

Specification No. : ICF/ELEC/934
No. of Pages : 13+3+5+1+2+2

SPECIFICATION FOR
LED BASED NIGHT LIGHT CUM
BERTH MINDICATION LIGHT

Issued By
Integral Coach Factory, Chennai - 38

CORRECTION SLIP NO.	-	01	02	03	04	05
REVISION No:	01	01	01	01	01	01
PREPARED BY	SVS SSE/D	SVS SSE/D	SVS SSE/D	SM SSE/D	GC SSE/D	GC SSE/D
APPROVED BY	NKV DYCEED	NKV DYCEED	NKV DYCEED	LNP CDE/E	JM DYCEED	JM DYCEED
DATE :	30.11.11	24.03.12	13.10.12	26.11.12	27.05.14	09.07.15

13	INTEGRAL COACH FACTORY, CHENNAI - 38	Page 1 of 13
	Specification for LED Based Night Light cum Berth Indication Light.	ICF / ELEC / 934 REV. NO: 01 DATE - 30.11.11

1 FOREWORD - The LED based Night light cum Berth indication light provided inside the coaches shall be suitable for 110 Volts DC/110 Volts AC supply. The supply system is backed up by battery system 110V DC for self-generation type coaches and 110 volts AC supply from Power Car for End-On-Generation coaches.

2 SCOPE-

2.1 The specification covers general guidelines for design, manufacture, supply, testing and commissioning of LED based Night light cum Berth indication light which gives 'BLUE' colour light output to be used in Coach to provide illumination as mentioned vide clause- 4.

2.2 Supplier will be solely responsible for testing & performance of this fitting after installation in the coach.

3 SERVICE CONDITION - The Light fitting shall be rugged in construction and shall meet following service conditions normally shall be met in service:

- i) Ambient : -5°C to +55°C
- ii) Train Speed : 160 Kmph
- iii) Humidity : Up to 98% during rainy season
- iv) Altitude : Maximum 1200 metres above sea level
- v) Atmosphere : Extremely dusty and desert terrain certain areas. The dust concentration in air may reach at high value of 1.6 mg./cubic meter.
- vi) Rainfall : Very heavy in certain areas.
- vii) Coastal area: The Equipment shall be designed to work in humid salt laden and corrosive atmosphere. The maximum values of the condition shall be as under:
Maximum Ph value : 8.5
Sulphate : 7 mg/litre
Max concentration : 6 mg/litre of chlorine
Max conductivity : 130 micro siemens/cm
- viii) Vibration : The equipment shall withstand the vibration and shocks encountered in service as specified below:
 - a) Maximum vertical acceleration - 3.0 g
 - b) Maximum longitudinal acceleration - 3.0 g
 - c) Maximum transverse acceleration - 3.0 g

The vibrations are of sinusoidal form of vibrations, the frequency 'f' lies between 1 Hz. and 100 Hz and their amplitude 'a' expressed in 'mm' is given as a function of 'f' by equation:

$$a = 25/f \quad \text{for values of 'f' between 1 Hz and 10 Hz}$$

$$a = 250/f^2 \quad \text{for values of 'f' between 10 Hz and 50 Hz}$$

for reference IEC 60571 (latest) shall be followed.

4 TECHNICAL REQUIREMENTS -

4.1 The light fitting shall comply with the following technical requirements.

Type of coach	Input voltage range	Nominal input voltage	Power consumption per luminaire
Self-Generation	90 to 140 volts dc	110 V dc (with 15% ripple content)	< 1W
End-On-Generation	90 to 170 volts ac	110 V ac	< 1W

PREPARED BY	VERIFIED BY	APPROVED BY
-------------	-------------	-------------

INTEGRAL COACH FACTORY, CHENNAI - 38	Page 2 of 13
Specification for LED Based Night Light cum Berth Indication Light.	ICF / ELEC / 934 REV. NO: 01 DATE - 30.11.11

4.2 Illumination Level:

Measured at a distance of	Light Output
2.1 metre	0.5 lux to 1.0 lux

Note:

- 1) The above values are measured at a surface perpendicular to the light rays.
 - 2) The light output variation shall be $\pm 2\%$ maximum allowed with input voltage variation as per para 4.1.
 - 3) The light output variation shall be $\pm 5\%$ maximum allowed for 24 hours continuous operation at 110 V DC/110V AC input.
 - 4) The illumination level shall not have infra-red and ultra-violet emission.
 - 5) The test certificate from the NABL approved laboratory shall be submitted.
 - 6) Electronic efficiency shall be more than 90%.
- 4.3 The berth indications wherever required shall be according to the seating arrangement for the following type of coaches:
- | | |
|------------------------------------------------------|--------------|
| a. Type 1 : for AC 2 Tier Sleeper coaches (LHB type) | (Annexure A) |
| b. Type 2: for AC composite coaches (LHB type) | (Annexure B) |
| c. Type 3: for Non-AC sleeper coaches (LHB type) | (Annexure C) |
| d. Type 4: for AC 2 Tier Sleeper coaches | (Annexure D) |
| e. Type 5: for AC composite coaches | (Annexure E) |
| f. Type 6: for AC 3 Tier sleeper coaches | (Annexure F) |
| g. Type 7: for AC I Class coaches | (Annexure G) |
- 4.4 In order to meet the performance requirements, all LED Drivers, sensors, switches etc are to be contained within the unit and no external interfaces are to be provided except wago type terminals for input supply.
- 4.5 All drivers shall be constant current based. DC voltage can vary across the LEDs to provide a constant current control, so as to ensure a consistent luminosity across varying input voltage as per clause 4.1 above & service conditions under clause 3.1 above.
- 4.6 Berth indication numbers should be both sides (front and back) and it shall be visible at a distance of ± 5 metres from the light.
- 4.7 The light output from fitting shall be "BLUE" in colour.
- 4.8 The diffuser used in the light fitting shall be made of Acrylic sheet which is embedded with UV inhibitors to ensure that there is no discoloration.
- 4.9 The high intensity type blue colour LEDs having viewing angle 30° (min) shall be from any one of the following OEMs:

Nichia Corporation, Japan	Oshram, Germany	Lumiled, USA
Avago, Singapore	Seoul semiconductors, Korea	

Note: The supplier shall enclose the proof of procurement of LEDs from above OEMs at the time of inspection of the unit against each purchase order.

4.10 The electronic components used shall be as per the following:

- a) IC (Integrated Circuit) shall be of industrial grade.
- b) Electrolytic Capacitor shall be rated for a maximum temperature of 105°C .
- c) Paper / Polyester Capacitor shall be rated for a maximum temperature of 85°C .
- d) The Resistors shall be preferably made of metal film of adequate rating. The actual loading versus rating shall be 3.

PREPARED BY	VERIFIED BY	APPROVED BY
-------------	-------------	-------------

INTEGRAL COACH FACTORY, CHENNAI - 38	Page 3 of 13
Specification for LED Based Night Light cum Berth Indication Light.	ICF / ELEC / 934 REV. NO: 01 DATE - 30.11.11

- e) Switching devices such as transistors, MOSFETs and IGBTs shall not exceed junction temperature of 150°C.
- f) The devices shall have adequate thermal margin at the ambient of 55°C.
- g) The protective cum adhesive coating used on PCBs should be clear and transparent and should not affect colour code of electronic components or the product code of the company.
- h) The heavy components should be properly fixed. The solder connection should be with good finish.
- i) The electronic circuits, PCB and components should also meet the RDSO Spec. No. ELRS/SPEC/S1/0015-OCT., 2001(Rev.0) specifications of Electronics used in Rolling Stock Application.
- j) The electronics covered for this equipment shall pass all the tests called for in the above specification. No deviations shall be accepted.
- k) The infrastructure for Quality Assurance facilities as called for in the above specification shall be available for the manufacture for this product. The compliance shall be indicated clearly in the tender itself.

5 GENERAL REQUIREMENT -

- 5.1 The complete lighting unit will be of compact design. Mounting and overall dimension shall be as per the 'sketch-1' attached.
- 5.2 The housing preferably single piece shall be of robust and reliable construction with 1.0 mm thickness sheet steel to IS: 513-94 Grade - 0 and powder coated to Spec. No. ICF/M/D/Specn-091 (latest) with minimum thickness of 50 microns to colour classic white epoxy polyester glossy finish to shade card no. 7501 of M/s MARPOL.
- 5.3 Housing will have suitable holes for mounting.
- 5.4 The hardware shall be supplied and will be suitable for outdoor application.
- 5.5 Fixing screws size will be M5 with slotted hexagonal head for UNIT assembly.
- 5.2 Wiring shall be with multi-strand copper cable having PTFE insulation to JSS specification No.51034 (latest) and adequately rated.
- 5.3

6 TESTS - The following tests will be carried out on the units.

6.1 Prototype Tests

The following tests shall be conducted during prototype test.

S n	TYPE OF TEST	Prototype test	Acceptance test	Routine test
1	Visual test	YES	YES	YES
2	Dielectric test	YES		YES
3	Insulation test	YES	YES	YES
4	Performance test	YES	YES	YES
5	Temperature rise test (Dry heat run test)	YES		
6	Temperature rise test (Damp heat test)	YES		
7	Vibration and shock test	YES		
8	Burn in test	YES		
9	Surge and transient tet	YES		
10	Dust, humidity and heat test	YES		
11	Reverse polarity test	YES	YES	YES
12	Mechanical and Electrical Endurance test	YES		
13	Test for enclosure	YES		

PREPARED BY	VERIFIED BY	APPROVED BY
-------------	-------------	-------------

INTEGRAL COACH FACTORY, CHENNAI - 38	Page 4 of 13
Specification for LED Based Night Light cum Berth Indication Light.	ICF / ELEC / 934 REV. NO: 01 DATE - 30.11.11

6.2. VISUAL TEST -

6.2.1. Dimensions and general workmanship shall be checked and should be good with all the component properly secured and sharp edges rounded off.

6.2.2. Document of purchase of LEDs as per clause 4.9.

6.3. DIELECTRIC TEST - The dielectric test shall be conducted as per IEC 60571 (latest) for supply voltages range between 72V to 125V with rms value of test voltage as 1000V.

6.4. INSULATION TEST - The insulation resistance of the unit between earth and current carrying parts shorted together shall be more than 10 Mega ohms at a ambient temperature of 55°C measured with 500V Insulation Tester (Megger).

6.5. PERFORMANCE TEST - The unit shall be tested for its functioning at upper voltage limit, lower voltage limit and rated voltages of supply system. The unit should work satisfactorily for 24hrs. at 55°C ambient. The illumination level shall also be measured during the performance test and the level shall not be less than as stipulated in this specification.

6.6. TEMPERATURE RISE TEST: (DRY HEAT RUN TEST): The Tests shall be carried out as per IEC 60571-19 (latest) on the complete electronic assembly in closed condition as during normal operation, on full load, placed in test chamber. Where temperature is progressively raised from ambient to 70°C as per IEC 60571-1 (latest). At the end of this test the performance test is repeated.

6.7. TEMPERATURE RISE TEST: (DAMP HEAT TEST): To be conducted as per IEC 60571-1 (latest) 1990-07. At the end of this test the performance test is repeated.

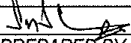
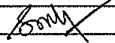
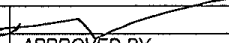
6.8. VIBRATION AND SHOCK TEST - To be conducted as per IEC 60571-1 (latest).

6.9. BURN IN TEST: The unit will be kept in energized condition by using external supply of 110V DC/110 V AC and placed in a chamber for 48 hours. During the test the temperature in the test chamber shall be maintained at 55°C. On completion of the test the unit should not show any signs of deterioration in the performance or any other failure.

6.10. SURGE AND TRANSIENT TESTS: The test shall be conducted as per IEC 60571-1, 1990-07

6.11. DUST, HUMIDITY AND HEAT TESTS: To be conducted as per IEC 60571-1 (latest). The performance test is to be repeated after the heat test as per clause 6.7.

6.12. REVERSE POLARITY TEST: The unit shall remain functional after applying 200V for one minute in correct polarity as well as in reverse polarity.

		
PREPARED BY	VERIFIED BY	APPROVED BY

INTEGRAL COACH FACTORY, CHENNAI - 38	Page 5 of 13
Specification for LED Based Night Light cum Berth Indication Light.	ICF / ELEC / 934 REV. NO: 01 DATE - 30.11.11

6.13. MECHANICAL AND ELECTRICAL ENDURANCE TEST-
The unit will be subjected to 5000 switching operations with 30 sec 'On' period and 30 seconds 'OFF' period. None of the unit component should show any sign of damage / deterioration.

6.14. TEST FOR ENCLOSURE: The enclosure along with the light fitting should have protection of IP-23 as per IEC60529 (latest).

7 MARKING-

7.1 The LED based Light shall be provided with a metallic name/rating plate riveted on the enclosure. The following information shall be available by either etching process or by engraving or screen-printed.

- Manufacturer's name and address
- Type / Make, Spec. No.
- Input Voltage range and Wattage.
- Serial Number of the equipment.

Note:

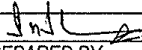

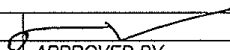
The first two digits shall indicate the year of manufacturing.
Next two digits month.
Next one digit for any type model, etc.
Next three digits manufacturing serial number.

8. GUARANTEE - The LED Light fittings shall be guaranteed for a period of 24 months from the date of commissioning or 36 months from the date of supply whichever is earlier. Type defect, if any shall continue to attract guarantee obligation till the same is successfully overcome. The successful tenderer shall offer prompt free after sales services during the guarantee period at ICF as well as at any Zonal Railways wherever the coach is running.

9. ELIGIBILITY CRITERIA - The firm should be Indian and in the field of LED based lighting systems manufacturing. Documentary evidence to this effect shall be given along with their offer.

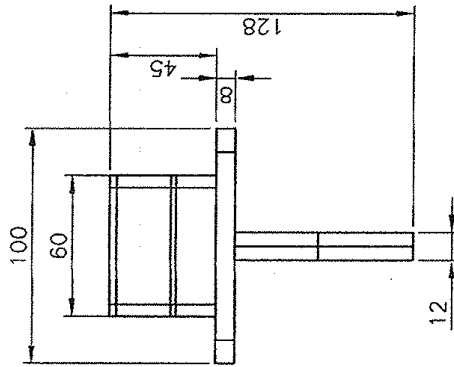
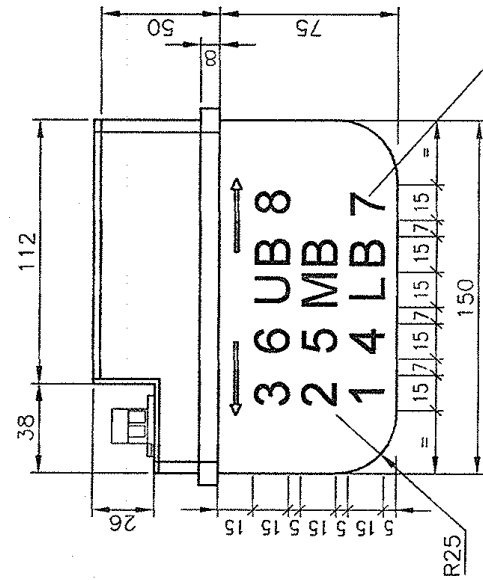
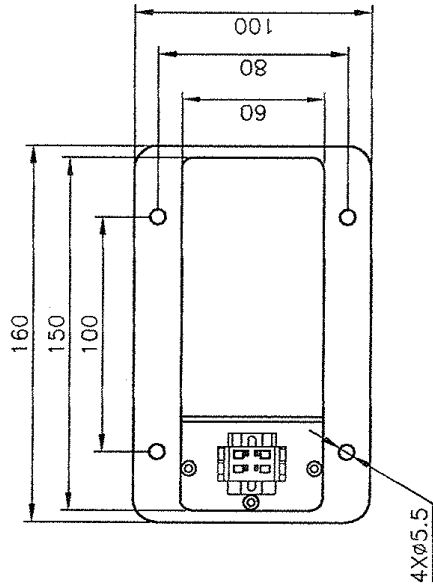
10. INSTRUCTIONS TO THE TENDERER -

- No deviations shall be accepted.
- The tenderer, shall also submit the details as called for in Clause C of this specification along with the offer. Failure to submit the details will lead to disqualification.
- The tenderer shall also submit the details of facilities available at their works for manufacture of this unit as required in the RDSO specification ELRS/SPEC/S1/0015.
- The successful tenderer shall submit the detailed drawing with all the components, rating details, schematic drawings, bill of material and get the same approved from ICF before manufacturing the prototype unit.
- One Prototype sample of light fitting shall be submitted along with test reports from a Government recognized laboratory for further test and approval before commencing bulk supply.

PREPARED BY 	VERIFIED BY 	APPROVED BY 
-------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------

PAGE 6 OF 13

SKETCH-1
OF SPECN. : ICF/ELEC/934

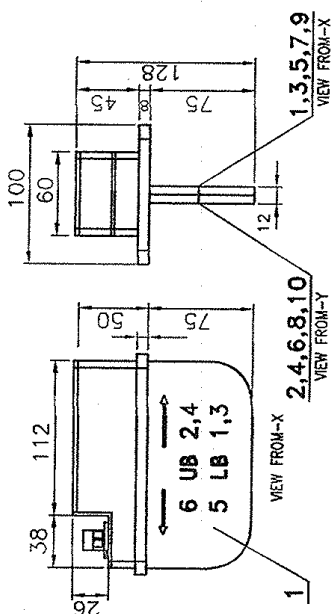
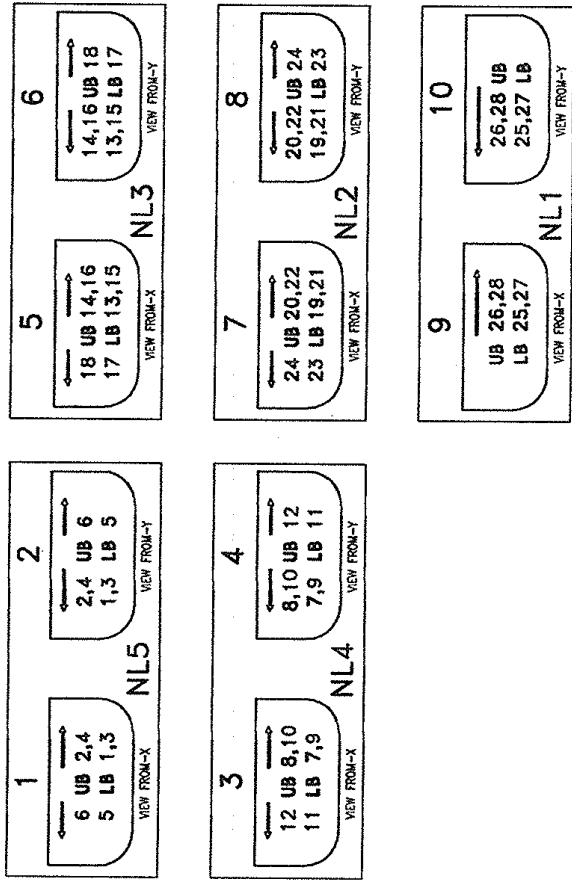
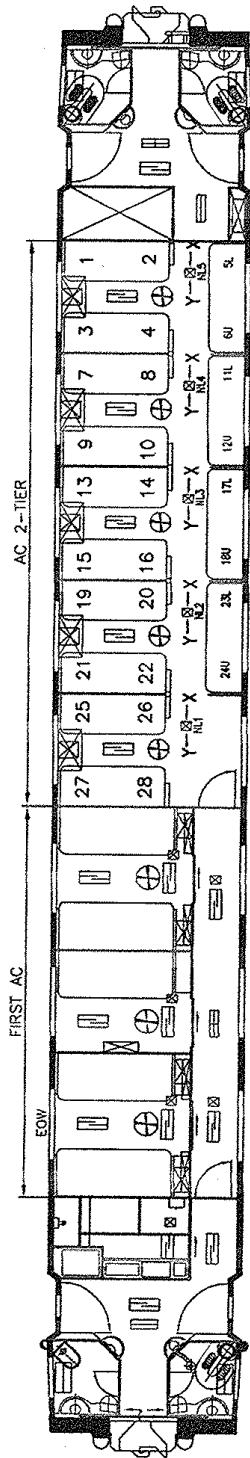


[Signature]

PREPARED BY



PAGE 8 OF 13

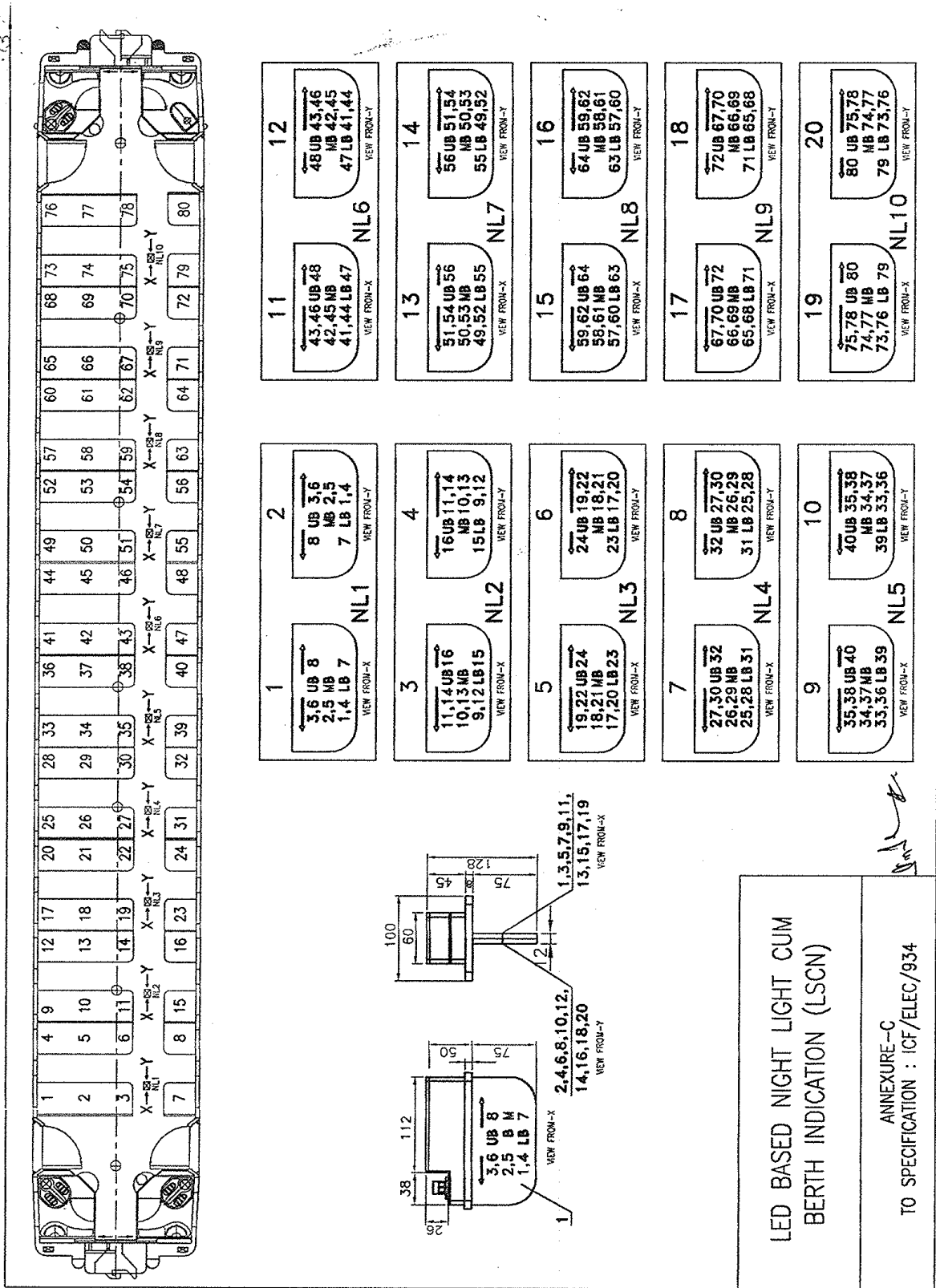


LED BASED NIGHT LIGHT CUM
BERTH INDICATION (LWGFSCWAC)

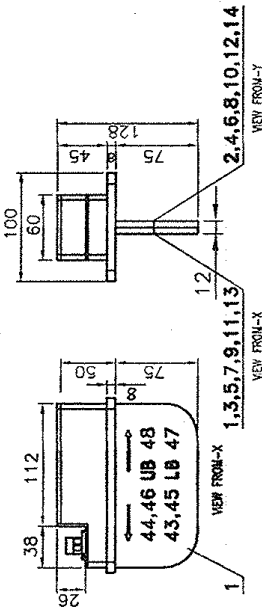
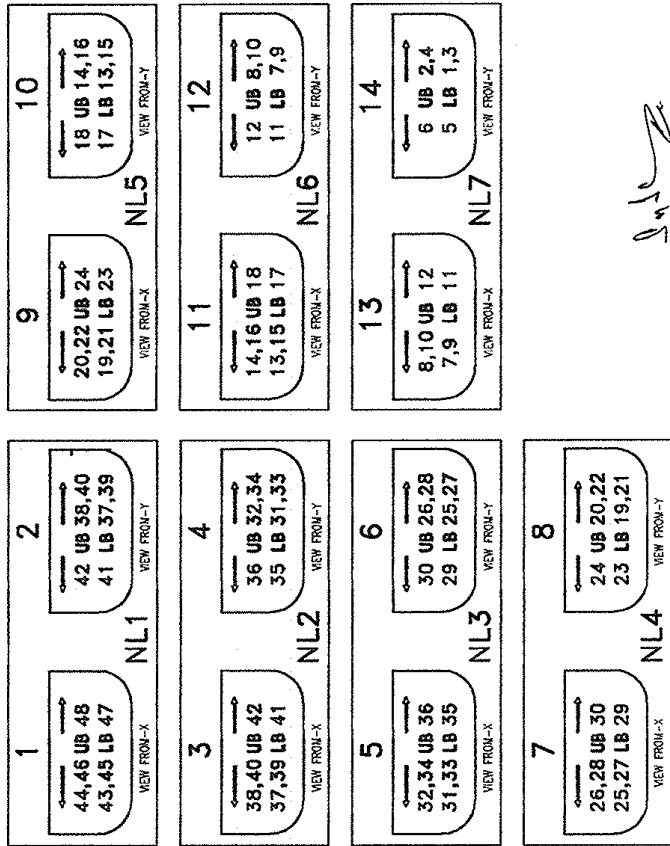
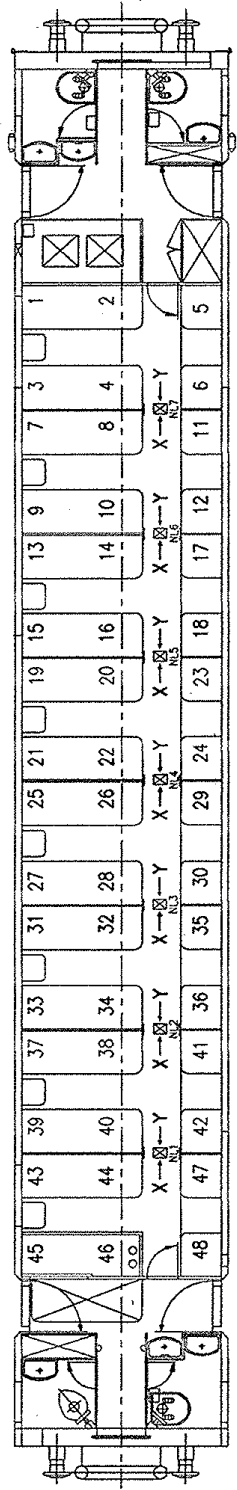
ANNEXURE-B
TO SPECIFICATION : ICF/ELEC/934

Handwritten signature

PAGE 7 OF 15



PAGE 10 OF 13

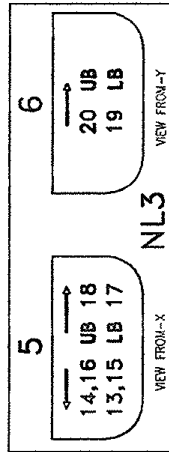
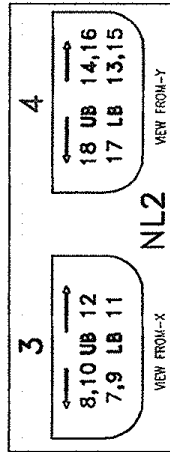
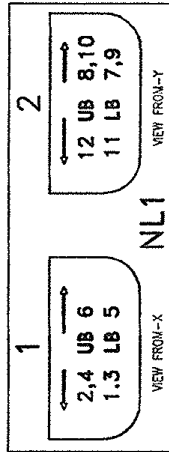
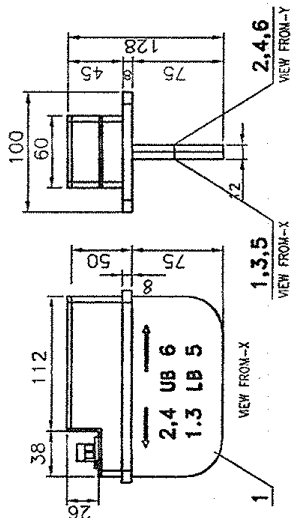
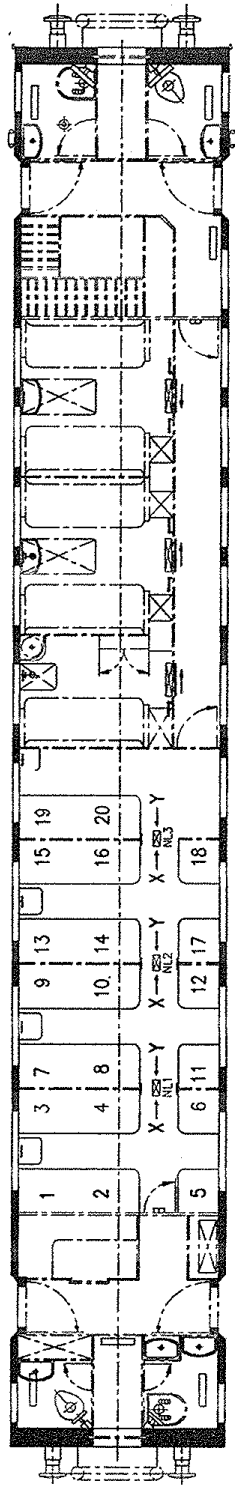


LED BASED NIGHT LIGHT CUM
BERTH INDICATION (WGSCWAC)

ANNEXURE-D
TO SPECIFICATION : ICF/ELEC/934

Signature

PAGE 11 OF 13

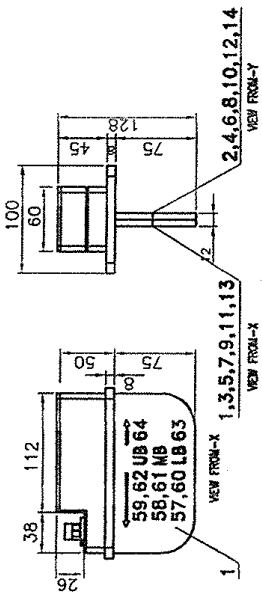
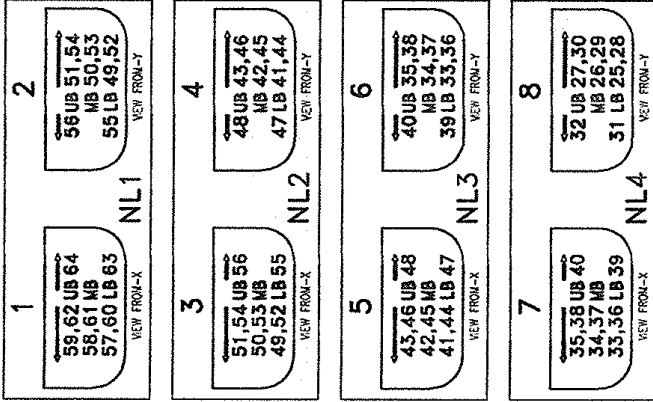
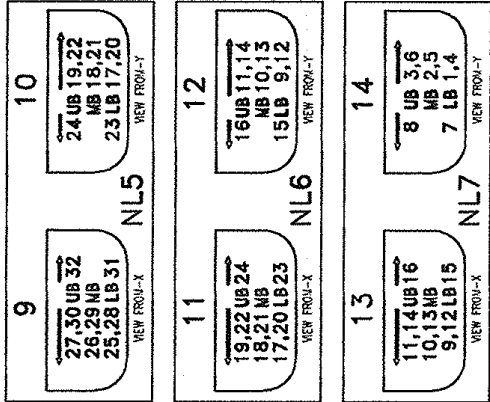
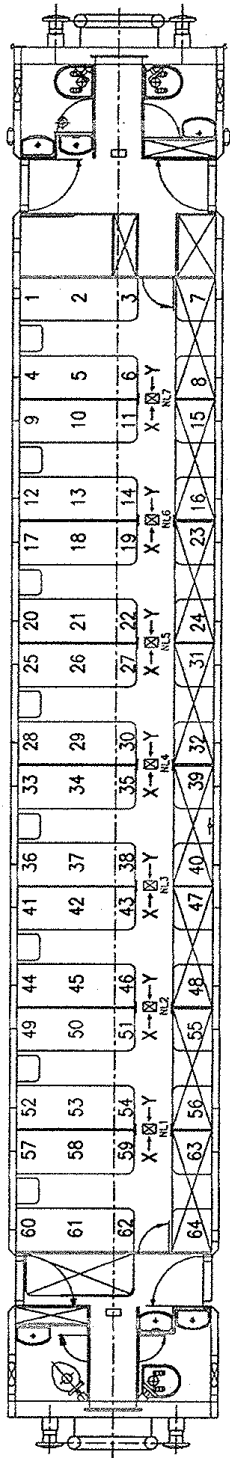


LED BASED NIGHT LIGHT CUM
BERTH INDICATION (WGFCWAC)

ANNEXURE-E
TO SPECIFICATION : ICF/ELEC/934

Handwritten signature

PAGE 12 OF 13

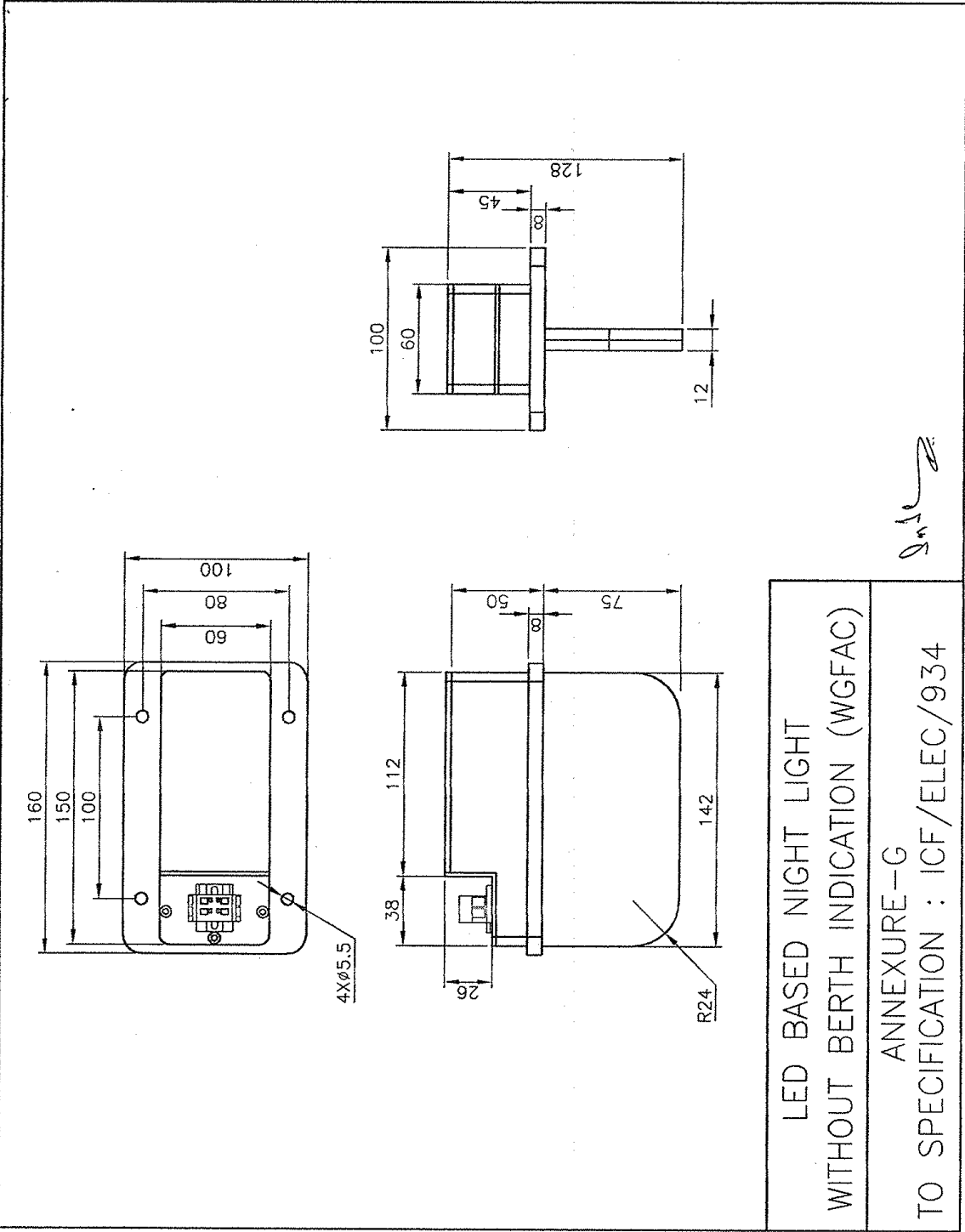


LED BASED NIGHT LIGHT CUM
BERTH INDICATION (WGACCN)

ANNEXURE-F
TO SPECIFICATION : ICF/ELEC/934

Signature

PAGE 13 OF 13



INTEGRAL COACH FACTORY, CHENNAI - 38	ICF / ELEC / 934 REV. NO. : 01,CS-01 DATE: 24.03.2012
Subject : Specification for LED Based Night Light cum Berth Indication Light	Page 1 of 1

Correction Slip No. 1 to Specification ICF/ELEC/934 Rev.1

Under clause No.4.3, the following additions are made:-

h) Type 8: for Non AC sleeper Coaches

(night light cum berth indication)

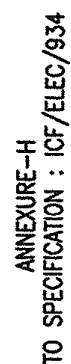
Annexure H

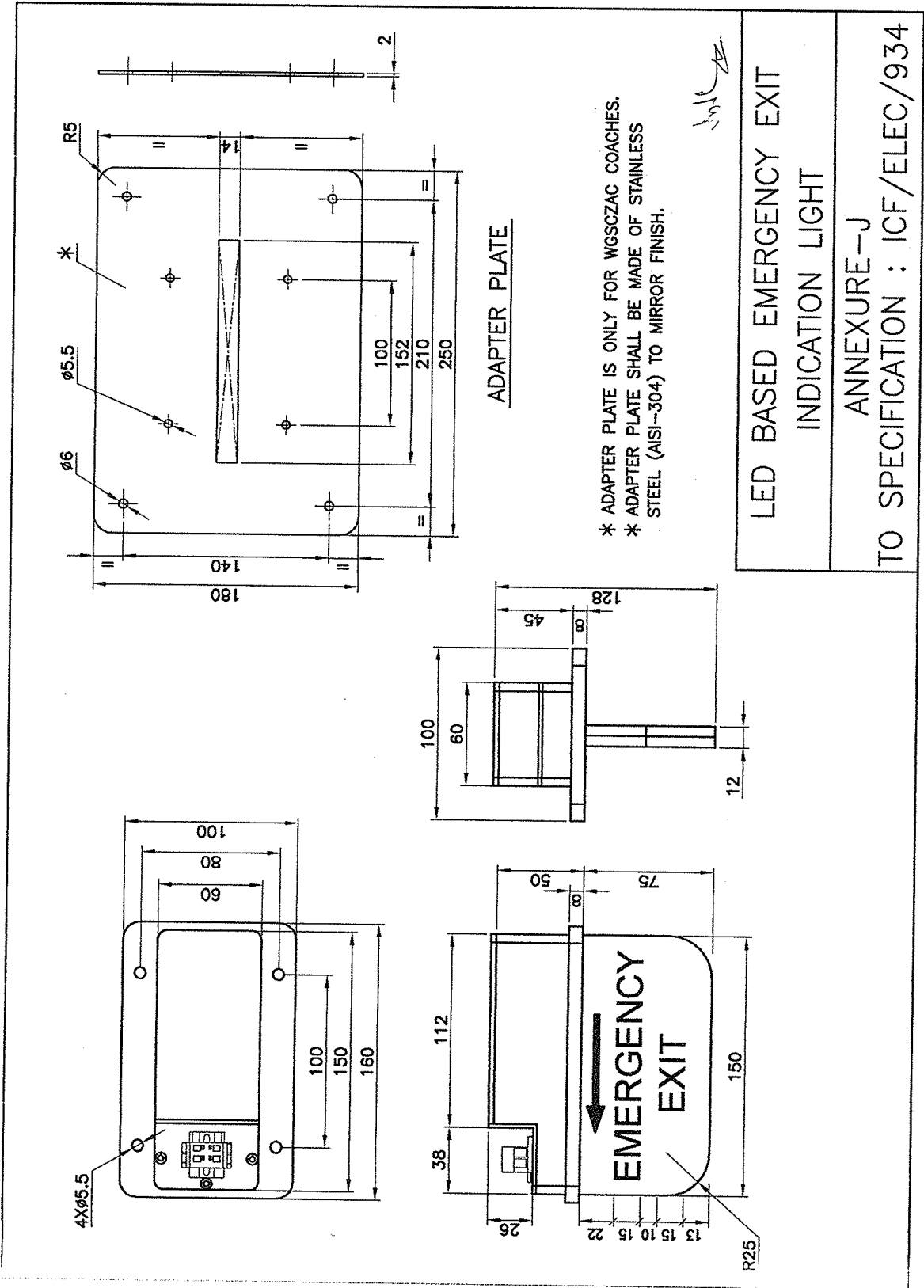
i) Type 9: for all Ac & non AC coaches

(Emergency exit indication)

Annexure J

		
PREPARED BY	VERIFIED BY	APPROVED BY



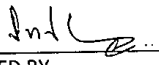
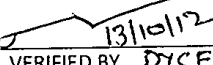
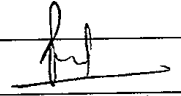


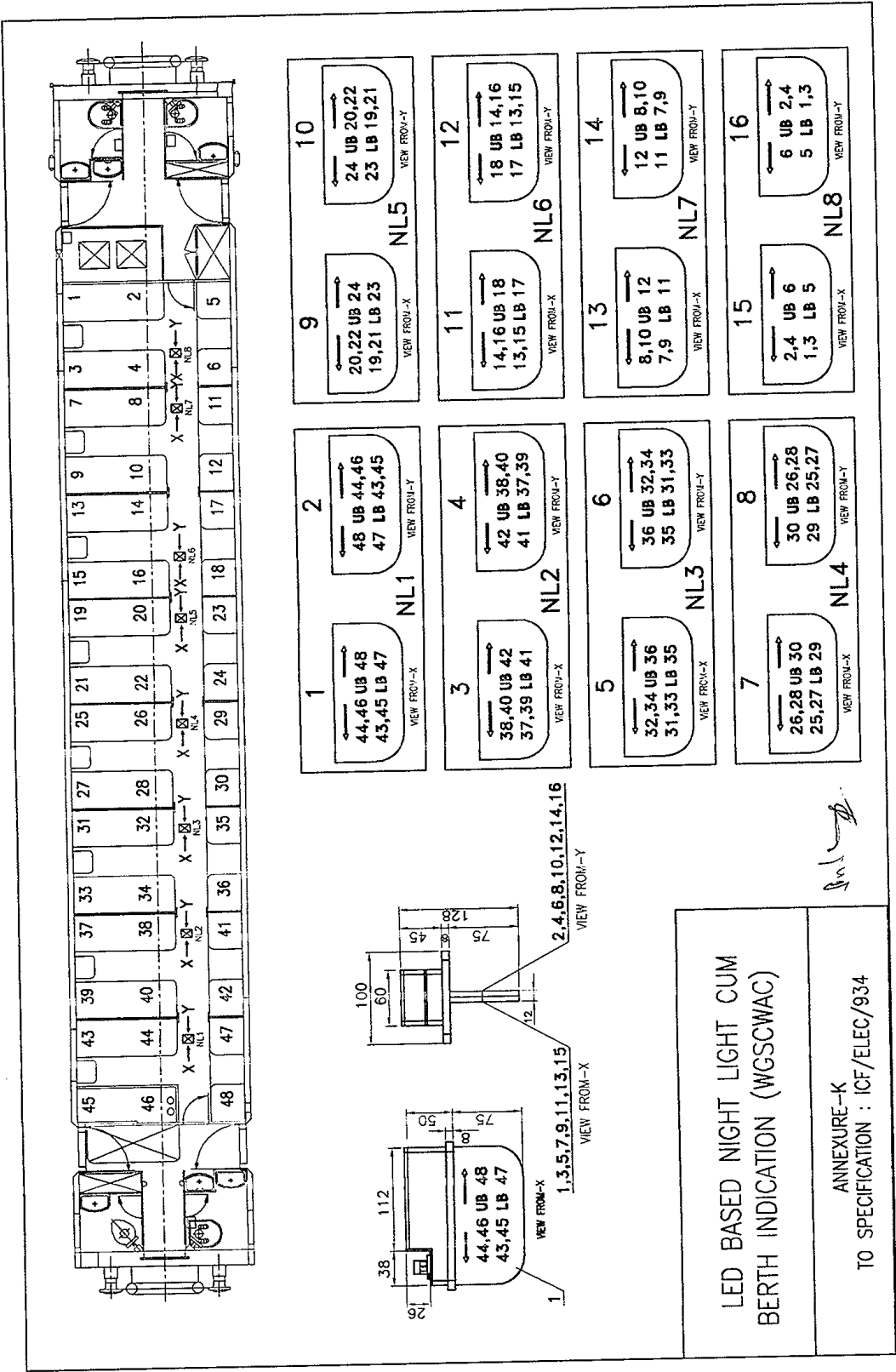
Integral Coach Factory, Chennai: 600 038	CS-02 TO ICF/ELEC/934 REV.1
Subject: Specification for LED based night light cum berth indication light .	Page 1 of 1

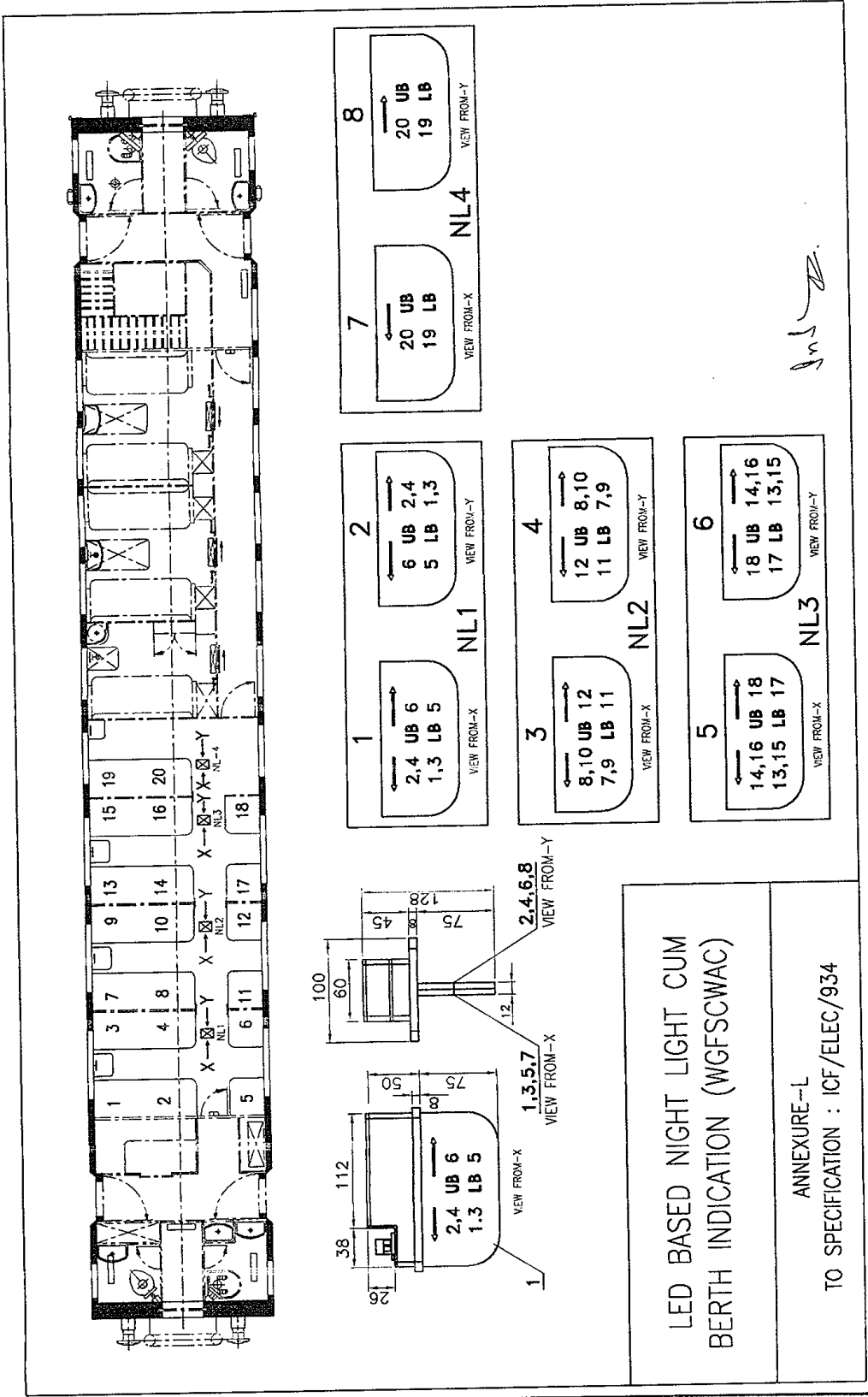
CS-02 to ICF SPEC.NO. ICF/ELEC/934 REV.1

The following drawings are added to Clause No. 4.3:

- j. TYPE 10: for AC Tier Sleeper coaches (Annexure K)*
- k. TYPE 11: for AC composite coaches (Annexure L)*
- l. TYPE 12: for AC 3 Tier Sleeper coaches (Annexure M)*

	 13/10/12	
PREPARED BY	VERIFIED BY DYCEE/D	APPROVED BY CDE/E







INTEGRAL COACH FACTORY, CHENNAI:38	ICF SPEC.NO. ICF/SPEC/934 REV.1 CS-03
Sub: LED Based Night Light Cum Berth Indication light for LHB Coaches	DATE: 26.11.12 PAGE: 1 of 1

CS-03 TO ICF SPEC.NO. ICF/ELEC/934

The following clause is added:

Clause No. 11

One manual will be supplied for supply of each LED based Night light cum berth indication light against this specification. Manual will contain the following details:

- Operating guidelines and Periodical Maintenance (periodicity to be mentioned) with justification for each maintenance and trouble shooting manual.
- Do's, don'ts
- Safety guidelines, applicable diagram.
- It shall be submitted in A4 size of coated book paper (gloss) with average caliper of more or equal to 5 mils and in the form of hard bounded booklet.

ICF will approve the document after evaluating the same.

PREPARED BY SSE/D/Elec. <i>[Signature]</i>	VERIFIED BY DY CEE/D <i>[Signature]</i> 29/11/12	APPROVED BY CDE/E <i>[Signature]</i> 29/11/12
-----------------------------------------------	-----------------------------------------------------	--------------------------------------------------

INTEGRAL COACH FACTORY, CHENNAI - 38	ICF / ELEC / 934 REV. NO. : 01, CS-04 DATE: 27.05.2014
Subject : Specification for LED Based Night Light cum Berth Indication Light	Page 1 of 1

Correction Slip No. 4 to Specification ICF/ELEC/934 Rev.1

Under Clause 4.3, the following annex added:

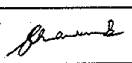

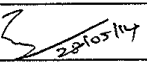
m) Type 13: for non AC Sleeper coaches (Annexure N)

Clause No. 4.4 shall be read as follows:

In order to meet the performance requirements, all LED drivers, sensors, switches etc are to be contained within the unit and no external interface are to be provided except wago type terminals (type 261-202) for input supply.

Clause No. 4.8 shall be read as under:

The diffuser used in the light fitting shall be made of polycarbonate sheet which is embedded with UV inhibitors to ensure that there is no discolouration. The polycarbonate material shall be ultra violet resistant with superior fire retardant properties and it should meet fire resistance test to RDSO Spec.No.E/14/01 Part 1.

		
PREPARED BY	VERIFIED BY	APPROVED BY

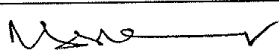
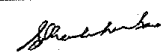
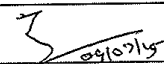


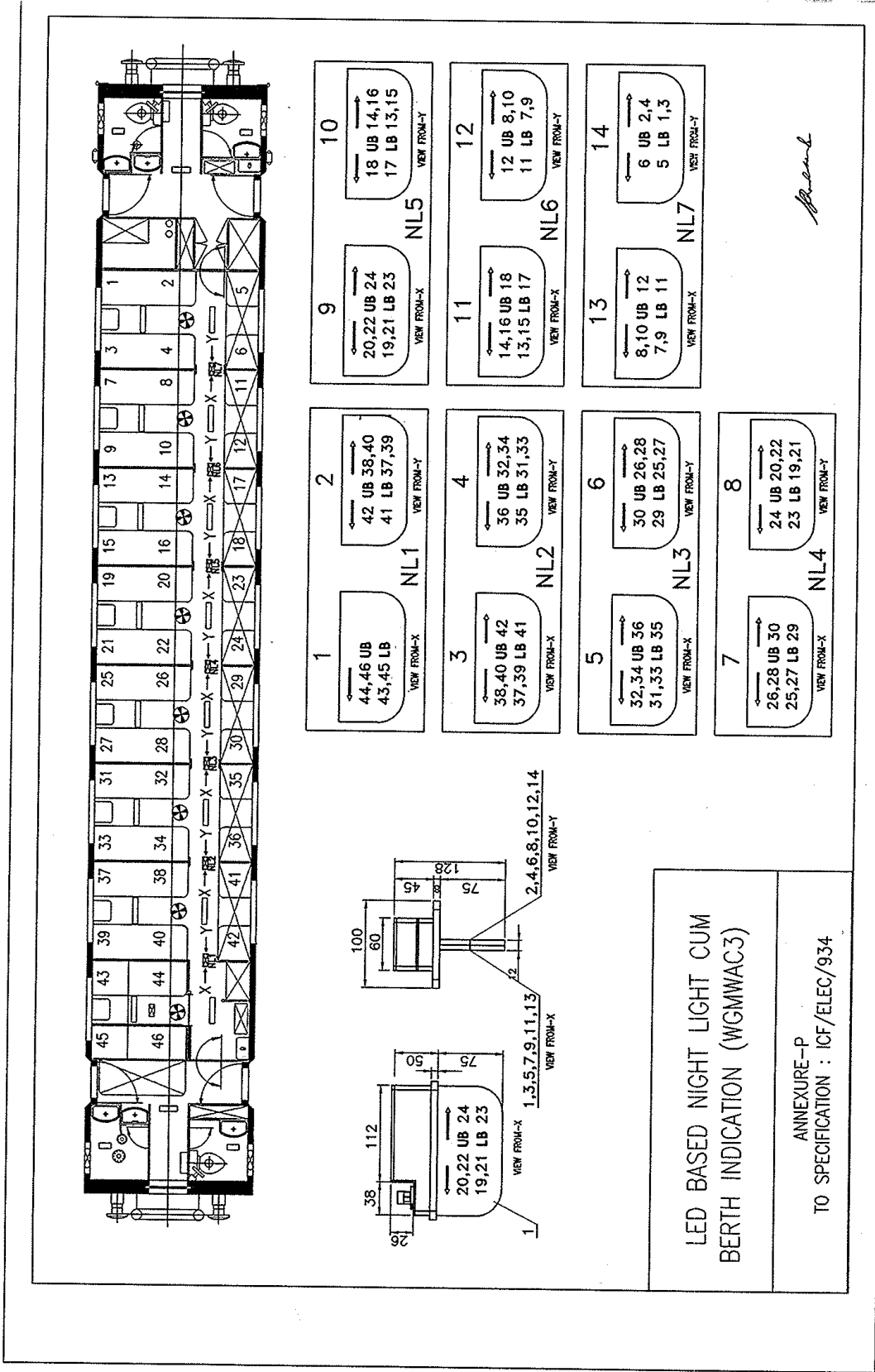
INTEGRAL COACH FACTORY, CHENNAI - 38	ICF / ELEC / 934 REV. NO. : 01,CS-05 DATE: 09.07.2015
Subject : Specification for LED Based Night Light cum Berth Indication Light	Page 1 of 1

Correction Slip No. 5 to Specification ICF/ELEC/934 Rev.1

Under Clause 4.3, the following annexure added:

n) Type 14 : for AC 2 Tier coach (Military) (Annexure P)

		
PREPARED BY	VERIFIED BY	APPROVED BY



Handwritten signature