Australian Government
Australian Maritime Safety Authority

ELECTRICAL INITIAL SURVEY REPORT

Marine Safety (Domestic Commercial Vessel) National Law Act 2012
Marine Order 503 (Certificates of survey – national law) 2018
National Law – Marine Surveyors Accreditation Guidance Manual 2014

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

Details and serial number of generator(s)

Details and serial number of inverter(s)

Model and calibration date of insulation testing device

Model and calibration date of RCD testing device

Model and calibration date of earth loop testing device

Details and serial number of generating set/sets

Details and serial number of generator engine

Details and serial number of generator alternator

Name of accredited/licenced person

Accreditation/Licence number

Name on electrical certificate of compliance

Certificate of compliance reference number

General Inspection

Item	Survey checks	✓/✕/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		
Circuits	Verify that circuits are correctly installed per approved wiring diagram Verify that circuits and conductors are correctly marked as per approved drawings		
System voltage	Is the vessel fitted with an High Voltage electrical system?		
Cables condition	Verify there is no evidence of overheating, burning or cracking		
Conductor insulation	Verify switchboard and electrical equipment conductor insulation is not deteriorated or damaged		
Cable manufacturer, type and temperature rating	Identify and record details of wiring		
Cable securing and support	Verify cable/wiring and electrical equipment is adequately supported and secured		

Item	Survey checks	✓/✕/NA	Surveyor Comments/ drawing / document reference
Penetration of bulkheads or decks	Verify cable penetrations are effectively protected from mechanical damage Verify watertight & fire rated bulkhead or deck penetrations maintain integrity		
Mechanical protection for cables	Verify cables have appropriate mechanical protection for cables the environment in which they are installed		
Damage - electrical fittings, fixtures and appliances	Verify electrical fittings, fixtures and appliances exhibit no mechanical damage and there is no evidence of overheating.		
IP rating	Verify electrical equipment is appropriately IP rated and fit for purpose		

Switchboards

Item	Survey checks	✓/✕/NA	Surveyor Comments/ drawing / document reference
Separation of electrical systems	Verify LV and ELV systems are adequately separated		
AC DC system segregation	Verify AC and DC systems are segregated		
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		
Labelling - switch and protective	Verify switches and protective devices are clearly labelled showing the circuit type they control or protect		
Labelling - inverter	Verify when an inverter is installed, the hazard warning label is fitted to or beside the ac switchboard		
Earth connection	Verify the main earthing conductor from the boat earth is correctly connected at the main switchboard		
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		
Conductor termination	Verify conductors are securely held in terminals or fittings and are not subject to tension at the terminations		
Conductor termination	Earthing connections are mechanically sound and fixed by a secure system		

Earthing and Equipment Potential Bonding

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

Item	Survey checks	✓/✕/NA	Surveyor Comments/ drawing / document reference
	resistance monitor is fitted and functioning		

Fixed Appliances

Item	Survey checks	✓/✕/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		
Appliance specification and arrangement	Verify electrical appliances are correctly mounted and protected against mechanical damage		
Appliance specification and arrangement	Electrical fittings in damp areas have the correct IP rating and are appropriate for the zone		
Fixed wired appliance condition	Verify covers of fixed-wired appliances are not broken or missing, giving access to live parts or basic insulation		

Shore Power

Item	Survey checks	✓/✕/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		
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		
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		
Shore power arrangement – all systems	Mechanical and electrical interlocks to prevent the paralleling of onboard generation with shore power		
Shore power arrangement – three phase systems	Verify a means of checking the phase sequence in relation to the vessel's system; is fitted		
Shore power arrangement – three phase systems	Verify appropriate switchgear to facilitate the reversal of phase sequence is fitted		
Galvanic isolation	Test galvanic isolator and record result		Record of results
Shore power connection notice	Verify a notice containing the following information is provided at the shore connection facility on the vessel: a) Supply voltage b) Frequency of the vessel's ac system c) The procedure for carrying out the connection		

Verification by Testing

Earth Continuity Tests

Item	Survey checks	✓/✕/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		
Earth continuity	Verify the connection between any point on the installation required to be earthed and the switchboard earth bar or terminal is continuous		
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 05 Ω		
Earth resistance	Verify the resistance of each equipotential bonding conductor does not exceed 05 Ω		
Earth connection	Verify fixed wired appliances requiring earthing (Class I) are connected to earth		
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		Record results

Polarity and Correct Connections

Item	Survey checks	✓/✕/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		
Neutral conductor connection	Verify neutral conductors of circuits are connected to the neutral bar of the switchboard from which the circuit is supplied		
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		
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		
Multiphase lead connection	Verify the polarity of the supply lead and appliance inlet is compatible		

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

Item	Survey checks	✓/✕/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		
RCD testing	Verify the correct operation of RCD has been verified by the use of special test equipment		
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		
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		

a.c. Electrical Power Sources

Item	Survey checks	✓/✕/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		
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		

Operational (Commissioning) Tests

Item	Survey checks	✓/✕/NA	Surveyor Comments/ drawing / document reference
Generator operation	Witness operation Verify against manufactures specification		Record details/settings:
Engine Governors	Witness operation Verify against manufactures specification		Record details/settings:
Parallel operation	Witness operation Verify against manufactures specification		Record details/settings:
Load sharing	Witness operation Verify against manufactures specification		Record details/settings:
Voltage regulator operation by instantaneous loading and unloading of generator	Verify against manufactures specification		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		Record details/settings:

Item	Survey checks	✓/✕/NA	Surveyor Comments/ drawing / document reference
Overload alarm circuits of essential service motors	Witness operation Verify against manufactures specification		Record details/settings:
Main engine safety alarms and trips	Witness operation Verify against manufactures specification		Record details/settings:
Machinery and equipment that incorporates remote controls, remote stops and limit switches	Witness operation Verify against manufactures specification		Record details/settings:
Emergency stop circuits	Witness operation Verify against manufactures specification		
Vessel alarm systems	Witness operation Verify against manufactures specification		Record details/settings:
Other systems and equipment installed in the vessel	Witness operation Verify against manufactures specification		Record details/settings:

Emergency Electrical Installations

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

Additional tests carried out

Item	Survey checks	✓/✕/NA	Surveyor Comments/ drawing / document reference

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 surveyor or licenced person

Date