UGL REGIONAL LINX

VITAL SIGNALLING RELAYS

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LINKING COMMUNITIES. CONNECTING CUSTOMERS.

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Document Control

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Revision	Issue Date	Revision Description
1.1	24/01/2022	UGLRL Operational Standards Template applied
2.0	27/01/2022	First approved and issued UGLRL version

Summary of changes made from previous version

Section	Summary of change
All	This document is based on the previous rail infrastructure maintainer (RIM). Full revision history is available on request from UGLRL.

1 General

The Signal Maintenance Engineer and the Signal Maintenance Supervisor shall ensure there is an up to date program for the changing and overhaul of relays as required by the TMP.

As the proper working of all relays is essential, the following instructions shall be most carefully observed and where Signal Electricians are in doubt with regard to the condition of any relay they shall report it to the Signal Maintenance Engineer immediately.

1.1 Sealing of Relays

All vital relays supplied by manufacturers are sealed, and all relays installed in the field that are not presently sealed, shall be considered as sealed and not opened.

This seal shall not be broken in the field except in exceptional circumstances when directed by a Signal Engineer. In the event of a defect being observed in a relay the seal shall be left intact until the relay is examined by a Signal Engineer.

1.2 Cyclic Changing and Overhaul of Relays

1.2.1 General Policy

The policy for changing and overhauling all shelf mounted relays is based on two (2) main classifications of relays, "Proved" and "Unproved". Unproved shelf relays shall be changed after 15 years in service and overhauled by an accredited supplier or scrapped.

Relays which are proved to release (down proved in circuit) are not to be changed on a regular basis but on an as required basis as determined by the normal inspections by the Signal Electricians.

Plug-in relays do not have a specified overhaul period laid down.

Samples of plug-in relays from typical installations are to be inspected in detail after 20 years in service to assess the need for overhaul or replacement of the complete group, or to assess the period to the next sample inspection.

This inspection shall be carried out by an accredited supplier of the types of relays being sample tested. This supplier shall advise the Signal Maintenance Manager of the outcome. The sample relays are to be completely dismantled during the inspection.

The Signal Maintenance Manager shall obtain a written report from the supplier and forward a copy to the Principal Signal Engineer. After the inspection report is accepted by the Principal Signal Engineer the sample relays which were dismantled for inspection may be discarded.

Shelf mounted Signal Branch type dc relays shall not be used.

If there are any Signal Branch shelf type dc relays in service they are to be immediately replaced, preferably with a shelf mounted plug-in relay conversion unit and where this is not practical by a DN 11 type shelf relay.

1.2.2 Jeumont Schneider Track relays.

This type of relay is to be kept under review until a fault or deterioration rate requires their replacement.

1.3 Type of wire connecting to shelf relays

Flexible stranded wire must not be terminated directly onto a shelf mounted relay.

Single strand, stiff wire (eg 1/1.7mm) without crimp lugs is to be used on shelf mounted relays. Where this is required to run to a “Q” type relay or similar which will not accept this wire type, an interfacing terminal block shall be used.

In cases where flexible, stranded wire has already been terminated directly onto shelf relays the following is required:-

1. Ensure that crimp lugs do not touch one another or other terminals.
2. Whenever it is necessary to change the relay or to disconnect then reconnect the wiring for any reason,
   a) each wire must be labelled with its relay terminal number and
   b) each crimp lug must be insulated as it is removed from the relay with either suitable sized plastic tubing which will fit tightly over the crimp lug or with another equally secure product.

2 Placing Signalling Relays into Service

(Refer also to “CRN SP 011 - Relay change”)

2.1 General

The integrity of all vital signalling relays to be placed into service is paramount particularly as they may be installed in circuits where they are not proved to release when de-energised.

Signalling relays must be handled, transported and stored with care and not in any manner, condition or circumstance that would subject them to damage or deterioration.

The relays must be stored on racks in enclosed buildings in a clean, dry and non-corrosive environment. They must always be kept in the upright position in case of any undetected foreign matter which has fallen to the bottom of the case moves to a critical position.

Spare overhauled relays with supplier testing dates in excess of that specified below shall not be placed into service and shall be resubmitted to the Signal Maintenance Engineer to arrange for retesting if there is a defined requirement for those types of relays.

Plug In D.C Relays	Seven (7) Years
D.C Shelf Relays	Five (5) Years

New “Q” Type plug-in relays which have been stored in their original boxes or packaging for periods up to seven (7) years may be used without being overhauled provided that the relay passes the visual examination specified in Clause 7.1 and the operating tests specified in Clause 7.2.

Relays which do not pass the inspection and/or test should be forwarded to the Signal Maintenance Engineer as described in Clause 7.1 & 7.2.

Prior to placing any plug-in relay in service it shall be closely inspected to see that the contacts are aligned correctly and that it has not been damaged in transit. When plug-in relays are to be changed, before insertion into the plug-in base, the Signal Electrician shall ensure that the replacement relay is the same voltage, the same contact arrangement (by direct examination of the contacts) and that the code pins are present in the same indexing locations. The base shall be fitted with one set only of five index holes. The Signal Electrician shall check the contacts to ensure they are not high resistance. Where relay test panels are provided this facility is to be utilised. The Signal Electrician shall check the operation of the relay in circuit and ensure that the functions controlled by it operate correctly.

Immediately prior to any relay being placed in service it must be examined at a bench under full lighting conditions by the Signal Electrician who is to install the relay. The Signal Electrician shall also arrange a test circuit to check the relay under operation.

The Signal Electrician is to examine the relay under normal electrical operation, observing the energise/de-energise cycle several times to ensure that the mechanical operation is normal, unrestricted but not pounding, and that the relay drops fully away.

Where there is any cause to suspect that the relay is not operating correctly it shall be immediately labelled accordingly and quarantined, with the details sent to the Signal Maintenance Supervisor for further actioning in respect of the problem.

Once the relay has been installed it shall be observed to function fully in its operating circuit and shall not be certified until the Signal Electrician is satisfied that it is operating correctly.

The Principal Signal Engineer shall be promptly advised of all incidents of an unsafe condition whether in use or in storage of a vital signalling relay and shall nominate a Signal Engineer to examine the relay before it is unsealed.

Before placing a shelf-mounted relay in service special care shall be taken to remove the armature securing screw provided to prevent damage during transport. The arrangement of terminals vary for different manufacturers of shelf-mounted relays, it is therefore necessary that Signal Electrician take special care when replacing a relay by one of a different manufacture to see that the connections are placed on the correct relative terminals and that circuit diagrams are updated for any change in contact numbers. The relay shall be examined and bench tested by the Signal Electrician prior to installation.

Also before placing the shelf-mounted relay in service the suitably accredited Signal Electrician shall remove the nuts on the studs and check that the bottom nut is tightened down. This is to ensure that the pigtail is securely maintained by a tight armature stud or that the carbon pillar is securely maintained in position by a tight point stud. Excessive force shall not be applied on the bottom nut as this could cause the stud to fracture.

When a shelf-mounted relay has been replaced the Signal Electrician changing the relay is responsible for seeing that a thorough test and check is made of all circuits passing through the relay to ensure that no incorrect connections have been made and that the circuits are in accordance with the circuit diagrams.

In addition when any dc shelf-mounted relay or dc plug-in track relay or dc standard 'B' size plug-in relay is changed the "pick-up", "drop-away" and "working" currents of the new relay shall be tested.

SF J024/B "Relay Changed Forms", at present, shall be made out in duplicate by the Signal Electrician for all shelf relays replaced and these forms shall be forwarded to the Signal Maintenance Engineer immediately after the relay or relays have been changed. The Signal Electrician shall show all relevant particulars on these forms and certify that the circuits through the shelf-mounted relays have been tested and are correct.

2.2 Shelf type relay - Recording relay change information

In the event of a shelf type relay being tested, installed or removed from service the Signal Electrician shall fill out the relay changed form SF J024/B Rev.1 form and forward it to the Signal Maintenance Engineer for recording.

3 Miniature Plug-in Relays BRB Series: Care of and Handling

Cases have occurred where newly installed miniature plug-in signalling relays have failed to operate, and it was found that their contacts were out of adjustment due to distortion of their stationary contact support brackets.

It has been demonstrated that this fault was a result of the relay having been dropped or struck during transport or installation.

Extreme care shall be exercised in transporting and handling relays. Any relay which is bumped or dropped should be closely examined and tested, and if need be returned to the supplier for overhaul.

Because of the risk that relays may have been dropped or damaged without knowledge, any relay which is to be placed in service shall be visually inspected, then inserted in a relay test unit and observed to operate correctly before being plugged into service.

If there is any sign of damage to the case or to the relay or if the operation or the relay is in any way suspect if shall not be put into service but returned to the supplier for overhaul.

4 Precautions to be taken when Changing Magnetically Latch Relays

Magnetically latched relays remain in the position to which they were last operated and for this reason special precautions are required to ensure that a relay is "down" before it is plugged into service. Magnetically latched relays are used for the parent relay of the route, point and release lock relays and the procedure for changing these relays is as follows.

4.1 Route NLR and RLR Relays

Prior to unplugging a route NLR or RLR relay the Signal Electrician shall:

a) Ensure that the signal to which the route lock relay applies is at stop, the route normalised, and that any train which is approaching the signal has been brought to a stand.

b) The magnetically latched relay which is to be placed in service shall then be plugged into the magnetically latched relay test base and the indicator lamp observed to ensure that the relay is down.

The relay to be withdrawn from service is then unplugged and the new relay removed from the test base and plugged into service.

Note: After changing a route NLR relay both the route NLR and RLR may be down. This will be indicated by a steady white light in the button knob controlling the route and the button shall be pulled to energise the NLR.

4.2 Point NLR and RLR relays

Prior to unplugging a point NLR or RLR relay the Signal Electrician shall:

a) Ensure that no trains are standing foul of or passing over or approaching the points concerned.

b) Ensure that all signals which protect the points concerned are at stop and that any trains which may be approaching those signals have been brought to a stand.

c) The magnetically latched relay which is to be placed in service shall then be plugged into the magnetically latched relay test base and the indicator lamp observed to ensure that the relay is down.

d) The relay to be withdrawn from the service is then unplugged and the new relay is removed from the test base and plugged into service.

Note: After changing a point lock relay both point NLR and RLR relays may be down. This will be indicated by both point position lights extinguished, and the transit light flashing. Under these conditions it will be necessary to move the point lever to the centre position and then to return the lever to its previous position and thereby energises the point lock relay for the position in which the points are laying.

4.3 Release Switch NLR or RLR Relays

Prior to unplugging a release NLR or RLR relay the Signal Electrician shall:

a) Ensure that no trains are standing foul of or passing over or approaching the ground frame points concerned.

b) Ensure that all signals which protect the ground frame points are at stop and that any trains which may be approaching those signals have been brought to a stand.

c) The magnetically latched relay which is to be replaced into service must then be plugged into the magnetically latched relay test base and the indicator lamp observed to ensure that the relay is down.

d) The relay to be withdrawn from service is then unplugged and the new relay is removed from the test base and plugged into service.

5 Routine Examinations and Tests

5.1 Examination of DC Relays, Shelf-Mounted

Signal Electrician are responsible for the inspection of all dc shelf-mounted relays on their section. These relays shall be inspected in accordance with the TMP and whenever the opportunity presents for any unusual condition and to see that the armature is operating freely and drops away promptly when the relay is de-energised. If any sluggishness or failure of the armature to drop away promptly is observed, the relay shall be replaced immediately and the Signal Maintenance Engineer advised. When making this check due allowance should be made for a slow release relay.

5.2 Examination of Plug-in Relays

Signal Electrician shall examine, to the extent practical without removal, all plug-in relays in accordance with the TMP. The inspection regime shall be in accordance with the Service Schedule for the particular type of relay.

Signal Electrician shall replace relays if any defects are detected and advise the Signal Maintenance Engineer.

5.3 Testing of Time Limit Relays

Type Approved electronic time limit relays, such as QTD5 time limit relays are not required to be tested.

5.4 Examination of Suspect Relays, all types

The Signal Maintenance Engineer is to promptly arrange for a relay replaced because of doubtful operation to be examined by a Signal Engineer delegated by the Principal Signal Engineer.

6 Despatch, Transport and Handling of Relays

Relays removed or replaced shall be forwarded to the Logistics Manager, Bathurst Main Store. A label detailing the reasons for its removal shall be attached to each relay.

Relays should be handled and transported at all times with care and always be kept in the upright position in case any foreign matter has escaped detection and can move into a critical position to prevent proper operation.

7 Re-use of Q Type Relays

Before Q Type (BRB930) miniature plug in relays, which have been in service for ten years or less, are considered for reuse in new or altered works, the following procedure of inspection and operating tests shall be carried out and the relay shall meet all performance criteria.

7.1 Visual Inspection

Visually examine the relay to ensure that:

- Seals are intact
- The cover and base (base of the relay itself) mouldings are not chipped, cracked or warped.
- Register pins are straight and correctly coded
- Plug-in contact fingers are not bent, distorted or burnt and have not lost tension
- There is no sign of overheating within the relay
- There are no signs of the plastic cover fouling the contact assembly or the assembly being misaligned.
- Plated components are not corroded and are not showing signs of deterioration
- There is no loose or foreign matter inside the cover
- The cover is still transparent and there is no internal coating of a rust coloured, metallic or greasy nature.

If the relay has any of the defects listed above or if the seals are broken, the relay is to be returned to the Logistics Manager, Bathurst Main Store for scrapping or overhaul.

Relays which in all respects pass the visual test shall be operationally tested as follows.

7.2 Operating Tests

Place the relay into the relay test set and check.

- Pick up and drop away values (see Relays Manual)
- Normal operation i.e. no chatter, excessive hum, slow to pick up or drop away (except where this is a function of the particular relay).
- Pick up and drop away times (where applicable).
- If the relay fails a) or b) it shall be scrapped. If it fails c) it shall be returned to the Logistics Manager, Bathurst Main Store for scrapping or overhaul.
- Check the contact resistance of each contact pair in the relay.

If the resistance is greater than 2 ohms the contact maybe able to be cleaned by cycle testing the contact at its full rated current. Retest for resistance. If now less than 2 ohms the relay may be re-used. If still more than 2 ohms the relay must be sent to the supplier for overhaul.

Note: A relay with contact resistance readings up to 7.5 ohms may be re-used as a temporary measure if no replacement is available. This relay must be replaced without delay. Such relays shall be marked "High resistance contacts, relay to be replaced".

7.3 Contact Full Current Cleaning

All relays which have had contacts full current cleaned MUST have a permanent label affixed which states “Nos .....contacts full current cleaned on ..... Signed .....”.

7.4 Relays with more than Ten Years Use

Any Q type relay removed from service which has been in operational use for more than ten years shall, provided it passes visual inspection, be returned to the supplier for overhaul.

7.5 Relays in Service

The above procedure for carrying out visual inspections and operating tests may also be used to test and clean relay contacts which are in service or which have been removed from service with suspected or proven high resistance contacts.

7.6 Alterations requiring spare contacts to be brought into service.

Whenever there are circuit alterations and circuits are connected to spare contacts that have not been in use for some time there is a probability that the contact may be high resistance. Again cycle testing the spare relay contact with its full rated current before it is connected in service may reduce the contact resistance and should be carried out, as required.

8 FORMS

8.1 Relays Changed

CRN Signalling Form SF J024/B Rev.1

RELAYS CHANGED

DISPLACED RELAY						NEW RELAY								
No.	TYPE	MAKERS NAME	LOCATION	CIRCUIT	REPAIR REQN. No.	DATE	No.	TYPE	MAKERS NAME	PICK UP	DROP AWAY	WORKING CURRENT	WORKSHOP TESTS	
													PICK UP	DROP AWAY

I certify that all connections to the relays are correct as per circuit.

Name: _____ Section: _____

Signature _____ Date: _____