#### 1. GENERAL DATA AND INFORMATION:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Panel No. |  |  | Designation | **50/50N/51/51N** |
| Panel Name |  | Rated Voltage | 125 VDC |
| Serial No. |  | Aux. Voltage | 110 – 250 VAC/DC |
| Make |  | Frequency | 50 – 60 Hz |
| MODEL | **ABB REQ650** | CT Ratio | 2000/1A |

#### 2. MECHANICAL CHECKS AND VISUAL INSPECTION:

|  |  |  |
| --- | --- | --- |
| ITEM | DESCRIPTION | CHECKED |
| 1 | Inspect for physical damage / defects. |  |
| 2 | Verify Connections as per approved drawings. |  |
| 3 | Check tightness of all connections. |  |
| 5 | Check apparatus lists. |  |
| 6 | Check ferrules. |  |
| 7 | Test Switch checked for correct function. |  |
| 8 | Check case earthing. |  |
| 9 | Watchdog contact (X319:3 , X319:2) |  |

#### 3. ELECTRICAL TESTS: With relay energized condition

|  |  |  |
| --- | --- | --- |
| ITEM | DESCRIPTION | CHECKED |
| 1 | Measured auxiliary supply. |  |
| 2 | Clock set at local time. |  |
| 3 | Time maintained when auxiliary supply removed. |  |
| 5 | Relay healthy (green) LED working. |  |
| 6 | Trip (red) LED working. |  |
| 7 | Communication with PC |  |
| 8 | Event Record Check |  |
| 9 | Disturbance Record Check |  |

#### 4. INPUTS AND OUTPUTS TESTS:

**INPUT OPTO-ISOLATORS CHECKS (With Relay Energized):**

Go to CONFIGURATION - MONITORING,

I/O STATUS,

then go to BINARY INPUTS VALUES ( X120 (AIM) – X110 (BIO) )

to check the values after giving pulse on each BI.

|  |  |  |  |
| --- | --- | --- | --- |
| **OPTO INPUT NO.** | **TEST METHOD**  **(Energize only one at a time with**  **125V DC Station Battery voltage)** | **RESULT**  **Display FALSE to TURE** | **REMARKS** |
| **X324** | | | |
| BI 1 | ENERGIZE TB NO. X324 : 2 – 1 |  | **INST. PROT IN** |
| BI 2 | ENERGIZE TB NO. X324 : 5 – 4 |  | **CBF INITIATION** |
| BI 3 | ENERGIZE TB NO. X324 : 6 – 4 |  | SPARE |
| BI 4 | ENERGIZE TB NO. X324 : 9 - 8 |  | **INST. PROT OUT** |
| BI 5 | ENERGIZE TB NO. X324 : 10 – 8 |  | **86CBF OPTD.** |
| BI 6 | ENERGIZE TB NO. X324 : 13 – 12 |  | **BF SUPPLY FAIL** |
| BI 7 | ENERGIZE TB NO. X324 : 14 – 12 |  | **RESET SUPPLY FAIL** |
| BI 8 | ENERGIZE TB NO. X324 : 17 – 16 |  | **AC SUPPLY FAIL** |
| BI 9 | ENERGIZE TB NO. X324 : 18 – 16 |  | **86BC OPTD.** |
| **X329** | | | |
| BI 10 | ENERGIZE TB NO. X329 : 2 – 1 |  | **TC1 SUPVN** |
| BI 11 | ENERGIZE TB NO. X329 : 5 – 4 |  | **TC1 SUPVN** |
| BI 12 | ENERGIZE TB NO. X329 : 6 – 4 |  | SPARE |
| BI 13 | ENERGIZE TB NO. X329 : 9 - 8 |  | SPARE |
| BI 14 | ENERGIZE TB NO. X329 : 10 – 8 |  | **TC2 SUPVN** |
| BI 15 | ENERGIZE TB NO. X329 : 13 – 12 |  | **TC2 SUPVN** |
| BI 16 | ENERGIZE TB NO. X329 : 14 – 12 |  | SPARE |
| BI 17 | ENERGIZE TB NO. X329 : 17 – 16 |  | **86B1B OPTD.** |
| BI 18 | ENERGIZE TB NO. X329 : 18 – 16 |  | **86B2B OPTD.** |

**OUTPUT RELAYS CHECKS (With Relay Energized):**

Test Procedure:

Go to IED CONFIGURATION,

TESTS, IED TEST, TEST MODE : ON,

then go to BINARY OUTPUTS-CHANGE THE POSITION OF EACH BO FROM FULSE TO TURE FROM HMI,

then check contact resistance.

|  |  |  |  |
| --- | --- | --- | --- |
| **OUTPUT RELAY No.** | **TEST METHOD**  **(Energize only one relay at a time by**  **Test ON in ‘IED TEST’)** | **RESULT**  **Contact Checked**  **≤ 0.2Ω** | **REMARKS** |
| **X317** | | | |
| BIO1 | CONTACT OPERATED X317 : 1 – 2 (N/O) |  | SPARE |
| BIO2 | CONTACT OPERATED X317 : 3 – 4 (N/O) |  | SPARE |
| BIO3 | CONTACT OPERATED X317 : 5 – 6 (N/O) |  | SPARE |
| BIO4 | CONTACT OPERATED X317 : 7 – 8 (N/O) |  | **INST. TRIP 50/50N** |
| BIO5 | CONTACT OPERATED X317 : 9 – 10 (N/O) |  | **IDMT. TRIP 51/51N** |
| BIO6 | CONTACT OPERATED X317 : 11 – 12 (N/O) |  | SPARE |
| BIO7 | CONTACT OPERATED X317 : 13 – 14 (N/O) |  | SPARE |
| BIO8 | CONTACT OPERATED X317 : 15 – 16 (N/O) |  | **CBF TRIP** |
| BIO9 | CONTACT OPERATED X317 : 17 – 18 (N/O) |  | **CBF TRIP** |
| **X321** | | | |
| BIO10 | CONTACT OPERATED X321 : 1 – 2 (N/O) |  | SPARE |
| BIO11 | CONTACT OPERATED X321 : 3 – 4 (N/O) |  | SPARE |
| BIO12 | CONTACT OPERATED X321 : 5 – 6 (N/O) |  | SPARE |
| BIO13 | CONTACT OPERATED X321 : 7 – 8 (N/O) |  | SPARE |
| BIO14 | CONTACT OPERATED X321 : 9 – 10 (N/O) |  | SPARE |
| BIO15 | CONTACT OPERATED X321 : 11 – 12 (N/O) |  | SPARE |
| BIO16 | CONTACT OPERATED X321 : 13 – 15 (N/C) |  | SPARE |
| BIO17 | CONTACT OPERATED X321 : 14 – 15 (N/O) |  | SPARE |
| BIO18 | CONTACT OPERATED X321 : 16 – 18 (N/C) |  | SPARE |
| BIO19 | CONTACT OPERATED X321 : 17 – 18 (N/O) |  | SPARE |

|  |  |  |  |
| --- | --- | --- | --- |
| **X326** | | | |
| BIO20 | CONTACT OPERATED X326 : 1 – 2 (N/O) |  | SPARE |
| BIO21 | CONTACT OPERATED X326 : 3 – 4 (N/O) |  | SPARE |
| BIO22 | CONTACT OPERATED X326 : 5 – 6 (N/O) |  | SPARE |
| BIO23 | CONTACT OPERATED X326 : 7 – 8 (N/O) |  | SPARE |
| BIO24 | CONTACT OPERATED X326 : 9 – 10 (N/O) |  | SPARE |
| BIO25 | CONTACT OPERATED X326 : 11 – 12 (N/O) |  | SPARE |
| BIO26 | CONTACT OPERATED X326 : 13 – 15 (N/C) |  | SPARE |
| BIO27 | CONTACT OPERATED X326 : 14 – 15 (N/O) |  | SPARE |
| BIO28 | CONTACT OPERATED X326 : 16 – 18 (N/C) |  | SPARE |
| BIO29 | CONTACT OPERATED X326 : 17 – 18 (N/O) |  | SPARE |

**INDICATION LED TEST**

**LED Checks:**

Go to hardware test to view the physical position of the LED.

|  |  |  |
| --- | --- | --- |
| **OPTO Input Number** | **Result Display On or Off** | **Function** |
| LED 1 |  | **INST. PROTN IN/OUT** |
| LED 2 |  | **OC START** |
| LED 3 |  | **OC TRIP R-PHASE** |
| LED 4 |  | **OC TRIP Y-PHASE** |
| LED 5 |  | **OC TRIP B-PHASE** |
| LED 6 |  | **EF START** |
| LED 7 |  | **EF TRIP** |
| LED 8 |  | **CBF INITIATION** |
| LED 9 |  | **86CBF OPTD.** |
| LED 10 |  | **TC1 SUPERVISION** |
| LED 11 |  | **TC2 SUPERVISION** |
| LED 12 |  | SPARE |
| LED 13 |  | SPARE |
| LED 14 |  | SPARE |
| LED 15 |  | SPARE |

**5. PICK UP & DROP OFF TEST:**

**50/50N:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current Setting**  **I**Threshold  **(50)**  **Amps** | **Over Current Relay** | | | | | | **Current**  **Setting**  **I**Threshold  **(51)**  **Amps** | **Earth Fault Relay (N)** | |
| R | | Y | | B | |
| P/U  A | D/O  A | P/U  A | D/O  A | P/U  A | D/O  A | P/U  A | D/O  A |
| 0.5 A |  |  |  |  |  |  | 0.5 A |  |  |

**51/51N IEC NORM. INV. CURVE:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current Setting**  **I**Threshold  **(50N)**  **Amps** | **Over Current Relay** | | | | | | **Current**  **Setting I**Threshold  **(51N)**  **Amps** | **Earth Fault Relay (N)** | |
| **R** | | **Y** | | **B** | |
| P/U  A | D/O  A | P/U  A | D/O  A | P/U  A | D/O  A | P/U  A | D/O  A |
| 1.2 A |  |  |  |  |  |  | 0.3 A |  |  |

**6. TIMING TEST:**

**50/50N:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Current Setting I**Threshold  **(50) SEC** | **Over Current Relay** | | | **Current**  **Setting I**Threshold  **(51) SEC** | **Earth Fault Relay (N)** |
| **R** | **Y** | **B** |
| 80 msec |  |  |  | 80 msec |  |

**51/51N IEC CURVE:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Current Setting I**Threshold  **(50N) SEC** | | **IEC Curves** | **Over Current Relay** | | | **Current**  **Setting I**Threshold  **(51N) SEC** | **Earth Fault Relay (N)** |
| **R** | **Y** | **B** |
| 2xIset | 0.2 NI | IEC **S** INVERSE |  |  |  | 0.2 NI |  |
| 10xIset |  |  |  |  |

**7. BREAKER FAILURE PROTECTION (50+62BF) PICK UP & DROP OFF**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Phase | Current ( A ) | | | Stage 1 | |
| Set | Pickup | Drop-off | Set | OPTD (ms) |
| R |  |  |  |  |  |
| Y |  |  |  |
| B |  |  |  |