

GK Switchgear

Providing the latest technology
for today's developments

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Why you need to know about BS6423 1983 Maintenance of LV Switchboards & Control Panels

Essential for the Health of your Employees, Plant & Equipment

What is BS6423 1983:

BS6423 1983 is The Code of Practice for Maintenance of Electrical Switchgear & Control Gear for Voltages up to and Including 1000V (1kV). BS6423 should be read in conjunction with the **Health & Safety at Work Act 1974 & The Electricity at Work Regulations 1989. Both of which are Statutory Law.**

BS 6423 recommends that for Switchgear & Control Panels to be of good working order they need to be **Maintained as per the Manufacturers Recommendations.** The majority of Manufacturers adhere to an **Annual Testing & Maintenance Regime** for their equipment.

The Electricity at Work Regulations 1989 requires that all Owners or Persons in Control of Part or all of an Electrical System have to ensure that it is **Safe to Operate and that it is Maintained in a Safe Condition** in accordance with the Manufacturers Recommendations.

The Health & Safety at Work Act 1974 requires that any Employer has to ensure the Safety so far as is Reasonably Practicable of their Employees. As an Employer the Act requires that you:

- **Make an Assessment of the Risks to Employees or others.**
- **Take Specialist Advice where necessary.**
- **The level of detail in the Assessment should be broadly proportionate to the Risk.**
- **As Switchgear & Control Panels can cause Serious Injury or Death then the Assessment should be fairly detailed and carried out by a Specialist.**

What you need to do next:

As a Specialist Contractor in the Installation, Modification & Testing of Switchboards & Control Panels we are able to assess your requirements and put together a Maintenance Regime.

1. Carry out a Full and Comprehensive Site Survey. This will let us ascertain your individual requirements.
2. Put together a Proposal for an **Annual Maintenance Regime** based on the information from the Site Survey.
3. Initiate a **Management System**.

If you use Electrical Switchgear you are required by Law to provide Management Systems that will ensure Safe Operation and Minimise the Risk of Injury.

Management Systems should include the following:

- An appropriate system of records.
- Policies and Procedures covering the Installation, Commissioning, Operation, Maintenance and Removal of the Equipment as set out in BS6423 1983
- Define the Responsibilities and Training Requirements for your Colleagues.
- An Auditing Regime to Monitor and Maintain the effectiveness of your Maintenance Procedures.

LV Switchboards & Control Panels

Maintenance should encompass:

- Itemising of Equipment. An Asset Register should be put in place.
- Cleaning of Equipment. Annually
- Mechanical Operation of Equipment. Annually or as per the Manufacturers Recommendations.
- Mechanical Tightness Check. Annually
- Checking of Component Parts. As per Manufacturers Recommendations.
- Electrical Testing. As per Manufacturers Recommendations.

Annual Maintenance Checks:

- **Visual Checks.** As required.

- **Torque Tightness** check should be carried out on all relevant Terminations that are accessible.
- **Cleaning** of all areas to remove any contaminants such as dust, grease, oils etc. Any contaminants close to Busbars or on Equipment Terminals will reduce the Dielectric Strength of the System. Most Busbars and Equipment rely on Air Gaps between Phases. These gaps are essentially used for Air Flow around the Switchboard. If these gaps are clogged up with Contaminants then the flow of air is restricted and a rise in temperature would

result thus lowering the Current carrying capacity of the component parts. Contaminants lying across Busbar Insulators and the Insulated sections between Terminations could also cause a breakdown of the Insulation Materials properties leading to Tracking and Short Circuiting.

- **Thermographic Studies** are a useful tool where a non intrusive Survey needs to be carried out and where the ability to Isolate Switchboards is prohibitive however they can only show a “Snapshot” of what is happening.

Life Cycle Management of Equipment:

Manufacturers of ACB's and MCCB's operate a Life Cycle Management Policy. This helps to ensure that the Lifespan of equipment is maximised and that older ranges of equipment are supported for as long as possible. As most people are not aware of this policy we have found an increasing number of Sites we are visiting where Critical parts of the Electrical System are now either out of date or unsupported.

As a lot of users of Electrical Power now operate Critical Systems it is not always possible to arrange for Full or Partial Shutdowns of their Systems. By the Installation of Withdrawable ACB's & MCCB's and by putting Back Up Systems in place it is normally possible to achieve some level of Maintenance Regime. Without Maintenance in place **it is inevitable that at some point, Safety of Personnel and or Continuity of the Supply will Fail.**

STORED ENERGY CIRCUIT BREAKERS – ACB`s & MCCB`s

Manufacturers of Stored Energy Circuit Breakers state a requirement to Service the Breakers at least once every 2 Years. Most ACB suppliers recommend that for Breakers over 5 years old, or in Sites with a poor Service History then Annual Servicing is required. Failure to carry out this Maintenance will result in the Breakers malfunctioning at some future date and would greatly increase the likely hood that the following would occur:

- Protection of Personnel, Plant and Critical Services would be reduced or removed.
- Power Supplies to the affected parts of the Electrical system would fail. Continuity of Power to critical systems would then be totally dependant on Secondary Mains, UPS or Generators which in turn normally rely on ACB's for their Power Distribution.
- With installed Breakers that have not had the correct Servicing, it is possible that any one of the Breakers could develop any number of problems, at any time soon.
- Should any of these Circuit Breakers open (whether by design or tripping under fault conditions), **it is possible that they would not correctly reinstate**, when ordered to.
- Switching times will increase – modern Air Circuit Breakers typically operate within 70-100ms on a short circuit fault. Without correct Servicing the ACB Main Mechanism slows down and the Opening time (Arc Extinction) increases. Let through Energy is determined by I^2t , therefore even a slight

delay in Opening (let's say 100ms) can double or treble the let through Energy, which the LV Switchboard and its component parts have to withstand.

- Any future expected Lifespan of the Breakers would be significantly reduced. With older or obsolete Breakers, spare parts are difficult and expensive to procure. Of course the actual Lifespan is also affected by a number of factors – Duty Cycle, Loads Carried, Ambient Temperatures, Ingress Protection, etc – but the **largest factor is Routine Maintenance** as recommended by the Manufacturer.

We recommend that every 2 years the Protection releases are Secondary Injected to ensure that

- a) the release mechanism works,
- b) the Breaker is Mechanically able to Open under Fault Conditions and
- c) the Site Owner has Documentation to prove that regular Servicing is in place. This will also form part of BS6423 1983.

All Protection Releases should Trip in accordance within the manufacturers specified time/current curves.

Please Note:

Failure to ensure the Safety of the Electrical System could result in Legal Action taken by the relevant HSE etc.

We hope that you have found this information useful and would like to offer our Services should require a Survey to be carried out or to call us if you have any further questions.