As Per the Schematic Drawings the Contents in This Test Format Can Be Modified.

1. **GENERAL DATA AND INFORMATION:**

|  |  |
| --- | --- |
| Panel designation |  |
| Serial no |  |
| Make |  |
| Panel type |  |
| Dwg & sch no |  |
| Panel no |  |

1. **MECHANICAL CHECK AND VISUAL INSPECTION**

As per TCS–P-105 Rev – 01, Item no 4.1

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Description | Checked | |
| 1 | Check tightness of all connections | ❑Yes | ❑N/A |
| 2 | Inspect for physical damage / defects | ❑Yes | ❑N/A |
| 3 | Panel condition, cleanliness, organization, labeling,  Readiness for service, panel doors, handles...etc | ❑Yes | ❑N/A |
| 4 | CT shorting checked | ❑Yes | ❑N/A |
| 5 | Indications checked | ❑Yes | ❑N/A |
| 6 | Contact resistance of tripping and alarm checked | ❑Yes | ❑N/A |
| 7 | Check the ferrules as per specification | ❑Yes | ❑N/A |
| 8 | Confirm that each panel has been properly secured to the floor in its final service location. | ❑Yes | ❑N/A |
| 9 | Panel Earthing checked | ❑Yes | ❑N/A |
| 10 | Confirm that panels are constructed and wired as per SEC relevant specification. | ❑Yes | ❑N/A |
| 11 | Check case cover and gasket for proper seal against dust. | ❑Yes | ❑N/A |
| 12 | Check all installed equipment nameplate information for compliance to approved drawings and equipment /material lists. | ❑Yes | ❑N/A |
| 13 | For all internal and external panel wiring, confirm that all screw terminations are tight and that crimp connectors are firmly secured to the wire and to the termination point. Ensure that no part of the wire is bent at the termination point. Check Ferrules. | ❑Yes | ❑N/A |
| 14 | Check that panel equipment is mounted securely and protected against mal operation due to vibration, shock, etc | ❑Yes | ❑N/A |
| 15 | Use of ring type terminals for wire termination for current circuit wires. | ❑Yes | ❑N/A |

1. **GENERAL PANEL FUNCTIONAL CHECKS**

As per TCS–P-105 Item no 5.1 & 5.9

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Description | Remarks | |
| 1 | Check Output of Ac Outlet | ❑Yes | ❑N/A |
| 2 | Check Illumination Lamp | ❑Yes | ❑N/A |
| 3 | Check Door Switch | ❑Yes | ❑N/A |
| 4 | Check Heater / Thermostat | ❑Yes | ❑N/A |

1. Single Line Diagram & Focus Of Capacitor Banks:

G T1

13.8 KV SWGR

SEC- A

B/C - 1

33 kv /10 MVAR

CAP BANK - 1

13.8 KV SWGR

SEC- B

33 kv / 10 MVAR

CAP BANK - 2

13.8 KV SWGR

SEC- C

33 kv / 10 MVAR

CAP BANK - 3

G T2

G T3

B/C - 2

1. **SWITCH GEAR CB OPERATION CHECKS:**

Mode of operation: Manual

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Initial condition of Swgr | | | Action taken place at C.B | | | Command  Given | Control By | |
| Cap  bank -1 | Cap bank -2 | Cap bank -3 | Cap bank -1 | Cap  Bank -2 | Cap  bank -3 | Local | Scada |
| 1 | Opened | Racked out | Racked out | close | Racked out | Racked out | Manual close |  |  |
| 2 | closed | Racked out | Racked out | open | Racked out | Racked out | Manual open |  |  |
| 3 | Racked out | opened | Racked out | Racked out | close | Racked out | Manual close |  |  |
| 4 | Racked out | closed | Racked out | Racked out | open | Racked out | Manual open |  |  |
| 5 | Racked out | Racked out | opened | Racked out | Racked out | close | Manual close |  |  |
| 6 | Racked out | Racked out | closed | Racked out | Racked out | open | Manual open |  |  |

Note: After tripping of CB 10 Min should be elapsed for further operation...

1. **FUNCTIONAL CHECKS OF ACCS:**

Mode of operation: Auto

Closing and opening of capacitor Bank breaker is 5 Min

In Auto Mode, the Closing of cap Bank Circuit Breakers should be in ascending order (i.e., cap bank -1, cap bank – 2, cap bank – 3 …..) Where as the opening of cap bank to be in descending order (i.e.,) cap bank -3,cap bank -2,cap bank -1 and so on.

* 1. **CASE 1:**

Bus coupler – 1(BC -1) and Bus coupler -2 (BC -2) are in open Position

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Conditions checked by ACCS | Initial position of CB | | | Action taken by ACCS panel to issue to C.B of | | | Remarks | Control By | |
| Cap bank -1 | Cap bank -2 | Cap bank-3 | Cap bank-1 | Cap  Bank -2 | Cap  bank-3 | Local | Scada |
| 1 | T -1 MVAR > 9 | Opened | Racked out | Racked out | Auto close | Racked out | Racked out | Over MVAR |  |  |
| 2 | T -1 MVAR < 1 | closed | Racked out | Racked out | Auto open | Racked out | Racked out | Under MVAR |  |  |
| 3 | T -2 MVAR > 9 | Racked out | opened | Racked out | Racked out | Auto close | Racked out | Over MVAR |  |  |
| 4 | T -2 MVAR < 1 | Racked out | closed | Racked out | Rackedout | Auto open | Racked out | Under MVAR |  |  |
| 5 | T -3 MVAR > 9 | Racked out | Racked out | opened | Racked out | Racked out | Auto close | Over MVAR |  |  |
| 6 | T -3 MVAR < 1 | Racked out | Racked out | closed | Racked out | Racked out | Auto open | Under MVAR |  |  |

* 1. **CASE 2:**

Bus coupler – 1(BC -1) Open and Bus coupler -2 (BC -2) in Close position

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Conditions checked  by ACCS | Initial position of CB | | | Action taken by ACCS panel to issue to C.B of | | | Remarks | Control By | |
| Cap bank -1 | Cap bank -2 | Cap bank -3 | Cap bank -1 | Cap  Bank -2 | Cap  bank -3 | Local | Scada |
| *1* | T -1 MVAR > 9 | Opened | Racked out | Racked out | Auto close | Racked out | Racked out | Over MVAR |  |  |
| *2* | T -1 MVAR < 1 | closed | Racked out | Racked out | Auto open | Racked out | Racked out | Under MVAR |  |  |
| *3* | T -2 + T -3  MVAR > 9 | Racked out | opened | Opened | Racked out | Auto close | Opened | Over MVAR |  |  |
| *4* | T -2 + T -3  MVAR > 9 | Racked out | closed | opened | Racked out | closed | Auto close | Over MVAR |  |  |
| *5* | T -2 + T -3  MVAR < 1 | Racked out | closed | closed | Racked out | closed | Auto open | UnderMVAR |  |  |
| *6* | T -2 + T -3  MVAR < 1 | Racked out | closed | opened | Racked out | Auto open | Auto open | Under MVAR |  |  |
| *7* | T -2 + T -3 still MVAR < 1 | Racked out | Opened | Opened | Racked out | Racked out | Racked out | Racked out |  |  |

* 1. **CASE 3:**

Bus coupler – 1(BC -1) Close and Bus coupler -2 (BC -2) in open position

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Conditions checked  By accs | initial position of cb | | | Action taken by accs panel to issue to c.b of | | | Remarks | Control by | |
| Cap bank -1 | Cap bank -2 | Cap bank -3 | Cap bank -1 | Cap  Bank -2 | Cap  Bank -3 | Local | Scada |
| 1 | T -1 + T -2 MVAR > 9 | Opened | Opened | Racked out | Auto close | Opened | Racked out | Over MVAR |  |  |
| 2 | T -1 + T -2 MVAR > 9 | Auto close | Opened | Racked out | Auto close | Auto close | Racked out | Over  MVAR |  |  |
| 3 | T -1+ T -2 MVAR < 1 | Racked out | Closed | Closed | Racked out | Closed | Auto open | Undermvar |  |  |
| 4 | T -2 + T -3 MVAR < 1 | Racked out | Closed | Auto open | Racked out | Auto open | Auto open | Under MVAR |  |  |
| 5 | T -3  MVAR >  9 | Racked out | Racked out | Opened | Racked out | Racked out | Auto close | Over MVAR |  |  |
| 6 | T -3 MVAR < 1 | Racked out | Racked out | Closed | Racked out | Racked out | Auto open | Under MVAR |  |  |

* 1. **CASE 4:**

Bus coupler – 1(BC -1) and Bus coupler -2 (BC -2) in Close position

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Conditions checked by accs | initial position of cb | | | Action taken by accs panel to issue to c.b of | | | Remarks | Control by | |
| Cap bank -1 | Cap bank -2 | Cap bank -3 | Cap bank -1 | Cap  Bank -2 | Cap  Bank -3 | Local | Scada |
| 1 | T -1 + T -2 +T -3 MVAR > 9 | Opened | Racked out | Racked out | Auto close | Racked out | Racked out | Over MVAR |  |  |
| 2 | T -1 + T -2 + T -3 MVAR >1 & < 9 | Closed | Racked out | Racked out | Open | Racked out | Racked out | Under MVAR |  |  |
| 3 | T -1+ T -2 + T -3 MVAR > 9 | Racked out | Opened | Racked out | Racked out | Auto close | Racked out | Over MVAR |  |  |
| 4 | T -1 + T -2 + T- 3 MVAR >1 & < 9 | Racked out | Closed | Racked out | Racked out | Open | Racked out | Under MVAR |  |  |
| 5 | T -1+ T -2 + T -3 MVAR > 9 | Racked out | Racked out | Opened | Racked out | Racked out | Auto close | Over MVAR |  |  |
| 6 | T -1+ T -2 + T -3 MVAR >1&<9 | Racked out | Racked out | Closed | Racked out | Racked out | Open | Under MVAR |  |  |

* 1. **CASE 5 & 6:**

Under voltage and over voltage operations

The Closing and opening of 33 kV capacitor bank breaker lies between 36 > 33 < 31

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Conditions checked by ACCS | Initial position of CB | | | Action taken by ACCS panel to issue to C.B of | | | Remarks | Control By | |
| Cap bank  -1 | Cap bank  -2 | Cap bank  -3 | Cap bank  -1 | Cap  Bank  -2 | Cap  Bank  -3 | Local | Scada |
| 1 | Bus – A volt  < 31 kv | Opened | Racked out | Racked out | Close | Racked out | Racked out | Under voltage |  |  |
| 2 | Bus – A volt  > 36 kv | closed | Racked out | Racked out | Open | Racked out | Racked out | Over voltage |  |  |
| 3 | Bus – B volt  < 31 kv | Racked out | opened | Racked out | Racked out | Close | Racked out | Under voltage |  |  |
| 4 | Bus – B volt  > 36 kv | Racked out | Closed | Racked out | Racked out | Open | Racked out | Over voltage |  |  |
| 5 | Bus – c volt  < 31 kv | Racked out | Racked out | Opened | Racked out | Racked out | Close | Under voltage |  |  |
| 6 | Bus – c volt  < 36 kv | Racked out | Racked out | closed | Racked out | Racked out | Open | Over voltage |  |  |

* 1. Case 7:

If any one of Three Grid Transformer is out of service, then the system will

Remain same.

1. **SCADA COMMANDS TO ACCS PANEL:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | From SCADA | To Accs Panel | Signal Name | Remarks |
| 1 | 1 X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | SCADA in |  |
| 2 | 1 X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | SCADA out |  |
| 3 | 1 X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | Cap Bank – 1 close Command |  |
| 4 | 1 X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | Cap Bank – 1 Trip Command |  |
| 5 | X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | Cap Bank – 2 close Command |  |
| 6 | X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | Cap Bank – 2 Trip Command |  |
| 7 | X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | Cap Bank – 3 close Command |  |
| 8 | X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | Cap Bank – 3 Trip Command |  |
| 9 | 1 X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | SCADA auto command |  |
| 10 | 1 X --- : \_\_\_ - \_\_ | X --- : \_\_\_ - \_\_ | SCADA manual command |  |

1. **ACCS INDICATIONS:**

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Alarm Local at ACCS | Received at Ecc | Remarks |
|  | ACCS Faulty |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

1. **ANNUNCIATOR WINDOWS & ALARMS:**
   1. **Capacitor bank annunciation -1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | | Source | | Annunciator | | Litra | | Remarks |
| 1 | | 3CBP - 1 | | Window - 1 | | Group -1 protection operated | |  |
| 2 | | 3CBP - 1 | | Window - 2 | | Group -2 protection operated | |  |
| 3 | | S ------- | | Window - 3 | | Trip ckt faulty | |  |
| 4 | | S ------- | | Window - 4 | | SF6 stage – 2 operated | |  |
| 5 | | 3CBP - 1 | | Window - 5 | | Stage - 1 alarm operated | |  |
| 6 | | S ------- | | Window - 6 | | SWGR trouble | |  |
| 7 | | 3CBP - 1 | | Window - 7 | | Prot faulty bank - 1 | |  |
| 8 | | 3CBP – 1 | | Window - 8 | | VT fail bank -1 | |  |
| * 1. **Capacitor bank annunciation -2** | | | | | | | | |
| 9 | | 3CBP – 2 | | Window - 8 | | Group -1 prot operated | |  |
| 10 | | 3CBP – 2 | | Window - 9 | | Group -2 prot operated | |  |
| 11 | | S ------- | | Window - 10 | | Trip ckt faulty | |  |
| 12 | | S ------- | | Window - 11 | | SF6 stage – 2 operated | |  |
| 13 | | 3CBP – 2 | | Window - 12 | | Stage - 1 alarm operate | |  |
| 14 | | S ------- | | Window - 13 | | SWGR trouble | |  |
| 15 | | 3CBP - 2 | | Window - 14 | | Prot faulty bank - 2 | |  |
| 16 | | 3CBP – 2 | | Window - 15 | | VT fail bank -2 | |  |
| * 1. **Capacitor bank annunciation -3** | | | | | | | | |
| 17 | 3CBP – 3 | | Ann window – 16 | | Group -1 protection operated | |  | |
| 18 | 3CBP – 3 | | Ann window - 17 | | Group -2 protection operated | |  | |
| 19 | S ------- | | Ann window - 18 | | Trip ckt faulty | |  | |
| 20 | S ------- | | Ann window - 19 | | SF6 stage – 2 operated | |  | |
| 21 | 3CBP – 3 | | Ann window - 20 | | Stage - 1 alarm operated | |  | |
| 22 | S ------- | | Ann window - 21 | | SWGR trouble | |  | |
| 23 | 3CBP – 3 | | Ann window - 22 | | Prot faulty bank - 3 | |  | |
| 24 | 3CBP - 3 | | Ann window - 23 | | VT fail bank -3 | |  | |

1. **GENERAL ANNUNCIATORS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 25 | PLC | Ann window - 27 | Main DC fail |  |
| 26 | ACCS | Ann window - 28 | PLC battery low / PLC faulty |  |