

TENDER SPECIFICATION

No. CLW/ES/S-3/6/1/I

ALT	A	B	C	D	E	F	G	H	I		
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ENCLOSURES :

1. DRG No. CLW/ES/SK-1/S-3/(2 SHEETS)

ALT	A	B	C	D	E	F	G	H	I		
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2. DRG No.

ALT											
-----	--	--	--	--	--	--	--	--	--	--	--

TOTAL No. OF SHEETS IN THIS SPECN.

ALT	G	H	I						
SHEETS	11	11	12						

25 KV AC ELECTRIC LOCOMOTIVES
CLASS: WAM4, WAG5, WAP1, WAG7, WAP4/6

PANTOGRAPH SELECTOR SWITCH (ZPT)

ISSUED BY:

DY. CHIEF ELECTRICAL ENGINEER (D&D)

CHITTARANJAN LOCOMOTIVE WORKS

P.O: CHITTARANJAN - 713331

DIST. BURDWAN, WEST BENGAL, INDIA.

SPECIFICATION FOR
PANTOGRAPH SELECTOR
SWITCH(ZPT)

Gopal Chandra
7/3/91

अ.ग.स.अ. (न.स.)
fDY. CEE. (D)

चितरंजन रेल इंजन मंत्रालय
अ.ग.स.अ. वर्क
CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL, INDIA
आदेश नं. : -CLW/ES/S-3/I

अ.ग.स.अ. (न.स.)
अ.ग.स.अ. (न.स.)
अ.ग.स.अ. (न.स.)

DETAILS OF ALTERATIONS

Page
Sheet 1A

ALT. No.	DATE	DESCRIPTION	SIGNATURE	REMARKS
A				
B	19-6-79	SPECIFICATION IS MADE APPLICABLE FOR WAM/4R & WAM/4B (WKR) LOCOS DRG. NO. CLW. 3P7009.04/A APPLICABLE FOR WAM/4B (WKR) LOCOS ONLY.	<i>Sd/-</i>	
C	14-5-82	DRG. NO. CLW/ES/SK-1/2R-2/ REMOVED, DRG. NO. CLW/ES/SK-1/5-3/A (2SHBETS) ADDED	<i>Sd/-</i>	
D	6-10-82	1) DRG. NO. CLW. 3R7009.04/A REMOVED 2) DRG. NO. CLW/ES/SK-1/5-3A MODIFIED TO DRG. NO. CLW/ES/SK-1/5-3B BY ADDING DEVELOPMENT PLAN.	<i>Sd/-</i>	
E	13-2-84	MATERIAL DETAILS FOR INSULATING MOULDED COMPONENTS ADDED AGAINST CL: NO. 10-10 AND CL: 10-10 CHANGE OVER TO 10-11.	<i>Sd/-</i>	
F	1-3-84	DI-ELECTRIC VALUE RAISED TO 4KV. CONTACT PRESSURE INCLUDED.	<i>Sd/-</i>	
G	7-3-91	WORKING POSITION 1,2 ELIMINATED. PROGRAMME OF ZPT SWITCH CHANGED FROM 5 PACKETS 4 POSITIONS TO 3 PACKETS 3 POSITIONS. DRG. NO. CLW/ES/SK-1/5-3/B MODIFIED TO DRG. NO. CLW/ES/SK-1/5-3/C CLAUSE 10-6 REVISED.	<i>Gopal Chandra</i> 7/3/91	TO BE IMPLEMENTED FROM 1992-93.
H	25-12-93	Clause 10-6 added regarding use of Siemens make Programme Switches.	<i>R. G. S.</i> 7/25/12/93	

SPECIFICATION FOR PANTOGRAPH SELECTOR SWITCH (ZPT)

Gopal Chandra
7/3/91
DRG. NO. 2. (WKR.)
FOY. CEE. (D)

चितरंजन रेल इंजन कारखाना
पश्चिम बंगाल, भारत
CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL INDIA
ड्राइंग नं. : CLW/ES/S-3

DRG. NO. : CLW/ES/S-3

ALT 4 9 0 0 0 8 2 5 1 1

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DRN.

INDEX

- 1.0 Scope of the contract.
- 2.0 Service conditions.
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- 9.0 Submission of Tender quotations proforma.
- 10.0 Technical Specification.
- 11.0 Standard.
- 12.0 Drawings accompanying the Specifications.
- 13.0 Tests.

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 SPECIFICATION FOR
 PANTO SELECTOR SWITCH
 (PST)

 CHITTARANJAN LOCOMOTIVE WORKS
 WEST BENGAL, INDIA.

No. "CLM/25/3-0/K" 487/I

BY: C.E.K.

DATE: June, 1972.

1-0 Scope.

1-1 This specification covers the manufacture and supply of Pantograph selector switch (PST) for installation on the 25 KV, Single Phase, 50 c/s, A.C. Electric Locomotives of the Indian Railways.

2-0 Service conditions.

2-1 As the Pantograph Selector Switch covered by the specification are mounted on Locomotives, they will be subjected to considerable vibrational and buffing shocks during service.

2-2 The Pantograph selector switch shall be suitable for working satisfactorily in an ambient temperature varying from 0°C to 60°C and a maximum relative humidity of 100%. The Locomotive shall be working in an altitude upto a maximum of 1000 metres above mean sea level.

3-0 Design and Workmanship.

3-1 The Pantograph selector Switch offered shall be

- Simple in Design.
- Of good Workmanship.
- Easy for maintenance and Operation.
- Robust and Rugged in construction.

4-0 Deviation.

4-1 Any deviation from the standards laid down with a view to improving the performance, may be given due consideration provided, full particulars with justification, thereof, are furnished. It may, however, be noted that due to limited availability of space in the locomotive and necessity to ensure interchangeability with the existing switches increase in the overall and mounting dimensions shall not be allowed normally.

5-0 Approval of samples.

5-1 The supplier shall make available at least two proto-types of the switch proposed to be supplied by him for inspection and tests at his works and advise the Dy-Chief Electrical Engineer (Design), Chittaranjan and Controller of Stores, Calcutta as and when he is ready with the prototype and necessary testing and measuring apparatus and facilities for carrying out the tests.

5-2 After the above tests, if it is considered necessary by the Dy-Chief Electrical Engineer (Design) or his authorised representative to carry out any further tests or trials of the proto-types at Chittaranjan, the supplier will arrange for the same by the quickest means.

SPECIFICATION FOR
PANTOGRAPH SELECTOR
SWITCH (PST)

CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL, INDIA.

No. CLM/SS/S-3/87/P64/2

DATE: 22nd, 1972.

DY. C.E.E.

- 5.3 Any short coatings or defects in the design and workmanship of the switch, shall be pointed out after the tests, to enable the manufacturer to incorporate the necessary improvements before bulk manufacture is commenced, without affecting the guaranteed deliveries or guaranteed performance characteristics.
- 5.4 Any testing and approval by the purchaser of the design, working drawing and prototype shall in no way absolve the supplier of his responsibilities under the terms of the contract for the switches supplied.
- 5.5 The supplier shall not offer switches of series production to the Inspector authorized under the contract until the prototype has been finally approved.
- 6.0 Conditions of contract-
- 6.1 The standard I.B.S. conditions of contract will be applicable for the supply of the equipment.
- 7.0 Technical Documents and Drawings to be furnished by the supplier as part of the contract-
- 7.1 The following drawings and documents shall be supplied by the supplier.

I. TYPE TEST REPORT OR CERTIFICATE-

This shall be supplied in standard 'A4' size of sheets with punched holes for filing. It shall be suitably enclosed in a cover. Type test reports shall have to be signed both by the suppliers engineers and C.I.E.'s engineers. Ordinarily 10 copies of the report shall be supplied.

II. ROUTINE TEST CERTIFICATE-

This shall be supplied in standard 'A4' size of sheets with punched holes for filing. Routine test certificates shall be submitted along with each individual equipment in 4 copies.

III. Maintenance Manuals-

Maintenance Manuals shall be prepared in standard 'A4' size paper with punched holes for filing. A draft manual shall be submitted in 2 copies within two months of the clearance of the prototype IPT switch to the Dy-Chief Electrical Engineer(Design), Chittaranjan Locomotive Works, Chittaranjan, District Burdwan, one copy of the corrected draft shall be returned to the supplier, duly signed by the above officer or his authorized representative.

6(six) copies of the maintenance manual duly incorporating the corrections shall then be despatched by the supplier to the Dy-Chief Electrical Engineer(Design) by Registered post, at the same time as the first lot of bulk supply of equipment is despatched.

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SPECIFICATION FOR
PANTOGRAPH SELECTOR
SWITCH (PST)

CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL, INDIA.

No. CLW/BS/3-2/25444/1

DATE: JUNE, 1972.

DY. C.E.E.

IV. DRAWINGS.

Detailed dimensioned drawings in six (6) copies shall be supplied in standard sizes of paper viz. 'A4', 'A3', 'A2' etc. indicating the constructional features to such an scale as to enable appreciating details of construction, assembly etc.

9.0 Guarantee.

- 9.1 The supplier shall give a guarantee of clear 12 months on all components from the date of commissioning of the Pantograph selector switch on the locomotive and any damage or defect noticed during the period due to defective material or workmanship, will be replaced by the supplier free of cost. The manufacturer shall arrange to send his Technical Officer for any investigation to anywhere on the Indian Railways where the switch will be working on the locomotive and shall submit a report of his investigation together with his proposals for any modification or improvements to the Dy-Chief Electrical Engineer (Design) for approval before commencing the repair works under guarantee.

9.0 Submission of Tender quotation.

- 9.1 All tender documents including the quotation shall be submitted in duplicate including any correspondence till contract is finalised.
- 9.2 The tenderer shall give sufficient information to prove that his factory has adequate facilities and capacity to manufacture the pantograph selector switch, to meet fully the technical requirements of the inspection and quality of materials and workmanship.
- 9.3 The tenderers are permitted to quote for alternative designs for the switch. For such deviations full particulars shall be furnished.
- 9.4 Quotations shall not be considered complete unless all information is furnished and are therefore liable to be rejected.
- 9.5 List of recommended spares for maintenance of the relays for two years.
- 9.6 Technical information to be furnished as per enclosure 'A'.

10.0 Technical specification.

- 10.1 The pantograph selector switch shall be used for raising and lowering one or both the pantographs of the locomotive and is mounted on the driving desk. The contacts of the switch shall be used in 100 volts, DC control circuit.
- 10.2 The contact sequence and the terminal marking shall be according to the drawing.
- 10.3 The switch shall have a continuous current rating of 10 amps. at 110V DC and it shall be capable of breaking 10 Amps. inductive load also at the same voltage.

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SPECIFICATION FOR
PANTOGRAPH SELECTOR
SWITCH (SPT)

CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL, INDIA.

No. CEI/81/S-3/B/2454/1.

DATE: June, 1971.

BY: C.E.E.

- 10.4 The terminals of the switches shall be suitable for connecting at least two straight wire ends of cross sectional area 3mm^2 by means of bevel spring washers. The switches shall be provided with additional washers and terminal screws for the connection of wires. The switch can be without enclosure.
- 10.5 The Selector switch shall be provided with suitable metal lever with rigidly fixed plastic ball handle for easy operation of the switch.
- 10.6 The complete switch unit shall be of robust and shock proof construction. There should not be any play of the handle in the working positions viz. ~~1, 2, 3, 4~~ 1, 2 (ALT. 6)
- 10.7 The operating handle shall be inserted and removed only in 'O' position and when the handle is moved from 'O' to any of the working positions it should get locked up in position.
- 10.8 Markings on the top plate as indicated in the drawing shall be engraved and painted white.
- 10.9 All the metal components of the Pantograph Selector Switch shall be made immune to corrosion.
- 10.10 All the insulating moulded components in Siemens type Switch shall be manufactured out of glass fibre re-inforced low inflammability tough moulding compound with unsaturated polyester/epoxy resin generally conforming to BS:5734 Pt.2-1979, or by IEC-110 of M/s. Borealis Nylon or equivalent. The surface of finished product shall be highly polished/glass paper as possible to avoid dust collection.
- 10.11 The construction of the switch shall be such as to permit easy interchangeability of the switch packs and replacement of defective contacts and shall be such as to permit easy accessibility to contacts.
- 10.12 (Please see Sheet No.8)
- 11.0 FINISHING: The manufacturers shall provide a name plate made out of anodized aluminium or nickel plated brass and shall engrave/emboss/lacrust the following :-
- A permanent identification marks.
 - Manufacturer's Name/Brand or Monogram if any.
 - Month and Year of manufacture.
 - Sl.No. Type
 - Rating
 - Ref:ISS:No.
- 12.0 STANDARD
- 12.1 The pantograph selector switch shall conform to Electro Technical commissions latest Publication No.132-1.
- 13.0 DRAWING
- 13.1 Drawing No. CLM/RS/SS-1/3-3/1 enclosed with the specification.

(ALT. 6)

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CHIEF.

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DEPN.

SPECIFICATION FOR
PANTOGRAPH SELECTOR
SWITCH (SPT)

पं. रेल. (मं. र.)
DY. CH. (S)

चित्तारंजन रेल इंजन कारखाना

पंजाब स्टेट, भारत

CHITTARANJAN LOCOMOTIVE WORKS

INDIA

SRN / No. :

दिना / Date :

June, 1972.

14.0 TEST

14.1 The following type & Routine tests shall be carried out :-

Type Test

Routine Test-

- | | |
|--|--|
| <p>i) Dielectric test at 4 KV-RMS 50 C/s, for 1 minute.</p> | <p>Dielectric test. Same as type test.</p> |
| <p>ii) Endurance test - The switches shall be operated at rated voltage and rated current, 1,00,000 times. After this test, the contact pressure and contact surfaces shall be checked. The contact surface should not have pitted, carbonized or deformed.</p> | <p>Endurance test - Nil.</p> |
| <p>iii) Vibration test - The Selector switch shall be mounted on a desk and rolled current at rated voltage shall be passed through the switch contacts. The desk shall then be subjected to vibration with an amplitude of 3.5mm at 30 cycles/sec. in both horizontal and vertical direction for a duration of 1 hour each, at the end of which the vibration is changed of 10mm at 5 cycles/sec, and the test continued for 1 more hour. During the test, there shall be no interruption of current or sparking at the contacts. At the end of the test the switches shall be examined and they should not show any mechanical damage.</p> | <p>Vibration Test - Nil.</p> |
| <p>iv) Insulation resistance test between Padis and between terminals and shaft.</p> | <p>Insulating resistance test - Same as type test.</p> |
| <p>v) Contact Pressure - In new condition, contact pressure shall be within the range of 300 gm \pm 15 gm.</p> | <p>Same as type test.</p> |

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SPECIFICATION FOR
PANTOGRAPH SELECTOR
SWITCH(S/S)


 श्री. वि. क. (अधीन)
 DY. C.E. (S)

बिस्तराजमन रेल इंजन कारखाना
 एच. एम. एम. वर्क
 CHITTARANJAN LOCOMOTIVE WORKS
 WEST BENGAL, INDIA
 श्रम / No. : CLM/EE/7-3/18-24/1
 दिना / Date : June, 1972.

ANNEXURE - 'A'TECHNICAL INFORMATION TO BE FURNISHED BY THE MANUFACTURER ALONG WITH THE TENDER SUBMISSION.

1. Type of switch whether "quick-make-and-break" or "slow-make-and-break".
2. Full details of the material used in the construction of switch body.
3. Type of contacts viz. Knife type or Spherical button type.
4. Contact materials, whether bented bi-metal or silver plated copper.
5. Contact ratings separately for 500V AC application and 110V DC application under the following headings:
 - a) Continuous rating.
 - b) Ruptured current for resistive load D-C.
 - c) Ruptured current for highly inductive load DC.
 - d) Voltage drop across a pair of contacts at rated current.
 - e) Contact temperature rise at continuous rated current.
 - f) - i) Mechanical life.
- ii) Electrical life. In millions of switching cycles preferably with a graph indicating switching cycles vs. breaking current.
 - g) Angle between individual switching positions.

- 13.13 Only Siemens make of Programme Switches are to be used in the manufacture of Pantograph Selector Switch (PST). If the manufacturer desires to use any other make of Programme Switches for manufacturer of Pantograph Selector Switch (PST) he should furnish complete technical details of the same and should obtain CLW's prior approval for the same.

P. END

CHKD.

DATE

 SPECIFICATION FOR
 PANTOGRAPH SELECTOR
 SWITCH (PST)

 H. C. E. E.
 DIV. C.E.E.

 CHITTARANJAN LOCOMOTIVE WORKS
 WEST BENGAL, INDIA.

No. CLW/22/3-3/55484/X

DATE: June, 1972.

ALT 2803YW034N2PT-1

M5 FIXING SCREWS

3 PACKET 344-250-07M (SIEMENS TYPE)

STOP WASHER 2.5 THICK

140

M8 CSK FIXING SCREW

M5 PARTS

PLASTIC HANDLE

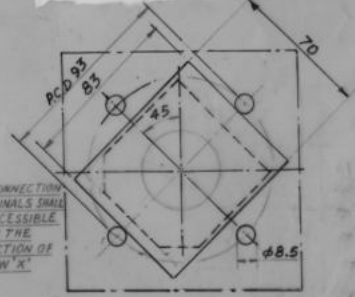
STUCK WITH ARALDITE

M.S. HANDLE ROD

M.S. HANDLE BOSS

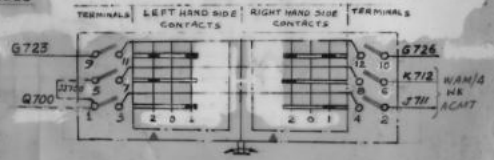
MOUNTING WALL THICKNESS 3 mm AT CLW

ALL CONNECTION TERMINALS SHALL BE ACCESSIBLE FROM THE DIRECTION OF ARROW 'X'



HOLES REQUIRED ON THE MOUNTING PANEL & POSITION OF THE SWITCH AS MOUNTED

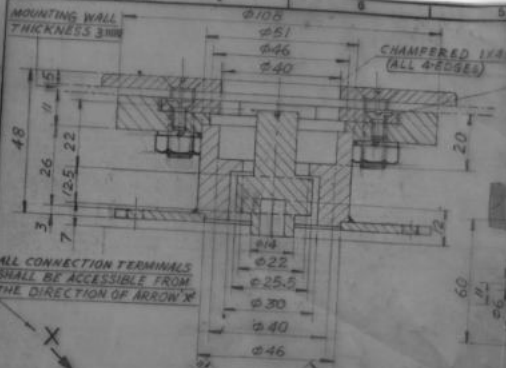
ALT. No.	AUTHORITY	DESCRIPTION	INITIAL	DATE
A	DX.CEE/D	DRG. MODIFIED		13-4-72
B	DX.CEE/D	DEVELOPMENT PLAN ADDED.	CLW	6-10-82
C	DX.CEE/D	PROG. OF ZPT SWITCH CHANGED FROM 8 PACKETS, 4 POSITIONS TO 3 PACKETS, 3 POSITIONS	Engel	7-3-71



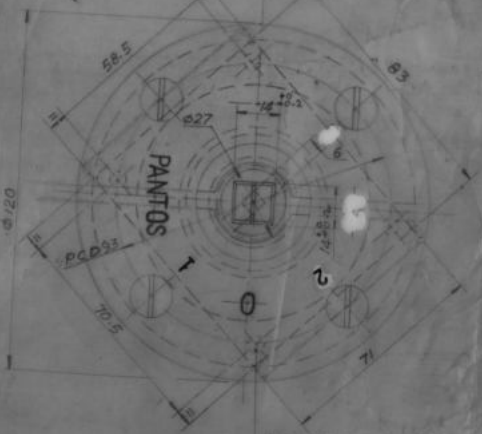
DEVELOPMENT PLAN ALT. G

CAD NO.	REF.	PART DRG. NO.	DESCRIPTION	QTY/	MATL. SPECN. WT.
008			USED FOR WAM-4, WAM-AB & WAM-AR LOCO		CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA.
DRN	23.52	A.K. 104	SHEET NO. 1		
CHD	17.40				
TRD					
COMP					
SCALE :-			PANTO SELECTOR SWITCH		
REF.			(ZPT)		
				APPROVED :-	
					NO. CLW/ES/SK-1/6-3/82

MOUNTING WALL
THICKNESS 3MM



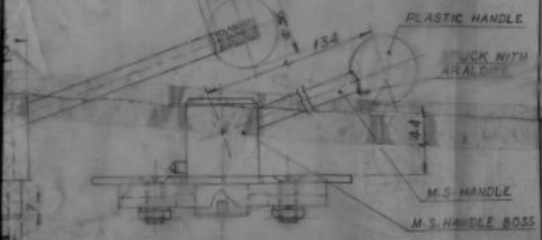
ALL CONNECTION TERMINALS
SHALL BE ACCESSIBLE FROM
THE DIRECTION OF ARROW X



4 HOLES Ø 5.5

MS SHUNK HOLES
4 COUNTER
BROW

ALT. No.	AUTHORITY	DESCRIPTION	INITIAL	DATE
C	DT. CRE/D	POSITION 1/2 ELIMINATED	Good	7-3-91

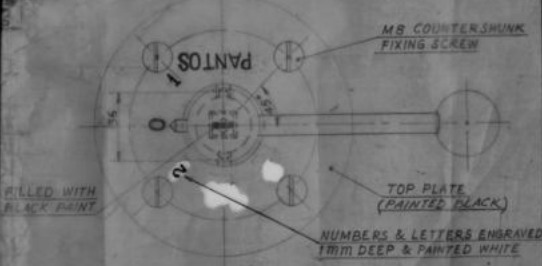


PLASTIC HANDLE

STUCK WITH
ARALDITE

M.S. HANDLE

M.S. HANDLE BOSS



MS COUNTERSHUNK
FIXING SCREW

PANTOS

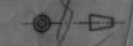
TOP PLATE
(PAINTED BLACK)

NUMBERS & LETTERS ENGRAVED
1MM DEEP & PAINTED WHITE

RILLED WITH
BLACK PAINT

REV.	REF.	DATE	BY	CHKD	APP'D	DESCRIPTION	QTY	MATL.	SPECN.	WT.
						USED FOR WAM-4, WAM-4B & WAM-4 LOCO				
						SHEET NO. 2				
						PANTO SELECTOR SWITCH (ZPT)				
						SCALE 1:1, 2:3				
						REF.				

CHITTARANJAN
LOCOMOTIVE WORKS
WEST BENGAL, INDIA.



APPROVED BY
NO. CLW/ES/SK-1 5/8