

**SPECIFICATION FOR 'HARNESS OF UNDER-FRAME AND ROOF ARRANGEMENT'
FOR HOG COMPLIANT LHB EOG NON-AC LSLRD (31 SEATER) COACHES**

- 1.0** This specification covers manufacturing, assembly, supply of readymade 'CABLE HARNESSES for UNDER FRAME AND ROOF FOR HOG COMPLIANT LHB EOG NON-AC LSLRD COACHES (31 SEATER)'. These harnesses shall comprise of thin walled flexible elastomeric cables with Copper conductors duly cut to specified lengths and ferruled for cable identification. The free ends of the cables shall be stripped & taped with FRLT cotton insulation tapes of approved makes.
- 1.1** The harness manufacturer shall quote for supply of the harness without commissioning.
- 1.2** The firm shall maintain date wise in-house quality control system and in-house quality control records etc. for in-stage process inspection and testing at harness manufacture premises and the same shall be made available to the inspecting official during Type testing.

2.0 SCOPE OF SUPPLY:

TYPE	DESCRIPTION
TYPE-1	Harness of 'Under-frame arrangement' for HOG compliant LHB EOG Non-AC LSLRD (31 Seater) coaches.
TYPE-2	Harness of 'Roof arrangement' for HOG compliant LHB EOG Non-AC LSLRD (31 Seater) Coaches.

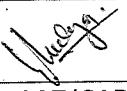
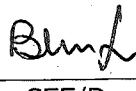
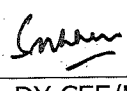
- a) Procurement of the items specified in the BOM of the specification shall be done from RDSO/RCF/ICF/MCF approved vendors mentioned in latest version of the vendor directory issued by RDSO/RCF/ICF/MCF respectively. Wherever some specific makes have been mentioned, procurement is to be done from those sources.

2.1 TYPE-1: HARNESS OF UNDER FRAME ARRANGEMENT' FOR HOG COMPLIANT LHB EOG NON-AC LSLRD (31 SEATER) COACHES:-

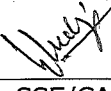
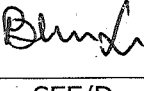
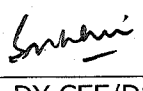
2.1 (a): BILL OF MATERIAL FOR UNDERFRAME WIRING:

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

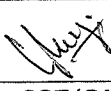
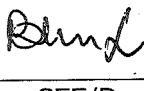
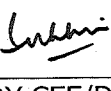
S.N.	Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	QPC	Remarks
1.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	150	Red	ELRS/SPEC /ELC/0019, Rev.-4	57 Mtrs	Feeder cables
2.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	150	Yellow	ELRS/SPEC /ELC/0019, Rev.-4	57 Mtrs	Feeder cables
3.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	150	Blue	ELRS/SPEC /ELC/0019, Rev.-4	57 Mtrs	Feeder cables

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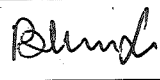
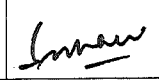
4.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	95	Black	ELRS/SPEC /ELC/0019, Rev.-4	57 Mtrs	Feeder cables
5.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	70	GNYE	ELRS/SPEC /ELC/0019, Rev.-4	9.8 Mtrs	For Feeder Earthing
6.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	50	GNYE	ELRS/SPEC /ELC/0019, Rev.-4	0.5 Mtrs	For Feeder Earthing
7.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Red	ELRS/SPEC /ELC/0019, Rev.-4	24 Mtrs	Feeder Junction Boxes to SBC
8.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Yellow	ELRS/SPEC /ELC/0019, Rev.-4	24 Mtrs	Feeder Junction Boxes to SBC
9.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Blue	ELRS/SPEC /ELC/0019, Rev.-4	24 Mtrs	Feeder Junction Boxes to SBC
10.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Black	ELRS/SPEC /ELC/0019, Rev.-4	24 Mtrs	Feeder Junction Boxes to SBC
11.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	16	Red	ELRS/SPEC /ELC/0019, Rev.-4	12.5 Mtrs	9 KVA TXR input (750V AC side)
12.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	16	Yellow	ELRS/SPEC /ELC/0019, Rev.-4	12.5 Mtrs	9 KVA TXR input (750V AC side)
13.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	16	Blue	ELRS/SPEC /ELC/0019, Rev.-4	12.5 Mtrs	9 KVA TXR input (750V AC side)
14.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	16	Black	ELRS/SPEC /ELC/0019, Rev.-4	12.5 Mtrs	9 KVA TXR input (750V AC side)
15.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	16	Red	ELRS/SPEC /ELC/0019, Rev.-4	13.5 Mtrs	9 KVA TXR output (415V AC side)
16.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	16	Yellow	ELRS/SPEC /ELC/0019, Rev.-4	13.5 Mtrs	9 KVA TXR output (415V AC side)
17.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	16	Blue	ELRS/SPEC /ELC/0019, Rev.-4	13.5 Mtrs	9 KVA TXR output (415V AC side)

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18.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	16	Black	ELRS/SPEC /ELC/0019, Rev.-4	13.5 Mtrs	9 KVA TXR output (415V AC side)
19.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	16	GNYE	ELRS/SPEC /ELC/0019, Rev.-4	1.1 Mtrs	For Earthing
20.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	6	Red	ELRS/SPEC /ELC/0019, Rev.-4	28 Mtrs	9 KVA TXR output (190V AC side)
21.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	6	Yellow	ELRS/SPEC /ELC/0019, Rev.-4	28 Mtrs	9 KVA TXR output (190V AC side)
22.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	6	Blue	ELRS/SPEC /ELC/0019, Rev.-4	28 Mtrs	9 KVA TXR output (190V AC side)
23.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	6	Black	ELRS/SPEC /ELC/0019, Rev.-4	28 Mtrs	9 KVA TXR output (190V AC side)
24.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	6	GNYE	ELRS/SPEC /ELC/0019, Rev.-4	4.5 Mtrs	HV panel to RBC
25.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	10	Red	ELRS/SPEC /ELC/0019, Rev.-4	14 Mtrs	BCT-1, BCT-2 to +ve fuse box
26.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	10	Black	ELRS/SPEC /ELC/0019, Rev.-4	11.5 Mtrs	BCT-1, BCT-2 to -ve fuse box
27.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	10	White	ELRS/SPEC /ELC/0019, Rev.-4	27 Mtrs	-ve fuse box
28.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	10	Choco.	ELRS/SPEC /ELC/0019, Rev.-4	32 Mtrs	+ve fuse box
29.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	2.5	White	ELRS/SPEC /ELC/0019, Rev.-4	4.5 Mtrs	RBC to HV Panel
30.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	2.5	Choco.	ELRS/SPEC /ELC/0019, Rev.-4	132.5 Mtrs	Feeder control cables & HV Panel to RBC

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31.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	2.5	GNYE	ELRS/SPEC /ELC/0019, Rev.-4	2.0 Mtrs	For Earthing
32.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	White	ELRS/SPEC /ELC/0019, Rev.-4	5 Mtrs	VK1 to HV Panel
33.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Choco.	ELRS/SPEC /ELC/0019, Rev.-4	5 Mtrs	VK1 to HV Panel
34. *	3x1.0 sqmm multicore cables 600/1000V colour Wh,Br,Blk	-	3x1.0	Wh,Br, Blk	EDTS-132, Rev-' C ' AM-3, Corr-1 (DS-4)	100 Mtrs *	Speed Sensor/ Disc brake Cable
			3x1.0	Wh,Br, Blk	EDTS-132, Rev-' C ' AM-3, Corr-1 (DS-4)	30 Mtrs (3x10 = 30 Mtr)	Net-1/Net-2 Control+ Spare.
35.	Cable marking system	-	-	-	EDML-60, Col-VI (Latest Revision)	1 no.	Heat shrinkable sleeves of M/S TYCO/ Phoenix/ Panduit make
36.	Copper crimping socket for 70 sq.mm cable	-	-	-	EDTS-200 (Latest Revision)	20 nos.	ITEM-7
37.	Copper crimping socket for 50 sq.mm cable	-	-	-	EDTS-200 (Latest Revision)	2 nos.	ITEM-11 (M-8)
38.	Copper crimping socket for 25 sq.mm cable	-	-	-	EDTS-200 (Latest Revision)	8 nos.	ITEM-14
39.	Copper crimping socket for 25 sq.mm cable	-	-	-	EDTS-200 (Latest Revision)	8 nos.	ITEM-23
40.	Copper crimping socket for 16 sq.mm cable	-	-	-	EDTS-200 (Latest Revision)	10 nos.	ITEM-15
41.	Copper crimping socket for 16 sq.mm cable	-	-	-	EDTS-200 (Latest Revision)	10 nos.	ITEM-16
42.	Copper crimping socket for 10 sq.mm cable	-	-	-	EDTS-201 (Latest Revision)	18 nos.	ITEM-2
43.	Copper crimping socket for 6 sq.mm cable	-	-	-	EDTS-201 (Latest Revision)	10 nos.	ITEM-4

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44.	Copper crimping socket for 2.5 sq.mm cable	-	-	-	EDTS-201 (Latest Revision)	10 nos.	ITEM-10
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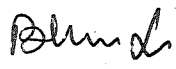
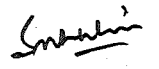
Note:-

- * 3x1.0 sq.mm shield multi-core cables of speed sensors have been shown for reference in BOM as these are being supplied by WSP system suppliers. Only cables for Net-1/Net-2 Control+Spare are to be supplied along-with Harness.

B) CONDUIT SYSTEM FOR CABLE MANAGEMENT & ACCESSORIES FOR UNDER FRAME WIRING:-

Firms supplying these items shall get these tested as per RDSO specification no. RDSO/PE/SPEC/AC/0138-2009 (Latest)

S. N.	DESCRIPTION	SPEC. NO.	TABLE	ITEM	QPC
1.	Polyamide flexible corrugated conduit, NW-17	RDSO/PE/SPEC/AC/0138-2009,(Latest)	A-1	3	131.5 Mtrs.
2.	Polyamide flexible corrugated conduit, NW-23		A-1	4	66 Mtrs.
3.	Polyamide flexible corrugated conduit, NW-29		A-1	5	18 Mtrs.
4.	Polyamide flexible corrugated conduit, NW-36		A-1	6	12 Mtrs.
5.*	Polyamide flexible corrugated conduit, NW-48		A-1	7	20 Mtrs.
6.	Straight PG metal thread End fitting PG-16	RDSO/PE/SPEC/AC/0138-2009,(Latest)	A-2	3	26 nos.
7.	Straight PG metal thread End fitting PG-21		A-2	5	22 nos.
8.	Straight PG metal thread End fitting PG-29		A-2	6	4 nos.
9.	Straight PG metal thread End fitting PG-36		A-2	7	2 nos.
10.*	Straight PG metal thread End fitting PG-48		A-2	8	4 nos.
11.	Hex.lock nut with PG thread brass PG-16	RDSO/PE/SPEC/AC/0138-2009,(Latest)	A-10	4	26 nos.
12.	Hex.lock nut with PG thread brass PG-21		A-10	5	22 nos.
13.	Hex. lock nut with PG thread brass PG-29		A-10	6	4 nos.
14.	Hex. lock nut with PG thread brass PG-36		A-10	7	2 nos.
15.*	Hex. lock nut with PG thread brass PG-48		A-10	8	4 nos.
16.	Tube clamp NW-17	RDSO/PE/SPEC/AC/0138-2009,(Latest)	A-8	3	19 nos.
17.	Tube clamp NW-23		A-8	4	32 nos.
18.	Tube clamp NW-29		A-8	6	15 nos.

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19.	Tube clamp NW-36	RDSO/PE/SPEC/AC/0138-2009,(Latest)	A-8	7	30 nos.
20.*	Tube clamp NW-48		A-8	8	10 nos.
21.	PG thread plug screws PG-16		A-18	4	16 nos.
22.	PG thread plug screws PG-21		A-18	5	4 nos.

Note:-

* Marked items shall not be procured as these items are available in RCF depots.

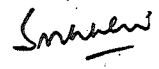
2.1 (b) PREPARATION / BUNCHING OF HARNESS:-

The preparation / bunching of harness shall be done as per under given for Under Frame wiring.

Har No.	Nos. & size of cable	Spec. no.	Working voltage	Color code	Length in mm	Ferrules marking	Route	Remarks & Flex. conduit size and length	Group name
1	3 nos., 150 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R,Y,B	21600	12 01 15 02, 12 01 18 02, 12 01 21 02	21	Feeder-1 From A16X1 to HOG Compliant Switch Board Cabinet (To be supplied loose)	FEEDER CABLES (Feeder-1)
	1 no., 95 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	Blk	21600	12 01 24 02	21		
1A	2 nos., 2.5 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Ch,Ch	23000	46 01 03, 46 01 04	25	Control cables (NW-17,L=21 Mtrs)	
1B	3 nos., 150 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R,Y,B	20500	12 01 01 02, 12 01 04 02, 12 01 07 02	10	Feeder-2 From A17X1 to HOG Compliant Switch Board Cabinet (To be supplied loose)	FEEDER CABLES (Feeder-2)
	1 no., 95 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	Blk	20500	12 01 10 02	10		
1C	2 nos.,X 2.5 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Ch,Ch	22500	46 01 01, 46 01 02	14	Control cables (NW-17, L=21 Mtrs)	
1D	3 nos., 150 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R,Y,B	7900	12 01 01 02 A, 12 01 04 02 A, 12 01 07 02 A	10A	Feeder-1 From A18X1 to HOG Compliant Switch Board Cabinet (To be supplied loose)	FEEDER CABLES (Feeder-3)
	1 no., 95 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	Blk	7900	12 01 10 02 A	10A		
1E	2 nos., 2.5 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Ch,Ch	9500	46 01 01 A, 46 01 02 A	14A	Control cables (NW-17, L=7.5 Mtrs)	

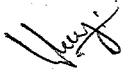
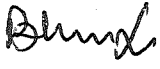
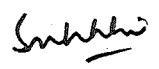
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1F	3 nos., 150 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R,Y,B	7000	12 01 15 02 A, 12 01 18 02 A, 12 01 21 02 A	21A	Feeder-1 From A16X1 to HOG Compliant Switch Board Cabinet (To be supplied loose)	FEEDER CABLES (Feeder-4)
	1 no., 95 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	Blk	7000	12 01 24 02 A	21A		
1G	2 nos., 2.5 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Ch,Ch	8500	46 01 03 A, 46 01 04 A	25A	Control cables (NW-17, L=6.5 Mtrs)	FEEDER LOOP CABLES
2	4 nos., 25 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R,Y,B, Blk	12000	12 01 01 01, 12 01 04 01, 12 01 07 01, 12 01 10 01	13	HOG Compliant Switch Board Cabinet to under-slung HV Panel NW- 48, L= 10 Mtrs)	
2A	4 nos., 25 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R,Y,B, Blk	12000	12 01 15 01, 12 01 18 01, 12 01 21 01, 12 01 24 01	23	HOG Compliant Switch Board Cabinet to under-slung HV Panel(NW- 48, L= 10 Mtrs)	
3	4 nos., 16 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R,Y,B, Blk	12500	12 01 12.02, 12 01 13.02, 12 01 14.02, 12 01 11.02	30	Input cables S1 (750V side) to S7 (NW-29, L= 11 Mtrs)	9 KVA Trans-former Input/Output Cables
3A	4 nos., 16 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	R,Y,B, Blk	13500	12 02 16.01, 12 02 17.01, 12 02 18.01, 12 02 19.01	31	Output cables S7 (415V side) to S1 (NW-36, L=12 Mtrs)	
3B	4 nos., 6 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	R,Y,B, Blk	13500	12 02 06.01, 12 02 07.01, 12 02 08.01, 12 02 09.01	31A	Output cables S7 (190V side) to S1 (To be laid with harness no.3A)	
4	1 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Ch	3000	35	35	Battery fuse box +ve (S4) to Battery box (S3) (NW-17, L=2.5 Mtr)	DC circuit cables
4A	1 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	W	3000	39	39	Battery fuse box -ve (S5) to Battery (S3) (NW-23, L=2.5 Mtr)	

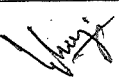
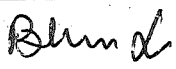
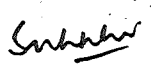
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4B	1 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Ch	11500	36	36	RBC (S1B) to LV Panel (S1A) (NW-17, L=9.5 Mtrs)
4C	1 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	W	10000	40	40	Battery fuse -ve (S5) to LV Panel (S1A) (NW-17, L=8 Mtrs)
4D	1 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Ch	7500	42	42	Battery fuse box +ve (S4) to RBC (S1B) (NW-17, L=5.5 Mtrs)
4E	1 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	W	4500	43	43	Battery fuse box -ve (S5) to RBC (S1B). (NW-17, L=3.5 Mtrs)
5*	3x1.0 mm ² + Shielded multi-core	EDTS-132, Rev.C, Am-3, Corr-1 (DS-4)	-	W,Br, Blk,	15000	23 03 10.02, 23 03 11.02, 23 03 12.02	81	HV Panel (S1) to connection box VK4 (NW-17, L=13 Mtrs)
5A*	3x1.0 mm ² + Shielded multi-core	EDTS-132, Rev.C, Am-3, Corr-1 (DS-4)	-	W,Br, Blk,	12000	23 03 07.02, 23 03 08.02, 23 03 09.02	82	HV Panel (S1) to connection box VK3 (NW-17, L=10 Mtrs)
5B*	3x1.0 mm ² + Shielded multi-core	EDTS-132, Rev.C, Am-3, Corr-1 (DS-4)	-	W,Br, Blk,	15000	23 03 01.02, 23 03 02.02, 23 03 03.02	76 (89)	HV Panel (S1) to connection box VK1 (NW-23, L=11 Mtrs) (NW-17, L=5 Mtrs to be supplied loose) Route no. 75 & 76 are to be laid in one flexible conduit, NW-23 and to be marked route no. 89.
5C*	3x1.0 mm ² + Shielded multi-core	EDTS-132, Rev.C, Am-3, Corr-1 (DS-4)	-	W,Br, Blk,	12000	23 03 04.02, 23 03 05.02, 23 03 06.02	75 (89)	HV Panel (S1) to connection box VK2 (To be laid with harness no. 5B)

Speed sensor cables

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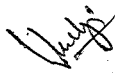
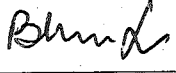
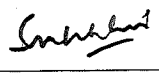
6*	3x1.0 mm ² + Shielded multi-core	EDTS-132, Rev.C,Am-3, Corr-1 (DS-4)	-	W,Br, Blk,	10000	23 02 06.01, 23 02 07.01, 23 02 05.06	86	HV PANEL (S1) to through box VK5 (EVS2/EVR2) (NW-29, L=7 Mtrs)	Disc brake cables
6A*	3x1.0 mm ² + Shielded multi-core	EDTS-132, Rev.C,Am-3, Corr-1 (DS-4)	-	W,Br, Blk,	10000	23 02 01.01, 23 02 02.01, 23 02 05.04		HV Panel (S1) to through box VK5 (EVS1/EVR1) (To be laid with harness no. 6)	
6B*	3x1.0 mm ² + Shielded multi-core	EDTS-132, Rev.C,Am-3, Corr-1 (DS-4)	-	W,Br, Blk,	13000	23 02 14.01, 23 02 15.01, 23 02 05.10	87	HV Panel (S1) to through box VK7 (EVS4/EVR4) (NW-23, L=11 Mtrs)	
6C*	3x1.0 mm ² + Shielded multi-core	EDTS-132, Rev.C,Am-3, Corr-1 (DS-4)	-	W,Br, Blk,	13000	23 02 10.01, 23 02 11.01, 23 02 05.08		HV Panel (S1) to through box VK7 (EVS3/EVR3) (To be laid with Har. no. 6B)	
7	2 nos., 1.5 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	W,Ch	5000	-	41	Air Brake Cable (Mech.) (NW-17, L=3 Mtrs)	Air Brake cable (Mech.)
8	2 nos., 2.5 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	W,Ch	4500	52	52	HV Panel (S1) to RBC (S1B) (NW-23, L=2.5 Mtrs)	RBC
9	5 nos., 6 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	R,Y,B, BLK, GNYE	4500	53	53	HV Panel (S1) to RBC (S1B) (NW-23, L=2.5 Mtrs)	
10	4 no., 6 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	R,Y,B, BLK	10000	55	55	HV Panel (S1) to On board LV Panel (S1A) (NW-23, L=8.5 Mtrs)	110V AC supply to On-Board Panel
11	4 nos., 70 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	GNYE	1250	PE	-	Earthing	Earthing cables
	8 nos., 70 mm ²			GNYE	600	PE	-	Earthing	
	1 no., 50 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	GNYE	500	PE	-	Earthing	

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	1 no., 16 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	GNYE	500	PE	-	Earthing	
	2 nos., 16 mm ²			GNYE	300	PE	--	Earthing	
	4 nos., 2.5 mm ²			GNYE	500	PE	-	Earthing	
12	3 X1.0 mm ² (3 nos.)	EDTS-132, Rev.-C,Am- 3,Corr-1 (DS-4)	Upto 750 volts	W,Br, Blk	10000	NET	56	NET-1&2 (NW-23, L= 8.5 Mtrs)	NET-1&2 + Spare
13	01 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Red	4000	BCT-1 to BCT-2	55A	BCT-1 to BCT-2 (NW- 23, L=3 Mtr)	BCT Cables
13A	01 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Blk	4000	BCT-1 to BCT-2	56A	BCT-1 to BCT-2 (NW- 23, L=3 Mtr)	
13B	01 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Red	10000	BCT-1 to Battery Fuse Box (+ve)	42A	BCT-1 to Battery Fuse Box (+ve) (NW-23, L=8 Mtr)	
13C	01 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Blk	7500	BCT-1 to Battery Fuse Box (-ve)	43A	BCT-1 to Battery Fuse Box (-ve) (NW- 23, L=5.5 Mtr)	
14	01 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Choc.	11000	RBC (+ve) to HOG Compliant SBC	36A	RBC (+ve) to HOG Compliant SBC (NW-17, L= 8 Mtr)	DC Supply to HOG Compliant SBC
14A	01 no., 10 mm ²	ELRS/SPEC /ELC/0019, Rev.-4	Upto 750 volts	Wh.	9500	Battery Fuse Box (-ve) to HOG Compliant SBC	40A	Battery Fuse Box (-ve) to HOG Compliant SBC (NW-17, L= 7.5 Mtr)	

Note:-

1. Harness No. 5, 5A, 5B, 5C, 6, 6A, 6B & 6C are marked (*) above for reference as cable for Speed Sensor & Disc Brake (WSP System) is being supplied by WSP Suppliers. Therefore, Harness supplier shall supply Polyamide Conduit only.
2. Reference for Wiring on under frame & Roof shall be taken as per clause no. 7.0.
3. Bunching for under frame cables shall be done as per clause 2.1(b) duly ferruled, legibly marked and laid in Polyamide Flexible/PVC Rigid conduits as per requirements in the coaches at shop floor.
4. Harnesses shall be prepared from multi-color cables only as specified for under frame and Roof wiring. Zero halogen, fire retardant heat shrinkable sleeves of M/S Tyco/Phoenix/Panduit/Brady makes of appropriate color to be used. The standard length of ferrules should only be used.
5. Multi-core cables shall be as per specification no. EDTS-132, (Latest Revision) to respective data sheets.

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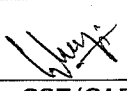
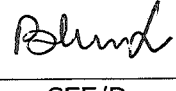
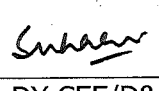
6. The marking ferrules for feeder cables shall not be heat shrunk at the time of supply by the harness manufacturer, however to be suitably provided at 750 mm from both ends of the cables such that these ferrules shall not disengage from the cables during laying in the feeder pipes. After laying of the harness in the coach these ferrules shall be heat shrunk in place according to shop requirements.

2.2 TYPE-2: HARNESS OF ROOF ARRANGEMENT' FOR HOG COMPLIANT LHB EOG NON-AC LSLRD (31 SEATER) COACHES:-

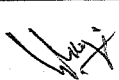
2.2 a) BILL OF MATERIAL FOR ROOF WIRING:-

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

Sr. No.	Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	QPC	Remarks/ Location
1.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Red	ELRS/SPEC/ELC/0019,Rev.-4	225.6 Mtrs.	Inside coach
2.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Yellow	ELRS/SPEC/ELC/0019,Rev.-4	202.4 Mtrs.	Inside coach
3.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Blue	ELRS/SPEC/ELC/0019,Rev.-4	119.6 Mtrs.	Inside coach
4.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Black	ELRS/SPEC/ELC/0019,Rev.-4	288.4 Mtrs.	Inside coach
5.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	GNYE	ELRS/SPEC/ELC/0019,Rev.-4	71.6 Mtrs.	Inside coach
6.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Red	ELRS/SPEC/ELC/0019,Rev.-4	71.8 Mtrs.	Inside coach
7.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Yellow	ELRS/SPEC/ELC/0019,Rev.-4	64.2 Mtrs.	Inside coach
8.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Blue	ELRS/SPEC/ELC/0019,Rev.-4	76.1 Mtrs.	Inside coach
9.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Black	ELRS/SPEC/ELC/0019,Rev.-4	20.7 Mtrs.	Inside coach
10. *	UIC Control cable	-	16-Core	-	RDSO/PE/MS/AC/0051-2011, Am-1, RCF Anx.-D	50 Mtrs.	Inside Coach
11.	PVC Spout type circular box fire retardant, 4-way dia 20mm	-	-	-	IS:3419-76,T-9, FIG-E	65 nos.	Inside coach
12.	Rigid PVC conduit Dia 20mmx300mm	-	-	-	IS:9537-83,P3, CL.5.1:2	18 nos.	Inside coach

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13.	Rigid PVC conduit Dia 20mmx 380 mm	-	-	-	IS:9537-83,P3, CL.5.1.2	14 nos.	Inside coach
14.	Rigid PVC conduit Dia 20mmx520mm	-	-	-	IS:9537-83,P3, CL.5.1.2	19 nos.	Inside coach
15.	Rigid PVC conduit Dia 20mmx750mm (Bell Mouth at one end)	-	-	-	IS:9537-83,P3, CL.5.1.2	20 nos.	Inside coach
16.	Rigid PVC conduit Dia 20mmx800mm	-	-	-	IS:9537-83,P3, CL.5.1.2	02 nos.	Inside coach
17.	Rigid PVC conduit Dia 20mmx870mm	-	-	-	IS:9537-83,P3, CL.5.1.2	04 nos.	Inside coach
18.	Rigid PVC conduit Dia 20mmx900mm	-	-	-	IS:9537-83,P3, CL.5.1.2	03 nos.	Inside coach
19.	Rigid PVC conduit Dia 20mmx1100mm	-	-	-	IS:9537-83,P3, CL.5.1.2	02 nos.	Inside coach
20.	Rigid PVC conduit Dia 20mmx1200mm	-	-	-	IS:9537-83,P3, CL.5.1.2	02 nos.	Inside coach
21.	Rigid PVC conduit Dia 20mmx1300mm	-	-	-	IS:9537-83,P3, CL.5.1.2	03 nos.	Inside coach
22.	Rigid PVC conduit Dia 20mmx1500mm	-	-	-	IS:9537-83,P3, CL.5.1.2	04 nos.	Inside coach
23.	Rigid PVC conduit Dia 20mmx1550mm	-	-	-	IS:9537-83,P3, CL.5.1.2	10 nos.	Inside coach
24.	Rigid PVC conduit Dia 20mmx2700mm	-	-	-	IS:9537-83,P3, CL.5.1.2	02 nos.	Inside coach
25.	Rigid PVC conduit Dia 20mmx3400mm	-	-	-	IS:9537-83,P3, CL.5.1.2	02 nos.	Inside coach
26.	Rigid PVC conduit Dia 20mmx4000mm	-	-	-	IS:9537-83,P3, CL.5.1.2	20 nos.	Inside coach
27.	Cable jacket system	-	-	-	EDTS-138 (Latest Revision)	25 mtr.	ITEM-5
28.	Cable jacket system	-	-	-	EDTS-138 (Latest Revision)	25 mtr.	ITEM-7
29.	Cable jacket system	-	-	-	EDTS-138 (Latest Revision)	45 mtr.	ITEM-8
30.	Cable jacket system	-	-	-	EDTS-138 (Latest Revision)	05 mtr.	ITEM-9
31.	Cable jacket system	-	-	-	EDTS-138 (Latest Revision)	05 mtr.	ITEM-11
32.	FRLT cotton insulation tape, RED	-	-	-	ICF/ELEC/921, Rev.00	03 nos.	-
33.	FRLT cotton insulation tape, YELLOW	-	-	-	ICF/ELEC/921, Rev.00	03 nos.	-
34.	FRLT cotton insulation tape, BLUE	-	-	-	ICF/ELEC/921, Rev.00	03 nos.	-
35.	FRLT cotton insulation tape, BLACK	-	-	-	ICF/ELEC/921, Rev.00	03 nos.	-
36.	FRLT cotton insulation tape, GREEN	-	-	-	ICF/ELEC/921, Rev.00	3 nos.	-
37.	FRLT cotton insulation tape, WHITE	-	-	-	ICF/ELEC/921, Rev.00	03 nos.	-

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38.	FRLT cotton insulation tape, CHOCO.	-	-	-	ICF/ELEC/921, Rev.00	03 nos.	-
39.	Cable Binder	-	-	-	CC76129, Alt-'a' Item-1	100 nos.	M/s EVEREST, NOVAFLEX, Panduit & M V Electro systems & other Approved Make
40.	Cable Binder	-	-	-	CC76129, Alt-'a' Item-2	100 nos.	
41.	Cable Binder	-	-	-	CC76129, Alt-'a' Item-4	100 nos.	
42.	Copper Crimping Socket for 4 sq. mm. cable (for EFT circuit and termination at EFT)	-	-	-	EDTS-201 (Latest), Table-1	12 nos.	Item-8 (M6)
43.	Copper Crimping Socket for 4 sq. mm. cable (for EFT circuit and termination at RSW panel)	-	-	-	EDTS-201 (Latest), Table-1	04 nos.	Item-12 (M8)

NOTE:

* UIC Control Cable 16-core is in the scope of RCF.

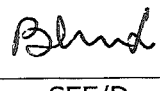
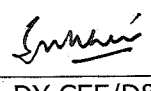
B) CONDUIT SYSTEM FOR CABLE MANAGEMENT & ACCESSORIES(ROOF WIRING):-

Firms supplying these items shall get these tested as per RDSO specification no. RDSO/PE/SPEC/AC/0138-2009, (Latest).

Sr. No.	DESCRIPTION	SPEC. NO.	TABLE	ITEM	QPC
1.	Polyamide Flexible Corrugated Conduit, NW-17	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-1	3	25 mt.
2.	Polyamide Flexible Corrugated Conduit, NW-23		A-1	4	10 mt.
3.	Tube clamp NW-17	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-8	3	5 nos.
4.	Tube clamp NW-23		A-8	4	5 nos.
5.	Straight PG Metal Thread End Fitting PG-21	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-2	5	10 nos.
6.	Hex. Lock Nut with PG Thread Brass PG-21		A-10	5	10 nos.

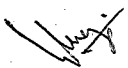
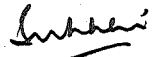
Note: -

- Reference for Wiring on under frame & Roof shall be taken as per clause no. 7.0.
- Bunching for Roof cables shall be done as per Annexure-B with duly ferruled, legibly marked and laid in polyamide flexible/PVC Rigid conduits as per wiring requirements in the coaches at shop floor. Cable protection system shall be supplied as per BOM of clause 2.2 (B).
- Identification shall be made with colored, zero halogen fire retardant heat shrinkable sleeves of **M/S TYCO/Phoenix/Panduit /MV make** upto 100mm length.

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3.0 TECHNICAL REQUIREMENTS:

- 3.1** While manufacturing of cable harnesses essential safety requirements for voltage grade segregation, crimping etc. shall be strictly followed as per instructions laid down in under given documents:
- General requirements shall be as per RDSO Spec. no. EL/TL/56-92 (Code of practice for train Lighting maintenance on Prevention of Fires on 110V DC).
 - Instructions laid down in Code of practice for wiring End On Generation Train Lighting system working at 750VAC, ELPS/SPEC/EOG-01(MARCH-94) shall be followed.
 - Work instructions for preparation of Harness to RCF document no. EDW0003 Ver.-02 or the Latest version.
 - Work instructions for crimping of cable ends and cable terminations to RCF document no. EDW0006 Ver.-01 or the Latest version.
 - Schedule of Technical Requirements **(STR) no. RCF/EL/0015-2011 (Rev.-C)** shall be strictly followed for preparation of ready-made harness.
- 3.2** Stripping of the cables at the ends shall be done where crimping sockets are not provided for ease of wiring.
- 3.3** The complete Roof Wiring Harness shall be made according to the Annexure-B.
- 3.4 Technical Staff:-**
- The staff with minimum qualification 'ITI' with **02** years experience or minimum **05** years experience for non ITI's in manufacturing harness of power-wiring/control wiring in panels or other similar works having intricate design.
 - The Supervisor staff for the skilled worker should be minimum graduate in Electrical/Electronics with 02 years experience in the same field or should be diploma holder in Electrical/Electronics discipline with at least **05** years experience in manufacturing of harness of power wiring control wiring in panels or other similar works. The firm shall deploy supervisors/staff in adequate nos. so as to match the delivery schedules as accepted by them against the contract".
- 3.5** Proper cutting/crimping tools for various sizes of cables shall be available for the staff for ease of crimping & cutting of cables.
- 3.6** Marking ferrules shall be of computer generated type for easy identification of the cables with the help of shrinking sleeves (self-extinguishing) of suitable size horizontally printed cable markers of Tyco/Phoenix/Panduit make only.
- 3.7** Test for thin walled flexible elastomeric cables with copper conductors for its basic properties may be conducted on any sample picked up from the supply. The cost for the testing will be borne by the firm. The specific tests to be done are covered in clause 4.9.
- 3.8** The firm shall take prompt action or act promptly within a reasonable time upon a short notice to rectify the defects/deficiency/deficiency noticed/reported by RCF in the cable harness supplied by the firm. Failure to do the needful up to the satisfaction of the RCF, Firm's contract may be rescind immediately or terminated without any further notice or may be levied penalty corresponding to the delay caused in the coach turn out for which the decision of the nominated '**Competent Authority**' shall be **Final and Binding on the firm**".

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- 3.9** The firm's premises may be inspected by representative of PCEE/RCF on any day on a short notice to ensure compliance to the various stipulations of the specifications, laid down standards including work instructions for the cable harness manufacturing practices. If anything is not laid or specified therein this specification, the work shall be completed as per the best-established Engineering Practices/Procedures being followed in the Industry. "The firm shall extend all the necessary help to allow visiting all the infrastructure facilities, M&P, Tools, Testing facilities, examination of related quality records/documents etc. during his visit"
- 3.10** All the Rigid Conduits, Flexible Conduits, End Fittings shall be in firm's scope of supply. However Clamps & it's Hardware's etc. will be in RCF scope of supply.
- 3.11** Only those firms shall be considered which have adequate infrastructure to make similar nature wiring/ harness at its manufacturing unit and conforming to STR.
- 3.12** Firm shall fill-up proforma for guaranteed performance as per **Annexure-'A'** and furnish details along with tender. It is perquisite without which offer shall be considered technically disqualified.
- 3.13** The Cable & Conduit manufacturer shall submit a certificate along with each lot of supply that the same raw material has been used in manufacturing of the present supply as was used on which the type tests were conducted.
- 3.14** Every letter from the firm shall have name and designation of the official signing the letter with the signature.
- 3.15** Procurement of the items specified in the BOM of the specification shall be from RDSO/RCF/ICF approved vendors mentioned in latest version of the vendor directory issued by RDSO/RCF/ICF respectively, however the procurement of cables shall be done from RDSO 'approved vendors' for minimum 80% quantity of NPQ and balance 20% quantity from 'developmental vendors' as mentioned in the latest version of vendor directory issued by RDSO.

Based on the procurement of various sizes of cables from either approved or developmental sources, the cable harness shall be categorized as under:

Category-A: Cable Harness with approved sources of cables (80% min.)

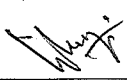
Category-B: Cable Harness with developmental sources of cables (up to 20%)

Category-B type of cable harnesses may be supplied with cables procured from developmental sources however in no case Category-A type shall be supplied with cables procured from developmental sources.

Firm shall maintain a record according to the above classification and offer to M/s RITES/inspecting official for inspection in format EDF 0001 with the specification.

4.0 TESTS:

- 4.1** Inspecting agency /RITES shall carry out the tests in harness manufacturer's premises as per acceptance and routine tests specified in the tender specification. Check list Proforma consisting of testing details, observations/measurements and acceptability of the measurements should be prepared and testing to be done as per Proforma jointly with the firm's engineer. This should be submitted along with the inspection certificate to RCF.

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- 4.2 Cables prescribed in RDSO/RCF specification of cables received by the harness manufacturer shall be inspected by RITES for acceptance and routine tests at cable manufacturer premises and certificate to this effect should be submitted by cable harness manufacturer to RCF.
- 4.3 Cable management system prescribed in RDSO specification RDSO/PE/SPEC/AC/0138-2009, (Latest) shall be inspected by RITES (RA Berlin- in case of imported manufacturer) for acceptance and routine tests and certificate to this effect should be submitted by cable harness manufacturer to RCF.
- 4.4 The format for inspection based upon the tests stipulated in specification shall be as per clause no.-4.10.
- 4.5 Firm's internal testing to be done by qualified person as per para 3.4 (b) of this specification and submitted to RCF.
- 4.6 **TYPE TEST:**

All the type tests mentioned in Clause 4.9 & 4.10 shall be carried out on a prototype unit. The firm manufacturing for the first time shall get the prototype approved from PCEE/RCF.

4.7 **ROUTINE TEST:**

Routine tests mentioned in clause 4.9 shall be carried out on each unit by the manufacturer at his works to ensure compliance with the specification and the drawings.

4.8 **ACCEPTANCE TEST:**

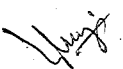
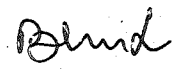
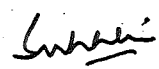
- Acceptance tests for cables will be done at cable manufacturer's premises as per RDSO specification no. ELRS/SPEC/ELC/0019 (Latest Revision).
- Acceptance tests for conduits etc. for cable management system will be done as per RDSO specification no. RDSO/PE/SPEC/AC/0138-2009, (Latest) for supply for Non-RDSO approved sources but RCF approved sources, clause 7.0 is to be followed.
- Acceptance test mentioned in clause 4.9 cable harness manufacturer to be witnessed by inspecting agency nominated by the purchaser at the works of the cable harness manufacturer, on the samples picked up by the inspecting authority. All the acceptance tests shall be carried out at firm's premises at the manufacturer's cost. Inspecting officer will witness the tests.

A copy of the internal tests conducted by the firm shall be supplied to inspecting/purchasing authority. Inspecting agency shall maintain record of all the tests conducted for future reference and will check the authenticity and the originality of the bill of material for each item by seeing the invoices invariably to avoid spurious material being safety involved.

4.9 **TABLE FOR TESTS:-**

Tests for harnesses at firm's premises:

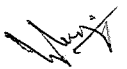
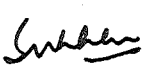
S.No	Tests	Type Test	Routine Test	Acceptance Test
1	Visual inspection, including inspection of wiring and electrical operational test. (Visual inspection for proper assembly, compatibility of sub-components & wiring etc.)	YES	YES	YES
2	Checking of electrical continuity	YES	YES	YES

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3	Checking of cable routing & alignment as per requirements	YES	YES	YES
4	Test for verification of dielectric properties. (shall withstand (2.0 KV for 1 minute)	YES	YES	-
5	Test for verification of insulation resistance. (>100 MΩ with 500 V Megger).	YES	YES	-
6	Compliance to safety related codes of practice as per para 4.0 of this specification.	YES	YES	YES
7	Originality of the bill of the material with proof of the invoices	YES	YES	YES
8	Check of crimping joints a) mV drop Test. b) Pull out Test.	YES	YES	-
9.	Test for thin walled flexible elastomeric cables with copper conductors	YES	YES	YES
10.	Test for cable protection system	YES	YES	YES
11.	Test for marking ferrules	YES	YES	YES
12.	Test for copper crimping sockets	YES	YES	YES
13.	Test for FRLT tape	YES	YES	YES
14.	Test for cable alley/ duct	YES	YES	YES

4.10 a): Details of testing:

S. No.	Details of testing	Remarks of Rites Inspecting official
1.	Tests for thin walled flexible elastomeric cables with copper conductors to RDSO Specification no. ELRS/SPEC/ELC/0019(Latest)	
a	Test for thickness of insulation and sheath as per applicable clause of RDSO spec (5% of each cable size to be checked.)	
b	High voltage test (water immersion test) as per applicable clause of RDSO spec. (on two cable size of cable used)	
c	Insulation resistance test as per applicable clause of RDSO spec. (on one cable size different from HV test)	
d	Tracking resistance as per applicable clause of RDSO spec.(on two size not covered in HV test & IR test)	
e	Strip ability as per applicable clause of RDSO spec. (10 samples in prototype testing and five samples in acceptance/routine test of different size 1mm to 6mm)	
f	Wind ability of the finished cable as per applicable clause of RDSO spec. (One sample 1-6 sq. mm & one sample more than 6 sq. mm)	
g	Slippage test as per applicable clause of the RDSO spec. (two samples for size less than 25mm dia and two samples for dia more than 25mm)	
2.	Cable Protection System- Testing as per RDSO Spec. No. RDSO/PE/SPEC/AC/0138(Latest)	
a	Make	
b	Type / Series used for	
i	Conduit	
	Checking of dimensions	
	Compression test (two sample of each size)	
	Impact test (one sample of each sizes)	
	Flexing test (2 samples of each type of fitting.)	
	di-electric strength (one sample of each size)	

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ii	End fitting – Tensile test (of different five sizes)	
iii	Tube clamps – Dimensional check as per – two sample of each size	
iv	Lock nuts – Dimensional check as per – two sample of each size.	
3.	Marking ferrules	
	Computer generated (verification of make/brand)	Tyco / Phoenix / Panduit /MV/____
4.	Copper crimping sockets	
	Visual inspection and checking of dimensions as per cl 5.6 of EDTS200 (five sample of each)	
	Crimping test as per cl 5.7 of EDTS200 (Two sample of size less than 6mm ² and two sample of 6mm ²)	
	Flattening test as per cl 5.8 of EDTS200	
5.	FRLT tape	
	ISI marked Resistance to flame propagation as per clause 6.0 of IS:7809 for 2 samples	
	Electrical strength as per clause 7.1 of IS:7809 for 5 samples IR value	
6.	Cable alley / duct	
	Make/catalogue number used verify make of _____ test certificates.	

4.10 (b): Tests after commissioning of the coach at RCF:

S.No	Tests	Type Test	Routine Test	Acceptance Test	Clause of IS:8623(P-I)-93
1	Verification of insulation resistance	YES	YES	YES	8.3.4
2	Checking of electrical continuity of all the circuits.	YES	YES	YES	8.3.3
3.	Verification of die electric properties	YES	YES	YES	8.2.2

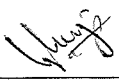
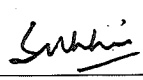
The accuracy of measuring instruments used for both type and routine tests shall be of class 1.5.

5.0 APPROVALS:

- 5.1 Firms manufacturing for the first time shall get the Prototype Inspection done by the office of the PCEE/RCF.
- 5.2 Firm supplying the Coach Harness for first time shall supply one set of coach harness for validation on coach before bulk supply.

6.0 PACKING AND TRACEABILITY:-

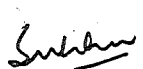
- Packing of harnesses shall be done as per Packing Instructions mentioned in the relevant PO's placed on the firm. Harnesses shall be bunched together and shall be supplied as single unit per coach. Each harness shall be duly bunched individually and legibly marked as per details specified in the specification on it for under frame and Roof arrangement.
- Packing per coach set shall be done as per packing conditions. However either card board packing in single unit or plastic containers (returnable basis) shall be used for supplying the material. The packing shall be legibly marked for the type of coach applicable for.

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3. All the loose wiring for lavatory area & other locations shall be segregated and bunched separately before packing.
4. Performa invoice of all the major items like cable, crimping sockets etc. shall be supplied along with each supply of material.
5. Every unit of supply item shall be numbered / marked for identification, traceability and analysis. The following details shall be imprinted on the number plate of each unit
 - a) Serial Number
 - b) Year and month of manufacture
 - c) Name of the item

7.0 ENCLOSURES:

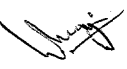
S.No	Drawing/Spec. no.	Description
1.	RDSO Spec. no. EL/TL/56-92	Code of practice for Train Lighting maintenance on Prevention of Fires on 110V D.C
2.	RDSO Spec. no. EL/TL/001	Code of practice for End On Generation for Train Lighting system working at 750VAC
3.	RCF/EL/0015-2011 (Rev. 'C')	Schedule of technical requirements (STR) for ready-made harness.
4.	EDW0003 Ver. – 02.	Work instructions for preparation of Harness
5.	EDW0006 Ver. – 01	Work instructions for crimping of cable ends and cable terminations
6.	Annexure-A	Performa for Performance Guarantee
7.	Annexure-B	Preparation/Bunching of Harness for Jumper and Branch wiring for Non AC LSLRD Coaches (31-Seater)
8.	SKED-782	Drawing of Jumper & Branch Wiring of Roof for Non AC LSLRD Coaches. (31-Seater)

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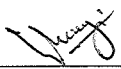
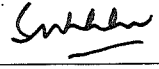
PERFORMA FOR PERFORMANCE GUARANTEE

S. No.	ITEMS DESCRIPTION	COMPLIANCE (YES/NO)
1.	Compliance of STR (if Yes, enclose clause by clause comments)	
2.	Compliance of qualified technical staff (if Yes, enclose the details)	
3.	Compliance of adequate space and condition for manufacturing, assembly (if yes, enclose the details)	
4.	Compliance of in-house testing facilities (if Yes, enclose the details)	
5.	Compliance of other details to improve the quality (if Yes, enclose the details)	

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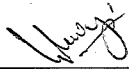
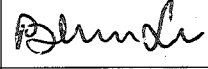
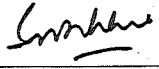
Annexure-B to EDTS-410, Rev-Nil

Preparation/Bunching of Harness for Jumper Wiring for Roof of LSLRD Coach (31-Seater)										
Har. No	Location		Ferrule no.				Cable size (in mm ²)	Color Code	Length (in mm)	Remarks
	From	To	From		To					
POSITIVE JUMPER WIRING										
1	CUBICLE	FDB-3	LI+	CUBICLE	FDB-3	LI+	4	Y	5700	LOOSE SUPPLY
	CUBICLE	FDB-3	LII+	CUBICLE	FDB-3	LII+	4	Y	5700	
	CUBICLE	FDB-3	F+	CUBICLE	FDB-3	F+	4	R	5700	
2	CUBICLE	FDB-5	LS-1		LS-1		1.5	Y	9000	
	CUBICLE	FDB-5	LS-2		LS-2		1.5	Y	9000	
JUMPER CABLE FOR PANEL ROOM GAURD COMPARTMENT										
3	FDB-3	FDB-2	F+	FDB-3	FDB-2	F+	4	R	1800	BUNCHING
4	FDB-3	FDB-1	LI+	FDB-3	FDB-1	LI+	4	Y	4100	
5	FDB-3	FDB-4	LI+	FDB-3	FDB-4	LI+	4	Y	3000	BUNCHING
	FDB-3	FDB-5	LII+	FDB-3	FDB-5	LII+	4	Y	4400	
	FDB-3	FDB-5	F+	FDB-3	FDB-5	F+	4	R	4400	
6	FDB-4	FDB-5	LI+	FDB-4	FDB-5	LI+	4	Y	1500	BUNCHING
7	FDB-5	FDB-6	LI+	FDB-5	FDB-6	LI+	4	Y	2200	
	FDB-5	FDB-6	LII+	FDB-5	FDB-6	LII+	4	Y	2200	
	FDB-5	FDB-6	F+	FDB-5	FDB-6	F+	4	R	2200	
	FDB-5	FDB-6	LS-1		LS-1		1.5	Y	2200	
	FDB-5	FDB-6	LS-2		LS-2		1.5	Y	2200	
8	FDB-6	FDB-7	LI+	FDB-6	FDB-7	LI+	4	Y	2200	BUNCHING
	FDB-6	FDB-7	LII+	FDB-6	FDB-7	LII+	4	Y	2200	
	FDB-6	FDB-7	F+	FDB-6	FDB-7	F+	4	R	2200	
	FDB-6	FDB-7	LS-1		LS-1		1.5	Y	2200	
	FDB-6	FDB-7	LS-2		LS-2		1.5	Y	2200	
9	FDB-7	FDB-8	LI+	FDB-7	FDB-8	LI+	4	Y	3700	BUNCHING
10	FDB-7	FDB-9	LII+	FDB-7	FDB-9	LII+	4	Y	5400	
	FDB-7	FDB-9	F+	FDB-7	FDB-9	F+	4	R	5400	
	FDB-7	FDB-9	LS-1		LS-1		1.5	Y	5400	
	FDB-7	FDB-9	LS-2		LS-2		1.5	Y	5400	
11	FDB-8	FDB-9	LI+	FDB-8	FDB-9	LI+	4	Y	1900	BUNCHING
12	VHF BOX (GUARD ROOM)	FDB-10	LI+	VHF BOX	FDB-10	LI+	4	Y	20000	LOOSE SUPPLY

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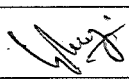
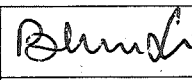
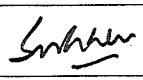
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NEGATIVE JUMPER WIRING										
13	CUBICLE	FDB-13	L-	CUBICLE	FDB-13	L-	4	BLUE	4700	LOOSE SUPPLY
	CUBICLE	FDB-13	F-	CUBICLE	FDB-13	F-	4	BLK	4700	
14	CUBICLE	FDB-15	LSN	CUBICLE	FDB-15	LSN	1.5	BLK	10000	
15	FDB-13	FDB-14	L-	FDB-13	FDB-14	L-	4	BLUE	3000	BUNCHING
	FDB-13	FDB-15	F-	FDB-13	FDB-15	F-	4	BLK	4400	
15A	FDB-14	FDB-15	L-	FDB-14	FDB-15	L-	4	BLUE	1500	BUNCHING
16	FDB-15	FDB-16	L-	FDB-15	FDB-16	L-	4	BLUE	2200	BUNCHING
	FDB-15	FDB-16	F-	FDB-15	FDB-16	F-	4	BLK	2200	
	FDB-15	FDB-16	LSN		LSN		1.5	BLK	2200	
17	FDB-16	FDB-17	L-	FDB-16	FDB-17	L-	4	BLUE	2200	BUNCHING
	FDB-16	FDB-17	F-	FDB-16	FDB-17	F-	4	BLK	2200	
	FDB-16	FDB-17	LSN		LSN		1.5	BLK	2200	
18	FDB-17	FDB-18	L-	FDB-17	FDB-18	L-	4	BLUE	3700	BUNCHING
	FDB-17	FDB-19	F-	FDB-17	FDB-19	F-	4	BLK	5400	
	FDB-17	FDB-19	LSN		LSN		1.5	BLK	5400	
19	FDB-18	FDB-19	L-	FDB-18	FDB-19	L-	4	BLUE	1900	BUNCHING
20	FDB-19	FDB-20	L-	FDB-19	FDB-20	L-	4	BLUE	3400	BUNCHING
21	FDB-13	FDB-12	F-	FDB-13	FDB-12	F-	4	BLK	1800	BUNCHING
22	FDB-13	FDB-11	L-	FDB-13	FDB-11	L-	4	BLUE	4100	BUNCHING
BRANCH WIRING POSITIVE FOR DOORWAY & LAVATORY LIGHTING										
23	CUBICLE	VHF BOX	LI+	CUBICLE	VHF BOX	LI+	1.5	Y	10000	LOOSE SUPPLY
24	SW-1, VHF BOX	FDB-1	LI+	SW-1	FDB-1	LI+	1.5	Y	5000	
25	SW-2, VHF BOX	FDB-1	LI+	SW-2	FDB-1	LI+	1.5	Y	5000	
26	FDB-1	DL-1	LI+,	FDB-1	DL-1,	LI+	1.5	Y	1500	
27	FDB-1	DL-2	LI+,	FDB-1	DL-2,	LI+	1.5	Y	3000	
28	FDB-4	DL-3	LI+,	FDB-4	DL-3,	LI+	1.5	Y	1500	
29	FDB-4	DL-4	LI+,	FDB-4	DL-4,	LI+	1.5	Y	3000	
30	FDB-8	DL-5	LI+,	FDB-8	DL-5,	LI+	1.5	Y	1500	
31	FDB-8	DL-6	LI+,	FDB-8	DL-6,	LI+	1.5	Y	3000	
32	FDB-1	LL-1	LI+,	FDB-1	LL-1,	LI+	1.5	Y	6000	
33	FDB-1	GL-1	LI+,	FDB-1	GL-1,	LI+	1.5	Y	4000	
34	FDB-4	LL-2	LI+,	FDB-4	LL-2,	LI+	1.5	Y	3000	
35	FDB-4	LL-3	LI+,	FDB-4	LL-3,	LI+	1.5	Y	5100	
36	FDB-4	GL-2	LI+,	FDB-4	GL-2,	LI+	1.5	Y	4000	
37	FDB-8	LL-4	LI+,	FDB-8	LL-4,	LI+	1.5	Y	2500	

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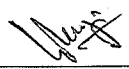
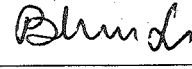
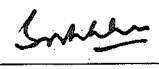
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BRANCH WIRING NEGATIVE FOR DOORWAY & LAVATORY LIGHTING										
38	CUBICLE	VHF BOX	L-	CUBICLE	VHF BOX	L-	1.5	BLUE	11000	LOOSE SUPPLY
39	FDB-11	DL-1	L-,	FDB-11	DL-1,	L-	1.5	BLUE	3000	
40	FDB-11	DL-2	L-,	FDB-11	DL-2,	L-	1.5	BLUE	1500	
41	FDB-11	LL-1	L-,	FDB-11	LL-1,	L-	1.5	BLUE	3000	
42	FDB-11	GL-1	L-,	FDB-11	GL-1,	L-	1.5	BLUE	4000	
43	FDB-14	DL-3	L-,	FDB-14	DL-3,	L-	1.5	BLUE	3000	
44	FDB-14	DL-4	L-,	FDB-14	DL-4,	L-	1.5	BLUE	1500	
45	FDB-14	LL-2	L-,	FDB-14	LL-2,	L-	1.5	BLUE	5100	
46	FDB-14	LL-3	L-,	FDB-14	LL-3,	L-	1.5	BLUE	3000	
47	FDB-14	GL-2	L-,	FDB-14	GL-2,	L-	1.5	BLUE	4000	
48	FDB-18	DL-5	L-,	FDB-18	DL-5,	L-	1.5	BLUE	3000	
49	FDB-18	DL-6	L-,	FDB-18	DL-6,	L-	1.5	BLUE	1500	
50	FDB-18	LL-4	L-,	FDB-18	LL-4,	L-	1.5	BLUE	5500	
BRANCH WIRING POSITIVE FOR COMPARTMENT LIGHT										
51	FDB-3	L-1	LII+,	FDB-3	L-1,	LII+	1.5	Y	1500	BUNCHING
	FDB-3	L-2	LI+,	FDB-3	L-2,	LI+	1.5	Y	3000	
52	FDB-5	L-3	LI+,	FDB-5	L-3,	LI+	1.5	Y	1500	BUNCHING
	FDB-5	L-4	LII+,	FDB-5	L-4,	LII+	1.5	Y	3000	
53	FDB-6	L-5	LII+,	FDB-6	L-5,	LII+	1.5	Y	1500	BUNCHING
	FDB-6	L-6	LI+,	FDB-6	L-6,	LI+	1.5	Y	3000	
54	FDB-7	L-7	LI+,	FDB-7	L-7,	LI+	1.5	Y	1500	BUNCHING
	FDB-7	L-8	LII+,	FDB-7	L-8,	LII+	1.5	Y	3000	
	FDB-7	L-9	LI+,	FDB-7	L-9,	LI+	1.5	Y	8000	
55	FDB-9	L-10	LI+,	FDB-9	L-10,	LI+	1.5	Y	1500	BUNCHING
	FDB-9	L-11	LII+,	FDB-9	L-11,	LII+	1.5	Y	3000	
56	FDB-10	L-12	LI+,	FDB-10	L-12,	LI+	1.5	Y	4000	BUNCHING
56A	FDB-10	L-13	LI+,	FDB-10	L-13,	LI+	1.5	Y	3000	
BRANCH WIRING NEGATIVE FOR COMPARTMENT LIGHT										
57	FDB-13	L-1	L-,	FDB-13	L-1,	L-	1.5	BLUE	3000	BUNCHING
	FDB-13	L-2	L-,	FDB-13	L-2,	L-	1.5	BLUE	1500	
58	FDB-15	L-3	L-,	FDB-15	L-3,	L-	1.5	BLUE	3000	BUNCHING
	FDB-15	L-4	L-,	FDB-15	L-4,	L-	1.5	BLUE	1500	
59	FDB-16	L-5	L-,	FDB-16	L-5,	L-	1.5	BLUE	3000	BUNCHING
	FDB-16	L-6	L-,	FDB-16	L-6,	L-	1.5	BLUE	1500	
60	FDB-17	L-7	L-,	FDB-17	L-7,	L-	1.5	BLUE	3000	BUNCHING
	FDB-17	L-8	L-,	FDB-17	L-8,	L-	1.5	BLUE	1500	
60A	FDB-17	L-9	L-,	FDB-17	L-9,	L-	1.5	BLUE	4000	LOOSE
61	FDB-19	L-10	L-,	FDB-19	L-10,	L-	1.5	BLUE	3000	BUNCHING
	FDB-19	L-11	L-,	FDB-19	L-11,	L-	1.5	BLUE	1500	
62	FDB-20	L-12	L-,	FDB-20	L-12,	L-	1.5	BLUE	4000	BUNCHING
62A	FDB-20	L-13	L-,	FDB-20	L-13,	L-	1.5	BLUE	3000	

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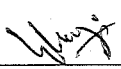
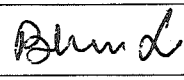
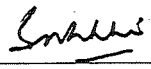
Annexure-B to EDTS-410, Rev-Nil

BRANCH WIRING POSITIVE FOR FAN									
63	FDB-2	FSW-1	F+,	FDB-2	FSW-1, F+	1.5	R	5000	BUNCHING
	FSW-1	F-1	F+,	FSW-1	F-1, F+	1.5	R	4000	
	FDB-2	FSW-2	F+,	FDB-2	FSW-2, F+	1.5	R	5000	
	FSW-2	F-2	F+,	FSW-2	F-2, F+	1.5	R	3000	
64	FDB-3	FSW-3	F+,	FDB-3	FSW-3, F+	1.5	R	5000	BUNCHING
	FSW-3	F-3	F+,	FSW-3	F-3, F+	1.5	R	4000	
	FDB-3	FSW-4	F+,	FDB-3	FSW-4, F+	1.5	R	5000	
	FSW-4	F-4	F+,	FSW-4	F-4, F+	1.5	R	3000	
65	FDB-5	FSW-5	F+,	FDB-5	FSW-5, F+	1.5	R	1800	LOOSE SUPPLY
	FSW-5	F-5	F+,	FSW-5	F-5, F+	1.5	R	3000	BUNCHING
	FDB-5	FSW-6	F+,	FDB-5	FSW-6, F+	1.5	R	1800	LOOSE SUPPLY
	FSW-6	F-6	F+,	FSW-6	F-6, F+	1.5	R	3500	BUNCHING
	FDB-5	FSW-7	F+,	FDB-5	FSW-7, F+	1.5	R	5000	
	FSW-7	F-7	F+,	FSW-7	F-7, F+	1.5	R	3000	
66	FDB-6	FSW-8	F+,	FDB-6	FSW-8, F+	1.5	R	1800	LOOSE SUPPLY
	FSW-8	F-8	F+,	FSW-8	F-8, F+	1.5	R	3000	BUNCHING
	FDB-6	FSW-9	F+,	FDB-6	FSW-9, F+	1.5	R	1800	LOOSE SUPPLY
	FSW-9	F-9	F+,	FSW-9	F-9, F+	1.5	R	3500	BUNCHING
	FDB-6	FSW-10	F+,	FDB-6	FSW-10, F+	1.5	R	5000	
	FSW-10	F-10	F+,	FSW-10	F-10, F+	1.5	R	3000	
67	FDB-7	FSW-11	F+,	FDB-7	FSW-11, F+	1.5	R	1800	LOOSE SUPPLY
	FSW-11	F-11	F+,	FSW-11	F-11, F+	1.5	R	3000	BUNCHING
	FDB-7	FSW-12	F+,	FDB-7	FSW-12, F+	1.5	R	1800	LOOSE SUPPLY
	FSW-12	F-12	F+,	FSW-12	F-12, F+	1.5	R	3500	BUNCHING
	FDB-7	FSW-13	F+,	FDB-7	FSW-13, F+	1.5	R	5000	
	FSW-13	F-13	F+,	FSW-13	F-13, F+	1.5	R	3000	
	FDB-7	BF-1 (BRACKET FAN)	F+,	FDB-7	BF-1, F+	1.5	R	9000	
68	FDB-9	FSW-14	F+,	FDB-9	FSW-14, F+	1.5	R	1800	LOOSE SUPPLY
	FSW-14	F-14	F+,	FSW-14	F-14, F+	1.5	R	3000	BUNCHING
	FDB-9	FSW-15	F+,	FDB-9	FSW-15, F+	1.5	R	1800	LOOSE SUPPLY
	FSW-15	F-15	F+,	FSW-15	F-15, F+	1.5	R	3500	BUNCHING

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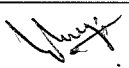
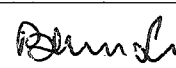
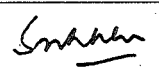
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BRANCH WIRING NEGATIVE FOR FAN									
69	FDB-12	F-1	F-, FDB-12	F-1, F-	1.5	BLK	2500	BUNCHING	
	FDB-12	F-2	F-, FDB-12	F-2, F-	1.5	BLK	1800		
70	FDB-13	F-3	F-, FDB-13	F-3, F-	1.5	BLK	2500	BUNCHING	
	FDB-13	F-4	F-, FDB-13	F-4, F-	1.5	BLK	1800		
71	FDB-15	F-5	F-, FDB-15	F-5, F-	1.5	BLK	2700	BUNCHING	
	FDB-15	F-6	F-, FDB-15	F-6, F-	1.5	BLK	2200		
	FDB-15	F-7	F-, FDB-15	F-7, F-	1.5	BLK	1800		
	FDB-15	LSN	LSN, FDB-15	LSN	1.5	BLK	4000		
72	FDB-16	F-8	F-, FDB-16	F-8, F-	1.5	BLK	2700	BUNCHING	
	FDB-16	F-9	F-, FDB-16	F-9, F-	1.5	BLK	2200		
	FDB-16	F-10	F-, FDB-16	F-10, F-	1.5	BLK	1800		
	FDB-16	LSN	LSN, FDB-16	LSN	1.5	BLK	4000		
73	FDB-17	F-11	F-, FDB-17	F-11, F-	1.5	BLK	2700	BUNCHING	
	FDB-17	F-12	F-, FDB-17	F-12, F-	1.5	BLK	2200		
	FDB-17	F-13	F-, FDB-17	F-13, F-	1.5	BLK	1800		
	FDB-17	LSN	LSN, FDB-17	LSN	1.5	BLK	4000		
73A	FDB-17	BF-1 (BRACKET FAN)	F-, FDB-17	BF-1, F-	1.5	BLK	5500	LOOSE SUPPLY	
74	FDB-19	F-14	F-, FDB-19	F-14, F-	1.5	BLK	2700	BUNCHING	
	FDB-19	F-15	F-, FDB-19	F-15, F-	1.5	BLK	2200		
	FDB-19	LSN	LSN, FDB-19	LSN	1.5	BLK	4000		
MOBILE CHARGING SOCKET CIRCUIT (CABIN SIDE)									
75	CUBICLE	MCS-1,2,3	MCS-1,2,3	CUBICLE	1.5	RED	10000	LOOSE SUPPLY	
	CUBICLE	MCS-1,2,3	MCS-1,2,3	CUBICLE	1.5	BLK	10000		
	CUBICLE	MCS-1,2,3	MCS-1,2,3	CUBICLE	1.5	GNYE	10000		
76	MCS-1	MCS-4,5,6	MCS-4,5,6	MCS-1	1.5	RED	5500	BUNCHING	
	MCS-1	MCS-4,5,6	MCS-4,5,6	MCS-1	1.5	BLK	5500		
	MCS-1	MCS-4,5,6	MCS-4,5,6	MCS-1	1.5	GNYE	5500		
77	MCS-4	MCS-7,8,9	MCS-7,8,9	MCS-4	1.5	RED	5500	BUNCHING	
	MCS-4	MCS-7,8,9	MCS-7,8,9	MCS-4	1.5	BLK	5500		
	MCS-4	MCS-7,8,9	MCS-7,8,9	MCS-4	1.5	GNYE	5500		
78	MCS-7	MCS-10,11,12	MCS-10,11,12	MCS-7	1.5	RED	9000	LOOSE SUPPLY	
	MCS-7	MCS-10,11,12	MCS-10,11,12	MCS-7	1.5	BLK	9000		
	MCS-7	MCS-10,11,12	MCS-10,11,12	MCS-7	1.5	GNYE	9000		

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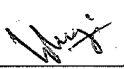
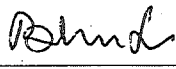
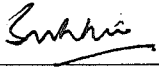
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MOBILE CHARGING SOCKET CIRCUIT (CORRIDOR SIDE)								
79	CUBICLE	MCS-14	MCS-14	CUBICLE	1.5	Y	7500	LOOSE SUPPLY
	CUBICLE	MCS-14	MCS-14	CUBICLE	1.5	BLK	7500	
	CUBICLE	MCS-14	MCS-14	CUBICLE	1.5	GNYE	7500	
80	MCS-14	MCS-15	MCS-15	MCS-14	1.5	Y	7500	BUNCHING
	MCS-14	MCS-15	MCS-15	MCS-14	1.5	BLK	7500	
	MCS-14	MCS-15	MCS-15	MCS-14	1.5	GNYE	7500	
81	MCS-15	MCS-16	MCS-16	MCS-15	1.5	Y	5200	BUNCHING
	MCS-15	MCS-16	MCS-16	MCS-15	1.5	BLK	5200	
	MCS-15	MCS-16	MCS-16	MCS-15	1.5	GNYE	5200	
82	MCS-16	MCS-17	MCS-17	MCS-16	1.5	Y	5200	BUNCHING
	MCS-16	MCS-17	MCS-17	MCS-16	1.5	BLK	5200	
	MCS-16	MCS-17	MCS-17	MCS-16	1.5	GNYE	5200	
83	MCS-14	MCS-13	MCS-13	MCS-14	1.5	Y	5200	BUNCHING
	MCS-14	MCS-13	MCS-13	MCS-14	1.5	BLK	5200	
	MCS-14	MCS-13	MCS-13	MCS-14	1.5	GNYE	5200	
(EXHAUST FAN-1) CIRCUIT FOR GUARD LAVATORY								
84	CUBICLE	EX.FAN-1	EX.FAN-1	CUBICLE	1.5	BLUE	11000	LOOSE SUPPLY
	CUBICLE	EX.FAN-1	EX.FAN-1	CUBICLE	1.5	BLK	11000	
	CUBICLE	EX.FAN-1	EX.FAN-1	CUBICLE	1.5	GNYE	11000	
EXHAUST FAN- 2, 3 & 4 CIRCUIT (PASSENGER LAVATORY & DIVYANGJAN LAVATORY)								
85	CUBICLE	EX.FAN-2	EX.FAN-2	CUBICLE	1.5	BLUE	6000	LOOSE SUPPLY
	CUBICLE	EX.FAN-2	EX.FAN-2	CUBICLE	1.5	BLK	6000	
85 A	CUBICLE	EX.FAN-3	EX.FAN-3	CUBICLE	1.5	BLUE	6000	
	CUBICLE	EX.FAN-3	EX.FAN-3	CUBICLE	1.5	BLK	6000	
86	CUBICLE	EX.FAN-4	EX.FAN-4	CUBICLE	1.5	BLUE	14000	
	CUBICLE	EX.FAN-4	EX.FAN-4	CUBICLE	1.5	BLK	14000	
TAIL LIGHT CUIRCUIT								
87	VHF BOX (GUARD ROOM)	TAIL LIGHT	TL (+VE)	VHF BOX (+VE)	1.5	R	25000	LOOSE SUPPLY
88	VHF BOX (GUARD ROOM)	TAIL LIGHT	TL (-VE)	VHF BOX (-VE)	1.5	BLK	26500	
89	VHF BOX (GUARD ROOM)	SIDE LIGHT-1	SL-1(+VE)	VHF BOX(+VE)	1.5	R	5000	
90	VHF BOX (GUARD ROOM)	SIDE LIGHT-1	SL-1 (-VE)	VHF BOX (-VE)	1.5	BLK	5000	
91	VHF BOX (GUARD ROOM)	SIDE LIGHT-2	SL-2 (+VE)	VHF BOX (+VE)	1.5	R	6000	LOOSE SUPPLY
92	VHF BOX (GUARD ROOM)	SIDE LIGHT-2	SL-2 (-VE)	VHF BOX (-VE)	1.5	BLK	6000	
93	CUBICLE	CS FOR TAIL LIGHT VHF BOX	CS FOR VHF BOX (+VE)	CUBICLE (+VE)	1.5	R	7000	

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94	CUBICLE	CS FOR TAIL LIGHT VHF BOX	CS FOR VHF BOX (-VE)	CUBICLE (-VE)	1.5	BLK	7000	
EFT CIRCUIT								
95	CUBICLE	EFT-I	EFT-I, +VE	SPM-I, CUBICLE	4	R	11500	LOOSE SUPPLY
96	CUBICLE	EFT-II	EFT-II, -VE	SN-I, CUBICLE	4	BLUE	10800	
97	EFT-I	EFT-II	EFT-II, +VE	+VE, EFT-I	4	R	7300	
98	EFT-II	EFT-I	EFT-I, -VE	-VE, EFT-II	4	BLUE	7300	
99	CUBICLE	EFT-III	EFT-III, +VE	SPM-II, CUBICLE	4	R	24000	LOOSE SUPPLY
100	CUBICLE	EFT-IV	EFT-IV, -VE	SN-II, CUBICLE	4	BLUE	24000	
101	EFT-III	EFT-IV	EFT-IV, +VE	+VE, EFT-III	4	R	7300	
102	EFT-IV	EFT-III	EFT-III, -VE	-VE, EFT-IV	4	BLUE	7300	
PACIL CIRCUIT								
103	FDB-5	LS-1	LS-1	FDB-5	1.5	R	800	LOOSE SUPPLY
	FDB-6	LS-2	LS-2	FDB-6	1.5	R	800	
	FDB-7	LS-3	LS-3	FDB-7	1.5	R	800	
	FDB-9	LS-4	LS-4	FDB-9	1.5	R	800	
104	FDB-5	LS-1	LS-1	FDB-5	1.5	R	800	LOOSE SUPPLY
	FDB-6	LS-2	LS-2	FDB-6	1.5	R	800	
	FDB-7	LS-3	LS-3	FDB-7	1.5	R	800	
	FDB-9	LS-4	LS-4	FDB-9	1.5	R	800	
105	CUBICLE	PACIL-1	PACIL-1	CUBICLE, (+VE)	1.5	Y	12300	LOOSE SUPPLY
106	CUBICLE	PACIL-2	PACIL-2	CUBICLE, (-VE)	1.5	BLK	9300	
107	PACIL-1	PACIL-2	PACIL-2	PACIL-1	1.5	Y	4300	
108	PACIL-2	PACIL-1	PACIL-1	PACIL-2	1.5	BLK	4300	
AEL CIRCUIT								
109	CUBICLE	AEL-1	AEL-1	CUBICLE, (+VE)	1.5	R	9800	LOOSE SUPPLY
110	CUBICLE	AEL-1	AEL-1	CUBICLE, (-VE)	1.5	BLK	9800	
111	AEL-1	AEL-2	AEL-2	AEL-1	1.5	R	10000	
112	AEL-1	AEL-2	AEL-2	AEL-1	1.5	BLK	10000	
113	AEL-2	AEL-3	AEL-3	AEL-2	1.5	R	9500	
114	AEL-2	AEL-3	AEL-3	AEL-2	1.5	BLK	8000	
115	AEL-3	AEL-4	AEL-4	AEL-3	1.5	R	9500	
116	AEL-3	AEL-4	AEL-4	AEL-3	1.5	BLK	8000	
ELECTRO-PNEUMATIC PRESSURISED FLUSHING SYSTEM CIRCUIT								
117	FDB-1	FLUSH-1	FLUSH-1 (+VE)	FDB-1	1.5	Y	7000	LOOSE SUPPLY
118	FDB-11	FLUSH-1	FLUSH-1 (-VE)	FDB-11	1.5	BLK	4000	
119	FDB-4	FLUSH-2	FLUSH-2 (+VE)	FDB-4	1.5	Y	4000	
120	FDB-14	FLUSH-2	FLUSH-2 (-VE)	FDB-14	1.5	BLK	7000	
121	FDB-4	FLUSH-3	FLUSH-3 (+VE)	FDB-4	1.5	Y	7000	
122	FDB-14	FLUSH-3	FLUSH-3 (-VE)	FDB-14	1.5	BLK	4000	
123	FDB-7	FLUSH-4	FLUSH-4 (+VE)	FDB-7	1.5	Y	4000	
124	FDB-17	FLUSH-14	FLUSH-4 (-VE)	FDB-17	1.5	BLK	7000	

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Corr.-1**Corrigendum – 1 to Specification no. - EDTS 410, Rev-Nil**

This corrigendum is issued to Specification no. EDTS 410, Rev. - Nil for 'Harness of Under frame and Roof arrangement for LHB EOG Non AC LSLRD (31-Seater) Coaches' to change the Scope of Supply as follows:

Clause 2.0 (a) shall be read as:

2.0 Scope of supply:

- a) Procurement of the item specified in BOM of the specification shall be from RDSO/RCF/ICF approved vendors mentioned in the latest version of the vendor directory issued by RCF/ICF/RDSO respectively, however the procurement of **e-beam Cables & Cable Management System** shall be done from RDSO 'Approved Vendors' for minimum **80%** quantity of total quantity and balance quantity up-to **20%** from 'Developmental Vendors' as mentioned in latest version of the vendor directory issued by RDSO.

Based on the procurement of various sizes of **e-beam Cables & Cable Management System** from either Approved or Developmental Sources, the cable harness shall be categorized as under:

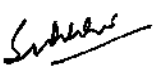
- **Category-A:** Cable Harness with Approved Source of e-beam Cables & Cable Management System (80% min.)
- **Category-B:** Cables Harness with Developmental source of e-beam Cables & Cable Management System (20% min.)

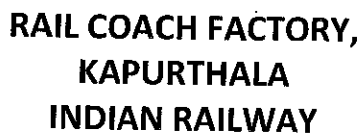
Category-B type of cable harness may be supplied with e-beam cables & cable management system procured from Developmental Sources, however in no case Category-A type shall be supplied with e-beam cables & cable management system procured from Developmental Sources.

Firm shall maintain a record according to the above classification and offer to RITES/Inspecting Official for inspection in format **EDF 0001, Ver. 2.0 (or Latest)** annexed with the specification.

Note:-

The above mentioned criteria is not applicable to Cable Management System of size NW10 & NW70 as the Approved Sources are less than three or only Developmental Sources are there. Therefore, the procurement of size NW10 & NW70 (if applicable) may be done for such sources subject to past performance, capacity, delivery requirements, quality under procurement, nature of item, outstanding order etc. to be treated as Bulk Orders.

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To be maintained by the cables harness manufacturer at his premises and to be signed by
the Inspecting official during inspection against each Purchase Order

Name of Firm :

P.O. No. :

Description :

Specification :

[illegible][illegible]

**Amendment No.-1 to Specification for 'Harness of Under-Frame and Roof Arrangement' for
HOG compliant LHB EOG NON-AC LSLRD(31 SEATER) Coaches.**

This Amendment is issued to specification for 'Harness of Under-Frame and Roof Arrangement' for HOG compliant LHB EOG NON-AC LSLRD(31 SEATER) Coaches to spec. no. EDTS-410, Rev 'Nil', Corr-1 in order to modify the length of harnesses based on design validation at Shop Floor, as under:-

1. Clause No.- 2.1 a) BILL OF MATERIAL FOR UNDERFRAME WIRING:

QPC is modified as under:-

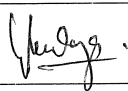
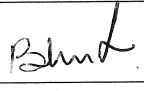
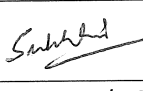
A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

S.N.	Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	Existing QPC	Revised QPC	Remarks
7.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Red	ELRS/SPEC/ ELC/0019, Rev.-4	24 Mtrs	27 Mtrs	Feeder cables
8.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Yellow	ELRS/SPEC/ ELC/0019, Rev.-4	24 Mtrs	27 Mtrs	Feeder cables
9.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Blue	ELRS/SPEC/ ELC/0019, Rev.-4	24 Mtrs	27 Mtrs	Feeder cables
10.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Black	ELRS/SPEC/ ELC/0019, Rev.-4	24 Mtrs	27 Mtrs	Feeder cables
27.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	10	White	ELRS/SPEC/ ELC/0019, Rev.-4	27 Mtrs	27.5 Mtrs	-ve Fuse Box
30.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	2.5	Choco.	ELRS/SPEC/ ELC/0019, Rev.-4	132.5 Mtrs	135.5 Mtrs	Feeder control cables & HV Panel to RBC

Following item is added as under:-

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

S.N.	Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	QPC	Remarks
45.	Flexible Flame-retardant high performance polyolefin heat shrinkable tubing	-----	-----	-----	EDML-176, Rev-0	01 set	Loose Supply

EDTS-410, Rev-Nil, Corr-1	1	21.10.2021				1 of 4
Spec. no.	Amdt.	Date	SSE/CAD	SEE/D&D	DY.CEE/D&D	PAGE

2. Clause No.-2.1 b) PREPARATION / BUNCHING OF HARNESS:-

The Length of Cable Harnesses modified as under:

Har. No.	Nos. & size of cable	Spec. no.	Working voltage	Color code	Existing Length in mm.	Revised Length in mm.	Ferrule Marking	Route	Remarks & Flex. conduit size and length	Group name
1A	2 nos., 2.5 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	Upto 750 volts	Ch,Ch	23000	23500	46 01 03, 46 01 04	25	Control cables (NW-17, L=21 Mtrs)	FEEDER CABLES
1C	2 nos., 2.5 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	Upto 750 volts	Ch,Ch	22500	23000	46 01 01, 46 01 02	14	Control cables (NW-17, L=21 Mtrs)	
1E	2 nos., 2.5 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	Upto 750 volts	Ch,Ch	9500	10000	46 01 01 A, 46 01 02 A	14A	Control cables (NW-17, L=7.5 Mtrs)	
1G	2 nos., 2.5 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	Upto 750 volts	Ch,Ch	8500	9000	46 01 03 A, 46 01 04 A	25A	Control cables (NW-17, L=6.5 Mtrs)	
2	4 nos., 25 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R	12000	13500	12 01 01 01, 12 01 04 01, 12 01 07 01, 12 01 10 01	13	HOG Compliant Switch Board Cabinet to under-slung HV Panel (NW-48, L=7 Mtrs)	FEEDER LOOP CABLES
				Y	12000	13500				
				B	12000	13500				
				BLK	12000	13500				
2A	4 nos., 25 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R	12000	13500	12 01 15 01, 12 01 18 01, 12 01 21 01, 12 01 24 01	23	HOG Compliant Switch Board Cabinet to under-slung HV Panel (NW-48, L=7 Mtrs)	FEEDER LOOP CABLES
				Y	12000	13500				
				B	12000	13500				
				BLK	12000	13500				
14A	1 no., 10 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	Upto 750 volts	Wh.	9500	10000	Battery Fuse Box (-ve) to HOG Compliant SBC	40A	Battery Fuse Box (-ve) to HOG Compliant SBC (NW-17, L=7.5 Mtrs)	DC Supply to HOG Compliant SBC

3. Clause No. 2.2 a) BILL OF MATERIAL FOR ROOF WIRING:-

QPC is modified as under:-

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

Sr. No.	Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	Existing QPC	Revised QPC	Remarks
1	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Red	ELRS/SPEC/ELC/0019, Rev.-4	225.6 Mtrs	223.3 Mtrs	Inside Coach

EDTS-410, Rev-Nil, Corr-1	1	21.10.2021	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	2 of 4
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Amendment-1

2	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Yellow	ELRS/SPEC/ELC/0019, Rev.-4	202.4 Mtrs	203.2 Mtrs	Inside Coach
3	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Blue	ELRS/SPEC/ELC/0019, Rev.-4	119.6 Mtrs	120.2 Mtrs	Inside Coach
4	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Black	ELRS/SPEC/ELC/0019, Rev.-4	288.4 Mtrs	289.2 Mtrs	Inside Coach
6	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Red	ELRS/SPEC/ELC/0019, Rev.-4	71.8 Mtrs	72.1 Mtrs	Inside Coach
7	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Yellow	ELRS/SPEC/ELC/0019, Rev.-4	64.2 Mtrs	64.7 Mtrs	Inside Coach
8	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Blue	ELRS/SPEC/ELC/0019, Rev.-4	76.1 Mtrs	76.3 Mtrs	Inside Coach
9	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Black	ELRS/SPEC/ELC/0019, Rev.-4	20.7 Mtrs	21 Mtrs	Inside Coach

Description is modified as under:-

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

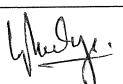
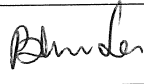
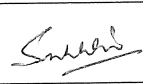
Sr. No.	Existing Description	Revised Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	QPC	Remarks/ Location
12.	Rigid PVC conduit Dia 20mmx300mm	Rigid PVC conduit Dia 20mmx350mm	-	-	-	IS:9537-83, P3, CL.5.1.2	18 nos.	Inside coach

4. Annexure-B:

The Length of Cable Harnesses modified as under:

Preparation/Bunching of Harness for Jumper Wiring for Roof of LSLRD Coach (31-Seater):-

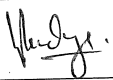
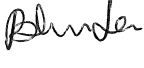
Har. No	Location		Ferrule no.				Cable size (in mm ²)	Color Code	Existing Length (in mm)	Revised Length (in mm)	Remarks
	From	To	From		To						
JUMPER CABLE FOR PANEL ROOM GUARD COMPARTMENT											
5	FDB-3	FDB-4	LI+ FDB-3	FDB-4 LI+	4	Y	3000	3100	BUNCHING		
	FDB-3	FDB-5	LII+ FDB-3	FDB-5 LII+	4	Y	4400	4600			
	FDB-3	FDB-5	F+ FDB-3	FDB-5 F+	4	R	4400	4600			
9	FDB-7	FDB-8	LI+ FDB-7	FDB-8 LI+	4	Y	3700	3800	BUNCHING		
10	FDB-7	FDB-9	LII+ FDB-7	FDB-9 LII+	4	Y	5400	5500			
	FDB-7	FDB-9	F+ FDB-7	FDB-9 F+	4	R	5400	5500			
	FDB-7	FDB-9	LS-1	LS-1	1.5	Y	5400	5500			
	FDB-7	FDB-9	LS-2	LS-2	1.5	Y	5400	5500			

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NEGATIVE JUMPER WIRING										
15	FDB-13	FDB-15	F- FDB-13	FDB-15 F-	4	BLK	4400	4600	BUNCHING	
15A	FDB-14	FDB-15	L- FDB-14	FDB-15 L-	4	BLUE	1500	1600	BUNCHING	
18	FDB-17	FDB-18	L- FDB-17	FDB-18 L-	4	BLUE	3700	3800	BUNCHING	
	FDB-17	FDB-19	F- FDB-17	FDB-19 F-	4	BLK	5400	5500		
	FDB-17	FDB-19	LSN	LSN	1.5	BLK	5400	5500		
BRANCH WIRING POSITIVE & NEGATIVE FOR DOORWAY & LAVATORY LIGHTING										
27	FDB-1	DL-2	LI+, FDB-1	DL-2, LI+	1.5	Y	3000	3200	LOOSE SUPPLY	
29	FDB-4	DL-4	LI+, FDB-4	DL-4, LI+	1.5	Y	3000	3200		
31	FDB-8	DL-6	LI+, FDB-8	DL-6, LI+	1.5	Y	3000	3200		
39	FDB-11	DL-1	L-, FDB-11	DL-1, L-	1.5	BLUE	3000	3200	LOOSE SUPPLY	
43	FDB-14	DL-3	L-, FDB-14	DL-3, L-	1.5	BLUE	3000	3200		
48	FDB-18	DL-5	L-, FDB-18	DL-5, L-	1.5	BLUE	3000	3200		
AEL CIRCUIT										
109	CUBICLE	AEL-1	AEL-1	CUBICLE, (+VE)	1.5	R	9800	9000	LOOSE SUPPLY	
110	CUBICLE	AEL-1	AEL-1	CUBICLE, (-VE)	1.5	BLK	9800	9000		
113	AEL-2	AEL-3	AEL-3	AEL-2	1.5	R	9500	8000		
116	AEL-3	AEL-4	AEL-4	AEL-3	1.5	BLK	8000	9500		

5. Clause No. 7 ENCLOSURES:-

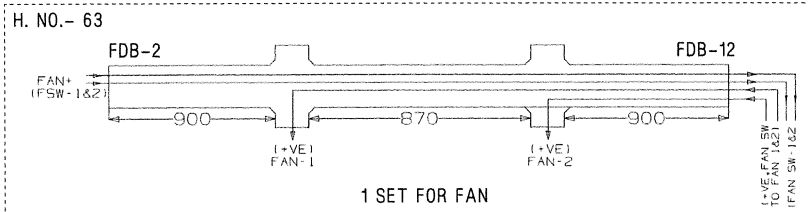
S.No. 8; SKED-782 shall be read as **SKED-782 A.**

EDTS-410, Rev-Nil, Corr-1	1	21.10.2021				4 of 4
Spec. no.	Amdt.	Date	SSE/CAD	SEE/D&D	DY.CEE/D&D	PAGE

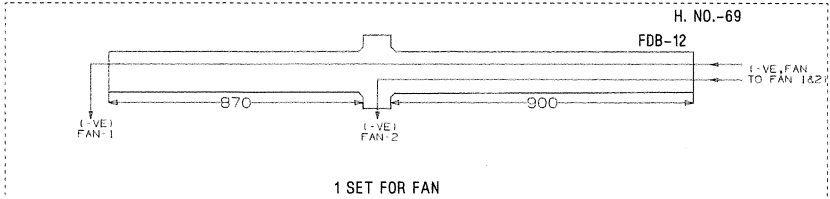
BRANCH WIRING FOR LIGHT,FAN & LS ,DIA-20MM RIGID PVC CONDUITS DETAILS

ALT.NO	ALT.DATE	ZONE	ALTERATIONS	AUTHORITY
0	05.10.2021	ALL	CONDUIT LENGTHS REVISED FROM 300MM TO 350MM. DRAWING MODIFIED ACCORDINGLY.	CR NO. 2300211007

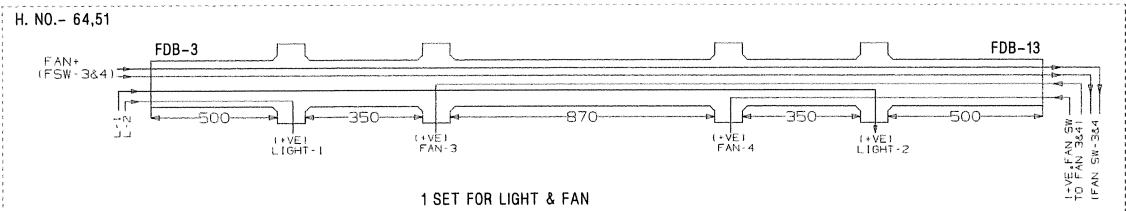
BRANCH WIRING FOR FAN (+VE) FOR GUARD ROOM



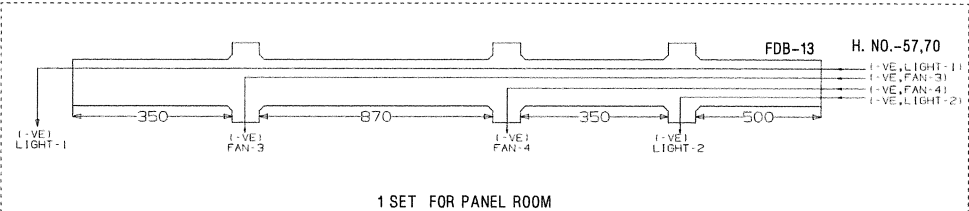
BRANCH WIRING FOR FAN (-VE) FOR GUARD ROOM



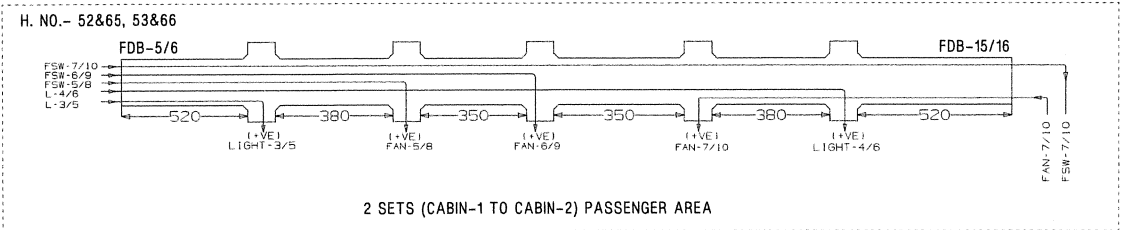
BRANCH WIRING FOR LIGHT & FAN (+VE) FOR PANEL ROOM



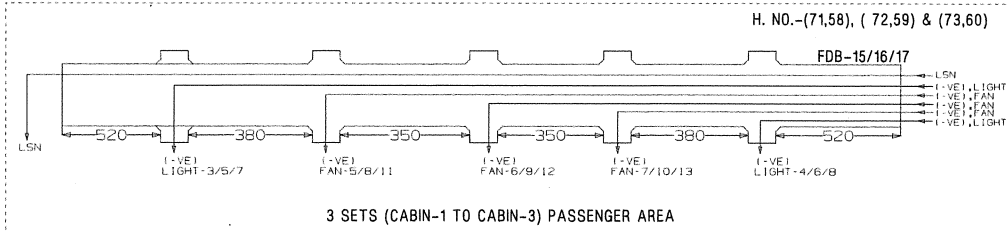
BRANCH WIRING FOR LIGHT & FAN (-VE) FOR PANEL ROOM



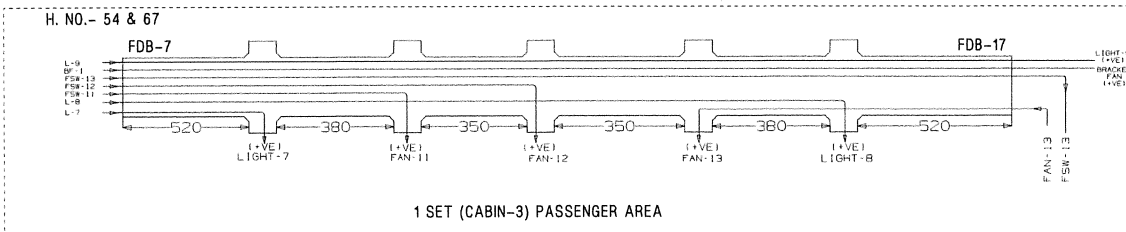
BRANCH WIRING FOR LIGHT & FAN (+VE) FOR PASSENGER CABIN



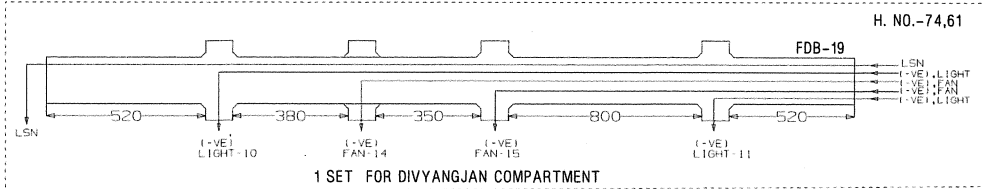
BRANCH WIRING FOR LIGHT, FAN & LSN(-VE) FOR PASSENGER CABIN



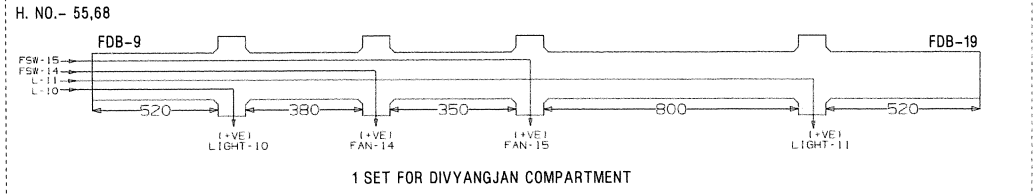
BRANCH WIRING FOR LIGHT & FAN (+VE) FOR PASSENGER CABIN



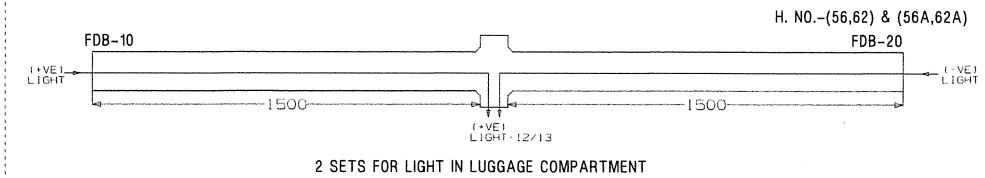
BRANCH WIRING FOR LIGHT, FAN & LSN (-VE) FOR DIVYANGJAN COMPARTMENT



BRANCH WIRING FOR LIGHT & FAN (+VE) FOR DIVYANGJAN COMPARTMENT



BRANCH WIRING FOR LIGHT (-VE) FOR LUGGAGE



ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.

DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE.

FOR UNTOLERANCED DIMENSIONS REFER MDG0008

DATE OF FIRST ISSUE

23/02/2021

WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS	OPASSLY	DETAIL DRG	MATL. & SPEC.	REMARKS
NIL	M	GROUP ELECTRICAL	SUPERSEDES:	SKED-782		
WEIGHT	FILE	D:\ABHI\COACH_DRAWINGS\LSLRD\ALT_C\SKED-782s2a.prt				
NIL	KG					
S.AREA						
NIL	M ²					
LENGTH/DIA						
NIL	M					
WIDTH/THICK.						
NIL	M					
HEIGHT						
NIL	M					
REF.DRG.No.						
PL NO.						
DRG.NO.						
ALT.						
SIZE						
SHEET						
2/2						



This Amendment is issued to specification for 'Harness of Under-Frame and Roof Arrangement' for HOG compliant LHB EOG NON-AC LSLRD (31 SEATER) Coaches to spec. no. EDTS-410, Rev 'Nil', AM-1, Corr-1 in order to modify the length of harnesses & end fittings based on feedback received from Shop Floor, inclusion of NW-48/PG-48 Cable Management system and modify harness w.r.t. provision of Double inlet centrifugal blower assembly from 1-Ø, 110VAC to 3-Ø, 190VAC supply system. The amendment is as under:-

1. Clause No.- 2.1 a) BILL OF MATERIAL FOR UNDERFRAME WIRING:

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

Following Items are **REVISED** as under:

S.N	Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	Existing QPC	Revised QPC	Remarks
7.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Red	ELRS/SPEC/ ELC/0019, Rev.-4	27 Mtrs	27.6 Mtrs	Feeder cables
8.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Yellow	ELRS/SPEC/ ELC/0019, Rev.-4	27 Mtrs	27.6 Mtrs	Feeder cables
9.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Blue	ELRS/SPEC/ ELC/0019, Rev.-4	27 Mtrs	27.6 Mtrs	Feeder cables
10.	Thin walled flexible elastomeric cables with copper conductors	above 750 volts upto 1.8KV/ 3.0KV	25	Black	ELRS/SPEC/ ELC/0019, Rev.-4	27 Mtrs	27.6 Mtrs	Feeder cables
24.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	6	GNYE	ELRS/SPEC/ ELC/0019, Rev.-4	4.5 Mtrs	14.5 Mtrs	HV panel to RBC & HV panel to LV panel

Amendment-2 to EDTS-410, AM-1, CORR-1	Nil	11.08.2023				1 of 6
Document No.	Revision	Date	SSE/CAD	SEE/D&D	DY.CEE/D&D	Page No.
दस्तावेज सं.	संशोधन	दिनांक	वरि. अनु. अभि./ अभिकल्प	वरि. विद्युत इंजीनियर/ अभि. एवं विकास	उप. मु. विद्युत इंजीनियर/ अभि. एवं विकास	पृष्ठ सं.

	रेल कोच फैक्टरी, कपूरथला Rail Coach Factory, Kapurthala	दस्तावेज सं.: सुधार सं.-2 Document no.: Amendment-2
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B) CONDUIT SYSTEM FOR CABLE MANAGEMENT & ACCESSORIES FOR UNDER FRAME WIRING:-

Firms supplying these items shall get these tested as per RDSO specification no. RDSO/PE/SPEC/AC/0138-2009 (Latest).

Following Items are **REVISED** as under:

EXISTING:

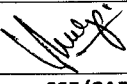
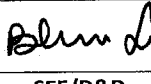
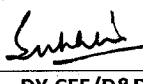
S. N.	DESCRIPTION	SPEC. NO.	TABLE	ITEM	QPC
5. *	Polyamide flexible corrugated conduit, NW-48	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-1	7	20 Mtrs.
10.*	Straight PG metal thread End fitting PG-48	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-2	8	4 nos.
15. *	Hex. lock nut with PG thread brass PG-48	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-10	8	4 nos.
20. *	Tube clamp NW-48	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-8	8	10 nos.

REVISED:

S. N.	DESCRIPTION	SPEC. NO.	TABLE	ITEM	QPC
5.	Polyamide flexible corrugated conduit, NW-48	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-1	7	22 Mtrs.
10.	Straight PG metal thread End fitting PG-48	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-2	8	4 nos.
15.	Hex. lock nut with PG thread brass PG-48	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-10	8	4 nos.
20.	Tube clamp NW-48	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-8	8	10 nos.

“Note” Deleted.

Note stating “* Marked items shall not be procured as these items are available in RCF depots” stands deleted, i.e. Items marked “*” in EDTS-410, Rev-Nil, AM-1; Corr-1 are to be supplied by firms along-with Harness w.e.f. issue of this amendment i.e. AM-2.

Amendment-2 to EDTS-410; AM-1, CORR-1	Nil	11.08.2023				2 of 6
Document No.	Revision	Date	SSE/CAD	SEE/D&D	DY.CEE/D&D	Page No.
दस्तावेज सं.	संशोधन	दिनांक	वरि. अनु. अभि./ अभिकल्प	वरि. विद्युत इंजीनियर/ अभि. एवं विकास	उप. मु. विद्युत इंजीनियर/ अभि. एवं विकास	पृष्ठ सं.

3/2

	रेल कोच फैक्टरी, कपूरथला Rail Coach Factory, Kapurthala	दस्तावेज सं.: सुधार सं.-2 Document no.: Amendment-2
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2. Clause No.-2.1 b) PREPARATION / BUNCHING OF HARNESS:-

Following cable harness bunches are **REVISED**.

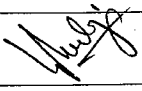
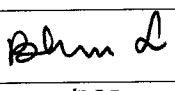
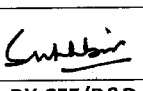
Har. No.	Nos. & size of cable	Spec. no.	Working voltage	Color code	Existing Length in mm.	Revised Length in mm.	Ferrule Marking	Route	Remarks & Flex. Conduit size and length	Group name
2	4 nos., 25 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R	13500	13800	12 01 01 01, 12 01 04 01, 12 01 07 01, 12 01 10 01	13	HOG Compliant Switch Board Cabinet to under-slung HV Panel (NW-48, L=11 Mtrs)	FEEDER LOOP CABLES
				Y	13500	13800				
				B	13500	13800				
				BLK	13500	13800				
2A	4 nos., 25 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	above 750 volts upto 1.8KV/ 3.0KV	R	13500	13800	12 01 15 01, 12 01 18 01, 12 01 21 01, 12 01 24 01	23	HOG Compliant Switch Board Cabinet to under-slung HV Panel (NW-48, L=11 Mtrs)	FEEDER LOOP CABLES
				Y	13500	13800				
				B	13500	13800				
				BLK	13500	13800				
10	5 nos., 6 mm ²	ELRS/SPEC/ELC/0019, Rev.-4	Upto 750 volts	R	10000	10000	55	55	HV Panel (S1) to On board LV Panel (S1A) (NW-23, L=8.5 Mtrs)	110V AC supply to On-Board panel
				Y	10000	10000				
				B	10000	10000				
				BLK	10000	10000				
				GYNE	0	10000				

3. Clause No. 2.2 a) BILL OF MATERIAL FOR ROOF WIRING:-

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

Following Items are **REVISED** as under:

Sr. No.	Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	Existing QPC	Revised QPC	Remarks
1.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Red	ELRS/SPEC/ELC/0019, Rev.-4	223.3 Mtrs	237.3 Mtrs	Inside Coach
2.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Yellow	ELRS/SPEC/ELC/0019, Rev.-4	203.2 Mtrs	228.9 Mtrs	Inside Coach
3.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Blue	ELRS/SPEC/ELC/0019, Rev.-4	120.2 Mtrs	106.7 Mtrs	Inside Coach

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4.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	1.5	Black	ELRS/SPEC/ELC/0019, Rev.-4	289.2 Mtrs	277.8 Mtrs	Inside Coach
6.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Red	ELRS/SPEC/ELC/0019, Rev.-4	72.1 Mtrs	72.2 Mtrs	Inside Coach
7.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Yellow	ELRS/SPEC/ELC/0019, Rev.-4	64.7 Mtrs	65.2 Mtrs	Inside Coach
8.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Blue	ELRS/SPEC/ELC/0019, Rev.-4	76.3 Mtrs	76.7 Mtrs	Inside Coach
9.	Thin walled flexible elastomeric cables with copper conductors	Upto 750 volts	4	Black	ELRS/SPEC/ELC/0019, Rev.-4	21 Mtrs	21.1 Mtrs	Inside Coach

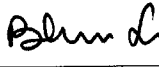
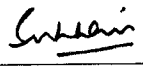
Following Item is **ADDED** as under:

Sr. No.	Existing Description	Working voltage	Cable size (in mm ²)	Cable color	Detail drg./ Spec.	QPC	Remarks/ Location
44.	Rigid PVC conduit Dia 20mmx3000mm	-	-	-	IS:9537-83, P3, CL.5.1.2	01 no.	Inside coach

B) CONDUIT SYSTEM FOR CABLE MANAGEMENT & ACCESSORIES (ROOF WIRING):-

Following Items are **DELETED** as under:

S. N.	DESCRIPTION	SPEC. NO.	TABLE	ITEM	QPC
5.	Straight PG Metal Thread End Fitting PG-21	RDSO/PE/SPEC/AC/0138-2009, (Latest)	A-2	5	10 nos.
6.	Hex. Lock Nut with PG Thread Brass PG-21		A-10	5	10 nos.

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4. Annexure-B:

Preparation/Bunching of Harness for Jumper Wiring for Roof of LSLRD Coach (31-Seater):-

The following cable harness bunches are **REVISED**.

Har. No	Location		Ferrule no.				Cable size (in mm²)	Color Code	Existing Length (in mm)	Revised Length (in mm)	Remarks
	From	To	From	To							
JUMPER CABLE FOR PANEL ROOM GUARD COMPARTMENT											
6	FDB-4	FDB-5	LI+	FDB-4	FDB-5	LI+	4	Y	1500	1800	BUNCHING
9	FDB-7	FDB-8	LI+	FDB-7	FDB-8	LI+	4	Y	3800	4200	BUNCHING
10	FDB-7	FDB-9	LII+	FDB-7	FDB-9	LII+	4	Y	5500	5600	
	FDB-7	FDB-9	F+	FDB-7	FDB-9	F+	4	R	5500	5600	
	FDB-7	FDB-9	LS-1		LS-1		1.5	Y	5500	5600	
	FDB-7	FDB-9	LS-2		LS-2		1.5	Y	5500	5600	
11	FDB-8	FDB-9	LI+	FDB-8	FDB-9	LI+	4	Y	1900	2100	BUNCHING
NEGATIVE JUMPER WIRING											
15	FDB-13	FDB-14	L-	FDB-13	FDB-14	L-	4	BLUE	3000	3900	BUNCHING
	FDB-13	FDB-15	F-	FDB-13	FDB-15	F-	4	BLK	4600	4600	
15A	FDB-14	FDB-15	L-	FDB-14	FDB-15	L-	4	BLUE	1600	1700	BUNCHING
18	FDB-17	FDB-18	L-	FDB-17	FDB-19	L-	4	BLUE	3800	4200	BUNCHING
	FDB-17	FDB-19	F-	FDB-17	FDB-19	F-	4	BLK	5500	5600	
	FDB-17	FDB-19	LSN		LSN		1.5	BLK	5500	5600	
19	FDB-18	FDB-19	L-	FDB-18	FDB-19	L-	4	BLUE	1900	2100	BUNCHING
BRANCH WIRING POSITIVE FOR DOORWAY & LAVATORY LIGHTING											
35	FDB-4	LL-3	LI+	FDB-4	LL-3,	LI+	1.5	Y	5100	5600	LOOSE SUPPLY
BRANCH WIRING NEGATIVE FOR DOORWAY & LAVATORY LIGHTING											
45	FDB-14	LL-2	L-	FDB-14	LL-2,	L-	1.5	BLUE	5100	5600	LOOSE SUPPLY
(EXHAUST FAN-1) CIRCUIT FOR GUARD LAVATORY)											
84	CUBICLE	EX.FAN-1	CUBICLE (R)		EX.FAN-1 (R)		1.5	R	0	11000	LOOSE SUPPLY
	CUBICLE	EX.FAN-1	CUBICLE (Y)		EX.FAN-1 (Y)		1.5	Y	0	11000	
	CUBICLE	EX.FAN-1	CUBICLE (B)		EX.FAN-1(B)		1.5	BLUE	11000	11000	
	CUBICLE	EX.FAN-1	CUBICLE		EX.FAN-1		1.5	BLK	11000	0	
	CUBICLE	EX.FAN-1	CUBICLE (PE)		EX.FAN-1 (PE)		1.5	GNYE	11000	11000	
EXHAUST FAN- 2, 3 & 4 (PASSENGER LAVATORY & DIVYANGJAN LAVATORY)											
86	CUBICLE	EX.FAN-4	EX.FAN-4		CUBICLE		1.5	BLUE	14000	0	LOOSE SUPPLY
	CUBICLE	EX.FAN-4	EX.FAN-4		CUBICLE		1.5	Y	0	14000	
	CUBICLE	EX.FAN-4	EX.FAN-4		CUBICLE		1.5	BLK	14000	14000	

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AEL CIRCUIT

113	AEL-2	AEL-3	AEL-3	AEL-2	1.5	R	8000	9500	LOOSE SUPPLY
115	AEL-3	AEL-4	AEL-4	AEL-3	1.5	R	9500	11000	
116	AEL-3	AEL-4	AEL-4	AEL-3	1.5	BLK	9500	9000	

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रेल कोच फैक्टरी, कपूरथला
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Amendment No.-3 to Specification No. EDTS-410, Rev-Nil, Am-2, Corr-1

This Amendment is issued to specification for 'Harness of Under-Frame and Roof Arrangement' for LHB EOG Non AC LSLRD Coaches (31-Seater)' to spec. no. EDTS-410, Rev- 'Nil', AM-2, Corr-1 in order to modify clauses regarding testing of PVC Rigid Conduits & Packing Instructions in the specification.

1. Clause No. 4.9: Table for Tests:

Following test is hereby added:

Test for Harnesses at firm's premises:

S.No.	Tests	Type Test	Routine Test	Acceptance Test
15.	Test for Rigid PVC Conduits to IS:9537 (Part-3)	YES	YES	YES

2. Clause No. 4.10 (a) Details of Testing:

Following Acceptance Test for PVC Conduit to IS: 9537 (Part-3) is hereby added.

7.	Acceptance test for PVC conduit to IS:9537	
S.No.	Details of Testing	Remarks of Rites Inspecting official
a.	Checking of dimensions as clause 7 of IS.	
b.	Bending test (at room temperature) as per clause 9.2 of IS spec.	
c.	Compression test as per cl. 9.3 of IS spec (5 sample in prototype and 2 samples in acceptance /routine)	
d.	Collapse test as per cl. 9.5 of IS spec (One sample)	
e.	Resistance to burning as per cl. 11 of IS spec. (2 samples)	
f.	Electrical characteristics as per cl. 12 of IS spec.	

3. Clause No. 6.0: Packing and Traceability

Reference Clause No. 6.0 (i) for Packing Instructions stands deleted.

Amendment-3 to EDTS-410, Rev-Nil, Am-2, CORR-1	Nil	06.05.2024				1 of 1
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