SPECIFICATION
FOR
ELECTRIC POINT MACHINE
NON TRAILABLE TYPE

IRS: S: 24-2024

July 2024

Pages: 24

Research Designs & Standards Organisation
Lucknow – 226 011

DOCUMENT DATA SHEET			
Designation **IRS:S: 24-2024**			**Amendment**
Title of Document **SPECIFICATION FOR ELECTRIC POINT MACHIN NON TRAILABLE TYPE**.			
Authors: **Name : Shri Dipu Shyam** **Designation: Executive Director/ Signal-II / RDSO**			
Approved by **Name: Shri Suresh Kumar** **Designation: Principal Executive Director/ Signal & Telecom,RDSO**			
Abstract This document defines specification for Electric Point Machine Non Trailable Type.			

DOCUMENT CONTROL SHEET

NAME	ORGANIZATION	FUNCTION	LEVEL
Shri Dipu Shyam Designation: Executive Director / Signal-II	RDSO	Member	Prepare
Shri Suresh Kumar Designation: Principal Executive Director/ Signal & Telecom, RDSO	RDSO	Approving Authority	Approve

AMENDMENTS

Version	Chapter/ Annexure	Amendment	Effective date
IRS: S-24/63	-	FIRST ISSUE	1963
IRS: S-24/90	-	Revision 1	1990
IRS: S-24/2002	-	Revision 2	2002
IRS: S-24/2002	-	Amendment 1	2005
IRS: S-24/2024		Revision 3	2024

Amendment 1 (Details)

Sl.	Clause	Amendment	status	Remarks
1.	0.2	1	Modified	To clarify the foreword
2.	11.2	1	Modified	Test load of 450 kg made common for both EPM.
3.	11.4	1	Modified	Test load of 580kg made common for both EPM
4.	11.6	1	Modified	Table modified as per new parameters
5.	15.10.2	1	Modified	Test load of 450 kg made common for both EPM.
6.	20.1	1	Modified	Tools added for maintenance.

TABLE OF CONTENTS

S. No.	Item	Page No.
0	Foreword	7
1	Scope	8
2	Terminology	8
3	Sequence of operation	9
4	Rated voltage	9
5	General requirements	10
6	Machine case	12
7	Motor	13
8	Crank handle operation	14
9	Terminals	14
10	Wiring	14
11	Operating Characteristic	15
12	Manufacturer	15
13	Marking & Identifications	16
14	Finish	16
15	Inspection and Testing	16
16	Rejection	20
17	Packing	20
18	Warranty	20
19	Installation and maintenance manual	21
20	Tools & Accessories	21

GOVERNMENT OF INDIA MINISTRY OF RAILWAYS(RAILWAY BOARD)

INDIAN RAILWAYS STANDARD SPECIFICATION

FOR

ELECTRIC POINT MACHINENON TRAILABLE TYPE Serial No. S 24-2024

0 FOREWORD

0.1 This specification is issued under the fixed serial no. S 24, the final number indicates the year of original adoption as standard, or in case of revision the year of last revision.

0.2 This specification requires reference to the following Indian Railway Standard (IRS) and Indian Standard (IS) Specifications:

(i)	IRS: S 23	Electrical Signalling and Interlocking Equipment.
(ii)	IRS: S 37	Motors for Electric Point Machine.
(iii)	IS: 7381	Hand operated square drive socket wrenches.
(iv)	IS : 7991	Attachments for hand operated square drive socket wrenches.
(v)	IS : 7975	Driving parts for hand operated square drive socket wrenches.
(vi)	IS : 2028	Open jaw wrenches (spanners)

0.3 Whenever reference to any of the above mentioned specifications appears in the specification, it shall be taken as a reference to the latest issue of that specification.

0.4 This specification is intended chiefly to cover the technical provisions and the provisions relating to supply of the materials and does not include all the necessary provisions of a contract.

1 SCOPE

1.1 This specification covers the requirements of Electric Point Machines for operation of points in Railway yard with following Types:

a. 143-mm Throw with internal locking & non-trailable Conventional Electric Point Machines.
b. 220 mm Throw with internal locking & non-trailable Conventional Electric Point Machines.
c. 143-mm Throw with internal locking & non-trailable Water-Proof Electric Point Machines.
d. 220-mm Throw with internal locking & non-trailable Water-Proof Electric Point Machines.

1.2 Vendor has to specify the option while applying for registration.

1.3 All the Clauses mentioned applies to all Options of Electric Point Machine as mentioned in item no. 1.1 above. Clauses which are specific to Conventional Electric Point Machine OR Water-Proof Electric Point machine have been mentioned separately.

2 TERMINOLOGY

2.1 The terminology used in this specification is covered by the definitions given in IRS: S 23.

2.2 The terms referred to in this specification but not covered in IRS: S 23, are defined below :

2.2.1 **'Conventional Electric Point Machine'**- It is an electrically driven machine used for operation of points in railway yards which is not water-proof Machine.

2.2.2 **'Water-Proof Electric Point Machine' -** It is an Water- proof electrically driven machine used for operation of points in railway yards which are prone for waterlogging.

2.2.3 '**Throw-Bar'**- That part of the point mechanism, which provides the thrust foroperation of points and to which the points driving rod is connected.

2.2.4 '**Lock Slide'**-That part of the point machine which has suitable notches in it for locking segment to effect locking of the points.

2.2.5 **'Detector'**- A device to prove the correct setting of points or correct setting and locking of points.

2.2.6 '**Detector Slide'**- That part of the point machine which controls the detector contactsand to which the detector rod is connected.

2.2.7 '**Time of Operation'**- The time required for one complete sequence of operation as specified in clause 3.1.

2.2.8 '**Right-hand Mounting'**- A point machine which is fixed to the right of the track as seen while facing the points.

2.2.9 **'Left-hand Mounting'**- A point machine which is fixed to the left of the track as seen while facing the points.

2.2.10 '**Stalling Load'**- The load applied to the throw-bar which, when the clutch of the point machine is deliberately prevented from slipping, would just prevent the drivingmovement of the machine.

2.2.11 '**Crank Handle'**- An appliance by which electrically driven point machines may be manually operated at the site.

2.2.12 **'Slipping Load'** – The load on throw-bar at which friction clutch of the point machine is adjusted in the factory to slip.

2.2.13 **'Slipping Current'** - The current corresponding to "slipping load" at which friction clutch of the point machine is adjusted to slip.

3 SEQUENCE OF OPERATIONS

3.1 The machine shall operate in the following sequence:-

a) Open the detection contacts
b) Unlock the points
c) Move the points
d) Lock the points
e) Close the detection contacts.

3.2 Operation (c) shall be completed to the full normal or full reverse position of thepoints, and operation (d) shall be completed before closing of detection contacts for respective position can take place. Unlocking of point shall start only after opening of detection contacts.

4 RATED VOLTAGE

4.1 The rated voltage of the machine shall be 110V DC.

5 GENERAL REQUIRIEMENTS

5.1 The machine shall be of robust construction, securely fixed and protected from unauthorized interference.

5.2 The Water-Proof Electric Point Machine shall be capable of functioning normally even after remaining in submerged condition.

5.3 The machine shall be so designed that it can be stopped, reversed or obstructed at any point during operation without any damage.

5.4 The machine shall be so constructed that no movement of the mechanism shall result from vibration or external force applied to the mechanical connection.

5.5 The machine shall be suitable for either right-hand or left-hand mounting, and shall be so constructed that it can readily be converted at site from right-hand to left-hand mounting and vice-versa.

5.6 The motor cut-off contacts shall be housed in the mechanism case and so designed thatthey follow the movement of the mechanism and do not complete their operation until the locking mechanism has completed its function.

5.7 The locking of the points shall be achieved by means of a locking segment engaging inthe locking slot of the lock slide.

5.8 The locking segment and the notch in the lock slide shall be of substantial size and shall have a substantial bearing surface between them in the locked position.

5.9 The entrance edges of the locking slot in the lock slide and the end face of the locking segments shall have square edges. Notches shall be cut to correct size and locking segments shall be made of hardened steel.

5.10 For Water-Proof Electric Point Machine, necessary sealing arrangements is to be provided for detector slides, lock slides, drive rod, Cable Entry Points, Machine Fixing Holes, Drainage hole, Crank handle arrangement holes and Machine cover to prevent water or dust ingress in the machine.

5.11 The detector unit shall have sufficient number of contacts for proving the full normal and reverse positions of the detector slides and the corresponding locked position of the lock slide. It shall also prove the complete operation of the point machine and the complete movement of locking process.

5.12 Detection and motor cut-off contacts shall be housed in a transparent cover made of UV stabilized polycarbonate material. The sealing arrangement should be provided on the transparent cover and it should be dust proof and water proof. The position of the detection and motor cut off contacts shall be such as to avoid dropping of grease, oil during maintenance work.

5.13 Electrical contacts shall be of low resistance, quick acting, self-aligning and wiping type and shall conform to IRS: S 23.

In addition to above, For Water-Proof Electric Point Machine, contacts should be properly insulated by epoxy or water-resistant material till silver contact so even if water enters in machine it shall protect against failure due to water.

5.14 Provision shall be made for proper and convenient lubrication of the moving parts ofthe machine, wherever necessary..

5.15 Exposed oil holes, cups and grease nipples shall be provided with weather-proof spring loaded covers.

In addition to above, for Water-Proof Electric Point Machine, Necessary sealing shall be provided for lubrication/ grease nipples to prevent water or dust ingress in the machine.

5.16 The design shall be such as to minimize condensation in the machine.

5.17 Clearance of not less than 12 mm shall be provided between any exposed current carrying parts and other metallic parts insulated therefrom.

5.18 With the exception of motor commutator, a surface leakage distance of not less than
6 mm shall be provided between any exposed current carrying parts and other metallic parts insulated therefrom.

5.19 The insulating materials used shall conform to IRS: S 23 and shall not be injuriously affected by atmospheric conditions.

5.20 Dimensions of fixing arrangement of point machine shall be as per drawing No. RDSO / S 10800 for 143 mm stroke and RDSO / S 11000 for 220 mm stroke IRS point machine.

5.21 Following aspects shall be ensured in the design of Water-Proof Electric Point Machine to achieve the compatibility with Conventional Electric Point.

a) Existing Position of ground connection shall remain unchanged.
b) Existing Position of P-Bracket and its holes for connecting ground connection shall remain unchanged.
c) Existing Position of Clamp lock assembly shall remain unchanged.
d) Existing Position of Machine fixing holes shall remain unchanged.
e) Existing Point installation Layout drawing RDSO/S 3454 ALT-B (OR Latest) for Thick Web Switch (220 mm) and Layout drawing RDSO/S 3262-63 (OR Latest) for Overriding Switch (143 mm) shall remain applicable.
f) Water- proof Electric Point Machine shall be replaceable with conventional Electric Point Machines without any change Ground Connection, P-Bracket, Clamp Lock assembly, Chair plate for fixing Point Machine.

6 MACHINE CASE

6.1 a. For Conventional Electric Point Machine, the machine shall be enclosed in a strong metallic weather-proof machine case, designed for mounting on two sleepers. Each machine case shall be provided with removable cover/covers. The main cover/covers shall be equipped with suitable fastenings to enable the covers to be secured and locked. Suitable hole or holes with removable metal plugs shall be provided, at the base or the machine case, for draining off of the accumulated oil or water.

b. For Water-Proof Electric Point Machine, the machine shall be enclosed in a strong metallic weather and Water-proof machine case, designed for mounting on two sleepers. . Each machine case shall be provided with removable cover/covers. The main cover/covers shall be equipped with suitable pressure mechanism fastenings to enable the covers to be secured and locked and to prevent water and dust ingress. Suitable Drain holes with removable sealing plugs for draining off of the accumulated oil or water shall be provided to prevent ingress of water and dust. All the holes at base for fixing shall be protected against water and dust ingress. Machine case shall be so designed to accommodate all the rods (detector, Lock and Throw) with necessary sealing arrangements/gaskets to prevent ingress of Water and dust. Sealing Material to be used shall be as following:

S. No.	Location	Component	Sealing material to be used
1.	Base mounting holes	O rings and Rubber gasket	Viton or Silicon
2..	Drain plug	O rings	Silicon or NBR(Nitrile Butadine Rubber)
3.	Bracket (LH/RH)	Sealing gasket	NBR (Nitrile Butadine Rubber)
4.	Clamping Block/ Detector slide bracket	Sealing gasket	NBR (Nitrile Butadine Rubber)
5.	Grease nipple	Grease nipple cap	NBR (Nitrile Butadine Rubber)
6.	Cable entry point.	Water proof cable gland for 9/12 core cable (2 No)	Waterproof cable gland
7.	Crank handle key hole	Rubber gasket	NBR (Nitrile Butadine Rubber)
8.	Crank handle hole	Rubber gasket	NBR (Nitrile Butadine Rubber)
9.	Point Machine	Rubber Gasket	Silicon or EPDM (Ethylene

	cover		propylene diene monomer)
10.	Point machine key lock	Latch lock or Pressured lock.	EPDM

(Table No-1)

Note:

(i) Condition of sealing material shall be checked by before each Monsoon and replaced, if required.

(ii) Sealing arrangement should be so sturdy so that it shall not get affected by Maintenance activities like opening of cover, replacement of ground connection, replacement of P-Bracket, replacement of Clamp lock assembly, replacement of Cable and maintenance in Crank Handle assembly etc.

6.2 The machine case shall be provided with cable entries of ample size, conveniently located for access to terminals, equipped with suitable means for connecting flexible conduit and arranged to protect the cable from mechanical injury. The cable entries shall be suitable for either right-hand or left-hand mounting of the machine, and shall be so designed that the machine case will be weather-proof

.

In addition to above, cable gland shall be provided at cable entry holes of Water-Proof Electric Point Machine to ensure protection against dust and water. Manufacturer shall supply water proof cable gland as per the size of cable being used.

6.3 Conventional Electric Point Machine case shall be provided with an opening, for application of crank handle protected by an external metal weather-proof cover equipped with suitable fastenings for locking.

6.4 The design of Water- proof Electric Point Machine shall allow operation of crank handle with existing key and existing crank handle in submerge condition. Suitable sealing arrangement shall be provided to prevent ingress of dust and water. Crank handle arrangement of Water- proof Electric Point Machine shall be protected by an external metal weather and water proof cover equipped with suitable fastenings for locking.

6.5 Conventional Electric Point Machine shall be so designed that it is capable of being mounted at a raised level on extended sleepers in flood prone areas.

6.6 The height of the machine shall be such that there is no infringement with the schedule of dimensions when the machine is mounted on two sleepers.

7 MOTOR

7.1 Motor shall comply with the requirements of IRS: S 37-2022, Version 2.0 (Or latest) 'Motor for Electric Point Machine'.

In addition to above, IP 67 motor as per IRS: S 37-2022, Version 2.0 (Or latest) should be used with Water-Proof Electric Point Machine,

7.2 Motor shall form an integral part of the machine and shall be removable therefrom.

7.3 Motor terminal blocks shall be made of unbreakable material like PBT.

8 CRANK HANDLE OPERATION

8.1 The machine shall be so designed as to permit manual operation by use of a crank handle.

8.2 The machine shall be provided with a crank handle cutout contact such that the crankhandle cannot be inserted in the machine without isolating the motor circuit. This circuit shall not be capable of being reconnected until the crank handle has been withdrawn from the machine.

8.3 The crank handles shall be provided with different ward combinations with matchingsockets on the machine, so that the crank handle having a particular ward combination can only operate point machines having matching sockets. Instead of crank handle, a key may also be provided with different ward combinations with matching sockets on the machine so that insertion of key of the particular ward only is possible in the point machine socket which will enable a common crank handle to be inserted in the machine.

8.3.1 Crank handle/key sockets on the machine shall be provided with detachable arrangements so that when the machine is taken out for maintenance purposes, the same crank handle/key ward can be used in the new machine, thus enabling the use of the same crank handle/key ward combination for that point.

9 TERMINALS

9.1 Terminals shall be M6 of nut type or as specified by the purchaser and shall conformto IRS: S 23.

9.2 Terminals shall be spaced not less than 20 mm and so located as to be easily accessible.

9.3 Terminals for external connections shall, as far as practicable, be located near the cable entry. Terminals of cable entry shall be of standard type.

9.4 Terminal shall be marked for identification purposes in accordance with the diagram of connections.

10. WIRING

10.1 Internal wiring shall be neatly arranged and shall conform to IRS: S 23. Color code and numbering of internal wiring shall be as per Figure 1.

10.2 The conductors for the internal wiring shall be insulated and shall be of tinned copper, stranded, having a cross-sectional area of not less than 2 sq. mm and not

less than 3 strands. Both ends of each conductor shall be labeled and provided with an eyelet of a suitable type. These eyelets shall be crimped and soldered.

10.3 Where wire connections are provided at a common terminal, the same shall be capable of being disconnected readily for test purposes.

10.4 Wiring diagram with explanation, if any, in English, engraved on an anodized metallic sheet, shall be securely attached to the inner face of the cover of the machine and protected from the effects of lubricants and moisture.

11. OPERATING CHARACTERISTICS

11.1 The machine shall comply with the appropriate operating data given in clause 11.6of this specification.

11.2 The machine shall be capable of operating between the limits of 75 percent and125 percent of the rated voltage at 450 kg. test load.

11.3 The machine in locked position, shall be capable of withstanding a thrust of 9000 Kg. through the connections, so that in the event of trail through, the damage is confined to the connections between the machine and points.

11.4 The friction clutch of the machine shall be factory adjusted to slip at not exceeding 580 kg. load on throw bar. The clutch adjustment shall be sealed in the factory. The slipping load and slipping current shall be indicated on the name plate.

11.5 The point machine shall have a min. AC immunity level of 160 V or 400V (r. m. s.), 50 Hz.

11.6 Operating Data

Throw of point machine	Time of operation (Max.)	Current consumption	Test voltage	Test load on throw bar	Slipping load	Stalling load (Min.)
143 mm ±2	4.0 sec.	≤ 4.5 Amp.	110 VDC	450 Kg.	≤ 580 kg	1000 kg.
220 mm +4/-1	5.5 sec.	≤ 5.5 Amp.	110 VDC	550 Kg.	≤ 580 kg	1000 kg.

(Table No-2)

12 MANUFACTURE

1 The manufacturer shall ensure that in addition to all the provisions of this specification, the requirements of any drawings, and / or specifications referred to by the purchaser are fully complied with.

2 Workmanship, limits and fits, interchangeability and other general requirements shall be in accordance with IRS:S 23 wherever applicable.

13 MARKING & IDENTIFICATION

13.1 Marking and identification shall be done in accordance with IRS: S 23.

13.2 The nameplate of the electric point machine shall have the following details, engraved on a metallic plate, affixed at a convenient place on the internal portion of the point machine.

1 Designed by RDSO
2 Manufacturer's name or trade mark
3 Type of Point Machine
4 Serial No.
5 Year of manufacture
6 Rated Voltage (110V, DC)
7 Throw
8 Slipping Current
9 Slipping Load

14. FINISH

14.1 The finish of various parts of the machine shall conform to IRS: S 23.

14.2 Suitable protective coating shall be provided on detector contacts, crank handle contacts and motor.

14.3 The external portion of electric point machine shall be painted with anti-corrosive paints. The color shall be as specified in the Indian Railway Signal Engineering Manual (1984 issue) as per Annexure 'A', Para 1102.

15. INSPECTION & TESTING

15. 1 Inspection and tests shall be carried out to ensure that all the requirements of this specification and that of IRS: S 23 are complied with.

15.2 Type Test

The following shall constitute type test and shall be conducted in the sequence givenbelow: -

(a) Visual check (clause 15.12.1)
(b) Operating voltage test (clause 11.2)
(c) Applied high voltage test (clause 15.5)

(d) Insulation resistance test (clause 15.6)
(e) AC immunity test (clause 11.5)
(f) Obstruction test (clause 15.11)
(g) Performance test (clause 15.7)
(h) Life test (clause 15.10)
(i) Dimensional check – Size of notches of lock and detector slides.
(j) **Water proof Electric Point Machine Dust Ingress Test**: - This test shall be performed as per IS/IEC 60034-5: 2000 to comply IP-67, before water immersion test. Ingress of dust shall be totally prevented. The protection is satisfactory if there is no ingress of dust or water.
(k) **Water proof Electric Point Machine Water Immersion Test**: - This test shall be performed as per IS/IEC 60034-5: 2000 to comply IP-67 protection. The Machine shall be kept submerged under water at a depth of 1 meter for 24 hours, no water should ingress. It shall be taken out and operated after recovery period of 10 minutes with thoroughly wiping externally using cotton cloth, verify its functionality. Measurement of operating parameters and insulation resistance test shall be done as per Clause 11.6 and Clause 15.6. The values of operating current and insulation resistance shall be within specified limits. This Clause shall be applicable for IP-67 complaint EPM

15.2.1 **Only one point machine shall be tested** for this purpose. The point machine shall **pass all the type tests** for proving conformity with this specification. If the point machine fails in any of the tests, the inspecting authority, at his discretion, may call for another point machine of the same type and rating and subject the same to all the type tests. No failure shall be permitted in the repeat test.

15.3 Acceptance Test:

The following test constitutes the acceptance test and shall be conducted in thesequence given below: -

(a) Visual check (clause 15.12.2)
(b) Operating voltage test (clause 11.2)
(c) Applied high voltage test (clause 15.5)
(d) Insulation resistance test (clause 15.6)
(e) AC immunity test (clause 11.5)
(f) Performance test * (clause 15.7)
(g) Dimensional check – Size of notches of lock and detector slides.
(h) Water immersion test as per clause 15.2 (k) for submerged duration of 04 hours instead of 24 hours with 10 minutes recovery shall be conducted in addition to Clause no. 15.3. (This test shall be applicable Water-Proof Electric Point Machines only)

Note: * Stalling load test shall be conducted on only one sampled point machine of alot.

15.3.1 The samples for acceptance test shall be selected as below.

SAMPLING PLAN

a) **Lot** :

All the point machines of the same type manufactured by the same factory during the same period shall constitute a lot.

b) **Sample Size:**

The number of point machines selected at random for acceptance test shall constitute sample size.

c) The lot size and sample size shall be as per the following table:

S. No.	Lot Size	Sample Size
1	1-4	50 % (min 1)
2.	5-20	25 % (min 2)
3.	21-50	20 % (min 5)
4.	51-100	16 % (min 10)

(Table No-3)

Note: If a lot consists of more than 100 point machines, the lot shall be divided intosmaller lots consisting of the above lot sizes.

15.3.2 For acceptance of the lot, no sample shall fail in the acceptance test.

15.4 **Routine Test:**

The following shall constitute routine test and it shall be conducted by the manufacturer on every point machine offered and the test result shall be submitted tothe inspecting authority during inspection.

(a) Insulation resistance test (clause 15.6)
(b) Performance test (clause 15.7)
(c) AC immunity test (clause 11.5)

15.5 Applied High Voltage Test:

15.5.1 The insulation of an assembled point machine after snubbing diode, if any, is disconnected, shall withstand for one minute test voltage of 2000 V r. m. s. between all parts of electric circuits and other metallic parts insulated therefrom.

15.6 **Insulation Resistance Test:**

15.6.1 This test shall be made immediately after the applied high voltage test specified in clause 15.5, at a potential of not less than 500 V DC.

15.6.2 The insulation resistance shall be measured between individual insulated circuits andearth. The minimum value for each individual insulated circuit shall be not less than 10 Meg. Ohms.

15.7 **Performance test:**

Test shall be conducted to verify the following:

(i) Operating characteristics (clause 11.6)
(ii) Contact resistance (clause 15.8)
(iii) Contact pressure (clause 15.9)

These tests shall be conducted on a layout approved by the purchaser or his nominee.

15.8 **Contact Resistance Test:**

The initial contact resistance of electrical contacts shall not exceed 0.03 ohm. The resistance shall be measured when the contact is carrying a direct current of 100 mA.At the end of the life test, the contact resistance shall not exceed 0.06 ohm.

15.9 **Contact Pressure Test**:

The initial contact pressure of electrical contacts in closed position when measured very near the point of contact shall not be less than 275 gm. At the end of the life test, the loss in contact pressure shall not exceed 10 percent of the initial contact pressure.

15.10 Life Test:

15.10.1 The point machine shall be installed on an approved layout and it shall be **operated continuously for one million operations at the rate of 4 operations per minute**. After every 20,000 operations, maintenance and lubrication of the point machine shall be carried out.

15.10.2 No damage to the point machine shall occur at the end of the test, and it shall becapable of hauling 450 kg test load on throw bar.

15.11 **Obstruction Test:**

The point machine shall be tested for obstruction test as per para 136 of SEM (1984 issue). With the test piece in,

1) the point machine shall not be able to complete its full operation.

2) the locking of the points shall not be effective.
3) the detection contacts shall not make.

15.12 Visual Check

15.12.1 **Visual Check for Type Test** :

The visual checks shall be carried out as laid down in IRS: S23. In addition, the detailed dimensional check and surface finish of all the parts, in reference to the drawings approved by the purchaser, shall be conducted. For such check the manufacturer shall submit three sets of the drawings of all the parts including their assembly drawings.

15.12.2 **Visual check for Acceptance Test:**

The visual checks shall be carried out as laid down in IRS:S23. In addition, the detailed dimensional check and surface finish of some important parts, such as lock and detector slide, rack & pinion, detection contacts etc. as considered necessary by inspecting official, shall be conducted. It shall be ensured that material of all components of the point machine is as per approved drawings. Chemical test report and relevant documents in support of it shall be verified by the Inspecting officer and recorded in Acceptance Test Report.

16. REJECTION

16.1 The machine or any part thereof that does not comply with any of the requirements of this specification and / or of any other specification and / or of drawings as approved by the purchaser may be rejected.

17. PACKING

17.1 The packing shall be done in accordance with IRS: S 23. Each electric point machine shall be packed in a suitable wooden crate to protect it from any damageduring transit etc.

18. WARRANTY

18.1 The warranty of the point machine shall be in accordance with the IRS specification No. IRS: S 23.

18.2 **Water proof EPM: -** The manufacturer shall submit an undertaking that they have tested the each electric point machine for protection against entry of dust and water ingress. In case of failure of any machine within 5 years from date of supply, the machine shall be replaced by the firm or repaired & installed again free of cost. The sealing arrangement used in the Electric point machine for water proofing shall be long lasting and shall not lose the effectiveness during codal life of EPM.

19. INSTALLATION AND MAINTENANCE MANUAL

19.1 A copy of installation and maintenance manual shall be supplied along with eachpoint machine.

19.2 The manual shall include the following information:

1) General information about the point machine such as overall dimensions and weight of point machine, stroke of throw bar, and dimensions of fixing centers of throw bar, lock rods and detector rods, etc.

2) Installation procedure.

3) Testing and adjustment procedure for friction clutch, detector slide etc.

4) Maintenance and lubrication procedures and their periodicity. Grade of oil and grease to be used.

5) Procedure for replacement of parts and periodicity of routine replacement of parts.

6) Tools required.

20. TOOLS & ACCESSORIES:

20.1 The following set of tools in a suitable tool box shall be supplied along with everyset of eight point machines or less.

i). Hand operated square drive socket wrenches of 12.5 mm driving square (short type) as per IS: 7381 for M8, M10, M12 & M18 threads.
(One 250 mm long 12.5 mm square extension bar as per IS: 7991 along with compatible Tee handle Square drive as per IS: 7975 suitable for above socket wrenches shall also be provided.

ii) Open jaw wrenches (spanners) for M10, M12, M20, M24 & M33 threads as per IS: 2028.

iii) Adjustable Wrench.

iv) Screw driver 300 mm long.

v) Additional Tools required for Water-Proof Electric Point machine for maintenance may be added as per requirement.

20.2 Junction box and two numbers of telescopic pipes of approved type shall be suppliedas an integral part of the point machine.

20.3 Ground connections and clamp lock shall be supplied along with the point machine on requirement from the purchaser as per latest drawing given below or as per their requirement-

i) RDSO / S 3361 – 62 (60 kg., 52 kg. on PSC sleepers)
ii) RDSO / S 3262 – 63 (52 kg., 90 R on wooden sleepers)
iii) RDSO / S 3454 (60 kg. TWS with clamp point lock)
iv) RDSO / S 3495 (60 kg. swing nose crossing with clamp point lock)

Annexure-1

Electric Point Machine drawings

SN	Drg. No	SN	Drg. No	Remark if any
1.	RDSO S10806-07(Alt-6)	51.	S10910	
2.	RDSO-S 3541-43	52.	S10911	
3.	S3264-65-66 Model	53.	S10912	
4.	S3271-74	54.	S10913-14-15	
5.	S10800	55.	S10916-17-18-19	
6.	S10801	56.	S10920	
7.	S10803	57.	S10921-22-23	
8.	S10803	58.	S10924A-24B	
9.	S10805	59.	S10925-26	
10.	S10808-09-09A-09B	60.	S10927	
11.	S10810-11	61.	S10928	
12.	S10812-13-14	62.	S10929-30	
13.	S10815-16	63.	S10931-32	
14.	S10817-18-18A-19	64.	S10933-34-35-36	
15.	S10820	65.	S10937-38-39-40	
16	S10821-22-23-24	66.	S10941-42-43-44	
17.	S10825-26-27-28	67.	S10945-46-47-48	
18.	S10830-32	68.	S10949-50-51-52 alt-2	
19.	S10833-34	69.	S10953-54-55-55A alt-2	
20.	S10835	70.	S10956	
21.	S10836-37	71.	S10957-58-59-60	
22.	S10838-39-40	72.	S10961-62-63-64	
23.	S10841-42-43-44	73.	S10965-66-67- 68	
24.	S10845-46-47	74.	S10969-70-71	
25.	S10848A-48B	75.	S10973A-E-74-75	
26.	S10848A-48B-48C-48D	76.	S10976-77-78-79	
27.	S10849A-49B	77.	S10980A-E-81	**Drg 1-77 for 143mm**
28.	S10850	1.	S11000	
29.	S10851	2.	S11001	
30.	S10852	3.	S11003	
31.	S10853-54-55-56	4.	S11004	
32.	S10857-58-59-60	5.	S11005	
33.	S10861-62-63-64	6.	S11006-07	
34.	S10865	7.	S11008	
35.	S10866	8.	S11009	
36.	S10867-68	9.	S11010-11	
37.	S10869	10.	S11012 13-14	
38.	S10870	11.	S11015	
39.	S10871-72-73-74	12.	S11016	
40.	S10875-76-77-78	13.	S11017	
41.	S10880	14.	S11018	**Drg. 1-14 for 220 mm**
42.	S10881-82	1.	S3396	
43.	S10883-84-85-86	2.	S3397	
44.	S10887-88-89-90	3.	S3398	

45.	S10891-92-93-94	4.	S3402-03	
46.	S10895-96-97-98	5.	S3436A-36B-37A-37B	
47.	S10899-900-01-02	6.	S3454	
48.	S10903-04-05-06	7.	S3456-57-58-59	
49.	S10907-7A-7B-7C	8.	S3460-61-62-63	**Drg 1-8 for clamp lock**
50.	S10908-09			

All changes require for water proof feature in existing drawings of Electric point machine (annexure 1) shall be intimated to RDSO for standardization.