This report is the National Regulator’s preferred method for surveyors or licensed electrical contractors to monitor and record the initial electrical – Low Voltage survey for a Domestic Commercial Vessel. It is a minimum set of information expected by the National Regulator, it is not intended to be an exhaustive list.

**Vessel Details**

Vessel name Unique identifier

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| --- | --- | --- |
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Details and serial number of generator(s) Details and serial number of inverter(s)

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Model and calibration date of insulation testing device Model and calibration date of RCD testing device

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| --- | --- | --- |
|  |  |  |
| Model and calibration date of earth loop testing device |  |  |
|  |  |  |

Details and serial number of generating set/sets Details and serial number of generator engine

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| --- | --- | --- |
|  |  |  |
| Details and serial number of generator alternator |  |  |
|  |  |  |

Name of accredited surveyor /electrical contractor Accreditation/electrical contractor number

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| --- | --- | --- |
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Name on electrical certificate of compliance Certificate of compliance reference number

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| --- | --- | --- |
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**General Inspection**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| Electrical drawing/s | Verify an approved wiring diagram signed by a person holding surveyor category (a) – electrical is provided | choose |  |
| Circuits | Verify that circuits are correctly installed per approved wiring diagram  Verify that circuits and conductors are correctly marked as per approved drawings | choose |  |
| System voltage | Is the vessel fitted with a High Voltage electrical system? | choose |  |
| Cables condition | Verify there is no evidence of overheating, burning or cracking | choose |  |
| Conductor insulation | Verify switchboard and electrical equipment conductor insulation is not deteriorated or damaged | choose |  |
| Cable manufacturer, type and temperature rating | Confirm cable colours conform with the applicable requirements  Identify and record details of wiring | choose | Record details: |
| Cable securing and support | Verify cable/wiring and electrical equipment is adequately supported and secured | choose |  |
| Penetration of bulkheads or decks | Verify cable penetrations are effectively protected from mechanical damage  Verify watertight & fire rated bulkhead or deck penetrations maintain integrity | choose |  |
| Mechanical protection for cables | Verify cables have appropriate mechanical protection for cables the environment in which they are installed | choose |  |
| Damage - electrical fittings, fixtures and appliances | Verify electrical fittings, fixtures and appliances exhibit no mechanical damage and there is no evidence of overheating. | choose |  |
| IP rating | Verify electrical equipment is appropriately IP rated and fit for purpose | choose |  |

**Switchboards**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| Separation of electrical systems | Verify LV and ELV systems are adequately separated | choose |  |
| AC DC system segregation | Verify AC and DC systems are segregated | choose |  |
| Insulation and distance between live conductors | Verify the here is adequate insulation and distance between live conductors and between live conductors and earth; where the conductors are bare | choose |  |
| Labelling - switch and protective | Verify switches and protective devices are clearly labelled showing the circuit type they control or protect | choose |  |
| Labelling - inverter | Verify when an inverter is installed, the hazard warning label is fitted to or beside the ac switchboard | choose |  |
| Earth connection | Verify the main earthing conductor from the boat earth is correctly connected at the main switchboard | choose |  |
| Switchboard arrangement | Verify the switchboard is constructed and installed in such a manner that, in the event of fire, the spread of fire will be kept to a minimum | choose |  |
| Conductor termination | Verify conductors are securely held in terminals or fittings and are not subject to tension at the terminations | choose |  |
| Conductor termination | Earthing connections are mechanically sound and fixed by a secure system | choose |  |

**Earthing and Equipment Potential Bonding**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| Main earth accessibility | Verify the main earthing and equipotential bonding conductor terminations are accessible | choose |  |
| Earth connections | Earthing and bonding connections are protected against mechanical damage, corrosion and vibration. | choose |  |
| Conductor identification and arrangement | Verify conductors of cables are correctly identified and are connected to the correct terminals of fittings | choose |  |
| MEN | Verify that in if MEN system, the neutral to earth bond is made at each generator | choose |  |
| Earth fault monitoring | Verify if isolated earth electrical system that an earth fault monitor or insulation  resistance monitor is fitted and functioning | choose |  |

**Fixed Appliances**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| Appliance specification and arrangement | Verify appliances are correctly positioned and are suitable for the environment they are located in | choose |  |
| Appliance specification and arrangement | Verify electrical appliances are correctly mounted and protected against mechanical damage | choose |  |
| Appliance specification and arrangement | Electrical fittings in damp areas have the correct IP rating and are appropriate for the zone | choose |  |
| Fixed wired appliance condition | Verify covers of fixed-wired appliances are not broken or missing, giving access to live parts or basic insulation | choose |  |

**Shore Power**

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| Shore power arrangement – all systems | Verify a circuit breaker operating in all live conductors of the supply, including neutral, is fitted adjacent to the shore supply inlet on the vessel. Note number of power inlets | choose | Record No. Inlets: |
| Shore power arrangement – all systems | Verify a test device, connected on the supply side of the vessel's shore supply circuit breaker to check, and visually indicate, the polarity of the shore supply in relation to the vessel's system is fitted | choose | Record location: |
| Shore power arrangement – all systems | Verify an interlocking circuit to ensure the shore power cannot be connected unless the polarity is correct or a polarity reversal arrangement incorporating interlocking circuitry is installed | choose | Record location: |
| Shore power arrangement – all systems | Mechanical and electrical interlocks to prevent the paralleling of onboard generation with shore power | choose |  |
| Shore power arrangement – three phase systems | Verify a means of checking the phase sequence in relation to the vessel's system; is fitted | choose | Record location: |
| Shore power arrangement – three phase systems | Verify appropriate switchgear to facilitate the reversal of phase sequence is fitted | choose |  |
| Galvanic isolation | Test galvanic isolator and record result | choose | Record of results |
| Shore power connection notice | Verify a notice containing the following information is provided at the shore connection facility on the vessel:   1. Supply voltage 2. Frequency of the vessel’s ac system 3. The procedure for carrying out the connection | choose | Record location: |

**Verification by Testing**

**Earth Continuity Tests**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| Earth continuity arrangement | Verify earth continuity between the vessel’s earth and the shore earth is maintained through an appropriate pin in a plug/socket shore power connection or by a dedicated earth terminal in a shore supply connection that uses terminals | choose |  |
| Earth continuity | Verify the connection between any point on the installation required to be earthed and the switchboard earth bar or terminal is continuous | choose |  |
| Main earth resistance | Verify the main ac earthing conductor between the main ac switchboard and the boat electrical earth is continuous and the resistance of the main earthing conductor does not exceed 0.5 Ω (Ohms) | choose |  |
| Earth resistance | Verify the resistance of each equipotential bonding conductor does not exceed 0.5 Ω (Ohms) | choose |  |
| Earth connection | Verify fixed wired appliances requiring earthing (Class I) are connected to earth | choose |  |
| Earth loop impedance test | With the boat connected to shore power an earth fault loop impedance test shall be carried out from each ac outlet on the boat to confirm that the earth loop impedance in ohms complies with AS/NZS 3000 | choose |  |

**Polarity and Correct Connections**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| Multiphase circuit isolation | Verify that in multiphase circuits, a switch, or circuit-breaker when used as an isolator, operates simultaneously in all active conductors of the circuit in which it is connected | choose |  |
| Neutral conductor connection | Verify neutral conductors of circuits are connected to the neutral bar of the switchboard from which the circuit is supplied | choose |  |
| Single phase socket connection | Verify single phase socket-outlets that accommodate flat-pin plugs are connected so that, when viewed from the front of the socket-outlet, earth, active and neutral are connected in a clockwise order and the earth is connected to the slot on the radial line | choose |  |
| Multiphase socket connection | Verify where multiphase socket-outlets of the same type form part of an electrical installation the phase sequence of the socket-outlets shall be the same | choose |  |
| Multiphase lead connection | Verify the polarity of the supply lead and appliance inlet is compatible | choose |  |

**RCD and Insulation Testing (RCD trip time and current to be recorded)**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| RCD arrangement | Verify every RCD operates in the live conductors (active and neutral) of the circuit(s) to which it is connected | choose |  |
| RCD testing | Verify the correct operation of RCD has been verified by the use of special test equipment | choose |  |
| RCD testing | Verify tests have been performed on each final sub circuit protected by an RCD to verify that the RCD operates to disconnect the designated circuit | choose |  |
| Insulation testing | Verify an insulation resistance test has been carried out with test instruments to ensure, so far as practicable, that there is adequate insulation between live parts and earth and between ELV and LV systems | choose |  |

**a.c. Electrical Power Sources**

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| --- | --- | --- | --- |
| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| Non-synchronised supply load transfer arrangement | Confirm transfer from one non-synchronized ac power source circuit to another is made by a means which opens all current-carrying conductors before closing the other source circuit and is interlocked by mechanical or electromechanical means | choose |  |
| Testing of synchronised ac power sources | Function test under/over voltage protection  Function test under/over frequency protection  Function test reverse power protection – generators  Function test backfeed protection – inverters  Confirm switchboard electrical instruments are indicating values within ±5% of the values indicated by the test instruments | choose |  |

**Operational (Commissioning) Tests**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| Generator operation | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Engine Governors | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Parallel operation | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Load sharing | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Voltage regulator operation by instantaneous loading and unloading of generator | Verify against manufactures specification | choose | Record details/settings: |
| Safety devices, such as overspeed trips, reverse power trips, over current trips, load shedding together with the associated controls and alarms | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Overload alarm circuits of essential service motors | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Main engine safety alarms and trips | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Machinery and equipment that incorporates remote controls, remote stops and limit switches | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Emergency stop circuits | Witness operation  Verify against manufactures specification | choose |  |
| Vessel alarm systems | Witness operation  Verify against manufactures specification | choose | Record details/settings: |
| Other systems and equipment installed in the vessel | Witness operation  Verify against manufactures specification | choose | Record details/settings: |

**Emergency Electrical Installations**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
| Code for compliance | Verify the location of the emergency supply complies to NSCV | choose |  |
| Emergency supply arrangement | Confirm equipment required to be supplied with emergency power is supplied when energised | choose |  |
| Emergency supply capacity | Verify the capacity of the emergency power supply complies with approved design | choose |  |
| Emergency lighting | Verify emergency lighting complies with approved design | choose |  |

**Additional tests carried out**

| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| --- | --- | --- | --- |
|  |  | choose |  |
|  |  | choose |  |

**Design approval compliance**

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| --- | --- | --- | --- |
| **Item** | **Survey checks** | **Y/N/NA** | **Surveyor Comments/ drawing / document reference** |
| In accordance with approved plans | The vessel’s lv electrical systems are constructed in accordance with the approved plans and design documentation. | choose |  |

**Declaration**

I declare that:

* I have conducted survey(s) as indicated, of the above mentioned vessel, in accordance with the applicable standards as set out in Marine Order 503 Certificates of Survey, and that to the extent evident from the inspection/s carried out I am satisfied that the vessel meets the standards.
* I consent to the Australian Maritime Safety Authority using and disclosing the information provided in this form for purposes associated with the administration of the Marine Safety (Domestic Commercial Vessel) National Law Act 2012.
* I understand and acknowledge that the Australian Maritime Safety Authority, as the National Regulator, may ask that I provide any information or document that the National Regulator reasonably considers necessary in relation to this recommendation.

Signature of accredited surveyor or electrical contractor Date

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