

Dated: 18.09.2024

Joint note regarding pre commissioning inspection of Loco No. 38525 equipped with M/S MV Electrosystems Ltd. make prototype IGBT based 3 - phase drive Propulsion Equipment.

Loco No. 38525 has been fitted with prototype Propulsion Equipment of M/S MV Electrosystems Ltd. Make and same is under commissioning at CLW/CRJ. The Locomotive functionality has been tested jointly with CLW/C-D&D & firm representative and observations made have been appended as below:

A. Key operational issues:

S. No.	ELS/TKD Observations	Firm Remarks	TKD Remarks in presence of CLW
1.	Sometimes while loco setup mode is getting jumped to 715 and at that instant, VCB is not getting closed. After 4-5 repeated attempts or some delay of 5-7 seconds, VCB is getting reclosed.	Phenomena Observed very rare, further monitoring shall be done during trial.	Observed sometimes
2.	For A-9 at emergency position, SR interlock – emergency brake pressure switches not active, and traction is coming. Firm is advised to check the logic with CLW.	Logic checked and found in order.	Message to be mapped.
3.	For MR pressure low, travel direction is getting set normally and traction is also enabled. Traction interlock for low MR is not active on setting reverser.	Rectified OK	Checked OK
4.	'VCB ON' command by BLDJ is getting active even before actual raising of pantograph. i.e. if ZPT- UP and BLDJ – ON command is given without delay, Then, it is needed to retract the BLDJ command and initiate again to close the VCB. 'VCB ON' command before actual raising of pan. Should be ignored.	Rectified OK Node 560 is for VCB stuck-ON/OFF	Checked ok
5.	If reverser and throttle is operated simultaneously before reaching 590 nodes, traction is getting enabled in this case. No interlocking/corresponding DDS has been mapped to prevent throttle operation before reaching 590 nodes.	Rectified OK	Checked OK.
6.	Simulation mode is getting activated without MCE reset i.e. If loco is charged and simulation key is operated, then there is instant activation of simulation mode without performing MCE reset	Rectified OK	Checked OK.
7.	Warning for over speeding i.e.(max-speed+5%) is not there.	Warning added	Checked in simulation, found OK.
8.	Emergency brake is not getting applied by over speed monitoring i.e. (max speed+10%). Neither emergency brake nor alarm chain pulling is getting activated on over speeding.	Emergency braking logic is available. It shall activate once Overspeed shall happen.	Can't be checked in HT mode due to speed restrictions.
9.	Over speeding pop-up message is also coming late.	Rectified OK	Checked OK
10.	Over speeding buzzer getting activated at 107-108 kmph speed.	Rectified OK	Checked in simulation and buzzer activated at 105 only.
11.	Loco creeping is not there. Firm to check the logic with CLW.	Implemented for effort >10 Kn for 1 minutes.	Checked OK

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12.	Vigilance acknowledgement is not working through PSA switch.	Implemented	Checked OK
13.	ACP is setting activated while charging BP through A-9. ACP gets de-activated when BP gets charged to 5.0kg/cm square.	Corrected	Checked OK
14.	Blending brakes is not proportionate with throttle (only working for initial throttle feedback).	Corrected and Verified OK	Checked OK
15.	If any of the two Trafo-oil pumps MCB is tripped, then VCB gets tripped with message TE/BE reduction and corresponding bogie also gets isolated. Firm to re- check the protection logic with CLW.	Logic corrected.	Checked OK.
16.	If TFP- MPH direction is wrong, Trafo- oil pressure is rising to 0.80 bars but no fault is coming for Trafo oil pressure not OK. Ventilation level is also not setting charged in this case. Firm to implement the protection logic with consultation to CLW.	Earlier trip limit was 0.7 bar, now trip Limit changed to 0.9 bar.	Checked OK.
17.	If SR MPH direction is wrong, coolant pressure is rising till 1.0 bar and VCB getting tripped after 12 sec with message coolant pressure< limit. Subsequently leading to logic isolation. (Firm to specify the normal range of coolant pressure).	Trip Limit is 1.5 bar. Nominal Pressure Value is 1.8 to 2.7 bar.	Checked OK.
18.	BPFA acknowledgement response is too slow.	Corrected OK	The response has been Improved
19.	Sometimes while Regenerative braking, braking effort is not getting reflected in TE/BE meter or display. (Checked in simulated).	TE/BE meter to be checked by IR.	To be checked after replacement of TE/BE meter.
20.	While in Traction/braking mode, BPCS is activated, then after vigilance warning acknowledgement through PVCD, BPCS is automatically getting cut – out after some delay without moving the throttle. {The case observed in TE/BE both modes in simulation and in braking mode in HT.}	Rectified OK	Checked OK
21.	Speed varying abruptly while exiting BPCS mode (in HT also).	Rectified OK	Checked OK
22.	While throttle at '0' and speed > 2kmph, no interlocking/corresponding fault message mapped to restrict the charge in reverse position. A speed abruptly changing to zero kmph.	Rectified OK	Checked OK.
23.	If speed sensor sub-D s opened and loco is tried to charge. Then, VCB opens at first instant with message fault in speed sensor. After reclosing the VCB, loco moves with jerk. LSP glows repeatedly or continuously.	Jerk problem rectified LSP still glowing	LSP still glowing after removing any of the speed sensor. Can be tuned for more accuracy
24.	Harmonic filter contactor status is being monitored at 590 nodes only. I.e. If FB cubicle GIMOTA coupler is opened then harmonic filter is getting isolated at 590 nodes only. Restricting the loco speed up to 40 kmph. {For harmonic filter contactor status, MSC node sequences to be followed.	Rectified OK	Checked OK.
25.	Protection logic implemented for earth fault in TM side is to be elaborated.	Implemented & Already tested during Type test &	Same has been confirmed

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		checked in simulation at CLW.	
26.	For initial brake application through A.9, BC status in DDU is not getting changed from released to applied.	Logic OK. Pressure switch on Loco to be checked.	To be verified
27.	On any BUR isolation, grouping contactor status is not getting changed simultaneously. It is getting changed only after MCE reset.	Implemented & Rectified OK	Checked OK
28.	On any BUR isolation, corresponding DC link voltage is not getting changed in AUX converter menu.	Implemented & Rectified OK.	Checked OK
29.	Contactor 8.41 feedback is not available on 504 modes.	Rectified OK	Checked OK
30.	On pressing BPEMS, ACP message is coming late.	30sec time is there.	Emergency stop message popped up but delay in ACP message maybe improved as per AFI logic
31.	VCU churning fans are not continuously working in drive mode.	Temperature controlled above 45 degrees Celsius.	It is design specific; performance needs to be monitored
32.	Traction bogie electronics is not getting switched OFF from MCB 127.1 (traction converter electronics).	Taken From gate unit power supply	Implemented for Gate unit power supply MCB 127.11 only. TSD to be ensured
33.	If VCB Gimota coupler is open, and BLDJ command is given fault message coming at VCB stuck in OFF position, but node is getting raised to 560.	Stuck On/OFF checked and verified in 560 found in order.	As per firm, 560 nodes has been taken for VCB stuck ON/OFF monitoring Checked OK
34.	After Opening the VCB during movement, VCB getting re-closed, but traction is getting enable for some delay of 14-15 sec	The delay time is due to the time taken for aux ramp-up.	Firm to check the feasibility for further enhancing the loco performance during neutral section negotiation.

Display functionality key issues:

1.	Simulation screen pixy is not available.	As kN & node are available in-home screen.	Checked OK
2.	Grouping contactor nomenclature is showing as 54 instead of 52.	Implemented and verified OK.	Checked OK
3.	BP and MR pressure is not available in pressure menu.	MR analog value is not available from loco side. So, BP pressure added.	BP pressure added. Checked OK
4.	As the loco is not having parking brake, the indication at display should be masked.	For conventional bogie, logic PB is released. For TBU/PBU bogie, it will be implemented.	As per firm remarks. Shorting needs to be ensured as logic of PB implemented
5.	Line Converter status is not available in display as graphics.	LC Converter status is available in	Graphics of Rectifier

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		traction converter screen. Graphics to be implemented at Home screen further.	converters status is to be added in GUI screen.
6.	MVB variables/IO signals monitoring is not available in display.	For the time being, it can be monitored through laptop. Same maybe implemented during field performance validation	Firm to check the feasibility for incorporating the same is display menu.
7.	Pop-up text is too small to read. Same should be legible.	Rectified OK.	Enhanced.
8.	Only pop-up message/DDS text is available on DDU. Further information regarding the same is not available.	Feasibility to be checked to provide guidance info to LP	To be implemented by firm as done for other propulsion system. Linking maybe
9.	For every pop-up message there should be an information menu to guide the LP for troubleshooting.		
10.	There is no differentiation of active/disappeared fault. Should have a separate menu for active faults.		
11.	Same fault message is getting repeated in DDS history.	Rectified OK.	Checked OK.
12.	Delay noticed in node progression of FLG1 & FLG2 should be minimised.	FLG1 is master & FLG2 is slave. FLG2 follow the FLG1. Improved.	Improved but still lagging sometimes.
13.	Combined KN of both bogies is not available on display.	Implemented.	Implemented
14.	For any HB MCB trip conditions corresponding sub-system is green only not red.	For P2 faults, status will be green. For isolation the subsystem status will change to RED	Same as per firm.
15.	There is no differentiation of Tractive/Braking effort in display. It should be differentiated with colour or +ve, -ve Kn.	Text colour changed as RED in BE. To be checked for feasibility of graph colour.	TE/BE text colour changed. May implement for differentiation through graph colour.
16.	New fault message is not getting synced automatically in DDS history.	To read new fault, F4 will be pressed every time.	F4 to be pressed for visualising the latest DDS. Indication/ demarcation maybe provided
17.	KN, current, rpm etc like critical parameters should be mapped for individual TM and displayed in TM menu.	43 critical parameters already being monitored. Additional requirements will be analysed	Firm may explore the same and add the signals in DDU for better visualization

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B. Issues related to fault mapping:

1.	All VCU related message is mapped under sub-head of FLG1. Even after removing VCU-1 MCU card, fault message is getting logged from FLG1 only. Message should be mapped for corresponding processor cards to ease the troubleshooting.	All message has been mapped from VCU-1 and same will be coming from VCU-2 only when complete VCU-1 processor is isolated	It is design specific as the processor has been clubbed. Firm maybe analyse the fault and try to sync the fault in line with MICAS VCU
2.	For fault in any of the two Panto DDS has been mapped for Pan1 only.	Mapped.	Checked OK.
3.	For bogie isolations through rotary 154 messages has been mapped as life sign from line converter is missing. It should have been mapped bogie control through rotary switch.	Message corrected for rotary switch 154.	Checked OK.
4.	No message mapped for operation of rotary switches like 237.1 (VCD isolation), 160 (shunting mode).	Mapped.	Checked OK.
5.	No messages have been mapped for representing of ZBAN (banking mode) & ZTEL switches.	Mapped	Checked OK.
6.	MCE ON/OFF information is not mapped in diagnostic.	Mapped	Checked OK.
7.	No message mapped for activation of self – hold mode.	Mapped	Checked OK.
8.	No message mapped for speed restriction on isolation of harmonic filter.	Mapped	Checked OK.
9.	No message mapped for LC/MC or any subsystem isolation.	Message available for disturbance only. The isolation is being displayed on GUI of DDU through motor indications on Home screen	Firm may explore possibility in future to add additional message for recording of individual inverter /rectifier isolations
10.	No message mapped for TM isolation for disturbance in speed/temperature sensor.		
11.	Message is wrongly mapped as 'dist. In converter 1/2' when the VCU-MCU card is removed to check redundancy.	Corrected.	Checked OK.
12.	Fault message to be mapped up to the component level inside the traction / auxiliary converter.	The logic for same is already implemented but the same is not accessible by user.	Firm may check the authority level and try to provide the maximum extent for troubleshooting

C. Design related issues:

1. Mechanical

SN	TKD comments	Firm Remarks
1.	There is no provision of churning fan in backplane of DDU.	The back plane of DDU has special design of Heat sink for heat dissipation which is already tested during Type Test
2.	Battery charger panel is not accessible for maintenance.	In Auxiliary converter battery charger electronics is accessible from front side. However, the CHBA is behind rectifier for better cooling

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3.	SR coolant inlet pressure sensor is not accessible for maintenance.	SR inlet coolant pressure is additional which maybe be removed in future provision
4.	SR Heat exchanger blower is not accessible easily. Any defects in blower may lead to lifting of traction converter for replacement.	It is being ensure that Blower will not require lifting of Traction converter
5.	MUB resistance is not accessible for maintenance.	Operational duty of MUB resistance is very less along with minimum maintenance. Further the MUB location is identical to GTO converter

2. Electrical

1.	the line side controller for traction converter is inbuilt in main processor card (TCU-MCU) so, any defect in line side controller the traction converter will get isolated. However, this should have restricted the power reduction to 25% only.	There is a dual-core processor that generates 4 pulses from each core. If one core fails, the other continues to function. This has been confirmed as well. In addition to this Hot standby power supply is provided which is supplying the processor modules.
2.	MCB for Blower Fan/pump for traction converter is common	There is separate MCB for Traction coolant pump and Blower fan inside the traction converter cabinet so failure wouldn't happen in case of Blower Fan gets earthed

d. Issues with diagnostic data

1.	Diagnostic history on display can be downloaded through pen drive from DDU. However, for background analysis, DDS needs to be downloaded through laptop from VCU.	Already Implemented.	DDS downloaded through pen drive and same is being displayed in excel format along with environmental data. Firm may explore the possibility for provide provision of non-tampering of data
2.	For internal data of traction converter, it is needed to download the fault log from each processor card of SR individually. There should be a common point of download in SR for diagnostic of all controllers inside that SR.	Will be implemented after checking the feasibility.	To be done by firm.
3.	For every disturbance fault message of VCU, related environmental parameters to be mapped in background.	Fault data with environment parameters available. Reference point to be check & more parameters to be added.	Respective environmental parameters to be mapped for specific faults as done in case of MICAS system

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