MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO. LTD.
(Government of Maharashtra U/T)
CIN No. U40109MH2005SGC153646
From: Name of Office: EXECUTIVE ENGINEER, EHV PROJECT DIVISION-II, PUNE
Office Address: Administrative Building, 1st Floor, 925, Kasba Peth, Pune – 411 011
Contact No.: FAX NO. (020) 245 70 525 &
\ PHONE NO. (020) 245 70 676
E-Mail Id : ee6620@mahatransco.in

Ref.No.EE/EHV/PROJ/DN-II/PN/T/159 **Date: 13.02.2025**

TO WHOM SO EVER IT MAY CONCERN

Subject:-Calling budgetary offers in r/o Supply, Installation and commissioning of Transformer Monitoring System & Control for substation project under EHV Projects Division-II, Pune.

The budgetary offers through e-mail are hereby invited for the above work as per Schedule 'A' mentioned below:

Sr. No.	Particulars	Unit	Quantity	Ex Rate	GST	Unit Rate
	Supply part					
1	**TAMS IEC 61850 protocol handling software with necessary customization as per S/s requirement –** This software collects data from various IED installed in the field near T/F and process it as per S/s. requirement and it provides easy to use graphical user interface for substation operating staff. Software should support scalability.	Nos	1 Nos. for Multiple T/F/ICT			
2	**TAP Changer Controller cum Transformer Monitoring Unit (TF IED) –** This device collects the data from Fan Control Cubicle and On Load Tap Changer Drive Mechanism and applies the necessary interlocks and logic and process the data and forward it to TAMS software installed in the control room. Usually one IED installed per T/F. This IED should be capable of accepting inputs such as 4- 20 ma, RS48S Comm. And it should work on 220VDC/110VDC/48VDC whichever available at S/s. And this communicates on 61850 protocols.	Nos	1 Nos Each T/F/ICT			

3	**PT IED –** This device used for configuration of LV PT with TAMS for Automatic Voltage Regulation purpose.	Nos	1 Nos. for Multiple T/F/ICT			
4	**Terminal Board –** This IP 55 rated panel with necessary stand of almost 4 feet height installed near each T/F in the field and grounded using cement in the field. IED and necessary devices installed in this panel. As it occupies one of the important device i.e. IED, this should follow all the standards of panel to be installed in harsh environment.	Nos	1 Nos. for each T/F/ICT			
5	**Industrial Grade PC along with Standard Kiosk in the Control Room –** Industrial grade PC used as it runs important TAMS software and standard industrial grade PC used for this project as it runs 24X7 and used for monitoring and controlling various parameters of T/F auxiliaries, this should be enclosed in KIOSK as per MSETCL standards.	Nos	1 Nos. for Multiple T/F/ICT			
6	**Armoured Fiber Optic Cable –** Fiber optic cable drawn from each IED installed in the field to control room accompanied by ring topology to achieve maximum uptime of TAMS. As this runs throughout the cable trench of the substation it is recommended to use armoured fiber optic along with HDPE pipe for safety from rodents throughout the trench length.	kM	kM			
7	**12C x 2.5 sqmm Copper, Armoured** Copper Cable for configuration of FCC/OLTC with TAMS IED.	kM	kM			
8	**4C x 2.5 sqmm Copper, Armoured** (Copper Cable for configuration of FCC/OLTC with TAMS IED).	kM	kM			

9	**FO Joint Box -** As IED gives communication 0/P in Ethernet/ FO Patch cords, LIU and convertor to be installed for conversion of Ethernet / FO Patch. Cords to armoured FO in the field and same needs to be reversed in the control room to establish necessary communication. Each T/F will require 2 Joint box, one in field and one in control room	Nos.	1 Nos. Required for Multiple T/F/ICT			
10	**Managed Ethernet Switch –** Managed Ethernet switch will be used to build communication infrastructure.	Nos	1 Nos. Required for Multiple T/F/ICT			
Erection Part						
1.	Installation & Configuration of TAMS on each T/F or ICT	Nos	1 Nos. for each T/F/ICT			

Note: Rate shall be valid for 60 days from the date of submission of offer.

You are requested to quote your best reasonable rate for the above work. The terms & Conditions are as follows:

Terms & Condition:

1. The rate should be quoted on firm quotation basis.
2. The rates should be exclusive of all taxes. Taxes should be quoted extra.
3. Quantity may be vary as per actual.
4. Standard BOQ vide ltr. No.: MSETCL/CO/CE (ACI&P)/KE/TAMS/No/473 dt 12.07.2024 is attached herewith Please ensure that the rates you provide comply with the specifications outlined in the mentioned document.
5. Bidder should be the approved for the subject product.
6. Technical specification of TAMS along with necessary test as per IEC standard.
7. You are requested to submit your best reasonable budgetary offer as per Schedule 'A' for above works on **E-mail id ee6620@mahatransco.in upto 18:15 Hrs on dtd:21.02.2025.**
8. Please note that said budgetary offer is only for estimation purpose and will not be considered for any bidding & no work order will be issued based on this offer.

Sd/-
(Abhijeet Kahalekar)
Executive Engineer
EHV Projects Division-II, Pune

MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO. LTD.
(CIN U40109MH2005SGC153646)

Chief Engineer
(Automation Communication Innovation & Protection)
MSLDC Old Building, Thane-Belapur Road,
MSETCL P.O. Airoli, Navi Mumbai-400708
Phone : (O) 022-27600405
E-mail : ceaci@mahatransco.in
Web: http://www.mahatransco.in

MSETCL/CO/CE (ACI&P)/KE/TAMS/No 0473 DATE: 12 JUL 2024

To,
M/s Karishma Electricals,
Plot No. X-204,
M.I.D.C. Waluj,
CS Nagar- 431136.

SUB: Approval for 'Standardization of solution architecture in respect of 'Tap changer controller cum Transformer Auxiliary Monitoring System' (TAMS) supplied by M/s. Karishma Electricals, CS Nagar using Phoenix contact.

REF: 1) Karishma Electrical letter dtd. 03.04.2024.
2) KE/TAMS/ACI/5502 dtd. 08.05.2024.
3) MSETCL/Dir. (Op) / 908 dtd 05.07.2024.

Dear Sir,

In view of letter at reference 01, the standardization of solution architecture offered by M/s. Karishma Electricals, CSN using Phoenix Contact products for **'Tap changer controller Cum Transformer Auxiliary Monitoring System' (TAMS)** for substations in MSETCL has been scrutinized based on the documents furnished vide ref no. 2. The product demonstration and verification was carried out successfully at Automation Lab, ACI&P office, Airoli, Navi Mumbai.

As per approval by the Director (Operations) vide letter under ref 03, this office is pleased to inform that your request for considering the product with solution **'Tap changer controller Cum Transformer Auxiliary Monitoring System' (TAMS) supplied by M/s. Karishma Electricals with Phoenix Contact as an approved solution & product provider is accepted for EHV substation in MSETCL.**

As approved, the solution is found suitable to apply at Non-SAS substations & against faulty RTCC. The selection of locations for usage of 'TAMS' shall be decided at CE, (Tr. O&M) office, CO, MSETCL.The approved architecture, BOQ & Technical Specifications are enclosed herewith.

You are requested to acknowledge the receipt of this letter.

Thanking you,

Shashank Jewalikar
Chief Engineer (ACI&P)
CO, MSETCL, Mumbai.

Copy s.w.r.to:
The Director (Operations), MSETCL, C.O. Mumbai.

Copy f.w.cs.to:
1) The Chief Engineer EHV PC O&M Zone, MSETCL, Amravati/ CS Nagar /Karad/ Nagpur/ Nashik/Pune/Vashi.
2) The Chief Engineer Trans (O&M), MSETCL, C.O. Mumbai.

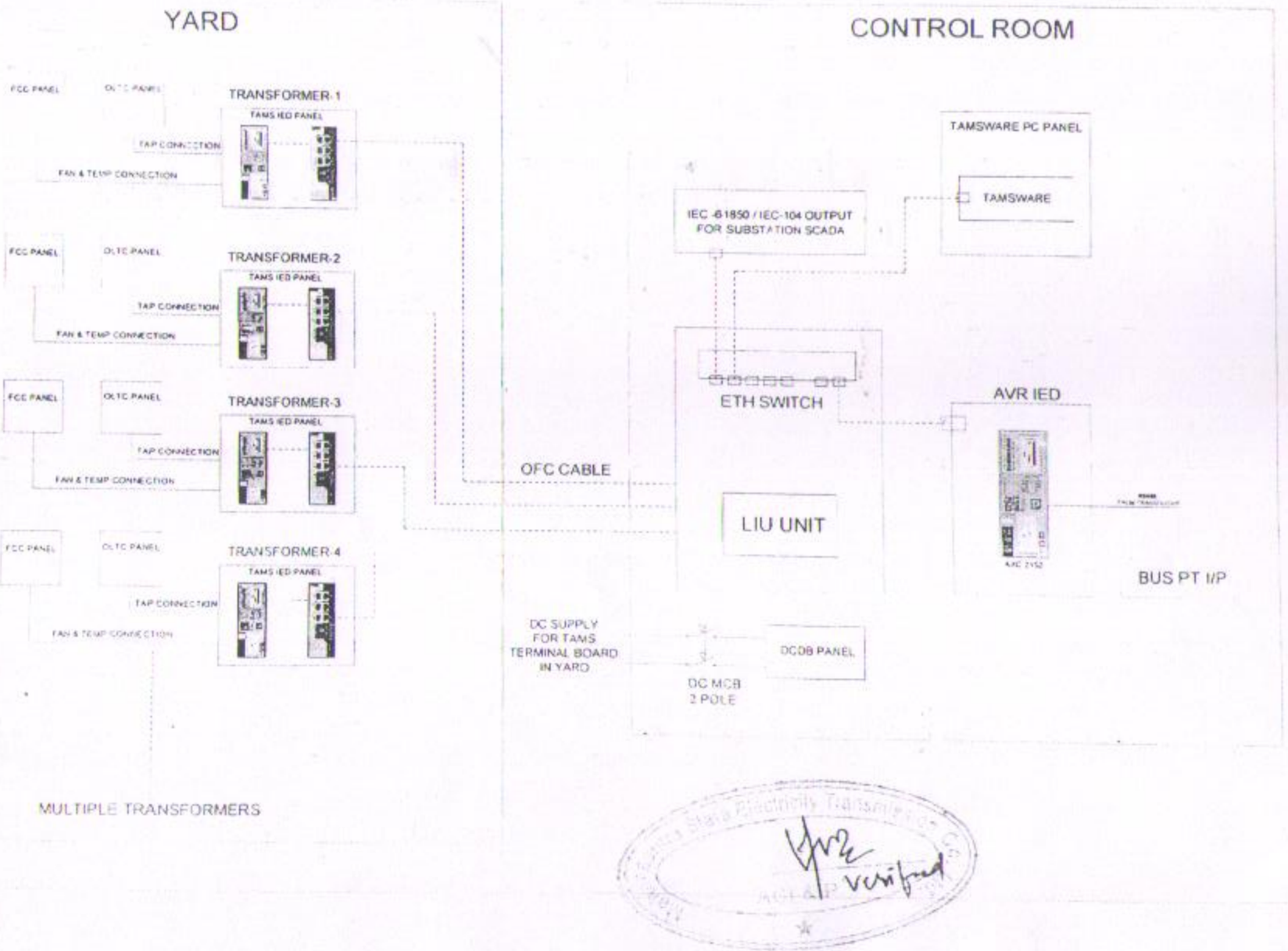
Copy to:
The Superintending Engineer, PAC Circle, MSETCL, Akola/CS Nagar/Karad/Nagpur/ Nashik/Pune/Vashi.

TAMS ARCHITECTURE

STAR TOPOLOGY

OPTICAL FIBER

CAT-6 ETHERNET



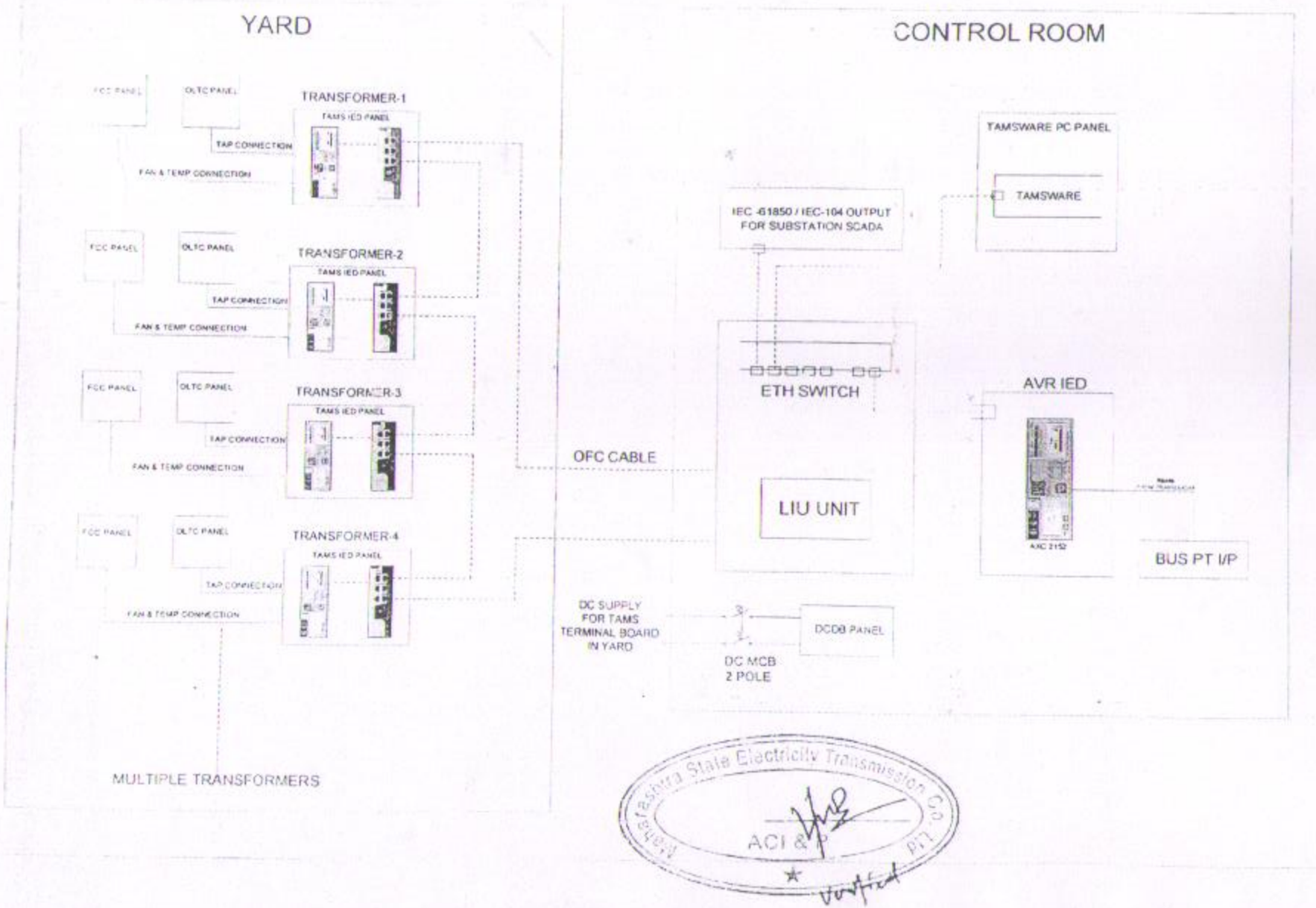
verified

TAMS ARCHITECTURE

RING TOPOLOGY

OPTICAL FIBER

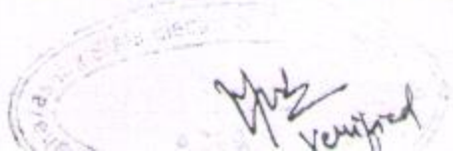
CAT-6 ETHERNET



Rajasthan State Electricity Transmission Co. Ltd.
ACI & P
Verified

TAMS Bill of Material

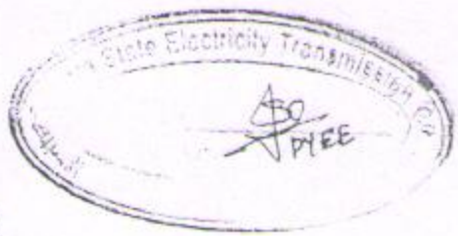
Item	Specification	Product Details	Qty. Remarks
TAMS Software with necessary Customization as per S/s. requirement	This software collects data from various IED installed in the field near T/F and process it as per S/s. requirement and it provides easy to use graphical user interface for substation operating staff. Software should support scalability	Pheonix Contact make VISU+	1 Nos. for Multiple T/F
TAP Changer Controller cum Transformer Monitoring Unit (TF IED)	This device collects the data from Fan Control Cubicle and On Load Tap Changer Drive Mechanism and applies the necessary interlocks and logic and process the data and forward it to TAMS software installed in the control room. Usually one IED installed per T/F.This IED should be capable of accepting inputs such as 4-20 ma ,RS485 Comm. And it should work on 220 VDC/110VDC/48VDC whichever available at S/s. And this communicates on 61850 protocols.	Pheonix Contact make AXC 2152	1 Nos. for Each T/F
PT IED	This device used for configuration of LV PT with TAMS for Automatic Voltage Regulation purpose	Pheonix Contact make AXC 2152	1 Nos. for Multiple T/F
Terminal Board	This IP 55 rated panel with necessary stand of almost 4 feet height installed near each T/F in the field and grounded using cement in the field. IED and necessary devices installed in this panel. As it occupies one of the important device i.e. IED , this should follow all the standards of panel to be installed in harsh environment	Hoffman make IP 55 rated	1 Nos. for each T/F
Industrial Grade PC along with Standard Kiosk in the Control Room	Industrial grade PC used as it runs important TAMS software and standard industrial grade PC used for this project as it runs 24X7 and used for monitoring and controlling various parameters of T/F auxiliaries, this should be enclosed in KIOSK as per MSETCL standards	Pheonix Contact make BL2 BPC 3100	1 Nos. for .Multiple T/F
Armoured Fiber Optic Cable	Fiber optic cable drawn from each IED installed in the field to control room accompanied by ring topology to achieve maximum uptime of TAMS. As this runs throughout the cable trench of the substation it is recommended to use armoured fiber optic along with HDPE pipe for safety from rodents throughout the trench length	Standard Make	RMT at actual
12 Core, 4 Core Copper Cable	Copper Cable for configuration of FCC/OLTC with TAMS IED.	Standard Make	RMT at actual
FO Joint Box	As IED gives communication O/P in Ethernet/ FO Patch cords , LIU and convertor to be installed for conversion of Ethernet / FO Patch Cords to armoured FO in the field and same needs to be reversed in the control room to establish necessary communication. Each T/F will require 2 Joint box , one in field and one in control room	Standard Make	1 Nos. Required for Multiple T/F
Managed Ethernet Switch	Managed ethernet switch will be used to build communication infrastructure.	Pheonix Contact Make	1 Nos. for Multiple T/F



Technical specifications TAMS:

Technical specifications and Test Certificate of major parts of offered product solution:

1. IED/RTU (Make- Phoenix Contact, Type- AXC F 2152 controller) with BI, BO and AI card.
   - Protocol - IEC 61850 Edition 1 & 2
   - Modbus/TCP- Client & server – RS485/RS232/RS422
   - IEC 60870-5-101/104 server & client
   - Memory / storage 512 MB
   - Protocols supported- https. FTP. SNTP. SNMP. SMTP. SQL. MySQL. DCP. etc.
   - IEC 62443-4-1 & IEC 62443-4-2 comply cyber secured IED/RTU.
   - IED/RTU support IPSEC VPN cyber secured communication protocol.
   - 8 Channel Analog Input.
   - Binary Inputs – Optional 16/24/32 – as per requirement.
   - Binary Outputs – Optional 8/16/24- as per requirement.
   - Ports -------2 x Ethernet Port.
   - **EMI/EMC Test**:
     1. Electrostatic Discharge IEC 61000-4-2
     2. Immunity Test (power frequency magnetic field) IEC 61000-4-8
   - **Environmental Test**:
     1. Cold test (IEC 60068-2-1)
     2. Damp heat cyclic (IEC 60068-2-30)
     3. Damp heat steady (IEC 60068-2-78)
     4. Dry heat test (IEC 60068-2-2)
   - **Cyber Security in accordance**:- IEC 62443
   - **Vibration test** (IEC 60068-2-6)
   - **Supply voltage - 24 VDC** (**Note:** Suitable Converter Shall Be Provided)



2. **Workstation PC :**
   - Linux operating system.
   - Industrial PC. (Phoenix Contact BL2 BPC 3100)Windows (latest version). FAN less design.
   - 2 x Ethernet interfaces (integrated switch)
   - SD card up to 2 GB as optional plug-in parameterization memory.
   - Memory 8GB / 512 GB.
   - Power supply -24 V DC (**Note:** Suitable Converter Shall Be Provided)

3. **Visu + Visualization software.**

(Make - Phoenix Contact.) Programming Standard. IEC 61131-3

D) Features verified at Automation Lab:

I. The Transformer Auxiliary signals are hardwired up through simulator in the IED/RTU (to be installed in substation switch yard) and its configuration in Visu+ SCADA (to be installed in substation control room) is done. Following functionality and features tested through SCADA by giving required signal input through simulator.

i. Monitoring of FAN status, HV and LV winding temperature, Oil temperature, TAP position, Number of TAP operation, and LV voltage.

ii. Manual & Auto operation of FAN, TAP.

iii. BI/ BO/ AO/ Temperature readings.

iv. Auto/ Manual, Master/follower mode selection for AVR / Tap operations.

v. Report extraction tool for temperature values, BI/ BO signals values and Tap position.

vi. Reports, trends / graphs extracted in excel sheet & pdf formats.

vii. Time based data log record for HV& LV- WTI, OTI, TAP Position, Tap Count & HV, and LV Voltage.

viii. Real time summary view, individual transformer screen, temperature setting, AVR setting page & Alarm pop up & master follower.

ix. Confirmation of Event & Alarm list in SCADA as per operation.

II. The IED / RTU shall be mounted in the substation near transformer in a separate panel (suitable for IP55, IP68 as required) and the transformer auxiliary signals are hardwired up from FCC to this panel. From this panel (IED/RTU) the data shall be routed through optic cable to the monitoring device (PC with Visu + software) in control room.

III. 02 types of Architecture are proposed, one with Ring topology and other with Star topology.

IV. The IEC 60870-5-104 and IEC 61850 communication protocol verified over third-party tool 'IED Scout'.