

Like for Like Renewals

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1 Introduction

1.1 Purpose

This procedure specifies requirements to perform Like for Like Renewal of signalling apparatus.

1.2 Scope

This procedure covers signalling personnel in performing Like for Like equipment renewals by providing suitable documentation that assists them in ensuring that all the required tests and checks have been completed before permitting the equipment to be booked back into service.

1.3 Reference Documents

The following documents support this procedure:

- SMP 01 Introduction to Signalling Maintenance
- ESM-00-10 Testing and Certifying Equipment Worked on or Altered During Maintenance
- ESM-24-01 Bridging or False Feeding Signalling Circuits as necessary
- SMP 08 Booking Signalling Equipment Out of Use
- ESM-00-12 Disconnection of Signalling Apparatus
- ESM-06-01 Facing Point Lock and Detection Testing
- SMS 04 Mechanical Points and Ground Frames
- SMP 31 Maintenance of Signal Sighting and Signals
- ESM-05-11 Vital Signalling Relays
- ESI-05-01N Level Crossing Monitor – Hardware Reset
- SMS 13 Road Level Crossing Monitoring Equipment
- SMS 02 Cerberus Level Crossing Monitoring Equipment
- SMP 36 Level Crossings
- SMS 14 Pedestrian Level Crossing Protection Equipment
- SMP 42 Work on Signalling Power Mains
- SMP 12 Repair/Replacement of Signalling Wires
- ESM-07-01 Track Circuits

1.4 Definitions

The following terms and acronyms are used within this document:

Term or acronym	Description
AMC	Type of card for Frauscher ACS2000 axle counter
ACB	Type of card for Frauscher ACS2000 axle counter
ARTC	Australian Rail Track Corporation

CBI	Computer Based Interlocking
CPU	central processor unit in telemetry or CBI system
EOL	Emergency Operation Lock
ESML	Emergency Switch Machine Lock
GAK	Trackside connection box for Frauscher ACS2000 or FADC axle counter
IBA	Infrastructure Booking Authority or Infrastructure Booking Advice Form
LED	Light Emitting Diode
Microlok II	A type of computer based interlocking
Operating rules and procedures	This includes: Network Rules, National Code of Practice and ARTC Addendum, TA20 Rule Book
Renewal	This is the replacement of an item of equipment with an identical item
RX	Track circuit receiver
TX	Track circuit transmitter
UM71	Type of audio frequency track circuits
Signal Engineer	Reference to Signal Engineers also includes CTC Engineer
Signal Technician	Includes Signal Electrician, Signal Electrical Maintainer, Signal Maintainer

2 General

Renewal of vital signalling equipment shall be done in accordance with the following:

- Applicable operating rules and procedures. See also ESM-00-12 section 2.8 Routine Maintenance for special situations.
- The restored equipment shall be tested and certified correct before the apparatus is used for rail traffic operations.
- All equipment must be type approved.
- The person has the competency for the specific item of equipment at level 2 or above
- There is coordination with the network controller as to the time required to do the work and restore the equipment to service and agreement for the work to be undertaken.

Where there is any modification required to the principle of the circuits, approved circuit design drawings are to be obtained before any alteration is carried out. These instances are not covered by this Procedure.

2.1 Renewal of Consumable items

The renewal of consumable items such as fuses, lamps and other pluggable items which are indexed against incorrect insertion are exempt from this procedure (not including plug-in style relays). The circuit will be subjected to a functional test of the replaced component, ensuring correct set up, adjustment and certification.

2.2 Plug In Relay Replacement

To aid in the correct removal and installation of the plug-in relay a 'Quick Reference Guide' is provided, refer to ESM0020F-03. The 'Quick Reference Guide' offers guidance on the process that should be followed from removal to installation. It also gives advice on the checks that are to be conducted prior to insertion of the new relay.

2.3 Replacement of Components without a Work Instruction or Signal Engineer Authorisation

It is permissible to replace components (including their pins and fasteners) without a work instruction or Signal Maintenance Engineer authorisation where there is minimal risk or error. This covers items that may need adjustment but do not have data or configurable plugs or links.

In such cases it is required that the replacement item is the same item and model as the component being replaced.

The comments section of the applicable maintenance card must be updated detailing the reason for the like for like change.

Examples of items that are in this category are detailed below. Refer to the Signal Engineer for other items that may be covered by this process.

Plug in modules

- Track circuit TX
- Track circuit RX

- Relays (plug in type only) (Refer to section ESM0020F-03 for 'quick reference guide' on removal and installation of a relay (plug in)).

Track side equipment

- Tuning Unit, Matching Unit
- Track filter unit
- UM71 compensating capacitor
- Shunts
- Pot heads
- Axle counter GAK and axle counter head

Other equipment

- Contact fingers, micro switches and contact blocks Replacement of minor mechanical components (e.g. crank, rod, etc)
- Motor only
- Replacement of defective signal lens
- LED signal module
- One for one wires or cable core

Card files – No data

- CBI i.e. Microlok II (excluding CPU cards)
- Coded track
- Axle counter i.e. AMC board
- Telemetry i.e. Kingfisher (excluding CPU cards)

2.4 Replacement of Components without a Work Instruction with Signal Engineer's Approval

In some circumstances it is permissible to replace some components without the need to complete a work instruction (see ESM0020F-03) but the Signal Maintenance Engineer **must** authorise the change.

The comments section of the applicable maintenance card must be updated detailing the reason for the like for like change. The entry shall also include the date the change was undertaken, all applicable test results together with the name and signature of the signal maintainer who performed the change.

Examples of items that are in this category are detailed below. . Refer to the Signal Maintenance Engineer for other items that may be covered by this process.

Card files – Data

- CBI – i.e. Microlok II CPU board
- Axle counter i.e. ACB board

- Telemetry i.e. Kingfisher CP-11 module
- Predictors
- Cerberus

2.5 Like for Like Renewal covered by a Standard Work Instruction

Standard work instructions have been developed for complex renewals to reduce the risk of error and to ensure all required checks and tests are completed.

The following standard templates are available:

- 1.1 – Points Electric Machine Single Ended Like for Like Renewal
- 1.2 – Points Electric Machine Double Ended Like for Like Renewal
- 1.3 – Electrical Detector Like for Like Renewal
- 1.4 – Cable Like for Like Renewal
- 1.5 – Signal Like for Like Renewal
- 1.6 – Shelf Relay Like for Like Renewal
- 1.7 – Releasing Switch Like for Like Renewal
- 1.8 – Road Boom Gate Mechanism Like for Like Renewal
- 1.9 – Pedestrian Swing Gate Mechanism Like for Like Renewal
- 1.10 – Pedestrian Boom Gate Mechanism Like for Like Renewal
- 1.11 - Relay Base (plug in) Like for Like Renewal
- 1.12 - CBI Cardfile Like for Like Renewal
- 1.13 - Transformer and power supply Like for Like Renewal
- 1.14 – Switchlock Like for Like Renewal
- 1.15 - Microlok CPU Card Like for Like Renewal – Data upload required
- 1.16 - Cerberus Unit Like for Like Renewal

2.6 Renewal that is not “Exactly” Like for Like – Requires Work Instruction and Signal Maintenance Engineer Authorisation

A like for like renewal is one where a piece of equipment is replaced with an identical item.

Where the equipment to be installed is not “exactly” identical, authorisation for use of this procedure shall be obtained from the Signal Maintenance Engineer. Before providing this authorisation, the Signal Maintenance Engineer shall assess the risks involved in the work and ensure that suitable measures are put in place to control these risks.

Some examples where authorisation is required:

- Later version of a machine replaces an earlier version.
- Similar equipment where later versions alter the terminal arrangement.
- Point machine changed on a triple-end (additional out of correspondence test required).
- More than one point machine is changed within the layout.

- Shelf relay replaced with plug-in relay conversion unit.
- In cases where a work instruction does not cater for the particular type of work.

2.7 Equipment Renewal which is not like for like

Where an item of vital signalling equipment is required to be replaced with an item which is not the same type and not equivalent in all respects then it should be treated as an alteration to signalling. These require a signal design or template design document/drawing and may require a NAN and CCL for the work. This work is not covered by this Procedure.

Examples of what are not considered like for like are:

- Conversion of Incandescent Signals to LED type
- The replacement of one LED type signal with a different LED type
- The replacement of power operated points machine with different model/version/type of point machine.

3 Task Requirements for Like for Like Renewals

3.1 Competency Requirements

Signal Technicians and Control Systems Technicians who lead a Like for Like renewal shall have a minimum Level 2 competency on their current Signals Statement of Competency for all tasks and equipment types applicable to the work to be undertaken.

The Signals Technician competency skill "Like for Like Renewal" level 3 covers the work of drafting a new work instruction from ESM0020F-01 work instruction where the standard templates are not applicable.

The Signal Engineer competency skill "Like for Like Renewal" level 2 covers the planning of the work by drafting a new work instruction from ESM0020F-01 work instruction where the standard templates are not applicable. It also covers the authorisation of these work instructions.

Note: the authorisation shall be undertaken by a person independent to the author of the work instruction who holds a competency skill "Like for Like Renewal" at a level that is suitable for the complexity of the work.

3.2 Requirements for a New Work Instruction

If the activity is not covered by Work Instructions ESM0020F-02 1.1 to 1.14, then draft a Work Instruction using ESM0020F-01 2.

The documentation instruction shall consist of the following:

- Scope of Work Authorisation page.
- List of work instructions, test certificates and checklists applicable to the work being performed.
- The work instruction for the appropriate equipment type (one work instruction per asset).
- Signalling plan extract (where applicable).
- Circuit diagrams and analysis pages (where applicable).
- Other references ie equipment manuals, manufacturer's handbooks, ARTC standards and procedures.
- IBA form.
- Bridging Authority (where applicable) with its own circuit diagrams.
- Test certificates (where applicable).
- Check Lists (where applicable)
- Submit for review by a suitably competent independent Signal Technician or Signal Engineer

All testing is to be documented on the work instruction where space is provided, or on the circuit diagram/analysis page, or signalling plan as appropriate.

The inspection and tests mentioned in the work instructions are detailed in the maintenance section of the ARTC extranet under varying sub headings, with a summarised explanation appearing in SMP 01 'Introduction to Signalling Maintenance Procedures' and ESM-00-10 'Testing and Certifying Equipment Worked on or Altered During Maintenance'.

The circuit diagrams and signalling plans shall be copies of the authorised issued circuits book or signalling documentation for the area (not hand drawn copies), with care taken to ensure these reflect the latest installed design, including any interim maintenance copies that may apply.

Disconnection of circuits shall be marked on the circuit diagrams.

3.3 Finalising the Work Instruction

3.3.1 Certification

Following completion of the works, the time of completion shall be noted on the Scope and Authorisation page, the work instruction shall be signed and any other document where testing notations have been made, such as the signalling plan or circuit diagram, shall also be signed and dated.

3.3.2 Final Check and Record Keeping

The completed instruction shall be forwarded to the Signal Maintenance Engineer who authorised the work instruction for audit review, and record keeping. Work instructions and associated documentation for work that did not require authorisation by a Signal Maintenance Engineer shall be retained and filed at the Provisioning Centre.

4 Forms

4.1 ESM0020F-01 Generic templates

- 1 – Scope of Work Authorisation – Like for Like Work Instruction/s
- 2 – Generic Work Instruction Template

4.2 ESM0020F-02 specific templates

- 1.1 – Points Electric Machine Single Ended Like for Like Renewal
- 1.2 – Points Electric Machine Double Ended Like for Like Renewal
- 1.3 – Electrical Detector Like for Like Renewal
- 1.4 – Cable Like for Like Renewal
- 1.5 – Signal Like for Like Renewal
- 1.6 – Shelf Relay Like for Like Renewal
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- 1.14 – Switchlock Like for Like Renewal
- 1.15 - Microlok CPU Card Like for Like Renewal – Data upload required
- 1.16 - Cerberus Unit Like for Like Renewal

4.3 ESM0020F-03 Quick Reference Guides

1. Relay (plug-in) Like for Like Work Renewal
2. Card changeover in Card File with no data change (to be detailed at a later date)