

EAST CENTRAL RAILWAY

**CORRECTION SLIP No. 01**

**( BLOCK WORKING MANUAL BOOK -2010 )**

“Rules for working of Block Panel Provided with Axle Counter on SINGLE LINE” is hereby added as **APPENDIX–D** (16 pages) to Block Working Manual of East Central Railway, Edition-2010. This shall be brought to the notice of all the officials concerned for immediate implementation.

Sd/-

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## APPENDIX-D

### **Rules for working of Block Panel Provided with Axle Counter on Single Line**

**1. Introduction:** This type of Block Panel is in use on East Central Railway where single line working is in force. These instructions will be applicable only at those stations where Neales's Token Instrument or Push Button Type Instrument or Frequency Modulated Tokenless (Diado/Kyosan) type Tokenless Block Instruments are not provided in lieu, Block panels are installed. The instrument is Non-Cooperative type in which Line Clear is taken by the train sending station after consent of Line Clear giving station under exchange of Private No. and instrument itself certify the Line Clear granting conditions if all conditions are complied with. These working instruction should be read in conjunction with General and Subsidiary Rules enforced on E.C. Railway.

**2. Block Panel for Single Line:**

The Block Panel means a panel associated with Universal Fail Safe Block Interface, Single Section Digital Axle Counter, Block Telephone & other equipment to control the movement of trains on single line block section from one block station to another in a fixed direction under the Absolute Block Working where single line working is in force. The panel works are based on the following principle:-

- i. The trains are worked on the Absolute Block System.
- ii. The block section is provided with an axle counter to verify the occupation or clearance of block section and indicated to block panel.
- iii. It is not possible to take the Last Stop Signal to 'off' unless Line Clear has been obtained from the other end station.
- iv. It is not possible to obtain Line Clear unless block section and an adequate distance beyond first stop signal at the train receiving is clear of trains.
- v. The Last Stop Signal assumes 'ON' aspect automatically on entry of trains in to block section and when so replaced, is maintained in its 'ON' position, till a fresh Line Clear is obtained on block panel.
- vi. Block Panel show automatically '**TRAIN ON LINE**' when train enters into the block section on line clear.
- vii. Train entry/exit buzzer to/from block section are provided and to be acknowledged.
- viii. Block section automatically closes on complete arrival of train at the receiving station.
- ix. A control to prevent the station in rear to take Line Clear on its Block Panel without taking consent of receiving station.
- x. A control to cancel the Line Clear, already taken by station in rear.
- xi. It is possible to close the block section only, if no train has entered the block section, at least 120 seconds of application of cancellation with a co-operation from station in rear.

**3. Description of Block Panel for Single Line:**

**3.1 Schematic Sketch:**

The Schematic sketch of the Block Panel for Single line arrangement in a station for one side in one direction is as follows:-

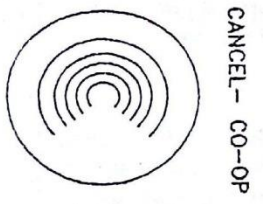
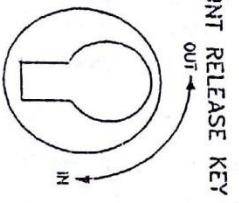
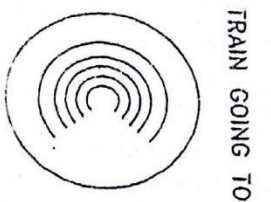
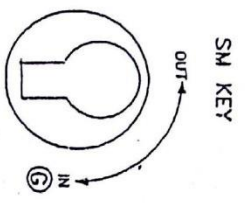
NAME OF STATION

TRAIN GOING TO

SNK	<input type="checkbox"/> Y	T G T	R/g	T O L	LSS ③ ④ ⑤ ⑥
SHK IN	G				
SHK OUT	R				
LINE (Y) CLOSED					
SNOEK	<input type="checkbox"/> Y				CANCEL ④ ⑤
LINE FREE/OCCUPIED	G R	T C F	R/g	T O L	CO-O-P ③ ④

TRAIN COMING FROM

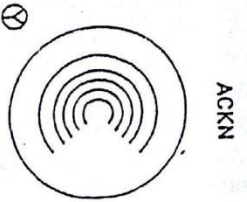
MUXUFSBI STATUS	OK ③ ④	FAIL ④ ⑤
COMMUNICATION LINK FAIL	④ ⑤	



CANCEL COUNTER

0	0	0	0	0	0
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CANCEL



0-132

**3.2 Indications on Block Panel: SM's Block Panel for Single Line is provided with following illuminated indications:**

3.2.01	LINE CLOSED INDICATION	Circular indications (Two Numbers) in 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.
3.2.02	TRAIN COMING FROM INDICATION	In a directional arrowhead pointing 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 train sending station and the conditions for the granting of LINE CLEAR at receiving station have been complied with and a rectangular indication named TCF lights up GREEN.
	b) RED	To indicate TRAIN ON LINE on entry of incoming train on LINE CLEAR and a rectangular indication named TOL lights up RED.
	c) FLASHING GREEN	To indicate: a) Block section clear after arrival of train, but associated Signals and their controls are not normal at either station. b) Cancellation of LINE CLEAR before 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.
3.2.03	TRAIN GOING TO INDICATION	In a directional arrowhead pointing upward for outgoing traffic at train sending station and a rectangular indication named TGT.
	a) GREEN	To indicate LINE CLEAR granted, when TRAIN GOING TO Button and BELL button have been pressed at train sending station and the conditions for taking the LINE CLEAR have been complied with at both stations and a rectangular indication named TGT lights up GREEN.
	b) RED	To indicate TRAIN ON LINE on entry of outgoing train on LINE CLEAR and a rectangular indication named TOL lights up RED.
	c) FLASHING GREEN	To indicate: a) Block section clear after arrival of train, but associated Signals and their controls are not normal at either station or both stations i.e. SNK off or Shunt key indication 'RED'. b) Cancellation of LINE CLEAR before entry of train in Block Section.
3.2.04	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.

3.2.05	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.
3.2.06	SNK INDICATIONS YELLOW	One such indication is provided. i) SNK: Yellow indication provided near TRAIN GOING TO directional arrowhead to indicate LAST STOP SIGNAL, Reception signal(s) and its controls at ON / Normal.
3.02.07	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"
3.2.08	Last STOP SIGNAL (LSS)	Circular in monogram of signal.
	RED	To indicate Last Stop Signal is at 'ON'
	GREEN	To indicate Last Stop Signal is at 'OFF'
3.2.09	LINE FREE INDICATION GREEN	An indication is provided near the arrowhead indication to indicate Block Section is clear of vehicles.
3.2.10	LINE OCCUPIED INDICATION	An indication is provided near the arrowhead indication to indicate Block Section is occupied.
	RED	An Indication near ACKN button.
3.2.11	ACKN INDICATION YELLOW	To indicate SECTION buzzer ON status
3.2.12	SM KEY 'IN' INDICATION	Indication near SM KEY.
	GREEN	To indicate SM key "IN'.
3.2.13	SHUNT INDICATION	
	RED GREEN	To indicate Shunt Key of EKT is "OUT" To indicate Shunt Key of EKT is "IN"
3.2.14	UFSBI/MUX OK INDICATION	Glow GREEN when MUX is OK otherwise extinguished.
3.2.15	UFSBI/MUX FAIL INDICATION	Glow RED when MUX goes into a failure mode otherwise extinguished.
3.2.16	COMMUNICATION LINK FAIL INDICATION	Glow steady YELLOW when LINK FAILS else flickering.

**3.3** SM's Block Panel is provided with following keys for various functions which to be kept in custody of SM on duty except Maintainer Back Cover Lock Key which to be kept in custody of S&T staff. For opening back cover, entry will be required in prescribed register kept for the purpose with signature of both SM and S&T staff along with disconnection notice.

3.3.1	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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3.3.2	Shunt Release key	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".
3.3.3	SM's Back Cover lockKey	To open or lock the back cover by SM/ASM/Switchman, when required by signal staff for maintenance or repairs.
3.3.4	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.

#### 3.4 SM's Block Panel is provided with following PUSH BUTTONS (non-locking type) & COUNTERS

3.4.1	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.
3.4.2	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.
3.4.3	ACKN but ton (Black in colour)	One button is provided- • To silence the SECTION buzzer on occupation or clearance of block section.
3.4.4	Cancel Co-op Button (Green in colour)	To give co-operation from sending station to cancel the line clear at receiving station.
3.4.5	CANCEL Button (Yellow in colour)	To cancel the Line clear. 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.
3.4.6	Cancellation Counter	To register cancellation of line clear.

4. **Buzzers:** Separate buzzers (Continuous and Intermittent) are provided to register the **BELL CODE** sent by other end SM & to register the occupation and clearance of each Block Section. The buzzer for receive line is intermittent and for dispatch line is continuous type. Provision to silence the audio alarm by pressing an acknowledgement push button is provided. The Block buzzer works through block telephone line.
5. **Block Telephone:** This is provided for speech communication with SM at other end of Block Section. Separate block telephone is provided for separate block section.
6. **Method of working of Block Panel for Single Line for the train movements from one block Station to other block Station.**

Consider a train is going from one block station to adjacent block station in a particular direction i.e. UP or DOWN direction.

- 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
- 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) Thereafter SM of sending station presses BELL & TRAIN GOING TO buttons.
- e) The directional arrowhead, TRAIN GOING TO/ TRAIN COMING FROM lights up green at train sending/receiving station respectively.
- f) SM of train sending station releases BELL & TRAIN GOING TO buttons on getting TRAIN GOING TO green indication.
- g) The train 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.

**7. 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 to be taken by SM of sending station is as under:

	SENDING STATION		RECEIVING STATION
1	SM ensures LINE CLOSED indication YELLOW, SNK indication YELLOW, SNOEK indication YELLOW, LINE FREE indication GREEN  SM inserts SM key & turns to IN a) SM sends 'Call Attention' signal to receiving station by pressing BELL button.	2	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 CLOSED 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 and rechecks conditions at his station and asks station at other end to recheck the conditions for granting LINE CLEAR.]	8	'LINE CLOSED' indicator turns off and 'TRAIN COMING FROM' arrowhead indication lights up GREEN .
9	'LINE CLOSED' indicator turns off. 'TRAIN GOING TO' arrowhead 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 FREE indicator turns to RED. SECTION buzzer starts ringing & 'TRAIN GOING TO' arrowhead indication turns RED. ACKN indicator lights up.  Acknowledges the buzzer by pressing ACKN button. ACKN indicator turns off.	11	LINE FREE indicator turns to RED. SECTION buzzer starts ringing & 'TRAIN COMING FROM' arrowhead indication turns RED. ACKN indicator lights up. Acknowledges the buzzer by pressing ACKN button. ACKN



	<p>Puts back the LSS controls to Normal. Ensures SNK lights up YELLOW</p>		<p>indicator turns off. SNOEK lights up YELLOW</p> <p>Takes reception signal `OFF' to receive the train. Train passes Home Signal. Home Signal replaces to `ON'. Train clears the Block Section.</p>
13	<p>SECTION buzzer starts ringing. ACKN indicator lights up. LINE FREE indicator turns to GREEN `TRAIN GOING TO' arrowhead indication turns to FLASHING GREEN.</p> <p>Acknowledges the buzzer by pressing ACKN button. ACKN indicator turns off.</p>	12	<p>SECTION buzzer starts ringing. ACKN indicator light up &amp; LINE FREE indicator turns to GREEN. `TRAIN COMING FROM' arrowhead indication turns to FLASHING GREEN. Acknowledges the buzzer by pressing ACKN button. ACKN indicator turns off.</p>
15	<p>SNOEK lights up yellow. `TRAIN GOING TO' arrowhead indication turns off. `LINE CLOSED' indicator lights up.</p>	14	<p>Replaces all controls pertaining to reception of train to Normal. SNK lights up YELLOW. `TRAIN COMING FROM' arrowhead indication turns off. `LINE CLOSED' Indicator lights up.</p>

### 8. Refusal to 'Line Clear Enquiry'

- (i) 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.
- (ii) 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.
- (iii) 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.

### 9. 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 cooperation from the other end station.

### 10. Method of "Push back" operation

	SENDING STATION		RECEIVING STATION
1.	Train clears the Block Section. LINE FREE indicator turns GREEN. SECTION buzzer starts ringing. ACKN indicator lights up.	2.	Train clears the Block Section. LINE FREE indicator turns GREEN. SECTION buzzer starts ringing. ACKN indicator lights up.
	'TRAIN GOING TO' arrowhead indication turns to FLASHING GREEN.		'TRAIN COMING FROM' arrowhead indication turns to FLASHING GREEN.
	Acknowledges the buzzer by pressing ACKN button. ACKN indicator turns off.		Acknowledges the buzzer by pressing ACKN button. ACKN indicator turns off.
3.	Advises receiving end station SM about cancellation on telephone after prescribed BELL code.	4.	Agrees to request, ensures SNK indicator YELLOW, SNOEK indicator YELLOW, SHUNT KEY indicator GREEN and gives consent on telephone after prescribed BELL code
5.	After verbal consent from other end SM Ensure SNK indication YELLOW, SNOEK indication YELLOW, SHUNT KEY indication GREEN  Presses CANCEL CO-OP button and releases on receipt of BELL code.	6.	CO-OP button 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 arrowhead indication turns off.  'LINE CLOSED' indication lights up.	7.	On expiry of 120 seconds, TRAIN COMING FROM arrowhead indication and CANCEL indication turns off.  'LINE CLOSED' indication lights up.

### 11. Block Back Operation

The SM, who intends to Block Back the section, 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 Loco Pilot 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 made in RED ink. The reasons for Block Back shall be recorded in remarks column against each entry.

	<b>Station in Rear</b>		<b>Station intending BLOCK BACK</b>
2.	Block Panel displays; LINE CLOSED - YELLOW LINE FREE - GREEN SNOEK - YELLOW SHUNT KEY - GREEN	1.	Block Panel displays; LINE CLOSED - YELLOW LINE FREE - GREEN SNOEK - YELLOW SHUNT KEY – GREEN
4.	Acknowledges call attention / attend telephone signal.	3.	Inserts SM key & turns, Gives call attention / attend telephone signal.
6.	Attends telephone.	5.	Attends telephone.
8.	Acknowledges & gives consent by private number.	7.	Informs intention to perform shunting in Block Section.
10.	SNOEK turns off.	9.	Takes Shunt Key 'OUT' from EKT and keeps in safe custody. Issue necessary authority to Loco Pilot 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 FREE indication turns to RED.		LINE FREE indication turns to RED.
	LINE CLOSED indication turns off.		LINE CLOSED indication turns off.
	Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off.		Acknowledges the buzzer by pressing ACKN button. 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 off.		Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off.
16.	Acknowledges call attention/attend telephone signal.	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.
18.	Attends telephone.	17.	Attends telephone.
20.	Acknowledges supported by a private number.	19.	Informs shunting is completed 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.

## **12. Shunting of train**

Where shunt signals are not provided for shunting on line leading towards Block section, the Loco Pilot 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.

### **12.1 Shunting of Train up to Last Stop Signal**

SHUNT KEY of EKT shall be taken OUT and kept in safe custody. The Loco Pilot 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 and ensured 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 Station Working Rules (SWR).

### **12.2 Shunting behind a train**

Shunting behind a train should be performed with message to station at other end. SM shall take out SHUNT KEY of EKT after entry of train beyond LSS and hand over to Loco Pilot of shunting train along with shunting order.

On completion of shunting, Loco Pilot of shunting train hands over SHUNT KEY of EKT to SM. SM ensures clearance of line between STARTER/ Shunt Signal/Stop Board / Fouling mark and LSS from any vehicle. The message regarding completion of shunting shall be sent to station at other end.

SM inserts SHUNT KEY of EKT and turns to IN position.

In case train arrives at station at other end before completion of shunting, TRAIN GOING TO/ TRAIN COMING FROM arrowhead indication will remain at RED, till shunting train clears the section. During such period line shall be BLOCKED BACK as per procedure laid down in the Clause 11 above.

### **12.3 Shunting Of Train in face of an approaching Train**

Shunting in face of an approaching train, upto LSS, where permitted in SWR by special instructions, can be performed. The Loco Pilot 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 FIRST STOP SIGNAL should be checked and ensured free from any vehicle.

**12.4 (a) Shunting beyond LSS following a Train:** Not permitted.

**(b) Shunting beyond LSS in face of an approaching Train:** Not permitted.

## **13. UFSBI Alarm Panel Box**

The ASM'S (UFSBI) alarm panel box consists of the following components as ACKN Button for Single CPU Fails, ACKN Button for Redundant DC-DC & ACKN Button for system failure and their indications. The function of components and action of SM/ASM are as given below:

Sl. No.	Name of Components	Functions	Action to be Taken
1	ACKN Button for Single CPU fails	Press button to silence the buzzer if any one of CPU of UFSBI goes bad.	Press ACKN button to silence the buzzer and call S&T Staff to attend the fault.
2	ACKN Button for Redundant DC-DC	Press button to silence the buzzer if any module of DC-DC converter of UFSBI goes bad.	Press ACKN button to silence the buzzer and call S&T Staff to attend the fault.
3	ACKN Button for System Failure	Press button to silence the buzzer if UFSBI system goes to shutdown mode.	Press ACKN button to silence the buzzer and call S&T Staff to attend the fault.
4	Indication (R) for Single CPU Fails	It glows when any one of CPU of UFSBI goes bad and remains "ON" till the fault rectified.	-
5	Indication (R) for Redundant DC-DC	It glows when any module of DC-DC converter goes bad and remains "ON" till the fault rectified.	-
6	Indication (R) for system failure	It glows when UFSBI system goes to shut down mode and remains "ON" till the fault rectified.	-

**Note:** The system failure indication (Audio & Visual) would be "ON" till the UFSBI is functioning Normal.

#### **14. Axle Counter (Block Proving & LVCD)**

Axle Counter has been provided on Block section to work as Block Proving & Last Vehicle Checking Device.

The occupation and clearance of the block Section will be indicated in the panel by red light & yellow light respectively at the both ends of stations.

Last stop signal of corresponding train sending station cannot be taken 'OFF' if axle counters shows occupied or fails.

#### **15. Procedure for Resetting of Block Panel when failed:**

A separate re-setting unit is provided with the Block Panel for this purpose.

After a train has been received at train receiving station or after a Block Back Operation when section is clear or when no train has entered into Block section, if LINE FREE indicator displays RED, the following procedures shall be adopted to reset the Block Panel.

##### **15.1 Verify the Block section is clear of any vehicles, by any of the following means:**

- a) SM will ensure that the last train has arrived/passed complete without leaving any portion in the block section complying the provisions of GR & SR 4.17
- b) In addition to above, he will ensure from train signal register that last train has arrived complete, in case the last train has passed earlier/block back operation has been done/ instrument has failed before giving line clear to any train.
- c) SM will also confirm from station at the other end under exchange of private number that last train arrived complete at the other end station.
- d) SM will exchange private number with Section Controller on duty regarding information of resetting. Section Controller on duty before giving private number will also ensure

that the last train in question has passed complete the station in question where resetting is being done from the in/out report of stations.

After the above verification, follow the procedure given below for resetting of Block Panel re-setting unit.

	<b>Receiving Station Performing Block Panel Resetting</b>		<b>Sending Station Performing Block Panel Resetting</b>
1.	Gives call attention/attends telephone signal	2.	Acknowledges call attention/attends telephone signal
3.	Attends telephone	4.	Attends telephone
5.	Informs SM of rear station about the complete arrival of train.	6.	Acknowledges
7.	Informs SM of rear station about the complete arrival of last train, with train no. & time of arrival that passed/arrived his station has been verified and intimate his intention to normalize the Block Panel and exchange the private number.	8.	Acknowledges & gives a private number.
9.	Inserts RESET key, turns & presses for short duration along with ACKN button.	10.	Inserts RESET key, turns & presses for short duration along with ACKN button.
11.	SM takes out RESET key & keeps in safe custody.	12.	SM takes out RESET key & keeps in safe custody.
13.	Preparatory indicator appears on panel for successful completion of resetting. If preparatory indicator does not appear at stations after resetting that means system is not becoming normal (may be informed to signal staff for attending the system).	14.	Preparatory indicator appears on panel for successful completion of resetting. If preparatory indicator does not appear at stations after resetting that means system is not becoming normal (may be informed to signal staff for attending the system).

#### **16. Block failures and action to be taken:**

The block failures can be categorized into the following:

##### **16.1 Failure of BLOCK PANEL**

Block panel should be considered to be defective and should not be restored for normal working until tested by competent signal staff & certified fit by them for use after the under-mentioned cases except for the case of Communication Link Failure (steady yellow indication). After the Communication Link Failure indication becomes flickering again block panel operation can be restored.

	<b>TYPE OF FAILURE</b>	<b>ACTION TO BE TAKEN</b>
1.	When no indication of any sort, at all appears on the block panel or;	For case 1-11, Block Panel should be treated as defective. Block working shall be suspended & trains should be dealt with by taking LINE CLEAR on the electrical communication equipment provided and by provisions of GR 14.13 & SR there under, if any.
2.	When the Bell Code signals are received indistinctly or;	
3.	Any damage is seen or reported to block panel or;	

	<b>TYPE OF FAILURE</b>	<b>ACTION TO BE TAKEN</b>	
4.	When no train has entered into the block section but the 'LINE FREE/ OCCUPIED' indicator changes to RED and this indication persists even after Resetting of Axle counter has been tried or;		
5.	When 'TRAIN GOING TO' or 'TRAIN COMING FROM' arrowhead indications does not appear by appropriate action though condition for asking 'LINE CLEAR' and granting permission to approach are available and LINE CLOSED 'YELLOW' is maintained or;		
6.	When a train arrives at the receiving station or pushes back at sending station, but Block Panel still shows 'TRAIN COMING FROM & TRAIN GOING TO' RED arrowhead indication or;		
7.	TRAIN GOING TO or TRAIN COMING FROM arrowhead indication does not turn to RED to give TRAIN ON LINE on the entry of train into Block Section at either of the stations or;		
8.	When a train has arrived at the receiving station but the Block Panel shows FLASHING GREEN indication even after ensuring SNK , SNOEK & SHUNT key indicator GREEN or;		
9.	When, after a Line Clear cancellation, CANCEL indicator does not light up FLASHING YELLOW or lights up steady YELLOW after appropriate actions or;		
10.	When UFSBI/Mux Fail indication appears.		
11.	When Communication Link Fail indication becomes steady yellow.		
12.	When LSS cannot be kept at 'ON' during its suspension/disconnection. or;		
			In addition to action taken for case 1-11, all efforts should be made to keep the LSS at ON position. If it is not possible, then a competent railway servant should be deputed with RED hand signal at the foot of the LSS to warn the Loco Pilots of approaching trains.

	<b>TYPE OF FAILURE</b>	<b>ACTION TO BE TAKEN</b>
13.	When LSS of the station does not go back to 'ON' position on the entry of a train into the Block Section	In addition, all trains in the relevant direction should be stopped at Home signal and after ensuring that they have come to a stop, the Home signal should be cleared to caution aspect only.
		To dispatch a train, STARTER signal should not be taken OFF until issue of relevant authority to pass LSS & Caution order should also be issued to the Loco Pilot about the defect of LSS.
14.	Total failure of communication during which train shall be worked as per extant rules in force on the Railway	In addition to action taken for case 1-13, the trains should be dealt with under the extant rules as laid down in GR 14.13 & SR there under.

### 16.2 Failure Of Last Stop Signal & Action To Be Taken

	<b>Cause of failure of the LSS</b>	<b>ACTION TO BE TAKEN</b>
1.	When LSS cannot be taken OFF even though LINE CLEAR has been obtained; or;	The LSS should be considered to have failed & failure shall be informed to Signal staff immediately. The LINE CLEAR shall be obtained on the BLOCK PANEL & Line Clear ticket/Paper line clear as prevalent on East Central Railway shall be issued to Loco Pilot of train.
2.	When it can be cleared without obtaining LINE CLEAR; or;	The LSS should be considered to have failed & failure shall be informed to Signal staff immediately and follow Clause 14.1.13 to 14.1.14 above.
3.	It does not restore to ON position on entry of train into Block Section	

### 16.3.1 Suspension of Block Working & Action to Be Taken

	<b>Cause of Suspension</b>	<b>ACTION TO BE TAKEN</b>
1.	An accident takes place in the mid section.	BLOCK PANEL shall be suspended, if any line adjacent to line controlled by it is reported to be infringing, till the infringement exists. LSS shall be treated as INOPERATIVE & FAILED and trains between stations shall be worked in accordance of G & SR 6.02.
2.	When any part of Block Panel is opened or removed for repairs under duly accepted disconnection notice.	BLOCK PANEL shall be suspended. LSS shall be treated as INOPERATIVE & FAILED and trains between stations shall be worked in accordance with special instructions of G&SR 6.02 and 14.08 as may apply.
3.	When disconnection has been taken by Signal Staff for repair of LSS of the station.	-DO-
4.	During Block BACK.	LSS shall be treated as INOPERATIVE & FAILED.



**16.3.2** When the cause of suspension of BLOCK PANEL and/or LSS is removed, SM shall restore the normal working of BLOCK PANEL / LSS, as the case may be.

**17. Working of Material lorry/Track Machines/Motor Trolley & Tower Wagon**

- 17.1** Material lorry shall run in the section as per the instruction of SR 15.18.
- 17.2** Track Machine shall run under Block Protection with special instructions described in SR 4.65.
- 17.3** Motor Trolley shall be run under Block Protection in accordance with instructions enumerated in SR 15.25.
- 17.4** Tower Wagon shall be treated and worked as trains. The movement and working of tower wagon shall be as per the instructions laid down in SR 17.08.

**18. Method of Line Clear Cancellation**

When Lin clear for a train has been taken from the station at the other end of the block section and subsequently it becomes necessary to cancel such line clear on account of crossing or for any other reason, the concerned departure signals including LSS will be put back to 'ON' by sending station observing G & SR 3.36, if already taken 'OFF' and its control to normal ensures SNK at "YELLOW". Then SM, who intends to cancel Line clear, shall advise SM of receiving station under exchange of Private Number with the permission of the Control. An entry in this regard shall be made in Train Signal Register (TSR). Now receiving station can carry out Line clear Cancellation. Sending Station extends co-operation by pressing CANCEL CO-OPERATION button.

On receipt of co-operation indication, receiving station presses bell and cancel button with SM KEY "IN". Receiving station observes cancel indication to light up flashing yellow and releases the buttons. TRAIN GOING TO/ TRAIN COMING FROM Arrow Head Indication turns to flashing green at sending/ receiving station respectively. After 120 seconds LINE CLOSED indication lights up "YELLOW". TRAIN GOING TO/ TRAIN COMING FROM Arrow Head Indication and cancel indication extinguish.

**18.1 Method of Cancellation**

SENDING STATION		RECEIVING STATION	
1.	PUTS back LSS to `ON`, if already taken `OFF, ensures SNK at YELLOW, Advises receiving end station SM about cancellation on telephone after prescribed BELL code.	2.	Agrees to request, ensures SNK at YELLOW and SNOEK at YELLOW and gives consent on telephone after prescribed BELL code.
3.	After verbal consent from other end SM, presses cancel co-operation button and releases on receipt of bell code.	4.	Waits for co-operation light up yellow and presses, bell & cancel button with SM key IN. Cancel counter increments. TRAIN COMING FROM arrowhead indication turns to flashing green. Cancel indication lights up flashing yellow & continues flashing for 120 seconds.
5.	'TRAIN GOING TO' indication turns flashing green.		
7.	'TRAIN GOING TO' Indication turns off LINE CLOSED indication lights up.	6.	On expiry of 120 seconds, TRAIN COMING FROM Indication & cancel indication turns off. LINE CLOSED indication lights up.

**-End of Chapter-**