NORTH WESTERN RAILWAY

Headquarters' Office Jaipur. Date: 14.09.2021

No. T-6/BWM/603/2

DRMs-AII, BKN, JP, JU PZRTI- UDZ

Sub: Amendment to Block Working Manual (English Version). **Ref:** CSE/NWR's Note No. SG/236/BPAC vol II Date 02.08.2021

Consequent upon CSE/NWR's Note, under reference, to incorporate block working of UFSBI, DAIDO & SSBPAC(D) Block instruments, Amendment Slip No. 1 to the Block Working Manual is being issued hereby. Summary of the amendments/modifications being incorporated is as under:

- (1) (A) Para No. 4.05 under "Contents" at Page No. iii has been replaced as:
 - 4.05 Tokenless Block Instrument Handle Type Kyosan/Daido

(B) A new Para No. 4.10, under "Contents", at Page No. iii, has been added as:

4.10 - Block Proving By Axle Counter (BPAC) Using UFSBI

- (2) Para 1.16 (B) at Page No. 9 has been replaced as:
- 1.16(B) Train Signal Register for Handle Type-Kyosan/**Daido**, Push Button Type Podanur make, Push Button Type - Siemen's make Tokenless block instruments
- (3) (A) Para 4.01 (a) (iv) at Page No. 27 has been replaced as:
 - (iv) Tokenless Block Instrument, handle type-Kyosan/Daido

(B) New Heading under Para 4.01 (a)(viii) at page no. 27 has been added as:

(viii) Block Proving By Axle Counter (BPAC) Using UFSBI

- (4) Para 4.05 at Page No. 39-46 has been replaced by **New Para** so as to include the working of Diado block instruments.
- Para 4.09 (2)(i) at page no. 73 has been amended so as to add "Daido" after Kyosan and to include "in para 4.10 for Block Proving By Axle Counter (BPAC) Using UFSBI"
- (6) A new Para No. 4.10 "BLOCK PROVING BY AXLE COUNTER (BPAC) USING UFSBI" has been added at pages from 75(1) to 75(14). Block working of SSBPAC (D) is same as Block working of UFSBI.
- (7) Heading of Para 5.01 (D) at Page No. 78 has been replaced as:
 [D] Applicable to tokenless Block Instrument handle type (Kyosan/Daido).—

The amendment slip is enclosed herewith in page size for convenience to replace page numbers (iii), (iv), 9, 10, 27, 28, 39 to 46 and 73 to 78 of Block Working Manual (English version).

Divisions are advised to print and distribute Amendment Slip as per requirement on their system and ensure that these pages have been replaced in Block Working Manual (English version) in entire division.

Copy: -

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PCOM

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[Remarks:-Time and description of any signal given or received, for which a special column is not provided. Testing of instruments (in red ink). Issue of caution orders. Failure of instruments (in red ink). Train shunted for others to pass. All remarks and corrections must be initialled in ink by the Station Master on duty.]

- (2) Columns 3 to 16 are for signals relating to trains approaching the station and columns 17 to 28 for those leaving the station.
- (3) The columns for the regular signals come first in each case, i.e. 3 to 13 and 17 to 25 will be filled in for every train. The last three columns in each case i.e. 14 to 16 and 26 to 28, will only be filled in as required by the Rules in this book.

(B) Train Signal Register for Handle Type-Kyosan/Daido, Push Button Type-Podanur make, Push Button Type-Siemen's make Tokenless block instruments-

(1) Each page has 28 columns, which are serially numbered and headed as follows:-

Date		 1
Number of train		 2
Call attention received and ackno	wledged	 3

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GENERAL	INSTRUCTIONS
ULIVENAL	INDINUCTION

Is line clear received and acknowledged		4
Private Number sent		5
Line No. on which the train will be received		6
Numbers of the outermost points keys with SM		7
Train entering section received and acknowledged		. 8
In case of a cabin or cabins, time slot or control given of	or received	9
Time signals taken off		10
Time Train arrived		11
Train out of section sent and acknowledged		12
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Station Master's initials		27
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[Remarks :-Time and description of any signal given or received, for which a special column is not provided. Testing of instruments (in red ink). Issue of caution orders. Failure of instruments (in red ink). Train shunted for others to pass. All remarks and corrections must be initialled in ink by the Station Master on duty.]

- (2) Columns 3 to 15 are for signals relating to trains approaching the station and columns 16 to 26 for those leaving the station.
- (3) The columns for the regular signals come first in each case, i.e. 3 to 12 and 16 to 23 will be filled in for every train. The last three columns in each case i.e. 13 to 15 and 24 to 26, will only be filled in as required by the Rules.

(C) Train Signal Register for S.G.E. and IRS type Lock & Block Double Line Block Instrument –

Number of train			 1	
Call attention received an	d acknowled	ged	 2	
Is line clear received and	line clear ser	ıt	3	,
Private Number sent			4	ł
Train entering section rec	eived and ac	knowledged	 5	,
Time Train arrived			 6)
Train out of section sent a	and acknowle	dged	 7	!
Line clear refusal sent			 8	
Obstruction danger sent a	and acknowle	dged	 9)

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CHAPTER IV

SINGLE LINE ELECTRICAL BLOCK INSTRUMENTS AND METHOD OF SIGNAILING TRAINS FROM BLOCK STATION TO BLOCK STATION

Note: The method of signalling trains on all the Block Instruments as shown in this chapter is on the assumption that similar instruments exist on contiguous stations.

4.01. (a) The types of Block Instruments used on single line sections of this Railway are:-

- (i) Tyer's Tablet Block Instrument.
- (ii) Neale's ball token Block Instrument.
- (iii) Neale's tablet token Block Instrument.
- (iv) Tokenless Block Instrument, handle type-Kyosan/Daido
- (v) Tokenless Block Instrument, push button type-Podanur make.
- (vi) Tokenless Block Instrument, push button type-Siemen's make.
- (vii) Block working with Axle Counter on Single Line
- (viii) Block Proving By Axle Counter (BPAC) Using UFSBI
- (b) The sections of the line provided with these Block Instruments are given in the Working Time Table.
- **4.02 TYER'S TABLET BLOCK INSTRUMENT.** Diagram of Tyer's Tablet Block Instrument is given below:-



(1) **Description**.— Each station has two Block Instruments, one controlling the Block Section on the Up side and the other controlling the Block Section on the Down side.

Terminal stations have one Block Instrument only and Junction stations have separate Block Instruments for the Branch or connected lines.

Each Block Instrument consists of :-

- (i) A Galvanometer.
- (ii) A Bell Plunger.
- (iii) A Switch Plunger.

SINGLE LINE ELECTRICAL BLOCK INSTRUMENTS

- (iv) An Upper Slide.
- (v) An Indicator.
- (vi) A Window.

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- (vii) A Lower Slide
- (viii) Cosserat Lock Key.
- (ix) A Bell.
- (x) SM's Lock.
- (i) The Galvanometer has a needle which indicates the passage of a current. The movement of the needle indicates that the Bell Plunger at the other end of the Block Section is being worked, even if the bell does not ring.
- (ii) The Bell Plunger is used for giving the Bell Signals, described in Chapter III, to the station at the other end of the Block Section. Each time the Plunger is pressed, the bell at the other end of the Block Section gives one beat.
- (iii) The Switch Plunger is used for controlling the movement of the Lower Slide.
- (iv) The Upper Slide is used for returning tablets to the Block Instrument.
- (v) The Indicator gives three indications:-
 - (a) Line Closed.
 - (b) Up (or Down) Train Approaching.
 - (c) Down (or Up) Train On Line.
 - as the case may be. The normal position is Line closed.
- (vi) The window is used for seeing if any tablet is left in the Block Instrument. When there are only five Tablets in the Instrument, a blank space can be seen above the fifth Tablet.
- (vii) The Lower Slide is used for withdrawing Tablets from the Block Instrument, and also as hereinafter described.
- (viii) The Cosserat Lock Key is used for releasing the Station Master's Lock on the Last Stop Signal, or, where there is no Starter or Advanced Starter Signal, on the Warner Signal.
- (ix) The bell is used for receiving the Bell Signals from the station at the other end of the Block Section.
- (x) A SM's Lock is provided on the Upper Slide. When SM locks the Upper Slide and removes the Key, no person can manipulate the Block Instrument.

There are 24 Tablets allotted jointly to the two Block Instruments controlling a Block Section. These are serially numbered 1 to 24, and in case of Lost Tablet, the replaced Tablet bears No. 25 and so on and each one bears the names of the Stations between which the Block Section extends. The notches of the Tablets of adjoining Block Sections differ in shape, so that they cannot be put in the wrong Block Instrument.

(2) Working of Block Instruments.—

(i) The following is the procedure to be observed in working the Tyer's Tablet Block Instruments when an Up train has to pass over a Block Section from station A to station B.

Station 'A' (Sending)	Station 'B' (Receiving)
1. Sends the 'Call Attention/Attend Telephone' signal to B by means of the	2. Acknowledges 'Call Attention/ Attend Telephone' signal to A and
bell plunger.	attends telephone.
3. Attends telephone and announces station name than makes line clear enquiry from	4. Agrees to give line clear to A.
'B' giving train number and description.	

SINGLE LINE ELECTRICAL BLOCK INSTRUMENTS

same as were extracted out by SSE/SE/JE(Signal) or Signal Maintainer from the Block Instrument of the adjoining station vide para (a) above. Nos. of tokens/tablets.

For Section.

Time inserted.

Position of the operating handle.

Signature of the Station Master.

(c) The SSE/SE/JE(Signal) or Signal Maintainer shall record the individual numbers of tokens/tablets extracted/deposited and the fresh balance of tokens/tablets left in the Block Instrument in the train signal register of respective stations. The Station Master on duty shall bring forward the fresh balance for striking the closing balance at the time of changing duty.

4.05 TOKEN LESS BLOCK INSTRUMENTS, HANDLE TYPE – KYOSAN/DAIDO

- (1) **Description of Instruments** The sketches below illustrate the Kyosan's/Daido's type of instruments. The description of their components and the working thereof are as under
 - (a) An operating handle.
 - (b) Bell Plunger (push button PB1)
 - (c) Push Button (PB2)
 - (d) A Block Bell
 - (e) A cancellation switch (S1) with veeder counter.
 - (f) A switch (S2) with veeder counter
 - (g) The Station Mater's Key (S. M)
 - (h) An occupation Key (OCC)
 - (i) A Buzzer (BZ1)
 - (j) A Buzzer (BZ2)
 - (k) Train on Line Indicator (TOLK)
 - (l) Time Release Indicator (TERK)
 - (m) Current Indicator (Galvanometer).
 - (n) Telephone.

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KYOSAN





(a) The Operating Handle – This has three position as under (A pointer is engraved on the handle to indicate to which of the positions that handle has been turned)-



- "Line Closed" (or "N") is the normal position with the handle vertical and the arrow pointing upwards. This position indicates that no "Line Clear" hasbeen given or received on the instrument for a train to enter the block sections.
- (ii) The "Train Coming From" (or "R") is the position with the handle horizontal and the arrow pointing to the right and indicates that "Line Clear" has been given to the station at the other end of the block section for a train to enter the block section and approach the station from that end.
- (iii) The "Train Going To" (or "L") is the position with the handle horizontal andthe arrow pointing to the left and indicates that "Line Clear" has been received from the station at the other end of the block section for a train to be dispatched into the block section towards the station at the other end.
- **Note:** The operating handle is normally locked in the vertical or Line closed position. It is released to be turned to the "Train Coming From" or "Train Going To" position when such release is electrically permitted by the Station Master at the other end of the block section. The handle when turned to either of the positions (TGT or TCF) will remain locked in that position until its release is again electrically permitted by the station at the other end.
- (b) Bell Plunger The bell plunger or push button (PB1) when pressed rings the bell of the corresponding block instrument at the other end of the block section. It shall only be employed for signalling trains by means of the prescribed code of bell signals. Each time the bell plunger is pressed the bell of the corresponding block instrument at the other station will give one beat.
 - **N.B.** : The use of the bell plunger is also necessary for enabling the release of operating handle of the instrument of the station at the other end. For this purpose the bell plunger has to be operated or kept pressed along with push button (PB2).
- (c) Push Button (PB2) The operation of push button (PB2) shall always be made after the bell plunger (PB1) has been operated and kept pressed. Keeping (PB1) and (PB2) jointly pressed in this manner will release the operating handle of the instrument at the other end and enable it to be turned to the "Train Going To" or "Train Coming From" position or from any of these positions to the "Line Closed"position.

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- (d) A Block Bell The block bell responds to signals given through the pressing of therelevant bell plunger by the stations at the other end of the block sections and serves to convey information through the prescribed Code of bell signals.
- (e) A Cancellation switch (S1) with Veeder Counter This is a switch attached to a number counter and is required to be operated for cancellation of "Line Clear" by the Dispatching Station before the Train enters the Block Section. The number counter attached to switch (S1) registers the next higher number for each operation of switch (S1)
- (f) A switch (S2) with Veeder Counter This is a switch attached to a number counter and is required to be operated by the Dispatching Station for closing the Block Section after the train returns back to the dispatching station from the Block Section and is received under proper Reception Signal. The number counter attached to switch (S2) registers the next higher number for each operation of switch (S2).
- (g) The Station Master's Key ("SM") This key when not in use in the instrument shall always remain in the possession of the person in charge of block working. The key when taken out of the instrument makes the instrument inoperative and thus prevents unauthorized manipulation of the Instrument when the person in charge of block working leaves the office or cabin. The bell code signals sent by the Station at the other end will however be audible and the Telephone may be used for communication.
- (h) An occupation Key ("OCC") This key when handed over to the Loco Pilot authorizes him to shunt beyond the advanced Starter up to the point for which shunting order has been given to him. The key can be taken out or put in only when the Operating Handle is in the "LINE CLOSED" position "N" and S.M's key inserted. The removal of the "OCC Key" locks the Operating Handle in the "LINE CLOSED" position. The SM's key can be taken out after removal of "OCC Key" but has to be inserted back before the "OCC Key" is replaced in the instrument.
- (i) A Buzzer (BZ1) The Buzzer (BZ1) provides audible indication at both Stations when the train enters the Block Section and stops only when the Receiving Station acknowledges the "Train Entering Section" signal.
- (j) A Buzzer (BZ2) The Buzzer (BZ2) provides audible indication at the Receiving Station when the whole of the Train passes within the Home signal and it stops either when the S.M's Home Signal Control Slide and Home signal lever is put back to normal or the Operating Handle is turned back from the "TRAIN COMING FROM" position (R) to "LINE CLOSED" position (N).
- (k) Train on Line Indicator (TOLK) This is a visual indication at both stations in addition to audible indication and automatically appears when the train enters the Block Section. This indication disappears in the process of turning Operating Handle from (L) to (N) or (R) to (N)
- (I) Time Release Indicator (TERK) This visual indication appears at the Dispatching Station after a predetermined time to 2 to 3 minutes, when the cancellation switch (S1) is operated for cancelling "Line Clear".
- (m) Current Indicator (Galvanometer) The Galvanometer is provided with a Needle the movement of which indicates the passage of an electric current received or sent and also the operation of corresponding Block Instrument at the other end of the section. This indicates the flow of current whenever the push button (PB1) is pressed.

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- (n) **Telephone** The Telephone is provided for communication between the two stations. The normal means of communication on the Telephone will be established by lifting the hand set preceded by "Call Attention" signal having been given previously.
- (2) Method of Signalling Trains from Block Station to Block Station with Kyosan's/Daido'sTokenless Block Instruments In the case of each train, after "Call Attention" Signal has been sent before any other operation on Tokenless Block Instrument is made, the names of Stations working together shall be exchanged on the telephone, one with the other, as an assurance that the correct stations are in communication.

Taking two adjacent stations X and Y and supposing that a train is to proceed from X to Y Block Section being clear, the Operating Handles of the Tokenless Block Instruments and all concerned signals and signals lever at both stations are normal, the following is the sequence of operation for signalling the train -

Station 'X'	Station 'Y'
1. Inserts S. M's Key and turns.	
2. Presses the bell plunger or Push	
Button (PB1) and sends "Call Attention"	
signal to Y.	
	3. Receives "Call Attention" signal.
	4. Inserts ("SM's") Key and turns.
	5. Acknowledges the "Call Attention"
	Signal to X by pressing the Bell Plunger
	or Push Button (PB1).
6. Attends telephone.	
	7. Attends telephone.
8. Gives name of Station on telephone.	
	9. Gives name of Station on telephone
10. Asks "Line Clear" for the train on	
telephone giving the number and	
description of the train duly recording,	
the transaction in Train Signal Register.	
	11. Accepts "Line Clear Enquiry" on
	telephone repeating the number and
	description of the train duly recording
	the transaction in Train Signal Register
	supported by a Private Numbers.
12. Sends "Call Attention" Signal to Y.	
	13. Acknowledges the "Call Attention"
	Signal to A by pressing the Bell Plunger
14 Sands "Is Line Clear" signal	
to V through Bell Plunger or Push	
Button (PB1) keeping the same pressed	
on the last heat and also presses Push	
Button (PB2) conjointly with (PB1) until	
the station Y operates his Handle.	

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	15. On the last beat of X's "Is Line Clear" signal, turn the operating handle of his Instrument to "TRAIN COMING FROM" position (R) and acknowledges the "Is Line Clear" signal to X keeping the Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB1) until the station X operates his Handle.
16. Turns the Operating Handle to the "TRAIN GOING TO" position (L) on the receipt of the last beat of Y's acknowledgement signal and acknowledges line clear by giving "Call Attention" Signal (one beat).	
 17. (a) Takes "OFF" the last stop signal. (b) Train enters Block section. (c) Last Stop signal returns to 'ON' position. (d) "Train on Line" indication appears automatically and Buzzer (BZ1), starts operating. (e) Replaces Last Stop Signal lever. 	
	 "Train On Line" Indication appears automatically and Buzzer (BZ1) starts operating.
19. Sends "Call Attention" Signal to Y.	20. Acknowledges "Call Attention" signal to X.
21. Sends "Train Entering Section" signal to Y.	
	 22. Acknowledges "Train Entering Section" signal to X and keeps (PB1) pressed on the last beat till Buzzer (BZ1) stops. Note – In cases, where, due to any reason, there is delay in conveying the Train Entering Section signal by beats on block instruments or acknowledgement thereof the time of the Train Entering the section should also be repeated on the block telephone and an entry made to this effect in the Remarks column of the Train Signal Register.

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23 Buzzer (BZ1) stops	
23. Buzzer (BZ1) stops.	 24. (a) Takes OFF the reception signals. (b) Train enters the station. (c) Buzzer (BZ2) starts operating. (d) Reception signal replaced to 'ON' position automatically. (e) Puts back levers of reception signals to normal position. (f) Buzzer (BZ2) stops when SM's Home slide or Home Signal lever is put back to normal if the Instrument remains in SM's office but will continue to ring when the same is in
	cabin.
	25. Sends "Call Attention" signal to X.
26. Acknowledges "Call Attention" signal to Y.	
	27. Sends "Train Out of Section" signal to X keeping Bell Plunger of Push Button(PB1) pressed on the last beat and also presses Push Button (PB1) conjointly with (PB2) until the station X operates the Handle.
28. On the last beat of Y's "Train Out of Section" signal turns the operating Handle of his instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to Y, keeping Bell Plunger or Push Button (PB1) pressed on the last beat and presses Push Button (PB2) conjointly with (PB1) until Station Y operates his handle.	
	29. Buzzer (BZ2) stops when the instrument is fitted in Cabin.

Note – Same procedure is repeated when sending a train from station Y to station X.

42(1) SINGLE LINE ELECTRICAL BLOCK INSTRUMENTS

(3) Cancelling "Line Clear" – How to cancel a "Line Clear" before train enters the Block section? Before proceeding to cancel the "Line Clear" obtained the Station Masterat the Station at which the Operating handle of the Instrument is in "TRAIN GOING TO" position (L) shall personally ensure that the last stop signal has been properly putback to 'ON' position and the Station Master's slide for the last stop signal concerned is put back to normal and that they remain so until the cancellation procedure is completed.

Station 'X'	Station 'Y'
Operating Handle at "TRAIN GOING TO" position (L) and concerned signals and signal levers normal.	Operating Handle at "TRAIN COMING FROM " position (R) and all concerned signals and signal levers normal.
1. Calls the attention of station Y and takes his consent on telephone with Private Numbers duly recording in Train Signal Register.	
	2. Gives consent on telephone to station X with Private Numbers duly recorded in Train Signal Register.
 3. (a) Turns cancellation switch (S1) from normal to cancellation position. (b) Veeder counter registers next higher number. This is duly recorded in Train Signal Register. (c) Wait for 2 minutes. (d) Time Release indicator operates. 	
4. Sends "Call Attention" signal to Y.	5. Acknowledges "Call Attention" signal to X.
 Sends "Train Out of Section" signal to Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB1) until the Station Y operates the Handle. 	

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	7. On the last beat of X's "Train Out of Section" Signal turns the Operating Handle of his instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" Signal to X keeping Bell Plunger or Push
	Button and also presses (PB2)
	conjointly with (PB1) until the
	station X operates his Handle.
8. Restores cancellation switch (S1)	
to normal and turns the Operating	
Handle To "LINE CLOSED"	
position (N) on Receipt of the	
last beat of Y's acknowledgement	
signal.	

(4) Normalizing of Tokenless Block Instrument after the Train returns back to the Dispatching Station from the Block Section and is received under proper reception Signals –

Station X	Station Y
Operating Handle at "TRAIN GOING	Operating Handle at "TRAIN COMING
TO" position (L) and all concerned	FROM " position (R) and all concerned
signals and signal levers normal.	signals and signal levers normal.
1. Calls the attention of station Y and	
takes his consent on telephone, with	
Private Numbers, duly recorded in Train	
Signal Register.	
	2. Gives consent on telephone to
	station X with exchange of Private
	Numbers, duly recorded in Train Signal
	Register.

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3. (a) Turns the concerned switch	
(S2) from normal position to operated	
position.	
(b) Veeder-counter registers next higher	
number. This is duly recorded in the	
Train Signal Register.	
(c) Takes 'OFF' the Reception signals.	
(d) Train enters the Station.	
(e) Buzzer (BZ2) starts operating.	
(f) Reception signals replaced to 'ON'	
Position automatically.	
(g) Puts back levers of Reception signals	
to normal position.	
(h) Buzzer (BZ2) stops when SM's	
Home Slide is put back to normal if the	
Instrument remains in SM's Office, but	
will continue to ring when the same is	
in the Cabin.	
4. Sends "Call Attention" signal to Y.	
	5. Acknowledges "Call Attention" signal
	to X.
6. Sends "Train Out of Section" signal to	
Ŭ	
Y keeping Bell Plunger or Push Button	
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also	
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly	
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates	
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of Section" signal turns the operating
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section"
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push Button (PB1) pressed on the last
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses (PB2) until the
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle.	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses (PB2) until the station X operates his Handle.
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle. 8. Restores switch (S2) to normal and	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses (PB2) until the station X operates his Handle.
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle. 8. Restores switch (S2) to normal and turns the Operating Handle to "Line	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses (PB2) until the station X operates his Handle.
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle. 8. Restores switch (S2) to normal and turns the Operating Handle to "Line Closed" position (N) on the last beat of	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses (PB2) until the station X operates his Handle.
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle. 8. Restores switch (S2) to normal and turns the Operating Handle to "Line Closed" position (N) on the last beat of Y's acknowledgement of signal.	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses (PB2) until the station X operates his Handle.
Y keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses Push Button (PB2) conjointly with (PB2) until the Station Y operates his Handle. 8. Restores switch (S2) to normal and turns the Operating Handle to "Line Closed" position (N) on the last beat of Y's acknowledgement of signal. 9. Buzzer (BZ2) stops with the	7. On the last beat of X's "Train Out of Section" signal turns the operating Handle of his Instrument to "LINE CLOSED" position (N) and acknowledges "Train Out of Section" signal to X keeping Bell Plunger or Push Button (PB1) pressed on the last beat and also presses (PB2) until the station X operates his Handle.

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Station X	Station Y
Operating Handle at "LINE CLOSED"	Operating Handle at "LINE
Position (N) and all concerned signals	CLOSED" Position (N) and all
and signal levers normal.	concerned signals and signal levers
	normal.
1. Calls the attention of station	
'Y' and Obtains his consent on	
telephone duly recording the Private	
Numbers	
	2 Gives consent on telephone to station
	'X' confirming by Private Numbers
	A continuing by I fivate (vulnoefs:
3. Inserts S. M.'s Key and turns.	
4. (a) Takes out the Occupation Key	
"OCC" of the concerned section	
Instrument. Takes out S. M's Key.	
(b) Hands over Occupation key to the	
Loco Pilot.	
(c) Loco Pilot completes shunting and	
returns the Occupation Key to S.M.	
(d) Inserts S.M's key and the Occupation	
key is put back in the instrument.	
5. Informs the Station Master at	
'Y' on telephone confirming by	
Exchange of Private Numbers	
Enclange of Fifture Fullocis.	6 Aaknowledges on telephone Deserts
	0. Acknowledges on telephone. Records
	through Exchange of Private Numbers.

(5) Shunting between last Stop Signal and Opposing First Stop Signal –

(6) Additional Equipments provided at the Block station at which tokenless Instruments are located

(a) Lock on the last stop signal-

- (i) The Last Stop Signal lever is locked on the normal or 'ON' position by means of an Electric Lever Lock, in addition to Electric Signal Reverser fitted on the Signal for the automatic replacement to 'ON' position after the train has operated the track circuit of 2 rail length slightly ahead of the Last Stop Signal and the signal cannot be taken 'OFF' until the Operating Handle has been turned to "TRAIN GOING TO" position (L).
- (ii) The lever is free in the reverse or "OFF" position and the signal can be put back to "ON" and taken "OFF" again at any time so long the train has not operated the Track Circuit ahead of the Last Stop Signal.
- (iii) Once the Last Stop Signal is replaced to "ON" position by the operating ofTrack Circuits ahead of the Last Stop Signal, by the passage of a train neither the signal can be taken "OFF" again on the same "Line Clear" nor the Last Stop signal lever can be pulled from normal to reverse position until the train has cleared the Block Section and the Instrument has been put back to "LINE CLOSED" position (N) and again turned to "TRAIN GOING TO" position (L).

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(b) Control on Reception Signals -

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- (i) Reception signals are controlled by Reversers and/are automatically replaced to 'ON' by the operation of the Track Circuit ahead of the Home Signals by the passage of the train. These signals cannot be taken off unless the Operating Handle is in "TRAIN COMING FROM" position or in normal position.
- (ii) Operation of switch (S2) is essential for taken off the reception signals with Operating Handle in "TRAIN GOING TO" position and closing the line when a train returns back to the dispatching station.
- (iii) The Reception Signals, however, may be taken off (provided it has not failed due to some other reason), in case the Tokenless Block Instrument has failed or is locked either in the "NORMAL" or "TRAIN COMING FROM" position.

(7) Failure of last stop Signal -

When the tokenless block instrument are functioning normally but the last stop signal cannot be taken off despite "Line Clear" having been obtained the SM / Cabinmaster / Cabinman will intimate this fact to the ASM on duty if the instrument is in the cabin and request the latter to issue T/369(3b) for train in question duly confirming his assurance that he has obtained line clear by exchange of Private Numbers. The Station Master on duty on receipt of the advice shall issue T/369(3b) with the following endorsement –

Suitable record of this transaction should be kept in the Train Signal Register in the Cabin and in the Log Register of the Station Master on duty.

In case the instrument is in the Station Master's office the Station Master on duty will issue the T/369(3b) after exchange Private Numbers with the cabinman controlling the Last Stop Signal for the said train.

When the block instrument also fails, Paper Line Clear working will be introduced as mentioned in Paragraph above.

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4.06 TOKENLESS BLOCK INSTRUMENT (PUSH BUTTON TYPE) PODANUR MAKE.—



(1) Brief description.— On section where such Block Instruments are used, co-operation of the receiving end Station Master for obtaining authority for occupation of the block section is not necessary. Co-operation between Station Master at both end stations is, however, necessary in the case of Cancellation and Push Back operation to restore the Block Instruments to 'Line Closed' position.

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For giving bell signals on the Block Instrument only one button, namely 'Bell Push' button has to be pressed. For all other operations, simultaneous pressing of the ''Bell Push'' button and another button ('Train Going To' button or 'Line Closed' button or 'Cancellation' button as the case may be) is necessary.

A shunting key can be extracted in the 'Line Closed' or in 'Train Going To' condition of the Block Instrument. The extraction of the shunting key will make the Block Instrument inoperative except that-

- (a) Transmission and reception of bell signals are possible.
- (b) Telephonic conversation is possible.

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(c) Reception of 'Train on Line' code and appearance of 'Train on Line' indicator are possible.

However, the conditions established prior to extraction of the key will continue to remain and therefore the shunting key also functions as an emergency key. Shunting key cannot be extracted from the Block Instrument when Block Instrument is in 'Train Coming From' position.

When the shunting key is taken out of the adjunct to the Block Instrument, the Block Instrument can not be changed from the 'Line Closed' condition to 'Train Going To' condition at sending station and 'Train Coming From' condition at receiving station. Whenever conditions warrant refusal of line clear, shunting key should be extracted from the adjunct of the Block Instrument and kept by S.M. in his safe custody.

- (2) The following are the principal components of the Block Instrument:—
 - (a) 'Bell Push' button (BCB).
 - (b) 'Line Closed' button (LCB)

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obtained as usual through Block Panel. The Station Master, however, will issue T 369-(3b) to the Driver authorizing him to pass the last stop signal in the 'ON' position. An endorsement to the effect that the line clear has been obtained shall be made on the form T 369-(3b) showing also the Private Number received from the block station in advance.[S.R. 3.70(c)]

4.09 WORKING OF DIGITAL AXLE COUNTER WITH CONVENTIONAL BLOCK INSTRUMENTS ON SINGLE LINE.-

(1) Brief Description of working.- This is a means of working wherein Block Instruments are provided for Block working and Digital Axle Counter are used for proving the clearence of the Block Section. Definition of Axle Counter is given in GR 1.02 (07) and at para 10.04 of the Block Working Manual. In addition to conventional type Block Instrument, "Reset Boxes" are kept in Station Master's office with the following indication:

- (a) Red for occupation of Block Section
- (b) Green for clearence of Block Section
- (c) Miniature Green- indicates axle counter is in preparatory reset condition
- (d) Yellow for power on
- (2) Line Clear working.-

(i) The types of Block Instruments used on single line section are given in para 4.01 and method of working trains from one block station to another block station are given in para 4.02 for Tyer's Tablet Block Instrument, in para 4.03 for Neal's Ball Token Block Instrument, in para 4.04 for Neal's Tablet Token Block Instrument, in para 4.05 for Tokenless Handle Type Kyosan/Daido Block Instrument, in para 4.06 for Tokenless Push Button Type Podanur make Block Instrument, in para 4.08 for Block Working with Axle Counter and 4.10 for Block Proving By Axle Counter (BPAC) Using UFSBI

(ii) At receiving station:- On receipt of line clear enquiry for an approaching train, the Station Master on duty shall ensure that the reset box is showing Green indication, which will mean that the block section over which the train has to enter is clear and free from obstruction. He shall then grant line clear by following the method of working laid down in different paras of Block Working Manual Chapter IV. He shall turn the operating handle of the block instrument to 'Train Coming From' position. As soon as the train enters the block section, the reset box will show Red indication and the Station Master on duty shall acknowledge the train entering block section signal to train sending end Station Master. On complete arrival of the train, reset box will show Green indication indicating clearance of the block section and the Station Master on duty shall turn the operating handle of the block instrument to 'line closed' position. For ensuring complete arrival of train the GR 4.17 and SRs thereunder shall be followed.

(iii) At sending station:- When it is intended to despatch a train, the Station Master on duty after ensuring that the reset box indication is Green, shall obtain line clear from the Station Master on duty at the block station in advance by the following method of signalling procedure laid down in Chapter IV of Block Working Manal. After getting Line Clear from the block station in advance, the Station Master shall take off departure signals for the train to start. After the train enters block section Station Master shall send the train entering block section signal to Station Master in advance and shall put back the departure signals to 'ON' position when the train has passed the last stop signal.

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- (3) Cancellation of Line Clear:- For cancellation of line clear from the Station Master on duty in advance, the method of cancellation of line clear as described in Chapter IV of BWM shall be followed.
- (4) Working of Axle Counter:-
 - (i) Whenever any train enters the block section and passes over the detection point kept at the entry of the block section, the Axle Counter equipment will start counting the number of axles which have entered the block section. This is recorded as <u>IN-COUNT</u>. Similarly, when the train reaches the destination station and passes over the detection point kept at the exit of the block section the axle counter equipment will count the number of axles which have passed over the detection point at the exit end. This is recorded as <u>OUT-COUNT</u>.
 - (ii) When OUT-COUNT is same as IN-COUNT the reset box shows Green indication. When the block section is occupied, the OUT -COUNT is less than the <u>IN-COUNT</u> and the reset box will show Red indication which will mean that the block section is occupied and it is not clear. Therefore, when the reset box is showing Red/No indication, it can have two implications. It would mean either a train portion is left behind in the block section or the Axle Counter is defective due to any technical fault. In such a case, the ASM on duty shall ensure complete arrival of a train according to GR 4.17 and SRs thereof. In case he is unable to ensure complete arrival of a 'run through' train, he shall ensure complete arrival of the train through exchange of private number from the station in advance and also the section controller. When the reset box is showing Red/No indication after reception of train, it means axle counter system has failed and resetting procedure given below shall be adopted.

(5) Failure of axle counter:-

- (i) When the axle counter used for clearance of block section fails and reset box shows occupied a reset button is provided on the reset box to set the axle counter back to normal. Once the axle counter has failed and the concerned block instrument deemed to be failed and last stop signal can not be taken off, the sending station shall verify the clearance of the block section by exchange of private number with the station in advance. After ensuring that the block section is clear, the axle counter shall be reset by cooperative effort between the Station Master on duty of the sending end and the receiving station. The counter reading on the reset box shall increase by one on every operation of the reset button.
- (ii) Register for recoding the reset operations:- A register with the following proforma is to be maintained for this purpose at all stations by Station Master on duty. The Station Master on duty at both sending and receiving end shall ensure that each and every operation of the reset button is properly recorded in the above register indicating the movement before and after the operation of the reset button. Each axle counter shall have individual proforma.

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S.N.	Date	Train	Train	Counter Re	eading	Resetting	First train	Sign	Remarks
		no.	no.			time	passed after	of	
		after	piloted	Before	After		normalization	SM	
		which	after	Resetting	Resetting		of axle	on	
		axle	failure				counter	duty	
		counter	of axle						
		failed	counter						
1	2	3	4	5	6	7	8	9	10

(6) Resetting of Axle Counter by Station Master on duty.-

(i) The receiving end Station Master of the train shall inform the Station Master of the train despatching end under exchange of private number about the complete arrival of the train after passage of which the axle counter has failed. The Station Master of the train despatching end shall then insert the reset key, turn and press the key alongwith reset button of the reset box. By this action, miniature preparatory Green indication shall glow on the reset box provided at the Station Master of the train receiving end. After observing the miniature Green indication, the Station Master at the train receiving end shall insert the reset key, press the key alongwith reset button. With this action, the miniature Green indication will appear on the reset box provided at the train receiving end station also.

(ii) The first train shall be despatched as per the extent rules by issue of paper line clear ticket. After the train is received at the receiving end station and cleared the portion monitored by axle counter, the Green indication will appear in the reset box at both the ends and the normal working of axle counter gets restored.

(7) Action to be taken when the axle counter can not be reset:-

(i) After complete arrival of train if the Green indication does not appear on the reset box the matter shall be reported to ESM of the section through telephonically and a written memo.

(ii) ESM shall rectify the failure of the axle counter after submission and acceptance of the disconnection memo.

(iii) During the failure of the axle counter the trains shall continue to be despatched on paper line clear ticket and no cognizance of the indication of the reset box shall be taken.

(iv) After rectification of the axle counter failure the ESM shall inform the Station Master on duty by giving a written message. The Station Master on duty alongwith coopration of the Station Master on duty of the train receiving station shall reset the axle counter as per the procedure given above at para 6 (i). After proper normalization of axle counter normal working shall be resumed.

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4.10 BLOCK PROVING BY AXLE COUNTER (BPAC) USING UFSBI :-



1. Brief System Description & Working:

The Block Panel work in Absolute Block system incorporating Block Proving by Axle Counter to control the movement of trains from one block station to another in a fixed direction. These working instructions are in conjunction with G & SR of Indian Railway. These working instructions do not supersede any rule laid down in G & SR.

Principle of working

- (a) The trains are worked on Absolute Block system.
- (b) Each block section is provided with an Axle Counter to verify the occupation or clearance of block section and indicated on Block Panel.
- (c) It is not possible to obtain Last Stop Signal to 'OFF' unless LINE CLEAR has been obtained from the station in advance.
- (d) It is not possible to take LINE CLEAR unless block section and an adequate distance beyond first stop signal of station in advance is clear of trains.
- (e) The Last Stop Signal assumes 'ON' aspect automatically on entry of train into block section and when so replaced, is maintained in its 'ON' position, till a fresh LINE CLEAR is obtained on block panel.
- (f) Block section show automatically Train on Line on panel when train enters into the block section on line clear.
- (g) Train entry/exit buzzer, to/ from block section are provided and to be acknowledged.
- (h) Block section automatically closes on complete arrival of train at the receiving station.
- (i) A control to prevent the station in rear to take LINE CLEAR on its Block Panel without taking consent of receiving station.
- (j) A control to cancel the LINE CLEAR, already taken by station in rear.
- (k) It is possible to close the block section only, if no trains have entered the Block Section for at least 120 seconds after application of cancellation with co-operation from station in rear
- 2. Description of Block Panel for Single line-
- (i) SM's Block Panel is provided with following KEYS for various functions.

SM key	SM/ASM/Switchman's control key. The key when out prevents the following operations:
	a) Transmission of BELL code
	b) Transmission of IS LINE
	CLEAR enquiry request
	c) Cancellation of LINE CLEAR

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Shunt Release Key	(1 + D + I) = I = (1 + O I)
Shunt Release Rey	Shunt Release Key (normally OUT).
	The following operation is possible
	when IN,
	a) To take out SHUNT KEY from electric key transmitter (EKT), which serves as tangible authority for Driver to shunt beyond Last Stop Signal up to First Stop Signal.
	b) The following operations are not
	possible when IN;
	(i) To take LINE CLEAR.
	(ii) Other side station to take LINE
	CLEAR.
	(iii) Closing of block.
	(iv)To take Last Stop Signal to "OFF".
SM's Back Cover lock Key	To open or lock the back cover by SM/ASM/Switchman, when required by signal staff for maintenance or repairs.
Maintainer Back cover lock key	To open or lock the back cover by authorized signal staff, for maintenance or repairs, provided SM's back cover lock key.

(ii) SM's Block Panel is provided with following *PUSH BUTTONS* (nonlocking type) & COUNTERS

BELL button (Black in colour)	• To transmit BELL codes to station
	at other end of Block section.
	• To take LINE CLEAR, when
	pressed along with TRAIN
	GOING TO button.
	To cancel LINE CLEAR,
	when pressed along with
	CANCEL button.

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TRAIN GOING TO Button (Red in colour)	To transmit IS LINE CLEAR enquiry to station in advance for taking LINE CLEAR. It is used in conjunction with BELL button at train sending station to light up TRAIN COMING FROM (GREEN) indication on Block Panel of receiving station, which in turn automatically grants LINE CLEAR to light up and TRAIN GOING TO (GREEN) indication on Block Panel of sending station.	
ACKN button (Black in Colour)	To mute the SECTION buzzer on occupation or clearance of block section.	
Cancel Co-op Button (Green in colour)	To give co-operation from sending station to cancel the line clear at receiving station.	
CANCEL Button (Yellow in colour)	 It is used in conjunction with BELL button at train receiving Station under following conditions: a) There is no Train in the block section and Line clear cancellation needs to be done. b) Complete train has been pushed back at train sending station. 	
Cancellation Counter	To register cancellation of line clear.	

(iii) Description of Indicators:-

SM's Block Panel is provided with following illuminated indications-

LINE CLOSED	Circular indications (Two Numbers) in
Indication	between the directional arrowhead.
YELLOW	To indicate Block Section free from
	vehicles and LINE CLEAR not granted
	/ received at train receiving /train
	sending station respectively.

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TRAIN COMING	In a directional arrowhead pointing
FROM Indication	downward for incoming traffic at train
	receiving station and a rectangular
	indication named TCF
a) GREEN	To indicate LINE CLEAR granted, when
	TRAIN GOING TO Button and BELL
	button have been pressed at sending
	station and the conditions for the
	granting of LINE CLEAR at receiving
	station have been complied with.
	To indicate:
	(a) Block section clear after arrival of
	train, but associated Signals and their
	controls are not normal at either station
	or the LCB Key is OUT.
b) FLASHING	(b) Cancellation of LINE CLEAR before
GREEN	entry of train in Block Section.
	(c) Block section clear after arrival of
	train, associated signals and their
	controls at normal at both stations but
	after unintentional insertion of Shunt
	Release Key "IN" when the train was in
	section
TOL indication	In a directional arrowhead pointing
	downward and a rectangular indication
	for incoming train at receiving station.
RED	To indicate TRAIN ON LINE on entry
	of incoming train on LINE CLEAR.
IKAIN GUING IU	
	in a directional arrownead pointing
Indication	upward for outgoing traffic at train
	upward for outgoing traffic at train sending station and a rectangular
a) CDFFN	upward for outgoing traffic at train sending station and a rectangular indication named TGT
a) GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL
a) GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending
a) GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the
a) GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with
a) GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with at both stations.
a) GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with at both stations. To indicate:
a) GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with at both stations. To indicate: (a) Block section clear after arrival of
a) GREEN b) FLASHING	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with at both stations. To indicate: (a) Block section clear after arrival of train, but associated Signals and their
a) GREEN b) FLASHING GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with at both stations. To indicate: (a) Block section clear after arrival of train, but associated Signals and their controls are not normal at either station
a) GREEN b) FLASHING GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with at both stations. To indicate: (a) Block section clear after arrival of train, but associated Signals and their controls are not normal at either station or the LCB Key is OUT at receiving
a) GREEN b) FLASHING GREEN	upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with at both stations. To indicate: (a) Block section clear after arrival of train, but associated Signals and their controls are not normal at either station or the LCB Key is OUT at receiving station.
a) GREEN b) FLASHING GREEN	 In a directional arrownead pointing upward for outgoing traffic at train sending station and a rectangular indication named TGT To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at sending station and the conditions for taking the LINE CLEAR have been complied with at both stations. To indicate: (a) Block section clear after arrival of train, but associated Signals and their controls are not normal at either station or the LCB Key is OUT at receiving station. (b) Cancellation of LINE CLEAR before

TOL indication	In a directional arrowhead pointing upward and rectangular indication for outgoing traffic at the train sending station.
RED	To indicate TRAIN ON LINE on entry of outgoing train on LINE CLEAR.
Cancel CO–OP indication YELLOW	Indication to indicate co-operation extended by station at other end for cancellation of line clear by pressing Cancel Cooperation button.
CANCEL indication FLASHING YELLOW	Circular LED. To indicate progress of LINE CLEAR cancellation timer of 120 seconds. The indication lights up on pressing of CANCEL Button along with BELL button when, TRAIN COMING FROM displays with FLASHING GREEN indication.
SNK Indications YELLOW	Two such indications are provided. i) SNK: Yellow indication provided near TRAIN GOING TO directional arrowhead to indicate LAST STOP SIGNAL and its controls at ON / Normal.
SNOEK (SNK other end) YELLOW	 i) Provided near TRAIN COMING FROM directional arrowhead to Indicate LAST STOP SIGNAL, Reception Signals and its controls at the station in rear are at ON / Normal. ii) Shunt Key of EKT at the other station is "IN"
Last Stop Signal (LSS)	Circular in monogram of signal.
RED	To indicate Last Stop Signal is at 'ON' To
GREEN	Indicate Last Stop Signal is at 'OFF'
LINE FREEindication GREEN	An indication is provided near the arrowhead indication to show Block Section is clear of vehicle.
LINE OCCUPIED indication RED	An indication is provided near the arrowhead indication to show Block Section is occupied.
ACKN indication YELLOW	An Indication near ACKN button. To indicate SECTION buzzer ON status

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SINGLE LINE ELECTRICAL BLOCK INSTRUMENTS 75(7)

SM KEY `IN'	Indication near SM KEY.
indication GREEN	To indicate SM key "IN'.
SHUNT Indication REDGREEN	To indicate Shunt Key of EKT is "OUT" To indicate Shunt Key of EKT is "IN"
UFSBI/MUX OK indication	GREEN when MUX is OK otherwise extinguished.
UFSBI/MUX FAIL indication	RED when MUX goes into a failure mode otherwise extinguished.
Communication LINK FAIL indication	Steady YELLOW when LINK FAILS else flickering.

3. Method of Signalling Trains from Block Station to Block Station

- (a) SM of the station intending to send a train from his station has to obtain verbal consent from station at other end before taking LINE CLEAR on its Block Panel.
- (b) Before a request for IS LINE CLEAR is sent to station at other end, SM shall ensure the following on its Block Panel:
- (i) LINE CLOSED indication YELLOW &
- (ii) LINE FREE indication GREEN &
- (iii) SNK indication YELLOW &
- (iv) SNOEK indication YELLOW &
- (v) SHUNT KEY indication GREEN

SINGLE LINE ELECTRICAL BLOCK INSTRUMENTS 75(8)

- (c) The station at other end while granting his consent shall ensure the following on its Block Panel;
- (i) LINE CLOSED indication YELLOW &
- (ii) LINE FREE indication GREEN &
- (iii) SNK indication YELLOW &
- (iv) SNOEK indication YELLOW &
- (v) SHUNT KEY indication GREEN
- (d) There after SM of sending station presses BELL & TRAIN GOING TO buttons.
- (e) The directional arrowhead, TRAIN GOING TO/ TRAIN COMING FROM lights upgreen at sending/receiving station respectively.
- (f) SM of sending station releases BELL & TRAIN GOING TO buttons on getting TRAIN GOING TO green indication.
- (g) The sending station SM, after obtaining LINE CLEAR on its Block Panel, can send a train into Block Section by taking the LSS to 'OFF'. On entry of train into section, TRAIN ON LINE lights up at both the stations near arrowhead indication. The TRAIN GOING TO / TRAIN COMING FROM Arrow Head Indications turns RED in respective stations. SECTION buzzer sounds at both the stations along with ACKN indicator near ACKN button. Pressing of ACKN will turn off the buzzer and ACKN indicator.
- (h) The train is received at receiving station on proper reception signals. On complete arrival of train, TRAIN COMING FROM indicator changes to FLASHING GREEN & LINE FREE indicator turns to GREEN at both the stations. TRAIN GOING TO /TRAIN COMING FROM indicator continues FLASHING GREEN at sending / receiving station respectively if reception & departure signals and their controls are not at normal or SHUNT KEY of EKT is `OUT'. In case reception & departure signals and their controls are at normal & SHUNT KEY of EKT is `IN' at sending/receiving station, TRAIN GOING TO/ TRAIN COMING FROM turns off and LINE CLOSED indicator lights up YELLOW.

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4. Sequence of operations of signalling a train between two stations-

If the block section is clear and the 'LINE CLOSED' indication is displayed on Block Panel at both the stations, the action is taken by the sending station SM as under:

SENDING STATION	RECEIVING STATION
1. SM ensures LINE CLOSED indicationYELLOW, SNK indicationYELLOW, SNOEK indication YELLOW, LINE FREE indication GREEN	2.
SM inserts SM key & turns to IN.a) SM sends 'Call Attention' signal to receiving station by pressing BELL button.	SM inserts SM key & turns to IN (a) SM acknowledges the 'Call Attention' signal by pressing BELL button.
3. SM sends 'Attend Telephone' signal by pressing BELL button.	4. SM acknowledges by pressing BELL button and attends telephone.
5. SM attends telephone and advises station at other end about the intended movement of the train on telephone & asks for LINE CLEAR after prescribed BELL code.	6. (a) Exchanges information regarding train movement and ensures LINE CLOSE indication YELLOW SNK indication YELLOW, SNOEK indication YELLOW, LINE FREE indication GREEN & SHUNT KEY indication GREEN & (b) Grants verbal LINE CLEAR.
 7. SM presses BELL & TRAIN GOING TO buttons until 'TRAIN GOING TO' arrowhead indication lights up GREEN. (If aforesaid indicator does not appear after 3 seconds (approx.) of pressing the buttons, SM releases the buttons 	8. 'LINE CLOSED' indicator turns off and 'TRAIN COMING FROM' arrow head indication
and rechecks conditions at his station and asks station at other end to recheck the conditions for grant of LINE CLEAR.)	

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9. 'LINE CLOSED' indicator turns off.	
'TRAIN GOING TO' arrow head	
indication lights up GREEN. Releases	
BELL & TRAIN GOING TO buttons.	
10. Takes LSS to `OFF'.	
Train enters the Block Section.	
LSS replaces to 'ON'.	
LINE OCCUPIED indicator turns to	11. LINE OCCUPIED indicator turns
RED.	to RED.
SECTION buzzer starts ringing &	
'TRAIN GOING TO' arrowhead	SECTION buzzer starts ringing &
indication turns RED. ACKN indicator	'TRAIN COMING FROM'
lights up.	arrowhead indication turns RED.
	ACKN indicator lights up.
Acknowledges the buzzer by	Acknowledges the buzzer by pressing
pressing ACKN button. ACKN	ACKN button. ACKN indicator turns
indicator turns off.	off.
Puts back the LSS controls to	
Normal.	SNOEK lights up YELLOW
Ensures SNK lights up YELLOW.	Takes reception signal OFF to
	Train passes Home Signal. Home Signal
	replaces to `ON'.
	Train clears the Block Section.
13. SECTION buzzer starts ringing.	12. SECTION buzzer starts ringing.
ACKN indicator lights up.	ACKN indicator light up & LINE FREE
LINE FREE indicator turns to GREEN	indicator turns to GREEN. 'TRAIN
IKAIN GUING IU' arrowhead	CUMING FROM arrowhead indication
Acknowledges the buzzer by pressing	unis to reasting oreen.
ACKN button. ACKN indicator turns	Acknowledges the buzzer by
off.	pressing ACKN button.
	ACKN indicator turns off.

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15. SNOEK lights up yellow.	14. Replaces all controls pertaining to reception of train to Normal.
'TRAIN GOING TO' arrow head	SNK lights up YELLOW.
indication turns off.	`TRAIN COMING FROM' arrow
'LINE CLOSED' indicator lights up.	head indication turns off.
	'LINE CLOSED' Indicator lights up.

5. Refusal to 'Line Clear Enquiry'

When a block section is blocked by the presence of a train in the section or train parting or shunting or opening of level crossing in mid section or for any other reason, the SHUNT key of EKT shall be taken out and kept in safe custody.

If the block station at other end refuses the IS LINE CLEAR enquiry signal, no train shall be allowed to leave until a fresh IS LINE CLEAR enquiry signal has been given to block station at other end and accepted.

On removal of obstruction, the Shunt Key of EKT shall be inserted and turned to IN position and the Shunt Release Key should be taken OUT. SM shall immediately inform SM of other end about the fact, so as to enable him to send a fresh IS LINE CLEAR signal.

6. Closing of Block after a "Push Back" operation

After a train has been pushed back at the sending station, the sending station advises the receiving station. The receiving station can close the section by pressing BELL and CANCEL button after getting co-operation from the other end station.

SENDING STATION	RECEIVING STATION
1. Train clears the Block Section.	2. Train clears the Block Section.
LINE FREE indicator turns GREEN.	LINE FREE indicator turns GREEN.
SECTION buzzer starts ringing.	SECTION buzzer starts ringing.
ACKN indicator lights up.	ACKN indicator lights up.
'TRAIN GOING TO' arrow head	'TRAIN COMING FROM' arrow
indication turns to FLASHING	head indication turns to FLASHING
GREEN.	GREEN.
Acknowledges the buzzer by pressing	Acknowledges the buzzer by pressing
ACKN button. ACKN indicator turns	ACKN button. ACKN indicator turns
off.	off.
3. Advises receiving end station SM	4. Agrees to request, ensures SNK
about cancellation on telephone after	indicator YELLOW, SNOEK
prescribed BELL code.	indicator YELLOW, SHUNT KEY
	indicator GREEN and
	Gives consent on telephone after
	prescribed BELL code

7. Method of "Push back" operation

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5. After verbal consent from other end	6.
SM Ensure SNK indication YELLOW,	
SNOEK indication YELLOW, SHUNT	
KEY indication GREEN	
Presses CANCEL CO-OP button and	
releases on receipt of BELL code.	CO-OP to light up YELLOW.
	Presses BELL & CANCEL button with
	SM key IN.
	CANCEL COUNTER increments.
	CANCEL indication lights up
	FLASHING YELLOW & continues
	flashing for 120 seconds
8. TRAIN GOING TO arrow head	7. On expiry of 120 seconds,
indication turns off.	TRAIN COMING FROM arrowhead
	indication and CANCEL indication turns
	off.
LINE CLOSED indication lights up.	'LINE CLOSED' indication lights up.

8. Block Back/Block Forward Operation

The SM, who intends to Block Back the line, shall inform the SM of station at other end on telephone for permission to Block Back, who will acknowledge the message and grant permission supported by a private number. SM takes SHUNT key of EKT OUT and keeps in safe custody. The SM will then issue necessary authority to driver of train to perform shunting in Block Section.

On completion of shunting, section clear message will be sent to SM of station at other end on telephone about obstruction removed supported by a private number, who in turn will acknowledge the same supported by a private number. Thereafter SM will insert SHUNT key of EKT and turn to `IN' position and takes out the shunt release key.

All the entries in Train Signal Register (TSR) for this operation should be make in RED ink. The reasons for Block Back shall be recorded in remarks column against each entry.

Station in rear	Station intending BLOCK BACK/
	Block Forward
2. Block Panel displays;	1. Block Panel displays;
LINE CLOSED – YELLOW	LINE CLOSED – YELLOW
LINE FREE – GREEN	LINE FREE – GREEN
SNOEK – YELLOW	SNOEK – YELLOW
SHUNT KEY - GREEN	SHUNT KEY – GREEN

SINGLE LINE ELECTRICAL BLOCK INSTRUMENTS 75(13)

4. Acknowledges call attention/	3. Inserts SM key & turns, Gives call
attend telephone signal.	attention / attend telephone signal.
6. Attends telephone.	5. Attends telephone.
8. Acknowledges & gives consent by	7. Inform intention to perform
private number.	shunting in Block Section.
10. SNOEK turns off.	9. Takes Shunt Key 'OUT' from EKT and keeps in safe custody. Issue necessary authority to driver of train to perform shunting in Block Section. SHUNT KEY indication turns to RED.
12. On entry of train in Block Section, SECTION buzzer starts ringing & ACKN indication lights up.	11. On entry of train in Block Section, SECTION buzzer starts ringing & ACKN indication lights up.
LINE OCCUPIED indication turns to RED.	LINE OCCUPIED indication turns to RED.
LINE CLOSED indication turns off.	LINE CLOSED indication turns off.
Acknowledges the buzzer pressing ACKN button.	Acknowledges the buzzer by pressing ACKN button.
ACKN indication turns off.	ACKN indication turns off.
14. On clearing of Block Section. SECTION buzzer starts ringing & LINE CLOSED indication lights up. ACKN indication lights up.	13. On clearing of Block Section. SECTION buzzer starts ringing & LINE CLOSED indication lights up. ACKN indication lights up.
LINE FREE indication turns to GREEN. LINE CLOSED indication lights up YELLOW.	LINE FREE indicator turns to GREEN. LINE CLOSED indication lights up YELLOW.
Acknowledges the buzzer by pressing ACKN button. ACKN indication turns	Acknowledges the buzzer by pressing
off.	off.
off. 16. Acknowledges call attention/attend telephone signal.	ACKN button. ACKN indication turns off. 15. On completion of shunting, SM verifies the line between opposite STARTER (if any)/ Shunt signal or Stop Board/ Fouling mark and FSS, free from any vehicle. Inserts SM key & turns, Gives call attention / attend telephone signal.

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20. Acknowledges supported by a	19. Inform shunting is completed
private number.	supported by a private number.
22. SNOEK lights up YELLOW.	21. Inserts SHUNT KEY of EKT &
	turns to `IN'.
	SHUNT KEY indication turns to
	GREEN.

9. Shunting of train

Where shunt signals are not provided for shunting on line leading towards Block section, the driver of shunting train shall be given shunting order at the foot of STARTER SIGNAL /STOP BOARD/FOULING MARK before allowing any shunting.

While shunting, the LAST STOP SIGNAL should be kept at ON.

- (a) A shunting key can be extracted under the following conditions :-
 - (i) 'Line Closed'
 - (ii) 'Train Going To'
 - (iii) 'Train on Line with Train Going To'
- (b) Shunting Key cannot be extracted from the Block Instrument when it is in 'Train Coming From' condition. The extraction of the shunting key will make the Block Instrument inoperative except that :-
 - (i) Transmission and reception of bell signals are possible.
 - (ii) Telephonic conversation is possible.
 - (iii) Reception of 'Train on Line' code and appearance of 'Train on Line' indicator are possible.

However, the conditions established prior to extraction of the key will continue to remain and, therefore, the shunting key also functions as emergency key.

Shunting of Train up to Last Stop Signal-

SHUNT KEY of EKT shall be taken OUT and kept in safe custody. The driver of shunting train shall be given shunting order to shunt up to LSS. On completion of shunting, the line between STARTER/ Shunt Signal/ Stop Board/ Fouling mark and LSS should be checked free from any vehicle. SHUNT KEY of EKT shall be inserted and turned to IN position.

When an IS LINE CLEAR enquiry is received from Block Station at other end of block section, permission for shunting up to LSS shall be granted only after compliance of GR 8.09 & 8.10 and as permitted by <u>Station Working Rules</u> (SWR).

Shunting of Train Beyond Last Stop Signal-

The shunting is done under protection of Block Back/Block Forward only.

FAILURE OF COMMUNICATIONS ON SINGLE LINE

CHAPTER V

FAILURE OF COMMUNICATIONS ON SINGLE LINE

5.01 Failure of Block Instruments.—

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Single line Block Instruments shall be considered to have failed or been rendered inoperative when:-

[A] General - Applicable to all instruments.—

- (i) Bell Codes on the bell are received indistinctly or fail altogether.
- (ii) The Station Master's control key is lost or the lock becomes defective.
- (iii) The Block Instrument or battery almirah for the Block Instrument is found unlocked or improperly locked or unsealed or improperly sealed.

Note: If it is found unsealed, steps should be taken to have it sealed as soon as possible.

- (iv) When a Government Telegraph /S& T /Rail Tel party is working on line, the Block Instrument should not be used till then.
- (v) If a train arrives at a station with the Block Instrument in 'Line Closed' condition.
- (vi) There are indications which may lead Station Master to believe that there is contact between block and other circuits.
- (vii) When any other damage or defect to the Block Instrument or its accessories, likely to endanger safety, is noticed.

[B] Applicable to Tyer's Tablet Block Instrument .---

- (i) When the signals on the Bell are received indistinctly or fail altogether.
- (ii) When a Tablet cannot be removed from the Block Instrument after proper signals have been exchanged.
- (iii) When a Tablet can be removed from the Block Instrument without the proper bell signals being exchanged.
- (iv) When the Lower Slide can be withdrawn to its full extent and a Tablet can be extracted when it ought only to come out halfway.
- (v) When the Lower Slide can only be withdrawn halfway, when it ought to come out to its full extent.
- (vi) When a Tablet is damaged so that it cannot be put into the proper Block Instrument, or can be put into the wrong Block Instrument.
- (vii) When a Tablet belonging to the Section has been over carried to another station.
- (viii) When a Tablet has been lost.
- (ix) When there is reason to believe that there is a contact between the block and any other circuit.
- (x) When the Tablet of an incoming train has been wrongly given to the Driver of an outgoing train proceeding over the Section to which the Tablet applies without clearing the Section and obtaining a fresh Tablet.

Note: The failures described in sub-paras (i), (iii) and (iv) may be considered indications that there is contact between the Block and some other Circuit.

Tyer's Tablet Block Instrument shall be suspended in the following conditions-

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- (a) When telegraph party is working on line.
- (b) When Block Instrument is taken by SSE/SE/JE(Signal) for maintenance.
- (c) When side door is found open.

[C] Applicable to Neales' Ball /Tablet Token Block Instrument.—

- (i) The Galvanometer needle/needles remain stationary while bell codes are being exchanged.
- (ii) The deflections of the Galvanometer needle/needles do not correspond to the positions of the block handle viz.
- (a) with needles of both Block Instruments in normal position the pressing of plunger at either end does not deflect both needles to the right.
- (b) with either handle turned to 'Train Going To' or 'Train Coming From' positions, the pressing of plunger of that Block Instrument does not deflect both needles to the left, or
- (c) if token/tablet has been deposited into either Block Instrument, the pressing of the plunger of that Block Instrument does not deflect both needles to the right or either Block Instrument can not be restored to the 'Line Closed' position.
- (iii) Permanent deflections or oscillations of the Galvanometer needle/needles or bell beats are noticed without the plunger at either end being pressed.
- (iv) No token/tablet is left in the Block Instrument at the station from which a train is ready to start.

Note:- In case all the tokens/tablets have exhausted in any one of the Block Instruments, such Block Instrument shall not be considered to have failed in respect of an approaching train as even though the tokens/tablets have exhausted, it is possible to operate the handle to the right i.e. from 'Line Closed' to the 'Train Coming From' position and thus give line clear to the remote and for an approaching train.

However, in the case of a train leaving from that end, where the tokens/tablets have exhausted, the Block Instrument shall be suspended by the Station Master and train worked on Paper Line Clear Ticket, but on receipt of a token/tablet, the Block Instrument will be again restored and normal working resumed by the Station Master without waiting for the SSE/SE/JE(Signal).

This does not, however, absolve the Station Master of his responsibility in intimating the sectional SSE/SE/JE(Signal) well in advance, as stated in para 4.04(5), for transferring the tokens/tablets.

While suspending and resuming that Block Instrument on account of the above, the message will be addressed to all concerned but this does not constitute a technical failure.

(v) The token/tablet is, in any way, damaged.

Note : Such a token/tablet, when obtained, may be utilised for working the train for which it was obtained, but must not be deposited into any token/tablet Block Instrument and S & T official as well as the Station Master in advance must be informed.

- (vi) The token/tablet jams the Block Instrument on being put back into the Block Instrument.
- (vii) A train arrives at a station without a token/tablet or with the token/tablet not referring to the block section over which the train has immediately passed, or with a token/tablet incorrectly obtained.
- (viii) A token/tablet is lost.

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(ix)	The last stop signal control key is lost.
(x)	The last stop signal lock provided on the Block Instrument is defective in an way.
(xi)	Two tokens/tablets are obtained at one end the same time.
(xii)	The block handle cannot be turned from one position to the next in spite of the correct beats and proper deflection of the Galvanometer needle.
(xiii)	No token/tablet is delivered on turning the block handle to 'Train Going To position though there are tokens/tablets left in the Block Instrument.
(xiv)	The Station Master's control lock on the token/tablet depositing drum/slide i defective.
(xv)	The block handle can be turned from one position to another without the co-operation of the Station Master on duty at the other end of the block section.
(xvi)	The block handles of the Block Instruments at both the stations ge simultaneously operated to 'Train Going To' or 'Train Coming From' positions.
[D] A	pplicable to tokenless Block Instrument handle type (Kyosan/Daido).—
(i)	The Galvanometer needle/needles remain stationary while bell codes are being exchanged.
(ii)	Permanent deflections or oscillations of the Galvanometer needle/needles or bell beats are noticed without the plunger at either end being pressed.
(iii)	The buzzer does not sound for the appropriate condition or sounds when it should not.
(iv)	Proper indication fails to appear on the Block Instrument.
(v)	'Free' indication fails to appear or counter fails to register next higher number.
(vi)	The position of the handle of the Block Instrument can be changed with the shunting key taken out.
(vii)	Shunting occupation key gets lost or the lock becomes defective.
(viii)	The last stop signal does not automatically go back to 'ON' after entry of train in the block section.
(ix)	The last stop signal comes 'OFF' without handle being in 'Train Going To position.
(x)	Last Stop Signal fails to come 'OFF' although block handle is in 'Train Going To' position.
(xi)	Home signal does not automatically go back to 'ON' after the train has passed inside it.
(xii)	Block handle gets locked in any particular position i.e. 'Line Closed', 'Train Coming From' or 'Train Going To' inspite of PB 1 and PB 2 push buttons having been pressed by the station at the other end of the block section.
(xiii)	The block handle can be turned from one position to another without th co-operation of the Station Master on duty at the other end of the block section.
(xiv)	Block handles of Block Instruments at both the stations get simultaneously operated to 'Train Going To' or 'Train Coming From' position.
()	