1. **GENERAL DATA AND INFORMATION:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Panel No. |   |  | Designation |  |
| Make | **ZIV** |  |  Rated Voltage | 13.8kV |
| Serial No. |   |  | Aux. Voltage | 48 – 250 VAC/DC |
| Model No. |  71RV-J4F-22S1A62KM |  | No. of Contacts |  |
| Frequency | 60 HZ |  | CT Ratio |  |

1. **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. |  |
| 7 | Test Switch checked for correct function. |  |
| 8 | Check case earthing. |  |

1. **OPERATING DC SUPPLY CURRENT:**

|  |  |  |
| --- | --- | --- |
| DC VOLT.(V) | DC CURRENT W/O FAULT(mA) | CALCULATED WATT(W) |
| **125** |  |  |

7IRV≈ 17,5W (±20%) Quiescent

Standard consumption for IRV models with 25 DI and 12 DO IEC61850 option.

Consumption increases in 0.5W per each additional digital output.

*Technical Data page:-61*

1. **ELECTRICAL TESTS:**

(With relay energized condition)

|  |  |
| --- | --- |
| Measured auxiliary supply. | OK |
| Clock set at local time. | Ok |
| Time maintained when auxiliary supply removed. | Ok |
| Relay READY(green) LED working. | OK |
| Watch dogcontact check | OK |

 *Note for testing:*

Load rating: continuous 20 A

For3 s: 250 A

For 1 s: 500 A

**5. INPUTS AND OUTPUTS TESTS:**

**Binary inputs: Binary Output:**

|  |  |  |
| --- | --- | --- |
| TERMINAL | BO | Result |
| C4 – C5 | TRIP 1 |  |
| C6 – C7 | TRIP1 |  |
| C8 – C9 | CLOSE1 |  |
| D1 –C10 | CLOSE1 |  |
| D5 – D6 | OUT1 |  |
| D7 – D8 | OUT2 |  |
| D9 – D10 | OUT3 |  |
| E1 –E2 | OUT4 |  |
| E3 – E4 | OUT5 |  |
| E5 – E6 | OUT6 |  |
| G1 – G2 | OUT7 |  |
| G3 – G4 | OUT8 |  |
| G5 G6 | OUT9 |  |
| G7 – G8 | OUT10 |  |
| G9 G10 | OUT11 |  |
| H1 – H2 | OUT12 |  |

|  |  |  |
| --- | --- | --- |
| TERMINAL | BI | Result |
| E7-E 8 | IN 1 |  |
| E10- E9 | IN 2 |  |
| F1 – E9 | IN 3 |  |
| F2 – E9 | IN 4 |  |
| F4 – F3 | IN 5 |  |
| F5 – F3 | IN 6 |  |
| F7 – F6 | IN 7 |  |
| F8 – F6 | IN 8 |  |
| H4 – H3 | IN 9 |  |
| H5 – H3 | IN 10 |  |
| H6 – H3 | IN 11 |  |
| H8 – H7 | IN 12 |  |
| H9 – H7 | IN 13 |  |
| H10 – H7 | IN 14 |  |
| I2 – I1 | IN 15 |  |
| I3 – I1 | IN 16 |  |
| I4 – I1 | IN 17 |  |
| I6 – I5 | IN 18 |  |
| I7 – I5 | IN 19 |  |
| I9 – I8 | IN 20 |  |
| I10 – I8 | IN 21 |  |
| J2 – J1 | IN 22 |  |
| J3 – J1 | IN 23 |  |
| J5 – J4 | IN 24 |  |
| J6 – J4 | IN 25 |  |

**6. MEASUREMENTS ACCURACY CHECKS:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Applied Value | Expected Value (A) | Displayed value ( A ) | INPUT VOLTAGE | APPLIED VALUE(V) | Displayedvalueprimary (k.V) |
| R | Y | B |
| 0.1In | 80 |  |  |  | VAB | 120∟0° |  |
| 0.5In | 400 |  |  |  | VBC | 120∟240° |  |
| 1 In | 800 |  |  |  | VCA | 120∟120° |  |
| 1.2In | 960 |  |  |  | VAN | 69.28∟0.0° |  |

Measured currents **±0.15%** or **±2 mA** (the greater)

*Technical Data page:2.1.6-62*

**OVER CURRENT ELEMENTS**

**Pickup of Phases and Ground**  **±3 %** or **±10mA**of the theoretical value (the greater)

**Reset of Phases and Ground** **1.5 cycles**

 (for In = 1A and 5A)

*Technical Data page: 2.1.7-63*

**MEASURING TIMES OF THE OVER CURRENT ELEMENTS**

**Fixed Time > 0 s** ±1% of the setting or ±30 ms (the greater)

**Inverse Time** Class 2 (E=2) or ±35ms (the greater)

(UNE 21-136, IEC 255-4) (For measured

Currents of 100 mA or greater

*Technical Data page: 2.1.7-64*

**Repeatability**

**Operating time 2 %** or **25 ms** (the greater)

**7. PHASE TIME OVERCURRENT**

**7.1 UNIT 1:**

|  |  |  |
| --- | --- | --- |
| Current Setting | DEFINIT TIME OVER CURRENT RELAY | DT TIME CHARACTERISTIC |
| R | Y | B | TIMESETT. | R | Y | B |
| P/U | D/O | P/U | D/O | P/U | D/O |
| 0.5 In |  |  |  |  |  |  | 50ms |  |  |  |
| 1.0 In |  |  |  |  |  |  | 3s |  |  |  |

**IDMT CHARACTERISTICS**

Time multiplier = 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FUNCTION | Current Setting | Injected Current (A) | Calculated Value (s) | Operating Time (s) |
| R | Y | B |
| IEC SI Curve | 0.2In | 10\*Is | 2.9 |  |  |  |
| IEC SH. I Curve Curve | 0.2In | 10\*Is | 0.518 |  |  |  |
| IEC VI Curve | 0.2In | 10\*Is | 1.5 |  |  |  |
| IEC EI Curve | 0.2In | 10\*Is | 0.808 |  |  |  |
| IEC LTI Curve | 0.2In | 10\*Is | 13.3 |  |  |  |

**7.2 UNIT 2:**

|  |  |  |
| --- | --- | --- |
| Current Setting | DEFINIT TIME OVER CURRENT RELAY | DT TIME CHARACTERISTIC |
| R | Y | B | TIMESETT. | R | Y | B |
| P/U | D/O | P/U | D/O | P/U | D/O |
| 0.5 In |  |  |  |  |  |  | 50ms |  |  |  |
| 1.0 In |  |  |  |  |  |  | 3s |  |  |  |

**IDMT CHARACTERISTICS**

Time multiplier = 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FUNCTION | Current Setting | Injected Current (A) | Calculated Value (s) | Operating Time (s) |
| R | Y | B |
| IEC SI Curve | 0.2In | 10\*Is | 2.9 |  |  |  |
| IEC SH. I Curve Curve | 0.2In | 10\*Is | 0.518 |  |  |  |
| IEC VI Curve | 0.2In | 10\*Is | 1.5 |  |  |  |
| IEC EI Curve | 0.2In | 10\*Is | 0.808 |  |  |  |
| IEC LTI Curve | 0.2In | 10\*Is | 13.3 |  |  |  |

**7.3) UNIT 3:**

|  |  |  |
| --- | --- | --- |
| Current Setting | DEFINIT TIME OVER CURRENT RELAY | DT TIME CHARACTERISTIC |
| R | Y | B | TIMESETT. | R | Y | B |
| P/U | D/O | P/U | D/O | P/U | D/O |
| 0.5 In |  |  |  |  |  |  | 50ms |  |  |  |
| 1.0 In |  |  |  |  |  |  | 3s |  |  |  |

**IDMT CHARACTERISTICS**

Time multiplier = 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FUNCTION | Current Setting | Injected Current (A) | Calculated Value (s) | Operating Time (s) |
| R | Y | B |
| IEC SI Curve | 0.2In | 10\*Is | 2.9 |  |  |  |
| IEC SH. I Curve Curve | 0.2In | 10\*Is | 0.518 |  |  |  |
| IEC VI Curve | 0.2In | 10\*Is | 1.5 |  |  |  |
| IEC EI Curve | 0.2In | 10\*Is | 0.808 |  |  |  |
| IEC LTI Curve | 0.2In | 10\*Is | 13.3 |  |  |  |

**8) GROUND TIME OVERCURRENT:**

**8.1) UNIT 1**

|  |  |
| --- | --- |
| Current Setting | DEFINIT TIMEOVER CURRENT RELAY |
| P/U | D/O | Time Setting (s) | Time result |
| 0.1 |  |  | 50ms |  |
| 0.3 |  |  | 3s |  |

**IDMT CHARACTERISTICS**

Time multiplier = 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FUNCTION | Current Setting | Injected Current (A) | Calculated Value (s) | Operating Time (s) |
| IEC SI Curve | 0.1In | 10\*Is | 2.9 |  |
| IEC SH. I Curve Curve | 0.1In | 10\*Is | 0.518 |  |
| IEC VI Curve | 0.1In | 10\*Is | 1.5 |  |
| IEC EI Curve | 0.1In | 10\*Is | 0.808 |  |
| IEC LTI Curve | 0.1In | 10\*Is | 13.3 |  |

**8.2) UNIT 2**

|  |  |
| --- | --- |
| Current Setting | DEFINIT TIMEOVER CURRENT RELAY |
| P/U | D/O | Time Setting (s) | Time result |
| 0.1 |  |  | 50ms |  |
| 0.3 |  |  | 3s |  |

**IDMT CHARACTERISTICS**

Time multiplier = 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FUNCTION | Current Setting | Injected Current (A) | Calculated Value (s) | Operating Time (s) |
| IEC SI Curve | 0.1In | 10\*Is | 2.9 |  |
| IEC SH. I Curve Curve | 0.1In | 10\*Is | 0.518 |  |
| IEC VI Curve | 0.1In | 10\*Is | 1.5 |  |
| IEC EI Curve | 0.1In | 10\*Is | 0.808 |  |
| IEC LTI Curve | 0.1In | 10\*Is | 13.3 |  |

**8.3) UNIT 3**

|  |  |
| --- | --- |
| Current Setting | DEFINIT TIMEOVER CURRENT RELAY |
| P/U | D/O | Time Setting (s) | Time result |
| 0.1 |  |  | 50ms |  |
| 0.3 |  |  | 3s |  |

**IDMT CHARACTERISTICS**

Time multiplier = 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FUNCTION | Current Setting | Injected Current (A) | Calculated Value (s) | Operating Time (s) |
| IEC SI Curve | 0.1In | 10\*Is | 2.9 |  |
| IEC SH. I Curve Curve | 0.1In | 10\*Is | 0.518 |  |
| IEC VI Curve | 0.1In | 10\*Is | 1.5 |  |
| IEC EI Curve | 0.1In | 10\*Is | 0.808 |  |
| IEC LTI Curve | 0.1In | 10\*Is | 13.3 |  |

**8.4) TIME MULTIPLIER TESTS( IN> ) :**

IN> = 0.1In

I inject = 2 Is Curve: SI

|  |  |  |
| --- | --- | --- |
| Time multiplier | N | Calculated Value |
| 0.2 |  | 2.01 |
| 0.5 |  | 5.03 |

**9) PHASE OVER CURRENT INSTANTANEOUS**

9.1) UNIT 1

|  |  |  |
| --- | --- | --- |
| Current Setting | INSTANTANEOUSOVER CURRENT RELAY | DT TIME CHARACTERISTIC |
| R | Y | B | TIMESETT | R | Y | B |
| P/U | D/O | P/U | D/O | P/U | D/O |
| 0.5 In |  |  |  |  |  |  | 0sms |  |  |  |
| 1.0 In |  |  |  |  |  |  | 3s |  |  |  |

9.2) UNIT 2

|  |  |  |
| --- | --- | --- |
| Current Setting | INSTANTANEOUS OVER CURRENT RELAY | DT TIME CHARACTERISTIC |
| R | Y | B | TIMESETT | R | Y | B |
| P/U | D/O | P/U | D/O | P/U | D/O |
| 0.5 In |  |  |  |  |  |  | 0sms |  |  |  |
| 1.0 In |  |  |  |  |  |  | 3s |  |  |  |

9.3) UNIT 3

|  |  |  |
| --- | --- | --- |
| Current Setting | INSTANTANEOUS OVER CURRENT RELAY | DT TIME CHARACTERISTIC |
| R | Y | B | TIMESETT | R | Y | B |
| P/U | D/O | P/U | D/O | P/U | D/O |
| 0.5 In |  |  |  |  |  |  | 0sms |  |  |  |
| 1.0 In |  |  |  |  |  |  | 3s |  |  |  |

**10. GROUND OVER CURRENT INSTANTANEOUS**

**10.1) UNIT 1**

|  |  |
| --- | --- |
| Current Setting | DEFINIT TIMEOVER CURRENT RELAY |
| P/U | D/O | Time Setting (s) | Time result |
| 0.1 |  |  | 0s |  |
| 0.3 |  |  | 3s |  |

**10.1) UNIT 2**

|  |  |
| --- | --- |
| Current Setting | DEFINIT TIMEOVER CURRENT RELAY |
| P/U | D/O | Time Setting (s) | Time result |
| 0.1 |  |  | 0s |  |
| 0.3 |  |  | 3s |  |

**10.3) UNIT 3**

|  |  |
| --- | --- |
| Current Setting | DEFINIT TIMEOVER CURRENT RELAY |
| P/U | D/O | Time Setting (s) | Time result |
| 0.1 |  |  | 0s |  |
| 0.3 |  |  | 3s |  |

**11)Breaker Failure Protection (50BF)**

|  |  |  |  |
| --- | --- | --- | --- |
| Phase | Current ( A ) | Stage 1 | Remark |
| Set | Pickup | Drop-off | Set | Optd |
| R | 0.2 In |  |  | 150 ms |  |  |
| Y |  |  |  |
| B |  |  |  |
| R | 0.8 In |  |  | 500 ms |  |  |
| Y |  |  |  |
| B |  |  |  |

**12) VT FUSE FAIL**

|  |  |
| --- | --- |
| VOLTAGE  | CURRENT  |
| SETTING  | R- | Y | B | SETTING | R- | Y | B |
| P/U | D/O | P/U | D/O | P/U | D/O | P/U | D/O | P/U | D/O | P/U | D/O |
| 30  |  |  |  |  |  |  | 0.2 |  |  |  |  |  |  |
| 40 |  |  |  |  |  |  | 0.5 |  |  |  |  |  |  |

**11) TRIP CIRCUIT SUPERVISION:**

* Communication with PC Check : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Trip circuit supervision :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Event Record Check : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Disturbance Record Check : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_