Note:

* The approved updated final settings should be applied.
* The approved final setting should be attached with this test format.
* The following test format contains minimum required tests and some of settings are mentioned as an example and not as limitation

1. **GENERAL DATA AND INFORMATION**

|  |  |  |  |
| --- | --- | --- | --- |
| Panel No. |  | Ratio, main CTs : |  |
| Relay Type |  | US |  |
| Manufacturer |  | No. of contacts: |  |
| SERIAL NO |  | Draw. & Sh No. : |  |
| Order - No. |  | Conn.Diag.No. |  |
| Type of Relay Flag |  | DC. Auxiliary. Voltage |  |
| Metrosil Type |  | Metrosil Rated Voltage |  |
| external voltage divider |  | divider | OHM |
|  |  | Frequency Fn | 60 Hz |

1. **MECHANICAL CHECKS AND VISUAL INSPECTION** (Ref: 4.1 of TCS-P-105-R1)

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Description | Remarks | |
|  | Inspect for any physical damage or defects. | ❑ Yes | ❑ N/A |
|  | Verify connections and ferrules as per approved drawings | ❑ Yes | ❑ N/A |
|  | Check tightness of all the connections. | ❑ Yes | ❑ N/A |
|  | Check Apparatus List | ❑ Yes | ❑ N/A |
|  | Check relay version and switching elements on printed circuit board | ❑ Yes | ❑ N/A |

1. **ELECTRICAL TESTS** (Ref: 4.2 of TCS-P-105-R1)
   1. FUNCTION TEST

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Description | Remarks | |
|  | Human Machine Interface (HMI) Checked. | ❑Yes | ❑N/A |
|  | Case Earthing checked. | ❑Yes | ❑N/A |
|  | LED’s Function Checked. | ❑Yes | ❑N/A |
|  | Trip Contacts Checked. | ❑Yes | ❑N/A |
|  | Reset Function Checked | ❑Yes | ❑N/A |
|  | Group active Functions Checked | ❑Yes | ❑N/A |
|  | Binary inputs checked. | ❑Yes | ❑N/A |
|  | Output Relays Checked | ❑Yes | ❑N/A |
|  | Event Display on HMI Screen Checked | ❑Yes | ❑N/A |
|  | Test switch / plug checked for correct function. | ❑Yes | ❑N/A |
|  | Watchdog contacts checked | ❑Yes | ❑N/A |
|  | Current shorting facility. | ❑Yes | ❑N/A |

* 1. **SECONDARY INJECTION TEST**
     1. **TEST OF VOLTAGE TAPS**

Tap Selections:

Voltage (Vs): as shown

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PHASE | Vs Set | TOTAL  CURRENT  MEAS.  (mA) | LIMITS  WITH  metrosil  (mA) | PICK-UP  VOLTAGE  MEAS.  (V) | LIMITS  (V) | DROP-OFF  VOLTAGE  MEAS.  (V) | VOLTAGE  ERROR = | | RELAY  CURRENT  MEAS.  (mA) | LIMITS FOR  RELAY ONLY  (mA) | METROSIL  CURRENT  (mA) |
| DROP-OFF | % |
| PICK-UP |
| R | 100 |  | 18-20 |  | 90-110 |  |  | |  | 19 |  |
| Y |  | 18-20 |  | 90-110 |  |  | |  | 19 |  |
| B |  | 18-20 |  | 90-110 |  |  | |  | 19 |  |
| R | 150 |  | 18-20 |  | 135-165 |  |  | |  | 19 |  |
| Y |  | 18-20 |  | 135-165 |  |  | |  | 19 |  |
| B |  | 18-20 |  | 135-165 |  |  | |  | 19 |  |
| R | 200 |  | 18-23 |  | 180-220 |  |  | |  | 19 |  |
| Y |  | 18-23 |  | 180-220 |  |  | |  | 19 |  |
| B |  | 18-23 |  | 180-220 |  |  | |  | 19 |  |
| R | 250 |  | 18-23 |  | 225-275 |  |  | |  | 19 |  |
| Y |  | 18-23 |  | 225-275 |  |  | |  | 19 |  |
| B |  | 18-23 |  | 225-275 |  |  | |  | 19 |  |
| R | 300 |  | 19-28 |  | 270-330 |  |  | |  | 19 |  |
| Y |  | 19-28 |  | 270-330 |  |  | |  | 19 |  |
| B |  | 19-28 |  | 270-330 |  |  | |  | 19 |  |
| R | 350 |  | 20-39 |  | 315-385 |  |  | |  | 19 |  |
| Y |  | 20-39 |  | 315-385 |  |  | |  | 19 |  |
| B |  | 20-39 |  | 315-385 |  |  | |  | 19 |  |
| R | 400 |  | 24-60 |  | 360-440 |  |  | |  | 19 |  |
| Y |  | 24-60 |  | 360-440 |  |  | |  | 19 |  |
| B |  | 24-60 |  | 360-440 |  |  | |  | 19 |  |

Limits:

Total current limit is as per MFAC34 Technical Manual page 7

The ratio of Drop-off/Pick-up should be > 50% (as per Service Manual page)

Pick-up voltage limit = = 10% (as per Service Manual page)

* + 1. **TEST OF OPERATING TIME**

Switch Selections: Voltage (Vs)

|  |  |  |  |
| --- | --- | --- | --- |
| Phase | Injected voltage | OPERATING TIME (ms) AT 2x Vs | |
| Measured | Calculated |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Limit: Operating time AT 2 x Vs should be between 14ms – 28 ms (Refer sh. 4 of the manual)

1. **FINAL SETTINGS**
   1. **FINAL TAP SETTING**

Voltage (Vs)

* 1. **SECONDARY INJECTION TEST AT FINAL SETTINGS**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase | Vs Set | Total  Current  Meas.  (mA) | limits  with  metrosil  (mA) | Pick-up  Voltage  Meas.  (V) | Limits  (V) | Drop-off  Voltage  Meas.  (V) | Voltage  Error = | | Relay  Current  Meas.  (mA) | Limits for  Relay only  (mA) | Metrosil  Current  (mA) |
| Drop-off / | % |
| Pick-up |
|  |  |  |  |  |  |  |  | |  |  |  |
|  |  |  |  |  |  |  |  | |  |  |  |
|  |  |  |  |  |  |  |  | |  |  |  |

Note: The ratio of Drop-off / Pick-up should be > 50%

* 1. **TEST OF OPERATING TIME**

Tap Selections: Voltage (Vs)

|  |  |  |  |
| --- | --- | --- | --- |
| PHASE | INJECTED VOLTAGE | OPEARTING TIME (ms) AT 2 x Vs | |
| MEASURED | CALCULATED |
| R |  |  |  |
| Y |  |  |  |
| B |  |  |  |

Note: Operating time AT 2 x Vs should be between 14ms – 28 ms (Refer sh. 4 of the manual)

1. **TEST EQUIPMENT USED**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sl. No | Description | Make | Equipment Sl. No | Calibration  Date | Calibration  Due Date |
|  |  |  |  |  |  |
|  |  |  |  |  |  |