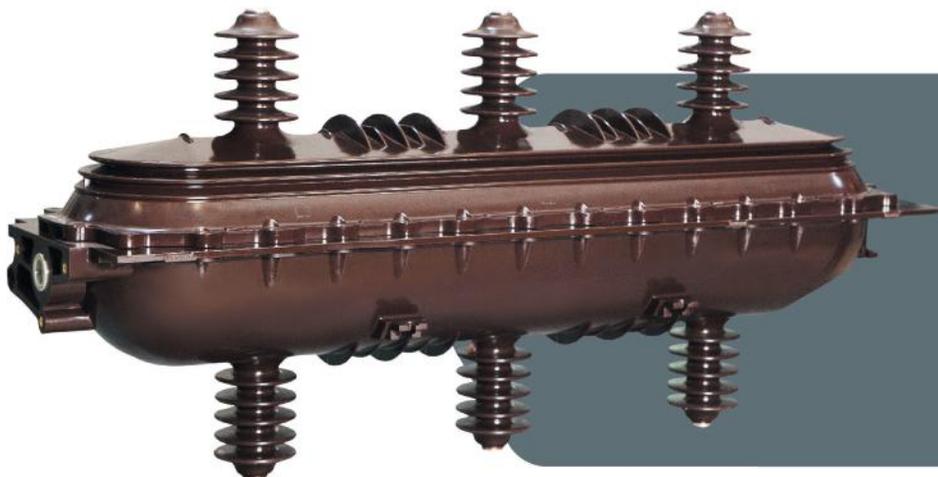
36-24 kV SF6 GAS-LOAD BREAK SWITCH BODY MANUFACTURING

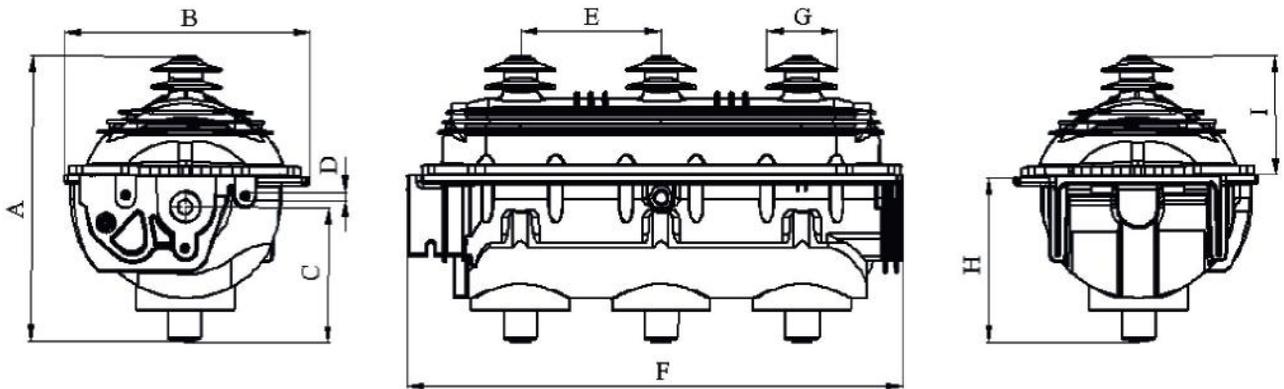
Switchgear bodies used in SF6 gas disconnectors and SF6 gas load break switches are one of the basic products of disconnectors. These products, which meet all the requirements of IEC 62271-102 and IEC 62271-103 standards, are adapted to the sealed pressure system and are filled with SF6 gas. These products, which contain fixed and movable contacts in their structure, carry out the arc extinguishing process with the help of SF6 gas.



PRODUCT NAME

	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)
36kV SF6 GAS-LOAD BREAK SWITCH BODY	586	365	M8	278	350	1263	108	321	265





PRODUCT NAME

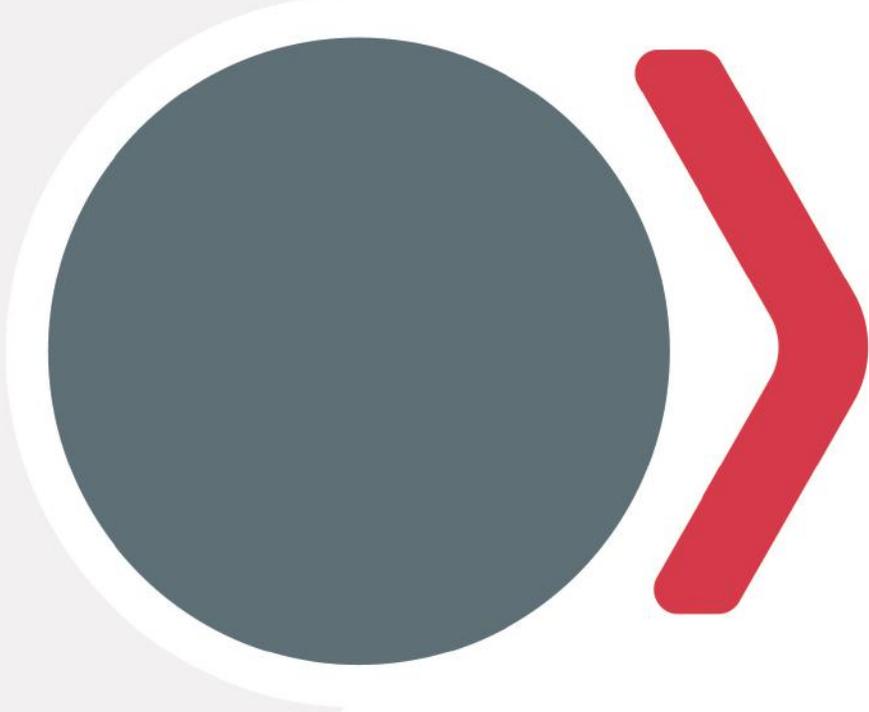
A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)
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24kV SF6 GAS-LOAD
BREAK SWITCH BODY

402	348	190	M8	200	705	100	232	168
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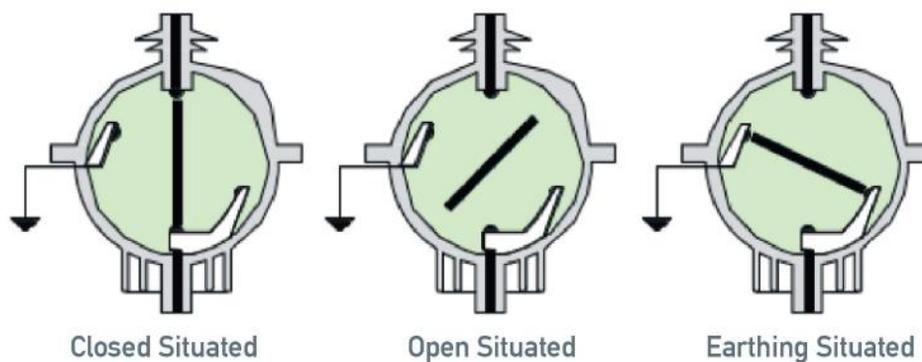


COMPONENTS



SF6 GAS DISCONNECTORS

SF6 Gas Disconnectors are enclosed in an epoxy casting body with a "sealed pressure system"; It has 3 poles and 3 positions. EFG brand SF6 Gas Disconnectors, which are offered to the consumer company by filling SF6 gas at 1.4-1.8 bar (abs) pressure during the production phase and checking the gas tightness in the production area, comply with TS EN 62271-102 (IEC 62271-102) standard, 30 years of SF6 gas life. It is designed in a sealed pressure structure that does not require reinforcement.

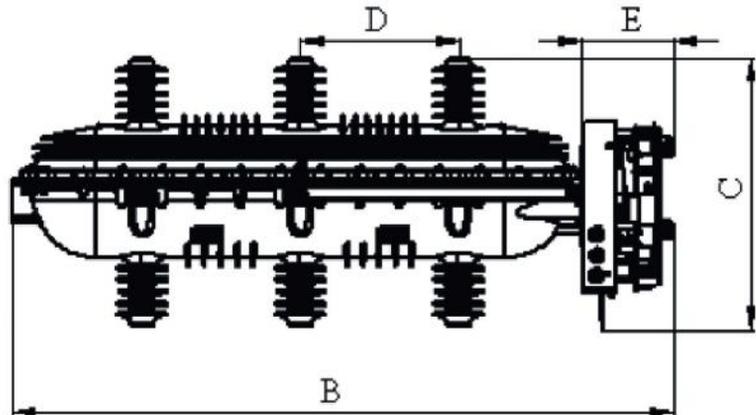
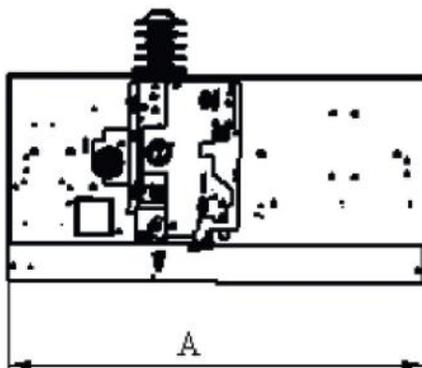
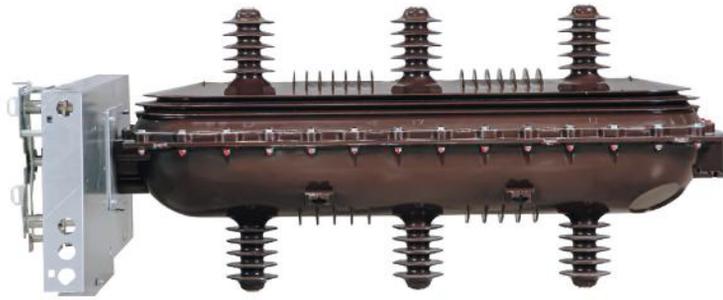


SF6 Gas Disconnectors have a manometer that shows gas pressure. These manometers are temperature compensated and are not affected by altitude changes.

During operation, if the SF6 gas pressure unexpectedly rises to a dangerous level, there is a pressure relief valve (weakened area) on the rear cover of the separator body to ensure that the gas is discharged in a way that does not pose a danger to the operating personnel.

In the EFG brand SF6 Gas Disconnectors mechanism, closing and opening operations are carried out manually. The closing and opening process of the grounding switch is defined as dependent on operator movement. The operating mechanism is monitored by position indicators that reliably indicate the open and closed positions of the contacts. As standard, 3 NO + 3 NC auxiliary contacts are provided, and additional contacts can be provided upon request. Upon customer request, a mechanical counter that records the number of openings can be added to the mechanisms.





PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-36L-01/02

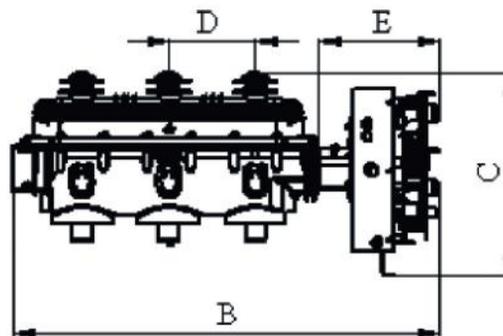
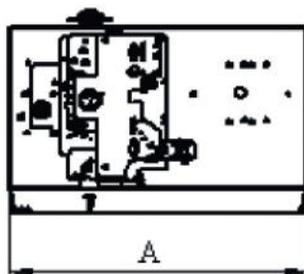
669 – 919 MM

1463 MM

580 MM

350 MM

203 MM



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-24L-01/02

438 – 690 MM

984 MM

498 MM

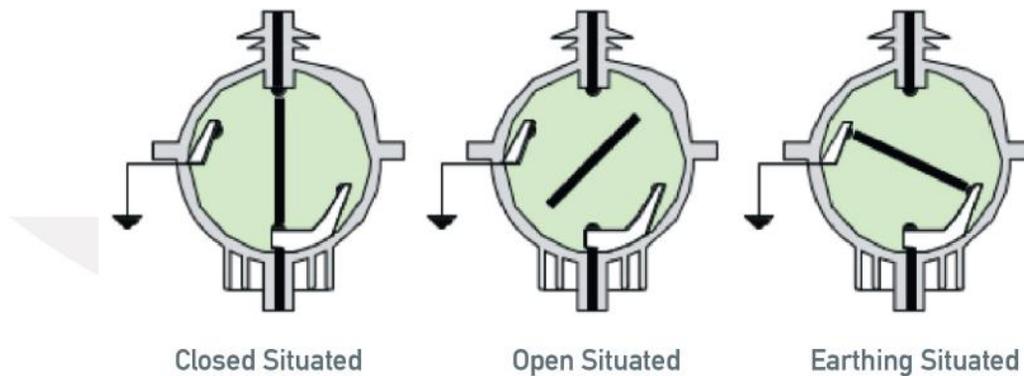
200 MM

279 MM

DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			ARM-36L-01 (630A) ARM-36L-02 (1250A)	ARM-24L-01 (630A) ARM-24L-02 (1250A)
Mechanical Class			M0	M0
Electric Class			E0	E0
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-102	IEC 62271-102
Place Of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Enclosure Protection Degree	IP		2X	2X
Degree of Protection Against Mechanical Impacts	IK		07	07
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Isolation Distance Voltage	Ud	kV	80	60
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Lightning Impulse Insulation Withstand Voltage	Up	kV	195 (peak - 1.2 - 50 µs)	145 (peak - 1.2 - 50 µs)
Nominal Current	Ir	A	630 - 1250	630 - 1250
Short Circuit Current	Ik	kA	16 - 20	16 - 20 - 25
Short Circuit Time	tk	s	1	1
Short Circuit Peak Current	Ip	kA	40 – 50	40 – 50 - 63
Short Circuit Closing Current	I _{ma}	kA	16 – 20	16 – 20 - 25
Insulation Type and Mass	Mf	kg	SF6 – 0,6	SF6 – 0,3
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Filling Pressure for Insulation	Pre	Bar (abs)	1,8	1,8
Minimum Functional Pressure for Insulation	P _{me}	Bar (abs)	> 1,4	> 1,4
Alarm Pressure for Insulation	P _{ae}	Bar (abs)	< 1,4	< 1,4
Minimum functional Pressure for Switching	P _{sw}	Bar (abs)	1,4	1,4
Rated Static Mechanical Terminal Load	F	N	< 400	< 400
Product Mass	M	kg	630A : 70 1250A: 76	630A : 46 1250A: 52
Main Circuit Resistance		µΩ	630A : < 80 1250A : < 44	630A : < 80 1250A : < 44
Creeping Distance (Upper Body)		mm	680	410
Creeping Distance (Underbody)		mm	640	460

SF6 GAS LOAD BREAK SWITCH

SF6 Gas Load Disconnectors are enclosed in an epoxy cast body with a "sealed pressure system"; It has 3 poles and 3 positions. EFG brand SF6 Gas Load Break Disconnectors, which are offered to the consumer company by filling SF6 gas at 1.4-1.8 bar (abs) pressure during the production phase and checking the gas tightness in the production area, comply with TS EN 62271-103 (IEC 62271-103) standard and have a 30-year SF6 lifespan. It is designed in a sealed pressure structure that does not require gas reinforcement.

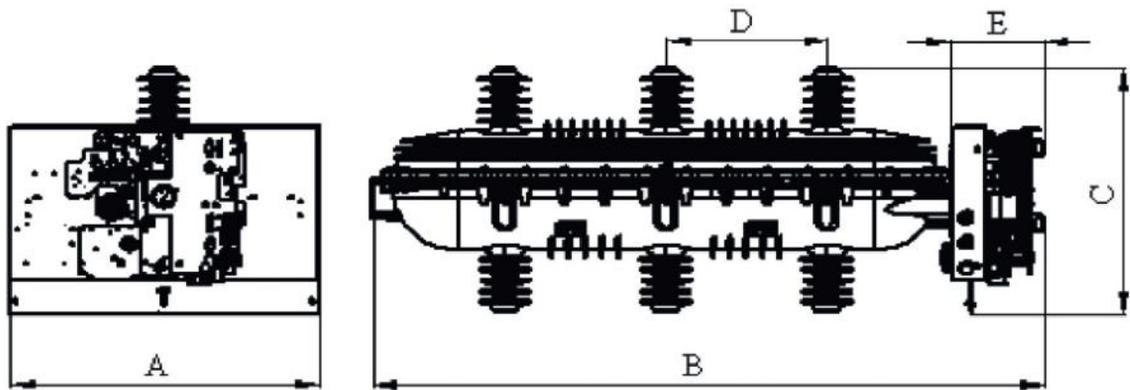
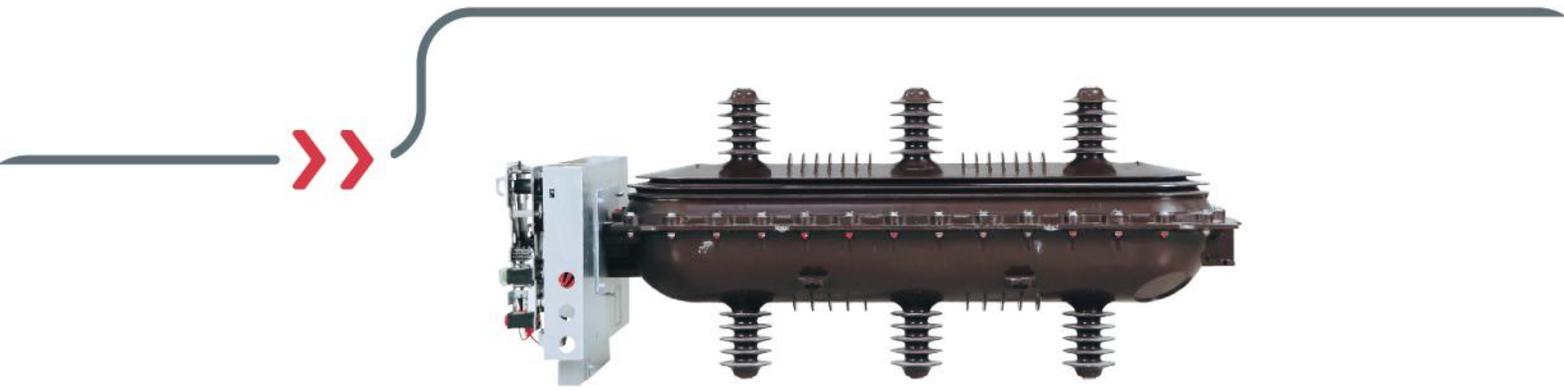


SF6 Gas Load Disconnectors have a manometer that shows gas pressure. These manometers are temperature compensated and are not affected by altitude changes.

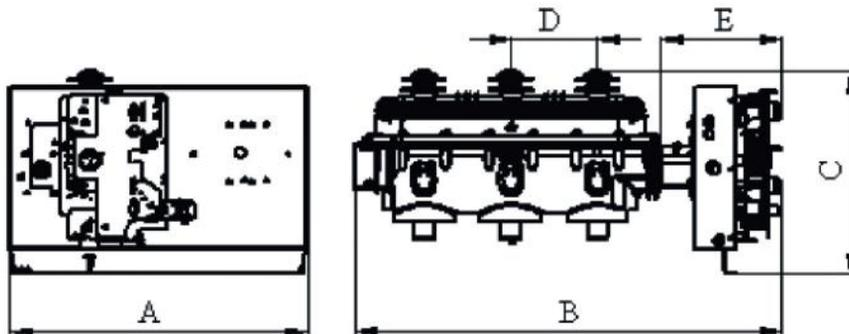
During operation, if the SF6 gas pressure unexpectedly rises to a dangerous level, there is a pressure relief valve (weakened area) on the rear cover of the separator body to ensure that the gas is discharged in a way that does not pose a danger to the operating personnel.

EFG brand SF6 Gas Load Breaker mechanism works with the energy accumulated in a spring arrangement, which is suitable for a remote control system and can be installed by hand or motor. Opening and closing operations can be done mechanically with the help of opening and closing coils, with the button on the front of the mechanism when there is no remote or auxiliary control voltage. The closing and opening process of the grounding switch is completed depending on the operator movement. The operating mechanism is monitored by position indicators that reliably indicate the open and closed positions of the contacts. As standard, 3 NO + 3 NC auxiliary contacts are provided, and additional contacts can be provided upon request. Upon customer request, a mechanical counter that records the number of openings can be added to the mechanisms.





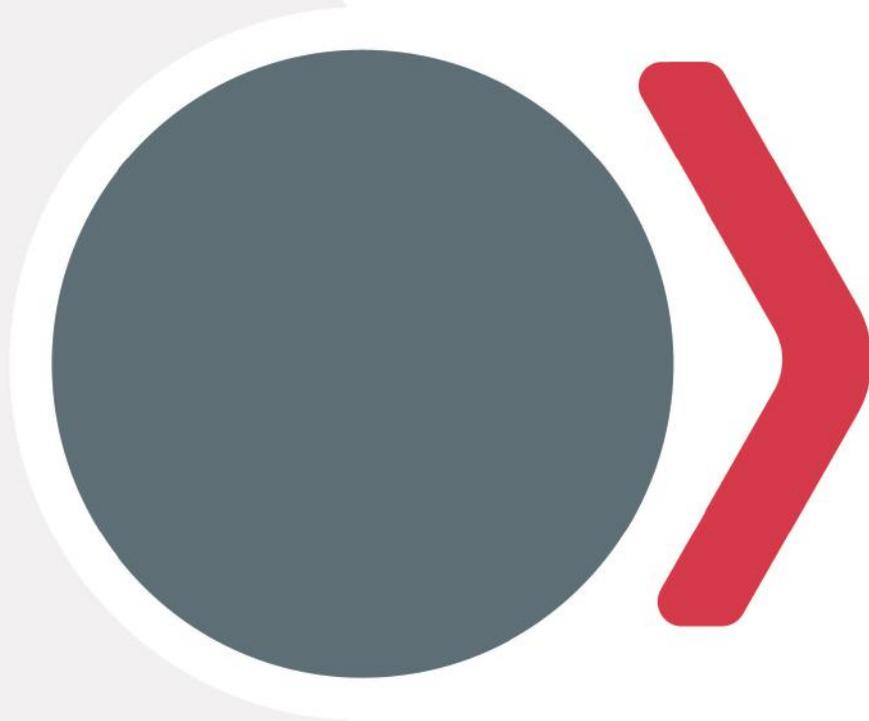
PRODUCT NAME	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
ARM-36LC-01	669 – 919 MM	1463 MM	580 MM	350 MM	203 MM



PRODUCT NAME	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
ARM-24LC-01	438 – 690 MM	984 MM	498 MM	200 MM	279 MM

DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			ARM-36LC-01 (630A)	ARM-24LC-01 (630A)
Mechanical Class			M1	M1
Electric Class			E3	E3
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-103	IEC 62271-103
Place Of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Enclosure Protection Degree	IP		2X	2X
Degree of Protection Against Mechanical Impacts	IK		07	07
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Isolation Distance Voltage	Ud	kV	80	60
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Lightning Impulse Insulation Withstand Voltage	Up	kV	195 (peak - 1.2 - 50 µs)	145 (peak - 1.2 - 50 µs)
Nominal Current	Ir	A	630	630
Short Circuit Current	Ik	kA	16 - 20	16 - 20 - 25
Short Circuit Time	tk	s	1	1
Short Circuit Peak Current	Ip	kA	40 - 50	40 - 50 - 63
Short Circuit Closing Current	I _{ma}	kA	16 - 20	16 - 20 - 25
Insulation Type and Mass	Mf	kg	SF6 - 0,6	SF6 - 0,3
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Filling Pressure for Insulation	Pre	Bar (abs)	1,8	1,8
Minimum Functional Pressure for Insulation	P _{me}	Bar (abs)	> 1,4	> 1,4
Alarm Pressure for Insulation	P _{ae}	Bar (abs)	< 1,4	< 1,4
Minimum functional Pressure for Switching	P _{sw}	Bar (abs)	1,4	1,4
Rated Static Mechanical Terminal Load	F	N	< 400	< 400
Product Mass	M	kg	630A : 73	630A : 48
Main Circuit Resistance		µΩ	630A : < 80	630A : < 80
Creeping Distance (Upper Body)		mm	680	410
Creeping Distance (Underbody)		mm	640	460

EARTHING SWITCHES

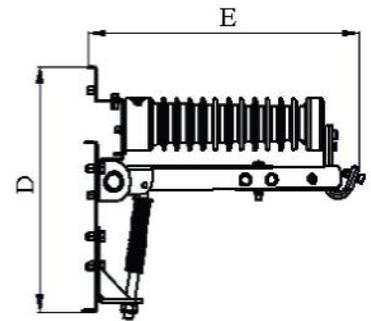
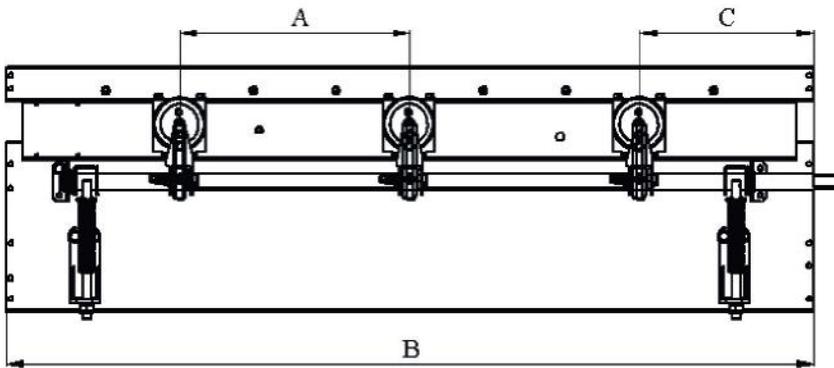


ARM-1TP-1kA and ARM-2TP-1kA type earthing switches used in AS36 LF and AS24 LF series 36-24kV 16-25kA 630A load disconnecter + fuse combined transformer protection switchgears produced by EFG ELEKTRIK are designed in accordance with standards. In addition, AS16-E2 and AS25-E2 type grounding switches used in circuit breaker switchgear meet the relevant standards. Type tests of grounding switches have been carried out in international and national laboratories. Grounding switches with E2 class type testing prevent harm to personnel in front of the cell, thanks to their 5-way shut-off feature upon short circuit. Grounding switches are produced as 3-pole and 2-position in accordance with TS EN 62271-102 (IEC 62271-102) standard.

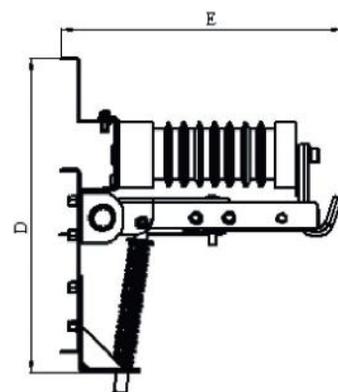
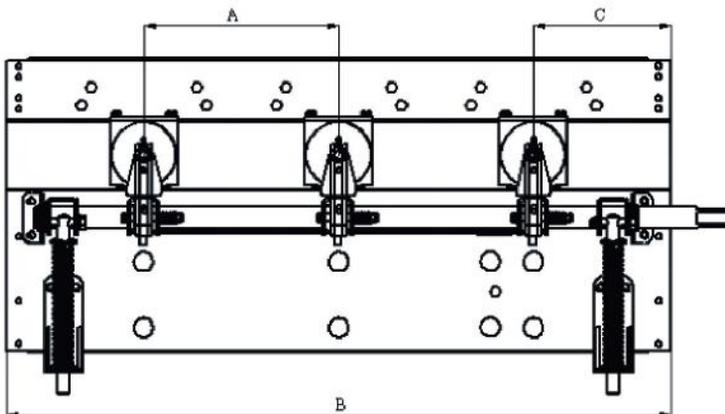
- Ability to work simultaneously with the disconnecter
- Independent hand control
- Closing upon short circuit
- Maintenance-free structure
- Ease of cable connection



PRODUCT NAME	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
AS16-E2	350 MM	1228 MM	264 MM	368 MM	413 MM



PRODUCT NAME	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
AS25-E2	230 MM	786 MM	163 MM	368 MM	332 MM



DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			AS16-E2	AS25-E2
Mechanical Class			M0	M0
Electric Class			E2	E2
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-102	IEC 62271-102
Place Of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Short Circuit Current	Ik	kA	16	16 - 20 - 25
Short Circuit Time	tk	s	1	1
Short Circuit Peak Time	Ip	kA	40	40 - 50 - 63
Short Circuit Closing Current	Ima	kA	16	16 - 20 - 25
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Rated Static Mechanical Load	F	N	< 400	< 400
Product Mass	M	kg	28,5	24



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-1TP-1kA

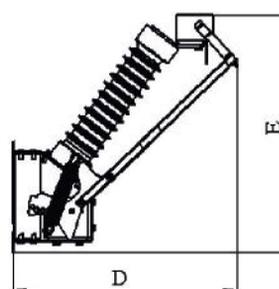
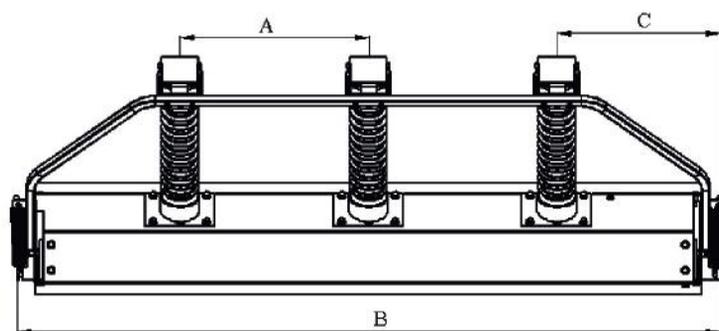
350 MM

1306 MM

303 MM

414 MM

438 MM



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-2TP-1kA

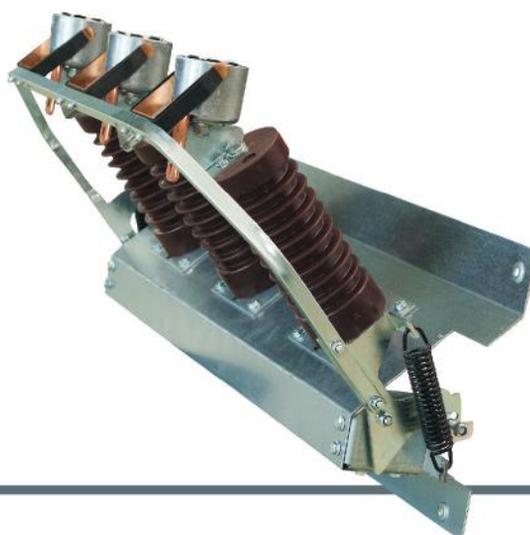
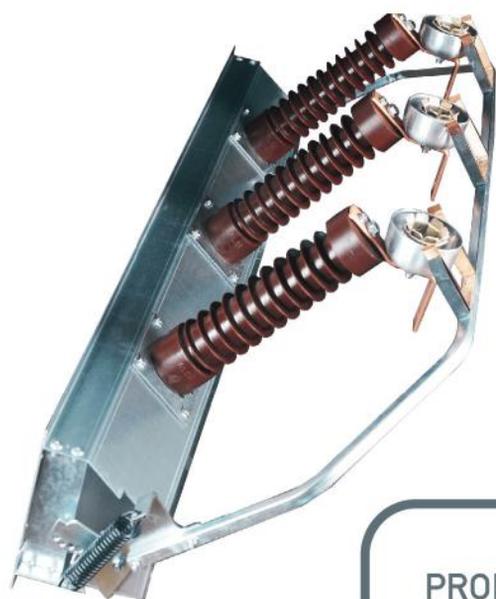
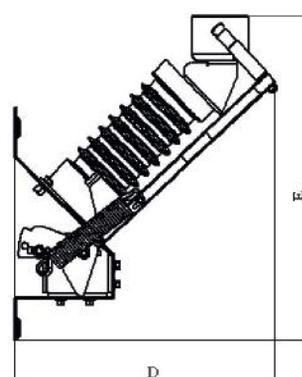
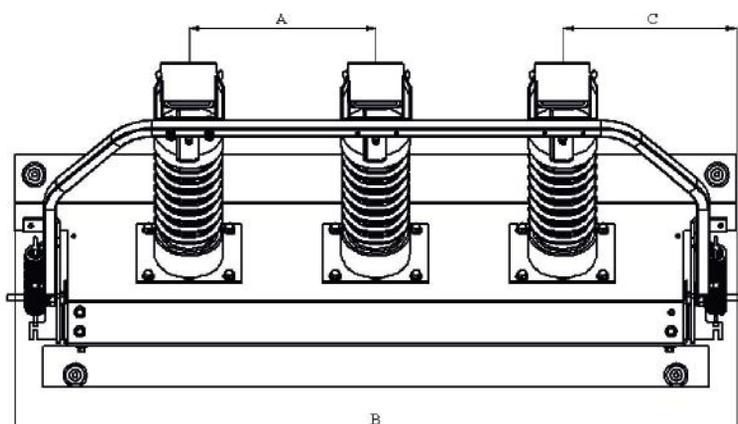
230 MM

888 MM

214 MM

320 MM

395 MM



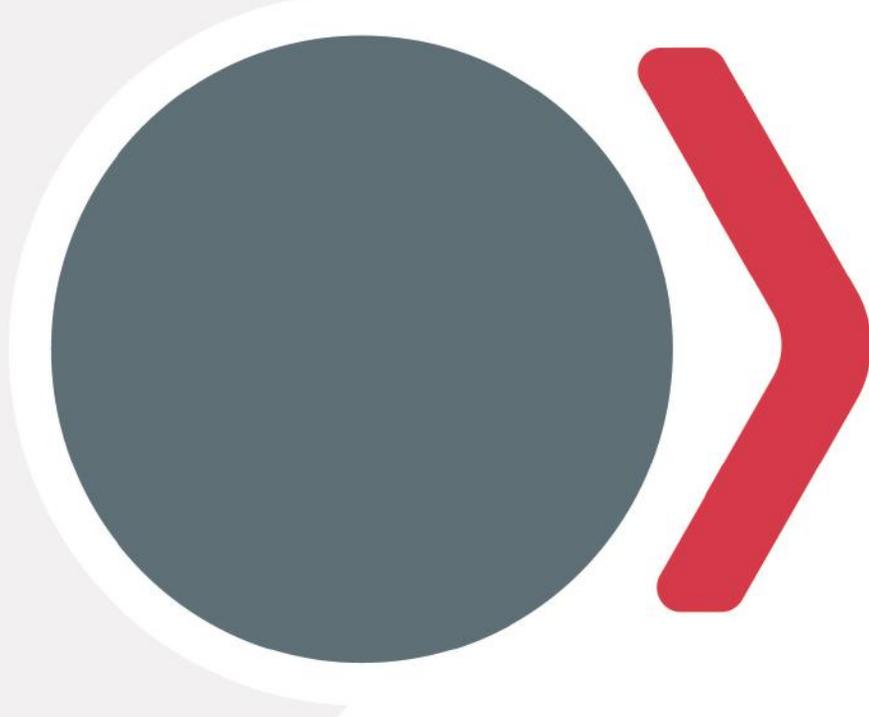
PRODUCT INSTRUCTION MANUAL AND TECHNICAL CATALOG





DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			ARM-1TP-1kA	ARM-2TP-1kA
Mechanical Class			M0	M0
Electric Class			E2	E2
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-102	IEC 62271-102
Place Of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Short Circuit Current	Ik	kA	1	1
Short Circuit Time	tk	s	1	1
Short Circuit Peak Time	Ip	kA	2.5	2,5
Short Circuit Closing Current	I _{ma}	kA	1	1
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Rated Static Mechanical Load	F	N	< 400	< 400
Product Mass	M	kg	28,5	16

SF6 GAS CIRCUIT BREAKERS





EFG brand SF6 Gas Circuit Breakers are designed in a sealed pressure structure that complies with the TS EN 62271-100 (IEC 62271-100) standard and does not require SF6 gas reinforcement for 30 years. Upon request, a contact pressure switch can be added to learn the gas pressure at the breaker poles.

The breaker operating mechanism works with the energy accumulated in a spring arrangement that provides an "On-Closed-Open" operation cycle without the need for a separate operation, is suitable for a remote control system and can be set up by hand or motor. The closing spring is installed by the electric motor or manually, and the opening spring is installed automatically when the breaker is closed. There is a locking system that prevents the breaker from operating if the closing spring is not fully installed.

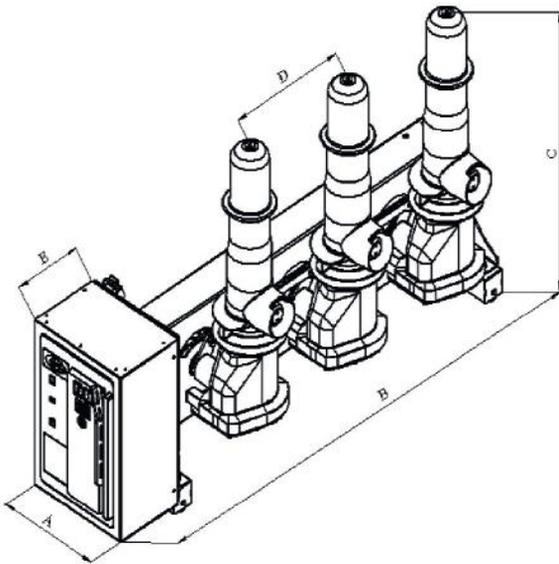
Opening and closing operations can be done mechanically with the help of opening and closing coils, with the button on the front of the breaker operating mechanism when there is no remote or auxiliary control voltage. There is a mechanical indicator on the operating mechanism that shows the open and closed states of the breaker and a mechanical counter that records the number of openings.

Breaker types are determined according to their appearance. These types are listed and we have project-based production as EFG brand.

Type A: The operating mechanism is at the front, the terminals are lined up behind the operating mechanism.

Type B1: While the operating mechanism remains on the left side, the terminals are lined up deeply from the right.

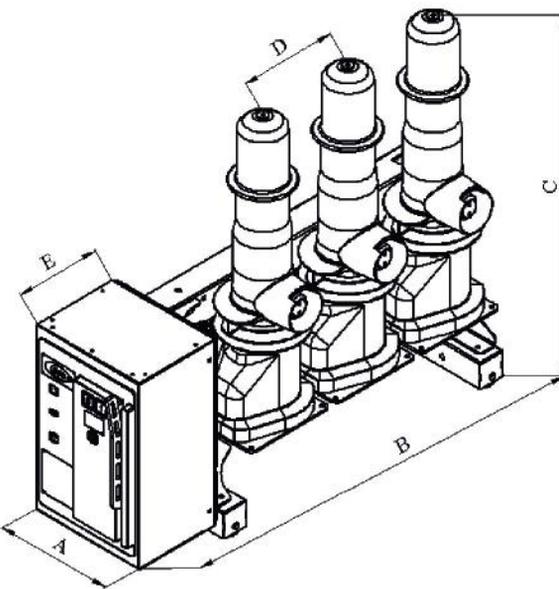
Type B2: While the operating mechanism remains on the right side, the terminals are lined up deeply from the left.



36 kV SF6 GAS CIRCUIT BREAKER WITH SIDE MECHANISM (TYPE B1)



PRODUCT NAME	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
ARM-36G-01	308 MM	1398 MM	787 MM	350 MM	218 MM



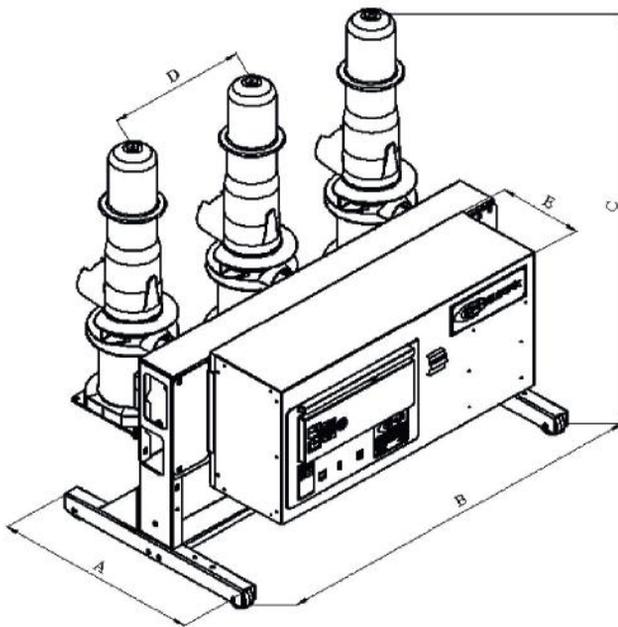
24 kV GAS CIRCUIT BREAKER WITH SIDE MECHANISM (TYPE B1)



PRODUCT NAME	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
ARM-24G-01	278 MM	993MM	850MM	230 MM	218 MM

DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			ARM-36G-01	ARM-24G-01
Electrical Strength Class			E1	E1
Capacitive Current Switching Class			C2	C2
Mechanical Class			M2	M2
Cable System Class			S1	S1
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-100	IEC 62271-100
Place of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Enclosure Protection Degree	IP		2X	2X
Degree of Protection Against Mechanical Impacts	IK		07	07
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Isolation Distance Voltage	Ud	kV	80	60
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Lightning Impulse Insulation Withstand Voltage	Up	kV	195 (peak - 1.2 - 50 µs)	145 (peak - 1.2 - 50 µs)
Nominal Current	Ir	A	630	630
Short Circuit Current	Isc	kA	16	16 - 20
Short Circuit Time	tk	s	3	3
Short Circuit Peak Current	Ip	kA	40	40 - 50
Short Line Fault Breaking Current	ISLF	kA	16	16 - 20
Phase Mismatch Breaking Current	Id	kA	9	6,3
Line Charge Cutting Current	Ii	A	10	10
Cable Charging Cutting Current	Ic	A	50	31,5
Short Circuit Breaking Current DC Time Constant	τ	ms	46	46
First Pole Clearing Factor	kpp		1,5	1,5
Working Cycle			A-0,3S-KA-3DK-KA	A-0,3S-KA-3DK-KA
Isolation Type And Mass	Mf	kg	SF6 – 0,28	SF6 – 0,28
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Filling Pressure for Insulation	Pre	Bar (abs)	2	2
Minimum Functional Pressure for Insulation	Pme	Bar (abs)	> 1,8	> 1,8
Product Mass	M	kg	105	99
Main Circuit Resistance		µΩ	630A : < 70	630A : < 70
Auxiliary Supply Voltage	Ua	V	*	*

36 kV FRONT MECHANISM (A TYPE) SF6 GAS CIRCUIT BREAKER



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-36G-02

520 MM

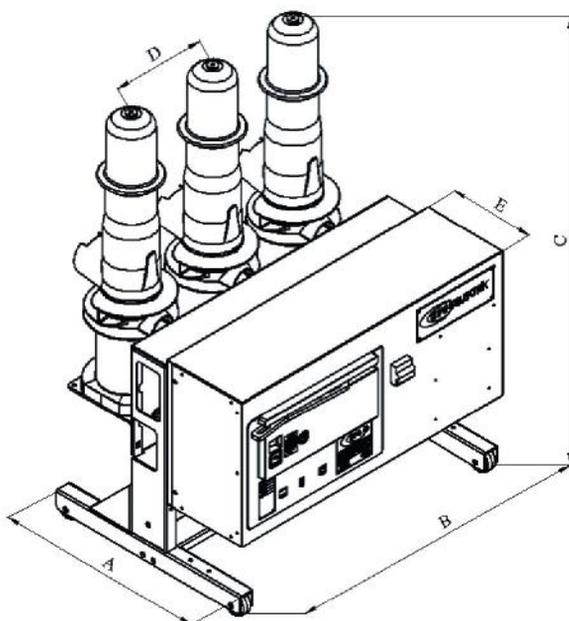
955 MM

970 MM

350 MM

218 MM

24 kV FRONT MECHANISM (A TYPE) SF6 GAS CIRCUIT BREAKER



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-24G-02

520 MM

735 MM

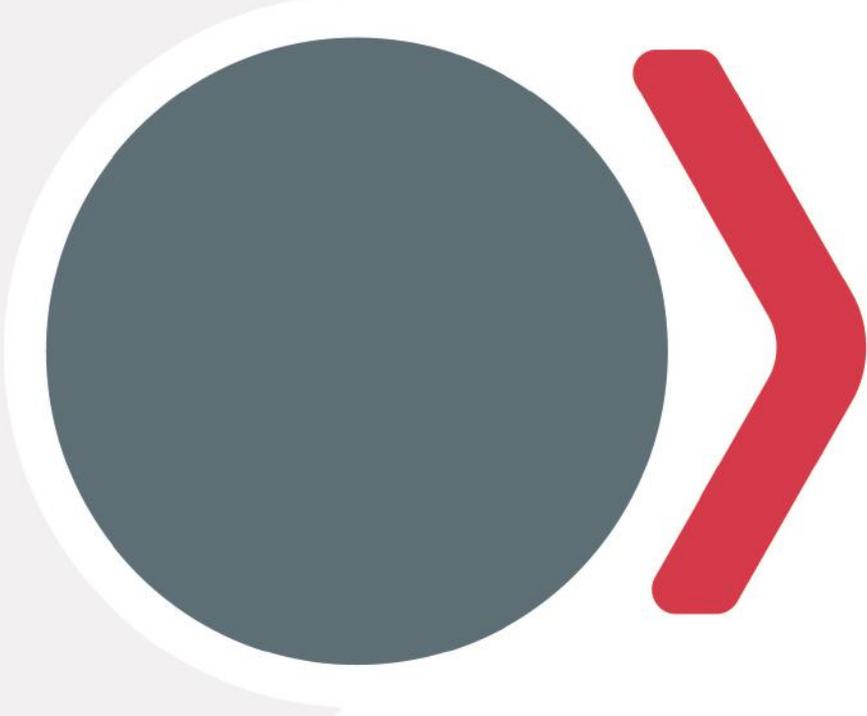
970 MM

230 MM

218 MM

DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			ARM-36G-02	ARM-24G-02
Electrical Strength Class			E1	E1
Capacitive Current Switching Class			C2	C2
Mechanical Class			M2	M2
Cable System Class			S1	S1
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-100	IEC 62271-100
Place of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Enclosure Protection Degree	IP		2X	2X
Degree of Protection Against Mechanical Impacts	IK		07	07
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Isolation Distance Voltage	Ud	kV	80	60
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Lightning Impulse Insulation Withstand Voltage	Up	kV	195 (peak - 1.2 - 50 µs)	145 (peak - 1.2 - 50 µs)
Nominal Current	Ir	A	630	630
Short Circuit Current	Isc	kA	16	16 - 20
Short Circuit Time	tk	s	3	3
Short Circuit Peak Current	Ip	kA	40	40 - 50
Short Line Fault Breaking Current	ISLF	kA	16	16 - 20
Phase Mismatch Breaking Current	Id	kA	9	6,3
Line Charge Cutting Current	Ii	A	10	10
Cable Charging Cutting Current	Ic	A	50	31,5
Short Circuit Breaking Current DC Time Constant	τ	ms	41	41
First Pole Clearing Factor	kpp		1,5	1,5
Working Cycle			A-0,3S-KA-3DK-KA	A-0,3S-KA-3DK-KA
Isolation Type And Mass	Mf	kg	SF6 – 0,28	SF6 – 0,28
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Filling Pressure for Insulation	Pre	Bar (abs)	2	2
Minimum Functional Pressure for Insulation	Pme	Bar (abs)	> 1,8	> 1,8
Product Mass	M	kg	108	99
Main Circuit Resistance		µΩ	630A : < 70	630A : < 70
Auxiliary Supply Voltage	Ua	V	*	*

VACUUM CIRCUIT BREAKERS





ARM type Vacuum Circuit Breakers are one of the main equipment of high voltage air insulated switchgear. Vacuum circuit breakers have a high ability to extinguish arcs that may occur during opening and closing. For this reason, it has found a wide range of application in medium and high voltage systems as an arc extinguishing and insulation. Type tests of vacuum circuit breakers produced at 36-24kV rated voltage have been completed in accordance with TS EN 62271-100 (IEC 62271-100) standard.

The circuit breaker operating mechanism works with the energy accumulated in a spring arrangement that provides an "On-Closed-Open" operation cycle without the need for a separate operation, is suitable for a remote control system and can be set up by hand or motor. The closing spring is installed by the electric motor or manually, and the opening spring is installed automatically when the breaker is closed. There is a locking system that prevents the circuit breaker from operating if the closing spring is not fully installed.

Opening and closing operations can be done mechanically with the help of opening and closing coils, with the button on the front of the breaker operating mechanism when there is no remote or auxiliary control voltage. There is a mechanical indicator on the operating mechanism that shows the open and closed states of the circuit breaker and a mechanical counter that records the number of openings.

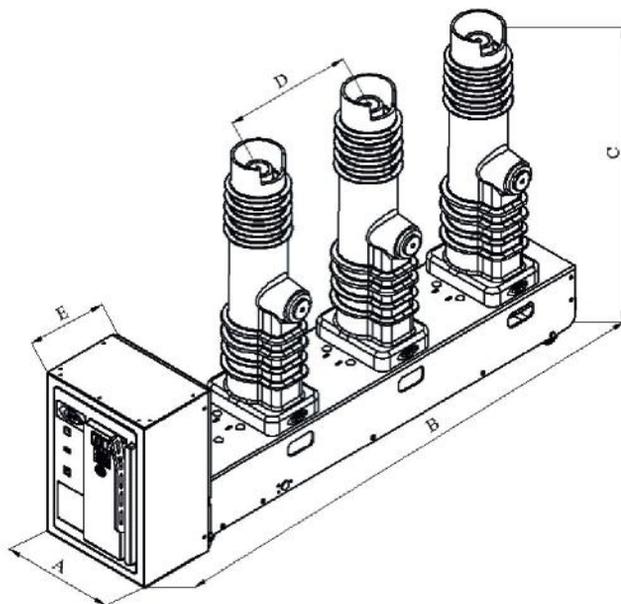
Circuit breaker types are determined according to their appearance. These types are listed and we have project-based production as EFG brand.

Type A: The operating mechanism is at the front, the terminals are lined up behind the operating mechanism.

Type B1: The type where the terminals are lined up deeply from the right while the operating mechanism remains on the left side.

Type B2: The terminals are lined up deeply from the left while the operating mechanism remains on the right side.

36 kV VACUUM CIRCUIT BREAKER WITH SIDE MECHANISM (B1 TYPE)



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-36V-01

308 MM

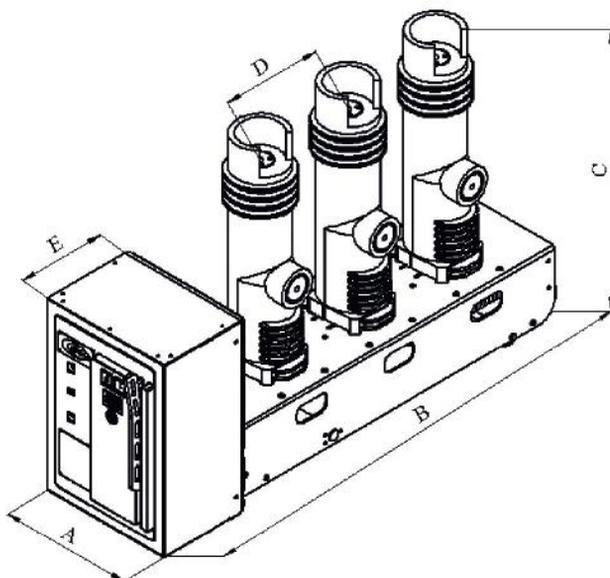
1431 MM

850 MM

350 MM

218 MM

24 kV VACUUM CIRCUIT BREAKER WITH SIDE MECHANISM (B1 TYPE)



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-24V-01

308 MM

1086 MM

684 MM

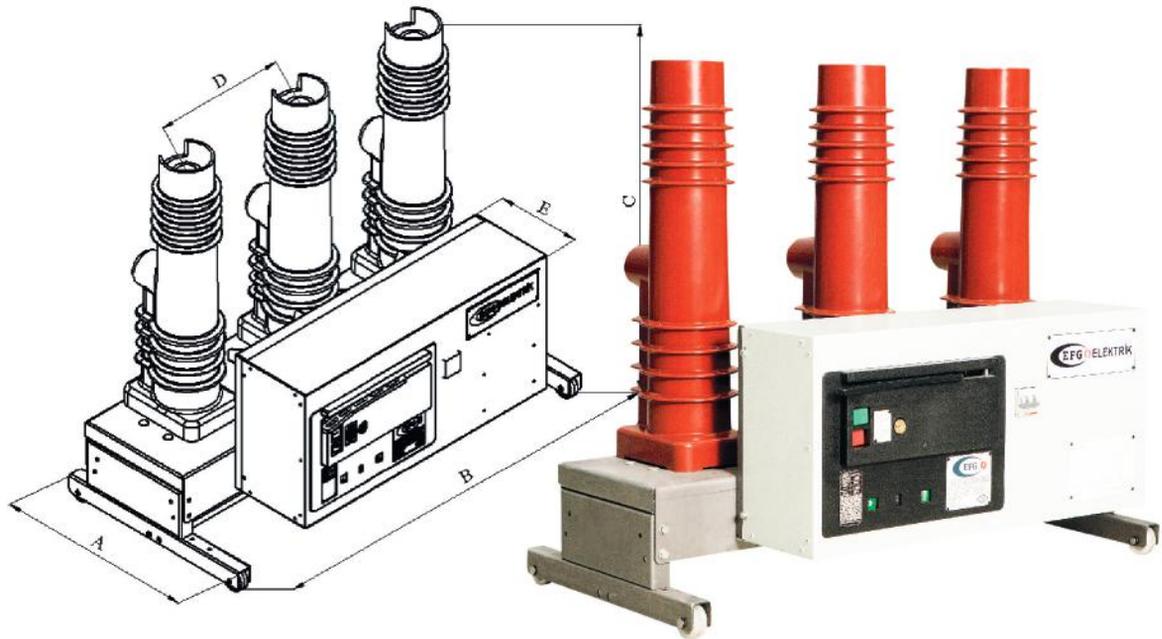
230 MM

218 MM

DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			ARM-36V-01	ARM-24V-01
Electrical Strength Class			E1	E1
Capacitive Current Switching Class			C2	C2
Mechanical Class			M1	M1
Cable System Class			S1	S1
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-100	IEC 62271-100
Place of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Enclosure Protection Degree	IP		2X	2X
Degree of Protection Against Mechanical Impacts	IK		07	07
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Isolation Distance Voltage	Ud	kV	80	60
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Lightning Impulse Insulation Withstand Voltage	Up	kV	195 (peak - 1.2 - 50 µs)	145 (peak - 1.2 - 50 µs)
Nominal Current	Ir	A	630	630
Short Circuit Current	Isc	kA	16	16 - 20 - 25
Short Circuit Time	tk	s	3	3
Short Circuit Peak Current	Ip	kA	40	40 - 50 - 63
Short Line Fault Breaking Current	ISLF	kA	16	16 - 20 - 25
Phase Mismatch Breaking Current	Id	kA	9	6,3
Line Charge Cutting Current	Ii	A	10	10
Cable Charging Cutting Current	Ic	A	50	31,5
Short Circuit Breaking Current DC Time Constant	τ	ms	32	50
First Pole Clearing Factor	kpp		1,5	1,5
Working Cycle			A-0,3S-KA-3DK-KA	A-0,3S-KA-3DK-KA
Insulation Type	Mf	kg	VACUUM	VACUUM
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Product Mass	M	kg	120	109
Main Circuit Resistance		µΩ	630A : < 100 1250A : < 32	630A : < 100 1250A : < 32
Auxiliary Supply Voltage	Ua	V	*	*

“ * ” marked information can be determined according to customer request.

36 kV VACUUM CIRCUIT BREAKER WITH FRONT MECHANISM (A TYPE)



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-36V-02

520 MM

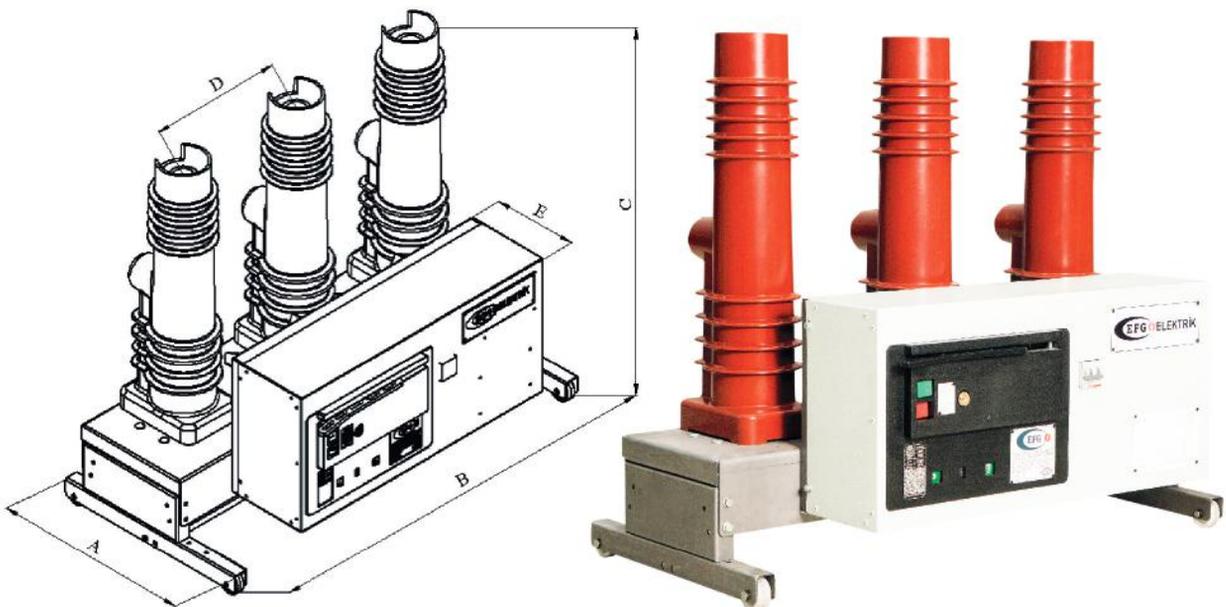
1059 MM

904 MM

350 MM

218 MM

24 kV VACUUM CIRCUIT BREAKER WITH FRONT MECHANISM (A TYPE)



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-24V-02

508 MM

800 MM

746 MM

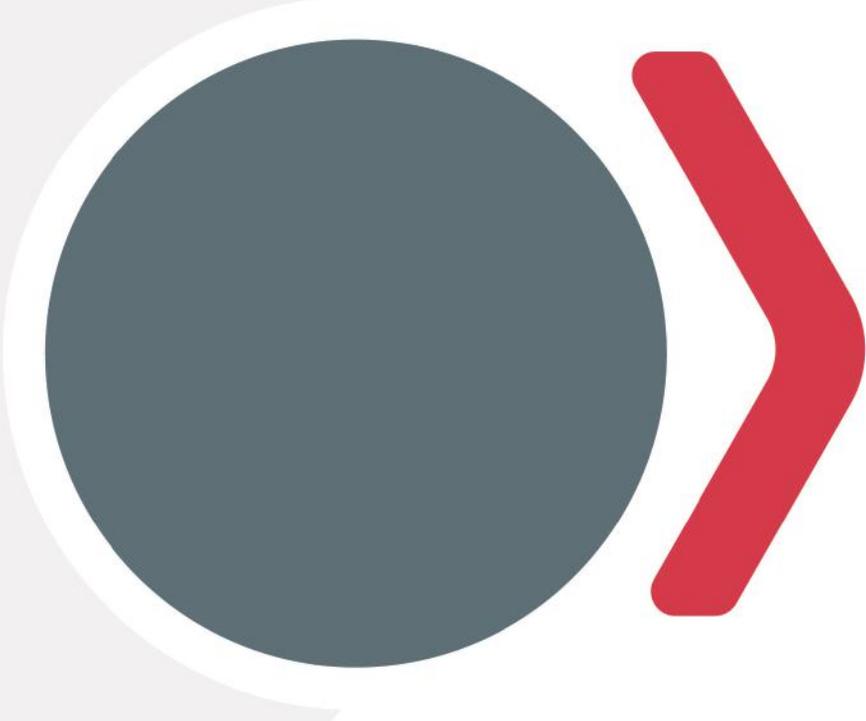
230 MM

218 MM

DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			ARM-36V-02	ARM-24V-02
Electrical Strength Class			E1	E1
Capacitive Current Switching Class			C2	C2
Mechanical Class			M1	M1
Cable System Class			S1	S1
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-100	IEC 62271-100
Place of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Enclosure Protection Degree	IP		2X	2X
Degree of Protection Against Mechanical Impacts	IK		07	07
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Isolation Distance Voltage	Ud	kV	80	60
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Lightning Impulse Insulation Withstand Voltage	Up	kV	195 (peak - 1.2 - 50 µs)	145 (peak - 1.2 - 50 µs)
Nominal Current	Ir	A	630 - 1250	630 - 1250
Short Circuit Current	Isc	kA	16	16 - 20 - 25
Short Circuit Time	tk	s	3	3
Short Circuit Peak Current	Ip	kA	40	40 - 50 - 63
Short Line Fault Breaking Current	ISLF	kA	16	16 - 20 - 25
Phase Mismatch Breaking Current	Id	kA	9	6,3
Line Charge Cutting Current	Ii	A	10	10
Cable Charging Cutting Current	Ic	A	50	31,5
Short Circuit Breaking Current DC Time Constant	τ	ms	32	50
First Pole Clearing Factor	kpp		1,5	1,5
Working Cycle			A-0,3S-KA-3DK-KA	A-0,3S-KA-3DK-KA
Insulation Type	Mf	kg	VACUUM	VACUUM
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Product Mass	M	kg	133	90
Main Circuit Resistance		µΩ	630A : < 100 1250A : < 32	630A : < 100 1250A : < 32
Auxiliary Supply Voltage	Ua	V	*	*

“ * ” marked information can be determined according to customer request.

SWITCHING PRODUCTS



AIR INSULATED METAL ENCLOSED MODULAR SWITCHGEARS

EFG brand Air Insulated Metal Enclosed Modular Switchgears are a switching and control scheme group designed according to TS EN 62271-200 (IEC 62271-200) standard for use in high voltage distribution systems up to 36kV. All type tests required by the standard have been completed in accredited laboratories at home and abroad. There are different types of cell designs with the functional features needed for HV distribution systems.

1. Suitable for remote monitoring and control systems
2. Safe disconnection and breaking operations with EFG brand SF6 Gas Load Break Switch, SF6 Gas Switch Disconnecter, SF6 Gas Circuit Breaker and Vacuum Circuit Breaker
3. Convenient and safe use in HV Distribution Transformer Centers [Concrete Enclosed Monoblock Substations, Sheet Metal Enclosed Monoblock Substations] with compact dimensions
4. Extensibility to the right and left in accordance with the modular structure logic, easy assembly and disassembly feature
5. Mechanical interlocks designed against maneuvering errors





DESIGN AND STRUCTURAL FEATURES

ENCLOSURE

Pregalvanized sheet material with a sheet thickness of 2 mm is used on all external surfaces of EFG brand Air Insulated Metal Enclosed Modular Switchgears. The covers and doors on the front of the enclosure and the front panels of the operating mechanism sections are painted with the electrostatic powder paint method. The enclosure has an IP3X degree of protection against people approaching live parts and moving parts.

DOORS AND COVERS

In EFG brand modular switchgears, access to the compartments where circuit breakers, current and voltage transformers and fuses are located can be provided through OPENABLE covers and doors. FIXED covers are covers that CANNOT be opened without using any tools and have a "DANGER" warning sign on them.

OBSERVATION WINDOWS

The open and closed positions of the circuit breaker, current-voltage transformers, insulator cable headers and grounding switches located in the accessible section on the modular cubicle can be seen through the observation windows on the covers in this section.

LOCKING DEVICES

The disconnecter can be closed if the grounding switch is open and the openable cover of the switchgear is closed.

The grounding switch can be closed if the disconnecter is open.

The circuit breaker can be closed if the disconnecter is closed, the grounding switch is open and the openable cover of the switchgear is closed.

SWITCHGEAR SECTIONS



MAIN BUS SECTION

It is located at the top of the modular switchgear. The main busbar terminals of the switchgear mounted modularly side by side are combined with copper or aluminum busbars to form the main busbar. Access to the main busbar section is only possible by removing the cover with a warning sign on it.

CABLE CONNECTION SECTION

It is located on the underside of the modular switchgear. It is the section where the high voltage cables or busbars entering and exiting are connected to the switchgear. The cover of this section is opened without using any tools after all conductors entering the section are de-voltaged and grounded.

Elements in the cable connection section according to the switchgear functional feature :

- Circuit breaker
- HV Fuses
- Earthing disconnectors
- Metering transformers

LOW VOLTAGE (LV) SECTION

It is located on the upper front face of the switchgear This section can be accessed when the system is under voltage. Elements in the low voltage section according to the functional characteristics of the cell :

- Protection relays
- Metering devices
- Counters
- Auxiliary relays
- Terminal array
- Other low voltage control and command switchgear devices

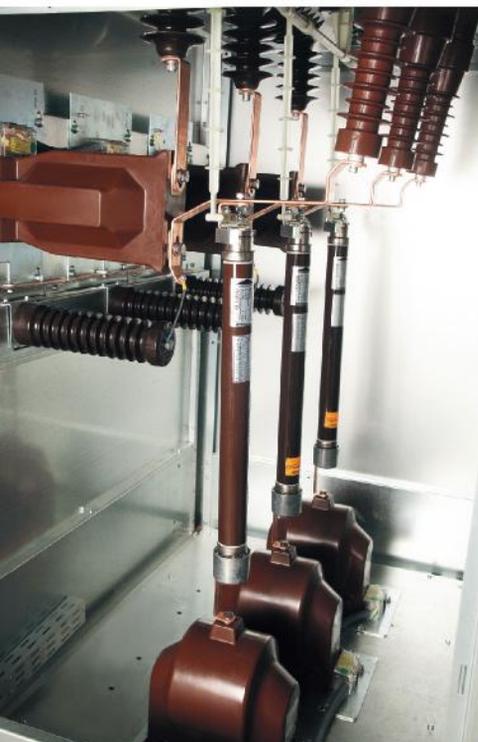
WORKING MECHANISM SECTION

It is located under LV section of the switchgear. It is a metal-enclosed section with IP3X protection degree where the operating mechanisms of SF₆ gas load break switch, SF₆ gas disconnecter and earthing switch are located. In switchgears with circuit breakers, the operating mechanism is located on the breaker. The operating mechanism section can be accessed when the system is under voltage.

In accordance with the single line diagram on the control and monitoring panel located on the front of the operating mechanisms, there are the following hardware and equipment :

- Mimic diagram
- Position indicators for SF₆ gas disconnectors, SF₆ gas load switches and earthing switches
- Joystick slots to control the disconnecter and earthing switch
- “Spring Installed” and “Spring Off” symbols
- Load break switch opening and closing buttons
- Voltage indicator and phase sequence control socket
- Operating instruction
- Sign plate

HV FUSE SELECTION AND FUSE CHANGE



- The rated voltage of the fuse must be equal to or greater than the rated voltage of the system.
- The right fuse should be selected according to the characteristics determined by the fuse manufacturing company. Fuses to be used in EFG brand Transformer Protection Switchgears with
 - Load Breaker and Fuses must have impact pins (medium type) in accordance with TS EN 60282-1 (IEC 60282-1) standard.
 - The Cable Connection Section cover, where the HV fuses are located, can be opened after the load disconnecter is opened and both sides of the high voltage fuses are grounded.
 - In article 11 of the standard numbered TS EN 62271-105 (IEC 62271-105), it is recommended to replace the fuses in the other phases in case one or two fuses blow (melt) in a Load Breaker and Fuse Combined Switchgear.

STANDARD AND OPTIONAL EQUIPMENT

CURRENT AND VOLTAGE TRANSFORMERS

Two different types of current transformers are used in EFG brand modular cells: toroid type (cable type) and support type. Different types of current and voltage transformers are used in line with customer requests and project needs.

FAULT INDICATOR SYSTEM

The Fault Indicator Device, which indicates phase and ground faults supplied from different suppliers, is optionally offered with the switchgears.

DIGITAL PROTECTION AND CONTROL RELAYS

Relays with different types of protection, measurement and control features are used in line with customer requests and project needs. It is shipped after the set values are loaded on the relays mounted in the switchgear.

MEASUREMENT TOOLS

The selection of measuring instruments such as ammeter, voltmeter, meter and energy analyzer is made in line with customer and project needs.

HV FUSES

In EFG brand modular switchgears, HV fuses with high breaking capacity are used, which are selected according to the transformer power.

REMOTE CONTROL

Operations on the switchgear can be carried out at a safe distance with the remote control offered as standard in EFG brand modular switchgears.

BUSBARS

Busbars used in inter-cell connections are manufactured from aluminum or copper insulated with heat shrink tubing, suitable for the rated current of the switchgear.

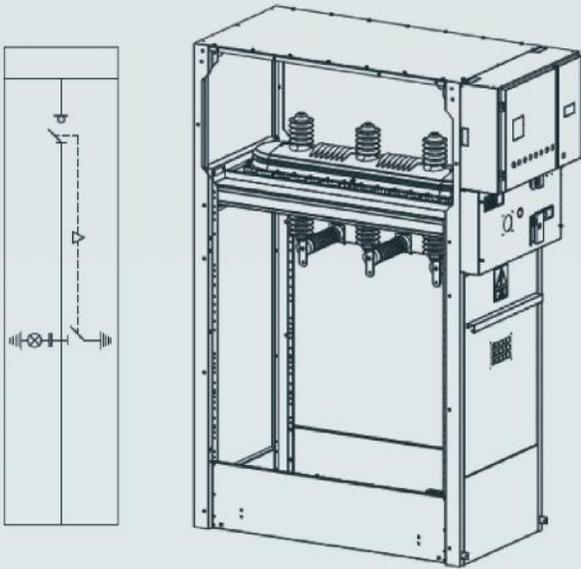
VOLTAGE INDICATOR AND PHASE SEQUENCE CONTROL SOCKET

Voltage indicator and phase sequence control sockets, which are offered as standard in EFG brand modular switchgears, indicate whether there is voltage in the modular cells with the ⚡ sign on the LCD screen or LED lights. It is equipped with the LRM (Low Resistance Modified) system that complies with the standards.

DESCRIPTION	SYMBOL	UNIT	SPEC.	SPEC.
Manufacturer			EFG ELEKTRİK	EFG ELEKTRİK
Product Type			AS36	AS24
Electrical Strength Class			E1	E1
Capacitive Current Switching Class			C2	C2
Mechanical Class			M1	M1
Cable System Class			S1	S1
Instruction Number			KL-16-01	KL-16-01
Standart			IEC 62271-100	IEC 62271-100
Place of Use			INTERNAL	INTERNAL
Environmental Pollution			LESS DIRTY	LESS DIRTY
Enclosure Protection Degree	IP		3X	3X
Degree of Protection Against Mechanical Impacts	IK		10	10
Frequency	fr	Hz	50/60	50/60
Nominal Voltage	Ur	kV	36	24
Insulation Voltage	Ud	kV	70	50
Isolation Distance Voltage	Ud	kV	80	60
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)	125 (peak - 1.2 - 50 µs)
Lightning Impulse Insulation Withstand Voltage	Up	kV	195 (peak - 1.2 - 50 µs)	145 (peak - 1.2 - 50 µs)
Nominal Current	Ir	A	630 - 1250*	630 - 1250*
Short Circuit Current	Isc	kA	16	16 - 20 - 25
Short Circuit Time	tk	s	1	1
Short Circuit Peak Current	Ip	kA	40	40 - 50 - 63
Short Line Fault Breaking Current	ISLF	kA	16	16 - 20 - 25
Phase Mismatch Breaking Current	Id	kA	9	6,3
Line Charge Cutting Current	Ii	A	10	10
Cable Charging Cutting Current	Ic	A	50	31,5
Short Circuit Breaking Current DC Time Constant	τ	ms	32	50
First Pole Clearing Factor	kpp		1,5	1,5
Working Cycle			A-0,3S-KA-3DK-KA	A-0,3S-KA-3DK-KA
Insulation Type	Mf	kg	VACUUM	VACUUM
Temperature Class		°C	-5 °C / +40 °C	-5 °C / +40 °C
Product Mass	M	kg	**	**
Main Circuit Resistance		µΩ	**	**
Auxiliary Supply Voltage	Ua	V	***	***

" * " marked information can be determined according to customer request.

AS36-24 LC / LC-M Input-Output Switchgear with Load Breaker



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	750	500
Depth (mm)	1450	1000

OPERATING INSTRUCTIONS

COMMISSIONING

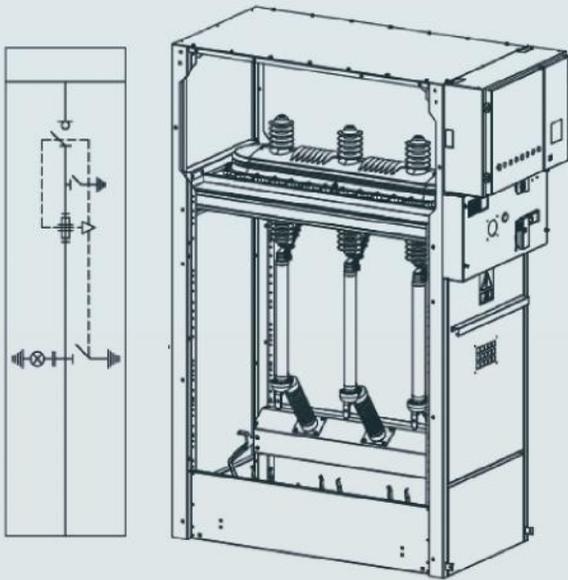
1. Insert the HV fuses with the arrow sign facing up..
2. Close switchgear door.
3. Open earthing disconnector.
4. Install the switch disconnector spring manually or by motor. (motor is optional)
 - A. To install the spring by hand, place the maneuver handle in the SPRING INSTALLATION slot and turn it towards the INSTALLATION DIRECTION.
 - B. To install the spring with motor, turn the Motor Installation switch in the LV section to position 1.
5. Close load break switch.
6. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. Open load break switch.
2. Check that the voltage marks on the voltage indicator are not lit..
3. Close earthing disconnector.
4. Switchgear door can be opened.

AS36-24 LF / LF-M

Fused Transformer Protection Switchgear with Load Breaker



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	750	500
Depth (mm)	1400	1000

OPERATING INSTRUCTIONS

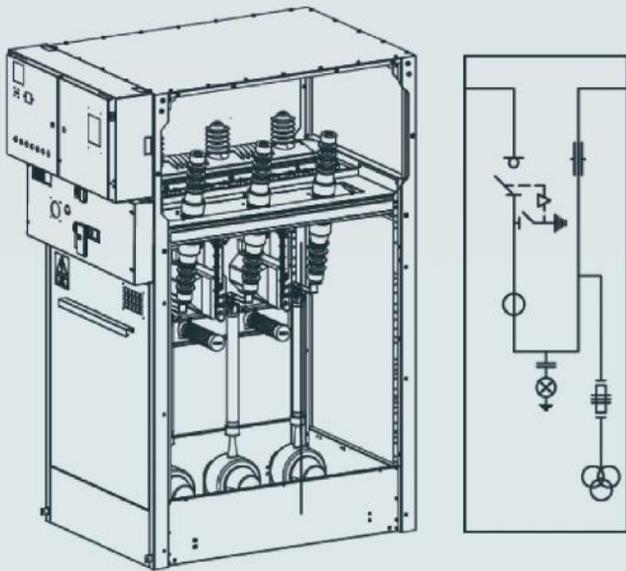
COMMISSIONING

1. Insert the HV fuses with the arrow sign facing up.
2. Close switchgear door.
3. Open earthing disconnector.
4. Install the switch disconnector spring manually or by motor. (motor is optional)
 - A. To install the spring by hand, place the maneuver handle in the SPRING INSTALLATION slot and turn it towards the INSTALLATION DIRECTION.
 - B. To install the spring with motor, turn the Motor Installation switch in the LV section to position 1.
5. Close load break switch.
6. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. Open load break switch.
2. Check that the voltage marks on the voltage indicator are not lit.
3. Close earthing disconnector.
4. Switchgear door can be opened.

AS36-24 LCV / LCV-M Current And Voltage Measurement Switchgear with Load Breaker



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	1000	750
Depth (mm)	1400	1000

OPERATING INSTRUCTIONS

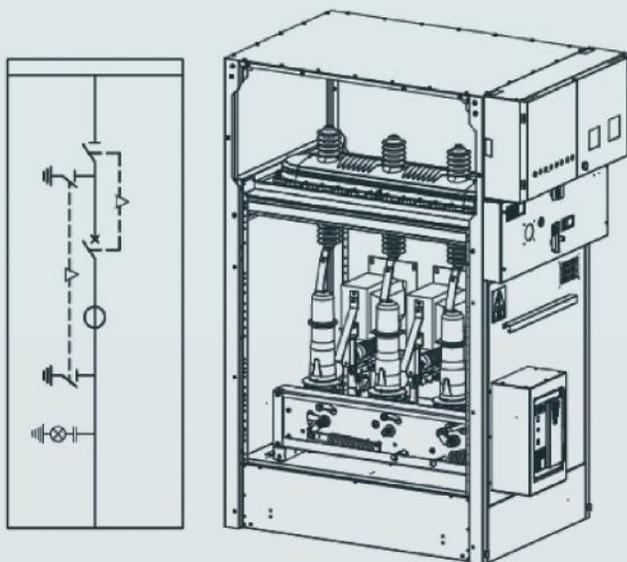
COMMISSIONING

1. Insert the HV fuses with the arrow sign facing up..
2. Close switchgear door.
3. Open earthing disconnector.
4. Install the switch disconnector spring manually or by motor. (motor is optional)
 - A. To install the spring by hand, place the maneuver handle in the SPRING INSTALLATION slot and turn it towards the INSTALLATION DIRECTION.
 - B. To install the spring with motor, turn the Motor Installation switch in the LV section to position 1.
5. Close load break switch.
6. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. Open load break switch.
2. Check that the voltage marks on the voltage indicator are not lit.
3. Close earthing disconnector.
4. Switchgear door can be opened.

AS36-24 CBC – CBT Input Output Switchgear with Circuit Breaker Transformer Protection Switchgear with Circuit Breaker



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	1000	750
Depth (mm)	1400	1000

OPERATING INSTRUCTIONS

COMMISSIONING

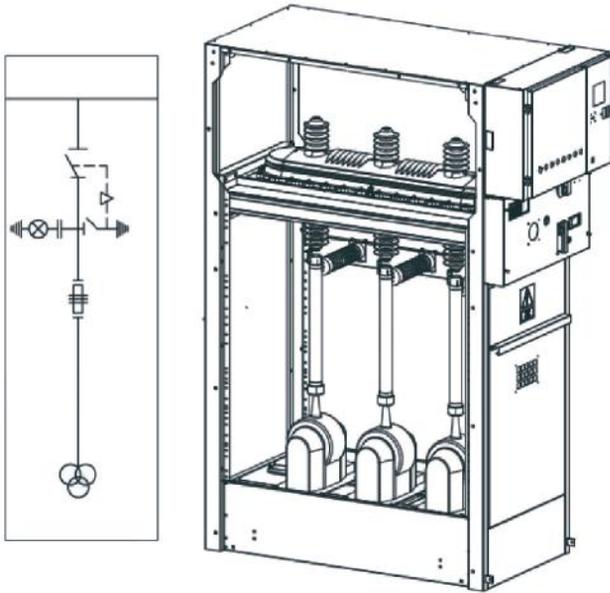
1. Install the breaker socket.
2. Close switchgear door.
3. Open earthing disconnector.
4. Close disconnector.
5. Lock the disconnector and remove the key.
6. Insert the key into the lock on the breaker and unlock the breaker.
7. Install the breaker spring by hand or motor.
8. Close the breaker.
9. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. Open breaker.
2. Check that the voltage marks on the voltage indicator are not lit.
3. Lock the breaker and remove the key, insert it into the disconnector.
4. Unlock the disconnector and open the disconnector.
5. Close earthing disconnector.
6. Switchgear door can be opened.

AS36-24 VTC – VTC/2

Voltage Measurement Switchgear



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	750	500
Depth (mm)	1400	1000

OPERATING INSTRUCTIONS

COMMISSIONING

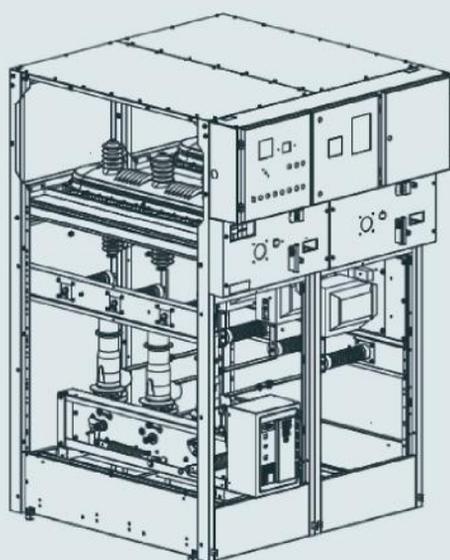
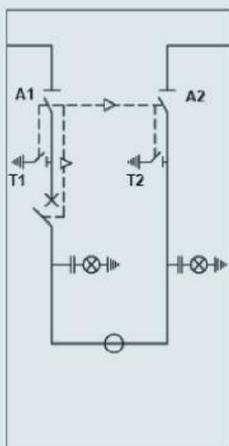
1. Insert the HV fuses with the arrow sign facing up..
2. Close switchgear door.
3. Open earthing disconnector.
4. Close disconnector.
5. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. Open load break switch.
2. Check that the voltage marks on the voltage indicator are not lit.
3. Close earthing disconnector.
4. Switchgear door can be opened.



AS36-24 CBC-C2 Busbar Connection (Coupling) Switchgear with Double Disconnecter Circuit Breaker



DESCRIPTIONS OF THE KEYS

1. The passwords for A1 (Disconnecter 1) and T2 (Earthing Disconnecter 2) key cores are the same.
2. The passwords of the breaker key and A2 (Disconnecter 2) key cores are the same.
3. The switch from the T2 (Earthing Disconnecter 2) hub does not come out when T2 (Earthing Disconnecter 2) is open.
4. Switch from hub A1 (Disconnecter 1) does not come out when A1 (Disconnecter 1) is open.
5. Switch from hub A2 (Disconnecter 2) does not come out when A2 (Disconnecter 2) is open.

OPERATING INSTRUCTIONS

COMMISSIONING

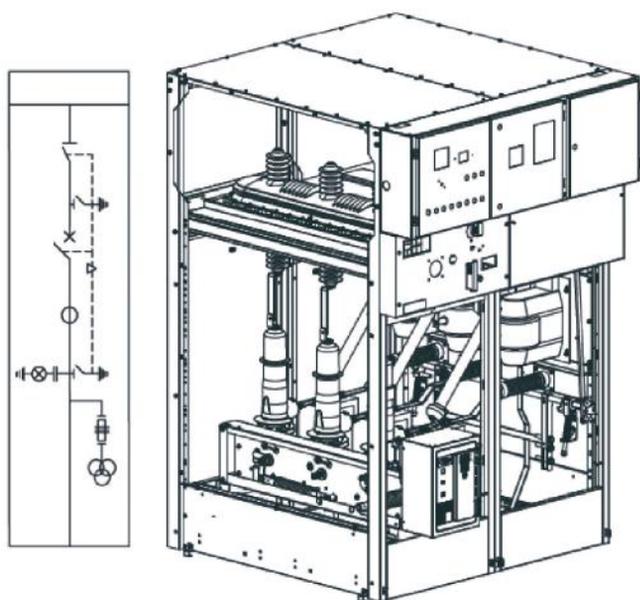
1. Install the breaker socket.
2. Close the switchgear door.
3. Open earthing disconnecter 1 (T1).
4. Close disconnecter 1 (A1). Lock the A1 key core and remove the key.
5. Insert the key into the T2 key hub, turn it on. Turn on Earthing Disconnecter 2 (T2).
6. Close disconnecter 2 (A2). Lock the A2 key core and remove the key.
7. Insert the key into the lock on the breaker and unlock the breaker.
8. Install breaker spring with hand or motor.
9. Close breaker.
10. Check that the voltage marks on the voltage indicator are lit.

DESCRIPTIONS OF THE KEYS

1. Open breaker.
2. Lock the breaker and remove the key. Plug into A2 key hub.
3. Turn the A2 switch hub on. Open disconnecter 2 (A2).
4. Close Earthing Disconnecter 2 (T2). Lock the T2 key core. take out the key.
5. Insert the key into the A1 key hub, turn it on. Open disconnecter 1 (A1).
6. Close earthing disconnecter (T1).

Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	1500	1000
Depth (mm)	1400	1000

AS36-24 CBC-OTOP Output Switchgear with Voltage Transformer Circuit Breaker (Autoproducer)



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	1500	1000
Depth (mm)	1400	1000

OPERATING INSTRUCTIONS

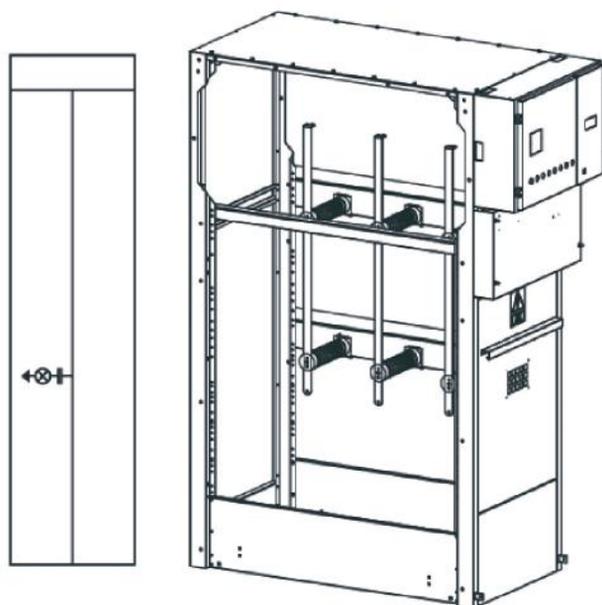
COMMISSIONING

1. Install the breaker socket.
2. Close the switchgear door.
3. Open earthing disconnector.
4. Close disconnector.
5. Lock the disconnector and remove the key.
6. Insert the key into the lock on the breaker and unlock the breaker.
7. Install the breaker spring by hand or motor.
8. Close the breaker.
9. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. Open breaker.
2. Check that the voltage marks on the voltage indicator are not lit.
3. Lock the breaker and remove the key, insert it into the disconnector.
4. Unlock the disconnector and open the disconnector.
5. Close earthing disconnector.
6. Switchgear door can be opened.

AS36-24 KB Cable Binding Switchgear



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	750	500
Depth (mm)	1400	1000

OPERATING INSTRUCTIONS

COMMISSIONING

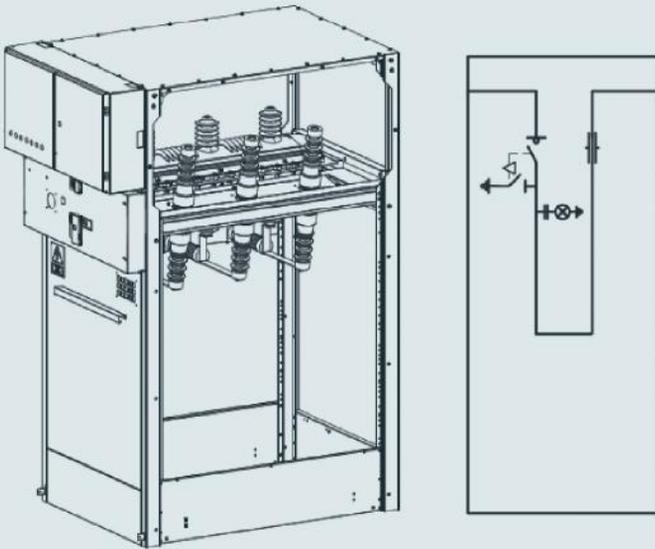
1. Close switchgear door.
2. Install the cover fixing screw.
3. Energize.
4. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. De-energize.
2. Check that the voltage marks on the voltage indicator are not lit.
3. Remove the cover fixing screw.
4. The switchgear door can be opened.

AS36-24 LC-BB

Busbar Partition Switchgear with Load Breaker



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	1000	750
Depth (mm)	1400	1000

OPERATING INSTRUCTIONS

COMMISSIONING

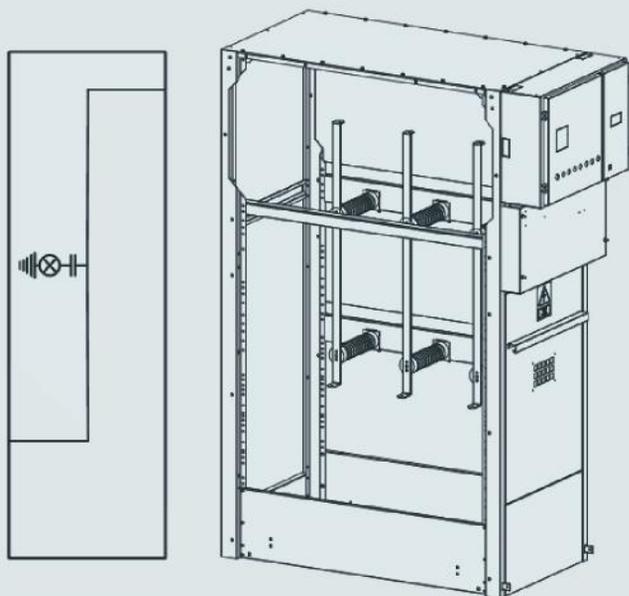
1. Close the switchgear door.
2. Open earthing disconnecter.
3. Install the switch disconnecter spring manually or by motor. (motor is optional)
 - A. To install the spring by hand, place the maneuver handle in the SPRING INSTALLATION slot and turn it towards the INSTALLATION DIRECTION.
 - B. To install the spring with motor, turn the Motor Installation switch in the LV section to position 1.
4. Close load break switch.
5. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. Open load break switch.
2. Check that the voltage marks on the voltage indicator are not lit..
3. Close earthing disconnecter.
4. Switchgear door can be opened.

AS36-24 BY

Busbar Upgrade Switchgear



Un	36 kV	24 kV
Height (mm)	2250	1800
Width (mm)	750	500
Depth (mm)	1400	1000

OPERATING INSTRUCTIONS

COMMISSIONING

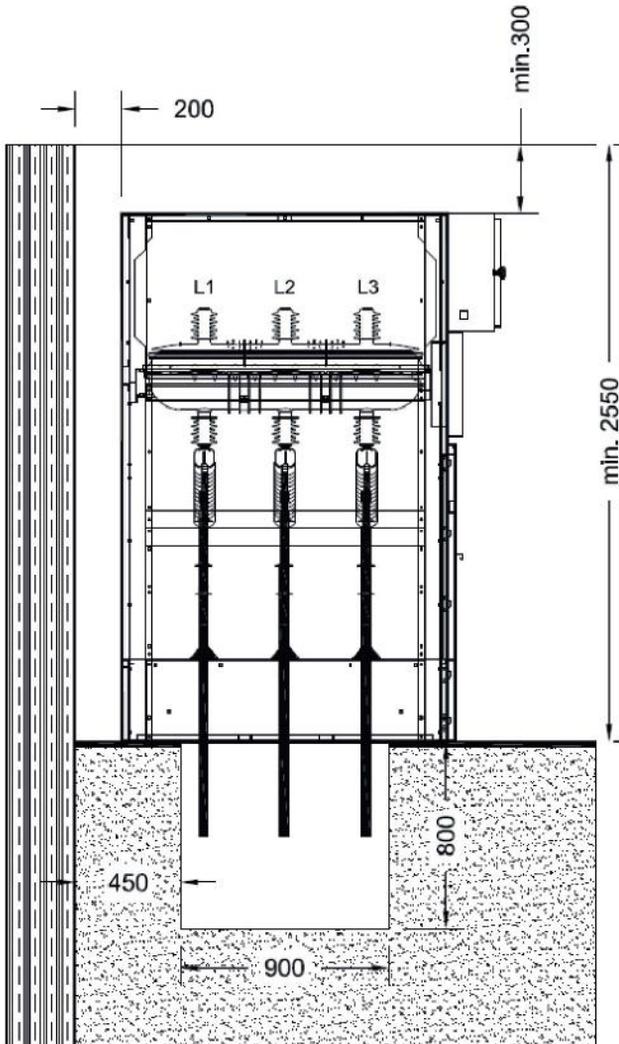
1. Close switchgear door.
2. Install the cover fixing screw.
3. Energize.
4. Check that the voltage marks on the voltage indicator are lit.

DECOMMISSIONING

1. De-energize.
2. Check that the voltage marks on the voltage indicator are not lit.
3. Remove the cover fixing screw.
4. The switchgear door can be opened.



INDOOR PLACEMENT OF SWITCHGEARS



Metal Enclosed Modular Switchgears (MEMS):

— The distance to the rear wall should be at least 200 mm.

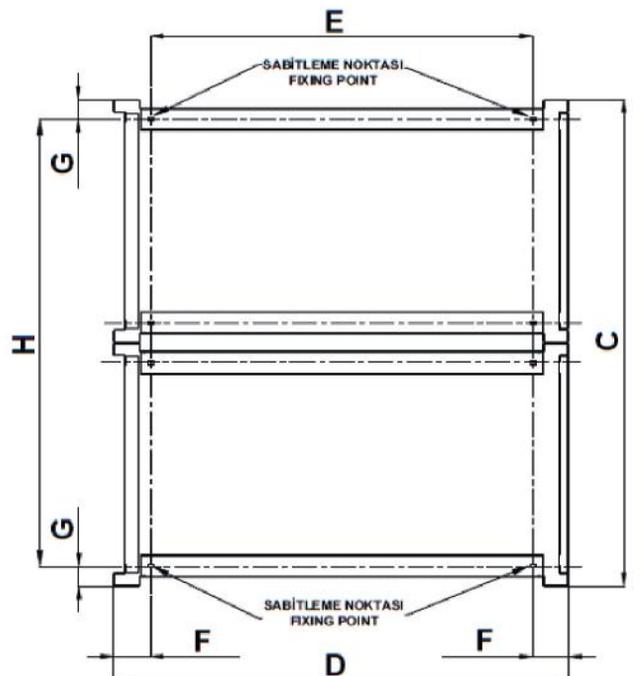
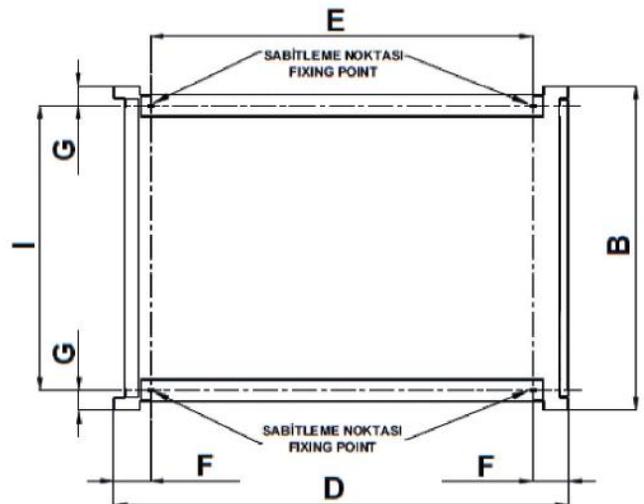
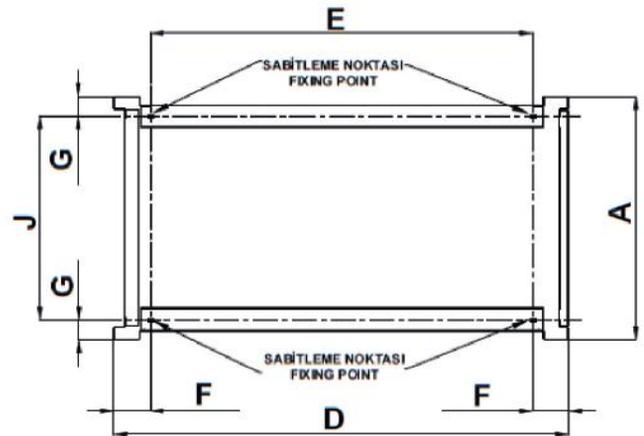
— The distance to the side walls should be at least 50 mm.

During the installation of Metal Enclosed Modular Switchgears, the distances shown above should be observed depending on the place of use. If these distances are not placed appropriately, the operator may be harmed due to internal arc faults that may occur in the switchgears. Therefore, attention should be paid to the dimensions given.

GROUND CONNECTION OF SWITCHGEARS

Un	36 kV	24 kV
A (mm)	750	500
B (mm)	1000	750
C (mm)	1500	1000
D (mm)	1400	1000
E (mm)	1175	800
F (mm)	112,5	100
G (mm)	60	15
H (mm)	1060	970
I (mm)	880	720
J (mm)	630	470

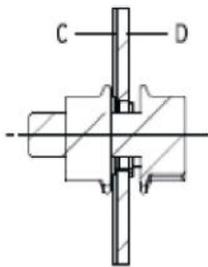
Steel dowels or anchor bars are placed at the points marked as "Fixing Point" of the switchgears. M8x25 It is fixed with bolts.



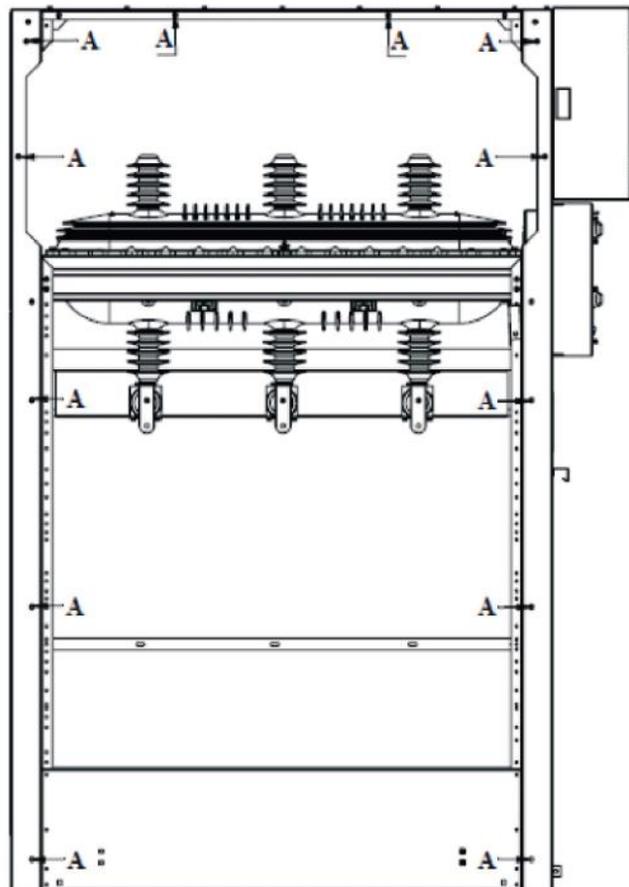
CONNECTION OF SWITCHGEARS TO EACH OTHER



After the lifting hooks are removed, the connection between the switchgears is fixed with M10x25 flanged bolts and nuts at the points marked with the letter A in the image below.

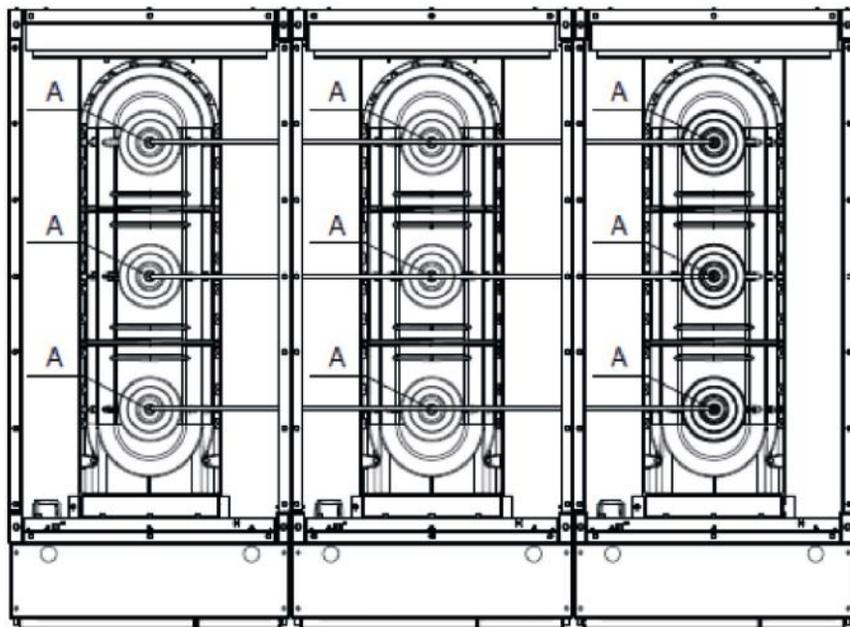


C : The switchgear on the left to be linked to
D : The switchgear on the right to be linked to



Switchgear Front View

INSTALLATION OF MAIN BUSBARS

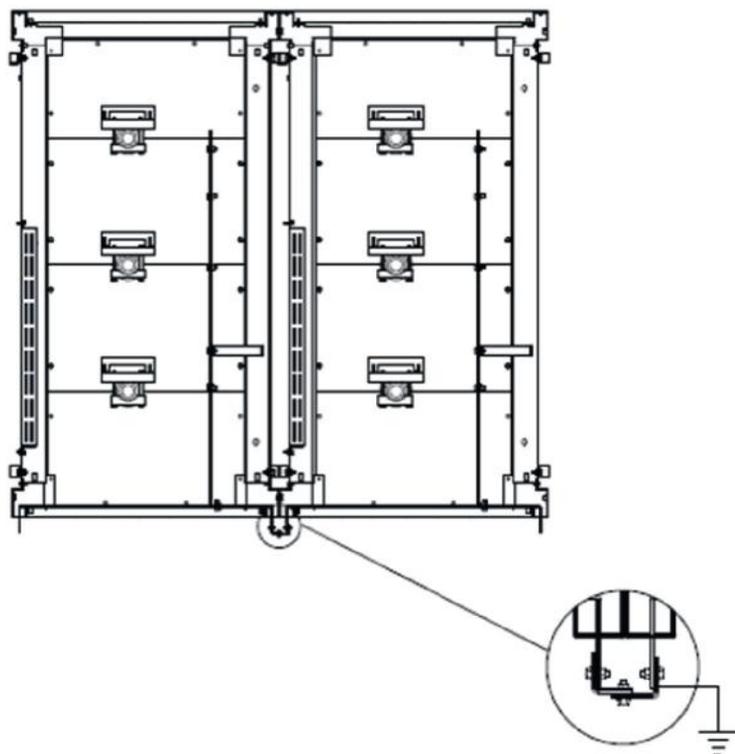


Copper Busbar Mounting: Depending on the single busbar or double busbar status, the main busbars are fixed with M10x30 imbus bolts at the points marked with the letter A in the image below.

Aluminum Busbar Mounting: Depending on single or double busbar status, the main busbars are fixed with M10x30 or M10x40 imbus bolts at the points marked with the letter A in the image below.

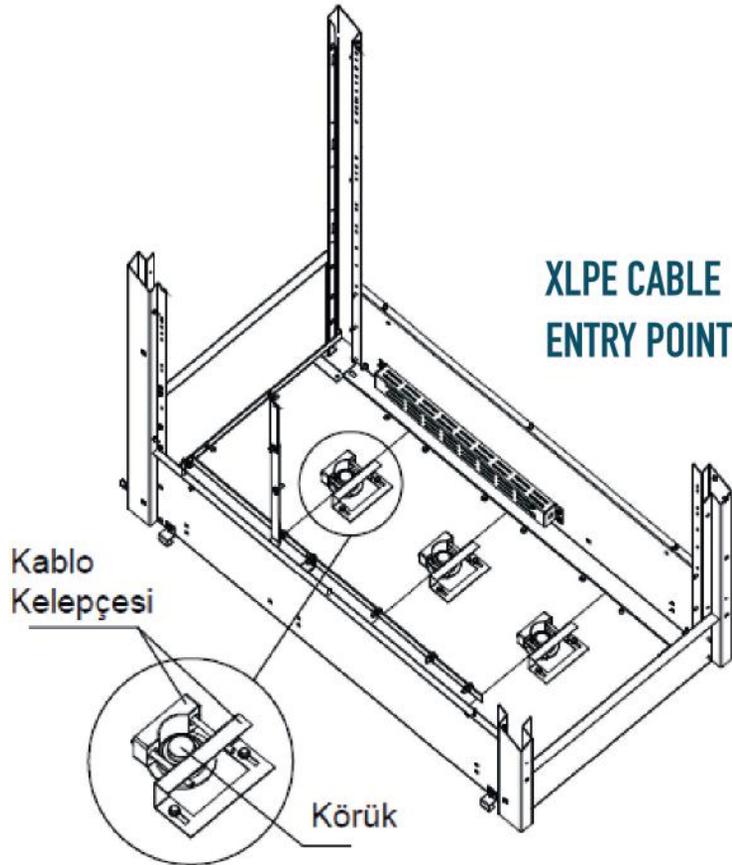
COMBINATION OF EARTHING BAR

The grounding copper coming from the front of the modular switchgear as per the standard and the grounding copper coming from the front of the modular switchgear to be added are fixed with M8x20 flanged bolts and nuts using the interconnect copper.

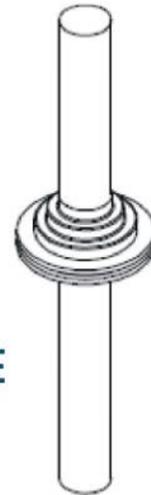


CONNECTION OF HIGH VOLTAGE CABLES

When connecting High Voltage XLPE cable, start from L1 phase first. Then L2 and L3 phases are performed. First, the cable clamps are loosened and the XLPE cable is passed through. The bellows is threaded onto the cable. The XLPE cable is stretched through the clamps and connected to the cable connection terminals and the clamps are tightened. The grounding of the XLPE cable is connected to the switchgear earthing busbar.



FITTING THE
BELLOW TO THE
XLPE CABLE



CABLE INPUT OUTPUT FOR LOW VOLTAGE CABLE CONNECTION

The sockets located in the low voltage cabinet are used for the transition of auxiliary service and control cables from switchgear to switchgear. Male and female sockets are taken to the side switchgear and combined using the cable passage hole in the low voltage cabinet.

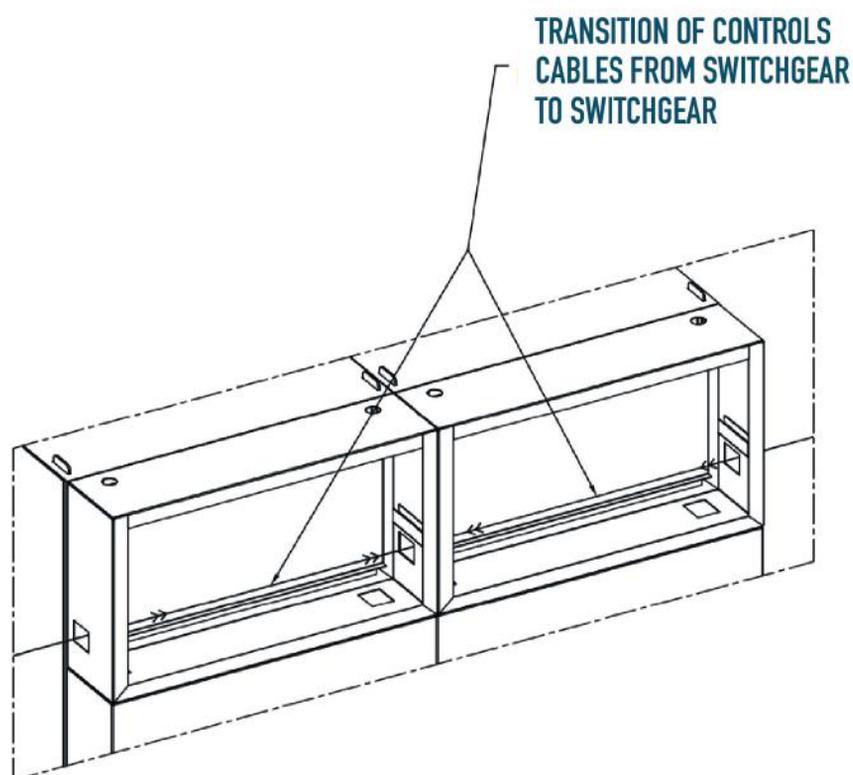


If there is a battery-rectifier group in the facility, check whether this equipment is connected to a 220 VAC source. If not connected, connect it.

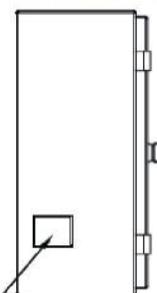


The cable passage hole of the switchgear at the beginning or at the end of the switchgear array is also used for the passage of cables such as auxiliary service, control and remote control coming to and coming from the switchgear array.

Switchgear-to-switchgear transition cables are made by connecting the sockets through the cable passage holes in this area. AC-DC transitions and intercell electrical locking cables pass here.

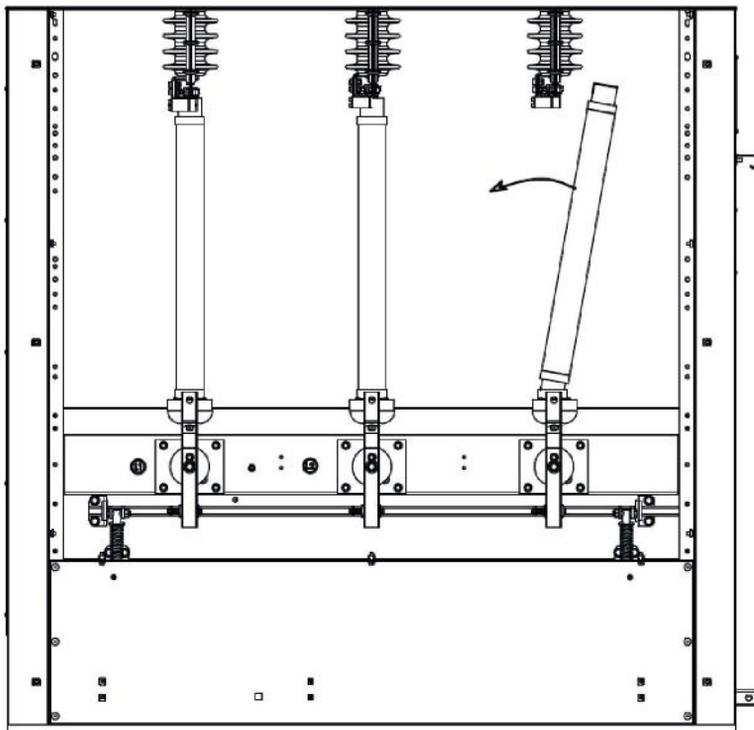


PROTECTION CONTROL CABINET



SOCKET TRANSITION

PLACEMENT OF HIGH VOLTAGE FUSES



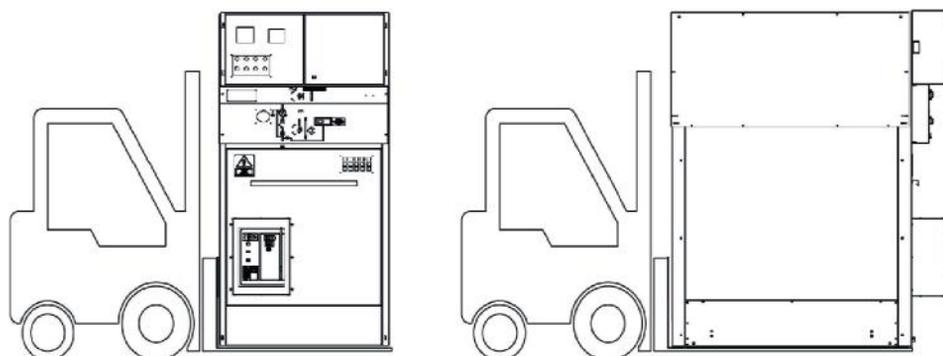
High voltage fuses should be installed with the fuse pin at the top. The bottom of the fuse should be pressed down so much that the tulip rests against the base of the contacts. Then, the upper part of the fuse (the side with the pin) should be placed into the slot.



If one or two fuses blow (melt) in the switchgear, it is recommended to replace the fuses in the other phases.

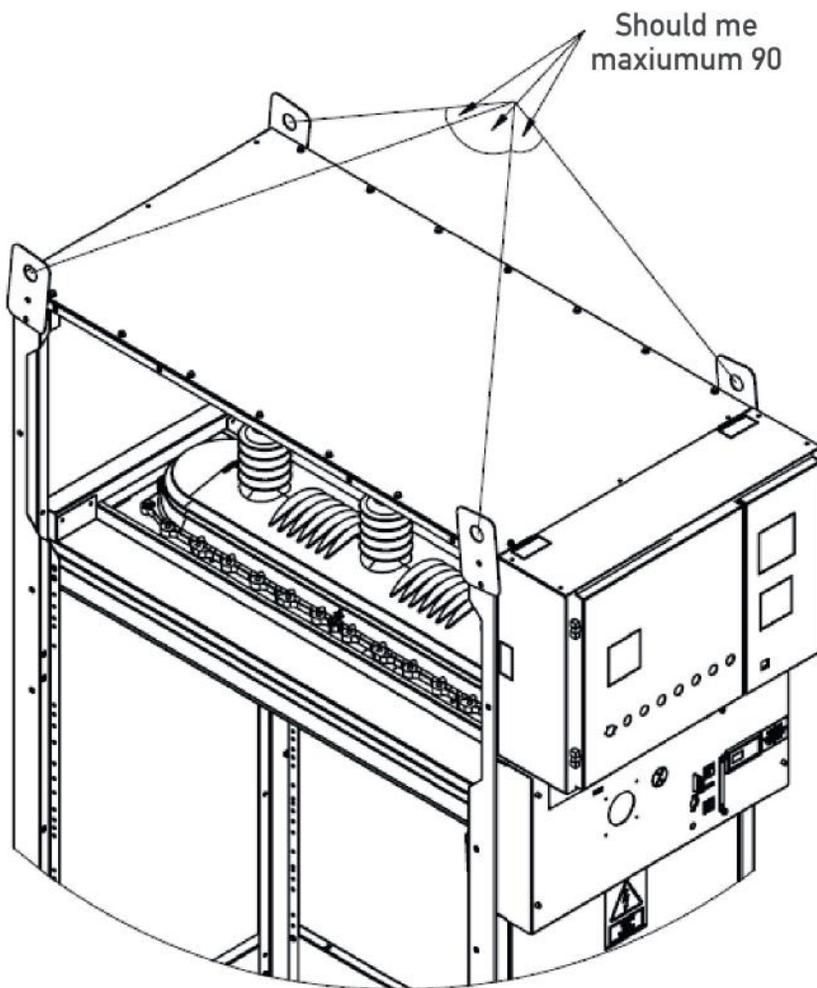
TRANSPORTATION OF THE SWITCHGEAR WITH A FORKLIFT

Modular switchgears can be moved in both ways as shown in the images below. It is generally used for unloading from the truck and transporting it to the assembly area.



TRANSPORTATION OF THE SWITCHGEAR WITH A SLING

Modular switchgears are carried with the help of slings in vehicles such as rescuers and cranes. It is generally used for loading and unloading modular switchgears from trucks.

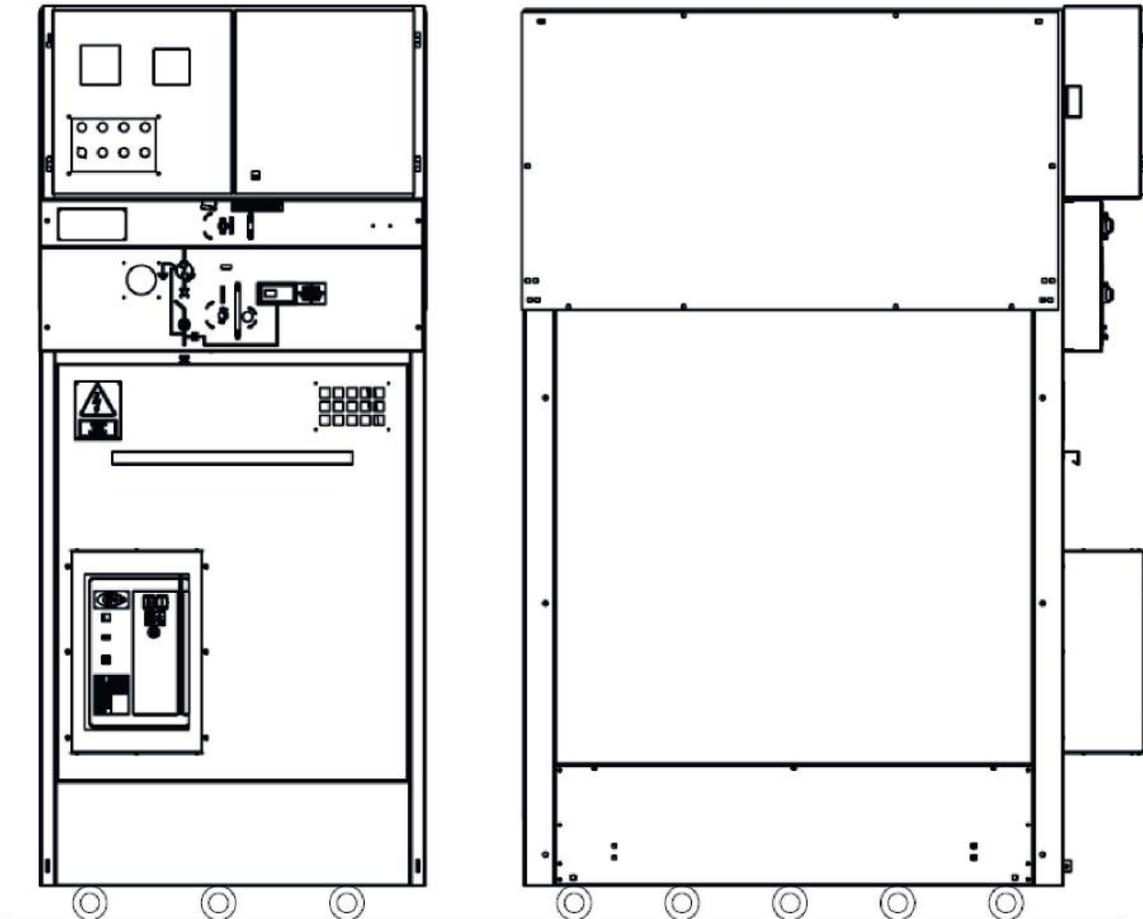


Never lay the switchgears on their sides. Do not carry it on its side.

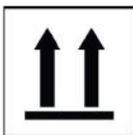


CARRYING THE SWITCHGEAR ON THE PIPE

Pipe transportation is used to arrange and dock modular switchgears side by side. Never use levers when using modular cells.



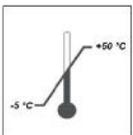
STORAGE WARNINGS



Store the products upright. Do not lay on one's side.

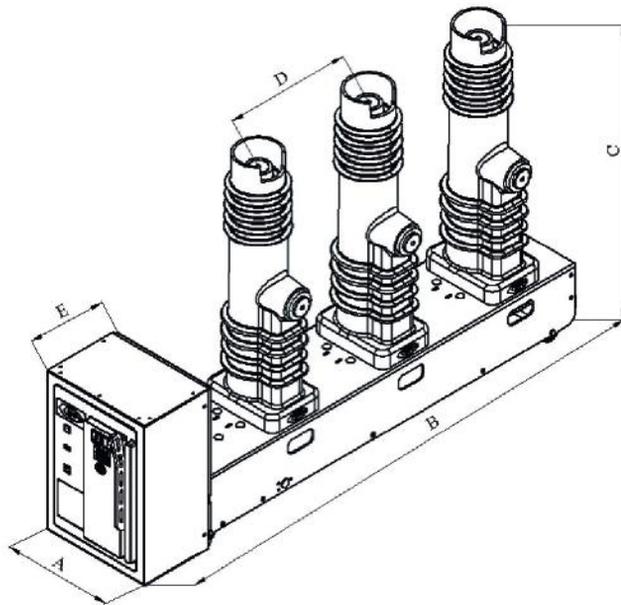


Protect the products from external factors.



Keep the products in extremely cold and extremely hot environments.

36 kV VACUUM CIRCUIT BREAKER WITH SIDE MECHANISM (B1 TYPE)



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-36V-01

308 MM

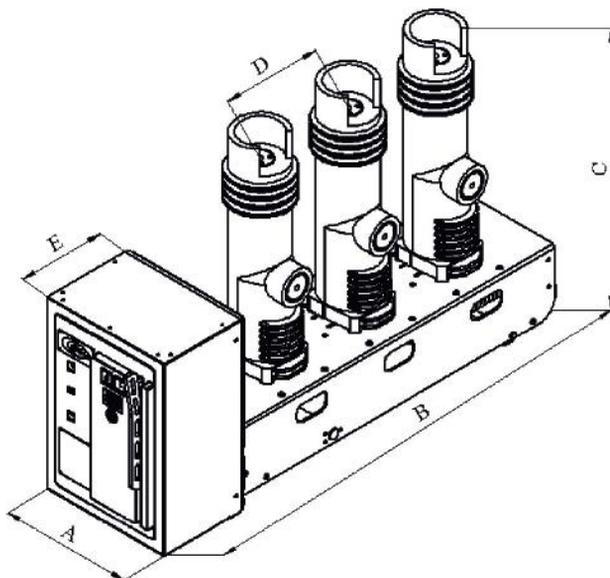
1431 MM

850 MM

350 MM

218 MM

24 kV VACUUM CIRCUIT BREAKER WITH SIDE MECHANISM (B1 TYPE)



PRODUCT NAME

A
(mm)

B
(mm)

C
(mm)

D
(mm)

E
(mm)

ARM-24V-01

308 MM

1086 MM

684 MM

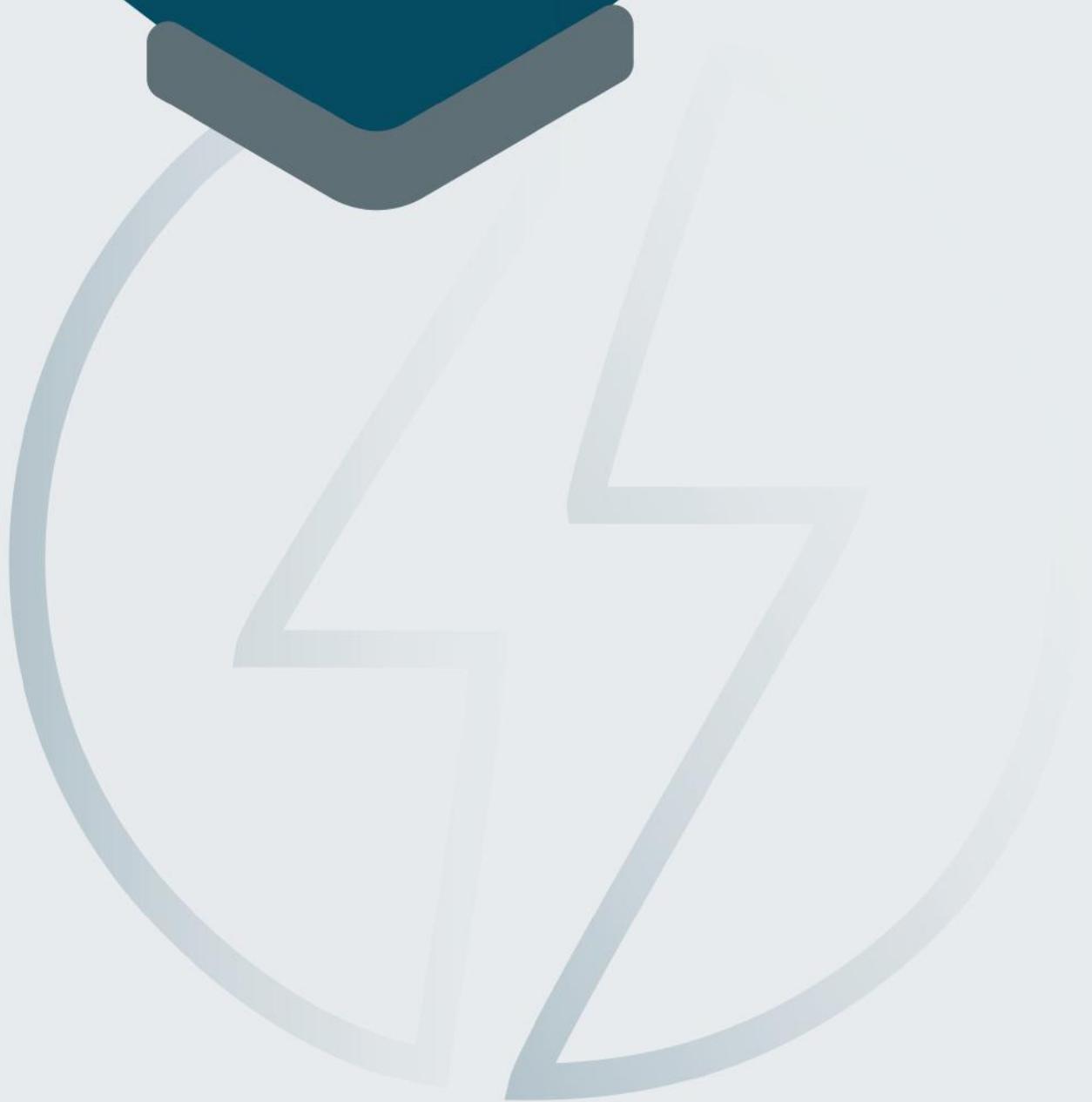
230 MM

218 MM

DESCRIPTION	SYMBOL	UNIT	SPEC.
Manufacturer			EFG ELEKTRİK
Product Type			ARM-36V-01
Electrical Strength Class			E1
Capacitive Current Switching Class			C2
Mechanical Class			M1
Cable System Class			S1
Instruction Number			KL-16-01
Standart			IEC 62271-100
Place of Use			INTERNAL
Environmental Pollution			LESS DIRTY
Enclosure Protection Degree	IP		2X
Degree of Protection Against Mechanical Impacts	IK		07
Frequency	fr	Hz	50/60
Nominal Voltage	Ur	kV	36
Insulation Voltage	Ud	kV	70
Isolation Distance Voltage	Ud	kV	80
Lightning Impulse Withstand Voltage	Up	kV	170 (peak - 1.2 - 50 µs)
Lightning Impulse Insulation Withstand Voltage	Up	kV	195 (peak - 1.2 - 50 µs)
Nominal Current	Ir	A	630
Short Circuit Current	Isc	kA	16
Short Circuit Time	tk	s	3
Short Circuit Peak Current	Ip	kA	40
Short Line Fault Breaking Current	ISLF	kA	16
Phase Mismatch Breaking Current	Id	kA	9
Line Charge Cutting Current	Ii	A	10
Cable Charging Cutting Current	Ic	A	50
Short Circuit Breaking Current DC Time Constant	τ	ms	32
First Pole Clearing Factor	kpp		1,5
Working Cycle			A-0,3S-KA-3DK-KA
Insulation Type	Mf	kg	VACUUM
Temperature Class		°C	-5 °C / +40 °C
Product Mass	M	kg	120
Main Circuit Resistance		µΩ	630A : < 100 // 1250A : < 32
Auxiliary Supply Voltage	Ua	V	*

* * * marked information can be determined according to customer request.

MAINTENANCE INSTRUCTIONS RECOMMENDATIONS FOR MODULAR SWITCHES





Before starting maintenance work; Switchgears and main busbars must be de-ENERGIZED, and EARTHING must be done.



Our company recommends that general maintenance be checked and cleaned (at the latest) once every two years, depending on the number of on-off switches of the switching products, and that solid insulation materials, especially in cells used in very dirty and corrosive environments, be checked and cleaned at least once every six months.



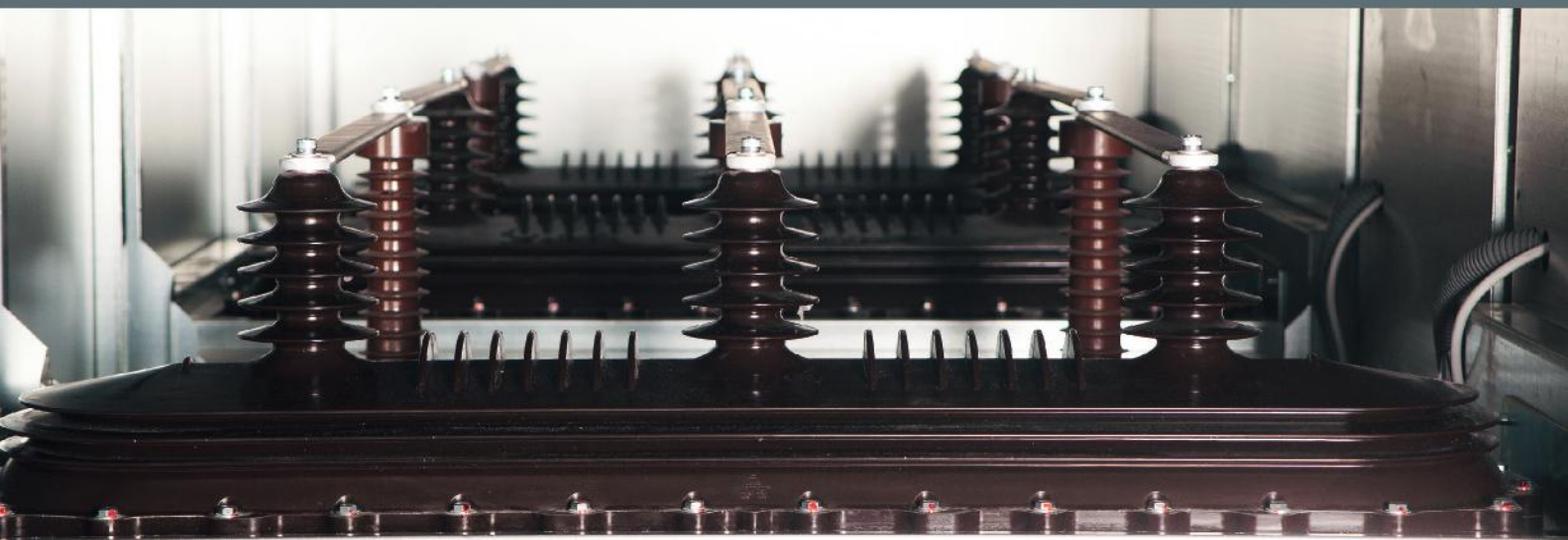
Maintenance work must be carried out by EFG Elektrik Authorized Service Personnel or the user's personnel who are trained and have the necessary qualification certificates.

MAIN BUSBAR SECTION

The main busbar section is accessed by removing the bolted connections of the fixed covers located on and next to the switchgear.

Check whether the connection points of the main busbars to each other and to the disconnecter or load break switch are loose. Tighten the loose bolts and nuts with 35-40 Nm. While performing these operations, do not damage the terminals of the disconnectors or load break switches. Never step on the busbar(s), disconnecter and switch bodies. Never walk on them.

Wipe the epoxy body and terminals with a dry cloth. Epoxy body and terminals; crack, fracture, carbonization mark etc. Check that there are no defects. If so, please inform the authorities.



SF6 GAS DISCONNECTORS – SF6 GAS LOAD BREAK SWITCHES

The lower body and lower terminal ends of the disconnectors can be accessed by opening the Cable Connection Section Cover.

Remove the Cable Connection Section cover. If the cover cannot be removed, check whether the appropriate sequence of operations has been followed.

Check whether the connections of the conductors forming the main circuit to the products are loose. Tighten the loose bolts and nuts with 35-40 Nm. While performing these operations, be careful not to damage the body and terminals of the disconnector.

Wipe the epoxy body and terminals with a dry cloth. Cracks, breaks, carbonization marks, etc. on the body and terminals. Check that there are no defects. If so, please inform the authorities.

Check the gas level from the pressure gauge. Verify that the relevant pressure values are met.

Check the mechanism with the maneuver lever. Make sure that the mechanism is working correctly by checking through the observation window.

Disconnector Mechanism Maintenance

Maintenance and all operations on the disconnector mechanism must be carried out by authorized persons or under the supervision of authorized persons, in accordance with safety standards.

- In the LV section, de-energize the auxiliary circuit of the disconnector by removing the connection cables coming to the disconnector.
- Press the load break switch opening button to the open position. (For gas disconnectors, do it with a maneuver handle)
- If the closing spring in the mechanism is installed, discharge the energy in the springs by using the closing and opening buttons. Then ground it. (There is no need for this process since there is no spring in gas disconnectors)
- Remove the key by locking the mechanical lock.
- Remove the mechanism protective cover. (Working mechanism section)
- Disconnect the cable connections on the disconnector.
- Wipe the accessible parts of the mechanism with a dry cloth.
- Lubricate the moving points inside the mechanism with spray oil and brush.
- Lubricate the motor winding system with a brush. (There is no need for this process since gas disconnectors do not have a motor)

HIGH VOLTAGE CIRCUIT BREAKERS

High voltage circuit breakers are accessed by opening the Cable Connection Section Cover.

Remove the Cable Connection Section cover. If the cover cannot be removed, check whether the appropriate sequence of operations has been followed.

Check whether the connections of the conductors forming the main circuit to the products are loose. Tighten the loose bolts and nuts with 35-40 Nm. While performing these operations, be careful not to damage the poles and terminals of the breaker.

Wipe the epoxy poles and terminals with a dry cloth. Cracks, breaks, carbonization marks etc. on poles and terminals. Check that there are no defects. If so, please inform the authorities.

Circuit Breaker Mechanism Maintenance

Maintenance and all operations on the circuit breaker mechanism must be carried out by authorized persons or under the supervision of authorized persons, in accordance with safety standards.

- Bring the breaker to the on position by pressing the on button.
- De-energize the auxiliary circuit of the breaker by removing the socket coming to the breaker.
- If the closing spring in the mechanism is installed, discharge the energy in the springs by using the closing and opening buttons.
- Remove the key by locking the mechanical lock.
- Remove the mechanism protective cover.
- Protect the breaker poles from external impacts.
- Wipe the accessible parts of the mechanism with a dry cloth.
- Lubricate the moving points within the mechanism with spray oil and a brush.
- Lubricate the motor winding system with a brush.
- Lubricate the pole motion transmission system with spray oil and brush.

HIGH VOLTAGE TRANSFORMERS



High voltage transformers can be accessed by opening the Cable Connection Section Cover.

Remove the Cable Connection Section cover. If the cover cannot be removed, check whether the appropriate sequence of operations has been followed.

Check whether the connections of the conductors forming the main circuit to the high voltage transformers are loose. Tighten the loose bolts and nuts with 35-40 Nm. While performing these operations, be careful not to damage the voltage transformer body and terminals.

Make sure that the free secondary ends of the voltage transformer are not short-circuited.

Wipe the epoxy body and terminals of the voltage transformer with a dry cloth. Cracks, breaks, carbonization marks, etc. on the body and terminals. Check that there are no defects. If so, please inform the authorities.

Check whether the High Voltage Fuses of the voltage transformers are intact. Complete any missing insurance, if any.

HIGH VOLTAGE CURRENT TRANSFORMERS

High voltage current transformers can be accessed by opening the Cable Connection Section Cover.

Remove the Cable Connection Section cover. If the cover cannot be removed, check whether the appropriate sequence of operations has been followed.

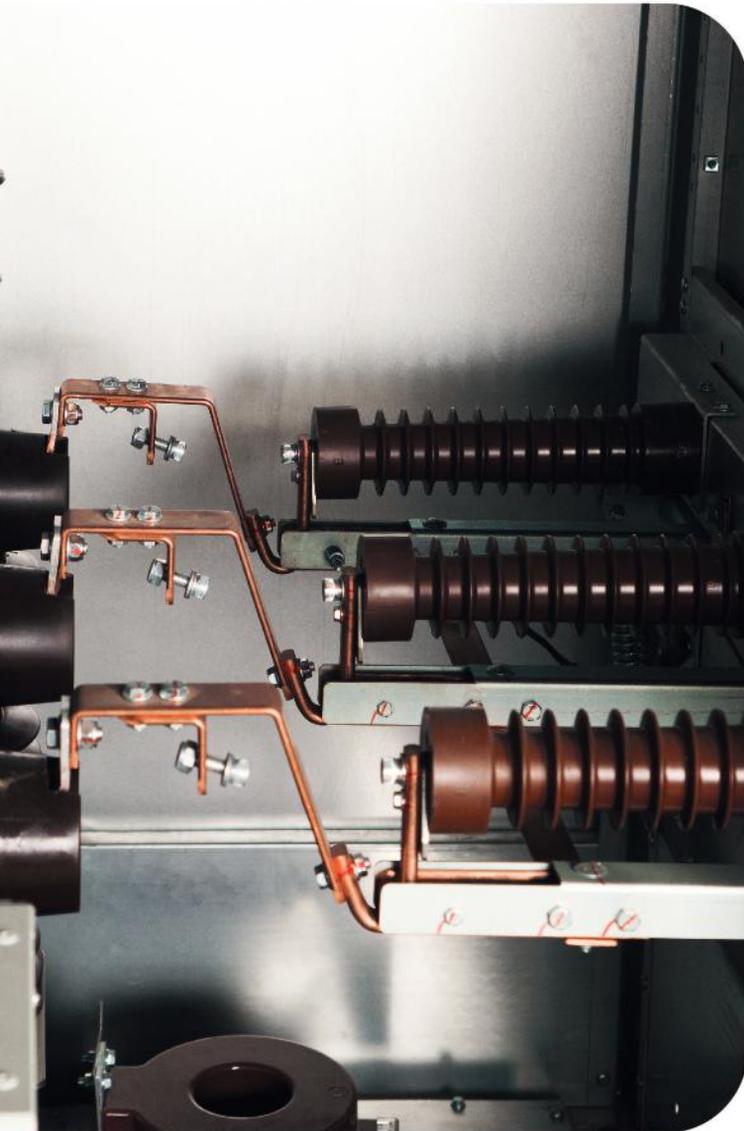
Check whether the connections of the conductors forming the main circuit to the high voltage current transformers are loose. Tighten the loose bolts and nuts with 35-40 Nm. While performing these operations, be careful not to damage the current transformer body and terminals.

Make sure that the free secondary ends of the current transformer are short-circuited.

Wipe the epoxy body and terminals of the current transformer with a dry cloth. Cracks, breaks, carbonization marks, etc. on the body and terminals. Check that there are no defects. If so, please inform the authorities.



» EARTHING DISCONNECTOR



The earthing switch is accessed by opening the Cable Connection Section Cover.

Remove the Cable Connection Section cover. If the cover cannot be removed, check whether the appropriate sequence of operations has been followed.

Check whether the connections of the conductors forming the main circuit to the grounding separator are loose. Tighten the loose bolts and nuts with 35-40 Nm. While performing these operations, be careful not to damage the earthing switch and its terminals.

Wipe the epoxy support insulators with a dry cloth. Cracks, breaks, carbonization marks, etc. on the support insulators and terminals. Check that there are no defects. If so, please inform the authorities.

» CONTROL MECHANISMS

Check that the control mechanisms of all equipment are working correctly and that the position indicators show the correct positions.

Breakers should be taken into general maintenance after M1 (2000 on-off) and M2 (10000 on-off) operations.

Load break switches should be taken into general maintenance after M1 (1000 opening and closing operations).

Gas disconnectors and earthing switches should be taken into general maintenance after M0 (1000 opening and closing operations).

» RELAYS AND MEASURING DEVICES

Check the connections of the relay and measuring instruments to the housing. Tighten any loose connections.

Check that relays and measuring instruments are working correctly.

If the zero setting of the dial measuring instruments is incorrect, adjust it.

» EARTHING CIRCUIT

Check the continuity of the earthing circuit of the cells. Tighten loose bolts and nuts to 35-40 Nm.

Check that the grounding terminals of the switchgears arranged side by side are connected to each other properly and tightly.

Check that all cells are connected to the external grounding system with a common grounding

» MECHANICAL INTERLOCKS

Check whether the mechanical locking of the switchgears is working correctly.

» AUXILIARY VOLTAGE SOURCE

If there is an auxiliary voltage source, check its connections.

Observe whether it works properly.



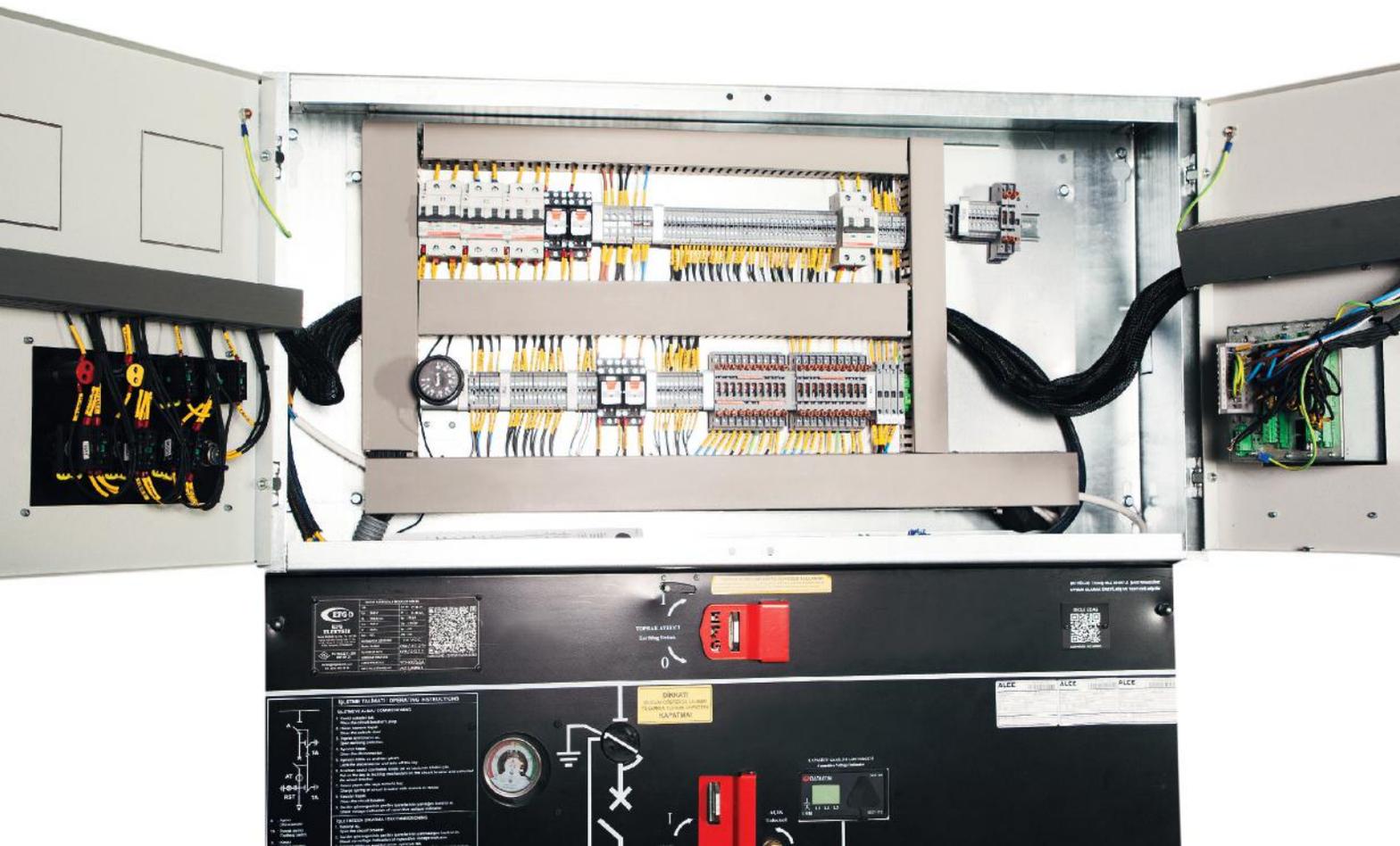
»» LV SECTION

Open the LV Section Cover and clean the inside.

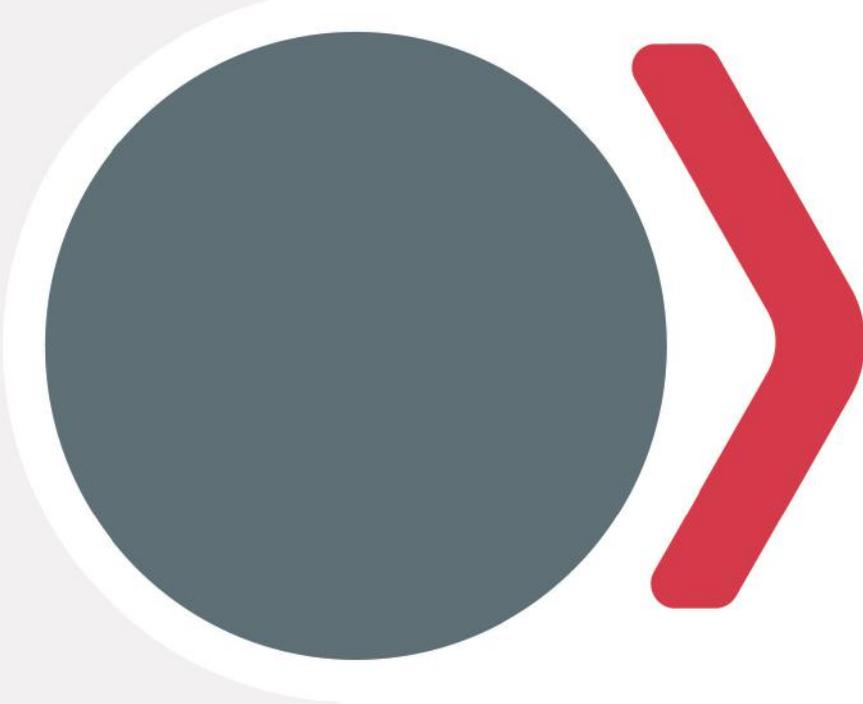
Check for broken insulation in the control circuit. If so, correct it.

Check the terminal connections. Tighten any loose connections, if any.

Check whether there are technical documents. Otherwise, request from the company.



DISTRIBUTION CENTERS



CONCRETE KIOSK DISTRIBUTION AND TRANSFORMER CENTERS

EFG brand HG/LV Concrete Kiosk Distribution and Transformer Centers are designed in accordance with TS EN 62271-202 (IEC 62271-202) standard and national relevant specifications as concrete encased, monoblock, compact type to be used in system voltages up to 36 kV. All type tests required by the standard have been completed in accredited laboratories at home and abroad.

Concrete Kiosk Distribution and Transformer Centers consist of three sections:

- HV Switching Units Department
- HV Distribution Transformers Division
- LV Distribution Panel Section

Each section has its own independent access doors and ventilation shutters. Different door and ventilation shutter configurations can be made according to need.

- IT IS SUITABLE FOR CHANGE DUE TO ITS MONOBLOCK STRUCTURE
- QUICK AND EASY INSTALLATION
- ENVIRONMENTALLY COMPATIBLE IN TERMS OF APPEARANCE AND STRUCTURE
- DIFFERENT COLOR OPTIONS ON DEMAND
- RESISTANT TO CLIMATIC CONDITIONS
- LONG LASTING
- SOLID CONSTRUCTION



DESIGN AND STRUCTURAL FEATURES

The concrete enclosure of the compact center is produced as a monoblock with the tank/foundation section and side walls, except for the roof, and the roof is produced separately. The roof, side walls and tank/foundation section and enclosure of the compact center are completely waterproof. The tank/foundation section is suitable for the smallest bend radius of the 36 kV 1x240 mm² cable.

USAGE AREAS

- Transformer Centers
- Distribution Centers
- Industrial Centers
- Wind Power Plants
- Solar Power Plants
- Compensation Facilities
- Water Pump Stations
- Generator Cabinets

CONCRETE KIOSK TYPES

ABK-A: Compact Transformer Substations with Air Insulated Switchgears (1000 kVA)

ABK-B: Compact Transformer Substations with Air Insulated Switchgears (1600 kVA)

ABK-H: Air Insulated Switchgear Distribution Centers

ABK-C: Compact Transformer Substations with Air Insulated Switchgears without LV Panel (1000 kVA)

ABK-D: Compact Transformer Substations with Air Insulated Switchgears without LV Panel (1600 kVA)

ABK-T: Centers with LV Panels and Distribution Transformers

ABK-R: Compact Transformer Substations with RMU



CASES AND SIDE PARTS

The roof of the compact center can withstand a load of 2500 N/m².

The enclosure is resistant to wind pressure of at least 34 m/s.

Ventilation shutters and doors are resistant to a mechanical shock (IK10) corresponding to a load of 20 Joules from inside and outside.

Enclosure Class: 10

Distribution centers have been proven to be safe against earthquake conditions.

The HV Switchgear Section and the Transformer Section, and the Transformer Section and the LV Panel Section are separated by partition walls made of concrete.

CONCRETE AND STEEL REINFORCEMENT

At least C35/45 concrete is used in accordance with TS EN 206-1 (IEC 206-1) standard.

Steel reinforcement in accordance with TS 708 is used.

Quality tests on concrete are carried out in accredited laboratories.

VENTILATION SHUTTERS, DOORS AND LOCKING SYSTEMS

2 mm thick ventilation shutters and doors are produced from pregalvanized sheet material and coated with electrostatic powder paint.

The doors are designed to remain open at 120° and cannot be removed from the outside.



DESCRIPTION	SYMBOL	UNIT	SPEC.
Manufacturer			EFG ELEKTRİK
Product Type			ABK
Instruction Number			KL-16-01
Standart Number			IEC 62271-202
Nominal Voltage	Ur	kV	36
Rated Power		kVA	1000 - 1600
Enclosure Class			10
Internal Arc Class	IAC		AB
Short Circuit Current	Ik	kA	16
Short Circuit Time	tk	s	1
Enclosure Protection Degree	IP		23D
Envirement Pollution Class			CLASS III
Maximum Solar Radiation		W/m ²	1000
Horizontal Ground Shaking Acceleration		g	0.5
Vertical Ground Shaking Acceleration		g	0.4

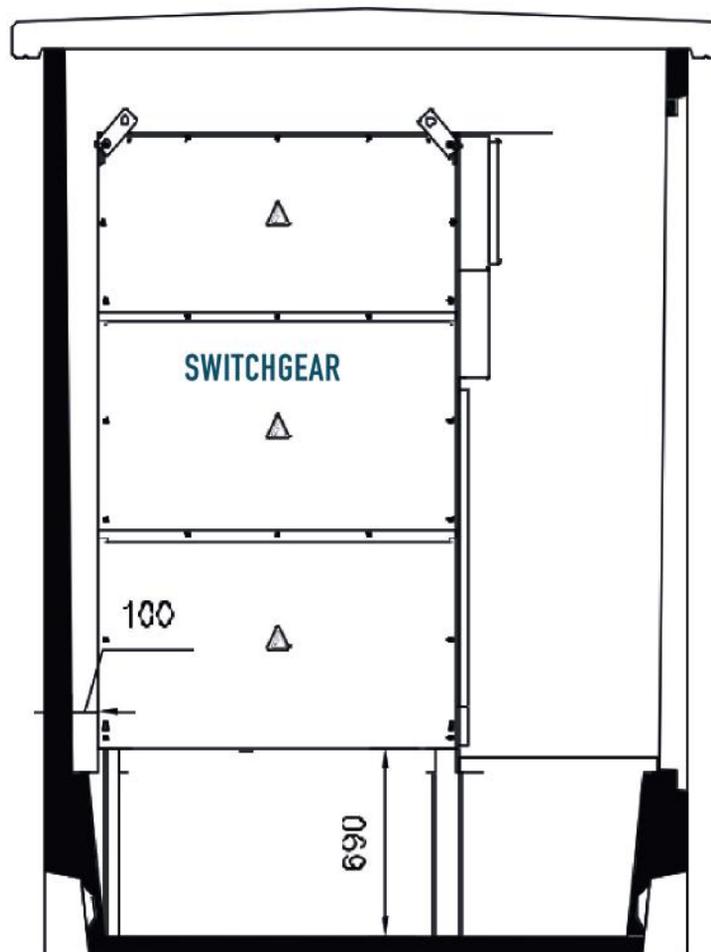
PLACEMENT OF SWITCHGEARS INSIDE THE MONOBLOCK KIOSK

Metal Enclosed Modular Switchgears (MMMH):

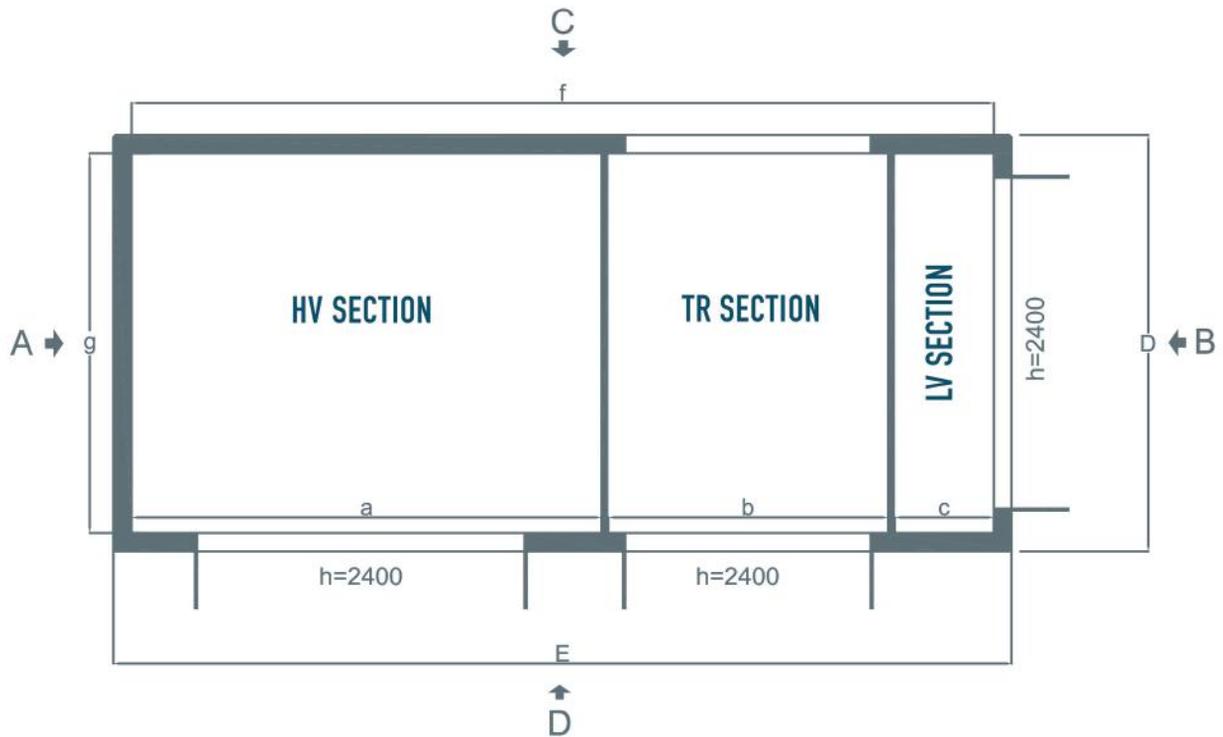
- The distance to the rear wall should be at least 100 mm.
- The distance to the side walls should be at least 50 mm.
- The distance to the subfloor must be at least 690 mm.

It is fixed to the steel construction in the monoblock kiosk from the mounting points on the cell floor with M8x30 bolts.

During the installation of Metal Enclosed Modular Switchgears, the distances shown above should be observed depending on the place of use. If these distances are not placed appropriately, the operator may be harmed due to internal arc faults that may occur in the switchgears. Therefore, attention should be paid to the dimensions given.



ABK-A AIR INSULATED SWITCHGEAR COMPACT TRANSFORMER CENTER (1000KVA)



TYPE (HV+TR+LV)	TRANSFORMER POWER	a (mm)	b (mm)	c (mm)	D (mm)	E (mm)	f (mm)	g (mm)
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ABK-A 4350	1000 kVa	1750	1700	600	2500	4350	4130	2280
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ABK-A 5450	1000 kVa	2850	1700	600	2500	5450	5230	2280
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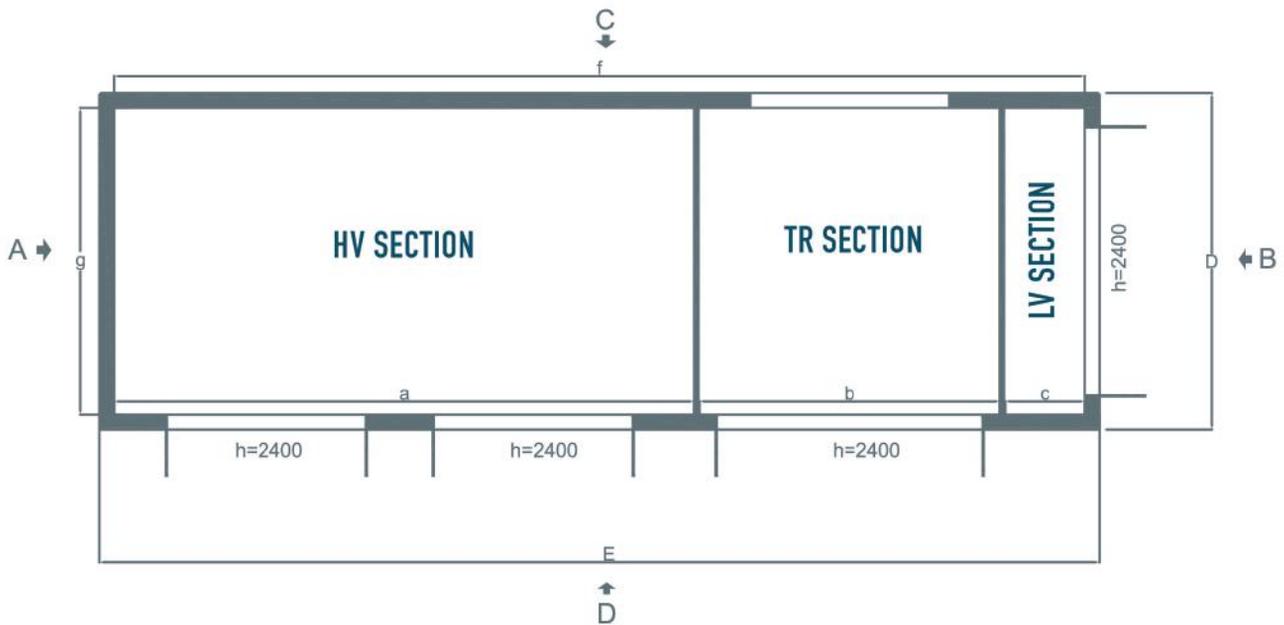
ABK-A 6000	1000 kVa	3400	1700	600	2500	6000	5780	2280
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ABK-A 6490	1000 kVa	3890	1700	600	2500	6490	6270	2280
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ABK-A 7500	1000 kVa	4900	1700	600	2500	7500	7280	2280
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- * Lowercase letters indicate inside and uppercase letters indicate outside measurement.
- * All dimensions are indicated in mm type

ABK-B AIR INSULATED SWITCHGEAR COMPACT TRANSFORMER CENTER (1600KVA)



TYPE (HV+TR+LV)	TRANSFORMER POWER	a (mm)	b (mm)	c (mm)	D (mm)	E (mm)	f (mm)	g (mm)
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ABK-A 4350	1600 kVa	2300	2250	600	2500	4350	5230	2280
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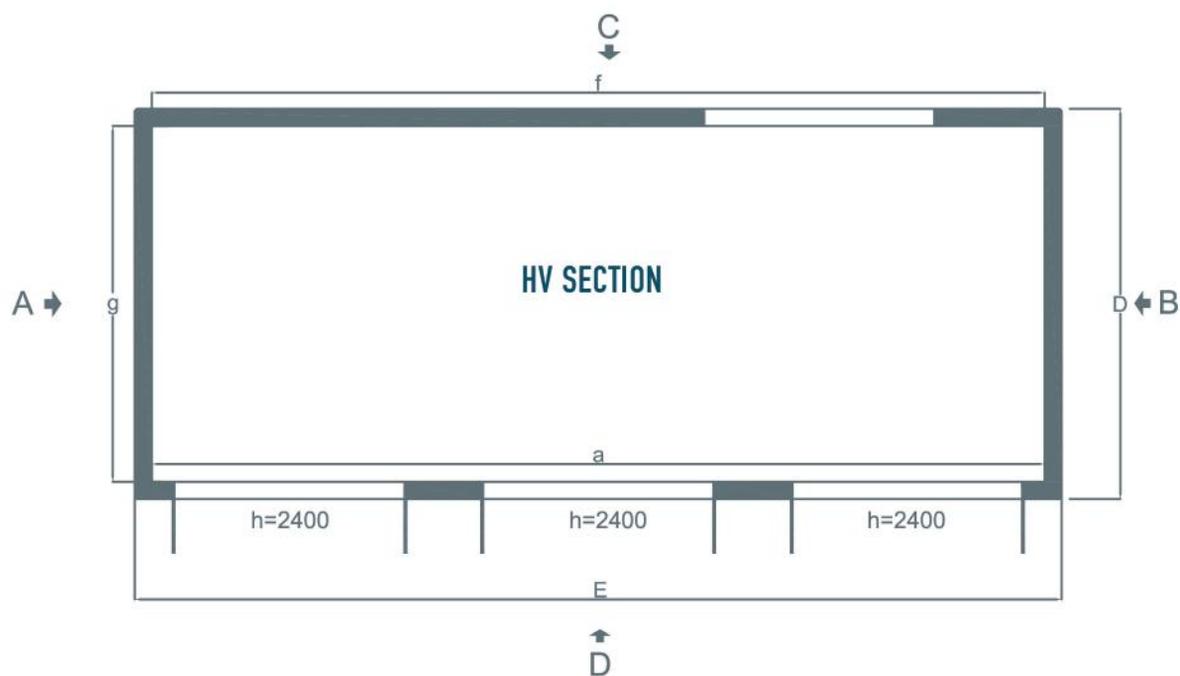
ABK-A 5450	1600 kVa	2850	2250	600	2500	6000	5780	2280
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ABK-A 6000	1600 kVa	3340	2250	600	2500	6490	6270	2280
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ABK-A 6490	1600 kVa	3890	2250	600	2500	7500	7280	2280
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- * Lowercase letters indicate inside and uppercase letters indicate outside measurement.
- * All dimensions are indicated in mm type

ABK-H AIR INSULATED SWITCHGEAR DISTRIBUTION CENTER



TYPE (HV)	TRANSFORMER POWER	a (mm)	b (mm)	c (mm)	D (mm)	E (mm)	f (mm)	g (mm)
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ABK-H 3800	-	3580	-	-	2500	3800	3580	2280
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ABK-H 4350	-	4130	-	-	2500	4350	4130	2280
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ABK-H 5450	-	5230	-	-	2500	5450	5230	2280
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ABK-H 6000	-	5780	-	-	2500	6000	5780	2280
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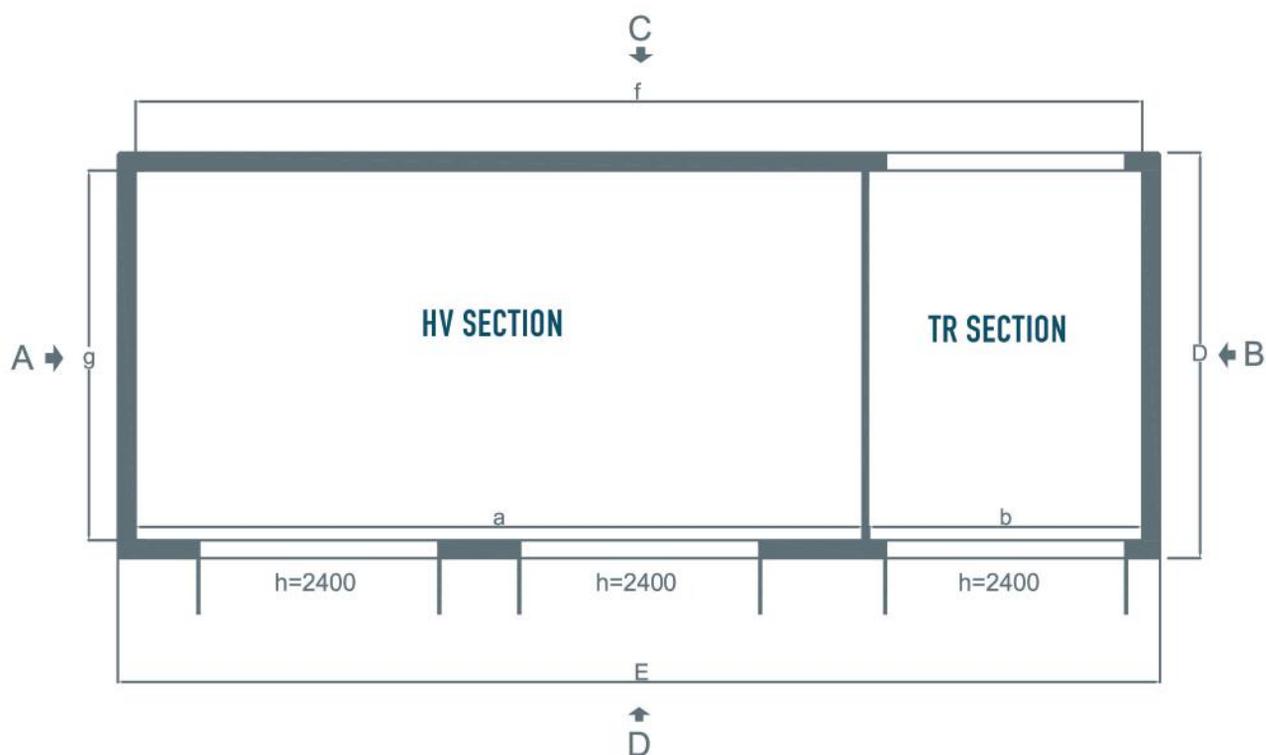
ABK-A 6490	-	6270	-	-	2500	6490	6270	2280
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ABK-H 7500	-	7280	-	-	2500	7500	7280	2280
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* Lowercase letters indicate inside and uppercase letters indicate outside measurement.

* All dimensions are indicated in mm type

ABK-C AIR INSULATED SWITCHGEAR COMPACT TRANSFORMER CENTER WITHOUT LV SECTION (1000KVA)



TYPE (HV+TR)	TRANSFORMER POWER	a (mm)	b (mm)	c (mm)	D (mm)	E (mm)	f (mm)	g (mm)
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ABK-C 5450	1000 kVa	3490	1700	-	2500	5450	5230	2280
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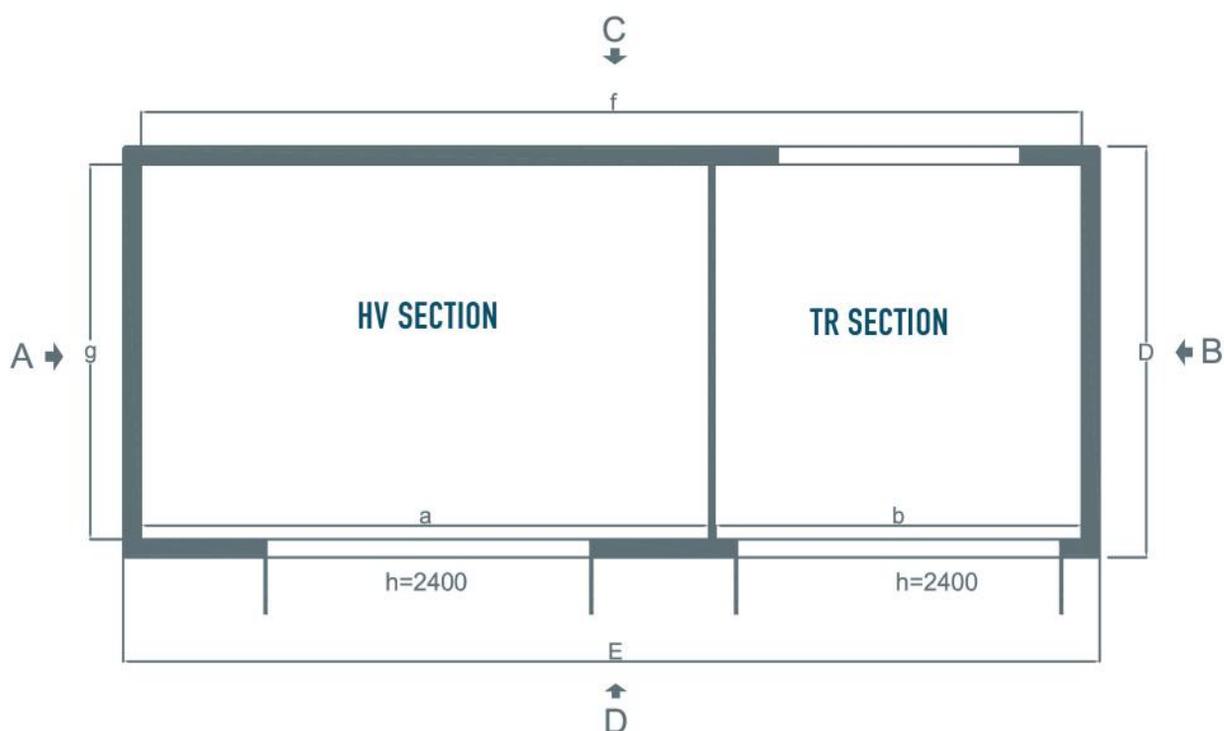
ABK-C 6000	1000 kVa	4040	1700	-	2500	6000	5780	2280
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ABK-C 6490	1000 kVa	4530	1700	-	2500	6490	6270	2280
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ABK-C 7500	1000 kVa	5540	1700	-	2500	7500	7280	2280
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- * Lowercase letters indicate inside and uppercase letters indicate outside measurement.
- * All dimensions are indicated in mm type

ABK-D AIR INSULATED SWITCHGEAR COMPACT TRANSFORMER CENTER WITHOUT LV SECTION (1600KVA)



TYPE (HV+TR)	TRANSFORMER POWER	a (mm)	b (mm)	c (mm)	D (mm)	E (mm)	f (mm)	g (mm)
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ABK-D 5450	1600 kVa	2940	2250	-	2500	5450	5230	2280
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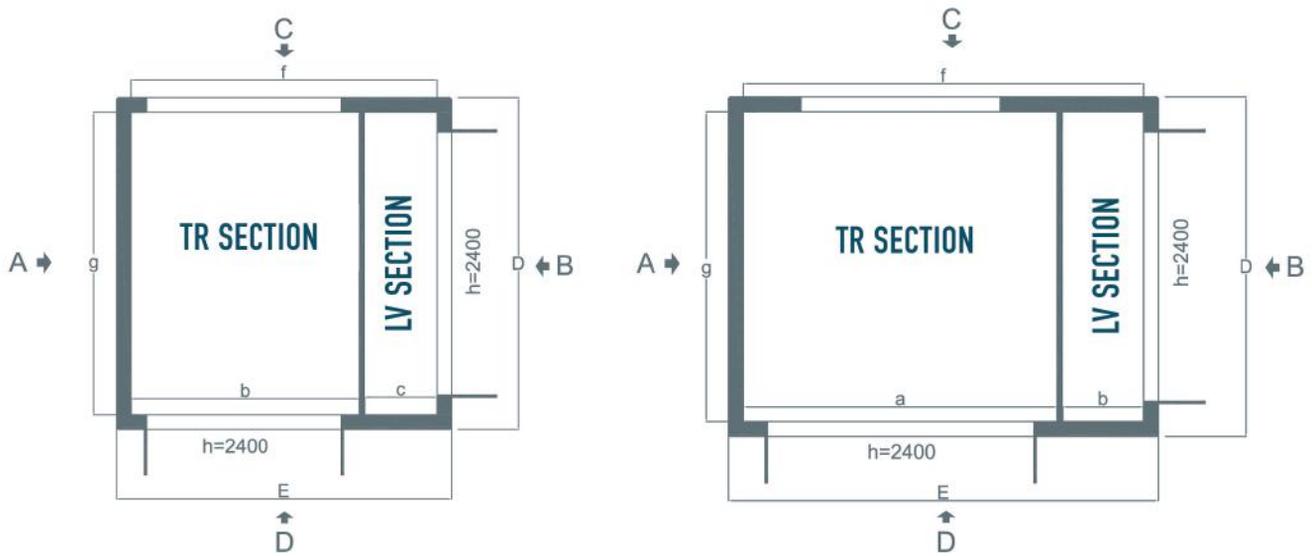
ABK-D 6000	1600 kVa	3490	2250	-	2500	6000	5780	2280
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ABK-D 6490	1600 kVa	3980	2250	-	2500	6490	6270	2280
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ABK-D 7500	1600 kVa	4990	2250	-	2500	7500	7280	2280
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- * Lowercase letters indicate inside and uppercase letters indicate outside measurement.
- * All dimensions are indicated in mm type

ABK-T LV SECTION AND DISTRIBUTION TRANSFORMERS CENTERS



TR SECTION

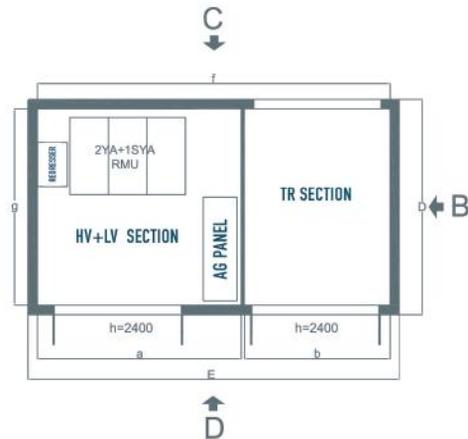
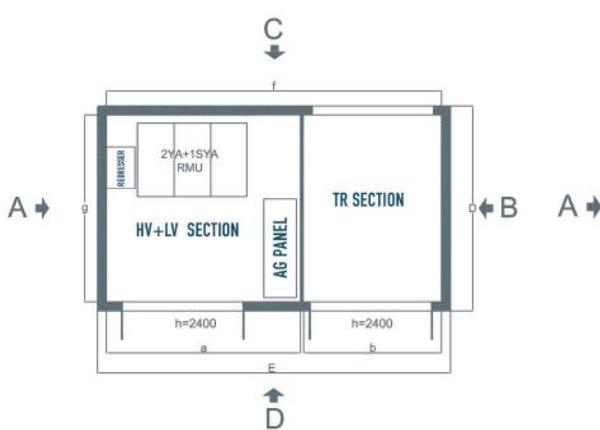
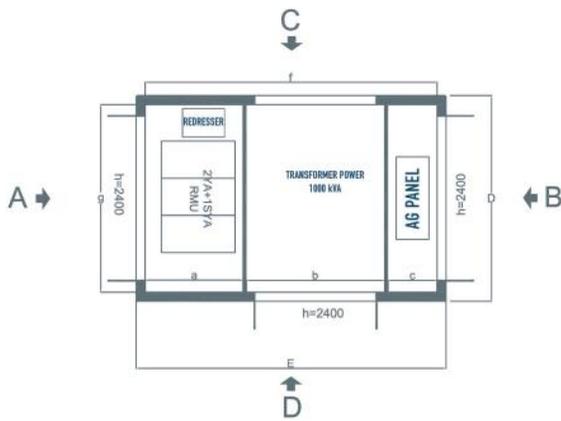
TYPE (TR+LV)	TRANSFORMER POWER	a (mm)	b (mm)	c (mm)	D (mm)	E (mm)	f (mm)	g (mm)
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ABK-T 2250	1000 kVa	-	1740	550	2500	2550	2330	2280
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ABK-T 3200	1000/1600 kVa	-	2340	600	2500	3200	2980	2280
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- * Lowercase letters indicate inside and uppercase letters indicate outside measurement.
- * All dimensions are indicated in mm type

ABK-R RMU COMPACT TRANSFORMER CENTERS



TYPE (RMU)	TRANSFORMER POWER	a (mm)	b (mm)	c (mm)	D (mm)	E (mm)	f (mm)	g (mm)
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ABK-R 3800(D)*	1000 kVa	1200	1700	600	2500	3800	3580	2280
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ABK-R 4350(I)**	1000 kVa	2390	1700	-	2500	4350	4130	2280
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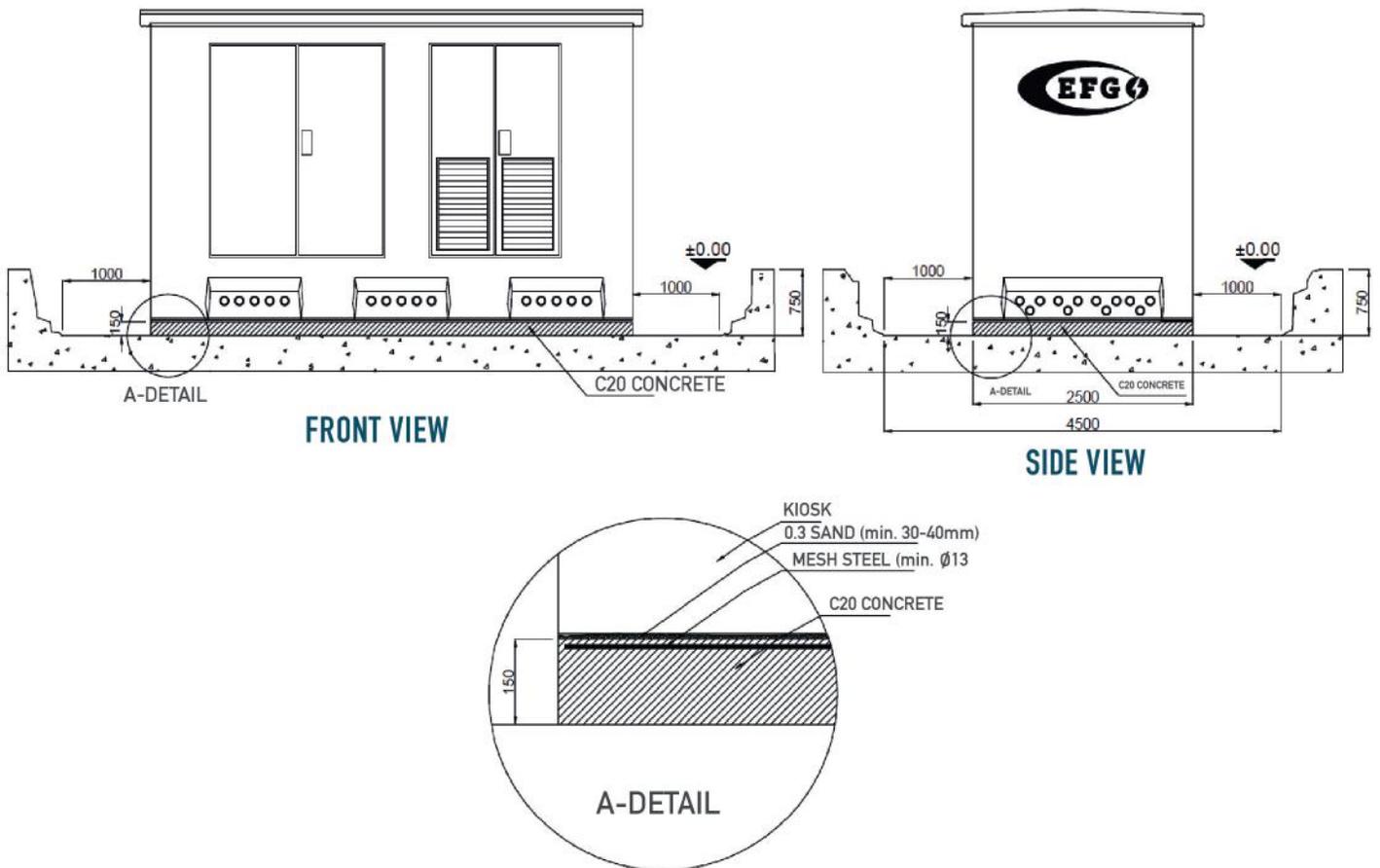
ABK-R 5450(I)**	1000 kVa	3490	1700	-	2500	5450	5230	2280
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ABK-R 4350(D)*	1000 kVa	1200	1700	600	2500	4350	4130	2280
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ABK-R 4800(I)**	1000 kVa	2290	1700	-	2500	4800	4580	2280
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- * Lowercase letters indicate inside and uppercase letters indicate outside measurement.
- * All dimensions are indicated in mm type

BASIC CONCRETE PREPARATION AND INSTALLATION PROCEDURES



- Ground excavation is carried out by paying attention to the water level and a grounding network is made.
- The ground is leveled. Approximately 150 mm thick C20 quality iron reinforced concrete is poured onto the ground.
- An intermediate surface is created by covering the concrete surface with 0.3 mm sand at a thickness of approximately 30-40 mm.
- The concrete kiosk is placed on the ground prepared in accordance with the instructions on the kiosk.
- LV and HV external cable connections are made. Cable entry/exit holes are sealed watertight.
- Grounding network connection is made with the Equipotential Grounding Bar located inside the kiosk.
- The landscaping of the compact center is done.

CONCRETE KIOSK LOADING, TRANSPORTATION AND UNLOADING INSTRUCTIONS

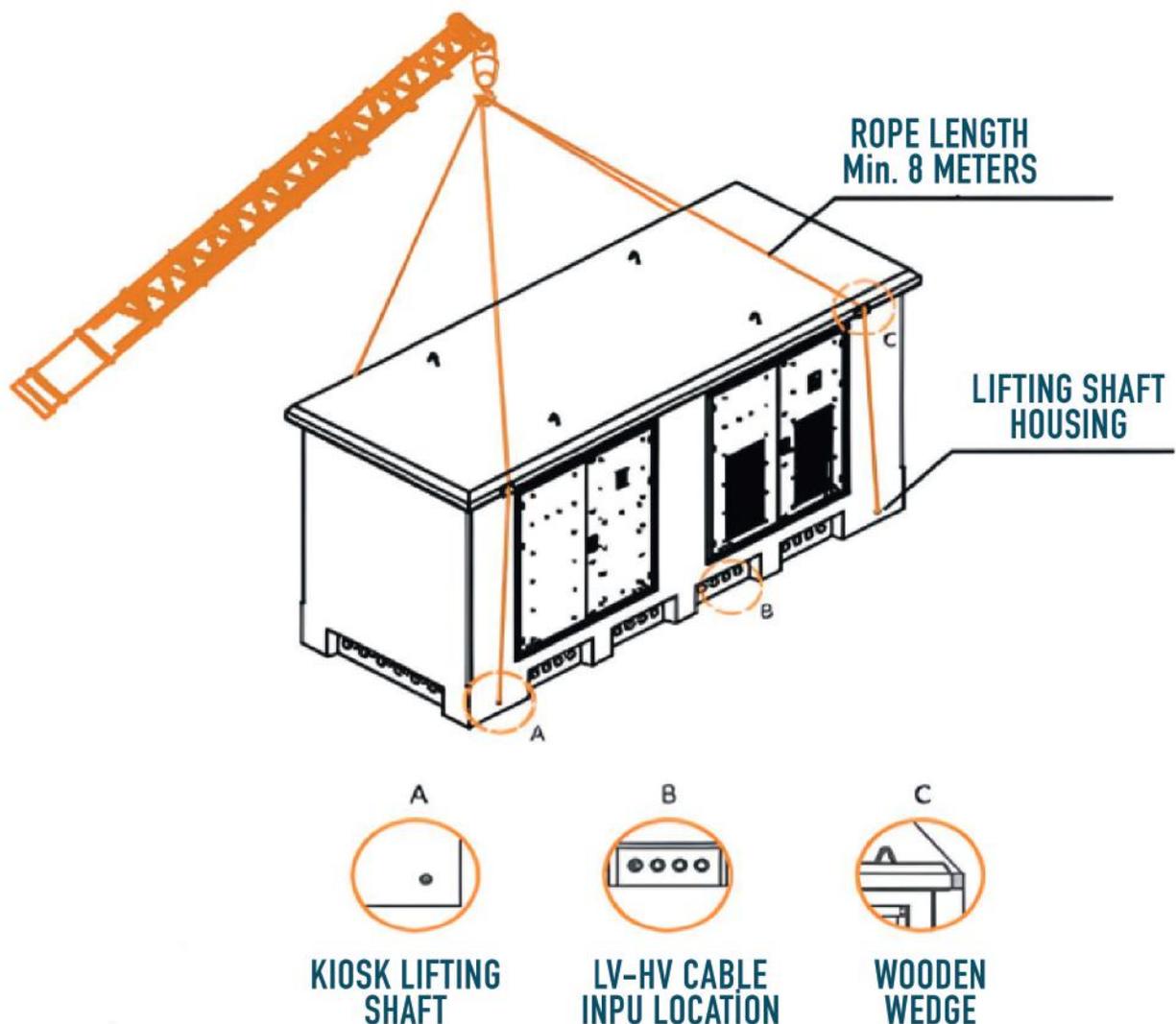


Loading, carrying and unloading operations of the concrete kiosk must be carried out by the user's trained personnel who have the necessary qualification certificates.

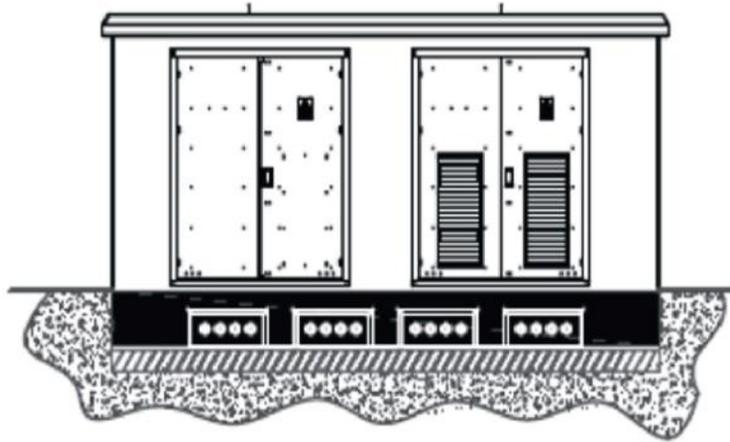
— For the transportation process, crane selection should be made based on 2.5 times the weight of the concrete kiosk (if there are products such as modular switchgears, transformers, etc. in the concrete kiosk, they should be included in the weight).

— Turn and connect the bolt system lifting shafts sent with the concrete kiosk to the lifting shaft slots on all four sides of the concrete kiosk. Make sure the ropes are attached to the lift shafts.

— Check that the lifting shafts are firmly connected to the lifting shaft housings.



— Place the concrete kiosk on the previously prepared ground. Do not shake the concrete kiosk while performing the placement process. After the placement process is completed, cover it with sand or soil fill.



Cover the area around the concrete kiosk with filling material, which is placed with the help of a crane.

— When placing the concrete kiosk in place, use wooden wedges between the rope and the roof to prevent damage to the roof.

— Never separate the roof from the concrete kiosk and perform loading, carrying and unloading operations. Otherwise, the concrete kiosk may be damaged.



The roof of the concrete kiosk must be on the concrete kiosk during loading, transportation and unloading.

— The roofs of the concrete kiosk are detachable. When removing the roof from the concrete kiosk, tie and use ropes, each weighing at least 3 tons and 4 meters long, to the fixed lifting hooks on the roof. Don't hit lifting hooks on the roof with Hammer etc.

— If the roof is to be separated from the concrete kiosk, place it on a flat surface to avoid cracking, breaking or deformation on the roof. Place support material under the roof during placement.

— After the concrete kiosk lowering process is completed, you can perform touch-up operations using the touch-up paint inside the concrete kiosk.



Operations carried out other than those stated in the Concrete Kiosk Loading, Transport and Unloading Instructions are outside the scope of warranty.

SHEET KIOSK DISTRIBUTION AND TRANSFORMER CENTERS

EFG brand HV/LV Sheet Metal Kiosk Distribution and Transformer Centers are designed in accordance with TS EN 62271-202 (IEC 62271-202) standard and national relevant specifications with sheet metal enclosure, monoblock, compact type features to be used in system voltages up to 36 kV.

Metal Kiosk Distribution and Transformer Centers consist of three sections:

- HV Switching Units Department
- HV Distribution Transformers Division
- LV Distribution Panel Section

Each section has its own independent access doors and ventilation shutters. Different door and ventilation shutter configurations can be made according to need.

Custom solutions can be offered with various configurations such as different sizes, body types, layouts and components according to customer needs and project requirements.

All sheet metal kiosk products are coated with electrostatic powder paint and can be used even in the most difficult environmental conditions with the help of various production materials, auxiliary equipment and accessories. According to the project requirements, insulation material can be used on the walls and roof to provide thermal insulation.

The lightweight construction of compact sheet metal transformer substations and their ease of lifting, lowering, transporting or relocating results in low transportation costs.

- TRANSPORTATION ADVANTAGE
- LIGHTWEIGHT CONSTRUCTION
- IT IS SUITABLE FOR CHANGE DUE TO ITS MONOBLOCK STRUCTURE.
- QUICK AND EASY INSTALLATION
- ENVIRONMENTALLY COMPATIBLE IN TERMS OF APPEARANCE AND STRUCTURE
- DIFFERENT COLOR OPTIONS ON DEMAND
- RESISTANT TO CLIMATIC CONDITIONS
- LONG LASTING
- SOLID CONSTRUCTION

DESCRIPTION	SYMBOL	UNIT	SPEC.
Manufacturer			EFG ELEKTRİK
Product Type			AOSK
Instruction Number			KL-16-01
Standart Number			IEC 62271-202
Nominal Voltage	Ur	kV	36
Rated Power		kVA	1000 - 1600 - 2500
Enclosure Class			10
Enclosure Protection Degree	IP		Till 54
Sheet Thickness		mm	2- 3
Coating			ELECTROSTATIC POWDER COATING

