ANNEXURE: Drg. of Aux. Contact Block 2NO+2NC

TECHNICAL SPECIFICATION FOR

AUXILIARY CONTACTOR VCB AND PANTOGRAPH

FOR 3-PHASE ELECTRIC LOCOMOTIVES.

Specification No : CLW/ES/3/0040/~~B~~ C

ISSUE DATE : 27.03.1997

ISSUED BY:

DY. CHIEF ELECTRICAL ENGINEER/ D-II
CHITTARANJAN LOCOMOTIVE WORKS
P.O.CHITTARANJAN – 713331
DIST.BARDHAMAN (WEST), WEST BENGAL (INDIA)

PREPARED BY	CHECKED BY	APPROVED BY
SSE/Design	AEE/Design	Dy.CEE/D-II

ALTERATION RECORD SHEET

Amendment No.	Date of Amendment	Page No.	Alteration No.	Reason	Authority
1	06-03-2003	3	A	Flammability test included	Sd/-
2	22.03.2021	6,7,8	B	i) Only Para 9 has been deleted from page no.7. ii) 'Mounting and overall dimensions shall be as per above drawing. The other dimensions of drawing are for guidanceonly', is included in sheet6. iii) 'For guidance only', is included in sheet 7 & 8. As per approval of Note: ELDD/Misc dt.26.02.2021.	Sd/-
3		8,9,10	C	i) For implementation of RDSO MS 475 Rev. '0', 01 no. of NC is required, which has been introduced in the spec. at page 8 of 10. ii) For implementation of RDSO/2018/EL/MS/0475 Rev. '1', qty. of Aux. Contactor and Aux. Contact block has been changed at page 9 of 10. Aux. contact Block characteristics is introduced at page 10 of 10 and Drg. of Aux. contact block 2NO+2NC has been introduced as annexure for WAG-9 loco only.	

Note: The specification has been digitized and all the alterations have been incorporated.

PREPARED BY	CHECKED BY	APPROVED BY
SSE/Design	AEE/Design	Dy.CEE/D-II

SPECIFICATION FOR

AUXILIARY CONTACTOR VCB & PANTOGRAPH

INDEX

1.0 SCOPE:

This specification covers the manufacturers and supply of Auxiliary Contactors VCB & Pantographfor SB1 & SB2 in 25 KV AC, 50 Hz, 3-phase Electric locomotives.

2.0 CLIMATIC AND ENVIRONMENTAL CONDITION:-

2.1 Climatic and environmental condition: -

Sl. no.	Climate and Environment conditions	Range
a.	Maximum atmospheric temperature	+ 70°C (Under Sun) & + 50°C (in Shade)
b.	Ambient temperature (operating)	-20….+70°C
c.	Ambient temperature (storage)	-30….+80°C
d.	Normal Humidity	60%
e.	Maximum Humidity	100% saturation during rainy season.
f.	Altitude	160 m above mean sea level.
g.	Rainfall	Very heavy in certain areas. The equipment should be designed in such a way to withstand its running at 10 Km/hr in flood water level of 102 millimeter above rail level.
h.	Atmosphere during hot weather	Extremely dusty and desert terrain in certain areas.
i.	Coastal areas	Locomotive and equipment will be designed to work in coastal areas in humid and salty laden atmosphere.
j.	Vibration	The equipment, subsystem and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in corresponding unless otherwise prescribed.

3.0 STANDARD: As per IEC-60158-1, IEC-60947-1, and IEC-60947-4.

Flammability test as per IS: 11731 (Part 1 & 2): 1986 or any other relevant IEC, DIN standards for the plastic components

4.0 TECHNICAL DATA:

Control circuit = DC supply
Type = LP1 – DC3 (9/25) -750 – 3 poles
Rated insulated voltage (Ui) Confirming to IEC-158-1 -750 V.
Conforming to IEC-60947-4 – 1000 V.
Degree of protection = Conforming to VDE 0160=protection against direct finger contact.
Protection treatment = TH

POLE CHARACTERISTICS:-
Number of poles = 3

Rated Insulated current (Ic) = In AC-3, 0≤55°C = 9 A

In AC-1, 0≤40°C = 25 A

Rated Insulated voltage (Ui) = upto 690.
Frequency limits of the operational current = 25---------400 Hz.

Rated thermal current (Ith) = (0≤40°C) = 25 A
Rated making capacity (Irms conforming to IEC 60947-4) = 250 A

Rated breaking capacity Irms 220-380-415-440V = 250 A
500V = 175 A
660-690V = 85 A

Permissible short time rating – for 1s = 210 A
From cold state, no current
Flowing for proceeding 15 minutes
At 0≤40°C.

5s = 130 A
10s = 105 A
30s = 76 A
1m = 61 A
3m = 44 A
10m = 30 A
Short circuit protection from 0≤440 V: Motor circuit (Type am) with thermal overload relay (type gl) =25 A
Average impedance per pole = 2.5 m Ω (1—50 Hz)

Power dissipation per pole for the above operational currents : AC-1 = 1.56 W
AC-3 = 0.20 W

CABLING :

Flexible cable without cable – 1 Conductor = Min/Max. c.s.a/1/4 mm²

2 Conductor = 1/4 mm^2

Flexible cable with cable- 1 Conductor = 1/4 mm^2

2 Conductors – 1/2.5 mm^2

Solid cable without cable end - 1 Conductor = Min/Max. c.s.a/1/4 mm^2

2 Conductor- 1/4 mm^2

Tightening Torque Power circuit connection = 1.2 NM

Control Circuit Characteristics :-

Rated Control Circuit Voltage (Uc) = 12..... 660 V

Control Voltage Limits 0 ≤ 55°C) – Operational – (i) Standard Coil = 0.8....1.1 Uc
(ii) Wide range coil = 0.7... 1.25 Uc

Average Consumption at 20°C and at Uc – (i) Inrush – 9 W, (ii) Sealed = 9 W

Average operating time at Uc = Operating times depend on the type of contactor electromagnet and its control mode. The closing 'C' is measured from the moment the coil supply is switched on to initial contact of the main poles. The opening time 'O' is measured from the moment the coil supply is switched off to the moment the main poles separate.

Closing 'C' = 40... 48 ms
Opening 'O' = 6... 14 ms

Mechanical Life at Uc = in millions of operating cycles = 30

Maximum Operating Rate at ambient Temp.≤ 55°C = In operating cycles/hrs = 3600

Mechanical Latch Block Characteristics : -

Rated insulation Voltage = Conforming to IEC 60158-1 = 660 V
Rated Control Circuit Voltage = 12 ... 220 V
Power required for Un latching = 190 W
Maximum Operating Rate = In operating cycles/hrs. = 1200
Mechanical Life at Uc = in millions of operating cycles = I

5.0 TENDER RELATED ISSUES :

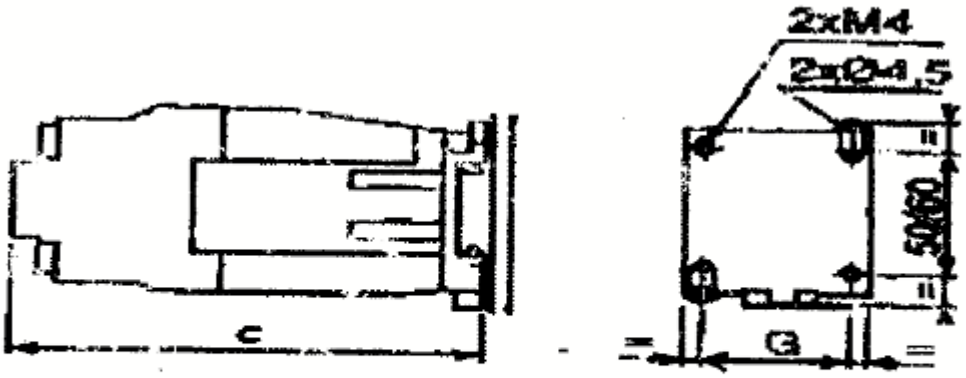
5.1 The Tenderer shall give sufficient information to prove that his factory has adequate facilities and capacity to manufacture the AUXILIARY CONTACTOR VCB & PANTOGRAPH to meet fully the technical requirements of the specification and qualityof materials and workmanship.

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

5.3 Detailed drawings of the AUXILIARY CONTACTOR VCB & PANTOGRAPH should besubmitted for approval of the purchaser.

6.0 DIMENSION & SCHEME :

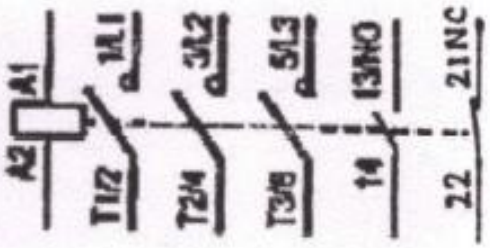
LP1-D09
PANEL MOUNTED



LP1-	D09
C	115
G	35

Note: Mounting and overall dimensions shall be as per above drawing. The other dimensions of drawing are for guidance only.

Scheme for ADD-ON CONTACTOR BLOCKS



Note: For guidance only.

PREPARED BY	CHECKED BY	APPROVED BY
SSE/Design	AEE/Design	Dy.CEE/D-II

7.0 Quantity / Loco **:-** 2 Nos.(existing) + 01 no. has been introduced for CE Resetting Scheme Rev. '1' in WAG-9 only and 01 no. of Aux. Contact Block 2NO+2NC.

8.0 TESTS **:-**

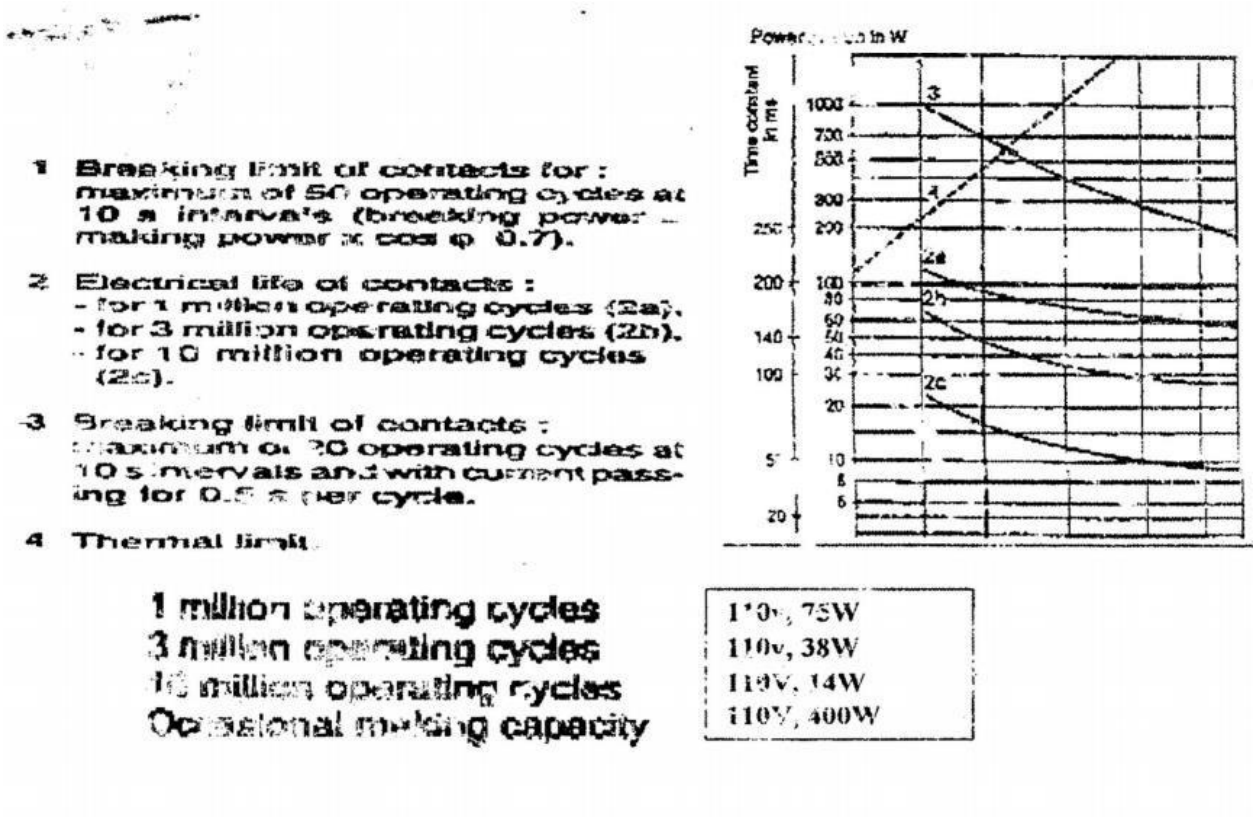
As per IEC 60947-1, 60947-4.

9.0 REFERENCE **: -**

This specification has the reference to the original manufacturers as follows :

M/s Telemecanique
D-27, South Extension Part-2,
New Delhi – 110049

10.0 SCHEMATIC POSITION **:-** 136.4, 130.1 & CE Resetting Scheme Rev. '1' in WAG-9 only.

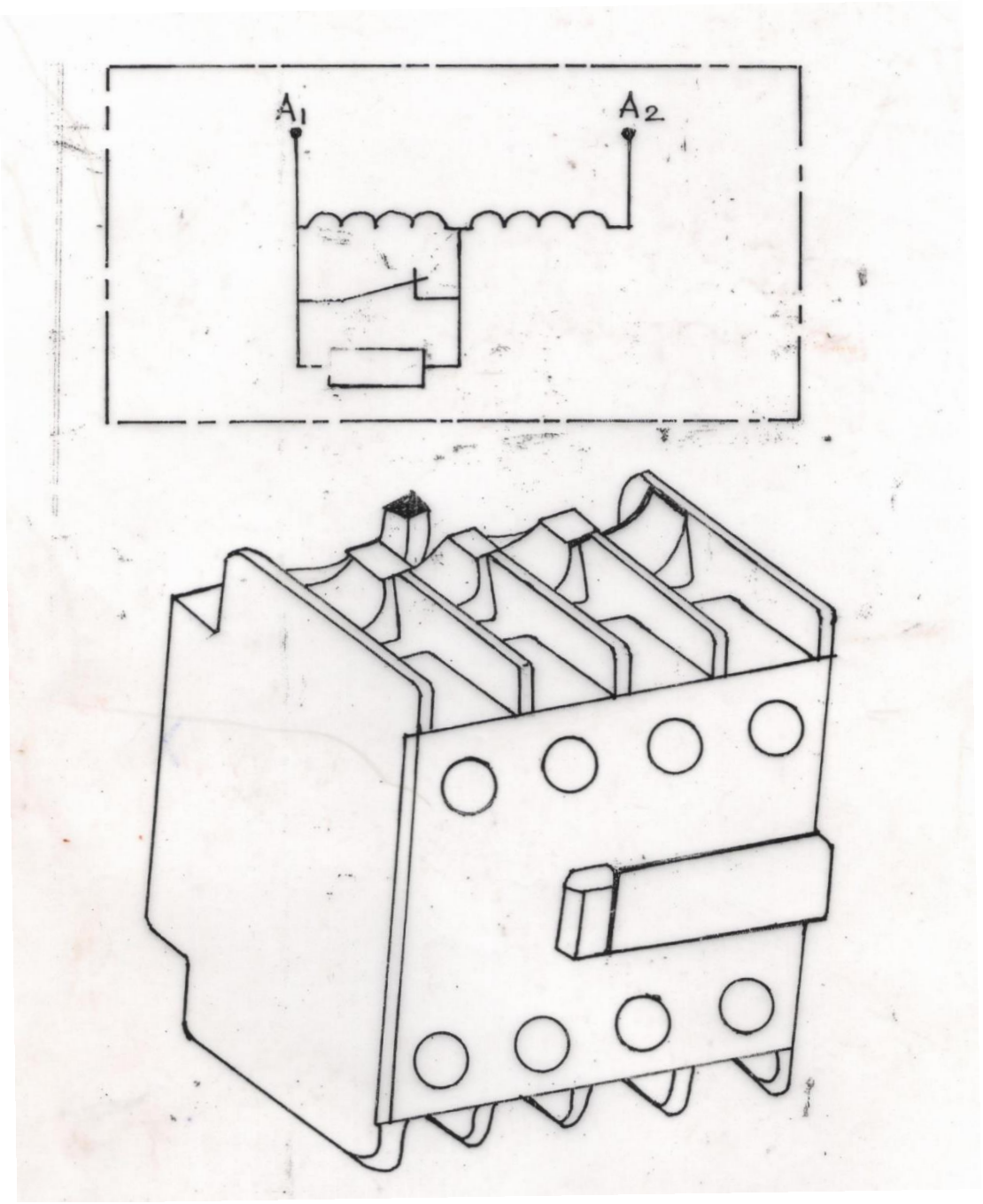


Note : For guidance only.

PREPARED BY	CHECKED BY	APPROVED BY
SSE/Design	AEE/Design	Dy.CEE/D-II

11.0 AUXILIARY CONTACT BLOCK 2NO+2NC CHARACTERISTICS

Mounting location	Front
Pole contact composition	2 NO + 2 NC
[Ue] rated operational voltage	690 V AC 25...400 Hz
[Ie] rated operational current	6 A at 120 V AC-15 1.04 A at 690 V AC-15 0.55 A at 125 V DC-13 0.1 A at 600 V DC-13
[Ui] rated insulation voltage	690 V conforming to IEC 60947-5-1 600 V conforming to UL 600 V conforming to CSA
[Ith] conventional free air thermal current	10 A (at 60 °C)
standards	EN/IEC 60947-5-1 UL 60947-5-1 CSA C22.2 No 60947-5-1 GB/T 14048.5
Irms rated making capacity	140 A AC conforming to IEC 60947-5-1 250 A DC conforming to IEC 60947-5-1
Permissible short-time rating	100 A 1 s 120 A 500 ms 140 A 100 ms
Protection type	GG fuse 10 A
Mechanical durability	30 Mcycles
Overlap time	1.5 ms
Non-overlap time	1.5 ms on de- energisation no overlap between NC and NO contact 1.5 ms on energisation no overlap between NC and NO contact
Insulation resistance	**>** 10 MOhm
height	48 mm (for reference only)
Width	44 mm (for reference only)
Depth	42 mm (for reference only)
Net weight	0.05 Kg (for reference only)
Environment	
Environmental characteristic	Normal environment
IP degree of protection	IP20 conforming to IEC 60529
Protective treatment	TH conforming to IEC 60068



AUXILIARY CONTACT 2NO+2NC

Note: For guidance only

Prepared By: SSE/Drg	APPROVED BY:	CHITTARANJAN LOCOMOTIVE WORKS
Checked By: AEE/Design	DY.CEE/D-II	SPECIFICATION FOR AUX. CONTACTOR VCB/PANTO SPEC. NO. CLW/ES/3/SK-1/0040