ENCLOSURE: DRG. NO. : CLW/ES/3/SK-1/0194/I

TECHNICAL SPECIFICATION FOR

CONTROL CUBICLE -1 (SB -1)

FOR 3-PHASE ELECTRIC LOCOMOTIVES.

Specification No : CLW/ES/3/0194/~~I~~ J

ISSUE DATE: 29.04.2010

ISSUED BY :

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ALTERATION RECORD SHEET

AMENDMENT NO.	DATE OF AMENDT.	ALT.	REASON	INITIAL
1.	29.04.2010	A	1. Drg. Of Page No. 4 has been deleted. 2. Modified Drg. Of sheet no. 26 has been added. 3. Page no 20 to 25 has been added	S/d-
2.	21.06.2010	B	Modification sheet no RDSO/2009/EL/MS/0377 (Rev. 0) dated 22.04.09 has been included. Clause no. 13.1 of page no. 19 has been added.	S/d-
3.	11.11.2010	C	One no. of 6 Amps MCB has been provided for speed sensor monitoring as per letter no. C- D&D/T/07 dated 01.10.10	S/d-
4.	20.02.2017	D	Specn. no. for Bare Panel has been corrected and sources are modified at sheet no. 24.	S/d-
5.	25.05.2018	E	OEM/Part-I source is replaced by CLW Approved sources (the term only)	S/d-
6.	21.03	F	Schematic Position and quantity has been modified and MCB for speed sensor has been deleted.	S/d-
7.	26.09.2019	G	Clause No. 19 (Page No. 25) has been added for modifications required for push pull operation in WAP-5 & WAP-7 locos.	S/d-
8.	24.03.2021	H	(i) Modification in existing control electronics (CE) resetting scheme of 3 phase loco vide RDSO/2018/EL/MS/0475 dtd. 12.12.2018 (ii) Modification in Earth fault circuit for elimination of spurious message on account of Earthing of control cable in 3 phase loco (MS-480) (iii) MS-413, paralleling of interlock of Aux-contactor of 3 phase loco. (iv) Modification in Blocking Diode to improve the reliability of 3 phase locos vide RDSO/2017/EL/MS/0467 Rev '0' dt. 07.12.2017	S/d-
9.	19.06.2021	I	Sub-D Connectors along with related cabling are to be deleted from the scope of supply as per Dy.CEE/D&D-I letter no. C/D&D/T/42 dtd.. 14.06.2021	S/d-
10	4,5,6,7,8,9, 10,11,12,13, 14, 19,20,21	J	(i) Manufacturer name for list of electrical components should be as per CLW approved Vendor Directory on UVAM and type no. has been deleted. (ii) Complete Continuity test as per cable cutting chart to be done 100 % during routine test. Remark added for Crimping test marked as *. (iii) Final Cable cutting chart enclosed as Annexure-II. The references are for guidance only. (iv) RDSO/2018/EL/MS/0475 Rev. '1' dated 26.10.2023 has been implemented in WAG-9 loco (Page no. 4, 5, 19 & 21). Previous RDSO modification RDSO/2018/EL/MS/0475 Rev. '0' dtd. 12.12.2018 remains valid for WAP-5 & 7 only.	

Note: The Specification has been digitized and all the alteration have been incorporated.

Prepared By	Checked By	Approved By
SSE/Design	AEE/Design	Dy.CEE/D-II

SPECIFICATION FOR CONTROL CUBICLE -1 (SB - 1) FOR 3-PHASE ELECTRIC LOCOMOTIVES

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SPECIFICATION FOR CONTROL CUBICLE – 1 (SB- 1) FOR 3- PHASE ELECTRIC LOCOMOTIVES

1. INTRODUCTION

Control Cubicle -1 i.e. SB-1 is panel of contactors, switches , circuit breakers etc. used to control the various functions of the locomotive. SB1 Cubicle provides interface to both locomotive devices like Pantograph, Traction coverter, Auxiliary converter, and Pneumatic Panel etc. as well as to control electronics. The external interface is provided on circular SICEM Connectors for easy maintenance . This specification contains technical details of the cubicle structure, equipment mounted within, wiring procedure, enviromental specification & acceptance test criteria .SB1 is assembled as per the draing enclosed with this document. Drg no. 3EHP 130215

1. Rotary Switch - Failure Mode operation (152)
2. Rotary Switch - Bogie Cut-Out (154)
3. Rotary Switch - Configuration (160)
4. Rotary Switch - Vigilance Device cut off (237.1) & for CE Resetting Scheme Rev. '1' for WAG-9 Only.
5. Key Switch - Simulation (179)
6. Illuminated Push- Button – Configuration (161)
7. Wire Resistor – Earthing screen train bus (381.71)
8. Resistor – Maximum Current Relay (78.1)
9. Thermostat – Control Electronics (211.1) and the cable connecting the thermostat to the electronics (Not in the tenderer's scope of supply)
10. Relay – Maximum Current (78)
11. Relay – Minimum Voltage (86)
12. Resistor - Earth fault detection , Control Unit (90.7)
13. Connecting Bus – Train Bus (381.7)(Not in the tenderer's scope of supply)
14. Relay – Control Electronics 'OFF' (126.5)
15. Snubber Circuit for Relay Control Electronics 'OFF' (126.5A)
16. Snubber Circuit to Contactor, auxiliary contactor VCB (136.4A)
17. Snubber Circuit to item 126.7 (126.7A)
18. Snubber Circuit to Relay, Time Relay VCB (136.3A)
19. Relay – Time Relay (136.3)
20. Contactor – Auxiliary Contactor VCB (136.4) & CE Resetting Scheme Rev. '1' for WAG-9 only.
21. Contactor – Power Supply Cab (126.7/1)
22. DC/DC Converter (118.4/1)
23. Contactor – Control Electronics (218)
24. Contactor – Control Circuits 'ON' (126)
25. DC/DC converter (118.5/1)
26. Rack – Central Electronics (CEL1) (411) (Not in tenderer's scope of supply)
27. Blocking Diode – Illumination Test (123.1/1)
28. Blocking Diodes (123/7),(123/8)

29. Blocking Diodes (123/5)
30. Blocking Diodes (123/3)
31. Blocking Diodes (123/1)& Blocking Diodes (123/9)
32. Relay Earth fault – Control Circuit (89.7)
33. Circuit Breaker – Central Electronics (127.9/2)
34. Circuit Breaker – Central Electronics (127.9/1)
35. Circuit Breaker - Electronics, Auxiliary Converter (127.22//1)
36. Circuit Breaker - Monitoring (127.2/1)
37. Circuit Breaker – Power Supply Gate Units (127.11/1)
38. Circuit Breaker - Electronic Traction Converter (127.1/1)
39. Circuit Breaker – Lighting Front (310.1/1)
40. Circuit Breaker – Power Supply 24 V /48 V (127.91/1)
41. Circuit Breaker - Pantograph/ VCB Control (127.12)
42. Circuit Breaker - Driver's Cab (127.3/1)
43. Contactor for Head Light (338)
44. Mechanical Structure Complete with
45. Reset Vigilance Control Switch-02 nos. (similar to BPVR) for CE Resetting Scheme Rev. '1' for WAG-9 only and 01 no. for WAP-7 & 5.
46. Off Time Delay Module-02 nos. for CE Resetting Scheme Rev. '1' for WAG-9 only and 01 no. for WAP-5 only and Nil for WAP-7.
47. VS Diode -03 nos. similar to Train parting Diode 12 amps for WAG-9 only.
48. 01 no. of Aux. Contact block 2NO+2NC for CE Resetting scheme Rev. '1' for WAG-9 only.

- Connectors
- Wiring and other accessories
- Terminal Block

- Fastener and Fixing arrangement for attaching the thermostat (211.1/2) Although thermostat along with cable is not in the tenderer's scope of supply

- Fastener and fixing arrangement for attaching the casing containing the Central electronics (CEL1) (411) rack to the SB1 equipment cubicle, although the central electronics (CEL1)(411) rack is not in the tenderer's scope of supply

- Fastener and Fixing Clamps etc. for mounting the total cubicle (along with Central electronics (CEL1)(411)Rack) inside the locomotive.

2. CLIMATIC AND ENVIRONMENTALCONDITIONS OF LOCO

Sl. no.	Climate and Environment conditions	Range
a.	Maximum atmospheric temperature	Under Sun : + 70°C In Shade : + 50°C
b.	Humidity	100% saturation during rainy season.
Ref. Site Conditions		
c.	Temperature	The maximum machine room temperature can be up to 70 °C and the equipment provided in the cubicle must function even at this temperature
d.	Humidity	60 %
c.	Altitude	160 m above mean sea level.
d.	Rainfall	Very heavy in certain areas.
e.	Atmosphere during hot weather	Extremely dusty and desert terrain in certain areas.
g.	Coastal area	Locomotive and equipment will be designed to work in coastal areas in humid and salt laden atmosphere.
h.	Vibration	The equipment , sub-system and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in IEC 60077unless otherwise prescribed.

3. LIST OF ELECTRICAL COMPONENTS

The following electrical components which are mounted in the cubicle shall be supplied by the panel supplier. ~~Only the OEM of components are also mentioned~~**.** ***Only the makes specified in CLW approved vendor directory shall be accepted.*** **The detailed CLW specification of each of these items would be passed on to the successful tenderers.**

Maximum Current Relay

Scheme Position : 78
Required Number : 01
Identification : DIK A210013R0037

Details :

Manufacturer : ~~SECHERON~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~SSA-DI/POS.12~~
Nominal Data : 2.5 A/ 3.3 A – 50 Hz

Resistor 50 W

Scheme Position : 78.1
Required Number : 01
Identification : NBT300213P0001

Details :

Manufacturer : ~~DANOTHERM~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~WID-050W~~
Nominal Data : 1.0 ohm +15/-5%, 50 W

Minimum Voltage Relay

Scheme Position : 86
Required Number : 01
Identification : 3EHP585821R0202

Details :

Manufacturer : ~~MESUCO~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~MES-VSA/5R~~
Nominal Data : 200 V/140 V-47 … 63 Hz

Earth Fault Relay

Scheme Position : 89.7
Required Number : 01
Identification : HBVW400011R0001

Details :

Manufacturer : ~~B+Z~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~ABB-BVW 2800/110V~~
Nominal Data : 150 mA-43 ohm +/- 10 %

Resistor 100 W

Scheme Position : 90.7
Required Number : 2
Identification : NBT300209P0063

Details :

Manufacturer : DANOTHERM *As per CLW approved Vendor Directory on UVAM*
Type : GRF-30/265-401284
Nominal Data : 390 Ohm +/- 10 %, 100 W

DC/DC Converter

Scheme Position :118.4
Required Number : 01
Identification : 3EHP590001R0100

Details :

Manufacturer : ~~MELCHER~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~MEC-PSB 483-7LIR B02~~
Nominal Data : 58…144 V DC -3 A- 48 V DC

DC/DC Converter

Scheme Position :118.5
Required Number : 01
Identification : 3EHP590001R0090

Details :

Manufacturer : ~~MELCHER~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~MEC-PSB 243-7LIR B02~~
Nominal Data : 31…144 V DC -3A- 24 V DC

Diode Block -5

Scheme Position : 123
Required Number : 05
Identification : HBT585480R0001

Details :

Manufacturer : ~~B+Z~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~ABB-DIBLO-5~~
Nominal Data : 1.5 A-1600 V- 5 DIOD

Socket

Scheme Position : 123, 123.1
Required Number : 05
Identification : HBT415175P0001

Details :

Manufacturer : ~~ELESTA~~ *As per CLW approved Vendor Directory on UVAM*

~~Type~~ : ~~GRI-HYTREL 4056~~

Nominal Data : 14 Poles – 6 A – 240 V AC

Fixation

Scheme Position : 123, 123.1

Required Number : 05

Identification : HBT415177P0001

Details :

Manufacturer : ~~ELESTA~~ *As per CLW approved Vendor Directory on UVAM*

~~Type~~ : ~~ELE – X12 CR NI 177~~

Nominal Data : 76 MM HIGH – 82 MM BR

Contact 1.0 mm^2

Scheme Position :123, 123.1

Required Number : 70

Identification : HBT415176P0001

Details :

Manufacturer : ~~ELESTA~~ *As per CLW approved Vendor Directory on UVAM*

~~Type~~ : ~~GRI- MS 58~~

Nominal Data : 1.0 mm^2 -0 GROOVE

Diode Block

Scheme Position : 123.1

Required Number : 01

Identification : HBTB585480R0003

Details :

Manufacturer : ~~B+Z~~ *As per CLW approved Vendor Directory on UVAM*

~~Type~~ : ~~ABB-DIBLO-8GA~~

Nominal Data : 0.3 A-1400 V – 8 DIOD

Contactor

Scheme Position :126, 218

Required Number 02

Identification : HBTB585633R0820

Details :

Manufacturer : ~~SCHALTBAU~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~SBM-S164C1DT/110V~~
Nominal Data : 110 V DC –NO

Relay

Scheme Position : 126.5
Required Number : 01
Identification : 3EHP585807P1207

Details :

Manufacturer : ~~TELEMECANIQUE~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~TEL-CA3 DN 22FW~~
Nominal Data : 10 A-600 V DC -110 V DC

Snubber Circuit

Scheme Position : 126.5A, 126.7A, 136.3A, 136.4A
Required Number : 04
Identification : 3EHW470024R0005

Details :

Manufacturer : ~~ABB~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~ABB-DSA1/1N5654A~~
Nominal Data : 110/120 V DC

Relay

Scheme Position : 126.7, 136.3
Required Number : 02
Identification : HBTB585683R4227

Details :

Manufacturer : ~~TELEMECANIQUE~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~TEL-LP1 D12008FW~~
Nominal Data : 12 A/25 A- 750 V – 4 POLES

Accessories (Relay)

Scheme Position : 126.7
Required Number : 01
Identification : 3EHP585771R0006

Details :

Manufacturer : ~~TELEMECANIQUE~~ *As per CLW approved Vendor Directory on UVAM*

~~Type~~ : ~~TEL-LA1 DC 22~~
Nominal Data : 2 NO, 2 NC

Circuit Breaker DC

Scheme Position : 127.1,127.12,127.2,127.9 ,127.91,310.1
Required Number : 07
Identification : HBTB585555R1013

Details :

Manufacturer : ~~CMC~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~CMC-QX1-DH 9538 6A~~
Nominal Data : 6 A – 250 VDC-1 POLE

Circuit Breaker DC

Scheme Position : 127.11
Required Number : 01
Identification : HBTB585555R1043

Details :

Manufacturer : ~~CMC~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~CMC-QX1-DH 8538 20 A~~
Nominal Data : 20 A – 250 VDC-1 POLE

Circuit Breaker DC

Scheme Position : 127.3 ,127.22
Required Number : 02
Identification : HBTB585555R1023

Details :

Manufacturer : ~~CMC~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~CMC-QX1-DH 9538 10A~~
Nominal Data :10 A – 250 VDC-I POLE

Time Delay Module

Scheme Position : 130.3
Required Number : 01
Identification : 3EHP590028R0001

Details :

Manufacturer : ~~TELEMECANIQUE~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~TEL-LA4 DT 0U~~
Nominal Data : 0,1……2 S - 24…..250 V

Contactor

Scheme Position : 136.4
Required Number : 01
Identification : HBTB585683R1127

Details :

Manufacturer : ~~TELEMECANIQUE~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~TEL-LP1 D09 10FW~~
Nominal Data : 9A/25 A-750 V – 3 POLES

Rotary Switch

Scheme Position : 152
Required Number : 01
Identification : HBTB585580R1032

Details :

Manufacturer : ~~SPRING~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~SPR-P-03-R-06A 500 V~~
Nominal Data : I O- 90 DEG

Rotary Switch

Scheme Position : 154
Required Number : 01
Identification : HBTB585580R1022

Details :

Manufacturer : ~~SPRING~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~SPR-P-02-R-06A 500 V~~
Nominal Data : NORM I I+II II-90 GD

Rotary Switch

Scheme Position : 160, 237.1
Required Number : 02
Identification : HBTB585580R0034

Details :

Manufacturer : ~~SPRING~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~SPR-P-04-R-06A 500 V~~
Nominal Data : O I- 90 GD

Booted Push Button Head

Scheme Position : 161
Required Number : 01
Identification : 3EHP585818P2151

Details :

Manufacturer : ~~TELEMECANIQUE~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~TEL-ZB2-BW557~~
Nominal Data : YELLOW – BLACK – BEZEL

Illum. Push button Body

Scheme Position : 161
Required Number : 01
Identification : 3EHP585819P2010

Details :

Manufacturer : ~~TELEMECANIQUE~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~TEL-ZB2-BW061~~
Nominal Data : 1 NO – STANDARD

Multi-LED

Scheme Position : 161
Required Number : 01
Identification : 3EHP585726P0024

Details :

Manufacturer : ~~EAO~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~EAO-700.002.24~~
Nominal Data : 18 mA-24 VDC-YELLOW

Key Switch

Scheme Position : 179
Required Number : 01
Identification : 3EHP585704R2222

Details :

Manufacturer : ~~SCHWEIZE~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~GUT-SS 22Y 21000~~
Nominal Data : 20/2S-2A-250 V-1NO

Thermostat (Not included in tenderer's scope of supply)

Scheme Position : 211.7
Required Number : 01
Identification : 3EHP590484R0003

Details :

Manufacturer : ~~TRAFAG~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~TRF-414.2620~~
Nominal Data : 70 DEFREE CELSIUS

Connecting Box Train bus (Not included in tenderer's scope of supply)

Scheme Position : 381.7
Required Number 01
Identification : 3EHE100002R0001

Details :

Manufacturer : ~~CHVEK~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~ABB-XV B708 A15~~
Nominal Data : 3 X SUB-D 9 POLES

RESISTOR 25 W

Scheme Position : 381.71
Required Number 01
Identification : NBT300207P0097

Details :

Manufacturer : ~~DANOTHERM~~ *As per CLW approved Vendor Directory on UVAM*
~~Type~~ : ~~WID-025 W~~
Nominal Data : 10 Kohm- 25 W

6U RACK including PCBS (Not included in tenderer's scope of supply)

Scheme Position 411
Required Number 01
Identification : 3EHL409256R0001

Details :

Manufacturer : ~~ADTRANZ INDIA/SWITZERLAND~~
As per CLW approved Vendor Directory on UVAM
~~Type~~ : ~~HV-B494~~

4. STANDARDS

IEC 60077	:	Electrical Traction Equipment
NF.F.16.101	:	Rolling stock, Fire behavior, Materials Choosing
NF.F.16.102	:	Rolling stock, Fire behavior, Effects on electrical equipment
3EHN600359	:	Insulation Co-ordination
3EHN600385	:	Min. insulation distance for basis insulation within air
IEC 60571	:	Electronic equipment for traction rolling stock

These standards will be available for study and reference at C-D&D/CLW

5. WIRING AND CABLING

1. The cables for wiring within the cubicle will be of RADOX CABLES (Electron Beam irradiated crosslinked Thin walled cables from M/s. HUBER & SUHNER, Germany) till some other type of cable is approved by CLW. The cables will be of fire retardant type
2. All connections will be terminated on terminal bars of approved design, provided for the purpose. The terminals and wire cable ends will be marked to facilitate correct connections.
3. Plugs and sockets and connectors will be used to connect pre-assembled units and to facilitate maintenance and ensure a better layout. The details of which will be passed on subsequently to the successful tenderer/s. But these details will be available for study and reference at C-D&D/CLW.
4. Cables for terminal connections will have only crimped joints.
5. The Cable size and cabling has to be according to CLW Documents which will be passed on subsequently to the successful tenderer/s.

6. SHEET METAL STRUCTURE

The cubicle is of detachable type and shall comply with the dimensions and tolerances specified in relevant part drawings documents which will be passed on subsequently to the successful tenderer/s but these details will be available for study and reference at C-D&D/CLW. The complete cubicle shall consist of a no. of panels secured to each other by Hex. Bolts/ screws, nuts, washers etc. made of stainless steel. The cubicle should be of sturdy construction so as not to vibrate loosely or excessively, when mounted in the machine room (The Fastener and the fixing clamps etc. for mounting the total cubicle along with the central electronics (CEL2) (412) Rack inside the locomotive has to be supplied by the tenderer).The dimensions and weight of the complete cubicle shall not be exceeded.

7. ENVIRONMENTAL AND OPERATIONAL CONDITIONS

The SB1 Cubicle shall be used under the following conditions :

7.1 Environmental Conditions

Environmental Condition within machine room :

Air Circulation	:	WeaK forced cooling
Operational temperature	:	0…..+65 ºC
Environmental air	:	salty, dusty
Air humidity	:	Condensation possible

7.2 Operational conditions

Operational Time :

Daily approx	:	16 hours (approx 330 days per year)
Yearly approx	:	5,280 hours
Within 30 years approx.	:	158,400 hours

Environmental conditions:

Rated values for environmental temperature and air humidity according to 7.1 “Condition within machine room”.

7.3 Reliability

Operational Conditions	:	according to 7.2
Availability Rate	:	98 %
Lifetime of the Loco	:	min. 30 years (Maintenance, spare parts, life time)

8. TEST CONDITIONS

8.1 TYPE TESTING :

a) Type test certificate of material and equipments used in the cubicle must be provided from an approved test house /supplier has to be procured during inspection and along with supplies.

b) Certificate for fasteners used and their material to be produced and supplied along with supplies.

c) Welding to be checked properly as per an approved test plan, which will be given to successful tenderer.

d) Panel should be electrically tested after wiring as per relevant standards to be passed on to the successful tenderer.

e) All electrical equipment’s procured shall be tested at assembly stages. Acceptance Test certificates shall be produced for OEM components. For use of any make/type of equipments/components other than that specified prior approval of CLW is required. Such approval will be given only after a thorough type test and field validation.

8.2 ROUTINE TESTING

The Cubicle will be tested for the following routine tests :

1. Integrity and completeness.

2. Testing of inter-connections and functionality of different sub assemblies within the panel.

3. Suitable checking fixtures are to be made by successful tenderers for checking the dimensions of the complete assembled panels .Certificate for raw materials and fasteners to be provided.

4. Complete cubicle and electrical items will be tested as per relevant standards.

8.3 Details of Type & Routine test are given clause no. 15.

9. STANDARDS /UNITS

Only international standards like IEC, ISO internal standards of ADTRANZ, Switzerland like BBC/ABB/Adtranz-Standards only are acceptable. Only the SI unit will be accepted.

10. SCOPE OF SUPPLY

One Control Cubicle 2 assembled as per the drawing no. 3EHP 130216 R0002, duly tested as per chapter 8 of this document.

11. INSPECTION

1. The Type/ Routine inspection will be carried out by authorized representative of Dy. CEE/Design.
2. The complete testing to be carried out as per clause 8 of this specification
3. The purchaser may carry out stage inspection during inspection of components, cabling or assly. stage of complete cubicle.

12. SUBMISSION OF TENDER QUOTATION

12.1 The tenderer shall give sufficient information to prove that his factory has adequate facilities and capacity to manufacture the complete panel to meet fully the technical requirement of the specification and quality of materials and workmanship.

12.2 Quotation shall not be considered complete unless all information is furnished and therefore liable to be rejected.

13. TECHNICAL DOCUMENTS TO BE SUPPLIED BY THE SUPPLIER

i) Type Test Reports
ii) Routine test report along with each set
~~iii) Maintenance Manual~~
iv) Detailed drawing

13.1 All individual components of the panel should be procured as per Annexure – I

Annexure – 1 (SB-1)

14. Details of Sub-components to be procured from CLW Approved sources

Sl. no.	Description	Specn. No.	Sch. Pos.	ABB Identification No.	Qty/Panel
1	Maximum Current Relay 2.5 A/3.3 A, 50 Hz	CLW/ES/3/0059/D or latest	78	DIKA210013R0037	1 No.
2	Resistor 50 W 12 + 15/-5	CLW/ES/3/0014/D or latest	78.1	NBT300213P0001	1 No.
3	Minimum Voltage Relay	CLW/ES/3/0060/B or latest	68	3EHP58521R0202	1 No.
4	Current Relay 150 m, 43 ohm, 36/110 V (Earth fault Relay)	CLW/ES/3/0090/B or latest	89.7	HBVW400011R0001	1 No.
5	Resistor 100 W, 390 ohm	CLW/ES/3/0014/D or latest	90.7	NBT300209P0063	2 Nos.
6	DC-DC Converter	CLW/ES/3/0054/B or latest	118.4	3EHP590001R0100	1 No.
7	DC-DC Converter	CLW/ES/3/0054/B or latest	118.5	3EHP590001 R0090	1 No.
8	Diode Block – 5 with socket, fixation and contacts	CLW/ES/3/0055/B or latest	123.1	HBTB585480R0001	5 Nos.
9	Diode Block – 8 with socket, fixation and contacts	CLW/ES/3/0055/B or latest	123.1	HBTB585480R0003	1 No.
10	Contactor (Contactor – control Electronics & Contactor – control electronics circuit 'ON')	CLW/ES/3/0034/B or latest	126 & 218	HBTB585633R0820	2 Nos.
11	Relay (Aux. Contactor) TEL CA3 DN 22 FW 10 A 600 V DC – 110 V DC	CLW/ES/3/0066/A or latest	126.5	3EHP585807P1207	1 No.
12	Snubber Circuit	CLW/ES/3/0067/A or latest	126.5A 126.7A 136.3A 136.4A	3EHW470024R0005	4 Nos.
13	Time Relay for VCB with Aux Contact	CLW/ES/3/0064/A or latest	126.7& 136.3	HBTB585683R4227 3EHP585771R0006	2 Nos.
14	Circuit Breaker DC	CLW/ES/3/0037/B or latest	127.1/1 127.12 127.2 127.9/1 & 2 127.91 310.1	HBTB585555R1013	7 Nos.

15	Circuit Breaker DC	CLW/ES/3/0037/B or latest	127.11	HBTB585555R1043	1 No.
16	Circuit Breaker DC	CLW/ES/3/0037/B or latest	127.3 127.22	HBTB585555R1023	2 Nos.
17	Time Delay Module	CLW/ES/3/0064/A or latest	136.3 & CE Reset	3EHP590028R0001	~~1 No.~~ **3** Nos for WAG-9
18	Aux. Contactor for VCB/Panto	CLW/ES/3/0040/A or latest	136.4 & CE Reset	HBTB585683R1127	~~1 No.~~ **2** Nos for WAG-9
19	Rotary Switch Failure mode operation	CLW/ES/3/0068/A or latest	152	HBTB585580R1032	1 No.
20	Rotary Switch Bogie Cut out	CLW/ES/3/0068/A or latest	154	HBTB585580R1022	1 No.
21	Rotary switch configuration	CLW/ES/3/0068/A or latest	160, 237.1 & CE Reset	HBTB585580R0034	~~2 Nos.~~ **3** Nos for WAG-9
22	Illuminated configuration	CLW/ES/3/0072/C or latest	161	3EHP585818P2151 3EHP585819P2010 3EHP585726P0024	1 No.
23	Key Switch Simulation	CLW/ES/3/0079 or latest	179	3EHP585704R2222	1 No.
24	Resistor 25 W Earthing Resistor Screen Train Bus in SB-1	CLW/ES/3/0014/D or latest	381.71	NBT300207P0097	1 No.
25	Cable	CLW/ES/3/0458/C or latest CLW/ES/3/0459 or latest	……	3EHP130215R0200	……
26	Set of Screw Type terminal Block	CLW/ES/3/0645/B or latest	……	……	……
27	Contactor for Head Light (Contactor Type-6)	CLW/ES/3/0034/B or latest	338	HBTB585402R0821	1 No.
28	Wago Type Terminal Block	CLW/ES/3/0644/A or latest			
28	Bare SB-1 Panel	CLW/MS/3/098 Alt. 10 or latest		3EHP130215	1 No.
29	2 Amps, 250 V Fuse	……	……	……	03 Nos.
30	BPVR Push Button Reset Vigilance Control	CLW/ES/3/0072/G or latest	CE Reset		02 Nos for WAG-9
31	VS Diode Train parting 12 Amps	CLW/ES/D-2	CE Reset		03 Nos for WAG-9
32	Auxiliary Contact Block 2NO+2NC	CLW/ES/3/203/B or latest	CE Reset		01 No. for WAG-9

15. Tests

Sl No.	Description	Type Test	Routine Test
(i)	Dimensional Checking	Yes	Yes
(ii)	Verification of Electrical & Mechanical equipments and its test reports	Yes	Yes
(iii)	Complete Continuity test as per cable cutting chart	Yes	Yes (100%)
(iv)	Fire –retardant test of all insulating material	Yes	No
(v)	Crimping test: - To check whether proper crimping tool with required pressure is applied so that there is no void in the cross section of the crimped cable	Yes*	~~No~~ Yes*
(vi)	Vibration Test (Optional)	Yes	No

***** *Sample cable crimped by each tool of each size are to be sealed in front of the inspector which shall be tested as per EN 50343 for crimping quality. The issued certificate shall be valid for inspection crimping during 3 Months and same process is to be repeated again for next 3 Months.*

16. Important Information :-

16.1 All the insulating material should have Fire Retardant Property as per CLW individual specn.

16.2 The Cable for wiring of SB-1 Panel will be with Electron beam irradiated cable only. The cable size and cabling have to be according to the CLW document which will be passed on subsequently to the successful tenders.

16.3 The Cable and terminal connections will have only proper crimping joints.

16.4 *All necessary amendments according to TOT modification or RDSO modification have to be incorporated by the firm in consultation in the CLW at firms own cost.*

16.5 *Final Cable cutting chart has been enclosed as Annexure-II. RDSO's Modification Sheet should be implemented by panel manufacturer time to time as required for.*

17. Annexure :

(i) All specification of components, sub components.
(ii) All documents referred for Cabling are 3EHP431440, 3EHP130215, & 3EHP130215R0200, 3EHP601578
(iii) All necessary amendments according to TOT modification or RDSO modification have to be incorporated by the firm in consultation with the CLW at firms own cost.
(iv) Document of cable list of Control Cubicle - 1 (SB- 1) – 3EHP431440 along with MO.18 Identification no. of Control Cubicle -1 (SB-1) 3EHP130215.
(v) Identification no of Cable loom 3EHP601578**.**

Note: The above mentioned references are for guidance only.

18. Modification sheet no. RDSO/2009EL/MS/0377 (Rev. 0) dated 22.04.09 has been included**.**

19. Modifications for push Pull operation in WAP-5 & WAP-7 locomotives to be incorporated in SB-1. As per scheme issued vide letter no. C-D&D/ T/ 47 dtd.8.8.19.

20. (i) Modification in existing control electronics (CE) resetting scheme of 3 Phase loco vide RDSO/2018/EL/MS/0475 dt 12.12.18.

(ii) Modification in Earth Fault Circuit for elimination of spurious message on account of earthing of control cable in 3 phase loco (MS 480).

(iii) MS-413, paralleling of interlock of Aux. Contactor of 3 phase loco.

(iv) Modification in Blocking diode to improve the reliability of 3 phase locos vide RDSO/2017/EL/MS/0467 Rev '0' dt. 07.12.2017.

(v) Modification sheet no. RDSO/2018/EL/MS/0475 (Rev. 1) dated 26.10.23 has been implemented in WAG-9 Locomotive. Previous RDSO modification RDSO/2018/EL/MS/0475 Rev. '0' dated 12.12.2018 remains valid for WAP-5 & 7 only.