



HÜNER TEKNİK

Your solution partner for M.V. and L.V.



As Hünér Teknik Contracting, Electricity, Industry and Trade Limited Company, we have been providing repair and On-Site Preventive Maintenance services since 1978 for circuit breakers of M.V. circuit breakers (cutout switches) and L.V. circuit breakers (power switches) regardless of the brand, model and type differences, through combining the technology with our expert technical staff.

OUR PURPOSE

Our purpose is to make contribution to the enhancement of the electricity sector and also to achieve saving by bringing in the idle materials to the system again. Regarding the On-Site Maintenance services, one of our purposes is to maintain healthy and long-lasting operations for transformers & M.V. and L.V. Systems.

ON-SITE MAINTENANCE

For Transformers & M.V. Chambers, we provide On-Site and Periodic Preventive Maintenance services with our experienced staff and our Mobile Service vehicles equipped as per the international standards. We provide Maintenance services for L.V. circuit breakers with our well-equipped and experienced staff as well.



CIRCUIT BREAKERS ARE CLASSIFIED according to their

- place of use;
- role during the operation;
- structures, and
- operating mechanism.



However, the most common circuit breakers used for the operations are:

- Minimum Oil Circuit Breakers
- SF6 Gas Blast Circuit Breakers
- Vacuum Circuit Breakers

Circuit breakers are manufactured in various types in compliance with the arc extinction's environmental features and they are classified as below:

1. Air-blast Circuit Breakers
2. Bulk Oil Circuit Breakers
3. Minimum Oil Circuit Breakers
4. Air Blast Circuit Breakers
5. Air Blast Circuit Breakers in a Magnetic Field
6. SF6 Gas Blast Circuit Breakers (Gas Blast Circuit Breakers)
7. SF6 Gas Blast Circuit Breakers in a Magnetic Field
8. Vacuum Circuit Breakers



STRUCTURAL PARTS OF THE CIRCUIT BREAKERS

- Insulating tube (Pole)
- Circuit breaker chamber
- Fixed main contact
- Moving main contact
- Fixed and moving auxiliary contacts
- Operating Mechanism
- Motors and Coils
- Propulsive Insulator and Coils
- Chassis



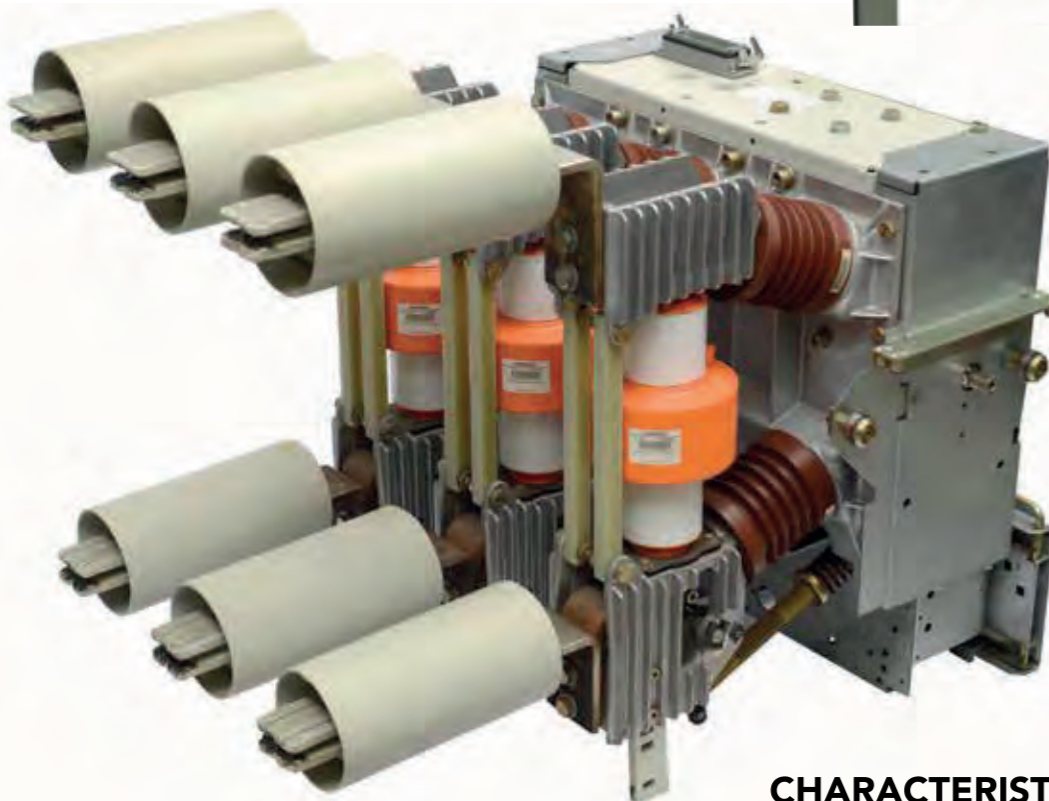


REPAIR AND MAINTENANCE OF THE MEDIUM VOLTAGE CIRCUIT-BREAKERS

CIRCUIT-BREAKERS

Being able to cut off and transmit the current is required in order to operate and maintain the network for every part of the system. The circuit-breakers are the tools we utilize for switching in the following cases:

- Off-load
- On-load
- In case of short circuit voltage



CHARACTERISTICS OF THE CIRCUIT-BREAKERS

- A perfect conductor while in the off-position
- A perfect insulator while in the on-position
- Hi-speed switching operations

Our Company has been successfully providing Repair and On-Site Preventive Maintenance services for many years regardless of the brand, model and type differences, and has availability of experienced staff, equipments and original spare-parts.



PURPOSE

Our purpose is to enhance the performance, reliability and operating life of the power plants.



VACUUM CIRCUIT BREAKERS REPAIRMENT

- Mechanism
- Pole
- Coils-Motors, etc. and make them utilizable again

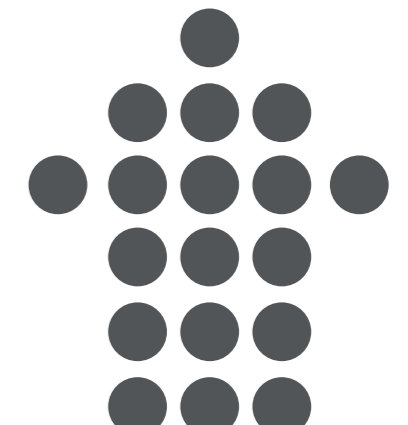


For the maintenance services of circuit-breaker, we give 1 (one) year guarantee for labor and material under normal operation conditions.

ARC EXTINCTION IN SF6 CIRCUIT-BREAKERS

In the SF6 (sulphur hexafluoride) technique, the extinction process of the electric arc is carried out when it is filled with SF6 gas (circuit breaker pole).

When the circuit-breaker is switched on, the moving contact moves downwards and also moves the piston. Thus the pressurized SF6 gas which has been pressed under the contact is sprayed on the arc and the arc becomes extinct.





SF6 GAS BLAST CIRCUIT BREAKERS

There are 2 main types of SF6 Gas Blast Circuit Breakers:

- Self-blown Circuit Breakers (gas-buffered & reciprocating), Gas Blast Circuit Breakers
- Circuit breaker with current-dependent extinction system (with rotating arc)
(Usually this type is manufactured in Turkey.)



CHARACTERISTICS OF THE SF6 GAS

- Colorless, odorless and non-poisonous
- High dielectric strength
- Non-inflammable
- Gaseous under normal atmospheric conditions. 5 times heavier-than-air under 1 bar pressure and at 200°C.



ARC EXTINCTION CHAMBER

In the arc extinction chambers, the ignition of the hole into which the moving contact rod moved is accepted as the criterion for making a decision whether the chamber is required to be renewed or re-used. The volume of this ignition is determined through measuring the part in the worst condition. The ignition of the arc extinction chamber can also be measured using a wire with a dimension of 3 mm diameter. In order to measure using a wire, the arc extinction chamber's moving rod should be fixed on the contact. If the wire (with a dimension of 3 mm diameter) can pass through the hole's part in the worst condition and the rod contact, it means that the ignition has gone over the allowed limit. It is recommended to renew also the arc extinction chamber together with the contacts.

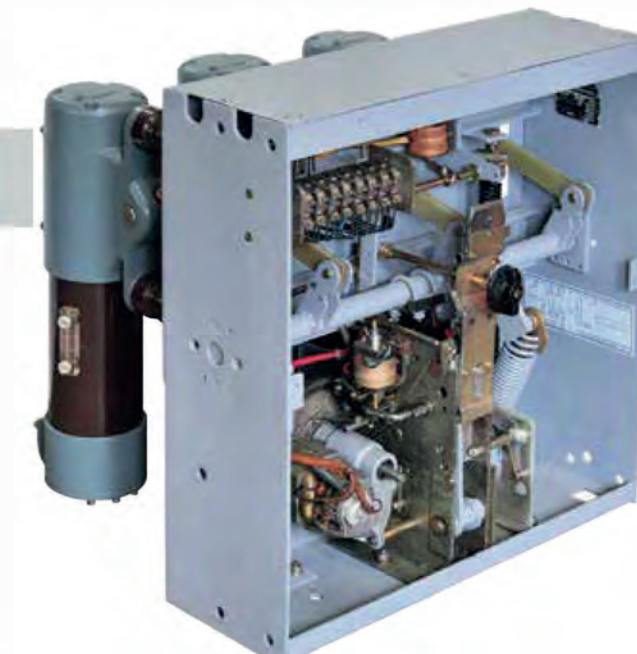
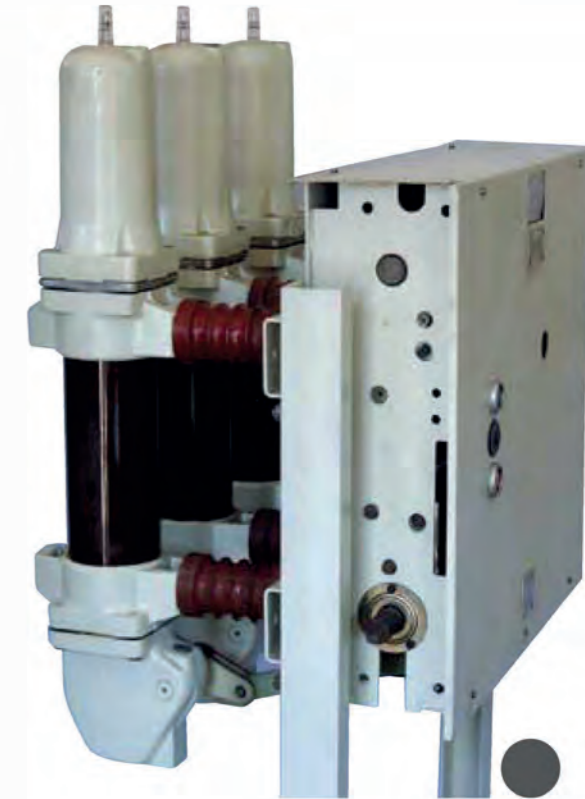


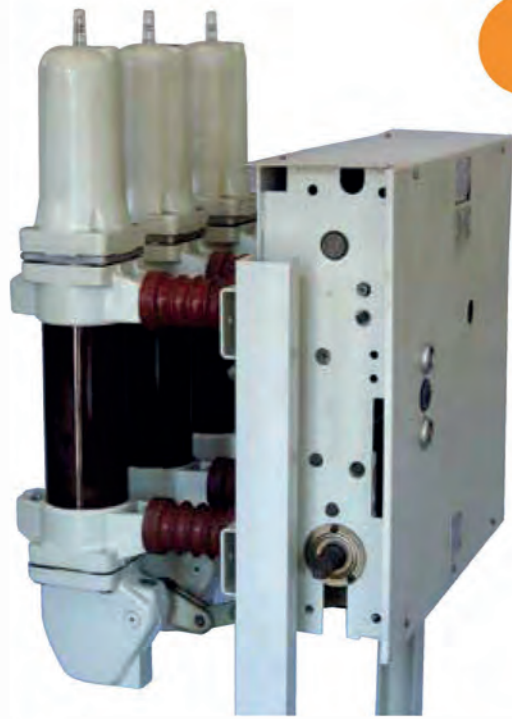
IGNITION CHECK FOR CONTACTS AND ARC EXTINCTION CHAMBERS

The following parts are required to be checked for ignition

- Moving contact rod
- Fixed lale contact
- Arc extinction chamber

In order to determine if the parts can still be used or should be renewed, ignition measurements should be carried out.



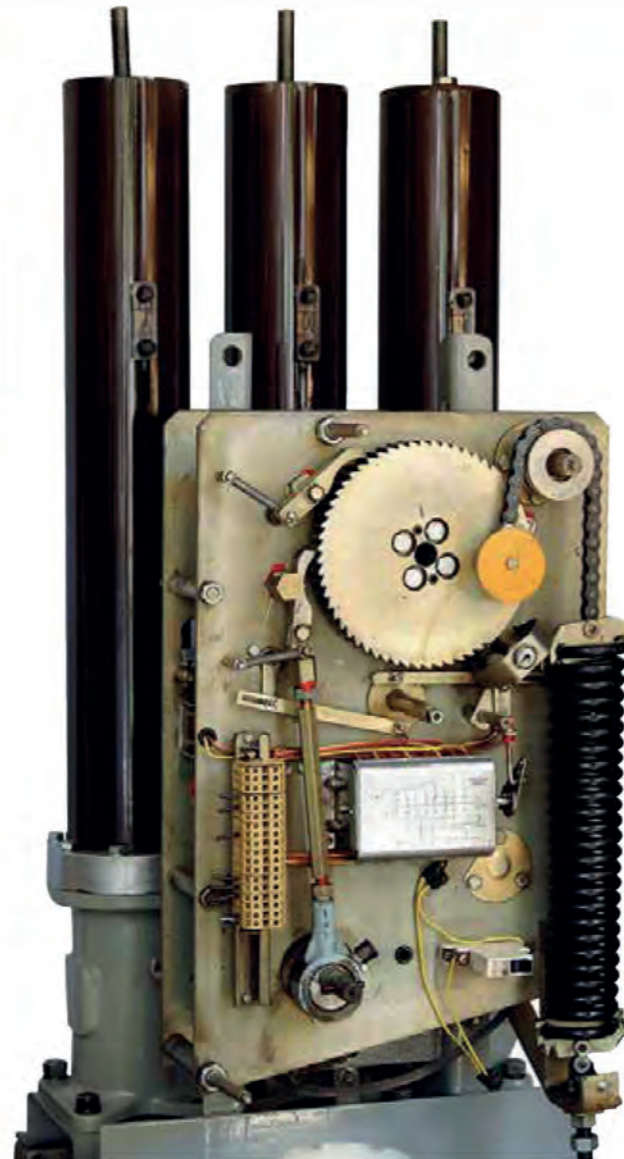


ARC EXTINCTION FOR OIL TYPE CIRCUIT BREAKERS

When the circuit-breaker receives a "switch on" instruction, the moving contact disconnects from the fixed contact and an arc is formed between them. It enters the arc cells through the arc path. An ignition occurs due to the arc's heat effect. The gas emerging as a result of this ignition moves to the pressure equalizing chamber. The pressure developed within the circuit breaker at that moment pushes the arc oil into the extinction chamber and the arc becomes extinct.

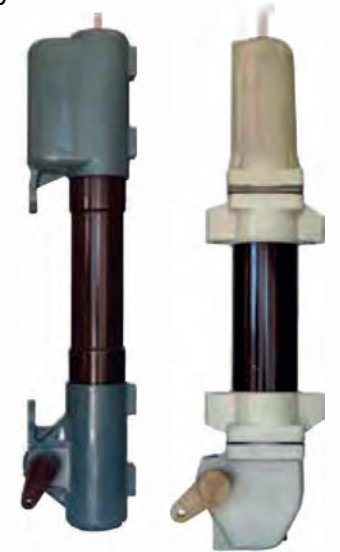
PERIODIC PREVENTIVE MAINTENANCE FOR MEDIUM AND LOW VOLTAGE SWITCHYARDS

After making a plan in terms of recommendations and instructions of the equipment's manufacturer; related standards; specifications and procedures, these maintenances are required to be carried out periodically with the aim of determining the problems and the needs of the existing power plant; enabling it to operate consistently without any malfunctions, and forecasting the possible malfunctions.



OUR COMPANY

The periodic maintenances for the switchyards should be carried out once a year.



PURPOSE

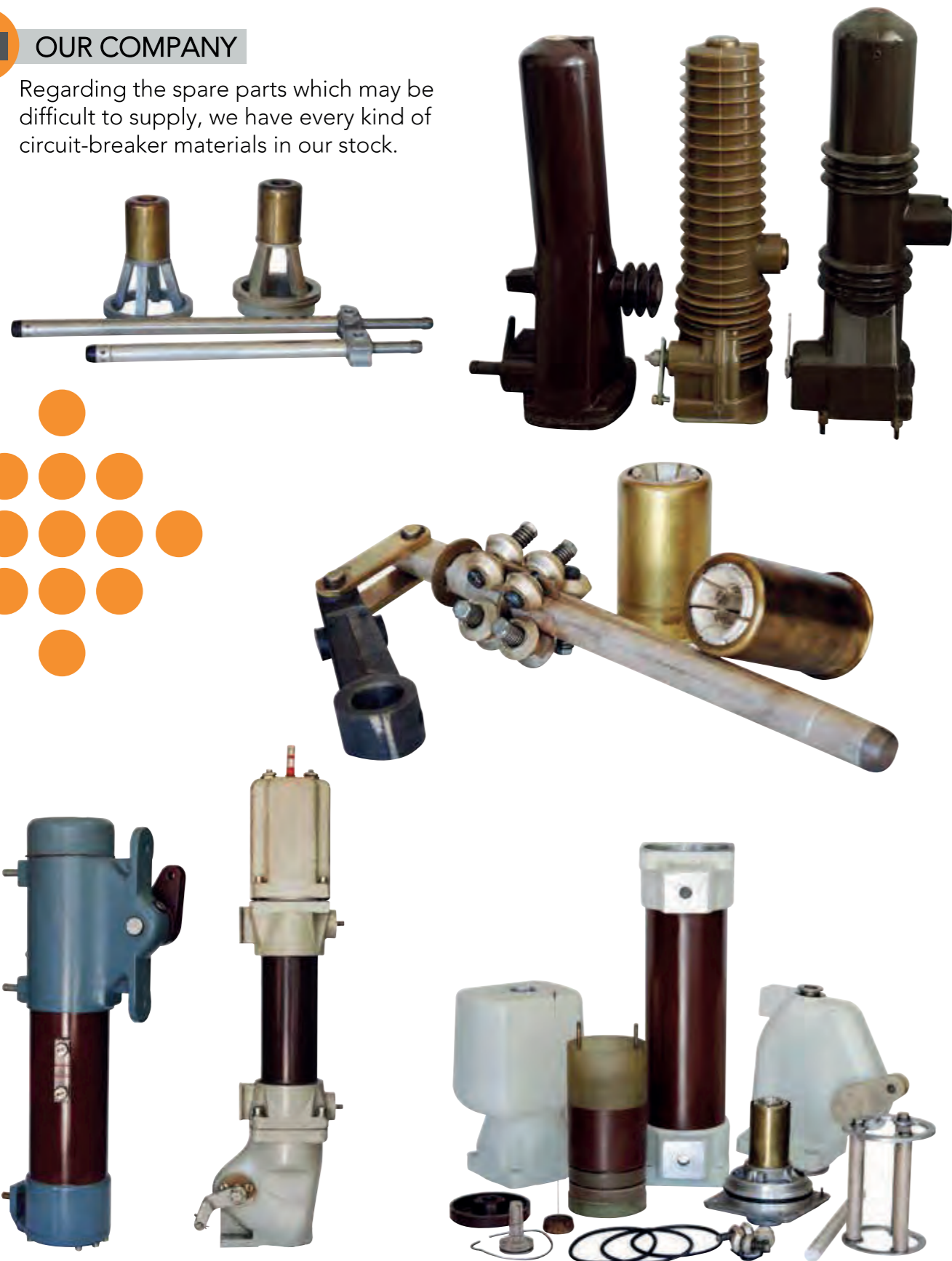
Our purpose is to prevent loss of production and protect our customers from unnecessary costs.





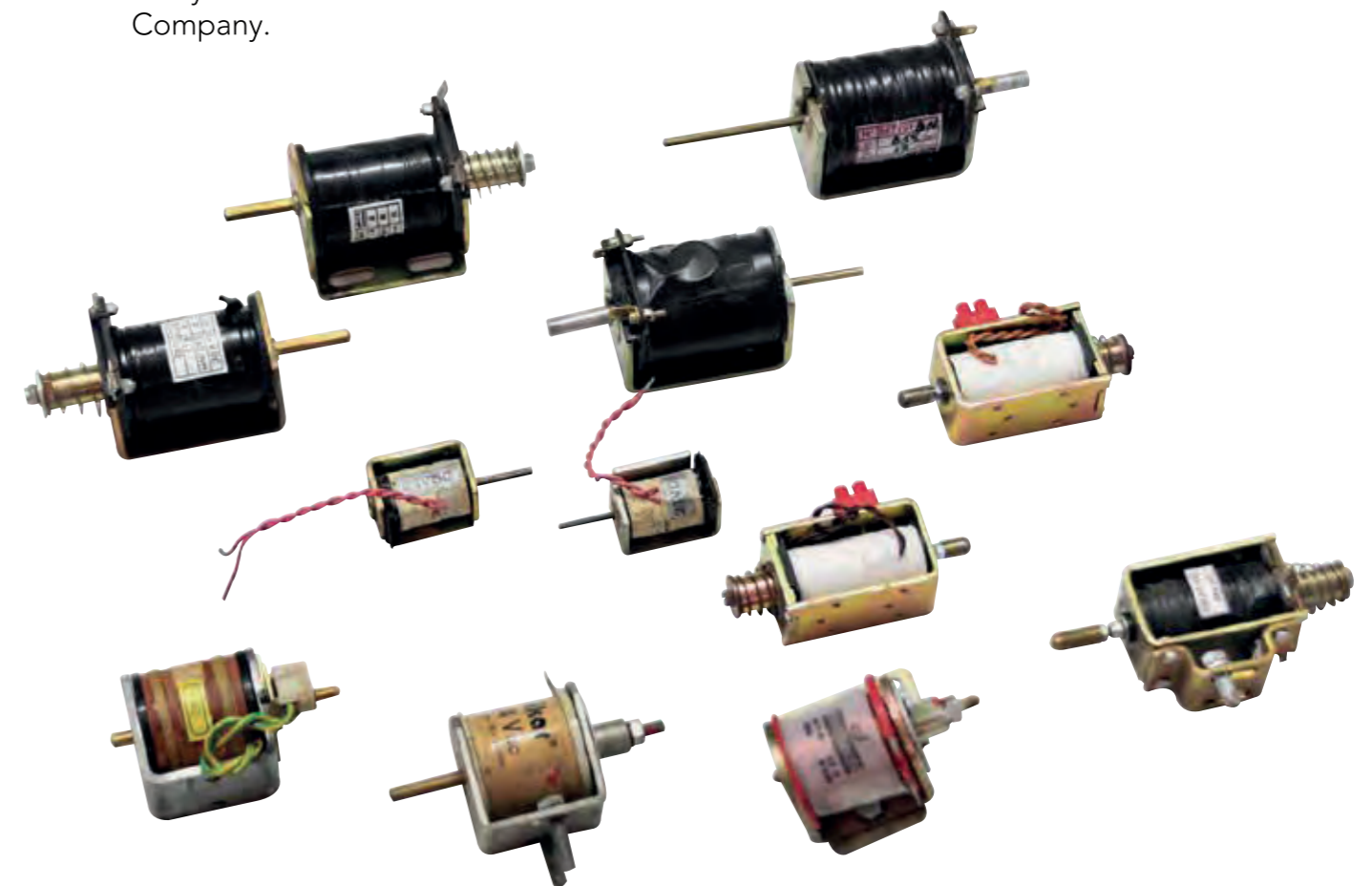
OUR COMPANY

Regarding the spare parts which may be difficult to supply, we have every kind of circuit-breaker materials in our stock.



MOTORS AND COILS

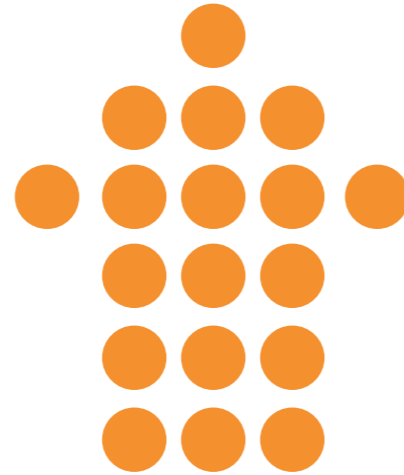
Every kind of motors and coils for circuit breakers in all brands can be obtained from our Company.





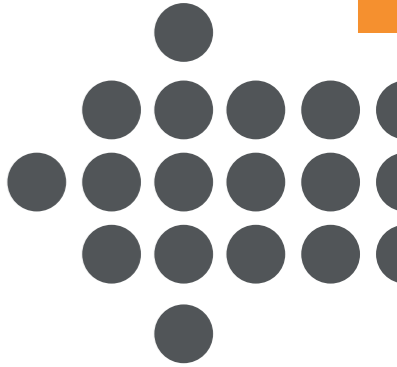
■ UNDER-VOLTAGE CIRCUIT BREAKERS

Under normal operating circumstances, it serves to switch-off and to carry the current of the circuit. However under abnormal circumstances such as short circuit and over-current, it is used as a mechanical switching tool to switch-off automatically. In addition to the switching feature, the circuit-breakers' another important feature is to protect the circuit during the abnormal circumstances.



As is known, sometimes there may be over-voltage in the power plants. Over-voltage is like a sudden impact and occurs in the course of stroke of lightning or activation and de-activation of the tools called switchers such as transducers, condensers, coils, etc. These temporary incidents cause short circuits due to a bypass among the phases or phase-ground. Any dirt, dust or moisture on the nonconductive covering accelerates the formation of this bypass.

Until the past couple of years there were scarcely any Companies in Turkey that manufactures moulded case circuit breakers. In Turkey we still cannot manufacture High Amperage Circuit Breakers which are also called "open-type circuit breaker". Some Companies are importing these materials. Since so many Companies do not provide a service network, we decided to repair these types of materials in line with our customers' demands.



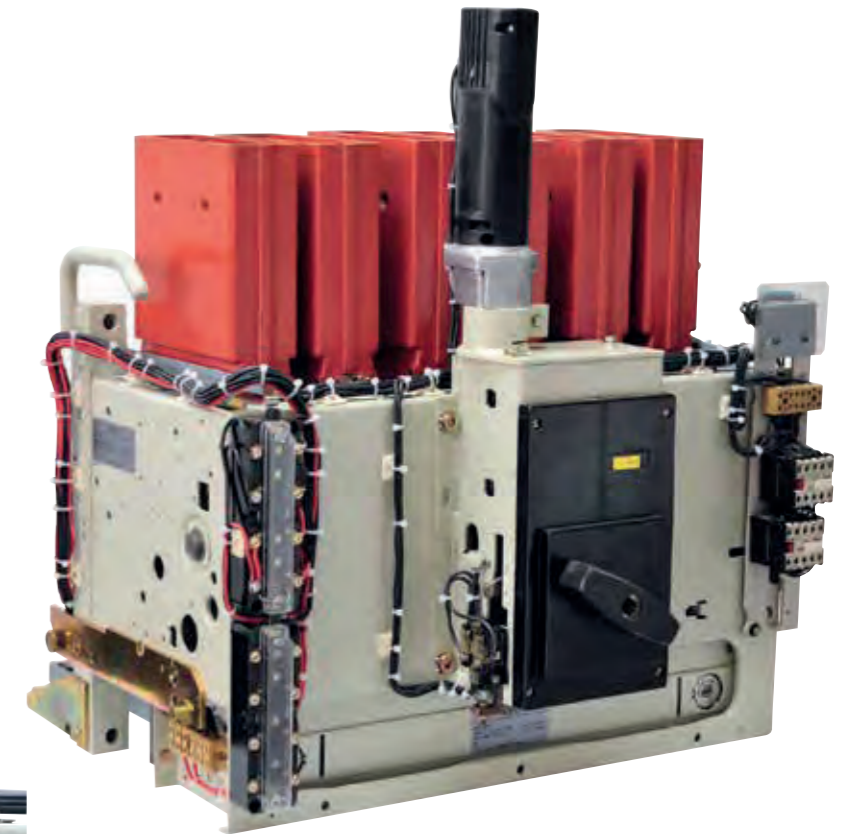
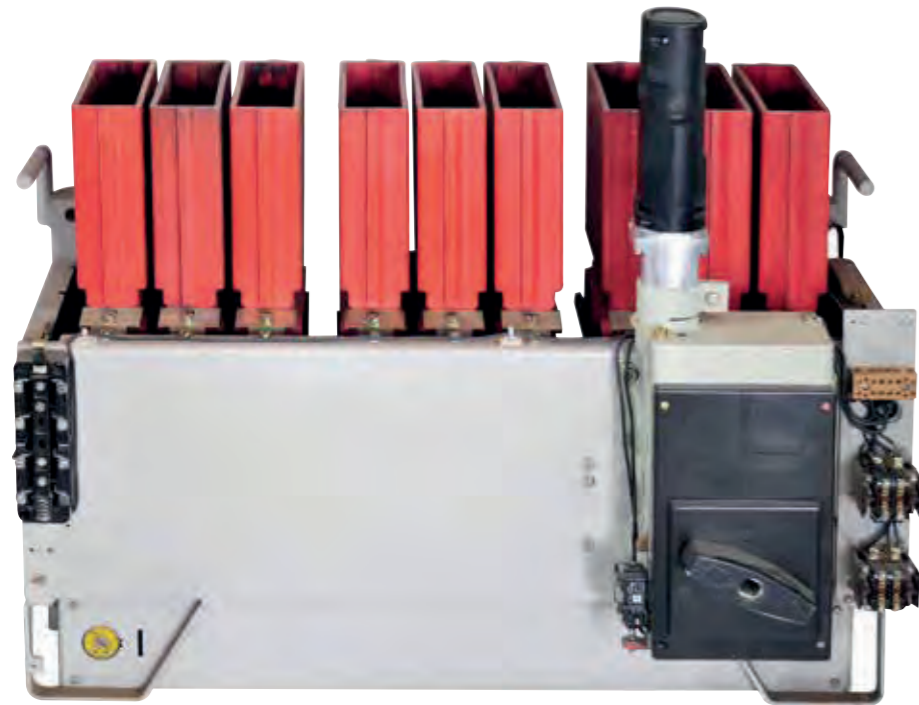
■ OUR COMPANY

Our Company has been providing Repair and On-Site Preventive Maintenance services professionally for more than 30 years. When the Circuit Breakers' sale prices are considered, rather than disposing, repairing them makes a great contribution to the Companies in the event of any kind of malfunction.



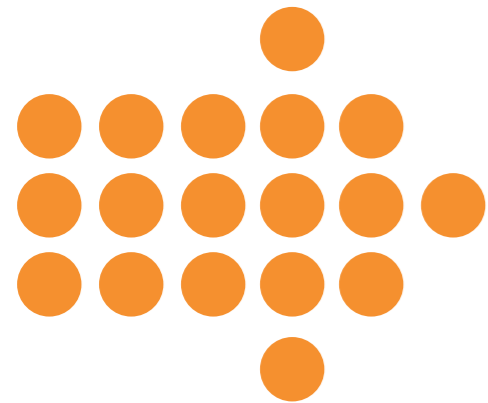


When you purchase a new power switch, the maximum guarantee period is for one (1) year. Within this period if you encounter any problems about the material, the Vendor shall repair it or renew if necessary. If the guarantee period is over, you will be advised to purchase another power switch or to send it to overseas for repairment.



OUR COMPANY

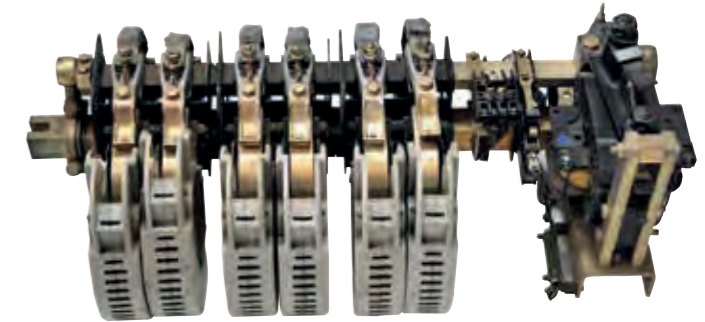
The maintenance guarantee (labor & material) period for a circuit breaker which we provided service is also one (1) year. Within this period if you encounter any problems, we will respond to the failure immediately and will be in search of the best solution.



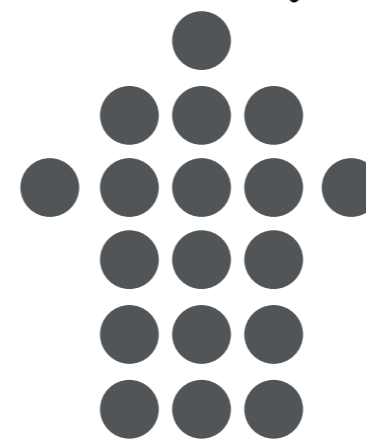


OUR COMPANY

We are able to provide repair and maintenance services for any L.V. circuit breaker regardless of the brand, type and performance differences.



Some of those circuit breakers we provide repair and maintenance services for:

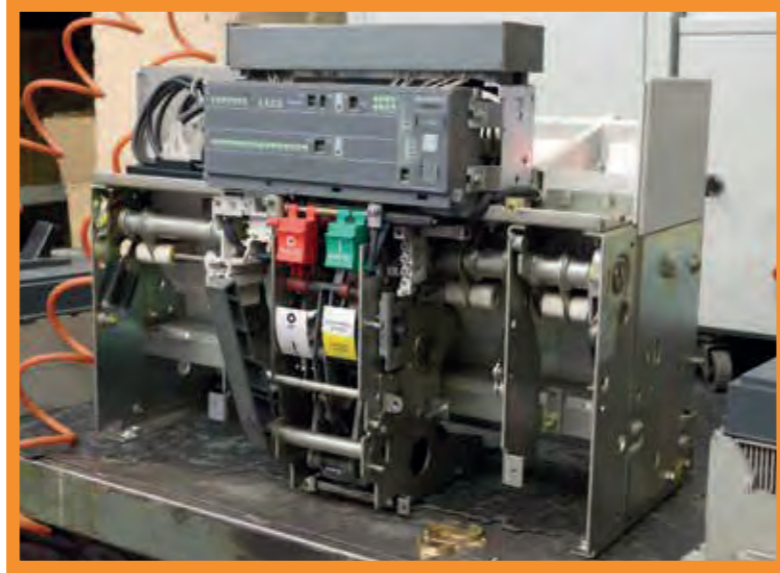


PURPOSE

Our purpose is to prevent loss of production and protect our customers from unnecessary costs.



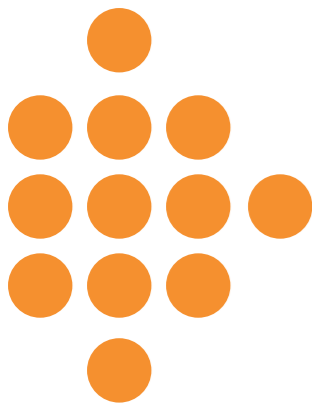
CIRCUIT BREAKERS



Switching on-off while on-load cause contacts to be abraded in time and the special alloyed silver contacts become unfunctional.



As a result, the circuit breaker turns on frequently and causes the operation to stop. This problem will be eliminated when the contacts are renewed.



OUR COMPANY

Regarding the spare parts which may be difficult to supply, we have every kind of circuit-breaker materials in all brands in our stock.





CONTACTS

Switching the contactor to off position will cause the current flowing over the contacts get warm. The contacts should have the high-current values without being exposed to any kind of failure or fusion. The loss of contact liquefaction in a specific switchgear depends on the general release current. The operating life of the contacts are determined according to this.



The other possible reasons of the contact adhesion are switching at a high-current density, short-circuits and the errors encountered during the delta-wye transition.

OUR COMPANY

Our Company has started to manufacture and give repairing services for electric contacts in 1978 and maximized the customer satisfaction through keeping up with the necessities of the time.



Our privileges are

- Economical price
- On-time delivery
- High quality thanks to the state-of-the-art technology



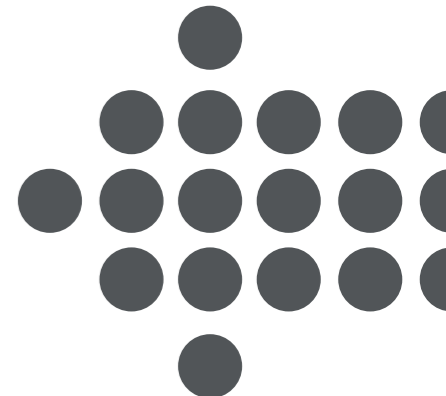
OUR COMPANY

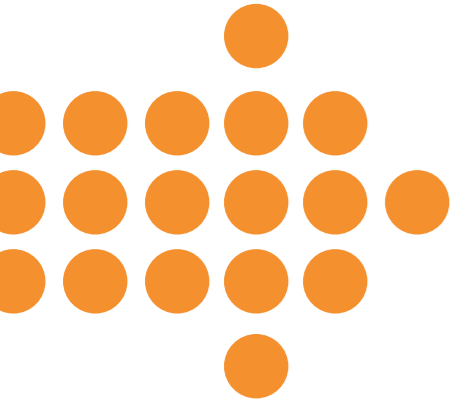
As a result of our experience we gained in more than 30 years, we have a large stock of apparatus moulds. In principle according to our sense of repairing we receive the old CONTACTS and give the new ones to the customer. Thus, we eliminate the contacts with material fatigue in time. We use the AgSnO₂ and AgCdO silver plates which we import. These plates:

- provide a remarkable protection against the "contact adhesion" for the currents up to 5000 amp,
- exhibit low level of abrasion for the currents between 1000 to 5000 amp,
- are better for arc extinction when compared to the other silver-metal oxides
- are easier to form
- have a less price of production

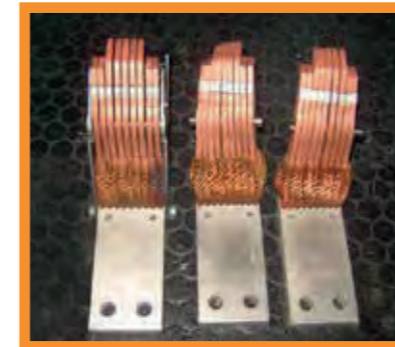


The manufactured contacts are covered in our workshop with silver as per the requested micronaire value.



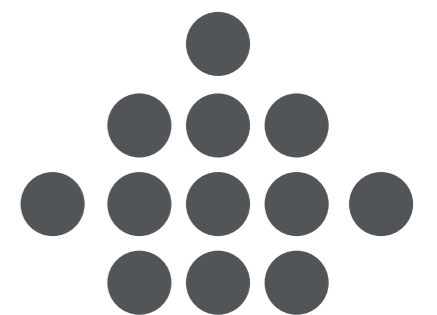


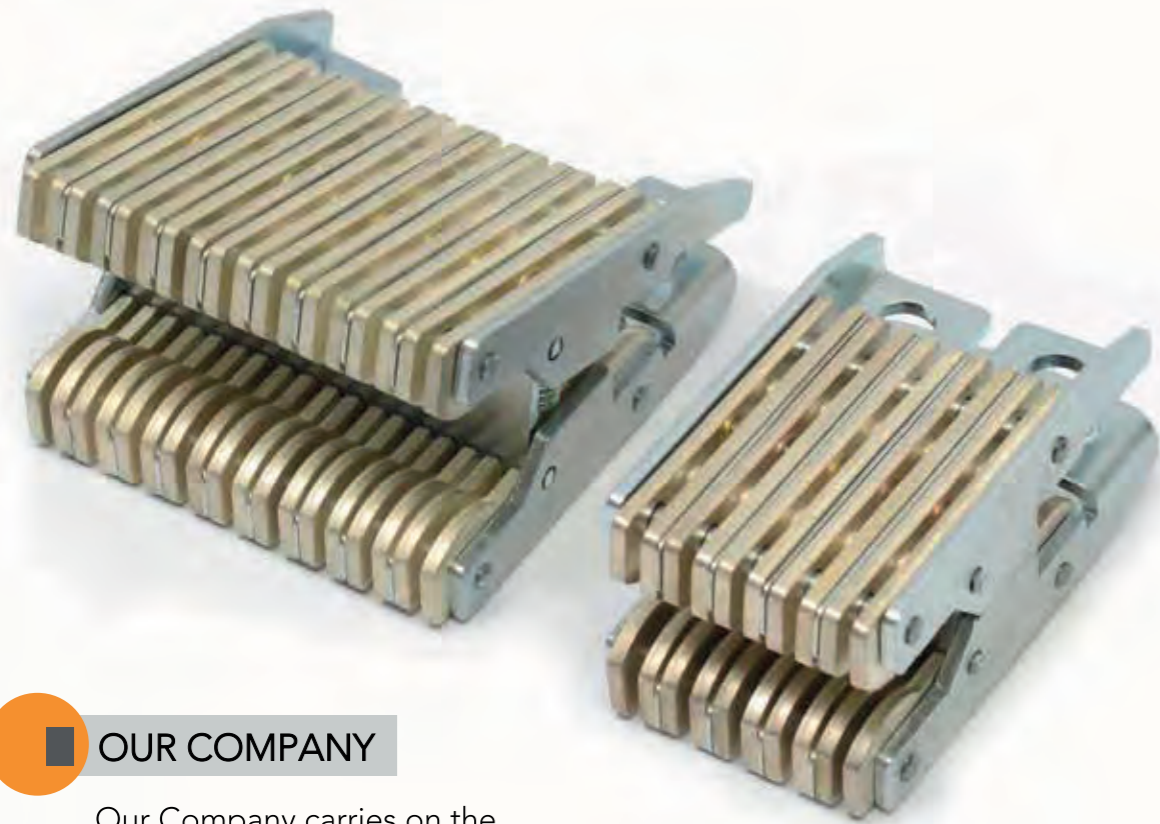
HÜNER TEKNİK generally uses original silver materials which are produced utilizing the sinter metallurgy technology for manufacturing the contact components.



OUR COMPANY

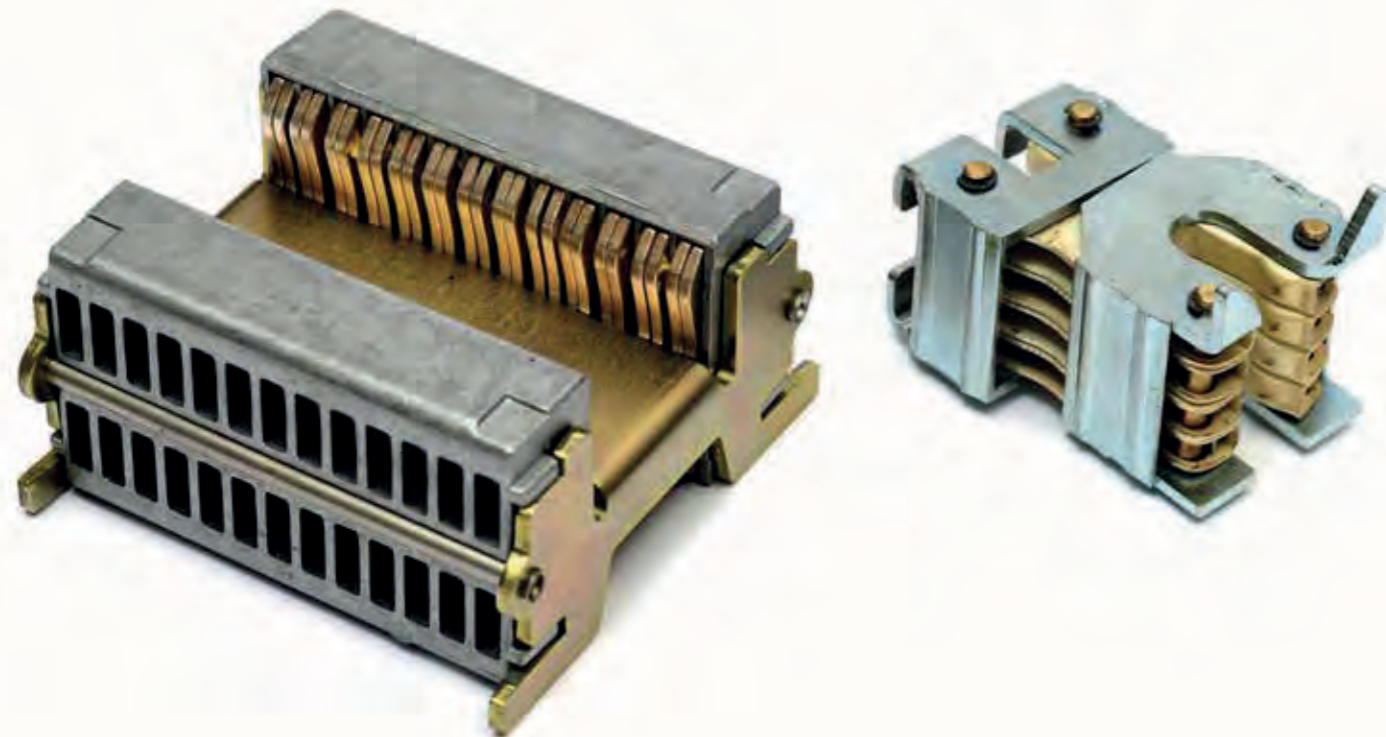
We manufacture in compliance with the original parts and according to the samples or technical drawings in accordance with the customers' requests.





OUR COMPANY

Our Company carries on the processes of manufacturing every kind of contacts successfully.



OUR COMPANY

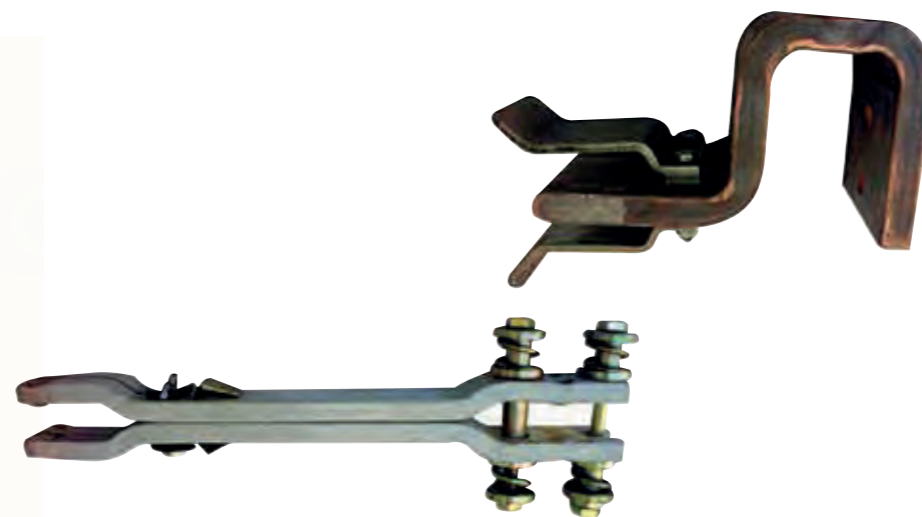
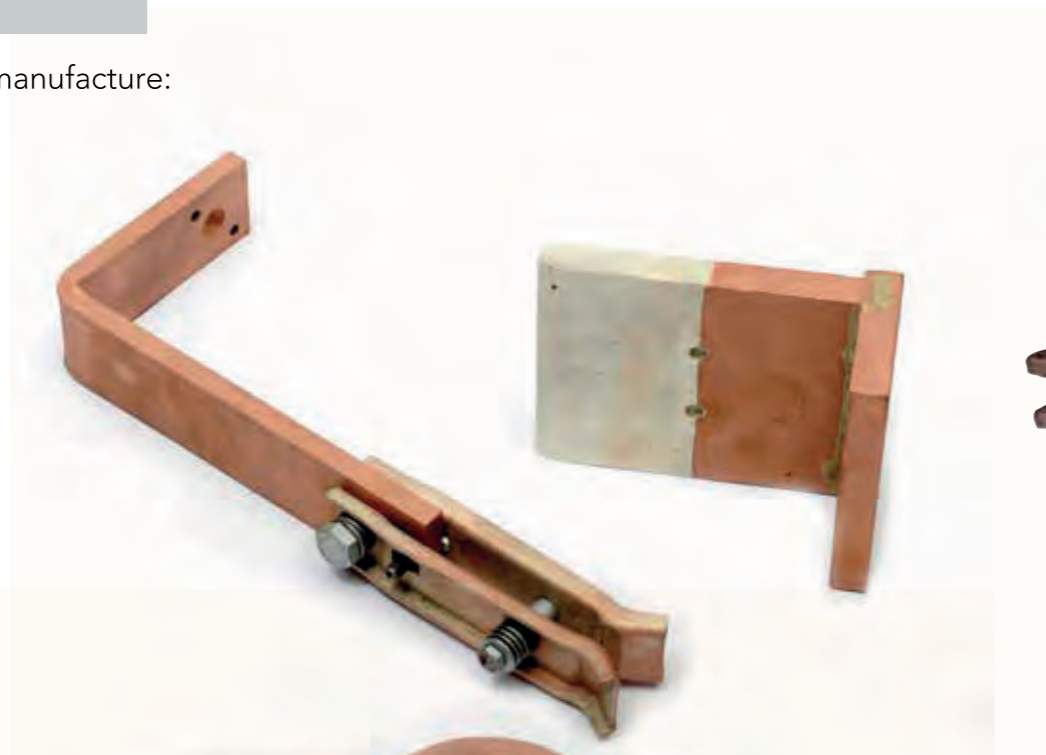
Our Company achieved high success rates for manufacturing contacts in years and reached the condition of meeting the contact demands of overseas companies.



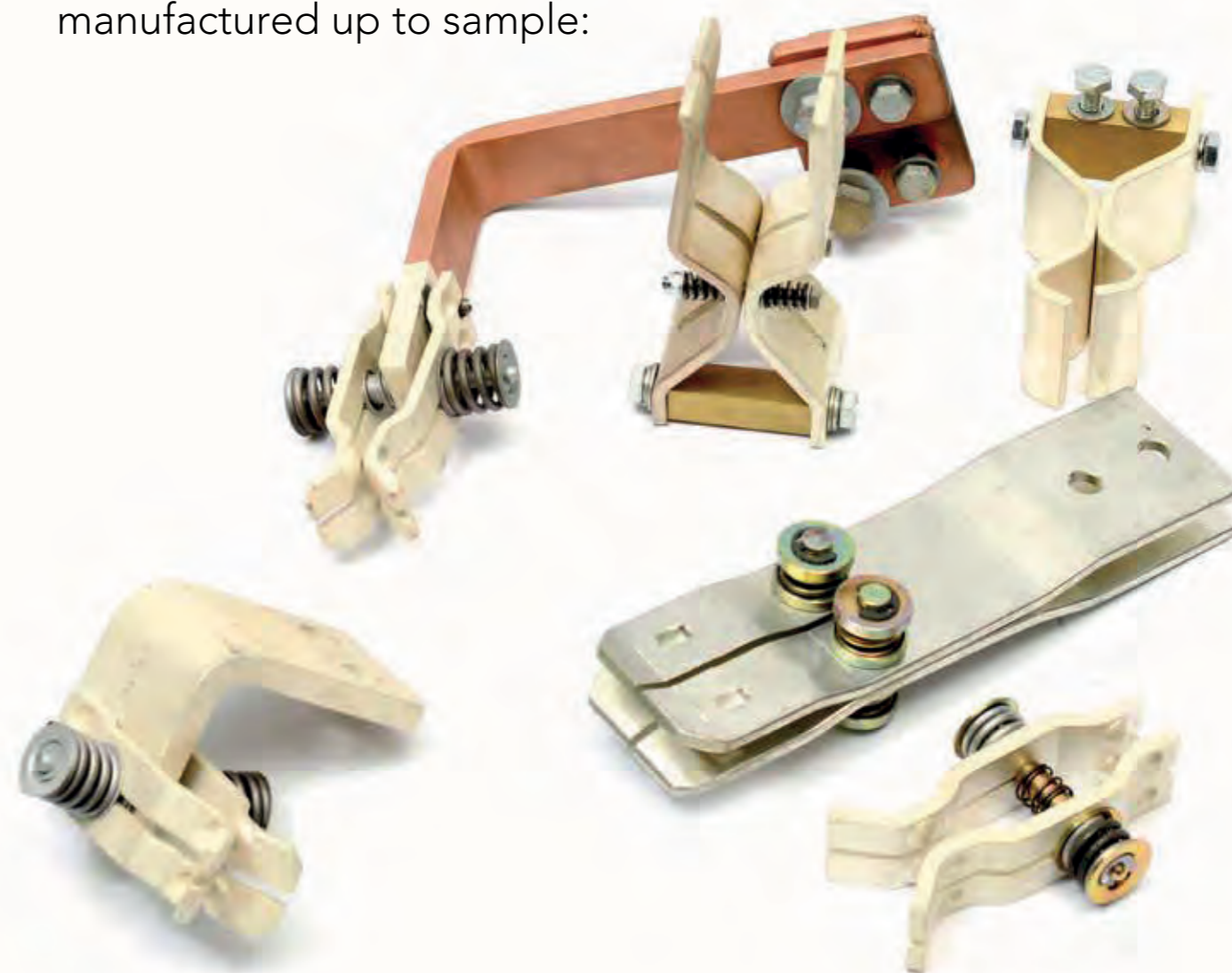
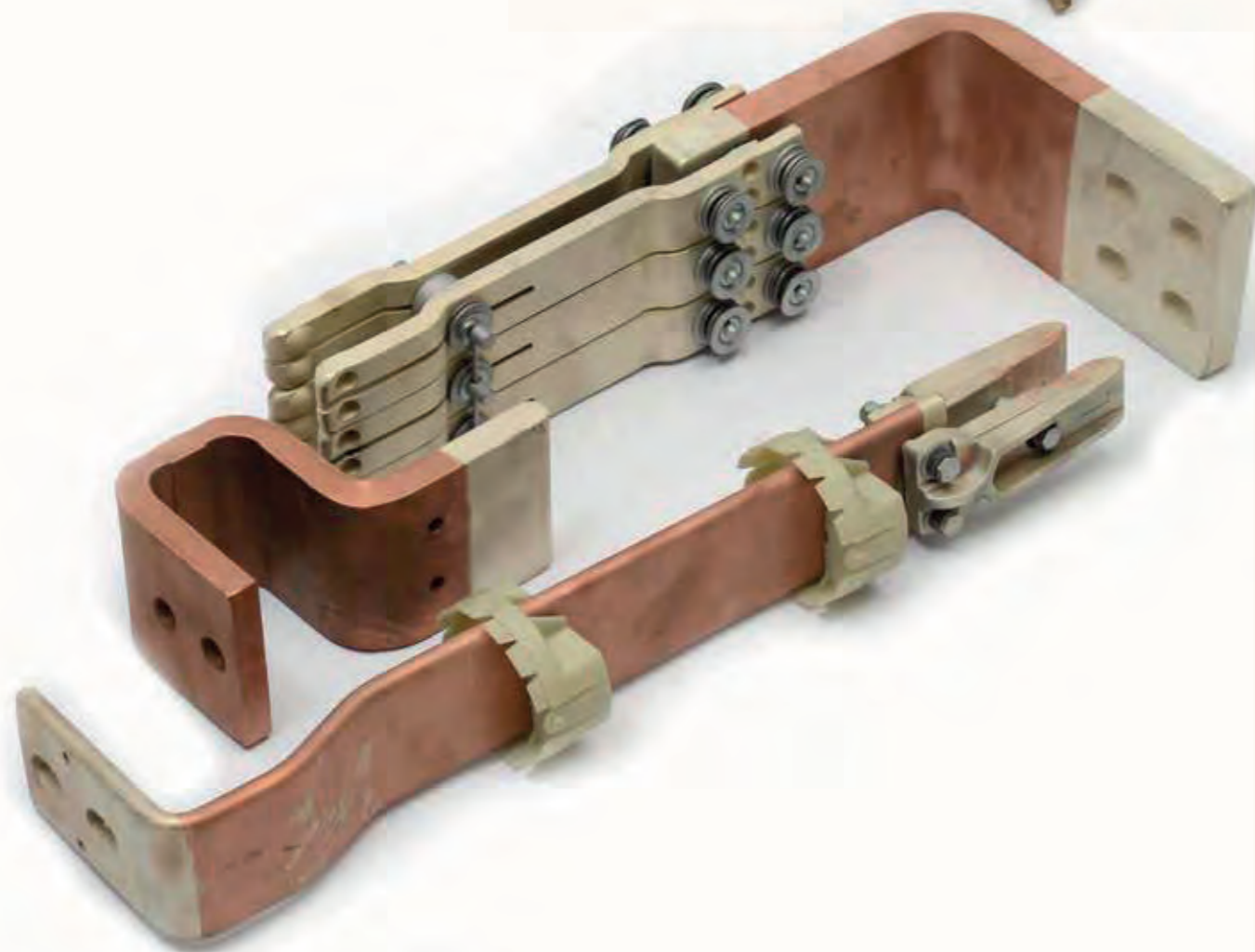


CONTACTS

Some of those contacts we manufacture:



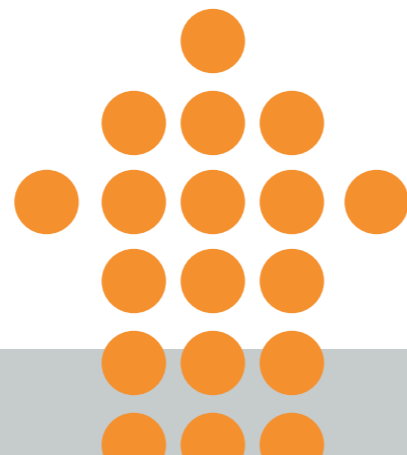
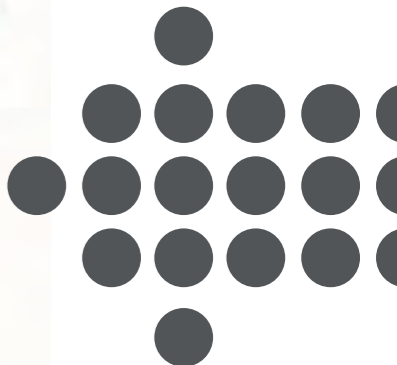
Some of those contacts we manufactured up to sample:





Our Company manufactures the special materials which are difficult to supply. We meet our customers' needs through handling the materials which are made of any kind of supplies as per order

Some of those special parts we manufacture:



We manufacture according to the samples or technical drawings.



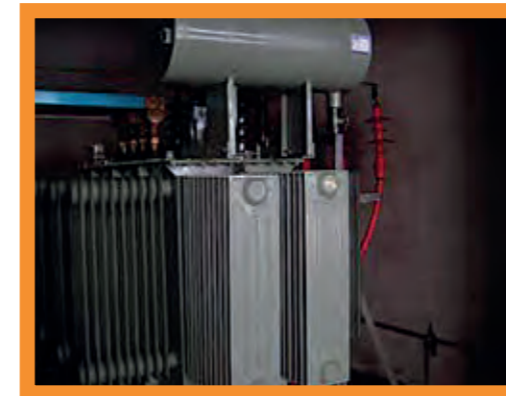
BRUSH HOLDERS

Our Company manufactures brush holders in various sizes and forms which are used for the motors.



M.V. - ON-SITE MAINTENANCE - TRANSFORMERS & CHAMBERS

WITH THE AIM OF MAINTAINING A HEALTHY AND LONG-LASTING OPERATION, THE PERIODIC MAINTENANCE AND TESTS SHOULD BE CARRIED OUT FOR TRANSFORMERS AND MEDIUM VOLTAGE (M.V.) SYSTEMS.



At least once a year...



BENEFITS PROVIDED TO OUR CUSTOMERS

- Providing a maintenance service for the devices in the power plant in line with the manufacturer's catalogues
- Identifying the defective parts in advance and enabling the customers to take precautions for them
- Eliminating the difficulties in supplying the spare parts
- Avoiding long shutdown periods when a malfunction occurs



WE CARRY OUT ALL ON-SITE MAINTENANCE AND TEST PROCESSES YOU NEED FOR YOUR M.V. SWITCHYARDS AND TRANSFORMERS USING OUR CUSTOM-MADE MOBILE SERVICE VEHICLES WHICH ARE EQUIPPED AS PER THE INTERNATIONAL STANDARDS.



- MAINTENANCE**
- general overview
 - oil treatment
 - tests
 - gas analyses
 - thermal camera checks



- TO DO LIST**
- maintenance and tests for the TRANSFORMER
 - treatment
 - current transformer tests
 - maintenance and settings of the relay
 - maintenance and tests for the circuit breakers
- VACUUM TYPE
SF6 GAS TYPE
MINIMUM OIL TYPE

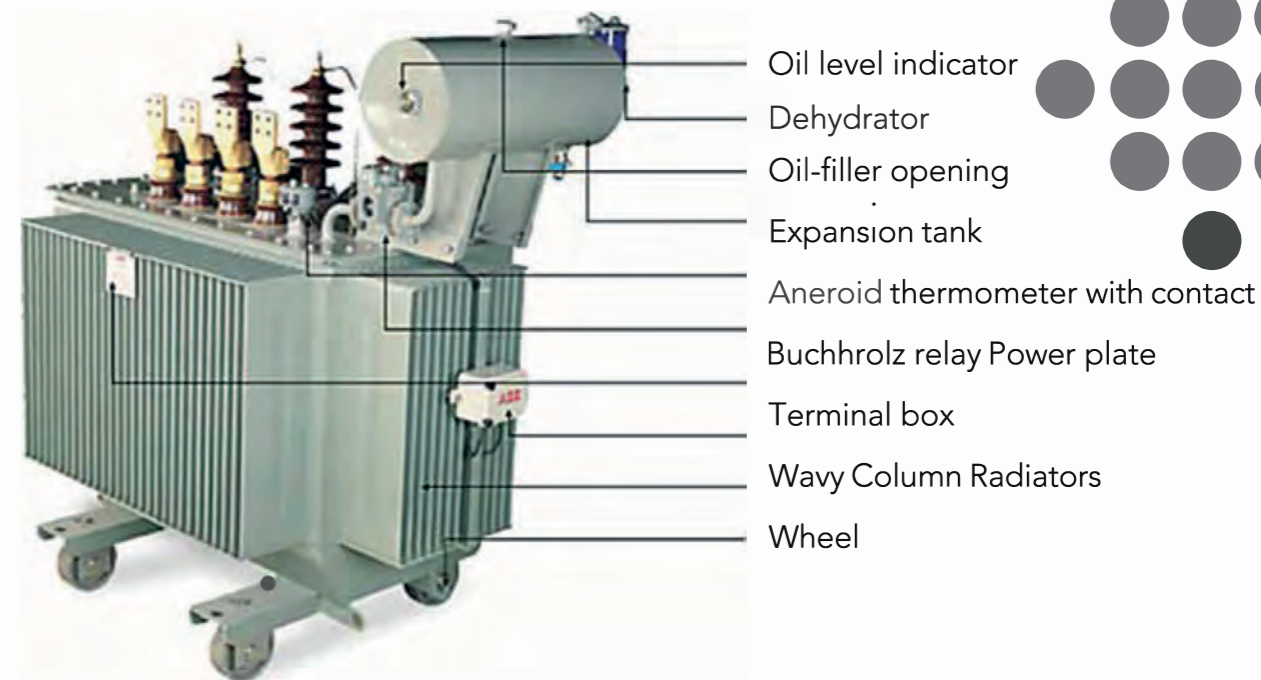


TRANSFORMER (TRANSDUCER)

- "Transducer" means converter. Transformer is the tool that changes the voltage of an electrical current, i.e. the electrical pressure. Therefore a transformer is a must for companies. Transformers are used to supply electricity for heating, lightening and for running the machines, and they ensure the required value of the current voltage without any loss.

- 1) Windings
- 2) Vector group
- 3) Cores
- 4) Tank

In addition to these, TRANSFORMER OIL is the most important component.



- THERE ARE 2 TYPES OF TRANSFORMERS:
- OIL TYPE TRANSFORMERS
 - DRY TYPE TRANSFORMERS
- Periodic maintenance is crucial for both types.



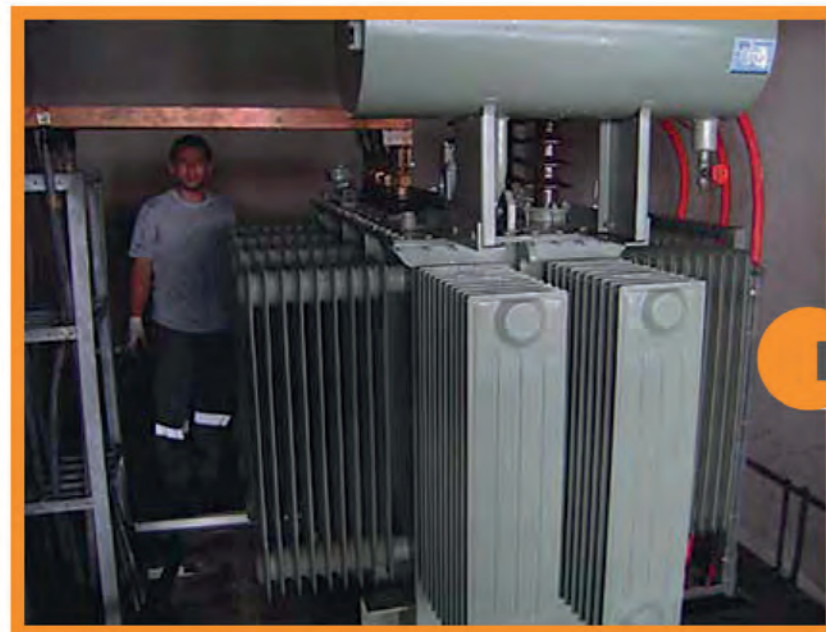
TRANSFORMER MAINTENANCE

Transformers are the electrical machines which require periodical maintenance. In addition to the severe operating conditions of the transformers, difficulties encountered for assembling/disassembling them brought the compulsion of performing On-Site Maintenance.

Since transformer oil is an expensive material, before changing the old oil, regaining this old oil should be taken into consideration. For this reason, transformer oil should be treated (substances such as water, sediments, etc. have to be removed).

In this process, transformer oil is heated in a special machine (Oil Separation Machine) and dried by spraying under vacuum. During this process, transformer oil is passed through filters and is purified from all sediments.

On-Site Maintenance process for your transformers can be performed with our Mobile Service vehicle.



TESTS CARRIED OUT FOR ON-SITE TRANSFORMER MAINTENANCE

- Measurement of:
- 1) Winding Turning Ratio Test
 - 2) Primary Winding Resistance
 - 3) Secondary Winding Resistance
 - 4) Insulation test
 - 5) Oil Dielectric Test



OTHER TESTS - CHAMBER

- 1) Current Breaker Insulation on switching
- 2) Current and Voltage Transformer Insulation Test
- 3) Electricity Transfer Line Insulation Test
- 4) Earthing Test
- 5) Tests and settings of the relay

Transformer Maintenance - Oil Type Transformers:

- General Overview and tests the transformers (oil type transformers)
- General Overview
- Reviewing their physical and mechanical conditions
- Checking the transducer chamber's conditions
- Checking the connection frequencies of the power circuit (Primer-Secondary terminals, delta-wye connections) using a torque wrench (screws for the bushing and the bar)
- Cleaning the low- and high-voltage insulators and the bushings located on the transformer
- Checking all of the earth connections of the transducer and the related components (transformer rails, cable brackets, door, etc.)
- Checking the transducer's tap positions
- General cleaning
- Throwing away the rubbish accumulated during the maintenance service
- Reporting the work done
- Washing the transformer under pressure using the special chemical liquid
- General cleaning of the transformer chamber

Tests

- Transformer Turning Ratio Test (Ratio Test)
- Transformer insulation test (between H.V./ L.V. ; H.V. /Tank ; L.V./Tank)
- Secondary Winding Resistance
- Determining the transformer polarization index coefficient
- Measuring transformer's star point and earth resistances
- Checking L.V. and M.V. rods and cable connections
- Buchholz relay function test and checking the alarms from the field to the panel
- Oil temperature thermometer function test and checking the alarms from the field to the panel
- Oil level relay function test and checking the alarms from the field to the panel
- Oil Tests
- Oil puncture resistance test
- Oil humidity test
- Oil Loss Factor Test
- Oil interior surface tension test
- Oil acidity test (pH-measurement)
- Cleaning the insulator
- Adjusting arrester intervals
- Reporting separately the maintenance services and the oil analyses
- Determining the required corrective maintenance





Improvement Works

Carrying out the oil treatments according to the oil analyses (filtering the oil via a 5 micron-3 folds filter; purifying the oil from the gases under vacuum; improvement works)
 Renewing the silica gel, if needed
 Checking the oil level and adding oil if it is insufficient up to 10 Kgs.
 Eliminating oil leakage through screwing the gaskets
 We will renew the ruined gaskets after receiving your approval
 Reporting separately the maintenance services and the oil analyses
 Determining the required corrective maintenance

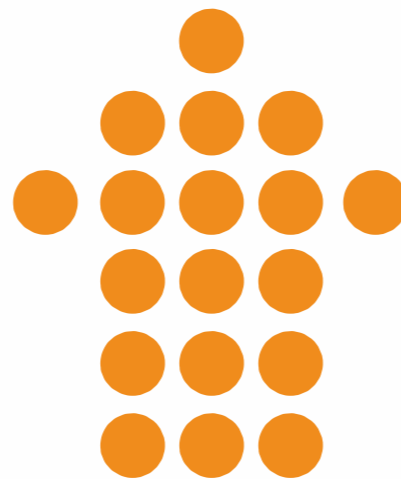


MAINTENANCE SERVICE FOR THE DRY TYPE TRANSFORMERS

All of the tests and checks, except for oil treatment, oil tests, screwing the gaskets, etc. will be carried out.

POWER TRANSFORMER'S OIL-GAS ANALYSES

The LGA (Liquefied Gas Analysis) of the transformer oil assures the operating life of the transformers and non-flammability of the oil. This is an advanced test method used to understand the state of the assembled windings within the transformer oil. It determines the amount of the gases in ppm such as C, CO, Ethan, Methane, Acetylene, Oxygen, Nitrogen etc. which are in a liquefied state within the transformer oil. It identifies the possible transformer malfunctions at a rate of 99,9%.



MAINTENANCE SERVICE FOR VACUUM- AND GAS BLAST- CIRCUIT BREAKERS

- Mechanism installation time
- Switching- on & off speed and time
- Synchronization of the contacts
- Sliding and abrasion in contacts
- Electrical characteristics during installation and switching- on & off

Their measurements are performed using the testing devices.



On-Site Maintenance - for the Minimum Oil Circuit Breakers:

- oil exchange
- mechanism checks
- contact checks
- general cleaning and greasing the mechanism



TESTS AND MAINTENANCE OF THE RELAY

The devices within the panel will be tested using the Relay Testing Device.
Defective devices will be determined and if it is possible the relays will be repaired either on-site or in the factory.
Errors in connections within the panel will be corrected.
Any incorrect or missing device within the panels will be identified and it will be ensured that they are mounted.
The protection settings of the devices within the protection panel which has taken its final shape will be measured according to the transformer power and current transformer rate.
In a non-electric environment, the circuit-breakers will be tested for switching.
Any kind of problems will be detected .
Energy will be supplied for the System.
The periodic maintenance schedule will be determined.
In case of a malfunction, the relay will send a "turn-on signal" to the circuit-breaker
Technical assistance will be provided to our customers for the problems they may encounter after the delivery of work.

TESTS AND MAINTENANCE OF THE CURRENT TRANSFORMERS

Ratio tests for the current transformers will be performed.
Polarity tests for the current transformers will be performed.
Connections will be checked.
General cleaning will be done.



PERFORMING THE EARTHING MEASUREMENTS

Operation earthing measurement
Protective earthing measurement
All the tests performed will be reported to you.

TESTS AND MAINTENANCE OF THE CURRENT TRANSFORMERS

Ratio tests for the current transformers will be performed.
Polarity tests for the current transformers will be performed.
Connections will be checked.
General cleaning will be done.



The L.V. circuit breakers are usually exposed to humidity and dust depending on their environment conditions, and these may cause mechanism failures. There may be an abrasion or an ignition on the contacts due to excessive current or some other reasons. Therefore, the L.V. circuit breakers require periodic preventive maintenance.

- Checking the contacts
- Checking the mechanism
- General cleaning
- Greasing



In addition to providing repair and maintenance services for transformers, medium voltage circuit-breakers, under-voltage circuit breakers, contactors and relays, Our Company also purchases and sells them.



The materials we sell are under the guarantee of our Company for 1 (one) year.

HEADQUARTERS

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