Instructions

Instructions for the low-voltage Work Controller

Team: Elsikkerhet
Responsible: Jon Halvor Holtet
Document owner: Endre Johan Hoel

Verified: 30.12.2024 by Jon Halvor Holtet
Approved: 30.12.2024 by Endre Johan Hoel
Planned review by: 30.12.2027

Keywords: El-sikkerhet

Based on the Norwegian document SDOK-515-12

1 Governing policy and legislation

These Instructions for the low-voltage Work Controller are subordinate to policy sikkerhet (Safety Policy). They are a supplement to, and superceded by FSE 2006 (Safety regulations related to the maintenance and operation of electrical installations) and "Forskrift om elektroforetak og kvalifikasjonskrav for arbeid knyttet til elektriske anlegg og elektrisk utstyr" (Regulations concerning electrical enterprises and qualifications requirements for work related to electrical installations and equipment), both of which are pursuant to the "Lov om tilsyn med elektriske anlegg og elektrisk utstyr" (Act relating to the Inspection of Electrical Installations and Electrical Equipment).

2 Purpose and validity

The purpose of these Instructions is to ensure a high level of safety during work on or in the vicinity of Statnett electrical installations and during their operation, by requiring adequate planning of all activities and the implementation of necessary safety measures to avoid any threat to life, health, or property.

These Instructions apply to all low-voltage installations where Statnett has authority as Installation Manager.

3 Intended audience

Operative personnel in Statnett and internal and external employees who are certified Work Controller on electrical installations where Statnett has operational responsibility.

4 Definitions

Installation Manager: Person appointed by the owner/manager to carry out and be responsible for the ongoing management and maintenance of electrical installations.

Low-voltage (LV): Normally not exceeding 1 000 V AC or 1 500 V DC

Work Controller: Person appointed to have responsibility for the electrical safety at the worksite.

Instructed Personnel: Person who is adequately instructed to ensure he or she is in a position to understand risk and to avoid danger related to electricity. May be accompanied and supervised by a competent person if necessary.

5 Work on or in the vicinity of a low-voltage installation

5.1 All work in low-voltage installations must be planned in advance. A risk assessment must be carried out in accordance with the Instruction for planning of work in electrical installations. The Work Controller is responsible for this being carried out and documented before the work starts.

5.2 Work on low-voltage installations may be conducted according to the procedures for work on **disconnected installations** or work on or in the vicinity of **energised installation components**. Refer to the procedures enclosed with these Instruction.

5.3 Necessary safety measures must be initiated. See attached procedures.

5.4 A **Work Controller** must be appointed for every work task on or in the vicinity of an exposed low-voltage electrical installation. This includes fuse replacement for which Instructed Personnel are required (service not safeguarded against direct contact) and voltage measuring on a voltage transformer. The appointment process must follow section 4.6 in Electrical safety procedural works: Appointing Work Controller for work on disconnected or in the vicinity of high-voltage installations, and appointing Work Controller for work on or in the vicinity of low-voltage installations.

5.5 The Work Controller must be able to communicate directly (without the use of an interpreter) with the person who has made the appointment or their substitute, and with the rest of the work team.

5.6 The Work Controller must be present during all work.

5.7 **Applying particularly to work on the secondary side of transformer circuits**

5.7.1 When working with **electrical circuits in operation** (secondary side of current transformers) **in operation** there must always be at least two persons present, one of which must be the Work Controller. For the second person, an **independent access permit** is required (ref. Instructions for training/access/safety cards to Statnett's electrical installations) on the installation and the person must have a relevant trade certificate or relevant approvel for the task by the Directorate for Civil Protection. The name of the second person must be documented by the Work Controller in the duty journal. The requirement for two persons present does not apply if:

- The test plugs/test switches are used, and the work is after the test plug/test switches.
- It works in relay cabinets when equipped with event-driven interruption-free power connections.

5.7.2 The Work Controller is responsible for implementing necessary short circuiting on the secondary side of transformers and/or other safety measures, to prevent overvoltages caused by open secondary circuits. The second person must check that the planned safety measures are done.

5.7.3 If there is any suspicion that the open current transformer secondary circuit or terminal blocks are not properly tightened, the Work Controller must contact the affected Regional Control Centre for immediate disconnection of the transformer.

5.7.4 **Circuits on the secondary side of the transformer** may be considered as **not in operation**, and the two-persons present requirement does not apply, if the associated current transformer is blocked against conducting current on the primary (disconnected) side (cf. 5.7.5). For bays with a double switch system with double current transformers the bay (both branches) must be blocked.

5.7.5 Blocking of primary current (disconnection) must be conducted in accordance with section 5.4 in Electrical safety procedural works: Work in the secondary circuit on current transformers with the primary side disconnected.

5.8 Applying particularly to work in control circuit

5.8.1 When demolition, testing or troubleshooting in control circuits for disconnectors and earthing switches, the motor fuses for the affected breaker must be disconnected before disconnecting control circuits, isolating links in terminal blocks are split or conductors in control circuits are disconnected.

5.9 Notifying the Regional Control Centre of work in the substation automation system

5.9.1 Before work may start at the beginning of each day, the Work Controller must contact the Regional Control Centre, informing them of the planned work on the substation automation system. This also applies to bays where another company has switching authority.

5.9.2 The Regional Control Centre must receive clear information about which part of the installation will be affected by the work, the name of the Work Controller, the scope of the job and how long it will last.

5.9.3 The Work Controller is not permitted to allow work to start before receiving permission from the Regional Control Centre. The Regional Control Centre may refuse to give permission for work to start.

5.10 Informing the Monitoring Centre if work could affect substation surveillance equipment or ICT equipment

5.10.1 Notification of all work involving an uninterruptible power supply (rectifier, inverter and battery system/UPS) must be given to the Monitoring Centre (71 68 90 20) before commencement.

5.10.2 The Work Controller must assess whether the planned work on the substation automation system could affect the remote-control function (RTU, substation computer, computer networks, etc.), kWh meters or the substation surveillance equipment (access control, camera functions, key cabinets etc). If there is a risk of any such functions being affected, the Monitoring Centre must be informed before work may be started.

5.10.3 If work could result in a full or partial shutdown of the surveillance system, the Monitoring Centre must be informed before this happens. The Monitoring Centre must also be notified when such work has been completed and the surveillance system is functioning as normal.

5.10.4 If the Monitoring Centre (with support from ICT peronnel) and the Work Controller decide that communications systems (remote control, relay protection and system protection communication) could be affected by the work on uninterruptable power supply or the substation automation system, the Monitoring Centre must notify the applicable Regional Control Centre and ID Officer.

6 Abstinence from alcohol

The person appointed as Work Controller must agree to refrain from consuming alcohol or other intoxicants during the 8 hours prior to starting work.

7 Confirmation of compliance

The responsibility for checking compliance with instructions lies with the document holder and approving body.

The position of Installation Manager includes authority to draw up and approve work procedures, guidelines and instructions in areas covered by electrical safety in accordance with policy sikkerhet (Safety Policy – Norwegian document only).

8 Enclosures and references

Enclosures:

- Procedure A: Procedure for work on de-energised installations
- Procedure B: Procedure for working on or in the vicinity of energised installations
- Procedure C: Procedure for working on or in the vicinity of energised installations in control panels/ cabinets/ field cabinets.

References:

- Policy sikkerhet (Safety Policy – Norwegian document only) (SDOK-856-6)
- Instructions for the high-voltage Work Controller (SDOK-515-55)
- Instruction for training/access/safety cards to Statnett's electrical installations (SDOK-515-60)
- Instruks for vernebekledning (Instructions for personal protective equipment - Norwegian document only) (SDOK-587-20)
- Instruks for planlegging av arbeid i elektriske anlegg (Instructions for planning of work in electrical insallations – Norwegian document only) (SDOK-515-36)
- Electrical safety procedural works (SDOK-515-73)
- Safety regulations related to the maintenance and operation of electrical installations (www.dsb.no)
- Forskrift om elektroforetak og kvalifikasjonskrav for arbeid knyttet til elektriske anlegg og elektrisk utstyr (Regulations concerning electrical enterprises and qualifications requirements for work related to electrical installations and equipment – only in Norwegian) (www.lovdata.no)
- Lov om tilsyn med elektriske anlegg og elektrisk utstyr (Act relating to the Inspection of Electrical Installations and Electrical Equipment – only in Norwegian) (www.lovdata.no)

9 Version log

Valid as of	Revision classification (New/Updated/Vocabulary/None)	Description of important changes
01.01.2025	Updated	5.1: Added that the Work Controller is responsible for a documented risk assessment being in place before the work starts. 5.7.1: Incorporated previous point 5.7.3 in this point. It is indicated that work alone when using a test plug/test switch applies to work after a test plug/test switch. Added that it is also possible to work alone in a relay cabinet equipped with event-driven interruption-free power connections.

10 PROCEDURE A – WORKING ON DE-ENERGISED INSTALLATIONS

10.1 Necessary equipment

Personal protective equipment must include:

- Helmet – can be omitted when safety measures according to pt. 10.2 are in place, unless other factors make use of helmet necessary.
- Clothing according to Instruks for vernebekledning

Other equipment must include:

- Voltage testing equipment
- Signs and tagging equipment
- Short-circuiting equipment

10.2 Implementing safety measures

The following safety precautions must be in place before work is permitted to start (in the given order):

10.2.1 The section of the installation where work is planned must be de-energised.

10.2.2 The circuits energising the de-energised parts must be tagged and, if applicable, switches locked out, cf. pt. 10.2.4

10.2.3 Voltage tests must be conducted to verify that the circuit elements and parts are de-energised.

10.2.4 The workplace must be short circuited if the safety practices outlined in pt. 10.2.2 are not considered to provide adequate personal safety.

10.2.5 If a drill is used, all installation parts must be protected from boring chips.

10.3 Dismantling safety measures

The following procedures must be followed (in the given order) before the installation is allowed to be re-energised:

10.3.1 Notify all who have participated in the work that the installation part must now be considered energised.

10.3.2 Removal of all tools and barriers.

10.3.3 Removal of any short-circuiting equipment.

10.3.4 Removal of switch locking and (warning) tags.

10.3.5 Re-energising of the installation.

11 PROCEDURE B – WORKING ON OR IN THE VICINITY OF ENERGISED INSTALLATIONS

11.1 Necessary equipment

Personal protective equipment must include:

- Helmet
- Visor
- Insulated gloves
- Clothing according to Instruks for vernebekledning

Other equipment must include:

- Flexible insulating shrouding with clamps for shielding exposed live parts that could come into contact with body parts or tools (above, below and on all sides)
- Tools with insulated handles or totally insulated tools

11.2 Implementing safety measures

The following safety measues must be taken before work is permitted to start (in the given order):

11.2.1 Shielding of exposed live parts that could come into contact with body parts or tools (protect above, below and on all sides) using flexible insulating shrouding

11.2.2 If a drill is used, all installation parts must be protected from boring chips

11.2.3 All tools must be either totally insulated or with insulated handles

11.3 Before re-energisation

The following procedures must be followed (in the given order) before the installation is allowed to be re-energised:

11.3.1 Removal of all tools and insulating shrouding

11.3.2 Cleaning of shrouding after use

12 PROCEDURE C – WORK ON OR IN THE VICINITY OF ENERGISED INSTALLATIONS IN CONTROL SWICTHBOARDS/CABINETS/FIELD CABINETS

12.1 Working with control switchboards/cabinets/field cabinets

12.1.1 This procedure applies only to control switchboards/cabinets/field cabinets in circuits with 10 A fuses or less. Circuits in the same switchboard/cabinet that are fused higher than 10 A must be completely shielded by an insulating shroud. If shrouding is impossible, procedures A or B must be followed.

12.2 Necessary equipment

Personal protective equipment must include:

- Eye protection
- Clothing according to Instruks for vernebekledning
- Outdoors: Helmet

Other equipment must include:

- Flexible insulating shrouding with clamps for shielding exposed live parts that could come into contact with body parts or tools (protect above, below and on all sides)
- Tools with insulated handles or totally insulated tools

12.3 Implementing safety measures

12.3.1 Shielding of exposed live parts that could come into contact with body parts or tools (protect above, below and on all sides) using flexible insulating shrouding. If shrouding is not possible, insulated gloves must be used.

12.3.2 All tools must be either self insulated or double insulated.

12.3.3 Any connection or disconnection of auxiliary voltage must be via pillar terminal blocks in cabinets.

12.4 Before re-energisation

12.4.1 Removal of all tools and equipment.

12.4.2 Removal of all barriers and insulating shrouding.

12.4.3 Cleaning of insulating shrouding after use.

Instructions

Instructions for the low-voltage Work Controller

Revision log SDOK-515-56:

Revision		Approved	Approved by	Description
7.0	Show changes	30.12.2024	Endre Johan Hoel	See the version log
6.0	Show changes	02.01.2024	Arnfinn Granheim	See the version log
5.0	Show changes	02.01.2024	Arnfinn Granheim	See the version log
4.0	Show changes	30.12.2022	Arnfinn Granheim	See the version log
3.0	Show changes	29.12.2021	Arnfinn Granheim	See the version log
2.0	Show changes	29.12.2021	Arnfinn Granheim	See the version log

...

Statnett

Nydalen Allé 33
0484 Oslo

T 23903000
F 23903001