

Testing of Interlockings – Maintenance Responsibilities

ESP-05-01

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Table of Contents

Table of Contents	2
1 Testing and Interlockings.....	3
1.1 Testing New Works and Alterations.....	3
1.2 Periodic Maintenance Interlocking Tests	3
1.3 Mechanical Locking.....	3
1.4 Relay Interlockings.....	3
1.4.1 Testing Interlockings.....	4
1.5 Computer / Processor Based Interlockings.....	5
1.6 Periodic Maintenance Interlocking Tests	5
1.7 Documentation	5
2 Appendix 1– Test Certificates (examples only).....	6

1 Testing and Interlockings

1.1 Testing New Works and Alterations

Requirements for testing and certifying new works and alterations are detailed in ESC-21-02 Inspection and Testing of Signalling – Plans, Programs, Documentation and Packages.

For new and altered works, form *ESP0501F-02 Design Integrity/Control Table Function Test Certificate* is to be used, which would also encompass the certification testing of relay interlockings.

1.2 Periodic Maintenance Interlocking Tests

Periodic maintenance interlocking tests shall be carried out by a Signal Maintenance Engineer or suitably qualified person that has been accredited to test interlockings for the primary reason of checking the interlocking and ensuring that it remains in accordance with the locking tables or interlocking portion of control tables, the locking diagrams and the working sketches/signalling plans.

For mechanical and relay interlocking, form *ESP0501F-01 Mechanical/Relay Interlocking Test Certificate* should be used.

Equipment that is permanently locked out of use is not required to be tested.

1.3 Mechanical Locking

Mechanical locks and mechanical interlocking frames are subject to wear and tear and do not have redundant interlocking.

Interlocking tests on mechanical interlocking frames of greater than four (4) levers shall be completed and certified on a *ESP0501F-01* certificate by a suitably accredited Signal Maintenance Engineer as per signalling Technical Maintenance Plan (TMP).

Mechanical interlocking frames of (4) levers or less shall be tested as per Signalling TMP.

Locking tests are also performed to ensure that mechanical locking items (such as, releasing switch locks, annett keys, annett locks, duplex locks, half pilot staff locks, emergency locks, bolt locks, bracket locks, staff contact locks, staff drawer locks, key staffs, loose keys, emergency switch machine locks, SL and XL locks on points) are effectively operational, safe and secure, and in accordance with Locking Tables, Control Tables, Locking Diagrams and Working Sketches/Signalling Plans. A signalling maintainer may be trained and competency assessed to perform these inspections and tests.

Signalling notice boards should be checked as part of the interlocking certification.

1.4 Relay Interlockings

Standard relay interlockings and route control relay interlockings contain some redundancy for safety spread over the interlocking and control circuits.

Relay interlocking integrity may be reduced by mechanical deterioration of relays or by the deterioration of circuit and/or equipment insulation through aging, termite or rodent attack, overheating, fire, lightning damage etc or by electrical leakage paths tracking across insulating surfaces.

Defects, mechanical or electrical, which hold a relay falsely energised, are likely to be brought to early attention due to the back proving or cross proving of relays or due to equipment malfunction.

However, defects of a type which result in part of the selection in an interlocking circuit being bridged out may not necessarily come to attention.

Reliable earth leakage detection equipment and bus-bar voltage leak to earth tests together with down proving of relays assist in guaranteeing the integrity of relay interlocking.

Interlocking relays and interlocking circuits are required to fully comprise:

1. plug-in relays; and
2. P.V.C. insulated and sheathed cables; and
3. double switched external circuits to relays used for interlocking; and
4. reliable earth leakage detection fitted to vital supplies for interlocking circuits;

Where the above four requirements are not complied with, signal engineer are required to assess the risk during the inspection and take appropriate actions to mitigate the risk.

The mechanical locking associated with relay interlocking areas, (e.g., ground frames, releasing switches, annett locks and keys, E.S.M.L.'s etc), must be tested and certified as per Signalling Technical Maintenance Plan, in accordance with applicable Locking Tables, Control Tables, Locking Diagrams and Working Sketches/Signalling Plans, as described for Mechanical Locking, and the ESP0501F-01 certificate shall be completed.

1.4.1 Testing Interlockings

The testing Engineer must ensure that the interface used for testing does not have logic that will mask the locking performance of the interlocking. This may typically be in the form of pre-test functions in a control system that prevent a command being sent to the interlocking.

Where this is the case an alternative interface is to be used such as a hardwire local control panel. Where this is not available a local control function on a portable maintenance computer may be used.

1.5 Computer / Processor Based Interlockings

A configuration of the data on all computer based signalling safety equipment is to be undertaken and recorded. This shall confirm the data and executive software versions, dates and checksums for each piece of equipment.

Where the data is on EPROM and the version details are not accessible electronically, then alternate processes to identify the version can be used.

For each Computer Based Interlocking the respective design shall be used to check that installed data matches to the design. Any differences shall be reported to the Manager for action.

1.6 Periodic Maintenance Interlocking Tests

Form ESP0501F-01 is the form to be used as “Mechanical / Relay Interlocking Test Certificate”.

1.7 Documentation

Interlocking Tests shall be undertaken using the information on the locking requirements implemented. This is recorded in the Locking Table.

2 Appendix 1– Test Certificates (examples only)

MECHANICAL/RELAY LOCKING TEST CERTIFICATE

MECHANICAL/RELAY LOCKING TEST CERTIFICATE

To be issued to the Project Manager or the responsible Signal Maintenance Engineer or Manager.

Commissioning Engineer for new works only:

Name: Signature: Date:

Purpose:

To Certify that * Mechanical / Relay locking is correct.

The * Mechanical / Relay Interlocking test at was completed and Certified correct

and are as designed, in accordance with the Control / Locking table title / No.

Dated:

The test was completed on Date at Time

Accredited Signal Discipline Tester Name: Date:

Tester Signed:

Received & reviewed by * Commissioning or Signal Maintenance Engineer or Manager

Signed: Date:

* Delete that not required

DESIGN INTEGRITY/CONTROL TABLE FUNCTION TEST CERTIFICATE

To be issued by the Commissioning Engineer.

Test Engineer Name: Date:

To be issued to: The Project Manager or the Responsible Signal Maintenance Engineer or Manager

Project/Job:

To Certify that * Design Integrity / Control Table Function Testing is correct.

The * Design Integrity / Control Table Function Test at completed

and Certified Correct on at Time is in accordance

with Control Table Title / No.

Dated: and / or

Design Integrity Test Plan Title / No. Dated:

Tester Engineer Signed:

Received by * Project Manager or the Responsible Signal Maintenance Engineer or Manager

Signed: Date:

* Delete Design Integrity Test where function testing is not carried out from signalling principles but directly from control table.

MICROLOK CONFIGURATION DATA FORM

Interlocking Locality: Signal Job No: Circuit Book No.:
Commissioned Date: Project Name:
Remarks:

Location	Compiled File Name	Size (kb)	Date	Time	Address	Version	Check Sum	Application Image CRC	Executive Version	Executive CRC

Example Only

CONFIGURATION CERTIFICATION
(To be signed by the nominated Configuration representative)

I certify that the data detailed above is a true copy of the Microlok data that is recorded in the Microlok Data configuration record.

Signed: Name:
Position: Date:

MAINTENANCE CERTIFICATION
(To be signed by the nominated)

I certify that the data detailed above is a true copy of the installed Microlok data.

Signed: Name:
Position: Date: