

(For official use only)

भारत सरकार
रेल मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS



SPECIFICATION FOR OVERHEAD LINE
INSPECTION WITH VIDEO RECORDING SYSTEM
FOR CURRENT COLLECTION TEST

विशिष्टी संख्या टी.आई./ओ.एच.ई./ओलिवर/0052
SPECIFICATION No. TI/SPC/OHE/OLIVIR/0052

(.....2020)

APPROVED BY	SIGNATURE
PED/TI	

Issued by:

कर्षण संस्थापन निदेशालय
अनुसंधान अभिकल्प और मानक संगठन
मानक नगर, लखनऊ-226 011

Traction Installation Directorate
Research Designs & Standards Organisation
Manak Nagar, Lucknow- 226 011

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1

SPECIFICATION FOR OVERHEAD LINE
INSPECTION WITH VIDEO RECORDING SYSTEM
FOR CURRENT COLLECTION TEST

SPECIFICATION No. TI/SPC/OHE/OLIVIR/0052 (...../2020)

Amendment Number	Date of Amendment	Total pages including Annexure.	Amendment/ Revision
0	NA	9	First Revision
1	...,2020	9	Second Revision

	PREPARED BY	CHECKED BY	ISSUED BY
SIGNATURE			
DATE			
DESIGNATION	SSE/TW-1	DD/TI	JDTI-1

NOTE : This specification is property of RDSO. No reproduction shall be done without permission from DG (TI), RDSO. This specification is not for general use.

This Specification supersedes the Specification No. TI/SPC/OHE/OLIVIR/0051(01/2015).

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1

INDEX

Sl. No.	Heading	Page
1.	Scope	4
2.	Service condition	4
3.	Procedure	5
4.	Mounting	5
5.	Hardware	5
6.	Software	7
7.	Power Supply Requirement	7
8.	GPS system	7
9.	Reporting	8
10.	Features	8
11.	Testing	8
12.	Training	9
13.	Manuals	9
14.	Warranty	9
15.	AMC	9
16.	Spares	9

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1

TECHNICAL SPECIFICATION FOR OVERHEAD LINE INSPECTION WITH VIDEO RECORDING SYSTEM FOR CURRENT COLLECTION TEST

1.0 Scope

This specification covers the supply of Overhead Line Inspection with Video Recording for Current Collection Test (OLIVIR-G) and analyzing Current Collection Test between the 25 kV a.c. overhead contact line {i.e. Overhead Equipment (OHE)} and the pantograph of the Electric Locomotive to identify localised irregularities (that lead to electrical sparking) in the contact line. The system shall consist of a suitable locomotive-roof mountable digital video cameras with USB/Ethernet communication port housed in an enclosure suitable for outdoor environment, a note book PC, software for storing sampled images and GPS antenna & receiver. The system shall incorporate the latest technological advancements in the field of Digital Video Processing and Global Positioning System (GPS) for automatic identification of sparks and their locations. The system shall be suitable for speed of 160 km/h and perform monitoring at night. The system shall be capable of storage of captured images and provision of software for analysis of the stored images and report generation software. GPS mapping data for OHE feature shall be provided by user Railway which shall be utilised by OLIVIR system supplier for location identification.

2.0 Service Conditions

The system is intended to be used on the 25 kV a.c. Electric Locomotive for monitoring of pantograph connectivity with Contact Wire (i.e. Overhead Equipment) in dynamic conditions. The service conditions are as under:

- (i) The complete system shall be suitable for perform monitoring at night.
- (ii) Shock & Vibrations:
 - (a) Suitability of System for train speed of : 160 km/h
 - (b) Maximum vertical acceleration : 1.0 g
 - (c) Maximum longitudinal acceleration and shocks : 3.0 g
 - (d) Maximum transverse acceleration : 1.0 g
- (iii) Humidity: 100% saturating during rainy season.
- (iv) Maximum atmospheric temperature : Under Sun 70°C
In shade 50°C
- (v) Atmosphere under hot weather : Extremely dusty & desert terrain in certain areas.

2.1 The "Make in India" policy of Government of India shall be applicable.

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1

3.0 Procedure:

3.1 The System shall record pantograph and Contact Wire contact continuously, or at predefined sampling rate alongwith location obtained from GPS receiver and linked with Mast number stored by conducting GPS survey of the Section(GPS mapping data for OHE shall be provided by user Railway). The System shall be based on latest state-of-the-art technology capable of capturing digital images with adequate accuracy and with the facility to view the required/ abnormal locations as defined by the user through the software. The digital video camera shall be mounted on the locomotive looking at the pantograph at suitable location. When a spark occurs, the digital video processing software shall identify it and immediate entry shall be made in the report. The location of the spark shall be identified using the GPS receiver and corresponding OHE mast number and features shall automatically be logged in the report. Other useful data like the intensity/size of the spark, current vehicle speed and section name shall also be recorded.

4.0 Mounting

The System shall be meant for mounting on any Locomotive in less than 5 minutes. GPS Antenna and Digital Camera shall be mounted on the Locomotive such that it shall not infringe schedule of dimensions of rolling stock. Data logging, processing and display unit shall be placed inside the Locomotive in the rear /front cab. Digital camera shall be mounted on the Locomotive focusing the contact part of OHE and pantograph.

Camera and focus light shall be mounted on a common stand with a swiveling arrangement and provision shall be made for clamping the stand with the handle of Locomotive such that camera can view the interaction of pantograph and Contact Wire.

5.0 Hardware

The System shall consist of HD quality high speed video recording camera with USB/ethernet communication port, GPS Antenna, display, processing and logging unit and other accessories necessary for satisfactory functioning of the System. The digital video camera shall be enclosed in a enclosure offering minimum degree of protection IP-65. The camera shall have high resolution equal to 1 mega pixel or higher. Horizontal field of vision of the camera shall be such as to view the complete pantograph of 850 mm from a distance of not more than 12 meters. The field of vision along the length of

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1

Contact Wire shall cover at least 1 m of Contact Wire on either side of the pantograph. The images captured shall be of good quality, sharp and clear at a speed of 160 kmph.

Following hardware & software shall be provided:

(i)	HD quality high speed video recording Camera.	Camera shall be high resolution / high definition for better quality of image capturing with 1080 p at 60 Progressive frame rate , 1 lux sensitivity , vide angle lens/, F/1.2 lens and USB2/Ethernet.
(ii)	Weight of Camera including Antenna & focus light	Maximum 3.0 kg.
(iii)	Frame frequency of digital camera	60 frames/seconds, suitable for capturing images of good quality at 160 kmph speed of loco/trains.
(iv)	Display & Processing Unit	Intel core i7 processor or latest, L2 cache, 8 GB RAM, 512 GB HDD, 24X CD RW/Combo & 14 inch plus HD LED display and ruggedised chassis with original windows operating system software and shall be suitable for Rail Bound Vehicle (Loco, rail Coach)
(v)	Battery backup for display and processing unit	3 hrs
(vi)	GPS Unit	High sensitivity and accurate 66 Channel GPS, 2.5 m CEP (SBAS), 5 to 10 Hz Update Rate and high autonomous accuracy.
(vii)	Active Antenna for GPS	L1 Active patch Antenna with magnetic mount and 5 m cable length.
(viii)	for OHE feature data collection	OHE mapping Data shall be provided by user Railway.

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1

6. Software

The Software shall perform the various required functions and shall work with windows operating system. Broad functional details required are as under:

- a) Establish communication with camera.
- b) Check camera status.
- c) Check GPS receiver status.
- d) Acquire image from camera.
- e) Store images in reference to locations.
- f) Facility for linking/connecting mast locations with location co-ordinates.
- g) Storing should take place only when locomotive is in run, optimizing storage memory.
- h) Filtering out bad image samples before storage.
- i) Software shall be menu driven and user friendly having facility for report generation.
- j) Establish communication with GPS via Serial or USB port.
- k) Adjust spark sensitivity without stopping system while doing current collection test. This will help you to record good quality spark.

6.1 The software shall use highly optimized, state-of-the-art digital video processing algorithms that work in real time. It shall monitor real-time OHE features; real time video display, real time spark detection & BMP save of locations having sparks beyond set value, real time report generation with spark classification & locations.

7. Power Supply Requirement

The Display and Processing unit shall run on both 110 Volt AC/DC and 220 Volt AC. It shall also have built-in battery which can run it for more than 3 hours without any external power supply. The GPS equipment and camera shall be powered by the "Display & Processing Unit".

8. Global Positioning System

The GPS receiver shall have provision to connect with PC and all other necessary interface and software required for successful connection with the computer. The time or distance parameter shall be received from a global positioning system and connected to laptop computer. The distance traveled shall be calculated from the latitude, longitude and altitude obtained from the GPS or the real time from the GPS

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1

which can be used to calculate the time lapsed from the last recording. GPS system used shall have adequate accuracy so as to give accuracy of location better than ± 10 m and system shall work with only valid data.

9. Reporting

Report is required to be printed in following formats:

- (i) Text based reports giving intensity of spark and their location,
- (ii) Graphical Report with pictures of sparks, intensity and location.
- (iii) Continuous movie recording (CMR).
- (iv) The system shall be able to work by inputting sectional mapping data in Excel sheet.

10. Features

- i) Total weight of complete system shall not be more than 10 kgs and shall be portable.
- ii) System shall be capable of capturing exact spark locations along with OHE features.
- iii) Settable spark intensity levels after current collection or at the time of reporting.
- iv) Spark shall be classified as **light Low**, medium and **heavy High** by the intensity size of spark. This shall be indicated in the report. Intensity of spark can be changed after current collection test if required.
- v) System installation time shall be maximum 5 minutes, mounting arrangement of camera, GPS etc. shall be suitable for all loco or any rail bound vehicle.
- vi) It should be possible to compare report of specific locations recorded in the previous run.
- vii) System should be capable to store pictures of current collection tests for long time.
- viii) There should not be any disturbance to Loco Crew during measurement/ recording.

11. Testing

The System shall be tested at the Works of the supplier to assess the capability of the System in the presence of the representative of purchaser. Integrated testing shall be carried out on the complete system to assess the performance and functionality of the System by

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1

mounting on a Locomotive and conducting field tests. The software functionality shall be ~~accessed~~ **assessed** during integrated testing.

12. Training

Supplier shall impart training to three personnel of the Railways with each supply of the System. Training will cover operational aspects, maintenance aspects and trouble shooting of the System.

13. Manual

Each System shall be supplied with two sets of properly bound copies of trouble shooting, operation and maintenance manuals. Manuals should have technical details of camera, GPS Antenna, display and processing unit and focus light.

14. Warranty

The System shall have warranty as per IRS standard condition.

15. AMC

Supplier shall quote separately for Annual Maintenance Contract (AMC) for a period of 5 years with effect from the completion of warrantee period. It will be optional and at the discretion of purchaser. Supplier shall define clearly scope of work of AMC.

16. Spares

Supplier shall quote separately for spares as per specified spares used in the system indicating quantity of each spare required for two years. It will be optional and at the discretion of purchaser. Supplier shall confirm availability of spares for 5 years in writing so that purchaser can purchase spares as and when required.

Prepared by	Checked by	Issued by
SSE/TW-1	DD/TI	JDTI-1