

GOVERNMENT OF INDIA / भारत सरकार
MINISTRY OF RAILWAYS / रेल मंत्रालय
(RAILWAY BOARD / रेलवे बोर्ड)

No. 2006/Elect(G)/138/1pt

New Delhi, Date 03/06/2025

**Principal Chief Mechanical Engineer,
All Zonal Railways**

Sub: Revised guidelines for Maintenance and Escorting of Power Car.

- Ref:** I. Board's letter no. 2006/Elect(G)/138/1pt dated 19.11.2024
II. Board's letter no. 2006/Elect(G)/138/1pt dated 16.07.2024.
III. Board's letter no. 2006/Elect(G)/138/1 dtd. 04.04.2025

The guidelines for Power Car Escorting and maintenance was issued vide letters under reference above. There were representations from Zonal Railways and a committee comprising of PED/PS&EMU/RDSO as convener and CEDE/RCF, CESE/NR, CESE/SCR & CESE/SR as members was formed vide letter under ref III. The committee has deliberated and finalized the terms and conditions including maintenance schedules, manpower requirement and penalty. The comprehensive policy regarding Power Car maintenance and Escorting is being issued in supersession of earlier policy (Ref I & II).

The new guidelines of Power Car maintenance and Escorting are issued as per committee recommendation and as approved by Board (MTRS). The details are as under:

1. Maintenance

If adequate manpower is not available, then maintenance work can be outsourced as per the requirement of the Zonal Railway. The followings to be taken care of for the outsourcing work:

(a) The maintenance activities of DA set and its associated electrical equipment fitted in power car should be as per CAMTECH LHB Maintenance Manual Vol-II- System Documentation (IRCAMTECH/GWL/MECH/2022-2023/LHB/Manual/1.1, July-2022) along with 5th correction slip (Electrical) of LHB Maintenance Manual version July 2022 Volume II(IRCAMTECH/M/GWL/Power Car/Schedule dated 30.07.2024) or latest.

(b) Schedules of DA sets as approved by RDSO have to be followed for all DA sets including CPCB-4 and are given as under:

SN	Make	Periodicity				
		A	B	C	D	E
1.	M/s Cummins India Ltd.	Every round trip	12 months or 500 hrs	36 months or 1500 hrs	72 months or 6000 hrs	On condition basis
2.	M/s Kirloskar Oil Engines Ltd (KOEL)	Every round trip	12 months or 500 hrs	36 months or 1500 hrs	72 months or 6000 hrs	On condition basis
		A	M1	M2+M3	M4	M5
3.	M/S Greaves Cotton Ltd.	Every round trip	12 months or 500 hrs	36 months or 1500 hrs	72 months or 6000 hrs	On condition basis

Danur

2430600/2025/O/o SSE/DRG/ELE/UBL/SWR

(c) DA Sets must be load tested after every maintenance schedule and during maintenance at pit line as per Railway Board instruction issued vide letter no-2024/Elect/(G)/114/1/PC dated 24.09.2024 and 97/Elect(G)/114/1/PC-IV dated 14.11.2023 respectively (Copy enclosed as Annexure-I and Annexure-II respectively for reference). The contractor must submit an activities wise compliance certificate after completion of respective schedule maintenance.

(d) Railways should have proforma for relay setting/checking of make wise DA set which should be jointly signed by contractor and Railways supervisor after maintenance. Relay setting for all three OEMs has been issued vide RDSO letter EL/0.6.2/PC/Main dtd. 14.02.2024 (Copy enclosed as Annexure-III).

(e) Standard operating procedure (SOP) for operation of power car/LSLRD and duties of power car/LSLRD escorting staff have been issued vide Railway Board letter no 2024/Elect(G)/114/1 dated 09.05.2025. (Letter is enclosed as Annexure-IV for reference). This SOP to be ensured

(f). The manpower requirement and time taken has been worked out for A,B, C& D checks and shall as follows

SN	Checks	Allowed Time per DA set	Man power requirement
i.	A	3 Hrs	1 Skilled*
ii	B	6 Hrs	1 skilled* and 1 semi-skilled
iii	C	8 Hrs	1 skilled* and 1 semi-skilled
iv	D	5 days on site work and total 15 days where movement of parts and assemblies required for repair and calibration.	2 skilled* and 1 semi-skilled

*The skilled staff should have minimum qualification ITI in technical trade.

(g) The maintenance schedule of DA Set should be 'Kit based' as approved by RDSO and rates shall be as per Rate contract finalized by RCF/Kapurthala for various schedules of make wise DA set running over IR. The labour rates should be applicable as per minimum wages notified by Government of India (Ministry of Labour) and re-imbursement of statutory charges (PF/ESI& Bonus) if applicable shall be as per relevant Govt. of India notification.

2. Escorting

If adequate manpower is not available, then Escorting work can be outsourced as per the requirement of the Zonal Railway. The followings to be taken care of for the outsourcing work:

(a) Escorting charges shall be paid on actual power car/LSLRD run on man-hour basis with one hour allowance each as pre- departure and post arrival allowance. The hourly rate of skilled category labour employed will be worked out by taking minimum daily wages of skilled category labour at Central government (Ministry of Labour) rates applicable for primary base depot area. The skilled staff should have minimum qualification ITI in technical grade. Further in order to work out hourly rates; the above mentioned minimum daily wage will be divided by 8 (eight) and also considering 1 day weekly rest.

Done

(b) The Labour Laws applicable as per minimum wages notified by Government of India (Ministry of Labour) and re-imbursement of statutory charges (PF/ESI & Bonus) if applicable shall be as per relevant Govt. of India notification.

(c) In case of additional requirement of escorting and maintenance in LHB rake, firm may be asked to escort the Power Car as per requirement of Railway, In that case firm would be intimated before 06 hours of departure..

3. The maintenance of Power Car and escorting of Power car and LSLRD shall be carried out by same agency. Maintenance (A, B/M1, C/M2+M3, D/M4 & E/M5) and Escorting works to be executed by respective OEMs.

OEM can get the work done through their authorized dealers for Escorting and A, B & C checks. D and E checks have to be carried out by OEMs only. Only OEM will participate in Railway tenders of DA set maintenance and escorting. Full responsibility regarding execution of work will be of OEM only and billing will also be done in name of OEM.

- Training to be imparted to all maintenance and escorting staff mandatorily by respective OEMs. Training should be imparted to work on 750 V systems also. After completion of training, competency certificate to be issued by OEMs with a validity of 6 months.
- Training of Fire fighting system such as FDSS, Fire Alarm & detection system, Fire extinguishers etc. and safety to be provided to all maintenance and Escorting staff by Zonal Railways before inducting them for service. Competency certificate to be issued by depot-in-charge with validity of 6 months.
- For monitoring of escorting staff, Escorting app has been developed by CRIS. Escorting App should be mandatorily used by all Escorting staff. Zonal Railways to provide training to all escorting staff for its use.

4. Penalty:

- Contractor has to ensure that all the staff deputed for escorting duty for any trip should be available in nominated power car/LSLRD during the entire period of that trip and should not leave the power car at enroute stations. In case the staff desert Power car/LSLRD or absconds from the duty before conclusion of the round trip, the recovery for the entire round trip at two times the rate for that staff or amount equal to the value of the damaged item resulted due to deserting the Power car/LSLRD, whichever is maximum or both shall be recovered from the Contractor's bills. The amount of recovery shall be decided by Railway Authority.
- It should be ensured that both the DG sets of power cars are sent in working conditions from Primary Maintenance depot, before departure of the train. Whenever it is noticed that any one DG set in the Power Car is sent in defective condition a penalty of Rupees 20,000/- (Rupees Twenty thousand) per DA set will recovered for each incidence.
- The Contractor has to ensure timely schedules of DA set and other power car assemblies as per mentioned in scope of work within the stipulated maintenance time as advised by Railway representative at washing line/Platform/sick line, failing for which a token penalty sum of Rs. 10000/- (Rs Ten Thousand) per engine for delay of per week) or part thereof will be deducted from bill of contractor.

Daniel

d. Failure of providing train services which is found to be negligence and bad workmanship of contractor's staff.

(i) Any detention upto one hour or part thereof due to negligence and bad workmanship of escorting staff/ enroute failure.

(ii) Detention of more than one hour and parts thereof will attract penalty at double the rate.

For clause (i) a token penalty of Rs 10,000/- (Rs Ten thousand) per failure power car will be imposed and for clause (ii) a penalty of Rs 25,000/- (Rs Twenty Five thousand only) and part thereof will be imposed.

- e. Failure to inform to Electric control/Railway escorting supervisor for timely fueling in the power car, will attract a penalty of ₹5,000 per onward/return trip. Escorting staff should inform Electrical control if 750 liters fuels are left in Diesel tank.
- f. Unscheduled DVS Power Car to be repaired within 24 hours of placement, otherwise a penalty of Rs. 10,000/- per day per case will be levied. In case of major breakdown which could not be attended the approximate time for fitment/PDC shall be jointly agreed between contractor & Railway and if firm does not comply to PDC then/thereafter a penalty of 10000/day shall be levied.
- g. A log book will be maintained jointly i.e. in between Railway's representatives and contractor's representative for the contractor's staff deputed in the trains covered under this contract. The log book will be signed daily by both the representatives verified by SSE/On duty. Failure to maintain the log book will attract a penalty of ₹1000/- (One thousand).
- h. Contractor will ensure that their staff boards the train/Power Car/LSLRD. If needed contractor can keep spare staff at his own cost to ensure 100% boarding the power cars by their staff.
- (i) In case contractor's staff does/do not turn up on duty before one hour from the schedule departure of the train, a penalty of ₹10,000/- (Ten thousand) will be imposed for each instance. Reporting time shall be monitored with a GPS enabled biometric attendance (procured by the contractor).
- (ii) In case the contractor has failed to provide one or more staff in a particular train the sum of penalty as above shall be imposed proportionate to the no. of staff, contractor failed to provide for the respective trip. Payment shall be made proportionately only to the no. of staff provided by the contractor for that particular trip.
- i. In case, if the contractor's staff is found without uniform or identity card or name badges, a token sum of penalty of one round trip payment or Rs 500/- (Rs Five hundred only) whichever is higher per defaulting staff for that train shall be recovered from the contractor's bill.
- j. In case of contract staff found in intoxication mood/disregard/misbehavior with passenger or railway officials, an amount of ₹1000/- (One thousand) per occasion shall be recovered in-addition to non-payment of wages for the respective onward/return trip.
- k. In case of contractor staff is found carrying any irrelevant/unauthorized parcels or

2430688/2025/O/o SSE/DRG/ELE/UBL/SWR

penalty of ₹5000/- (Five thousand) per occasion shall be recovered and appropriate action will be taken as per railway norms.

- l. In case of contract staff involved in any illegal / theft activities or damage to railway properties a penalty equivalent to the material cost shall be recovered and legal action as per relevant Railway act will be initiated.
- m. A penalty of ₹1000/- (One thousand) for failure to maintain prescribed tools or PPE.

This is issued with the approval of Board (MTRS).

Diwakar
3/6/25

(दिवाकर कुमार)

निदेशक, विद्युत इंजीनियरिंग (सा.)

दूरभाष - 011-47845423, ई-मेल: diwaker.kumar@gov.in

कमरा न: 376D, रेल भवन, रेलवे बोर्ड,

रायसीना मार्ग, नई दिल्ली - 110001

Copy to:

1. DG/IRIEEN for kind information please.
2. PED/PS&EMU/RDSO for kind information please.
3. PED/CAMTECH for kind information please.
4. CESEs/All Zonal Railways for kind information and necessary action pl.

GOVERNMENT OF INDIA / भारत सरकार
MINISTRY OF RAILWAYS / रेल मंत्रालय
(RAILWAY BOARD / रेलवे बोर्ड)

No. 2024/Elect(G)/114/I/PC

New Delhi, Date 24.09.2024

Principal Chief Mechanical Engineer,
All Zonal Railways

Sub: Guideline for Load Testing of DA sets of power cars.
Ref: RDSO's letter no. EL/0.6.2/PC Main dated 20.09.2024.

Please find enclosed the RDSO guidelines for load testing of DA sets of power cars for information and implementation with immediate effect.

(तेज प्रताप नारायण)
विशेष कार्य अधिकारी, बिजली इंजीनियरिंग (सा.)
दूरभाष - 47845420, ई-मेल: tej.pratapnarayan@gov.in
कमरा न:112, पहला तल, रेल भवन, रेलवे बोर्ड,
रायसीना मार्ग, नई दिल्ली - 110001

Copy to:

1. PED/PS&EMU/RDSO for information please.
2. CESE/All ZRs for necessary action please.

2024

Tele: +91-522-2465739
Fax: +91-522-2465717
Email: dirmrv@gmail.com



भारत सरकार - रेल मंत्रालय
अनुसंधान अभियंत्रण और मानक संगठन
संयोजक - 226011
Government of India - Ministry of Railways
Research, Designs & Standards Organization,
LUCKNOW - 226011

295

No. EL/0.6.2/PC Main

Date-As above

विशेष कार्य अधिकारी विजली इंजिनियरिंग (सा.)
रेलवे बोर्ड, रेल भवन,
रेल मंत्रालय, नई दिल्ली - 110 001
Email: tej.pratapnarayan@gov.in

Sub.: Guideline for Load Testing of DA sets of power cars.

Ref.: i. Railway Board's letter No. 2024/Elect (G)/114/1/PC-IV dated 06.09.2024.

ii. This office letter of even no dated 08.05.2024.

Railway Board vide letter reference (i) above, has advised RDSO to frame guideline for load testing of DA Sets after schedule /unscheduled maintenance. This issue was deliberated earlier by Committee members and recommendations were submitted vide this office letter reference (ii) above. It is submitted that after introduction of HOG system, actual running of power car DA sets has drastically reduced with respect to EOG system. To ensure effectiveness of maintenance schedule, DA sets are required to be tested after various maintenance schedules. Therefore, committee recommendations regarding load testing of DA sets are reiterated as below for guidance of Zonal Railways -

- After every B/C check Schedule, DA Sets must be run on rake load for minimum 01 Hrs.
- After every D/M4 & E/M5 check schedule, DA Sets must be run for full load condition for minimum 04 Hrs on load bank.
- DA Sets must be run on full load for minimum 02 Hrs after every SS1/SS2/SS3 schedule.

Further, in case of any unscheduled breakdown maintenance, DA Sets must be load tested for full load/rake load depending on the extent of repairs required to be carried out.

Digitally Signed by
Jitendra Yadav

Date: 20-09-2024 15:39:56
Reason: (Jitendra Yadav)

Approved
DSE/MRVC

Director General /PS & EMU

DA-Nil



GOVERNMENT OF INDIA / भारत सरकार
MINISTRY OF RAILWAYS / रेल मंत्रालय
(RAILWAY BOARD / रेलवे बोर्ड)



No. 97/Elect (G)/114/1/PC-IV

New Delhi, Date 14.11.2023

Principal Chief Mechanical Engineers,
All Zonal Railways

Sub: Guidelines for power car operation during maintenance at pitline.
Ref: i) Board's letter no. 97/Elect(G)/114/1/PC-IV dated 28.03.2023
ii) DSE/RDSO's letter no. EL/0.6.2/PC/Main line dated 08.11.2023.

Aporopos above (ii), RDSO has advised guidelines for power car operation during maintenance at pitline, which is reproduced below;

"A check/ trip schedule of each DA set should be carried out as per Railway Board guidelines vide letter no. 2006/Elect(G)/138/1 pt. Dated 11.01.2023 and activities in CAMTECH maintenance manual of LHB coaches. Each DA set of power car should be tested at full load for minimum 30 minute during maintenance at pitline/ washing line to ensure reliability of DA sets, where 3 phase 750 Volt external power supplies are available at pit line/washing line."

All Zonal Railways are advised for compliance accordingly.

DA: As above

dh
14.11.2023
(तेज प्रताप नारायण)

विशेष कार्य अधिकारी, विजली इंजीनियरिंग (सा.)
दूरभाष - 47845420, ई-मेल: tej.pratapnarayan@gov.in
कमरा नं: 112, पहला तल, रेल भवन, रेलवे बोर्ड,
रायगीना मार्ग, नई दिल्ली - 110001

Copy to: CESEs/all Zonal Railways for kind information and n.a. pl.

File No.RDSO-PE0PEB(DAS)/1/2020-ED/PSEMU/RDSO-Part(2)

Tele: +91-522-2465739
Fax: +91-522-2465717
Email: dirmrvvc@gmail.com



भारत सरकार - रेल मंत्रालय
अनुसंधान अधिकार्य और मानक संगठन
लखनऊ - 226011
Government of India- Ministry of Railways
Research, Designs & Standards Organization,
LUCKNOW - 226011

No. EL/0.6.2/PC/Main file

Date-As above

विशेष कार्य अधिकारी बिजली इंजिनियरिंग (सा.)
रेलवे बोर्ड, रेल मयन,
रेल मंत्रालय, नई दिल्ली- 110 001
Email-tej.pratapnarayan@gov.in

(Kind Attain- Sh Tej Pratap Narayan, OSD, Elect Engg (G).

Sub.: Guidelines for Power Car operation during maintenance at pitline.

Ref.: i. Railway Board's letter No. 97/Elect (G)/114/1/PC-IV dated 28.03.2023.
ii. This office letter of even no dated 27.04.2023.

Railway Board vide letter reference above; had advised RDSO to issue guideline regarding DA set operation of power Car during maintenance at Pit line/washing line where 750 V external power supply is available.

Zonal Railway views were sought vide this office letter reference (ii) above. Views of Zonal Railways are examined in regard to improve reliability and reduce HSD fule consumption in DA Set of power car during pitline/washing line maintenance and therefore, following is recommended -

"A Check/Trip Schedule of each DA set should be carried out as per Railway Board guideline issued vide letter no-2006/Elect (G)/138/1pt, dated 11.01.2023 and activities advised in CAMTECH maintenance manual of LHB Coaches. Each DA set of power car should be tested at full load for minimum 30 minute during maintenance at Pit line/washing line to ensure reliability of DA sets, where 3 phase 750 Volt external power supplies are available at Pit line/washing line."

This is for kind information please.

DA-Nil

Digitally Signed by
Jitendra Yadav
Date: 08.11.2023
Reason: DIRMVVC
For Director General /PS & EMU

Tele: +91-522-2465739
Fax: +91-522-2465717
Email: dirmrv@gmail.com



भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226011
Government of India- Ministry of Railways
Research, Designs & Standards Organization,
LUCKNOW - 226011

No. EL/0.6.2/PC/Main

Date: As above

प्रधान मुख्य विद्युत इंजीनियर

कोकण रेलवे, रायगड भवन, बेलापुर भवन, प्लॉट-6, सेक्टर 11, सीबीडी बेलापुर, नवी मुंबई 400 614

प्रधान मुख्य यांत्रिक इंजीनियर

पूर्व रेलवे, फेयरली प्लेस, कोलकाता- 700 001	पूर्वोत्तर रेलवे, गोरखपुर- 273 001
उत्तर रेलवे, बड़ौदा हाउस, नई दिल्ली- 110 001	उत्तर पश्चिम रेलवे, जयपुर- 302 006
मध्य रेलवे, मुंबई सी एस टी - 400 001	पूर्वोत्तर सीमान्त रेलवे, मालीगांव, गुवाहाटी- 781 011
पश्चिम रेलवे, चर्चगेट, मुंबई- 400 020	पश्चिम मध्य रेलवे, जबलपुर- 482 001
दक्षिण रेलवे, पार्कटाउन, चेन्नई- 600 003	दक्षिण पूर्व रेलवे, गार्डेन रीच, कोलकाता- 700 043
पूर्व मध्य रेलवे, हाजीपुर दिघी, जिला वैशाली, बिहार- 844 101	दक्षिण मध्य रेलवे, 7 तल, रेल निलायम सिकंदराबाद- 500 071
पूर्वोत्तर रेलवे, बी-2, रेल विहार, चन्द्रशेखरपुरा, मुवनेश्वर, 751 023 (उड़ीसा)	दक्षिण पश्चिम रेलवे, 4 तल, श्री लक्ष्मी नारायण काम्पलेक्स, स्टेशन रोड हुबली- 580 020
उत्तर मध्य रेलवे, हेडक्वाटर, ब्लाक ए, सुबेदारगंज, इलाहाबाद- 211 033	दक्षिण पूर्व मध्य रेलवे, बिलासपुर- 495 004

Sub: Reliability of DA Set of Power car.

The reliability of DA sets in power car was discussed in meeting held with Railway Board on 2nd Feb 2024. In this regard RDSO was advised to investigate a few bad cases of power car failures and advice measures for improvement in maintenance of DA sets. In this regard following major issues have been identified for improvement in reliability and availability of power cars.

a) Overdue schedule:

Power cars were found to be running overdue of their scheduled maintenance. The overdue running of DA sets may lead to failure of power car with extended damages and so Railways must critically monitor and ensure timely scheduled maintenance of DA sets, as per periodicity issued by Railway Board.

b) Bypassing/ Nonfunctioning of protective devices.

During joint investigation of one of the power cars by RDSO & concerned divisional officials following sensors of DA set were found in bypassed/not functioning condition.

- RFR relay (Relay for monitoring function/ air flow of radiator)
- Lube Oil pressure sensor
- EGT Sensor (Exhaust Gas temperature sensor)
- Radiator water level sensor

All the above relays are critical for safe running of DA sets. The working of DA sets in their bypassed condition may not only lead to unsafe conditions but can cause

major damage to the DA sets like seizure, overheating etc. which will require substantial amount of time and expenditure in their unscheduled repairs.

The working of all the protective relays is essential for safe running and preventing any major damage to the engines in the event any defects. In this regard the list of all the protective relays and their setting in different make of DA sets is being enclosed herewith as annexure. Railways must ensure that all the protective devices are functional with their proper settings. Proper functioning of all the protective devices will prevent any major damages to the engine in the event of any failures.

c) **Running Defective Power cars:**

It was noted that though the power car was under AMC but was still being permitted to run with single DA set in working condition for a long duration of period, without attention. The condition of power cars need to be critically monitored to ensure their timely attention and defective power cars should not be permitted to run in service.

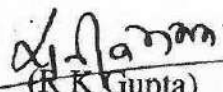
d) **Penalty Clauses of Contract**

The penalty clauses in the contracts must be reviewed for ensuring/ enforcing timely attention of scheduled/ unscheduled maintenance to avoid running of overdue maintenances as well as long period of down time for unscheduled maintenances of power cars.

e) **Up keeping of records**

History of DA sets are not being properly maintained. Failure analysis of DA sets cannot be done properly without reference to the failure history. Logbook also found missing in one of the power cars due to which operator would be unable to know about any of the unusualls reported in the previous trips, which may lead to major failure in the upcoming trips. Railways are advised to maintain proper records related to history of DA sets and their records should be transferred to other divisions or zones on transfer of Power Cars.

DA : As above


(R K Gupta) 14/11/2024
PED/PS&EMU

For Director General /PS & EMU

Copy to:

1. OSD/Electrical Engg. (G), Railway Board- for kind information please

ANNEXURE1. M/s Greaves Cotton make DA Set

SN	SAFETY PARAMETERS	Reference Value
1	AIR LOCK SAFETY of Radiator failure Relay (RFR)	Engine will trip before one minute when motor fan flow stopped.
2	HIGH ENGINE WATER TEMPERATURE	
a.	WARNING - HIGH ENGINE TEMP.	Engine warning when water temp. get high 95 deg C
b.	TRIPPING - HIGH ENGINE TEMP	Engine will trip when water temp. get high 98 deg C.
3	Low Radiator Water Level	Engine will trip when water level low.
4	AIR FILTER CHOCKED	Engine will trip when air filter gets chocked beyond permissible limit. (Pressure limit 40 milli bar)
5	LOW OIL PRESSURE	Engine warning 2.5 bar & then will trip at 2 bar when oil pressure get low.
6	HIGH ENGINE LUBE OIL TEMPERATURE	
a	WARNING - HIGH ENGINE OIL TEMP	Engine warning when lube oil temp. get high 115 deg C
b	TRIPPING - HIGH ENGINE OIL TEMP	Engine will trip when lube oil temp. get high 120 deg C
7	ENGINE UNDER SPEED AND OVER SPEED	
a	WARNING	Engine warning when rpm get low & high (1350 & 1700)
b	TRIPPING	Engine will trip when rpm get low & high (1300 & 1750)
8	High Exhaust Gas Temperature (EGT Sensor)	Engine will trip when temp goes beyond set temp $710 \pm 10^{\circ}\text{C}$
9.	High Exhaust Gas Temperature difference (EGT Sensor)	Engine will trip when temp difference between two bank goes beyond set temp $50 \pm 10^{\circ}\text{C}$
10	Emergency stop	Engine will trip when push the emergency stop button.
11	High Voltage	
a	WARNING - HIGH voltage	Engine warning at 825
b	TRIPPING - HIGH Voltage	Engine will trip at 850
12	Under Voltage	
a	WARNING - Low voltage	Engine warning at 675
b	TRIPPING - Low Voltage	Engine will trip at 650
13	Over Load	
a	WARNING - Overload.	Engine warning at 370 KW
b	TRIPPING - Overload	Engine will trip at 375 KW
14	Unbalance Load	Engine will trip at during 20% unbalance load.
15	UNDER FREQUENCY AND OVER FREQUENCY	
a.	WARNING - LOW FREQUENCY	Warning when frequency get low & high (47 & 53 Hz)
b.	TRIPPING - HIGH FREQUENCY	Engine trip when frequency get low & high (45 & 55 Hz)

2. M/s KOEL make DA set

SN	SAFETY PARAMETERS	Reference Value
1	Air lock safety or radiator failure relay (RFR)	Engine will trip before one minute when motor fan flow stopped.
2	High engine water temperature	
a	Warning - high engine temp.	Engine warning when water temp. get high 93 deg C
b	Tripping - high engine temp	Engine will trip when water temp. get high 96 deg C
3	Low Radiator Water Level	Engine will trip when low water level
4	Air filter choked	Engine will trip when air filter gets choked beyond permissible limit. (As per KOEL Pressure limit 50 milibar)
5	Low oil pressure	Engine will trip at 2 bar when oil pressures get low.
6	High lube oil temperature	Engine will trip when oil temp. get high 120 deg c
7	Engine over speed	Engine will trip when rpm get high 1650.
8	Emergency stop	Engine will trip when push the emergency stop button.
9	Over Voltage	Engine will trip at 826V
10	Under Voltage	Engine will trip at 638V
11	Phase sequence test	Engine will trip at during changing the phase sequence in engine controller.
12	Under frequency and over frequency	Engine will trip when frequency get low & high (44 & 56 Hz)

3. M/s Cummins make DA set

SN	SAFETY PARAMETERS	Reference Value
1	AIR LOCK SAFETY of Radiator failure relay (RFR)	Engine will trip before one minute when motor fan flow stopped.
2	HIGH ENGINE WATER TEMPERATURE	
a	WARNING - HIGH ENGINE TEMP.	Engine warning when water temp. get high 92 deg C
b	TRIPPING - HIGH ENGINE TEMP	Engine will trip when water temp. get high 97 deg C
3	Low Radiator Water Level	Engines will shut down when water level low.
4	AIR FILTER CHOCKED	Engine will give warning when air filter gets chocked beyond permissible limit. (As per Cummins Pressure limit 62 mili bar)
5	LOW OIL PRESSURE	Engine warning 2.75 bar & then will trip at 1.379 bar when oil pressure get low.
6	HIGH ENGINE OIL TEMPERATURE	
a	WARNING - HIGH ENGINE OIL TEMP.	Engine warning when oil temp. get high 115 deg C
b	TRIPPING - HIGH ENGINE OIL TEMP.	Engine will trip when oil temp. get high 120 deg C
7	ENGINE OVER SPEED	Engine will trip when rpm high (1725 rpm)
8	Emergency stop	Engine will trip when push the emergency stop button.
9	High Voltage	Engine will trip at 825
10	Under Voltage	Engine will trip at 650
11	Over Load	
a	WARNING - Overload.	Engine warning at 370 KW
b	TRIPPING - Overload	Engine will trip at 375 KW
12	Unbalance Load	Engine warning at 25 % unbalance load
13	UNDER FREQUENCY AND OVER FREQUENCY	Engine trip when frequency get low & high (44 & 56 Hz)

GOVERNMENT OF INDIA (भारत सरकार)
MINISTRY OF RAILWAYS (रेल मंत्रालय)
RAILWAY BOARD (रेलवे बोर्ड)

No. 2024/Elect(G)/114/1

New Delhi, Date 09.05.2025

Principal Chief Mechanical Engineer,
All Zonal Railways

Sub: Standard Operating Procedure (SOP) for operation of power car/LSLRD and duties of escorting staff.

Ref: RDSO letter no. No. EL/1.6.9.22/HOG/Main dated 18.02.2025.

In order to ensure reliability of Power cars, Board (MTRS), on the recommendation of RDSO, has approved the standard operating procedure (SOP) for power car/LSLRD operation and duties of escorting staff of Power Car /LSLRD.

Following Annexure are attached:

1. Annexure-1: Standard operating procedure for operation of Power Car/LSLRD.
2. Annexure-2: Duties of power car/LSLRD escorting staff.
3. Annexure-A: Duties of Escorting Electrical Staff at the time of Emergency.
4. Annexure-B: Joint procedure order for HOG operation.

All Zonal Railways are advised to take necessary action for implementation of for safe and reliable operation of trains.

Diwakar
(दिवाकर कुमार)

निदेशक, विद्युत इंजीनियरिंग (सा.)

दूरभाष - 011-47845423, ई-मेल: diwaker.kumar@gov.in

कमरा न: 376D, रेल भवन, रेलवे बोर्ड,

रायसीना मार्ग, नई दिल्ली - 110001

Copy to: CESEs/All Zonal Railways- for necessary action please.

Annexure-1**STANDARD OPERATING PROCEDURE FOR OPERATION OF POWER CAR/LSLRD****a. SOP for DA set operation of Power Car:**

1. Check Log book for arrival remarks and attention thereof.
2. Visual Inspection of Underslung safety items (IV Coupler, UIC Socket, RBC/EBC, 60 kVA Transformers, Fuel tanks, WRA, Battery box, capacitor bank, tail lamp, side lamp. etc.) for intactness and any abnormality.
3. Check availability of AC paralleling cable, UIC cable (Circular & Rectangular) & EL box.
4. Check Nitrogen Pressure in Fire detection and suppression system (FDSS) is within the permissible limits. Otherwise report to onboard SSE/C&W.
5. Visual inspection of Engine, Radiator motor, Starter battery, Alternator, starter motor, Isolation Switch for any oil/fuel leakages/damages.
6. Check coolant level of Radiator in sight glass (top up if required).
7. Ensure tightness of radiator cap after inspecting the coolant level.
8. Check oil level of Engine is between 'L' & 'H' mark. Top up if required.
9. Check 290 Ah starter battery for Electrolyte level (top up if required).
10. Ensure fuel tank is full while leaving primary/secondary depot.
11. Ensure FOL, FEL, AEL, UVR and Radiator Vane relay are not bypassed.
12. Engage starter motor isolation switch.
13. Switch on 24V DC control switch (S2S23)
14. Switch the RA mode rotary switch to normal mode (BSW1/BSW4, BSW2/BSW5, and BSW3/BSW6) for HOG A / HOG B respectively.
15. Switch Voltmeter selector RSW (MSSW1/2) in Alt position
16. Switch HRSW1/2 to position '2' (DG)
17. Switch plant selector RSW switch (S2S11) in Plant A, Plant B or Plant A&B.
18. Record the initial KWh (as per multi-function meter) in the logbook
19. Press test indication lamp push button (S2S22) and ensure all indication lights are glowing.
20. Switch on RSW DCIS 1 / DCIS 2 for SET A / SET B respectively.
21. Ensure DC ON indication is glowing & UVR Red light is glowing
22. Select auto mode in HMI of DA set controller.
23. Press 'START' in HMI or engine E-ON 1 / 2 in SBC2 to crank the respective engine.
24. Check the AC voltage (750 V), oil temperature, oil pressure, RPM in HMI. Ensure the parameters are within limits.
25. Switch on ACB S2A3/S2A6 for SET A / SET B respectively.
26. Switch ON the push button S2S8/ S2S10 to switch ON transformer 1 / transformer 2 respectively.
27. Switch ON respective DA SET Radiator motor, starter & Ventilator motor starter.
28. Check the direction of radiator motor and ventilator motor.
29. Ensure the Alternator generation is in Auto mode.
30. Ensure availability of 750 V in SBC1.
31. Select NET1 / NET2 selector in SBC1.
32. Switch ON battery charger MCB in SBC1.
33. Switch ON S2S21 / S2S21a and ensure the starter battery is charging and voltage is above 24 V. Record the battery charger voltage and current.
34. Dis-engage the starter motor isolation switch to isolate the starter motor.
35. Carry out visual inspection of Engine, Alternator & battery for any leakage or abnormal noise.



3577864/2025/O/o PED/PS&EMU/RDSO

36. Press the safety loop ON push button (S2S18 / S2S20) to switch ON safety loop A / B.
37. Press the feeder 1 / feeder 2 ON push button (S2S14/S2S16) to switch ON respective feeder.
(To feed single DA set / HOG supply to both feeders)
38. Switch HRSW1(if SET B working)/ HRSW2 (if SET A working) to position '1' (Bus coupler)
39. Switch plant selector RSW switch (S2S11) in Plant A or Plant B.
40. Press the BUS coupler ON button (S2S12).
41. Press the safety loop ON push button of the non-working DG (S2S18/S2S20).
42. Press feeder ON push button S2S14/S2S16 (non-working DG).
43. Ensure the total load current is shared between the feeders.
44. Check the load voltage & load current, frequency, oil temperature, oil pressure & coolant temperature in HMI.
45. Check starter battery voltage in HMI.
46. After switching on all Loads, check for oil / fuel leakage, any abnormal noise in Diesel Engine / alternator.
47. Ensure full load current does not exceed 80% of DA SET (max. current 385A)
48. Load test to be carried out for 30 min minimum.
49. One Oil Engine Driver (OED) should be available in the working power car during maintenance / escorting.
50. Ensure working of Tail light with flasher and side lamp.

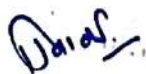
b. SOP for operation of HOG in power car:

1. Connect the UIC and IV Coupler as detailed in the duties of escorting staff.
2. Switch the RA mode rotary switch to normal mode (BSW1/BSW4, BSW2/BSW5, and BSW3/BSW6) for HOG A / HOG B respectively.
3. Switch Voltmeter selector RSW (MSSW1/2) in HOG position.
4. Switch HRSW1/2 to position '3' (HOG)
5. Switch HRSW 3 / 4 to ON position to enable the output of respective hotel load converter.
6. Ensure the availability of 750 V in the respective voltmeter.
7. Switch plant selector RSW switch (S2S11) in Plant A, Plant B or Plant A&B.
8. Record the initial KWh (as per multi-function meter) in the logbook
9. Press test indication lamp push button (S2S22) and ensure all indication lights are glowing.
10. Ensure availability of 750 V in SBC1.
11. Select NET1 / NET2 selector in SBC1.
12. Switch ON battery charger MCB in SBC1.
13. Switch ON S2S21 / S2S21a and ensure the starter battery is charging and voltage is above 24 V. Record the battery charger voltage and current.
14. Press the safety loop ON push button (S2S18 / S2S20) to switch ON safety loop A / B.
15. Press the feeder 1 / feeder 2 ON push button (S2S14/S2S16) to switch ON respective feeder.
16. Ensure the total load current is shared between the feeders.

c. SOP for Operation of Power Car in RA Bypass condition:

For RA bypass mode operation when SET A working:

1. Switch ON BSW 2 to enable bypass of HOG control.
2. Switch ON BSW 3 to close HOG contactor.



3577864/2025/O/o PED/PS&EMU/RDSO

For RA bypass mode operation when SET B working:

1. Switch ON BSW 5 to enable bypass of HOG control.
2. Switch ON BSW 6 to close HOG contactor.

For RA bypass mode operation in Non-working Power car:

1. Switch ON BSW 1 / 4 to enable bypass of feeder A / B control respectively and disconnection of 24 V supply (to avoid starting of engine)
2. Switch ON Feeder A / B ON push button (S2S14 / S2S16) respectively.
3. Switch ON BSW 2 / 5 to enable bypass of HOG control.
4. Switch ON BSW 3 / 6 to close HOG contactor.

d. SOP for operation of HOG in LSLRD:

1. Switch ON 110 V DC supply switch (S2S84)
2. Ensure the voltage is above 90 V, if not available switch ON DC bypass rotary switch.
3. Press the Test lamp push button (S2S22) and ensure working of all indication lamps.
4. Connect the UIC & IV Coupler as detailed in the duties of escorting staff.
5. Press 24 V DC supply (S2S23) push button.
6. Switch RASS-HA / RASS-HB to HOG (OFF) position (position 1).
7. Switch converter selector rotary switch (S2S52) to position 2 (Conv. A & B)
8. Switch converter A / converter B rotary switch (S2S54 / S2S55) to ON position.
9. Ensure the availability of 750 V of both the converters in the SBC.
10. Switch ON W/NWSS- A / B to position 1 to switch ON NET 1 / NET 2 to feed the coach supply
11. Switch ON Safety loop A / B push button (S2S18 / S2S20) respectively.
12. Switch ON Feeder A / B push button (S2S14 / S2S16) respectively.
(To feed single HOG supply to both feeders)
13. Switch converter selector rotary switch to position 1 (Conv. A) or position 3 (Conv. B).
14. Press Bus coupler ON push button (S2S12).
15. Switch ON Safety loop A / B push button (S2S18 / S2S20) respectively.
16. Press feeder A / B ON push button (S2S14 / S2S16) to switch ON the second feeder.

e. SOP for Operation of LSLRD in RA Bypass condition:

1. Switch ON RASS-HA / HB to position 2 to enable bypass of HOG control.
2. Switch ON S2SRA-HA / HB to extend supply to RA/OMS.

Daish

3577864/2025/O/o PED/PS&EMU/RDSO

Annexure-2**DUTIES OF POWER CAR/LSLRD ESCORTING STAFF**

1. Escorting staff will ensure to complete all the sign on formalities within 10 to 15 minutes of reporting on duty at Lobby and will reports immediately after that on the power car for taking over the charge.
2. The escorting staff should be present in the rake, in proper uniform with valid identity card & proper tool kit at least one hour before the scheduled departure of the train after collecting travelling authority from SSE in charge on duty.
3. Escorting staff should have operational mobile no. and will exchange the mobile no. with AC Escorting in charge of rake from Electrical Side and with Electrical control.
4. Carryout 'A' check for all the DA sets of power car in the rake.
5. In case of non-attachment of HOG loco till one hour before the scheduled departure of the train, switch ON the DA set of Power Car to enable pre-cooling. Monitor & record the various electrical parameters of the DA set viz., Engine start time, Lube oil pressure, Lube oil temperature, Coolant temperature, Voltage, Current, Frequency, and THD etc. Switch ON the feeders in such a way that rake load is shared between the feeders.
6. Escorting staff along with escorting coordinator will ensure disconnecting and reconnecting of HOG couplers at LOCO changing/Reversing stations enroute by taking proper safety precautions steps by following the guidelines mentioned in Joint Procedure Order for HOG Operation. (Annexure B).
7. After completion of HOG coupling work, one staff shall be available in each of the front and rear power car / LSLRD. Give the status of HOG working to the control.
8. Ensure functioning of Tail lamp and guard AC of power car before departure.
9. Escorting staff will ensure that doors of Switch Board cabinets of Power cars/SLRD are in properly closed condition and no unauthorized material is available inside switch board panels of Power Cars/SLRD and Diesel engine room of power cars.
10. Escorting staff will ensure no electrical equipment/safety is in bypassed condition.
11. Power car/SLRD shall never be left unmanned.
12. Co-ordinate with AC Escorting staff to enable trouble free services.
13. During reversal of rakes / change of loco at enroute stations, carry out operations to provide / remove the HOG couplers safely and on time to avoid enroute train detentions.
14. Monitor the fuel position of the power car and give control message well in advance in case of fuelling requirement at enroute / other end stations.
15. Follow the prescribed procedure during fuelling and ensure that correct quantity is fuelled. Further, have a close watch on consumption of Diesel engine & inform to Electric Control /Concerned Installation for any requirement of diesel oil in power car well in advance and will ensure fuelling in power car in specified stoppage.
16. Check for under gear safety, especially fuel tanks & equalizer line during train stoppages.
17. During train operation, observe the condition of DA sets and report any abnormality noticed.
18. Be alert to switch ON the DA sets at any time during train run, when required.
19. Escorting staff will regularly observe the power car/SLRD parameters like Load (Amp), KWH readings, three phase Voltage, Power, running hours, Power factor on HOG/EOG supply and will note down the same on hourly basis in Power car/SLRD log book as well as in Trip schedule Performa.
20. Power car staff should ensure switch OFF of manual isolation switch after cranking of Engine.



3577864/2025/O/o PED/PS&EMU/RDSO

21. Power car escorting staff will take the round of engine room on half hourly basis for any abnormal sounds, any Lube oil leakage/Battery/Spillage of oil etc on EOG supply and will record engine room temperature in log book.
22. Any enroute defect noticed while the train is on run from primary depot shall be promptly reported to other end depot and necessary co-ordination done to attend the defect.
23. Carry out periodic check on the HOG couplers in enroute station for intactness.
24. In case of equipment failure enroute the power car escorting staff will inform to Elect CNL timely and will try to safely rectify the same during journey & if it is not possible to attend during journey and it is necessary to replace the equipment at secondary end, the escorting staff with the help of secondary depot staff will replace the equipment within lie over period in consultation with the Primary as well as Secondary maintenance Railway authorities.
25. In case of HOG operation of rake, regular monitoring of power supply should be done. In case of any tripping enroute, same should be communicated to train driver/escorting coordinator through Guard and try to restore the HOG power supply after resetting.
26. In case of emergency, escorting staff will perform duty as per **Annexure A**.
27. At terminating stations, uncouple the HOG/UIC couplers and secure them properly in dummy sockets.
28. If maintenance/repair at roof of the coach under OHE is required, it must be done in consultation with the Primary as well as Secondary maintenance Railway authorities and disconnection of OHE must be ensured and authority from Railway representative for the same be taken before climbing up the roof of coach.
29. Any enroute failure / complaint shall be communicated to control. Power car Escorting staff will inform the Installation/Rake in charge/ regarding any major equipment failure/defects/deficiencies on arrival to primary depot.
30. Monitor the load current closely whether the rake is in HOG / EOG. Switch ON the 2nd engine when the load exceeds the capacity of one DA set.
31. In case of EOG, both the DG sets should be run in sequence, even if load demand can be met by one DG set, so as to assess the working of the both DG sets.
32. Ensure before departure of train that, Fire detection and suppression system (FDSS) is in working condition else, inform to C&W staff for necessary attention.

Daish

Annexure A

Duties of Escorting Electrical Staff at the time of Emergency:

- i. **(Disaster Management in Indian Railways):**
 - Escorting staff must be trained to handle the situation of fire, Electric shock & should have other disaster management skill.
 - Escorting staff should have basic communication skill to convey emergency situation promptly.
- ii. **Fire in the train:**
 - Disconnect electric supply of affected coach (certainly).
 - Use fire extinguisher equipment as far as possible to extinguish fire.
 - Use and operation of fire separation system in power car.
 - Inspect lighting system in coach and provide lighting in the dark coach.
 - Provide lighting on accident spot.
 - Take actions cautiously to help accident prone passengers as per circumstances.
 - Help to draw out accident affected persons/dead bodies.
- iii. **Derailment or Collision or Level Crossing accident:-**
 - Inspection lighting system in the coach and provide lighting in the dark coaches.
 - Provide light at accident spot.
 - Take actions cautiously to help accident prone passengers as per circumstances/requirements.
 - Help to draw out accident affected persons/dead bodies
- iv. **Cyclone or Storm or Flood :**
 - Disconnect electric supply of affected coach (Certainly)
 - Inspection lighting system in vehicles and provide light in the dark coaches.
 - Provide light at the accident spot.
 - Take action cautiously to help accident prone passengers as per circumstances/requirements.
 - Help to draw out accident affected persons/dead bodies.
- v. **When presence of bomb has come to be known in the train:**
 - Vehicle in which the information that bomb is kept is to be separated from the train with the help of the carriage & wagon staff.
 - Provide emergency light in case the lighting system is interrupted in the coaches.
 - Separate power cars of trains.
 - Help the passengers to come out from the coaches.
 - Open/break the emergency windows of the affected coaches.
- vi. **In case of explosion of bomb in the train.**
 - Disconnect electric supply of affected coach (Certainly)
 - Provide emergency light on the explosion spot.
 - Advise the passengers of other coaches to vacate the coaches in order to prevent the increase in accident due to explosion.
 - Immediately check lights in all the coaches and provide light in dark coaches.
 - Help in extricating the trapped passengers/bodies.
 - Open/break the emergency windows of the affected coaches.
 - Use fire extinguisher to extinguish fire.

3577864/2025/O/o PED/PS&EMU/RDSO

vii. **On getting information of bomb explosion in permanent installation.**

- Inform ETL- Control, Traction Power Control, through available resource, walkie-talkie or telephone for assistance management.
- Ask certainly for the fire brigade assistance while informing Assistant Station master/control.
- Use fire extinguisher as far as possible to extinguish fire.
- Do not become panic when coach catches fire.
- Remove the seal & clamp of the fire extinguishers.
- Find out the base of the fire.
- Hold the nozzle and aim towards near to the base of the fire.
- Hit the operating knob and ensure that the powder is sprayed properly.
- Ensure the fire is totally extinguished and it is cool.
- After extinguishing fire, isolate the fired equipment from the circuit.

viii. **Electric Shock.**

Electric shock occurs when an electric current flows through the body. The human body is made up of 60% to 70% water. This makes it a good conductor of electricity. Burns, damage to internal organs, heart rhythm problems and death can result from electric shock.

What to do when a person received an electric shock:

- Switch off the current, if possible, by removing the fuse or switching off the circuit breaker.
- Do not remove the victim from the source until the power source has been shut off.
- Separate the person from the source of electric current using a dry broom handle or other type of non-conducting material such as wood or rubber.
- Let his head be slightly lower than the rest of the body, and raise his legs.
- Inform TTE/conductor and call any Doctor, if available in the coach/train to attend the injured person. Inform this incidence to electrical control.

FIRST AID

In case of any emergency, escorting staff should be prepared to face such situations as these happen suddenly. The victims of such situations need some immediate help. This kind of help is called **First Aid**.

First Aid Box is always available with Guard of train. Try to look for available Doctors in the coach/train for helping victims.

Dos & Don'ts of First Aid

Dos (✓)	Don'ts (X)
In case of Burns	
Pour cold water immediately on the burn till the burning sensation stops	Apply any ointment on the burn
Keep an ice or cold water pack on the burn	Cover the burn with thick cloth
If a person's clothes catch fire, wrap a blanket around him & make the person roll on the floor	Let him run around in flames.
Protect the burn from dust, dirt, flies, etc. Cover it with a thin and light cotton cloth	Tie a cloth tightly. Use a dirty cloth
If the burn is severe, must immediately get the help of doctor.	Get the help from an unqualified person
In case of head injury/ bleeding nose	
Make the victim lie down with his head in a lower position than the body	Put a pillow under the victim's head
Pour cold water on the victim's head	The victim must not put his finger in the

Daich

3577864/2025/O/o PED/PS&EMU/RDSO

	nose
A cold pack can be put on the nose	The victim must not blow his nose too often
If the condition is severe, must immediately get the help of doctor.	Get the help from an unqualified person
Do's (✓)	Don'ts (X)
In case of trauma	
Make the victim lie down in a cool place	Crowd around the victim
Keep an ice or cold water pack on the head of victim	Cover the victim with any cloth, especially woollen cloth
Give the victim water or juice to drink	Give hot tea or coffee to the victim
If the condition is severe, must immediately get the help of doctor.	Get the help from an unqualified person

Diagnose

3577864/2025/O/o PED/PS&EMU/RDSO

Annexure B

JOINT PROCEDURE ORDER FOR HOG OPERATION**A. Items pertaining to Loco branch:-**

- 1.0 Loco Pilot/LPS will couple the HOG fitted loco with rake fitted with HOG equipment. Available RSO staff/CLI/CC/ALP, will co-ordinate for connecting HOG couplers at originating station.
- 2.0 After attachment of CBC by traffic department and attachment of air brake pipe by C&W, Electrical Coaching staff will approach LP and will advise to lower the pantograph to cut off the power supply, since it is crucial safety activity the register is to be maintained with joint signature and time. Loco Pilot/LPS will trip VCB and lower the pantographs to allow coupling of UIC and IV couplers by Electrical coaching/power car staff from Power car/LSLRD to Locomotive.
- 3.0 After attachment of UIC and IV couplers, Electrical Coaching staff will approach LP and will advise him to raise the pantograph, Loco Pilot will again raise the pantograph and close VCB of locomotive and will switch ON the HOG by BLHO switch. Before starting the train, the power car supervisor & Loco Pilot shall confirm working of HOG and record in the power car log book and loco log book respectively.
NOTE: To avoid ambiguity and to ensure electrical safety between Loco and Electrical Coaching staff a joint Performa should be signed by Loco and Electrical Coaching staff which contains timing of Loco placement, Pantograph-lowering time, Pantograph-raising time (Attached as Sheet 1) or a MEMO of confirmation to be exchanged between LP/ALP and escorting staff.
- 4.0 Loco pilot and RSO staff should ensure that both HOG Converters shall remain in service which will be verified by monitoring indications available on converters. Loco pilot and RSO staff available should be aware about non-working of one or both HOG converters.
NOTE: On analysing the Non HOG cases, a common failure, waiting ON command has been observed which reflects failure in Loco or power control circuit. A testing jig should be developed by both Loco and Elect Coaching wing to check respective control circuit (DC) and loco/Rake should be offered for train operation after ensuring the same.
- 5.0 In Case both HOG converters are working, which is confirmed by LP and if supply is not extended to Power Car panels, available Electrical Coaching staff of power car is required to check IV Couplers/ratchet and UIC coupler for Hotel load of both ends (loco and power car) for proper connections and try to put loads on HOG.
- 6.0 Sockets for HOG UIC Couplers are provided in ALP side and is labelled/marked with "HOG" Power car staffs shall ensure connection of HOG UIC coupler to HOG sockets meant for it. Further to differentiate between HOG and MU Couplers, HOG couplers on loco face should be painted in some uniform pattern which is to be ensured by respective Electric loco sheds.
- 7.0 After any tripping/train passing neutral section, Loco Pilot will switch ON BLHO switch as per requirement and as per existing guidelines of OEM of converters that are normally provided in locomotives by respective loco sheds.
- 8.0 In case of non-working of HOG during run due to any failure in loco/coach/power cat, Loco Pilot/power car staff should communicate with some suitable communication medium.



3577864/2025/O/o PED/PS&EMU/RDSO

Normally, problem of malfunctioning of HOG takes place after neutral section, i.e. during run, which shall be reset by LP by operating BLHO switch & following the TSD on HOG. There is inherent requirement of proper communication between the LP and the power car staff to ensure the continuous supply of HOG as mobile of Loco pilot remains in switched off position and VHF sets are not being provided to escorting staff of power cars. Therefore, it is imperative that Power Car Staff may be provided with the VHF sets for communicating in the event of HOG failure. Electrical Escorting staff can also approach LP on the en-route station on this behalf where the train is halted.

- 9.0 After reaching the destination, Electrical coaching staff will approach LP and will advise him to lower the pantograph. Loco Pilot will switch off the HOG (BLHO) and pantograph will be lowered. After ensuring lowering of pantograph, Electrical coaching staff will detach HOG couplers and will inform LP to raise pantograph for facilitation of further movements, if any.
NOTE: To avoid ambiguity and to ensure electrical safety between Loco and Electrical Coaching staff a joint Performa should be signed by Loco and Coaching staff which contains, Pantograph-lowering time (Attached as Sheet 1) or a MEMO of confirmation to be exchanged between LP/ALP and escorting staff.
- 10.0 Earth leakage should be checked before offering the loco for train service, if loco being turned out ex out pit loco shed.
- 11.0 Output voltage of Loco converter should be checked before offering the loco, for train service, if loco being turned out ex out pit loco shed.

B. Items pertaining to Electrical Coaching Branch:

- 1.0 Power car escorting staff should be ready with UIC cable as soon as locomotive is attached with rake. After lowering of pantographs and getting permission from Loco pilot/RSO staff, both UIC and IV couplers should be attached with locomotive in minimum possible time. To ensure proper electrical safety, timing and joint signature must be ensured as advised in annexure.
- 2.0 Power car staff shall be responsible for proper attachment of HOG couplers with power car and its locking of ratchets to ensure its proper tightness. The staff shall inform Loco Pilot/RSO staff subsequently after the attachment of HOG coupler is done.
- 3.0 After taking feedback of BLHO on from locomotive, Power car staff should switch on HOG system command from power car which will ensure output availability to power car from locomotive. Power car staff should check all indications on both panels and check Voltage and other values for proper operation.
- 4.0 In case of failure of one HOG Converter, if load permits, full load can be taken on one working HOG Converter. Therefore power car staff has to switch ON bus coupler to connect the loads on both circuits.
- 5.0 IV Couplers shall be unlocked properly before removal of the IV cables. This is required to prevent damage of IV couplers on locomotive side in case of any deficiency in working of IV couplers on loco side, galvanized iron wire/ Nylon Rope can be used for securing.
- 6.0 The Electrical coaching staff shall ensure the rotary switch of HOG panel at proper marked position is for HOG as per the instructions for HOG panel installed on the power car and displayed over there.
- 7.0 Power car staff thereafter, energizes the feeder as per the requirement.

Darsh

- 8.0 The Electrical coaching staff shall, thereafter, check and inspect the control panel in each coach up to the rear power car for satisfactory working. Any abnormality observed in the equipment provided in the switch board cabinet shall be immediately acted upon. In case of isolation of any equipment, the same shall be recorded in the maintenance diary and shall be informed to the Electrical Control.
- 9.0 Before starting the train, the power car supervisor & Loco Pilot shall confirm working of HOG and record in their respective power car log book and loco log books and Escorting staff should exchange status with LP, in case of problem and communicate mutually through VHF sets (available) or personally during stoppages of train. Both staff should exchange their CUG/Mobile numbers also in case of discussion during emergencies, however Loco Pilot is not obligated to switch on the mobile during run as per extent instructions.
- 10.0 HOG Reset push put-on is provided in Power Car, which can be used for resetting HOG in case "Converter Faulty" lamps glows.
- 11.0 Electrical Coaching staff shall monitor the working of HOG in power car during run.
- 12.0 In no case parallel operation of HOG with DG set shall be done in one feeder.
- 13.0 On arrival at the terminal station, with the permission of LP after lowering of pantograph, the Electrical escorting/Maintenance staff shall detach the HOG couplers from the locomotive and secure on the power car at its location to prevent its falling.
- 14.0 If train engine is being attached in washing line/yard, HOG couplers will be attached on the washing line itself by the Electrical Coaching staff as per the above procedure to avoid detention at PF.
- 15.0 It shall be ensured that UIC and IV couplers are insulated properly so that likelihood of shock to staff attaching BP and FP pipes between loco and rake can be ruled out.
- 16.0 Earth leakage should be checked before offering the loco for train service, if loco being turned out ex out pit/loco shed.

Dr. Ar

[illegible]

Assurance of Completion

LP/ALP Confirmation (Signature with Date & Time)	Power Car Staff Confirmation (Signature with Date & Time)