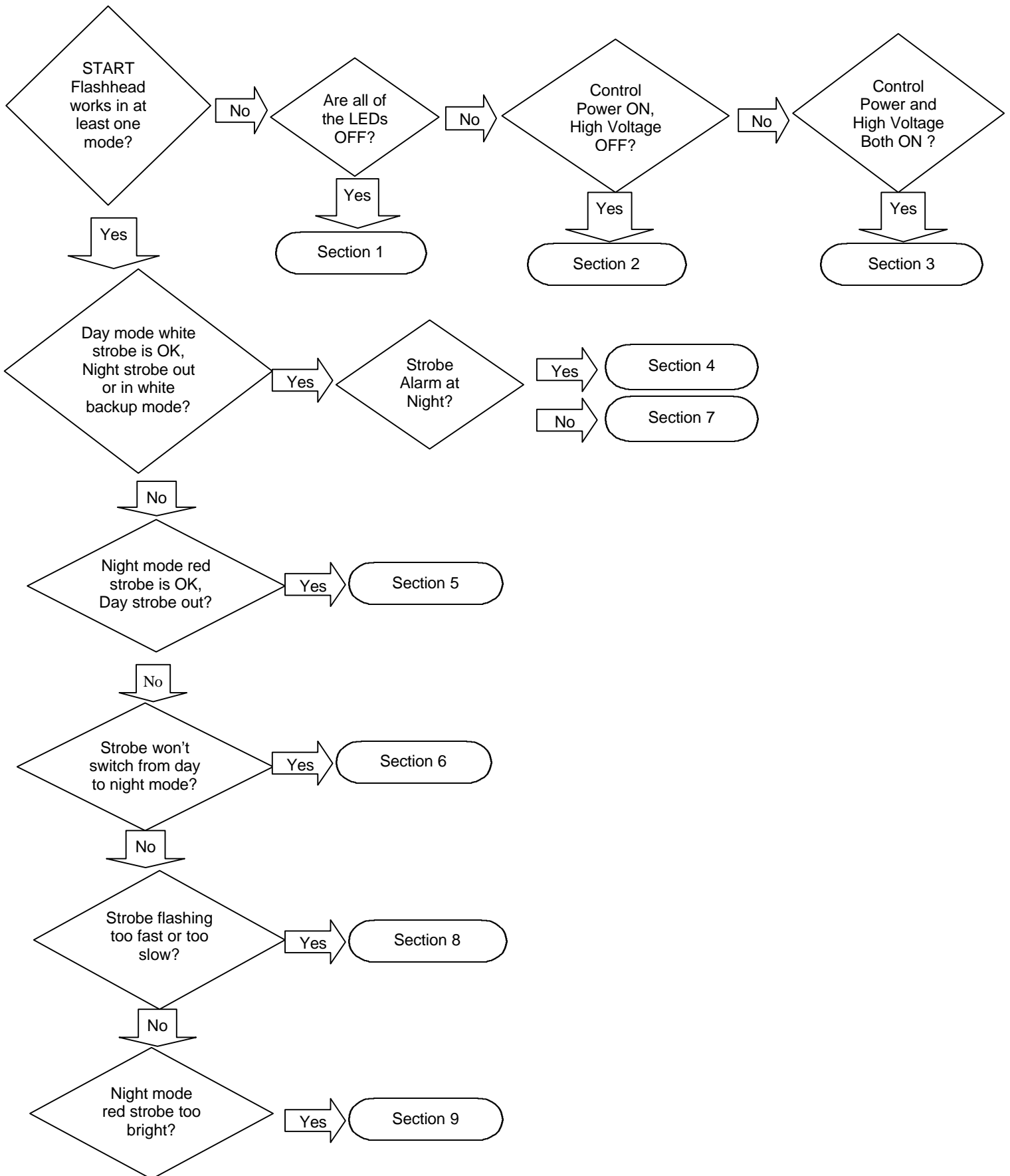


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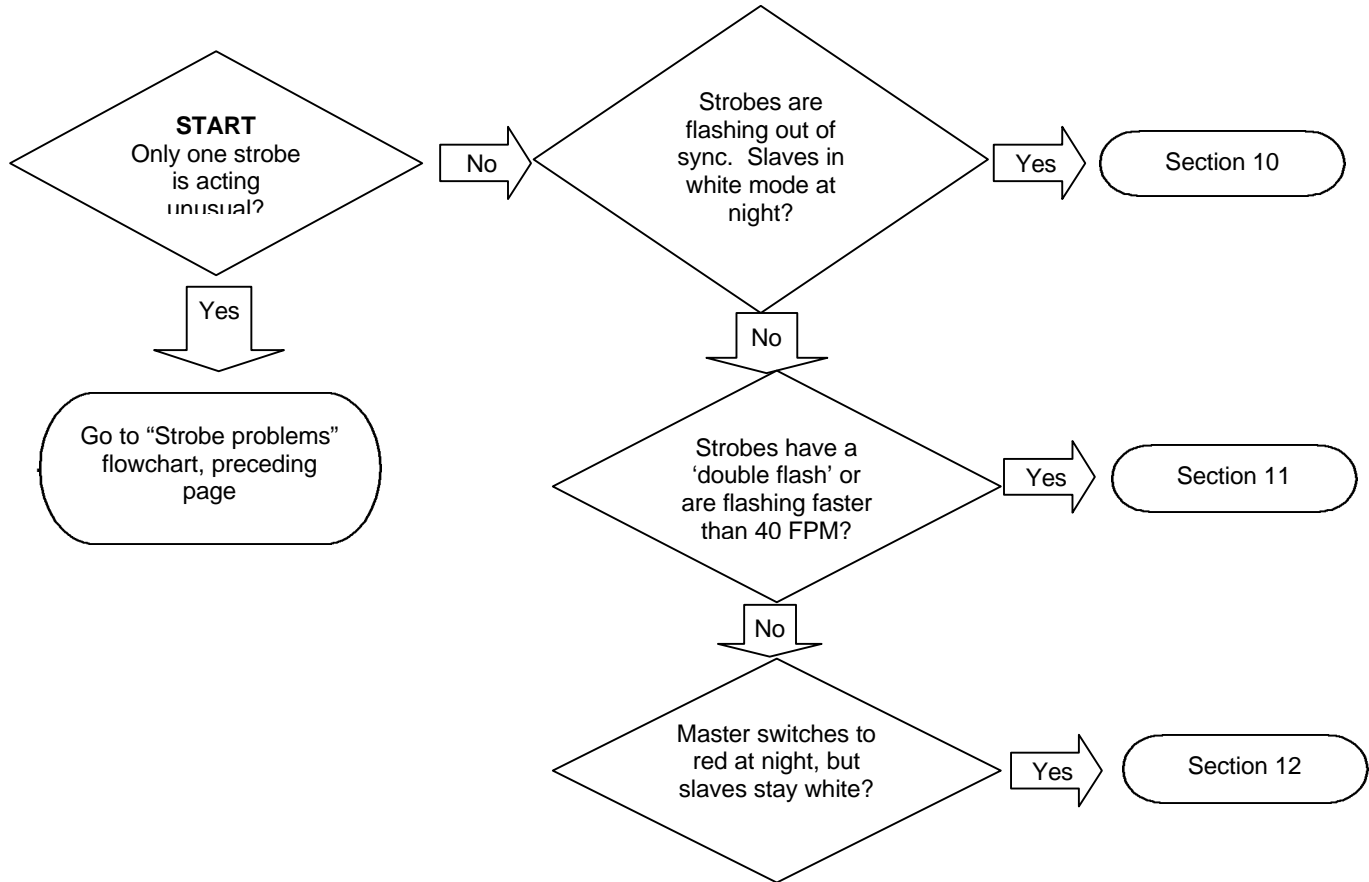
FlashGuard 3000B Dual Lighting System Troubleshooting Guide

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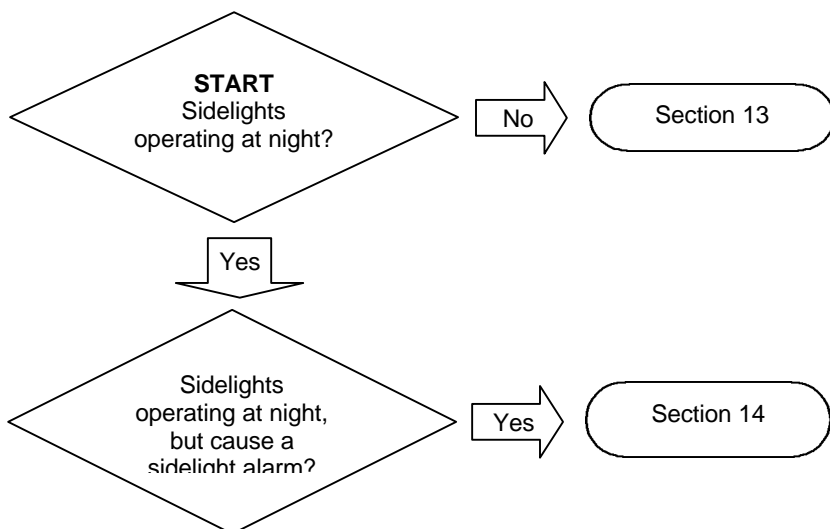
Flashhead (Strobe) Problems – Section A



Multiple Strobe Problems – Section B



Sidelight Problems – Section C



FLASHHEAD (STROBE) PROBLEMS

Section 1 Flashhead does not operate in any mode, no LED's on.

Possible Cause: Input power incorrect.

Diagnostic Test: Measure input power – it should be 120 VAC \pm 10%.

Corrective Action: Supply correct input power.

Possible Cause: Power supply interlock switch not engaged.

Diagnostic Test: Press the power supply interlock switch and hold it down.

Corrective Action: Close the unit – the system should operate properly.

Possible Cause: Blown F1 (6 Amp) fuse, or transformer (630mA) fuse.

Diagnostic Test: Remove all three circuit boards and check for damage. Remove the photocell wiring from TB1-1 and TB1-2. Perform “Flashhead Isolation Test” (section 15) and check for improper resistances. Leave the flashhead cable disconnected, replace the fuse and apply power. Replace the strobe cable, the photocell wiring, and the circuit boards one by one to determine which one will blow the fuse.

Corrective Action: Replace the defective component.

Section 2 Flashhead does not operate in any mode, control power indicator on, high-voltage neon lamp off.

Possible Cause: Flashhead interlock switch not engaged.

Diagnostic Test: Remove the flashhead wires TB2-5 and TB2-6 (gray and white), and measure resistance between them – it should be less than 5 Ω .

Corrective Action: Re-seat the flashhead cover, making sure the interlock switch engages when the cover is closed. If the system still does not have continuity between TB2-5 and TB2-6, replace the flashhead interlock switch and/or inspect the strobe cable for damage.

Possible Cause: Relay **K1** not energizing.

Diagnostic Test: When the interlock switches are engaged, the K1 relay should energize. If not, measure for 120 VAC across the relay coil. Alternatively, remove the connectors and check resistance across the K1 coil – it should be 1,200 Ω .

Corrective Action: Replace the K1 relay.

Possible Cause: Faulty high-voltage board.

Diagnostic Test: Visually check the traces on the high-voltage board. Check for any shorted diodes. Use diode check function on multimeter if available.

Corrective Action: Replace the high-voltage board.

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Section 3 Flashhead will not operate in any mode. Control power indicator on, high-voltage board LED indicator on.

Possible Cause: Trigger control board defective, or incorrect DIP switch setting.

Diagnostic Test: Perform tests in section 15, 16, and 17 also compare trigger board DIP switch settings with default settings in manual.

Corrective Action: Set DIP switches according to specifications. If no trigger output is observed when performing section 17, "Trigger Test", replace the trigger control board.

Possible Cause: Insufficient trigger voltage to the flashhead.

Diagnostic Test: If tower height is greater than 340 feet, remove the connector at terminal E13 on the motherboard, and connect it to E14. This will boost the voltage to the flashhead by approximately 10%.

Corrective Action: Leave the connector at E14.

Section 4 Flashhead operates properly in day mode, but at night goes into white backup night mode and trips the strobe alarm.

Possible Cause: Red flashtube/ red trigger transformer faulty.

Diagnostic Test: Disconnect the red wire from K3 relay.

Corrective Action: If system flashes red night mode through the white flashtube, with the strobe alarm off, replace the red flashtube and/or red trigger transformer.

Possible Cause: Trigger control board faulty.

Diagnostic Test: Perform "Trigger Test" (section 17) to check for trigger pulses.

Corrective Action: Replace the trigger control board.

Possible Cause: Diode board **DB1** faulty.

Diagnostic Test: Remove the two mounting screws on the control panel. Disconnect DB1, and measure resistance both ways across each diode. Make sure CR1/2/3 have no shorts. If shorted, DB1 is faulty. **Note:** The diode board DB1 is located under the control panel where the test switches are.

Corrective Action: Replace DB1.

Section 5 Flashhead operates properly in night mode, strobe alarm is off. No flash in day mode, strobe alarm is on.

Possible Cause: Day Enable switch SW2-5 on the trigger control board set to "OFF."

Diagnostic Test: Set SW2-5 on the trigger control board to "ON," then test the unit in day mode.

Corrective Action: Leave SW2-5 "ON."

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Possible Cause: White flashtube and/or white trigger transformer faulty.

Diagnostic Test: On TB2 swap the black and blue wires from the flashhead cable so that black is on TB2-4 and Blue is on TB2-3.

Corrective Action: If system flashes day mode through the red flashtube, with the strobe alarm off, replace the white flashtube and / or white trigger transformer.

Possible Cause: Trigger control board faulty.

Diagnostic Test: Perform "Trigger Test" (section 17) to check for trigger pulses.

Corrective Action: Replace the trigger control board if test fails.

Possible Cause: Day capacitor/s or 20 Ω resistors faulty, or connections loose/open.

Diagnostic Test: With all conductors attached, check resistance across the terminals of any C2 capacitor. Resistance should be @ 40 Ω .

Corrective Actions:

1. If resistance is near 0 Ω , one or more C2 capacitors is shorted. Remove conductors to each capacitor, and individually check / replace each capacitor.
2. If resistance is too high, one or more C2 capacitors may a loose connection, or one or more of resistors R2, R3, and R4 may be defective or have a loose connection. Tighten connections to all C2 capacitors and resistors R2, R3, and R4. If resistance is still too high, individually disconnect / check / replace the resistors.

Note: The resistors R2, R3, and R4 are located under the control panel (where the test switches are) below the diode board DB1. R2 is at the bottom, R3 in the middle, and R4 is topmost of the three.

Possible Cause: Diode board **DB1** faulty.

Diagnostic Test: Remove the two mounting screws on the control panel. Disconnect DB1, and measure resistance across each diode. Replace DB1 if any diodes have shorted. **Note:** The diode board DB1 is located under the control panel where the test switches are.

Corrective Action: Replace DB1.

Section 6 System will not switch between day and night modes correctly.

Possible Cause: Mode switches in wrong position.

Diagnostic Test: Put both mode switches in "Remote" position. Illuminate the photocell for a minute or so to approximate daytime conditions. The system should go into day mode.

Cover the photocell with a thick, dark, opaque material, to approximate nighttime conditions.

Wait for a minute or so. The system should go into night mode. If the system does not respond correctly to the photocell, try changing modes by using the mode switches on the control panel.

Corrective Action: If the system responds to the switches, but not to the photocell, replace the photocell.

Possible Cause: K2 mode relay malfunctioning.

Diagnostic Test: Set the day mode switch to "Remote," night mode to "Test." The K2 relay should energize. If not, measure for 120 VAC across the relay coil. Alternatively, remove the connectors and check resistance across the K2 coil – it should be @ 1,200 Ω .

Corrective Action: Replace the K2 relay.

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Section 7 System operates properly in day mode, but at night goes into white backup night mode, no strobe alarm.

Possible Cause: Sync board switch S1-3 set to white night mode – “OFF” position.

Diagnostic Test / Corrective Action: Set S1-3 to red night mode – “ON” position.

Possible Cause: K3 relay near the motherboard is defective.

Diagnostic Test: Measure K3 coil resistance on motherboard between E15 – E16. Should read approximately 700Ω.

Corrective Action: Replace K3 relay

Section 8 Flashhead flashing slow (15 – 20 flashes per minute), in backup mode at night, and strobe alarm on.

Possible Cause: Mis-configured or defective sync monitor board.

Diagnostic Test: Ensure the DIP switches on the sync monitor board are set correctly per the manual. Visually verify that the red LED on the sync monitor board is pulsing at 40 fpm.

Corrective Action: If the DIP switch settings are correct, and the red LED is not pulsing at 40 fpm, replace the sync monitor board.

Possible Cause: Current sense transformer wires are crossed, or current sense transformer is defective.

Diagnostic Test: The brown wire should connect to the capacitor side of the current sense transformer, the purple wire towards TB2.

Corrective Action: If the transformer wires are correct, replace the current sense transformer.

Section 9 Night mode very bright, red, no alarms.

Possible Cause: K2 relay open.

Diagnostic Test: Put the system in night mode. Visually check to see that K2 energizes. Check for 120 VAC across the coil of the K2 relay. Alternatively, remove the connectors and check resistance across the K2 coil – it should be @ 1200Ω.

Corrective Action: Replace the K2 relay.

MULTIPLE STROBE PROBLEMS

Section 10 Flashheads are operating, but out of sync. At night, slave units in white backup night mode instead of normal red.

Possible Cause: Sync monitor board on the master power supply not configured as master.
Diagnostic Test/ Corrective Action: DIP switch S1-4 in the master unit should be set to "OFF."

Possible Cause: Interconnecting wire between master and slave power supplies missing.
Diagnostic Test: Inspect wiring between power supplies. TB1 position 3 should be daisy-chained between each power supply, per the installation wiring diagram.
Corrective Action: Install interconnecting wiring.

Section 11 All lights are in sync, but there is a double-flash, or flashing faster than 40 flashes per minute (fpm).

Possible Cause: More than one sync monitor board is set as master.
Diagnostic Test: Inspect the DIP switches on each sync monitor board. In the master power supply, DIP switch S1-4 should be set to "OFF," which is the master position. In all the other power supplies, this switch 4 should be set to "ON," which is the slave position
Corrective Action: Reconfigure sync monitor boards. Refer to the manual for correct positions.

Section 12 Master unit switches to night mode at night, but slave units remain in day mode.

Possible Cause: Interconnecting wire between master and slave power supplies missing.
Diagnostic Test: Inspect wiring between power supplies. TB1 position 1 should be daisy-chained between each power supply, per the installation wiring diagram for multiple units.
Corrective Action: Install interconnecting wiring.

SIDELIGHT PROBLEMS

Section 13 Sidelights not operating at night.

Possible Cause / Corrective Action: Verify correct wiring per installation diagram. On systems with more than one power supply, note that each sidelight module should run one level of sidelights

Possible Cause: F3 fuse open.

Diagnostic Test: Remove the F3 fuse. Check for continuity.

Corrective Action: Reseat / Replace.

Possible Cause: Power supply mode switches are in the wrong position.

Diagnostic Test / Corrective Action: Make sure both switches are in the "Remote" position, and that the photocell is not illuminated by artificial lighting.

Section 14 Sidelights in alarm

Possible Cause: Sidelight lamp burned out.

Diagnostic Test: On the sidelight module Set the DIP switches to monitor 1 (one) less sidelight than the current number (reference switch setting positions in manual). Alternatively, measure the current going out to your sidelights though the wire on TB3-1. Compare your current reading to the nominal (expected) current level to see how many sidelights you have operating.

Corrective Action: Replace burned out sidelight.

Possible Cause: Wrong DIP switch setting on the sidelight alarm module.

Diagnostic Test / Corrective Action: Match DIP switch setting with the actual number of sidelights to monitor (see "Default Switch Settings," Operations chapter).

Possible Cause: Low input voltage.

Diagnostic Test: Check input voltage at TB1, 9&10. It should be 120 VAC +/- 10%.

Corrective Action: Increase input voltage.

Sidelight Alarm Module Current Levels

The following are the current thresholds for the sidelight module (Part # 277-4195) for the FlashGuard 3000B. These values were obtained using 120 VAC input power and 116 Watt, 120 VAC lamps.

	<u>One Lamp</u>	<u>Two Lamps</u>	<u>Three Lamps</u>
Nominal (Expected) Current Level	0.94 A	1.88 A	2.79 A
Alarm Threshold, Lower Level (Unit goes into alarm)	< 0.59 A	< 1.36 A	< 2.31 A
Alarm Threshold, Upper Level (Unit comes out of alarm)	> 0.59 A	> 1.45 A	> 2.38 A

Flashhead Isolation Test

Disconnect the seven conductor cable from power supply at terminal block TB2. Using an Ohmmeter, check the resistance between the conductors of the disconnected flashhead cable, and compare to the expected values:

FG 3000 Dual Red/White Strobe (cable disconnected from power supply)

- #1 **Red**: Open to all conductors
- #2 **Brown**: < 5Ω to blue and black, open to all others
- #3 **Black**: < 5Ω to blue and brown, open to all others
- #4 **Blue**: < 5Ω to brown and black, open to all others
- #5 **White**: < 5Ω to gray, open to all others
- #6 **Gray**: < 5Ω to white, open to all others
- #7 **Ground**: Open to all conductors

Flashhead Test Results

1. Correct readings do not ensure that the flashhead and cable are good, but this is a quick check for obvious problems.
2. If the readings above are correct, proceed to section 16, Power Supply Isolation Test.
3. If the resistance between #5 (gray) and #6 (white) is greater than 5Ω, or is 'open', suspect that the flashhead interlock switch is not depressed.
4. For other inconsistencies with the above chart, the probable causes are miswiring, or conductors shorted and/or opened. If possible, disconnect the flashhead cable at both ends and perform a 'Megger' test with a Megohm Meter.

Power Supply Isolation Test

Leave the seven conductor strobe cable disconnected from the power supply at terminal block TB2. Install a jumper wire between terminals 5 and 6 to simulate the interlock switch being depressed. Apply power to the system and insure the following:

Voltage Measurements

Using a voltmeter, measure the voltages of the conductors to ground terminal 7. Check the measurements in both day and night modes, and compare to the expected values:

FG 3000 Measurements

#1, Red: +500 VDC to ground

#2, Brown: -500 VDC to ground

#3 See Note 1

#4, Blue: See Note 1

#5, Gray: 120 VAC to ground

#6, White: 120 VAC to ground

If either the red or the brown conductor does not have +500 VDC or -500 VDC respectively, there is most likely a problem in the T1 transformer, the high voltage board, or a capacitor has failed. Check the input and output voltage of the transformer. Check the high voltage board for bad diodes. Check each capacitor for the proper value. If your meter will not measure capacitance (Farads) then check the capacitors for opens or shorts.

**Note 1: DO NOT MEASURE WITH METER. MAY CAUSE DAMAGE TO EQUIPMENT.*

Trigger Test

Install a neon lamp (Radio Shack catalog # 272-1102, Honeywell Part # 77-2342) across the trigger output. For the FG3000B, install the neon lamp in TB2-2 and TB2-4 if checking for Day triggers.

Install neon lamp in TB2-2 and TB3 if checking for Night triggers.

The neon lamp should be flashing at 40 flashes per minute. With the power supply in day mode, you should see one quick flash. When the system is put into night mode, you should see a long 'burst' of flashes for a few seconds. Then the lamp should begin flashing short 'bursts' of flashes. This happens because the power supply can tell that the red flashtubes are not operating, so it tries to go into backup white night mode.

If the neon tube will never flash, you most likely have a problem with the trigger board. Check the dip switch settings with those in the manual, and replace the board if necessary.

If the neon tube flashes slowly, you most likely have a problem with the sync board. Check the dip switch settings with those in the manual, and replace the board if necessary.

If the neon lamp is flashing correctly, and the voltages are correct, the power supply is probably working, and the problem is likely in the flashhead or the strobe cable.

Remove neon lamp & jumper from TB2 before reconnecting the flashhead.

Status Indicators

Control Power ON

- Located on the control panel (top center), this indicator is illuminated whenever input power is present and the power supply interlock switch is engaged.

High Voltage Neon Lamp

- Located on the high voltage circuit (top) board, this lamp indicates that the high voltage circuits are active.
- Extreme caution should be used if the neon lamp is on.

Flashhead Alarm Status LED

- Located on the sync/monitor (middle) board, this LED will be green when the flashhead is operating correctly.
- If the LED is off, the system is in alarm mode.

Sync Out LED

- Located on the sync/monitor (middle) board, this LED blinks red to indicate that a sync signal has been generated.
- In a multiple flashhead system, only the sync/monitor board that is set as the master will blink this LED.

Sync In LED

- Located on the trigger/control (bottom) board, this LED blinks green to indicate that a sync signal has been received from the sync/monitor board.

Flashtube Status LED

- Located on the trigger/control (bottom) board, this LED is red if the red flashtubes are in operation.
- If the white flashtubes are being used, the LED is off.

Sidelight Failure LED

- Located on the red light control module, this LED turns red to indicate a sidelight lamp failure.
- This LED is off when the sidelights are operating properly.

Tools Required

- Flat head screwdriver
- 5/16" nutdriver to open flashhead
- Clean gloves to use when changing flashtubes
- Digital multimeter w/ Ohm reading and 500 VDC capacity
- NE2 neon light, Radio Shack catalog number 272-1102, Honeywell part # 77-2342
- Short piece of wire for jumper (Approx. #12 wire gauge)
- Needle Nose Pliers

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Recommended Spare Parts

Flashhead Spares (Upstairs)

<u>Part Number</u>	<u>Description</u>
12S00602	Flashtube Assembly: FT1, FT2
77-4040W	White Trigger Transformer: T1
77-4040R	Red Trigger Transformer: T2

Power Supply Spares (Downstairs)

<u>Part Number</u>	<u>Description</u>
CA706A441EK	Day Capacitors. C2 (A-F)
*77-3311	Night Capacitor: C3
77-1167 (Qty 2)	6 Amp Fuse: F1
77-2040 (Qty 2)	10 Amp Fuse: F3
DP-1019 (Qty 2)	630mA fuse: TB-F1
277-3939	PC Board, Diode
277-3937	PC Board, High Voltage
277-4163	PC Board, Sync/Monitor
277-5016	PC Board, Trigger/Control
77-2013	Relay: K1, K2
77-4192	Relay, K3
77-3259	Photocell
77-2342	Neon Lamp (Used for testing purposes)