DIAGNOSTIC
REPAIR
MANUAL

GENERAC®

Transfer Switch Troubleshooting Guide

"W", "WN" AND "CTTS" STYLE CONTACTOR ASSEMBLIES

AUTOMATIC STANDBY GENERATORS

Important Safety Notice

Proper service and repair is important to the safe, economical and reliable operation of all standby electric power systems. The troubleshooting, testing and servicing procedures recommended by Generac and described in this manual are effective methods of performing such operations. Some of these operations or procedures may require the use of specialized equipment. Such equipment should be used when and as recommended.

It is important to note that this manual contains various DANGER, CAUTION, and NOTE blocks. These should be read carefully in order to minimize the risk of personal injury or to prevent improper methods or practices from being used. Use of improper or unauthorized practices may damage equipment or render it unsafe. The DANGER, CAUTION and NOTE blocks are not exhaustive. Generac could not possibly know, evaluate and advise the service trade of all conceivable ways in which operations described in this manual might be accomplished or of the possible hazardous consequences of each way. Consequently, Generac has not taken any such broad evaluation. Accordingly, anyone who uses any troubleshooting, testing or service procedure that is not recommended by Generac must first satisfy himself that neither his safety nor the equipment's safety will be jeopardized by the procedure or the method he selects.

⚠ ***SAVE THESE INSTRUCTIONS – The manufacturer suggests that these rules for safe operation be copied and posted in potential hazard areas. Safety should be stressed to all operators and potential operators of this equipment.***

Study these SAFETY RULES carefully before installing, operating or servicing this equipment. Become familiar with the *Owner's Manual* and with the unit. The generator can operate safely, efficiently and reliably only if it is properly installed, operated and maintained. Many accidents are caused by failing to follow simple and fundamental rules or precautions.

Generac cannot anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and on tags and decals affixed to the unit are, therefore, not all inclusive. If using a procedure, work method or operating technique that Generac does not specifically recommend, ensure that it is safe for others. Also make sure the procedure, work method or operating technique utilized does not render the generator unsafe.

⚠ DANGER ⚠

⚠ **Despite the safe design of this generator, operating this equipment imprudently, neglecting its maintenance or being careless can cause possible injury or death. Permit only responsible and capable persons to install, operate or maintain this equipment.**

⚠ **Potentially lethal voltages are generated by these machines. Ensure all steps are taken to render the machine safe before attempting to work on the generator.**

⚠ **Parts of the generator are rotating and/or hot during operation. Exercise care near running generators.**

⚠ GENERAL HAZARDS ⚠

- For safety reasons, Generac recommends that this equipment be installed, serviced and repaired by an authorized service dealer or other competent, qualified electrician or installation technician who is familiar with applicable codes, standards and regulations. The operator also must comply with all such codes, standards and regulations.
- Installation, operation, servicing and repair of this (and related) equipment must always comply with applicable codes, standards, laws and regulations. Adhere strictly to local, state and national electrical and building codes. Comply with regulations the Occupational Safety and Health Administration (OSHA) has established. Also, ensure that the generator is installed, operated and serviced in accordance with the manufacturer's instructions and recommendations. Following installation, do nothing that might render the unit unsafe or in noncompliance with the aforementioned codes, standards, laws and regulations.
- The engine exhaust fumes contain carbon monoxide gas, which can be DEADLY. This dangerous gas, if breathed in sufficient concentrations, can cause unconsciousness or even death. For that reason, adequate ventilation must be provided. Exhaust gases must be piped safely away from any building or enclosure that houses the generator to an area where people, animals, etc., will not be harmed. This exhaust system must be installed properly, in strict compliance with applicable codes and standards.
- Keep hands, feet, clothing, etc., away from drive belts, fans, and other moving or hot parts. Never remove any drive belt or fan guard while the unit is operating.
- Adequate, unobstructed flow of cooling and ventilating air is critical to prevent buildup of explosive gases and to ensure correct generator operation. Do not alter the installation or permit even partial blockage of ventilation provisions, as this can seriously affect safe operation of the generator.
- Keep the area around the generator clean and uncluttered. Remove any materials that could become hazardous.
- When working on this equipment, remain alert at all times. Never work on the equipment when physically or mentally fatigued.
- Inspect the generator regularly, and promptly repair or replace all worn, damaged or defective parts using only factory-approved parts.
- Before performing any maintenance on the generator, disconnect its battery cables to prevent accidental start-up. Disconnect the cable from the battery post indicated by a NEGATIVE, NEG or (–) first. Reconnect that cable last.
- Never use the generator or any of its parts as a step. Stepping on the unit can stress and break parts, and may result in dangerous operating conditions from leaking exhaust gases, fuel leakage, oil leakage, etc.

⚠ ELECTRICAL HAZARDS ⚠

- All generators covered by this manual produce dangerous electrical voltages and can cause fatal electrical shock. Utility power delivers extremely high and dangerous voltages to the transfer switch as well as the standby generator. Avoid contact with bare wires, terminals, connections, etc., on the generator as well as the transfer switch, if applicable. Ensure all appropriate covers, guards and barriers are in place before operating the generator. If work must be done around an operating unit, stand on an insulated, dry surface to reduce shock hazard.
- Do not handle any kind of electrical device while standing in water, while barefoot, or while hands or feet are wet. **DANGEROUS ELECTRICAL SHOCK MAY RESULT.**
- If people must stand on metal or concrete while installing, operating, servicing, adjusting or repairing this equipment, place insulative mats over a dry wooden platform. Work on the equipment only while standing on such insulative mats.

- The National Electrical Code (NEC), Article 250 requires the frame and external electrically conductive parts of the generator to be connected to an approved earth ground and/or grounding rods. This grounding will help prevent dangerous electrical shock that might be caused by a ground fault condition in the generator set or by static electricity. Never disconnect the ground wire.
- Wire gauge sizes of electrical wiring, cables and cord sets must be adequate to handle the maximum electrical current (ampacity) to which they will be subjected.
- Before installing or servicing this (and related) equipment, make sure that all power voltage supplies are positively turned off at their source. Failure to do so will result in hazardous and possibly fatal electrical shock.
- Connecting this unit to an electrical system normally supplied by an electric utility shall be by means of a transfer switch so as to isolate the generator electric system from the electric utility distribution system when the generator is operating. Failure to isolate the two electric system power sources from each other by such means will result in damage to the generator and may also result in injury or death to utility power workers due to backfeed of electrical energy.
- Generators installed with an automatic transfer switch will crank and start automatically when NORMAL (UTILITY) source voltage is removed or is below an acceptable preset level. To prevent such automatic start-up and possible injury to personnel, disable the generator's automatic start circuit (battery cables, etc.) before working on or around the unit. Then, place a "Do Not Operate" tag on the generator control panel and on the transfer switch.
- In case of accident caused by electric shock, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. **AVOID DIRECT CONTACT WITH THE VICTIM.** Use a nonconducting implement, such as a dry rope or board, to free the victim from the live conductor. If the victim is unconscious, apply first aid and get immediate medical help.
- Never wear jewelry when working on this equipment. Jewelry can conduct electricity resulting in electric shock, or may get caught in moving components causing injury.

FIRE HAZARDS

- Keep a fire extinguisher near the generator at all times. Do NOT use any carbon tetra-chloride type extinguisher. Its fumes are toxic, and the liquid can deteriorate wiring insulation. Keep the extinguisher properly charged and be familiar with its use. If there are any questions pertaining to fire extinguishers, consult the local fire department.

EXPLOSION HAZARDS

- Properly ventilate any room or building housing the generator to prevent build-up of explosive gas.
- Do not smoke around the generator. Wipe up any fuel or oil spills immediately. Ensure that no combustible materials are left in the generator compartment, or on or near the generator, as FIRE or EXPLOSION may result. Keep the area surrounding the generator clean and free from debris.
- Generac generator sets may operate using one of several types of fuels. All fuel types are potentially FLAMMABLE and/or EXPLOSIVE and should be handled with care. Comply with all laws regulating the storage and handling of fuels. Inspect the unit's fuel system frequently and correct any leaks immediately. Fuel supply lines must be properly installed, purged and leak tested according to applicable fuel-gas codes before placing this equipment into service.
- Diesel fuels are highly FLAMMABLE. Gaseous fluids such as natural gas and liquid propane (LP) gas are extremely EXPLOSIVE. Natural gas is lighter than air, and LP gas is heavier than air; install leak detectors accordingly.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

SPECIFICATIONS

PART 1
TROUBLESHOOTING

"W", "WN" AND "CTTS" STYLE CONTACTOR ASSEMBLIES

TABLE OF CONTENTS

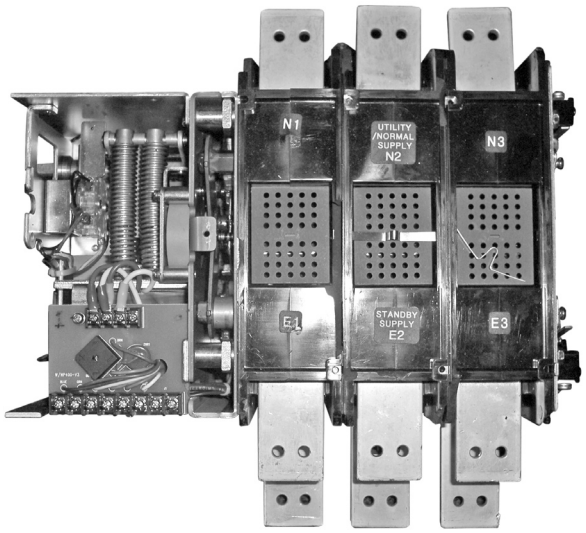


Figure 1. "W" Type Contactor Assembly

SWITCH WILL NOT TRANSFER TO GENERATOR

If the GTS/HTS "W" switch will not retransfer to Standby Position, and generator voltage is measured on Wires 107 (B1) and B2 (E2), proceed as follows:

⚠ **IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. In addition, verify utility power is secured and service entrance disconnect is in the off or open position.**

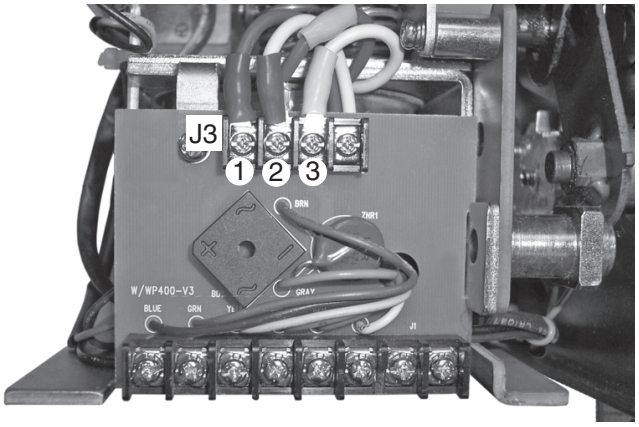


Figure 2. "W" Type PCB

1. Remove the cover on the contactor assembly.
2. Using a multimeter (set to ohms scale), measure the resistance of the coil as follows and compare the results to the chart provided below.
3. On the J3 block, measure the resistance between the red wire (blue covering) and the white wire (yellow covering).
4. Measure resistance from the red wire (blue covering) to the white wire (blue covering)/red wire (yellow covering).
5. Measure resistance from the white wire (yellow covering) to the white wire (blue covering)/red wire (yellow covering).
6. If proper resistance values were not measured in Steps 3 through 5, the closing coil is faulty (Contact service department or replace coil). If proper resistance values were measured, proceed to Step 7.
7. Remove the screw from the PCB and unplug the harness (located behind the PCB). If the contactor is not in the utility position, manually transfer it to the utility position.
8. Measure the resistance between the yellow and brown wires on the female side of the plug (see Figure 3). Less than 1 ohm should be measured. If the proper resistance value is NOT measured, replace the LS1 (Part # 0D4516). If proper resistance was measured, proceed to Step 10.
9. Measure the resistance between the blue and brown wires on the female side of the plug (see Figure 3). INFINITY should be measured. If INFINITY is NOT measured, replace the LS1 (Part # 0D4516). If proper resistance was measured, proceed to Step 10.

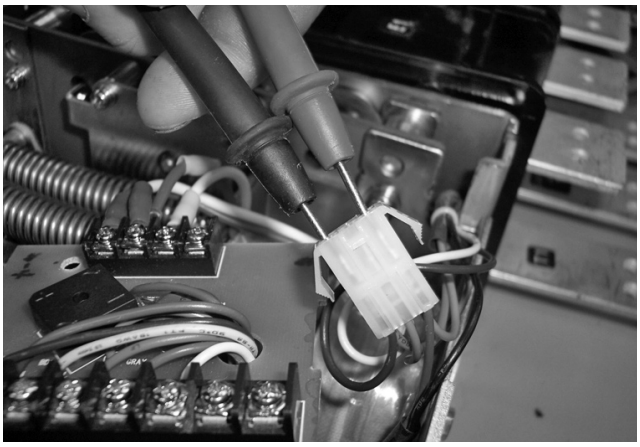
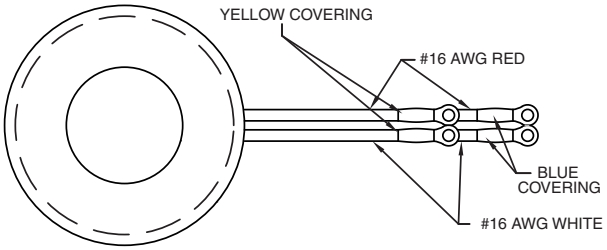


Figure 3.

10. With the contactor in utility position, measure the resistance between the orange and gray wires on the female side of the plug. Less than 1 ohm should be measured. If proper resistance is NOT measured, replace the LS2 (Part #0D4516). If proper resistance is measured, proceed to Step 9.

CONTACTOR	RESISTANCE
100A/2-POLE	70.66
100A/3-POLE	
100A/4-POLE	50.10
150A/2-POLE	
150A/3-POLE	
200A/2-POLE	
200A/3-POLE	
150A/4-POLE	34.26
200A/4-POLE	
300A/2-POLE	37.68
300A/3-POLE	
400A/2-POLE	
400A/3-POLE	
300A/4-POLE	29.66
400A/4-POLE	

ALL COIL RESISTANCES ±7% @ 20°C



11. With the contactor in utility position, measure the resistance between the green and gray wires on the female side of the plug. INFINITY should be measured. If INFINITY is NOT measured, replace the LS2 (Part # 0D4516). If proper resistance was measured, proceed to Step 12.
12. If all tests prove favorable results, replace the PCB (Part # 0D7400).

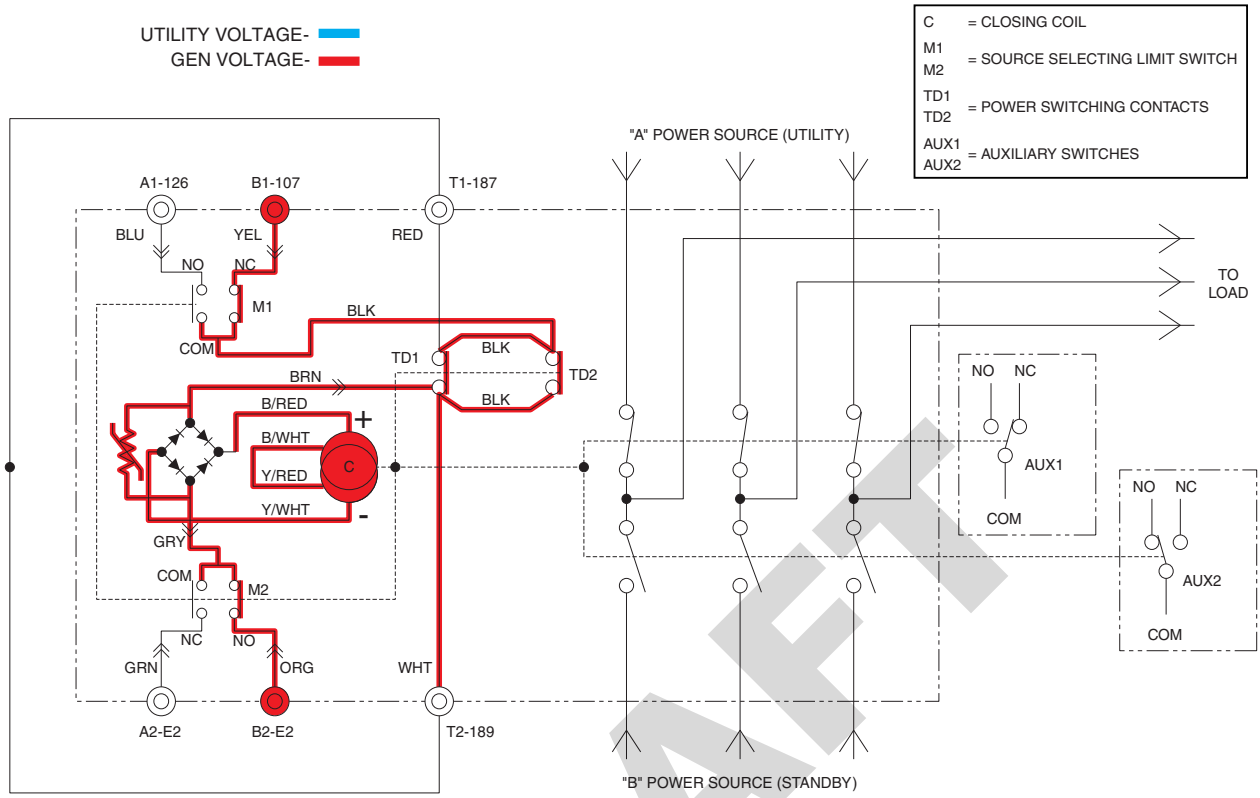
SWITCH WILL NOT RETRANSFER TO UTILITY

If the GTS/HTS "W" switch will not retransfer to utility power and utility voltage is measured on Wires 126 (A1) and N2 (A2), then proceed as follows:

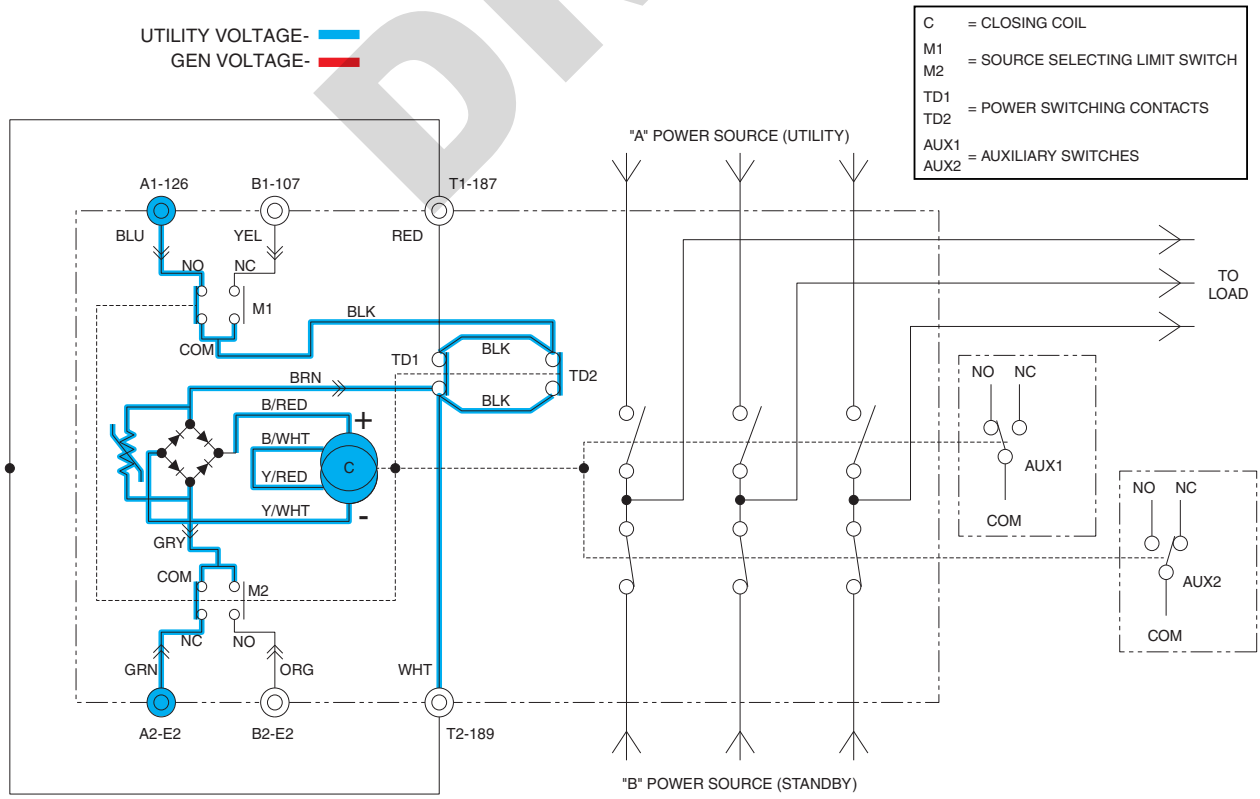
⚠ **IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. In addition, verify utility power is secured and service entrance disconnect is in the off or open position.**

1. Remove the cover on the contactor assembly.
2. Using a multimeter (set to ohms scale), measure the resistance of the coil as follows and compare the results to the chart provided below.
3. Measure resistance between J2-1 and J2-3. Closing coil resistance should be measured. Refer to chart below.
4. If proper resistance values were not measured in Step 3, replace the transfer coil. If proper resistance values were measured, proceed to Step 5.
5. Remove the screw from the PCB and unplug the harness (located behind the PCB). If the contactor is not in the generator (standby) position, manually transfer it to the standby position.
6. Measure the resistance between the blue and brown wires on the female side of the plug (see Figure 3). Less than 1 ohm should be measured. If the proper resistance value is NOT measured, replace the LS1 (Part # 0D4516). If proper resistance was measured, proceed to Step 8.
7. Measure the resistance between the yellow and brown wires on the female side of the plug (see Figure 3). INFINITY should be measured. If INFINITY is NOT measured, replace the LS1 (Part # 0D4516). If proper resistance was measured, proceed to Step 8.
8. With the contactor in standby position, measure the resistance between the green and gray wires on the female side of the plug. Less than 1 ohm should be measured. If proper resistance is NOT measured, replace the LS2 (Part #0D4516). If proper resistance is measured, proceed to Step 10.
9. With the contactor in standby position, measure the resistance between the green and gray wires on the female side of the plug. INFINITY should be measured. If INFINITY is NOT measured, replace the LS2 (Part # 0D4516). If proper resistance was measured, proceed to Step 10.
10. Plug the PCB harness back in. On the J1 main contacts, measure the resistance between T1 (Red) and T2 (White). A reading of less than 1 ohm should be measured. If good, measure the resistance between A1 (Blue) and T1 (Red). A reading of less than 1 ohm should be measured. If good, measure the resistance between A1 (Blue) and T2 (White). A reading of less than 1 ohm should be measured. If ANY of these readings are greater than 1 ohm or INFINITY, replace the time delay limit switch. If all tests prove favorable results, replace the PCB (Part # 0D7400).

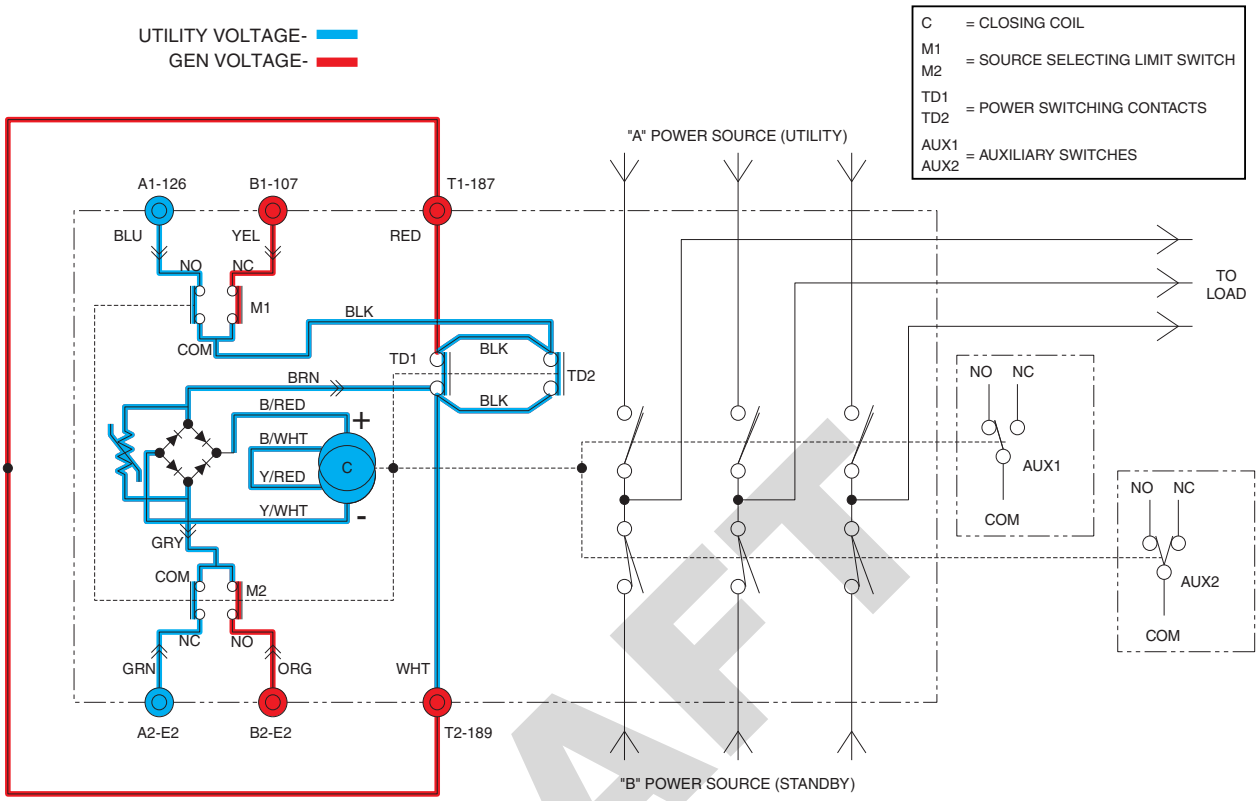
UTILITY POSITION – TRANSFER TO STANDBY



STANDBY POSITION – TRANSFER TO UTILITY



TIME DELAY TRANSFER FROM UTILITY TO STANDBY



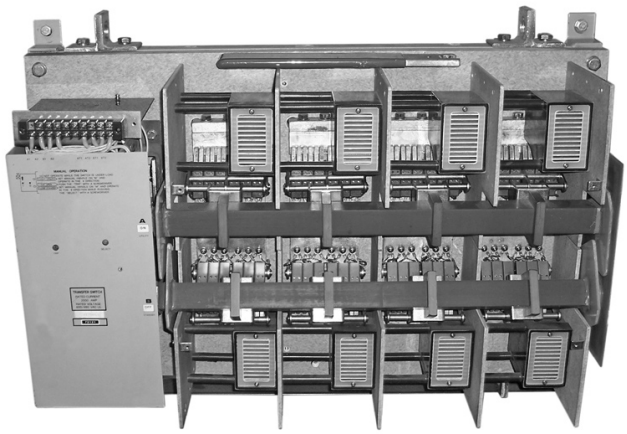


Figure 1. "Wn" Type Contactor Assembly

SWITCH WILL NOT TRANSFER TO GENERATOR

If the transfer switch will not switch over to generator power and generator voltage is measured at E2 (AT2)/107 (AT1) and E2 (B2)/234(B1) then proceed as follows:

⚠ **IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.**

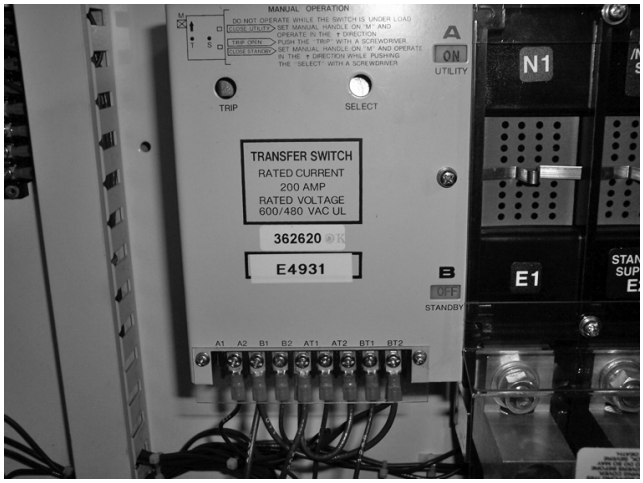


Figure 2. "Wn" Type Contactor Front Cover

Figure 3. PCB Cover Removal

1. Remove front cover.
2. Remove top PCB cover (see Figure 3).
3. For the purpose of testing, the PCB layout is as follows (see Figure 4).

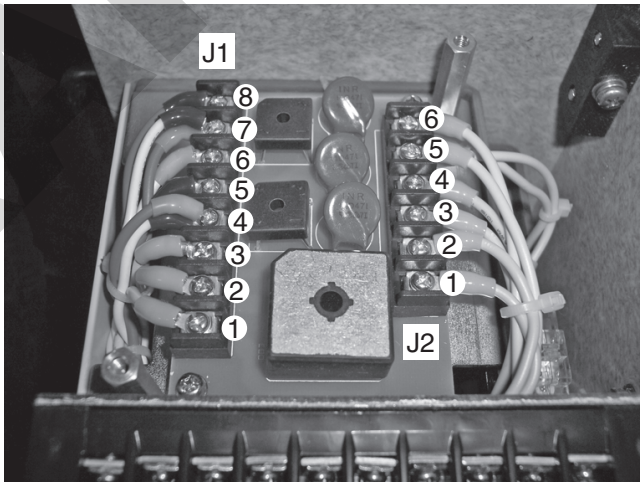


Figure 4. PCB Layout (view as installed from top looking down)

4. If switch is not tripping to neutral, measure the resistance between J1-6 and J1-8. The resistance of the trip coil should be measured, +/- 7%. If INFINITY is measured, replace the trip coil. If good, proceed to Step 5.
5. Measure ohms between AT2 (E2) and PCB J2-5. A resistance of 0.2 ohms should be measured. If INFINITY is measured, replace ATS1 upper limit switch (Part # 071345). If good, measure the resistance between AT1 (107) and PCB J2-6. If INFINITY is measured, replace ATS2 lower limit switch (Part # 071345). If good, proceed to Step 6.
6. At this point, if Steps 4 & 5 results were good, the switch should be tripping to neutral. If switch is not in the neu-

tral position, push the manual trip button and trip the switch to neutral. Measure ohms between J1-3 and J1-5. Select coil resistance should be measured. If INFINITY is measured, replace the select coil. If good, proceed to Step 7.

7. Measure resistance between B2 and J2-3. A resistance of 0.2 ohms should be measured. If an INFINITY reading is recorded, replace the wire running between B2 and J2-3. If proper resistance is measured, measure the resistance between B1 and J2-4. A reading of 0.2 ohms should be measured. If INFINITY is measured, replace AXBX limit switch (Part # 071345, located on the outside of the contactor assembly). If good, proceed to Step 8.
8. At this point, if Steps 6 and 7 results were good, the select coil should be energizing. Test the closing coil. Measure resistance between J1-1 and J1-2. Closing coil resistance should be measured. If good, proceed to Step 9.
9. Measure resistance between B1 and J2-1. INFINITY should be measured. Manually push down the select coil button. Once button is depressed, 0.2 ohms should be measured. If INFINITY is measured, replace LS (Generac Part#074672A), which is located inside the contactor assembly to the right of the trip coil. If proper resistance is measured, measure the resistance between B2 and J2-2. INFINITY should be measured. Again, push down on the coil button. Once depressed, a reading of 0.2 ohms should be recorded. If INFINITY is measured, replace the LS (Part # 074672A).
10. If all tests report satisfactory readings, replace the PCB (Part # 082428).

SWITCH WILL NOT RETRANSFER TO UTILITY

If the switch will not retransfer to the utility position and utility voltage is measured on BT1 (126)/BT2 (N2) and (N2) A2/(233) A1, then proceed as follows:

⚠ **IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.**

1. Remove front cover.
2. Remove top PCB cover (see Figure3).
3. For the purpose of testing, the PCB layout is as shown in Figure 4.
4. If switch is not tripping to neutral, measure the resistance between J1-6 and J1-8. The resistance of the trip coil should be measured, +/- 7%. If INFINITY is measured, replace the trip coil. If good, proceed to Step 5.
5. With the switch in the generator position, measure the resistance between BT1 and J2-6. A reading of 0.2 ohms should be measured. If INFINITY is measured, replace the BTS1 Limit Switch (Generac Part # 071345), located on the bottom of the switch. If favorable resistance is measured, proceed to Step 6.
6. Next, measure the resistance between BT2 and J2-5. A reading of 0.2 ohms should be measured. If INFINITY is measured, replace the BTS2 Limit Switch (Part # 071345). If favorable resistance is measure, proceed to Step 7.
7. Measure the resistance between J1-1 and J1-2. Closing coil resistance should be measured.
8. At this point, if Steps 4 and 5 results were good, the switch should be tripping to the neutral position. If switch is not in the neutral position, push the manual trip button and manually trip the switch to the neutral position. With the switch in the neutral position, measure the resistance between A2 and J2-2. A reading of 0.2 ohms should be measured. If INFINITY is measured, replace LS (Part # 074672A). If good, proceed to the following test.
9. Measure the resistance between A1 and J1-1. A reading of 0.2 ohms should be measured. If INFINITY is measured, measure resistance across AX contacts of the AXBX limit switch (Part # 071345). If closed, measure the resistance between NO/Com (upper/lower) contacts on LS (Part # 07472A). If INFINITY is measured, replace.
10. If results from all steps are good, then replace the PCB (Part # 082428).

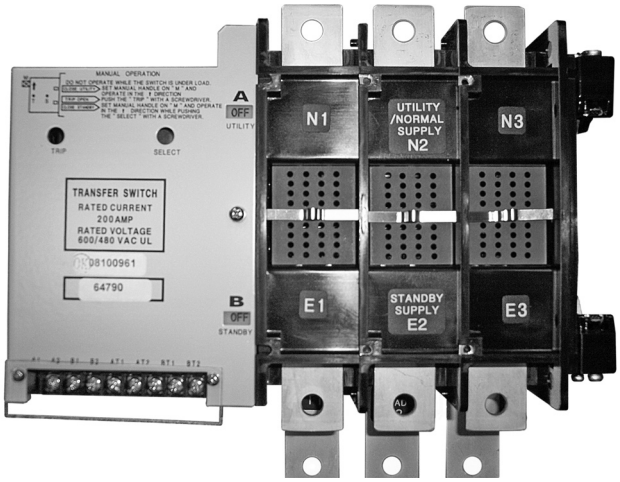


Figure 1. "Wn" Type Contactor Assembly

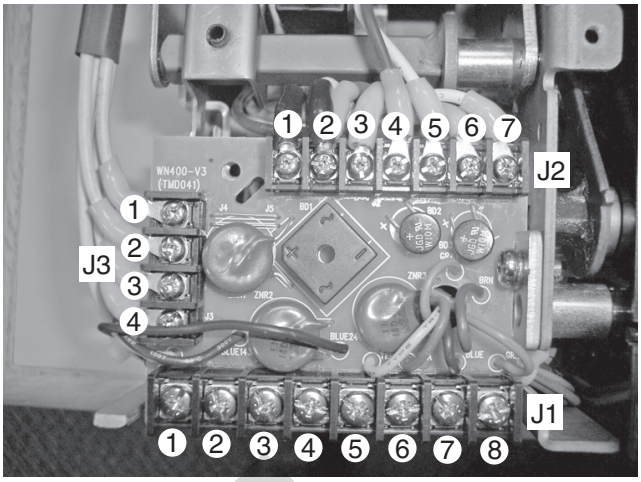


Figure 2. PCB Layout (view as installed from top looking down)

SWITCH WILL NOT TRANSFER TO GENERATOR

If the transfer switch will not switch over to generator power and generator voltage is measured at E2 (AT2)/107 (AT1) and E2 (B2)/234(B1) then proceed as follows:

IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.

1. Remove front cover.
2. For the purpose of testing, the PCB layout is shown in Figure 2:
3. If switch is not tripping to neutral, measure resistance between J2-6 and J2-7. The resistance of the trip coil should be measured, +/- 7%. If INFINITY is measured, replace the trip coil. If good, proceed to Step 4.
4. Remove the single Phillips head screw holding the PCB in place. Unplug the male to female connector located behind the PCB. Verify the contactor is in the utility position. On the female side the harness (see Figure 3) measure ohms between the yellow and brown wires 0.2 ohms should be measured. Measure ohms between the orange and gray wires 0.2 ohms should be measured. Press the manual trip button and re-test. Both tests should now show open or INFINITY.

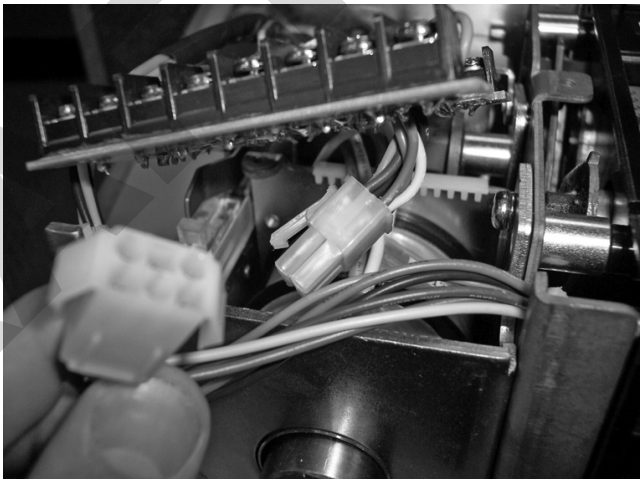


Figure 3. Male to Female Connector

Figure 4. Measuring Resistance at Female Connector

5. At this point, if Steps 3 & 4 results were good, the switch should be tripping to neutral.
6. If switch is not in the neutral position, push the manual trip button and trip the switch to neutral. Measure ohms between J2-4 and J2-5. Select coil resistance should be measured. If INFINITY is measured, replace the select coil. If good, proceed to Step 7.
7. Measure resistance between B2 and J3-3. A resistance of 0.2 ohms should be measured. If an INFINITY reading is recorded, replace the PCB or check the solder points and trace on the back of the PBC. If proper resistance is measured, measure resistance between B1 and J2-4. A reading of 1.6 M ohms should be measured. If INFINITY is measured, test the AXBX limit switch.
8. Measure ohms between the back contacts on the AXBX limit switch (blue wires) 0.2 ohms should me measured. If open replace AXBX limit switch. (Part # 071345, located on the outside of the contactor assembly). If good, proceed to Step 9.
9. At this point, if Steps 6 and 7 results were good, the select coil should be energizing. Test the closing coil. Measure resistance between J2-1 and J2-3. Closing coil resistance should be measured. If good, proceed to Step 10.
10. Measure resistance between B1 (J1-3) and J3-2, open or INFINITY should be measured. Manually push down the select coil button. Once button is depressed, 0.2 ohms should be measured. If INFINITY is measured, test AXBX limit switch. Verify the switch is still in the neutral position and measure the resistance between the two front contacts with the yellow wires attached to them. A reading of 0.2 ohms should be measured. If and open or INFINITY is measured replace the AXBX limit. If the AXBX limit switch tests good replace the select LS (Generac Part#074672A), which is located inside the contactor assembly to the right of the trip coil. If proper resistance is measured, measure resistance between B2 and J3-1. INFINITY should be measured. Again, push down on the coil button. Once depressed, a reading of 0.2 ohms should be recorded. If INFINITY is measured, replace the LS (Part # 074672A).
11. If all tests report satisfactory readings, replace the PCB.

SWITCH WILL NOT RETRANSFER TO UTILITY

If the switch will not retransfer to the utility position and utility voltage is measured on BT1 (126)/BT2 (N2) and (N2) A2/(233) A1, then proceed as follows:

IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.

1. Remove front cover.
2. For the purpose of testing, the PCB layout is shown in Figure 2:
3. If switch is not tripping to neutral, measure resistance between J2-6 and J2-7. The resistance of the trip coil should be measured. If INFINITY is measured, replace the trip coil. If good, proceed to Step 4.
4. Remove the single Phillips head screw holding the PCB in place. Unplug the male to female connector located behind the PCB. Verify the contactor is in the utility position. On the female side the harness (see Figure 3) measure ohms between the Blue and Gray wires 0.2 ohms should be measured. Measure ohms between the Green and Brown wires 0.2 ohms should be measured. Press the manual trip button and re-test. Both tests should now show open or INFINITY.
5. At this point, if Steps 3 & 4 results were good, the switch should be tripping to neutral.
6. If switch is not in the neutral position, push the manual trip button and trip the switch to neutral.
7. Measure resistance between A1 and J3-2. A resistance of 0.2 ohms should be measured. If an INFINITY reading is recorded, verify the switch is in the neutral position and test the AXBX limit switch as previously shown. If the AXBX limit switch tests good, test the select LS by placing 1 meter lead on the upper front contact of the AXBX limit switch and the other lead on the J3-2 contact. 0.2 ohms should be measured. If an open or INFINITY is measured replace the select LS.

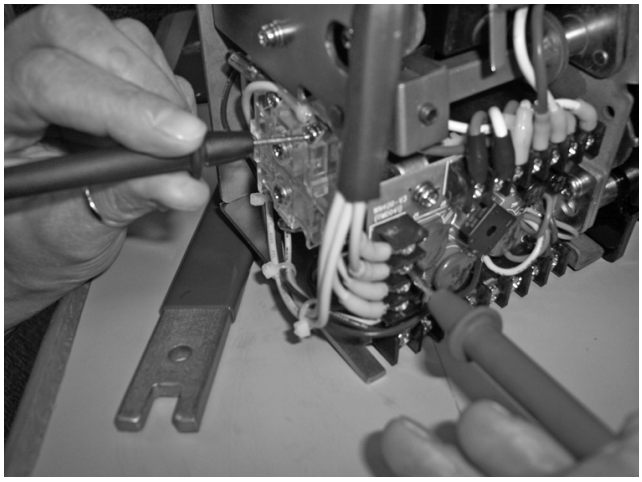


Figure 5. Measuring Resistance at Female Connector

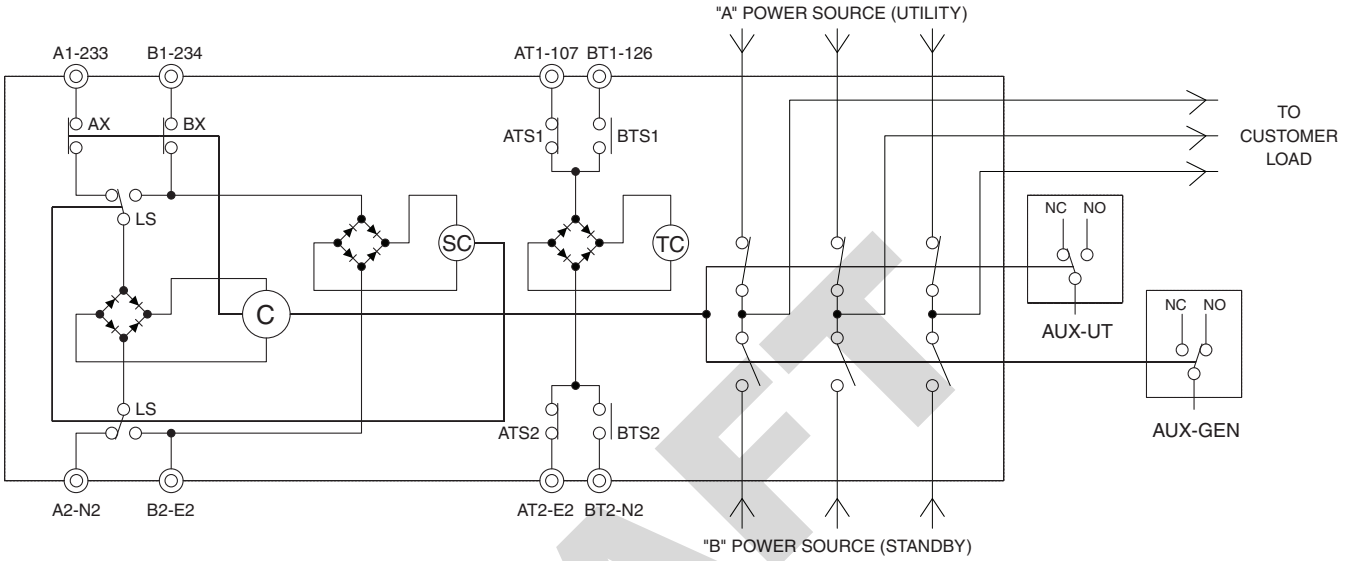
8. Measure resistance between A2 (J1-2) and J3-1, 0.2 should be measured. Manually push down the select coil button. Once button is depressed, open or INFINITY should be measured. If INFINITY is measured, between J1-2 and J3-1 Verify the switch is still in the neutral position and measure ohms between J1-2 and J3-4. 0.1 ohms should be measured. If and open or INFINITY is measured replace the PCB or check the solder point on the back of the PCB between J1-2 and J3-4. If 0.1 ohms is measured between J1-2 ad J3-4 measure resistance between J3-4 and J3-1 0.2 ohms should be measured. If an open or INFINITY is measured replace the select LS (Part # 074672A).
9. If all tests report satisfactory readings, replace the PCB.

UTILITY POSITION

C = CLOSING COIL
LS = SELECTIVE SWITCH
AX BX = CONTROL SWITCH
SC = SELECTIVE COIL
TC = TRIP COIL
AUX = AUXILIARY SWITCH

ATS1 ATS2
BTS1 BTS2 = TRIP CONTROL SWITCH
A1 A2 = A POWER SOURCE SIDE (ON)
B1 B2 = B POWER SOURCE SIDE (ON)
AT1 AT2 = A POWER SOURCE SIDE (TRIP)
BT1 BT2 = B POWER SOURCE SIDE (TRIP)

UTILITY VOLTAGE-
GEN VOLTAGE-

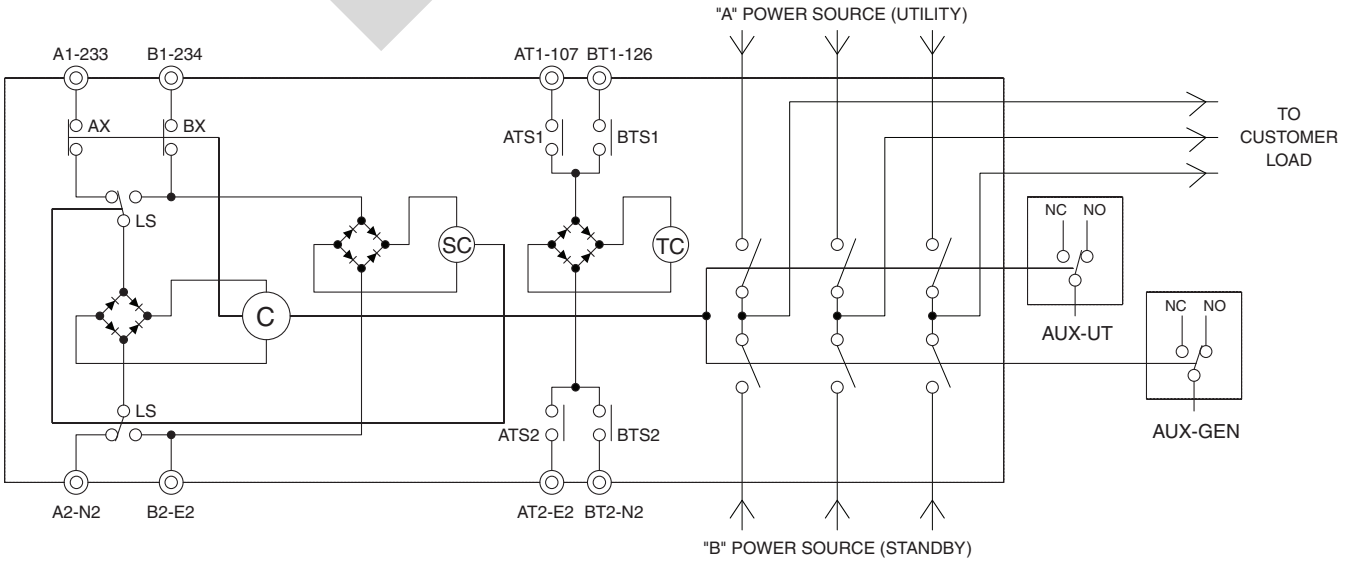


NEUTRAL POSITION

C = CLOSING COIL
LS = SELECTIVE SWITCH
AX BX = CONTROL SWITCH
SC = SELECTIVE COIL
TC = TRIP COIL
AUX = AUXILIARY SWITCH

ATS1 ATS2
BTS1 BTS2 = TRIP CONTROL SWITCH
A1 A2 = A POWER SOURCE SIDE (ON)
B1 B2 = B POWER SOURCE SIDE (ON)
AT1 AT2 = A POWER SOURCE SIDE (TRIP)
BT1 BT2 = B POWER SOURCE SIDE (TRIP)

UTILITY VOLTAGE-
GEN VOLTAGE-

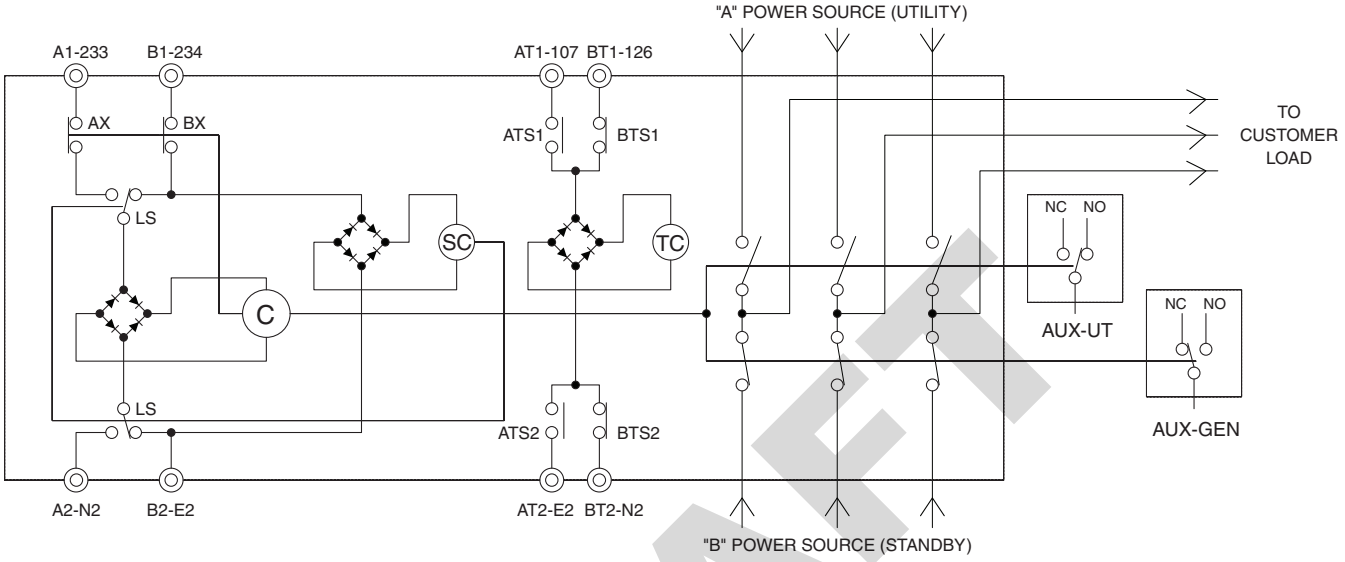


STANDBY POSITION

C = CLOSING COIL
LS = SELECTIVE SWITCH
AX BX = CONTROL SWITCH
SC = SELECTIVE COIL
TC = TRIP COIL
AUX = AUXILIARY SWITCH

ATS1 ATS2
BTS1 BTS2 = TRIP CONTROL SWITCH
A1 A2 = A POWER SOURCE SIDE (ON)
B1 B2 = B POWER SOURCE SIDE (ON)
AT1 AT2 = A POWER SOURCE SIDE (TRIP)
BT1 BT2 = B POWER SOURCE SIDE (TRIP)

UTILITY VOLTAGE-
GEN VOLTAGE-

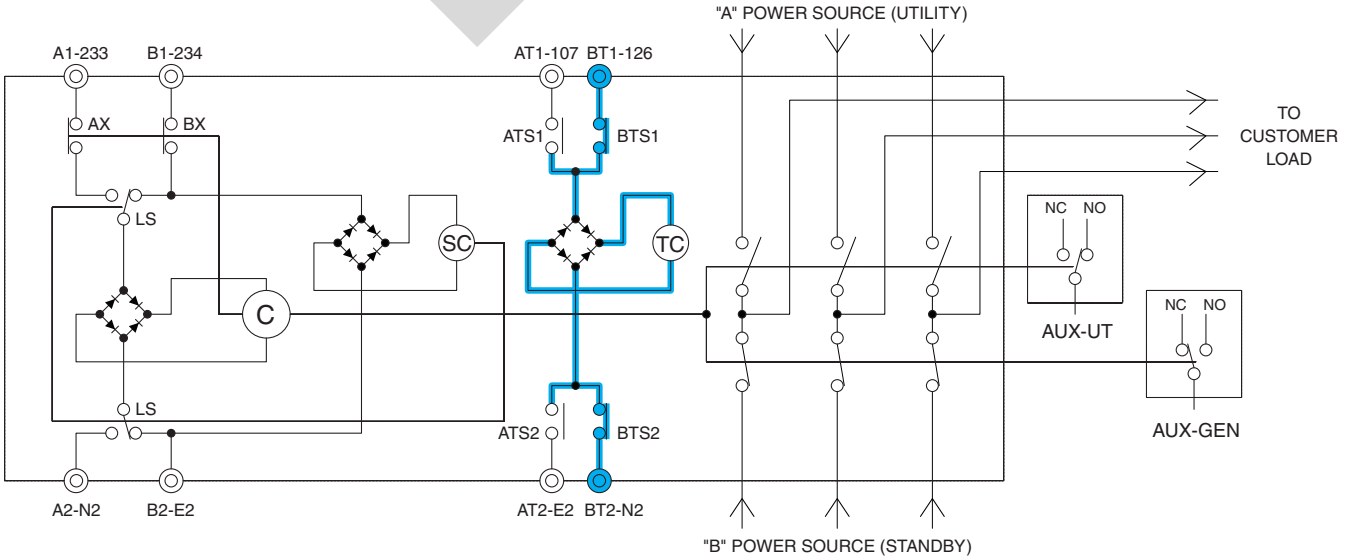


STANDBY POSITION – TRIP TO NEUTRAL

C = CLOSING COIL
LS = SELECTIVE SWITCH
AX BX = CONTROL SWITCH
SC = SELECTIVE COIL
TC = TRIP COIL
AUX = AUXILIARY SWITCH

ATS1 ATS2
BTS1 BTS2 = TRIP CONTROL SWITCH
A1 A2 = A POWER SOURCE SIDE (ON)
B1 B2 = B POWER SOURCE SIDE (ON)
AT1 AT2 = A POWER SOURCE SIDE (TRIP)
BT1 BT2 = B POWER SOURCE SIDE (TRIP)

UTILITY VOLTAGE-
GEN VOLTAGE-

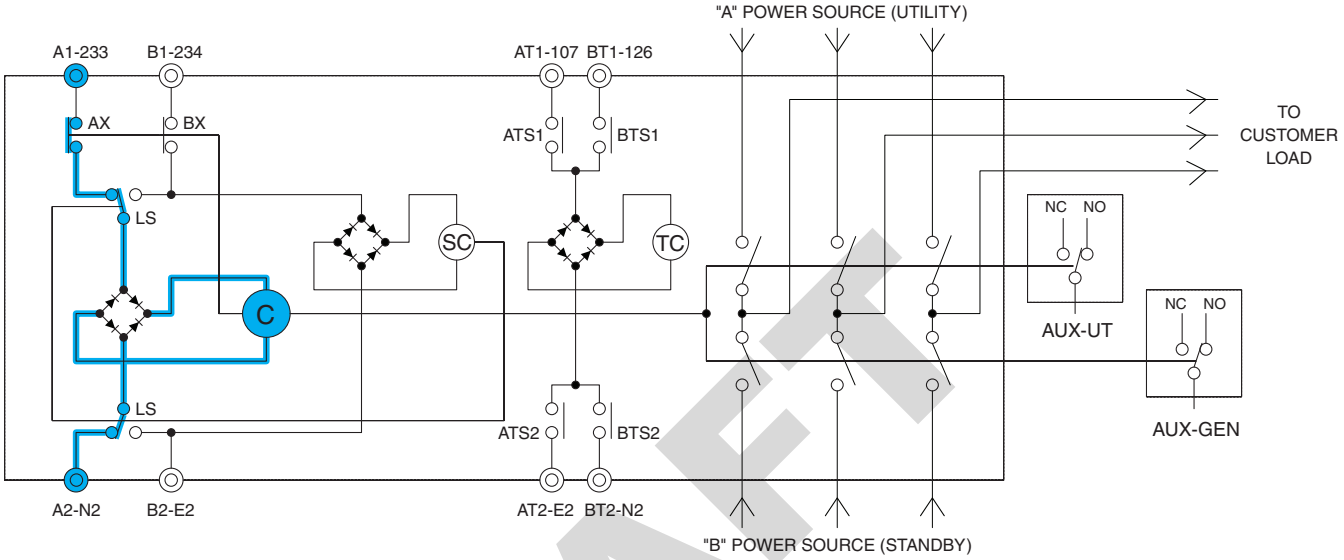


NEUTRAL POSITION – CLOSE TO UTILITY

C = CLOSING COIL
LS = SELECTIVE SWITCH
AX BX = CONTROL SWITCH
SC = SELECTIVE COIL
TC = TRIP COIL
AUX = AUXILIARY SWITCH

ATS1 ATS2 = TRIP CONTROL SWITCH
BTS1 BTS2
A1 A2 = A POWER SOURCE SIDE (ON)
B1 B2 = B POWER SOURCE SIDE (ON)
AT1 AT2 = A POWER SOURCE SIDE (TRIP)
BT1 BT2 = B POWER SOURCE SIDE (TRIP)

UTILITY VOLTAGE-
GEN VOLTAGE-

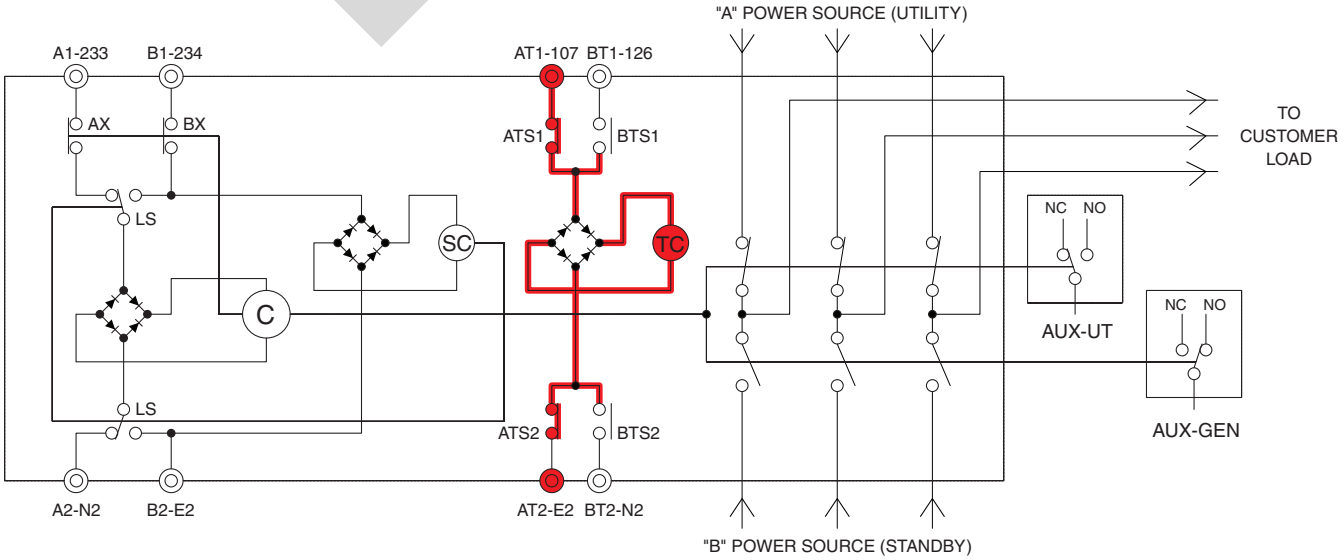


UTILITY POSITION – TRIP TO NEUTRAL

C = CLOSING COIL
LS = SELECTIVE SWITCH
AX BX = CONTROL SWITCH
SC = SELECTIVE COIL
TC = TRIP COIL
AUX = AUXILIARY SWITCH

ATS1 ATS2 = TRIP CONTROL SWITCH
BTS1 BTS2
A1 A2 = A POWER SOURCE SIDE (ON)
B1 B2 = B POWER SOURCE SIDE (ON)
AT1 AT2 = A POWER SOURCE SIDE (TRIP)
BT1 BT2 = B POWER SOURCE SIDE (TRIP)

UTILITY VOLTAGE-
GEN VOLTAGE-

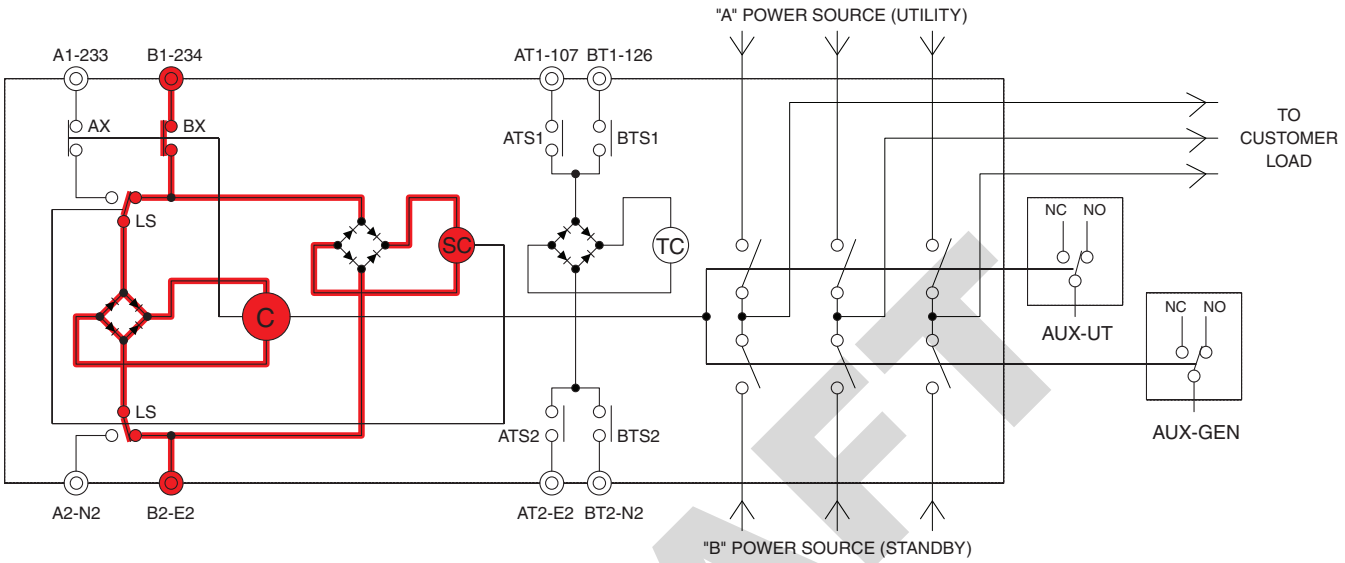


NEUTRAL POSITION – CLOSE TO STANDBY

C = CLOSING COIL
LS = SELECTIVE SWITCH
AX BX = CONTROL SWITCH
SC = SELECTIVE COIL
TC = TRIP COIL
AUX = AUXILIARY SWITCH

ATS1 ATS2 = TRIP CONTROL SWITCH
BTS1 BTS2
A1 A2 = A POWER SOURCE SIDE (ON)
B1 B2 = B POWER SOURCE SIDE (ON)
AT1 AT2 = A POWER SOURCE SIDE (TRIP)
BT1 BT2 = B POWER SOURCE SIDE (TRIP)

UTILITY VOLTAGE-
GEN VOLTAGE-



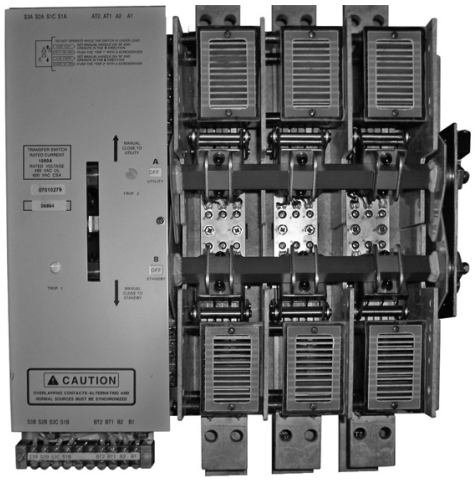


Figure 1. "CTTS" Type Contactor Assembly

SWITCH WILL NOT TRANSFER TO STANDBY

If generator voltage is measured on AT1 (Wire 233) and AT2 (Wire 205), then proceed as follows:

IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.

1. Remove the cover. Refer to Figure 1 for PCB layout as used in these tests.
2. For testing purposes, please follow the PCB numbering shown in Figure 2.

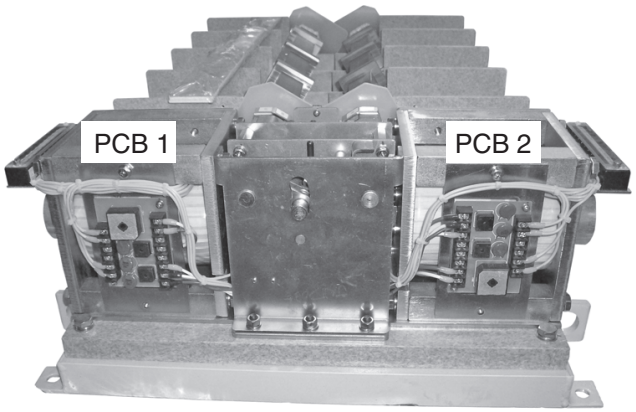


Figure 1. "CTTS" Type PCB Location

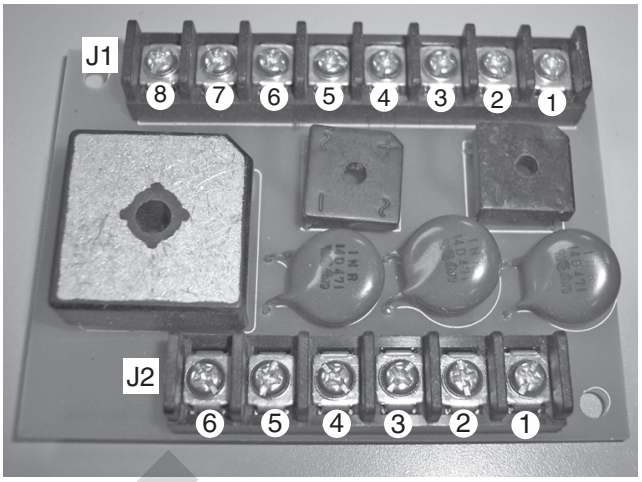


Figure 2. PCB Layout

3. Measure resistance on Trip Coil. Measure resistance between J1-1 and J1-3 on PCB1. Refer to the chart below for resistance values. If proper resistance values are measured, proceed to the next step. If proper resistance values are NOT measured, replace the Trip Coil.

Generac Part #	VT Coil	No. of Turns	DC Resistance
081147	TMD368	2664 x 2	93.1 OHMS
081147A	TMD034	390 x 2	3.57 OHMS
081147B	TMD368	2664 x 2	93.1 OHMS

4. Test the ATS limit switch. Measure resistance between AT1 and J2-1 (PCB1). Less than 4 ohms should be measured. Next, measure resistance between AT2 and J2-2 (PB1). Less than 4 ohms should be measured. If INFINITY is measured in either reading, replace the ATS limit switch (Part # 071345).
5. At this point, if both Steps 3 and 4 test good and the switch is not tripping to neutral, replace PCB 1 (Part #082428).
6. If switch is tripping to neutral but will not close to standby and standby voltage is measured at B1(107B) and B2(205), measure resistance between PCB2 J1-7 and J1-8. Closing coil resistance should be measured. If closing coil resistance is favorable, proceed to Step 7.
7. Test the BX limit switch. Measure resistance between B1 and PCB2 J2-6. Next, measure resistance between B2 and PCB2 J2-5. Less than 4 ohms should be measured. If INFINITY is measured, replace the BX limit switch (Part # 071345).
8. At this point, if the closing coil and the BX limit switch both test good, replace PCB 2 (Part # 082428).

SWITCH WILL NOT RETRANSFER TO UTILITY

If the transfer switch will not retransfer from the generator position to the utility position and utility voltage is measured between BT1 (234A) and BT2 (110A), then proceed as follows:

IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.

1. Remove the cover. Refer to Figure 1 for PCB layout as used in these tests.

1a. For testing purposes, please follow the PCB numbering shown in Figure 2.

2. Test the utility trip coil. Measure resistance between PCB2 J1-1 and J1-3. Compare measurement with the values in the chart below. If good proceed to Step 3.

Generac Part #	VT Coil	No. of Turns	DC Resistance
081147	TMD368	2664 x 2	93.1 OHMS
081147A	TMD034	390 x 2	3.57 OHMS
081147B	TMD368	2664 x 2	93.1 OHMS

3. Test the BTS limit switch. Measure resistance between BT1 and PCB2 J2-1. Next, measure resistance between BT2 and PCB2 J2-2. A measurement of less than 4 ohms should be read. If INFINITY is measured, replace the BTS limit switch (Part # 071345).

4. At this point, if both tests 2 and 3 posted favorable results and the switch is not tripping to neutral, replace PCB2 (Part # 082428).

If the switch is tripping to neutral, but not closing to utility and utility voltage is measured at A1 (126) and A2 (110), then proceed as follows:

5. Test the utility closing coil. Measure resistance between PCB1 J1-7 and J1-8. Closing coil resistance should be measured. If good, proceed to Step 6.

6. Test the AX limit switch. Measure resistance between A1 and PCB1 J2-6. Next, measure resistance between A2 and PCB2 J2-5. A measurement of less than 4 ohms should be recorded. If INFINITY is measured, replace the AX Limit Switch (Part # 071345).

7. At this point, if both Steps 5 and 6 posted favorable results, replace PCB1 (Part # 082428).

TESTING THE BTS1&2 AND ATS1&2

Follow the steps below to test the BTS1 and BTS2.

1. With the switch in the utility position, less than 1 ohm should be measured between SA1 and S1C, as well as S3A and S3C.

2. Cycle switch to generator position. Less than 1 ohm should be measured between S1B and S1C, as well as S3B and S3C.

TESTING THE LATCHING ALARM RELAY

Follow the step below to test the latching alarm relay.

1. In Utility, Standby or Neutral position, INFINITY should be measured between S2B and S2A.

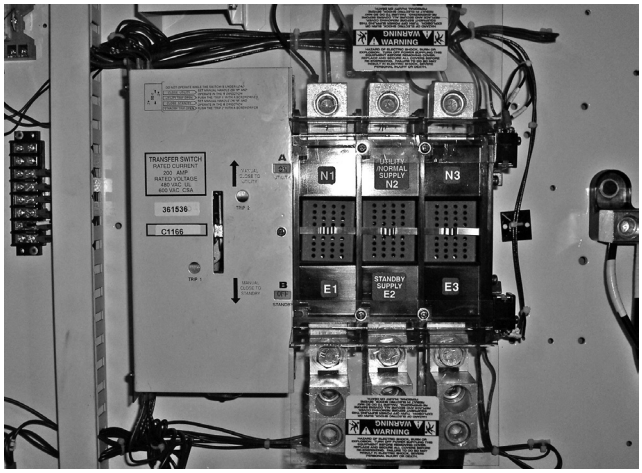


Figure 1. "CTTS" Type Contactor Assembly

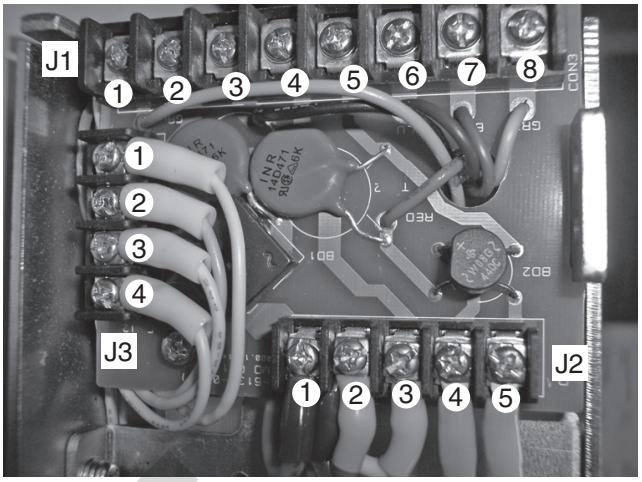


Figure 2. PCB 1 (Utility) Layout

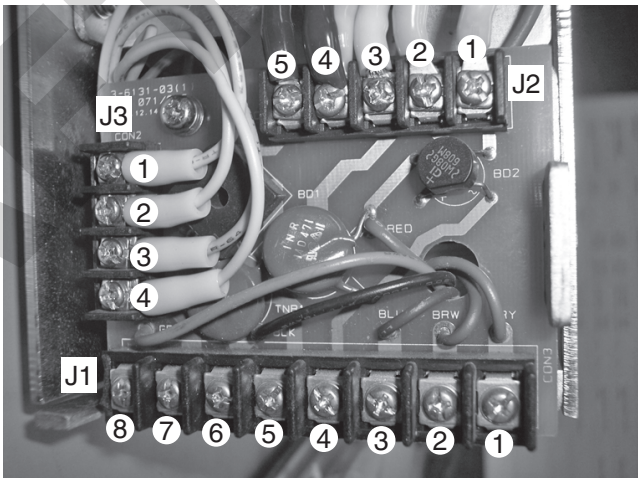


Figure 3. PCB 2 (Standby) Layout

SWITCH WILL NOT TRANSFER TO STANDBY

If generator voltage is present between AT1 and AT2, then proceed as follows:

⚠ **IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.**

1. Remove the cover. Refer to Figure 1 for PCB layout as used in these tests.
2. For testing purposes, please follow the PCB numbering shown in Figures 2 and 3.

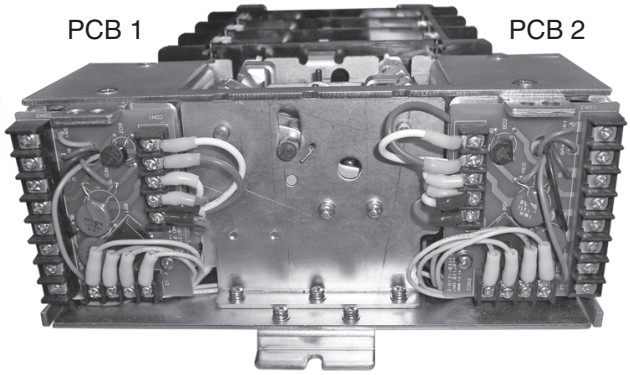


Figure 1. "CTTS" Type PCB Location

3. Measure resistance on Trip Coil. Measure resistance between J2-1 and J2-2 on PCB 1. Roughly 2.2 ohms should be measured. If proper resistance value is measured, proceed to the next step. If proper resistance values are NOT measured consult factory for replacement.
4. Test the ATS limit switch. Remove the single Phillips head screw and remove the PCB 1 to access the wiring harness behind the PCB. Unplug the connector and measure resistance between the Red and Blue wires on the female side of the harness. If greater than 1.0 ohms is measured replace the ATS 1 limit switch.
5. At this point, if both Steps 3 and 4 test good and the switch is not tripping to neutral, replace PCB 1 (Part #082428).
6. If switch is tripping to neutral but will not close to standby and generator voltage is measured at B1and B2, measure resistance between PCB2 J2-3 and J2-5. Closing coil resistance should be measured (67 ohms).

7. Test the BX limit switch. Measure resistance between J1-1(B1) and PCB2 J3-1. Next, measure resistance between J1-2 (B2) and PCB2 J3-2. Less than 1 ohm should be measured. If INFINITY is measured, replace the BX limit switch.
8. At this point, if the closing coil and the BX limit switch both test good, replace PCB 2.

SWITCH WILL NOT RETRANSFER TO UTILITY

If the transfer switch will not retransfer from the generator position to the utility position and utility voltage is measured between BT1 (234A) and BT2 (110A), then proceed as follows:

⚠ **IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.**

1. Remove the cover. Refer to Figure 1 for PCB layout as used in these tests.
2. For testing purposes, please follow the PCB numbering shown in Figures 2 and 3.
3. Measure resistance on Trip Coil. Measure resistance between J2-1 and J2-2 on PCB2. Roughly 2.2 ohms should be measured. If proper resistance value is measured, proceed to the next step. If proper resistance values are NOT measured consult factory for replacement.
4. Test the ATS limit switch. Remove the single Phillips head screw and remove the PCB 2 to access the wiring harness behind the PCB. Unplug the connector and Measure resistance between the Red and Blue wires on the female side of the harness. If greater than 1.0 ohms is measured replace the BTS 1 limit switch.
5. At this point, if both Steps 3 and 4 test good and the switch is not tripping to neutral, replace PCB 2.
6. If switch is tripping to neutral but will not close to Utility and utility voltage is measured at A1 and A2, measure resistance between PCB1 J2-3 and J2-5. Closing coil resistance should be measured (67 ohms).
7. Test the AX limit switch. Measure resistance between J1-1(A1) and PCB1 J3-4. Next, measure resistance between J1-2 (B2) and PCB2 J3-2. Less than 1 ohm should be measured. If INFINITY is measured, replace the AX limit switch.
8. At this point, if the closing coil and the AX limit switch both test good, replace PCB 1.

TESTING THE BTS1&2 AND ATS1&2

Follow the steps below to test the BTS1 and BTS2.

1. With the switch in the utility position, less than 1 ohm should be measured between S1A PCB1 J1-5 and S1C PCB1 J1-6, as well as S3A PCB1 J1-8 and S3C PCB2 J1-6.
2. Cycle switch to generator position. Less than 1 ohm should be measured between S1B PCB2 J1-5 and S1C PCB1 J1-6, as well as S3B PCB2 J1-8 and S3C PCB2 J1-6.

TESTING THE LATCHING ALARM RELAY

Follow the step below to test the latching alarm relay.

1. In Utility, Standby or Neutral position, infinity should be measured between PCB2 J1-7 S2B and S2A PCB1 J1-7.

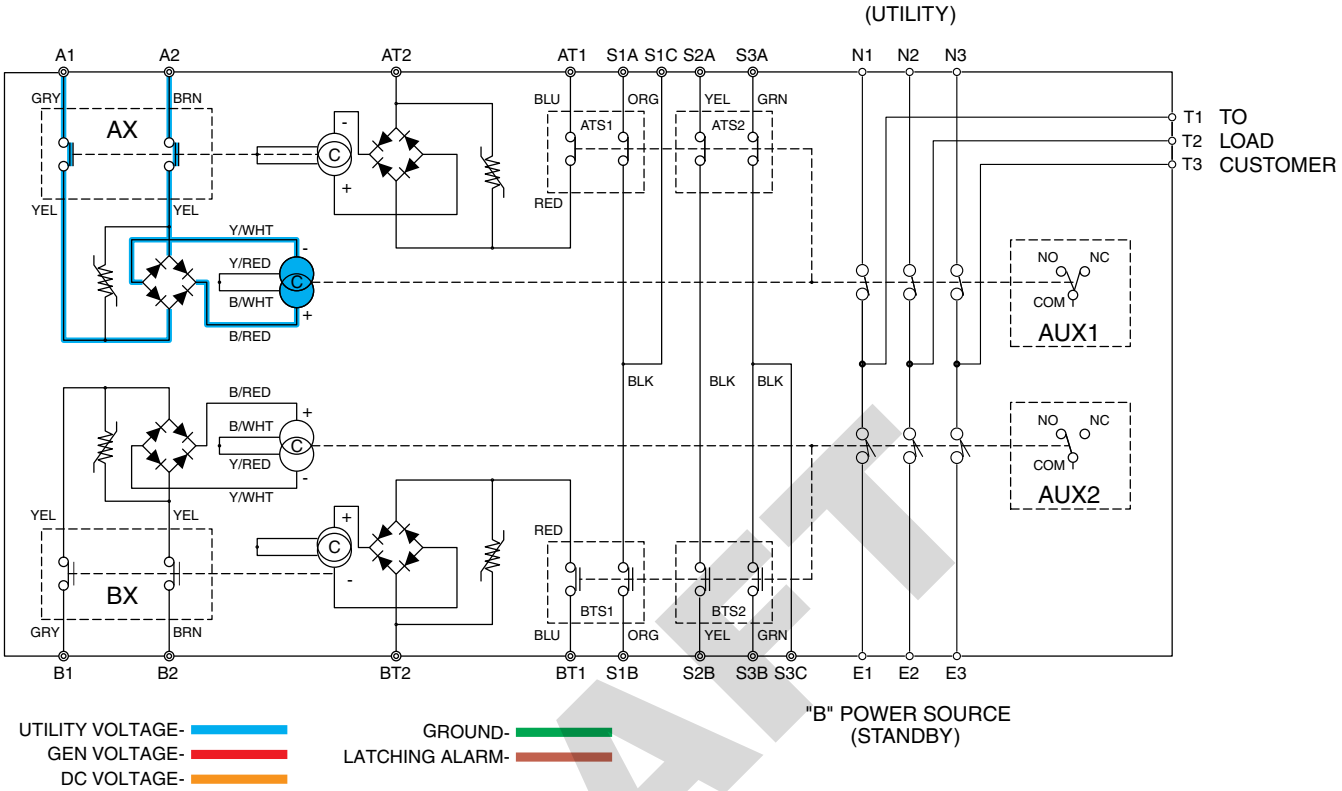
CTTS CONTACT LEGEND

Use this legend to navigate the CTTS Mode of Operation drawing on the previous page.

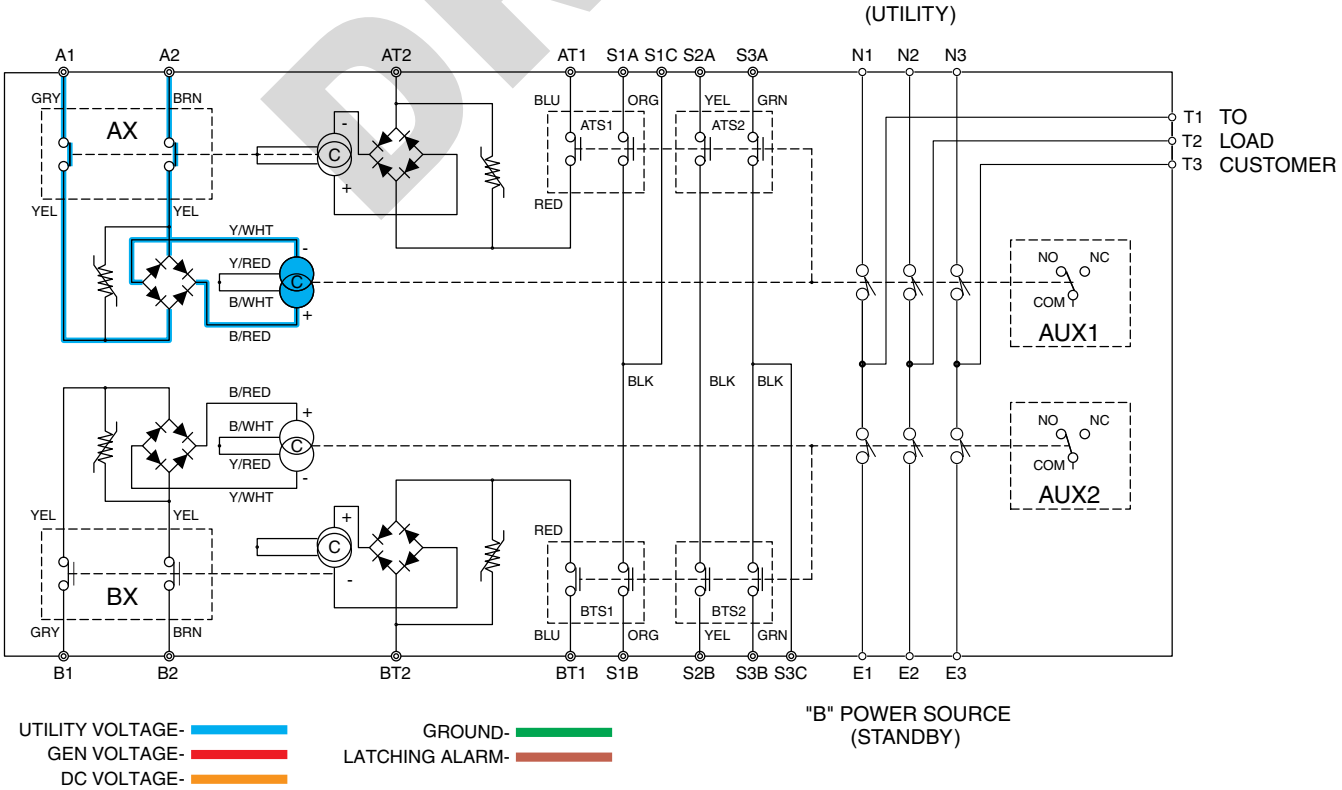
LEGEND

A1, A2	"A" POWER SOURCE SIDE (ON)
AT1, AT2	"A" POWER SOURCE SIDE (TRIP)
ATS1, ATS2	SWITCH, POSITION CONTACTS
BTS1 BTS2	
AUX1, 2	SWITCH, AUXILIARY
Ax, Bx	SWITCH, CONTROL
B1, B2	"B" POWER SOURCE SIDE (ON)
BT1, BT2	"B" POWER SOURCE SIDE (TRIP)
C	COIL, CLOSING
COM	COMMON
CTTS	CLOSED TRANSITION TRANSFER SWITCH
E1, E2, E3	STANDBY POWER SOURCE CONN.
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
N1, N2, N3	UTILITY POWER SOURCE CONN.
S1A, S1B S1C	SWITCH, POSITION SENSING
S2A, S2B	
S3A, S3B, S3C	
TC	COIL, TRIP
T1, T2, T3	CUSTOMER LOAD CONN.

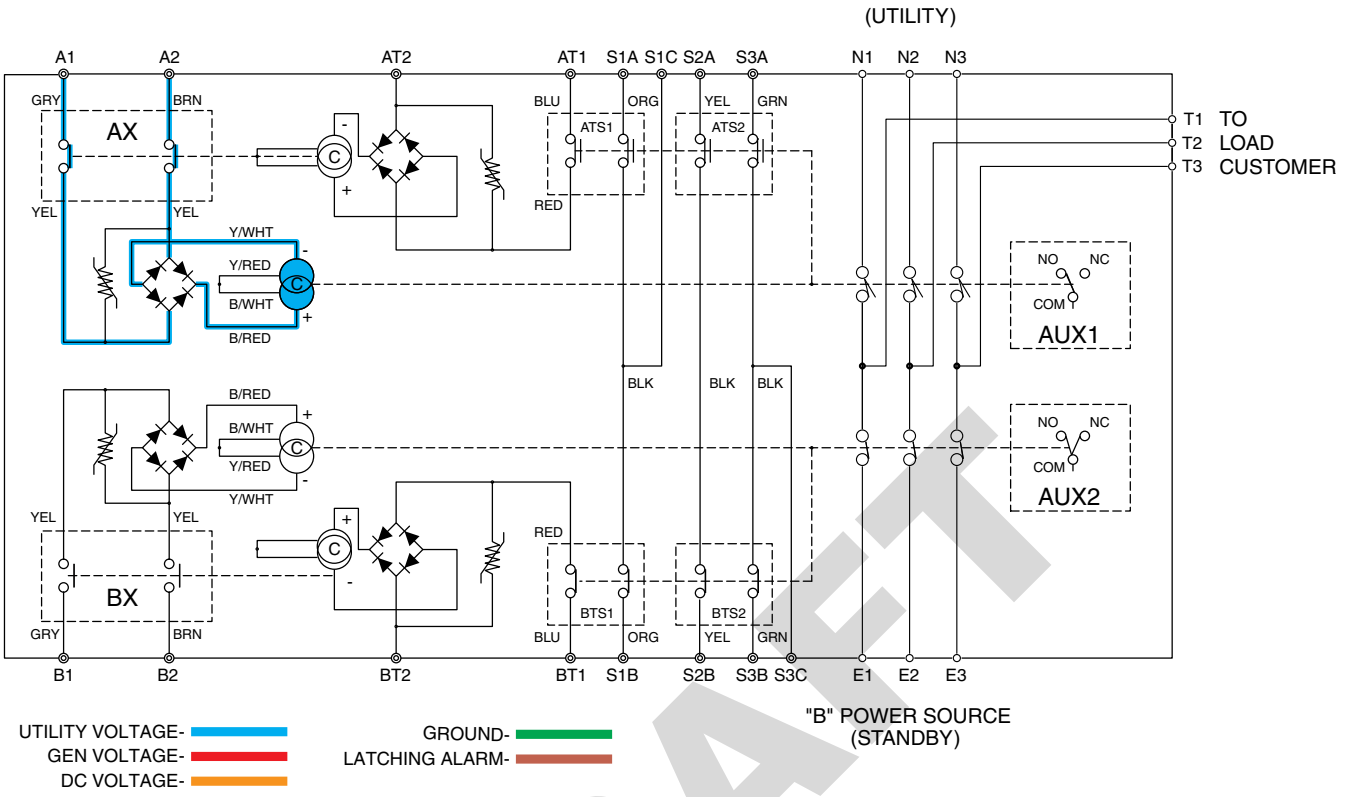
UTILITY POSITION



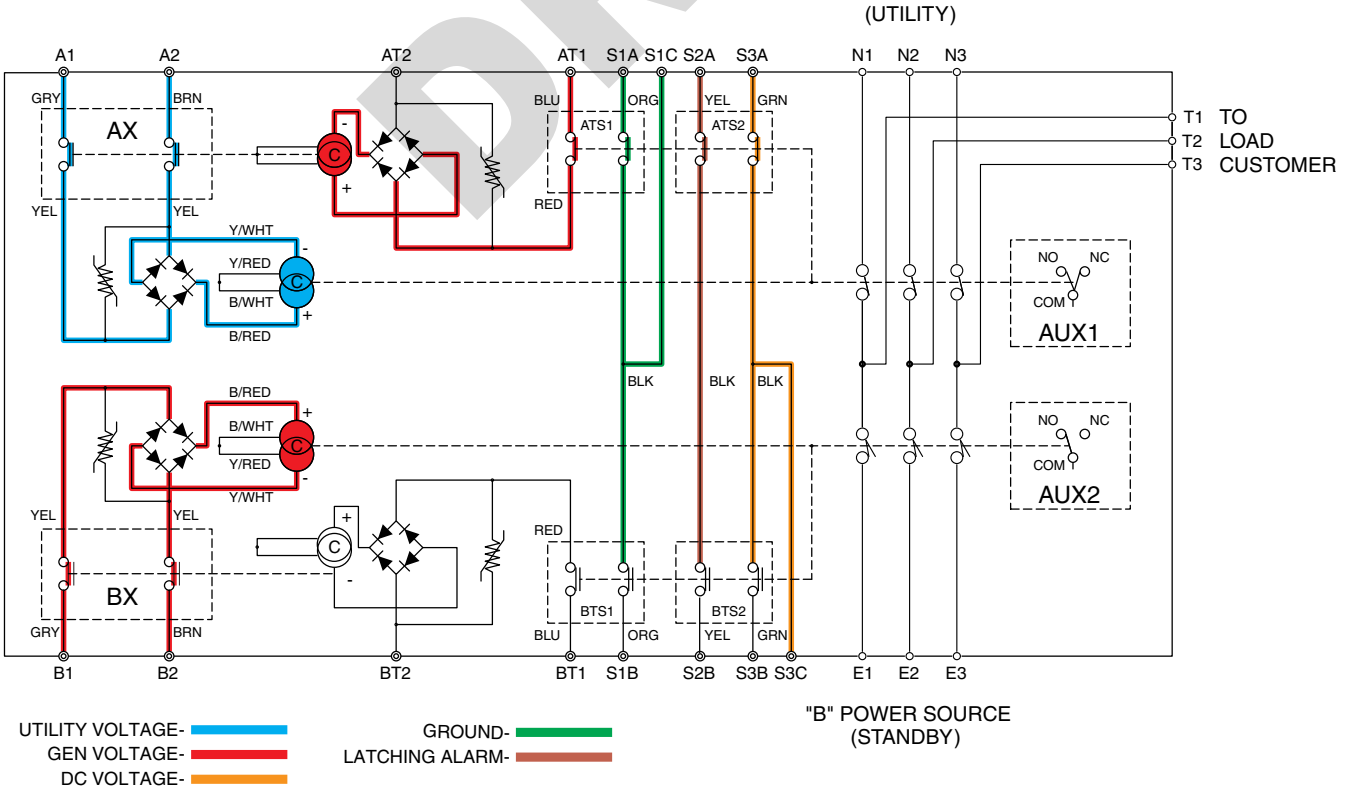
NEUTRAL POSITION



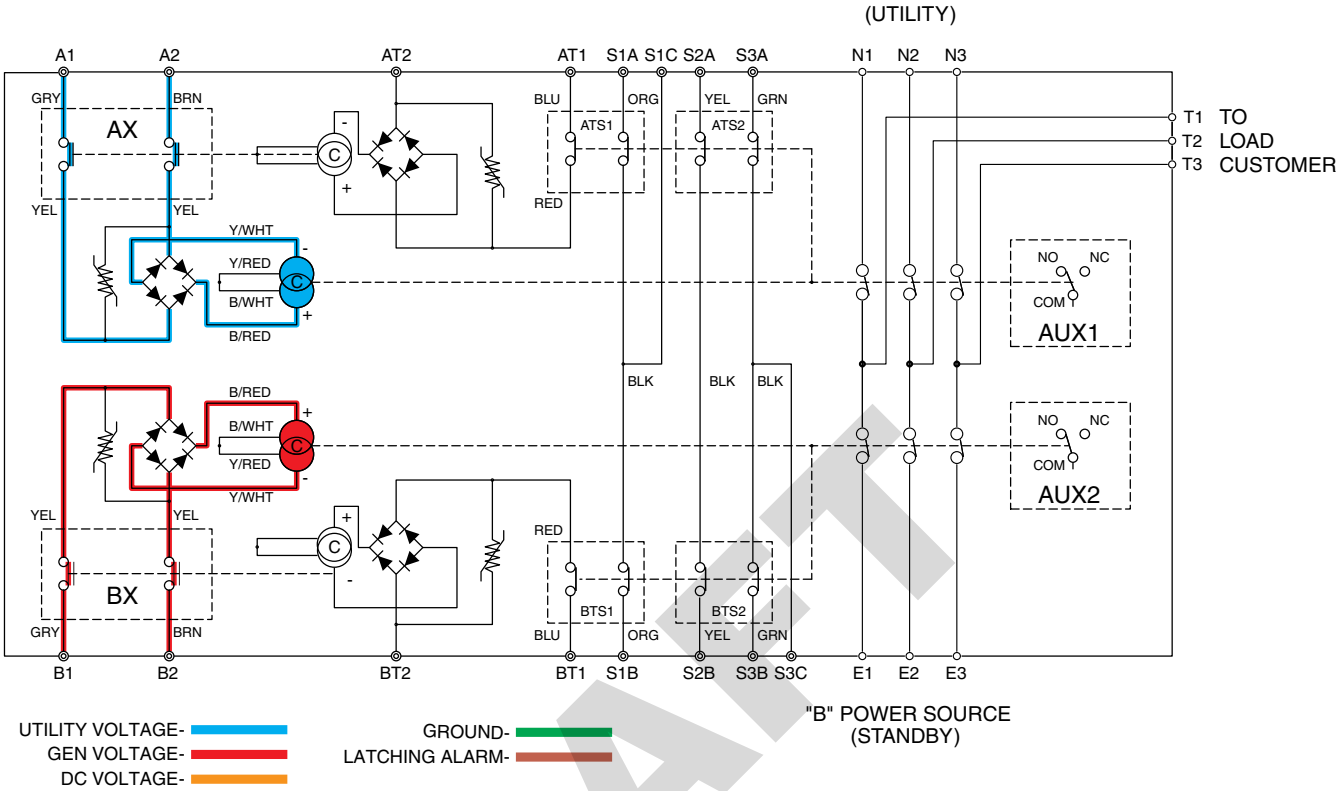
STANDBY POSITION



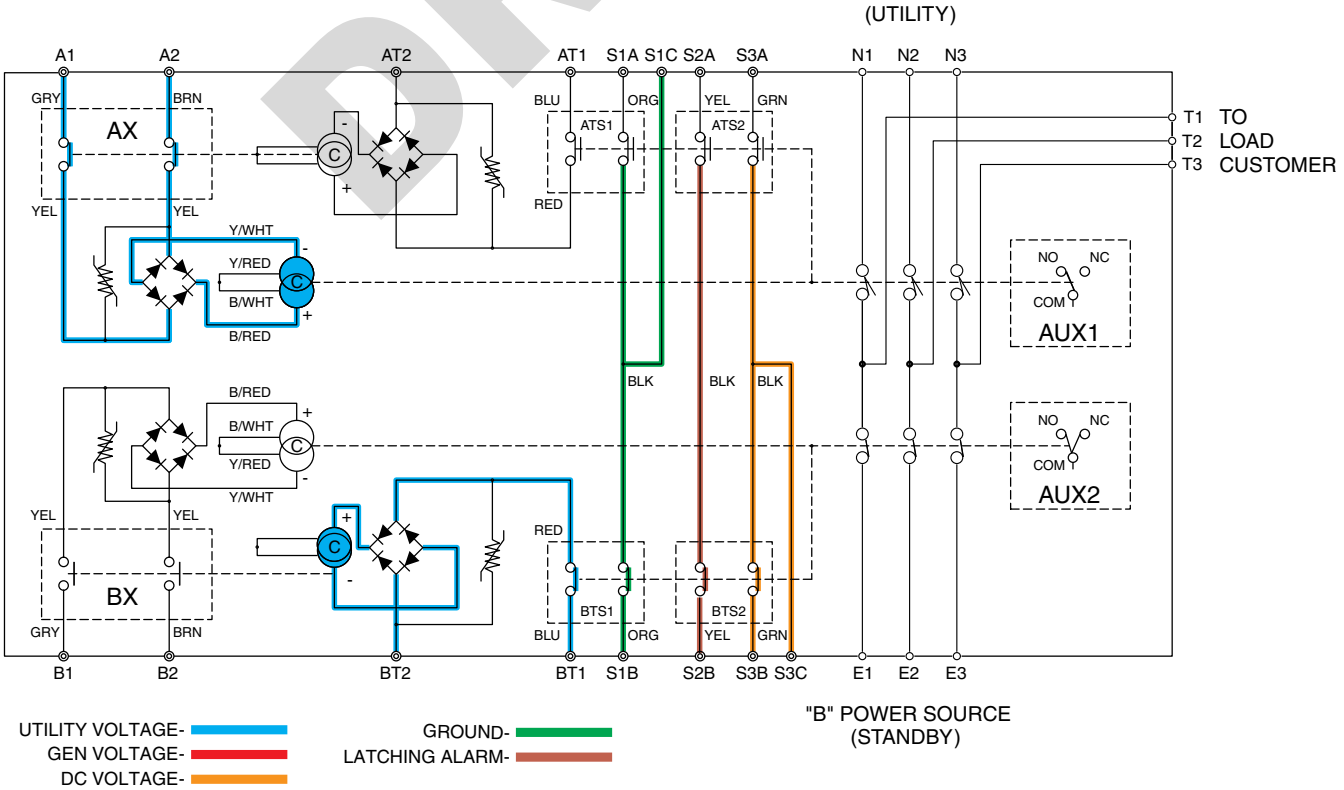
TRIP FROM UTILITY – CLOSE TO STANDBY



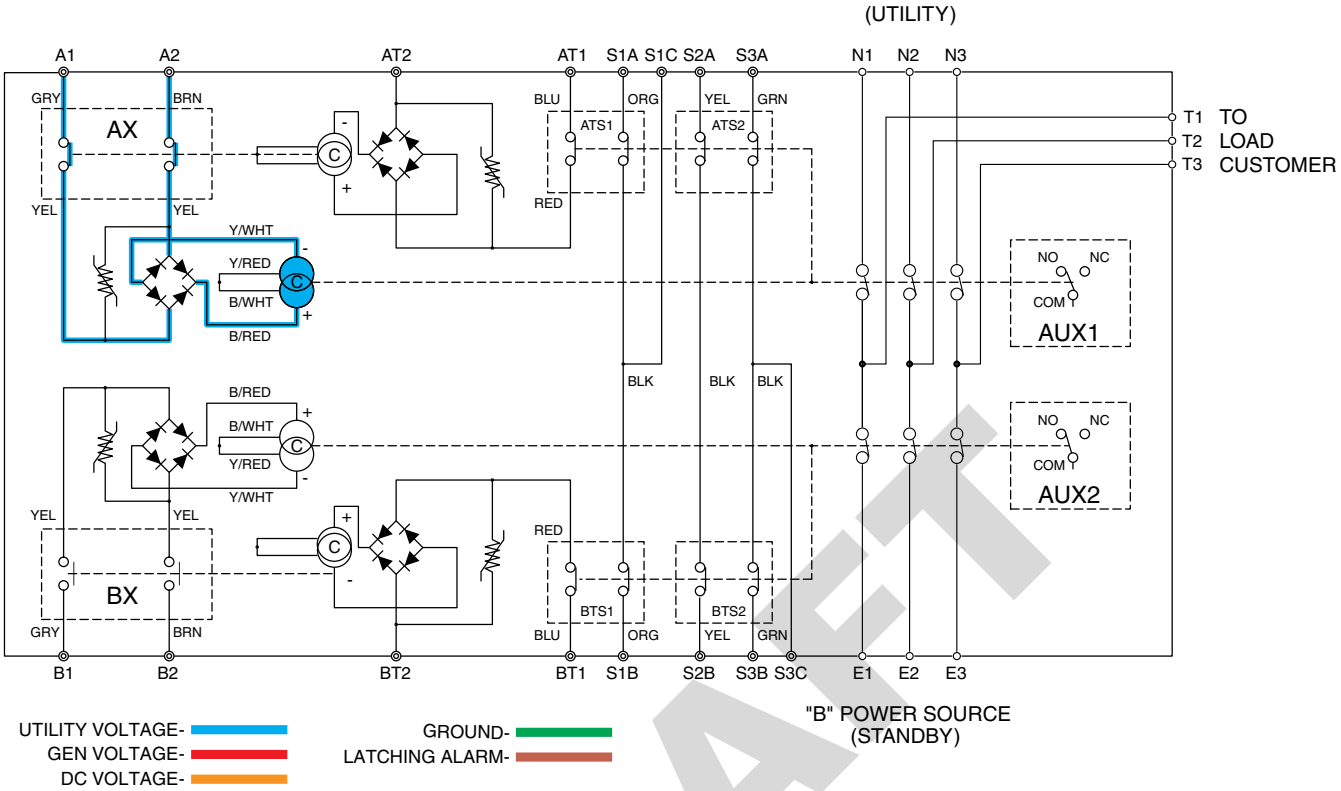
CLOSED TRANSITION FORM UTILITY TO STANDBY



TRIP FROM STANDBY – CLOSE TO UTILITY



CLOSED TRANSITION FORM UTILITY TO STANDBY



PART 2
REPAIR

“W”, “WN” AND “CTTS” STYLE CONTACTOR ASSEMBLIES

TABLE OF CONTENTS		
PART	TITLE	PAGE
2.1	“W” Style CONTACTOR Assembly	
2.2	“Wn” Style CONTACTOR Assembly 600-2600 Amp	
2.3	“Wn” Style CONTACTOR Assembly 100-400 Amp	
2.4	“CTTS” Style CONTACTOR Assembly 600-2600 Amp	
2.5	“CTTS” Style CONTACTOR Assembly 100-400 Amp	

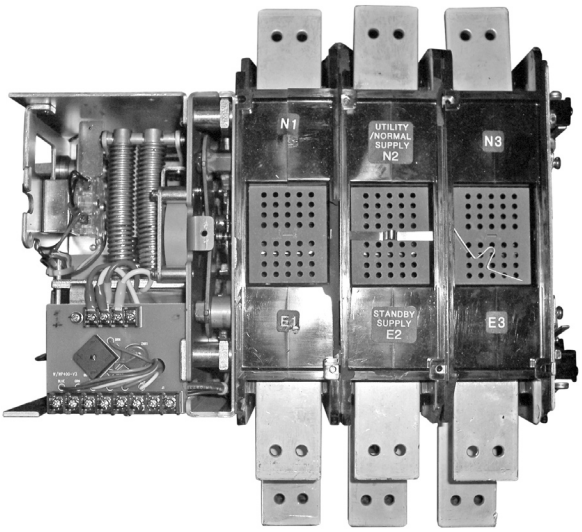


Figure 1. "W" Type Contactor Assembly

LS1 & LS2 LIMIT SWITCH REPLACEMENT

IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and insure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. In addition, verify utility power is secured and service entrance disconnect is in the off or open position.

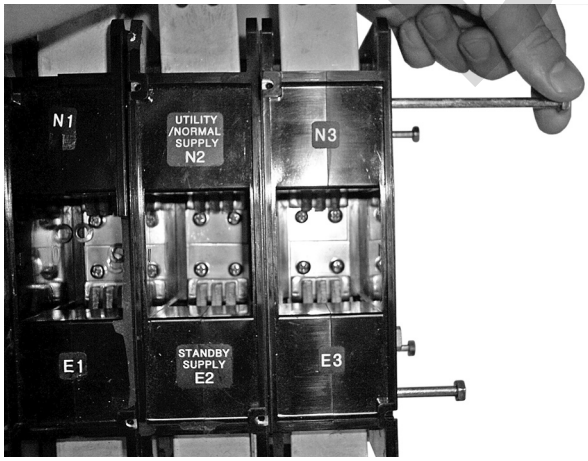


Figure 2. "W" Type Contactor Through Bolts

Remove the conductors from the main lugs, and control wires from A1, A2, B1, B2, T1, and T2. Once all wiring is disconnected from the main contactor, remove the main contactor assembly from the transfer switch and lay it on its back.

Remove the outer auxiliary limit switches and the four through bolts on the right side of the main contactor assembly.

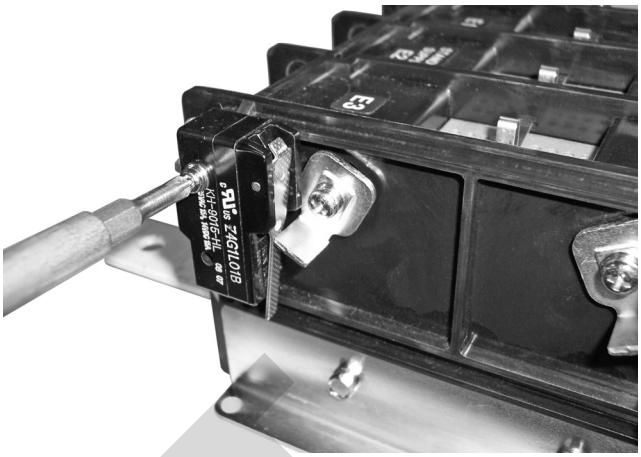


Figure 3. Remove Outer Auxiliary Limit Switches

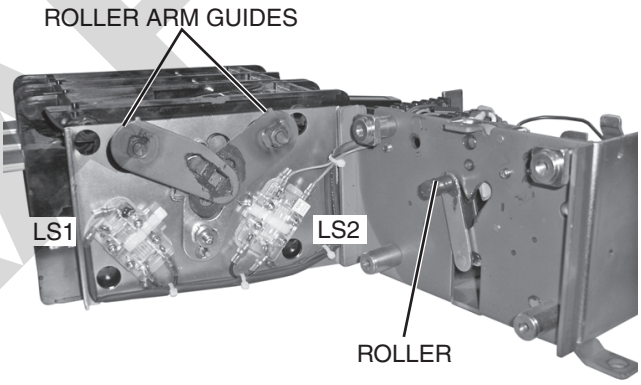


Figure 4. Split Contactor in Half

Once all four through bolts are removed, carefully split the contactor assembly in half.

Replace LS1 or LS2 limit switches (shown above) as required, based on diagnostic testing.

Once the limit switch as been replaced, reassemble both sides of the contact assembly

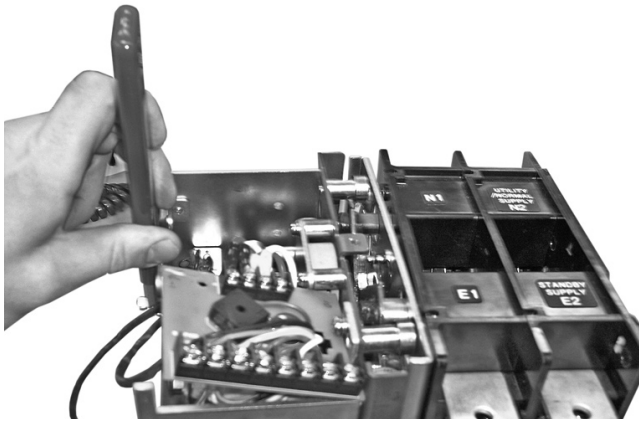


Figure 5. Ratcheting the Contactor

Ensure the roller goes back in both roller arms. Verify that all wires are free and not pinched between the two sides of the contactor assembly. In order to get the alignment correct, it may be necessary to ratchet the contactor assembly back and forth from utility to the stand by position.

To align the switch properly, continue to cycle back and forth until both roller guide arms are fully in their guide holes. Once the roller guide arms are in the guides reinstall the four through bolts and associated hardware.

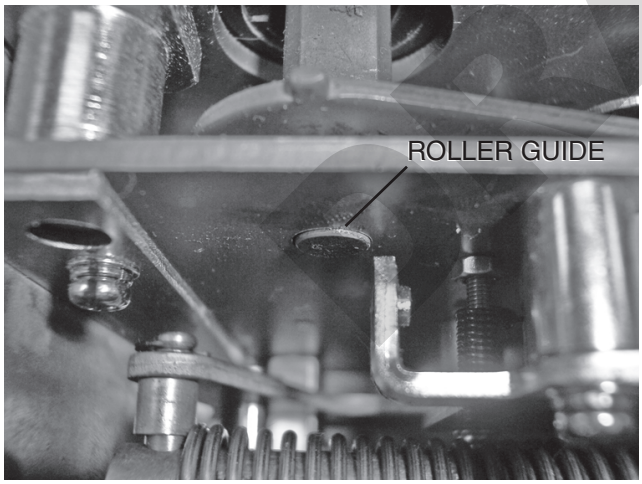


Figure 6. Roller Guide Arms Properly Installed

Once the contactor assembly is reassembled ensure that the 4 through bolts are not over tightened (2.3 ft-lbs) and the switch transfers back and forth from Utility to Standby freely.

Reinstall contactor assembly. Reconnect all control wires and conductors.

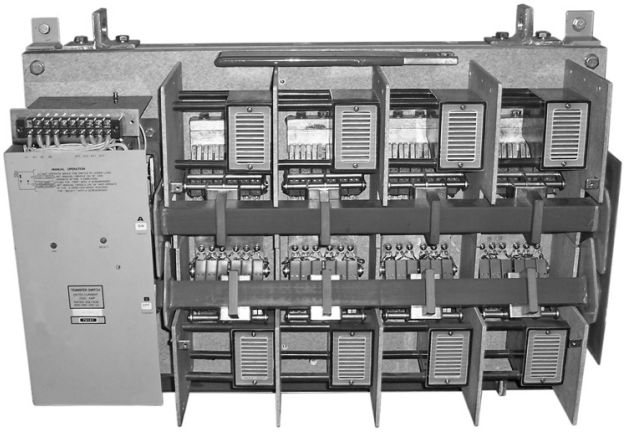


Figure 1. "Wn" Type Contactor Assembly

IMPORTANT: DISABLE THE GENERATOR FROM STARTING. Follow all Safety guidelines and ensure that the unit is 100% disabled by confirming that it's in the "OFF" position, the Main Line Circuit Breaker is in the "OPEN" position and that the "NEGATIVE" Battery Cable is properly disconnected. This must be verified PRIOR to performing this and/or any inspection of moving components.

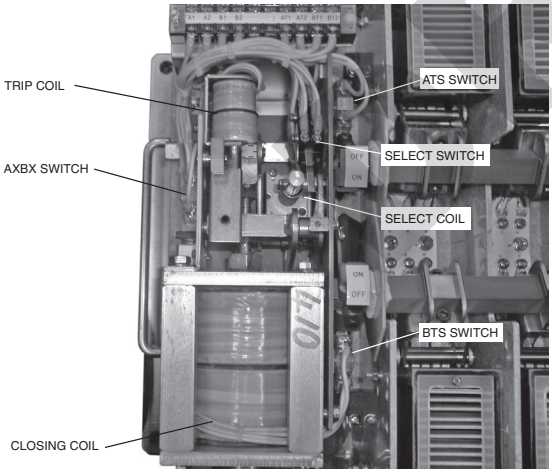


Figure 2. "Wn" Type Contactor Parts

The large majority of the "Wn" contactor parts can be changed out while the contactor assembly is still in place. The ATS, BTS, AXBX, and LS limit switches can be changed out in place without removing the entire contactor assembly, along with the PCB1, Trip Coil, and Select Coil.

The Closing Coil can be changed out in place, however, it should be replaced by removing the contactor assembly from the transfer switch. Contact the Service Department before replacing the main closing coil.

AXBX LIMIT SWITCH REPLACEMENT

Figure 3. "Wn" Type Contactor Cover Removal

Remove the main contactor assembly cover plate.

The AXBX control switch is located on the left side of the main contactor assembly. Remove and label the wires A1 and B1. Remove and reinstall the AXBX limit switch.

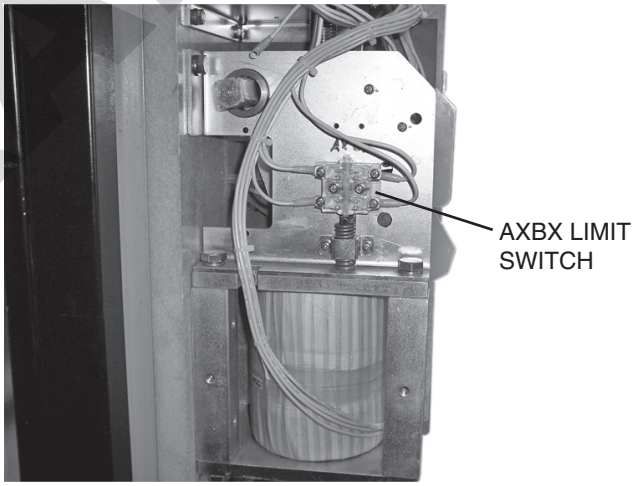


Figure 4. AXBX Limit Switch

ATS & BTS TRIP CONTROL SWITCH REMOVAL

ATS LIMIT SWITCH:

Remove main contactor assembly cover plate.

The ATS limit switch is located on the upper half or Utility side of the contactor assembly.

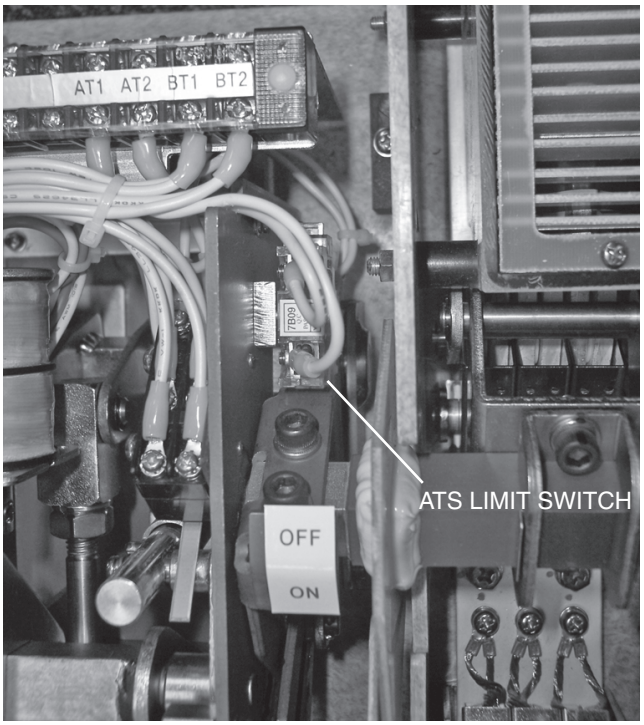


Figure 5. ATS Limit Switch

To remove the ATS limit switch it is necessary to remove the Utility arc shoot assembly First remove the 2 Phillips head screws that attach the arc shoot to the backing plate.

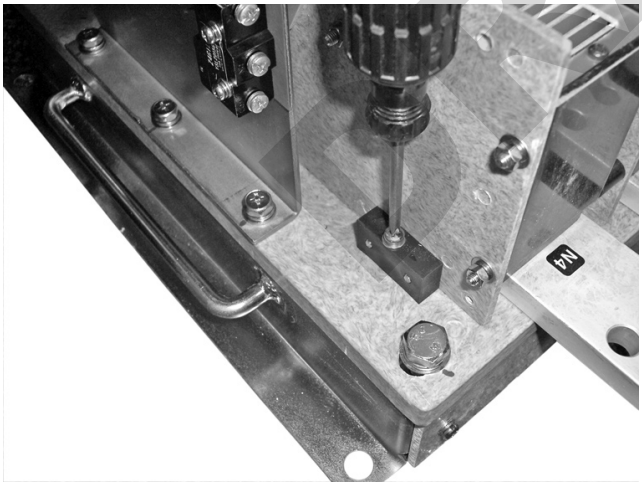


Figure 6. Removing the Arc Shoot Screws

Once the screws are removed slide the arc shoot up vertically and remove it from the contactor assembly.

Once the arc shoot assembly is removed, the ATS limit switch will be accessible. To access the lower screw holding the ATS limit switch, it may be necessary to manually put the transfer switch in the Utility position.

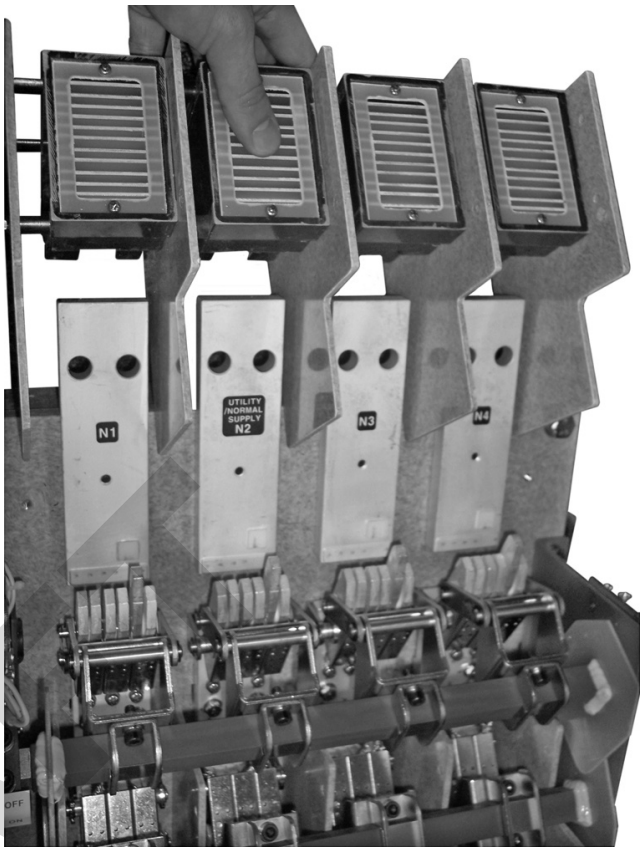


Figure 7. Arc Shoot Removal

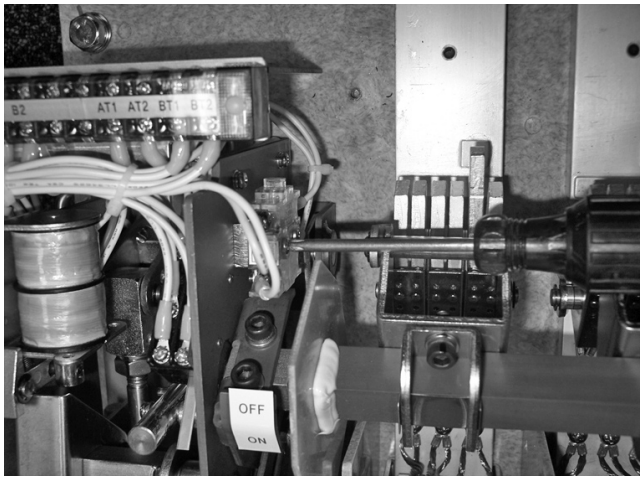


Figure 8. ATS Limit Switch Removal

The BTS limit switch is located on the bottom half or Emergency side of the contactor assembly.

To replace the lower BTS limit switch repeat the previous steps and remove the main contactor assembly and the arc shoot backing screws.

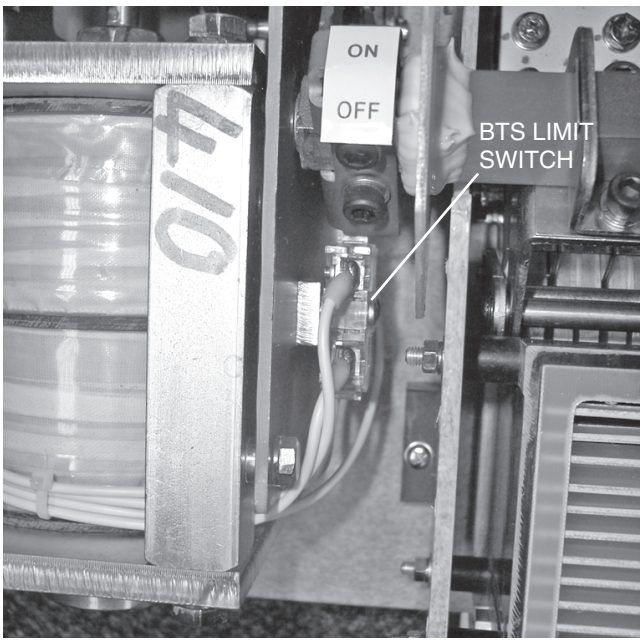


Figure 9. BTS Limit Switch

In order to remove the lower Emergency arc shoot assembly it may be necessary to manually transfer the contactor assembly to the Emergency position and removed the E1-E3 lugs, and E4 if applicable.

Once the arch shoot assembly is removed, remove and reinstall the BTS limit switch as shown with the ATS limit switch.

Figure 10. E1-E4 Lug Removal

SELECT SWITCH REMOVAL

Repeat contactor assembly cover removal process.

Remove and label select switch wiring. Remove two screws holding select switch to the inner side plate. For some smaller transfer switches it may be necessary to remove the trip coil to access the select switch screws. There are two access holes on the outer left side plate. Reverse removal process for reinstallation.

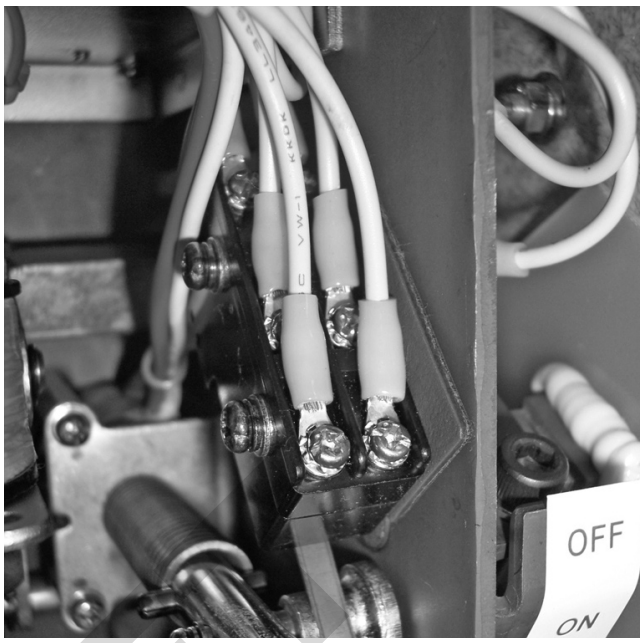


Figure 11. Select Switch

TRIP COIL REMOVAL

Remove the front contactor assembly as previously shown.

Disconnect the 4 or 2 wires from the PCB. If it is a 4 wire coil remove the wires from PCB J1-6, J1-7, and J1-8. If it is a 2 wire coil remove the wires from J1-6 and J1-8. Cut all required zip ties.

Remove the two screws from the outside of the contactor assembly and slide coil off the plunger assembly.

Remove trip coil and reverse process for reinstallation.

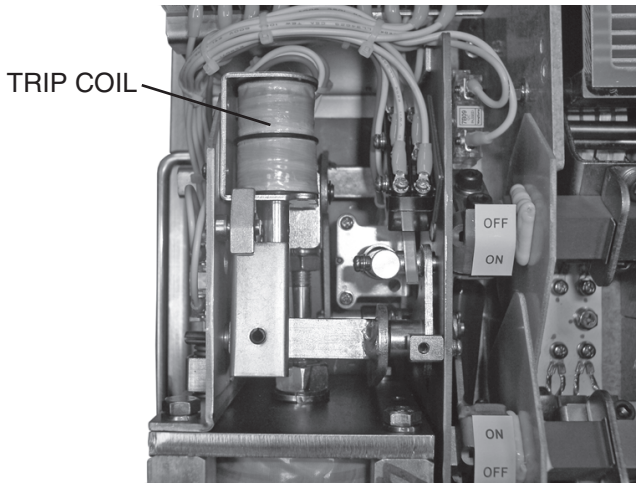


Figure 12. Trip Coil

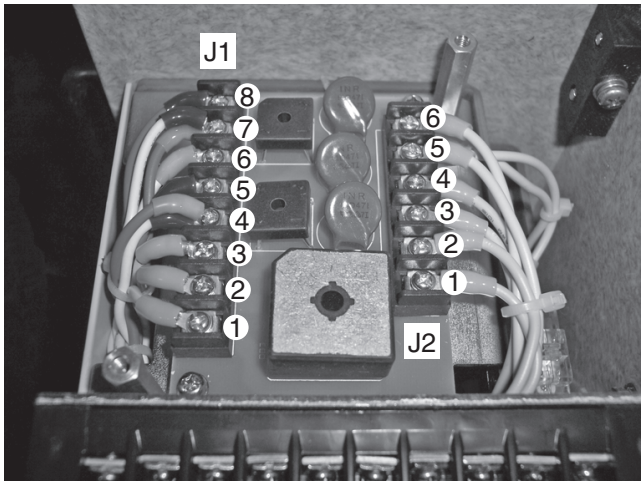


Figure 12. PCB

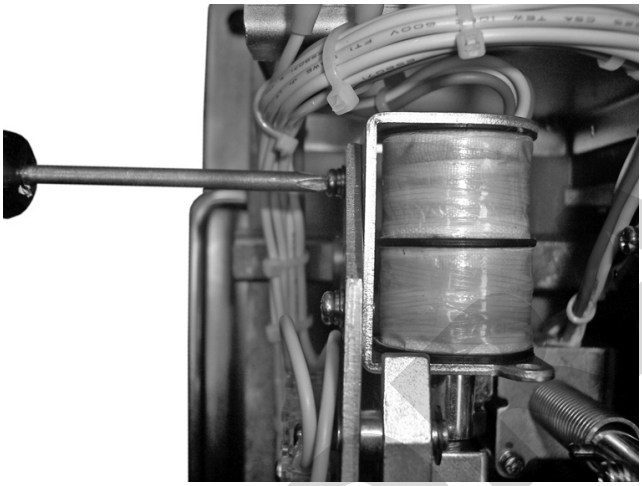


Figure 13. Remove Trip Coil Screws

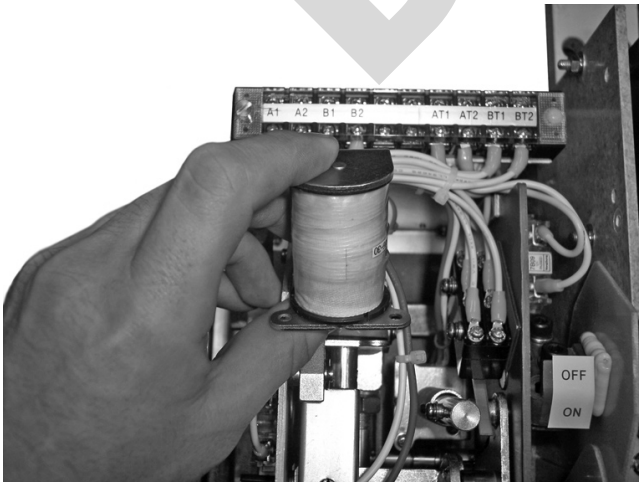


Figure 14. Remove Trip Coil

SELECT COIL REMOVAL

Repeat process for main contactor assembly cover removal.

Remove and label select coil wires from main PCB. For a 2 wire coil the wire remove the select coil wires from J1-3 & J1-5, for a 4 wire coil remove wires from J1-3, J1-4, & J1-5. Remove all necessary zip ties.

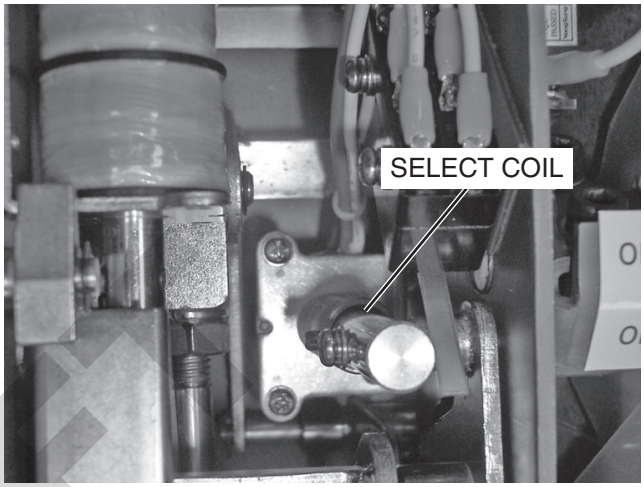


Figure 15. Select Coil

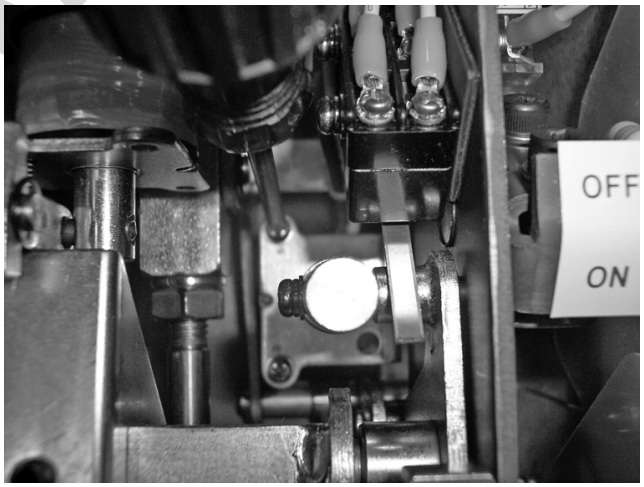


Figure 16. Select Coil Screw Removal

Once the wiring is disconnected remove the two screws holding the select coil to the backing plate.

Next remove the screw to disconnect the select coil plunger assembly. It may be necessary to remove the upper wire from the AXBX limit switch on the left side of the contactor assembly to access the hole for select coil plunger removal.

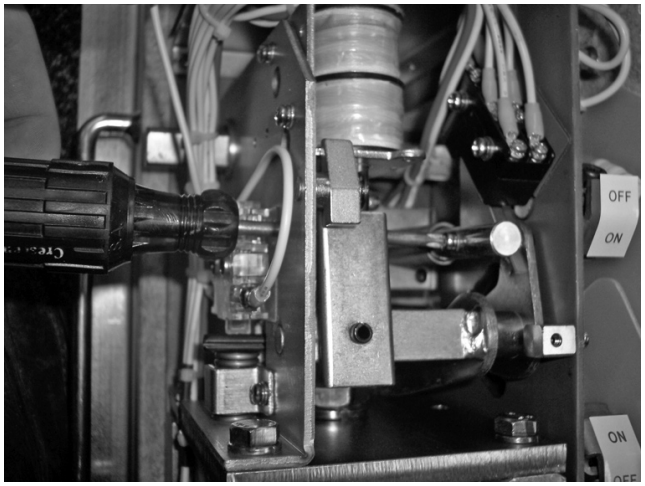


Figure 17. Select Coil Plunger Screw Removal

After the select coil plunger is disconnected the select coil can be removed from the contactor assembly. Depending on the size of the transfer switch it may be necessary to remove the select coil limit switch, the trip coil, or both. The removal process for both components was shown previously.

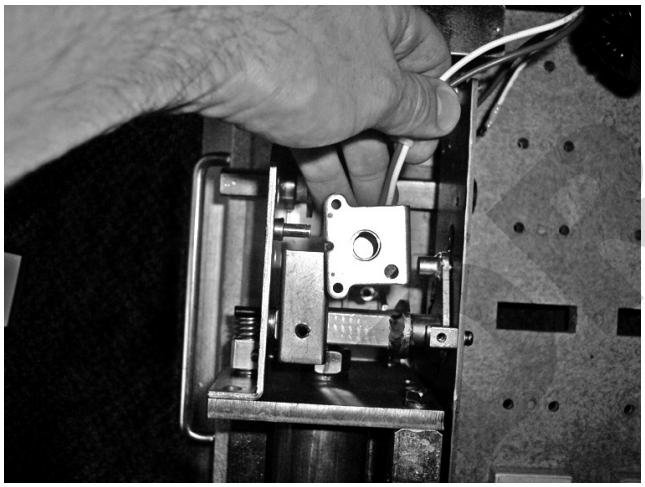


Figure 18. Select Coil Removal

CLOSING COIL REMOVAL:

Repeat cover plate removal process. Disconnect and label the closing coil wiring from PCB J1-1 & J1-2. Remove all necessary zip ties.

Remove the lower closing coil cover plate.

Next, slide the coil off the plunger and keeper assembly. Reverse process for reinstallation.

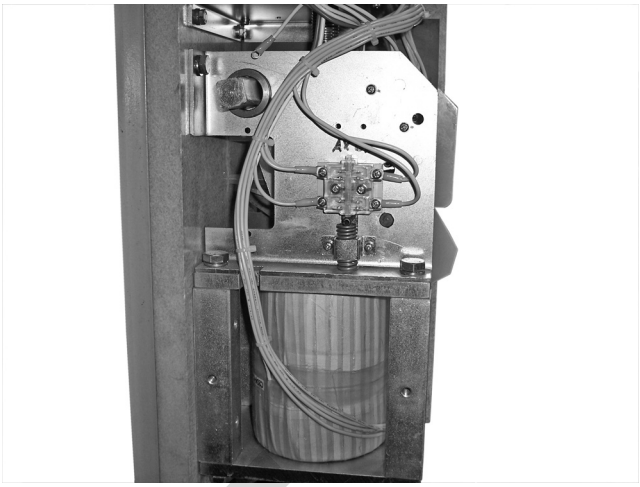


Figure 19. Closing Coil

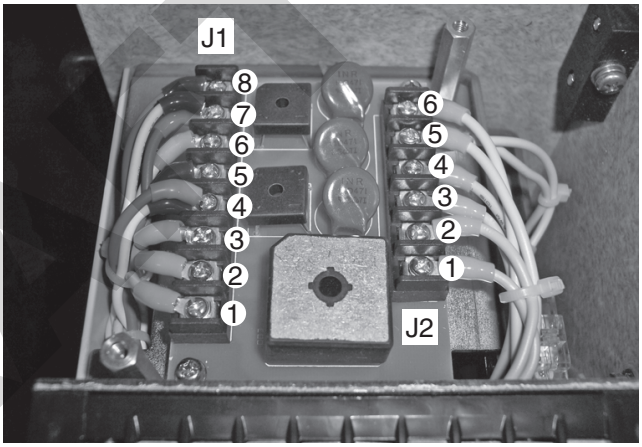


Figure 20. PCB

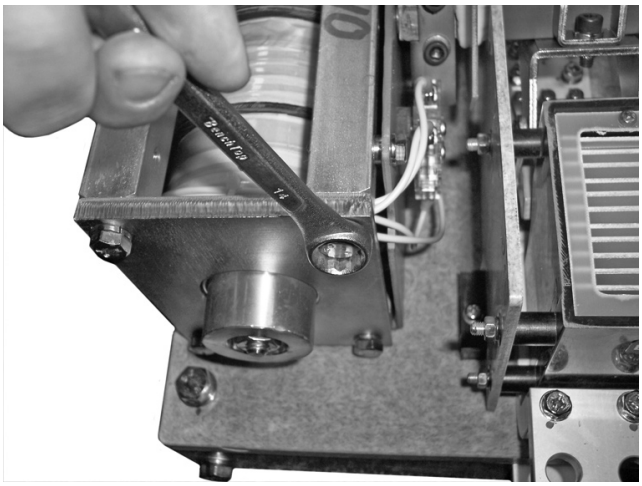


Figure 21. Closing Coil Cover Plate Removal

Figure 22. Slide Coil Off Plunger

Note: The plunger removal is not necessary to remove the closing coil it is shown and explained for change out of the plunger and or spring only.

Loosen the upper nut from the closing coil plunger assembly. Once the nut is loose, turn the plunger assembly counterclockwise from the bottom end.

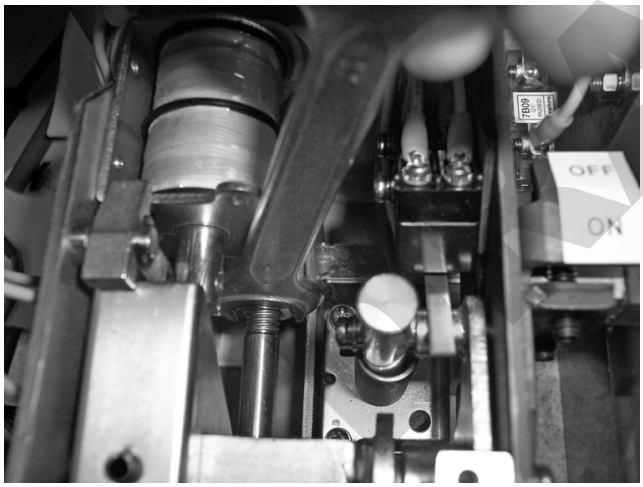


Figure 23. Loosen Upper Nut From Plunger

Some plunger assemblies will have a hole that a Phillips head screwdriver or small punch will fit in, if it is difficult to turn the plunger by hand, due to Locktite on the plunger threads.

Once the nut is off the plunger threads slide the plunger and spring out of the bottom of the contactor assembly.

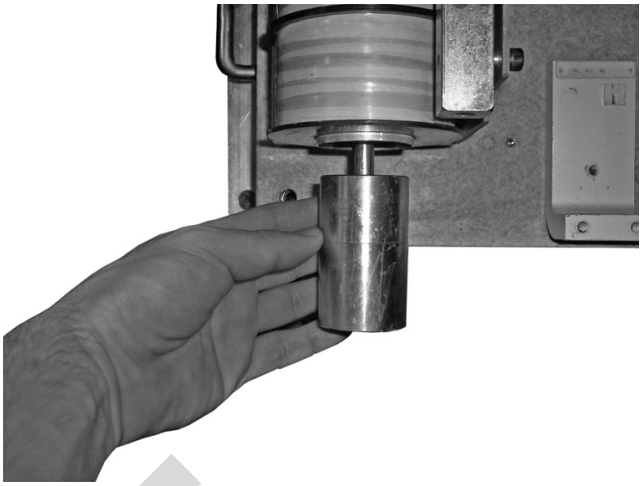


Figure 24. Plunger Removal

ATS1 & 2 AND BTS1 & 2 LIMIT SWITCH REMOVAL

Remove main contactor assembly cover plate.

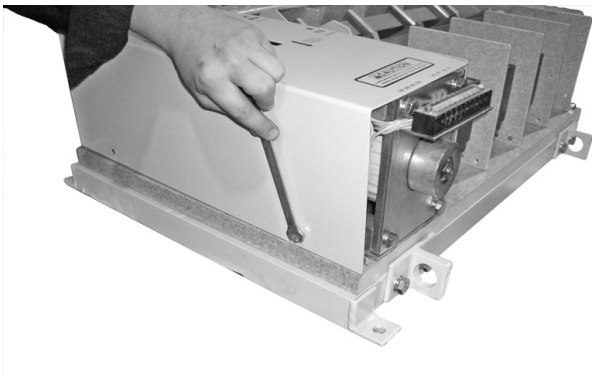


Figure 1. Removing the Cover Plate

The ATS1 &2 limit switches are located on the upper half or Utility side of the contactor assembly.

The BTS1 & 2 limit switches are located on the bottom half or Emergency side of the contactor assembly.

To remove the ATS1&2 limit switches or BTS1 & 2 it is necessary to remove the corresponding arc shoot assembly. First, remove the Phillips head screws that attach the arc shoot to the backing plate.

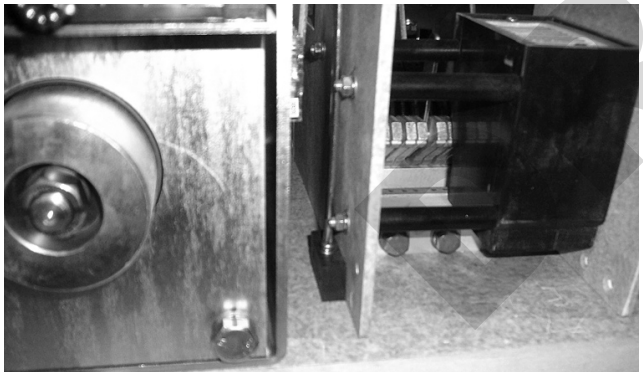


Figure 2. Removing the Arc Shoot Screws

Figure 3. Removing the Arc Shoot Screws

Once the screws are removed, remove the arc shoot from the contactor assembly.

Once the arc shoot assembly is removed, the ATS1&2 or BTS1&2 limit switches will be accessible. To access the lower screw holding the ATS2 or BTS2 limit switches, it may be necessary to manually put the transfer switch in the neutral position.

Once the arch shoot assembly is removed, remove and reinstall the BTS1 & 2 or ATS1 & 2limit switches shown.

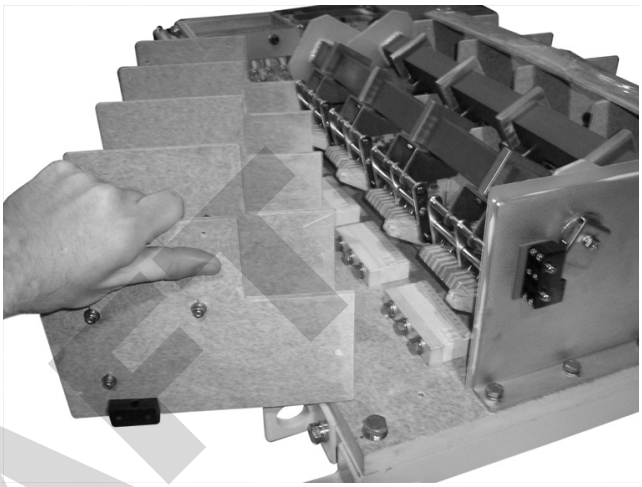


Figure 4. Removing the Arc Shoot Assembly

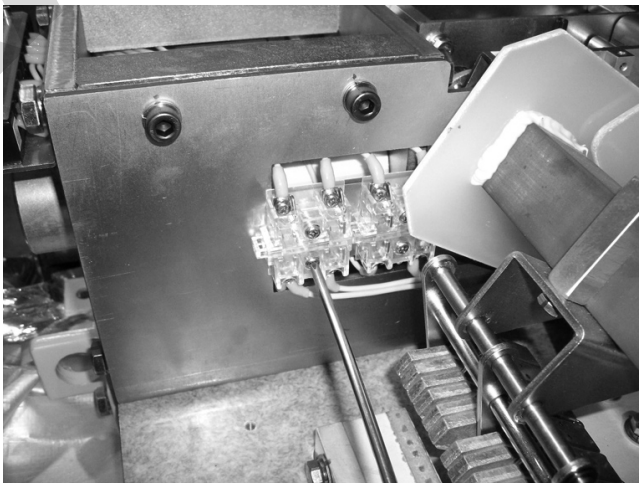


Figure 5. Replacing Limit Switches

ELECTRICAL FORMULAS

TO FIND	KNOWN VALUES	1-PHASE	3-PHASE
KILOWATTS (kW)	Volts, Current, Power Factor	$\frac{E \times I}{1000}$	$\frac{E \times I \times 1.73 \times PF}{1000}$
KVA	Volts, Current	$\frac{E \times I}{1000}$	$\frac{E \times I \times 1.73}{1000}$
AMPERES	kW, Volts, Power Factor	$\frac{kW \times 1000}{E}$	$\frac{kW \times 1000}{E \times 1.73 \times PF}$
WATTS	Volts, Amps, Power Factor	Volts x Amps	E x I x 1.73 x PF
NO. OF ROTOR POLES	Frequency, RPM	$\frac{2 \times 60 \times Frequency}{RPM}$	$\frac{2 \times 60 \times frequency}{RPM}$
FREQUENCY	RPM, No. of Rotor Poles	$\frac{RPM \times Poles}{2 \times 60}$	$\frac{RPM \times Poles}{2 \times 60}$
RPM	Frequency, No. of Rotor Poles	$\frac{2 \times 60 \times Frequency}{Rotor\ Poles}$	$\frac{2 \times 60 \times Frequency}{Rotor\ Poles}$
kW (required for Motor)	Motor Horsepower, Efficiency	$\frac{HP \times 0.746}{Efficiency}$	$\frac{HP \times 0.746}{Efficiency}$
RESISTANCE	Volts, Amperes	$\frac{E}{I}$	$\frac{E}{I}$
VOLTS	Ohms, Amperes	I x R	I x R
AMPERES	Ohms, Volts	$\frac{E}{R}$	$\frac{E}{R}$

E = VOLTS I = AMPERES R = RESISTANCE (OHMS) PF = POWER FACTOR

GENERAC®

Generac Power Systems, Inc.
S45 W29290 Hwy. 59 • Waukesha, WI 53189
1-888-GENERAC (1-888-436-3722) • generac.com

Part No. 0H3949 rev. A / Printed in USA 05.09