



## **ES50M-65N**

# **TROUBLESHOOTING AND REPAIR MANUAL**

**ALL REPAIRS SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN**

The ES50M-65N 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, L5, T2 and T5 are neutral (white wires). Be sure there is no debris inside enclosure.

### **I. GENERATOR CONTACTOR WILL NOT OPERATE**

- A.** With generator power off, check the coil with the voltmeter set to measure ohms. Place the test leads at S12 and S12A. The meter should read between 75 and 80 ohms. If the meter reads 0 ohms or open circuit, the coil needs to be replaced. Go to Section V for instructions on replacing the coil.
- B.** Is the pc board securely fastened to the contactors? To check this, loosen screws S11, S11A, S12, and S12A. Be sure pc board's fork terminals are securely positioned under each screw and that the female terminals S6, S7,

S8 and S9 are attached to the male terminals of the contactors. Tighten terminal screws (S11 through S12A) to 20 lb-in.

- C. Are the generator power leads connected to L4, L5 (neutral) and L6? If not, you must connect power leads to L4 and L6 with neutral at L5. If working with a 120-volt two wire generator system, install a jumper from L6 to L4. The jumper must be same wire gage as the generator cable.
- D. **WARNING: HAZARDOUS VOLTAGES.** With generator power on, check voltage between L4 & L5 and L6 & L5 using an AC voltmeter. There will be a 20-30 second delay before the pc board will engage generator contactor. NOTE: The pc board has a 90 VAC cutout on the generator side which automatically turns off the generator contactor and energizes the shore contactor (if the shore cord is plugged in). The voltmeter must read above 90 volts and below 140 volts. If not, check the generator outputs and review procedure I.A above (turn generator off.).
- E. If all the above procedures have been completed and the switch still does not work, replace the pc board by tagging and removing wires from L1 through L6. Loosen screws S11 through S12 and gently pull the pc board away from contactors. Install a new pc board following procedure I-B above. Reinstall power leads to lugs L1 through L6 and tighten to 40 lb-in.

## II. SHORE CONTACTOR WILL NOT OPERATE.

- A. With shore power off, check the coil with the voltmeter turned to ohms. Put test leads at S11 and S11A. The meter should read between 75 and 80 ohms. . If the meter reads 0 ohms or open circuit, the coil needs to be replaced. Go to Section V for a list of available replacement parts.
- B. Is the pc board securely fastened to the contactors? See procedure I-B above.
- C. Are the power leads hooked up to L1, L2 (neutral) and L3? If not, you must connect power leads to L1 and L3 with neutral at L2. If working with a 120-volt two wire system, install a jumper from L1 and L3. The jumper must be same wire gage as the shore cord.
- D. With shore power on, check voltage between L1 & L2 and L3 & L2 with an AC voltmeter. The voltmeter must read above 95 volts and below 140 volts. If not, check power source and disconnect power until problem is solved.
- E. If all the above procedures have been completed and the switch still does not work, the pc board must be replaced. Follow procedure I-E above.

## III. CONTACTORS HUM OR CHATTER WHEN IN OPERATION.

- A. Humming is an inherent problem with AC coils in all transfer switches. Hum or chatter could be caused by dust, metal shavings or moisture in the contactors. Make sure all power sources are off. Remove screws S13, S14, S15 and S16 and lift off contactor covers. Using an air hose with a thin rag over the end of hose to prevent moisture being blown into the contactors, blow out the enclosure, contactors and underneath the contactors. Replace the contactor covers making sure they are oriented as shown in the wiring

diagram. Secure the covers with screws S13 through S16. Do not over tighten the screws.

- B. Low voltage on the shore contactor will make the contactor hum and could potentially damage the coil if below 90 volts. Check the voltage between L1 & L2 and L2 & L3 as in procedure II-C above.
- C. If all the above procedures check OK, go to Section IV.

#### **IV. REPLACE OR INSTALL CONTACTORS (Disconnect all power sources).**

- A. When removing the wires from the contactors, be sure to tag each wire so they can be re-installed in the proper locations. If removing the shore contactor, tag and remove L1 through L3 and T1 through T3. If removing the generator contactor, tag and remove L4 through L6 and T4 through T6. Remove the pc board by loosening screws S11, S11A, S12, and S12A. Pull the pc board away from the contactors and out of enclosure. Using a flexible socket driver, loosen the two nuts that hold the defective contactor in place. Remove the contactor from the enclosure.
- B. To install the contactor, reverse the steps in IV-A above. Reinstall the nuts that secure the contactor to the enclosure and tighten to 20 in-lbs. Replace the pc board as in described in procedure I-E above. When replacing the wires, be sure the white neutral wires are on L2, L5, T5 and T2. Check that all connections are securely tightened to 40 lb-in before power is re-applied.

#### **V. REPLACE CONTACTOR COILS (Disconnect all power sources).**

- A. Remove the problem contactor as described in procedure IV-A above.
- B. Turn the contactor upside down and remove 4 small recessed screws on bottom of contactor. Holding the base with one hand, slide the contactor enclosure off the base. Lift the coil out of the base. Replace the coil and slide the contactor back onto the base. Replace the recessed screws and tighten securely. Re-install the contactor according to procedure IV-B above.

#### **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:** Humming contactors, 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, generator is not properly installed.

**Potential Damage:** burned contactors, pc board damage.

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

### REPLACEMENT PARTS

PART #	DESCRIPTION	QUANTITY
SPC8X8X4 1/2	ENCLOSURE (BLACK)	1
CR353ADY39APAK	SHORE CONTACTOR	1
CR353AD3BA1	GENERATOR CONTACTOR	1
55-B31A	CONTACTOR COIL	1
B122-501	TIME DELAY PC BOARD	1
QN2-6	GROUND BAR	1
CH1024-12	10-24x3/4" CLINCH STUD	4
90480A011	10-24 HEX NUT	4
ES101-8BK7-1R	BLACK POWER WIRE	2
ES101-6WH7-1R	WHITE NEUTRAL WIRE	1
ES50-COVER	COVER LABEL	1
ES50M-65N-INST	INSTRUCTION LABEL	1

# ES50M-65N Wiring Diagram

