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6 Section 2.3: Maintenance Checklists for "B1" Service Check

6.1 Sub-Section 2.3.1: "B1" Service Checklist

Title : B1 Service Check list		Checklist No: 3B-02-03-01	
Note: This Checklist for 'B1' Service Checks should be applied to the running distance or service time period elapsed, since the last Car Overhaul.		Running Distance	Service Time
Maintenance Interval:		Approx. 18 kkm	45 days
Maintenance Tolerance:		±1.0 kkm	Approx. ±1 days
Downtime	Man Power	Skill Requirements	
8 hours	18 persons per train	Mechanical & Electrical	
Train No.		Date and Time	
Checked by		Approved by	
1 Tools and Equipments Torque Wrench (120N) Markers Multitester Torches Spanners Dust clothes Radio Sandpapers			


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Safety Helmet


Safety Vest

Paint Brush (for VVVF Arc Shoot Clean)


Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
Inspection (Without DC & AC Power)								
Work Preparation								
1. Wear the Safety Helmet For U/F Working								
2. Wear the Safety Vest								
3. Switch off all Units								
4. Isolate and earth the third rail power supply line								
Task 1. Underfloor Equipment Condition Check								
1	Low Tension Junction Box	1 Visually check if the component is damaged or deteriorated. 2 Inspect that bolts of Terminal Block and Receptacle have not loosened. 3 Inspect that the component labelling are existing. 4 Check the cable connection state.	3C-80131-01	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
2	High Tension Junction Box	1. Visually check if the component is damaged or deteriorated. 2. Inspect that bolts of Terminal Block and Receptacle have not loosened. 3. Inspect that the component labelling are existing. 4. Check the cable connection state.	3C-80132-01	X	X	X		
3	Traction Motor Junction Box	1. Visually check if the component is damaged or deteriorated. 2. Check if Receptacle is fastened. 3. Inspect that the component labelling are existing.	3C-80133-01	X		X		
4	Bogie	1 Visually check the following for damage and safety a. All earth cables (body/bogie and journal box/frame). b. Axle end earth cables. 2 Visually check the Journal box for sign of overheating (eg. discoloration, paint blisters, any grease	3C-KM310-01	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		leakage from the rear of the journal box) 3 Visually Check Journal box for mechanical damage or cracks 4 Visually Check the safety of front covers and the integrity of the cover seal, fixations with torque mark 5 Visual Inspection of brake calliper unit for damage, safety, fixations with torque marks 6 To ensure torque mark in all bogie mounted equipment.						
5	Levelling Valve & Installation rod	1 Check levelling valve installation rods and links for safety, damage and signs of air leakage. 2 Measure Installation rod Height (300±3mm)	3C-KM310-01	X	X	X		
6	Driving Gear	Visual Inspection 1. The axle gearbox oil leakage and check oil level 2. The axle gearbox for visible damage. 3. The spherical bearings of the torque arm for cracks	3C-KM315-01,02	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		4. Check Flexible coupling 5. Cleaning						
7	Brake Pad	1. Inspect pads worn irregularly. 2. Check that no pad may be thinner than 5mm at any point.	3C-KM316-03	X	X	X		
8	BC Hose Pipes (hose to brake cylinder)	1. Inspect visually the hose pipe connection for outward damage and cracking.	3C-KM316-07	X	X	X		
9	Air Reservoir – Visual Inspection	1. Inspect the air reservoir for outward damage. 2. Exchange the air reservoir immediately if the inspection of the circumferential and longitudinal welds reveal any cracking. 3. Check the reservoir connections. The fittings screwed into the reservoir connections must be either stainless steel or galvanized steel. No other kind of fitting is allowed. 4. Check any air leakage from the fittings connected to the	3C-KM613-06	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		reservoir by using soap water. Tighten the fittings immediately if there is air leak. 5. The fasteners holding the air reservoir on board the vehicle must fit tightly. The strap holding the air reservoir must fit tightly. 6. The water collected must be drained from the air reservoir by its water drain after specified time periods.						
10	Wheel set	[Axle] Visual Inspection 1. The axles for any signs of corrosion, surface damage, poor paint adherence, blistered paint. 2. There is no debris lodged between the traction motors and motor axles. 3. Rust on axles [Wheel] Inspect 4. Measure Wheel diameter and Deviation from true running (New diameter 860mm (+0.5/-0) condemn 780mm)	3C-KM320-01	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		5. Measure wheel profile i. Flange Thickness, new – 32.5mm condemn 22mm ii. Flange Height – min 28 mm, max – 36 mm iii. Gradient not less than 6.5 mm 6. Visual check wheel profile for crack, grooves, skid, metal out on tread						
11	Centre pivot	1. Check fixations 2. Casting defects	3C-KM313-01	X	X	X		
12	Mono link	1. Visually check for cracks and spherical bush for damage. 2. Check fixation and torque mark	3C-KM313-02	X	X	X		
13	Anti-roll bar system	1. Visually check for any damage 2. Check all fixings are present and secure with torque mark	3C-KM335-01	X	X	X		
14	Lateral Buffer Stop	1. Visually check each rubber buffer stop for crack or any de-bonding of the rubber. 2. Check fixation and torque mark	3C-KM313-04	X	X	X		
15	Lateral and Vertical Damper	1. Visual check for any damage & oil leakage and clean	3C-KM313-06, KM333-01,02	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		2. Check rubber bushes for de-bonding 3. Check fixation and torque mark						
16	Conical Spring (Primary Spring)	1. Visual Inspection for bonding failure & any mechanical damage 2. Visual Inspection of fixations and torque mark 3. Check the crown height(H) 45 ± 5 mm. Check if the height difference(A) in a bogie is within 3mm 4. Check to see if it has cracks of size more than about 10% of adhesion area 5. Check to see if a crack have grown deeper than 3 mm throughout	3C-KM331-01	X	X	X		
17	Air Spring	Inspect 1. The external rubber surface for damage and cracks. 2. Clean dirt or oil deposits from the air spring using clean water. 3. Check for any audible sound	3C-KM332-02	X	X	X		
18	Flange Lubricator	1. Check the position of wheel flange	3C-KM336-01, 02	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
	System	lubricator. 2. Check the free movement of sticks in the applicator case. 3. Inspect the wheel flange lubricator system for wear. 4. The angle that is made between the applicator and the flat on the back of the wheel should be: $\Theta = 55^\circ$ 5. The distance between the dispensing end of the applicator and the wheel flange should be as per dimension "F" and "T" where: F = 13.5 mm -0+2 T = 6.5 mm -0+2						
19	Front Automatic Coupler	1. Rough cleaning 2. Visual check for damage 3. Check the coupler head for damages, rust or sign of wear. 4. Visual check of tension spring, 5. Grease coupler head according to greasing plan 6. Visual and audible check for Air pipe connection: Clean	3C-80421-01	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		mouth pieces (socket and gasket) 7. Inspect supporting device for any defect 8. Visually check draft gear housing for any damages						
20	Front Automatic Coupler	1. Check horizontal and vertical alignment of coupler by means of a level indicator and adjust by turning the screw nuts	3C-80421-03	X				
21	Intermediate Automatic Coupler (MC-MC)	1. Rough cleaning 2. Visual check for damage, without uncoupling 3. Visual check of tension spring, 4. Visual and audible check for Air pipe connection, if leakage found the Clean mouth pieces (socket and gasket) 5. Inspect supporting device for any defect 6. Visually check draft gear housing for any damages	3C-80422-01			X		
22	Intermediate Automatic Coupler (MC-MC)	Check horizontal and vertical alignment of coupler by means of a level indicator and adjust by turning the screw nuts	3C-80422-03			X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
23	Semi-permanent Coupler (Muff coupler)	1. Visual check for damage without uncoupling. 2. Visual and audible check for the air connectors. 3. Check the supporting device for its position and any damage, if any. 4. Visually check draft gear for any defect/damage 5. Check Muff coupling visually, if bores of muffs are filled with grease.	3C-80423-01	X	X	X	.	
24	BC Hose Pipes (Flexible hose to brake cylinder)	Inspect the hose pipe connection for outward damage and cracking.	3C-KM611-25	X	X	X		
25	Hose Pipe – Visual Inspection	1. Inspect the hose pipes for outward damage and cracking. 2. Exchange any hose pipe found to be damaged. 3. Test the hose pipes for leakage at their points of connection.	3C-KM615-04	X	X			
26	MS Box	Please follow safety precautions in MWI 3C-152300A-02	3C-152300A-02	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		1. Visually check condition of MS box exterior, covers, rubber gasket and locks for signs of damage, 2. Ensure that cover are correctly fitted and secured by the latching locks 3. Check mounting and safety brackets for signs of damage or cracks and dust. 4. Visual Check HV cable connections.						
27	MS Box- 2	Please follow safety precautions in MWI 3C-152300A-02 1. Visually check condition of MS box exterior, covers, rubber gasket and locks for signs of damage, 2. Ensure that cover are correctly fitted and secured by the latching locks 3. Check mounting and safety brackets for signs of damage or cracks and dust. 4. Visual Check HV cable connections.	3C-152300B-02	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
28	Filter Inductor	<ol style="list-style-type: none"> 1. Check the mounting bolts and torque (343.35 Nm) 2. Check the mounting points for cracks or deformation. If there is any crack or deformation, repair it. 3. Check the main circuit cables HV512(L1), HV514(LL1), HV522(L2) and HV524(LL2) having any sign of insulation damage ,deformation or bend. 4. Check the safety earth cables having any sign of insulation damage. 5. Check the terminal covers for cracks or deformation. If there is any crack or deformation, repair it. 6. Check the side covers for cracks or deformation. If there is any crack or deformation, repair it. 7. Check the frame covers for cracks or deformation. If there is any crack or deformation, repair it. 8. Check the side covers for blockages or 	3C-152400-02	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		clogging of foreign materials. If there is any blockage or clogging of foreign materials, remove it.						
29	DC Arrestor	1. Check for any sign of damage or looseness of the DC Arrestor Box. 2. Remove the bolts of the covers of DC Arrestor 3. Clean the porcelain surface with a damp cloth to remove any dirt. 4. Check visually the porcelain surface for any cracks. Replace if found. 5. Check by hand all high tension connections (Terminal lugs) for looseness. Torque if necessary. 6. Check by hand earth Connections (Terminal lugs) for looseness. Torque if necessary.	3C-152200-01	X		X		
30	VVVF Inverter	1. Visually check condition of C/I box exterior, covers, rubber gasket of covers and locks for signs of damage, cracks or deformation	3C-152500-03	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		2. Ensure that covers are correctly fitted and secured by the key locks 3. Check mounting and safety brackets for signs of damage or cracks 4. Check that the Interior condition of VVVF box is free from dirt and dust. 5. Check that cooling fins with guide rods of VVVF power units are free from dust and dirt. Clean if required by a stiff brush. 6. Check earth cables/straps for damage and ensure these are connected properly. 7. Check connectors and pins for any sign of damage and ensure that no cable/wire is touching the body.						
31	Brake Resistor	Visually check and its fixations with torque mark	3C-152600-01	X		X		
32	Auxiliary Inverter box(APS)	1. Visually check condition of APS box exterior, covers, rubber gasket of covers and locks for signs of damage, cracks or deformation.	3C-171100-03		X			

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		2. Ensure that covers are correctly fitted and secured by the key locks. 3. Check mounting and safety brackets for signs of damage or cracks. 4. Check that the Interior condition of APS box is free from dirt and dust by opening of front cover. 5. Check earth cables/straps for damage and ensure these are connected properly. 6. Check connectors and pins for any sign of damage. 7. APS filter cleaning						
33	Battery Control Box (BIS, Relay, contactor, Diode)	1. Check to see if any of the components are damaged or have deteriorated. 2. Inspect the component mounting bolts to see if any have become loosened. 3. Check if any label lettering is damaged or missing. 4. Check visually that all cable connections are	3C-80721-01		X			

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		secure. 5. Check that the component does not make any abnormal noises.						
34	Battery Control Box	Low tension – Visual Inspection / Replace terminal block, Diode block, contactor, Battery switch, current sensor, power supply and Interface PCB, Relay MCB.	3C-80721-02		X			
35	Main Air Compressor VV120	Check if, 1. The level has fallen below the bottom mark on the oil sight glass 2. The level is so low that it may be expected by past experience to reach the bottom mark before the next maintenance appointment.	3C-KM1011-01-01		X			
36	Main Air Compressor VV-120	Top up the oil if the level has fallen below the bottom mark on the oil sight glass. Or the level is so low that it may be expected by past experience to reach the bottom mark before the next maintenance appointment.	3C-KM1011-01-03		X			

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
37	Main Air Compressor VV120	1. Check vacuum indicator to see if the air filter is dirty; Once a negative pressure of about 50 mbar is reached, the indicator plunger latches and still remains fully visible when the compressor is turned off. The air filter element must be exchanged in this case 2. The operator must subsequently restore the vacuum indicator to its home position by pulling out the reset button.	3C-KM1011-01-02		X			
38	Micromesh Oil Filter	1. Cautiously vent the micromesh oil filter by loosening the hand drain slowly or by switching over/ turning the isolating cock or drain plug 2. Remove the oil precipitate from the unit.	3C-KM1013-01		X			
Task 2. Cab								
39	Footrest Ass'y	Inspect 1. The safety of the footrest fixings. 2. The footrest functions normally.	3C-80242-03	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
40	Miniature Circuit Breaker Panel	Inspect 1. The component is damaged or deteriorated 2. The MCB is secured in the DIN rail 3. The letters of any label are missing 4. The condition of the cable connection	3C-KM243-01	X				
41	Driver's Seat	Inspect the safety of the seat frame fastenings and the seat mounted equipment fastenings Test 1. Unfolding/folding 2. Fore/aft sliding 3. Vertical height adjustment 4. Armrest rotation	3C-80244-01	X				
42	Auxiliary Seat	Inspect the safety of the seat frame fastenings and the brackets fastenings Test unfolding/folding	3C-80245-01	X				
43	Cab-Accessories Inspection	The fire extinguisher is clamped to a stainless steel bracket, which is secured to the driver's desk by hex. head screws. The Sun-Blind assembly is secured to cab front upper panel by the hexagon bolts.	3C-80246-01	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		Examination of the accessories is limited to a visual inspection and checking the safety of all fastenings.						
44	Wiper Blade	Swing back the wiper arm from the windscreen Inspect 1. Wiper blade for wear and external damage 2. Rubber lip for damage 3. The joints of wiper blade for free movement 4. The joint bolt used to fasten wiper blade to the wiper arm must be correctly fastened.	3C-80247-05	X				
45	Washer tank	1. Unscrew cap, and fill washer tank to the very top mark with the washing liquid (soapy water). 2. Screw on cap tight again by hand	3C-80247-08	X				
46	Traction Motor	1. Clean wire net filter of air Inlet box by stiff Nylon brush or blowing compressed air (4 bar) over it. 2. Check lead wire for damage, Inspection cover and motor exterior. 3. Visually Check grease	3C-80523-01,02	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		leakage from bearing surface 4. Check all fixing bolts are loose or missing 5. Tighten Traction Motor lead cable to 22.6 N/m. (Junction box) 6. Check Bearing Box and Bearing Cap for signs of oil leakage						
47	PWM generator	1. Visually check the PWM Generator unit for signs of damage. 2. Check Connector and cable for any sign of damage or loose connection. 3. Check PWM box cover and fasteners for proper fitment	3C-153100-01	X				
48	PA & PIS	1. TFT Display walk through test TFT Display – 18.5” – Functional test iii. Go to the PAPIS HMI and select 'START TFT TEST' button in the 'TESTING ADVANCED FUNCTIONS' tab. iv. Check if TFT Display is emitting the test pattern.	3C-KM-12-01-01	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		2. Check PA/PIS, CCTV healthiness from PAPIS HMI by selecting 'DEVICE OVERVIEW ADVANCED FUNCTIONS' and by selecting one by one every individual subsystem of PAPIS/CCTV showing in the screen for every coach. If showing Green, it implies healthy, if showing Red, implies unhealthy and should be got attended.						

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
49	PA & PIS	1. Checking of manual announcement by MCP a. Press INT button on master MCP and check PA mode enable during PTT switch pressing b. Check announcement is executed from all loudspeakers (Internal and external) clearly 2. Check on manual announcement by ACP a. Push PTT to speak to the microphone of ACP. b. Check announcement is executed from all internal loudspeakers at clearly. 3. Check on Cab - Cab intercommunication by MCP a. Check that MCP becomes to CAB mode when the CREW CALL (C-C) button is pressed. b. CREW CALL	3C-KM-12-01-02,03	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		<p>button is blinking on MCP in leading (Occupied) and slave (that is non occupied) side</p> <p>c. Check that audible alarm is sounding in slave MCP.</p> <p>d. Press blinking button when the CREW CALL button is lit.</p> <p>e. Check that CAB/CAB intercommunicatio n can be made.</p> <p>4. Check on Cab - Cab intercommunication by ACP</p> <p>a. Press CREW CALL (C-C) button on leading cab..</p> <p>b. C-C button is blinking on ACP in master and slave (non-occupied) side.</p> <p>c. Check that audible alarm is sounding in slave (non-occupied cab).</p> <p>d. Press blinking button when the C-C button is lit.</p> <p>e. Check that CAB/CAB intercommunication can be made.</p>						

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
50	PA & PIS	PEAU, PAD push button – Functional test Perform intercom from every PEAU	3C-KM-12-01-04,05	X	X	X		
51	PA & PIS	Interior Speaker - Audio walk through test – 1. Go to the HMI and select 'START PRM TEST' button in the 'TESTING ADVANCED FUNCTIONS' tab. 2. Walk through the complete train interior and check if every audio device is emitting the test tone in interior speakers.	3C-KM-12-01-07	X	X	X		
52	PA & PIS	Exterior Speaker - Audio walk through test – 1. Go to the HMI and select 'START test PRM' button in the 'TESTING .. ADVANCED FUNCTIONS' tab 2. Walk left & right outside (left & right) the complete train and check if every audio device is emitting the test tone in exterior speakers (left & right)	3C-KM-12-01-08	X		X		
53	PA & PIS	iCom & FDI Function check through PIS HMI by selecting	3C-KM-12-01-09,12	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		any one route from 'List of Journeys' for Manual Announcement in train. Check if this is launched in the system and also check if station announcement is happening. Check if Front destination indicator is emitting the Destination Station.						
54	PA & PIS	PIS HMI Functional test - Network Check: Use the TGUT to check if all devices are online a. One single device not discovered could mean a failure of the devices itself of a rupture in the cable between the switch and the device or a switch port not working. b. Multiple devices that are on the same IP cable in failure could mean that one of the devices is blocking the communication or a rupture in the cable between the switch and the first device or a switch port not working. c. All devices in a car not working could mean that the local switch is not	3C-KM-12-01-10	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		powered or is not connected to the backbone.						
55	PA & PIS	Microphone + PTT – Functional test Audio function test: 1. Perform a PA from every ACP 2. Perform a PA from every microphone 3. Perform a PA from OCC / BCC 4. Perform cab-to-cab intercom 5. Perform intercom from every ACP 6. Perform intercom from every PEAU	3C-KM-12-01-13	X				
56	PA & PIS	Switch 28 ports – Functional test Network Check: Use the TGUT to check if all devices are online a. One single device not discovered could mean a failure of the devices itself of a rupture in the cable between the switch and the device or a switch port not working. b. Multiple devices that are on the same ip cable in failure could mean that one of the devices is	3C-KM-12-02-01	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		<p>blocking the communication or a rupture in the cable between the switch and the first device or a switch port not working.</p> <p>c. All devices in a car not working could mean that the local switch is not powered or is not connected to the backbone.</p>						
57	PA & PIS	<p>Switch 16 ports – Functional test</p> <p>Network Check:</p> <p>Use the TGUT to check if all devices are online</p> <p>a. One single device not discovered could mean a failure of the devices itself of a rupture in the cable between the switch and the device or a switch port not working.</p> <p>b. Multiple devices that are on the same ip cable in failure could mean that one of the devices is blocking the communication or a rupture in the cable between the switch and the first device or a switch port not working.</p> <p>c. All devices in a car not working could mean that the local switch is not</p>	3C-KM-12-02-02		X			

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		powered or is not connected to the backbone.						
58	PA & PIS	<p>Coupler box – Functional test</p> <p>Network Check:</p> <p>Use the TGUT to check if all devices are online</p> <p>a. One single device not discovered could mean a failure of the devices itself of a rupture in the cable between the switch and the device or a switch port not working.</p> <p>b. Multiple devices that are on the same ip cable in failure could mean that one of the devices is blocking the communication or a rupture in the cable between the switch and the first device or a switch port not working.</p> <p>c. All devices in a car not working could mean that the local switch is not powered or is not connected to the backbone.</p>	3C-KM-12-02-03	X				
59	PA & PIS	<p>DVR, CCTV HMI Functional Test – CCTV test</p> <p>1. Go to the HMI and check the view on few</p>	3C-KM-12-03-01,04	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		camera.						
60	PA & PIS	Saloon camera Functional Test – CCTV test 1. Go to the HMI and check the view on each camera.	3C-KM-12-03-02	X	X	X		
61	PA & PIS	Exterior camera Functional Test – CCTV test 1. Go to the HMI and check the view on each camera.	3C-KM-12-03-03	X		X		
62	Cab Back Wall	1. Inspect Cab Back Wall for any damages	3C-80243-05	X				
63	Cab Side Door	1. Check for mounting of cab door limit switch 2. With the cab side door closed and from inside the cab, check rotation the main lock handle on the cab side door between in and out. 3. Check that the door unlocks and can be opened into the cab. 4. Check that the main lock springs back when the handle is released in the door open position. 5. Close the door and check that it closes	3C-80820-01	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		<p>correctly.</p> <p>6. Check the door is manually operated door type.</p> <p>7. Check the Two rollers connected with panel and those operate on the upper track rail.</p> <p>8. Check the bottom guiders are operated on bottom rail simultaneously with the action of the two rollers.</p> <p>9. Check the door can withstand rough handling including slam-open and slam close by operation and maintenance personnel.</p> <p>10. Check the stoppers are possible to completely buff for opening power.</p> <p>11. Check the Auto-Locking mechanism</p> <p>12. Check for play in doors</p> <p>13. Visually check if there are any damaged areas on the access panel.</p> <p>14. Check door status on TCMS</p>						

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
64	Partition door	1. Check for proper operation, locking from both sides. 2. Check functionality of limit switch	-	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
Task 3. Interior								
65	Passenger Seat	Inspect 1. Outer surfaces for damage or scratching 2. Seat pans, seat lower covers and seat brackets to ensure safety of mountings 3. Major scratches or cracks of the rubber seal between the seat back and the window panel, and also between the seat edge and the draught screen glazing panel	3C-80238-01	X	X	X		
66	Grab pole & Rail	Inspect 1. The grab pole and grab rail outer surfaces for damage or scratching 2. Any tube or parts shows a major permanent deformation 3. Any slack fixing screws or bolts 4. A fracture over 3 mm in length.	3C-80239-01	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
67	Doorway & Gangway grab handle	Inspect 1. The doorway grab handle outer surfaces for damage or scratching 2. Any tube or parts shows a major permanent deformation 3. Any slack fixing screws or bolts 4. A fracture over 3 mm in length	3C-80239-07	X	X	X		
68	Strap-hanger	Inspect the joint between the strap hanger and grab rail for any slack fixing bolts.	3C-80239-10	X	X	X		
69	Draught screen Glasses	Inspect 1. The condition of the draught screen glass. 2. The condition of the fixing of the upper and lower parts of the draught screen glass for any slack fixing bolts and/or rubber packing	3C-80239-12	X	X	X		
70	Bulkhead panels	Inspect 1. The condition of the draught screen paint of the surface for any scratches 2. The condition of the bulkhead panel fixings for any slack fixing	3C-80239-14	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
71	Fire Extinguisher	1. Ensure the extinguisher is properly located in plain view and its access is unobstructed. 2. Visually check unit for any signs of corrosion, leakage or physical damage. 3. Ensure the nameplate is secure and legible and that operating instructions face outward. 4. Ensure visual inspection safety clip is in place and intact. 5. Visually check the discharge hose to ensure it is not damaged or obstructed. 6. Date and initial the inspection tag and keep a record. 7. Check for expire date.	3C-8023B-01	X	X	X		
72	Double corrugated bellows, compl.	Inspect 1. Damages, cuts or tears in the fabric 2. Broken bellows frames 3. Worn sealing profiles 4. Evenly fitting on couple frames and screw-on frame	3C-80411-01, 02	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
73	Bridge plate, compl. wagon side	Inspect 1. Sluggishness of rod hinge by carefully moving the floor flap up and down 2. Bridge plates resting correctly on couple frame sided bridge plate 3. Sliding ledge worn	3C-80412-01	X	X	X		
Task 4. Exterior								
74	Windows	Check if the window glasses (Windscreen and Body side windows glasses) are broken or cracked, or the glazing sealing is damaged	3C-80221-01	X	X	X		
75	Bridge plate, compl. couple frame side	Visually check 1. For tears and holes in fabric 2. To see if couple frames do not evenly fit 3. Sliding ledge worn/damaged	3C-80413-01	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
Task 6. Functional Checks								
76	VAC 3 phase 415V AC& 110V DC Power Plug (Saloon and Cab)	1. Inspect the 110V connector located on the panel. Check that it is locked in position. 2. Ensure no force has been used to connector in 110 V DC power cable and there is no existing physical or structural damage. 3. After visual inspection turn ON main control switch, and start the unit. Ensure the unit is operable. 4. Inspect the three-phase connector located on the panel. Check that it is locked in position. 5. Check that there are no loose pins in the insert module. 6. After visual inspection turn ON main control switch, and start the unit. Ensure the unit is operable.	3C-191130-01	X	X	X		
			3C-192127-01	X				
77	VAC (Saloon and Cab)	1. With power applied to the electrical cubicle, check that there are NO faults are available in TCMS 2. Check that the sight	3C-191110-03 3C-192110-01	X X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		<p>glass is full (colour change).</p> <p>3. Run the VAC in Normal AUTO mode and observe any unusual noise in any VAC</p> <p>4. Operate VAC in Normal AUTO mode and physically check whether air conditioning appears to be normal. Also, check and record the temperature readings corresponding to each VAC from TCMS VDU.</p> <p>5. Check CAB VAC operations in all modes by operating Rotary switch</p>						
78	VAC (Saloon and Cab)	<p>1. Check the tray and drain under evaporator coil to see if any debris is found clean the tray and drain.</p> <p>2. Check and clean if necessary drains in the condenser coil compartment</p>	3C-191110-04 3C-192110-02	X X	X X	X X		
79	VAC- Saloon	Fresh air filter cleaning	3C-191120-01	X	X	X		
80	VAC- Saloon	Return air filter cleaning	3C-191121-01	X	X	X		
81	VAC- Cab	Mixed air filter cleaning	3C-192120-01	X				
82	TCMS-	a. Turn	3C-1A1100-01	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
	Central Control Unit-CCU	<p>OFF control power to the Central Control Unit.</p> <p>b. Check the connector insulating materials for any defects, damage and contamination. Replace if necessary.</p> <p>c. Check the condition of the pins and sockets for defect and damage. Replace if necessary.</p>						
83	TCMS-Communication Node	a. Turn OFF control	3C-1A1200-01	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		power to the Communication Node. b. Check the connector insulating materials for any defects, damage and contamination. Replace if necessary. c. Check the condition of the pins and sockets for defect and damage. Replace if necessary.						
84	TCMS-Remote I/O	a. Turn OFF control power to the	3C-1A1400-01	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		Remote I/O Unit and inputted/outputted signal source powers. b. Check the connector insulating materials for any defects, damage and contamination. Replace if necessary. c. Check the condition of the pins and sockets for defect and damage. Replace if necessary.						
85	TCMS- Video display Unit	1. Check connector insulating materials for	3C-1A1300-021	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		defect, damage and contamination. Replace if necessary. 2. Check the condition of the pins and sockets for defect and damage. Replace if necessary 3. Check frame for damage, defect and contamination, clean with a vacuum cleaner, alcohol and a dry cloth if required. 4. Check connecting cables for signs of damage. Repair if necessary.						
86	Passenger Saloon Door	1. Open/close the Passenger Saloon doors by pressing push buttons 2. Check the results on TCMS Display 3. While Opening and closing door, check that doors open and close without obstruction.	3C-80810-01	X	X	X		
87	Passenger Saloon Door	1. Check function of obstruction detection. 2. Check the indication of obstruction detection. 3. Check the door movement monitor in	3C-80810-02	X	X	X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		opening direction. 4. Check, if all securing elements of drive and limit switches are intact 5. Check, if sealing wax(torque marking) at mounting screws is intact. 6. Check the pull arms for mechanical damage. 7. Check drive unit. 8. Check the wiring and electrical attachments. 9. Check emergency access device manually. 10. Check emergency egress device manually 11. Check the mechanical door cut out.						
88	Brake System	a. Check the Brake page on TCMS monitor b. Inspect MR Pressure (8 to 10 bar) and BP pressure	3C-KM610-01	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		(5 bar) from gauge in the Cab. c. Check the application and release of Service Brake. d. Check the application and release of Emergency Brake, Emergency brake push button and BP drivers brake valve. e. Check the Emergency Brake application / release function test by EBPBs, DBV &						

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		TBC f. Difference between TCMS and pressure gauge reading to be checked and recorded in any difference found there.						
89	Brake System	1. Check that brake equipment is working without any abnormal noise 2. Check that pressure gauge in the cab working properly.	3C-KM610-02	X	X	X		
90	Leakage test	KBI Test for leakage checking 1. Check that pressure in MR gauge (through gauge in DM car) doesn't fall below 0.2 bar in 5min. 2. Check the pressure on TCMS. If the pressure are different , it should be recorded	3C-KM610-02	X	X	X		
91	Current	1 Visual inspection of	3C-KM511-01	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
	Collector Device	all components for damage and dirt 2 Check the right height of the Current Collector. H1=120mm (+0/-2) H2=201mm (±2) H3=221.5mm (±2) 3 Wear inspection of the collector shoe. 4 Check fixation and torque mark.						
92	HSCB	1. Check the High Speed Circuit Breaker box for damage to the box, the covers, the fasteners and the FRP cover(Bolting torque value: 15N·m, M10 which is the torque value of FRP cover fixation bolt). 2. Check the connector is securely fitted. 3. Check the earth strap mounting point for signs of damage. 4. Check the earth strap for signs of damage. 5. If any damage is found, repair or replace the damaged part. 6. Checking of the mounting brackets	3C-152100-02	X		X		

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		(M12x 30L) and check the Torque (73.58 Nm)						
93	Signages & Stickers	Inspection of Marking and Labelling If the marking / labelling is stained, has colour fading, is stretched, and shrunk, blistered or peeling off, replace in accordance within Maintenance Work Instruction 3C-80237-02 "Replacement of Marking and Labelling".	3C-80237-01	X	X	X		
94	TCMS	1. Check from TCMS display that there is no faulty equipment on the train. 2. Check door screen for faults and cut-out switch position. 3. Check brake screens for brake controller and cut-out switch. 4. Check powering screen for position of VVVF. 5. Check Auxiliary screen for APS position. 6. Perform on-board test for VVVF, APS, BECU, VAC, DCU. 7. Function test through TCMS for Interior	-	X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		Saloon light.						
95	FDS	Check Train FDS status in FDS-HMI		X				
96	Electrical Jumper	Visually check for any abnormalities		X	X	X		
97	Interior & Exterior	1 Visually check for any abnormalities 2 Check end wall panel locking condition		X	X	X		
98	Under frame equipment	Visually check all under frame equipment cover and their fixation		X	X	X		
99	Cab light & Console light	Check driving console light by operating Driving Console Light Switch		X				
100	Head light and Tail light	Check head lights by operating Head Light Switch (HLS). 8. Check tail lights functionality		X				
101	Exterior Indicator	Check the function of Train Number Indicator(TNI) & Destination Indicator Front(DIF), Door Indicator Lamps		X	X	X		
102	Flasher Light	Check the flasher light function in MS FOR/REV & SCS cut-out mode.		X				
103	Air Horn	Check the operation (Dual tone)		X				
104	Sun Visor	Check functionality of sun		X				

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		visor						
105	Battery box	Visual check of Cells: 1. Check if fuses are damaged or have deteriorated. 2. Check to see if the fuse holder bolts have loosened. 3. Check if any label lettering is damaged or missing. 4. Check that all cable connections are secure. 5. Check that the component does not make any abnormal noises. 6. Ensure assembled cells are clean and dust free. 7. Ensure no signs of leakage of electrolyte, cracks / damage. If minor traces of leakage of electrolyte is found, wipe it with soft cloth. If major leakage is observed, replace the cell with new one. 8. If any white crystals found on the cell around the vent cap, clean with wet cloth first, later with dry	3C-172200-01		X			

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		<p>cloth.</p> <p>9. Visual check of condition of CWS vent plugs:</p> <p>10. Visual check of condition of water pipes, water inlet & outlet connector and connector covers.</p> <p>11. Check all the water pipes, L-bends, U-bends, Water inlet & outlet connectors for free from fraying or cracks. If found, replace with new one.</p> <p>12. Ensure all the cable ties are firmly tightened.</p> <p>13. Ensure connector covers free from any damages or melting or heat affected marks. If found, replace with new one.</p> <p>14. Visual check of condition of cable & Lug:</p> <p>15. Ensure cables are free from damages, fraying of strands at lug crimping area and overheating.</p> <p>16. Ensure lug is free from defects like peeling of electroplating, over</p>						

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		heating If found any defects in cable & lug, replace with new one. Individual cell voltage 17.Keep HSCB Off position. 18.Keep BCB in OFF position. 19.Pull the battery tray out and remove connector covers to access polarity terminals 20.Check individual cell voltage with the help of Digital Multi meter. Open circuit voltage of fully charged cells should be 1.30±0.03 volts. 21.If any cell is found below 1 volt, it should be removed and follow O&M manual for the corrective maintenance. Charger Output: 24.Keep BCB in ON position. 25.Keep train in auxilliary ON position. 26.Check output voltage of charger in float mode. it should be 110.4 min- 114.4 max						

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Task No	Equipment	Maintenance Actions	MWI No.	Car Applicability			Result	Remark
				DM	T	M		
		volts. 27.Aux OFF train for a while and discharge the battery for 5~10 minutes. Aux ON and check the boost voltage. it should be 117.6 max to 112.8 min volts. Check drawing current with the help of clamp meter. Charging current should not be more than 18 amps (float mode).						