This Carolina Thomas Bus Buzz addresses a condition where the Grid Heater Power Cable for Caterpillar engines can chafe the ¼ turn heater shutoff valve on an FS65 with Caterpillar engine.

Please make sure all your technicians receive this and you inspect every FS65 with a Caterpillar engine.

Condition: The Caterpillar Engine Grid Heater Wire Can chafe the ¼ turn shutoff valve and cause a direct short resulting in severe damage to the bus.

This Carolina Thomas Bus Buzz shows photos of where to inspect and what to do if your inspection uncovers a damaged cable.

All FS65 units with Caterpillar Engines should be inspected and then repaired as necessary regardless of age or mileage.

You should systematically inspect every unit and monitor this so that every unit is inspected and repaired if a repair is necessary.

Photo shows ¼ turn heater shutoff valve (circled) that is on a standpipe extending up from back of Caterpillar engine block on the entrance door side of the bus. The grid heater cable is indicated with an arrow. Chafing can occur behind this shutoff valve and may not be visible if the cable is not moved away from the valve piping to visually inspect.

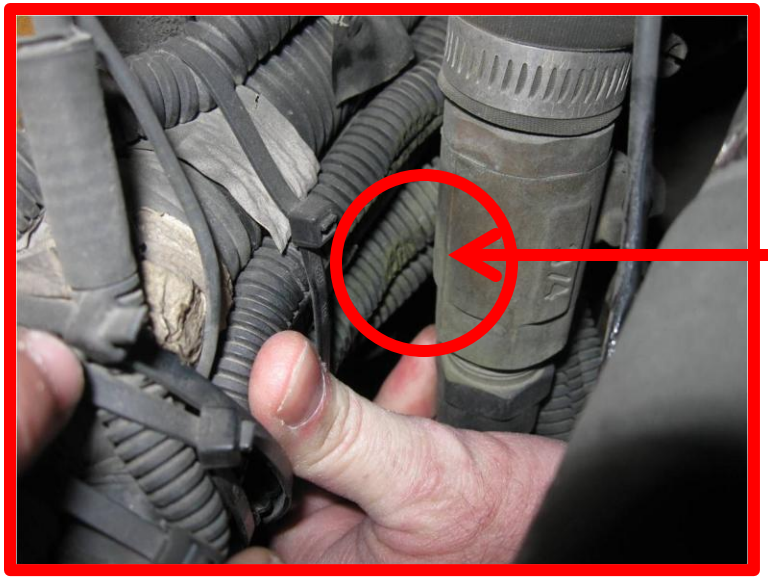
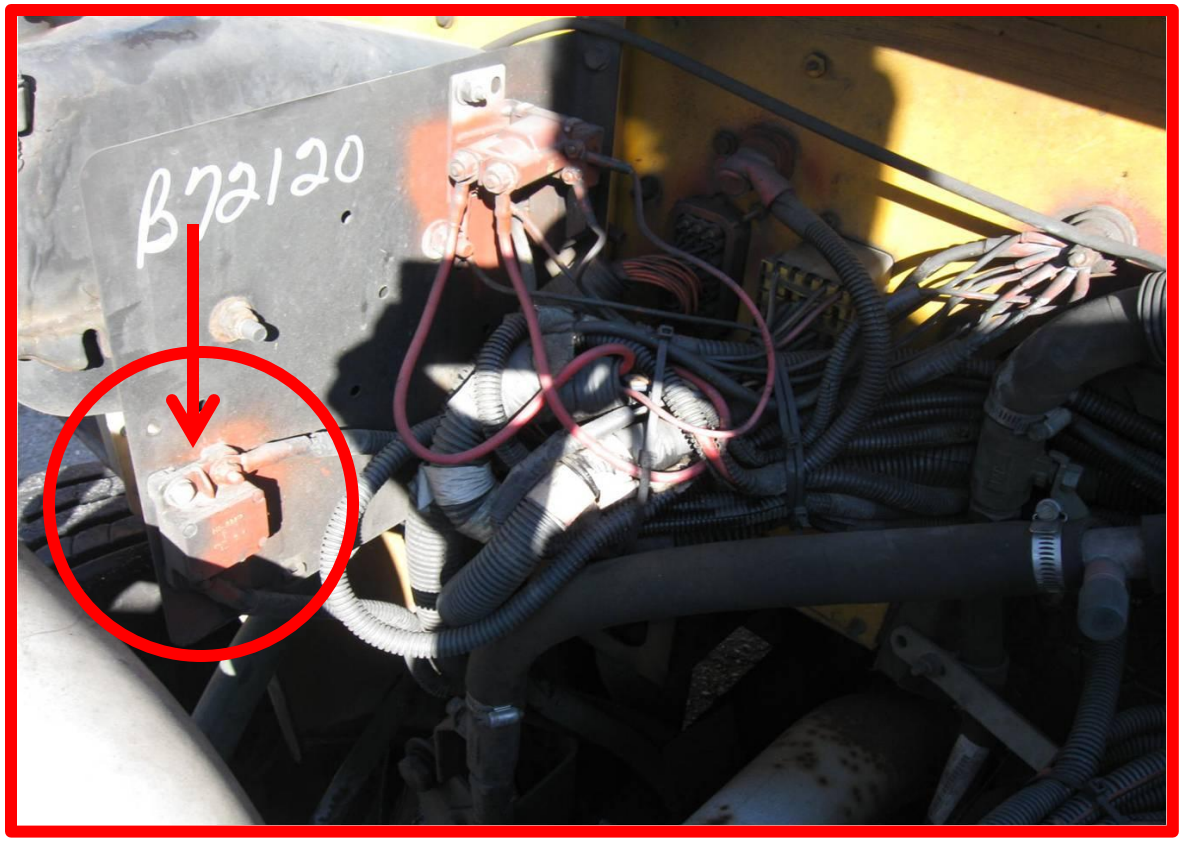


Photo shows convoluted harness protection with minor damage (chafing started on protective wrap). Cable had to be pulled away to view.

Photo shows convoluted harness protection with medium damage (chafed through protective wrap but NOT into cable covering). Cable had to be pulled away to view.



NOTE: Grid Heater Wire connects to power relay by surge tank for reference (area circled.)

Inspection and Repair Procedures

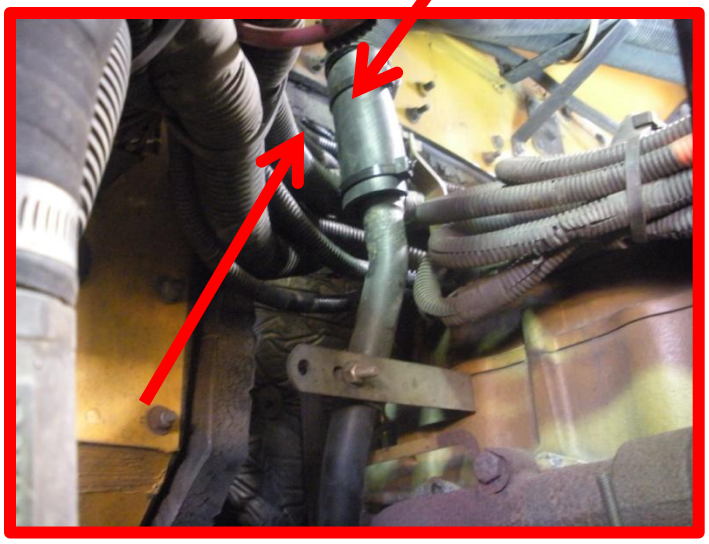
1. Implement “Lock-out / Tag-out” procedure to prevent bus from moving or starting during inspection and repair.
2. Chock wheels.
3. Disconnect batteries.
4. Visually inspect Caterpillar grid heater cable by moving it away from heater shut off valve if necessary. This step is required. Without moving the harness it is not always possible to inspect the cable for any damage.
5. NOTE: If grid heater cable is chafed through its covering to the copper wiring we are recommending that the cable be replaced immediately before bus is put back into service to avoid a short which can result in an engine compartment fire. Minor and medium damage to convoluted protection can be repaired in the following manner.

Inspection and Repair Procedures

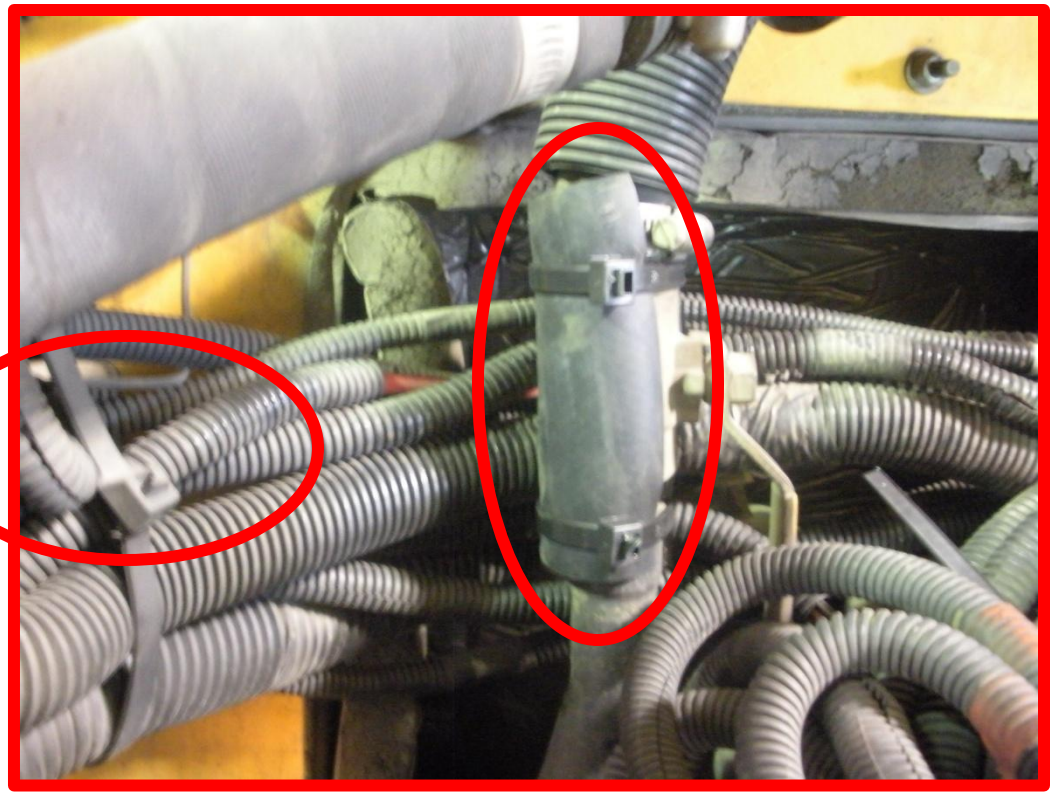
6. Heater shutoff valve and standpipe can be moved toward front of engine to allow for more clearance for wiring loom. Please note that the engine moves with acceleration and deceleration and clearance must be provided to prevent chafing. Loosen fitting at bottom of standpipe into block and rotate standpipe to front of engine 1” to provide clearance for harness. Retighten fitting.

Block Fitting

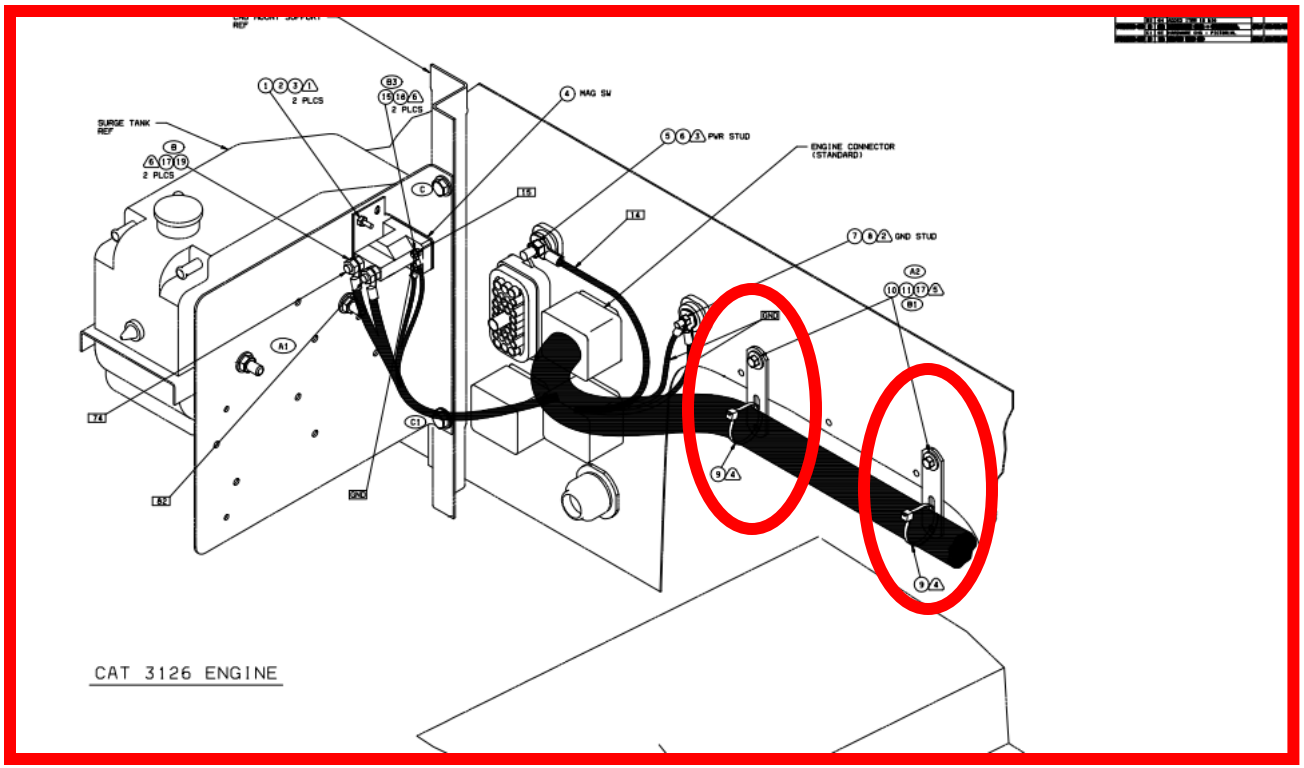
Clearance shown



7. Minor and/or medium damage to cable can be repaired with heat shrink protection as shown. Cable should then be protected with convoluted tubing and secured away from ¼ turn shutoff valve with 50# tensile strength zip ties (part # 23-09796-509). NOTE: If power cable is chafed through coating to copper wire we recommend that it be replaced before the bus is put back into service.



8. Photo shows ¼ turn shutoff valve insulated with heater hose material as an extra precaution and zip ties (circled) and new convoluted tubing applied to cable after repair.



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Reference: This drawing shows the original recommended routing of the harness that follows the chassis cowl behind the engine. There are a couple locations where the part # 23-09796-509 zip ties can be located to keep harness up away from engine movement.

Finally, The FS65 School Bus Maintenance manual recommends checking the following every 12 months:

•Electrical Wiring for insulation damage from chafing or heat.

•Cable connections for corrosion.

•Electrical Center Relays and fuses firmly seated.

•Connections on bulkhead are firmly seated with no corrosion or dirt.

Our hope is that you find this information useful as our goal is to be the best bus vendor in North Carolina. Please call us toll free (1-800-440-3492) if you have any questions as we want to help you any way possible.