

Overview

This standard identifies the competences you need to wire electrical components and equipment in enclosures, in accordance with approved procedures. The final enclosure could be used for distribution equipment, switchgear or control systems. The rated operating voltage of the completed assembly will not exceed 1,500 volts DC or 1,000 volts AC, at frequencies not exceeding 1,000 Hertz. You will be required to select the appropriate tools and equipment to use, based on the operations to be performed and type of components to be wired and to check that they are in a safe and serviceable condition.

In carrying out the operations, you will be required to follow laid-down procedures and specific assembly techniques, in order to wire various components in enclosures, such as isolator switches, fuses/circuit breakers, contactors, relays, bases for plug-in devices, rail-mounted terminal blocks, trunking, earthing, bonding and sub-assemblies, such as power supplies, card racks, process controller units. The activities will also include making all necessary checks and adjustments to ensure that components are free from damage following the wiring operations.

Your responsibilities will require you to comply with organisational policy and procedures for the wiring activities undertaken and to report any problems with the activities, components or equipment that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying wiring techniques and procedures to electrical components. You will understand the distribution equipment, switchgear or control systems being wired, their application and the wiring techniques used. You know about the components used, in adequate depth to provide a sound basis for carrying out the wiring activities to the required specification.

You will understand the safety precautions required when carrying out the wiring operations. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

- P1 work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- P2 follow the relevant instructions, assembly drawings and any other specifications to carry out the wiring activities
- P3 ensure that the specified components and tools are available and that they are in a usable condition
- P4 assemble the components in their correct positions using appropriate methods and techniques
- P5 secure the components using the specified connectors and securing devices
- P6 check the completed assembly to ensure that all operations have been completed and it meets the required specification
- P7 deal with problems within your control and report those that cannot be solved
- P8 complete and store all relevant documentation in accordance with organisational requirements
- P9 leave the work area in a safe condition on completion of the activities, as per organisational requirements

Knowledge and understanding

You need to know and understand:

- K1 how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
- K2 the importance of wearing the appropriate personal protective equipment (PPE), and of keeping the work area clean and tidy
- K3 how to effectively deal with emergency situations in relation to electric shock and safe isolation
- K4 how to obtain and interpret drawings, circuit and physical layouts, charts, specifications, graphical electrical symbols, wiring regulations and other documents needed for the electrical wiring activities
- K5 the basic operating principles of the equipment/circuits being wired and the purpose of individual components within the circuit
- K6 the different types of cabling and their application
- K7 the application and use of a range of electrical components
- K8 the assembly methods and techniques to be used when wiring electrical distribution equipment, switchgear or control systems
- K9 the different types, applications and methods of attaching identification markers/labels during the electrical wiring activities
- K10 the visual checks and preparation requirements for the components to be wired
- K11 how to identify any orientation requirements, values or polarity for the components used in the electrical wiring activities
- K12 how to use appropriate lifting and handling equipment in the electrical wiring activities
- K13 the methods, tools and techniques used to prepare the electrical distribution equipment, switchgear or control systems equipment to be wired

K14 how to check that tools and equipment are free from damage or defects, are in a safe and usable condition and are configured correctly/calibrated for the intended purpose

K15 the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

K16 how to access, use and maintain information to comply with organisational requirements and legislation

Scope/range related to performance criteria

1. Carry out all of the following during the wiring activities:
 - 1.1 use the correct assembly drawings, specifications and job/order instructions
 - 1.2 adhere to health and safety regulations, systems and procedures to realise a safe system of work
 - 1.3 ensure that components and equipment used are free from damage, foreign objects, dirt or other contamination
 - 1.4 use safe and approved techniques to wire electrical components and equipment in enclosures
 - 1.5 leave the work area in a safe and tidy condition
2. Terminate and join cables/wires to ten of the following components:
 - 2.1 contactors
 - 2.2 timers
 - 2.3 limit switches
 - 2.4 overload relays
 - 2.5 relays
 - 2.6 power supplies
 - 2.7 programmable controllers
 - 2.8 transformers/chokes
 - 2.9 circuit boards
 - 2.10 plugs/sockets
 - 2.11 circuit breakers/fuses
 - 2.12 thermistors/thermocouples
 - 2.13 lighting fixtures
 - 2.14 panel meters (voltage, current)
 - 2.15 indicators (lamps, LEDs)
 - 2.16 batteries
 - 2.17 terminal blocks/junction boxes
 - 2.18 thermostats
 - 2.19 sensors
 - 2.20 switches (push button, toggle)
 - 2.21 busbars
 - 2.22 solenoids
 - 2.23 capacitors
 - 2.24 soft starters
 - 2.25 resistors
 - 2.26 variable speed drives
 - 2.27 rectifiers
 - 2.28 bases for plug-in devices
 - 2.29 other specific components
3. Use ten of the following methods and techniques (and the associated tools) during the wiring activities:
 - 3.1 cable forming/bending
 - 3.2 cable/wire crimping
 - 3.3 screwed connections

- 3.4 cable supporting/tying
 - 3.5 insulation stripping
 - 3.6 soldering (where appropriate)
 - 3.7 cable/wire clamping
 - 3.8 locking and retaining devices (such as cable ties, clips, proprietary fasteners)
 - 3.9 cable routing
 - 3.10 cable protection (such as sleeving, grommets)
 - 3.11 torque setting of fasteners
 - 3.12 connecting pre-formed looms
 - 3.13 wire marking/colour coding
4. Use two of the following cable/wire types:
- 4.1 single core cable
 - 4.2 mineral insulated cable
 - 4.3 twisted pair/ribbon cable
 - 4.4 multicore cable
 - 4.5 screened cable
 - 4.6 laminated copper
 - 4.7 fibre optic
 - 4.8 data/communication cable
 - 4.9 braided copper
 - 4.10 SWA armoured cable
 - 4.11 other specialist cable
5. Assemble electrical components in enclosures, to one of the following quality and accuracy standards:
- 5.1 organisational drawings and procedures
 - 5.2 wiring regulations
 - 5.3 customer drawings and requirements
 - 5.4 current industry standards, codes of practice and procedures
 - 5.5 other international standards
6. Check all of the following on the completed assembly:
- 6.1 location and position of items (such as components, labels, trunking covers, doors, cages)
 - 6.2 continuity of cable/wiring connections (such as battery and lamp checks)
 - 6.3 function of mechanical interlocks/switches (where appropriate)
 - 6.4 mechanical operation of overload protection devices (where appropriate)
 - 6.5 enclosure free of debris (such as cable offcuts/insulation, enclosure/trunking breakouts)

Developed by	Enginuity
Version Number	4
Date Approved	31 Mar 2026
Indicative Review Date	01 Apr 2029
Validity	Current
Status	Original
Originating Organisation	Enginuity
Original URN	SEMEEE3-32
Relevant Occupations	Engineering, Engineering and Manufacturing Technologies, Engineering Technicians, Maintenance Team Technician, Manufacturing Technologies, Production and Process Engineers
Suite	Electrical and Electronic Engineering Suite 3
Keywords	Engineering; electrical; electronic; wiring; components; enclosure; distribution systems; switchgear; control system; equipment
