



AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Signalling)

Category: Procedure

# Testing and Certifying Equipment Worked on or Altered During Maintenance

## ESM-00-10

### Applicability

ARTC Network Wide	✓	CRIA (NSW CRN)	✓
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### Primary Source

SMP 10
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### Document Status

Version	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
1.3	13 August 2010	Standards	Manager Standards	Exec Manager SS&P 25/06/2010	CEO

### Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
1.0	2 October 2008		First issue. Supersedes NSW Standard SMP 10 v1.2
1.1	7 October 2009		Disclaimer updated as per Risk & Safety Committee 14/09/2009
1.2	25 June 2010		Residual NSW standard SMP 10 retained. ESM-00-10 partially supersedes SMP 10.
1.3	13 August 2010	All	Issued as final.

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# Contents

1	General - Take Adequate Precautions, Test on Completion .....	3
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# 1 General - Take Adequate Precautions, Test on Completion

This document defines the signalling procedures to be followed for the testing and certifying of signalling equipment worked on or altered during maintenance.

When working on signalling equipment which involves disconnection, disarrangement, disassembly or adjustment, signalling maintainers must take adequate precautions during the work and carry out proper tests at the completion of the work proportional to the risk of incorrect reconnection, assembly or adjustment and a resultant irregularity or function failure.

In all cases, where work on vital signalling equipment involves disconnection, disarrangement, disassembly or adjustment then, the principle shall be that,

- the equipment is worked on in accordance with the appropriate Network Rules and Procedures.
- adequate precautions are taken to eliminate the probability of incorrect reconnection, assembly, replacement or adjustment.
- the equipment is tested to function correctly after the work is completed
- the work is recorded and the appropriate document/s signed by the signalling maintainer which shall signify that it has been tested and functions correctly, e.g. MST.
- where it is not practical to obtain prior authority, the details are to be promptly brought to the attention of the Signal Manager, Signal Engineer or Signal Team Manager.
- Where it is required the documentation is submitted to the Signal Manager, Signal Engineer or Signal Team Manager, who actions it appropriately and retains the documented report on file.

The Signal Manager, Signal Engineer or Signal Team Manager shall ensure that documentation submitted is adequate and satisfy him/herself that the work has been properly carried out.

Signalling maintainers are to perform inspections and tests that will satisfy the certification requirements for the particular work.

A list of various types of inspections and tests used to verify correct physical and functional compliance is set out in the Signalling Test Procedure contained within the Signal Construction Procedures.

**TYPICAL INSPECTIONS AND TESTS TO VERIFY PHYSICAL & FUNCTIONAL COMPLIANCE**

Apparatus Inspection:	Verify correct configuration, type, colour, labelling, inscriptions, positioning, clearances, rating, warding/pin coding/indexing, tightness, secureness, lock-up security, damage free, quality workmanship, no loose wires, extraneous items/material removed, temporary wiring/bridging removed.
Wire Count:	Verify correct number of conductors on terminals, also tightness and termination workmanship.
Null Count:	Verify no conductors on spare terminals.
Insulation Test:	Megger test insulation of conductor to earth, frame, cable screen/drain, cable spare conductors.
Bell Continuity Test:	Bell/meter test for conductor continuity between wire termination points.
Hand Trace:	Verify conductor runs directly (ie. No intermediate connections) between two wire termination points by hand tracing.
Apparatus Function Test:	<p>Test apparatus operates correctly from its local controls and power source and indicates its status correctly to local indications.</p> <p>Verify apparatus operates its contacts in correct correspondence and adjustment.</p> <p>Verify mechanisms operate freely and within specified tolerances and in correct adjustment and that lights are correctly illuminated and focused/aligned.</p> <p><i>(1. Local operation and correspondence test, 2. Contact proving test, 3. Adjustment test)</i></p>
Contact Proving Test:	Test apparatus opens and closes its contacts in correct correspondence and adjustment.
Circuit Function Test:	Test the circuit function energises and de-energises when its control devices change state and when fuses, links are removed and replaced.
Circuit Strap and Function Test:	Test the circuit function is energized and de-energised by the specified contacts of its control devices when those individual contacts open and close, also when fuses, links are removed and replaced.
Function Test to Control Tables:	Test that functions interlock and/or control one another, in accordance with the control table.
Through Circuit Test:	Circuit function test the completed circuit over outgoing/incoming cable links and verify correct correspondence.
Through System Test:	Test correspondence from initial input to final output for controls and indications combined.
Track Circuit Shunt Test:	Test track relay is dropped away when the track circuit is shunted by a train (Train Shunt Check) or by a fixed shunt of the correct value at the relay end (Fixed Shunt Check) or by a fixed shunt at all extremities (Fixed Shunt Test).
Track Circuit Polarity Test:	Test for polarity reversal at block joints between adjoining track circuits, at all extremities.
Power Supply Polarity Test:	Test power supply polarity is correct and has not been reversed when transformers are changed or when wiring is worked on
Power Supply Isolation Test:	Test that power supply busbars are free of earths. Test that power supplies busbars are not interconnected.
Mechanical Locking Test:	Test mechanical locking (to Locking Table, Locking Diagram, Working Sketch) of interlocking frames, release switch locks, electric locks, releasing keys, annett locks, pilot man's locks, half pilot staff locks, staff instruments, staff contact boxes, bolt locks, bracket locks, mechanical detectors/selectors, train bars, depression bars, facing point lock bars, emergency switch machine locks, etc.