# RELAY INFORMATION:

|  |  |  |  |
| --- | --- | --- | --- |
| Model No. | T60TCBHKHF8LH6AM8NP6TU6CWXX | **Manufacturer** | **GE** |
| **Panel Description** | **+R03.2** | S. No. | MBHC1716978 |
| **Frequency** | **60 Hz** | **Aux. Voltage** | **125 V DC** |

# TRANSFORMER DETAILS:

|  |  |
| --- | --- |
| Transformer Ratio | **33/13.8 kV**  |
| Vector Group | **YNyn0d1** |
| Rating (MVA) | **67 MVA** |
| HV ( a ) Side CT Ratio | **600/1 A** |
| LV ( b ) Side CT Ratio | **3600/1 A** |

# MECHANICAL CHECKS:

|  |  |  |
| --- | --- | --- |
| **S.N** | **General checks** | **Status** |
| 1. | Inspect for no physical damage. | Ok |
| 2. | Verify the wiring connection as per approved drawing. | OK |
| 3. | Relay case connected to a local earth bar. | OK |
| 4. | Power up the relay circuit and check relay is healthy. | OK |

# I/O CHECK

## WATCHDOG RELAY CHECK :

|  |  |  |
| --- | --- | --- |
| **OUTPUT** | **Contact Status** | **Remarks** |
| **Relay OFF / Software Failure** | **Relay ON / Healthy** |
| ALARM B1a-B2b |  Closed | Open | OK |
| ALARM B1a-B1b |  Open | Closed | OK |

##  RELAY BURDEN CHECK :

|  |  |  |  |
| --- | --- | --- | --- |
| **TEST** | **VOLTAGE (Vdc)** | **MEASURED CURRENT(A)** | **POWER** |
| Without fault |  125 V |  |  W |
| With fault |  125 V |  |  W |

## CONTROL INPUT CHECK:

|  |  |  |  |
| --- | --- | --- | --- |
| OPTO Input No. | V DC Applied Terminal No. | Function assignedfor OPTO input | RESULT |
| + Terminal No. | - Terminal No. |
| Contact IP 1 | H5a | H5b | HV CBF INITIATION |  |
| Contact IP 2 | H5c | LV CBF INITIATION |  |
| Contact IP 3 | H6a | PROTN OUT |  |
| Contact IP 4 | H6c | TR. MECH OPTD |  |
| Contact IP 5 | H7a | H7b | TR. WIND TEMP STG2 TRIP |  |
| Contact IP 6 | H7c | 94T-2 OPTD |  |
| Contact IP 7 | H8a | 86T-2 OPTD |  |
| Contact IP 8 | H8c | Spare |  |
| Contact IP 9 | P5a | P5b | IN/OUT DC FAIL |  |
| Contact IP 10 | P5c | INDICATION DC FAIL |  |
| Contact IP 11 | P6a | AC SUPPLY FAIL |  |
| Contact IP 12 | P6c | 86BB OPTD |  |
| Contact IP 13 | P7a | P7b | 86CBF OPTD |  |
| Contact IP 14 | P7c | HV CB CLOSE |  |
| Contact IP 15 | P8a | HV CB OPEN |  |
| Contact IP 16 | P8c | LV CBF OPTD |  |

## CONTROL OUTPUT RELAY CHECK:

|  |  |  |  |
| --- | --- | --- | --- |
| **Output Relay No.** | **Output Contact No.** | **Function Assigned to Output Relay** | **Result** |
| Contact OP-1 | H1b-H1c (NO) | TCS POST CLS |  |
| Contact OP-2 | H2b-H2c (NO) | TCS PRE POST CLS |  |
| Contact OP-3 | H3b-H3a (NC) | ACSE INIT |  |
| H3b-H3c (NO) |  |
| Contact OP-4 | H4b-H4a (NC) |  87T/64NP/64N |  |
| H4b-H4c (NO) |  |
| Contact OP-5 | P1b-P1c (NO) | 87T/64NP/64N |  |
| Contact OP-6 | P2b-P2c (NO) | 51S/51NS+SBEF |  |
| Contact OP-7 | P3b-P3c (NO) | 51P/51NP |  |
| Contact OP-8 | P4b-P4c (NO) | HV CBF TRIP |  |
| Contact OP-9 | U1a-U1b (NO) | SPARE |  |
| Contact OP-10 | U2b-U2c (NO) | LV CBF TRIP |  |
| Contact OP-11 | U3b-U3c (NC) | ACSE INIT |  |
| Contact OP-12 | U4b-U4c (NO) | LV CBF TRIP |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Output Relay No.** | **Output Contact No.** | **Function Assigned to Output Relay** | **Result** |
| Contact OP-13 | U5b-U5c (NO) | ACSE BLOCK |  |
| Contact OP-14 | U6b-U6c (NO) | SPARE |  |
| Contact OP-15 | U7b-U7c (NO) | SPARE |  |
| Contact OP-16 | U8b-U8c (NO) | 51S/51NS+SBEF |  |

# MEASUREMENTS:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **CT Ratio** | **Percentage** | **Phase** | **Expected****value** | **Actual****value** |
| **SRC 1****(CT F1)** | 600/1 A | 100 % | R | 600 | 599 |
| Y | 600 | 598 |
| B | 600 | 599 |
| **SRC 2****(CT M1)** | 3600/1 A | 100 % | R | 3600 | 3593 |
| Y | 3600 | 3594 |
| B | 3600 | 3595 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function** | **CT Ratio** | **Winding** | **Expected** | **Actual** |
| 51G | 800/1A | SRC 3 (G) | 800 | 798 |
| LV-REF | 3600/1A | SRC 2 (G) | 3600 | 3598 |
| HV- REF | 600/1A | SRC 1 (G) | 600 | 599 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function** | **VT Ratio** | **Winding** | **Expected(KV)** | **Actual** |
| VA | 132000/115 | SRC 1 (F5) | 76.2 | 67.1 |
| VB | 76.2 | 67.1 |
| VC | 76.2 | 67.2 |
| VAB | 132 | 132 |
| VBC | 132 | 131.98 |
| VCA | 132 | 131.99 |

# DIFFERENTIAL ELEMENT:

Iref a (Prim)=Sref /√3\* Vnom a = (67 MVA/1.732\*132KV) = $293A$

Iref b (Prim)=Sref /√3\* Vnom b = (67 MVA/1.732\* 13.8 KV) = $2803A$

Kam,a = CT Ratio a / Iref a = (600/$293$) = $2.047$

Kam,b = CT Ratio b / Iref b = (3600/= $2803$) = $1.28$

Where:

Iref a (Prim) $293$A HV full load current (Primary value)

Iref b (Prim) $2803A$ LV full load current (Primary value)

Sref 67 MVA Transformer capacity

Vnom,a 132 KV Transformer HV Side voltage

Vnom,b 13.8 KV Transformer LV Side voltage

CT Ratio a: 600A Transformer HV Side phase CT ratio

CT Ratio b: 3600A Transformer LV Side phase CT ratio

Kam,a 2.047 Winding “a” amplitude matching factor

Kam,b 1.28 Winding “b” amplitude matching factor

## DIFFERENTIAL TEST:

### *OBJECTIVE* To test:

**Test method:**

Inject balanced currents in all phases (one by one)

Gradually increase currents till relay operation. Note down the value.

**Transformer Differential**

Setting / Grouped Elements / Group 1 / Transformer/percent differential

**TRANSFORMER DATA:**MVA: **67.0** RATIO: **132KV/13.8kV** CT (HV) = **600/1A** CT (LV) =**3600/1**

Vector group: **DNyn +d1**

|  |  |  |  |
| --- | --- | --- | --- |
| **SOURCE SETTING** | **SOURCE 1** | **SOURCE 2** | **SOURCE 3** |
| Name | HV | LV | SBEF |
| Phase CT | F1 | M1 | X |
| Ground CT | F1 | M1 | M5 |
| Phase VT | F5 | X | X |

|  |  |  |  |
| --- | --- | --- | --- |
| **AC INPUTS SETTING** | **CT F1** | **CT M1** | **CT F5** |
| Phase CT Primary | 600 | 3600 | 1 |
| Phase CT Secondary | 1 | 1 | 1 |
| Ground CT Primary | 600 | 3600 | 800 |
| Ground CT Secondary | 1 | 1 | 1 |

|  |  |  |  |
| --- | --- | --- | --- |
| **WINDING 1 SETTINGS** | **VALUE** | **WINDING 2 SETTINGS** | **VALUE** |
| Source | SRC 1 | Source | SRC2 |
| Rated MVA | 67.0 | Rated MVA | 20.0 |
| Nom Ph-Ph Voltage | 132kV | Nom Ph-Ph Voltage | 13.8 kV |
| Connection | YN | Connection | YN |
| Grounding | within zone | Grounding | within zone |
| Angle WRT | 0 | Angle WRT | 0 |
| Resistance 3Ph | 10 | Resistance 3Ph | 10 |

**OPERATING CRITERIA:**
The differential element operates if the differential current (Id) exceeds the characteristic defined by the relay settings for restraint current magnitude (Ir) The differential current Id is the vector sum of the compensated currents, and Ir is the largest compensated current. Compensation refers to vector and magnitude corrections applied to the currents from the HV and LV transformer sides.
The tests verify the operation and no-operation response for points from all regions of the percentage differential characteristic. Inject 3-Phase Balance Current for all tests given bellow.

## Minimum Pickup

**Calculation For Pickup Current**

Side “a” Pick up Current



for HV. For LV side Replace M[2] in formula.

Where minimum pick up = 0.25 (set value) CT is of 1A

andM[1] can be calculated as (since LV side K factor is Lower, so Ref CT/VT Ratio will be CT/VT Ratio of LV Side)

$$M\left[1\right]=\frac{CTRatio\*Vnom(HV)}{RefCT Ratio\*Vnom(LV)}= \frac{600\*132\*10^{3}}{3600\*13.8\*10^{3}}=1.59$$

$$M\left[2\right]=\frac{CTRatio\*Vnom(LV)}{RefCT Ratio\*RefVnom(LV)}= \frac{3600\*132\*10^{3}}{3600\*132\*10^{3}}=1$$

M[1] is for HV side pickup and M[2] for LV

KVG (FACTOR) is according to transformer vector group as per following table:

|  |  |  |
| --- | --- | --- |
| **Type of fault** | **Even VG-numeral** **0,2,4,6,8,10** | **Odd VG-numeral** **1,3,5,7,9,11** |
| Three-phase | 1 | 1 |
| Two-phase | 1 | 0.866 |
| Single-phase with I0 elimination | 1.5 | 1.73 |
| Single-phase without I0 elimination | 1 | 1.73 |

### Percent differential minimum pickup

#### **HV SIDE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fault Type** | **Idiffsetting** | $I\_{A}^{}\left[W1\right]PU$ **Expected**  | $I\_{A}^{}\left[W1\right]$ **Expected**  | $I\_{A}^{}\left[W1\right]$ **Measured** **(PU/ DO)** |
| **A-N** | 0.3 PU | 0.282 P.U | 0.282 P.U | **0.286** | **0.262** |
| **B-N** | 0.3 PU | 0.282 P.U | 0.282 P.U | **0.284** | **0.264** |
| **C-N** | 0.3 PU | 0.282 P.U | 0.282 P.U | **0.284** | **0.264** |
| **A-B** | 0.3 PU | 0.188 P.U | 0.188 P.U | **0.19** | **0.174** |
| **B-C** | 0.3 PU | 0.188 P.U | 0.188 P.U | **0.19** | **0.174** |
| **A-C** | 0.3 PU | 0.188 P.U | 0.188 P.U | **0.19** | **0.174** |
| **A-B-C** | 0.3 PU | 0.188 P.U | 0.188 P.U | **0.19** | **0.176** |

#### **LV SIDE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Fault Type** | Idiffsetting | $I\_{A}^{}\left[W2\right]PU$ Expected  | $I\_{A}^{}\left[W1\right]$ **Measured** |
| **A-N** | 0.3 PU | 0.45 P.U | **0.45** | **0.422** |
| **B-N** | 0.3 PU | 0.45 P.U | **0.45** | **0.422** |
| **C-N** | 0.3 PU | 0.45 P.U | **0.45** | **0.422** |
| **A-B** | 0.3 PU | 0.346 P.U | **0.3** | **0.28** |
| **B-C** | 0.3 PU | 0.346 P.U | **0.3** | **0.28** |
| **A-C** | 0.3 PU | 0.346 P.U | **0.3** | **0.28** |
| **A-B-C** | 0.3 PU | 0.4 P.U | **0.3** | **0.28** |

### Instant differential minimum picku

#### **HV SIDE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Phase** | **Setting** | **Expected** | **Current PICK UP & DROP OFF** **(A)** | **Timing** **(m sec)** |
| R | 8 | 7.52 | 7.53 | 7.3 | 30.2 |
| Y | 8 | 7.52 | 7.53 | 7.3 | 30.2 |
| B | 8 | 7.52 | 7.53 | 7.3 | 30.7 |
| RYB | 8 | 5.018 | 5.02 | 4.852 | 35.3 |

#### **LV SIDE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Phase** | **Setting** | **Expected** | **Current PICK UP & DROP OFF****(A)** | **Timing** **(m sec)** |
| R | 8 | 12 | 12 | 11.65 | 33 |
| Y | 8 | 12 | 12 | 11.65 | 30.7 |
| B | 8 | 12 | 12 | 11.65 | 35 |
| RYB | 8 | 8 | 8 | 7.740 | 29.2 |

##

## SLOPE CHECK (Percent Differential)

### M1 Slope

**Test method:**

Inject balanced currents in all phases written as “Injected current side ‘a’ ” & “Injected current side ‘b’ ” (one by one) as of following procedure (This procedure is applicable only for vector group DNyn0):-











Ir must be larger than intersection of minimum PKP and SLOPE 1 = 0.3\*(100/30) =1



So Ir =1.5

 Id= 1.5 x 30/100

 Id= 0.45

|  |  |  |  |
| --- | --- | --- | --- |
| **PHASE** | **Calculated Values** |  **Calculated Injected current Pick up** | **Measured Values** |
| **Idiff** | **I rest** | $I\left[W1\right]$ injected | $$I\left[W2\right]$$injected | **I diff** | **I rest** | **Slope%** |
| **R** | **0.45** | **1.5** | 0.988 | 2.25 | 0.450 | 1.499 | 30 |
| **Y** | **0.45** | **1.5** | 0.988 | 2.25 | 0.45 | 1.499 | 30 |
| **B** | **0.45** | **1.5** | 0.988 | 2.25 | 0.45 | 1.499 | 30 |

### M2 Slope

As the setting of Break point 2 = 5.0 PU, TD=0 Sec

So Ir =5.5

 Id= 5.5 x 80/100

 Id=4.4

|  |  |  |  |
| --- | --- | --- | --- |
| **PHASE** | **Calculated Values** |  **Calculated Injected current Pick up** | **Measured Values** |
| **Idiff** | **I rest** | $I\left[W1\right]$ injected | $$I\left[W2\right]$$injected | **I diff** | **I rest** | **Slope%** |
| **R** | **4.4** | **5.5** | 5.175 | 1.65 | **4.403** | **5.5** | 80 |
| **Y** | **4.4** | **5.5** | 5.175 | 1.65 | **4.403** | **5.503** | 80 |
| **B** | **4.4** | **5.5** | 5.175 | 1.65 | **4.403** | **5.5** | 80 |

### Testing of transition region :

* **Setting:**
* PKP= 0.3
* Slope1 (S1) = 0.3
* Slope2 (S2) = 0.8
* Break1 (B1) = 2.0 PU
* Break2 (B2) = 5.0 PU

F(X) = C0 + C1\*X + C2\*$X^{2}$ + C3\* $X^{3}$

Where (B1<X<B2) – Restraint Current

And F(X) – Differential current

Where:

$$C0=\frac{2\*\left(S1-S2\right)\*B1^{2}\*B2^{2}}{\left(B1-B2\right)^{3}}$$

$$C1=\frac{[S2\*B1\*\left(B1^{2}+B1B2+4B2^{2}\right)-S1\*B2\*\left(4B1^{2}+B1B2+B2^{2}\right)}{\left(B1-B2\right)^{3}}$$

$$C2=\frac{2\*\left(S1-S2\right)\*(B1^{2}+B1B2+B2^{2})}{\left(B1-B2\right)^{3}}$$

$$C3=\frac{\left(S2-S1\right)\*(B1+B2)}{\left(B1-B2\right)^{3}}$$

* Injected current from star side[W1] and assume it is max

|  |  |  |  |
| --- | --- | --- | --- |
| **FAULT TYPE** | **Calculated Values** |  **Calculated Injected current Pick up** | **Measured Values** |
| **Idiff** | **Irest** | $IA\left[W1\right]$ injected | $$IA\left[W2\right]$$injected | **Idiff** | **Irest** |
| **L1** | **1.437** | **3** | 2.823 | 2.344 | 1.438 | 2.999 |
| **L2** | **1.437** | **3** | 2.823 | 2.344 | 1.438 | 2.999 |
| **L3** | **1.437** | **3** | 2.823 | 2.344 | 1.438 | 2.999 |

**As per reference manual page no. 445**

## DIFFERENTIAL ELEMENT 2ND HARMONIC RESTRAIN TEST :

|  |  |  |
| --- | --- | --- |
| **Phase** | **High Voltage side** | **Low Voltage side** |
| Injected I at 60 HZ | Measured 120 HZ value for | Injected I at 60 HZ | Measured 120 HZ value for |
| Trip | Block | Trip | Block |
| **A** | **1A** | 0.13 | 0.152 | **1A** | 0.13 | 0.15 |
| **B** | **1A** | 0.13 | 0.152 | **1A** | 0.13 | 0.15 |
| **C** | **1A** | 0.13 | 0.152 | **1A** | 0.13 | 0.15 |

## DIFFERENTIAL ELEMENT 5TH HARMONIC RESTRAIN TEST :

|  |  |  |
| --- | --- | --- |
| **Phase** | **High Voltage side** | **Low Voltage side** |
| Injected I at 60 HZ | Measured 300 HZ value for | Injected I at 60 HZ | Measured 300 HZ value for |
| Trip | Block | Trip | Block |
| **A** | **1A** | 0.244 | 0.248 | **1A** | 0.244 | 0.25 |
| **B** | **1A** | 0.244 | 0.248 | **1A** | 0.244 | 0.25 |
| **C** | **1A** | 0.244 | 0.248 | **1A** | 0.244 | 0.25 |

* If set to “**Per phase**”, the relay performs inrush inhibit individually in each phase. If used on modern transformers, this setting should be combined with adaptive 2nd harmonic function.
* If set to “**2-out-of-3**”, the relay checks 2nd harmonic level in all three phases individually. If any two phases establish a blocking condition, the remaining phase is restrained automatically.
* If set to “**Average**”, the relay first calculates the average 2nd harmonic ratio, then applies the inrush threshold to the calculated average. This mode works only in conjunction with the traditional 2nd harmonic function.

## HV SIDE OVER CURRENTPROTECTION TEST :

**Phase Time Over Current (TOC) HV Side Used contact is (PHASE TOC1 OP)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Curve Type** | **Phase** | **Set current Is (A)** | **TD** | **Injected current(A)** | **Expected Trip Time(Sec)** | **Operated Trip Time(Sec)** |
| **IEC-A** | **R** | 0.63 | 0.22 | 1.5 | 1.76 | 1.78 |
| **IEC-A** | **Y** | 0.63 | 0.22 | 1.5 | 1.76 | 1.787 |
| **IEC-A** | **B** | 0.63 | 0.22 | 1.5 | 1.76 | 1.786 |

## HV SIDE EARTH FAULT PROTECTION TEST :

**NEUTRAL CURRENT TEST(HV SIDE)** Used contact is (NEUTRAL TOC1 OP)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Curve Type** | **Phase** | **Set current Is (A)** | **TD** | **Injected current(A)** | **Expected Trip Time(Sec)** | **Operated Trip Time(Sec)** |
| **IEC-A** | **N** | 0.15 | 0.2 | 0.5 | 1.15 | 1.178 |

## LV SIDE OVER CURRENTPROTECTION TEST :

**Phase Time Over Current (TOC) LV Side** Used contact is (PHASE TOC2 OP)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Curve Type** | **Phase** | **Set current Is (A)** | **TD** | **Injected current(A)** | **Expected Trip Time(Sec)** | **Operated Trip Time(Sec)** |
| **IEC-A** | **R** | 1 | 0.2 | 2 | 2 | 2.038 |
| **IEC-A** | **Y** | 1 | 0.2 | 2 | 2 | 2.037 |
| **IEC-A** | **B** | 1 | 0.2 | 2 | 2 | 2.038 |

## LV SIDE EARTH FAULT PROTECTION TEST :

**NEUTRAL CURRENT TEST(LV SIDE)** Used contact is (NEUTRAL TOC2 OP)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Curve Type** | **Phase** | **Set current Is (A)** | **TD** | **Injected current(A)** | **Expected Trip Time(Sec)** | **Operated Trip Time(Sec)** |
| **IEC-A** | **N** | 0.08 | 0.25 | 0.2 | 1.895 | 1.938 |

## 6.9 LV SIDE SBEF PROTECTION TEST:

**GROUND (TOC)SBEF Used contact is (GROUND TOC1 OP)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Curve Type** | **Phase** | **Set current Is (A)** | **TD** | **Injected current(A)** | **Expected Trip Time(Sec)** | **Operated Trip Time(Sec)** |
| **IEC-B** | **N** | 0.3 | 0.1 | 0.5 | 0.242 | 0.255 |

## LV SIDE NEUTRAL ALARM TEST :

**GROUND (IOC)NEUTRAL ALARM (NO TRIPING) Used contact is (GROUND TOC2 OP)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Curve Type** | **Phase** | **Set current Is (A)** | **PICKUP (A)** | **DROP OFF (A)** | **Setting Time(Sec)** | **Operated Trip Time(Sec)** |
| **IEC-B** | **N** | 0.10 | 0.101 | 0.097 | 5 | 5 s |

##

1. **Restricted Ground fault:**

Igd = | IG + IN | =| IG + IA + IB + IC |

Irest = max (IR0, IR1, IR2)

IR0 = | IG – IN | =| IG – (IA + IB + IC) |

1. **Restricted Earth Fault for the High Side**
* **Restricted Earth Fault Pickup Value = 0.1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PHASE** | **Set Current (m.A)** | **PU****(m.A)** | **DO****(m.A)** | **MEAS TIME AT 2In****(m.Sec)** |
| **IG** | **100** | **100** | **98** | **33.2** |

* **Slop**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| HV Inj. current | NETURAL Inj. current | Idiff (A) | I bias (A) | SLOP % Setting | SLOP %Measured |
| 0.75 | 0.25 | 299.56 | 598.2 | 50 | 50 |
|  |  |  |  |  |  |

1. **Restricted Earth Fault for the Low Side**
* **Restricted Earth Fault Pickup Value = 0.1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PHASE** | **Set Current (m.A)** | **PU****(m.A)** | **DO****(m.A)** | **MEAS TIME AT 2In****(m.Sec)** |
| **IG** | **100** | **100** | **96** | **27.3** |

* **Slop**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LV Inj. current | NETURAL Inj. current | Idiff (A) | I bias (A) | SLOP % Setting | SLOP %Measured |
| 0.75 | 0.25 | 1796 | 3589 | 50 | 50 |

1. **HV BREAKER FAILURE PROTN(50BF)**

**FUNCTION NAME: - BREAKER S FAILURE LOGIC:**

**Pickup Current: 0.100 A time delay: 0.15 Sec**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PHASE** | **SETING (A)** | **PICKUP** | **DROP OFF** | **TIME FOR****0.15 sec****@ 2 In(S)** |
| R | 0.1 | 0.10 | 0.096 | 169 |
| Y | 0.10 | 0.096 | 169 |
| B | 0.10 | 0.096 | 169 |

ACCURCY (A) = ±3% of setpoint (t) = ±0.1% of operate time

1. **LV BREAKER FAILURE PROTN(50BF)**

**FUNCTION NAME: - BREAKER T FAILURE LOGIC:**

**Pickup Current: 0.1 A time delay: 0.15 Sec**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PHASE** | **SETING (A)** | **PICKUP** | **DROP OFF** | **TIME FOR****0.15 sec****@ 2 In(S)** |
| R | 0.1 | 0.10 | 0.096 | 0.17 |
| Y | 0.10 | 0.096 | 0.17 |
| B | 0.10 | 0.096 | 0.17 |

ACCURCY (A) = ±3% of setpoint (t) = ±0.1% of operate time

|  |  |
| --- | --- |
| DEVICE NAME | OMICRON CMC256 PLUS |
| SERIAL NUMBER | RJ955T |
| CALIBARATION DATE | 09-FEB -2023 |
| DUE DATE | 09-FEB -2024 |