ESR 0222

TESTING OF VIGILANCE CONTROL SYSTEM

Version 1.0

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<tr>
<th>Revision</th>
<th>Date</th>
<th>Summary of change</th>
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<tr>
<td>(RSS 0222) 1.0</td>
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Summary of changes from previous version

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Scope
This Brake Instruction outlines the testing procedures for EH solid state vigilance control, Westinghouse AA type vigilance control and D2/D3 electro-pneumatic type vigilance control equipment.

General
This Instruction is to be read in conjunction with RSS 0223 “Vigilance Control Equipment”.

Before conducting this test a rag may be placed over the warning whistle on AA and D2/D3 vigilance equipment to reduce the noise level of the whistle during the test. The rag MUST be removed at the conclusion of the test.

EH solid state type vigilance control - test procedure
1. Engine running and main reservoirs charged to normal operating pressures.
2. On one brake pedestal:
   - Both brake valve handles to be in running position.
   - Driver's brake valve isolating cock to be open.
   - Other brake pedestal isolated.
3. Ensure vigilance control:
   - Circuit breaker (VCB) is sealed in the “on” position.
     (Non failsafe vigilance control units only)
   - Emergency cock sealed in open position.
   - Box cover sealed in closed position.
     If seals are broken test equipment and rectify if necessary before resealing.
4. With the reverser in forward or reverse positions operate all vigilance control acknowledgment buttons to ensure their function.
   With the reverser in the central position operate all vigilance control acknowledgment buttons to ensure they are isolated.

   Return the reverser to forward or reverse.

3.1 Locomotives with dual cabs:
   During flashing light period (before brakes apply) check all buttons in cab acknowledge.
   Buttons in the other cab should not acknowledge.

3.2 Locomotives with dual equipment in a single cab:
   These locomotives are fitted with two additional buttons for observer’s operation. The button in the control stand on the opposite side of the cab to the operating pedestal should not acknowledge.

   Press this button during flashing light period (before brakes apply) and observe that it does not function.
Change operating pedestal (close driver’s brake valve isolating cock and open the one on the opposite side) after which the previously inactive press button should now function whilst that in the other control stand should not function. All other buttons should operate.

5. Press an active acknowledgment button, after which the following conditions should apply in the time periods shown:

<table>
<thead>
<tr>
<th>Period after acknowledgment</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 to 65 seconds</td>
<td>Flashing light</td>
</tr>
<tr>
<td>77 to 82 seconds</td>
<td>Bell warning</td>
</tr>
<tr>
<td>94 to 99 seconds</td>
<td>Automatic brake application occurs with at least 280 kPa brake cylinder pressure</td>
</tr>
<tr>
<td>100 to 130 seconds</td>
<td>System returns to normal cycle after the brake cylinder pressure reaches a minimum of 330 kPa when acknowledgment button is pressed</td>
</tr>
</tbody>
</table>

6. With brakes released, keep an active acknowledgment button depressed and observe that the brakes are automatically applied after a period of between 94 and 99 seconds including flashing light and bell operation.

7. With vigilance control equipment functioning during the flashing light period (before brakes apply) check that operation of the equipment is suppressed (i.e. Warnings cease) when:
   - Both driver’s brake valve isolating cocks are closed on double control stand locomotives.
   - In dual cab locomotives the driver’s brake valve isolating cock is closed in the cab with the active control stand.
   - When independent brake is applied to a brake cylinder pressure of 250 kPa or over.

Note: When operating side is closed warning should cease.

8. With the brake stand cut in move the reverser handle to the forward or reverse position. Move the independent brake controller to the full application position and, once the brake cylinder pressure exceeds 200 kPa, move the reverser handle to the central position and check that the vigilance system is suppressed.

Should any of the events outlined occur outside the tolerance periods set out above, or the equipment is faulty in any respect, repairs should be effected, a replacement unit fitted if necessary and checked for correct operation before the locomotive goes into service.
4 Westinghouse “AA” type vigilance control - test procedure

1. Engine running and main reservoir charged to normal operating pressures.

2. On one brake pedestal:
   - Both brake valve handles to be in running position.
   - Driver’s brake valve isolating cock to be open.
   Other brake pedestal isolated.
   - Closed vigilance control panel switch or switches.
   Control circuit must also be closed.

3. Ensure that vigilance control main reservoir supply and emergency application valve exhaust isolating cocks are open and sealed.

If seals are broken test equipment and rectify if necessary before resealing. (see RSS 0223)

4. Operate all vigilance control acknowledgment buttons to ensure their function.

5. Check timing cycle.

<table>
<thead>
<tr>
<th>Period after acknowledgment</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 7 seconds</td>
<td>Pressure switch activated when timing reservoir pressure reaches 400 to 450 kPa</td>
</tr>
<tr>
<td>65 to 68 seconds</td>
<td>Audible warning commences when timing reservoir pressure is reduced to 175 kPa</td>
</tr>
<tr>
<td>90 seconds</td>
<td>Penalty application occurs when timing reservoir pressure is further reduced to 125 kPa</td>
</tr>
</tbody>
</table>

6. Apply the independent brake to 225 kPa brake cylinder pressure. The vigilance must be suppressed. Release independent brake.

7. Suppression valve and pipe leakage test - charge vigilance control pressure to 450 kpa or to just under the pressure switch setting by holding the button depressed then close both driver’s brake valve isolating cocks. The vigilance control must be suppressed.

8. Open the driver’s brake valve isolating cock and with brakes released and magnet valve de-energised note the pressure in the vigilance control gauge falls slowly and that an audible warning occurs at 175 kPa.

9. Allow pressure to continue falling to a penalty brake application at 125 kPa.

10. Observe that brake cylinder pressure rises to at least 275 kPa.

11. Leave penalty application applied for approximately 60 sec before releasing. The brakes should not release without brake valve manipulation.

12. Place automatic brake valve handle in lap noting that emergency application valve exhaust ceases at approximately 175 kPa brake pipe pressure. Reduce brake pipe to zero before releasing in the normal manner.

13. Build the vigilance control pressure up to 480 kPa by holding the button depressed and obtain an audible warning, keep magnet valve energised and obtain a penalty application.


15. Examine vigilance control generally for any irregularities and rectify.

16. Remove rag from over the warning whistle. (where applicable)
5 Electro – pneumatic type D2/D3 vigilance control - test procedure

1. Engine running and main reservoir charged to normal operating pressures.

2. Ensure that vigilance control main reservoir and brake pipe isolating cocks are open and sealed. Equipment box is also to be sealed.

If seals are broken, test equipment and rectify if necessary before resealing. (Refer ESR 0223)

3. One brake pedestal to be ‘cut in’.
   - Both brake valve handles to be in running position.
   - Driver’s brake valve isolating cock to be open.

Other brake pedestal isolated.

Close vigilance control panel switch or switches.

Control circuit must also be closed.

4. Operate all vigilance control acknowledgment buttons to ensure their function. Listen where possible for the operation of the equipment.
   - Locomotives with dual cabs.

During flashing light period (before brakes apply) check all buttons in cab acknowledge.

Buttons in the other cab should not acknowledge.
   - Locomotive fitted with dual equipment in a single cab

these locomotives are fitted with two (2) additional buttons for observers operation. The button in the control stand on the opposite side of the cab to the operating pedestal should not acknowledge. Press this button and note that there is no audible indication of the equipment in the box functioning.

5. Check timing cycle

<table>
<thead>
<tr>
<th>Period after acknowledgment</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 to 3 seconds</td>
<td>pressure switch activated when timing reservoir pressure reaches 410 to 450 kPa</td>
</tr>
<tr>
<td>55 to 60 seconds</td>
<td>flashing light when pressure switch opens</td>
</tr>
<tr>
<td>75 to 80 seconds</td>
<td>audible warning commences</td>
</tr>
<tr>
<td>90 seconds</td>
<td>automatic brake application occurs</td>
</tr>
</tbody>
</table>

6. Keep the acknowledgment button depressed, a penalty application should occur in 12 to 15 seconds.

7. Observe brake cylinder pressure rises to at least 275 kPa.

8. Leave penalty application applied for approximately 60 seconds then release by pulling the knob on the side of the equipment box.

9. Do not press an acknowledgment button, observe that flashing light functions before audible warning.

10. Allow flashing light and audible warnings to function for a further time of 12 - 15 seconds to a penalty application.
11. Proceed as in 5.7 and 5.8.
12. With flashing light functioning, apply independent brake, light should stop functioning.
13. Release independent brake, flashing light should cease to function when both drivers brake valve isolating cocks are closed.
14. Open isolating cock or return auto brake valve handle to release. Apply independent brake.
15. Examine vigilance control generally for any irregularities and rectify.

6 Referenced standards

6.1 RailCorp standards

ESR 0223 Vigilance control equipment