नाम
Name : _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

अनुक्रमांक
Roll No : _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

पाठ्यक्रम
Course : _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

दिनांक
Date : _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

प्राप्तांक
Marks Awarded :

अनुदेशक के आद्यक्षर
Instructor Initial :

IRS ROTARY TYPE NON-TRAILABLE ELECTRIC POINT MACHINE

Introduction:

IRS type of electric point machine (Rotary Type) is manufactured as per IRS specification S-24-2002 .This point machine is suitable for all types of points layouts and different rail profiles (52Kg / 60Kg).

Description:

DC MOTOR generates required power with help thrust to move the tongue rails . It has of reduction gear, inside the oil field chamber attached to it. Further mechanical advantage is derived from friction clutch to rotate a shaft and a pinion is keyed on at the end of the shaft. Pinion converts the rotary movement into linear movement to generate 143mm stroke. A lock segment is also attached on the shaft which rotates along with shaft to lock and unlock the point as this lock segment enters into the notches provided on the lock slides and these lock slides are attached to the switches of the point. Friction clutch is provided as a over load protection to the motor in case of obstruction of point as it declutches the motor and point in case of obstruction of point. There is also arrangement to adjust the thrust of point machine which is ordinarily adjusted to 580 Kg. Switching unit which contains the control and detection contacts and used to control feed to the motor and proving of correct setting and locking of point.

Components of point machine

1. Case with stop rod and drain out arrangement
2. Cover with lock and apertures to provide access to crank handle and keys
3. D.C.series split field motor
    a. Crank handle contact assembly
    b. Motor
    c. Reduction gear
4. Switching unit
5. Transmission assembly and friction clutch
6. Lock & detection slides and gear rack (throw bar)
7. Crank handle and crank handle key

D.C. motor IRS-37-82
Exercise-1

1. **DC motor is - - - - - - - - - - series and - - - - - - - - - - - - - - split field**
2. **Power of motor is - - - - - - - - - - 0.44 K Wt and RPM is - - - - - - - - - - 1700**

3. **Motor has total - - - - - - - six terminals, out of which terminal number - - - - - -- - - - - - 1 & 0 (OR 3 in alstrom machine) & 2 used for as Power supply terminals are serial number**
4. **Insulation grade of motor is of - - - - - - - - - - - 'B'class**
5. **Normal working voltage & current rating is - - - - - - - - -&- - - - - - - - -120 volts & 5.3 amps**

Detection slides

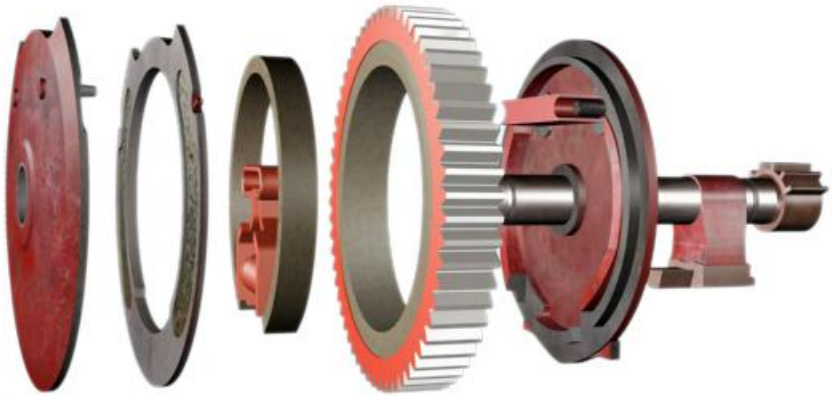
There are two detection slides used to detect correct setting of switches and each has two notches one short and other long. The threaded portion is welded sidewise to avoid interchanging of slide which may otherwise leads detection of close switch by wide notch.

Exercise-2

1) How do you confirm that close switch is detected by short notch of detection slide of close switch?

Transmission assembly and friction clutch: It is the most important part of point machine and performs the following functions. Friction clutch is an assembly of spring loaded Gear, shaft and disks which are placed between motor and Load (point throw / transmission assembly).

- Functions of friction clutch are
  - ✓ To protect the motor from overload
  - ✓ To achieve mechanical (dynamic) snubbing
  - ✓ To follow the sequence of point operation
  - ✓ Provide scope for adjustment of thrust



Exercise-3

1) Identify the following

I. Control disc.
II. Lift out disc.
III. Slip rim
IV. Compression spring.& Spring lever LH & RH
V. Adjusting nut with lock and seal.
VI. Gear rim
VII. Drive disc with projection.
VIII. Lock segment
IX. Pinion

2) Write down function of gear rim, slip rim, lift out disc and control disc

SWITCHING UNIT (CONTROL & DETECTION CONTACTS):

Contact assembly comprises of two spring loaded contact groups which are fixed inside the casting. Function of the contact assembly is to make and break the sets of contact. One group Contains two sets of contact fixed side by side. The contact called as Normal/ reverse detection contact (ND/RD) and Normal/ reverse control contact (NC/RC). Making and opening of contact depends upon position of point. Control Contact controls feed (Power) to motor & cut supply to motor if point set & locked required position. Detection contact used to prove setting & locking switches subject to correct adjustment of ground connection and detection and lock slides.

Exercise-4

1) Identify the parts of switching unit

1. Crank
2. Crank Axle
3. Bottom Roller
4. Top Roller.
5. Finger contacts
6. Spring.
7. Spring base with fixing rod.
8. Contact & Terminal blocks

2) Write down function of top roller and bottom roller

Exercise-5

1) The detection contacts are nearer to pinion& - - - - - - - - - - - - - - - - **inner side** of switching unit and control contacts are on **the** - - - - - - - - - - - - - - - - **outer side** of switching unit with respect to pinion.
2) Write down the position (open/ make) of control and detection contact in column against their names, as per various position of point.

Sr NO	**POSSITION OF POINT**	**ND**	**RD**	**NC**	**RC**
1.	**POINT NOT SET & NOT LOCKED**	**OPEN**	**OPEN**	**MAKE**	**MAKE**
2.	**POINT SET & LOCKED IN NORMAL**	**MAKE**	**OPEN**	**OPEN**	**MAKE**
3.	**POINT SET & LOCKED IN REVERSE**	**OPEN**	**MAKE**	**MAKE**	**OPEN**

Installation:

The point machine is fixed on long extended sleeper number 3 &4, it is very important to have proper spacing between various ground connections, inner surface of sleeper and the edge of switch rail and centre line of sleeper number 3. If proper marking for drilling of holes is not given at the time of installation then it is very difficult to install the machine OR machine will work very hand.

Exercise-6

CONNECTIONS TO THE POINTS: Refer to the layout diagram of IRS Electric point machine and note the following Dimensions in millimetre.

1. Distance between the C/L of Point machine and gauge face of the nearest stock rail =

2. Distance between the C/L of Third Point Sleeper and the Fourth Point sleeper =

3. Distance between the front William Stretcher and the switch toe. =

4. Distance between the drive rod and switch toe =

5. Distance between the near end lock rod and switch toe =

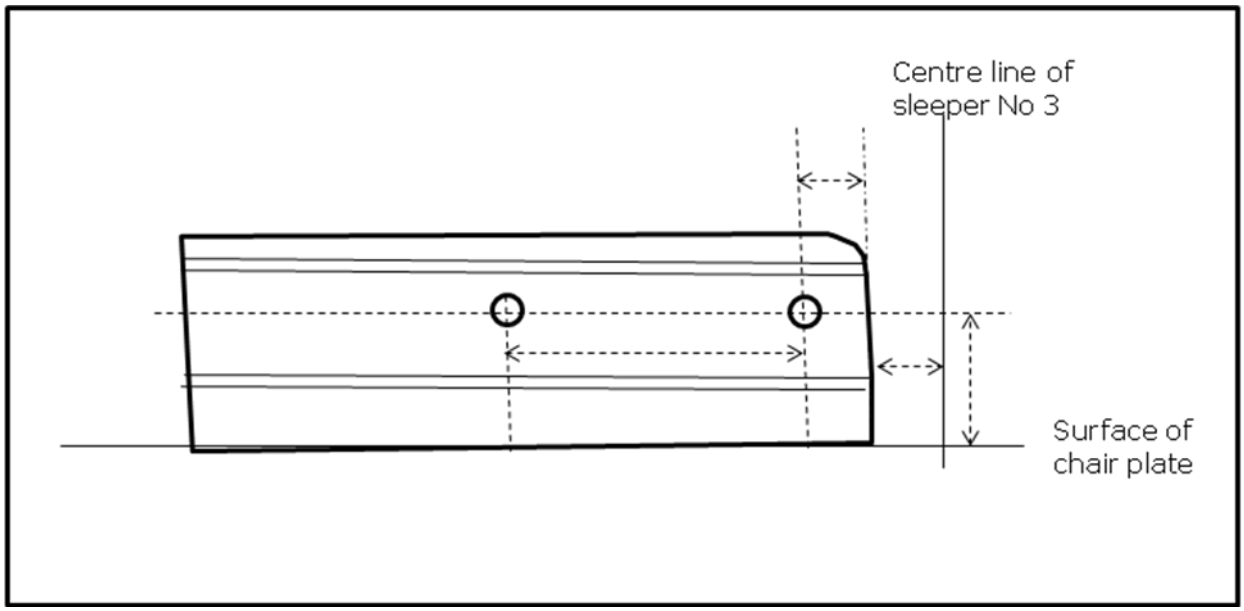
6. Distance between the far end lock rod and switch toe =

7. Distance between the far end detection Rod and switch toe. =

8. Distance between near end detection rod and switch toe =

9. Distance between the C/L of Third Point Sleeper and switch toe =

10. Mark the dimensions for fixing of 'P' bracket for 60 Kg rail



Marking of holes for 'P' bracket

Exercise-7
Obstruction current
PROCEDURE

1. Insert the crank handle key & unlock
2. Connect multi-meter (in current mode) leads on terminals of crank handle contact assembly
3. Operate point & note down normal working current
4. Put 5 mm test piece on switch rail at 150mm from toe & operate point
5. Note down obstruction current.

1) Normal working current is - - - - - - - - - - - Amps
2) Obstruction current is - - - - - - - - - - - Amps
3) Observation-1 Obstruction current is - - - - - - - - - - - - -**more / less** than 2 times of normal working current
4) Observation-2 difference between Obstruction current & normal working current is - - - - - - - - - - - - -**more / less** than - - - - - - - - - - **0.5 Amps**
5) If values of obstruction current are less than stipulated value then what remedial action shall be taken?

Exercise-8
Perform the obstruction test
Procedure for 5mm test (No go test)

1) Put 5 mm thick test piece obstruction between the switch and the stock rail at 150 mm from the toe of the switch and operate the point and observe

   (i) The point cannot be - - - - - - - - - **- locked**
   (ii) The point detector contacts should not assume the position indicating point closure that is detection contacts- - -- - - - - - - - - - **does not make**
   (iii) Friction clutch - - - - - - - -**slips."**

2) If anyone of above observation does not takes place then what remedial action shall be taken?

Procedure for 1.6mm test (Go test)

1) Put 1.6mm thick test piece obstruction between the switch and the stock rail at 150 mm from the toe of the switch and operate the point and observe
   I. The detection contacts shall - - - - - - - - - - **just make**

Oiling and greasing of point machine
Lubricate the slides. Rollers & pins with axle oil medium grade to IS: 1628 –Avoid over flow of oil. The periodicity of lubrication shall maintain as manufacturer manual or as local circular.

Exercise-9

1) **There are total - - - - - - - - - - - eleven greasing nipple.**
2) **Machine oil - - - - - - - - - -- SAE 30 or Shell 100X be used**

Date: **Signature of the Trainee**