



**Ministry of Railways  
Government of India**  
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## **DOUBLE LINE TOKENLESS HANDLE TYPE BLOCK INSTRUMENT**



**CAMTECH/S&T/S/2009/P/DLBI/2.0  
NOVEMBER 2009**



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## SGE DOUBLE LINE BLOCK INSTRUMENT

There are three types of Double line block instruments:

(i) SGE type: Byculla make (ii) IRS type: Howrah make and (iii) SR type: Podanur make

**Table A: The main differences among the three types of Double line Block instruments**

S.	Name of part	SGE Type	SR Type	IRS Type
1.	Door lock Mechanism	Mechanical Stick	Electrical Stick	Mechanical Stick
2.	Resistance of Electric Lock Coil	50 ohm	48 ohm	14.8 ohm
3.	Working Current of Electric Lock Coil	200 ma	250 ma	250 ma
4.	Resistance of Bell Relay	500 ohm	400 ohm	400 ohm
5.	Working Current of Bell Relay	20 mA	25 mA	25 mA
6.	Resistance of bell Coil	60 ohm	48 ohm	30 ohm

**Table B :Important parameters of Double line Block instrument**

S. N.	Name of unit	Resistance	Rated working current	Rated working voltage
1.	Top indicator	140 Ohms	17 to 25 mA	2.38 VDC
2.	Bottom indicator	140 Ohms	17 to 25 mA	2.38 VDC
3.	Door lock coil	50 Ohms	200 mA	10 V DC
4.	Bell coil	60 Ohms	150 mA	9 V DC
5.	Bell relay	500 Ohms	20 mA	5 V DC
6.	Polarised relay	77 Ohms	17 to 25 mA	2.38 VDC

*“Double line Block Instrument”*

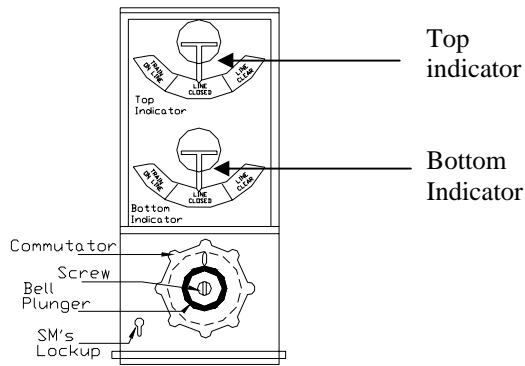


Fig. 1: Front view of SGE double line block instrument

### Line wires between two block instruments

In Non-RE area, it requires 3 wires (min.) along with earth return for its working. One for Top indicator, One for Bottom indicator and One for Block bell and Telephone.

In DC traction area instead of earth return, metallic return is used to avoid interference from stray current.

In AC RE area, it requires two Phantom lines along with earth return, one phantom for Top indicator and another phantom for Bottom indicator and two pair of cable, one for bell code exchange and other for block telephone

### Power Supply arrangements

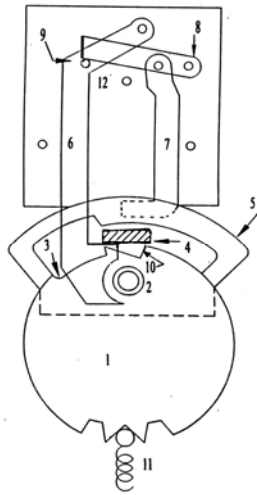
Double Line Block Instrument requires following supply for its working in Non RE area :

(a) Block Needle battery (9 V + line drop) (b) Bell battery (6 V + line drop) (c) Telephone battery (3 V to 4.5 V) and (d) Local Battery (12/ 24 V).

And following supply for RE area :a) Block Needle battery (14 V + line drop) b) Telephone battery (3 V to 4.5 V) c) Local Battery ( 12/ 24 V).

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## Door lock mechanism for conditional TOL locking in SGE & IRS type instruments

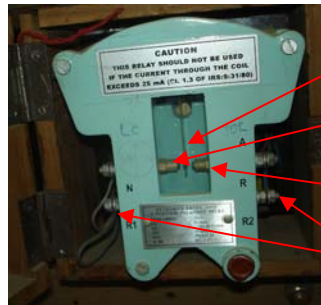


1. Commutator disc
2. Commutator pin
3. Locking notch (Full notch)
4. Armature
5. Locking bracket
6. Holding pawl
7. Releasing bracket
8. Releasing lever
9. Holding pin
10. Half notch
11. Spring loaded ball
12. Resting pin

Note: In SR type PTJ make block instrument, this locking is achieved by electrical means of holding.

## Polarized relay

A polar relay complying to IRS S 31/80 is included in series with the top indicator to control the last stop signal and fulfill the requirements of absolute block system.



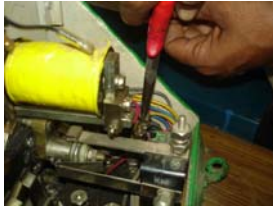
- PR Tongue
- Normal contact
- Reverse contact
- Coil connections

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## Earth

A separate earth should be provided for indication and Bell circuit of each block instrument. The resistance of earth shall not exceed 10 Ohm

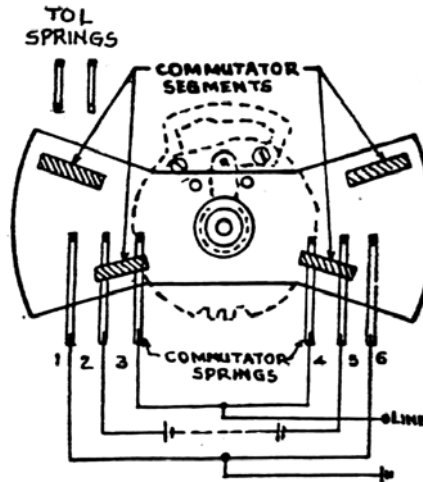
## Maintenance



- Tighten the terminal, screws, nuts, lock nuts and locking screws and ensure that all split pins are opened.

- Inspect the contact surfaces (brass segments) on the butterfly assembly. If pitted, clean them with chamois leather.

- Ensure that the needle indicators operate fully and return to the normal position, when the commutator is brought to Line Closed position. If not, then check resistance and working current of indicator coil and replace if necessary.



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- Ensure that the commutator movement is smooth while turning it from one position to another position
- Check the resistance of indicator coil, lock coil and their working currents and ensure that they are within permissible limits. (refer table B).
- Check the coil resistance of bell relay, bell coil and their working currents during inspections and ensure that they are within permissible limits (refer table B).
- Check that the full notch is of square shape and half notch is of beveled shape. Check that holding pin is not worn out.(refer Fig.3).
- Check the telephone battery, replace if necessary.
- All batteries must be clean. Terminals must be free from dirt and corrosion.
- Ensure that wire connections at the terminals are firm.
- Check and ensure that earth connections are intact and in good condition.(photo)
- Measure earth resistance, the maximum value should be below 10 ohms.

### Precautions



Ensure double locking arrangement and check that block instrument is properly sealed and punched



- Ensure PR tongue is in middle position in Line closed condition. Always keep the polarized relay inside wooden case properly sealed.
- Ensure that for same block instrument, batteries for Indication and bell circuit are separate

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- Indication battery for two block instruments of adjacent section at a station should also be separate.
- Ensure that common earth is not used for indication circuit

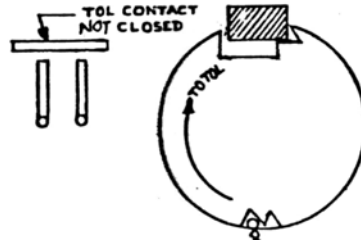
### Additional equipments in RE area

A block filter of an approved design is connected between the block instrument and line wire. The line and block instrument terminals of the filters should never be interchanged.

Also two gaseous type Lightning Arrestors with a flash voltage of 150 V are provided on the line side for high voltage protection.

### Testing

- Check that commutator gets locked first when it is turned from line clear to TOL position before TOL indication contacts are made.
- Safe condition - Armature falls into half notch to lock the commutator well in advance when TOL contact not making.
- Check that commutator is not locked in TOL position when it is turned from line closed to TOL position.
- Ensure that SM's key cannot be extracted in unlocked position i.e. it can be taken out only after turning the key clock-wise for locking the commutator handle.(refer Fig.1).
- SM's key when taken out shall lock the block handle in any of the three positions i.e. line clear, line closed and TOL.
- LSS once taken OFF should not go to ON when the block handle is disturbed momentarily from line clear position.
- LSS cannot be taken OFF without line clear.



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## Overhauling

Periodicity of overhauling - 7 years

3 position polarized relay should also be overhauled along with block instrument.

## Maintenance schedule

Sr. No.	Activity	ESM	SE	SSE
Checking of				
1.	Locking & sealing	F	M	Q
2.	SM key locking working	F	M	Q
3.	Due date of overhaul	--	M	Q
4.	Full deflection of indicators	F	M	Q
5.	Polarized relay returning to normal position when no current is flowing	F	M	Q
6.	Electrical & mechanical locks	F	M	Q
7.	All contacts for cleaning & pitting	F	M	Q
8.	All springs for good condition and proper adjustment	M	M	Q
9.	All terminal screws, lock nuts and locking screws for tightness and opening of split pins.	F	M	Q
10.	Block and telephone batteries	W	M	Q
11.	Whether LSS can be taken OFF without line clear	F	M	Q
12.	Conditional TOL locking	F	M	Q
13.	Half notch working	F	M	Q
14.	Block release circuits	--	M	Q
15.	Telephone and its cord	F	M	Q
16.	Line current	F	M	Q
17.	Block bell unit filter unit & its LD	M	Q	Q
18.	Block earth (Physical checking)	M	Q	Q
19.	Block earth value (Measurement of resistance)	--	Y	Y

Fortnightly – F, M – Monthly, Q – Quarterly, W - Weekly

### Disclaimer

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