TECHNICAL SPECIFICATION OF USB MOBILE CHARGING SOCKET FOR LHB EOG COACHES

1. SCOPE

1.1 This specification covers the design, manufacture, supply of USB mobile charging socket for LHB Type coaches.

1.2 The quality of the USB charger as a whole shall be of International Standards.

1.3 The firm shall maintain date-wise in-house quality control system and in-house quality control records etc. for in-stage inspection and testing and the same shall be made available to the inspecting official during testing.

1.4 Firm shall submit clause by clause technical details during tendering stage for technical scrutiny of the offer.

2.0 SERVICE CONDITIONS

2.1 The USB charger governed by this specification shall be suitable for following service conditions:-

Ambient	5 to55 deg. C
Train speed	200 KMPH
Humidity	Up to 98% during the rainy season
Altitude	Max.1200m above sea level
Atmosphere	Extremely dusty and desert terrain in certain areas. The dust concentration in the air may reach at the high value of 1.6mg/cubic meter.
Rainfall	Very dusty atmosphere with fog, case iron dust of brake block shoe, flying ballast etc. Very heavy in certain areas.
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	7mg/litre
Max. concentration of Chlorine	6mg/litre
Max. Conductivity	130sq/cm
Vibration	The arrangement system and their mounting arrangement shall be capable to withstand satisfactorily the vibration and shocks encountered in service as specified below.

Maximum vertical acceleration	3.0 g
Maximum lateral acceleration	3.0 g
Maximum longitudinal acceleration	3.0 g

Sinusoidal from of vibration, the frequency 'f' lies between 1 Hz and 50 Hz and their amplitude 'a' expressed in mm is given as a function 'f' by the equation.

a=25/f for the values of 'f' between 1 Hz and 10 Hz.
$a=250/f^2$ for the values of 'f' between 10 Hz and 100 Hz.

3.0 Government specifications

3.1 Reference shall be made to the following standard specifications:-

IS:13252 (part-1)/IEC-60950-1	Information Technology Equipment- Safety
IEC60571	Electronic equipment used in Railway vehicle
ELRS/SPEC/SPEC/S1/0015 (Rev-1) Oct-2011 or Latest	Specification of electronics used in Rolling Stock application
UIC IEC 68-2-30	Basic environment testing procedure
IEC-61373	Shock & vibration tests for rolling stock application.
IEC-61000	Electromagnetic compatibility (EMC)
IEC-60529	Classification of Degree of Protection
EN 45545	European Railway Standard for Fire safety

4.0 ELECTRICAL PARAMETERS:

i.	Nominal Input Voltage	110V AC/DC ±5% single phase
ii.	Operating Voltage Range	90-140V AC/DC
iii.	Frequency	50 Hz ±3%
iv.	Output Voltage	5V DC (+0.25V & -0.55V)
v.	Output Current	2A (Maximum)
vi.	Power Consumption	10W (Max.)

5.0 TECHNICAL REQUIREMENTS

5.1 The USB charging socket shall be as per USB 3.0 compliant and shall be conforming the safety requirement as per IS: 13252 (part-1)/IEC-60950-1.

5.2 There shall be one electronic module equipped with driving USB socket. This shall be capable of charging mobiles of all types. These modules shall be capable of working with 110V DC with ± 30% ripple. These modules shall be incompatible to work with any other type of supply voltage except mentioned above. Proper inrush current limiting and input filters shall be incorporated at the input stage.

5.3 The electronic component shall be used as follows.

a) All electronic component used the circuit shall be of industrial grade or above.
b) Metallic film/Paper/polyester capacitor shall be rated for 105° C or above.
c) The resistor shall be preferably made of metal film/Chip resistor adequate rating. The actual loading versus rating shall be 3.
d) The junction temperature of the switching devices such as transistors and MOSFETs etc. shall not exceed 125° C allowing thermal margin of 25° C.
e) The protective cum adhesive coating (fire retardant) used on PCB shall be clear and transparent and shall not affect colour code of electronic equipment or the product code of the company.
f) The heavy component shall be properly fixed. The solder connection should be with good finish. The electronic circuits, PCB and component shall meet the requirement of RDSO specification no. ELRS/SPEC/S1/0015 (Rev-1) Oct-2011 or Latest for Electronics used in Rolling Stock Application. The electronics covered in

this equipment shall pass all the tests called for in the specification. The manufacturer shall indicate the deviation of compliance.

5.4 The USB charging point shall be possible to sustain a DC input of 600V at input for 1 Hours. There shall be no damage in any of component during this period.

5.5 There shall not be any electrolytic capacitors or electromagnetic relay used in the circuits either at the input or at the output sides. All the components used in the unit shall be halogen free and fire retardant only.

5.6 The USB charging point shall be galvanically isolated from mains DC and shall be compatible with all types and capacity of mobile phones. The individual USB shall follow a definite charging profile with current limit beyond 2 Amps. The overall short circuit shall be limited in USB by less than 4 Amps.

5.7 The USB charging point shall be thermal overload and short circuit protected. The unit shall shut down and restart after any such fault.

5.8 There shall be no switch/LED indication for ON/OFF the USB.

5.9 The output voltage shall have tolerance within ± 15%.

5.10 Design and construction of USB shall be of sturdy and self-protected type and suitable for rough usage.

5.11 The complete assembly shall be fire retardant standard HL-3 of EN 45545.

5.12 USB port and PCB shall be reliable and as per RDSO specification no. ELRS/SPEC/S1/0015 (Rev-1) Oct-2011 or Latest.

5.13 The power factor of the USB shall be more than 0.50.

5.14 The USB mobile charging housing shall be of aluminium or fire retardant polycarbonate having IP65 protection.

5.15 The overall size of the USB mobile charging housing shall be as under:

- Height=60mm (Max.)
- Width=30mm and with mounting 50mm (Max.)
- Depth=25mm

6.0 TESTS:

6.1 TYPE TEST:

The type test shall be carried out as per clause 6.4 to prove confirmation with the requirement of specification and general quality/design features of the unit. The firm manufacturing for the first time shall get the prototype approval from CEDE/RCF.

6.2 ROUTINE TEST:

The routine tests mentioned in the clause shall be carried out on each unit by the manufacture at his works to ensure compliance with the specifications and the drawings.

6.3 ACCEPTANCE TEST:-

Acceptance test mentioned in the clause are to be carried out by an inspecting authority nominated by the purchaser at the works of the manufacturer, on the samples picked up by the inspecting authority. All the acceptance tests shall be carried out at the 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 the inspecting/purchasing authority

6.4 Following tests shall be conducted on the unit:

	Test Description	Type test	Routine test	Acceptance test
i.	Visual inspection	Yes	Yes	Yes
ii.	Checking of purchase document of USB	Yes	Yes	Yes
iii.	Insulation resistance test	Yes	Yes	Yes
iv.	High voltage/dielectric test	Yes	Yes	Yes
v.	Over voltage protection	Yes	Yes	Yes
vi.	Short circuit protection	Yes	-	Yes
vii.	Surge protection	Yes	-	-
viii.	Reverse polarity test	Yes	Yes	Yes
ix.	Temperature rise test	Yes	-	-
x.	Fire retardant test	Yes	-	-
xi.	IP Protection test	Yes	-	-
xii.	Vibration shock and impact test	Yes	-	-
xiii.	Environmental test	Yes	-	-
xiv.	EMI/EMC test	Yes	-	-
xv.	Endurance test	Yes	-	-

6.5 VISUAL INSPECTION:-
The unit shall be checked visually for general workmanship and rating and make of electronic items. Documents shall also be verified.

6.6 CHECKING OF PURCHASE DOCUMENTS:-
Documents purchase of USB with bill of material shall be checked and verified.

6.7 INSULATION RESISTANCE TEST:-
The Insulation resistance of the unit between current carrying parts shorted together shall not be less than 100MΩ at 60° RH when measured with 500V Megger before and after H.V. test.

6.8 HIGH VOLTAGE/ DIELECTRIC TEST:-
Immediately after insulation resistance test, an AC voltage of 1.72 kV r.m.s. of sine waveform of 50 Hz shall be applied for 1 minute between live parts and the body frame. There shall not be any kind of breakdown, flashover or tripping of supply.

6.9 OVERVOLTAGE PROTECTION:-
The USB shall withstand 600V DC/AC for 1 hour. There shall be no damage in any of the components.

6.10 SHORT CIRCUIT PROTECTION:-
The USB shall withstand short circuit protection. The USB shall work normal after fault clearance.

6.11 SURGE PROTECTION:-
It shall withstand a surge of 3kV ±5% as per procedure given in IEC-60571 at the input terminal of USB.

6.12 REVERSE POLARITY:-
The USB shall withstand polarity reversal. It shall be operated with reverse voltage for 1 minute at 200 V. At the end of this period the supply shall made in correct polarity and USB shall operate in a normal way.

6.13 TEMPERATURE RISE TEST:-
Temperature rise test shall be conducted at 90V DC with full load. The temperature shall be recorded by temperature detector mounted at the specified reference points on the body of semiconductor, capacitors and other components. The maximum recorded temperature under worst condition shall be corrected to 55°C and compared with maximum permissible temperature (for power devices at junction).
The temperature at junction shall not exceed 125°C when corrected to 55°C. The maximum temperature rise of the electronic devices on the PCB shall not be more than 20°C.

6.14 FIRE REATRDENT TEST:-
Fire retardant test shall be conducted as per HL-3 of EN 45545 for the insulating material used in the USB.

6.15 IP PROTECTION TEST:-
This test shall be conducted as per IEC-60529.

6.16 VIBRATION & SHOCK TEST:-
The complete unit together with its mounting arrangement shall be subjected to the vibration & shock testing (for category-1 class-B) as per latest IEC-61373.

6.17 ENVIRONMENTAL TESTS:-
The USB shall meet the following tests as prescribed in IEC-60571
a) Dry heat test
b) Damp heat test
c) Salt mist test for 96hours.
d) Burn in test on PCB controller card as per RDSO specification no. ELRS/SPEC/S1/0015 (Rev-1) Oct-2011 for 45 hrs.

6.18 EMI/EMC TEST:-

EMI/EMC test shall be conducted on USB unit as per IEC-61000-4-2, IEC-61000-4-3, IEC-61000-4-4 and IEC-61000-4-6.

6.19 ENDURANCE TEST:-

The unit shall be kept "ON" with input voltage of 110V DC for 200 hours. After this, the USB unit is subjected to 20,000 cycles of "ON" and "OFF", each cycle consisting of 3 seconds "ON" and 10 seconds "OFF" period. USB shall pass this test. After endurance test post performance test shall be carried out.

7.0 MARKING

The following information shall be marked on the housing of the USB.

a) Indian Railway Insignia.
b) Year of manufacture/Serial number (MM/YY/ABCD)
c) Name of manufacturer
d) Rated voltage (input/Output)
e) Rated output current
f) Specification no.

8.0 GAURANTEE

Guarantee/Warranty obligation of the complete USB charger shall be as per IRS condition of contract.

9.0 INFRINGEMENT OF PATENT RIGHT

Indian Railway shall not be responsible for infringement of patent rights arising due to similarity in design, manufacturing process, use of similar components in design & development of this item and any other factor not mentioned herein which may cause such a dispute. The entire responsibility to settle any dispute/matters lies with the manufacturer/supplier.

It shall be responsibility of firm to ensure that details/documents given by them are not infringing any IPR and they are responsible in absolute and full measure instead of Railways for any such violation, Data, specifications and other IP as generated out of interaction with Railways shall not be unilaterally used without the consent of RCF and right of Railways/RCF on such IP is acceptable to them.

10.0 APPROVAL

While seeking approval, the firm shall submit sample to the vendor approving authority along with test results, circuit diagram and dimensional drawing of the USB charger. Firm Manufacturing for the first time shall take prototype approval from CEDE/RCF.

11.0 REVISION OF SPECIFICATION:

This spec. is issued for the first time by RCF.Though comments from RDSO have been incorporated, still it shall be subject to further revision on the basis of performance/feed back received from user railways in due course of time.

(5)

Corrigendum-1 to EDTS-411, Rev-'nil'

This corrigendum is issued to specification no. EDTS-411, Rev-'nil', to modified the clause of USB Mobile charging socket in LHB EOG Coaches.

The following clause may be read as:

S.No.	Cl. No. Of Spec.	Existing Clause	Revised Clause
1	5.4	The USB charging point shall be possible to sustain a DC input of 600V at input for 1Hour.There shall be no damage in any of component during this period.	The USB charging point shall be possible to sustain a DC/AC input of 250V at input for 2 minutes. There shall be no damage in any of component during this period.
2	6.9	**Over voltage Protection:-** The USB shall withstand 600V DC/AC for 1 Hour. There shall be no damage in any of the components.	**Over voltage Protection:-** The USB shall withstand 250V DC/AC for 2 minutes. There shall be no damage in any of the components.

EDTS-411, Rev-'nil'	1	23/07/2021				1 of 1
Spec.no.	**Corr.**	**DATE**	**SSE/CAD**	**SEE/D**	**DY.CEE/D&D**	**SHEET**

(13)

Corrigendum -2 to EDTS-411 Rev. 'Nil' Corr-1

This corrigendum is issued to specification no. EDTS-411 Rev. 'Nil' Corr-1, to modify the clauses of USB Mobile Charging Socket in LHB EOG Coaches for provision of USB Type-C port with Type A port for Mobile Charging Socket.

The following clauses may be read as:

S.No.	Cl. No. of Spec.	Existing Clause	Revised Clause
1.	3.1	Reference shall be made to the following standard specifications	**Added: IEC 62680-1-3** Universal Serial Bus interface for Data & Power – USB Type-C connector specification for Charging Purpose only
2.	4.0	Electrical Parameters:	Electrical Parameters: It shall be simultaneously suitable for dual port operation
		v. Output Current (Maximum).	v. Output Current 5A (Max) USB Type-A: **2A** at 5V(Maximum). USB Type-C: **3A** at 5V (Maximum)
		vi. Power Consumption: 10 W (Max.)	Power Consumption: 15 W (Max.) for dual port USB operation.
3.	5.1	The USB charging socket shall be as per USB 3.0 compliant and shall be conforming the safety requirement as per IS: 13252(Part-1)/IEC-60950-1.	5.1 a. The USB **Charger along with** charging socket shall be as per USB 3.0 compliant and shall be conforming the safety requirement as per IS:13252 (Part-1)/IEC-60950-1. **5.1 b The pin assignment shall be as per respective IEC/ International standards for Charging only.**
4.	5.6	The USB charging point shall be galavanically isolated from main DC sand shall be compatible with all types and capacity of mobile phones. The individual USB shall follow a definite charging profile with current limit beyond 2 Amps. The overall short circuit shall be limited in USB by less than 4 Amps.	The USB charging point shall be galavanically isolated from main DC sand shall be compatible with all types and capacity of mobile phones. The individual USB shall follow a definite charging profile with current limit **as per respective type of connectors as tabled at sno. 4.** The overall short circuit shall be limited in USB by less than 6 Amps.
5.	5.9.	The Output voltage shall have tolerance within +/- 15 %.	The Output voltage shall have tolerance **as per clause 4 of specification.**
6.	5.12	USB port and PCB shall be reliable and as per RDSO Specification no. ELRS/SPECS/S1/0015 (Rev-1) Oct-2011 or Latest	USB port and PCB shall be reliable and as per RDSO Specification no. ELRS/SPECS/S1/0015 (Rev-1) Oct-2011 or **latest conforming to International Standards.**
7.	5.13	The power factor of the USB shall be more than 0.50.	**Deleted.**

ALT.NO	ALT.DATE	ZONE	ALTERATIONS	AUTHORITY
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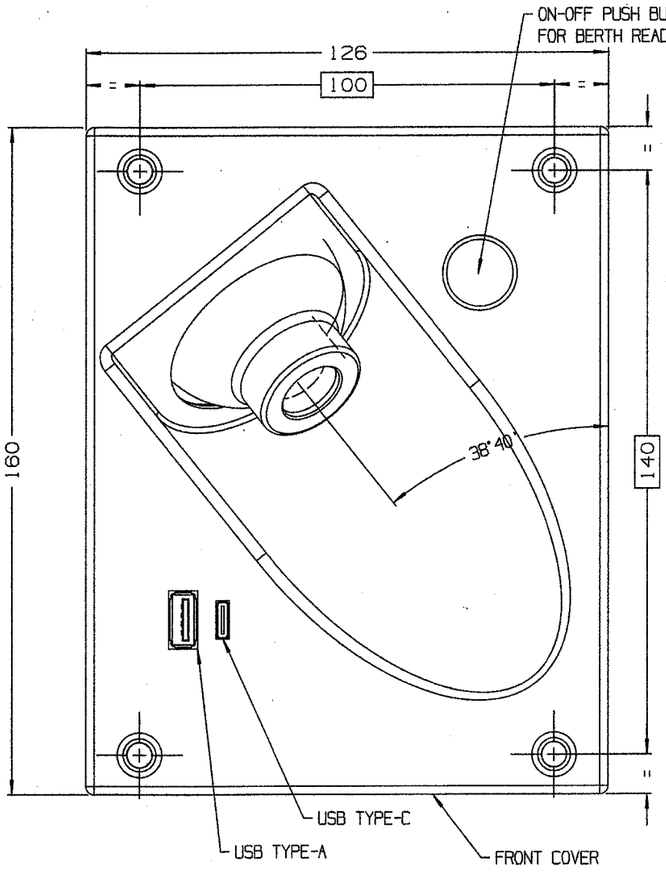
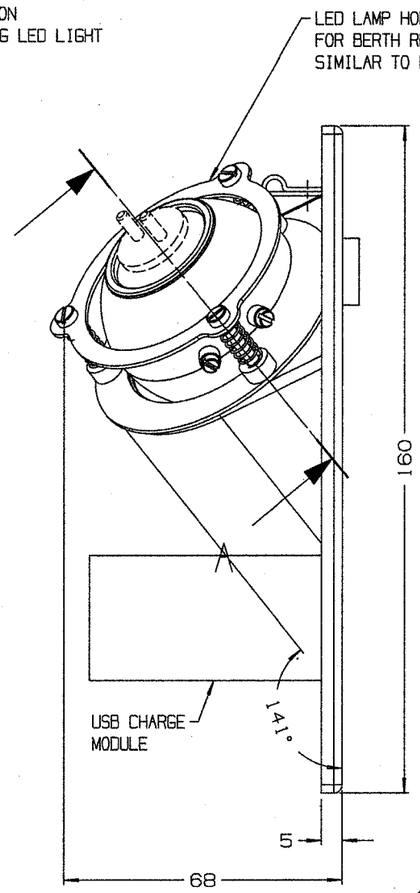
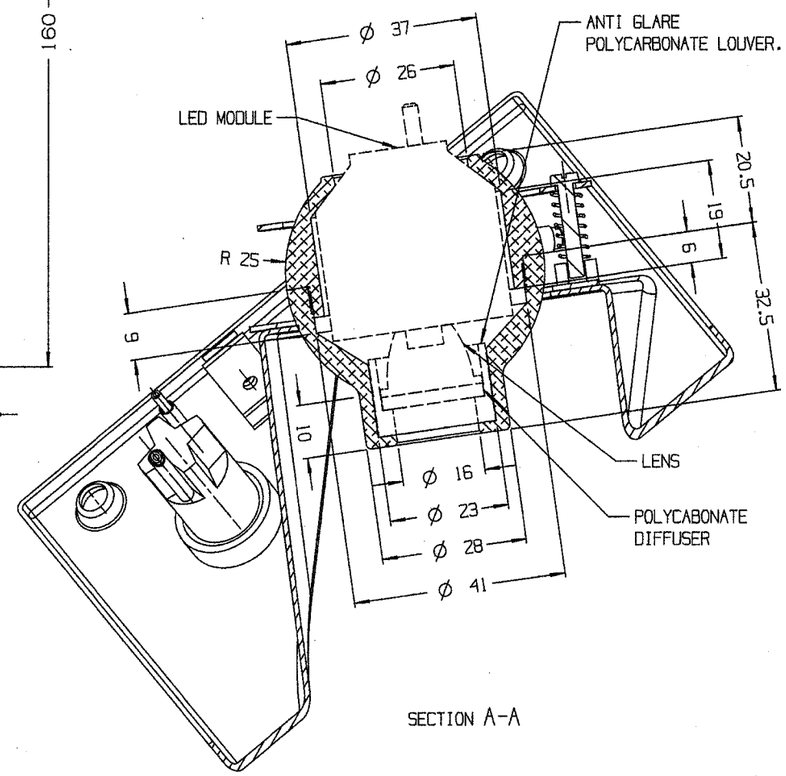
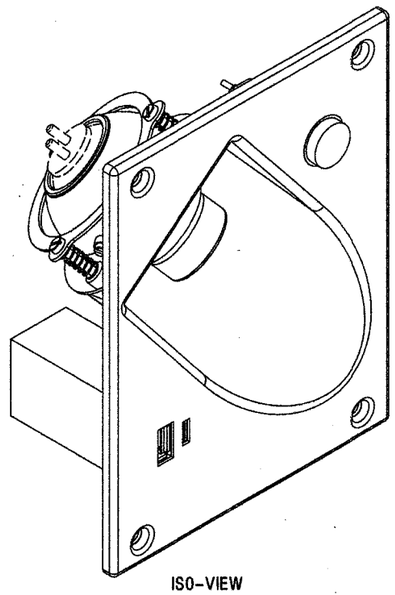






SECTION A-A



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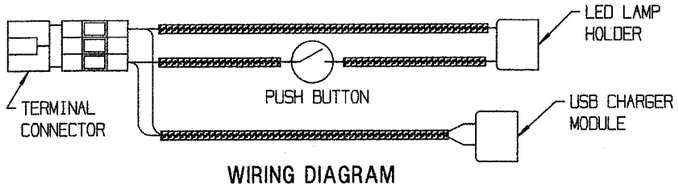

WIRING DIAGRAM

7. ANTI GLARE POLYCARBONATE LOUVER/DIFFUSER OF MIN. 1.5MM. THICKNESS TO CAT. NO. LEXAN SP 24-432X OF M/S SABIC OR EQUIVALENT MAKE SHALL BE PROVIDED TO OPTIMSE THE LIGHT OUTPUT SPECTRUM AND TO REDUCE GLARE.
6. SPOT UNIT SHALL BE AS PER DETAIL SHOWN IN SECTION-AA. MATERIAL TO IS: 733(LATEST EDITION) DULL ANODIZED TO IS: 1868 Gr. AC-5.
5. TERMINAL CONNECTOR SHALL BE OF CAGE CLAMP TYPE WAGO/PHOENIX MAKE TO PART NO. 721-603, 721-103/026-000.
4. USB TYPE-A & C CHARGER MODULE SHALL CONFORM TO SPECIFICTION NO. EDTS-411 (LATEST REVISION) SUITABLE FOR DUAL PORT OPERATION.
3. FRONT COVER MATERIAL SHALL BE OF DEEP DRAWN GRADE TO IS: 513 AND NOT FABRICATED. FOR HOLDING ARRANGEMENT OF LED BERTH READING LIGHT AND MOUNTING DETAILS REFER DRG NO. LW76093.
2. BERTH READING LIGHT SHALL GENERALLY CONFORM TO RDSO SPEC. NO. RDSO/PE/SPEC/TL/0091-2016 (REV-1).
1. ALL DIMENSIONS IN MM.

NOTE: -

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

ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.

FOR UNTOLERANCED DIMENSIONS REFER MDG0008 | DATE OF FIRST ISSUE | 18/07/2023

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S.AREA						CHD
NIL M^2						DRN BKRM LOGIN
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NIL M						
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NIL M						
HEIGHT		SEE/D&D	DY.CEE/D&D		DRG.NO.	LW76419
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ALT.NO	ALT.DATE	ZONE	ALTERATIONS	AUTHORITY
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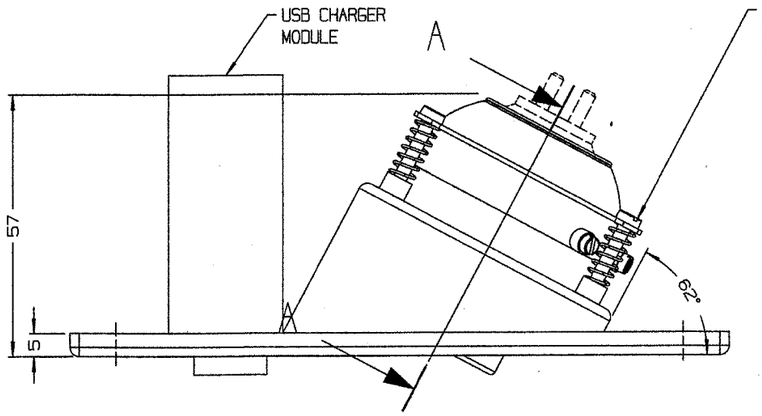

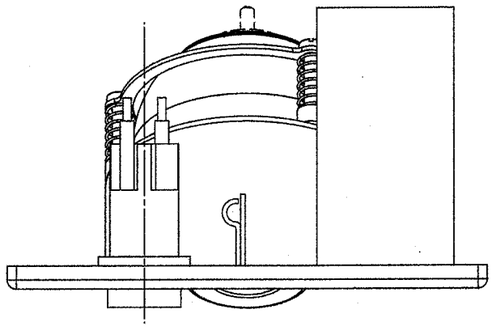

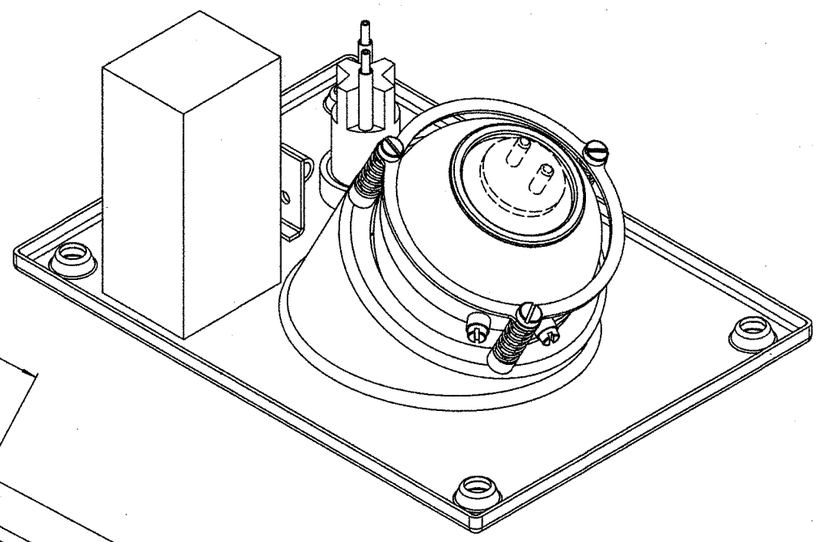

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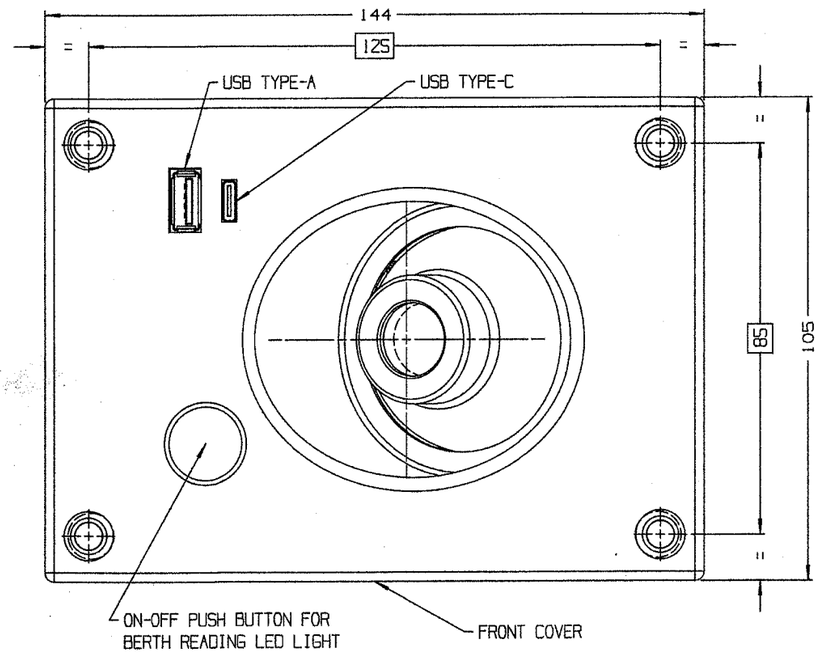

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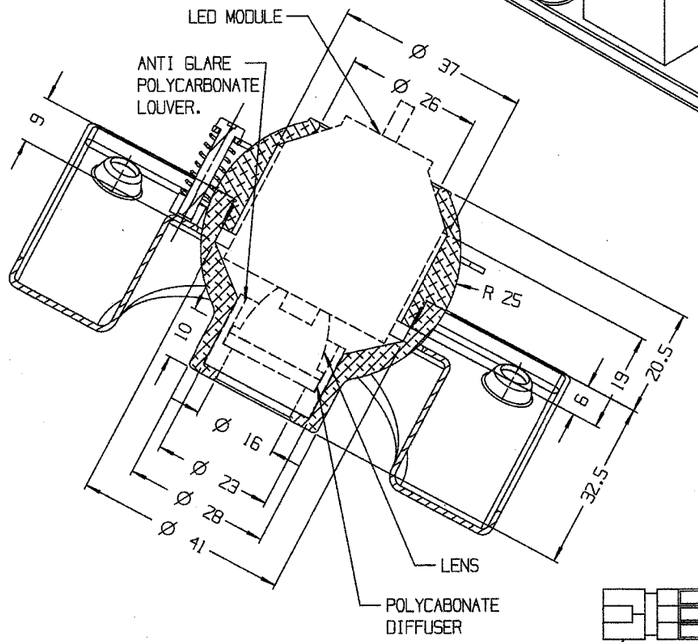
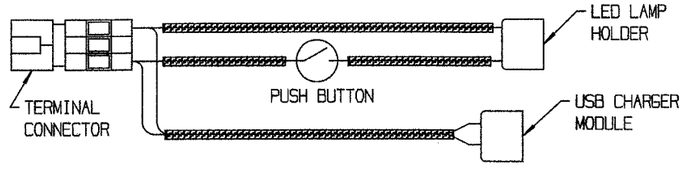


SECTION A-A



WIRING DIAGRAM

7. ANTI GLARE POLYCARBONATE LOUVER/DIFFUSER OF MIN. 1.5MM. THICKNESS TO CAT. NO. LEXAN SP 24-432X OF M/S SABIC OR EQUIVALENT MAKE SHALL BE PROVIDED TO OPTIMSE THE LIGHT OUTPUT SPECTRUM AND TO REDUCE GLARE.
6. SPOT UNIT SHALL BE AS PER DETAIL SHOWN IN SECTION-AA. MATERIAL TO IS:733(LATEST EDITION) DULL ANODIZED TO IS:1868 Gr. AC-5.
5. TERMINAL CONNECTOR SHALL BE OF CAGE CLAMP TYPE WAGO/PHOENIX MAKE TO PART NO. 721-603, 721-103/026-000.
4. USB TYPE-A & C CHARGER MODULE SHALL CONFORM TO SPECIFICTION NO. EDTS-411 (LATEST REVISION) SUITABLE FOR DUAL PORT OPERATION.
3. FRONT COVER MATERIAL SHALL BE OF DEEP DRAWN GRADE TO IS:513 AND NOT FABRICATED. FOR HOLDING ARRANGEMENT OF LED BERTH READING LIGHT AND MOUNTING DETAILS REFER DRG NO. LW76094.
2. BERTH READING LIGHT SHALL GENERALLY CONFORM TO RDSO SPEC. NO. RDSO/PE/SPEC/TL/0091-2016 (REV-1).
1. ALL DIMENSIONS IN MM.

NOTE: -

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FOR UNTOLERANCED DIMENSIONS REFER MDG0008 | DATE OF FIRST ISSUE | 18/07/2023

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S.AREA						CHD
NIL M²						DRN BKRM LOGIN
~~LENGTH / DIA~~		RAIL COACH FACTORY, KAPURTHALA			REF.DRG.No.	NIL
NIL M						
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NIL M						
HEIGHT					DRG.NO.	LW76420
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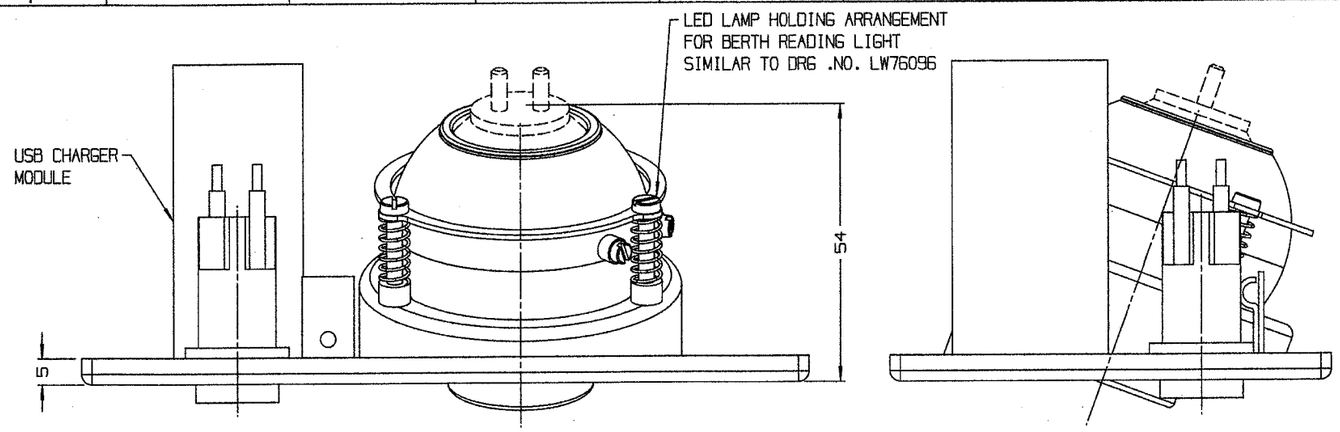

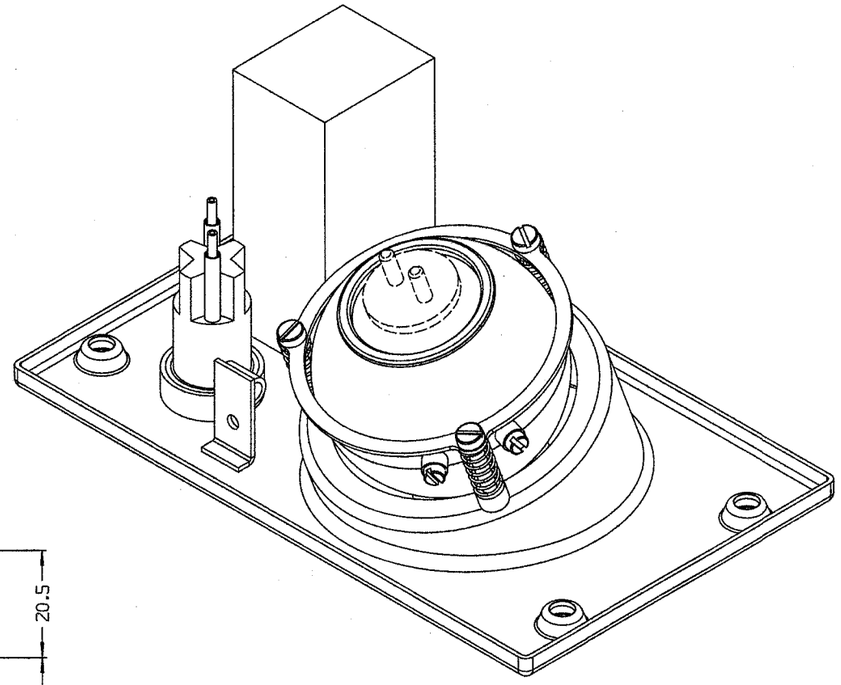

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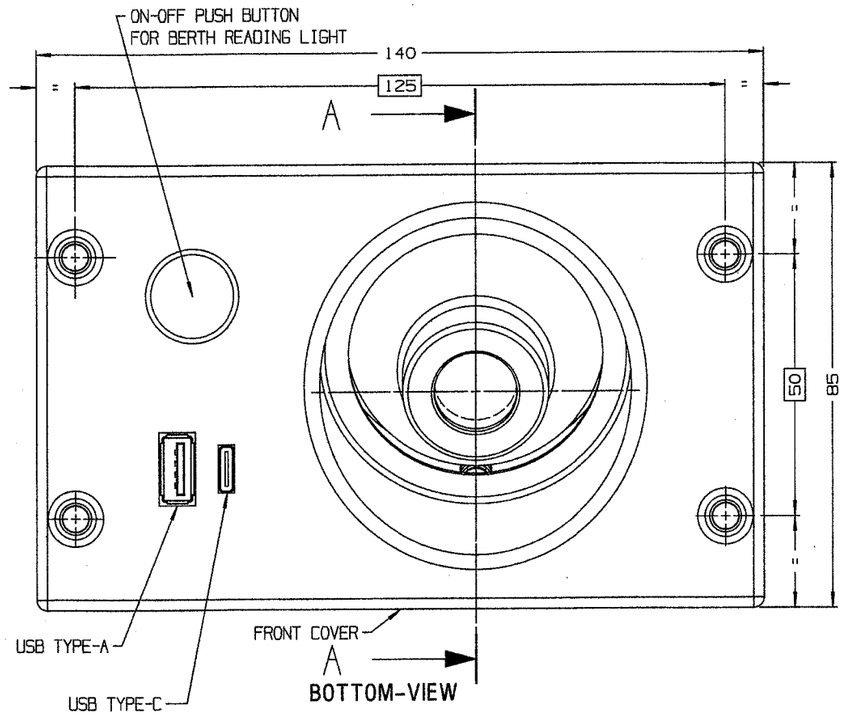

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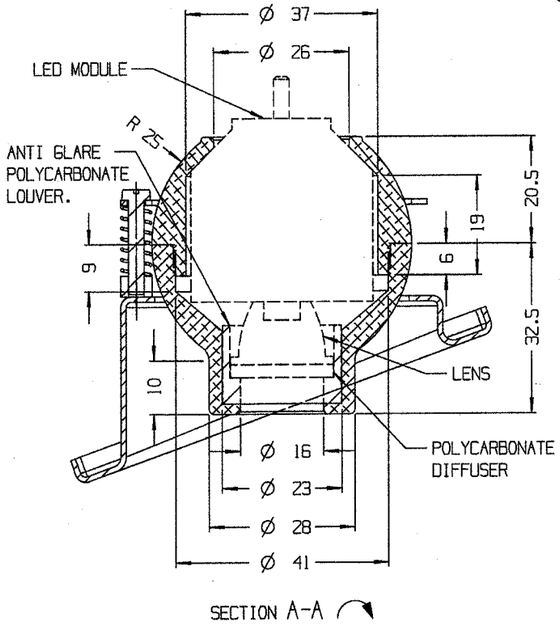
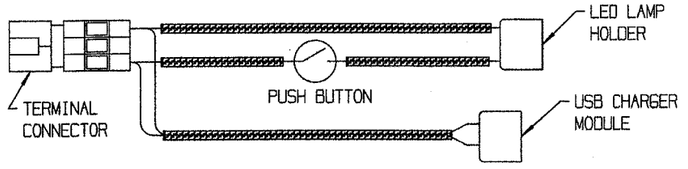


SECTION A-A



WIRING DIAGRAM

NOTE:

7. ANTI GLARE POLYCARBONATE LOUVER/DIFFUSER OF MIN. 1.5MM. THICKNESS TO CAT. NO. LEXAN SP 24-432X OF M/S SABIC OR EQUIVALENT MAKE SHALL BE PROVIDED TO OPTIMSE THE LIGHT OUTPUT SPECTRUM AND TO REDUCE GLARE.
6. SPOT UNIT SHALL BE AS PER DETAIL SHOWN IN SECTION-AA. MATERIAL TO IS: 733(LATEST EDITION) DULL ANODIZED TO IS: 1868 Gr. AC-5.
5. TERMINAL CONNECTOR SHALL BE OF CAGE CLAMP TYPE WAGO/PHOENIX MAKE TO PART NO. 721-603, 721-103/026-000.
4. USB TYPE-A & C CHARGER MODULE SHALL CONFORM TO SPECIFICTION NO. EDTS-411 (LATEST REVISION) SUITABLE FOR DUAL PORT OPERATION.
3. FRONT COVER MATERIAL SHALL BE OF DEEP DRAWN GRADE TO IS: 513 AND NOT FABRICATED. FOR HOLDING ARRANGEMENT OF LED BERTH READING LIGHT AND MOUNTING DETAILS REFER DRG NO. LW76096.
2. BERTH READING LIGHT SHALL GENERALLY CONFORM TO RDSO SPEC. NO. RDSO/PE/SPEC/TL/0091-2016 (REV-1).
1. ALL DIMENSIONS IN MM.

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

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FOR UNTOLERANCED DIMENSIONS REFER MDG0008 | DATE OF FIRST ISSUE | 18/07/2023

WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS	QPASSLY	DETAIL DRG	MATL. & SPEC.	REMARKS
NIL M			NIL	NIL	NIL	NIL
	GROUP	ELECTRICAL	SUPERSEDES:	NIL		
WEIGHT	FILE	Z:\lw76421.prt				
NIL KG						
S.AREA						
NIL M^2						
~~LENGTH / DIA~~						
NIL M						
~~WIDTH / THICK~~						
NIL M						
HEIGHT						
NIL M						

BERTH READING LIGHT FITTING
WITH USB CHARGING SOCKET TYPE A & C
FOR TRANSVERSE L.H.S. BERTH

RAIL COACH FACTORY, KAPURTHALA

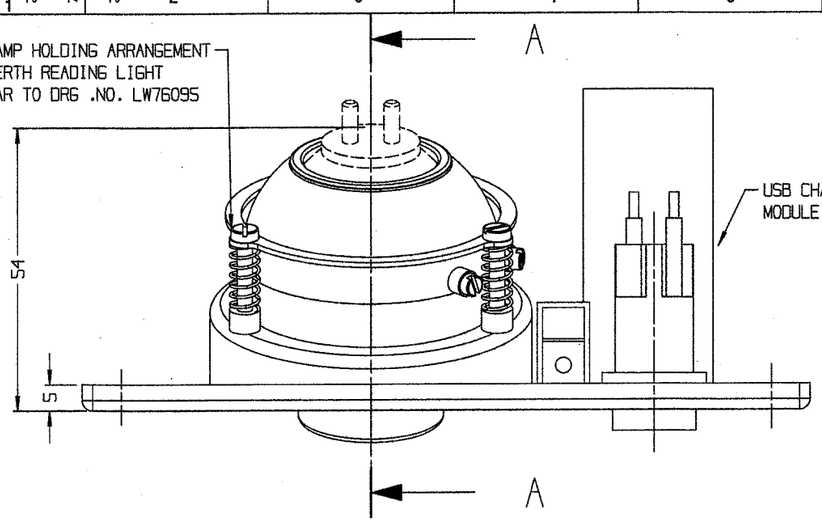
रेलकोच फैक्टरी कपूरथला | IRS

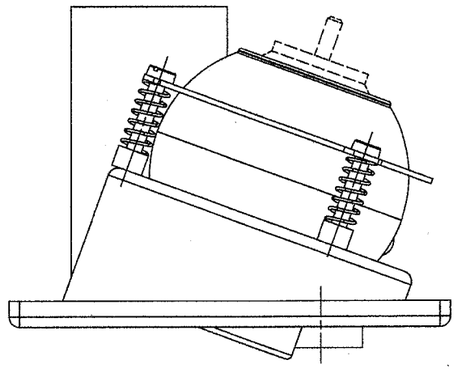
SEE/D&D | DY.CEE/D&D

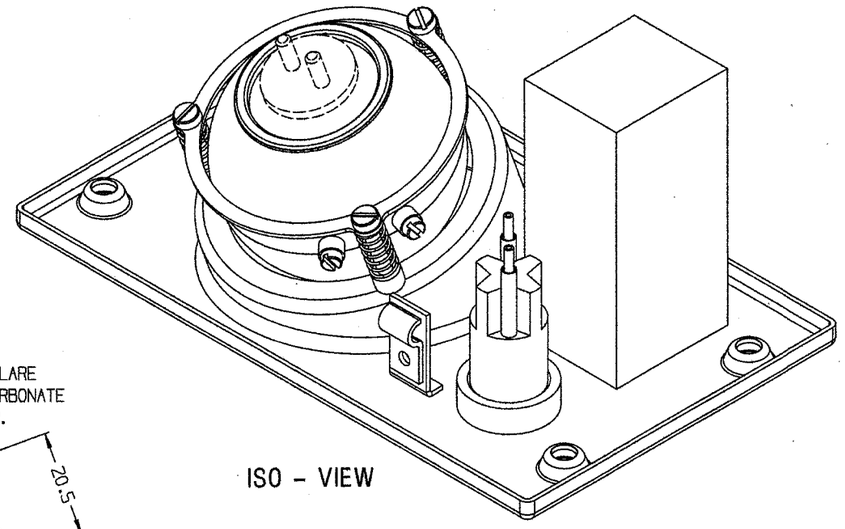
SCALE	SSE/ED	
	CHD	
	DRN	BKRM
REF.DRG.No.	NIL	
PL NO.	NIL	
DRG.NO.	LW76421	
ALT. NIL	SIZE A2	SHEET 1/1

ALT.NO	ALT.DATE	ZONE	ALTERATIONS	AUTHORITY
NIL	NIL	NIL	NIL	NIL

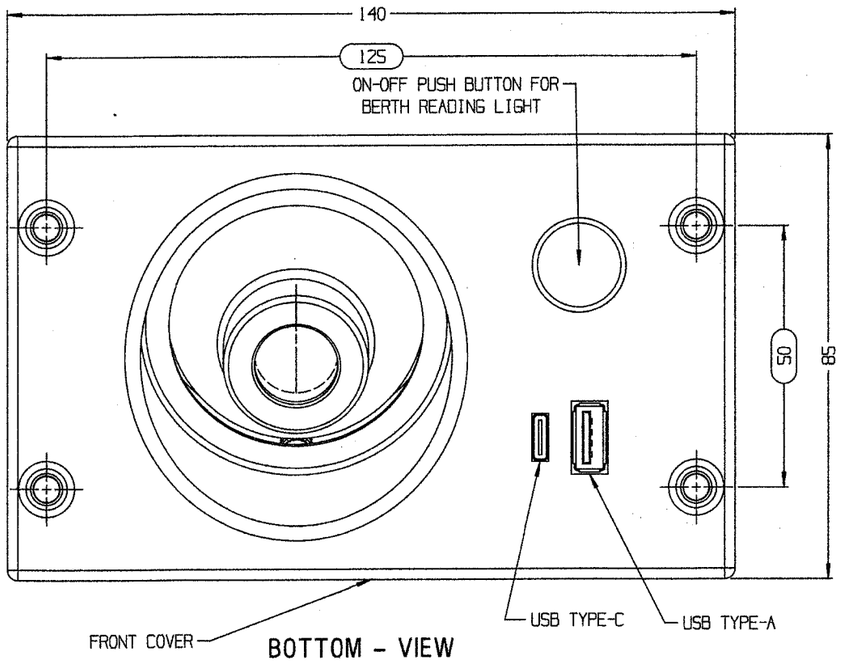
LED LAMP HOLDING ARRANGEMENT
FOR BERTH READING LIGHT
SIMILAR TO DRG .NO. LW76095



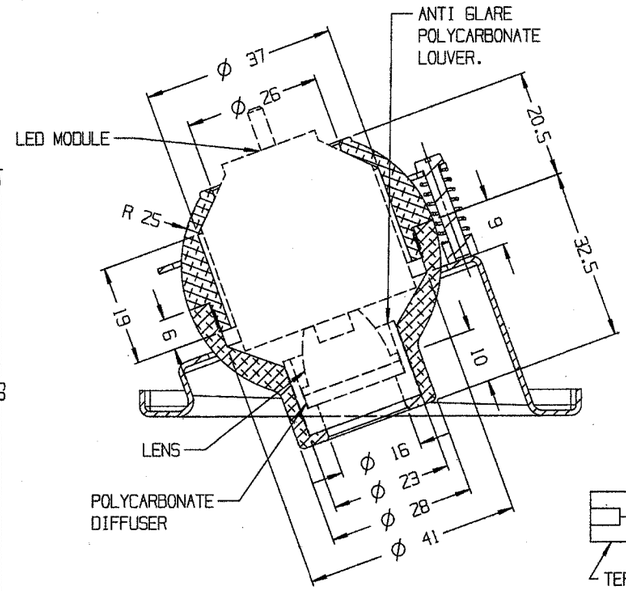




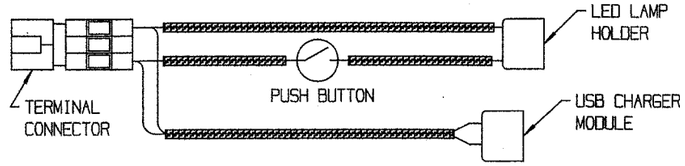
ISO - VIEW



BOTTOM - VIEW



SECTION A-A



WIRING DIAGRAM

NOTE:

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WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS	QPASSLY	DETAIL DRG	MATL. & SPEC.	REMARKS
NIL M	GROUP	ELECTRICAL	SUPERSEDES:	NIL		
WEIGHT	FILE	Z:\lw76422.prt				
NIL KG						
S.AREA						
NIL M^2						
~~LENGTH / DIA~~						
NIL M						
~~WIDTH / THICK~~						
NIL M						
HEIGHT						
NIL M						

BERTH READING LIGHT FITTING
WITH USB CHARGING SOCKET TYPE A & C
FOR TRANSVERSE R.H.S. BERTH

RAIL COACH FACTORY, KAPURTHALA

रेल कोच फैक्टरी कपूरथला | IRS

SEE/D&D | DY.CEE/D&D

SCALE	SSE/ED	
	CHD	
	DRN	BKRM LOGIN
REF.DRG.No.	NIL	
PL NO.	NIL	
DRG.NO.	LW76422	
ALT.	NIL	SIZE A2 SHEET 1/1