**DOCUMENT CONTROL**

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| **Document Number** | **TPDF02-DIS01-OCP-028** | |
| **Title of Document** | **COMMUNICATION TESTING & TROUBLESHOOTING SCADA** | |
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**Amendment Details:**

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| 1 | 1 | 0 | 01.12.2021 | First Issue | Shilajit Ray<br>Satish Shah | Snehal Shah<br>Abdulrashid Shaikh |
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## 1. PURPOSE

1.1. Communication testing & troubleshooting

## 2. SCOPE OF DOCUMENT

2.1. The scope of this document is to define a procedure for Communication testing and troubleshooting of following cables.

(1) RS-485 cable

(2) Automation equipments

2.2. The process document aims to define the guidelines to ensure the process efficiency and effectiveness as required by the Integrated Management System.

## 3. FIELD OF APPLICATION

3.1. This procedure is used for Communication testing & troubleshooting in TPL-D's Franchisee areas of Bhiwandi & SMK.

## 4. FREQUENCY

4.1. As and when required

## 5. AUTHORITIES AND RESPONSIBILITY

5.1. The Head of Department is responsible for implementation of this procedure for effectiveness

5.2. The Head of Section at respective location is responsible for execution of this procedure

5.3. The authorized person of HV Cell department is responsible for execution of the work in accordance with this procedure.

## 6. REFERENCES

6.1. Device manual

6.2. OEM Guideline

## 7. SPECIFIC COMPETANCY REQUIREMENTS

7.1. Tech/Jr. Exe/Exe/AM/M should have Knowledge of

(1) Type of cable and its handling aspects

(2) Cable route, termination type and related safety aspects

(3) Safe working practices and use of PPE

7.2. Tech/Jr. Exe/Exe/AM/M shall have authority for electrical isolation and issue of LCP/PTW.

## 8. INTERFACE WITH OTHER DEPARTMENTS/SECTIONS, IF ANY

8.1. Control Room

8.2. Safety Department

8.3. Store Department

8.4. HR and Security Department

## 9. TOOLS AND TACKLES

9.1. Equipments

(1) Laptop with all required accessories and software

9.2. The team shall carry following tools & tackles.

(1) Tool kit

(2) Extension Board with ELCB

(3) Crimpers & connectors

(4) Multi Meter

(5) DB Meter

(6) Barricading tape

9.3. Stationery and Documents

(1) All forms enlisted as attachments

## 10. PERSONAL PROTECTIVE EQUIPMENTS / SAFETY TOOLS

Following PPEs shall be used to carry out work at site.

10.1. Safety shoes

10.2. Safety helmet

10.3. Safety Goggles

10.4. Cotton Gloves

10.5. Insulating Gloves as applicable

10.6. Dust mask

10.7. Gum boot

## 11. SIGNIFICANT RISK PARAMETRS

11.1. Quality Management System: Low

11.2. Impact on Environment: Medium

11.3. Health and Safety Risk: High

11.4. Energy Management: Low

11.5. Asset Management Risk: High

## 12. PROCEDURE

**12.1.** Work procedure

(1) Communication testing of RS485 cables

(a) Check the serial device whose communication is to be tested is powered up and also doesn't show any kind of error.

(b) Always ensure that the number of devices connected in a RS-485 loop is not more than 32 devices in case of Modbus protocol communication.

(c) Connect the laptop to the RS-485 loop of the device using the appropriate communication cable.

(d) While testing, it is preferred that the laptop is connected to the first device in the loop. This makes troubleshooting easy in case of communication problem.

(e) By using the testing software, test the communication of the devices connected in that loop as per the Substation device details.

(f) If any device or devices are not communicating, first check its configuration and then its communication wiring. Reboot the device and again check its communication status.

(g) Arrange to replace if any faulty device is found and inform control room for its related procedures.

(h) After successful communication wait for some time and observe the communication behavior of the connected devices. It should not give any kind of error.

(i) Cross check with control room for any SCADA data non-

availability before leaving the site.

(2) Automation equipment communication testing related to Troubleshooting

(a) Check the device whose communication error has been reported is powered up and doesn't show any kind of error.

(b) Check whether the communication cable of the device for which problem reported has been connected correctly or not. If not rectify the same.

(c) Check whether the cable connectors are proper and check its health.

(d) Check the configuration of the problematic device

(e) Reboot the device & verify communication once again

(f) Connect the laptop to the communication port of the device using the appropriate communication cable. Communication loop troubleshooting or testing can also be done directly with RTU / SCADA by removing one by one device in the loop and verification.

(g) Remove the device from the loop & make sure that the device is communicating directly one to one.

(h) If device is not communicating directly one to one, or it is working ok directly but creating problem in loop then disconnect the device from the loop. Faulty devices require to be replaced with healthy one.

(i) After communication testing wait for some time and observe the communication behavior of the connected devices. It should not give any kind of error.

(j) Cross check with control room for any SCADA data non-availability before leaving the site.

**12.2. Housekeeping**

(1) The team shall at all the times keep the site free from the accumulation of waste materials and debris and upon completion of work shall clear away and dispose all the surplus materials, rubbish and temporary works of whatsoever nature and kind. The team shall ensure clean and tidy site.

(2) The team shall ensure that the hazardous waste is handled as per OCP TPDF02-STO01-OCP-006 & 007

## 13. IMPACT ANALYSIS OF SIGNIFICANT RISKS

13.1. Quality Management System

(3) Details of Quality Issues involved

(a) Incompetent manpower (Wrong testing approach)

(b) Incompetent manpower (Poor workmanship)

(4) Details of Quality Assurance plan

(a) Ensure work to be carried out as per OEM Manual

13.2. Health and Safety

(1) Details of Health and Safety Hazard involved

(a) Eye strain, headache

(b) Mental stress

(c) Musculoskeletal disorders

(d) Obesity

(e) Hypertension

(f) Burn injury

(g) Body Injury

(h) Cut Injury

(i) Electrocution

(2) Health and Safety Precautions required

(a) Barricade the working area by barricading tape & restrict any unauthorized entry in and around working place

(b) Conduct Toolbox talk in presence of all crew members about health & safety precautions

(c) Use all required PPEs during execution of the job

(d) Use extension board with ELCB for LT supply and Provision of Body earthing

(e) Keep the First aid box ready within reachable limit for any exigency during work

(f) Tools and PPE Checking

(g) Training on road safety policy & guideline

(h) BBS observation and spot correction

(i) Training on PPE

13.3. Environment

(1) Details of Environmental impact

(a) Resource depletion

(b) Land contamination

(2) Precautions to minimize Environmental impact

(a) Ensure that Material consumption monitored during and after work.

(b) Ensure that all waste including hazardous waste collected & segregated and stored at defined area

(c) Ensure that all plastic waste, metal waste, wooden waste Collected and submitted to the store/scrap yard for proper disposal as per relevant Waste Management OCP

13.4. Energy Management

(1) Details of energy use involved

(a) Consumption of auxiliary power by testing equipment & tools during work

(b) Fuel consumption during material handling

(2) Precautions to minimize energy use

(a) Switch off supply when not in use during work.

(b) Ensure energy efficient tools and equipments

13.5. Asset Management

(1) Details of Asset related risks

(a) Asset damaged due to mishandling

(2) Mitigation plan for asset related risks

(a) Work to be carried out under authorized person supervision

(b) Any deviation such as damage, loss of the asset-SAP Notification (Fault Notification) to be generated for further action

## 14. LIST OF ATTACHMENTS

| Sr. | Document /Record Description | Reference No. |
|---|---|---|
| 1 | Communication testing & troubleshooting Checklist | TPDF02-DIS01-OCP-028-F01 |

***** End of Procedure *****