

Start-Up Scope of Work Attachment L-2

This scope of work is shared by UPS, Eaton DC, Eaton PDU/PDR/RPP/STS, Flywheel, Non Eaton UPS and Distributed Bypass. The following is an outline of general procedures and tests, if applicable, that are normally performed by Field Service Personnel during the course of a standard start-up for new units or to recertify and restart a previously started UPS. All checks and processes may not be applicable to all equipment models.

UPS/PDU/RPP/STS START-UP PROCEDURE

1. VISUAL INSPECTION

- 1.1. Visually inspect all equipment for signs of shipping damage and/or foreign materials.
- 1.2. Check all battery cells for proper electrolyte levels.
- 1.3. Observe type of ventilation, room cleanliness, use of proper signs and any safety related items that may be noteworthy

2. MECHANICAL INSPECTION

- 2.1. Check internal power connections in UPS module for tightness while observing proper safety precautions.
- 2.2. Check all control wiring terminations and plugs in UPS module for tightness and/or proper setting.
- 2.3. Check to see that all factory connections, power modules, subassembly pans and legs are secure.
- 2.4. Inspect the ISBM or IOM (inspect auxiliary connections)

3. ELECTRICAL PRECHECK

- 3.1. Check system for ground faults at all power inputs and outputs
- 3.2. Check DC bus for short circuits and proper polarity.
- 3.3. Checks input and bypass power terminations for proper voltages and phase rotation inside all modules.
- 3.4. Check and adjust, if necessary, all power supply voltages.
- 3.5. Verify CTO and Serial numbers programmed into system match the equipment labels

4. INITIAL UPS, PDU ENERGIZATION

- 4.1. Verify all system annunciations are in "go" condition.
- 4.2. Energize unit(s) and verify proper DC walkup and AC phase on.
- 4.3. Check DC link holding voltage, AC output voltages and output waveforms.
- 4.4. Check final DC link voltage and inverter AC output. Adjust if required.
- 4.5. Check for proper synchronization with bypass source.
- 4.6. Check voltage differences between inverter outputs and bypass source.

5. INITIAL DC SYSTEM ENERGIZING

- 5.1. Installation of one rectifier
- 5.2. Initial power up of equipment
- 5.3. Verification of correct voltage / polarity for rectifiers
- 5.4. Installation of all rectifiers
- 5.5. Verification of proper operation of rectifiers
- 5.6. Verification of proper operation of the system controller

6. BATTERY SET-UP

- 6.1. Determine common or separate battery set-up process and settings
- 6.2. Check for proper cell interconnections with respect to polarity throughout battery.
- 6.3. Check battery configuration matches required unit configuration (voltage, polarity, number of cells per string)

7. BRANCH CIRCUIT MONITORING SET-UP (if optionally purchased)

- 7.1. Ensure installation configuration matches application
- 7.2. Perform branch circuit breaker scheduling
- 7.3. Check voltage and current calibrations

8. OPERATIONAL INSPECTION

- 8.1. Check proper system operation in Normal Mode, Bypass Mode, and Battery Mode
- 8.2. Check system transitions between operating modes
- 8.3. Check multi-module operations
- 8.4. Verify system calibrations and adjust as necessary

9. FUNCTIONAL TEST

- 9.1. Test Battery mode
- 9.2. Simulate the loss of bypass when on battery testing
- 9.3. Perform ISBM loss of logic power testing
- 9.4. Emergency transfer testing
- 9.5. Local and Remote Emergency Power Off testing
- 9.6. Mini CSB Failure testing
- 9.7. Fan Failure Test (ONLY PERFORM IF NO LOAD IS APPLIED)
- 9.8. Building Alarms testing
- 9.9. Basic Easy Capacity testing

10. INSTALL OPTIONAL CONNECTIVITY AND MONITORING

- 10.1. Upon customer enrollment and request (www.powerquality.eaton.com/enotify, select "Install eNotify", and complete an "eNotify Request Form"), install and program connectivity parts and test monitoring connection. Customer must enroll and authorize Eaton to provide monitoring (connectivity parts may require separate purchase); customer may self install eNotify or purchase a separate installation if not completed at startup.

11. INSPECTION COMPLETION

- 11.1. Ensure dead fronts and door panels are reinstalled
- 11.2. System will be left in normal mode when environmental controls are operational
- 11.3. Conduct on-site customer system operation training
- 11.4. Final EEPs, calibration EEPs, meters report, service log, and configuration reports will be downloaded and stored
- 11.5. Startup data forms and reports are available as required.
- 11.6. Clean up tools and debris around the system.

FLYWHEEL UNITS ONLY (Varies by Flywheel type)



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1. MECHANICAL INSPECTION

- 1.1. Check internal power connections in Flywheel module for tightness while observing proper safety precautions
- 1.2. Check all control wiring terminations and plugs in Flywheel module for tightness and/or proper setting
- 1.3. Check to see that all subassembly heat sinks are secure
- 1.4. Verify bearing and hardware installation

2. ELECTRICAL PRE-CHECK

- 2.1. Check Flywheel system for grounds
- 2.2. Check DC bus for short circuits
- 2.3. Check power terminations for proper voltages
- 2.4. Check and adjust, if necessary, all power supply voltages
- 2.5. Check all lamp test functions
- 2.6. Verify auxiliary power supply
- 2.7. Check cooling fans
- 2.8. Verify internal operations

3. INSTALLATION VERIFICATION (power system configuration dependant on Flywheel type)

- 3.1. Verify power wiring to and from the UPS system has been properly installed
- 3.2. Verify correct polarity of all Flywheel DC cabling to the UPS and battery *
- 3.3. Verify grounding from Flywheel to the UPS cabinet, and all battery cabinets *
- 3.4. Ensure that the auxiliary power ground is on the same ground plane as the UPS and Flywheel

4. INITIAL UNIT ENERGIZATION

- 4.1. Verify all system annunciations are in "go" condition
- 4.2. Energize unit and verify proper DC walkup and Flywheel RPM
- 4.3. Verify that vacuum is adequate and stable