

(75)

**East Central Railway
Signal & Telecommunication Department**

TECHNICAL CIRCULAR NO. 16

Sub. Installation & Maintenance Practices of LED lit Signals.

Ref: - (i) ML's DO No.-2005/Sig/PLN/3/Pt., Dated-02.11.2005

(ii) RB's L.No. - 2003/SIG/CLS (LED), Dated-26.03.04

1. LED Signals offer better visibility in all conditions, consume less power and provide very high reliability.
2. As per Board's policy letter all future installations of MACLS should be provided with LED lamps and for existing installations signal lamps shall be progressively replaced with LED lamps on programmed basis.
3. Only LED Signals shall be used for all new EI/PI/RRI/MACLS installations.
4. For new LED Signal installations only LED ECRs (QECX-61) shall be used and existing installations where conventional ECRs are provided will be progressively replaced with LED ECRs.
5. All new LED Signal installations shall be provided with HMU and existing installations where HMU are not provided will also be provided with HMU progressively. Use of HMU is necessary for following reasons-
 - (a) Comprehensive spike protection at the feeding point.
 - (b) Protects the systems against cable short through fuse.
 - (c) Detects voltage and current leakage and gives alarm.
 - (d) Provides preventive indicators/alarms on deviated performance at signal.
6. LED, HMU and current regulator of same company/firm to be installed, mixing of different make to be avoided.
7. For proper functioning of LED Signals, following precautions needs to be taken during installation / regular maintenance.
8. **Installations**
 - 8.1 Before installation of LED Colour Light Signal bench test should be done for 24 hours to weed out transit damage.
 - 8.2 Ensure correct jumper selection in current regulator and HMU before fixing it to signal housing. The recommended settings of pin selection are following.
 - (i) Selection Detail For Main Signal Current Regulator.

For Power Supply-	(i)	110V AC	Short 2,3
	(ii)	110V DC	Short 1,2
For ECR-	(i)	AC LED	Short 6,7
	(ii)	DC LED	Short 4,5
	(iii)	Conventional AC	Short 5,6
For Blanking & Non Blanking-	(i)	Blanking	Short 8,9
	(ii)	Non Blanking	Short 9,10
 - (ii) Selection Details for Route & Shunt Signals. (In Built Current Regulator)

(74)

Mode Selection	Selection details
AC LED ECR	Short 1-2 Short 6-7 Short 8-9
Conventional ECR (AC)	Short 1-2 Short 5-6 Short 8-9
DC ECR	Short 2-3 Short 4-5 Short 9-10

Pins are counted from bottom to top from input terminal side.

(iii) Selection Details for Route & Shunt Signals.(In Built Current Regulator)

Mode Selection	Selection Details
AC LED ECR	Short 2,3 Short 6,7
Conventional ECR (AC)	Short 2,3 Short 5,6
DC ECR	Short 1,2 Short 4,5

- 8.3 After selecting jumper in current regulator recap transparent/Red cap properly.
- 8.4 Surge protection should be installed in supply feeding point, particularly where HMU is not used.
- 8.5 All the equipment (current regulator, ECR, HMU) must have similar selection.
- 8.6 The power supply source should be stable and clean. Generator when used should be connected only after it has stabilized.
- 8.7 The power supply for CLS should be separate, i.e, not having any extra load (battery charger, track circuit, etc.).
- 8.8 Current regulator current must be higher than the picked up current of ECR in order to have good contact.
- 8.9 630 mA fuse should be used instead of 2A fuse for main signal as well as for HMU.
- 8.10 During installation of LED main signal, it is suggested that first the connector should be matched between current regulator and aspect then the signal power cable should be connected. Otherwise signal blanking/non blanking may operate. Signal re-start is then needed through disconnection
9. **Regular Maintenance-**
- 9.1 Connection should be tight at the terminal of current regulator.
- 9.2 Current regulator coupler should be properly connected to LED main aspect.
- 9.3 Avoid sulphation on respective terminals used for signal in location box.
- 9.4 Voltage should be maintained above 95 volts at the signal.
- 9.5 Clean LED Aspect lenses with antistatic cloth once in a week.
- 9.6 Each and every termination related to signal either in relay room, location box or on signal post must be tight.

- 9.7 Don't open 2-pin & 4-pin connector when signal is energized.
- 9.8 The operating current should be measured with True RMS meters as AC. ECRs respond to RMS current. In case current is measured by average meter the value should be divided by the Power Factor.

Average Current/RMS Current = Power Factor (approx.)

Typical Power Factor for 0.7 to 0.8 of the entire circuit.

- 9.9 The periodicity of maintenance of LED Signal lighting unit, Current Regulator and HMU shall be as under-

Item	ESM/SIM	JE/SE (Section)	SE/SSE Incharge
(i) Voltage at lamp & HMU for main signal-	Fortnightly (F)	Quarterly (Q)	Half Yearly (HY)
(ii) Physical Check of LED Signal Unit & CR	(F)	(Q)	(HY)
(iii) Check for Safety validation	--	(Q)	(HY)
(iv) Test for non-interference of HMU with signal lighting	--	(Q)	(HY)

- 9.10 Details of maintenance & inspection should be followed as mentioned in Standard Maintenance Register meant for LED Signal lighting unit, Current Regulator and HMU.

10. Pre monsoon Maintenance-

- 10.1 Signal housing should be sealed properly with 3-inch packing tape on all sides to avoid water ingress
- 10.2 Gasket should be used in signal housing for proper packing. Because frequent ingress of rain water can affect the operating current regulator due to repeated thermal shocks affecting its ventilated relay driver load, etc. over a period of time.

This issue with the approval of CSTE.

(Rajesh Kumar)

Chief Signal Engineer
for General Manager (S&T)

Docket No.-ECR/S&T/Technical Circular/185/2235
Docket to -

Date- 18.09.2009
30

1. CCE, CSTE(Plg), CSTE/W & CSTE/Pr./HJP
2. CSTE/C & CSTE/C-I/MHX
3. DRM/DNR, DHN, MGS, SEE & SPJ
4. Sr.DSTE/DNR/DHN/MGS/SEE/SPJ
5. Dy.CSTE/W/DHN & MGS
6. DY.CSTE/C & C-1/DNR, Dy.CSTE/C/SPJ
7. All S&T officers at HQ/HJP

