



LPT50CA

TROUBLESHOOTING AND REPAIR MANUAL

ALL REPAIRS SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN

The LPT50CA is a field repairable switch. Warranty covers defective parts only. Do not return the complete switch unless instructed to do so. The only tools needed are slotted and Phillips screwdrivers, flexible nut driver and an AC (Volt, Ohm) meter. These tools are available at most hardware stores. If technical support or repair parts are needed, please call your OEM or ESCO at (574) 264-4156. All warranty claims must be directed back to the OEM.

ALWAYS BE SURE POWER IS OFF AND DISCONNECTED

Disconnect the shore cord, turn breakers off at the generator and disconnect the inverter if installed. Remove the lid from the enclosure and check for AC voltage at all terminals to be sure that power is disconnected. Refer to the wiring diagram at the end of this manual for test points. Check connections to make sure all wires are secured and not broken off or burned. Lugs L2 & T2 on both contactors are neutral (white wires). Be sure there is no debris inside enclosure.

I. SHORE CONTACTOR WILL NOT OPERATE

- A.** With shore power disconnected, check the coil with the voltmeter set to measure ohms. Place the test leads at locations C1 and C2. An easy way to do this is to touch the back of the OC tabs that protrude through the back side of the circuit board. The meter should read between 65 and 90 ohms. If the meter reads 0 ohms or open circuit, the contactor must be replaced. Go to **Section IV** for instructions on replacing the contactor.

- B. The shoreline power leads must be connected to L1 and L3 with neutral at L2. If not, you must connect power leads. If working with a 120-volt two wire system, install a jumper from L1 to L3. The jumper must be same wire gage as the shoreline cable.
- C. Check side switch for proper operation. This switch is located next to the Generator contactor. Be sure the leads are securely fastened to the switch and the switch is firmly seated against the contactor. Using an ohmmeter, attach the test leads to positions S1 and S2. The meter should read 0 Ohms. Push down on the black rectangular "button" located at the top of the switch. The switch must move freely up and down. In the down position, the ohmmeter should read open circuit. If either test fails, the side switch is bad and must be replaced.
- D. Is the PC board securely fastened to contactors? The circuit board plugs onto the contactors via horizontally placed OC tabs at C1 & C2 and C3 & C4. The PC board connects to the vertically placed tabs at L2 & L3 on both the Shoreline and Generator contactors. Make sure all connectors are fully seated and the wire tie fits loosely against the board.

If the wire tie is missing, obtain one from a hardware store. Install the wire tie by placing the tip downward through the square opening in the interlock next to T3 on the Shoreline contactor. Route the tip along the bottom of the enclosure towards the PC board. Bring the tip around the PC board and secure with just enough pressure to fit loosely against the PC board. DO NOT OVERTIGHTEN.

Also check the wires coming off the side switch located on the Generator contactor to be sure they are fully seated onto the appropriate OC tab.

- E. **WARNING: HAZARDOUS VOLTAGES.** With shore power on, check the voltage between L1 & L2, and L3 & L2 with AC voltmeter. The voltmeter must read above 90 volts and below 145 volts. The contactor may not engage if there is less than 90 VAC present. If the voltage is not correct, check the power source and disconnect power until the input voltage problem is solved.
- F. If all the above steps have been completed and the switch still does not work, replace the pc board by tagging and removing wires from L1 through L3 on both the Shoreline and Generator contactors. Remove the brown wires from locations S1 & S2 on the side switch. Cut and discard the wire tie holding the PC board to the contactors. Gently pry and pull the PC board away from contactors. Install a new pc board following step **I-D** above. Reconnect the brown wires to the side switch. Reinstall power leads to lugs L1 through L3 on both contactors and tighten to 40 lb-in.

II. GENERATOR CONTACTOR WILL NOT OPERATE

- A. With generator power off, check the coil with the voltmeter set to measure ohms. Refer to the wiring diagram at the end of this document. Place the test leads at C3 and C4. The meter should read between 65 and 90 ohms. If the

meter reads 0 ohms or open circuit, the contactor must be replaced. Go to **Section IV** for instructions on replacing the contactor.

- B. Is the PC board securely fastened to contactors? See step **I-D** above.
- C. Check interlock switch **I1** for proper operation. Make sure the switch moves freely and is not binding or holding the contactor in the open position.
- D. The generator power leads must be connected to L1 and L3 with neutral at L2. If not, you must connect the power leads. If working with a 120-volt two wire generator system, install a jumper from L1 to L3. The jumper must be same wire gage as the generator cable.
- E. **WARNING: HAZARDOUS VOLTAGES.** With generator power on, check voltage between L1 & L2 and L3 & L2 using an AC voltmeter. There will be a 20-40 second delay before the pc board will engage generator contactor. The contactor may not engage if there is less than 90 VAC present. If the voltage is not correct, check the power source and disconnect power until the input voltage problem is solved
- F. If all the above steps have been completed and the switch still does not work, remove the PC board by following step **I-F** above.

III. CONTACTORS HUM OR CHATTER WHEN IN OPERATION

Humming is an inherent problem with AC coils in all transfer switches. Excessive humming and chattering at 120V AC can be warranted but low humming problems will not be warranted when caused by insufficient voltages. Low voltages are a major cause in the 60 cycle humming of contactor based transfer switches and we cannot control the quality of power coming from provided shore stations.

- A. Dust or moisture in the contactors or auxiliary switches could cause humming. **Make sure the shore power cord is disconnected and the generator is off.** Using an air hose with a rag over end of hose to prevent moisture being blown into contactors, blow out the contactors and enclosure. Make sure to also get underneath the contactors.
- B. Input voltages below 90 VAC on shore contactor could cause the contactor to hum and cause the coil to burn out. Check the voltage between L1 &, L2 and L3 & L2 as in step **II-F** above.
- C. Damaged coils may also cause humming. If the above steps do not solve the problem, replace the contactor.
- D. An improperly seated interlock can cause chattering. Make sure the interlock tabs are fully seated and flush against the top of both contactors. Test the assembly by pushing down individually on the center "button" on each contactor. It should move freely.
- E. The side switch located on the Generator contactor could cause chattering. Make sure the two tabs are fully seated flush against the contactor body. Push down on the black "button" on the side switch to verify that it moves freely.

IV. REMOVING AND INSTALLING CONTACTORS

Make sure the shore power cord is disconnected and the generator is off. Refer to the wiring diagram to complete this procedure.

- A. Follow step **IF** above for removing the PC board. Tag and remove the Shoreline and Generator leads from L1- L3 on the respective contactor. Tag and remove the Control panel leads from locations T1-T3 on the Shoreline contactor. Remove the enclosure from the coach.
- B. Supporting the contactor assembly with one hand, drill out the 8 rivets that hold the contactors to the enclosure using a 3/16" drill bit.
- C. Once the contactor assembly has been removed from the enclosure, remove the mechanical interlock holding the contactors together. Grasp the contactor assembly with one hand and gently rock the defective contactor back and forth while pulling the contactor down. This will free it from the interlock. Mark and remove the three loop wires from T1, T2 and T3 on the defective contactor. If you are working on the Generator side, carefully remove the side switch. While pulling up on the switch body, press the tab located at the top of the switch toward the black "button" and lift the switch away from the contactor.
- D. To remove the wires from the Shoreline contactor lugs or the T2 terminal on the Generator contactor, the lugs need to be loosened. First, remove the large lug screw from the lug and set it aside. Using a large Phillips screwdriver, loosen, but do not remove, the screw located inside the lug. Remove the wire from the lug.
- E. Orient the new contactor so that the coil terminals face the same direction as the existing contactor's coil terminals. Holding the existing contactor in one hand, slide the new contactor up along side the mechanical lockout until the lockout's tabs seat into the notches in the side of the new contactor. The lockout should rest flat against the side of the contactor.
- F. Test for proper installation by pressing down on the "button" in the center of the Shoreline contactor. Try to press the "button" down on the Generator contactor. It should be blocked from moving. Repeat the test for the Generator side. If it does not pass both tests, repeat step E above.
- G. To install the loop wires on the new contactor, reverse step D above. The strands of the white wire must be split into a "V" so that half go to the left and half go to the right of the Phillips screw. Tighten the Phillips screws securely. Insert, but do not tighten, the large lug screws removed earlier.
- H. Orient the contactor assembly so that the Shore and Generator input side of the assembly matches the Shore and Generator wires entering the enclosure. Secure the contactor assembly using 8 AD64BS (.187 D x .440 L) rivets or

similar fasteners. Make sure the assembly cannot move and rests tight against the enclosure floor.

- I. If the side switch was removed, reinstall it on the Generator contactor. Carefully slide the switch down from the top until it locks into place. Check for proper operation by pushing down on the “button” in the center of the Generator contactor. The “button” on the side switch should also move down freely. If it does not, try reinstalling the switch.
- J. Reinstall the pc board by following step **1-D** above.
- K. Reinstall the enclosure in the coach and reconnect the Shore, Generator and Control Panel leads. Test the LPT50CA for proper operation.

COMMON REASONS FOR FAILURE*:

(1) LOW VOLTAGE ON SHORE CORD -

Reasons: Bad connection at park box, extension cord too long, defective adapters, operating too much load for power available.

Potential Damage: burned out coils and pitted contacts.

(2) DIRTY POWER AND SPIKES -

Reasons: Storms (lightening), unbalance load at park, utility service at park is undersized or located next to an industrial environment.

Potential Damage: burned out coils, pc board damage, pitted contacts.

(3) DEBRIS IN ENCLOSURE -

Reasons: Metal shavings, knock outs, saw dust caused by poor production control, moisture or dirt inside enclosure, transfer switch not installed in an airtight compartment.

Potential Damage: Chattering relays, burned out coils, damage to pc board. Metal particles could cause a fire.

(4) GENERATOR OVERRUNS -

Reasons: Generator needs to be serviced, manual override of governor or throttle control, generator is undersized or is not properly installed.

Potential Damage: burned out coils, pc board damage, pitted contacts.

*All of the above reasons can create damage in the R.V.

REPLACEMENT PARTS

PART NO	DESCRIPTION	QUANTITY
C25DNF340A	Contactora 50A	2
C321KM608-84	Interlock	1
C320XGS-84	Auxiliary Switch	1
6WHP-45P-00	6AWG White Partial Strip Each End	1
10BKP-45S8-00	10AWG Black w/ #8 Spade	2
16BRP-55F-00	16AWG Brown w/ Female QC	1
16BRP-25FF-00	16AWG Brown w/ Female Flag	1
AD64BS	Rivet (.187 D x .440 L)	8
COVER LABEL	Cover Label Transfer Switch	1
LAB-ILPT50CA	Inside Wiring Label LPT50CA	1
QN2-6	6 hole neutral bar, 50A	1
LAB-TORO	Torque Label 1/2x1/2	1
LPT50-TIME	Time Delay LPT50-Tlme	1
LAB-IDLPT50CA	Label LPT50CA ID Label	1
63128	Cable tie, black	1
SPC8X8X4 1/2	Metal Box, 8x8x4	1
CH1024-12	10x24x3/4" cinch stud	2
10-EXT-LW	#10 external lock washer	2
90480A011	10-24 zinc hex nut	2

LPT50CA Wiring Diagram

