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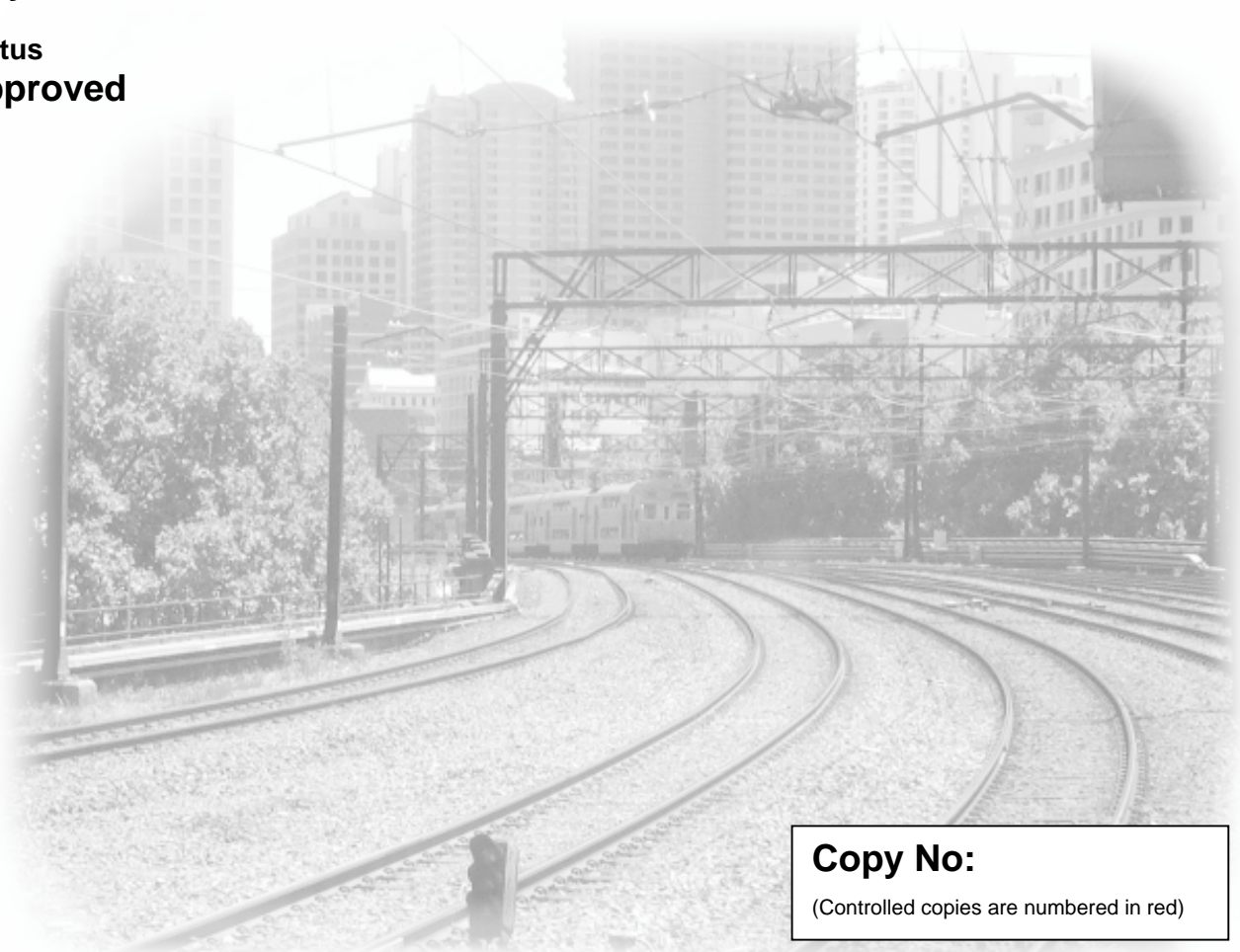
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Single Car Air Test

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About This Standard

The Single car Air Test was published in TRS 1024 Brake Maintenance and Single Car Air Testing.

This standard is based on TRS 1024 and TRS 1649.

Version History

Version 1.0

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Version 1.1 Issued July 2004

Page 7. Scope: Requirement for test after rectifying major air leaks deleted.

Page 7. Preliminary: Procedure for attaching pressure gauge to greasing port added.

Page 12. Test 6b, piston travel “150 to 200 mm” was “170 to 200 mm” and “75 to 150 mm” was “120 to 150 mm”

Page 14. Note re sensitivity exhaust chokes for Test 8 – Reference to 6” and 8” brake cylinders deleted.

Page 14. Test 9, brake release time for piston type triple valve deleted.

Pages 14 & 15. Test 10 divided into tests for new improved and old type accelerated release valves.

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1 Scope

All freight vehicles undergoing periodic maintenance as specified in RSS0060, **must** be air tested.

All freight vehicles must be air tested after the replacement of any defective air brake equipment.

All vehicles having scaled wheels must be air tested and a Skidded & Scaled Wheels Inspection Report Sheet completed.

2 Preliminary

1. Blow out air supply to remove water or foreign matter from pipes and hoses.
2. Connect a pressure gauge (0 to 1000 kPa) to the rear of the brake cylinder or pipe work to the brake cylinder.

The pressure gauge may be connected to the greasing port at the brake cylinder end. In this case remove the plug and apply the brakes to blow out excessive grease from greasing port. Release brakes. Connect pressure gauge to greasing port.

3. Connect single car tester to wagon brake pipe and air supply.
4. Ensure minimum supply air pressure to test stand is **600kPa**.

Adjust test stand regulator to give a minimum brake pipe pressure of **500kPa**.

5. Passenger cars only – water service to be cut in (If vehicle fails steps 4, 6, or 7 cut out water service and repeat – fault may be in water service).
6. Grade Control Valve (where fitted) is to be in the EX position.
7. Freight only - Empty/Load changeover valve to be in “E” for non-relay equipment and “L” for relay equipment. (Use a wedge in auto changeover equipment)
8. Two pipe vehicles only - A supply of air (600kPa minimum) must be available for connection to the Main Reservoir pipe. Do not connect until Step 2 of the Test Procedure below. Exhaust all air from main reservoir system and then close all main reservoir end cocks.

An additional pressure gauge (0 to 1000 kPa) is required for test 2.

9. Soapy water (brush or spray) must be available to locate leaks.

NOTE: It is important that the vehicle pass the Sensitivity on Release Test (7) to avoid the possibility of scaled wheels.

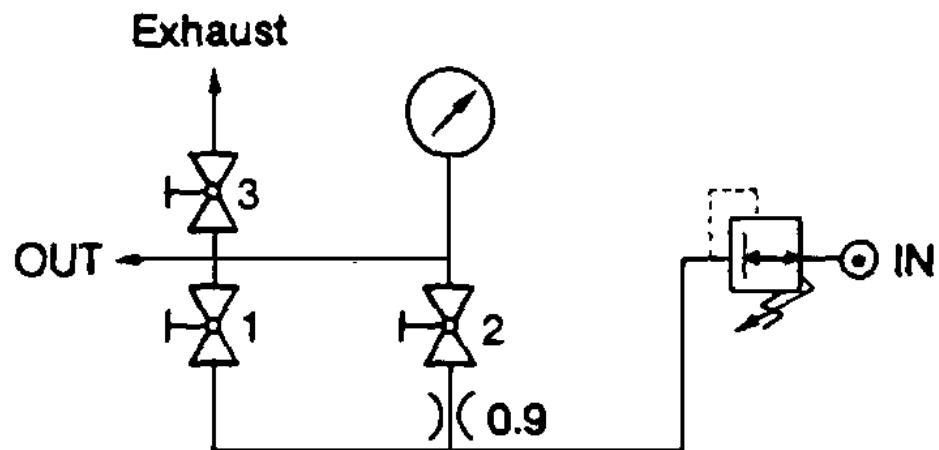
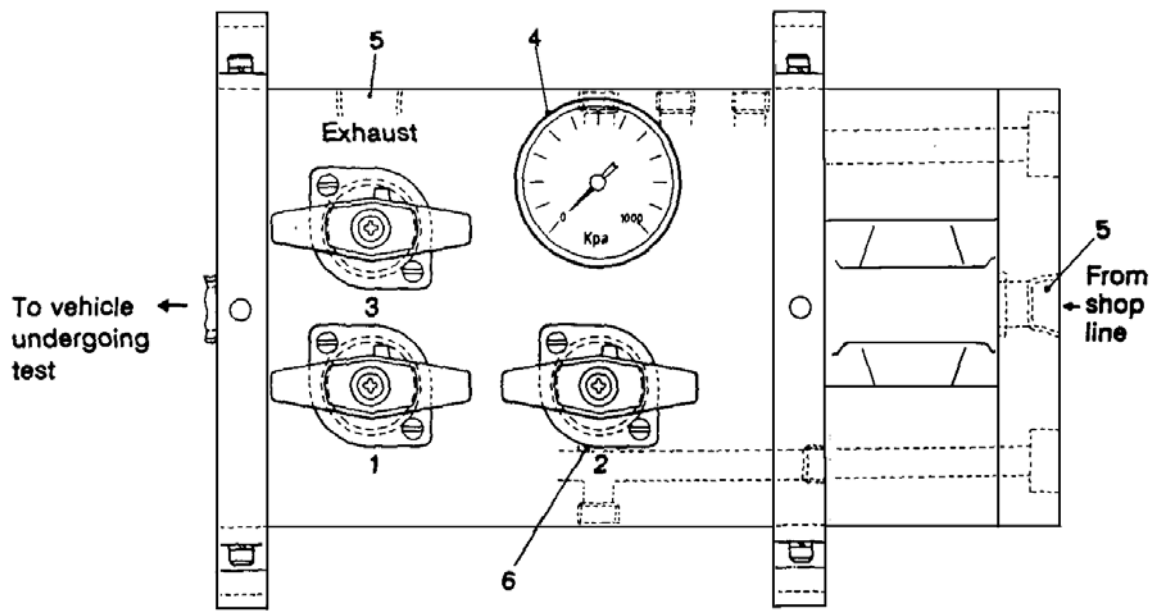


Figure 1 SMC Portable Single car Tester

KEY:-

1. Charging Cock
2. Sensitivity on Release Cock
3. Application Cock
4. Brake Pipe Pressure Gauge
5. Application Choke (Orifice Nut)
6. Sensitivity on Release Choke

Test	Description	Cock No.	Fault Code
3	<p>Main Reservoir Pipe Leakage Test (two pipe wagons only)</p> <p>Attach pressure gauge to a main reservoir hose and open coupling cock.</p> <p>Charge main reservoir pipe to a minimum pressure of 600 kPa.</p> <p>All wagon main reservoir equipment must be cut in.</p> <p>Shut off air supply and close the coupling cock.</p> <p>Check MR gauge for 1 minute - pressure must not drop by more than 10 kPa.</p>		14
4	<p>Auxiliary Reservoir And Main Reservoir Leak Back Test</p> <p>Apply brakes fully. Fully exhaust BP.</p> <p>Check that there is no continual leakage of air from brake pipe exhaust.</p> <p>No leakage is permitted.</p> <p>Operate release valve - ensure brakes release.</p>	Close 1/Open 3	13 4

Test	Description	Cock No.	Fault Code
6	Setting Piston Travels Place load compensation into LOADED		

6a	Vehicles Without Slack Adjusters Apply and release brakes as necessary. Reduce BP by 150 kPa. Adjust brake rigging on vehicle to give correct brake cylinder travel of 150-200 mm.	Close 1/Open 3 Close 3/Open 1	
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6b	Pneumatic Or Ratchet J Type Slack Adjuster <i>For non-relayed systems:</i> Apply and release brakes as necessary. Reduce BP by 150 kPa. Check that slack adjuster pipe is taken off centre port on brake cylinder. Set piston travel in range 150 to 200 mm (It is better at the lower end of the range, ie. closer to 150 mm) <i>For relayed brakes:</i> Check that slack adjuster pipe is taken off brake cylinder port closest to the slack adjuster. Set piston travel to 75 to 150 mm. (It is better at the lower end of the range, ie. closer to 75 mm) NOTE: <i>For non-relayed and relayed systems:</i> - With new brake blocks fitted, the slack adjuster may run out up to 125 mm. If more than 125 mm then brake rigging must be adjusted.	Close 1/Open 3 Close 3/Open 1	
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Note: For test 8 fit the sensitivity exhaust choke as follows:
non relayed brakes:
 10" brake cylinders use size 61 choke.
 12",14" & 16" brake cylinders use size 56 choke.
relayed brakes
 61 choke

Test	Description	Cock No.	Fault Code
8	<p>Sensitivity On Application</p> <p>Apply brakes</p> <p>Check brakes must apply before Brake Pipe is reduced by 75 kPa. Stop reduction when BP pressure is 425 kPa.</p> <p>Leave applied for 60 seconds on first test. Brakes must not release during this time.</p>	<p>Close 1/Open 3</p> <p>Close 3</p>	10

NOTE: Before conducting Sensitivity on release test, check if the Accelerated Release Feature on the triple valve is the new improved type. If it is, then conduct Test 9, Sensitivity on Release Test and Test 10, Accelerated Release Test at the same time.

9	<p>Sensitivity On Release</p> <p>Release brakes via sensitivity exhaust choke</p> <p>Brakes must release within: 30 sec (diaphragm type triple valves)</p> <p>Fully recharge brake pipe.</p>	<p>Open 2</p> <p>Close 2/ Open 1</p>	11
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NOTE: **Repeat Steps 8 and 9 a minimum of 5 times for sticking brake cases.** It is essential that all vehicles pass this test each time it is carried out. Vehicles failing this test must not be released into service as they could get scaled wheels.

10	<p>Accelerated Release (where fitted)</p> <p>Check type of Accelerated Release Valve fitted to triple valve:</p>		
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<p>10a</p>	<p><i>New Improved Accelerated Release Valve:</i></p> <p>When the triple valve is heard to release in previous test (test 9) watch the Brake Pipe gauge carefully. Gauge pressure should be seen to jump upwards as the brakes release indicating correct operation of <i>accelerated release</i>.</p>		<p>9</p>
<p>10b</p>	<p><i>Old type Accelerated Release Valve:</i></p> <p>Apply brakes. (Reduce BP by 100 kPa)</p> <p>Release brakes.</p> <p>Watch the Brake Pipe gauge carefully. Gauge pressure should be seen to jump upwards as the brakes release indicating correct operation of <i>accelerated release</i>.</p>	<p>Close 1/ Open 3 Close 3/ Open 1</p>	<p>9 9</p>
<p>11</p>	<p>Grade Control Valve Or Fixed Exhaust Choke Test</p> <p>Place Empty/Load valve in LOADED</p>	<p>Fit 3/16" choke</p>	
<p>11a</p>	<p>Grade Control Valve</p> <p>Place GCV in HP</p> <p>Apply brakes. (Reduce BP by 100 kPa)</p> <p>Release brakes.</p> <p>Move GCV back and forth between HP and IP- Allow brake cylinder pressure to reduce to between 50 to 70 kPa and return GCV to HP</p> <p>Check brake cylinder pressure does not reduce by more than 10 kPa in one minute.</p> <p><i>Check for air leaks around GCV and associated piping.</i></p> <p>Return GCV to EX</p>		

Test	Description	Cock No.	Fault Code
11b	<p>Fixed Exhaust Choke</p> <p>Apply brakes.</p> <p>Release brakes.</p> <p>Check time for brake cylinder pressure to fall from full brake cylinder pressure to 70 kPa. Should be nominally 40 seconds - must not be greater than 60 seconds or less than 30 seconds</p>	<p>Close 1/Open 3 Close 3 Open 1</p>	8

12	Empty/Load Changeover Valve Test (if applicable)		
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12a	<p>Manual Empty/Load</p> <p>Place handle in LOADED</p> <p>Apply brakes (reduce BP by 170 kPa)</p> <p>Check brake cylinder pressure should be in range 325 to 375 kPa (if outside this range check brake cylinder piston travel for non-relayed brakes)</p> <p>Place handle in EMPTY</p> <p>Check brake cylinder pressure should be in range 150 to 225 kPa</p>	Close 1/Open 3	5
			5

12b	<p>Automatic Empty/Load</p> <p>Check plunger is wedged about 35 mm above bogie operating pad.</p> <p>Apply brakes (reduce BP by 170 kPa)</p> <p>Check brake cylinder pressure should be in range 325 to 375 kPa</p> <p>Remove wedge or packing.</p> <p>Check brake cylinder pressure should be in range 150 to 225 kPa</p>	Close 1/Open 3	6
			6

Test Completed For Freight Vehicles

Additional tests for passenger cars

Test	Description	Cock No.	Fault Code
13	Passenger Car Tests		

13a	<p>Water Service Tests</p> <p>Cut in water service.</p> <p>Check for air leaks, repair as necessary.</p> <p>Check water service pressure gauges: <i>LP gauge should indicate BP pressure</i> <i>HP gauge should indicate 75 to 125 kPa.</i></p> <p>Check water taps work in car.</p> <p>Fully exhaust brake pipe</p> <p>Check for HP water pressure drop. The pressure must not drop by more than 100 kPa over 30 minutes.</p>	Close 1/Open 3	
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13b	<p>Passenger & Guard's Emergency Valve (where fitted)</p> <p>Check for air leaks, repair as necessary.</p>		
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Test Completed For Passenger Cars

4 Reporting

4.1 Freight Vehicles

Complete a Freight Vehicle Single Car Air Test Report Sheet.

4.2 Passenger Vehicles

Complete a Passenger Vehicle Single Car Air Test Report Sheet.

4.3 Vehicles with Skidded or Scaled Wheels

Complete a Skidded & Scaled Wheels Inspection Report Sheet.

5 Single Car Air Test Fault Finding Guide

Note:- **WHD** refers to Westinghouse brake equipment

D&M refers to Davies & Metcalfe brake equipment

5.1 Fault Code 1

Defect	Probable Causes	Remedy
Brakes fail to apply	(i) Auxiliary reservoir not charged with air	Charge system with air. Operation of release valve will indicate if air is present in the auxiliary reservoir. Failure of air pressure can be caused by: (a) Leakage in reservoir or piping. (b) Defective triple or distributing valve. (c) Triple valve isolating cock defective.
	(ii) Supplementary reservoir not charged	This is evident if the brake pipe is recharged after an application and air exhausts from the grade control valve. Test if supplementary reservoir is being charged. (i) Close isolating cock and drain all air from system. (ii) Remove drain plug from supplementary reservoir, open isolating cock and recharge system. (iii) Place hand over drain hole in reservoir to see if reservoir is being charged. If supplementary reservoir is not being charged: WHB: (i) Check release valve gasket correctly fitted. (ii) Replace release valve. D&M: Replace distributor.
	(iii) Relay valve defective.	If supplementary reservoir is being charged, defect is most likely a defective relay valve. WHB: Replace relay valve. D&M: Replace distributor.

5.2 Fault Code 2

Defect	Probable Causes	Remedy
Brake pipe pressure continues to fall	(i) Brake cylinder or pipe leaking (ii) Relay valve leaking (iii) Brake pipe leak.	Rectify leakage. Replace relay valve or distributing valve. Rectify leakage.
Leakage at triple valve or distributor valve	(i) Not sealing at mounting face. (ii) Distorted valve face. (iii) Defective mounting gasket. (iv) Any other leak	Tighten nuts. Replace triple valve or distributor valve. Replace gasket. Replace triple valve
Leakage at relay valve or distributing valve	(i) Not sealing at mounting face. (ii) Leakage at brake cylinder exhaust port or other location.	Tighten nuts or replace relay valve , distributor valve or gasket. (i) Check for leakage at dummy volume or pipes. (ii) Replace relay valve or distributing valve.
Leakage at release valve	(i) Valve or gasket defective	WHB: If unable to rectify, replace valve and gasket. D&M: Replace distribution valve
Leakage at empty/load cock or variable volume	(i) Defective cock or pipe fitting.	WHB: Replace cock. D&M: Replace distribution valve
Leakage at automatic changeover valve	(i) Ensure flexible pipes are not crossed. (ii) Defective changeover valve	Refer to description re' automatic changeover valve. Replace valve
Leakage at grade control valve	(i) Triple valve or distributing valve loose on mounting. (ii) Defective triple valve or gasket. (iii) Defective relay valve. Particularly where type "W" relay valve fitted.	Check for tightness. Replace triple valve or distributing valve,, check gasket and replace if necessary. Replace relay valve
Continual blow of air from grade exhaust nipple	(i) Triple valve or distributing valve loose on mounting. (ii) Defective triple valve or gasket. (iii) Defective relay valve. Particularly where type "W" relay valve fitted	Check for tightness. Replace triple valve or distributing valve, check gasket and replace if necessary. Replace relay valve

5.3 Fault Code 3

Defect	Probable Causes	Remedy
<p>Brakes fail to stay applied</p>	<p>Rise in brake pipe pressure caused by:</p> <p>(i) Single car tester charging brake pipe</p> <p>(ii) Supplementary reservoir feeding back to brake pipe. <i>(Relay only)</i></p> <p>(iii) Accelerated release reservoir feeding back to brake pipe. <i>(Relay only)</i></p> <p>(iv) Defective triple valve isolating cock. <i>(Relay only)</i></p> <p>Other causes:</p> <p>(i) Defective triple or distributing valve.</p> <p>(ii) Auxiliary reservoir leak.</p>	<p>Check that cocks (1) & (2) are closed. If necessary disconnect tester from the vehicle and check that no feed air is coming from the tester, cocks may be defective.</p> <p>Supplementary reservoir check valve not seating. WHB: Replace release valve. D&M: Replace distributing valve.</p> <p>Accelerated release check valve not seating. WHB: Replace triple valve. D&M: Replace distributing valve.</p> <p>Replace cock.</p> <p>Replace triple or distributing valve.</p> <p>Test for leakage with soapy water.</p>

5.4 Fault Code 4

Defect	Probable Causes	Remedy
Brakes fail to release with release mechanism (automatic release not operating),	(i) Release mechanism not operating valve correctly. (ii) Release valve defective. (iii) Grade control valve incorrectly set or exhaust nipple blocked. Release valve defective	Ensure release mechanism functions correctly,, particularly on D&M equipment. WHB: Replace release valve. D&M: Replace distributor valve. Set handle in "EX" Remove nipple and check for blockage. . WHB: Replace release valve. D&M: Replace distributing valve

5.5 Fault Code 5

Defect	Probable Causes	Remedy
Incorrect brake cylinder pressure with manual E/L changeover valve	(i) Wrong type cock fitted. (ii) Cock incorrectly piped. (iii) Relay valve defective (iv) Incorrect piston stroke on non-relayed systems	Fit correct cock. Check piping. Replace relay valve or distributing valve Correct piston stroke.

5.6 Fault Code 6

Defect	Probable Causes	Remedy
Incorrect brake cylinder pressure with automatic changeover valve	(i) Automatic changeover valve defective. (ii) Pipes incorrectly coupled	Replace changeover valve. Check Pipework

5.7 Fault Code 7

Defect	Probable Causes	Remedy
Grade control valve not retaining in "HP",	(i) Defective grade control valve. (ii) Leaking grade control valve and piping. (iii) WHB triple valve, 3/8" B.S.P. plug leaking	Replace valve. (i) Rectify leakage. (ii) Replace retaining valve. Secure plug.

5.8 Fault Code 8

Defect	Probable Causes	Remedy
Incorrect choke timing	(i) Wrong choke size (ii) Blocked choke (iii) Air leakage around thread	Check markings on choke - must comply with RSS 0065. Check choke for blockage. Re-seal thread.

5.9 Fault Code 9

Defect	Probable Causes	Remedy
Accelerated release not operating	(i) Reservoir not charged. (ii) Valve not operating	Crack open a pipe and check for air pressure. Replace triple valve or distributing valve

5.10 Fault Code 10

Defect	Probable Causes	Remedy
Brakes fail to apply during sensitivity test	(i) Exhaust nipple air brake test stand partly blocked. (ii) Defective triple valve. (iii) Auxiliary reservoir leak (iv) Wagon not fully charged	Clean nipple. WHB: Replace triple valve. D&M: Replace distributing valve. Test for leakage with soapy water Charge wagon.

5.11 Fault Code 11

Defect	Probable Causes	Remedy
Brake fails to release during sensitivity test	(i) Leakage from brake cylinder, or pipe; supplementary reservoir or pipe; accelerated release reservoir or pipe; (ii) Blocked charging choke on air brake test stand. (iii) Air pressure supply insufficient. (iv) Defective triple valve. (v) Brake piston travel too long. (vi) Release valve diaphragm defective (WHB) (vii) TV cut out cock defective	Check leakage with soapy water solution. Clean choke. Check pressure. Replace triple valve or distributing valve. Check and adjust if necessary. Replace release valve. Replace cutout cock

5.12 Fault Code 12

Defect	Probable Causes	Remedy
Continual blow of air from brake pipe exhaust	(i) Accelerated release feeding back. (ii) Auxiliary reservoir feeding back (iii) Supplementary reservoir feeding back. (iv) Distorted triple valve cover gasket on 3.5" triple valve	Replace triple valve or distributing valve Replace triple valve or distributing valve WHB: Replace release valve or check valve assembly in "D" bracket, or replace isolating cock. D&M: Replace distributing valve. Replace gasket

5.13 Fault Code 13

Defect	Probable Causes	Remedy
Main reservoir air leak in to brake pipe	(i) Defective check valve. (ii) Defective isolating cock	WHB: Replace release valve. D&M: Replace distributor valve WHB: Replace isolating cock and mounting gasket. D&M: Replace isolating cock or 'O' ring seals

5.14 Fault Code 14

Defect	Probable Causes	Remedy
Leakage from main reservoir pipe	(i) Supplementary reservoir check valve not sealing. (ii) Door operating reservoir check valve not sealing	Replace check valve. Replace check valve

5.15 Fault Code 15

Defect	Probable Causes	Remedy
Leakage from brake pipe to main reservoir	Faulty check valve between Main Reservoir and Supplementary Reservoir	Replace check valve

6 References

6.1 RIC Standards

- RSS 0010 Ballast Wagon Maintenance Policy
- RSS 0011 Wagon Maintenance Policy (1996)
- RSS 0060 Air Brake Maintenance