

Technical Description

Electrical Installation

Skill 24



1 Skill Overview	3
2 Task Assignment Overview	4
3 Materials and Equipment	6
4 Skill-Specific Requirements	12
5 Assessment Framework	15

1 Skill Overview

1.1 Skill Name and Category

Electrical Installation, Construction and Building Technology

1.2 Number of Competitors

This is an individual Skill Competition with one competitor.

1.3 Competition Time

The total competition time is 6 hours and is divided into the following modules:

- Module A: Electrical Installation Work – 3 hours
- Module B: Motor Installation and Control – 3 hours

1.4 Description of the Skill

Electrical Installation involves the installation and/or repair of electrical systems in accordance with provided plans, electrical drawings, technical documentation, and specifications.

Competitors are expected to accurately interpret electrical drawings, circuit diagrams, and other technical documentation, and to carry out installations with precision, professionalism, and a strong commitment to safety.

Tasks may include installing wiring systems, mounting electrical components, connecting and controlling electric motors, testing electrical circuits, and ensuring that all installations comply with applicable standards, regulations, and industry best practices.

Success in this skill requires strong problem-solving abilities, attention to detail, and a comprehensive understanding of electrical principles, installation methods, tools, equipment, and safe working practices.

In addition to technical competence, electrical installation is also a customer service profession. Effective communication and interpersonal skills are essential, as electricians interact with clients, colleagues, supervisors, and other construction professionals. These skills contribute to high-quality workmanship, customer satisfaction, and efficient teamwork.

2 Task Assignment Overview

2.1 Task Assignment Description and Familiarisation Session

The Task Assignment is the main competition task used to assess the competitors' skills. It defines what the competitors must complete during the competition and forms the basis for all assessments. The final result is evaluated only on the finished work produced during the official competition time.

A familiarisation session is organised on C-1. During this session, competitors may enter the workshop, see the workspace, check the available tools and materials, and ask questions about procedures or practical arrangements. Competitors are not allowed to practise, start, or rehearse any part of the Task Assignment during this session.

Occupational safety, electrical safety, and working practices are assessed during the official competition time in accordance with the published assessment criteria.

2.2 Task Assignment Structure

The competition consists of two modules with a total competition time of 6 hours.

Module A: Electrical Installation Work

Competition time: 3 hours

Competitors install lighting equipment, switches, socket outlets, associated wiring systems, and the required power supply and control circuits. The work includes the necessary connections and control arrangements in the distribution board.

All work must comply with the provided electrical drawings, technical documentation, and applicable safety requirements.

Module B: Motor Installation and Control

Competition time: 3 hours

Competitors install the cable routing system and supply cable for a three-phase motor, together with the specified variable frequency drive and associated protection and control equipment. The motor must be controlled from a remote control station using digital I/O.

Competitors carry out motor condition assessment measurements, connect the motor, and complete the required commissioning inspections, tests, and measurements.

All work must comply with the provided electrical drawings, technical documentation, and applicable safety requirements.

The Task Assignment defines the exact requirements for each module, including materials, components, installation requirements, drawings, inspections, tests, and measurements.

2.3 Task Assignment Technical Requirements

Competitors are required to demonstrate the following skills and knowledge:

- Reading and accurately interpreting electrical drawings, circuit diagrams, and other technical documentation.

- Planning and organising installation work safely and efficiently.
- Selecting appropriate tools for the required tasks.
- Using tools correctly and safely.
- Selecting the required materials and components based on the provided documentation.
- Installing materials and components in accordance with the manufacturers' instructions.
- Carrying out electrical installations in accordance with the provided drawings, specifications, and applicable standards.
- Performing the required inspections, tests, and verification measurements to confirm the quality, compliance, and safety of the completed installations.

All electrical installation work shall comply with applicable Finnish legislation and electrical safety standards, including:

- SFS 6000:2022 – Low-voltage electrical installations;
- SFS 6002:2025 – Electrical work safety;
- SFS-EN 61439 – Low-voltage switchgear and controlgear assemblies, where applicable; and
- SFS-EN 60204-1 – Safety of machinery – Electrical equipment of machines, where applicable.

All electrical installation work must be carried out under de-energised conditions. Completed installations must be inspected and tested in accordance with the applicable requirements before energisation. Energisation is permitted only with authorisation from the designated competition official responsible for electrical safety.

The Task Assignment defines the exact requirements, including installation requirements, materials, components, technical documentation, inspections, tests, and verification measurements, and may include task-specific variations or additional elements.

3 Materials and Equipment

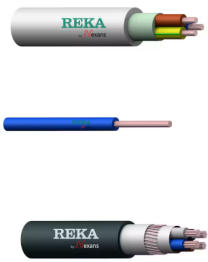
3.1 Materials and Equipment Provided by the Competition Organiser

The Organiser provides the materials, tools, and equipment listed below.

Images are for reference only. They do not indicate a specific brand or model unless otherwise stated in the specifications. Quantities are per competitor unless otherwise stated.

Items will be available at the competitor's workstation or in the designated competition area, as appropriate. Where exact brands, models, or task-specific material details are not specified, these may be confirmed before the competition or defined in the Task Assignment, as appropriate.

No.	Equipment / Material	Picture	Specifications	Quantity
01	Distribution board (DB)		Suitable for a 400/230 V AC three-phase installation. Pre-installed on the competition wall, with DIN rails and neutral (N) and protective earth (PE) terminal bars. Suitable for the specified protective and control devices.	1
02	Miniature circuit breakers (MCBs)		6 × C16 A, single-pole (1P); 3 × B10 A, single-pole (1P); 1 × C16 A, three-pole (3P). Schneider Electric or equivalent.	10
03	Residual current device (RCD)		Rated current: 40 A; rated residual operating current: 30 mA; Type A; four-pole (4P). Schneider Electric or equivalent.	1

04	Main switch (switch- disconnector)		Rated current: 63 A; four-pole (4P). Suitable for use as the main isolating switch in a 400/230 V AC distribution board. Schneider Electric or equivalent.	1
05	Multifunction time relay		Hager EZN006 or equivalent; time range: 0.1 s–10 h; one changeover contact, 8 A; DIN rail mounting.	1
06	Interposing relay		Hager ERC218; one normally open (NO) contact and one normally closed (NC) contact; 16 A; coil voltage: 230 V AC.	3
07	Cables and conductors		MMJ 3 × 2.5 mm²; MMJ 5 × 2.5 mm²; MMJ 3 × 1.5 mm² S; MMJ 3 × 1.5 mm² N; MCMK 3 × 1.5 + 1.5 mm²; ML 1.5 mm² and ML 2.5 mm² in brown, black, grey, and yellow/ green.	As required
08	Cable routing systems and accessories		Rigid steel electrical installation conduit (JAPP conduit), wire mesh cable tray, and associated mounting accessories, supports, connectors, and fixings. Dimensions as specified in the electrical drawings and Task Assignment.	As specified in the electrical drawings and Task Assignment
09	Socket outlets, switches,			As required

	and electrical installation accessories		As specified in the electrical drawings and Task Assignment.	
10	Luminaire or luminaire outlet		Basic surface-mounted or recessed luminaire similar to the illustrated examples, or a luminaire outlet. The exact type is specified in the electrical drawings.	As specified in the electrical drawings and Task Assignment
11	Three-phase squirrel-cage induction motor		ABB M2QA 90SLA 4, product code 3GQA092010-ASN, or equivalent; mounting arrangement IM B5. Supplied pre-mounted on a mounting flange, which the competitor secures to the wall at the location specified in the electrical drawings. Operated exclusively through a variable frequency drive (VFD).	1
12	Variable frequency drive (VFD)		ABB ACS580-01-02A7-4 or equivalent, compatible with the specified motor. The exact type is specified in the electrical drawings. Motor control is from a remote control station using digital I/O.	1

3.2 Materials and Equipment Supplied by Competitors

Competitors may bring only the materials, tools, and equipment listed below. Personal tools and equipment must fit within a toolbox or tool case suitable for checked luggage, with a maximum total weight of 23 kg, including the toolbox or case. This requirement does not apply to clothing,

footwear, personal protective equipment (PPE), or equipment required due to the competitor's condition or special needs and agreed in advance with the Organiser.

Images are for reference only. They do not indicate a specific brand or model unless the specifications state otherwise. Quantities are per competitor unless otherwise stated.

No.	Equipment / Material	Picture	Specifications	Quantity
01	Electrically insulated cable stripping and cutting tools		Electrically insulated hand tools complying with IEC 60900, where applicable.	1 wire stripper, 1 wire cutter, and 1 cable stripping tool
02	Electrically insulated screwdriver set		Complying with IEC 60900. Suitable for electrical installation work and including appropriate types and sizes for the specified electrical components.	1 set
03	Cordless drill/driver and screwdriver bit set		Drill/driver: Makita LXT DDF490Z or equivalent from another manufacturer. Bit set: Makita Impact Black B-66880, 35-piece set, or equivalent from another manufacturer.	1 drill/driver and 1 bit set
04	Two-pole voltage and continuity tester		Fluke T150 or equivalent. Minimum requirements: CAT III 690 V / CAT IV 600 V; IP64; AC/DC voltage testing range 6–690 V; voltage and continuity testing; complying with EN 61243-3.	1
05	Hammer			1

				
06	Cut-resistant gloves		Complying with EN 388, with cut resistance suitable for electrical installation work.	1 pair
07	Safety Helmet		Industrial safety helmet complying with EN 397. Suitable for construction-site electrical installation work.	1
08	Safety footwear with toe protection		Complying with EN ISO 20345:2022, with protective toe caps. Suitable for electrical installation work in a construction-site environment.	1 pair
09	High-visibility tool vest		Complying with EN ISO 20471. Suitable for electrical installation work, with pockets or holders for hand tools.	1
10	Safety glasses		Complying with EN ISO 16321-1:2022. Suitable for protection against mechanical hazards during electrical installation work.	1 pair
11	Hearing protection		Complying with the applicable EN 352 standard. Suitable for the noise generated during electrical installation work. Earplugs or	1 pair

			earmuffs are permitted.	
12	Toolbox and tools		For the personal electrical installation tools listed in this section. All tools must comply with the competition's safety requirements and be inspected and approved by the Chief Judge before the competition begins.	1

3.3 Prohibited Materials and Equipment

Competitors may use only the materials, tools, and equipment listed in Sections 3.1 and 3.2, unless otherwise authorised by the Skill Manager or Chief Judge. This restriction does not apply to clothing, footwear, or personal protective equipment (PPE) required in Section 4.1, or to equipment required due to the competitor's condition or special needs and agreed in advance with the Organiser.

All other materials, tools, and equipment are not permitted.

4 Skill-Specific Requirements

4.1 Skill-Specific Requirements

The Skill-Specific Requirements below apply to this Skill Competition and must be followed in addition to the Abilympics Competition Rules. The Skill Manager or Chief Judge may provide additional instructions, as needed, to ensure the competition is conducted safely and fairly.

Topic	Skill-Specific Requirements
Materials and tools provided by the Organiser	Competitors must check all materials, tools, and equipment provided by the Organiser before the competition begins. If anything is missing, damaged, or defective, competitors must immediately inform the Judges. No replacements will be provided after competition time has commenced, unless authorised by the Judges. If equipment provided by the Organiser fails and the failure is confirmed not to have been caused by the competitor, the Chief Judge may grant additional time. Competitors are responsible for ensuring that the materials and components they use are electrically suitable for the assigned task, based on the task instructions.
Use of personal tools	Competitors may bring and use only the personal tools and equipment listed in Section 3.2. This restriction does not apply to equipment required due to the competitor's condition or special needs and agreed in advance with the Organiser. Tools used for electrical installation work must be appropriately insulated and suitable for the work. All personal tools and equipment must be inspected and approved by the Chief Judge before the competition begins.
Personal protective equipment (PPE)	Competitors must wear the required personal protective equipment during the competition: • Safety helmet – EN 397 • Safety glasses – EN ISO 16321-1 • Hearing protection – EN 352, where required by the work being performed or the noise level • Cut-resistant gloves – EN 388 • High-visibility tool vest with pockets or holders for hand tools – EN ISO 20471 • Safety footwear with toe protection – EN ISO 20345:2022
Clothing / Uniform	Competitors must wear work trousers and clothing suitable for electrical installation work in industrial or construction-site environments. The required high-visibility tool vest, safety footwear,

Topic	Skill-Specific Requirements
	and other protective equipment are specified under Personal protective equipment (PPE). Clothing must not display large commercial logos or promotional branding. Small, non-distracting brand marks are permitted.
Electrical safety and installation standards	All electrical installation work must comply with applicable Finnish legislation and electrical safety standards, including: • SFS 6000:2022 – Low-voltage electrical installations • SFS 6002:2025 – Electrical work safety • SFS-EN 61439 – Low-voltage switchgear and controlgear assemblies, where applicable • SFS-EN 60204-1 – Safety of machinery – Electrical equipment of machines, where applicable All electrical installation work must be carried out under de-energised conditions. Before energisation, installations must undergo visual inspection and all required tests that can be performed under de-energised conditions. Competitors must not energise or re-energise an installation without authorisation from the Judges. Testing requiring voltage may take place only after the installation has been confirmed safe for energisation and permission has been granted by the Judges. Energisation and testing requiring voltage must follow the competition's electrical safety procedures and take place under the supervision of the designated competition officials.
Sideline coaching	Competitors must remain at their workstations or within the designated competition area during competition time, unless authorised to leave by the Judges. Competitors may not communicate with other competitors or members of the public during competition time. Competitors may communicate with Judges, Interpreters, personal assistants, and other authorised persons when required. The role and permitted involvement of a personal assistant must be agreed in advance with the Organiser based on the competitor's condition or special needs.
Use of technology	Competitors may not use personal laptops, tablets, mobile phones, smartwatches, or other personal communication or electronic devices during competition time. Competitors must store such devices away and may access them only during the lunch break or at the end of the competition day. This restriction does not apply to devices required due to the competitor's condition or special needs and agreed in advance with the Organiser. Judges and Interpreters may use devices required for their official duties only as agreed by the Skill Manager and the Chief Judge. The Skill Manager and the Chief Judge may use devices required for

Topic	Skill-Specific Requirements
	competition management and will specify any additional restrictions or permitted device use within the competition area.

5 Assessment Framework

5.1 Assessment Principles

All Abilympics Skill Competitions are marked out of 100 points.

Points are divided between criteria that reflect the required skills and expected outcomes.

Two methods of assessment are used:

- **Measurement:** objective, factual scoring (e.g., size, accuracy).
- **Judgement:** expert evaluation of quality, technique, and artistic choices.

5.2 Assessment Areas

Detailed marking criteria and scoring are provided in the Task Assignment.

Assessment focuses on the following key areas:

Assessment Area	Points
Occupational Safety and Electrical Safety	20
Functionality, Quality and Compliance of Installation Work	35
Interpretation of Electrical Drawings and Technical Documentation	10
Accuracy and Quality of Workmanship	20
Testing, Commissioning, Professional Conduct and Communication	15
Total	100