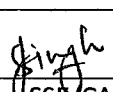




PA SYSTEM FOR LHB RAJDHANI RAKE**1.0 SCOPE**

- 1.1 The specification covers the design, development, Installation and Commissioning of Public Announcement/ Public Address and Music broadcasting system for all LHB type EOG Coaches. The system is low voltage complying to the basic requirements of UIC 568.
- 1.2 System complies of Main amplifier and speech unit with talk switch integrated in a CRCA box, as per SKED-481, Alt-'a' for installation in Hot Buffet coach. All PA equipments in the CRCA box shall be rigidly fixed in the box and prewired to fulfill the requirements of the scheme. The input power connections and interconnections of the PA equipments shall be done by means of cage clamp terminals of M/s Wago or equivalent approved make.
- 1.3 A distribution amplifier and speakers with the line matching transformers shall be provided in each coach including hot buffet coach and power car.
- 1.4 The system shall be compatible with 110 Volts system based magneto phone and intercom provided in the existing Rajdhani coaches even in case all signals are routed through single multi-core cable.
- 1.5 All the amplifiers shall be provided with signal conditioning and filter units and shall be EMI/RFI protected to eliminate cross talk and interference of Guard/Drivers communication with the PA system.
- 1.6 The firm shall be an OEM of PA systems proven for rolling stock applications or shall be an established organization dealing with the installation and commissioning of PA systems in Rolling Stock applications/ fixed commercial installations with sufficient expertise, know how, R&D back-up, system support and network to attend warranty obligations during service with complete infrastructure and in-house testing facility. The PA system offered shall be of reputed make and the prototype shall be got approved from CEDE/RCF prior to bulk supplies.
- 1.7 The equipments in the PA system are prone to theft, therefore anti theft arrangements shall be incorporated in the design exclusively.

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2.0 SERVICE CONDITIONS

Environmental conditions

Ambient temperature : 5 deg. C to 55 deg. C
 Max. Relative humidity : Up to 98 % during Rainy season
 Altitude : Maximum 1000 meters

Working conditions:

Train speed (Max.) : 160 Kmph

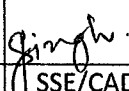


Vibration and shocks:

- i) Maximum vertical acceleration : 3.0 g
- ii) Maximum lateral acceleration : 3.0 g
- iii) Maximum longitudinal acceleration : 3.0 g

Sinusoidal form of vibration, the frequency 'f' lies between 1 Hz and 100 Hz and their amplitude 'a' expressed in mm is given as function of 'f' by the equation :-

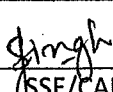

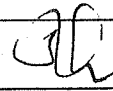
$a = 25/f$ values of 'f' between 1 Hz and 10 Hz.

$a = 250/f$ for values of 'f' between 10 Hz and 100 Hz

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3.0 SCOPE OF SUPPLY:

S No	Description	Type-I Hot Buffet Chair car-I	Type-II Power Car	Type-III AC-2T AC-3T	Type-IV FAC	Type-V Chair Cars-II	Type-VI EOG Non-AC	Type-VII Double decker Power Car	Type-VIII Double decker Chair Car
1	Main Amplifier	1	-	-	-	-	-	1	-
2	Speech Unit	1	-	-	-	-	-	1	-
3	Distribution Amplifier	1	1	1	1	1	1	-	1
4	Speakers with Mounting bracket (LMT & Speaker)	5	2	11	10	9	6	-	13
5	GVC	-	-	-	10	-	-	-	-
6	19-pin coupler to drawing no. CC75251 alt 'a' compatible to existing coach	-	2	-	-	-	-	-	-
7	14 pin coupler- Allied to cat no. MG0222-19S	-	1	-	-	-	-	-	-
8	Cable for speaker and amplifier connection of adequate length	Lot	Lot	Lot	Lot	Lot	Lot	-	Lot
9	Front cover openable CRCA fabricated sheet box with pad lock to accommodate main amplifier, speech unit, output and input terminals with 'ON-OFF' switches as per SKED-481 Alt-'a'	1	-	-	-	-	-	1	-

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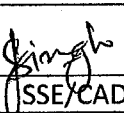
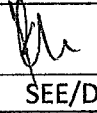
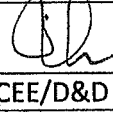
4.0 Amplifiers

PA system comprise of one main amplifier and speech unit located in the hot buffet coach and distribution amplifiers in each coach which drives 9 nos of speakers. These amplifiers shall generally meet the requirements of the UIC 568. The system should have the possibility of cutting the loudspeaker in the immediate vicinity of the PA system when the PA system is being used when conveying announcements over musical broadcasts. The coach distribution amplifier amplifies the low frequency voltage (line level 1.8 V +/- 0.2 volts) coming from microphone pre-amplifier or from train circuit and converts it to 100 volts system and to drive the speakers. Technical details of the main amplifier and the distribution amplifier are as under:

- 4.1 Enclosure of the amplifiers should be with isolated ground i.e. neither(+ve) nor (-ve) supply should be available on the chassis/cabinet as the cabinet is liable to be subjected to high voltages than normal supply voltage and shall be with 19" rack compatible design.

4.2 Technical Details for the Main Amplifier (M.A.)

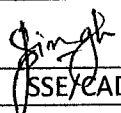

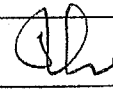
Sr. No.	Description	Technical Parameter
1	Supply Voltage Range	24 Volts DC
2	Rated Voltage	24 Volts DC
3	No Load Current	300 mA
4	Current at Full load	6 Amps
5	Input	Transformer balanced
6	Input Voltage	1.8 +/- 0.2 Volts (signal)
7	Input Impedance	10 K ohms balanced
8	Output	Transformer balanced
9	Output Voltage	100 +/- 5 Volts
10	Output Impedance	500 ohms
11	Power Output	40 W rms at 5% THD 36 W rms at 2% THD
12	Frequency Response	50 Hz – 15 KHz +/- 3 dB
13	Output Regulation	1 dB from No load to full load
14	Signal/Noise ratio	65 dB
15	Tone Control Bass(100 Hz) Treble (10 KHz)	+/- 10dB +/-10 dB
16	Protection	Over-voltage and over load

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		Fuse 3.5 amps DC
17	Output Monitor	Clip LED bar graph
18	Dimensions	19" rack mounting
19	Connectors	a) Signal Input Terminals: 1 nos. 6.35 mm socket per channel i.e. for:- i) Cassette cum CD player unit ii) Speech Unit b) Signal Output terminals: 2 sets of Male female connector of M/s Wago (for 2 circuits) Cat. No. 231-603/019-000 (male) Cat. No. 231-103/037-000 (female) c) Power Input terminals: 4 conductor terminal strip to cat no. 261-203 of M/s Wago-1 nos.
20	Make/Type	M/s Ahuja/Bosch or any other equivalent reputed make proven for rolling stock applications.

4.3 Technical Details for Distribution Amplifier

Sr. No.	Description	Technical Parameter
1	Supply Voltage Range	19-33 Volts DC
2	Rated Voltage	24 Volts DC
3	No Load Current	300 mA max.
4	Current at Full load	3.2 Amps
5	Input	Transformer balanced
6	Input Voltage	1.8 +/- 0.2 Volts (signal)
7	Input Impedance	10 K ohms balanced
8	Output	Transformer balanced
9	Output Voltage	100 +/- 5 Volts
10	Output Impedance	500 ohms
11	Power Output	20 W rms at 1% THD 18 W rms at 0.5% THD
12	Frequency Response	50 Hz – 15 KHz +/- 3 dB
13	Output Regulation	1 dB from No load to full load
14	Signal/Noise ratio	80 dB
15	Tone Control Bass(100 Hz) Treble (10 KHz)	+/- 10dB +/-10 dB

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16	Protection	Over-voltage and over load Fuse 3.5 amps DC
17	Output Monitor	Clip LED bar graph
18	Dimensions	19" rack mounting
19	Make/Type	M/s Ahuja/Bosch or any other equivalent reputed make proven for rolling stock applications.

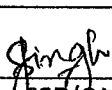

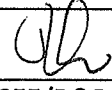
4.4 Technical Data for Speech Unit

Speech unit comprises of microphone of electrodynamic type assembled in telephone handsets with hold-down push button and "Press to Talk" feature and amplifier.

Sr. No.	Description	Technical Parameter
1	Supply Voltage Range	24 Volts DC
2	Current Consumption	45 mA
3	Input	Transformer balanced
4	Rated Level	-41 dBu (7mV)
5	Input Impedance	1.5 K ohms
6	Output	Transformer balanced
7	Rated level	+7 dBu +/- 1 dB (1.8 V +/- 0.2 V)
8	Impedance	20 ohms
9	Make/Type	M/s Ahuja/Bosch or any other equivalent reputed make proven for rolling stock applications.

4.5 Technical Data for the Speakers:

Sr. No.	Description	Technical Parameter
1	Size	Oval 6"x4"
2	Impedance	8 ohms
3	Voice Coil DC resistance	6.2 ohms +/- 30%
4	Power handling capacity	6 W rms continuous
5	Frequency Response	150 Hz to 10 KHz
6	Sensitivity	85 dB at 1 KHz/ at 1 meter
7	Make/Type	M/s Ahuja/Bosch or any other equivalent reputed make proven for rolling stock applications.

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4.6 Technical data for the Line Matching Transformers:

Sr. No.	Description	Technical Parameter
1	Primary	100 volts
2	Secondary	8 ohms
3	Wattage Taps	1-2.5-5 watts
4	Frequency Response	50 Hz to 15 KHz – 3dB
5	Make/Type	M/s Ahuja/Bosch or any other equivalent reputed make proven for rolling stock applications.

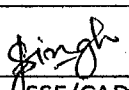

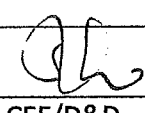
4.7 Technical data for the Graduated Volume Control GVC

Graduated Volume Control will be provided in LHB FAC Coach for controlling the volume of the individual speakers operating on 100 volts line with LMT. Overall size of the enclosure shall not exceed by 60x100x100 mm excluding knob. Any size lesser than this shall be acceptable, subject to prior approval. Volume level setting along with graduated display plate shall be provided. Connection diagram shall be displayed on each unit at suitable location.

Sr. No.	Description	Technical Parameter
1	Type	Box type with wire wound linear type/stepped type
2	Dimensions	Completely housed fire retardant enclosure compatible to LHB Rajdhani Rake. Prototype to be got approved by CEDE/RCF.
3	Maximum Power	6 watts
4	Connections	Cage clamp Wago Type

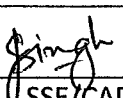

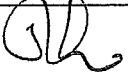
4.8 Cables:

2x1.5 mm² electron beam irradiated cable 600/1000 V multi-core to specification no. EDTS-132, (Latest), shall be used for wiring of the speakers in the coach. The cables shall be in the scope of RCF.

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5.0 Tests

S. No.	Tests	Type Test	Routine Test	Acceptance Test
1	Visual Inspection, including inspection of wiring and electrical operational test	YES	YES	YES
2	Test for Amplifiers: <ul style="list-style-type: none"> • Max. power consumption (VA) • Rated output mains (RMS) • Max. Output mains(RMS) • Frequency Response (Hz) • Signal to Noise Ratio (dB) • Total Harmonic distortion • Output Regulation (from No-load to full load) 	YES	YES	NO
3	Test for Speakers <ul style="list-style-type: none"> • Power handling capacity • Rated input voltage • Effective frequency range • Rated impedance • Internal Taps • Sensitivity 	YES	YES	YES
4	Tests for Cassette Player <ul style="list-style-type: none"> • Power output – RMS (W) • Total Harmonic distortion • Frequency Response 	YES	YES	NO
5	Test for verification of clearance and creepage distance and IR value	YES	YES	NO
6	Verification for effectiveness of protective circuits	YES	YES	YES
7	Complete system testing for proper operation and functioning of the PA system	YES	YES	YES

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6.0 General Special Conditions

- 6.1 The tenderer shall offer clause wise comments on the specification either conforming the acceptance of the clause or indicate deviation there from specifically. Full particulars of the deviations including the technical details, its implications, cost repercussions etc shall be furnished.
- 6.2 Normally no post deviations shall be accepted. Deviation if any may be advised at the tender stage only.
- 6.3 The warranty card duly filled should be supplied along with each set along with the addresses for authorized service centres.
- 6.4 The supplier shall provide the purchaser with conformance to the technical requirements defined in both this generic specification and the relevant individual specification by means of certificates giving the results of the tests performed.
- 6.5 Operational and Maintenance manual for each item along with wiring diagram should be supplied with each set of amplifier.

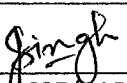

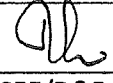
7.0 Approvals

The firm shall submit the following for approval before commencing bulk quantity:

- Detailed circuit diagram of all the components and a write up of the system functioning and circuit description shall be submitted along with the supply.
- Complete in-house test results and from reputed Govt. Lab for the system.
- Detailed instruction/maintenance/ trouble shooting manual.
- The tenderer may seek technical clarifications, if any, in writing 30 days before opening the tenders.

8.0 Commissioning and Testing

The supplier will commission all the system components and accessories for the PA system including cabling and connections and shall test complete system functioning. Firm shall be given material handling equipment and support by RCF.

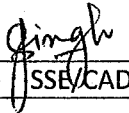

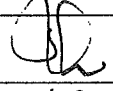
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Scope of the commissioning shall be as under:

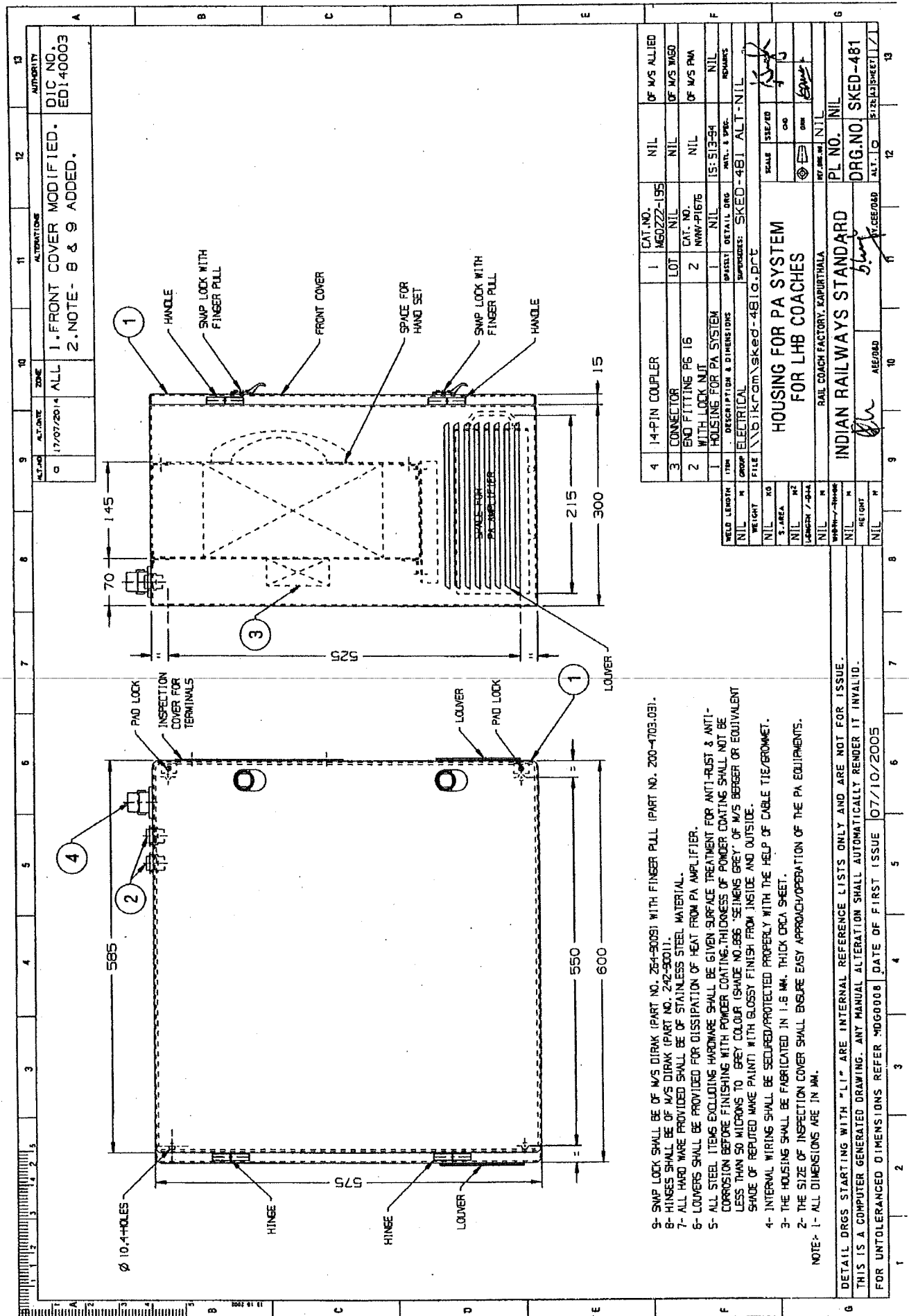
- a. Installation of CRCA box, Main amplifier and speech unit in the Hot Buffet coach.
- b. Installation of Distribution amplifier, speakers and GVC (in FAC Coaches) with interconnecting cables in the coaches. Installation of 19-pin and 14 pin coupler on power car and interconnections.
- c. Installation of UIC couplers with UIC cables in the vestibule. Interconnecting cables with couplers shall be supplied by RCF.
- d. Testing of each coach with the installed system and final testing to prove out the scheme on complete rake formation at RCF.

9.0 Enclosures

1. SKED-481, Alt – 'a'
2. CC75251 Alt - 'a'

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- 9- SNAP LOCK SHALL BE OF M/S DIRAK (PART NO. 264-9009) WITH FINGER PULL (PART NO. 200-4703.03).
- 8- HINGES SHALL BE OF M/S DIRAK (PART NO. 242-9001).
- 7- ALL HARD WARE PROVIDED SHALL BE OF STAINLESS STEEL MATERIAL.
- 6- LOUVERS SHALL BE PROVIDED FOR DISSIPATION OF HEAT FROM PA AMPLIFIER.
- 5- ALL STEEL ITEMS EXCLUDING HARDWARE SHALL BE GIVEN SURFACE TREATMENT FOR ANTI-RUST & ANTI-CORROSION BEFORE FINISHING WITH POWDER COATING. THICKNESS OF POWDER COATING SHALL NOT BE LESS THAN 50 MICRONS TO GREY COLOUR (SHADE NO.886 'SEIMENS GREY' OF M/S BERGER OR EQUIVALENT SHADE OF REPUTED MAKE PAINT) WITH GLOSSY FINISH FROM INSIDE AND OUTSIDE.
- 4- INTERNAL WIRING SHALL BE SECURED/PROTECTED PROPERLY WITH THE HELP OF CABLE TIE/BROWNET.
- 3- THE HOUSING SHALL BE FABRICATED IN 1.6 MM. THICK ORCA SHEET.
- 2- THE SIZE OF INSPECTION COVER SHALL ENSURE EASY APPROACH/OPERATION OF THE PA EQUIPMENTS.
- NOTE- 1- ALL DIMENSIONS ARE IN MM.

DETAIL DRGS STARTING WITH "L1" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE.
THIS IS A COMPUTER GENERATED DRAWING. ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER IT INVALID.
FOR UNTOLERANCED DIMENSIONS REFER MDG0008 DATE OF FIRST ISSUE 07/10/2005

ITEM	GROUP	DESCRIPTION & DIMENSIONS	DETAILS	REMARKS
1	14-PIN COUPLER	1	CAT. NO. 460222-195	NIL
2	CONNECTOR	LOT	NIL	NIL
3	END FITTING P6 16	2	CAT. NO. 460222-195	NIL
4	WITH LOCK NUT	1	NIL	NIL
5	HOUSING FOR PA SYSTEM	1	IS: 513-94	NIL
6	ELECTRICAL	1	IS: 513-94	NIL
7	FILE	1	IS: 513-94	NIL
8	SCALE	1	IS: 513-94	NIL
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74	SCALE	1	IS: 513-94	NIL
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77	SCALE	1	IS: 513-94	NIL
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79	SCALE	1	IS: 513-94	NIL
80	SCALE	1	IS: 513-94	NIL
81	SCALE	1	IS: 513-94	NIL
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100	SCALE	1	IS: 513-94	NIL

HOUSING FOR PA SYSTEM
FOR LHB COACHES

INDIAN RAILWAYS STANDARD

PL NO. NIL

DRG. NO. SKED-481

RAIL COACH FACTORY, KAPURTHALA

DATE OF FIRST ISSUE 07/10/2005

SCALE 1:1

1/1

Technical drawing of a mechanical part showing a top view and a side view. The top view is a circle with a central crosshair and a small rectangular feature at the bottom. The side view is a rectangle with a central crosshair and a small rectangular feature at the bottom. Dimensions are given in millimeters: 740.2, 5.7550.1, 9.550.2, 22.54.2, 2.56, 430.2, and 5mm CUT. A circled 'D' is at the top left.

Technical drawing of a cable assembly. The drawing shows a cross-section of a cable with a central core of 13.5 strands (13.5 str.) and an outer jacket. The total diameter is 1.00 ± 0.02. The central core has a diameter of 0.80 ± 0.02. The outer jacket has a thickness of 0.10 ± 0.02. The drawing also shows a detail of the jacket material, which is labeled "ELECTRO TINNED COPPER WIRE MESH". The detail shows a mesh structure with a diameter of 0.02 ± 0.01 and a thickness of 0.02 ± 0.01. The drawing includes various dimension lines and tolerances.

DETAIL OF ITEM -13

4. RUBBER PROTECTOR SYN. RUBBER (HEAT RESISTANCE) ASTM-D735, 6/7A 512 TENSILE STRENGTH 1200 PS. ULTIMATE ELONGATION 45% MIN.
3. SLEEVE FOR EXTERNAL COUPLER (FEMALE) SILVER PLATED ELECTROLYTE COPPER ANNEALED.
2. BRASS PIN COMPLETE WITH ELECTROLYTE COPPER SLEEVES BOTH SILVER PLATED SUITABLE FOR CRIMPING 3 Sq. mm CABLE (145 STRANDS OF 0.3 mm EACH)
1. ALL DIMENSIONS IN MM.

	0	8	30	120	400	1000
NOMINAL						
TITZ						
MACHINED	+0.2	-0.5	+0.6	+1.2	a2	
FABRICATED	a1	a1	a1.5	a2	a3	

19-PIN
EXTERNAL COUPLER
(FEMALE)

1	CABLE PROTECTOR	20	NIDZPINE	
1	RUBBER GASKET	19	NIDZPINE	
1	RUBBER PROTECTOR	18	SYN. RUBBER	S
1	SP. RING	17	SP. STEEL	DUAL-PLAT
1	SEALER BAND	16	CAST ALUMINUM	
2	SOLDER	15	10-42289-81	DUAL-PLAT
2	SOLDER, SOLDER WAXES	15		PLAT
1	CABLE CLAY	14		PLAT
13	ROCKET ASSEMBLY	13		*
19	ROCKET	12	MS	COLL PLAT
1	FIXED PLATE	12		
1	INSULATING DISC TYPE-4	11	DAC - BS-5794	
1	INSULATING DISC TYPE-3	10	DAC - BS-5794	
2	FIBRE GASKET	9		
8	SLAVE	8		*
19	PIN	7	PHAS	NICKEL-PLAT.
1	INSULATING DISC TYPE-2	6	DAC - BS-5794	
1	INSULATING DISC TYPE-1	5	DAC - BS-5794	
8	SPRING WASHER 1/4"	4	STEEL	NICKEL-PLAT.
8	SCREWED IN SCREW	3	15-3003-72	DUAL-PLAT
2	SCREW	2	MS	DUAL-PLAT
1	FIXED COUPLER BODY	1	CAST ALUMINUM	DUAL-PLAT
1	MOTABLE COUPLER BODY	1	CAST ALUMINUM	DUAL-PLAT
1	WATERPROOFING & DIMENSIONAL	1	WAT. & SPEC.	REMARKS

19-PIN
 EXTERNAL COUPLER
 (FEMALE)

APPROVED BY: _____
 SUPERVISOR
 DATE: _____
 ALT. ORN. _____
 ALL CHG. FACTORY
 INP. FACTORY

C675251
 SHEET 1 OF 2

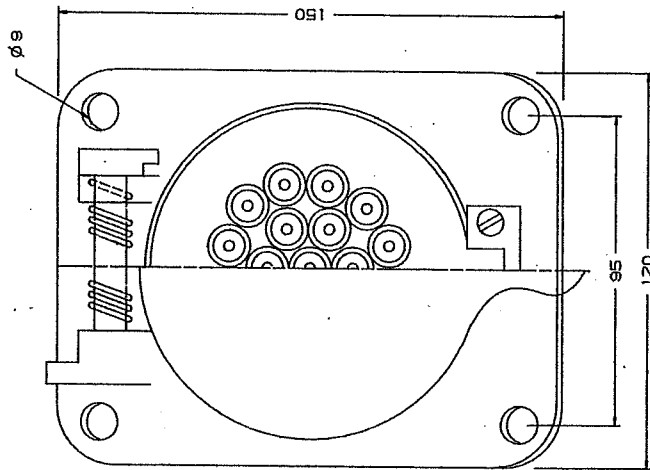
19-PIN
 EXTERNAL COUPLER
 (FEMALE)

APPROVED BY: _____
 SUPERVISOR
 DATE: _____
 ALT. ORN. _____
 ALL CHG. FACTORY
 INP. FACTORY

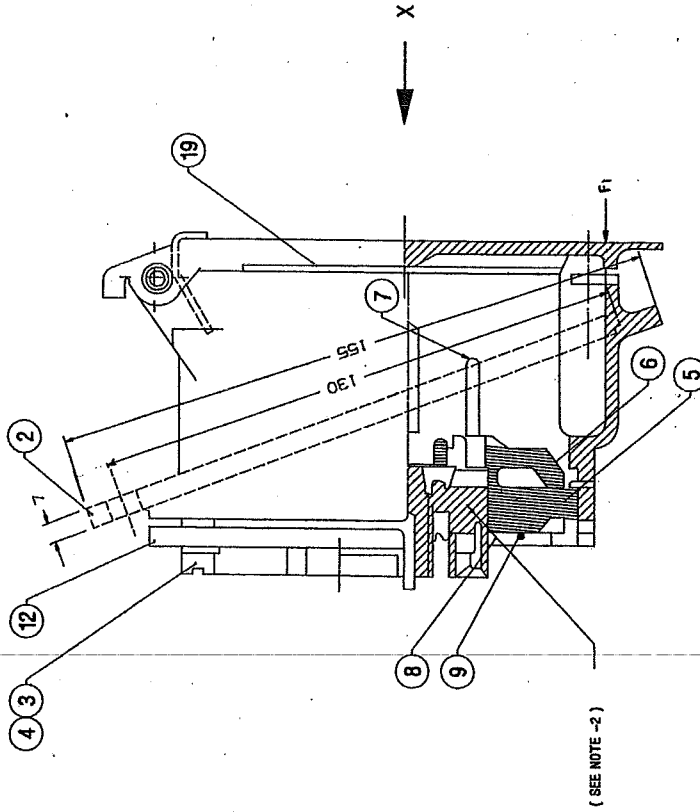
C675251
 SHEET 1 OF 2

CC75251

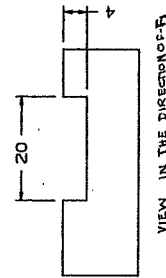
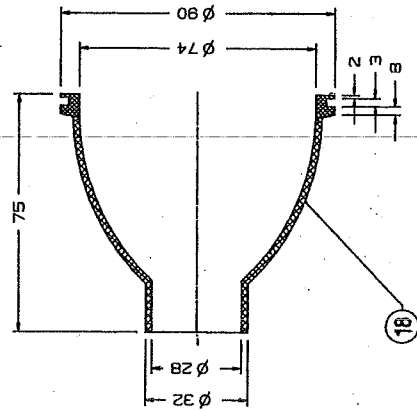
ALTERATIONS



VIEW IN THE DIRECTION OF - X



(SEE NOTE -2)



VIEW IN THE DIRECTION OF - F

QTY	DESCRIPTIONS & DIMENSIONS	ITEM	REF.	DWG.	MAT.	& SPECN.	REMARKS
	19 - PIN EXTERNAL COUPLER (MALE)						
	SUPERSEDED BY:						
	SCALE: 1:1						
	DMD						
	DRN						
	ALT						
	RAIL COACH FACTORY KAPURTHALA						
	CC75251						
	SHEET -2 OF 2-SHEETS						

DATE	13.08.23
SEE/D	13.08.23
PER ASSY.	13.08.23
ASSY. DRGS.	13.08.23

NOTE




Corrigendum-1

This corrigendum is issued to specification for P.A system for LHB Rajdhani/Shatabdi Rake for corrections in technical data and introduce eligibility criteria.

The following clauses are amended as under :




3.0 SCOPE OF SUPPLY: Modified as follows:

S No	Description	Type-I Hot Buffet Chair car-I DD power car	Type-II Power Car	Type-III AC-2T AC-3T	Type-IV FAC	Type-V Chair Cars-II	Type-VI EOG Non-AC	Type- VII Double decker CC
1	Main Amplifier	1	-	-	-	-	-	-
2	Speech Unit	1	-	-	-	-	-	-
3	Distribution Amplifier	-	1	1	1	1	1	1
4	Speakers with Mounting bracket (LMT & Speaker)	5	2	11	10	9	6	13
5	GVC	-	-	-	10	-	-	-
6	19-pin coupler to drawing no. CC75251 alt 'a' compatible to existing coach	-	2	-	-	-	-	-
7	14 pin coupler- Allied to cat no. MG0222-19S	-	1	-	-	-	-	-
8	Cable for speaker and amplifier connection of adequate length	Deleted						
9	Front cover openable CRCA fabricated sheet box with pad lock to accommodate main amplifier, speech unit, output and input terminals with 'ON-OFF' switches as per SKED-481 Alt-'a'	1	-	-	-	-	-	-
10	Microphone for mobile use with flexible coil cord and close to lip speaking to avoid background noise. 200-6Khz, sensitivity 2.3mV/Pa, Impedence 500 Ω	1	-	-	-	-	-	-

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4.2 Technical Details for the Main Amplifier (M.A.)

S. No.	Description	Technical Parameter
1	Supply Voltage Range	90-135 Volts DC
2	Rated Voltage	110 Volts DC
3	No Load Current	< 350 mA
4	Current at Full load	< 2.0 Amps
5	Input	Electronic/Transformer balanced
6	Input Voltage	1.8 +/- 0.2 Volts (signal)
7	Input Impedance	10 K ohms balanced
8	Output	Transformer balanced
9	Output Voltage	100 +/- 5 Volts
10	Output Impedance	125 ohms
11	Power Output	80 W rms at 1% THD
12	Frequency Response	50 Hz – 15 KHz +/- 3 dB
13	Output Regulation	1 dB from No load to full load
14	Signal/Noise ratio	80 dB
15	Tone Control Bass(100 Hz) Treble (10 KHz)	+/- 10dB +/-10 dB
16	Protection	<ul style="list-style-type: none"> › Over-voltage and over load Fuse 4 amps DC › Inbuilt electro mechanical resettable circuit breaker on the output side for protection against accidental short circuit of output wires
17	Output Monitor	Clip LED bar graph
18	Dimensions	19" rack mounting
19	Connectors	<ul style="list-style-type: none"> › Built in mp3 player for USB , SD/MMC card reader › Built in balanced MIC input with priority over all other inputs › 2 nos. 12 pin connector for input and output with built in parallel line level inputs with input no.1 having priority over input no.2 › For 110V DC input male female cage clamp type connectors (M/s wago/phoenix/weidmuller)
20	Make/Type	M/s Ahuja/Bosch or any other equivalent reputed make proven for rolling stock applications.

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

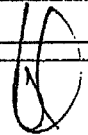
4.3 Technical Details for Distribution Amplifier:

S. No.	Description	Technical Parameter
1	Supply Voltage Range	90-135 Volts DC
2	Rated Voltage	110 Volts DC
3	No Load Current	< 350 mA
4	Current at Full load	< 2.0 Amps
5	Input	Electronic/transformer balanced
6	Input Voltage	1.8 +/- 0.2 Volts (signal)
7	Input Impedance	10 K ohms balanced
8	Output	Transformer balanced
9	Output Voltage	100 +/- 5 Volts
10	Output Impedance	125 ohms
11	Power Output	80 W rms at 1% THD
12	Frequency Response	50 Hz – 15 KHz +/- 3 dB
13	Output Regulation	1 dB from No load to full load
14	Signal/Noise ratio	80 dB
15	Tone Control Bass(100 Hz) Treble (10 KHz)	+/- 10dB +/-10 dB
16	Protection	<ul style="list-style-type: none"> › Over-voltage and over load Fuse 4 amps DC › Inbuilt electro mechanical resettable circuit breaker on the output side for protection against accidental short circuit of output wires
17	Output Monitor	Clip LED bar graph
18	Dimensions	19" rack mounting
19	Connectors	2 nos. 12 pin connector for input and output with built in parallel line level inputs with input no.1 having priority over input no.2 For 110V DC input male female cage clamp type connectors(M/s wago/phoenix/weidmuller)
20	Make/Type	M/s Ahuja/Bosch or any other equivalent reputed make proven for rolling stock applications.

4.4 The supply voltage of speech Unit shall be 110V DC instead of 24V DC.

4.5 Technical Data for the Speakers alongwith LMT and mounting bracket:

Sr. No.	Description	Technical Parameter
1	Size	Oval 6"x4" or 3"x5" full range speakers
2	Impedance	1.6K/3.3K/6.6K ohms

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3	Power handling capacity Wattage	6 W rms continuous 6/3/1.5 W
4	Frequency Response	125 Hz to 15 KHz
5	Sensitivity	88 dB at 1 KHz/ at 1 meter
6	Make/Type	M/s Ahuja/Bosch or any other equiv. reputed make proven for rolling stock applications.

4.6 Technical data for the Line Matching Transformers: deleted



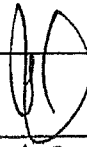
5.0 Tests : Test for cassette player at S.No 4 deleted and the following tests added:

S. No.	Tests	Type Test	Routine Test	Acceptance Test
8	EMI/EMC protection IEC 61000	YES	-	-
9	Testing of electronic equipments used in Rolling Stock EN 50155/IEC 60571	YES	-	-

The following clauses added:

6.7 Eligibility Criteria (for new vendors):

- 6.7.1 The tenderer must submit detailed clause wise comments to the specification. In absence of above, offers shall be deemed as incomplete and may not be considered.
- 6.7.2 The complete system shall be suitable for use in rolling stock applications and EN 50155/IEC 60571 compliant.
- 6.7.3 The offer of the firm shall be supported by documents clearly bringing out that the firm has successfully installed and commissioned P.A equipment with similar system in minimum two rakes over Indian Railway / Metro / International Railway to ensure interchangeability of the systems and equipment in existing stock over IR.
- 6.7.4 The tenderer should possess essential sufficient expertise know how, R&D back-up, system support and network to attend warranty obligations with respect to repair and maintenance of the system at its premises during service with complete infrastructure and in-house testing facility. Purchaser may carry out physical verification of the same, if required.
- 6.7.5 Supporting documents/certificates from the organizations for which they worked/are working should be submitted for satisfactory performance of the installed systems for min. 2 year period in rolling stock application.



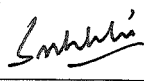
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Corr.-2

This corrigendum is issued to specification no. EDTS-173, Rev-'b',Corr-1 to modified the clause PA System for LHB Rajdhani rake.

The following clause may be read as:

S.No.	Cl. No. Of Spec.	Existing Clause	Revised Clause
1	1.2	System complies of Main amplifier and speech unit with talk switch integrated in a CRCA box , as per SKED-481, Alt-'a' for installation in Hot-buffet coach. All PA equipment in the CRCA box shall be rigidly fixed in the box and prewired to fulfil the requirements of the scheme. The input power connections and interconnections of the PA equipments shall be done by means of cage clamp terminals of M/s Wago or equivalent approved make.	System complies of Main amplifier and speech unit with talk switch integrated in a stainless steel box , as per SKED-481, Alt-'b' for installation in Hot-buffet coach. All PA equipment in the stainless steel box shall be rigidly fixed in the box and prewired to fulfil the requirements of the scheme. The input power connections and interconnections of the PA equipments shall be done by means of cage clamp terminals of M/s Wago or equivalent approved make.
2	3.0 Scope of supply (s.no.-9)	Front cover opennable CRCA fabricated sheet box with pad lock to accommodate main amplifier, speech unit, output and input terminals with 'ON-OFF' switches as per SKED-481,Alt-'a'	Front cover opennable stainless steel fabricated box with pad lock to accommodate main amplifier, speech unit, output and input terminals with 'ON-OFF' switches as per SKED-481,Alt-'b'
3	8.0 Commissioning and Testing	Scope of the commissioning shall be as under: a. Installation of CRCA box, Main Amplifier and speech unit in the Hot-buffet coach. b. Installation of Distribution...on power car and interconnections c. Installation of UIC couplers shall be supplied by RCF. d. Testing of each coach with the Installed..... formation at RCF.	May be read as: a. Installation of stainless steel box, Main Amplifier and speech unit in the Hot-buffet coach. b. Remain same c. Remain same d. Remain same
4	9.0 Enclosures	1. SKED-481,Alt-'a' 2. CC75251,Alt-'a'	1. SKED-481,Alt-'b' 2. CC75251,Alt-'a'
5	New Added	-	Annexure-1

EDTS 173, Rev-'b',Corr-1	2	24/06/2020				1 of 3
Spec.no.	Corr.	DATE	SSE/CAD	SEE/D	DY.CEE/D&D	SHEET

ANNEXURE-1

This Annexure is issued to specification no. EDTS-173, Rev-'b', Corr-2 in order to incorporate IRIS conditions in the specifications. The Following clauses are added:-

A. First Article/Prototype Inspection:-

1. First Article inspection (FAI) will be done in case of first time manufacture and approved by CEDE/RCF before bulk supplies.
2. External Provider shall carryout FAI at their premises as per ISO/TS 22163:2017 requirements and submits the report along with the documents to RCF, Kapurthala prior to FAI by the purchaser. The following documents shall be submitted:-
 - i) FAI report
 - ii) QAP (Quality Assurance Plan)
 - iii) Details of special processes and their compliance.
3. Special Processes are as under:-
 - i) Welding
 - ii) Soldering
4. On completion of First Article Inspection in-house by the firm and submission of documents to RCF, the representative of the purchaser shall be nominated to carry out FAI along with the validation of the above two special processes at firm's premises.
5. Validation of outsourced special processes shall also be carried out as per requirement of the ISO/TS 22163:2017.
6. Audit inspection shall be done during regular production in the firm for certify quality of PA System for LHB Rajdhani rake.
7. Firm has to fulfil all the requirements as mentioned in the IRIS standard ISO/TS 22163:2017.

B. RAMS (Reliability, Availability, Maintainability and Safety):-**1. Reliability targets:-**



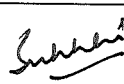
The achieved level of reliability shall ensure MDBF of 2,00,000 kms or more after initial reliability growth period of one years. The following fleet average levels of MDBF shall be achieved after the mentioned period of time:

- MDBF > 80,000 kms after 06 months.
- MDBF > 2,00,000 kms after 12 months.

For this purpose, any equipment shall be counted as available for calculations only after a stabilization period of 6 months after putting the train into revenue service.

2. Availability Requirements:-

The availability of the coach calculated on quarterly basis and considering unscheduled repairs for the equipment should not be less than 96%.


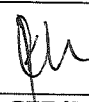
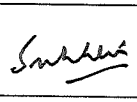
EDTS 173, Rev-'b', Corr-1	2	24/06/2020				2 of 3
Spec.no.	Corr.	DATE	SSE/CAD	SEE/D	DY.CEE/D&D	SHEET

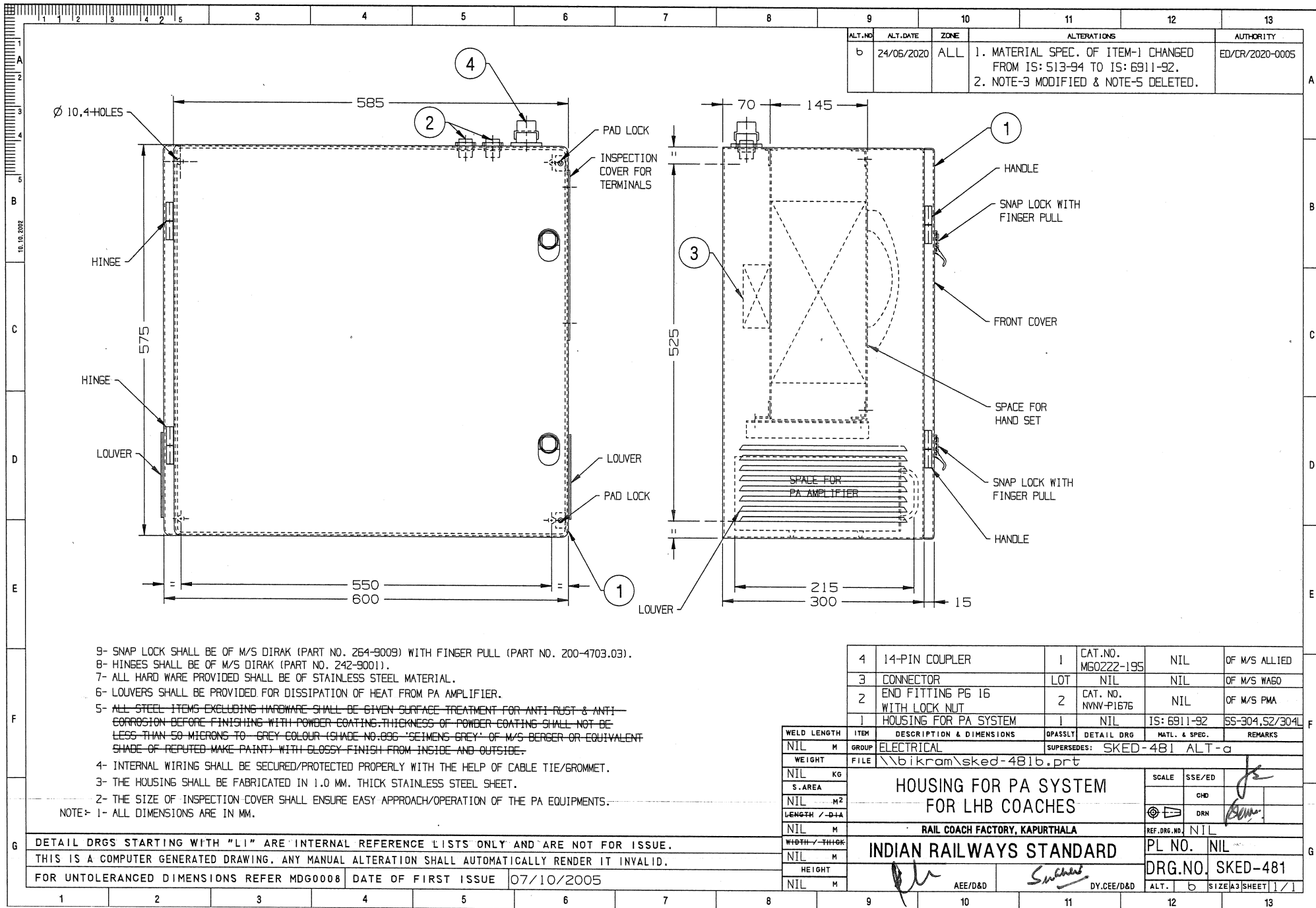
3. Maintainability:

The maintenance program prepared by EPPPS shall have the following objectives:-

- a) Enhancement of Rolling stock availability
- b) Minimisation of maintenance costs
- c) Minimisation of coach downtime/MTTR (meantime to restore serviceability)

EPPPS shall submit the basic maintenance schedules for the equipment. The minimum interval between overhauls at workshop be as per the maintenance manual/Schedule for LHB coaches issued by CAMTECH.

EDTS 173, Rev-'b',Corr-1	2	24/06/2020				3 of 3
Spec.no.	Corr.	DATE	SSE/CAD	SEE/D	DY.CEE/D&D	SHEET



Corrigendum 3 to EDTS 173, Rev-b, Corr-1,2 with Annexure-1

This corrigendum is issued to EDTS 173, Rev-b, Corr-1,2 with Annexure-1 to modify the clause 6.7 added vide corr-1 i.e. Eligibility Criteria (for new vendors)

Clause 6.7.1 :- Deleted

Clause 6.7.2:-The complete system shall be suitable for use in rolling stock applications and EN50155/IEC60571 compliant.

Clause 6.7.3 :- Deleted

Clause 6.7.4 :- Deleted

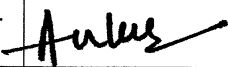
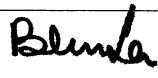
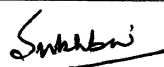
Clause 6.7.5 :- Deleted

EDTS173 Rev. B	3	27.08.2022	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	1 of 1
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Corrigendum -4 to EDTS 173, Rev B, Corr. 1,2,3 with Annexure-1

This corrigendum is issued to EDTS 173, Rev B, Corr. 1,2,3 with Annexure-1 to modify the clause 6.7 added vide corr.1 i.e. Eligibility Criteria (for new vendors)

Clause 6.7.2: Deleted

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