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Lock-out / tag-out and hazardous energy isolation

How Telic engineers make sure equipment is de-energised, locked and verified before maintenance, troubleshooting, repair or installation work.

Revision history: rev 0, 4 November 2026: new procedure; replaces the LOTO steps that were part of TE-PRC-06 section 2.

GE Vernova document requirements, Lock Out / Tag Out. Where each requirement is covered in this document:

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1. PURPOSE OF LOTO

Lock-out / tag-out (LOTO) prevents injury from the unexpected energisation, start-up or release of stored energy while someone is working on equipment. Telic engineers work on gas turbine, steam turbine, compressor and generator packages: control panels, MCCs, fuel and hydraulic actuation systems, instrumentation and fire suppression. These hold electrical, hydraulic, pneumatic, fuel, thermal, mechanical and chemical energy. This procedure applies to the director, engineers from Telic's network and subcontractors on every Telic assignment where maintenance, troubleshooting, repair or installation requires contact with such energy. Telic always works within the client's or installation's isolation and permit-to-work system; this procedure sets the minimum Telic requirements within that system. Where the site rules are stricter, they apply.

2. DEFINITION OF ZERO ENERGY STATE AND CONTROL OF ALL HAZARDOUS ENERGY SOURCES

Zero energy state means that every hazardous energy source that can reach the equipment or the work area has been isolated, locked and tagged, that stored or residual energy has been released or restrained, and that the absence of energy has been verified (section 3). The energy sources on Telic's equipment and how each is controlled:

Energy	Typical sources on turbine packages	Isolation and control of stored energy

Electrical	MCC and generator circuits, 110/230 VAC supplies, 24/125 VDC control and battery systems, UPS, heaters, motors	Breaker or disconnect opened and locked, fuses withdrawn, control power isolated, capacitors and UPS outputs discharged or isolated, battery strings disconnected where they feed the work
Hydraulic and lube oil	Accumulators, HPU, servo and trip oil, lift oil	Pump isolated and locked, accumulators bled, lines vented to zero at a gauge, bleed valves locked open
Pneumatic and instrument air	Actuators, air start, instrument air headers	Supply valve closed and locked, line vented, actuator springs restrained or at rest position
Fuel gas and liquid fuel	Fuel skids, metering valves, manifolds	Double block and bleed by operations, vented and gas-freed, spades where the site requires, gas test before intrusive work
Mechanical and rotational	Turbine rotor, generator, couplings, turning gear, starter	Start inhibit and starter isolated, turning gear locked out or engaged as required, rotor at rest confirmed
Thermal	Hot gas path, exhaust, enclosure	Cool-down period, surface temperature checked, hot surfaces barriered
Chemical and fire suppression	CO2, inert gas or water mist systems in enclosures, chemicals	Suppression inhibited and locked at the release panel, pilot cylinders isolated per site procedure, enclosure ventilated and gas tested
Gravity and spring	Raised covers, hatches, valve springs	Supported, pinned or blocked before work

Before any work the engineer identifies all energy sources from the drawings, P&IDs and single-line diagrams and confirms them with the site isolation authority. The isolation list is part of the permit and of the task risk assessment (TE-RA-01, TE-RA-04).

3. VERIFICATION OF ZERO ENERGY

After isolations are applied and before work starts, the engineer who will do the work verifies, personally, that the equipment is at zero energy:

- **Electrical:** test the meter on a known live source, test the circuit for absence of voltage on all conductors, test the meter again on the known live source (live-dead-live). Only meters rated for the circuit category are used.
- **Pressure:** read zero on a gauge at the work point and open a bleed; confirm no pressure recovery.
- **Rotation and start:** try-start attempted from the control system with the site operator, confirm the unit does not start and the start inhibit alarm is active; rotor at rest observed.
- **Fire suppression:** inhibit indication confirmed at the release panel and in the control system.
- **Gas:** gas-free test by the site's authorised gas tester for fuel and hazardous area work.

If the verification fails, work does not start: the engineer informs the isolation authority and the isolation is corrected and verified again. Verification is repeated after any break in the isolation, at shift change and when the engineer returns after leaving the site.

4. TAGS OR LABELS AFFIXED TO EACH LOTO LOCK

Every Telic lock carries a tag with: the name and company of the person who applied it, mobile number, date and time, the permit number and the equipment or task. Telic locks are personal, keyed differently, identified "Telic Engineering B.V." and used only for LOTO. The key stays with the person who applied the lock. Where the site issues its own locks and tags, those are used in addition and the site's tag format applies. Tags are never used alone where a lock can be applied (section 11).

5. REMOVAL OF ABANDONED LOCKS AND EMERGENCY REMOVAL OF LOTO LOCKS

A lock is removed only by the person who applied it, after that person has confirmed the work is complete or suspended safely, tools and people are clear and guards are refitted. Exceptions, both only through the site's isolation authority and never by a Telic engineer on his own:

- **Abandoned lock** (the owner has left the site or cannot be reached): the site isolation authority verifies that the owner is not at the equipment, makes every reasonable attempt to contact him (phone, accommodation, supervisor), records the attempts, inspects the equipment, and removes the lock under the site's documented lock-removal procedure with a second authorised person as witness. The owner is informed before he next returns to work.
- **Emergency removal** (fire, gas release, medical emergency, flooding): removal is authorised by the OIM, site manager or isolation authority, the work area is cleared first, and the removal is recorded and investigated afterwards (TE-PRC-08).

The Telic director is informed the same day when a Telic lock is removed by anyone other than its owner.

6. TRAINING

- Every engineer is briefed on this procedure before the first Telic assignment, yearly and when it changes; the briefing covers energy sources, the isolation sequence, personal locks and tags, verification of zero energy, group LOTO and the rule that nobody works on unverified equipment.
- Site LOTO and permit-to-work training as required by the client or installation, attended before work. Authorisation to apply isolations is granted by the site; Telic engineers do not operate site isolation points without that authorisation.
- VCA-VOL (director) and MIST or VCA (all engineers) include isolation awareness and permit-to-work. Electrical isolation and testing competence is documented per engineer.
- LOTO training is listed in the training plan TE-TRN-01 for both job categories, with frequency.

7. PROCEDURE FOR MORE THAN ONE PERSON (GROUP LOTO)

When more than one person works under the same isolation, each person applies his personal lock to the lock box or multi-lock hasp that holds the isolation keys; the isolation is not released until the last personal lock is removed. The site's isolation authority or permit holder applies the first lock and removes the last. At shift change the outgoing engineer removes his lock only after the incoming engineer has applied his and has verified zero energy himself (section 3). When Telic works with a client crew, Telic engineers join the client's group lock box; Telic locks are never applied to a key that another company holds without a hasp or lock box.

8. INSPECTIONS OR AUDITS TO VERIFY PROPER LOTO PRACTICES

- Before each task: the engineer checks his own isolation points, lock, tag and verification record against the permit (self-check, noted in the daily report).
- During the assignment: the director or lead engineer inspects LOTO practice on at least one task per assignment, and takes part in the site's permit and isolation audits when requested.
- Yearly: the director audits this procedure (application on recent assignments, incidents and near misses involving isolations, training records) as part of the HSE review in TE-HSE-01, and revises it where needed.
- Any deviation (missing tag, unverified isolation, lock removed by another person) is reported as a near miss (TE-PRC-08) and work stops until corrected (TE-PRC-09).

9. RESPONSIBILITIES FOR IMPLEMENTING THE LOTO PROGRAM

Role	Responsibility
Director (Remco Petersen)	Owns this procedure, provides personal locks and tags, trains and briefs engineers, assigns only engineers competent for the isolations in scope, inspects and audits LOTO practice, investigates deviations.
Lead engineer on site	Confirms the isolation list with the site isolation authority, coordinates group LOTO for Telic personnel, inspects LOTO practice on the task.
Every engineer	Identifies energy sources, applies his personal lock and tag, verifies zero energy himself, never works on unverified equipment, removes only his own lock, reports deviations.
Site isolation authority / permit holder	Applies and releases site isolations, authorises Telic locks, holds the lock box, performs abandoned-lock and emergency removal. Telic follows their instructions where stricter.

10. RISK ASSESSMENT AND ALTERNATIVE CONTROLS WHEN LOTO OR TAG-OUT IS NOT FEASIBLE

Some Telic tasks cannot be done at zero energy: live loop checks, control tuning, voltage and signal measurements, functional tests of running equipment. For these the engineer and the site isolation authority carry out a task risk assessment (form TE-RA-04, method TE-RA-01) that identifies the energy that remains, the people exposed and the alternative controls, and the work is done under a permit that states these controls. Minimum alternative controls:

- Energised work limited to measurement and adjustment through designed test points, terminals or software; no breaking of connections or removal of covers on live circuits above extra-low voltage.
- Partial isolation of everything that is not needed for the test; start inhibit and trip protection kept active; test agreed with the control room with hold points and abort criteria.
- Insulated and rated tools and meters, arc-rated PPE, barriers and signs, second person present (never alone, TE-PRC-05), communication with the control room.
- Written approval of the site isolation authority on the permit before the work starts.

11. TAG-OUT ONLY PROCEDURES WITH ADDITIONAL MEANS OF HAZARDOUS ENERGY CONTROL

Tag-out without a lock is used only when the isolation device physically cannot accept a lock and the site isolation authority confirms this in writing on the permit. A tag-out then always has at least one additional means of energy control that gives protection equivalent to a lock, for example: removal of fuses or control links, withdrawal of the breaker to the racked-out position, disconnection of a plug or coupling, closing and chaining of a valve, removal of a drive belt or coupling spacer, or a second isolation point in series. The additional means is recorded on the permit, the tag is applied at the isolation point and at the control location, and verification of zero energy (section 3) is repeated before work. Tag-out only is never used for group work on energised electrical systems.

Signed on behalf of Telic Engineering B.V. (digitally signed)
Remco Petersen, Director · 4 November 2026

Digitally signed by Remco Petersen
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