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**The procedure of despatch chamber test**

**In BIRDS-4**

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| --- | --- | --- | --- |
| **Version** | Date | Remarks | Writer |
| **Ver 1.0** | Jun 11, 2019 |  | Nozaki |
| **Ver 1.1** | July 3, 2019 |  | Nozaki |
| **Ver 1.2** | July 10,  2019 | Changed 2.4  (minutes) | Nozaki |
| **Ver 1.3** | August 23, 2019 | Renamed:  -X panel → -Y panel | Nozaki |
| **Ver 1.4** | September 3,  2019 | Modify procedure | Nozaki |
| **Ver 1.5** | September 27,  2019 | Changed the condition  -15℃ → -30 ℃ | Nozaki |

1. Purpose of this test

To observe how antennas deploy in the despatch chamber.

To demonstrate the burner circuit can deploy antennas even if the battery is at low-level voltage when the satellite deploys in eclipse condition @ -30 degrees.

2. Objectives

The Burner Circuit can deploy antennas successfully under low temperatures.

→ The nichrome-wire can melt four strings within 30 seconds.

→ The TMP sensor can read the actual temperature.

→ Antennas do not stuck after deployed.

→ The battery can supply power to the Burner Circuit.

3. Materials

|  |  |  |
| --- | --- | --- |
| Item | Quantity | Check |
| -Y panel  (Antennas were already rolled)  (with structure) | 1 | ⬜︎ |
| OBC board | 1 | ⬜︎ |
| FAB board | 1 | ⬜︎ |
| Flexible cable | 1 | ⬜︎ |
| Thermocouple cable  (K type) | 3 | ⬜︎ |
| Kapton tape | 1 | ⬜︎ |
| multimeter | 1 | ⬜︎ |
| Scissors | 1 | ⬜︎ |
| Alligator clip | 1 | ⬜︎ |
| Tester | 1 | ⬜︎ |

Check connection

|  |  |  |
| --- | --- | --- |
| pin | Check | Double-check |
| GND | ⬜︎ | ⬜︎ |
| Unreg2 line | ⬜︎ | ⬜︎ |
| TMP line | ⬜︎ | ⬜︎ |
| OBC line | ⬜︎ | ⬜︎ |
| TMP 3.3V line | ⬜︎ | ⬜︎ |

4. Procedure

|  |  |  |
| --- | --- | --- |
| No. | Procedure | Check |
| 1 | Turn ON the ventilation fan and the fan  before doing this test | ⬜︎ |
| 1.1 | Check the pressure of tank of liquid nitrogen  and note it | ⬜︎ |
| 1.2 | Check the thermocouples cable using the tester | ⬜︎ |
| 1.2.1 | Attach the thermocouples to the satellite  (Near nichrome wire, the battery inside and outside) |  |
| 1.3 | Set up LabView to be monitoring the temp in the chamber | ⬜︎ |
| 1.4 | Check oximeter is working well  and the value of more than 20% | ⬜︎ |
| 1.5 | Measure the battery voltage by multimeter before putting the satellite in chamber | ⬜︎ |
| 1.6 | Put -Y panel (satellite) in the chamber | ⬜︎ |
| 1.7 | Connect cables between Testbed and -Y panel  and check the connection using the tester | ⬜︎ |
| 1.8 | put on the thermocouples the same position  near the nichrome wire | ⬜︎ |
| 1.9 | Take photos inside the chamber | ⬜︎ |
| 2 | Turn ON the chamber and set up the target temp is -30℃ | ⬜︎ |
| 2.1 | Checking the Tmp in the chamber with monitoring LabView | ⬜︎ |
| 2.1.1 | Check the temperature reach target temp (-30 ℃) by monitor |  |
| 2.2 | Deploy the antenna by OBC command after 2 minutes | ⬜︎ |
| 2.3 | Measure the time to deploy the antenna and the voltage of the battery | ⬜︎ |
| 2.4 | Set up the target temp is +40℃ and extract water from the board while 15 minutes | ⬜︎ |
| 2.5 | Take photos inside the chamber | ⬜︎ |
| 2.6 | Put out -Y panel from the chamber | ⬜︎ |
| 2.7 | Measure the battery voltage by multimeter | ⬜︎ |
| 2.8 | Try again and again this test until the satellite cannot deploy antennas | ⬜︎ |
| 3 | Turn OFF the ventilation fan and the fan  after doing this test | ⬜︎ |
| 3.1 | Check the pressure of tank of liquid nitrogen  and note it | ⬜︎ |
| 3.2 | Clean up around the chamber | ⬜︎ |
| 3.3 | Return thermocouple to SVBL 2F | ⬜︎ |

5. Result

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Battery before  [V] | Battery after  [V] | Deployment time  [s] | Temp of battery [℃] | Remarks |
|  |  |  |  |  |
|  |  |  |  |  |
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|  |  |  |  |  |
|  |  |  |  |  |

※1 We tried to deploy antennas 3 times, but it is not deployed.

6. Consideration

7. Conclusion

8. References

[1] BIRDS-2 Antenna Deployment Test Report - FM

[2] Despatch chamber user manual