

TECHNICAL BULLETIN - #2909E
SUBJECT: **TROUBLESHOOTING 5-SERIES UNITS**
Effective Date: 1/26/00 Revised Date: 8/23/05

The 5-series stop / crossing arm contains two internal circuits; a motor circuit and a motor control circuit. The motor control circuit consists of two relays and 3 or 2 micro-switches, which are tied electronically to the 4 or 8-way flasher system of the school bus. The motor circuit is controlled by the motor control circuit, from which it is insulated. For this reason, the base of the unit must be properly grounded to the bus body.

For proper operation, the system voltage must be 12V. While it may seem complicated, the 5-series may be easily troubleshot using a test light or DC voltmeter. Please refer to the appropriate wiring diagram for the reference points listed.

***Note:** that components that are determined to be 'at fault' are not necessarily defective. The fault may be due to loose connections, dirty contacts, etc. as well as worn parts. The situations listed below are those that are most often encountered in the field. If further help is needed, contact the Engineering department at Specialty Manufacturing Company.

A- Unit is switched ON, 4 or 8-light flasher system is ON and the door is open causing the lights at the top of the bus to switch from Amber to Red, but the unit will not open:

1. Pull the hinge fully open, remove the cover and then partially close the hinge. Check for voltage at (A). If this voltage is NOT 12V, check for a steady voltage (12V) at the "Stop Arm Solenoid" terminal on the 4 or 8 light flasher system. If this voltage is not acceptable, the flasher system or wiring connections are 'at fault'. If the voltage at these two points is 12V, proceed to step 2.
2. For 3 micro-switch units, check the voltage at (B). If this voltage is NOT 12V, micro-switch MS2 is probably 'at fault'. If this voltage checks out or for a 2 micro-switch unit, proceed to step 3. *See section "D" and reference note at D-1.
3. Disconnect the white wire at (C) and check the voltage on the bared relay R1 terminal at (C). If this voltage is NOT 12V, relay R1 is probably 'at fault'. If this voltage checks out, reconnect the white wire (feeling the relay "click") and proceed to step 4. If the relay doesn't "click", the white wire may not be properly grounded.
4. Check the voltage at (D) on micro-switch MS1. If this voltage is NOT 12V, micro-switch MS1 is probably 'at fault'. If this voltage point checks out, proceed to step 5. Reference note at D-1.
5. Disconnect the double white wire at (E) and check the voltage on the bared relay R2 terminal. If this voltage is NOT 12V, relay R2 is probably 'at fault'. If this voltage checks out, reconnect the double white wires (feeling the relay "click") and proceed to step 6. If the relay doesn't "click", the white wire may not be properly grounded.
6. Check the voltage at (F) on relay R2. If this voltage is NOT 12V, then relay R2 internal contacts are probably 'at fault'. If this voltage checks out, proceed to step 7.
7. Disconnect the black wire at (G) on relay R1 and check the voltage on the black wire. If this voltage is NOT 12V, the Motor is probably 'at fault'. If this voltage checks out, touch connect the black lead to

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ground momentarily to verify the motor runs and then reconnect the black lead to the relay R1 and proceed to step 8. If the motor runs with the black lead touched to ground, the problem is either the relay R1 contacts or the orange wire connections.

8. Disconnect the orange wire at (H) on relay R1 and check the voltage on the bared terminal of the relay. If this voltage is NOT within the guidelines, the contacts of R1 are 'at fault'. If this voltage checks out, then the orange wire connections or the base to chassis grounding is 'at fault'.

B- Unit is switched ON, opens to 95+ degrees or excessively past 90 degrees:

1. This is most often due to micro-switch MS1 'at fault'. Reference the note in D-1.

C- Unit is switched ON, opens to ~90 degrees, but will not nearly return if pushed way past the 90 degree position.

1. This is most often due to micro-switch MS2 'at fault'. Reference the note in D-1.

D- Unit operates properly, but continues to run after closing.

1. This is most often due to micro-switch MS3 'at fault'. **NOTE-** During installation of new micro-switches, they must be pushed away from the cam as far as possible before tightening the nuts to clamp the cover plate holding them in position.

E- Unit is switched ON, opens properly, but will not close after being switched OFF (door closed).

1. Pull the hinge fully open, remove the cover and then partially close the hinge. Check the voltage at (I). If this voltage is not within the guidelines, micro-switch MS3 is probably 'at fault'. If this voltage checks out, proceed to step 2. Reference the note at D-1.
2. Check the voltage at (G). If this voltage is not within the guidelines, relay R1 is 'at fault'. If this voltage checks out, proceed to step 3.
3. Disconnect the red wire at (F) and check the voltage at the red wire. If this voltage is NOT within the guidelines, the Motor is probably 'at fault'. If this voltage checks out, reconnect the red wire and proceed to step 4.
4. With the unit in the full open position and switched OFF (door closed), disconnect the double black/green or blue/green wires at (A). If the unit closes, the unit is NOT 'at fault'. The problem lies within the 4 or 8-way flasher, which is not signaling the unit to close. Contact the flasher manufacturer for assistance in troubleshooting.
5. Verify ground connections: Check ground from white wire to chassis ground on motor at orange wire. If bad ground connection found- run a ground wire from chassis to base of unit.
6. Verify RotoClip clamps are intact. If RotoClips are broken- replace RotoClips. (p/n 5030)

F- Unit is switched ON, opens properly, but moves back and forth about 3 to 4 inches on the blade tip at the full OPEN position, commonly called "oscillation". (For stop arms only)

1. This is most often caused by wear on the micro-switch pawls or in the camshaft. There is NO adjustment and none should be attempted. This problem may be corrected by replacing the micro-switch plate assembly (p/n 5177) or the camshaft (p/n 5031). Much earlier units using the snap ring camshaft (p/n 5025) should order the camshaft replacement kit (p/n 5169).

G- Unit does not work properly in extreme cold temperatures

1. Verify there is no ice build-up on hinge area. If present, remove all ice build-up on hinge area

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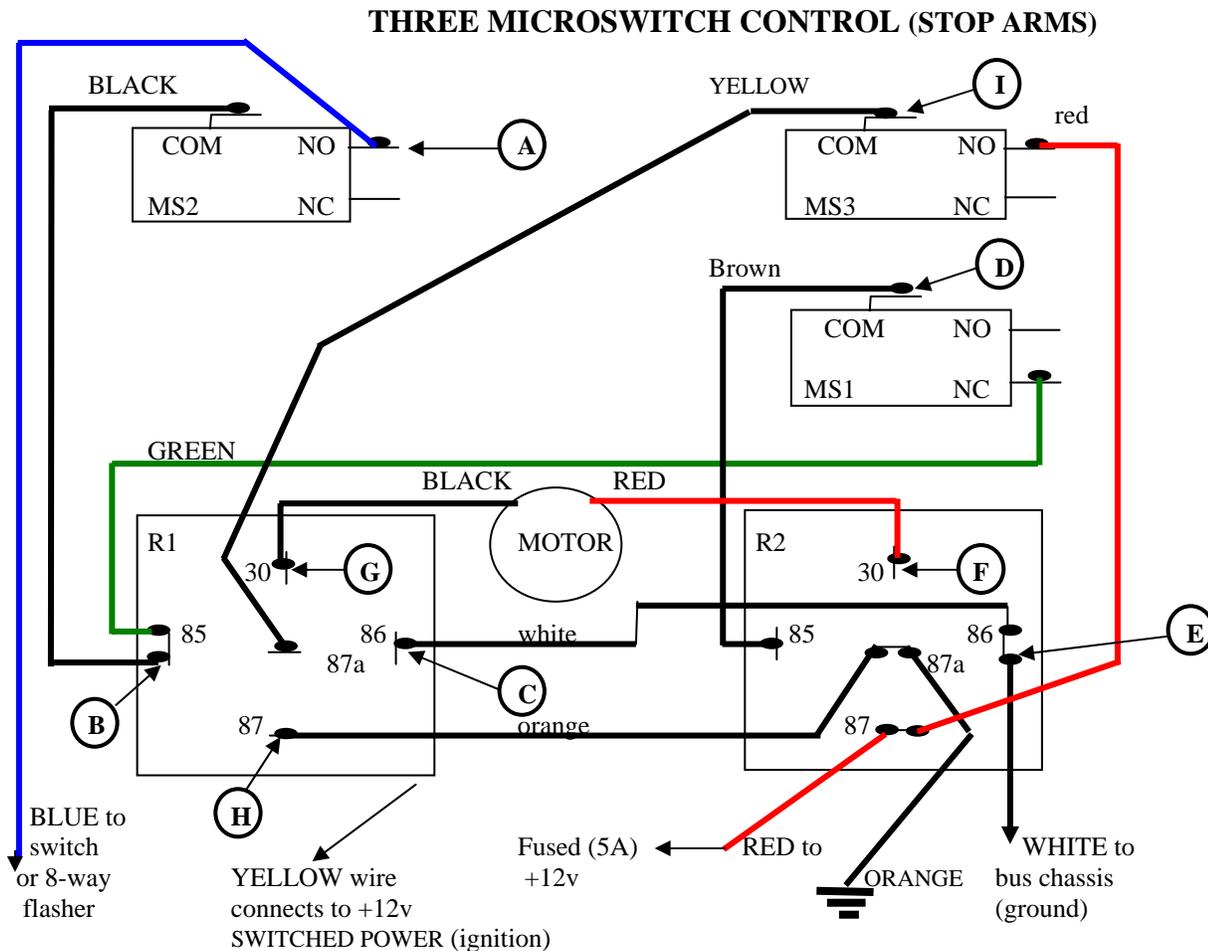
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2. Verify the heater (yellow wire) for the microswitch plate is connected to switched power (ignition) This needs to be on any time the bus is on.
3. Verify the unit does not have silicone sealant all the way around the cover on the base. There should be a small area left unsealed toward the back. This is to allow the unit to “breathe”, and allow any condensation to evaporate.
4. Verify the small “weep” hole in the bottom of base unit is clear of obstructions. If necessary, this can be made larger.

H- Dirt and Debris is getting inside the crossing arm base.

1. Ensure the splash shield is installed. The splash shield must be installed correctly on all 5 series crossing arm units. ***FAILURE TO FOLLOW CORRECT INSTALLATION PROCEDURES WILL VOID WARRANTY ON ALL PARTS OF CROSSING CONTROL ARM.**

***NOTE: USING OR SUBSTITUTING OTHER THAN ALL GENUINE SPECIALTY MANUFACTURING COMPANY COMPONENTS WITHIN THE UNITS, INCLUDING BLADES, STROBE LIGHTING AND LENSES WILL VOID WARRANTY.**



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TWO MICROSWITCH CONTROL (CROSSING ARMS)

