ArcticSkills

2024

Kirkenes videregående skole
Girkonjárgga joatkkaskuvla
FINNMARK FYLKESKOMMUNE
FINNMÁRKKU FYLKKAGIELDA

ELECTRICAL INSTALLATION

Participants name	**Nationality**

The judges	**Nationality**
Krister Bjørk	Sweden
Mikko Rokkonen	Finland
Raimo Stark	Finland
Gjermund Hansen	Norway

Description of the competition task

The participant shall install and put into service the electrical installation as provided in the attached documentation. All work must be performed in accordance with HSE and electrical safety regulations. The competition task must be installed, controlled and put into operation within the available time.

The task is divided into three parts: lighting control - heating system - motor control.

The task contains the following documents:

- Description of the competition task
- Evaluation of the competition task
- Time schedule
- Overview over components in the installation
- Plans of the installation
- Documentation of group central GC
- Documentation of motor central MC
- Documentation of equipment
- Inspection scheme
- Assessment criteria with points

A total of 7.5 hours have been set aside for the assignment.

Group Central GC

The group central is completed and installed in the workstation in advance. The central shall provide all parts of the assignment. The cable insulation should be led 10-30 mm inside the central. There must be a minor rebuilding in the central. Before starting installation work, the circuit breaker used on group no. 2 has to be replaced with a more suitable circuit breaker, which will be available.

All equipment must be installed in accordance with HSE and electrical safety regulations in such a way that the completed installation can be put into operation.

Wiring for power supply of circuits must be carried out so that the end connected to the central is the last to be connected.

Motor Central MC
The motor is a three-phase asynchronous short-circuit motor which is controlled using a contactor and smart relay / PLC located in motor central MC. The MC has been completed in forehand and the smart relay / PLC has been pre-programmed.
The participant shall perform mounting and connection of wire for power supply to the MC and wire from MC to the motor.
Central MC shall be supplied from GC. The cable insulation should be led 10-30 mm inside the central.

Cables and conductors

Cables and conductors should be fastened according to good installation method. The cables must be fastened with nail clamps and/or screw fasteners. Installation shall be carried out as a surface-mounted arrangement.

A protective pipe must protect the wire for power supply of the motor.

Wires from the centrals must be installed in accordance with the group listings and associated circuit breaker. The cable insulation should be inserted 5-10 mm into equipment as junction boxes, switches, lamps and motors.

Operation of electric motor
Condition of the motor must be measured before installation of the motor commences and the results must be recorded on a dedicated form following the documentation of the task. The direction of rotation of the motor must be clockwise, and it must be mounted on the wall so that the motor shaft is horizontally and orientated to the right.

Lighting and outlets
Lighting control includes one luminaire, which is controlled by wall-mounted switches. The cable must be connected to the luminaire in a professional manner in accordance with the requirements for open installation. The IP degree of the lamp, the connection box and the light-switches must not be impaired during installation.

Thermal Management
The heating system includes a heater, which is controlled by a plug-in programmable thermostat.

Marking
Circuit breakers must be marked in distribution GC.
In distribution GC group listing must be completed.

Documentation
Documents related to installation work such as drawings, installation instructions and measurement forms must be handed over to the judges.
The same goes for documentation of equipment and user manuals.

Inspection of the installation
Once the installation is completed and before the job is handed over to the judge, an inspection of the installation must be performed. During commissioning, continuity measurement of protective conductors and measurement of insulation resistance are performed. On the RCDs, it is required to check trip time, trip current and test button. The results of the measurements must be recorded on the inspection form included in the documents following the task. The inspection form shall be delivered to the referee.
A judge shall be present during completion of the inspection.

User Manual
After the job is completed, the installation will be handed over to the customer, which in this task is one of the judges. The handover should enable the customer to cope with basic usage and the most common errors that may occur in the installation. The customer must be able to disconnect the power supply in case of emergency. The customer must also be advised of the necessary maintenance of the installation.

Sustainable development, entrepreneurship and attitudes
In carrying out the installation work, the principles for sustainable development must be taken into account, insofar as they apply to this work. This means good handling of equipment, remains and waste. For work that affects work capacity, physically excess workload must be avoided.
Attitudes towards entrepreneurship and entrepreneurial spirit are reflected in; quality of work done, self-motivated work, skills for problem solving and ability to assess own work. The participant must be prepared to present to the judge his own assessment of whether the work is in a condition that can be handed over to the customer.

Equipment and tools that the participant must bring along

- Hand tools for electricians
- Cordless screwdriver with bit set
- Multimeter
- Instrument for test of insulation resistance and continuity
- Instruments for testing earth fault switches/RCDs
- Workwear, protective clothing and personal protective equipment (gloves, safety goggles and hearing protection)

Evaluation of the competition task

The competition task is evaluated on a scale from 0 to 100 p.

- Work and electricity safety 18 p
- Commissioning, testing and operation 20 p
- Circuit design 18 p
- Attachment of devices and conductors 10 p
- Wiring and connections 14 p
- Customer service and documentation 10 p
- Sustainable development, entrepreneurship and attitude 10 p

In the evaluation process, all judges assess the following subjects: work and electrical safety, sustainable development, entrepreneurship and attitude. Other items of the evaluation will be divided so that the same judges will evaluate the same evaluation target from all the competitors.

If problems occur during work, the participants can turn to the judges for clarification. It is not allowed for the participant to speak directly to the judge from his own country. Issues regarding arrangements, supply failures, or broken equipment do not affect the evaluation. Questions about the actual installation work and the requested advice will affect the evaluation.

The judges will only once point out breach of rules for HSE and electrical safety. If the participant repeatedly acts in violation of the rules for HSE and electrical safety, the referees will immediately interrupt the work and the assignment will be rejected.

Participants must use workwear and footwear in addition to personal protective equipment such as safety goggles and gloves throughout the competition. For safety reasons, gloves should not be used while working with cordless screwdriver. Hearing protection should be used when needed. In order to safeguard electrical

safety in all situations during the competition, the participant must use personal measuring instruments that are suitable for measuring whether voltage is applied. In addition, the participant must bring his own personal hand tool.

The participant must also bring with him personal measuring instruments that are suitable and approved to perform measurements in connection with commissioning of the facility.

Time schedule Arctic Skill 2024

Overview over components in the installation

Component/object	Description/notes
-QO	Safety switch
-GC	Group Central
-MC	Motor Central
-M1	Three phase AC asynchronous induction motor
-EH1	Heater Nobø NFK4N 05 500W
-EL1	Electric lamp
-SW1/-SW2	Light switches Elko no. 6
-CB1	Connection box Elko model 76