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भारतसरकार-रेलमंत्रालय  
अनुसंधानअभिकल्पऔरमानकसंगठन  
लखनऊ- 226011

Govt. of India - Ministry of Railways  
Research, Designs & Standards Organization,  
LUCKNOW - 226011

No. EL/11.5.5/5

Date: 02.07.2018

M/s. CG Power and Industrial Solution Limited,  
Plot No. 9, MPAKVN Phase-2,  
New Industrial Area, Mandideep - 462046.

**Sub:** Minutes of the Meeting held at RDSO, Lucknow on 02.07.2018 on Reliability of M/s CGL make IGBT based converters fitted in three phase electric locomotives.

Please find enclosed herewith a copy of Minutes of the Meeting held at RDSO, Lucknow on 02.07.2018 on Reliability of M/s CGL make IGBT based converters fitted in three phase electric locomotives for information and necessary action.

*[Signature]*  
(Suresh Kumar)  
For Director General (Elect.)

Encl: As above.

Copy to:

1. **Secretary (Electrical), Railway Board, Rail Bhawan, New Delhi-110 001.** For kind information.
2. **Chief Electrical Engineer, (For information and necessary action)**
  - Central Railway, HQs Office, 2<sup>nd</sup> floor, Parcel Office Bldg., Mumbai-400 001
  - East Central Railway, Hajipur (Bihar)-844 101
  - Eastern Railway, Fairlie Place, Kolkata - 700 001
  - East Coast Railway, Railway Complex, Bhuvneshwar - 751 017
  - Northern Railway, Baroda House, New Delhi-110 001
  - North Central Railway, Allahabad - 211 001
  - South East Central Railway, Bilaspur-495 004
  - South Central Railway, HQs Office, Rail Nilayam, Secunderabad-500 071
  - South Eastern Railway, Garden Reach, Kolkata- 700 043
  - Southern Railway, Park Town, Chennai - 600 003
  - West Central Railway, HQs Office, Opp. Indira Market, Jabalpur-482 001
  - Western Railway, Churchgate, Mumbai - 4000 020
  - Chittaranjan Locomotive Works, Chittaranjan - 713 331(WB)

*[Signature]*  
(Suresh Kumar)  
For Director General (Elect.)

Encl: As above.



**Reliability meeting of M/s CGL make IGBT based converters fitted in 3-ph loco  
held at RDSO on 02.07.2018**

**Member Present**

RDSO	M/s CGL
1. Shri O.P. Kesari, PEDSE	1. Shri M.V. Pradhan, AGM
2. Shri S.K. Deo, SSE/TPS-2	2. Shri Krishan Junwani, Manager
3. Shri Ran Vijay, JE/TPS-1	

In this meeting, issues related to M/s CGL make IGBT based Traction Converter and Auxiliary Converter have been discussed. The detailed deliberations done during the meeting are appended below:

**1.0 M/s CGL make Traction Converter**

**1.1 Failure trend of CGL make traction converter:**

SN	Cause of failure	2016-17	2017-18	2018-19 (Apr-Jun) Reported by CGL
1	Power module	7	20	4
2	PCB cards	3	4	4
3	Coolant pump	1	1	0
4	Software malfunctioning	26	40	8
5	Others	6	14	2
	Total	43	79	18
	Total Population (Loco)	18	71	79
	FRPCPY	238	111	---

**1.2 Following issues are with M/s CGL make traction converter:**

SN	Item	Action plan	Remark of Firm
1	Failure of power module & their cliplam connector	CGL to propose the solution to provide bus-bar connections in place of cliplam arrangement.	<p>CGL has proposed to modify the modules with bus-bar type arrangement.</p> <p>Modification of only 23 locos as on date has been carried out so far as against target of 69 locomotives. The progress is very slow.</p> <ul style="list-style-type: none"> <li>• The total locos to be modified: 69</li> <li>• Locos already modified: 23 (14-BNDM, 9-RPM)</li> <li>• Locos still to be modified: 46</li> </ul> <p>CGL has confirmed that</p>

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SN	Item	Action plan	Remark of Firm
			modification in all locos shall be done by Dec'18 end.
2	Software issues	<p>There are lots of software issues which need to be immediately addressed for the reliable operation of the locomotives.</p> <p>Problems still pending:</p> <ol style="list-style-type: none"> <li>Frequency out of range</li> <li>DC link over voltage</li> <li>Main Power off</li> <li>Rectifier error</li> <li>Over voltage in BUS</li> <li>Earth fault trafo/motor.</li> </ol> <p>Firm has indicated that they have resolved the issues in software trial version 22 beta (WAP7) and 23 beta (WAG9H).</p>	<p>a. <b>Frequency out of range:</b> This issue has been resolved and performance is under observation.</p> <p>b. <b>DC link over voltage/ Main Power off/ Rectifier error/Over voltage in BUS:</b> Tuning of the scaling amplifier for Kp &amp; Ki is completed &amp; got satisfactory result. Implementation of ATD protection is completed. Performance is under watch.</p> <p>c. <b>Earth fault trafo/motor:</b> Introduced software filter of 400 Hz in <math>V_{leak}</math> signal to resolve the issue and the same is under observation.</p> <p>The above software tuning have been done in loco no. 30578, 30541, 30538, 30680 of ELS/RPM and 31832, 31918, 31874, 31869, 31829, 31913 of ELS/BNDM.</p> <p>After satisfactory performance of software trial version 22 beta (WAP7) and 23 beta (WAG9H) by July'18 end, CGL shall approach CLW/RDSO for regular approval.</p> <p>PDC: 31.07.2018</p>
3	Issues with UTGEN CPU electronic.	<p>UTGEN CPU Electronics are old generation electronics having booting time 120 Secs. Presently, firm is using new generation VEGA Electronics having booting time less than 45 secs. Firm is presently working to set right the issues with Converters using VEGA type of electronics. Firm has stated that the listed issues once corrected in VEGA will be</p>	<p>After satisfactory performance of software trial version 22 beta (WAP7) and 23 beta (WAG9H) in VEGA electronics by July'18 end, CGL shall make necessary changes in UTGEN CPU Electronics to meet the functional requirement.</p> <p>CGL shall revert back with cut-in date by 31.07.18.</p>

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SN	Item	Action plan	Remark of Firm
			Locomotives at shed.
7	Repeated failure of balancing resistor	The failure is due to overheating of resistor and its outer cover is getting cracked. The issue is with Kiyosh make resistors.  M/s CGL shall replace Kiyosh make resistors with HVR Pentagon make resistors.	Firm has informed to use 5 locos with HVR Pentagon make resistors & monitor the performance. The loco nos. are 31846, 31785, 31968, 31742 (BNDM) & 32028 (GMO).  Firm stated that they will maintain spares of HVR Pentagon make resistors at various loco sheds so that these resistors may be replaced as and when required.
8	High arising of gate driver card failure	Gate driver card 5 nos failed. CGL has sent card for investigation to OEM Power integration / Switzerland.	Report shall be submitted to RDSO by 31.07.18 without fail.
9	Failure of modified X24 Card (Analog I/O card).	Two cards failed in two month service. Firm has sent this card to OEM CAF/Spain for investigation and report awaited.	Report shall be submitted to RDSO by 31.07.18 without fail.

## 2.0 Failure trend of CGL make auxiliary converter:

SN	Cause of failure	2015-16	2016-17	2017-18	2018-19 (Apr-Jun) Reported by CGL
1	Power supply card (KUC153 A02)	74	106	24	1
2	BUR processor card (CCPU card)	9	39	49	0
3	INVCC-01 electronic card	21	60	75	6
4	Inverter module	0	2	18	1
5	Others	0	17	25	5
	Total	104	224	191	13
	Total Population (Loco)	182	217	308	320
	FRPCPY	57	103	62	---

## 2.1 Following issues are with M/s CGL make auxiliary converter:

SN	Item	Action plan	Remark
1.	Failure of PS card (KUC153A02)	In place of KUC153A02 card, firm modified KUB921 card of VCU and made it suitable for auxiliary converter.	Six locomotives in Gomoh, Three locos in VSKP and Two locos in TATA are still remaining. Material is available in the shed. Cards will be replaced as per loco

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SN	Item	Action plan	Remark of Firm
		transferred to the UTGEN Electronics converters. CGPISL is having 13 locomotives converters of UTGEN type.	
4	Main power off: In case of failure of FLG-1, Main power becomes Off.	This issue was observed in loco no. 32020 of ELS/TATA due to failure of FLG-1.	After replacement of same card with healthy one, the issue has been resolved. Joint note with ELS/TATA & CGL is enclosed as Annexure-1. M/s CGL shall submit failure investigation report by 31.07.18.
5	Monitoring tool: There is no snapshot in log viewer file due to which it is not possible to monitor electrical parameters at any particular time of fault. Monitoring tool is required to be modified and shall be provided to user Railways.	Firm has intimated that they are providing latest monitoring tool. Firm need to conduct trainings for different sheds/CLW/RDSO.  User manuals still to be submitted to CLW/RDSO/Railways.	All messages have been made available on DDS. CGL stated that the same is included in their training schedule. List of faults having snapshots are as follows: 1. Primary over current 2. Auxiliary over current 3. Harmonic filter over current 4. Catenary over voltage 5. Pre-charge Contactor stuck On 6. Inverter over current (U-V-W phase) 7. Bus over voltage(V bus Max) 8. Line bridge over current 9. Earth Fault 10. IGBT error  CGL shall submit revised user manual to CLW/RDSO/ Railways by 15.08.18.
6	Discoloration of SR coolant with bad smell in machine room.	All locomotives have been cleaned. ELS/BNDM has informed that there is reoccurrence of discoloration of coolant in one locomotive. Firm to look into.	The issue of discoloration of coolant is reoccurring in ten locomotives of ELS/BNDM. CGL mentioned that Fresh coolant will be replaced in loco 31739, 31756, 31821, 31869, 31874, 31887, 31917, 31935, 31910, 31835 by 20.05.2018. CGL has stated that new batch of fresh coolant (2500 liter) have been made available at ELS/BNDM. In Loco 31869 coolant is already changed and in balance locos, it will get changed on the availability of

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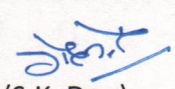
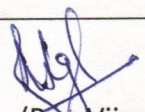
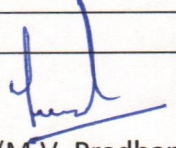
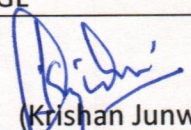
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			availability.
2.	Failure of BUR card (CCPU)	Failure was due to over sensitivity of input channel. Sensing voltage has been modified from 10 V to 36 V.	Modification has been done in all locos except 6 locos in ELS/GMO. Material is available in the shed. Cards will be replaced as per loco availability.
3.	Failure of INVCC card	The failure is due to spurious inverter fault message in INVCC card. To resolve this problem the resistance to sense the over current has been increased in gate driver and corresponding software modification in INVCC card.	
4.	Wrong generation of fault message, BA charger current < 10 Amp. Problem raised by ELS/TATA in loco no. 31436, 31487 & 31429, ELS/GMO in 31596 and ELS/BNDM in loco 31869.	Firm was advised to visit ELS/Tata to study the issue and prepare joint note. Firm again requested to visit ELS TATA to study the problem and take necessary action.	Required changes are done in Loco 31596 of ELS/GMO and performance is under observation. After getting satisfactory performance, corrective action will be taken for balance locos of different sheds. Investigation report of the issue shall be submitted by 31.07.18.

### 3.0 Other points:

M/s CGL was requested to update the position of action plan every month along with other details as discussed today and send the compliance every month on email [dsetplgroup@gmail.com](mailto:dsetplgroup@gmail.com).

For RDSO		For CGL	
 (S.K. Deo)	 (Ran Vijay)	 (M.V. Pradhan)	 (Krishan Junwani)

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Joint Note between ELS/TATA and M/s CGL

Electric Loco Shed TATANAGAR	दक्षिण पूर्व रेलवे / South Eastern Railway	ISO 9001:2008 Series Certified Shed
No-RS/TATA/G9/JN/ <sup>2018-19</sup> <del>2017-18/01</del>	कार्यालय / Office of the वरिष्ठ मंडल विद्युत इंजी. (टीआरएस) / टाटानगर Sr. Divl. Elect. Engineer (TRS)/Tatanagar Rly. Tel. No. 73240(O) - 73241(R) P&T No. 0657-2345654 (O) - 0657-2299823(R) Fax No. 73534(Rly.) - 0657-2345654 (P&T) Email address: srdeetata@gmail.com Date: 16.04.2018	

**JOINT NOTE****Equipment: VCU(C-DAC)****Make: CGL****Loco No: - 32020****Date of failure-11/04/18****Fault details-**Loco failed on while working in train no-N/BOBS-E (push-pull) due to having problem of isolation of Cab-1.**Shed Finding-** Loco arrived in shed on 13/04/18 on the same day failure checking done in presence of firm's representative.

During analysis of DDS data , fault message found "Life sign missing from FLG-1 and STB-1" which was responsible of isolation problem of cab-1.

**Firm's attention -**

- 1) Faulty FLG-1 processer card (SI.No-1712173) replaced by pulling from loco no-32102.
- 2) After fitting above card function checked found loco was working normal so given fit for service.
- 3) Message given to firm's higher authority for providing replacement of faulty FLG card.

Loco was detaining from 11/04/18 to 15/04/18 on account of firm.

The firm is advised to provide failure investigation report of faulty card as soon as possible.

For M/s CGL

  
 Gaurav Kumar  
 Service Engineer

For TRS/TATA

  
 A.K. Bhandekar  
 SSE/G9

Countersign

  
 16/4/18  
 Sr. DEE/TRS/TATA

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