

Procedure

ATW Fault Finding on Low Voltage Electrical Equipment

Amd Date 21/09/07

[Objective](#)

[Scope](#)

[Flowchart](#)

[Definitions](#)

[Responsibilities](#)

[Actions](#)

[Communication](#)

[Review](#)

[Records Management](#)

[Links and References](#)

Objective

To outline basic techniques and safety precautions for fault finding on low voltage electrical equipment.

Scope

All electrical fault finding practices undertaken as part of maintenance tasks performed on low voltage circuits across all SCL operated and/or maintained sites. If the work involves altering the integrity of the equipment then it is not covered by this procedure and a plant isolation or a live electrical maintenance work control guide is to be used.

Functional Flowchart

Not applicable

Definitions

Authorised Electrical Person: A person who has the technical knowledge and experience to do work that involves contact with or being near to the electrical part and has been approved by the person in control of the electrical part to do work that involves contact with or being near to the electrical part.

Authorised Licensed Electrical Worker: A person who is the holder of a Queensland Electrical Workers Licence (or equivalent). Authorised Licensed Electrical Workers must successfully complete and be current in the following training modules: HS073 Authorised Electrical Persons and Electrical Safety Observers, HS074 Specific Requirements for Electrical Work, HS069 Rescue from Low Voltage Equipment and Resuscitation.

Competent: Means having acquired the knowledge and skills enabling that person to perform the task required, in a safe and effective manner.

Exposed part: is any terminal, connection, conductor or electrical part that can be contacted with a standard test finger.

Extra Low Voltage: Means voltage of 50V or less AC RMS, or 120V or less ripple-free DC "(QLD Electrical Act 2002. schedule 2)".

Flame Retardant Clothing: Means clothing that has properties, which suppress or delay the combustion or propagation of flame.

High Current Plant: High current plant is any electrical plant or equipment where the prospective fault current is 1000 Amperes or greater.

Low Voltage: Voltage exceeding 50 volts AC or 120 volts ripple-free DC but not exceeding 1000 volts AC or 1500 volts ripple-free DC.

Person In Control: The person who is in control of the electrical equipment at a particular location. For SCL this is the Site manager.

PPE: Personal protective equipment

Procedure

ATW Fault Finding on Low Voltage Electrical Equipment

Amd Date 21/09/07

- + + **PPE Zone:** The area totalling 500mm in any direction from live Exposed parts within which an authorised person has approval to perform work using PPE control measures.
- + **RPEQ Registered Professional Engineer Queensland**
- + **Safety Observer – Electrical:** A person who has been trained and authorised to perform the duties of a Safety Observer – Electrical.
- + **Standard Test Finger:** A device used to determine minimum clearances around electrical parts as per the dimensions set out in the IEC Standard 61010.

Responsibilities

Corporate Electrical Safety Advisor

- Maintain the currency and accuracy of the Fault Finding on Low Voltage Electrical Equipment Procedure reflective of legislative and corporate change

Station/Site Manager

- Monitor the implementation of the Fault Finding on Low Voltage Electrical Equipment Procedure.
- Allocate responsibilities and resources to ensure site-specific practices/procedures are developed to satisfy the Corporate Procedure.

Employee and contractor

- Comply at all times with the requirements specified within this Corporate Procedure for Electrical Safety.
- Comply with any site-specific procedures.

Actions

Safety Precautions

Fault finding is to be undertaken on de-energised plant rather than energised plant. If this is not possible additional controls are to be implemented before commencing work.

General

Only Authorised Electrical Persons (i.e. Electrical Apprentices and Electrical Engineers) and Authorised Licensed Electrical Workers are to perform fault finding tasks on plant.

Only approved test instruments that have current test and calibration status are to be used.

Note: Refer to "[HB#709587](#)– ATW Electrical Test to Prove De-energised Requirements Corporate Procedure" for specific information regarding the maintenance and safe use of test instruments.

Only insulated hand tools are to be used.

Common hazards

When fault finding, it is extremely important to identify all sources of electricity supply as well as other hazards likely to be encountered during the fault-finding task. The following list of examples is also to be considered during the identification process:

- Voltages between phases;
- Voltages between phases and earth;
- Voltages across undischarged capacitors;
- Voltages on disconnected conductors – particularly neutral conductors;

Procedure

ATW Fault Finding on Low Voltage Electrical Equipment

Amd Date 21/09/07

- + + *Fault Finding on Hazardous Area Classified Plant and Equipment*
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 - A Hot Work Control Guide must be used for any fault finding tasks performed within a classified hazardous area.
 - Current plant classification drawings must be used to identify the extent of the hazardous area.
 - The equipment, that is the subject of the fault finding, is to be de-energised unless it is part of an intrinsically safe system.
 - Only Authorised Electrical Persons and Authorised Licensed Electrical Workers who are hazardous area qualified are to perform fault finding tasks on hazardous area plant.
 - Use only intrinsically safe test equipment unless the area has been assessed as “dust free” or “gas free”.

Note: A hazardous area inspection must be completed at the completion of the work if the hazardous area installation has been altered in any way. The completed inspection sheet must be added to the site hazardous area verification dossier.

Generic Process for Fault Finding On or Near Live Conductors

Before Starting and During Work:

- Consultation with respect to the job scope and activities is to be undertaken with co-workers who are assisting in the fault finding process;
- Ensure test equipment selected is appropriate for the task and has been set to the correct operating range.
- Safety barriers/signs are to be placed to prevent other persons entering the vicinity of exposed live parts or exposed conductive parts that could become live during testing;
- Identify all isolation points for the work being undertaken in the event of an emergency;
- An Electrical Safety Observer is to be present to observe the work for the entire duration of the job.
- Identify exposed conductive parts that could become live whilst using test instruments.
- Use isolation barriers to isolate all workers from contact with exposed conductive parts that could become live during testing.
- Conduct periodic reviews of the situation to ensure no new hazards are created during the process.

If leaving the worksite before completion of the job, ensure the following occurs so that the work area or plant cannot become a hazard for others:

- All live conductors have been insulated to prevent contact with other equipment or persons.
- Relevant persons have been informed about the status of the work.
- Precautions have been taken to prevent equipment becoming energised.
- The worksite has been left in a safe state to allow access by others.

When the fault finding work is completed, circuits and equipment is to be restored to their original state or if changes have been made are to be approved by an RPEQ Electrical. For example, covers replaced and accessories and equipment properly secured.

Communication Plan

This procedure and any subsequent updates are communicated via Hummingbird Workflow. Additional communication may be coordinated by the procedure owner.

This procedure is available electronically in Hummingbird (HB# 709588).

Review

This corporate standard will be reviewed every three years or as necessary due to changes in legislation.

Procedure

ATW Fault Finding on Low Voltage Electrical Equipment

Amd Date 21/09/07

++ Records Management

- + Documents associated with fault finding must be kept for five years. This refers to any work method statements and control guides.

+ Links and References

QLD Electrical Safety Regulations 2002
AS/NZS 3000:2007 Wiring Rules
AS/NZS 4836:2001 Safe working on low voltage electrical installations

[HB# 625195-Hazardous Areas](#)

[HB# 709587-ATW Electrical Test to Prove De-energised Requirements](#)

Hot Work Control Guide available through ATW Wizard

[Return To Top](#)