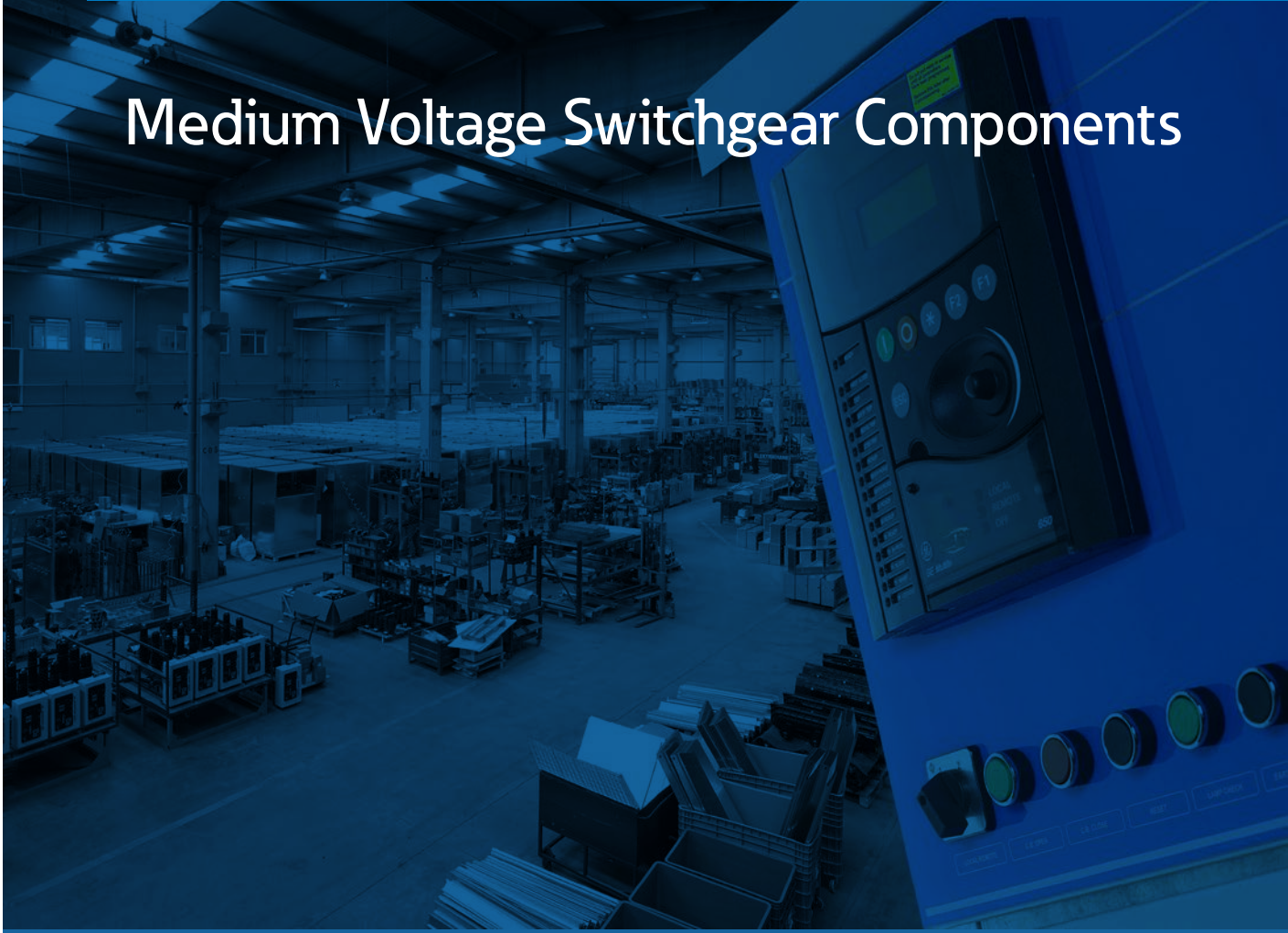


Medium Voltage Switchgear Components



Powering Business Worldwide



Energizing a world that demands more.

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- **Hydraulic and electrical solutions** that enable machines to deliver more productivity without wasting power
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INDEX

About Ulusoy Elektrik.....	01
1. LBS Series - Load Break Switch.....	02
1.1 Technical Data of LBS Series Load Break Switch.....	03
1.2 Technical Drawings Of LBS Series Load Break Switch.....	04
2. USFB Series - SF6 Circuit Breaker.....	05
2.1 Technical Data Of Usfb Series SF6 Circuit Breaker.....	05
2.2 Technical Drawings Of USFB Series SF6 Circuit Breaker.....	06
3. RVU Series - Vacuum Circuit Breaker.....	07
3.1 Technical Data Of RVU Series Circuit Breakers.....	08
3.2 Technical Drawings Of RVU Series Vacuum Circuit Breaker.....	08
4. Complimentary Equipments.....	09
4.1 Capacitive Voltage Dividers.....	09
4.2 Support Insulators.....	10
4.3 Wall Bushings.....	10
4.4 Earthing Switch.....	11
4.5 Voltage Indicator.....	12
4.6 Fuse Strike Mechanism.....	12
4.7 Annunciator.....	13
4.8 Manuel Operating Handle.....	14
4.9 Rogowski Coil Current Sensors.....	14



About Ulusoy Elektrik

Ulusoy Elektrik A.S. was founded as an engineering company in 1985 by Sait Ulusoy. As an integrated manufacturing platform for a wide variety of medium voltage electrical equipments for MV electrical distribution networks and industrial plants, it has proven Turkey's dynamic power as a leader in industry and has been at the forefront of its own sector. Ulusoy Elektrik has become one of the leading players in the electromechanical industry. Ulusoy Elektrik has undertaken many successful projects by its proven achievements in the national and international markets, a wide range of high quality products, its sectorial innovations and service quality.

Ulusoy Elektrik conducts its activities in an area of more than 83.000 m² (56.000 m² of which are indoors) at the Ankara ASO First Organised Industrial Zone, Temelli Anatolia Organised Industrial Zone and Indonesia Cikarang Organised Industrial Zone.

With a staff of over 700 qualified employees and over 100 specialist engineers, it carries out all of its product design, development, and R & D activities on-site.

As a result of major projects, its production capacity and industrial success, Ulusoy Elektrik ranked #364 among "Turkey's Top 500 Industrial Enterprises" survey for the year 2017, published every year by Istanbul Chamber of Industry.

By exporting to more than 70 countries, Ulusoy Elektrik has successfully carried out a worldwide production launch of its medium voltage electricity distribution equipments.

Ulusoy Elektrik is a publicly traded company listed on Istanbul Stock Exchange Stars Market as of November, 2014.

Eaton has completed the acquisition of %82,275 of the Ulusoy Elektrik A.S. shares as of April 15, 2019. Eaton, a global power management company with 2018 sales of \$21.6 billion, 99,000 employees worldwide, and customers in more than 175 countries, acquired a controlling interest in Ulusoy Elektrik from the Ulusoy family.

1. LBS Series - Load Break Switch

The Load Break Switches are metal enclosed modular switchgears. Ulusoy LBS's are suitable for almost all metal enclosed switchgear designs. Unlike other load break switches available in the market, Ulusoy LBS works in vertical axis similar to circuit breaker. The active sections of the Load Break Switch are present in SF6 gas medium closed with sealed pressure system inside the epoxy resin frame. During its normal operation lifespan of 20 years, it does not require any gas refill or any maintenance. LBS have three poles and two positions. The earthing switch which quickly closes when a short circuit is occurred in SF6 gas environment and inside a resin frame. This feature of the load break switch offers an additional safety feature for the operating staff. Because of the mechanical and electrical interlocking systems between the Load Break Switch and the earthing switch, possibility of a wrong-maneuver is prevented by these interlocking systems. Load Break Switch can open and close under the load. Because the coppers which are inside of the contacts are thick, so this feature increases the current carrying capacity. Therefore Load Break Switch's contacts are durable than disconnector switch's contacts. The only difference between Load Break Switch and Disconnector Switch is the contact's type. LBS can close only when the cubicle door is closed and earthing switch is open. Upon request Ulusoy's metal enclosed switchgear metal parts design's would be available in CAD format.



1.1 Technical Data of LBS Series Load Break Switch

24kV Load Break Switch

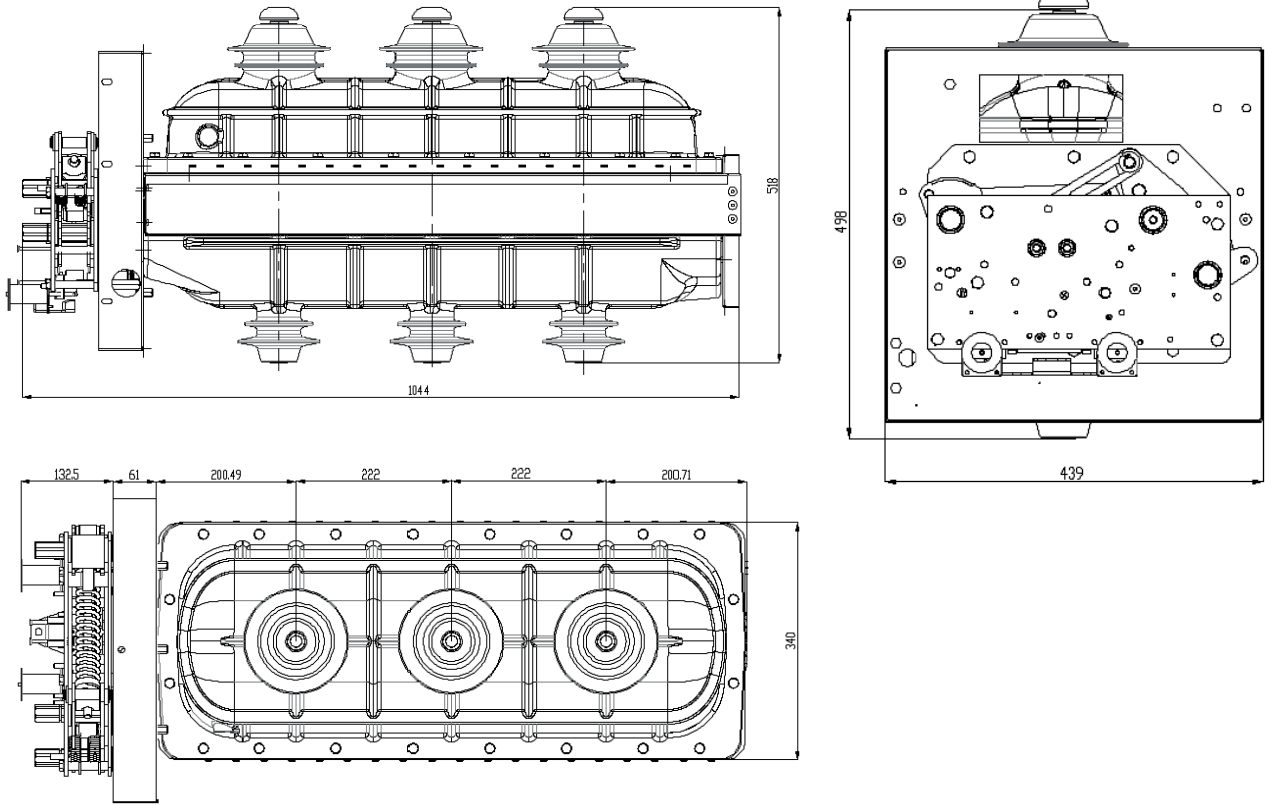
Type	LBS-24	LBS-36
Rated Voltage	12/24kV	36Kv
Rated Lightning Impulse Withstand Voltage	75/125kV	170Kv
Between Isolating Distance (Open Position Between The Contacts)	85/145kV	195Kv
Rated Power Frequency Withstand Voltage(1min)	28/50kV	70Kv
Between Isolating Distance (Open position)	32/60kV	80Kv
Rated Frequency	50-60Hz	50-60Hz
Rated Current	630-1250A*	630-1250A*
Rated Short Circuit Current (1sec)	16-20kA	16-20kA
Rated Peak Short Circuit Current	40-50kA	40-50kA
Mechanical Class	M1	M1
Electrical Class	E3	E3
Protection Degree	IP68	IP68
Insulation Medium	SF6	SF6
Rated Fillin Level for Insulation	0.5 bar	0.5 bar

* 630A: On load switch and off load switch

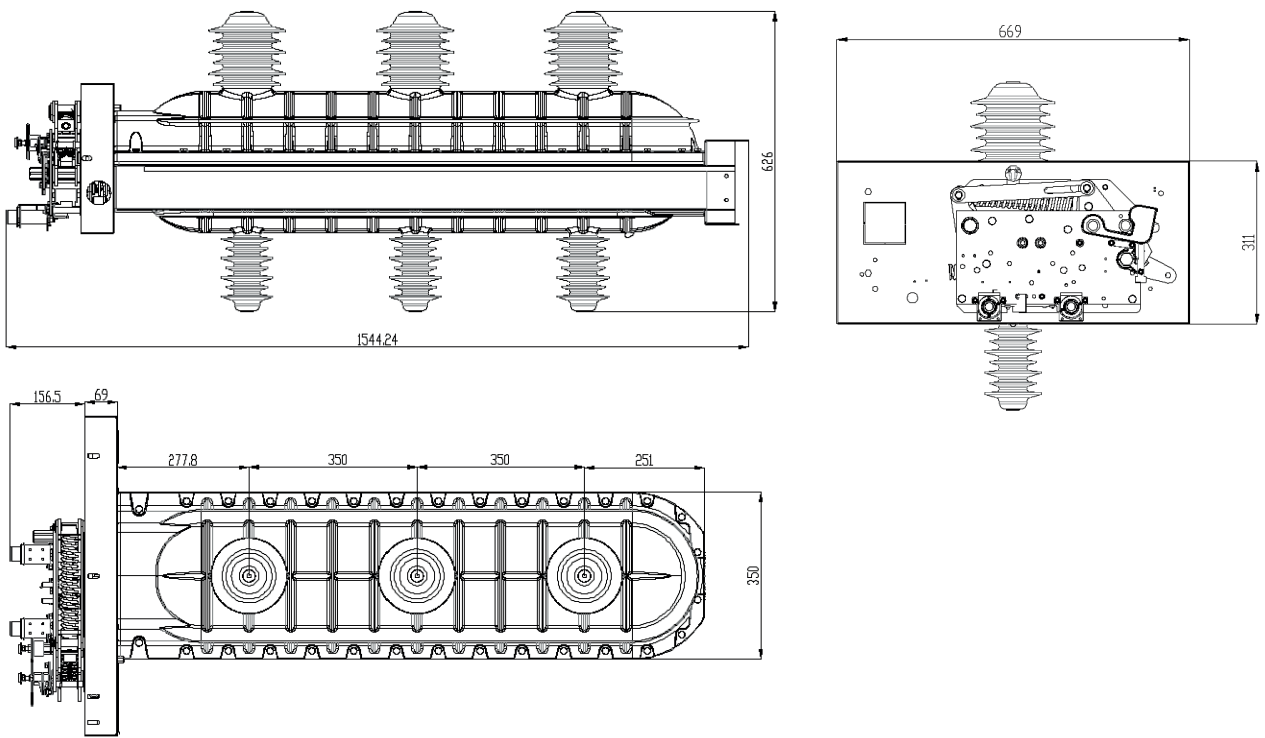
* 1250A: Only for off load switch

1.2 Technical Drawings Of LBS Series Load Break Switch

24kV Load Break Switch

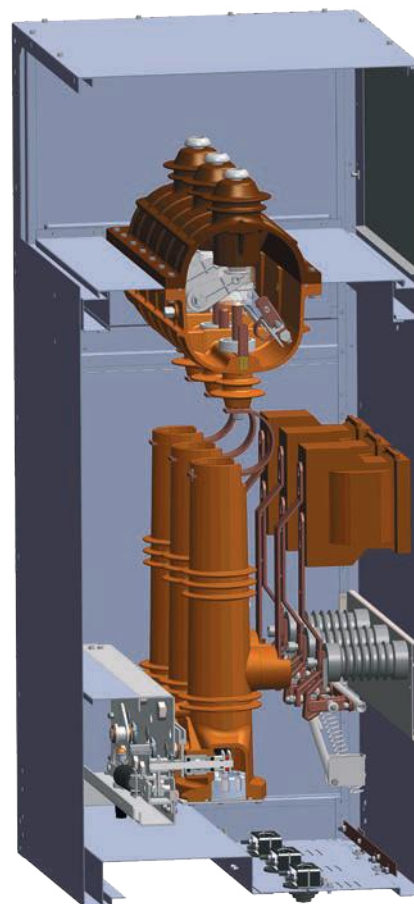


36kV Load Break Switch



2. USFB Series - SF6 Circuit Breaker

The circuit breaker consists of three pieces of independent poles which contain the fixed and moving contacts where the arc extinguishing process takes place and is filled with SF6 gas by an impermeable - guaranteed sealed system. The breaker mechanism works on the principle of releasing the stored energy of a spring. The mechanism can be operated motorized or manually by means of the leverage which comes with the breakers. The circuit breaker with re-closing feature offers the ability to make various mechanical and electrical interlocks by use of the switch disconnecting or load break switch.

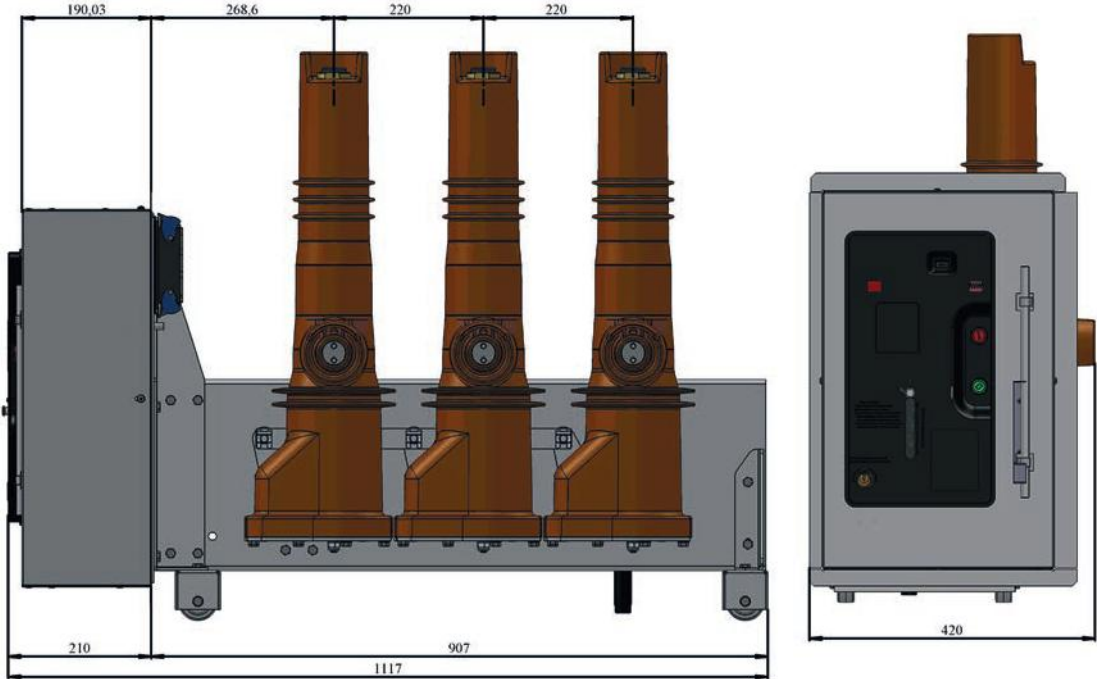


2.1 Technical Data of USFB Series SF6 Circuit Breaker

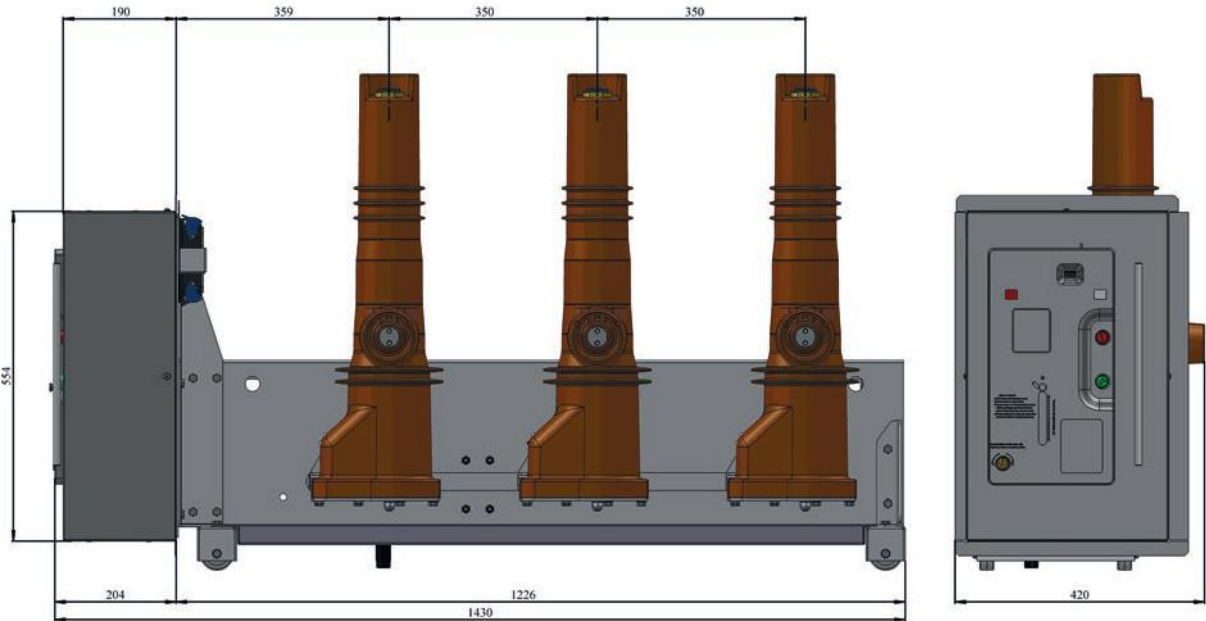
Type	USFB 24R SF6 CIRCUIT BREAKER	USFB 36R SF6 CIRCUIT BREAKER
Rated Voltage	24kV	36Kv
Rated Lightning Impulse Withstand Voltage	125kV	170Kv
Rated Power Frequency Withstand Voltage(1min)	50kV	70Kv
Rated Frequency	50-60Hz	50-60Hz
Rated Current	630-1250A	630-1250A
Rated Short Circuit Current (3 sec)	16-20kA	16-20kA
Rated Peak Short Circuit Current	40-50kA	40-50kA
Mechanical Class	M2	M2
Electrical Class	E2	E2
Insulation Medium	SF6	SF6
Rated Fillin Level for Insulation	1.6 bar - 2.0 bar	1.6 bar - 2.0 bar

2.2 Technical Drawings Of USFB Series SF6 Circuit Breaker

24kV SF6 Circuit Breaker

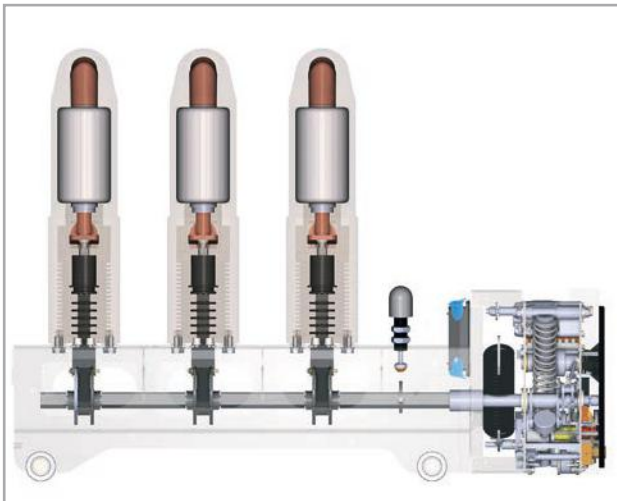


36kV SF6 Circuit Breaker



3. RVU Series - Vacuum Circuit Breaker

RVU series 12-24 kV vacuum circuit breaker designed by Ulusoy Elektrik is a three-phase AC indoor breaker with 12-24 kV rated voltage suitable for air insulated switchgear and can be applied in controlling and protecting electrical equipment in industrial and mineral enterprises, power plants and substations. Operation mechanism installed laterally. The product conforms to the IEC 62271-100 standard. Short circuit type tests are performed in KEMA High Power Laboratory in the Netherlands. RVU series provide safe and reliable performance. The embedded poles of RVU's have the technique of ventilation and convection. Besides the vacuum interrupter has low resistance and high number of short circuit breaking. All of that reduce the power consumption and the temperature rising due to the longtime running of circuit breaker.

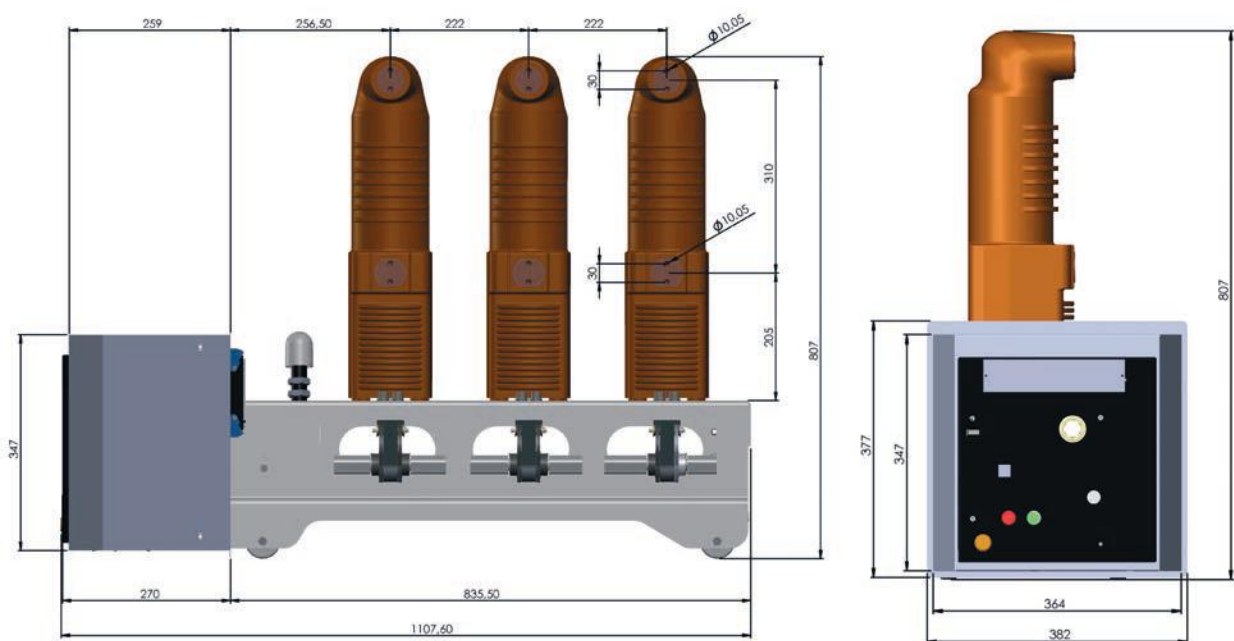


3.1 Technical Data of RVU Series Circuit Breakers

Type	RVU 12	RVU 24
Rated Voltage	12kV	24kV
Power Freq. Withstand Test Voltage	28kV (1min)	50kV (1min)
Lightning Impulse Withstand	75kV peak	125kV peak
Rated Current	1250A	
Rated Short Circuit Current (3 sec)	16-20kA	16-20kA
Operating Sequence	0 300msec - CO-3min-CO	
DC Component Max	%40	
Cable Charging Breaking Current	31,5A	
System Neutral	Neutral earth or without earth	
Out of Phase Breaking	6,25kA	
Motor Supply Voltage	24-48-110-220VDC, 220VAC	
Trip Coils Supply Voltage	24-48-110-220VDC, 220VAC	
Mechanical Class	M2	
Working Temperature	min: -25°C max: +50°C	
Interruption Medium	Vacuum	
Standard	IEC 62271-110	

3.2 Technical Drawings of RVU Series Vacuum Circuit Breaker

12-24kV 1250A Vacuum Circuit Breaker



4. Complimentary Equipments

4.1 Capacitive Voltage Dividers

Voltage divider insulators are used for the detection of the presence of voltage on phase lines. The insulators are epoxy cast resin. The main dimensions and mechanical requirements are in accordance with DIN 48136 and IEC 60273. Each and every insulator manufactured by Ulusoy Electric are individually subject to partial discharge test.



4.2 Support Insulators

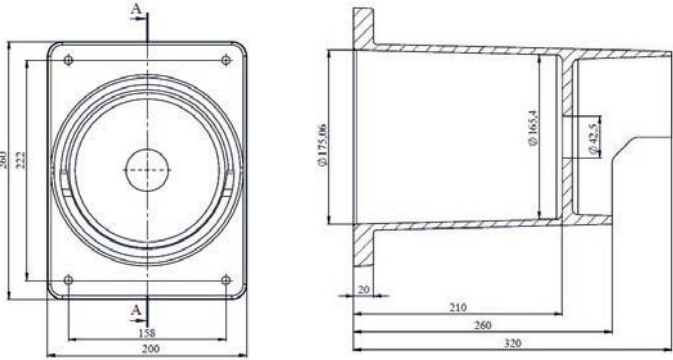
Support insulators are used for providing insulation in fuse, switch and bar applications. Main dimensions and mechanical requirements are in accordance with DIN 48136. Each and every insulator manufactured by Ulusoy Electric are individually subject to partial discharge test.



Power Frequency Withstand Test, Partial Discharge Test and Capacitance Test are applied according to IEC 60660-1999.

4.3 Wall Bushing

Wall bushings are used for insulation between busbars and cubicle and also provides insulation between bar connections. Shape and dimensions of the hole can change according to customer requirements.

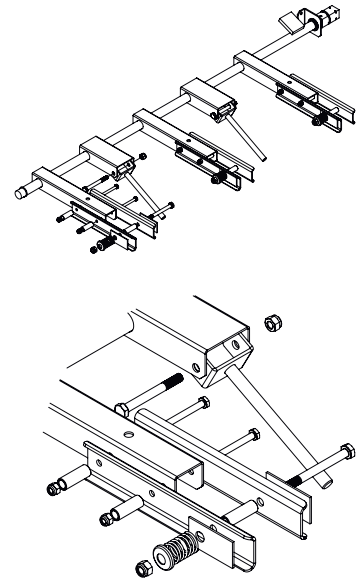
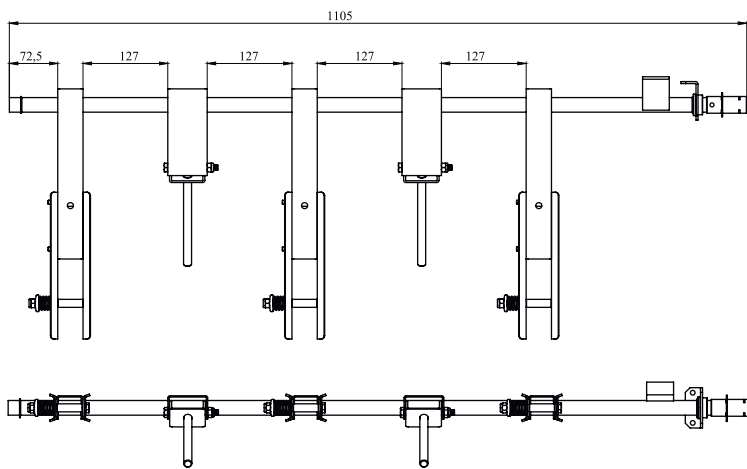


4.4 Earthing Switch

Support insulators are used for providing insulation in fuse, switch and bar applications. Main dimensions and mechanical requirements are in accordance with DIN 48136. Each and every insulator manufactured by Ulusoy Electric are individually subject to partial discharge test.

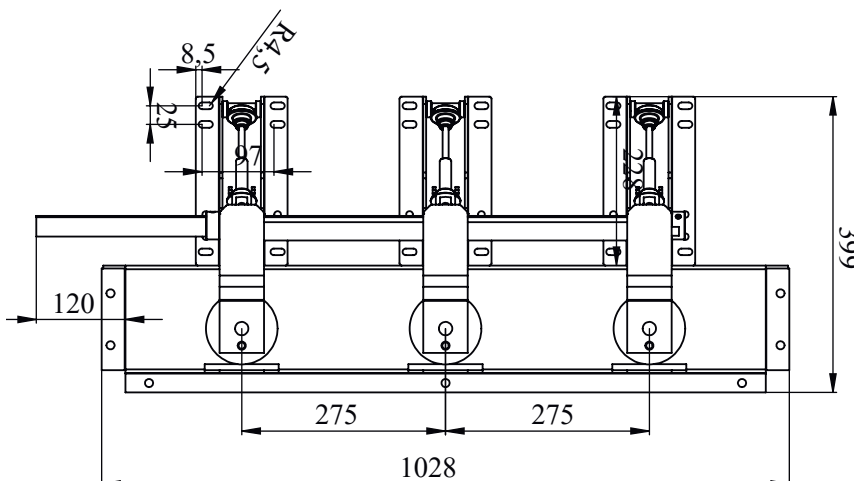
Technical Specifications of Earthing Switch Class - 1

Rated Voltage : Up to 36kV
Short Circuit Withstand Capacity : 16kA t = 1 sec.
Electrical Class : E2 (5 closure)



Technical Specifications of Earthing Switch Class - 2

Rated Voltage : Up to 36kV
Short Circuit Withstand Capacity : 31,5kA t = 3 sec.
Electrical Class : E2 (5 closure)



4.5 Voltage Indicator

The voltage indicator works collectively with capacitive voltage dividers on modular cubicle panels. It is used to indicate each phase voltages.

There are three indicators which measure each phase voltages. Back terminal connections have sockets so it makes mounting and cabling easier.

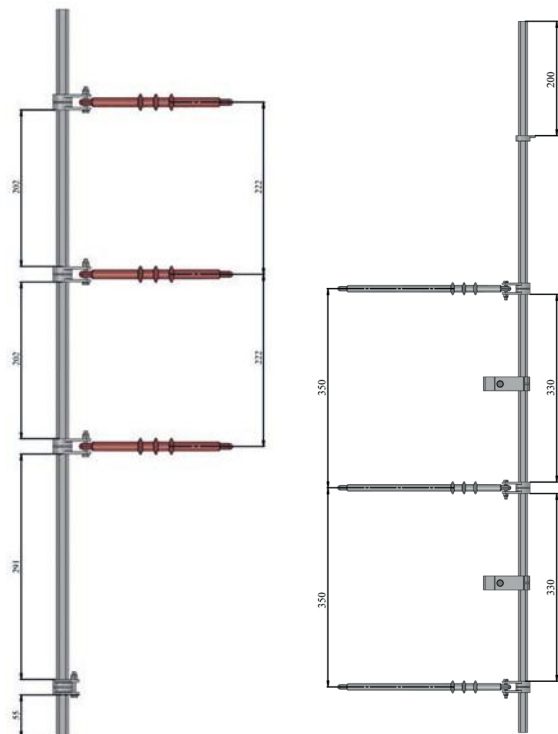


Technical Specifications of Voltage Indicator

Operating Voltage	: 2kV - 40kV by capacitive voltage divider
Measuring probe point	: 4 (for 3 phase and ground separately)
Diemensions	: 35x61x46

4.6 Fuse Strike Mechanism

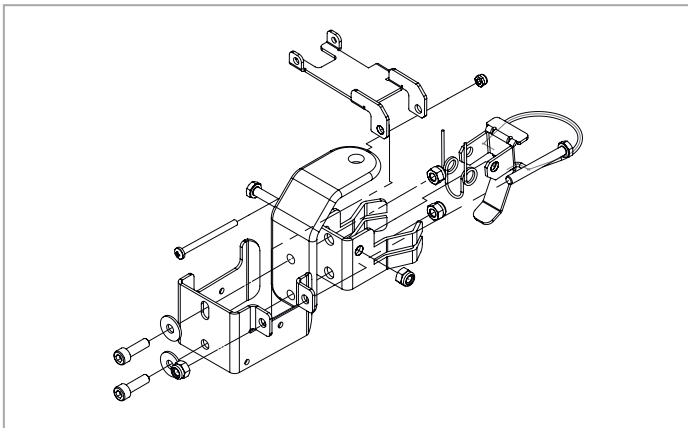
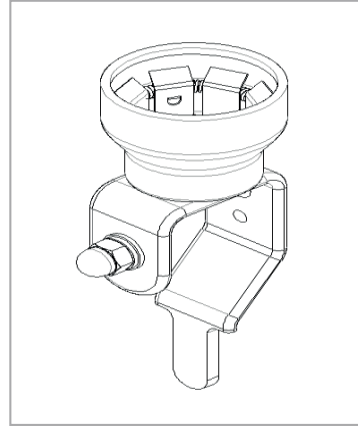
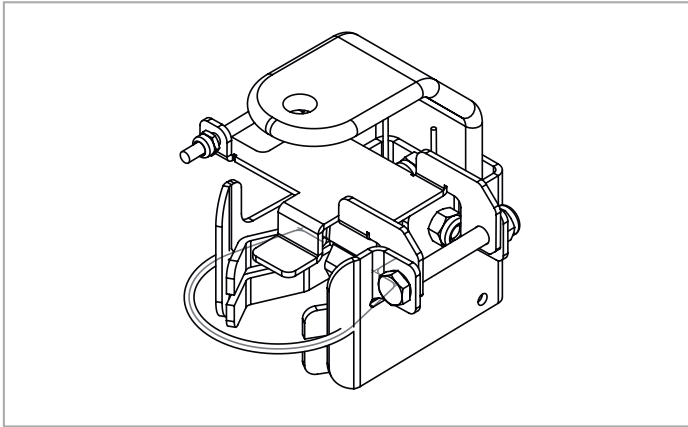
Fuse strike mechanism is a mechanical tripping system. It is used in transformer protection metal enclosed switchgears with fuse. If a fault occurs at one of fuses, it strikes and the mechanism turns upward and the load break switch opens.



24kV

36kV

Fuse holders fixed the fuses in the switchgear.



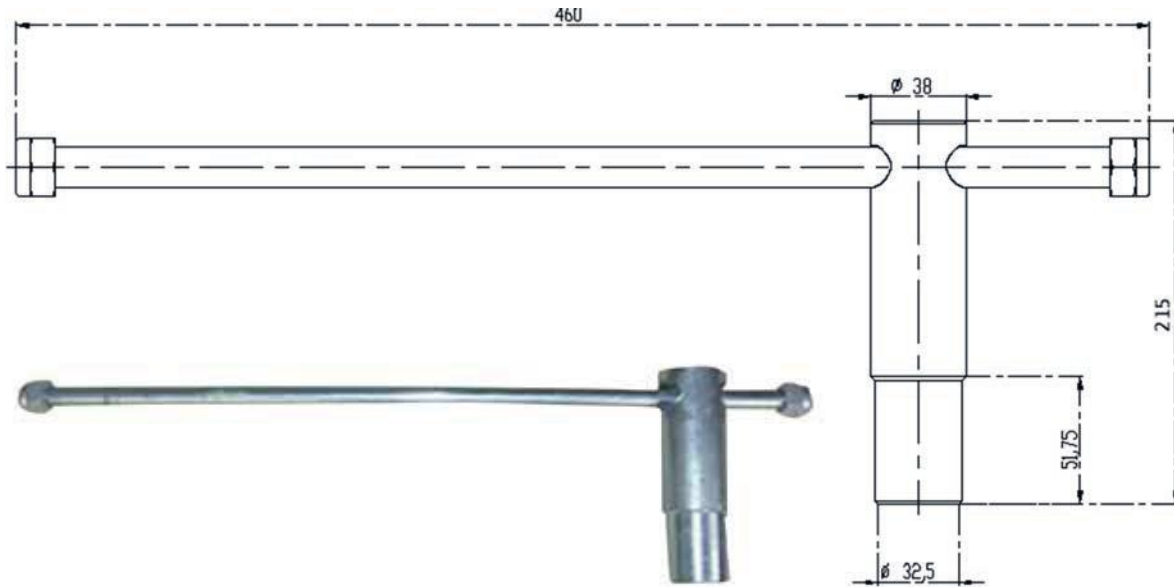
4.7 Annunciator

The annunciator indicates the signals which warn about the transformer's situation or distribution substation's situation.



4.8 Manuel Operating Handle

The manual operating handle is used charging mechanism manually when the motor is not available.



4.9 Rogowski Coil Current Sensors

Coil current sensors which is a member of electronic current transfer family, manufactured in accordance with IEC 60044-8. Rogowski sensors works with the principle of electro magnetic field theory. The current flows across the cable located center of the loop induced a magnetic field at the coil. With an A/D converter output which is proportional with measured current can be obtained. The most important features are its small dimensions and ability to be in a single standard within a very large current range.



Technical Data of USFB Series SF6 Circuit Breaker

Standard	: IEC 60044-8
Rated Primary Current	: 100A
Rated Secondary Voltage	: 22.5mV
Measuring Range	: 1,25 ~1600 A
Accuracy Error	: % 1
Phase Displacement	: <0.5°
Rated Short Circuit Current	: 63kA / 1sn
Insulation	: 0.72 kV

	Current Transformer	Coil Sensor
Output	1 A- 5 A	22,5 mV
Linearity	No	Yes
Saturation	Yes	No
Temperature Withstand	No	Incl.In Accuracy
EMC	No	Shielded
Open Secondary	Destructive	Safe
Weight	40 - 60kg (CT+VT)	2-25 kg
Standardisation	No	Yes
Frequency Response	40-60 Hz	1Hz-3MHz

