

an EnerSys company

METHOD OF PROCEDURE

Replacement of fuses in Alpha Rotary Bypass Switch with Electrical Interlock

Summary

This procedure outlines how to replace of fuse in solenoid circuit and AC power status LED's in Alpha Rotary Bypass Switch with Electrical Interlock.

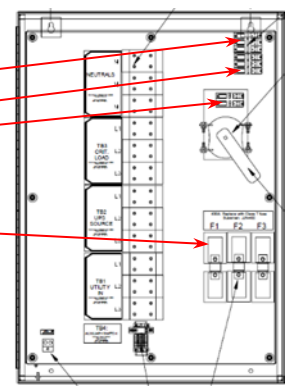
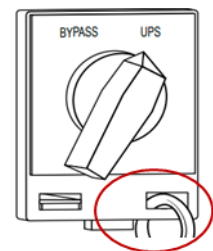
Equipment or Tools Necessary

- Bussmann FP-2 fuse puller – for 2A & 1/2A fuses
- Electrical safety gloves and appropriate PPE
- Digital Voltmeter
- Insulated tools – socket set & torque wrench for 400A fuses

WARNING! Hazardous energy is present in the enclosure! Only qualified technicians should open the cabinet.

Notes:

1. Use insulated tools and appropriate PPE while working on energized equipment.
2. Alarms may be generated during this process, please notify NOC before working on the system and follow end user policies, procedures, and MOP's.
3. The door mounted switch handle may be get moved during the procedure. Simply adjust the position to clock it correctly with the switch. The door will not close correctly if the switch alignment is not clocked correctly. See "Aligning the Outside Handle and Maintenance Handle" in EMBS Manual#020-EMBS INT-J0 document.
4. When turn off/on power to/from EMBS or Inverter/UPS power or changing power flow to BYPASS/UPS follow the end user's practices and policies.
5. Lock-out-tag-out safety device is recommended before attempting fuse replacement.
6. There are (4) different fuse sets in the Rotary EMBS
 - A. Utility Status LED Fuse (2-amp & 1/2-amp)
 - B. UPS Status LED Fuse (2-amp & 1/2-amp)
 - C. Solenoid Fuse (2-amp)
 - D. Utility Power Input Fuse (400-amp)Fuse block locations are different on each model of cabinet.
7. LED status indicator fuses for L1 uses a 2-amp fuse while L2 & 3 use a 1/2-amp fuse. L1 fuse is larger to power the status LED and control circuitry.
8. Utility input power fuses are included in the 200A (P/N: 0200222-INT) and 250A (P/N: 0200223-INT) cabinet and both use the same P/N: fuse. The 100A cabinets omit this fuse.
9. Part numbers of fuses:
 - 1/2-amp fuse P/N: 4600137 (FNQ-R-1/2)
 - 2-amp fuse P/N: 4600136 (FNQ-R-2) – for LEDs
 - 2-amp fuse P/N: 4600138 (LP-CC-2) – for Solenoid
 - 400-amp fuse P/N: 4600113(JLLN-400X or JLLN-400X)





an EnerSys company

Solenoid Fuse Replacement:

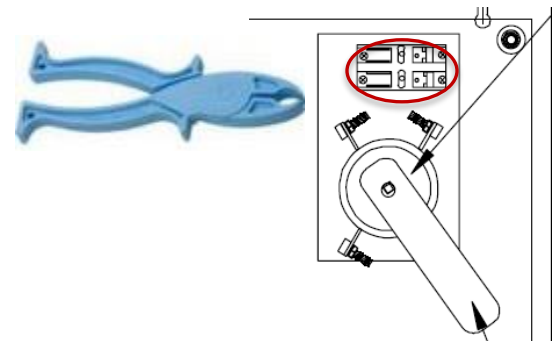
Key indicator of this fuse being tripped is that the interlock does not release in "OVERRIDE" key positions. Verification is not hearing the solenoid release or continuity test on the fuse.

Notes:

1. Solenoid fuses are de-energized for maintenance under this condition:
 - a. Keyed selector switch set to "LOCKED" position.
In this condition the critical load power flow is not changed or put at risk of changing.
2. Solenoid fuse block has two position. Only one of them is wired the other is unused.
3. Unless the unit is completely de-energized (which is not required) hazardous energy is present in the enclosure! Use insulated tools and appropriate PPE.

Steps:

1. Set keyed switch to "LOCKED" position and remove the key. This is the normal condition.
2. Remove fuse using Bussmann FP-2 fuse puller.
3. Install new fuse. Check replacement fuse for continuity before installing.





an EnerSys company

Utility Power Status LED Fuse Replacement Procedure:

Key indicator of this fuse being tripped is that the amber LEDs labeled "UTILITY" are not luminated. Verification includes verifying utility input is powered and testing the fuses for continuity.



Notes:

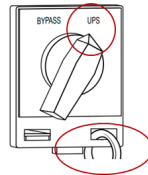
1. Utility LED fuses are de-energized for maintenance under this condition:
 - a. Utility input is open circuited (turned off).
 - b. Rotary switch is in UPS (normal) position.

In this condition the inverter/UPS will be feeding the critical load. The only network risk will exist is the lack of utility power as emergency backup should the inverter/UPS completely fail during the repair procedure.

2. Unless the unit is completely de-energized (which is not required) hazardous energy is present in the enclosure! Use insulated tools and appropriate PPE.

Steps:

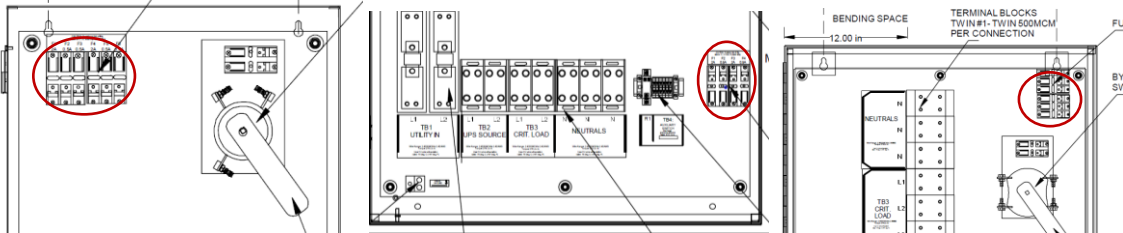
1. Set rotary switch is in UPS (normal) position.



2. Set keyed switch to "LOCKED" position and remove the key.



3. Remove fuse(s) using Bussmann FP-2 fuse puller.



4. Install new fuse(s). Check replacement fuse for continuity before installing.
5. Close the utility input circuit to restore the EMBS to normal.
6. Verify the UTILITY LED lamps are luminated. If not troubleshoot to resolve this issue.



an EnerSys company

Inverter/UPS Power Status LED Fuse Replacement Procedure:

Key indicator of this fuse being tripped is that the amber LEDs labeled "UPS" are not luminated. Verification includes verifying UPS input is powered and testing the fuses for continuity.

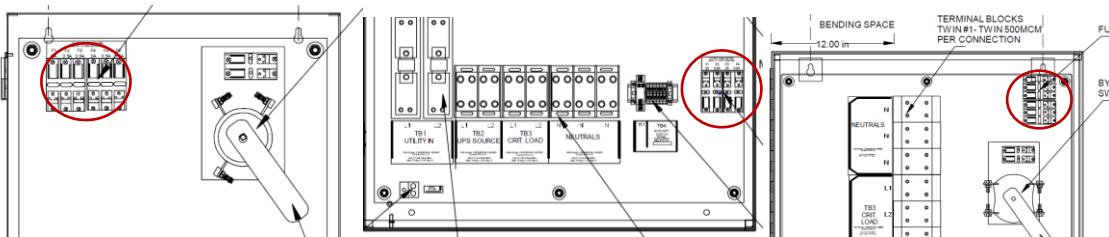
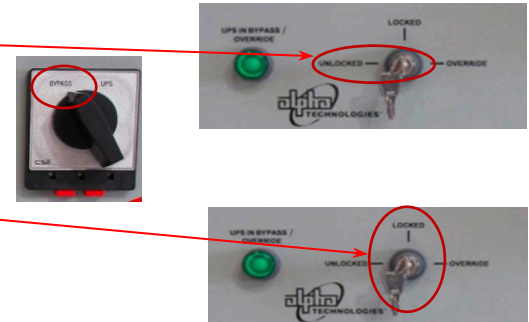


Notes:

1. UPS LED fuses are de-energized for maintenance under this condition:
 - a. Rotary switch is in Bypass (abnormal) position.
 - b. Inverter/UPS input to EMBS in open (turned off) condition.
 In this condition the utility/generator will be feeding the critical load. In this abnormal condition the critical load will not be fully protected.
2. Unless the unit is completely de-energized (which is not required) hazardous energy is present in the enclosure! Use insulated tools and appropriate PPE.

Steps:

1. Verify inverter/UPS utility input is closed (turned on).
2. Transfer power to BYPASS at the inverter/UPS. Use the zero phase shift feature if available.
3. Verify EMBS utility input is closed (turned on).
4. Set EMBS keyed switch to "UNLOCKED" position.
5. Transfer power to BYPASS at the EMBS using the rotary switch.
6. Set keyed switch to "LOCKED" position and remove the key.
7. Open inverter/UPS output breaker (turn off).
8. Remove fuse(s) using Bussmann FP-2 fuse puller.



9. Install new fuse(s). Check replacement fuse for continuity before installing.
10. Close inverter/UPS output breaker (turn on).
11. Transfer power to BYPASS at the inverter/UPS.
12. Transfer power to inverter/UPS at the EMBS using the rotary switch.
13. Transfer power to INVERTER at the inverter/UPS. Use the zero phase shift feature if available.
14. Verify the UTILITY LED lamps are luminated and system is normal. If not troubleshoot to resolve issues.



an EnerSys company

Utility Power Input 400A Fuse Removal and Replacement Procedure:

Key indicator of this fuse being tripped is that the amber LEDs labeled "UTILITY" are not illuminated. Verification includes verifying utility input is powered and testing the fuses for continuity.

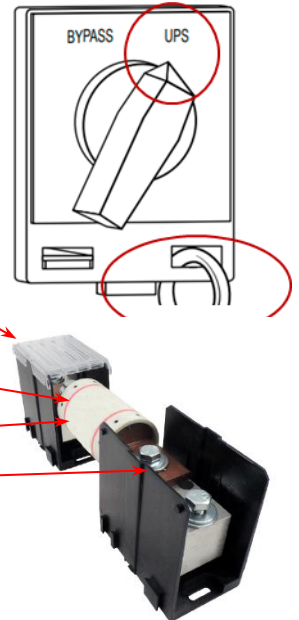


NOTES:

1. Utility input power fuses are de-energized under this condition:
 - a. Utility input is open circuited (turned off).
 - b. Rotary switch is in UPS (normal) position.In this condition the inverter/UPS will be feeding the critical load. The only network risk will exist is the lack of utility power as emergency backup should the inverter/UPS completely fail during the repair procedure.
2. Unless the unit is completely de-energized (which is not required) hazardous energy is present in the enclosure! Use insulated tools and appropriate PPE.

Steps:

1. Make sure EMBS switch is in "UPS" position.
2. Open circuit the UTILITY feed to the bypass switch.
3. Remove plastic cover can be removed with by hand to expose the bolts attaching the fuse.
4. Remove failed fuse(s) using insulated tools. Use insulated tools.
5. Install new fuse(s). Check replacement fuse for continuity before installing.
6. Torque bolts to 21 ft-lb (250 in-lb, 28 N-m).
7. Replace plastic screw covers.



End of Method of Procedures

For assistance, contact Alpha Technical Support:
Toll Free North America: 1-888-462-7487
International: +1-604-436-5547
Monday - Friday, 7:00 AM - 5:00 PM PST for regular inquires
24/7 for emergency support
[Click here to report a problem](#)

For more information visit www.alpha.com

Page 5 of 5