1. **TITLE**: Instruction for Inspection and Testing REF as well as ACTUAL CURRENT and VOLTAGE DPM PCB assembly (PA79/557/B) In Model Rhino D K3, K4 500 and K4 2X301. (ERP CODE: **017.01.008.0374, 017.01.008.0376 and 017.01.008.0377)**
2. **SCOPE:**
   1. Applicable for testing of REF as well as ACTUAL CURRENT and VOLTAGE DPM PCB ASSEMBLY. In model: Rhino D K3, K4 500 and K4 2X301.
3. **DETAILS OF THE INSTRUCTION:**

2.1 Inspection / Measuring / Test Equipment.:

2.1.1 Digital Multimeter.

2.1.2 Wire boom for test.

2.1.3 External Variable DC Power Supply (0 to 50 Vdc).

2.1.4 Record the test results (OK / NOT OK) in the test report as the testing progress.

(REF INSP4704/I5/R0).

**2.2** **VISUAL INSPECTION:**

* + 1. Check the sticker for software version number (Rhino D K3 500: **REV 1.0** , K4 500: **REV 2.0** andK4 2X301: **REV1.0**), it should be proper.
    2. Check the short link for model selection whether **link LK1, LK2, LK3** are open for Rhino D K3 and K4 **500A**.
    3. Check the short link for model selection whether **link LK2, LK3** are Short for Rhino K4 2X301 **300A**.

**2.3** **ELECTRICAL TEST:**

**NOTE: After testing keep toggle switches and knobs to their default position.**

**NO LOAD TEST:**

* + 1. Switch ON power supply of TEST JIG***.***
    2. Keep SHUNT/HALL SENSOR switch to HALL SENSOR position and

REF/CUR switch of test jig to REF position.

* + 1. Vary Feedback current POT from MIN to MAX position and check voltage at

Respective test point (from 0V- 4V).

* + 1. Connect the provided wire boom the **DPM section** in the test jig. Connect the PCB under test, as per the given wiring diagram (Test jig PA79/906/A). Switch ON the power supply.
    2. Program the TEST PCB (For programming refers **DSGN2004/I4/R0**.).

***(Microcontroller – PIC16F886 and Programming connector CN1 on TEST PCB)***

**Note: Ensure the correct software revision is displayed during power on of PCB**

* + 1. Now check the voltage levels at the test points with respect to ground (TP2) as follows on Test PCB.

|  |  |
| --- | --- |
| **TEST POINT** | **VOLTAGE** |
| TP1 | +5 Volt |
| TP2 | GND |
| TP4 | 0V |
| TP5 | 0V |

**REFERENCE CURRENT CALIBRATION**:

* + 1. For **017.01.008.0374 , 017.01.008.0376 and 017.01.008.0377,** Connect the external DC Power Supply to CN2 of test PCB (CN2-6 to +VE terminal and CN2-3 to –VE terminal of DC power supply) and set it to 50Vdc. Now switch off the external DC power supply and then supply of test jig.
    2. Keep SHUNT/HALL SENSOR switch of test jig to HALL SENSOR position and

REF/CUR switch of test jig to REF position.

* + 1. For **017.01.008.0374 and 017.01.008.0376,** Switch ON power supply of TEST JIG and then Switch on the external DC supply. Vary Feedback current POT from MIN to MAX position (0V to 4V); DPM will show set reference current 10 to 500 (DISP 1, 2, 3, 4). Maximum value should be calibrated by **Preset ‘P4’.**

**(Note : This step is not applicable for 017.01.008.0377)**

**FEEDBACK CURRENT CALIBRATION**:

* + 1. Connect the external DC supply to the CN2 connector (Pin CN2-1 to +Ve terminal and CN2-4 to -Ve terminal of DC supply.) Ensure that external DC supply is set to 4Vdc. DPM shows Max current 500A (DISP 1, 2, 3, 4). Maximum value should be calibrated by **Preset ‘P1’.**
    2. For **017.01.008.0374 and 017.01.008.0376,** verify the voltage @ TP5 of test PCB by varying External Regulated DC supply, from min (0V) to max (4V) and check the voltage at respective test point.

For 0-4V output for 500 Amp:

|  |  |  |
| --- | --- | --- |
| Input feedback voltage @ External Regulated DC supply. | Voltage @ TP5 w.r.t. ground (i.e.TP2) on Test PCB. | Output on display |
| 0 / 0 V | 0 to 0.05 V | 10 (+/-5) |
| 1 / 1V | 0.6 to 0.8 V | 125 (+/- 5) |
| 2 / 2V | 1.4 to 1.6 V | 250 (+/- 5) |
| 3 /3V | 2.1 to 2.3 V | 375 (+/- 5) |
| 4 / 4V | 2.9 to 3.1 V | 500 (+/- 5) |

* + 1. For **017.01.008.0377,** verify the voltage @ TP5 of test PCB by varying External Regulated DC supply, from min (0V) to max (4V) and check the voltage at respective test point.

For 0-3V output for 300 Amp:

|  |  |  |
| --- | --- | --- |
| Input feedback voltage @ External Regulated DC supply. | Voltage @ TP5 w.r.t. ground (i.e.TP2) on Test PCB. | Output on display |
| 0 / 0 V | 0 – 0.2 | 0 (+/-5) |
| 1 / 1V | 1.0 – 1.2 | 100 (+/-5) |
| 2 / 2V | 2.0 – 2.2 | 200 (+/-5) |
| 3 / 3V | 3.0 – 3.2 | 300 (+/-5) |

**FEEDBACK VOLTAGE CALIBRATION (Lower 4 Digit)**:

* + 1. Keep the feedback current knob at max position (75mv and switch at CUR position).
    2. Ensure that external DC supply is set to 50Vdc. DPM will show the 50.00 on lower 4 seven segments (DISP 5,6,7,8). Calibrate this using **Preset ‘P3’**.
    3. Now verify the voltage @ TP4 of test PCB as per table given below by varying external DC power supply from 10 to 50 Volt.

|  |  |  |
| --- | --- | --- |
| Input feedback voltage @ External Regulated DC supply. | Voltage @ TP4 w.r.t. ground (i.e.TP2) on Test PCB. | Output on display |
| 0 / 10 V | 0.3 to 0.5 V | 10 (+/- 3) |
| 1 / 20 V | 0.6 to 0.8 V | 20 (+/- 3) |
| 2 / 30 V | 0.9 to 1.1 V | 30 (+/- 3) |
| 3 / 40V | 1.2 to 1.4 V | 40 (+/- 3) |
| 4 / 50V | 1.5 to 1.7 V | 50 (+/-3) |

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**WIRBOOM DIAGRAM**

TEST PCB

CN3

CN2

05

05

04

06

06

03

03

01

2

3

4

5

6

7

8

1

1

2

TEST JIG DPM

1

1

2

3

4

5

6

External Supply 50V

External Supply 4V

**External Power Supply Connections**

* + 1. For **017.01.008.0374 , 017.01.008.0376 and 017.01.008.0377,** Connect the external DC Power Supply to CN2 of test PCB (CN2-6 to +VE terminal and CN2-3 to –VE terminal of 50V DC power supply)
    2. For **017.01.008.0374 , 017.01.008.0376 and 017.01.008.0377,** Connect the external DC Power Supply to CN2 of test PCB (CN2-1 to +VE terminal and CN2-4 to –VE terminal of 4V DC power supply)