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## SPECIFICATION FOR SNUBBER CIRCUIT USED FOR 3-PHASE ELECTRIC LOCOMOTIVE OF INDIAN RAILWAYS

Specification No:CLW/ES/3/0067, Alt. B 'C'

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ISSUED BY:

DY. CHIEF ELECTRICAL ENGINEER/D-III

CHITTARANJAN LOCOMOTIVE WORKS

P.O CHITTARANJAN – 713331

DIST. BARDHMAN (WEST), WEST BENGAL (INDIA)

Prepared By	Checked By	Approved By
JE/SSE-DESIGN	AEE/SEE-DESIGN	Dy.CEE/D-III

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### ALTERATION RECORD SHEET

SL.No	Date of Amendment	Page No.	Alteration No.	Reason	Authority
1	01.10.2004	9	A	Quantity/Loco have been changed as per category book.	Sd/
2	03.06.2013	9	B	Quantity per loco increased due to implementation of A.C system in Three phase locomotives as per the approved note (proposal) No. ELDD/3257 dated 25.03.2011.	Sd/
3	--	6	C	Alternate contactor as per clause no. 8 may be used for (i) DC-Limit Curve & (ii) Current and voltage shape.	--

Note: Specification has been digitized and all alterations have been incorporated.

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## **SPECIFICATION FOR SNUBBER CIRCUITS**

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## 1. SCOPE :

This specification covers the manufacture and supply of snubber circuit with all electrical equipment and fitting including cabling for 3- phase 25 kV, 50 HZ, AC locomotive.

All contactor have to be wired with protective network non-wired contactor produce unpermissible overvoltage peak and disturbances in the whole wiring system of vehicle when turned off. The contactor snubber circuit also protects the contact of switching element against arcing.

## 2. SERVICE CONDITION

### 2.1 Climatic and environmental condition: -

- Maximum atmospheric temperatures : + 70°C (in Sun).  
: + 50°C (In shade)
- Ambient Temperature(operating) : -20°C . . . +70°C
- Ambient Temperature (Storage) : -30°C. . . +80°C
- Normal Humidity : 60%.
- Maximum Humidity : 100% saturation during rainy season.
- Altitude : 160 m.a.s.l
- Rainfall : Very heavy in certain areas. The equipment should be designed in such a way to withstand it's running at 10 kilometer per hour in flood water level of 102 millimeter above rail level.
- Atmosphere during hot weather : Extremely dusty and desert terrain in certain areas.
- Coastal areas : Locomotive and equipment will be designed to work even in coastal areas in humid and salt laden atmosphere.
- Vibration : The equipment , subsystem and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in corresponding IEC publications unless otherwise prescribed.

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### 3. STANDARDS

As per IEC-60158-1

### 4. TECHNICAL DATA

Power consumption at nominal voltage	: 35W
Maximum voltage	: $1.25 \times U_n = U_{max} = 137.5V$
Power consumption at $1.25 \times$ nominal voltage	: 55 W
Current at nominal voltage	: 0.31 A
Maximum current at $U_{max}$	: 0.39 A

### 5. SUBMISSION OF TENDER QUOTATION:

- 5.1 The Tenderer shall give sufficient information to prove that his factory has adequate facilities and capacity to manufacture the relay to meet fully the technical requirements of the specification and quality of materials and workmanship.
- 5.2 Quotation shall not be considered complete unless all information is furnished and are therefore liable to be rejected.
- 5.3 Detailed drawings of the relay should be submitted for approval of purchaser.

Full Technical documents and drawings to be furnished by the supplier as part of the contract.

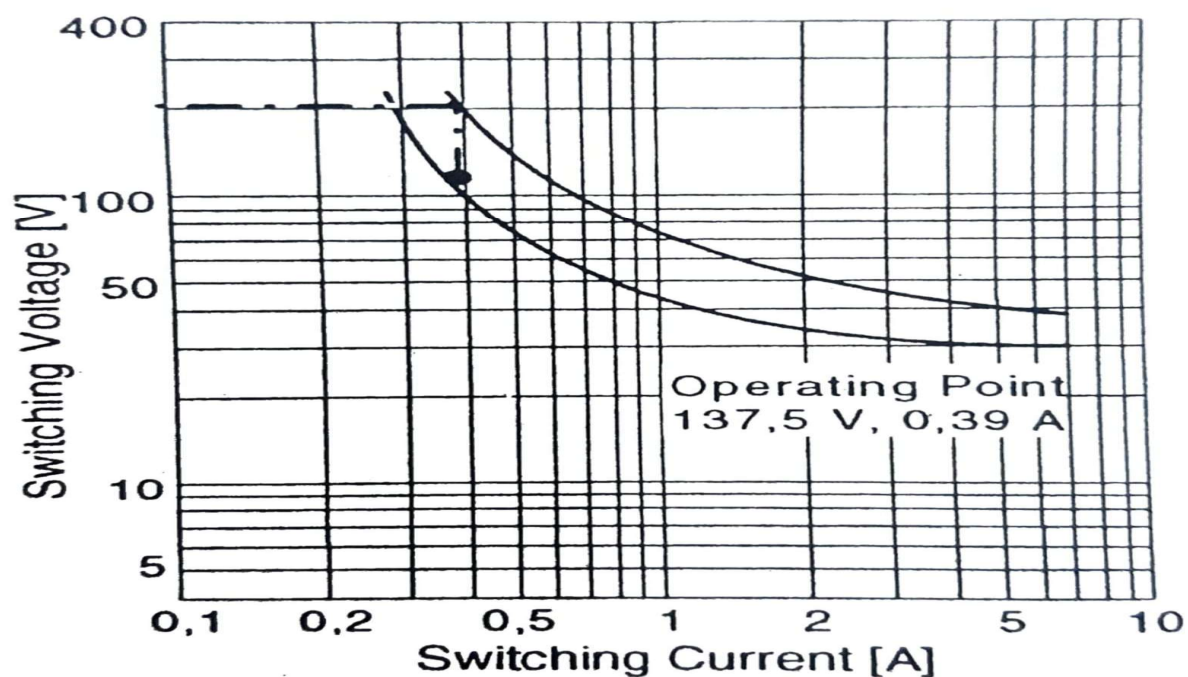
### 6. TESTS & DEGREE OF PROTECTION:

Type tests and routine tests shall be carried out according to relevant International/Indian standards to be specified to the successful tenderer & protection against direct finger contact.

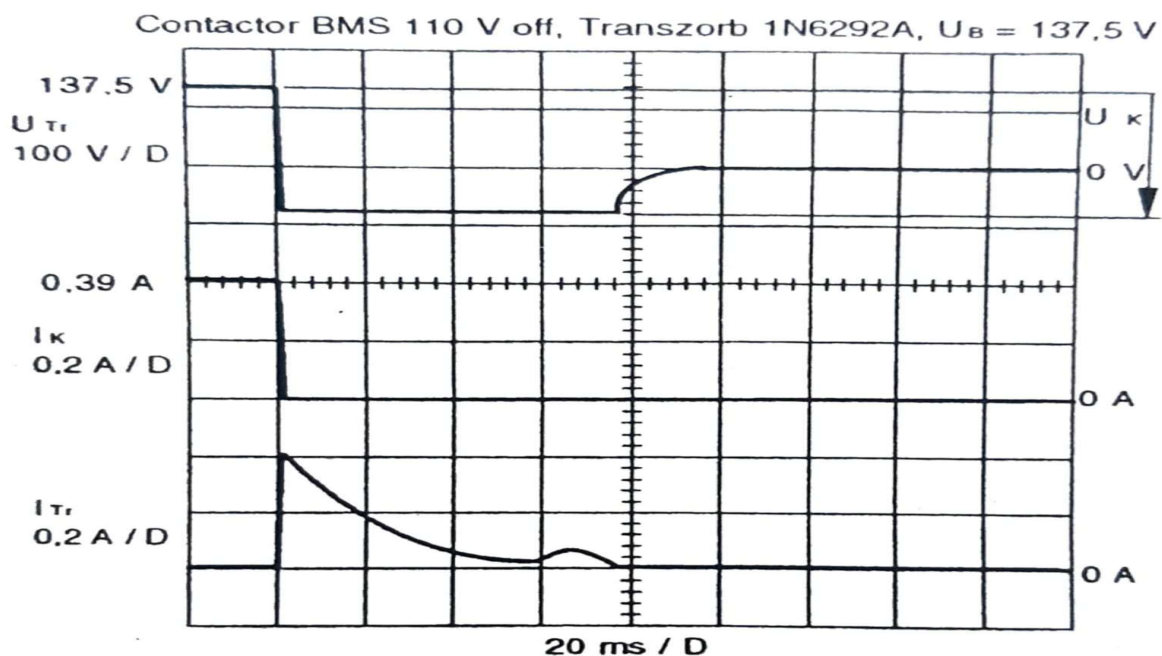
### 7. TECHNICAL DOCUMENTS TO BE SUPPLIED BY THE SUPPLIER:

- i. Type test reports
- ii. Routine tests report along with each set
- iii. Maintenance manual

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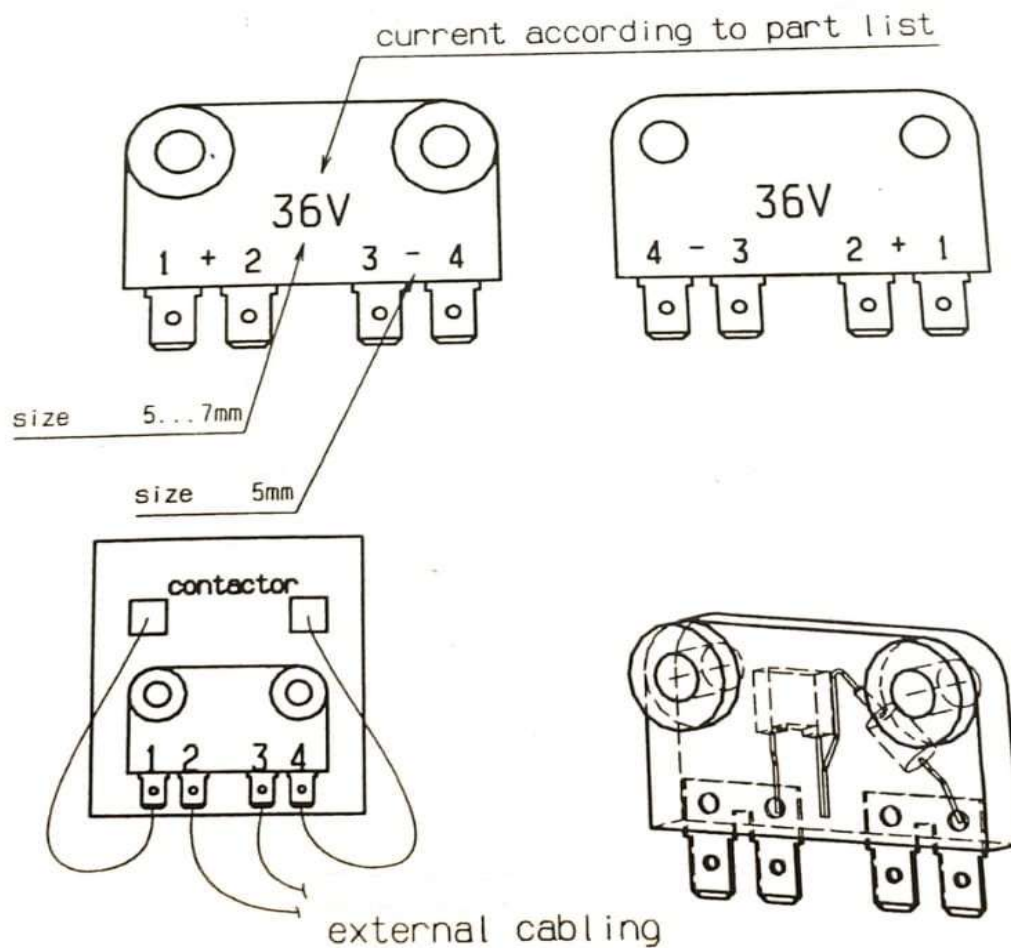
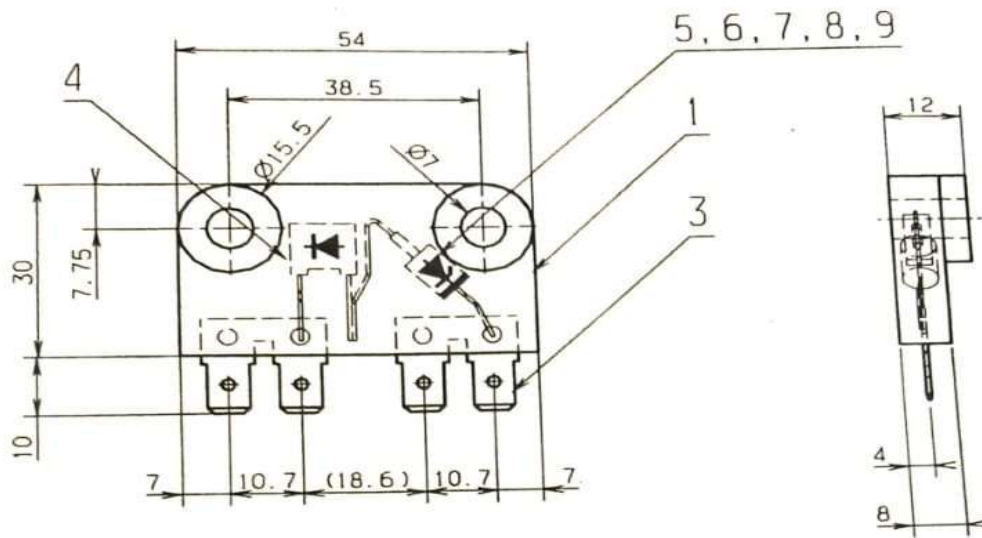


**DC-Limit Curve for Contactor BMS 110 V / Contactor as per clause no. 8**



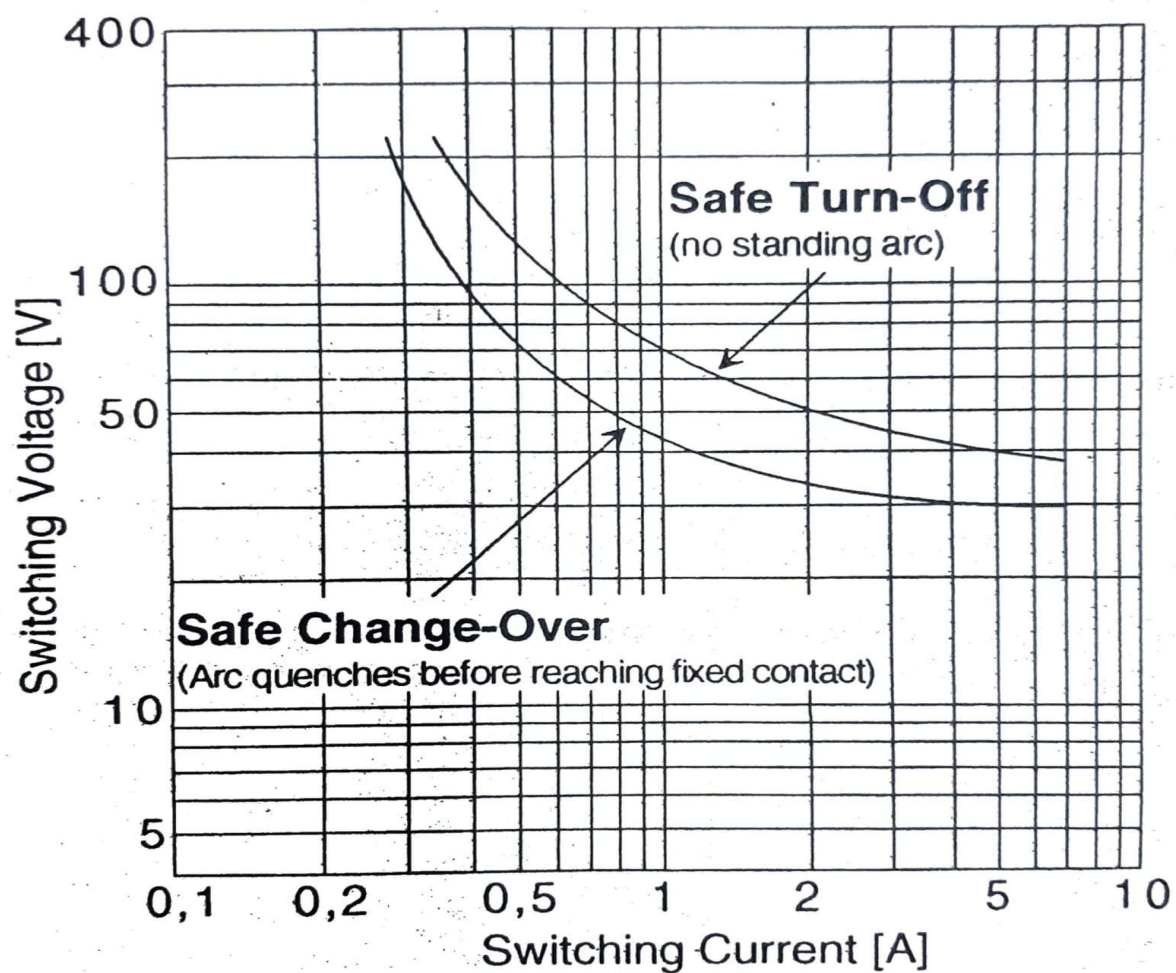
**Current and voltage Shape Contactor BMS 110 V / Contactor as per clause no. 8**

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DC-limit Curve for the DSP-1 Relay

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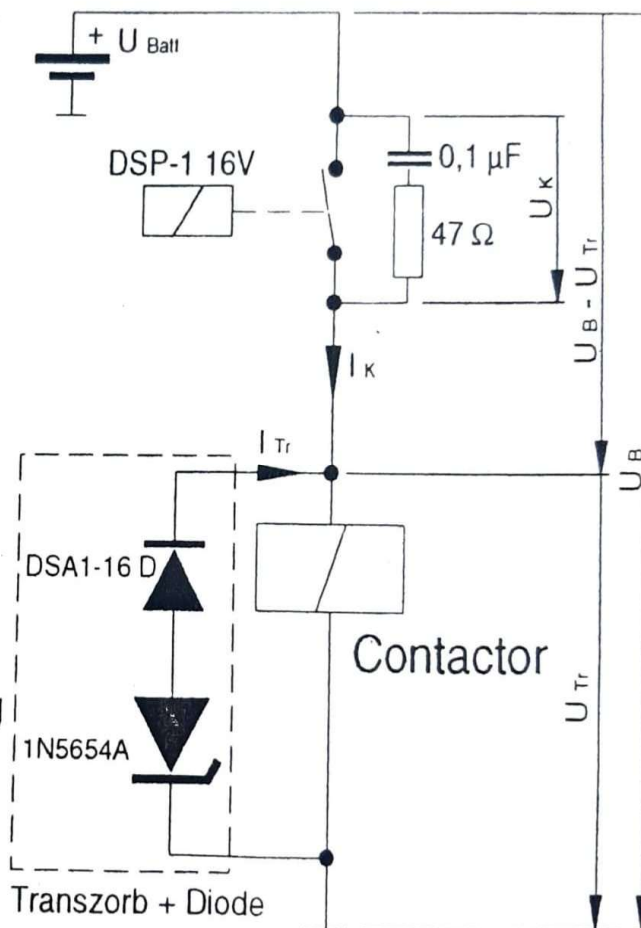
### Values Snubber-Circuit:

Battery Voltage	Transzorb Type	$U_{Tr\ max}$
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110V	1N5654A	79 V
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120V	1N5654A	79 V
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Transzorb in metall-housing  
1500 W Peak Power



### Contactor Snubber Circuit, Snubber Circuit and Designations

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## 8. QUANTITY / LOCO

SNUBBER CIRCUIT TO :-

- |     |   |          |
|-----|---|----------|
| (1) | Control electronics OFF in SB-1               | = 1 no.  |
| (2) | Time relay VCB in SB-1                        | = 1 no.  |
| (3) | Auxiliary contactor VCB in SB-1               | = 1 no.  |
| (4) | Contactor power supply Cab in SB-1&2          | = 2 nos. |
| (5) | Auxiliary contactor pantograph in SB-2        | = 1 no.  |
| (6) | Relay temperature control electronics in SB-2 | = 1 no.  |
| (7) | Contactor main Compressor & BUR 1/2           | = 4 nos. |
| (8) | Implementation of AC System                   | = 1 no.  |

## 9. QUALITY ASSURANCE: As per-9000

## 10. REFERENCE :

The equipment used by ABB for- WAG- 9 class (CO,CO), Electric locomotive is supplied by ABB / Switzerland

SCH Position no. :

- |     |                                    |
|-----|------------------------------------|
| (1) | 126.5A                             |
| (2) | 136.3A                             |
| (3) | 136.4A                             |
| (4) | 126.7A/1, 126.7A/2                 |
| (5) | 130.1A                             |
| (6) | 211. A                             |
| (7) | 52.4A/1, 52.4A/2, 47.2A/1, 47.2A/2 |
| (8) | 52.7A                              |

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