

Work Instruction		WO No.	
		Date:	
<b>Scope:</b>			
<b>Team Leader:</b>		<b>Relay Type:</b>	
<b>Activity:</b>		Shelf Relay Like for Like Renewal	
<b>Reference:</b>		PR S 40008, PR S 40009, PR S 40010, PR S 40011, PR S 40024, Relay Equipment Manual	
Activity No.	Task No.	Work Description	Completed Name/Sign
<b>APPARATUS INSPECTION &amp; PREPARATION</b>			
1	1A	Examine the replacement (refurbished) relay in accordance with PR S 40024. Ensure relay is sealed and the seals are not damaged. Ensure the armature securing-screw is removed. Check all terminal studs - bottom (back) nuts to ensure they are tightened down. Ensure that each pigtail is securely maintained by a tight armature stud and that the carbon pillar is securely maintained in position. Do not overtighten. If relay is to be directly wired, conduct an operating bench test ensure correct operation. For electro-mechanical type or thermal type time-limit relays, additionally test the relay energisation occurs at the time period specified in the circuit book.	
	1B	Confirm the replacement relay is of the same type and contact configuration as the one to be replaced and as shown in the circuit book analysis. Ensure the label shows the 'pick-up', 'drop-away' and 'working' currents.	
	1C	Observe each relay contact and corresponding terminal number to ensure it is of the correct type (front or back) and opens and closes correctly. Any discrepancy consult the maintenance signal engineer.	
	1D	Check the wiring on the existing relay against the circuit book contact analysis. Any discrepancy to be investigated by the maintenance signal engineer.	
	1E	Confirm the locknuts between studs and relay top on the replacement relay are tight.	
<b>Note:</b>		If a detachable top is fitted perform activity 2A then go to activities 5B to 5G. If relay is directly wired, then perform activities 3A to 5G.	
<b>CHANGE OVER – relay fitted with detachable top</b>			
2	2A	Advise the signaller of the work and of affected signalling. Ascertain an opportunity between train running to undertake the work. Request application of blocking facilities on protecting signals. Change the relay. Ensure the detachable top is secured to the relay.	
<b>WIRING CONFIRMATION – relay directly wired</b>			
3	3A	Examine relay to find which terminals are not in use.	
	3B	On the replacement relay fit nuts and washers to the corresponding spare terminals and tighten. Fit bottom washers only to the terminals to be used.	
	3C	Confirm any bridges on the existing relay and fit the same bridges on the replacement relay before installation. Tighten down nuts.	
	3D	Ensure that every wire on the existing relay is correctly labelled with its terminal number and circuit name, and that the wiring is securely tied with multiple ties in a firm loom corresponding to the relay terminal configuration.	
	3E	Write down the relay contact configuration, wire count and null count for each terminal on the relay on a copy of the contact analysis sheet attached to work package.	
	3F	Compare actual wire count and null count against the circuit book and the contact analysis sheet. Any discrepancy to be investigated by the maintenance signal engineer.	
	3G	Advise the signaller of the work and the affected signalling. Ascertain an opportunity between train running to undertake the work. Book out of use and disconnect affected signalling associated with circuits that pass through every relay contact in accordance with PR S 40008 and PR S 40009.	

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<b>CHANGE OVER – direct wired only</b>			
4	4A	Remove the nuts, locknuts and washers from the existing relay and lift wiring loom clear, ensuring that no wire touches any metal shelf/bracket, or any other relay or relay stud and the wiring is not disturbed.	
	4B	Immediately remove the existing relay and install the replacement relay.	
	4C	Lower the wiring loom onto the replacement relay and check that the terminal number on each wire label corresponds with the relay terminal to which the wire is fitted- fit washers and nuts.	
	4D	Check if any bridges are left on the replaced relay once removed from the shelf.	
<b>CERTIFICATION</b>			
5	5A	Confirm relay wiring against written down wire count and null count on circuit book analysis sheet (record by ticking the wire /null count in the copy of contact analysis sheet - results from step 3E & 3F).	
	5B	Observe that the relay correctly energises and de-energises.	
	5C	<i>(cross out relay type not applicable)</i> <b>For relays directly wired:</b> Function test each end-function that passes through the changed-relay contacts. Ensure each end-function corresponds with the changed-relay's <u>specific contact</u> (front and back) in accordance with the signalling design (analysis). This is achieved by temporarily removing the wiring from one side of each specific contact while checking correspondence with the end-function. Reinstate wires before testing the next contact. Record results on a copy of the analysis sheet for each end-function. Ensure all relay terminal nuts and wires are secure at the end of the test. <b>For relays fitted with detachable tops:</b> Function test each end-function that passes through the changed-relay contacts. Ensure each end-function corresponds with the changed-relay's <u>position</u> (energised and de-energised) in accordance with the signalling design (analysis). This can be achieved by operating the changed-relay while checking correspondence with the end-function.	
	5D	For track relays: additionally ensure that the shunt value is within the permissible range of values for the type of track. Ensure the local coil voltage and current and track coil voltage and current are correct. Update the Track History Card.	
	5E	For time-limit relays: additionally confirm relay energisation occurs at the specified time period as specified in the circuit book.	
<b>Note</b>	If any concern arises during the process that could put at risk the safety of the signalling, then the affected functions through the relay contacts shall remain disconnected and booked out of use (or be disconnected and booked out of use for relays fitted detachable top) until certified by further testing. Involve a signal engineer as necessary.		
	5F	Advise the signaller that the work is complete, and the affected signalling is available for use (includes the removal of applied blocks). Where applicable, book affected signalling apparatus back into use.	
	5G	Complete and sign relay change form PR S 40024 FM01.	

I certify \_\_\_\_\_ relay at \_\_\_\_\_

location have been inspected and tested and is fit for service.

\_\_\_\_\_

Print Name

\_\_\_\_\_

Position

\_\_\_\_\_

Signature

\_\_\_\_\_

Date

OFFICIAL