

Trainer's Guide

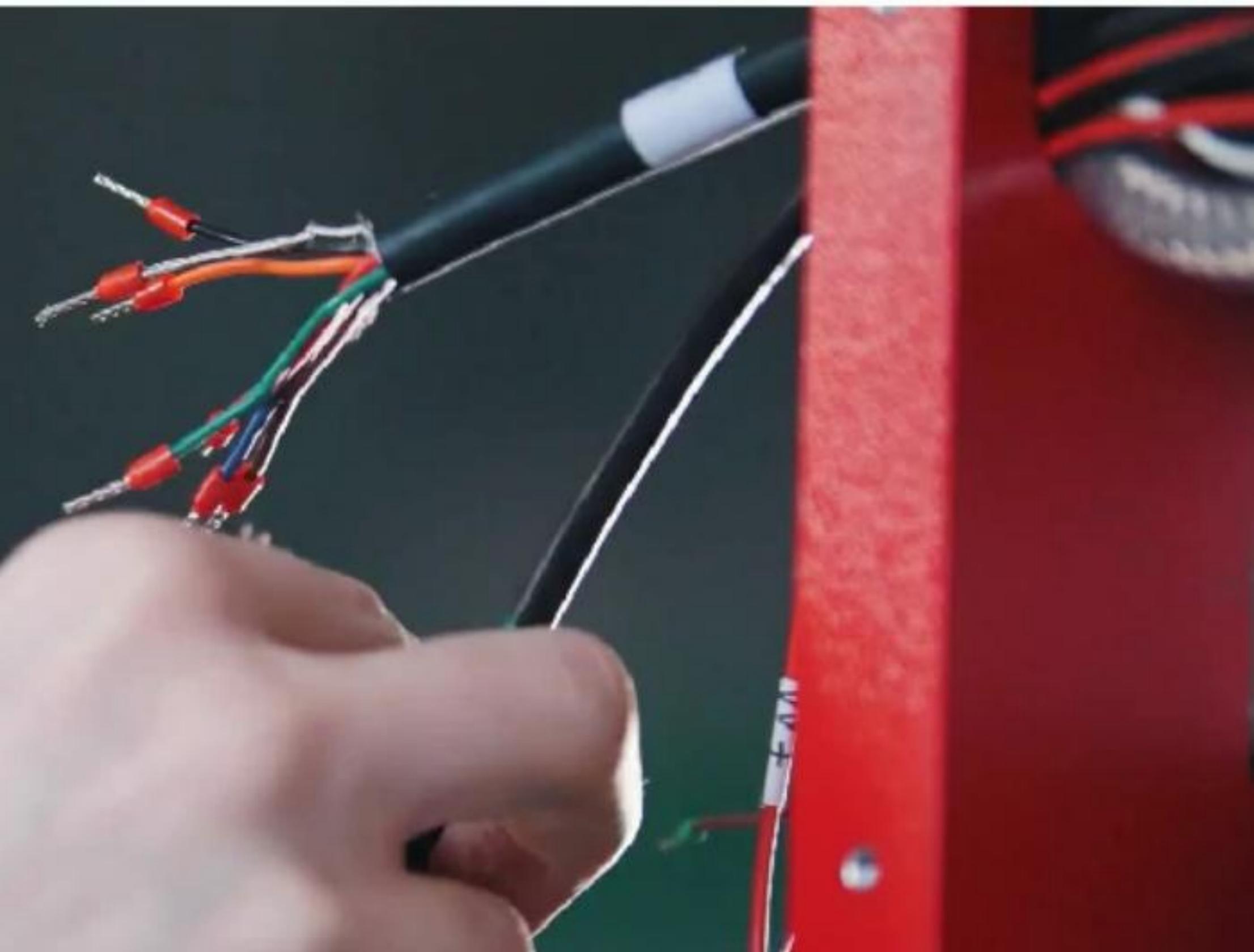


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Module Name:

Electrical Safety for Skilled Workers





Module Name: Electrical Safety for Skilled Workers

Session Flow

After completing this session, participants will be able to:

- ❖ Identify electrical hazards associated with HT panels, LT panels, capacitor panels, and battery banks
- ❖ Apply safe work practices while working on high-voltage and low-voltage electrical systems
- ❖ Select appropriate earth leakage and short-circuit protective devices
- ❖ Follow correct safety procedures while working with capacitor banks and battery installations
- ❖ Perform safe electrical joints, cable terminations, and cable gland selection
- ❖ Prevent electrical fires, arc flash incidents, and equipment damage



Module Name: Electrical Safety for Skilled Workers

Session Flow

- ❖ Introduction & Electrical Safety Objectives
- ❖ Safe Working on HT Panels
- ❖ Safe Working on LT Panels
- ❖ Safe Working on Capacitor Panels
- ❖ Battery Hazards & Safe Working Practices
- ❖ Selection of Protective Devices (RCCB, RCBO, MCB)
- ❖ Electrical Joints & Cable Termination
- ❖ Cable Glands – Purpose & Selection
- ❖ Quiz & Summary

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Module Name: Electrical Safety for Skilled Workers

Resource Materials

- 01 Presentation Deck (Electrical Safety)
- 02 Procedure Videos / Voiceover Scripts
- 03 Participant Handbook
- 04 HT & LT Panel Images / Videos
- 05 Sample PPE (Gloves, Helmet, Arc Flash Suit)
- 06 RCCB, RCBO, MCB, MCCB Samples
- 07 Sample Cables, Lugs, Glands
- 08 Whiteboard / Blackboard



Module Name: Electrical Safety for Skilled Workers

Notes for Facilitation

Activity: Safety Awareness Discussion

Begin the session by welcoming the participants and setting a safety-focused tone.

Introduce the Topic: Electrical Safety for Skilled Workers

Explain that electrical work involves hidden hazards and that most accidents occur due to unsafe practices, overconfidence, or lack of awareness.

Ask participants:

- ❖ Have you ever witnessed an electrical accident?
- ❖ What do you think was the root cause?

Encourage sharing of experiences to build relevance and seriousness.

Key Takeaways:

- ❖ Electrical hazards are often invisible
- ❖ Safety procedures save lives
- ❖ Skilled workers must lead by example



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Notes for Facilitation

Activity: Reception Role Play

Form two groups in the classroom:

- ❖ Client
- ❖ Assistant/Receptionist

Scenario:

A client, Mr. Arun, arrives for his second microdermabrasion session.

The assistant must confirm:

- ❖ Appointment timing
- ❖ Session number
- ❖ Any discomfort after the previous session



Module Name: Electrical Safety for Skilled Workers

Introduction & Electrical Safety Objectives

Explain the objectives of the module clearly:

- ❖ Working safely on HT panels, LT panels, capacitor panels, and battery banks
- ❖ Understanding protective devices such as RCCB, RCBO, and MCB
- ❖ Learning correct electrical joints and cable termination practices

Emphasise:

Electrical safety is not optional—it is a professional responsibility.



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Safe Working on HT Panels

Explain that systems operating between **1.1 kV to 33 kV** are high-voltage systems and are extremely dangerous.

Demonstrate using visuals or video:

- ❖ Panel construction features
- ❖ Interlocks and isolation points

Explain key practices:

- ❖ Treat all circuits as live until isolated and proven dead
- ❖ Only qualified and authorized persons are allowed
- ❖ Use correct PPE and ensure emergency equipment availability
- ❖ Follow LOTO procedures
- ❖ Maintain minimum clearances (2.6 m for 12 kV, 2.8 m for 33 kV)
- ❖ Never bypass interlocks

Emphasise:

If unsure—stop work and ask.



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Vital Precautions for HT Panels

Explain each precaution one by one:

- ❖ Remote switching whenever possible
- ❖ Never open energized panel doors
- ❖ No racking with doors open
- ❖ De-energize before opening cable compartments
- ❖ No live thermography with doors open
- ❖ Discharge residual energy
- ❖ Prove dead using HV testing devices
- ❖ Remove temporary earths before energization

Use examples of real accidents to reinforce learning.



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Safe Working on LT Panels

Explain that LT systems can also cause fatal injuries due to arc flash.

Cover the following:

- ❖ Avoid live work unless unavoidable
- ❖ Use arc flash PPE for live work
- ❖ Prevent accidental contact with live terminals
- ❖ Use double-insulated tools
- ❖ Never test at bus bars or incoming feeders
- ❖ Use CAT III / CAT IV rated instruments
- ❖ Avoid multiple loads on one feeder
- ❖ Ensure no back-feed from DG or tie feeders

Trainer Tip:

Show a CAT III vs CAT IV meter image and explain surge protection.



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Safe Working on Capacitor Panels

Explain stored energy hazards and delayed discharge.

Cover:

- ❖ Use grounding hooks even with automatic discharge
- ❖ Grounding hooks must be voltage-rated
- ❖ Minimum five-minute waiting time
- ❖ APFC panel precautions
- ❖ Avoid automatic switching during maintenance

Explain capacitor fire incidents:

- ❖ Internal failures
- ❖ Incorrect protective devices
- ❖ Importance of 1.5 times current rating
- ❖ Use of capacitor-duty contactors



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Battery Hazards & Safe Working Practices

Explain VRLA batteries and why they are still hazardous.

Discuss hazards:

- ❖ Shock and arc hazard
- ❖ Acid electrolyte
- ❖ Fire and explosion risks

Explain precautions:

- ❖ No jewellery or conductive objects
- ❖ No open flame or sparks
- ❖ Adequate ventilation
- ❖ Restricted access

Proper illumination and clear exit paths



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Required PPE & Battery Do's and Don'ts

Display PPE images and explain their use:

Safety glasses and face shields

- ❖ Insulated gloves
- ❖ Aprons and safety shoes
- ❖ Acid neutralizers and fire extinguishers

Explain Do's:

- ❖ Cleaning batteries
- ❖ Torque-controlled tightening
- ❖ Thermography
- ❖ Voltage and resistance checks

Explain Don'ts:

- ❖ Overcharging
- ❖ Mixing batteries
- ❖ Replacing single cells
- ❖ Charging in sealed cubicles



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Selection of Protective Devices

Earth Leakage Protection

Explain RCCB and RCBO selection based on:

- ❖ Rated current
- ❖ Residual operating current
- ❖ Short-circuit capacity
- ❖ Number of poles

Explain:

- ❖ 30 mA – personal protection
- ❖ 100 mA – fire and indirect contact
- ❖ 300 mA – fire protection

MCB Selection

Explain:

- ❖ Overload and short-circuit protection
- ❖ Rated current and breaking capacity
- ❖ Utilization categories B, C, D, K, Z with applications



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Electrical Joints, Termination & Cable Glands

Explain why joints are weak points if done improperly.

Demonstrate:

- ❖ Steps in making a good joint
- ❖ Types of joints: Pig tail, Western Union, Married, Tee

Explain cable termination:

- ❖ Loop formation
- ❖ Correct tightening direction
- ❖ Use of lugs for multi-strand cables

Explain cable glands:

- ❖ Mechanical holding
- ❖ Earthing continuity
- ❖ Environmental protection
- ❖ Selection parameters



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Quiz



Read questions aloud and encourage participation.

Q1. Why must HT equipment always be treated as live until proven dead?

- a. To avoid paperwork
- b. To prevent shock and fatal accidents
- c. To save time
- d. To bypass PPE

Correct Answer: b

Feedback: Hidden energy sources can be fatal if assumed dead.

Q2. Which RCCB rating is mandatory for socket outlets?

- a. 300 mA
- b. 100 mA
- c. 30 mA
- d. 500 mA

Correct Answer: c

Feedback: 30 mA RCCB provides personal protection against electrocution.



Module Name: Electrical Safety for Skilled Workers

Quiz



Q3. Why are grounding hooks mandatory for capacitor banks?

- a. For faster work
- b. Because automatic discharge may fail
- c. To save tools
- d. For documentation

Correct Answer: b

Feedback: Stored energy can remain even after isolation.



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Quiz



Q2. Which item is used to secure eye pads firmly during treatment?

- a. Hairband
- b. Micropore tape
- c. Face pack brush
- d. Sunscreen lotion

Correct Answer: b. Micropore tape

Feedback: Micropore is a sticky plaster used to secure eye pads properly.

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Summary

Reinforce the key learning points:

Electrical safety depends on:

- ❖ Hazard recognition
- ❖ Strict adherence to procedures
- ❖ Correct PPE usage
- ❖ Proper device selection
- ❖ Sound installation practices

Skilled workers are responsible not only for their own safety but also for the safety of others and the reliability of the electrical system.

End the session by reminding participants:

“No job is so urgent that it cannot be done safely.”