#### GENERAL DATA AND INFORMATION:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Panel No. | **UFLS** |  | Designation | **81-C** |
| Panel Name | **13.8kV U/F LOAD SHEDDING** | Rated Voltage | 125 VDC |
| Make |  | Aux. Voltage | 110 – 250 VAC/DC |
| Model | **ABB REC670** | CT Ratio | 800/1A |
| Serial No. |  | VT Ratio | 13.8kV/120V |
| Order No. | **1MRK004814-AC** | Neutral CT Ratio | 10/1A |
| Frequency | 60 Hz | Neutral VT Ratio | 5600/110V |

#### MECHANICAL CHECKS AND VISUAL INSPECTION:

|  |  |  |  |
| --- | --- | --- | --- |
| ITEM | DESCRIPTION | CHECKED | |
| 1 | Inspect for physical damage / defects. | ❑ Yes | ❑ N/A |
| 2 | Verify Connections as per approved drawings. | ❑ Yes | ❑ N/A |
| 3 | Check tightness of all connections. | ❑ Yes | ❑ N/A |
| 4 | Check apparatus lists. | ❑ Yes | ❑ N/A |
| 5 | Check ferrules. | ❑ Yes | ❑ N/A |
| 6 | Test Switch checked for correct function. | ❑ Yes | ❑ N/A |
| 7 | Check case earthing. | ❑ Yes | ❑ N/A |
| 8 | Watchdog contact. | ❑ Yes | ❑ N/A |

#### ELECTRICAL TESTS: With relay energized condition

|  |  |  |  |
| --- | --- | --- | --- |
| ITEM | DESCRIPTION | CHECKED | |
| 1 | Measured auxiliary supply. | ❑ Yes | ❑ N/A |
| 2 | Clock set at local time. | ❑ Yes | ❑ N/A |
| 3 | Time maintained when auxiliary supply removed. | ❑ Yes | ❑ N/A |
| 4 | Relay healthy (green) LED working. | ❑ Yes | ❑ N/A |
| 5 | Trip (red) LED working. | ❑ Yes | ❑ N/A |
| 6 | Human Machine Interface [HMI] checked. | ❑ Yes | ❑ N/A |
| 7 | LED’s function checked. | ❑ Yes | ❑ N/A |
| 8 | Trip contacts checked. | ❑ Yes | ❑ N/A |
| 9 | Reset of indications checked. | ❑ Yes | ❑ N/A |
| 10 | Group active function checked. | ❑ Yes | ❑ N/A |
| 11 | All binary inputs checked. | ❑ Yes | ❑ N/A |
| 12 | All binary outputs checked. | ❑ Yes | ❑ N/A |

#### INPUTS AND OUTPUTS TESTS:

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SLOT NO.** | **OPTO INPUT NO.** | **TEST METHOD**  **(Energize only one at a time with**  **125V DC Station Battery voltage)** | **RESULT**  **Display FALSE to TURE** | | | **FUNCTION** |
| **X31** | | | | | | |
| P3 | BI.01 | ENERGIZE TB NO. X31: 1-2 | ❑ Yes | ❑ N/A | | **PROT. IN** |
| P3 | BI.02 | ENERGIZE TB NO. X31: 3-4 | ❑ Yes | ❑ N/A | | **PROT. OUT** |
| P3 | BI.03 | ENERGIZE TB NO. X31: 5-6 | ❑ Yes | ❑ N/A | | **STG-1 & 2 OPTD** |
| P3 | BI.04 | ENERGIZE TB NO. X31: 7-8 | ❑ Yes | ❑ N/A | | **STG-3 & 4 OPTD** |
| P3 | BI.05 | ENERGIZE TB NO. X31: 9-10 | ❑ Yes | ❑ N/A | | **IN/OUT DC FAIL** |
| P3 | BI.06 | ENERGIZE TB NO. X31: 11-12 | ❑ Yes | ❑ N/A | | **AC SUPPLY FAIL** |
| P3 | BI.07 | ENERGIZE TB NO. X31: 13-14 | ❑ Yes | ❑ N/A | | **13.8 BUS-C VT FAIL** |
| P3 | BI.08 | ENERGIZE TB NO. X31: 15-16 | ❑ Yes | ❑ N/A | | SPARE |
| **X32** | | | | | | |
| P3 | BI.09 | ENERGIZE TB NO. X32: 1-2 | ❑ Yes | | ❑ N/A | SPARE |
| P3 | BI.10 | ENERGIZE TB NO. X32: 3-4 | ❑ Yes | | ❑ N/A | SPARE |
| P3 | BI.11 | ENERGIZE TB NO. X32: 5-6 | ❑ Yes | | ❑ N/A | SPARE |
| P3 | BI.12 | ENERGIZE TB NO. X32: 7-8 | ❑ Yes | | ❑ N/A | SPARE |
| P3 | BI.13 | ENERGIZE TB NO. X32: 9-10 | ❑ Yes | | ❑ N/A | SPARE |
| P3 | BI.14 | ENERGIZE TB NO. X32: 11-12 | ❑ Yes | | ❑ N/A | SPARE |
| P3 | BI.15 | ENERGIZE TB NO. X32: 13-14 | ❑ Yes | | ❑ N/A | SPARE |
| P3 | BI.16 | ENERGIZE TB NO. X32: 15-16 | ❑ Yes | | ❑ N/A | SPARE |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SLOT NO.** | **OPTO INPUT NO.** | **TEST METHOD**  **(Energize only one at a time with**  **125V DC Station Battery voltage)** | **RESULT**  **Display FALSE to TURE** | | | **FUNCTION** |
| **X51** | | | | | | |
| P5 | BI.01 | ENERGIZE TB NO. X51: 1-2 | ❑ Yes | ❑ N/A | | SPARE |
| P5 | BI.02 | ENERGIZE TB NO. X51: 3-4 | ❑ Yes | ❑ N/A | | SPARE |
| P5 | BI.03 | ENERGIZE TB NO. X51: 5-6 | ❑ Yes | ❑ N/A | | SPARE |
| P5 | BI.04 | ENERGIZE TB NO. X51: 7-8 | ❑ Yes | ❑ N/A | | SPARE |
| P5 | BI.05 | ENERGIZE TB NO. X51: 9-10 | ❑ Yes | ❑ N/A | | SPARE |
| P5 | BI.06 | ENERGIZE TB NO. X51: 11-12 | ❑ Yes | ❑ N/A | | SPARE |
| P5 | BI.07 | ENERGIZE TB NO. X51: 13-14 | ❑ Yes | ❑ N/A | | SPARE |
| P5 | BI.08 | ENERGIZE TB NO. X51: 15-16 | ❑ Yes | ❑ N/A | | SPARE |
| **X52** | | | | | | |
| P5 | BI.09 | ENERGIZE TB NO. X52: 1-2 | ❑ Yes | | ❑ N/A | SPARE |
| P5 | BI.10 | ENERGIZE TB NO. X52: 3-4 | ❑ Yes | | ❑ N/A | SPARE |
| P5 | BI.11 | ENERGIZE TB NO. X52: 5-6 | ❑ Yes | | ❑ N/A | SPARE |
| P5 | BI.12 | ENERGIZE TB NO. X52: 7-8 | ❑ Yes | | ❑ N/A | SPARE |
| P5 | BI.13 | ENERGIZE TB NO. X52: 9-10 | ❑ Yes | | ❑ N/A | SPARE |
| P5 | BI.14 | ENERGIZE TB NO. X52: 11-12 | ❑ Yes | | ❑ N/A | SPARE |
| P5 | BI.15 | ENERGIZE TB NO. X52: 13-14 | ❑ Yes | | ❑ N/A | SPARE |
| P5 | BI.16 | ENERGIZE TB NO. X52: 15-16 | ❑ Yes | | ❑ N/A | SPARE |

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SLOT NO.** | **OPTO INPUT NO.** | **TEST METHOD**  **(Energize only one at a time with**  **125V DC Station Battery voltage)** | **RESULT**  **Display FALSE to TURE** | | **FUNCTION** |
| **X41** | | | | | |
| P4 | BI.01 | ENERGIZE TB NO. X41: 2-1 | ❑ Yes | ❑ N/A | **U/F STAGE -1 TRIP** |
| P4 | BI.02 | ENERGIZE TB NO. X41: 2-3 | ❑ Yes | ❑ N/A | **U/F STAGE -1 TRIP** |
| P4 | BI.03 | ENERGIZE TB NO. X41: 5-4 | ❑ Yes | ❑ N/A | **U/F STAGE -2 TRIP** |
| P4 | BI.04 | ENERGIZE TB NO. X41: 5-6 | ❑ Yes | ❑ N/A | **U/F STAGE -2 TRIP** |
| P4 | BI.05 | ENERGIZE TB NO. X41: 8-7 | ❑ Yes | ❑ N/A | **U/F STAGE -3 TRIP** |
| P4 | BI.06 | ENERGIZE TB NO. X41: 8-9 | ❑ Yes | ❑ N/A | **U/F STAGE -3 TRIP** |
| P4 | BI.07 | ENERGIZE TB NO. X41: 11-10 | ❑ Yes | ❑ N/A | **U/F STAGE -4 TRIP** |
| P4 | BI.08 | ENERGIZE TB NO. X41: 11-12 | ❑ Yes | ❑ N/A | **U/F STAGE -4 TRIP** |
| P4 | BI.09 | ENERGIZE TB NO. X41: 14-13 | ❑ Yes | ❑ N/A | **PROT. IN** |
| P4 | BI.10 | ENERGIZE TB NO. X41: 14-15 | ❑ Yes | ❑ N/A | **PROT. OUT** |
| P4 | BI.11 | ENERGIZE TB NO. X41: 17-16 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.12 | ENERGIZE TB NO. X41: 17-18 | ❑ Yes | ❑ N/A | SPARE |
| **X42** | | | | | |
| P4 | BI.13 | ENERGIZE TB NO. X42: 2-1 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.14 | ENERGIZE TB NO. X42: 2-3 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.15 | ENERGIZE TB NO. X42: 5-4 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.16 | ENERGIZE TB NO. X42: 5-6 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.17 | ENERGIZE TB NO. X42: 8-7 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.18 | ENERGIZE TB NO. X42: 8-9 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.19 | ENERGIZE TB NO. X42: 11-10 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.20 | ENERGIZE TB NO. X42: 11-12 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.21 | ENERGIZE TB NO. X42: 14-13 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.22 | ENERGIZE TB NO. X42: 14-15 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.23 | ENERGIZE TB NO. X42: 17-16 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.24 | ENERGIZE TB NO. X42: 17-18 | ❑ Yes | ❑ N/A | SPARE |

1. **INDICATION LED TEST**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **OPTO Input Number** | **LED**  **COLOR** | **RESULT DISPLAY**  **ON OR OFF** | | **FUNCTION** |
| LED 1 | Red | ❑ Yes | ❑ N/A | **U/F SGT-1 TRIP** |
| LED 2 | Red | ❑ Yes | ❑ N/A | **U/F SGT-2 TRIP** |
| LED 3 | Red | ❑ Yes | ❑ N/A | **U/F SGT-3 TRIP** |
| LED 4 | Red | ❑ Yes | ❑ N/A | **U/F SGT-4 TRIP** |
| LED 5 | Red | ❑ Yes | ❑ N/A | **U/F BLOCKED** |
| LED 6 | Red | ❑ Yes | ❑ N/A | **PROT. IN** |
| LED 7 | Yellow | ❑ Yes | ❑ N/A | **PROT. OUT** |
| LED 8 | Yellow | ❑ Yes | ❑ N/A | **U/F SGT-1 START** |
| LED 9 | Yellow | ❑ Yes | ❑ N/A | **U/F SGT-2 START** |
| LED 10 | Yellow | ❑ Yes | ❑ N/A | **U/F SGT-3 START** |
| LED 11 | Yellow | ❑ Yes | ❑ N/A | **U/F SGT-4 START** |
| LED 12 | Yellow | ❑ Yes | ❑ N/A | SPARE |
| LED 13 | Yellow | ❑ Yes | ❑ N/A | SPARE |
| LED 14 | Yellow | ❑ Yes | ❑ N/A | SPARE |
| LED 15 | Yellow | ❑ Yes | ❑ N/A | SPARE |

#### ANALOGUE INPUTS MEASUREMENT TEST:

VT Ratio = 13.8 kV/ 120 V (BUS VT)

TRM P40 - 6I+6U:

|  |  |  |
| --- | --- | --- |
| Applied Frequency | Measured Frequency | %Error |
| 59.50 |  |  |
| 59.30 |  |  |
| 59.00 |  |  |
| 58.50 |  |  |
| 58.30 |  |  |

1. **UNDER FREQUENCY PROTECTION - (SAPTUF:1):** 
   1. **PICK-UP AND DROP OFF TEST:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency Set (Hz) | Actual Frequency –Hz | | | | | | | |
| Stage-1  **SAPTUF:1** | | Stage-2  **SAPTUF:2** | | Stage-3  **SAPTUF:3** | | Stage-4  **SAPTUF:4** | |
| P/U | D/O | P/U | D/O | P/U | D/O | P/U | D/O |
| 59.5 |  |  |  |  |  |  |  |  |
| 58.6 |  |  |  |  |  |  |  |  |

* 1. **TIMING TEST:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Set Time (sec) | Actual Time – sec | | | |
| Stage-1  **SAPTUF:1** | Stage-2  **SAPTUF:2** | Stage-3  **SAPTUF:3** | Stage-4  **SAPTUF:4** |
| 1 sec |  |  |  |  |
| 2 sec |  |  |  |  |

* 1. **TECHNICAL DATA:**

