# ESI-100
# Lock-out / tag-out procedure HV
# Dutch offshore high voltage installations
**15-04-2022**

This electrical safety instruction is part of the activities in the technical work instructions.

## Purpose
Electrical insulation and standardisation of electrical installation for the purpose of electrical and non-electrical work. Where it is part of carrying out work on the electrical high voltage installations on Dutch offshore HV-Platforms.

## Nomination and assignment
The persons who are going to carry out the work have thorough knowledge of the electrical insulation and normalisation of electrical high-voltage installations by means of training and/or experience.

You will be instructed by a NPcWA locally or remotely via an approved contract (AC).

Carry out this assignment with two people.

You have to be at least a $SP_{HS\text{-}OFFSHORE}$.

## Risks and measures

| Risk | Measure |
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| On electric arc. | Use flame-retardant and antistatic work and industrial clothing. |
| On hearing damage. | Above 80 db(A) use hearing protection. |
| To injuries caused by falling objects. | Use a safety helmet. |
| To injuries caused by falling, falling or rolling objects, pinching and/or sharp objects on the ground. | Use safety footwear with steel toecap and steel midsole. |
| On eye damage caused by ejected particles, (corrosive) liquids and/or gases. | Use eye protection. |
| Take safety measures in the wrong bay. | Apply the 4-eyes principle. |
| By insufficient lighting. | Apply general workplace lighting and/or work with a headlamp. |
| To cold. | Use flame-retardant and antistatic work and industrial clothing with inner lining. Use flame retardant and antistatic helmet cap and neck protection or bandana. |
| To heat. | Wear airy / dry (summer) flame retardant and antistatic work clothing. Take a rest and drinking break regularly (guideline is 0.33cl of water per hour). Make sure there is always cooled water nearby. |

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| To sun. | Work in the shade and use sunscreen. Use safety goggles with UV protection. |
| On electrocution. | Work only voltage-free. Follow the disengagement procedure (5 steps procedure). Apply protection to adjacent active parts. Blocking by the use of padlocks. |
| On working in an unsafe (free from voltage) bay. | Mark the secured area with red-and-white chain or ribbon with marked entry and exit. |
| On feed back by measurement and/or proven activities. | Remove circuit breakers from the voltage transformers. |
| On re-energizing. | Short-circuit-proof and reliable earthing and short-circuiting of active parts. First connect the earth point and then the active parts. |
| Inductively or capacitive transmitted voltage. | Ground and short-circuiting active parts. |
| Working at height with a fall distance of 2.5 metres or more and in an aerial work platform. | Use fall protection. |
| To weather conditions. | Cease work in the event of lightning and leave the high-voltage room. |
| Wrongful switching. | Always use the as-built drawings, if necessary block out commands from protection relays. |

## Personal protective and safety equipment

Personal protection equipment (PPE)

- Flame retardant and antistatic safety clothing;
- Helmet, unventilated model (working voltage 1000V), Compliant with EN50365. Helmet, colour black for SP and NPcWA, colour white for others;
- Insulated safety footwear class S3 and class 0 (working voltage 1000V);
- Insulated gloves Class 0 (working voltage 1000V), Compliant with: EN 60903 RC;
- Eye protection, in accordance with NEN-EN 166:2001 en;
- Fall protection / harness.

Safety equipment (SE)

- Demarcate safe working area by means of a red/white chain/ ribbon with IN/OUT aisle;
- Demarcate unsafe area by means of a yellow/black chain/ ribbon;
- If necessary, short-circuit proof earthing 220kV = copper 70 $mm^2$ / alumn 120 $mm^2$;
- If necessary, short-circuit proof earthing 66kV = copper 90 $mm^2$ / alumn 170 $mm^2$;
- Padlocks, by means of a unique series/colour to be applied per activity;
- Earthing equipment.

**Procedure**

Prior tot he work

Before you start working, check the following:

Personal protection equipment (PPE):

- Do the personal protective equipment not contain any form of wear, dents or dents or contain cracks that adversely affect its operation?

Safety equipment (SE):

- Do the safety devices not contain any form of wear, dents or cracks that would adversely affect the operation?

Work permit:

- Is the work plan / work permit still valid?
- Is the above laying permit to work still valid?
- Are all the necessary signatures present?
- Does the work plan / work permit (incl. drawings) correspond?
- with the situation in the workplace?
- Are there any other work plans that could affect this work?

Workplace:

- Check for unwanted risks by means of an LMRA.
- Check that the job is correct with the situation in the workplace.
- Is there enough space to work safely?
- Is the workplace easily accessible?
- Is the workplace sufficiently illuminated: Light intensity ≥ 500lux; Light colour 4000 - 6000K?
- Is the workplace sufficiently shielded and/or cordoned off?
- Are the weather conditions good to start with the work activities??

If the above points are met, you may start the work activity. If this is not the case, the NPcWA must be contacted immediately. If the above points are no longer met during the work activity, the work must be stopped if it is safe to do so and the NPcWA must be contacted directly. If the situation is not safe, a safe situation must first be created before stopping the work and contacting the NPcWA.

## Isolating from voltage

**Step 1**

**Completely disconnect and ground the system**

- On demand of the NPcWA, carried out by the CO of the NCC by means of remote control.
- Switch off power circuit breaker(s).
- Switch off disconnector(s).
- Switch on 1st earting switch.
  In case of remote operation, a blocking TAG must be placed on the EMS in name of the NPcWA.

**Step 2** **Secure against reconnection**

Blocking the situation provided by the NCC against reconnection.

- Check that the positions of components correspond to the switching-plan.
- Switch relevant installation parts to local control.
- Attach component(s) to the relevant installation part of the circuit-breaker(s) of a padlock, if not possible provided with a 'do not switch' sign(s) or software blocking(s).
- Third parties can install a second padlock under the supervision of a SP.
  Place warning signs with text or icon 'do not switch' or software blocking(s) at the operating areas.

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|  | Persons involved in the insulation must be convinced that the situation as delivered by the NCC is blocked against reconnection and must agree with the NPcWA whether the additional safety measures may be implemented. |

## Additional safety measures

**Step 3** **Determine absence of operating voltage at the workplace**

- By checking measured values on bay controller/HV-console.
- By means of local control of positions of separator(s) and earthing device(s).

**Step 4** **Earthing and short-circuiting**

All parts of the high-voltage installation being worked on must be earthed and short-circuited.

- By switching on the other earthing devices.
- By means of placing work earthing (if necessary).
- For the relevant installation part, provide the isolating-switches of component(s) with a padlock, if not possible provided with a 'do not switch' sign(s) or software blocking(s).
- No visible grounding in the workplace?

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|  | If it is not possible to make a visible earthing connection at the workplace, it is necessary to make sure locally that the installation is adequately separated, earthed, blocked and locked. |

**Step 5** **Protection to adjacent active parts**

- Mark the secured area with red-and-white chain or ribbon with marked entry and exit.
- If there are parts of an electrical installation in the vicinity of the workplace that cannot be de-energized, special additional precautions must be applied.

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|  | Before work can commence, the additional safety measures must be coordinated with the NPcWA and recorded on the e-workplan. |

**Normalize and re-energize the installation**

1. Persons, materials and tools no longer needed from the workplace.
2. Persons involved in normalisation shall convince themselves that the part of the installation concerned is free of persons, materials and tools.
3. Lower but do not remove marking chain/tape.
4. Remove additional safety measures such as protective equipment.
5. Remove additional safety measures such as earthing and short-circuit accessories.

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|  | Persons involved in normalisation shall convince themselves that all previous additional safety measures have been lifted and shall agree with the NPcWA whether the situation as can be unblocked by the NCC. |

6. Have third parties remove their lock(s) under supervision of an SP.
7. Remove all GSO locking devices.
8. Removing the marking chain/tape.
9. Remove all local warning signs, blocking signs and the blocking TAGS on the EMS.
10. Check that the installation part is free of alarms.
11. Placing the respective installation part on remote control.
12. Delete the block TAG placed in name of the NPcWA on the EMS.
13. Normalize and re-energize the installation.

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**Controlling components outside the software-based interlocks.**

The unlock key of the bay controller (BC) is used to switch outside the software-based interlocks. This operation increases risk for man and installation. The unlock-key should therefore not be used for regular maintenance activities. See also ESI-003.

## Procedure in the event of an incident

- In the event of a near incident, the OIM and the NPcWA must be contacted immediately.
- In the event of an incident involving personal injury, first aid must be provided immediately. Immediately after that, the OIM and the NPcWA must be contacted.
- In the event of an incident without personal injury, first aid must be provided immediately. Immediately after that, the OIM and the NPcWA must be contacted.
- In all cases an incident must be reported, taking into account the privacy rights of the people involved.

## Procedure in the event of a deviation

- As soon as the execution of a work plan is hindered by a malfunction, the a SP in charge of the activities on site, supervisor or SP agrees with the NPcWA who then informs the NPcEI and OIM.
- After assessment of the situation, an LMRA and determination of the measures to stop the work activity (s) in a controlled way, the failure analysis can follow.
- As soon as the cause of the malfunction has been resolved or isolated, coordination with the NPcWA and OIM is necessary before the execution of the work plan can be resumed.
- The NPcWA informs the NPcEI of the disruption, depending on the nature of the disruption and the possible follow-up.

## Ending

When you're ready, do the following:

- Register the required maintenance data.
- Report to the NPcWA that the work is ready, the NPcWA informs the NPcEI.
- Leave the workplace clean, tidy and safe.
- Check the safety equipment before storage.