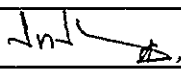




TYPE – V : 225 mm SWEEP, WALL BRACKET TYPE, 110 V DC FAN

1. Fans shall be generally conforming to IS:6680-1992 with deviations as per RDSO Annexure-H, (Dec-2005).
2. Motor body shall be of Aluminium die casting conforming to IS:617-94 grade 4600 having C.I bush at both the bearing ends.
3. Fan base, Motor body & Bracket shall be conforming to Drg.No:ICF/SK-7-6-179.
4. Motor body, Outer body/Carcass, Fan base, Fan bracket and guard shall be powder coated to Silver ash metallic finish to HYC 100 of M/s.HAWCOPLAST / 95-03014 of MARPOL. The thickness of the powder coating shall not be less than 60 microns.
5. Fan Blades shall be of Knife Type Shape with M.S. Bush for fixing of the blade to the shaft and Fire Retardant Plastic (FRP) material in light grey colour with injection moulding process. Blades material shall have the properties as per optional clause 20.1 of IS 6680-92 with RDSO Annexure-H (Dec-2005). Weight of residue / ash content after carrying out the ash content testing as per ISO 345-1-1 shall be around 33-38 %. This 33-38 % residue / ash contains minimum 30 % Glass fibre and 3 to 8 % other residue e.g. fire retardant agents, pigments, and coupling agents. Adequate strengthening of fan blades shall be made to ensure no distortion of blades occurs with passage of time. FRP Blade shall be with M.S. Bush for fixing of the blade to the shaft in place of Aluminum Bush.
6. FRP Fan Blade to be procured from RDSO approved sources as per annexure-1 of RDSO spec. RDSO/PE/SPEC/TL/0050, (rev.1).
7. Firm shall ensure the fixing arrangement of fan blade to IS: 6680-92 with RDSO Annexure-H (Dec-2005) to ensure interchangeability with M.S fan blade.
8. Fan guard shall be of crash worthy design to Drg no. ICF/SK-7-6-158/Col-II, Alt. 'f'. The overall diameter of guard shall be suitably altered in accordance with the sweep of the fan.
9. Welding of Spiral wire in guard should be at all contact points and high quality and strength. Spiral wire should be of single piece only.
10. Guard round plate shall have individual Railway logo as per RDSO/SK-CSC-1124, A (but maximum dimensions scaled down to required size) and not the name of the manufacturer.
11. The securing of inspection dome cover shall be as per fig.19 of IS 6680-92 with RDSO Annexure-H (Dec-2005).
12. The Goose neck bracket shall be of stainless steel with On-Off Toggle switch and FLYBACK connector suitable for 2 pole connection with suitable lug for termination on FLYBACK connector side and fan body side.
13. All fans shall be supplied without speed regulator and resistance box.
14. The connecting leads shall be 1.5 Sq.mm E-Beam cables to RDSO Specn. ELRS/SPEC/ELC/0019, Rev-2. and 560mm long, measured from outside the motor body crimped with suitable lug for termination on FLYBACK connector side and Fan body side.
15. Carbon brushes will be of RDSO approved make and Carbon brush springs will as per RDSO Drg. SKEL-3722, Alt.1.
16. Maximum weight of the Fan shall not exceed 6.5 kg.
17. Colour of the rating plate shall be Black.
18. Ball bearing of SKF/FAG makes shall be provided at each end of the fan.
19. The Fans shall be supplied in assembled condition in individual carton box with suitable packing.
20. The location of the terminals inside the fan should be such as, it does not infringe with any metallic part while closing the cover.
21. ICF/RCF/RDSO approved sources only be considered.
22. Rites inspected hologram should be fixed on fan body only.
23. Firm shall carry out 100% routine internal test with fully assembled sets including guards on position.
24. Firm manufacturing for the first time shall get the prototype approval from CEE/ICF after commissioning on the coach to avoid any teething problems before bulk supply.

TYPE – III : 400 mm SWEEP, SWIVEL TYPE, 110 V DC FAN

1. Fans shall be generally conforming to IS:6680-1992 with deviations as per RDSO Annexure-H, (Dec-2005).
2. Motor body shall be of Aluminium die casting conforming to IS:617-94 grade 4600 having C.I bush at both the bearing ends.
3. Motor body, Outer body/Carcass, Fan base, Fan bracket and guard shall be powder coated to Silver ash metallic finish to HYC 100 of M/s.HAWCOPLAST / 95-03014 of MARPOL. The thickness of the powder coating shall not be less than 60 microns.
4. Fan Blades shall be of Knife Type Shape with M.S. Bush for fixing of the blade to the shaft and Fire Retardant Plastic (FRP) material in light grey colour with injection moulding process. Blades material shall have the properties as per optional clause 20.1 of IS 6680-92 with RDSO Annexure-H (Dec-2005). Weight of residue / ash content after carrying out the ash content testing as per ISO 345-1-1 shall be around 33-38 %. This 33-38 % residue / ash contains minimum 30 % Glass fibre and 3 to 8 % other residue e.g. fire retardant agents, pigments, and coupling agents. Adequate strengthening of fan blades shall be made to ensure no distortion of blades occurs with passage of time. FRP Blade shall be with M.S. Bush for fixing of the blade to the shaft in place of Aluminum Bush.
5. Fan Blade shall be conforming to Drg no: RDSO/PE/SK/TL/0108-2008, Alt.1.
6. FRP Fan Blade to be procured from RDSO approved sources as per annexure-1 of RDSO spec. RDSO/PE/SPEC/TL/0050, (rev.1).
7. Firm shall ensure the fixing arrangement of fan blade to IS: 6680-92 with RDSO Annexure-H (Dec-2005) to ensure interchangeability with M.S fan blade.
8. Fan guard shall be crashworthy to ICF drawing No. ICF/SK-7-6-158,Alt.'f'.
9. Welding of Spiral wire in guard should be at all contact points and high quality and strength. Spiral wire should be of single piece only.
10. Guard round plate shall have individual Railway logo as per RDSO/SK-CSC-1124, A (but maximum dimensions scaled down to required size) and not the name of the manufacturer.
11. The securing of inspection dome cover shall be as per fig.19 of IS 6680-92 with RDSO Annexure-H (Dec-2005).
12. For clause no.8.10.1 of IS: 6680-92: In lieu of the existing FRP-2 way connector, FLYBACK connector assembly suitable for 2.5 sq.mm E-Beam cables with Wire End Ferrule shall be provided. Makes M/S Wago, M/S Phoenix & M/S WeidMuller are only acceptable.
13. All fans shall be supplied without speed regulator and resistance box.
14. The mounting hole shall be of $\phi 9$ mm at 108mm PCD as specified in the drawing RDSO/PE/SK/TL/0025-2002, (REV.0), ALT .3.
15. The Assembly shall generally conform to Fig-6 of IS: 6680-92 with RDSO Annexure-H (Dec-2005).
16. Rubber packing to ICF Drg. ICF/SK-7-3-058/Item-1, Alt.-'e' shall be supplied along with fans.
17. The connecting leads shall be 1.5 Sq.mm E-Beam cables to RDSO Spec. ELRS/SPEC/ELC/0019, Rev-2 and 560 mm long, measured from outside the motor body crimped with suitable lug for termination on FLYBACK connector side and Fan body side.
18. Carbon brushes will be of RDSO approved make and Carbon brush springs will as per RDSO Drg. SKEL-3722, Alt.1.
19. Maximum weight of the Fan shall not exceed 9 kg.
20. Colour of the rating plate shall be Black.
21. Ball bearing of SKF/FAG makes shall be provided at each end of the fan.
22. The Fans shall be supplied in assembled condition in individual carton box with suitable packing.
23. The location of the terminals inside the fan should be such as, it does not infringe with any metallic part while closing the cover.
24. ICF/RCF/RDSO approved sources only be considered.
25. Rites inspected hologram should be fixed on fan body only.
26. Firm shall carry out 100% routine internal test with fully assembled sets including guards on position.
27. Firm manufacturing for the first time shall get the prototype approval from CEE/ICF after commissioning on the coach to avoid any teething problems before bulk supply.

ICF Annex-1 to IS 6680-92 with RDSO Annex-H Dec (2005)	11.4.14				3 of 14
	DATE	SSE/D	DY.CEE/D	CDE/E	Pg No.

Terms and Conditions for Bidders (including Pre-Qualification requirements)
for “Indented item”.

S. No	Description of requirement	Document to be attached
1	Bidder should submit a self-declaration stating that, “Offered item is same as per enquiry and there is no deviation”.	Self-declaration on letterhead of firm.
2	Data Sheet / Drawings / Catalogues of the product (s) offered in the bid, are to be uploaded along with the bid documents. Buyers can match and verify the Data Sheet with the product specifications offered. In case of any unexplained mismatch of technical parameters, the bid is liable for rejection	Data Sheet / Drawings / Catalogues of the product (s)
3	In case Bidder is not be OEM but its Reseller then bidder to submit valid authorisation certificate from OEM with the bid.	Authorisation certificate
4	Registration / Empanelment Requirement: Contract shall be awarded to only such bidder or their OEM (in case of reseller), whose make are approved/Provisionally approved by ICF/RDSO/Indian Railways for the “ Required PI items #1: RAILWAY CARRIAGE FAN 225 MM SWEEP, #2: SWIVEL FAN 400MM SWEEP ” for DETC (Diesel Electric Tower Car) application on the date of bid opening to qualify for this tender.	Supporting document of approval.

Terms Other than PQR to be compiled during Bidding:

Terms	Complied/Not Complied
Quoted SL NO.	
OEM Declaration/Authorization Certificate to be submitted by vendor	
Delivery accepted as per Tender	
Mobile no of concerned Person	
Email ID	

Note: Bidders providing above documents and not meeting above criteria essential for Offer Consideration

ITEM SL NO	Quoted/ Not-Quoted
1	
2	

NO DEVIATION CERTIFICATE

Reference: Bid No. _____ Dated: _____

Subject: Self-Declaration for No Deviation

This is to certify that the items/services offered by us against the above-referred enquiry are **fully compliant** with the specifications, terms, and conditions mentioned in the bid document.

We hereby confirm that **there are no deviations** from the stipulated specifications, commercial terms, conditions, and other requirements of the enquiry.

For _____
(Authorized Signatory)

Date: _____

Seal:

OEM SELF-DECLARATION (FOR OEM)

Date: _____

Subject: **OEM Self-Declaration**

Ref: Bid No. _____

We certify that:

1. The bidder **M/s** _____ is the OEM** itself.
2. The product(s) offered are **new, genuine, and comply** with all specifications mentioned in the tender.
3. We shall provide full **warranty support, technical assistance, and spare parts** availability as required.

For **(Name of OEM)**

Authorized Signatory

Name: _____

Designation: _____

Seal:

OEM address:

**** OEM refers to (Original Equipment Manufacturer)**

B. OEM AUTHORIZATION CERTIFICATE (FOR BIDDER AS DEALER)

Date: _____

Subject: **OEM Authorization Certificate**

Ref: Bid No. _____

We, **(Name of Original Equipment Manufacturer – OEM)**, hereby authorize:

M/s _____
(Address: _____)

We confirm that:

1. Bidder is **authorized partner / dealer / distributor / bidder** for participating in the above-mentioned tender
2. The bidder is authorized to **quote, supply, install (if any), and support** our products.
3. The products offered will be **genuine, brand-new, and manufactured by us (OEM)**.
4. We will provide full **warranty support, technical support, and spare parts (wherever applicable)** for the supplied equipment throughout the warranty/AMC period.

For **(Name of OEM)**

Authorized Signatory

Name: _____

Designation: _____

Seal:

**** OEM refers to (Original Equipment Manufacturer)**



INTEGRAL COACH FACTORY, CHENNAI – 600038
(Ministry of Railways)



Fax No. 044-26262795
Office of the CDE/Elect,
dt. 02.03.2023

No. MD/DPD/OHE/DETC/US/157B

M/s. Bharat Heavy Electricals Ltd.,
Regd. Office: BHEL House, Siri Fort, New Delhi: 110049.
(Kind Attn. Shri Ramakant Yadav, Sr. Engr./CET)

Dear Sir,

Sub: Approval of Bill of Material for DETC US
Ref: 1. ICF PO No. 08221635D03964 dt. 3.11.22
2. Lr.No. CET/3.4/B/T07/015 dt. 06.02.2023

The Bill of Material for DETC US to Doc.No. CET/3.4/ES0007/T07 (Rev.02) consisting of 25 sheets and Annexure B - 1 sheet submitted vide letter under reference (2) for ICF PO under reference (1) have been examined and provisionally approved, subject to compliance of remarks shown in red in the document and general conditions of compliance given below & the items under S.No.20 & 22 of SOR to be included in BOM.

General conditions of compliance:

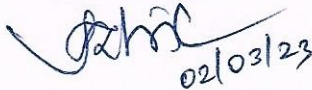
- The supply will generally meet the requirement of the specification/drawing.
- No design change or the change in Bill of Material shall be made without the prior approval of ICF.
- Notwithstanding this approval, vendor is wholly and completely responsible for quality of the performance, reliability and life of the item/items supplied by him.
- Complete compliance to the conditions given in purchase order of Railway Board/Railways/Production units/any coach manufacturing unit assigned by Railways.
- Firm shall submit the feedback of service engineer's visits in field units of railways and failure analysis of the equipment every six months to ICF.

Approved BOM is attached.

Encl: as above.

Thanking you,

Yours faithfully,


02/03/23

(K. EZHILARASU)
DY.CEE/DII
for CDE/Elect.

Copy to: DY.CEE/QA : for inf.

**BILL OF MATERIAL
FOR**

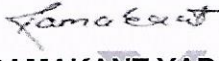

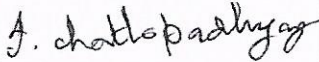
700 HP UNDERSLUNG DIESEL ELECTRIC TOWER CAR (DETC)

ICF'S PO NO. - 08221635D03964 dated 03-Nov-22

Tender No.08221635

(Schedule of Requirement (SOR) dt.07/01/2022)

DOCUMENT NO: CET/3.4/ES0007/T07 (Rev.02)

REV	DATE	PREPARED BY	CHECKED BY	APPROVED BY
02	06.02.2023	 RAMAKANT YADAV	 RAHUL SINGH PATEL	 I CHATTOPADHYAY

**CENTRE FOR ELECTRIC TRANSPORTATION
BHARAT HEAVY ELECTRICALS LTD. BHOPAL**

DOCUMENT NO: CET/3.4/ES0007/T07 (Rev.02)

Page 1



BILL OF MATERIAL

SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
A: DIESEL ENGINE							
1	Integrated power pack assembly consists of following items.				NTA855R (Cummins make)	Vendor WTC/ BHEL	
1.1		Under-slung naturally aspirated, turbo-charged and after cooled Diesel Engine of continuous rating of 340 HP of proven design suitable for 8-Wheeler Diesel Electric Tower Car with starter motor with starter protection unit and all standard accessories including base frame and AVMs.	REFER ANNEXURE-A for details	2 sets			R.D.S.O Approved. No. T1/04E/8W DETC/1 GEN/13 Pt iii. 101 DE 18.12.2017.
1.2		Diesel engine cooling System viz. radiators and radiator fan, Hydrostatic/ Electrical Drive and control arrangement Complete.		2 sets			ICF Approval letter no. MD/DSS/DETC/OH E/U/S/157B Dated. 15.03.2019
1.3		Engine driven Air compressor with suitable mounting and coupling arrangement and other accessories.		2 sets			
1.4		Electronics Governing system.		2 Nos.			
1.5		Actuator		2 Nos.			
1.6		Gauges, Instruments and Safety devices		2 sets			
1.7		Engine starter battery charging system (as part of Diesel engine).		2 sets			



SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
1.8		Screened cable for governor-engine connections, meters etc.		2 sets			

B: Traction Machine

1.9	Three phase variable speed, self-ventilated, separately excited and brushless and underslung Traction Alternator.	Traction Alternator TA4502AZ with flexible coupling and mounting Bolts	34300092076 (Rev.02)	2 nos.	BHEL	Vendor WTC/ BHEL	Inspection as per approved QAP No. QTM/QAP/TA4502AZ/ 18-19/ REV.01 or latest ICF Approval letter no. MD/DSS/DETC/O HE/U/S/157B Dated. 15.03.2019
3	Traction motor with pinion, gear, gear case, nose suspension block, motor suspension unit (with taper roller bearing arrangement) leather bellows for air intake and all hardware's for mounting the traction motor on to the bogie.	Traction Motor type TM4303 BY with pinion.	04390080001 (Rev. 14)	4 nos	BHEL	Vendor WTC/ BHEL	Inspection as per approved QAP No. QMX/QAP/TM/10 -11/ Rev. 11 or latest ICF Approval letter no. MD/DSS/DETC/O HE/U/S/157B Dated. 15.03.2019
		Motor suspension unit consisting of 16 items	04461599024 (Rev. 00)	4 sets			
		1) suspension tube for TM4303	04461599008 (Rev. 02)	4 nos.			
		2) Suspension bearing gwe	34391580001 (Rev.02)	4 nos.			
		3) Suspension bearing rwe	34391580002 (Rev.02)	4 nos.			
		4) Bearing housing	14461599019 (Rev.02)	4 nos.			

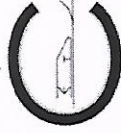
VERIFIED
Provisionally
APPROVED
Date 02/03/2019
Dated. 15.03.2019

उप मुख्यालय / अतिरिक्त डिजाइन
मुख्यालय / एच.सी.ई.



SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
		5) Grease nipple	34394028003 (Rev.07)	8 nos.			
		6) Adjustment washer	14461599018 (Rev.02)	4 nos.			
		7) End cover rwe	14461599014 (Rev.01)	4 nos.			
		8) End cover gwe	14461599015 (Rev.01)	4 nos.			
		9) Abutment piece	14461599017 (Rev.02)	4 nos.			
		10) Enclosure	14461599016 (Rev.01)	4 nos.			
		11) Socket Hd Cap Screw 10 X 30 MM Long	44391560001 (Rev.06)	24nos.			
		12) Socket Hd Cap Screw 12 X 60 MM Long	44391553001 (Rev.01)	32nos.			
		13) Socket Hd Cap Screw 12 X 70 MM Long	44391560003 (Rev.07)	32nos.			
		14) Washer and bolt of size M30X105 MM. For Suspension tube	44393180003 (Rev.04)	32nos			
		15) NSU steel part	24461599002 (Rev.01)	4 nos.			
		16) NSU rubber part	24461599004 (Rev.01)	4 nos.			
		Gear Case Assy.	04461699042 (Rev.05)	4 nos.			

सत्यापित / VERIFIED
अनुमोदित / APPROVED
 दिनांक/Date: 02/03/23
 उप मुखि / ऑफिस / DY/CEE / Design
 मुखि / दि / For CEE
 भारतीय इंटीग्रेल कोच फैक्ट्री / INTEGRAL COACH FACTORY



SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
4	8Kw self-cooled, brushless Auxiliary Alternator and rectifier regulator with base frame, coupling, mounting accessories, mounting hardware and associated electrics.	Gear Wheel (91 Teeth)	14461699024 (Rev.00)	4 nos.			
		Leather Bellows	14391080001 (Rev.03)	4 nos.			
		Mounting Bolts		16nos			
		Auxiliary Alternator	Drg. No. 19-A 3086 ALT-5	2 sets	KEL	Vendor WTC/ BHEL	ICF Approval letter no. MD/DSS/DETC/O HE/U/S/157B Dated. 15.03.2019
		Rectifier regulator unit	Drg. No. 4-A 3089 ALT-4	2 sets			
		base frame, coupling, coupling accessories, mounting hardware and associated electrics.		2 sets			
C: Control Items							
2	Full wave three phase silicon diode bridge Power rectifier			1 sets	M/s BHEL	BHEL	
2.1	Rectifier - I	Rectifier - I	26670600308 V00 Rev.01	1 No.	M/s BHEL		
2.2	Rectifier - II	Rectifier - II	26670600308 V01 Rev.01	1 No.	M/s BHEL		
5	Control Equipment and Instruments consists of following items:						
5.1	Control Equipment and Instruments as per the specification which includes Prewired Driver Desks, Control Cubicle for Cab 1, control Cubicle for Cab 2,						

VERIFIED / APPROVED
Pravish Kumar
 Date 02/03/2023
 उप निविड / आमि / DY.CEE / Design कृते सु वि ड / For CEE
 मयाम डिवा कागुन / INTEGRAL COACH FACTORY

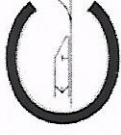


SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
	Motor Switch Group Cubicle and Resistor Panel.						
5.1.1	Control Cubicle -Cab-I	Control Cubicle -Cab-I	25730030058 Rev.08	1 No.	M/s BHEL	BHEL	
5.1.2	Control Cubicle -Cab-II	Control Cubicle -Cab-II	25730030059 Rev.05	1 No.	M/s BHEL		
5.1.3	Motor Switch Group	Motor Switch Group	15730030050 Rev.05	1 No.	M/s BHEL		
5.1.4	Driver Desk- I	Driver Desk- I	25730030057 Rev.09	1 No.	M/s BHEL		
5.1.5	Driver Desk- II	Driver Desk- II	25730030057 Rev.09	1 No.	M/s BHEL		
5.1.6	Resistor Box	Resistor Box	36670600396 Rev.06	1 No.	M/s BHEL		
5.2	Voltage sensing system each in Cab1 & Cab2 as per CLW Specification no. CLW/ES/I-25.			1 Set 2 Set	M/s SAMADHAN	vendor WTC/ BHEL	ICF Approval letter no. MD/DSS/DETC/OH E/U/S/157B Dated. 15.03.2019
5.3	Speed indicator and recording equipment as per RDSO Spec. No. MP-0.3700-07 (latest), suitable for speed range of 0-160 kmph. One cab of OHE car will have one recorder cum indicator and the other cab will have one speed indicator only.			1 Set	M/s AAL/ Laxven system/ Medha	vendor WTC/ BHEL	ICF Approval letter no. MD/DSS/DETC/OH E/U/S/157B Dated. 15.03.2019
5.4	External 24V DC Battery Charger confirming to specification no. ICF/ELEC/848.			1 No.	1. M/s RAMYAA ELECTROGE AR P. LTD.)	vendor WTC/ BHEL	ICF Approval letter no. MD/DSS/DETC/OH E/U/S/157B Dated. 15.03.2019

* Subject to remarks shown in REP.

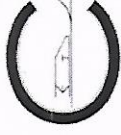
* Personally APPROVED

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अनुमोदित / APPROVED
 दिनांक / Date 02.03.23
 उप सु वि ड / ऑफिस / DY.CEE / Design
 कुल्ले सु वि ड / For CEE
 सहायक डिप्टी कार्यपालक / INTEGRAL COACH FACTORY



SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
6	Light fittings:						
6.1	LED Head light to RDSO Spec. RDSO/2017/EL/SPEC/0134 (Latest).			2 Nos.	M/s ENSAVE DEVICES PVT LTD or ICF/RDSO/Indian Railways approved Supplier	vendor WTC/ BHEL	RDSO letter No. EL/6.11.1 (Ensave dated. 10.03.2021 with ICF approved drg. no. 0120630001 R5 for Ensave Device Pvt. Ltd.
6.2	LED Marker light cum Tail light to Spec no. ELRS/SPEC/PR/0022, Suitable for use in system voltage type 'E' of CL2.2 of RDSO Spec. to ICF adaptor plate Drg.No. DMU/DPC3/SS-9-0-309 COL-I			4 Sets.	M/s Altos Electronics or ICF/RDSO/Indian Railways approved Supplier	vendor WTC/ BHEL	RDSO approved drg. no. ALT-MLE-16 R0 E-RFL-DWG.03 R02 for Altos Electronics
6.3	LED based flasher light and control unit system to RDSO spec no: ELRS/SPEC/LFL/0017, ICF (latest) and ICF Drg.No. ICF/SK 7-5-047 alt.'b' and ICF/SK 7-5-048 alt.'a' (The lamp unit & flasher unit dimensionally interchangeable)	<p>✓ Suitable for use in system voltage of type 'E' 2 Sets.</p> <p>★ Provisionally approved</p> <p>दिनांक/ Date 02.03.23</p> <p>उप मुखि / ऑफि / DY.CEE / Design</p> <p>कुले मुखि / For CEE</p> <p>महाराष्ट्र राज्य रेलवे इंटीग्रेल कोच फैक्ट्री</p>		2 Sets.	M/s Altos Electronics or ICF/RDSO/Indian Railways approved Supplier	vendor WTC/ BHEL	RDSO approved drg. no. EL-C-EMU-01 R01 for LED flasher control unit and EL-L-EMU-01 R01 for flasher lamp unit for Altos Electronics
6.4	Fog light to 24V, 100W. with 180 mm glass dia. suitable to rolling stock applications.			2 Nos.	D R Auto Industries or ICF/RDSO/Indian Railways approved Supplier	vendor WTC/ BHEL	PLW approval letter no. SD-I/DMW/WR-1/101579 Dated. 14.09.2021 for D R Auto Industries

★ Subject to remarks shown in RED.



SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspecti on Agency	Remarks
6.5	Search light 24V, 100W with 180mm glass dia. suitable to rolling stock applications.			2 Nos.	D R Auto Industries or ICF/RDSO/Indian Railways approved Supplier	vendor WTC/ BHEL	PLW approval letter no. SD-I/DMW/WR-1/101597 Dated. 14.09.2021 for D R Auto Industries
6.6	LED light fittings generally conforming to RDSO Spec. No. RDSO/PE/SPEC/TL/0091 Rev.0, 2008 with Amdt.2 or latest and Dimensions as per ICF Drg. No. ICF/STD-7-6-042 alt. 'nil', ITEM-2 (9W) along with mating connectors.			25 Nos.	D R Auto Industries or ICF/RDSO/Indian Railways approved Supplier	vendor WTC/ BHEL	ICF approval letter no. ELECT/W/1-2 Dated 28.06.2017 for D R Auto Industries
6.7	Spotlight to Drg. ICF/STD 7-6-035 Alt.Nil			4 Nos.	M/s. AGASTYA TECHNOLOGY AND TRANSMISSION PVT LTD /M/s ALTOS ELECTRONIC S or ICF/RDSO/Indian Railways approved Supplier	vendor WTC/ BHEL	ICF approval letter no. MD/DSS/APD-2091 Dated. 12.06.2010 with ICF approved drg. No. ICF-SPL-00-60 R00 for AGASTYA TECHNOLOGY AND TRANSMISSION PVT LTD/ ICF approved drg. ALT-SPL-26R1 for Altos Electronics

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SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspecti on Agency	Remarks
6.8	LED Cluster Light (Amber) to ICF Drg No. ICF/SK3 7- 6-023 Item-2			2 Nos.	M/s. AGASTYA TECHNOLOG Y AND TRANSMISSI ON PVT LTD /M/s ALTOS ELECTRONIC S or ICF/RDSO/Indi an Railways approved Supplier	vendor WTC/ BHEL	ICF approval letter no. MD/DSS/APD- 2091 Dated. 21.06.2010 with ICF approved drg. No. ICF-CLL-00-60 R00 for AGASTYA TECHNOLOGY AND TRANSMISSION PVT LTD/ ICF approved drg. ALT- LCL-27 R0 for Altos Electronics
6.9	Nightlight fitting to ICF/ELEC/934 REV-1, CS- 5, Annexure - G			2 Nos.	D R AUTO INDUSTRIES/ Agastya Technology and Transmission Pvt. Ltd. or ICF/RDSO/Indi an Railways approved Supplier	vendor WTC/ BHEL	ICF approval letter no. ELEC/W/I-2 Dated. 13.05.2017 for D R Auto Industries / ICF approved Drg. No. AGS-NLM-ASSY for Agastya Technology and Transmission Pvt. Ltd.
6.10	LED based Flood Light fitting (75 Watt) to RDSO Spec. TI/SPC/OHE/8WDETC/009 2			5 Sets	ICF/RDSO/Indi an Railways approved Supplier	vendor WTC/ BHEL	Documents/ Drgs. shall be shared with ICF for confirmation prior to placement of PO on vendor.

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SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspecti on Agency	Remarks
7	Fans:						
7.1	Railway carriage fan 225 mm sweep, wall bracket type, 110 V DC fan Type - V of ICF annexure 1 to IS:6680-92 with RDSO annexure-H Dec-2005			4 Nos.	M/s S P J INDUSTRIES or ICF/RDSO/Indi an Railways approved Supplier	vendor WTC/ BHEL	ICF approval letter ELEC/W/1-2 Dated. 16.07.2021 for S P J INDUSTRIES PVT. LTD.
7.2	Swivel fan 400 mm sweep, 110VDC TYPE -III of ICF ANNEXURE 1 to IS: 6680-92			6 Nos.	M/s S P J INDUSTRIES or ICF/RDSO/Indi an Railways approved Supplier	vendor WTC/ BHEL	ICF approval letter ELEC/W/1-2 Dated. 16.07.2021 for S P J INDUSTRIES PVT. LTD.
7.3	Exhaust fan 130 mm sweep, 110VAC to Drg. ICF/SK-7-6- 177 (latest)			2 Nos.	M/s KONTACT CONSORTIU M INDIA PVT LTD or ICF/RDSO/Indi an Railways approved Supplier	vendor WTC/ BHEL	As per ICF Drg. No. ICF/SK-7-6-177 (Latest) supporting evidence is enclosed.
8	Switch and Plug & socket assembly:						
8.1	100VA Individual static inverter for laptop/mobile charging point in coaches to SPEC.NO. RDSO/PE/SPEC/TL/0142-2010 (REV.0) TYPE 'B'.			2 Nos.	M/s HY-TECH POWER SYSTEMS or ICF/RDSO/Indi an Railways approved Supplier	vendor WTC/ BHEL	ICF approval letter no. Elec./W/1-2 Dated. 03.10.2017 for HY-TECH POWER SYSTEMS

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SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
8.2	Plug and socket board enclosure with 3 pole and earth metal socket of 20 AMPS, 415V rating as per RDSO Spec. No. TI/SPC/OHE/8WDETC/0092			1 Set	Legrands/Havells/Hager	vendor WTC/ BHEL	Standard Electrical Accessories shall be supplied as per requirement.
8.3	Plug and socket board enclosure with 3 pole and earth metal socket of 30 Amps, 415V rating to IS/IEC-8623- latest confirming to cat no. (i)DHDPUTN030 of M/s. HAVELLS or (ii)607851 M/S Legrand (iii)HMP 332N of M/s. HAGER Fitted with 1 no. of triple pole MCB 10 KA breaking capacity, C-curve, 10A, 415VAC, 3PH rating conforming to IS/IEC-60898-1 latest.			1 Set	Legrands/Havells/Hager	vendor WTC/ BHEL	Standard Electrical Accessories shall be supplied as per requirement.
8.4	230VAC, 6A, 3pin socket and switch with polycarbonate surface mounting box as per RDSO Spec. No. TI/SPC/OHE/8WDETC/0092			2 Sets	ICF/Indian Railways/BHEL approved sources	vendor WTC/ BHEL	Standard Electrical Accessories shall be supplied as per requirement.

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SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
8.5	Plug and socket board enclosure with double pole and earth metal socket of 20 Amps, 230V rating to IS/IEC- 8623-latest confirming to cat no. (i)DHDPUDP020 of M/s HAVELLS or (ii) A9HMS220 of M/s. SCHNEIDER or (iii) 607843 of M/s. LEGRAND Fitted with 1 no. of double pole MCB 10KA breaking capacity, C-curve, 20A, 240VAC to IS/IEC: 60898-1 latest. MCB's shall be as per IR PUs approved makes only. - 1 No.			1 No.	Legrands/Havells/Schenider	vendor WTC/ BHEL	Standard Electrical Accessories shall be supplied as per requirement.
8.6	Modular Switch assembly. All the switches shall be of 6A, 230VAC, SPST					vendor WTC/ BHEL	Standard Electrical Accessories shall be supplied as per requirement.
8.6.1	Single switch modular assembly to Drg.No. DETC/US 7-4-003 (Lat.) CoH- (Dimensions confirming to Drg.No. ICF/SK3-7-4-001 (lat.).	<div><div>सत्यापित / VERIFIED अनुमोदित / APPROVED</div><div>दिनांक/Date 02/03/23</div><div>उप मु बि इ / आसि / DY.CEE / Design</div><div>कृते मु बि इ / For CEE</div><div>महाराष्ट्र विद्युत आ. (महाराष्ट्र) / INTEGRAL COACH FACTORY</div></div>	3 Nos.	ICF/Indian Railways/BHEL approved sources			
8.6.2	Double switch modular assembly to Drg.No. DETC/US 7-4-003 (Lat.) CoH- (Dimensions confirming to Drg.No. ICF/SK3-7-4-001 (lat.).		6 Nos.				



SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspecti on Agency	Remarks
8.6.3	Three switch modular assembly to Drg.No. DETC/US 7-4-003 (Lat.) Col-VI (Dimensions confirming to Drg.No. ICF/SK3-7-4-001 (lat.)			3 Nos.			
8.7	Terminal board box complete to drg, ICF Drg.No.ICF/SK3-7-6-056			1 No.	ICF/Indian Railways/BHE L approved sources	vendor WTC/ BHEL	Shall be supplied as per ICF Drawing.
8.8	Steel Distribution box fitted with 20A 230V AC metal clad socket & scraping earth, assembled with single pole MCB 10 KA breaking capacity, C curve, 6A 1) IS: 8623-1993 similar to Cat No. 6078 41 of M/s. Legrand 2) IS/IEC-60898-1(2002)			5 Sets	M/s Legrand or ICF/RDSO/Indi an Railways/BHE L approved Supplier	vendor WTC/ BHEL	Standard Electrical Accessories shall be supplied as per requirement.
8.9	Twin stud terminal board to Drg.No. DETC/US-7-2- 017. (Latest) Col I			1 No.	M/s VAANAVIL ENTERPRISE or ICF/RDSO/Indi an Railways/BHE L approved Supplier.	vendor WTC/ BHEL	
9	Fabricating items:						
9.1	Stainless steel Traction motor connection box suitable for underslung mounting to Drg ICF/SK-7-			4 Nos	ICF/RDSO/ Indian Railways/BHE L approved	vendor WTC/ BHEL	Shall be supplied as per ICF Drawing.

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Item against Sl.no 8.8 shall be accommodated inside the housing box as indicated in Sl.no. 9.3 of this BOM

DOCUMENT NO: CET/3.4/ES0007/T07 (Rev.02)

SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
	ICF/ELEG/OHE/007, Rev.0; CS-01				ICF/RDSO/Indi an Railways approved Supplier.		57B Dated. 21.12.2018 for AMPL CORPORATION PVT. LTD.
11	Pantograph along with roof insulators:						
11.1	Single Pan Pantograph to as per RDSO SPEC.TI/SPC/OHE/8WDET C/0092 and Supply and install scale to ICF Drg. No. DETC-2-6-003			1 No.	CONTRANSY S PRIVATE LIMITED / CONCEPT RAIL ENGG. PVT.LTD or ICF/RDSO/Indi an Railways approved Supplier.	vendor WTC/ BHEL	RDSO letter No. EL/2.2.1/Concept dated. 14.09.2016 for CONCEPT RAIL ENGG. PVT.LTD
11.2	Roof Insulators for pantograph as per RDSO SPEC TI/SPC/OHE/8WDET/009 2.			4 No.	BHARAT HEAVY ELECTRICAL S LIMITED / SARAVANA GLOBAL ENERGY LIMITED / INSULATOR AND ELECTRICAL S or ICF/RDSO/Indi an Railways approved Supplier.	vendor WTC/ BHEL	CLW approval letter no. ELDD/3232/AK Dated. 06.03.02, with approved drg. No. CQS033P052 R5 for M/S INSULATOR AND ELECTRICALS / ICF approval letter no. ICF/08/17/2080/10 70/F dated. 05.04.2018 with ICF approved drg. No. 033-RY-A-0221

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SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty / DETC	Supplied by/ Make	Inspection Agency	Remarks
12	Hydraulically operated lifting & swivelling platform for overhead equipment inspection car as per RDSO spec. no. TI/SPC/OHE/8WDETC/0092 to Spec No. ICF/ELEC/OHE/001 REV No. 01 With CS04			1 Set	HYDRAULIC ACTUATORS PRIVATE LIMITED / ORIONE HYDRAULICS PVT. LTD. or ICF/RDSO/Indian Railways approved Supplier.	vendor WTC/ BHEL	R3 for SARAVANA GLOBAL ENERGY LIMITED ICF approval letter no. MD/DPD/OHE/DETC/US/157B Dated. 23.12.2022 to M/s ORIONE HYDRAULICS PVT. LTD shall be followed / ICF approved Drg. No. 4.91.121.00 R2 for HYDRAULIC ACTUATORS PRIVATE LIMITED
13	Intercom System for use in Over Head Equipment Inspection Car as per RDSO spec. no. TI/SPC/OHE/8WDETC/0092 to ICF Spec No. ICF/ELEC/OHE/002 REV.B.			1 Set	ELIXIR ELECTRONIC S or ICF/RDSO/Indian Railways approved Supplier.	vendor WTC/ BHEL	ICF approval letter no. MD/DPD/OHE/DETC_US/US/157B dated. 23.12.2017 for ELIXIR ELECTRONICS
14	CCTV Networking system as per RDSO spec. no. TI/SPC/OHE/8WDETC/0092 to ICF SPEC. NO. ICF/ELEC/OHE/009 Rev-01			1 Set	PUNJAB RADIOS PVT. LTD or ICF/RDSO/Indian Railways approved Supplier.	vendor WTC/ BHEL	ICF approval letter no. MD/D/DETC/157 Dated. 17.10.2020 for PUNJAB RADIOS PVT. LTD

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SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
15	EPDM cable sealing system for cables and pipes routed from underslung to on-board #			1 Set	WALLMAX INDIA ENTERPRISE S PRIVATE LIMITED or ICF/RDSO/Indi an Railways approved Supplier.	vendor WTC/ BHEL	
16	Batteries:						
16.1	VRLA Control battery as per RDSO Spec. No. TI/SPC/OHE/8WDETC/009 2 and as per RDSO Spec. No. RDSO/PE/SPEC/AC/0009-2014,REV.2			1 Set	AMARA RAJA BATTERIES LTD / HBL POWER SYSTEMS LTD or ICF/RDSO/Indi an Railways approved Supplier.	vendor WTC/ BHEL	ICF approval letter no. MD/DPD/OHE/DET C/US/157B Dated. 09.05.2019 for HBL POWER SYSTEMS LTD
16.2	Starter Battery 24V, 450Ah of RDSO approved make #			1 Set	MYSORE THERMO ELECTRIC PVT LIMITED / BHARAT BATTERY MANUFACTURING PVT LTD or ICF/RDSO/Indi an Railways approved Supplier.	vendor WTC/ BHEL	

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\$ The starter battery shall be supplied as per - Charged condition, and OGA drawing shall be submitted for reference & record.

DOCUMENT NO: CET/3.4/ES0007/T07 (Rev.02) # The drawings shall be submitted duly Page 17 considering all cables entries and pipe entries from underframe to onboard. EPDM pipe sealing for pneumatic pipes inside driver's cab is in ICF scope.



SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspection Agency	Remarks
17	Cab heater unit. as per RDSO spec. no. TI/SPC/OHE/8WDETC/009 2 and as per SPEC-1GFELEG/OHE/008 Rev-0, CS-01			2 Set	TOPGRIP INSTRUMENTS COMPANY or ICF/RDSO/Indian Railways approved Supplier.	vendor WTC/ BHEL	ICF approval letter no. ELEC/W/I-2 Dated. 03.11.2021 for TOPGRIP INSTRUMENTS COMPANY and ICF approved drawing vide ICF letter no. MD/DPD/DETC/OH E/US/1578 Dated. 12.01.2018 shall be followed.
18	Power, control, data and communication cables Harness	* Approved vide ICF Lr no. MD/DPD/OHE/DETC/US/1578 Dtd. 25.2.2023		1 Set	All Cables used in Cable Harness shall	vendor WTC/ BHEL	Provision for flexible conduits, cable jackets, sleeves shall be

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⇒ The items under 20.22 of SOR shall also to be supplied by M/S BHEL.

⇒ All other instructions given in SOR shall be adhered to.



SOR Sl. no. ref.	Item Description as per SOR	Sub Item Description	Drawing no/ part no	Qty./ DETC	Supplied by/ Make	Inspecti on Agency	Remarks
i.	Harness Chart for Roof Wiring to ICF Drg. No DETC/US-7-0-003				be from RDSO/ICF Approved Vendors		supplied as required. All earthing hardwares at both coach side and equipment side shall be provided.
ii.	Harness Chart for Roof Wiring to ICF Drg. No DETC/US-7-0-036						
iii.	Harness Chart for Roof to ICF Drg. No DETC/US-7-0-039						
iv.	Harness Chart for Control Circuit to ICF Drg. No. DETC/US-7-0-013						
v.	Harness Chart for Control Circuit to ICF Drg. No. DETC/US-7-0-029						
vi.	Harness Chart for Power and Aux. to ICF Drg. No. DETC/US-7-0-016						
vii.	Harness Chart for Power and Aux. to ICF Drg. No. DETC/US-7-0-032						
viii.	Harness Chart for Power and Control (On board & UF) to ICF Drg. No. DETC/US-7-0-040						
ix.	Harness Chart for Cab- & II and Driver Desk-I & II to ICF Drg. No DETC/US-7-0-046						

* As per Letter No. MD/DPD/OHE/DETC/US/1578/
dt. 25/10/2021 separate detailed cable BOM
shall be required to be submit for approval
as per latest approved Schematic.

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ANNEXURE-A

S.No.	Description	Part No.	Unit	PER ENGINE	PER DETC	Remarks
1	PROPOSED ENGINE LAYOUT OF DETC (NTA 855 ENGINE)	New part no.	Set	1	2	
1.1	DIAGRAM, ENGINE INSTALLATION	4071440	No	1	2	
1.1.1	SUPPORT, ENGINE FRONT	3392316	No	1	2	
1.2	ALTERNATOR MOUNTING BRACKET	New part no.	Set	1	2	
1.2.1	ISOLATION, VIBRATION	3392084	No	4	8	
1.2.2	ISOLATION, VIBRATION	3392083	No	1	2	
1.2.3	HARDWARE REQUIRE FOR MOUNTING VIBRATION ISOLATORS					
1.3	COOLING SYSTEM LAYOUT DRAWING WITH HYDRAULIC SYSTEM	New part no.	Set	1	1	
1.3.1	RADIATOR	4071893	Nos	1	1	Common radiator for both engine.
1.3.2	FAN,ENGINE	4348442	Nos	1	2	
1.3.3	ISOLATOR, VIBRATION	3877027	Nos	6	6	
1.3.4	HOSE, HYDRAULIC	4072079	Nos	1	2	
1.3.5	CONNECTOR, MALE	4072069	Nos	1	2	
1.3.6	HOSE, HYDRAULIC	3414239	Nos	1	1	
1.3.7	PLUG, THREADED	3392743	Nos	1	2	
1.3.8	PLUG, THREADED	3392670	Nos	2	2	
1.3.9	ADAPTER, PLAIN	3392404	Nos	1	2	
1.3.10	ADAPTER, PLAIN	3392401	Nos	2	4	
1.3.11	HOSE, FLEXIBLE	AK 5017 SS	No	1	2	उप मु वि ड / आभि / DY.CEE / Design
1.3.12	HOSE, FLEXIBLE	AK 5011 SS	sets	1	1	कुते मु वि ड / For CEE
1.3.13	HOSE, FLEXIBLE	AK 5013 SS	Nos	1	2	
1.3.14	HOSE, FLEXIBLE	AK 5010 SS	sets	1	1	

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1.3.15	HOSE,FLEXIBLE	AK 5014 SS	Nos	1	2
1.3.16	MOTOR,HYDRAULIC	3230038	Nos	1	2
1.3.17	HOSE,FLEXIBLE	4055132	Nos	1	1
1.3.18	HOSE,HYDRAULIC	4072078	Nos	1	2
1.3.19	ELBOW,MALE ADAPTER	120437	Nos	2	4
1.3.20	ELBOW,MALE ADAPTER	116936	Nos	5	5
1.3.21	SWITCH,FLUID LEVEL	4084367	Nos	1	2
1.3.22	CONNECTOR,MALE	116935	Nos	5	10
1.3.23	GASKET,FLOAT VALVE BODY	2885025	Nos	1	2
1.3.24	CONNECTOR,PIPE	3872268	Nos	10	20
1.3.25	CONNECTOR,PIPE	3872294	Nos	1	2
1.3.26	CONNECTOR,PIPE	3872258	Nos	1	2
1.3.27	HOSE,FLEXIBLE	AK 6040 SS	Nos	3	6
1.3.28	COUPLING,PLAIN HOSE	3069172	Nos	1	2
1.3.29	TANK,OIL	4071561	Nos	1	1
1.3.30	PUMP,HYDRAULIC	3392916	Nos	1	2
1.3.31	CONNECTION,OIL SUCTION	3167068	Nos	1	2
1.3.32	GASKET,HYDRAULIC PUMP	2885024	Nos	1	2
1.3.33	SLEEVE,SPLINE COUPLING	3023506	Nos	1	2
1.3.34	CONNECTION,OIL SUCTION	3167067	Nos	1	2
1.3.35	RING,RETAINING	100475	Nos	1	2
1.3.36	VALVE,OIL CONTROL	3876879	Nos	1	2
1.3.37	COOLER,OIL	4071659	Set	1	1
1.3.38	HARDWARE REQUIRE FOR MOUNTING RADIATOR WITH COACH BODY				
1.4	EXHAUST SYSTEM LAYOUT	New part no.	Nos	1	2
1.4.1	MUFFLER	3414984	Nos	1	2
1.4.2	CAP,RAIN	3414081	Nos	1	2
1.4.3	FLANGE,WELD	3877783	Nos	3	6
1.4.4	CONNECTION,EXHAUST OUTLET	4084138	Nos	1	2

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1.4.5	TUBE, EXHAUST OUTLET	3392230	Nos	1	2
1.4.6	TUBE, WATER TRANSFER	3392094	Nos	4	8
1.4.7	ADAPTER, EXHAUST OUTLET	186918	Nos	1	2
1.4.8	GASKET, EXH OUT CONNECTION	2880039	Nos	6	12
1.4.9	CLAMP, V BAND	186917	Nos	1	2
1.4.10	STRAP, MUFFLER	3873208	Nos	2	4
1.4.11	HARDWARE REQUIRE FOR EXHAUST SYSTEM		Set	1	2
1.5	AIR INTAKE SYSTEM LAYOUT	New part no.	Nos	1	2
1.5.1	INDICATOR, RESTRICTION	3872813	Nos	1	2
1.5.2	CLEANER, AIR	3872668	Nos	1	2
1.5.3	CAP, DUST	3225660	Nos	1	2
1.5.4	PLUG, PIPE	70295	Nos	10	20
1.5.5	CLAMP, T BOLT	140314	Nos	6	12
1.5.6	HOSE, ELBOW	3030513	Nos	1	2
1.5.7	CLAMP, T BOLT	152026	Nos	1	2
1.5.8	CLAMP, T BOLT	125741	Nos	14	28
1.5.9	TUBE, AIR INLET	3229644	Nos	1	2
1.5.10	TUBE, AIR INLET	3230888	Nos	1	2
1.5.11	HOSE, ELBOW	3030772	Nos	5	10
1.5.12	TUBE, AIR INLET	3235632	Nos	2	4
1.5.13	HOSE, HUMP	3030792	Nos	1	2
1.5.14	TUBE, AIR INLET	4054677	Nos	3	6
1.5.15	TUBE, AIR INLET	3236756	Nos	2	4
1.5.16	TUBE, AIR INLET	3877954	Nos	1	2
1.5.17	HOSE, HUMP	3232257	Nos	2	4
1.5.18	HOSE, ELBOW	3030774	Nos	2	4
1.5.19	HOSE, ELBOW	3235134	Nos	1	2
1.5.20	TUBE, AIR INLET	3877953	Nos	1	2
1.5.21	CLAMP, T BOLT	125739	Nos	1	2
1.5.22	HARDWARE REQUIRE FOR AIR INTAKE SYSTEM		Set	1	2

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1.6	FUEL SYSTEM LAYOUT	New part no.	Nos	1	2
1.6.1	HOSE,FLEXIBLE	AK 8065 MS	Nos	1	2
1.6.2	CONNECTOR,MALE	3178747	Nos	1	2
1.6.3	CONNECTOR,MALE	105503	Nos	1	2
1.6.4	UNION,MALE	3100517	Nos	1	2
1.6.5	HOSE,FLEXIBLE	AK10060 SS	Nos	2	4
1.6.6	COUPLING,PLAIN HOSE	3069174	Nos	2	4
1.6.7	SEPARATOR,FUEL WATER	3231787	set	1	2
1.6.8	ELBOW,MALE UNION	129859	Nos	1	2
1.6.9	CHECK VALVE FUEL FILTER	3240088	Nos	1	2
1.6.10	VALVE,CHECK	3874152	Nos	1	2
1.6.11	CONNECTOR,TUBE	3252438	Nos	1	2
1.7	CONTROL SYSTEM		Nos	1	2
1.7.1	ACTUATOR	3875875	Nos	1	2
1.7.2	MTG FUEL PUMP	3241317	Nos	1	2
1.7.4	BRACKET,ACTUATOR	3877591	Nos	1	2
1.7.5	AMPLIFIER,POWER	3167062	Nos	1	2
1.7.6	CONTROL,GOVERNOR (WOODWARD)		Nos	1	2
1.7.7	CONTROL,AUT STARTING	5276183	Nos	1	2
1.7.8	SWITCH,TEMPERATURE	4327021	Nos	1	2
1.7.9	SWITCH,TEMPERATURE	4327027	Nos	1	2
1.7.10	SWITCH,PRESSURE	2897691	Nos	1	2
1.7.11	SENSOR,PRESSURE	4071835	Nos	1	2
1.7.12	SENSOR,TEMPERATURE	4071834	Nos	2	4
1.7.13	GAUGE,TEMPERATURE	4071829	Nos	1	2
1.7.14	SWITCH,FLUID LEVEL	4084367	Nos	1	2
1.7.15	SWITCH,FLUID LEVEL	4084368	Nos	1	2
1.7.16	GAUGE,PRESSURE	4071832	Nos	1	2
1.7.17	GAUGE,TEMPERATURE	4071831	Nos	1	2
1.7.18	TACHOMETER	2879766	Nos	1	2
1.7.19	TACHOMETER	3231408	Nos	1	2

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1.7.20	PICKUP, MAGNETIC	4912304	Nos	1	2
1.7.21	PICKUP, MAGNETIC	4105447	Nos	1	2
1.7.22	MOTOR, STARTING	4078515	Nos	1	2
1.7.23	AMMETER	178919	Nos	1	2
1.7.24	HARNESS, WIRING	4397630	Nos	1	1
1.8	KIT, ENGINE INSTALLATION	4398450	Set	1	1
1.8.1	KIT, ENGINE INSTALLATION	4397668	Set	1	1

Air system:- Piping from air intake to Engine shall be in supplier's scope.

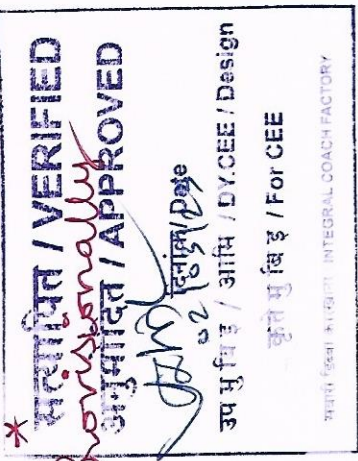
Exhaust system:- Silencer mounting & piping from exhaust manifold to silencer shall be in supplier's scope.

Fuel system:-

Fuel tank to engine - piping shall be in Firm's scope.

cooling system:-

water tank for radiator filling & its mounting, water pipe connections from engine to radiator & hydraulic tank & its mounting along with pipe connections shall be in Firm's Scope.



* Subject to remarks are shown in RED.

1. REVISION HISTORY

S.No.	Rev. No.	Date	Remarks
1.	00	06/12/2022	Original Issue
2.	01	22/12/2022	Revised in line with ICF Letter No. MD/DPD/OHE/DETC/US/157B dt. 16-12-2022.
3.	02	06.02.2023	Revised in line with ICF Letter No. MD/DPD/OHE/DETC/US/157B dt. 10-01-2023 & dt. 23.01.2023

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Annexure-B:- Items included in pneumatic accessories of Cummins make Engine

Sl. No.	Component Description	Manufacturer/ SPEC /DWG ref	Qty. per Coach	Remarks
1	Air Pressure Switch	SMC/CIL - A062N867/ SMC-ISG130-031	1 No.	
2	J1 safety Valve (set at 7.5 Kg/cm ²)	(RECON / FAIVELY)/CIL- A062N865/ REC/SV/1014 OR 025220013	1 No.	
3	After Cooler	SS HEAT RECOVERY/CIL- A062N868/ SSHRE-D-1323	2 No.	
3.1	After Cooler Mounting Frame		1 No.	
3.2	Hex. Bolt M12 X 110L	SS -IS: 1364-2002	8 No.	
3.3	Hex. Nut M12	SS-IS: 1364-2002	8 No.	
3.4	Spring Washer B12	IS: 3063-1994	8 No.	

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