



नाम

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Course : \_\_\_\_\_

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Date : \_\_\_\_\_

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अनुदेशक के आद्यक्षर

Instructor Initial : \_\_\_\_\_

## IRS ELECTRICAL POINT AND LOCK DETECTOR (EPD)

Electrical point and lock detector is used to prove correct setting and locking of switches in required position and generally placed by the side of point on the long extended sleeper No 2 & 3 of point layout. It is generally fixed on normal switch rail side of point. The following three arrangements of IRS design (Roller actuated) EPDs are available:

1. EPD for a single pair of points fitted with lock with “IN & OUT” (IRS Drg.SA23331 & RDSO Drg.S/9301-03);
2. EPD for single pair of points and lock with “STRAIGHT THROUGH” lock movement (IRS Drg.SA23332 & RDSO Drg.S/9302-03); and
3. For Double Slip Points (IRS Drg.SA23332).

The main components of the detector unit are:

1. Cast iron base, frame and cover
2. Contact operating mechanism FIX plat, Yoke and helical spring
3. Contact Block
4. Detector & lock slides for point

The cast iron base provides housing for four switch detection slide or three switch detection slide and a lock detection slides. The cover is detachable and have latch for locking arrangement. It also has cable entry on two side of it.

A fixed plate screwed to the frame above on one side and a yoke provided below it. The yoke is hinged at one end and is forced down by the springs. A crank is attached to the other end of the yoke by means of a pin. An insulating block with three bridge contacts is fixed to the crank on top. Two sets of rollers with a stagger in between are mounted on crank at the bottom. These sets of rollers ride over the detection slides as they move. The nominated set of rollers drop in proper depressions (notches) on these slides if the points are correctly set and locked, Dropping of roller causes the trolley with bridge contacts to swing over a pin and close three pairs of normal or reverse springs on either side.

There are two contact blocks in a detector. One is screwed to the fixed plate on one side while the other is screwed to the projected frame casting on the other side. Each block consists of –

1. A fixed contact spring;
2. Six detection contact springs; and

### 3. A movable shunt

#### Switch detection slide

These slides are rectangular flat iron bars with a screw & Cast iron lugs end on one side for connectivity to point switch rail. Each bar has two 7 mm deep under & half cuts (notches) on its surface, one short and the other long on each slide. Locating marks are provided on the top surface of the slides which coincide exactly with a finished surface of cast iron frame when point is set and lock correctly.

There are four types of switch detection slides out of which only C slid & D slides are normally used.

1. switch detection slide A
2. switch detection slide B
3. switch detection slide C
4. switch detection slide D

**‘C’ type Switch Detection Slide (S-23377):** It has smaller notch and locating mark nearer to the threaded portion AND always connected to the nearest closed switch.

**‘D’ type Switch Detection Slide (S-23378):** It has longer notch nearer to the threaded portion of the locating mark is away from the threaded portion of the slide.

#### Lock Detection Slides

The lock slide is also a rectangular flat bar of the same dimension as that of point detection slides with screw-end, check-nuts and lug on one side. These slides, either has half cut staggered notches on both upper & lower side surface of slide or a full cut notch on only one side surface of slid and connected to Facing Point Lock to prove locking of switches

#### **A’ type Lock Detection Slides (S-23370):**

It has half cut notches and locating marks on both upper and lower side surface of the slide. There are two types of locating marks provided on both upper and lower side surface of the slide at the distance of 10 mm. and 42 mm. from the end of the slide. **This slide is used in “IN & OUT” type of locking**. If lock rod moves away from point/ track during unlocking of point then 42 mm locating mark shall be on top and If lock rod moves towards the point/ track during unlocking of point then 10 mm locating mark shall be on top.

#### **B’ type Lock Detection Slide (S-23380):**

It has single notch and two locating marks on the same side surface of the slide. Locating marks are provided at distance of 10 mm. and 42 mm. from the end of the slide. ‘B’ type lock detection slide is used in the case of “Straight through Locking”. When EPD is placed on RH side and nearest switch is closed and locked then 42 mm shall alignment with the surface of the body. When EPD is placed on LH side and nearest switch is closed and locked then 10 mm shall alignment with the surface of the body.

When EPD is fixed on a double slip point all four switch slides each connected to a tongue rail and operate the detector contacts through its trolley subject to condition point is correctly set. When EPD is fixed on a single pair of points, two switch detection slides and a lock slid are connected to tongue rails & Facing point lock plunger (FPL) through their detector connecting rods. When only three slides are used then, one spacer each is fixed in between two slides on either side of detector frame. A screw stud fixed beneath each holds the spacers in place

#### **Detection contacts**

There are total four contacts on either side of contact block (three detection and one shunt). These contacts are called as Normal / reverse detection and Normal / reverse shunt

contact. These contacts make when point is set & lock correctly in required position, subject to correct adjustment of slides.

Sr NO	POSITION OF POINT	ND	RD	NORMAL SHUNT	REVERSE SHUNT
1.	POINT NOT SET &/OR NOT LOCKED	OPEN	OPEN	MAKE	MAKE
2.	POINT SET & LOCKED IN NORMAL	MAKE	OPEN	MAKE	OPEN
3.	POINT SET &/ LOCKED IN REVERSE	OPEN	MAKE	OPEN	MAKE

### Testing of point

1. Set and lock the point in normal and disconnect the lock detection rod keeping lock slide in its operated condition and now unlock the point .
2. Place a 3.25mm. obstruction test piece between the reverse switch rail at 150mm. from and operate the points to reverse .
3. Check whether the reverse detection contacts are not closed. If closed adjust the position of reverse switch slide to open them sufficiently.
4. Repeat the procedure for normal tongue rail also
5. Place a 5 mm. obstruction test piece between the reverse switch rail at 150mm. from and operate the points to reverse.
6. Observe that point could not get locked if get locked adjust split stretcher bar.
7. Repeat the procedure for normal tongue rail also

Study the working of detector and fill in the blanks below:

1. Trolley rollers are \_\_\_\_\_ in position to prevent point detection with a \_\_\_\_\_ notch of slide beneath the rollers if a switch detection rod is \_\_\_\_\_.
2. The swing of bridge contact block is limited by the \_\_\_\_\_ on the fixed plate.
3. The movement of detection contact springs is limited within \_\_\_\_\_mm.
4. The opening of shunt contacts is limited to \_\_\_\_\_.
5. Shunt contacts are opened or closed by the \_\_\_\_\_ or bridge contact block.

Study the various detection slides and their connection to fill in the blanks below:

1. The movement of switch slides is \_\_\_\_\_mm.
2. The movement of lock slide is \_\_\_\_\_ mm.
3. \_\_\_\_\_ type switch slide is offset to the left from its threaded end and \_\_\_\_\_ type switch slide is offset to the right from its threaded end.
4. \_\_\_\_\_ notch is close to the threaded end in A&B type switch slides.
5. The short notch is close to the threaded end in a \_\_\_\_\_ type straight switch slide and it is away from the threaded end in a \_\_\_\_\_ type switch slide.
6. The short notch on switch slides is for the detection of \_\_\_\_\_ tongue rail and the long notch is for the detection of \_\_\_\_\_ tongue rail.
7. \_\_\_\_\_ type lock slide is used with "IN and OUT" type locking on points and \_\_\_\_\_ type is used with "STRAIGHT THROUGH" type locking on points.

8. \_\_\_\_\_ type lock slide has two notches one on each of its faces.
9. \_\_\_\_\_ type lock slide has only one notch on one of its faces.
10. \_\_\_\_\_ type lock slide has a locating mark on each of its two faces, one at \_\_\_\_\_ mm. and the other at \_\_\_\_\_ mm. from the end.
11. \_\_\_\_\_ type lock slide has two locating marks on the same face, one at \_\_\_\_\_ mm. and the other at \_\_\_\_\_ mm. from the end.
12. In IRS design layout, for a single pair of points, one \_\_\_\_\_ type switch slide is connected to the nearest switch rail and one \_\_\_\_\_ type switch slide is connected to the farthest switch rail, on whichever side of the points (LH or RH) the detector is fixed.
13. In RDSO design layout, two \_\_\_\_\_ type switch slides are connected with their threaded ends operated to each other.
14. With IN and OUT type locking on points:
  - a) if the lock slide moves towards the track during unlocking of points, keep \_\_\_\_\_ mm.
15. "Left in right out" principle is followed for locking economically operated points. With these, the direction of movement of switches to reverse is always \_\_\_\_\_ that of lock slide.
16. The disadvantage of \_\_\_\_\_ layout is that if slides of open and closed switches are interchanged by mistake, gap in points may not be detected which is unsafe.

#### INSTALLATION AND ADJUSTMENT OF DETECTOR

1. Fix the detector on 4250mm. long sleepers as per layout drawing No.S-9301/03 with its closer edge at a minimum distance of 1676mm. in BG and 1370mm. in MG from the track centre.
2. Fix the spacers in vacant slide position of the detector.
3. Keep the points locked in normal.
4. Place the switch and lock slides in the detector so that –
  - a) the shorter notch of closed switch slide;
  - b) the longer notch of open switch slide; and
  - c) the lock slide notch let one set of trolley rollers to drop in them. Also see that locating marks on all three slides coincide with the finished surface of detector frame.
5. Connect the detection rods with their respective slides in position and see that normal detection contacts make after the reverse shunt contact opened.
6. Now, operate and lock the points in reverse.

Date:

Signature of the Trainee