सत्यमेव जयते

भारत सरकार GOVERNMENT OF INDIA
रेल मंत्रालय MINISTRY OF RAILWAYS

केवल कार्यालयीन उपयोग हेतु
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ENHANCEMENT OF POH INTERVAL FROM 12 TO 18 MONTHS FOR ICF DESIGN COACHES

CAMTECH/2008/Coach-POH/1.0

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Centre for Advanced Maintenance TECHnology

उच्च अनुरक्षण प्रौद्योगिकी केन्द्र

Excellence in Maintenance

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PREFACE

Railway Board directed CAMTECH vide letters no.2007/M(C)/141/1 dt.03-07-2007 and 95/Elec/G/114/7 dtd.16-07-2007 to undertake an Integrated view of all electrical and mechanical equipments in connection with "**Enhancement of POH periodicity from 12 to 18 months for ICF design coaches" with introduction of IOH at 9 months interval.** A joint seminar of Electrical and Mechanical department was held at CAMTECH from 20-08-07 to 22-08-07.

Based on the field surveys, feed back during the seminars of Mechanical and Electrical departments, field reports and literature, this report has been prepared to facilitate its large scale introduction. In this report proposed schedules to be adopted in IOH have been recommended. The list of must change items during POH have been suitably enhanced and some Passenger Amenity fittings have also been included based on field experience. Certain recommendations have also been made to minimize the field problem.

Comments/ Suggestions received from RDSO and Railway Board on the draft report sent to them in September 2007 have been incorporated in this Final Report.

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ENHANCEMENT OF POH INTERVAL FROM 12 TO 18 MONTHS FOR ICF DESIGN COACHES

TERMS OF REFERENCE

Railway Board vide their letters No. 2007/ M (C) /141/1 dated 31.01.2007 and 24.4/ 9.5.2007 had directed the Railways to carry out trails for undertaking POH on limited number of coaches of Mail/Express trains at a periodicity of 18 months with IOH at 9 months interval. These trials were to be carried out only on those coaches in which during POH eight materials have been changed 100% with materials to new specifications issued by RDSO (details in Annexure 'E') with the stipulation that during IOH bogies shall be replaced with completely overhauled bogies.

Further Railway Board vide their letters No. 2007/M(C) /141/1 dated 03.07.2007 and 95/Elec(G)/114/7 dated 16.07.2007 directed CAMTECH to take an integrated view of all mechanical and electrical equipments on different ICF design coaches to fix their maintenance schedules both in open line and workshops to facilitate large scale implementation of 18 months POH periodicity.

OBSERVATIONS

1. Most of the Railways have not so far procured the upgraded material and fitted into experimental coaches for trial purposes. In August 2007 Southern Railway has turned out one rake with upgraded materials, which is plying on Chennai-Jaipur route. However, it is too early to assess the life of these upgraded materials. So, CAMTECH could not obtain any feed back from the Railways regarding the above limited trials.

2. CAMTECH conducted a seminar for Mechanical and Electrical Officers and supervisors from 20th August to 22nd August 2007 to ascertain the views of open line and workshops regarding enhancement of periodicity of POH of Mail/Express coaches from 12 to 18 months. The Railways expressed following major difficulties in implementation of this.

    2.1 Non-availability of adequate number of bogies as capital spares;

    2.2 Logistics problems in transportation of bogies from Coaching depots to Workshops and back due to restricted movement of department vehicles, restrictions on movement of trucks during day time in cities & far away location of any depots fro workshops, etc;

    2.3 Proper adhesive is not available in the market for pasting of PVC on smooth stainless steel surface of the toilets with stainless steel inlays, due to which PVC sheet is coming out carrying wrinkles, water accumulation etc.

    2.4 Condition of Toilet fittings steel toilet inlays;

    2.5 Conventional paint is not even lasting for 12 months due to abrasion, bulging and flaking;

    2.6 Frequent changing of alternator 'V' belts;

    2.7 Premature wearing out of buffer plunger face plate.

    2.8 Premature breakage of FRP type window shutters.

RECOMMENDATIONS

18 month POH with IOH after every 9 months can be introduced on ICF design coaches subject to the following conditions:-

1.1 The revised POH periodicity shall be applicable to all Mail/Express coaches and respective Railways shall arrange the required logistics for transportation of bogies from and to workshops..

1.2 A marking on the coach below the return date, shall be specified to distinguish coaches of 18 months periodicity.

1.3 The general sequence of work during POH of a coach will remain same as mentioned in Coach Maintenance Manual. List of must changed Mechanical and Electrical items during POH are given in Appendix' A' and Appendix 'B' respectively.

1.4 The trip schedules, monthly (A) schedules and quarterly (B) schedules will remain same as mentioned in Coaching Maintenance Manual. The coach will undergo two quarterly schedules (B schedule) before IOH and two quarterly schedules (B schedule) between IOH and POH. The work to be carried out during IOH schedules for mechanical and Electrical equipments are given in Appendix 'C' and Appendix 'D' respectively.

1.5 CMIs, SMIs and Technical Circulars /pamphlets issued time to time by RDSO should be followed for necessary modifications and replacements.

1.6 Immediate action should be taken to supply adequate number of fully equipped bogies as unit exchange. The requirements can be worked out based on transportation time plus 2 days buffer multiplied by umber of bogies required per day.

1.7 The layout of bogie exchange facilities in coaching depots for IOH has been shown in Annexure E-I. However, in some of the minor coaching depots where it is not possible to provide EOT crane, the layout as per option 2 can be provided. The list of additional M&P for coaching depots has been detailed in Annexure 'F'.

It is also recommended that:

1.8 In order to overcome the problem of premature wearing out of plunger face plate, the depots should be provided with sufficient no. of complete buffer plungers for unit exchange with the workshops.

1.9 Railways should use solvent base adhesive to ICF-specification No. ICF/MD/Spec.-093 for pasting PVC flooring on stainless steel inlays of toilets to overcome the problems of its non-sticking. (Ref.: RDSO L.No.MC/CB/Adhesive dt.03-12-07)

1.10 To derive the benefit of expected higher life of new material, Workshops will reuse/replace brake gear bushes, upper and lower washers for primary suspension on condition basis during overhauling of bogies. They will also maintain a record for these items so that life can be fixed up.

1.11 Workshops to switch over to PU painting at the earliest as RDSO has already advised Railways to switch over to PU paint vide their letter no. MC/Paint dated 03-08-07..

1.12 At present water tank on each and every coach are interconnected with GI fittings and flexible hosepipe with jubilee clamp. The conventional hosepipe gets shifted from its location and sometimes hose gets compressed and torn. Redesigning of these conventional hosepipe interconnection to overcome this problem may also be examined by RDSO.

1.13 At present prescribed periodicity of overhauling of DV (with Cast Iron body) is alternate POH i.e. every 2 years, which have now been recommended as every POH with change of entire kit i.e. after every 18 months. RDSO may carry out trials for exploring the possibility of increasing its periodicity as alternative POH i.e. every 3 years. Based on the results, the periodicity may be suitably revised. However, Overhauling of aluminum body distributor valve to Spec.C-K209 may be carried out every 3rd POH or on completion of 8 lakh km whichever is earlier.

1.14 Railways may enter into contracts for Zero deficiency passenger amenity fittings on the pattern of S.C. Railway/Secunderabad Division.

1.15 In wake of large number of on line failures of the alternator "V" belts and subsequent sick marking/coach lifting to attend to the same. "Provision of spare 'V' belts which was discontinued vide recent instructions may be continued. Foolproof securing arrangement must however be ensured to prevent falling off the spare V belts during run". RDSO shall carry out a study on performance of high capacity V belts for enhancing the service life and obviating the requirements of spare V belts.

1.16 Life of different type of batteries differs (for example Lead acid, VRLA, LMLA, etc). The periodicity of changing the different batteries during 2nd or 3rd POH to be matched accordingly.

1.17 Large scale of introduction of brush less carriage fans to be done. Meanwhile, quality of carbon brushes to be improved to avoid frequent attention resulting in waste of manpower.

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APPENDIX 'A'

LIST OF ITEMS, WHICH MUST BE CHANGED DURING POH OF BG COACHES (MECHANICAL)

Following items should be included as "must change" during POH of BG Coaches:

S.No.	Items	EVERY POH (18 months)	ALTERNATE POH
1	Locking plates (T-0-2-637) when opened	Y	--
2	Rubber sealing ring of axle box front & rear cover (T-0-2-625) *	Y	--
3	Rubber packing ring (T-0-1-632) *	Y	--
4	Guide ring (T-0-1-635)	Y	--
5	Guide bush (T-0-1-634)	Y	--
6	Circlip for dash pot guide bush (if used) (ICF Sk-0-1-182, item 3) *	Y	--
7	Shoe adjuster assembly (T-3-1-612, T-3-1-607, T-3-1-609) & M16 nut & bolt with split pin	Y	--
8	Brake gear bushes (as a set)(RDSO Sk.81039)	Y	--
9	Brake gear bushes (Composite brake gear bushes to spec.no.C-K307)	--	Y
10	All bulb type cotters (T-3-2-632)	Y	--
11	Sealing washer for air vent screw (T-0-1-629)	Y	--
12	Rubber stopper (RDSO Sk.-97068)	Y	--
13	Crown bolt (RDSO Sk.-97068)	--	Y
14	Buffer plunger wear plate	Y	--
15	Draw hook support plate	--	Y
16	Dash pot bottle	--	Y
17	Centre pivot guide bush and sleeve	--	Y
18	All rubber item of air brake equipment	Y	--
19	Centre pivot locking plate (T-0-6-612)	Y	--
20	Bush for equalizing stay (RDSO SK 88018 item 5 & 6, RDSO SK 88105 item 5)	Y	--
21	Silent block for anchor link (T-0-7-601)	Y	--
22	Silent block for anchor link of upgraded specification (Injection moulded spec no.RDSO/2006/CG-5	--	Y
23	Dirt collector filters	Y	--
24	Felt ring	Y	--

*** Must change items during IOH also.**

S.No.	Items	EVERY POH (18 months)	ALTERNATE POH
25	Rubber beadings of window glasses (Good quality PU/ Silicon based sealant must be used.)	Y	--
26	Window runner in non AC coaches	Y	--
27	Hoses of water tank	Y	--
28	Draft pad of screw coupling	--	Y
29	Draft pad of buffers	--	Y
30	Bogie bracket for Alternator	--	Y
31	Tension rod supporting bracket	--	Y
	AMENITY/INTERIOR FITTINGS		
1	Toilet Mirror	Y	--
2	Toilet Wash Basin	--	Y
3	Lavatory Pan along with wall protector	--	Y
4	Fish Tail	Y	--
5	Flushing Valve	Y	--
6	Gravity Push Cock	Y	--
7	Support Handle (Commode Handle)	Y	--
8	Mirror shelf	Y	--
9	Soap dish	Y	--
10	Lavatory latch	Y	--
11	Barel Bolt	Y	--
12	Lavatory Door with turn over latch	--	Y
13	Commode seat cover	Y	--
14	Toilet Glass Shutter (Banjo)	Y	--
15	Toilet Glass Shutter (Frosted Glass)	Y	--
16	Compartment mirror	Y	--
17	Bottle Holder	Y	--
18	Window Glasses	On condition basis	
19	Window Shutter Louvers	--	Y
20	Main Door Handle	--	Y
21	Luggage Ring	--	Y
22	Foot Steps	On condition basis	
23	Rexine covers for seat/ berth securing chain	Y	--
24	Magazine Bag	Y	--
25	Rubber sealing profiles for doors	Y	--
27	Main door pivot housing (bottom)	--	Y

NOTE : All consumables viz Roller bearing grease, dashpot oil, side bearer oil and all rubber items and split pins should be changed during POH.

APPENDIX 'B'

1. MUST CHANGE ITEMS FOR POH OF AC COACHES (ELECTRICAL)

Following items should be included as "must change" during POH of AC Coaches.

S. No.	Items		EVERY POH (18 months)	ALTERNATE POH
A	**Alternator with pulley**			
	Suspension pin with lock nut		Y	--
	'V' Belt		Y	--
	Alt. Nylon Bush		Y	--
	Bogie bush		Y	--
	Bearings		--	Y
	Cotter pin for locking suspension pin		Y	--
	Axle pulley rubber pad		Y	--
	Washers (Spring & Flat)		Y	--
	Studs with nut, check nut & split pin for axle pulley		Y	--
	Split pins		Y	--
	Axle pulley for 'V' belt		--	Y
	Tension rod sleeve		Y	--
	Tension rod complete assembly		--	Y
B	**RRU/ERRU**			
	Regulator fixing nut bolt on cradle		Y	--
	Sponge rubber gasket		Y	--
	Split pin		Y	--
	Cover fixing flying nut-bolts		--	Y
C	**Battery**			
	POH Kit for Battery	Vent plugs	Y	--
		Float guide	Y	--
		Connecting strips/ leads of lead acid batteries with nut & bolts	Y	--
		Fuse carrier of battery fuse	--	Y
	Battery box suspension bolts, nuts, split pins		Y	--
	Changing of batteries * (Refer RDSO l.no. EL/1.6.9.15 dtd. 21.11.2007)		Old batteries in second POH i.e. after 3 years of service can be reused if capacity of battery after measurement is more than 90%.	
	FRP Tray		To be changed, if broken.	Y

* Batteries with more than 80% but less than 90% capacity can be transferred to Railways for maintenance purpose.

S. No.	Items		EVERY POH (18 months)	ALTERNATE POH
D	**Inverter**			
	The maintenance of inverter should be undertaken through AMC from respective OEMs.			
E	**Power Control panel fuses & switch gear etc. for under slung and RMPU type AC coaches**			
	Kit of copper contact tip of contactors		Y	--
	Kit of copper contact tip of switches		Y	--
	Door locks		Y	--
	Cable conduits		--	Y
F	**Water Raising apparatus**			
	Compressor type			
	POH Kit for Compressor type WRA	Crank with bush, Distance Bush	Y	--
		Piston with gudgeon pin	Y	--
		Piston with bush	Y	--
		Spider ring	Y	--
		Piston Ring	Y	--
		Oil seal	Y	--
		All gaskets and “O” rings	Y	--
		Breather Assembly	Y	--
		Air filter assembly	Y	--
	Needle Roller		Y	--
	Ball bearing 6305		Y	--
	Tyre coupling		Y	--
	Compressor oil		Y	--
	Monoblock pump			
	POH Kit for Monoblock type WRA	Mechanical Seal	Y	--
		Drain plug rubber washer	Y	--
		Flange gasket (‘O’ ring)	Y	--
		Oil Seal	Y	--
		Circlip of Mech. Seal	Y	--
	Non Return Valve		--	Y
	Pump Assembly		--	Y

S. No.	Items		EVERY POH (18 months)	ALTERNATE POH
G	**Air conditioning equipments**			
	Canvas duct		Y	--
	Fresh air & return air Filters		Y	--
	Anti Vibration Mounting pads for machines		Y	--
	Ball bearings of all motors		--	Y
	Under slung type coaches			
	Compressor ACCEL			
	Compressor oil		Y	--
	Gear shaft for pump 11ER		--	Y
	Pump end bearing		Y	--
	Seal end bearing		Y	--
	Half suction bearing 17AR		Y	--
	Tyre Coupling		Y	--
	POH Kit for Compressor ACCEL	Shaft seal assembly 10 A-GR	Y	--
		'O' ring for oil pump 11 SR	Y	--
		Bearing bushing for oil pump 11 CR	Y	--
		Piston ring 18CR	Y	--
		Piston pin 18AR	Y	--
		Discharge valve seat 20 AR	Y	--
		Discharge valve ring plate 20 CR	Y	--
		Valve spring 19 GR	Y	--
		Filter bag for BG 34 BR	Y	--
		Set of gasket (1 set)	Y	--
		Set of Neoprene 'O' ring (1 set)	Y	--
		Scrapper ring 18 DR	Y	--
		Seeger ring 18 ER	Y	--
		Suction valve retaining plate 19 HR	Y	--
		Suction valve ring plate 19 FR	Y	--
		Suction valve spring 19 GR	Y	--
		Bushing for piston pin 17 BR	Y	--
		Connecting rod bolt 17 CR	Y	--
		Connecting rod nut 17 DR	Y	--
		Split pin 17 ER	Y	--
		Guide pin 17 FR	Y	--

S. No.	Items		EVERY POH (18 months)	ALTERNATE POH
	Kirloskar FK 4			
	'O' ring set 3040225550		Y	--
	Gasket set 3040230100		Y	--
	Connecting ring 3040212850		Y	--
	Toroidal sealing ring 3040211750		Y	--
	Piston ring 3020212550		Y	--
	Compression ring 3020212650		Y	--
	Plate locking 3020212150		Y	--
	Discharge valve reed 0.4 thickness 3020210850		Y	--
	Suction valve reed 3020210750		--	Y
	Suction valve filter 3040230100		--	Y
	Ball bearings 3040210950		--	Y
	Gear set for oil pump 3040211450		--	Y
	Compression ring 3020211050		--	Y
	Teflon packing 3020210350		--	Y
	Valve plate 3020216550		--	Y
	Carbon brush for motor		Y	--
	Condenser unit			
	Catch all filter		Y	--
	All Flange gasket		Y	--
	Evaporator Unit			
	POH Kit for Evaporator Unit	Flange Gasket	Y	--
		Rubber lining	Y	--
		Drip tray gasket	Y	--
	Drip tray drain pipe line		Y	--
	Drip tray		--	Y
	Cotter pin for impeller		Y	--
	Condenser Motor			
	Bearing		--	Y
	Carbon brushes		Y	--
	Carbon brush holder		--	Y

S. No.	Items		EVERY POH (18 months)	ALTERNATE POH
	Blower Motor			
	Bearing		Y	--
	Carbon brushes		Y	--
	Carbon brush holder		--	Y
	Compressor Motor			
	Bearing		--	Y
	Carbon brushes		Y	--
	Carbon brush holder		--	Y
H	**Air conditioning equipments (RMPU type AC Coaches)**			
	Sealed compressor oil changing		Y	--
	Earthing shunt		Y	--
	Strainer in liquid line		Y	--
	POH Kit for RMPU	Rubber lining of evaporator compartment	Y	--
		Rubber packing for support of refrigerant pipe line	Y	--
		Rubber profile below RMPU	Y	--
	Fasteners		Y	--
	Insulation over suction line		--	Y
	Separator of terminal block		Y	--
	Anti-vibration mounting pads of RMPU		Y	--
	Rubber mounting pads of compressors		Y	--
	Vane relay		--	Y
	Sensor for electronic thermostat		--	Y
	Electronic thermostat with single temperature setting		It should be provided in each RMPU during POH.	
I	**Cables conduit etc.**			
	Rubber grommets, fittings and cleats		Y	--
	Jointed cables		Y	--
	PVC flexible conduits		Y	--
	Under frame cables rewiring		--	Y

S. No.	Items	EVERY POH (18 months)	ALTERNATE POH
J	**Light fittings**		
	Sealing gasket	Y	--
	Diffuser	Condition basis	
	Reflector	--	Y
K	**Carriage fans**		
	DC/AC Fans		
	Ball bearing 6200	--	Y
	Insulating rubber pads	Y	--
	Carbon brush Spring	Y	--
	Carbon Brush	Y	--
	Brush holder	--	Y
	Crimping socket	--	Y
	Fasteners	Y	--
	Brush less DC Fans		
	Ball bearing	--	Y
L	**Any other items/ components**		
	All gaskets, grommets, jointed cables	Y	--
	HRC fuse base	--	Y
	All switches	--	Y
	All sockets (Mobile/laptop charging)	--	Y
	Battery charging terminals	--	Y

2. MUST CHANGE ITEMS FOR POH OF NON-AC COACHES (ELECTRICAL)

Following items should be included as "must change" during POH of Non-AC Coaches.

S. No.	Items		EVERY POH (18 months)	ALTERNATE POH
A	**Alternator with pulley**			
	Suspension pin with lock nut		Y	--
	'V' Belt		Y	--
	Alt. Nylon Bush		Y	--
	Bogie bush		Y	--
	Bearings		--	Y
	Cotter pin for locking suspension pin		Y	--
	Axle pulley rubber pad		Y	--
	Washers (Spring & Flat)		Y	--
	Studs with nut, check nut & split pin for axle pulley		Y	--
	Split pins		Y	--
	Axle pulley for 'V' belt		--	Y
	Tension rod sleeve		Y	--
	Tension rod complete assembly		--	Y
B	**RRU/ERRU**			
	Regulator fixing nut bolt on cradle		Y	--
	Sponge rubber gasket		Y	--
	Split pin		Y	--
	Cover fixing flying nut-bolts		--	Y
C	**Battery**			
	Battery box suspension bolts, nuts, split pins		Y	--
	FRP Tray		To be replaced, if broken	Y
	Changing of batteries * (Refer RDSO l.no. EL/1.6.9.15 dtd. 21.11.2007)		Old batteries in second POH i.e. after 3 years of service can be reused if capacity of battery after measurement is more than 85%.	
	POH Kit for Battery	Vent plugs	Y	--
		Float guide	Y	--
		Connecting strips/ leads of lead acid batteries with nut & bolts	Y	--

S. No.	Items	EVERY POH (18 months)	ALTERNATE POH
D	**Cables conduit etc.**		
	Rubber grommets and fittings	Y	--
	Jointed cables	Y	--
	PVC flexible conduits	Y	--
	Under frame cables rewiring	--	Y
E	**Light fittings**		
	Sealing gasket	Y	--
	Diffuser	Condition basis	
	Reflector	--	Y
F	**Carriage fans**		
	DC/AC Fans		
	Ball bearing 6200	--	Y
	Insulating rubber pads	Y	--
	Carbon brush Spring	Y	--
	Carbon Brush	Y	--
	Brushless DC Fans		
	Ball bearing	--	Y
G	**Any other items/ components**		
	All gaskets, grommets, jointed cables, cleats	Y	--
	HRC fuse base	--	Y
	Rotary switches	Y	--
	Battery charging terminals	--	Y

* Release batteries with more than 80% capacity can be transferred to Railways for maintenance purpose.

APPENDIX 'C'

MAINTENANCE SCHEDULES (MECHANICAL)

The schedule 'IOH' shall be carried out **on Sick line at nominated primary depot.**
The following work should be carried out during IOH:

Sr.No.	Particulars	IOH
	Frequency of Examination	**9 months + 30 - 0 days**
1.0	**Coach**	
1.1	Coach should be washed both from out side & inside. *	√
1.2	Disinfect and spray insecticide at corner and crevices of coaches after washing all coaches *	√
1.3	Intensive cleaning of coach *	√
2.0	**Shell**	
2.1	Visually check body panels/end walls for damages	√
2.2	Visually inspect destination boards brackets	√
2.3	Visually inspect window bars for damage/missing	√
2.4	Examine body side doors for working/ damages	√
2.5	Inspect door handles for damages/missing	√
2.6	Inspect vestibule and its Rubber fittings for damages/missing, repair if necessary	√
2.7	Visually check vestibule fall plate, mounting brackets, pins and lock lever for ease of operation, damages/ deficiency	√
2.8	Thoroughly clean and remove dust, rust accumulated at pillars through turn under holes with coir brush and compress air	√
2.9	Examine for corrosion of sole bar and other under frame members with torch light or inspection lamp	√
2.10	Repainting of damaged paint both inside & outside, (As per requirement) and Touching up of printed portion, if faded	√
2.11	Check roof ventilator for damages	√
3.0	**Under frame**	
3.1	Visually examine centre pivot mounting bolts and attend if needed	√
3.2	Check condition of head stock/sole bar	√
3.3	Examine trough floor, turn under and other under frame members from underneath for corrosion	√
3.4	Visually inspect centre pivot cover	√

*** These activities may be carried out on Pit Line after IOH before attachment to a rake.**

Sr.No.	Particulars	IOH
	Frequency of Examination	**9 months + 30 - 0 days**
4.0	**Bogie (Bogie to be run out during IOH and sent to w/s and overhauled bogie supplied by w/s should be fitted)**	
4.1	Lifting the coach body	√
4.2	Running out bogie	√
4.3	Check overhauled bogie for any defect/deficiency	√
4.4	Check oil level in side bearer oil-bath and oil filling cap, top-up oil if needed	√
4.5	Place over hauled bogies and Lowering the coach body maintaining body/ bogie clearances	√
4.6	Check oil level in dash pot, Add specified grade of oil in dash pot if needed	√
5.0	**Brake System**	
5.1	Air brake system	
5.1.1	Conduct brake test as per rake test and attend leakages and defective components if any.	√
5.1.2	Visually inspect for damage on brake pipe, feed pipe and hose coupling.	√
5.1.3	Visually inspect suspension bracket for air brake equipment and anti pilferage device for any defect and rectify	√
5.1.4	Check passenger alarm by pulling the chain with spring balance with 6.4 kg to 10 kg force	√
5.1.5	Carry out manual brake release test to ensure proper function of release lever	√
5.1.6	Check and adjust brake gear to achieve correct piston stroke	√
5.1.7	Service application, release test of every coach of the rake to ensure full brake power	√
5.1.8	Carry out guard van valve test to ensure proper functioning of guard van valve.	√
5.1.9	Examine slack adjuster for damage and mal functioning and subsequent replacement	√
6.0	**Draw gear**	
6.1	Check and replace damage/missing split pins/cotters/rivets	√
6.2	Examine draw hook, draw bars, rubber pads for damages	√
6.3	Check condition of the screw coupling and its components and replace if required.	√
6.4	Ensure that wear on screw coupling shackle pins, trunion pins, shackle/link holes and draw hook holes should not exceed 3mm.	√
6.5	Ensure that wear at any section on draw hook should not exceed 10 mm.	√
6.6	Check condition of draw beam and locating pins on it	√
6.7	Examine visually draft key locking pins	√

Sr.No.	Particulars	IOH
	Frequency of Examination	**9 months + 30 - 0 days**
7.0	**Buffing gear**	
7.1a	Visually examine buffer plungers for damage/drooping/stroke length.	√
7.1b	Ensure the length is within 584-635 mm	√
7.2	Inspect buffer plunger face plate for wear and profile, If face plate is worn out by more than 5 mm, the plunger assembly to be replaced.	√
7.3	Examine buffer mounting bolts and attend if necessary	√
7.4	Examine visually buffer casing for cracks/damages	√
8.0	**Running gear**	
8.1	Check wheel distance gauge for loose or tight wheel	√
9.0	**Seats and berths**	
9.1	Examine middle and upper berth chains	√
9.2	Examine the holding/securing brackets for seats and berths and attend if necessary	√
9.3	Examine snack tables for damages and rectify if necessary	√
9.4	Examine and repair damaged upholstery cushions and curtains	√
9.5	Examine reclining mechanism on chair cars for proper functioning and attend if necessary	√
9.6a	Wooden seats and frames should be cleaned	√
9.6b	Disinfect the seats and frames.	√
9.7	Cushion should be cleaned with duster. Oil or head stain and dirty spots if any should be cleaned with mild soap solutions and wipe dry	√
10.0	**Doors**	
10.1	Examine doors for proper functioning and securing with hinge pivots. Doors should not graze with floor or door sill plates	√
10.2	Examine door locks, latches firmly secured with correct sized screws and properly/smoothly engaging in their slot. The tongue of gravity type latch should be in proper alignment with its slot plate.	√
10.3	Visually examine window shutters for smooth working and proper locking	√
10.4	Examine visually rolling shutters/sliding doors of vestibule for smooth working	√
10.5	Examine compartment sliding doors in AC first and ordinary first class coaches for smooth function	√
10.6	Thorough inspection and repair of sliding doors in SLR coaches for easy and smooth operation.	√

Sr.No.	Particulars Frequency of Examination	IOH 9 months + 30 - 0 days
11.0	**Windows**	
11.1	Examine window shutters of non AC coaches for smooth movement in railing to prevent rattling and disengaging of catches on run	√
11.2	Window frame on non AC coaches should not be broken and its glass, gauze wire and venetian louver should be in proper condition	√
11.3	Check window balancing mechanism on non AC coaches for proper function	√
11.4	Examine window safety catches for proper engagement in their slots	√
11.5	**Check lavatory banjo shutters for damage/missing**	√
11.6	Examine window frame and rubber profile of sealed windows in AC coaches for damages and attend if needed	√
11.7	Window bars should be provided and fixed in prescribed manner and replaced if damaged	√
11.8	Examine sealed windows of AC coaches, replace broken/damaged glasses	√
11.9	Check the availability of emergency exits in AC and Non AC coaches. Examine and attend if necessary.	√
12.0	**Flooring**	
12.1	Inspect and attend torn/damaged/cracked PVC flooring	√
12.2	Examine and attend opened PVC joints	√
12.3	Examine Drain holes in trough floor for accumulation of water due to clogging if noticed, inspect affected area for corrosion.	√
12.4	Inspect and attend torn/damaged/cracked PVC flooring in the lavatory	√
13.0	**Interior fittings**	
13.1	Examine laminated panels and mouldings for damage /cracks.	√
13.2	Visually inspect passenger amenity fittings, replace if found damaged/deficient	√
13.3	Examine door closer in AC coaches for proper function	√
13.4	Examine tower bolts of back rests in sleeper coaches for proper working	√
13.5	Examine visually curtain clothes in AC coaches attend if necessary	√
13.6	Examine ventilation grills for damages	√
13.7	Examine luggage racks/bunks for breakage	√

Sr.No.	Particulars	IOH
	Frequency of Examination	**9 months + 30 - 0 days**
14.0	**Lavatory and lavatory fittings**	
14.1	Check lavatory hinge door for proper function	√
14.2	Examine lavatory door latches/ tower bolts for proper function	√
14.3	Examine push cock, flush valve for proper functioning.	√
14.4	Check and attend leakage in pipes, fittings and shower roses in lavatory	√
14.5	Clean drain grills and drain holes in bath room and wash basin if found choked.	√
14.6	Check and replace damaged/ missing mirrors/shelves/ soap dishes	√
14.7	Examine squatting pans and foot rest for damages	√
14.8	Intensive cleaning of lavatory pans and commode with cleaning agent.	√
14.9	Thorough cleaning and descaling of water tanks	√

Note: PVC flooring in the lavatory should be checked and attended during quarterly schedule (B) for crack, damage and torn etc..

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APPENDIX 'D'

WORK SCHEDULE FOR IOH (ELECTRICAL)

The **schedule 'IOH'** shall be carried out **on sick line at nominated primary depot.**

Following work is to be carried out during IOH. Different SMIs issued by RDSO time to time for the maintenance of TL & AC equipments to be followed.

S.No.	Particulars	IOH
	Frequency of Examination	9 months + 30 days – 0 days
	TL & AC EQUIPMENT	
1.0	**ALTERNATORS**	
1.1	Carry out visual inspection of terminal box for signs of overheating, fumes and presence of water etc., clean it.	√
1.2	Check the connections for any defect, if required re-crimping and taping should be done. Replace spring washers, if overlapping.	√
1.3	Disconnect the regulator and measure the insulation by 500 V megger; if found less than 10 M-ohm, remove alternator and heat its winding in the oven at 80 degree C for 1 hour.	√
1.4	Check the condition of outgoing cables and its cleating arrangement. Replace the grommet, if necessary. Ensure that flexible pipe carrying the cables is connected properly to the grommet to prevent damage to insulation.	√
1.5	Check the suspension pin, main suspension lugs of alternator and bogie brackets for any signs of crack. Provide new nylon bushes and secure nuts and bolts, with new split pins. Play between alternator lugs and bogie bracket should not be more than 4.0 mm.	√
1.6	Check profile of 'V' groove for worn out pulley as per SMI No. RDSO/PE/SMI/TL/0030-2005 (Rev.0) dtd. 12.08.2005.	√
1.7	Check the pulley fixing, concentrating on lock nut and locking collar pin. If lock nut is damaged, replace it.	√
1.8	Check safety chains and chain fixing nuts, bolts and split pins.	√
1.9	Replace tension rod sleeve. Fit tension rod fixing pin of alternator with new washer and split pin. Replace spring, if belts loose upon coach arrival.	√
1.10	Lubricate the threads of the tension rod and adjusting nut.	√
1.11	Check the logbook for abnormal/ unequal load sharing and ensure that the difference is within the range of 30 A with RRU and 10 A with ERRU. Follow the instructions given in SMI No. RDSO/PE/SMI/AC/0018-99 (Rev.0) dtd. 05.02.1999.	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
2.0	**AXLE PULLEY & ALTERNATOR PULLEY**	
2.1	Check the lock nuts and split pins for availability and tightness. Appropriate open jaw type torque wrench to be used for uniform tightness of all studs, value of torque depends on the gap required between two pulley halves.	√
2.2	Check distance between wheel hub and axle pulley with gauge plate.	√
2.3	Check the condition of pulleys and its 'V' grooves profile as per SMI No. RDSO/PE/SMI/TL/0030-2005 (Rev.0) dtd. 12.08.2005. Replace the pulley, if required.	√
2.4	Examine the indicating white mark on the axle pulley and ensure that the pulley has not shifted. If pulley found shifted, remove the pulley and re-tighten it after replacing rubber pads and provide indicating white mark.	√
2.5	Tap with hammer and judge the tightness by sound.	√
2.6	Ensure gap between the two halves of the axle pulley is 3.0 ± 0.5mm.	√
3.0	**'V' BELTS**	
3.1	Replace all existing "V" belts with new "V" belts having same grade/make. Follow the instruction given in SMI No. RDSO/PE/SMI/TL/0027-2004 (Rev.0) dtd. 05.03.2004 for checking new "V" belts. The old "V" belts removed from service to be destroyed.	√
3.2	Check tension of "V" belts. For the exact measurement of static tension, apply force `P' with a spring balance at the centre of span in direction perpendicular to the span until the belt is deflected from the normal to the extent of 16 mm per meter of span. The force `P' should be between 31.4 to 47.0 kg.	√
4.0	**RECTIFIER CUM REGULATOR UNIT (RRU/ ERRU)**	
4.1	Clean regulator box externally and remove all the dust with dry compressed air.	√
4.2	Open cover and change sealing sponge rubber gasket.	√
4.3	Clean all dust with soft brush and vacuum cleaner from inside, particularly from heat sink of electronic components and terminal board.	√
4.4	Check voltage and current setting. Ensure that they have not been disturbed and are in locked position. Following tests shall be done to ensure proper working of RRU/ ERRU with alternator: • Set specified voltage at half load at 1500 rpm. • Check OVP set voltage and working.	√
4.5	Check field and phase HRC fuses for their proper rating and fitment.	√
4.6	Tighten all the electrical connections and check whether power connections are provided with locking washers.	√
4.7	Check the proper suspension of the unit and provide new split pin in its suspension bolt.	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
5.0	**BATTERY CHARGER**	
5.1	Clean battery charger externally and remove all the dust.	√
5.2	Clean all dust with soft brush and vacuum cleaner from inside, particularly from heat sink of electronic components and terminal board.	√
5.3	Ensure that the coarse and fine control switch is in position No.1.	√
5.4	Check and clean all connections and contacts and tighten all electrical connections.	√
6.0	**BATTERY & BATTERY BOX**	
6.1	**Lead Acid Batteries**	
6.1.1	Clean the battery box externally and remove all dust with dry compressed air.	√
6.1.2	Open battery box covers. Remove inter-cell connections and take out the cells.	√
6.1.3	Clean the cells, inter-cell and end cell connectors thoroughly. Replace spring washers, if each are overlapping.	√
6.1.4	Check for crack in cell containers leading to leakage. If needed, replace the defective cell with healthy cell of similar capacity, make and lug date.	√
6.1.5	Check for heating signs on the positive and negative terminals and discolouring of the cells container/ top lid. Clean the sulphation of terminals.	√
6.1.6	Check the level of electrolyte in all the cells and top up with distilled water, if necessary.	√
6.1.7	Check the specific gravity and voltage of all cells with cell tester.	√
6.1.8	Check all vent plugs and float guides conditions and replace defective ones.	√
6.1.9	Check the conditions of connecting strips/ leads and replace if required.	√
6.1.10	Check all suspension bolts of battery box suspension/ cradle for signs of any crack, corrosion, rusting and take corrective action.	√
6.1.11	Clean and examine condition of battery boxes.	√
6.1.12	Examine condition of FRP tray and replace if necessary.	√
6.1.13	Paint all battery boxes. Battery box will be applied with Grey colour high build epoxy paint to RDSO Spec. No. M & C/ PCN/111 to a thickness of 100 – 120 micron.	√
6.1.14	Provide all cells in battery boxes with proper packing.	√
6.1.15	Connect all inter-cell connections and end cell connectors. Provide petroleum jelly on all connections.	√
6.1.16	Charge the battery bank at the rate I = 0.1 x C_{10} fully till 3 constant hourly readings of voltage found, indicating the condition of a fully charged cell.	√
6.1.17	Fit the battery box covers and secure them properly.	√

S.No.	Particulars	IOH
	Frequency of Examination	**9 months + 30 days – 0 days**
6.2	**VRLA Batteries**	
6.2.1	For the maintenance of VRLA batteries follow the instructions given in SMI No. RDSO/PE/SMI/TL/0024-2004 (Rev.1) dt. 01.10.2004.	√
6.3	**LMLA Batteries**	
6.3.1	For the maintenance of LMLA batteries follow the instructions given in SMI No. RDSO/ PE/ SMI/ AC/ 0032-2006 (Rev.0) dt. 31.05.2006. For TL batteries follow RDSO/ PE/ SMI/ TL/ 0025 and RDSO/ PE/ SMI/ TL/ 0028.	√
	UNDERSLUNG AIR CONDITIONING EQUIPMENTS	
7.0	**COMPRESSOR ACCEL**	
7.1	Clean the compressor externally with dry compressed air.	√
7.2	Clean the oil strainer with petrol or CTC (Carbon Tetrachloride).	√
7.3	Replace filter bag for BG 34 BR	√
7.4	Check oil level and observe any signs of leakage, which will be indicated by presence of oil at the point of leakage.	√
7.5	Check for signs of leakage at joints & shaft seal and rectify.	√
7.6	Replace the compressor oil with new oil. Follow the instructions given in SMI No. RDSO/ AC /SMI/ 6 dtd. 08.09.1981 and correction slip issued vide L.No. EL/ 7.1.75 dtd. May 1982.	√
7.7	Examine the reading of HP, LP and OP gauges recorded in the log sheet for any abnormality and take necessary action.	√
7.8	Check the tightness of fasteners of compressor head and its cover.	√
7.9	Examine the fixing arrangement, check the condition of the anti vibration mounting pads and check the tightness of bolts with 30 kg-m torque wrench and tighten, if necessary.	√
7.10	Replace shaft seal assembly.	√
7.11	Replace HP/ LP/ OP cutout switches, if defective.	√
7.12	Tighten the clamping of the refrigerant pipeline.	√
7.13	Check leakage from HP/ LP/ OP cutout switches.	√
8.0	**CONDENSER**	
8.1	Clean the condenser fins and copper tubes thoroughly as per the instructions given in SMI No. RDSO/ SMI/ AC/ 16 dtd. 29.05.1998.	√
8.2	Examine the fins for external damage due to flying ballast and take corrective action if necessary.	√
8.3	Replace catch all filter.	√
8.4	Check the condition of body frame and replace the condenser, if necessary.	√
8.5	Check and ensure that the protection plates and grills are provided on the three sides of the frame.	√
8.6	Ensure minimum airflow of 4 meters per second through condenser.	√
8.7	Check the leakage and rectify, if required.	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
9.0	**EVAPORATOR, DRIP WATER DRAIN AND EXPANSION VALVE**	
9.1	Clean the assembly of evaporator coil and surroundings.	√
9.2	Clean the drip tray and drainpipe thoroughly and check for water leakages.	√
9.3	Pour water on evaporator coil and ensure that water drains out easily.	√
9.4	Clean the strainer, provided before expansion valve.	√
9.5	Replace return and fresh air filters.	√
9.6	Check and ensure that fresh air dampers provided with locking arrangement.	√
9.7	Replace canvas duct, if required.	√
9.8	Check the condition of heater bank.	√
10.0	**COMPRESSOR, CONDENSER & EVAPORATOR MOTORS**	
10.1	Clean the motors externally with dry compressed air.	√
10.2	Check mounting of all motors for any signs of crack, corrosion and rusting. Take remedial action if required.	√
10.3	Check the condition of the anti vibration mounting pads and check the tightness of bolts with 30 kg-m torque wrench and tighten, if necessary.	√
10.4	Disconnect the motors connections, measure the insulation resistance by 500 V megger; if found less than 2 Meg ohms, replace the same.	√
10.5	Open inspection covers and examine the condition of commutator. Clean with sand paper or pumice stone, if necessary. Do not remove the dark tan film unnecessarily. Remove all carbon dust with dry compressed air.	√
10.6	Examine the condition of brush holders replace, if required and measure the spring tension. If less than the value recommended by manufacturer, replace the spring.	√
10.7	Replace the carbon brushes with approved grade and make.	√
10.8	Check for the positive locking of rockers.	√
10.9	Examine the incoming leads for proper connections and tightness. Check the flexible conduit for its condition and proper anchoring at both ends.	√
10.10	Check the bearings for noise by shock pulse meter and replace, if required. Lubricate bearings with appropriate quantity of recommended grease.	√
10.11	Examine flexible tyre coupling of compressor and replace, if found defective.	√
10.12	Check the alignment of the compressor and its motor.	√
10.13	Check the starting resistance connectors for tightness.	√
10.14	Connect the motor connection and tighten the terminal connections in the terminal box.	√
10.15	Check the direction of rotation of motor for correctness.	√
10.16	Clean the condenser fan blades and tighten, if loose.	√
10.17	Clean the blower drum and check it's fixing for tightness.	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
11.0	**DEHYDRATOR AND LIQUID RECEIVER**	
11.1	Check the sight glass for leakage, rectify if necessary.	√
11.2	Clean the strainer in the dehydrator-cum-filter unit.	√
11.3	After 10 minutes of starting the compressor, check the level of liquid refrigerant. It should be at the bottom of the lower glass of the liquid receiver.	√
11.4	After 15 minutes of starting the plant, feel the outlet and inlet to dehydrator by hand for temperature difference. The outlet should not be colder than inlet.	√
12.0	**THERMOSTATS**	
12.1	Clean thermostat bulb with cotton.	√
12.2	Check for any breakage in mercury column or body of the thermostat and replace it with new one if required. Do not heat the bulb to join the the broken pieces of mercury column.	√
12.3	Check the condition of thermostat holder and its fixing arrangement. Replace it with new one if found broken or contacts defective.	√
12.4	Ensure working of plants in auto mode for all temperature setting.	√
13.0	**PANEL BOARD**	
13.1	Clean the panel and remove dust.	√
13.2	Check the working of indicator lamps.	√
13.3	Ensure availability of spare fuses in the place provided for the same.	√
13.4	Clean copper contact tips of contactors by suitable chemical agent and check proper operation of contactors.	√
13.5	Provide arc chutes properly.	√
13.6	Check and tighten all electrical connections.	√
13.7	Check the relays and their connections.	√
13.8	Check the PCB in the thermostat circuits for their proper functioning	√
13.9	Check all diodes and their connections.	√
13.10	Check all rotary switches and their connections.	√
13.11	Check the operation of cooling pilot relay (by short circuiting terminals of C.T.). Remove short after the completion of check.	√
14.0	**COACH WIRING**	
14.1	Revised check the earth leakage in the wiring with a double test lamp method as explained in the RDSO code of practice and prevention of fire as per EL/ TL 56.	√
14.2	Revised check for loose connection in all the junction box/ terminal boards & tighten if necessary	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
14.3	Carry out coach insulation test as per item no. 5.8 of code of practice for prevention of fire. (RDSO/ PE/ O/ 0008-205, Rev. '0' dt. Oct. 2006).	√
14.4	Clean the electrical control/ cubicle and terminal boxes/ terminal boards, remove dust.	√
14.5	Check the locking and securing arrangement for the door and covers of control/ power cubicle and terminal boxes/ terminal boards/ fuse distribution boards. Rectify or replace if necessary.	√
14.6	Check supply to laptop/ mobile charging points.	√
15.0	**LIGHTS**	
15.1	Open each fitting and clean properly from inside and outside. Ensure free operation of locking mechanism and replace defective fitting.	√
15.2	Replace rusted fittings and fittings with damaged surface.	√
15.3	Check all the lights for proper working. Rectify or replace if necessary.	√
15.4	Check all light switches for their condition and proper working. Replace defective switches.	√
15.5	Check up all lighting circuit fuses for correct rating and replace if necessary.	√
16.0	**FANS**	
16.1	Check and clean plastic fan blade and ensure that there is no crack on the blade or hub.	√
16.2	Check the leakage current, if greater than 300 micro Amps. Then replace capacitor in AC fan.	√
16.3	Ensure proper fixing of fans and locking arrangement.	√
16.4	Check for abnormal sound, rectify or replace, if needed.	√
17.0	**PRE-COOLING UNIT**	
17.1	Clean rectifier unit externally with dry compressed air.	√
17.2	Clean and check terminal box connections.	√
17.3	Load the pre-cooling unit to its maximum capacity and check for any overheating.	√
17.4	Check the pre-cooling socket pins and its fixing arrangement.	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
18.0	**GENERAL**	
18.1	Check log- sheet of last trip and attend all the faults recorded in the log sheet.	√
18.2	Run the plant for half an hour. Check system operation, specially the following : 1. Suction pressure gauge reading should be 2-3 Kg/cm^2. 2. Discharge pressure gauge reading should be 10 – 14 Kg/cm^2. 3. Oil pressure should be minimum 3.0 kg/cm^2 above suction pressure. 4. Suction should be cold and sweaty. Delivery should be very hot and liquid line should be warm. 5. Feel the expansion valve by hand. It should be cold. 6. Ensure setting of fresh air damper.	√
18.3	Record the battery voltage on LOAD and NO LOAD conditions.	√
18.4	Adjust the air diffuser for air distribution.	√
	ROOF MOUNTED AC PACKAGE UNIT	
19.0	**CONTROL PANEL**	
19.1	Check the log sheet and attend the defects noticed during run as reported by escorting staff.	√
19.2	Clean the panel with vacuum cleaner or compressed air and check for any loose connections. All cable entry holes to be provided with grommets.	√
19.3	Check that all legend plates inside the control are intact.	√
19.4	Check that glass cover over indication PCB is intact.	√
19.5	Check and clean the power and control contractors and clean copper contact tips of contactors by suitable chemical agent.	√
19.6	Check the connection of switchgear terminal blocks for overheating and tightness.	√
19.7	Check rotary switches for proper working.	√
19.8	All the earthing shunts should be checked and replace, if required.	√
19.9	Check the working of gauges, voltmeters and ammeters.	√
19.10	Take IR of live terminals to body for power and control supply with 500 V megger and it should be more than 2 M ohms.	√
19.11	Check panel doors for proper closing and locking. Check the door locks and hinges.	√
19.12	Check all safety and protection devices for their proper working.	√
19.13	Replace defective/ by passed components including indicator LEDs and lamps, if any.	√
19.14	Check proper working of electronic thermostat.	√
19.15	Remove the out going wires from MCB 7, in case of scroll compressor. (There is no provision of crank case heater in scroll compressor)	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
19.16	Clean accumulated dust over sensor of electronic thermostat.	√
19.17	Mercury in glass thermostat	
	a. Clean the dust on the temperature sensor. b. Calibrate the temperature sensor by digital contact type calibrated temperature meter having probe sensor. c. Check the cut in the cable of sensor and replace damaged/ cut cable by new cable. d. Avoid the by pass connection for manual operation and ensure the auto mode operation. e. Ensure the single setting of temperature i.e. 25 cut in 23 cut off in summer and 19 cut in 21 cut off in winter.	√
19.18	Electronic thermostat	
	a. Clean the dust on the temperature sensor. b. Calibrate the temperature sensor by digital contact type calibrated temperature meter having probe sensor. c. Ensure the functional working of Display unit. d. Check the cut in the cable of sensor and replace damaged/ cut cable by new cable. e. Ensure the connector for sensor i.e. Amphenol make no. MIL – C – 5015 type 4 pin connector with model no. MS 3106 R – 14S – 2S – 3202 & MS 3106 F – 14S – 2S – 3202 series for controller box and sensor both. If not matched, replace by Amphenol make series connector. Ensure the interchangeability of one make sensor with other make sensor. f. Correct the by pass connection for manual operation and ensure the auto mode operation of electronic thermostat. g. Ensure the single setting of temperature i.e. cut in 25 degree C - cut off 23 degree C in summer and 19 cut in 21 cut off in winter. h. Ensure that the insulation resistance is more than 20 Mega ohms. If less, take corrective action.	√
20.0	**RMPU**	
20.1	Replace all fresh air and return air filters	√
20.2	Clean all air bellows and ducts.	√
20.3	Check the condition of cables and conduits.	√
20.4	Check the working of all motors and take their IR values with 500V megger and record the same. IR should be more than 2 M ohms. If found less, take corrective action.	√
20.5	Check all the motors for abnormal sound by shock pulse meter and replace the bearings, if necessary.	√
20.6	Check all the earthing wires provided on the equipments.	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
20.7	Check and clean condenser fan blades and ensure that there is no crack on the blades or the hubs.	√
20.8	Check anti-vibration mounting pads of compressor, condenser and blower motors and replace if necessary.	√
20.9	Check the working of HP, LP and control pressure cutouts. Check the working of internal heat protection of motors, if any.	√
20.10	Check the condition of latch for securing the evaporator compartment cover.	√
20.11	Ensure proper clamping of all the refrigerant pipelines.	√
20.12	Check the condition of drainpipes and clean it.	√
20.13	Check heater tripping when blower MCB is off.	√
20.14	Check the working of RMPU.	√
20.15	Run the plant for half an hour and check the current drawn by various equipments with the help of clamp tester. Normal currents for various equipment and mode of operation shall be as under:- Package in cooling mode : 20 - 23 Amp. Package in heating mode : 11 - 13 Amp. Compressor motors : 7 - 10 Amp. Condenser motors : 1.5 - 2 Amp. Blower Motor : 1.5 - 2.5 Amp.	√
20.16	Check working of all over load relays.	√
20.17	Check for proper operation of time delay relays provided in compressor circuit. As soon as power supply is switched `ON' first compressor should come in circuit after 2 minutes and the second one after 2.5 minutes.	√
20.18	Check working of both Roof Mounted Package Units (RMPUs) with either of the inverter on the Self Generating (SG) AC coaches provided with two package units.	√
21.0	**INVERTER**	
	The maintenance of coach inverter should only be done through respective OEMs.	√
22.0	**DRIP TRAY**	
22.1	Clean the sludge inside the pipe walls and tray.	√
22.2	Pour water into drip tray and ensure that the poured water is drained through the outlet pipe.	√
22.3	Check the normal flow of water in drip tray by running the AC plant continuously for 2 to 3 hours.	√

S.No.	Particulars Frequency of Examination	IOH 9 months + 30 days – 0 days
23.0	**WRA**	
23.1	**COMPRESSOR TYPE**	
23.1.1	Clean and check complete assembly for any defect or abnormality. Take corrective action, if required.	√
23.1.2	Replace breather, air filter assembly and compressor oil.	√
23.1.3	Check proper operation of pump.	√
23.2	**MONOBLOCK TYPE**	
23.2.1	Clean and check complete assembly for any defect or abnormality. Take corrective action, if required.	√
23.2.2	Replace drain plug rubber washer.	√
23.2.3	Check proper operation of pump.	√
24.0	**MICROPROCESSOR CONTROLLER FOR RMPU**	
24.1	Check the insulation resistance. If less, take corrective action.	√
24.2	Check on/ off switch for proper working. Replace defective switch.	√
24.3	Check LED for proper working. Rectify or replace, if necessary.	√
24.4	Clean the dust on the temperature sensor and humidity sensor.	√
24.5	Calibrate the temperature sensor by digital contact type calibrated temperature meter having probe sensor.	√
24.6	Calibrate the humidity sensor by digital contact type calibrated humidity meter.	√
24.7	Check the cut in the cable of sensor and replace damaged/ cut cable by new cable.	√
24.8	Correct the by-pass connection for manual operation and ensure the auto mode operation of micro-processor controller.	√
24.9	Ensure the set temperature and night start hours and night end hours for sleep mode operation. The data should be in memory after once switch off and switch on again.	√
25.	**Testing**	
25.1	Generation testing should be conducted on SGAC coaches by running both alternators through dyna drive on full coach load.	√

NOTE: SMI and MS issued time to time by RDSO will be followed and maintenance schedule shall be up dated accordingly

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APPENDIX 'E'

The increased periodicity will apply only to those coaches where during POH following materials have been changed 100% with new specification issued by RDSO:-

S.NO.	Item Description	Upgraded Specification	Warranty period
1.	PVC Flooring	RDSO/2006/CG-12	6 year from date of supply or 5 years from date if fitment.
2.	Seat Upholstery	Fire Retardant Vinyl Coated Fabric to Spec. No. RDSO/2006/CG-16	42 months from date of supply or 36 months from date of fitment which ever is earlier.
3.	Decorative Thermosetting resin Bonded LP Sheet	Fire Retardant Decorative Thermosetting resin Bonded LP Sheet to Spec. No. C-8914	
4.	Cushioning Material for seats and berths	Densified Thermal Bonded Polyster Block (Recron) to Spec. No. C-K607/PU foam to spec. No. C-8914	
5.	Overhead water tanks	Two piece Overhead water tank to ICF Drg. No. ICF/SK-6-3-444 latest alteration	
6.	Brake Gear Bushes	Composite brake Gear Bushes to Spec. No. C-K605/C-K307/C-K510	24 moths from date of supply or 24 months from date of fitment.
7.	Upper and Lower washers for primary suspension	High capacity Hytrel washers to spec. No. C-K409 (Rev.1)	30 moths from date of supply or 24 months from date of fitment
8.	Silent block for anchor link	Injection moulded silent block for anchor link to spec. No. RDSO/2006/CG-5	42 moths from date of supply or 36 months from date of fitment

APPENDIX 'F'

ADDITIONAL FACILITIES REQUIRED IN IOH DEPOT

Sl.no.	Description	0-100	101-250	251-500	501 &above
1	EOT crane 10 t capacity	01	01	02	02
2	Set of Whiting jacks (05 nos)	01	01	02	04
3	Trailer	01	01	02	02
	M&P required at IOH depot without EOT crane				
1	Set of Whiting jacks (05 nos)	01	01	NA	NA
2	Turn table	04	04	NA	NA
3	Jib crane 10t	01	01	NA	NA
	M&P required at IOH depot for Electrical Work				
1	Fork lift truck for battery bank replacement	01	01	02	02
2	Dyna Drive for generation testing of SGAC coaches	02 sets	02 sets	04 sets	04 sets
3	Constant current/ Constant voltage battery charger for charging of individual cell of SGAC battery bank	01	01	02	02

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