Ram Heavy Duty Exterior Lighting Modifications 2019+

Blind Spot Monitoring

We do not recommend modifying rear lighting or removing the bed on pick-ups with blind spot monitoring. The blind spot sensors are located in the rear lighting assembly. Removing them or modifying them will trigger faults or change system functionality.

EXPLANATION OF BULB OUT DETECTION FEATURE

Ram trucks have the ability to perform lighting diagnostics on all exterior lighting circuits except trailer lighting circuits. The Central Body Controller (CBC) controls the lights and the associated diagnostics. The CBC monitors the lighting circuits for overload or short and open circuit conditions by comparing the current load on the circuit to that of the anticipated factory condition load. If a condition causes the load to go outside this predefined range, the CBC will set a diagnostic trouble code (DTC) and may send a notification to the cluster about the bulb that is out of range and/or turn off the output. If the bulb is a turn signal, the cluster will "fast flash" the turn signal indicator of the appropriate turn signal (left or right).

An out of range condition can be created through modification or disconnecting of the exterior lighting circuits. This document will outline what you need to know about avoid this condition and its effects on Ram trucks.

Caution:

Exterior lighting circuits do not have replaceable fuses between the lights and the lighting drivers with the exception of the trailer lighting circuits. The circuits are protected by the solid state drivers in the CBC. Excessive loads placed on the lighting circuit may cause the drivers to turn off. Repeated overloading could cause the drivers to permanently turn off, resulting in expensive repairs. The guidelines in this document must be followed when modifying exterior lighting.

The minimum wire size to ensure proper circuit overload protection should be at least 18 gauge or 0.75mm^2 and rated for a temperature of at least 125^o C (257^o F) such as Cross-link Polyethylene (XLPE) insulation. Larger wire may be required to reduce voltage drop to the load, depending on the length of the circuit.

Do not combine or tie outputs together to feed lamps. Keep the individual outputs feeding the lamps on the respective sides isolated from other drivers, eg. do not hook the left and right tail lamp outputs together to feed multiple tail or running lamps.

REAR BULB OUT DETECTION DISABLING

Note: NHTSA requires turn signal bulb out detection on some vehicle configurations. It is the upfitter's responsibility to confirm that the vehicle is complaint with FMVSS 108 when delivered to the end user.

In order to prevent pop ups and DTCs related to rear lighting, bulb out detection must be disabled. Disabling bulb out detection will also eliminate any existing DTCs and pop ups that may have already occurred.

For 2019 model year, certain Ram truck configurations will have bulb out detection disabled from the factory on REAR FACING LIGHTING ONLY. These configurations are as follows:

- All XBC sales code which includes all 3500, 4500 and 5500 cab chassis
- All box delete 2500 and 3500 pickups (sales code XBC)

For all other configurations, the following options are available to disable bulb out detection on REAR FACING LIGHTING ONLY.

METHOD A – RECOMMENDED

Have rear bulb out detection disabled at an authorized dealer. If your dealer is not familiar with this procedure, inform them that the sales code LB6 must be added to the vehicle using the "Vehicle Option Updates" tool. Once the sales code is associated to you VIN, a vehicle reconfiguration must be performed with a service tool to update the truck.

METHOD B

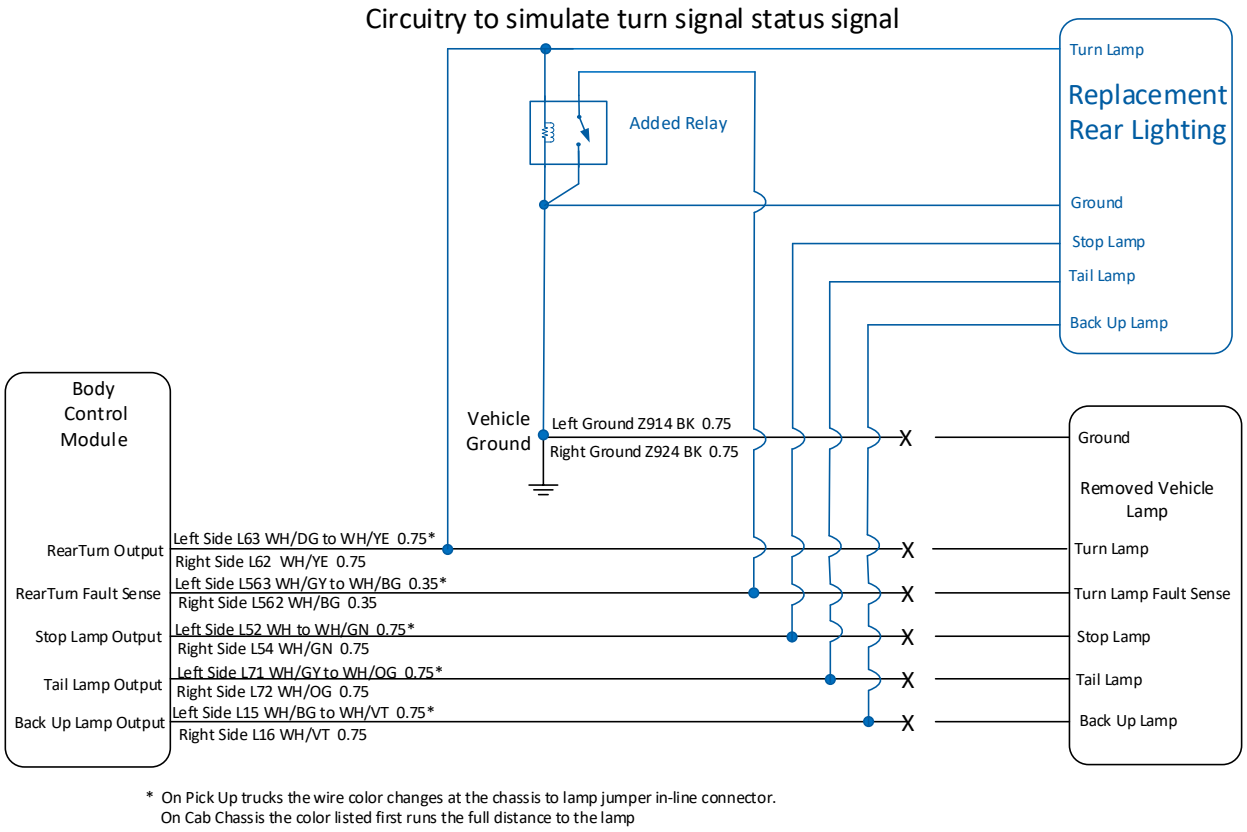
Vehicles equipped with a VSIM --- Circuit W509 (WH/BN) Pin 4 of the green VSIM connector will disable bulb out detection on rear facing lights when it is grounded. Rear facing lighting includes: stop/turn lights, backup lights, CHMSL light (when equipped), and rear park lights.

METHOD C (INCANDESENT TURN SIGNALS ONLY)

On incandescent bulb turn signals only ---Adding 10 Ohm 50 Watt Resistors in parallel to each of the Brake/Turn lamp circuits to ground if using LED's, will prevent active turn signal lamp outage faults. Running lamps and Reverse lamps should function without resistors.

Method D (led rear lighting)

On vehicles with LED rear lighting and whithout a VSIM (refer to METHOD B) or not adding the sales code LB6 (refer to METHOD A), a relay will need to be wired into the circuitry to simulate the original equipment turn signal status signal if the original equipment lamps are removed and replaced. The circuit provides a ground signal to the Body Control module that coincides whent the respective turn signal is on. There will need to be a separate relay and signal for each side of the vehicles rear turn signals. Refer to the diagram below. Added circuitry in **BLUE.**



* On Pick Up trucks the wire color changes at the chassis to lamp jumper in-line connector.
On Cab Chassis the color listed first runs the full distance to the lamp

Modifying Exterior Rear Lighting on Ram Trucks

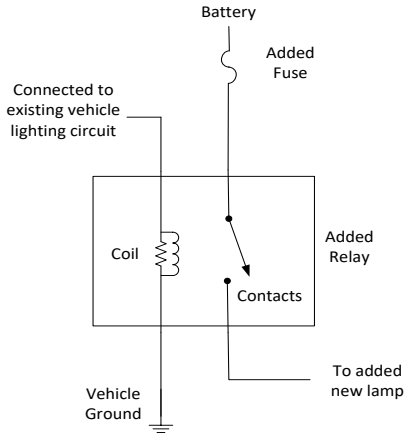
Once bulb out detection has been disabled, the OEM lighting can be replaced with aftermarket components as long as the overall load of the lighting doesn't exceed the max current rating of the circuit. The table below shows the max current ratings for each of the lighting outputs.

Maximum Allowable Electrical Load Per Lighting Output (Rear Lighting) 2019+ Model Year	Current (Amperes)
BACKUP-REVERSE LAMP LEFT	3.7 bulb equipped, 1.8 LED equipped
BACKUP-REVERSE LAMP RIGHT	3.7 bulb equipped, 1.8 LED equipped
BED LIGHT	1.36
CENTER HIGH MOUNTED STOP LAMP (CHMSL)	2.5 bulb equipped, 0.7 LED equipped
LICENSE PLATE LAMPS	1.3 bullb equipped, 0.7 LED equipped
REAR TAIL LAMP LEFT	1.3
REAR TAIL LAMP RIGHT	1.3
CLEARANCE LAMPS, DUALLY MARKER LAMPS, TAILGATE LIGHT BAR (15A FUSE 70% MAX CONTINUOUS)	10.5
SIDE REPEATER LEFT	0.54
SIDE REPEATER RIGHT	0.54
STOP-TURN SIGNAL LEFT	3.0 bulb equipped, 1.8 LED equipped, 3.7 Chassis Cab
STOP-TURN SIGNAL RIGHT	3.0 bulb equipped, 1.8 LED equipped, 3.7 Chassis Cab
AUXLIARY STOP LAMP SIGNAL / CHMSL FEED (L56 - refer to Blunt Cut Wires in the Upfitter Circuit Schematics)	2.8

Trailer Tow Lighting Outputs are fed by 20A fuses - Recommended Maximum Continuous load is 70% of the fuse rating, or 14A.	
TRAILER TOW RIGHT STOP-TURN (BLUNT CUT WIRE CHASSIS CAB - TRAILER CONNECTOR ON PICK-UP)	14
TRAILER TOW LEFT STOP-TURN (BLUNT CUT WIRE CHASSIS CAB - TRAILER CONNECTOR ON PICK-UP)	14
TRAILER TOW PARK/TAIL LAMP (BLUNT CUT WIRE CHASSIS CAB - TRAILER CONNECTOR ON PICK-UP)	14
TRAILER TOW BACK UP LAMP (BLUNT CUT WIRE CHASSIS CAB - TRAILER CONNECTOR ON PICK-UP)	14

Note that these ratings are separate for the left and right circuits, but the wires CANNOT BE PHYSCIALLY COMBINED to double the max continuous current rating. Instead, left side lighting should be wired to the left side circuitry and right to the right to take full advantage of the current maximums on each sides of the vehicle.

If these ratings are insufficient to support the desired lighting, a relay must be used. The diagram below shows and example of how the relay should be wired to power additional lighting.



OVER CURRENT (SHORT) CONDITIONS

The body controller will consider any load that exceeds the limits above to be a short circuit. This can be caused by placing to many lights on a signal circuit, installing to large of a light, or connecting the lighting circuit directly to ground. When this occurs, the CBC will turn off the overloaded lighting circuit in order to protect its hardware from failure. If it is determined with a volt meter, test light, or other means that a lighting output has been disabled, it can be re-enabled by eliminating the load condition causing the short and cycling the ignition off and back to run. If cycling the ignition doesn't re-enable the circuit, then it's possible that that driver on the CBC has been permanently damaged.

Note that an over current situation may not be encountered until the vehicle's engine is running. This is because the vehicle's charging system will increase the battery voltage when the engine running. Increasing voltage will increase current draw of the load, potentially triggering short circuit detection.

RE-ENABLING BULB OUT DETECTION

If it is determined that bulb out detection must be re-abled ensure that the OEM lighting, or lighting with an equivalent load has been installed before following the steps below. Failure to do so will result in DTCs and possible faults displaying in the cluster.

METHOD A

If this method was followed to disable bulb out detection, or if you vehicle came from the factory with bulb out detection disabled, an authorized dealer can enable bulb out detection on your vehicle. If your dealer is not familiar with this procedure, inform them that the sales code 5QR must be added to the vehicle using the "Vehicle Option Updates" tool. Once the sales code is associated to you VIN, a vehicle reconfiguration must be performed with a service tool to update the truck.

METHOD B

If method B was used to disabled bulb out detection, simply unground the VSIM wire and isolate the wire used to make the ground connection.

FORWARD FACING LIGHTING

Modification of the forward facing lighting and its associated circuitry is not advised. For 2015 and beyond, snow plow upfits should make used of the dedicated snow plow wiring found under the power distribution center. See Snow Plow Installation for more details.