#### GENERAL DATA AND INFORMATION:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Panel No. |  |  | Designation | **GP1** |
| Panel Name | **13.8kV CAPACITOR BANK PROT.** | 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. | **1MRK002814-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 |

#### ANALOGUE INPUTS MEASUREMENT TEST:

CT RATIO = 800 /1 A (MAIN CT), 10/1 A (Neutral Unbalance CT)

VT Ratio = 13.8 kV/ 120 V (MAIN VT) 5600/110 V (Neutral Displacement VT)

TRM P40 - 6I+6 :

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Channel** | **DUTY** | **Inj. Values** | **Set values** | | **Measured values** | | | |
| **Prim.** | **Sec.** | **Primary** | | **Secondary** | |
| **Value** | **Angle** | **Value** | **Angle** |
| CH 1-I | CT1 -IL1 | 1.00 A | 800A | 1.0 A |  |  |  |  |
| CH 2-I | CT1 -IL2 | 1.00 A | 800A | 1.0 A |  |  |  |  |
| CH 3-I | CT1 -IL3 | 1.00 A | 800A | 1.0 A |  |  |  |  |
| CH 4-I | Neutral CT | 1.00 A | 10 A | 1.0 A |  |  |  |  |
| CH 5-I | Spare | - | - | - |  |  |  |  |
| CH 6-I | Spare | - | - | - |  |  |  |  |
| CH 7-U | Voltage-UL1 | 69.3 V | 7.967 kV | 69.3 V |  |  |  |  |
| CH 8-U | Voltage-UL2 | 69.3 V | 7.967 kV | 69.3 V |  |  |  |  |
| CH 9-U | Voltage-UL3 | 69.3 V | 7.967 kV | 69.3 V |  |  |  |  |
| CH 10-U | Neutral VT | 63.5 V | 5.6 kV | 63.5 V |  |  |  |  |
| CH 11-U | Spare | - | - | - |  |  |  |  |
| CH 12-U | Spare | - | - | - |  |  |  |  |
| VAB | Ph-Ph | 120 V | 13.8 kV |  |  |  |  |  |
| VBC | Ph-Ph | 120 V | 13.8 kV |  |  |  |  |  |
| VCA | Ph-Ph | 120 V | 13.8 kV |  |  |  |  |  |
| Frequency | ABC | 60 HZ | 60 HZ | |  | |  |  |
| Active power | ABC | 120 V, 1A | 19.12 MW | |  | |  |  |
| Reactive power | ABC | 120 V, 1A | 0 | |  | |  |  |
| Apparent power | ABC | 120 V, 1A | 19.12 MVA | |  | |  |  |
| Power factor | ABC | 1A | 1 | |  | |  |  |

#### 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 | | **CB CLOSED** |
| P3 | BI.02 | ENERGIZE TB NO. X31: 3-4 | ❑ Yes | ❑ N/A | | **CB OPEN** |
| P3 | BI.03 | ENERGIZE TB NO. X31: 5-6 | ❑ Yes | ❑ N/A | | **VT MCB TRIP** |
| P3 | BI.04 | ENERGIZE TB NO. X31: 7-8 | ❑ Yes | ❑ N/A | | **BF EXT. INI** |
| P3 | BI.05 | ENERGIZE TB NO. X31: 9-10 | ❑ Yes | ❑ N/A | | **86C-1 OPTD** |
| P3 | BI.06 | ENERGIZE TB NO. X31: 11-12 | ❑ Yes | ❑ N/A | | **86C-2 OPTD** |
| P3 | BI.07 | ENERGIZE TB NO. X31: 13-14 | ❑ Yes | ❑ N/A | | **SET-1 PTN IN** |
| P3 | BI.08 | ENERGIZE TB NO. X31: 15-16 | ❑ Yes | ❑ N/A | | **SET-1 PTN OUT** |
| **X32** | | | | | | |
| P3 | BI.09 | ENERGIZE TB NO. X32: 1-2 | ❑ Yes | | ❑ N/A | **GP1 IN/OUT DC FAIL** |
| P3 | BI.10 | ENERGIZE TB NO. X32: 3-4 | ❑ Yes | | ❑ N/A | **RST DC FAIL** |
| P3 | BI.11 | ENERGIZE TB NO. X32: 5-6 | ❑ Yes | | ❑ N/A | **IND DC FAIL** |
| P3 | BI.12 | ENERGIZE TB NO. X32: 7-8 | ❑ Yes | | ❑ N/A | **GP2 DC FAIL** |
| P3 | BI.13 | ENERGIZE TB NO. X32: 9-10 | ❑ Yes | | ❑ N/A | **AC SUPPLY FAIL** |
| P3 | BI.14 | ENERGIZE TB NO. X32: 11-12 | ❑ Yes | | ❑ N/A | **GP2 FAULTY** |
| 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 | **(59,27) O/V U/V TRIP** |
| P4 | BI.02 | ENERGIZE TB NO. X41: 2-3 | ❑ Yes | ❑ N/A | **(59,27) O/V U/V TRIP** |
| P4 | BI.03 | ENERGIZE TB NO. X41: 5-4 | ❑ Yes | ❑ N/A | **50/51/50N/51N/UC +**  **DIR NEG SEQ TRIP** |
| P4 | BI.04 | ENERGIZE TB NO. X41: 5-6 | ❑ Yes | ❑ N/A | **50/51/50N/51N/UC +**  **DIR NEG SEQ TRIP** |
| P4 | BI.05 | ENERGIZE TB NO. X41: 8-7 | ❑ Yes | ❑ N/A | **46 NEUTRAL**  **UNBALANCE TRIP** |
| P4 | BI.06 | ENERGIZE TB NO. X41: 8-9 | ❑ Yes | ❑ N/A | **46 NEUTRAL**  **UNBALANCE TRIP** |
| P4 | BI.07 | ENERGIZE TB NO. X41: 11-10 | ❑ Yes | ❑ N/A | **CBF OPTD** |
| P4 | BI.08 | ENERGIZE TB NO. X41: 11-12 | ❑ Yes | ❑ N/A | **CBF OPTD** |
| P4 | BI.09 | ENERGIZE TB NO. X41: 14-13 | ❑ Yes | ❑ N/A | SPARE |
| P4 | BI.10 | ENERGIZE TB NO. X41: 14-15 | ❑ Yes | ❑ N/A | SPARE |
| 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 WIRED |
| P4 | BI.14 | ENERGIZE TB NO. X42: 2-3 | ❑ Yes | ❑ N/A | SPARE WIRED |
| P4 | BI.15 | ENERGIZE TB NO. X42: 5-4 | ❑ Yes | ❑ N/A | SPARE WIRED |
| P4 | BI.16 | ENERGIZE TB NO. X42: 5-6 | ❑ Yes | ❑ N/A | SPARE WIRED |
| 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 | **50/51 OPTD** |
| LED 2 | Red | ❑ Yes | ❑ N/A | **50N/51N OPTD** |
| LED 3 | Red | ❑ Yes | ❑ N/A | **NEG SEQ DIR O/C TRIP** |
| LED 4 | Red | ❑ Yes | ❑ N/A | **UNDER CURRENT TRIP** |
| LED 5 | Red | ❑ Yes | ❑ N/A | **46 NEUTRAL UNBALANCE TRIP** |
| LED 6 | Red | ❑ Yes | ❑ N/A | **CBF OPTD** |
| LED 7 | Yellow | ❑ Yes | ❑ N/A | **U/V STG-2 TRIP** |
| LED 8 | Yellow | ❑ Yes | ❑ N/A | **O/V STG-2 TRIP** |
| LED 9 | Yellow | ❑ Yes | ❑ N/A | **59ND OV TRIP** |
| LED 10 | Yellow | ❑ Yes | ❑ N/A | **FUSE FAIL OPTD** |
| LED 11 | Yellow | ❑ Yes | ❑ N/A | **VT MCB TRIP** |
| LED 12 | Yellow | ❑ Yes | ❑ N/A | **U/V STG-1 ALARM** |
| LED 13 | Yellow | ❑ Yes | ❑ N/A | **O/V STG-1 ALARM** |
| LED 14 | Yellow | ❑ Yes | ❑ N/A | **46 NEU UBAL O/C ALARM** |
| LED 15 | Yellow | ❑ Yes | ❑ N/A | **CBF INITIATION** |

1. **OVER CURRENT PROTECTION - (OC4PTOC:1) & (EF4PTOC:1):** 
   1. **51/51N IEC NORM. INV. CURVE:**
      1. **PICK-UP AND DROP OFF TEST:**

**IDMT 51P: 0.48 amp. K= 0.28 Curve: Normal Inverse.**

**IDMT 51N: 0.11 amp. K=0.28 Curve: Normal Inverse.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current Setting**  **I**Threshold  **(50N)**  **Amps** | **Over Current Relay** | | | | | | **Current**  **Setting I**Threshold  **(51N)**  **Amps** | **Earth Fault Relay (N)**  **EF4PTOC:1** | |
| **R**  **OC4PTOC:1** | | **Y**  **OC4PTOC:1** | | **B**  **OC4PTOC:1** | |
| P/U  A | D/O  A | P/U  A | D/O  A | P/U  A | D/O  A | P/U  A | D/O  A |
| 0.48 A |  |  |  |  |  |  | 0.11 A |  |  |

* 1. **TIMING TEST:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Current Setting I**Threshold  **(50N) SEC OC4PTOC:1** | **IEC Curves** | **Over Current Relay** | | | **Current**  **Setting I**Threshold  **(51N) SEC** | **Earth Fault Relay (N)**  **EF4PTOC:1** |
| **R** | **Y** | **B** |
| 2xIset | IEC **NORM.** INV. |  |  |  | 2xIset |  |
| 5xIset |  |  |  | 5xIset |  |

Curve Equation: *where*

* 1. **50/50N IEC DEF. TIME CURVE:**
     1. **PICK-UP AND DROP OFF TEST:**

**High Set 50P: 2.0 amp. Delay = 100 msec**

**High Set 50N: 0.9A Delay = 100 msec**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current Setting**  **I**Threshold  **(50N)**  **Amps** | **Over Current Relay** | | | | | | **Current**  **Setting I**Threshold  **(51N)**  **Amps** | **Earth Fault Relay (N)**  **EF4PTOC:1** | |
| **R**  **OC4PTOC:1** | | **Y**  **OC4PTOC:1** | | **B**  **OC4PTOC:1** | |
| P/U  A | D/O  A | P/U  A | D/O  A | P/U  A | D/O  A | P/U  A | D/O  A |
| 2.0 A |  |  |  |  |  |  | 0.9 A |  |  |

* 1. **TIMING TEST:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Current Setting I**Threshold  **(50N) SEC OC4PTOC:1** | **TIME**  **SETTING** | **Over Current Relay** | | | **Current**  **Setting I**Threshold  **(51N) SEC** | **Earth Fault Relay (N)**  **EF4PTOC:1** |
| **R** | **Y** | **B** |
| 2xIset | 100 msec |  |  |  | 2xIset |  |

1. **UNDER CURRENT PROTECTION - (CVGAPC:2):**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **Setting** | **Under Current (A)** | | **UC**  **Delay**  **Setting** | **UC**  **Delay**  **OPTD** |
| **Pick-Up** | **Drop Off** |
| R-N | **0.2 In** |  |  | **0.4 sec** |  |
| Y-N |  |  |  |
| B-N |  |  |  |

1. **NEGATIVE SEQUENCE DIRECTIONAL O/C - (NS4PTOC:1):**

Start curr\_OC1: **15%** Ib,

Time Delay: 0.4 Sec

Directional mode: **forward**,

Low volt Vm: **5%**

RCA = **-60°**

ROA = **80°**

* 1. **PICK-UP & DROP OFF TEST:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Phase** | **Neg. Seq. Setting Current (A)** | **Calc.**  **Current(A)** | **Measured** | | **Neg. Seq. Setting Voltage (V)** | **Volt**  **Calc.** | **Measured (V)** | |
| **Pick up** | **Drop off** | **Pick-up** | **Drop off** |
| R | 15% | 0.45 |  |  | 5% | 58.905 |  |  |
| Y | 15% | 0.45 |  |  | 5% | 58.905 |  |  |
| B | 15% | 0.45 |  |  | 5% | 58.905 |  |  |

* 1. **TRIP ZONE CHECK:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase** | **Current Injected** | **Voltage Injected** | **Operating Angle Measured** |
| R |  |  |  |
| Y |  |  |  |
| B |  |  |  |

* 1. **TIMING TEST:**

|  |  |  |
| --- | --- | --- |
| **Phase** | **Set Time (ms)** | **Measured Time** |
| R | 400 |  |
| Y | 400 |  |
| B | 400 |  |

1. **UNDER VOLTAGE TEST - (UV2PTUV:1):**
   1. **UNDER VOLTAGE STAGE-1 ALARM:**

Voltage Setting: **90% Ub,**

Characteristic: **definite time**

t1: **5 sec**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **U1˂ Setting** | **Time Set (sec)** | **Measured Volt** | | **Timing** |
| **Pick up** | **Drop off** |
| R – Y | 90% | 5 |  |  |  |
| Y – B | 90% | 5 |  |  |  |
| B – R | 90% | 5 |  |  |  |

* 1. **UNDER VOLTAGE STAGE-2 TRIP:**

Voltage Setting: **70% Ub,**

Characteristic: **definite time**

t1: **10 sec**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **U1˂ Setting** | **Time Set (sec)** | **Measured Volt** | | **Timing** |
| **Pick up** | **Drop off** |
| R – Y | 70% | 10 |  |  |  |
| Y – B | 70% | 10 |  |  |  |
| B – R | 70% | 10 |  |  |  |

1. **OVER VOLTAGE TEST - (OV2PTOV:1):**
   1. **OVER VOLTAGE STAGE-1 ALARM:**

Voltage Setting: **112% Ub,**

Characteristic: **definite time**

t1: **120 sec**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **U1> Setting** | **Time Set (sec)** | **Measured Volt** | | **Timing** |
| **Pick up** | **Drop off** |
| R – Y | 112% | 120 |  |  |  |
| Y – B | 112% | 120 |  |  |  |
| B – R | 112% | 120 |  |  |  |

* 1. **OVER VOLTAGE STAGE-2 TRIP:**

Voltage Setting: **115% Ub,**

Characteristic: **definite time**

t1: **5 sec**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **U1> Setting** | **Time Set (sec)** | **Measured Volt** | | **Timing** |
| **Pick up** | **Drop off** |
| R – Y | 115% | 5 |  |  |  |
| Y – B | 115% | 5 |  |  |  |
| B – R | 115% | 5 |  |  |  |

1. **FUSE FAILURE TEST - (SDDRFUF:1):**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PHASE** | **3U0> 30% UBIAS** | | **3I0< 10% UBIAS** | |
| **SET** | **OPTD** | **SET** | **OPTD** |
| R | 30%  (48.5 V) |  | 10%  (0.100 A) |  |
| Y |  |  |
| B |  |  |

1. **BREAKER FAILURE TEST - (CCRBRF:1):**

Settings: IP> **15%** Ibase,

IN>**15%** Ibase,

t2 = **0.150** sec

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **Current Setting (A)** | | | **Stage-1 (BU TRIP)** | |
| **Set** | **Pick-up** | **Drop off** | **Set** | **Optd (ms)** |
| R | 15% In |  |  | 150 ms |  |
| Y |  |  |  |
| B |  |  |  |

1. **NEUTRAL UNBALANCE TRIP - (CVGAPC:1):**
   1. **NEUTRAL UNBALANCE O/C STAGE-1 ALARM:**

Current Setting: **350% Ib,**

Characteristic: **definite time**

t1: **3.5 sec**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **Setting** | **Time Set (sec)** | **Measured Volt** | | **Timing** |
| **Pick up** | **Drop off** |
| N | 350% | 3.5 |  |  |  |

* 1. **NEUTRAL UNBALANCE O/C STAGE-2 TRIP:**

Current Setting: **650% Ib,**

Characteristic: **definite time**

t1: **0.100 sec**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **Setting** | **Time Set (sec)** | **Measured Volt** | | **Timing** |
| **Pick up** | **Drop off** |
| N | 650% | 0.100 |  |  |  |