



TRUST. WELL EARNED.

Service and Repairs Supply, Deliver, Install, Test & Commission



As an Original Equipment Manufacturer (OEM), BRUSH have been installing and commissioning switchboards produced in our factories for decades.

All our engineers are fully factory trained and are fully conversant with all aspects of the equipment.

We offer a complete installation service or alternatively the supply of a supervisor to “oversee” and guide the installation, testing and commissioning of your equipment.

BRUSH will undertake upgrades, modifications and extensions to existing installations and fully engineer this work in every aspect if required.

BRUSH operate throughout the world and offer a comprehensive service including routine maintenance, repair, installation and modification, followed by pre-commissioning, test and final commissioning as required.

We offer complete Method Statements and Risk Assessments in accordance with our ISO9001 accreditation. Dedicated Site Quality Plans are compiled for every site contract.

BRUSH Switchgear Services, as part of a major OEM, have the full support of the Production and Design elements of the factory as well as the Spares Department, Drawing Office and Contracts Engineers.

This allows us to correctly and effectively advise you of any other items of work you may require on site or at the factory during manufacture.



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Maintenance of Primary Plant

As a major Original Equipment Manufacturer (OEM) of MV switchgear, BRUSH offers a comprehensive global service for the maintenance of switchboards, protection and circuit breakers. This also includes all ancillary equipment.

All types of testing is undertaken either to BRUSH documented specifications or any other specific requirements.

BRUSH Switchgear service covers 3.3kV, 6.6kV, 11kV & 33kV switchgear, generation, offshore and land-based equipment as well as overhead line (33kV, 132kV, 275kV & 400kV).

As an OEM, our Service Team are fully experienced with all our products both past and present whether this is Hawker Siddeley Switchgear, BRUSH Switchgear, South Wales Switchgear or Whipp & Bourne Switchgear.

BRUSH Switchgear offer a comprehensive global service whether routine maintenance, repair, installation, commissioning or modification of existing or equipment.

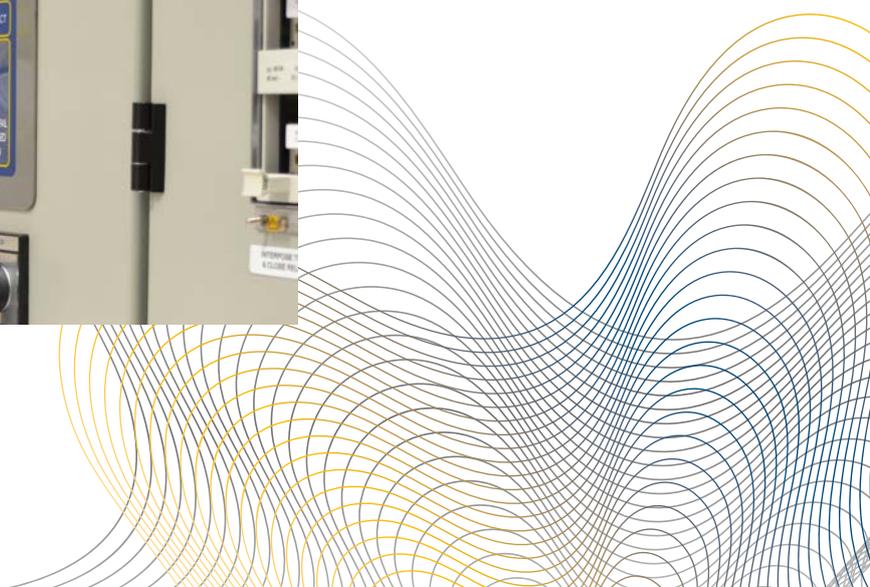
We offer complete method statements, risk assessments and safety plans on request, while our site Team work to dedicated Site Quality Plans as part of our ISO 9001 accreditation.

BRUSH Switchgear Services, as the OEM, are fully supported by the Production and Design departments of the factory as well as the Spares Department, Drawing Office and Contracts Engineers.

This allows us to give fast and effective technical advice for all aspects of switchgear maintenance work.

BRUSH Switchgear offers peace of mind that your equipment will be correctly maintained by a major OEM.

As an OEM, our Switchgear Service Team are fully experienced with all our products both past and present...





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Protection and Control Equipment

Maintenance

Protective relays and devices must be tested and functionality proven at certain intervals during the life of the equipment. However, when planning or carrying out primary plant maintenance the protection element is easily overlooked.

As a major Original Equipment Manufacturer (OEM) of MV switchgear BRUSH Switchgear offer a comprehensive service of protection and control equipment testing irrespective of whether the equipment is electro-mechanical, electronic or micro-processor based (programmable) type.

Whatever the system parameters BRUSH Switchgear can test your protection and control schemes.

The BRUSH Switchgear Service Team work globally and as part of an OEM, have the full support of our experienced Technical, Production and Test Departments in the factory.

Our Field Engineers will resolve problems at site or report any unusual findings to the supporting staff back at the factory who are available on request to rectify any problematic situations with technical solutions.

As an OEM, the factory has specialist testing facilities; ensuring that protection and control relays are fully operational and compliant with calibration criteria and specifications.

Primary/Secondary current injection of protection relays (and associated CTs) ensure that relays are compliant with calibration criteria and specifications.

Upgrading

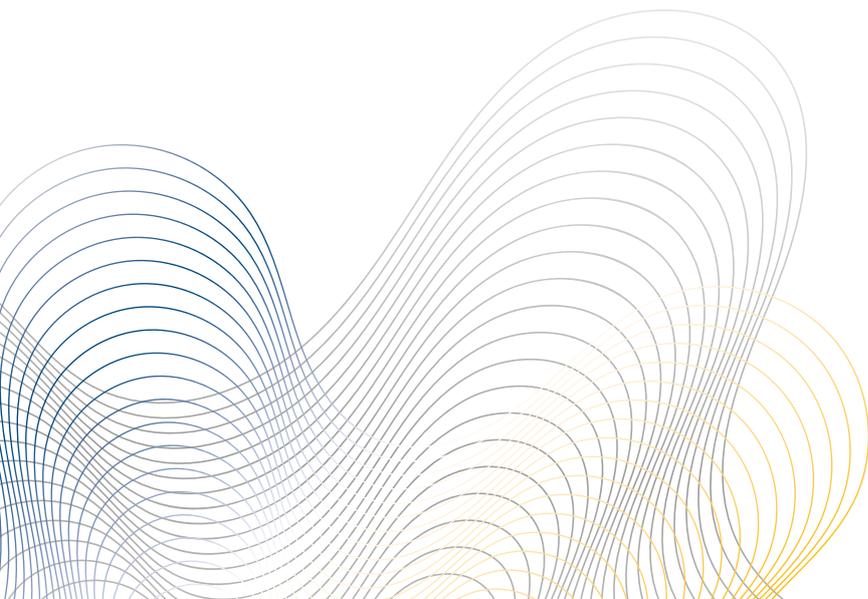
BRUSH Switchgear will advise you of faulty equipment and offer a choice of options to correct the situation.

As a result of this we offer the additional service of retrofitting new protection relays and control schemes to older types of switchgear irrespective of who manufactured the original equipment.

BRUSH Switchgear can, if an installation has been re-engineered by BRUSH Switchgear (or others), provide a site service which can vary from upgrading CT's to changing the functionality of the circuit from a simple feeder to a fully automated motor or generator circuit.

BRUSH Switchgear is an ISO9001 compliant company, assuring you of quality service every time.

All of our site work is controlled by dedicated Site Quality Plans. Detailed reports are issued on completion using BRUSH Switchgear pro-forma test sheets or any customer specified test sheets.





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Gas Handling, Decontamination, Maintenance or Disposal of SF₆ Switchgear

BRUSH Switchgear as an Original Equipment Manufacturer (OEM) and on-site service provider is very experienced in the handling and use of SF₆ gas as an arc control and insulating medium in switchgear.

SF₆ gas, being a green house gas, has strict emission control requirements, with all personnel involved in its use, i.e., disposal, processing, gassing, de-gassing & topping up activity, being required to be trained and certified in accordance with F Gas regulations.

SF₆ gas is odourless, tasteless and non-poisonous in its purest state. It is however heavier than air and as such will become an asphyxiant.

In addition, when subjected to electrical arcing, SF gas produces by-product contaminants which are carcinogenic.

To comply with current legislation and to minimise these hazards down to effective zero, all BRUSH Switchgear Services team members involved with SF₆ gas handling are trained/certified in accordance with F Gas Regulations, issued with appropriate PPE, and work to strict procedures developed for the handling of potentially contaminated SF₆ gas filled switchgear.

The processing of switchgear, for either maintenance or disposal purposes, can be carried out either in a "clean" room at our Service Centre in Blackwood, or, as our specialist gas handling equipment is portable, at the customers site.

Potentially contaminated switchgear is only opened under strictly controlled conditions by operators correctly protected and using breathing apparatus.

Any carcinogenic by-products produced by electrical arcing are neutralised before the switchgear is released for maintenance work or disposal.

Once maintenance work is complete the switchgear is re-sealed and re-gassed to OEM specifications.

BRUSH Switchgear offers peace of mind that SF₆ gas will be handled and processed in accordance with current legislation, potentially carcinogenic by-products will be neutralised and that your switchgear will be correctly maintained or disposed of by a major OEM, whether in our Switchgear Service Centre or at site by trained, competent and certified personnel.



Any carcinogenic by-products produced by electrical arcing are neutralised before the switchgear is released...



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Condition Monitoring

Increasingly the demand for cost reduction has to be balanced with the need to complete essential maintenance work.

Based on proven techniques and data, the elapsed time span between maintenance cycles has increased for some users of MV switchgear.

Maintenance is by definition an intrusive activity. The cost of the actual maintenance has to be coupled to the cost of the down time of switchgear to get a true picture of what maintenance costs mean to some users.

However failure to complete maintenance can lead to expensive disruptive failures.

BRUSH Switchgear offer a non-intrusive condition monitoring service that provides an insight into the status of the switchgear without equipment being removed from service.

Detailed reports then give the switchgear user the opportunity to make an assessment based on the findings and either give the switchgear a clean bill of health or plan for an unforced intrusive intervention.

What does BRUSH Switchgear offer?

Partial Discharge Mapping

Evidence suggests that most disruptive failures occur due to discharge activity of solid insulating materials. This activity can be detected using specifically designed instrumentation.

Indicative outlines of the switchgear are produced on dedicated test sheets and partial discharge is recorded in decibels for the mapping points identified on the test sheets.

Thermal Imaging

As a compliment to Partial Discharge Mapping a Thermal Image of the switchgear is taken using state of the art infrared cameras. Such imagery will readily identify any hot spots within switchgear chambers. The digital print out from the camera forms an integral part of the final report.

Battery Condition Check

As switchgear protection is dependant on a battery to provide the power source for tripping purposes it is vital that the battery is capable of performing to its specification when called upon to do so.

Observing that there is voltage on the battery voltmeter is only confirmation that there is a charger output and not that the battery is charged and capable of delivering load-current when called upon to do so.

As part of the Condition Monitoring Service the Battery Impedance will be checked. Such a check is capable of identifying single defective cells with the battery on-line.

Environmental

General observation of the sub-station environment is an integral part of the Condition Monitoring Service. Photographs are taken of the general status of the substation. Temperature and Humidity are recorded for the specific date and time of the inspection.

Observations are made as to the status of cable trenches to ascertain if there is any standing water.

Any non functioning lighting will be recorded. Any circumstance observed that is deemed to be detrimental will be recorded such as broken windows, failed locks, general building damage etc.



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Functions of Condition Monitoring

Modern approaches to maintenance requires non-intrusive testing to identify any developing problems that could, if left undetected, lead to expensive disruptive failures. BRUSH offers the following as part of a non-intrusive Condition Monitoring Service.

Partial Discharge

Partial discharge occurs when solid insulation begins to break down either through age deterioration or application problems.

This deterioration can be detected and mapped to dedicated record sheets with specially designed sensitive (TEV) instrumentation while the switchgear asset is still electrically live.

This type of first pass testing enables decisions as to whether any intrusive intervention will be required.

Infrared Imaging

Used in conjunction with partial discharge detection, sophisticated cameras operating in the infrared range are capable of detecting heat sources within switchgear compartments.

Printouts of the heat pattern can be down-loaded and included as part of the overall reporting.

Battery Impedance Testing Batteries are an essential and important part of the switchgear protection application.

Faulty or defective cells can be detected with the battery still on line. This is especially useful for simple battery systems that only have an output voltmeter, as voltmeter may be more indicative of the charger output than the battery status.

Environmental Conditions

As part of the application of Condition Monitoring the general condition of the substation is included as part of any final report. Typical of the data recorded is humidity and temperature at the time and date of the non-intrusive testing.

Other important recorded factors will be presence of any standing water in cable trenches, defective lighting, defective locks and any general building damage.

This would all be supported by photographic evidence.

Standards and Application All tests offered by BRUSH Switchgear as part of a Condition Monitoring package are to British Standards.

They can be applied as a one off occurrence or can form part of an overall ongoing programme of activities to all types and makes of switchgear, irrespective of asset age.

BRUSH

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