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Replace the Solenoid, Rectifier & Disconnect Switch Block for a 4000 Amp ZTS Switch

Purpose:	To replace a defective Solenoid, Rectifier Disconnect Switch Block.
When:	When directed by a service order.

Required Tools & Equipment:	
Basic electricians hand tools	PPE
Multimeter Digital or Analog	Rubber insulating gloves class 0
Solenoid	Safety glasses
Tie wraps	Electrical hazard safety shoes
Contact Block for Disconnect Switch	
Rectifier Assembly	

Danger

HAZARDOUS VOLTAGE
Can Cause Severe Injury or Death

Ensure before the enclosure is opened, you must lockout all energy sources to the ATS.

Do These Steps:

1. *Obtain* the proper documentation.
2. *Open* the front Enclosure.
3. *Place* the disconnect switch to "Inhibit".
4. *Disable* the generator start-up circuit.

Danger

HAZARDOUS VOLTAGE
Can Cause Severe Injury or Death

On systems with multiple ATS's connected to a single generator, you must lockout all energy sources to the ATS, before continuing on.

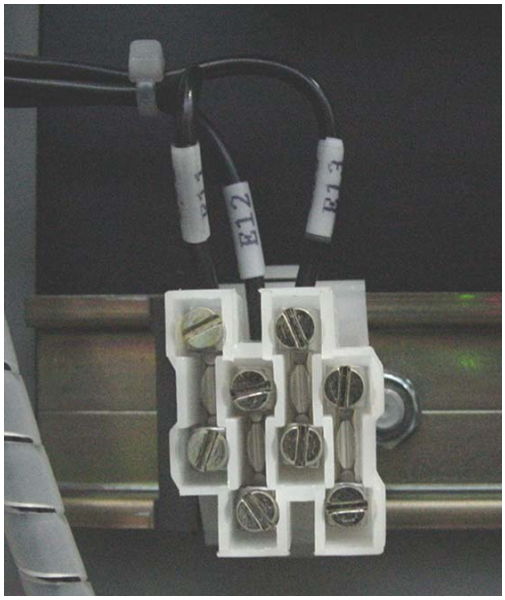


Figure 1.

5. *Disconnect* Main Power
6. *Verify* zero volts across each phase.

7. Remove the solenoid operator covers.

Figure 2.

8. Determine the solenoid to remove.

   Note: The steps for removal and replacement for both the upper and lower solenoids are the same.

9. Remove the two (2) solenoid bolts that secure the bracket.

Figure 3.

10. Remove the lock nut holding the DS in place.
11. Remove the DS from the bracket.
12. Scribe the position of the solenoid.

    Note: The scribe mark is used to return the solenoid to the manufacturing position.

13. Cut the harness tie wraps to the associated rectifier.

14. Remove the cotter pin from the Clevis pin.

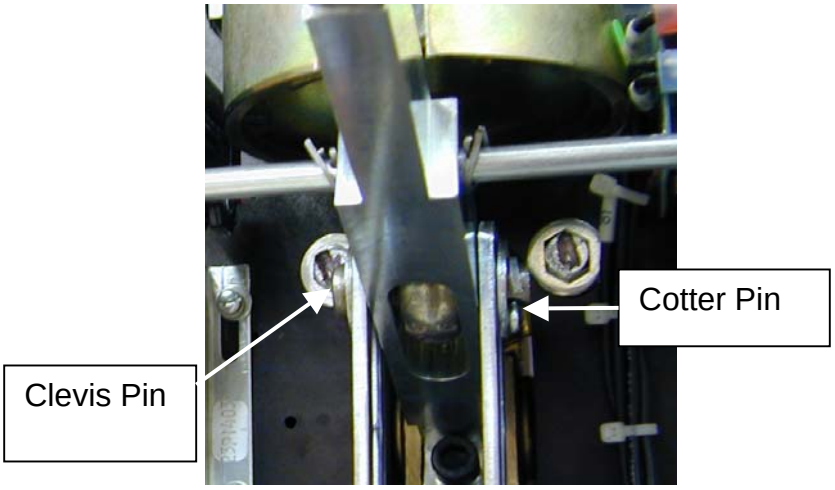


Figure 4.

15. Remove the Clevis pin to disconnect the plunger from the linkage.
16. Loosen the remaining two bolts holding the solenoid in place.
17. Disconnect the DC "Fast On" connections from the harness.

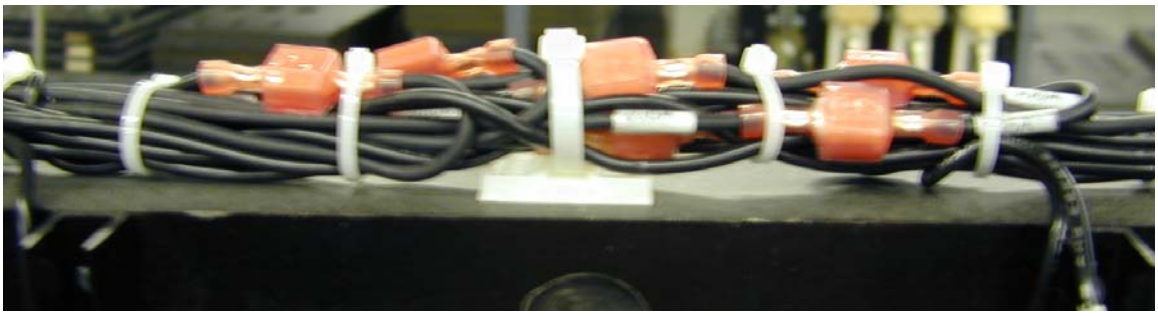


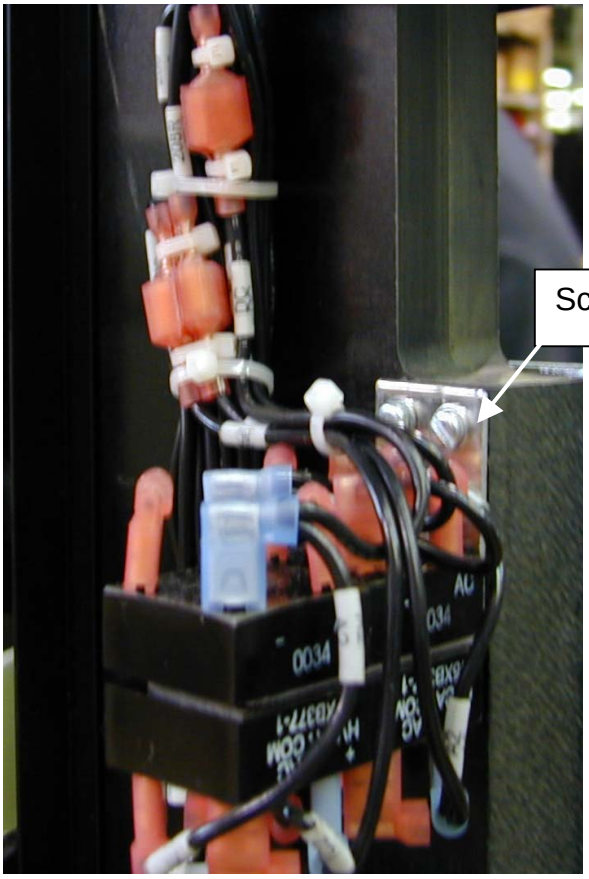
Figure 5.

18. Remove the final two bolts holding the solenoid.
19. Remove the solenoid from the ATS.
20. Check the resistance to determine which coil in the solenoid is defective.

    Note: If the reading is infinite or shorted, that coil is defective.

21. Remove the AC "Fast On" connections, from the harness, associated with the defective rectifier.

22. Remove the two screws holding the rectifier pack.



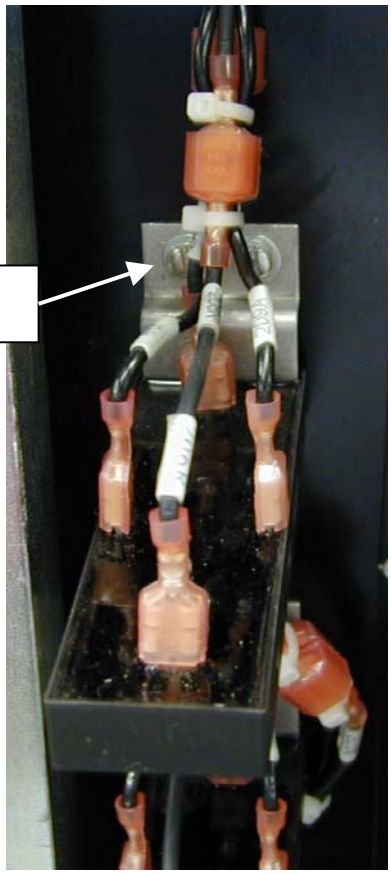


Figure 6.(old style) Figure 7. (new style)

23. Remove the rectifier pack.

24. Remove the wiring from the associated block of the DS.

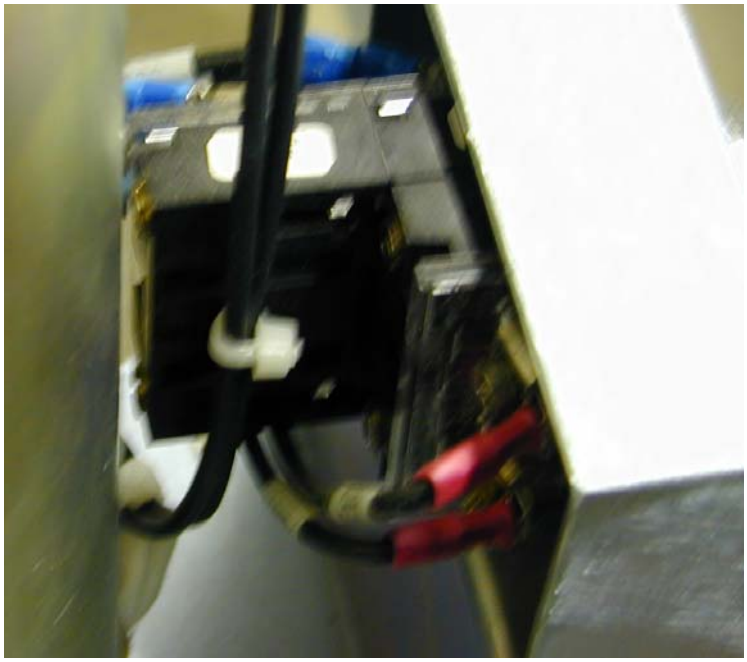


Figure 8.

25. Remove the associated block from the DS.

26. Examine the harness, associated with the defective coil, for burnt or charred insulation.

If the insulation is:	Then
Good	Continue on.
Burning/charring no more than two individual wires.	Repair wiring. Continue on.
Burning/charring of three or more wires.	Call for service tech to replace the harness.

27. Install the new block into the DS.

28. Connect the wiring to the new block of the DS.

29. Install the new rectifier pack.

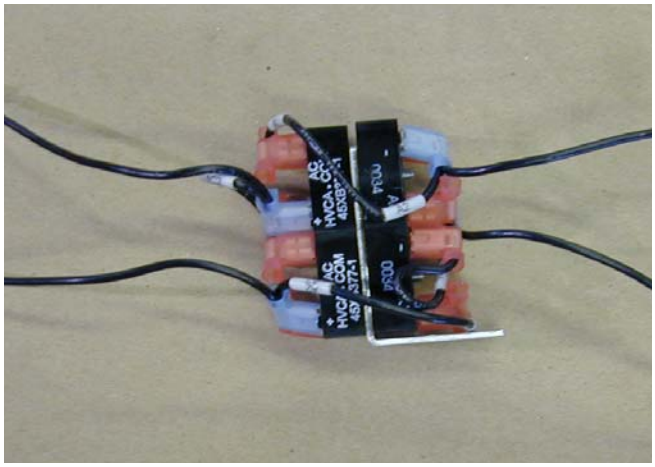


Figure 9.

30. Connect the rectifier pack AC “Fast On” connections to the wiring harness.
31. Install the solenoid.
32. Tighten the two (2), non bracket, bolts hand tight.
33. Adjust the solenoid to the scribed mark in step 11.
34. Torque the bolts to 25 ft-lbs.
35. Connect the DC “Fast On” connections in the wiring harness.
36. Align the plunger to the linkage.

37. Insert the Clevis pin through the linkage and plunger.

Figure 10.

38. Install the washers and cotter pin in to the Clevis pin.
39. Install the DS into the bracket.
40. Tighten the lock nut onto the DS.
41. Install the bracket.
42. Tighten the remaining two (2) solenoid bolts, hand tight.
43. Place the ATS into the normal position.
44. Check the Clevis pin for some free play.

    Note: If you do not have some small amount of free play, adjust the solenoid up a few thousands upwards.

45. Place the ATS into the emergency position.
46. Check the Clevis pin for some free play.

    Note: If you do not have some small amount of free play, adjust the solenoid up a few thousands downwards.

47. Repeat steps 43 and 46 until you have a few thousands play from the plunger in both normal and emergency.

48. Adjust the Limit Switches.

    1) Place solenoid into the Zero Toggle position.

    Note: Zero toggle is obtained when the contact block in the rear of the panel is parallel to the ground.

    Note: Since you can not see the contact block inside a ZTS cabinet, you must go by feel and your experience.

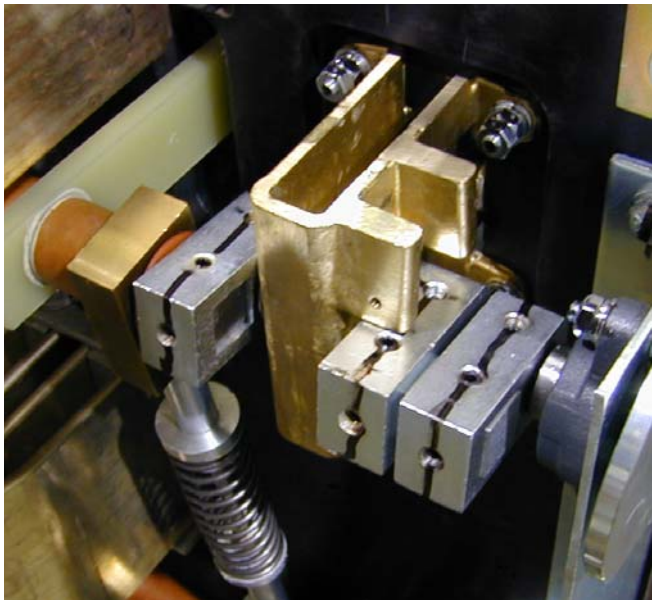


Figure 11.

    2) Check to ensure that the micro switch is activated.

    Note: You should hear the micro switch click, to activate.

If the micro switch is:	Then:
Activated	Continue on.
Not activated	Adjust the micro switch bracket until the switch is activated. Go to step 48.

    3) Throw the ATS into over toggle.

4) Check to ensure the micro switch is not bottomed out.

Note: You should a small amount of play in the switch.

If the micro switch is:	Then:
Not bottomed out	Continue on.
Bottomed out	Adjust the micro switch bracket until the switch has slight play. Go to step 48.

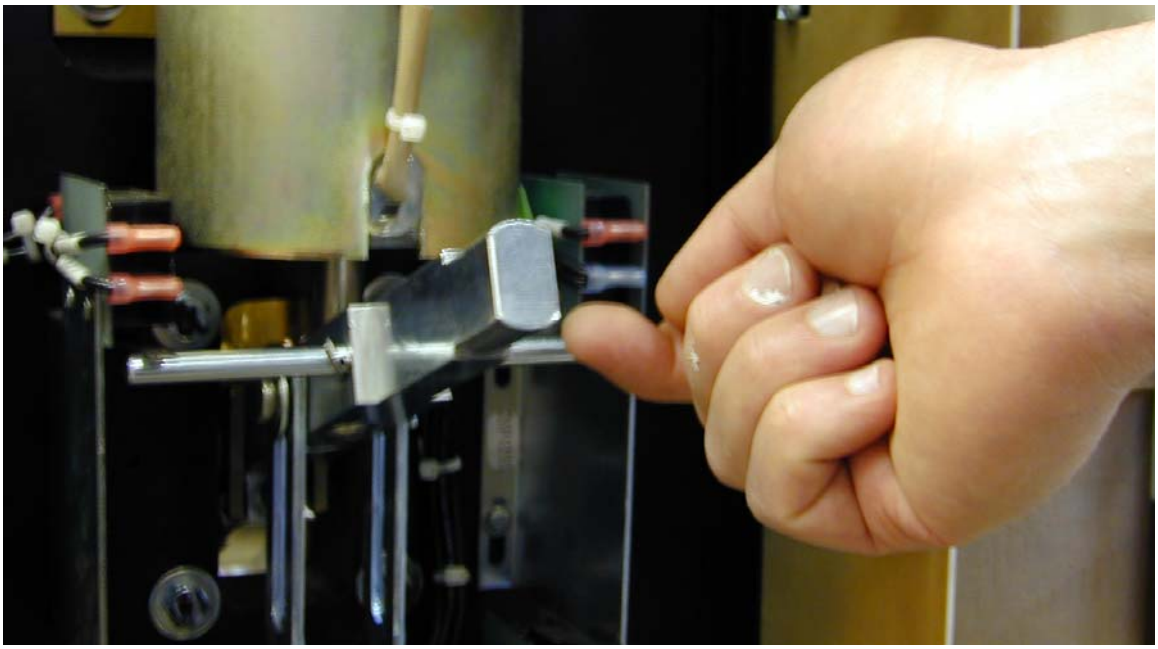


Figure 12.

5) Place the switch into the open position.

6) Check to ensure that the switch is activated, but not bottomed out.

Note: You should hear the micro switch click, to activate, but still have some free play in it.

If the micro switch is:	Then:
Activated and not bottomed out	Continue on.
Not activated or bottomed out	Adjust the micro switch bracket until the switch is activated. Go to step 48.

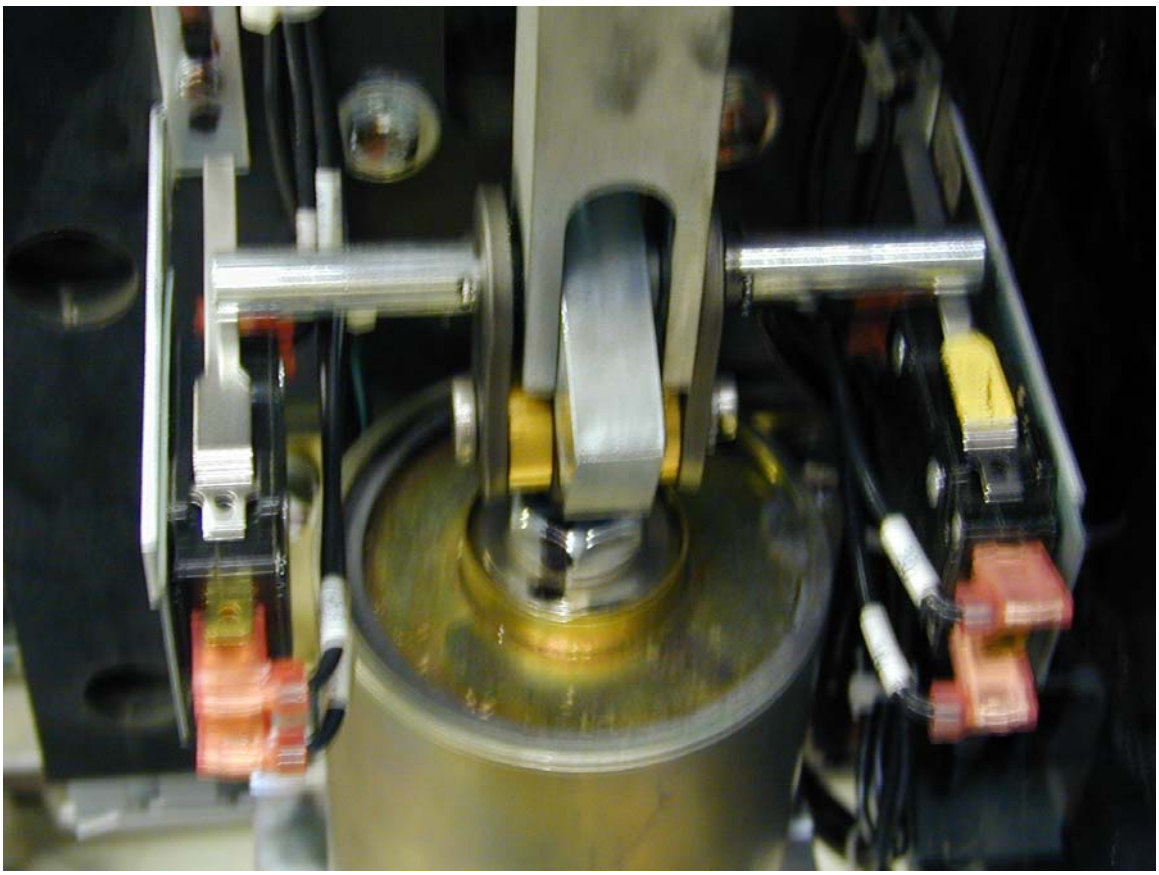


Figure 14.

49. Torque the remaining solenoid bolts to 25 ft-lbs.
50. Tie wrap the harness.
51. Replace the solenoid operating plate.

52. Clean the inside of the ATS
53. *Energize* the ATS.
54. *Enable* the generator start-up.
55. *Place* the disconnect switch to "Auto".
56. *Close* the enclosure.
57. *Push and hold* the test pushbutton.

    Note: After the time delay switch should automatically transfer to the emergency position.

Figure 15.

58. Release the test pushbutton.

    Note: Once you release the test pushbutton and after the time delay, the ATS should return to the normal position.

59. *Clean-up* the area.
60. *Complete* the Service Report.
61. *Send* Reports to GE Zenith Controls.

You know you are completed when:

- ☐ The transfer switch is secured and operating properly.
- ☐ The tools are stored.
- ☐ The reports are completed.