# CHAPTER I

## DESCRIPTION OF BLOCK INSTRUMENTS, INDOOR APPARATUS AND OUTDOOR APPARATUS

*Note:* ***1.*** *The term' Station Master' wherever used in this Manual, also applies to Assistant Station Master, Cabin Assistant Station Master, Cabin Master / Switchman and any other competent staff, who may, for the time being, be in charge of block working.*

***2.*** *The name of stations as represented by W, X, Y and Z in this Manual and the number, direction and description of trains mentioned shall be read only as examples. In actual working, the proper names of the stations and the number, direction and description of trains shall be used.*

### 1.1. Provision of Block Instrument:

The following types of Token less Block Instruments are in use on certain Single Line sections of this Railway.

**a)** Daido Handle Type and

**b)** Push Button Type: Following types of Push Button type Block Instruments are provided in this Railway.

**i.** Kyosan make;

**ii.** Podanur make and

**iii.** Axle Counter Proven Block Panel: Following types of Axle Counter Proven Block Instruments are provided on this Railway:

**a)** UFSBI and

**b)** SSBPAC (D) - Single Line.

The sections of the line provided with these Block Instruments are notified in the Working Time Table for passenger trains.

### *1.2.* Parts and description of Diado Handle Type Token less Block Instrument: *(See Figure No. 3 at the end of this Chapter)*

These instruments are provided at two consecutive block stations 'X' and 'Y' on the single line to control trains passing over both the Up and Down block sections between these stations. These instruments are electrically connected with each other. Each block instrument contains the following parts as shown in figure No.3

**a)** Push Button - PB 1;

**b)** Push Button - PB 2;

**c)** Galvanometer;

**d)** Single stroke bell or Gong;

**e)** Block handle;

**f)** Buzzer 1;

**g)** Buzzer 2;

**h)** 'Train On Line' indicator;

**i)** 'Time Release' indicator;

**j)** Cancellation switch – S 1 and counter;

**k)** Cancellation switch – S 2 and counter;

**l)** Shunt key;

**m)** Station Master's key;

**n)** Telephone

**o)** SNR indicator

The above parts are described in detail in the following paragraphs.

**a) Push Button - PB 1:**

This is used to transmit Code of Bell signals.

**b) Push Button - PB 2:**

This is to be pressed along with PB 1 by 'X' to enable 'Y' to turn his Block Handle:–

**i)** From 'Line closed' to 'Train going to' (normal to left);

**ii)** From 'Line closed' to 'Train coming from' (normal to right).

**iii)** From 'Train Going to' to 'Line closed' (left to normal).

**iv)** From 'Train coming from' to 'Line closed' (right to normal).

**c) Galvanometer:**

Consists of a needle housed in a case with a glass front; the deflection of the needle indicates the flow of outgoing and incoming line currents.

***Note:*** *There will be no deflection if both the stations press PB 1 simultaneously.*

**d) Single stroke Bell or Gong:**

The Bell or Gong responds to the signals given by the station at the other end of the block section. At stations where more than one instrument is provided, different Bells or Gongs (with distinct sounds) are fitted to identify the individual instrument whose Bell or Gong rings.

**e) Block Handle:**

This has three positions.

i. 'Line closed' position with the handle vertical and the arrow pointing upwards. This is the normal position.

ii. The 'Train Coming From' position with the handle horizontal and the arrow pointing to the right. The handle is turned to this position when 'Line clear' is being given to the station in rear for a train

iii. The 'Train Going To' position with the handle horizontal and the arrow pointing to the left. The handle is turned to this position whenever a train has to enter into the relevant block section.

*NOTE : The block handle with the plunger shall always be left correctly in the 'Line closed' or 'TGT' or 'TCF' position, as otherwise transmission of bell code and other block operation will not be possible.*

The block handle is normally locked in the vertical i.e., 'Line closed' position, with the arrow pointing upwards. It is released to be turned over to 'Train Coming From' or 'Train Going To' position as the case may be, when a prolonged beat

along with necessary bell code is received from the station at the other end. The handle so turned will remain locked in that position until a prolonged beat along with necessary bell code is again received from the station at the other end after the relevant sequence of operation concerning either the train movement or cancellation of 'Line clear' is completed.

**f) Buzzer 1:**

This provides an audible alarm at both the stations when the train enters the block section. This alarm will cease only when 'Train entering block section' signal is acknowledged by the station receiving the train. At the train despatching station, the buzzer will sound continuously and at the train receiving station intermittently, till acknowledged by the Station Master at the receiving station by pressing the PB I.

**g) Buzzer 2:**

This provides an audible alarm at the station receiving the train when whole of the train passes within the Home signal. This alarm ceases when the SM's control slide/lever/knob for the Home signal is put back / turned to normal.

**h) Train On Line indicator:**

Normally this indicator shows white. It is operated automatically when the train enters the block section and then changes over to show 'Train On Line' on red background. This 'Train On Line' indication changes again to white only when the block handle is restored to normal.

**i) 'Time Release' Indicator:**

This is an indicator, which is displayed when the time element relay is operated after two minutes when the cancellation of 'Line clear' is made before the train entering block section. Normally, this indicator shows 'Locked' on white background. When operated, it changes to
`Free' on a green background,

**j) Cancellation switch – S 1:**

This switch is operated for cancellation of 'Line clear' obtained, when the train has not left the station. The operation of this switch is recorded progressively on the counter.

**k) Cancellation switch – S 2** :

This switch is operated for receiving the train on reception signals in the event of its returning back to the station from where it left. The operation of this switch is recorded progressively on the counter.

*Example : Goods train unable to haul and pushing back*.

**l) Shunt key:**

This is the authority given to the Driver of a train when shunting is to be carried out beyond the Advanced starter and up to the opposing First Stop Signal. This key can be removed only when the block handle is in 'Line closed' position and when extracted locks the handle in that position, thus making it impossible to operate the block handle. However, the telephone communication is maintained.

**m) Station Master's key:**

Extraction of this key prevents unauthorized manipulation of the instrument during the absence of the Station Master. However, this does not prevent receipt of incoming bells and communication on telephone. This key should be kept in the personal custody of the Station Master when it is not required to operate the instrument.

**n) Telephone:**

A telephone is provided in conjunction with each instrument for communication with the Station Master at the other end of the block section.

**o) SNR indicator:**

This is an aid to the Station Master to verify if all relevant controls, levers/knobs, signals etc., are normal.

**p) <u>Indoor Apparatus:</u>**

**Electric Lock on LSS:**

An electric lock is provided on the Last Stop Signal lever which is released only when' Train Going To' indication is displayed on the block instrument of the concerned block section.

*NOTE : The above lever lock is dispensed with in case of single line tokenless block instrument with colour light signals.*

**q) <u>Outdoor Apparatus:</u>**

The Outdoor apparatus is installed as under –

**i) First Vehicle Track Circuit:**

This is fixed slightly in advance of the Last Stop Signal. As soon as the engine or the first vehicle of a train going from 'X' to 'Y' passes over the First Vehicle Track Circuit, the Last Stop Signal is automatically replaced to 'ON' and the indication 'Train On Line' is displayed automatically on the instruments at stations 'X' and 'Y'. The buzzer at both stations 'X' and 'Y' gives an alarm and continues until the 'Train Entering Block Section' signal is acknowledged by the station 'Y'.

**ii) Electrical signal reverser:**

This is actuated by the FVT and replaces the Last Stop Signal at 'X' to 'ON' immediately as the engine
or the first vehicle of the train going to 'Y' passes over the First Vehicle Track Circuit.

**iii) a Last Vehicle Track Circuit:**

This is fixed at an adequate distance inside the First Stop Signal. When the last vehicle of a train passes over the LVT, the buzzer gives alarm at 'Y' and continues to do so until 'Y' replaces the SM's control slide/lever/knob for the Home signal to normal.

**1.3. Parts and Description of Kyosan / Podanur make Push button tokenless block instruments:**

*( See Figure No. 4 for Kyosan make and Figure No. 5 for Podanur make at the end of this Chapter)*

These instruments are provided at two consecutive block

stations 'X' and 'Y' on the single line to control trains passing over both the Up and Down block sections between these stations. These instruments are electrically connected with each other. Each block instrument contains the following parts as shown in figure Nos.4 and 5

**a)** Station Master's key.

**b)** e Bell Code Push Button.

**c)** 'Train Going To' Push Button.