Headlight Door Circuit

The following explanation of the headlight motor circuit was developed with help from SOBill. Please provide comments if any of this is not clear.

The headlight motor control circuit includes the use of a Double Pole Double Throw (DPDT) relay to reverse the flow of current to the motor to open and close the headlight doors. A DPDT relay switches two independent input contacts to selectively connect to two independent pairs of output contacts. In this instance, a first relay input contact is connected to +12V controlled by the IGNITION SWITCH. Whenever the IGNITION SWITCH in is RUN or ACC, +12V is present on this contact. A second relay input contact is always connected to ground. The relay is switched by the HEADLIGHT SWITCH. When the HEADLIGHT SWITCH is in the OFF or PARKING LAMP position, 0V is sent to the relay, and the first relay input contact (+12V) connects to a first Normally Closed (NC) output contact and the second relay input contact (ground) connects to a second NC output contact. When the HEADLIGHT SWITCH is in the ON position, +12V is sent to the relay, and the first relay input contact (+12V) connects to a first Normally Open (NO) output contact and the second relay input contact (ground) connects to a second Normally NO output contact.

Please note that whenever the IGNITION SWITCH is in RUN or ACC, +12V is provided to the relay. Whether or not the headlight motor is running is determined by the ground circuits through the up and down limit switches. Basically, the relay controls the +12V OPENING and CLOSING power signal, and the switches open and close the ground portion of the circuit.

FIG. 1 shows the circuit in the door opening position. The IGNITION SWITCH is in the RUN or ACC position (+12V on the first relay input) and the HEADLIGHT SWITCH is in the HEADLAMPS position. The relay receives +12V and connects the +12V through the first NO contacts to the BR wire to the motor and the ground path travels through the Y wire to the closed UP LIMIT SWITCH and back through the second NO contact of the relay, and to ground.

FIG. 1A shows only the active circuit elements of FIG. 1 for simplification.

FIG. 2 shows the circuit in the door open position. The IGNITION SWITCH is in the RUN or ACC position (+12V on the first relay input) and the HEADLIGHT SWITCH is in the HEADLAMPS position. The relay receives +12V and connects the +12V through the first NO contacts to the BR wire to the motor, but now the UP LIMIT SWITCH is open so the path to ground is open and the motor is off.

FIG. 3 shows the circuit in the door closing position. The IGNITION SWITCH is in the RUN or ACC position (+12V on the first relay input) and the HEADLIGHT SWITCH is in the OFF position. The relay receives +12V and connects the +12V through the first NC contacts to the Y wire to the motor and the ground path travels

through the BR wire to the closed DOWN LIMIT SWITCH and back through the second NC contact of the relay, and to ground.

FIG. 3A shows only the active circuit elements of FIG. 3 for simplification.

FIG. 4 shows the circuit in the door closed position. The IGNITION SWITCH is in the RUN or ACC position (+12V on the first relay input) and the HEADLIGHT SWITCH is in the OFF position. The relay receives +12V and connects the +12V through the first NC contacts to the Y wire to the motor, but now the DOWN LIMIT SWITCH is open so the path to ground is open and the motor is off.

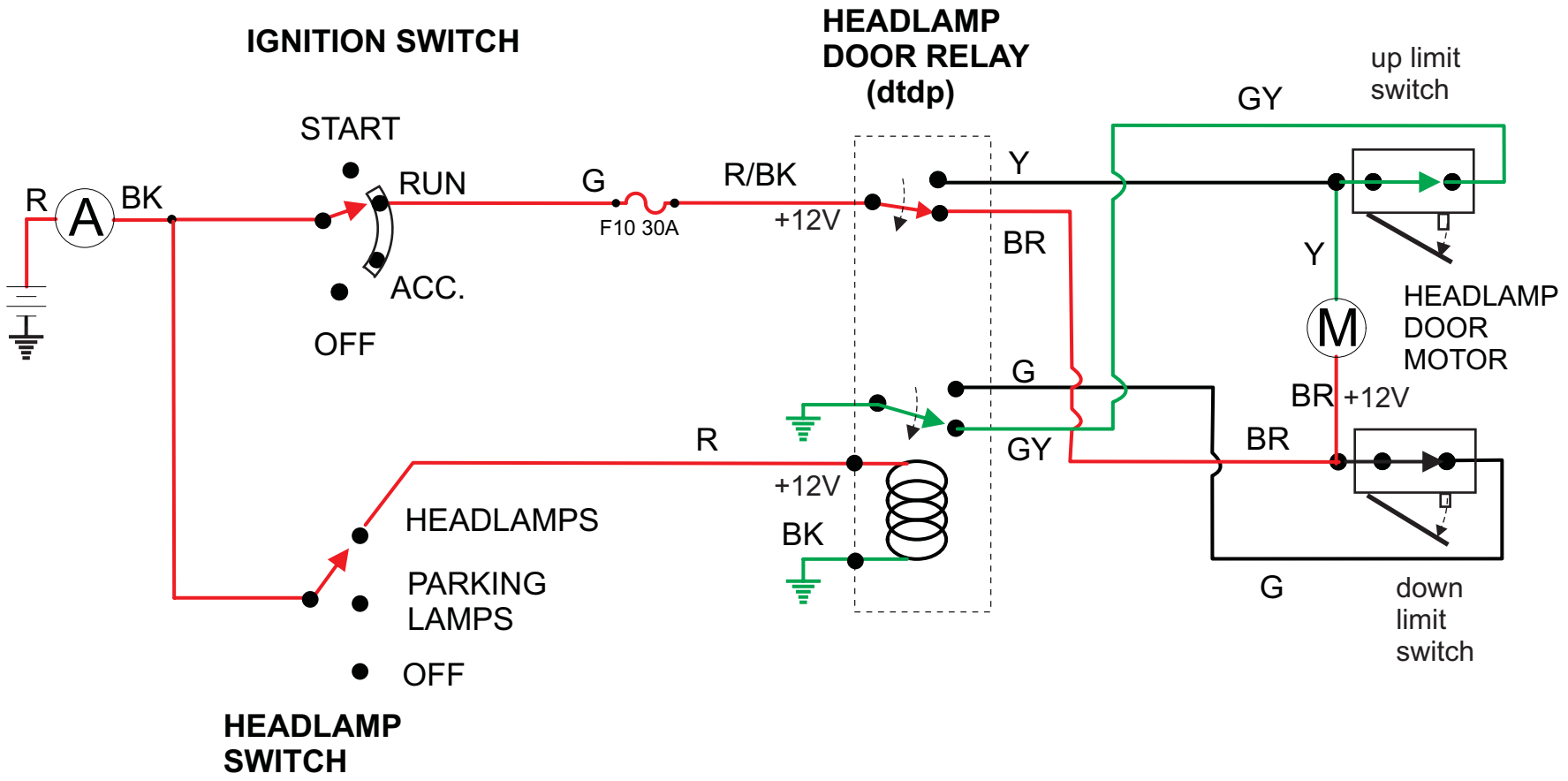

FIG. 1, HEADLAMP DOORS OPENING

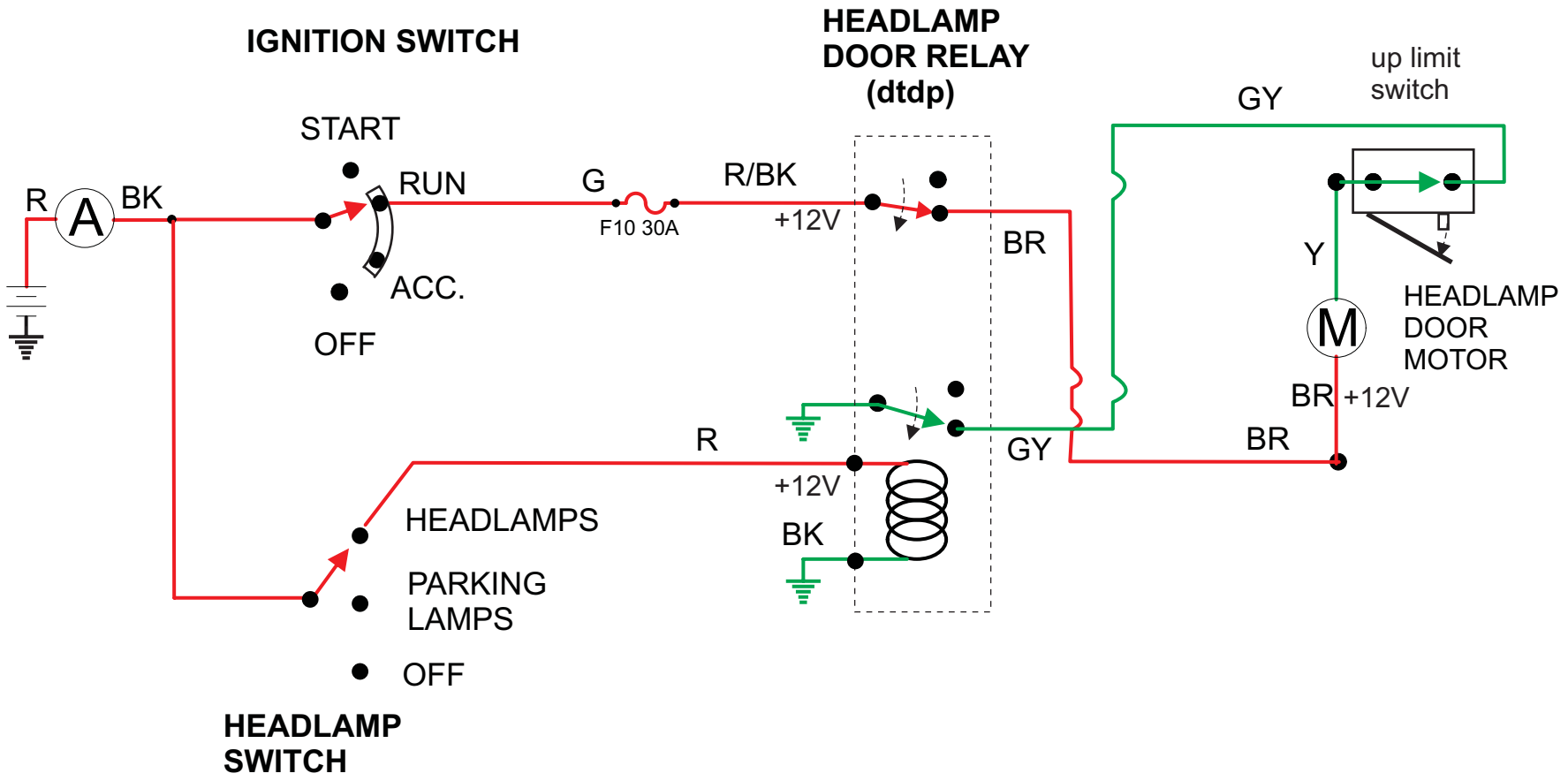

FIG. 1A, HEADLAMP DOORS OPENING

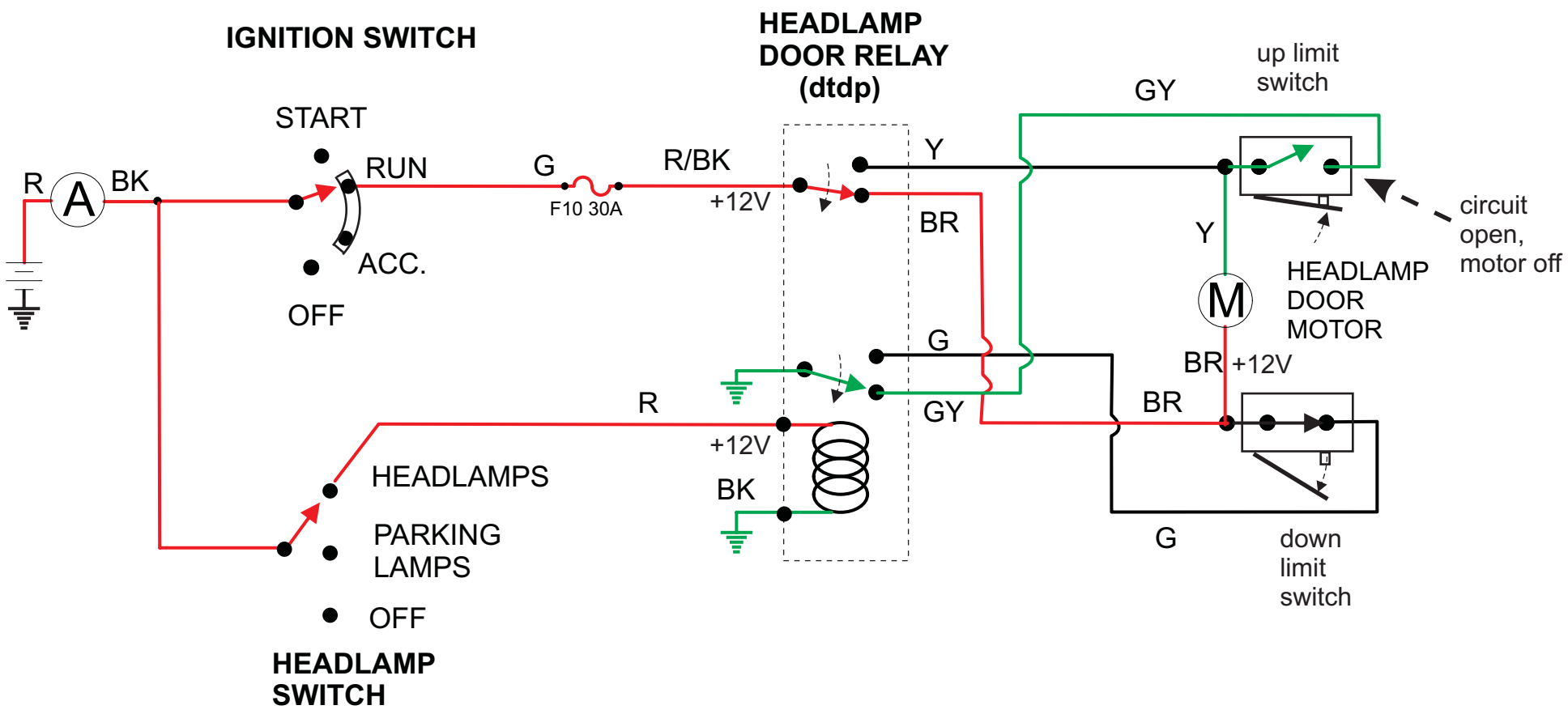

FIG. 2, HEADLAMP DOORS OPEN

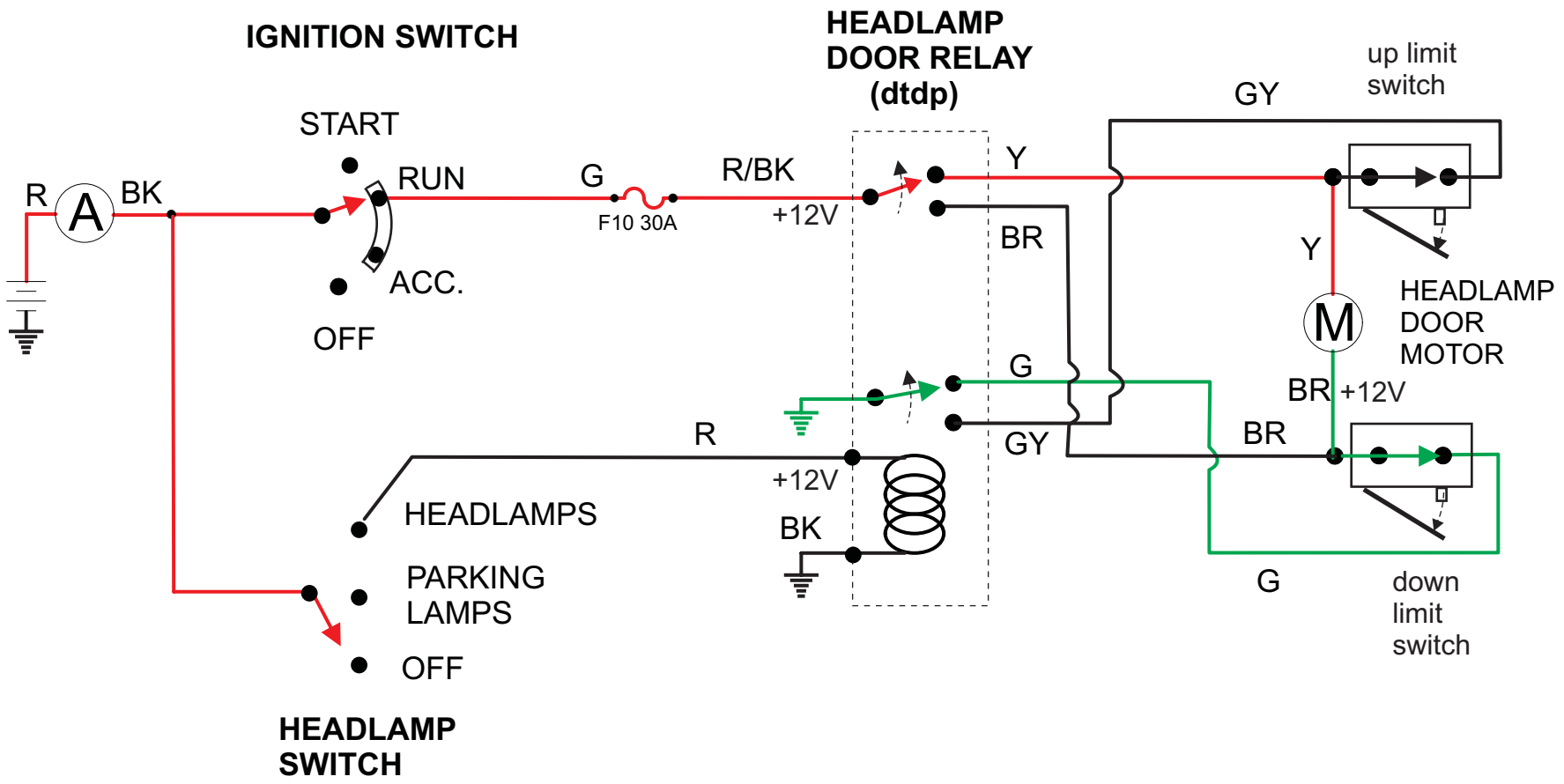

FIG. 3, HEADLAMP DOORS CLOSING

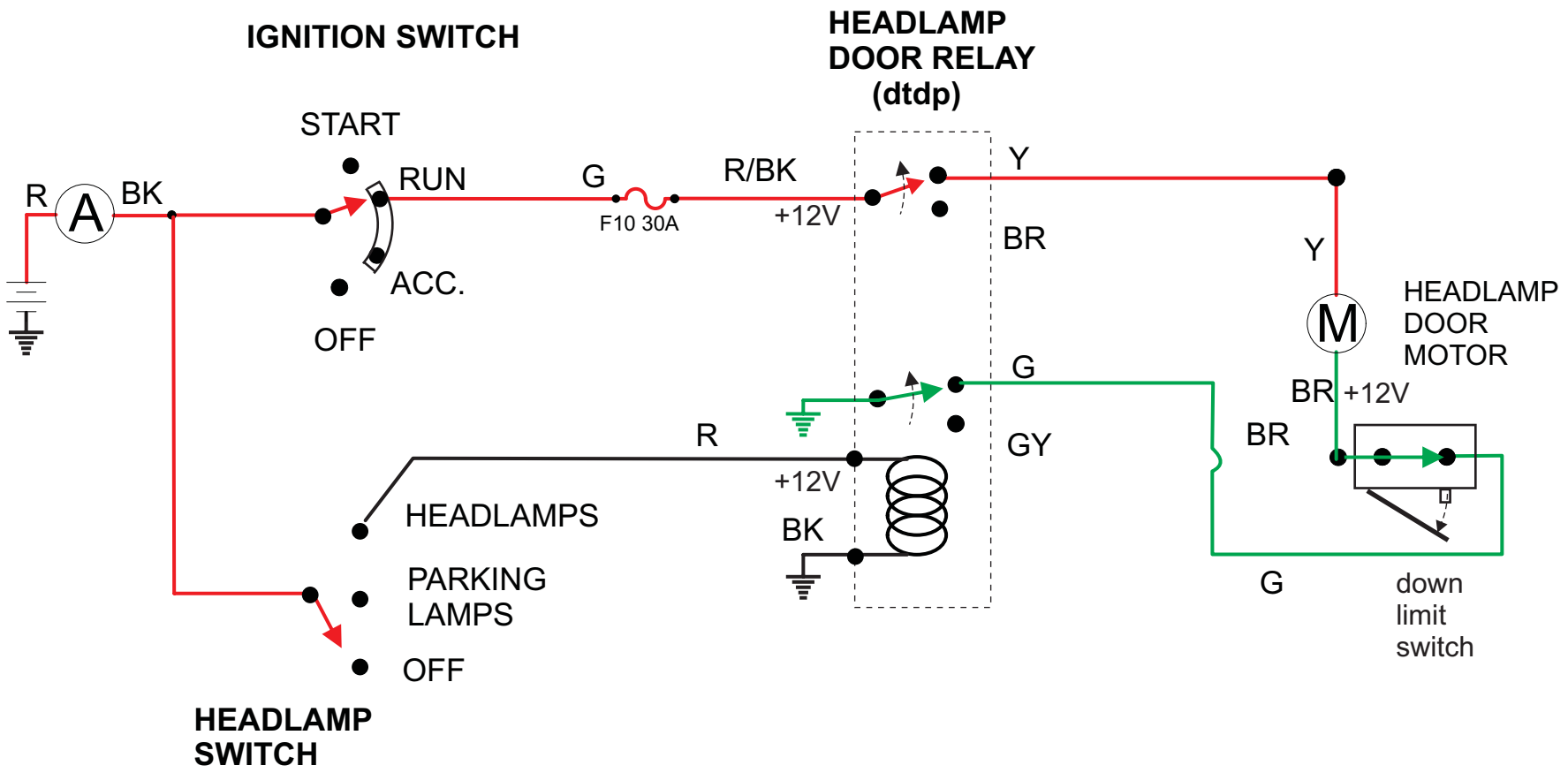

FIG. 3A, HEADLAMP DOORS CLOSING

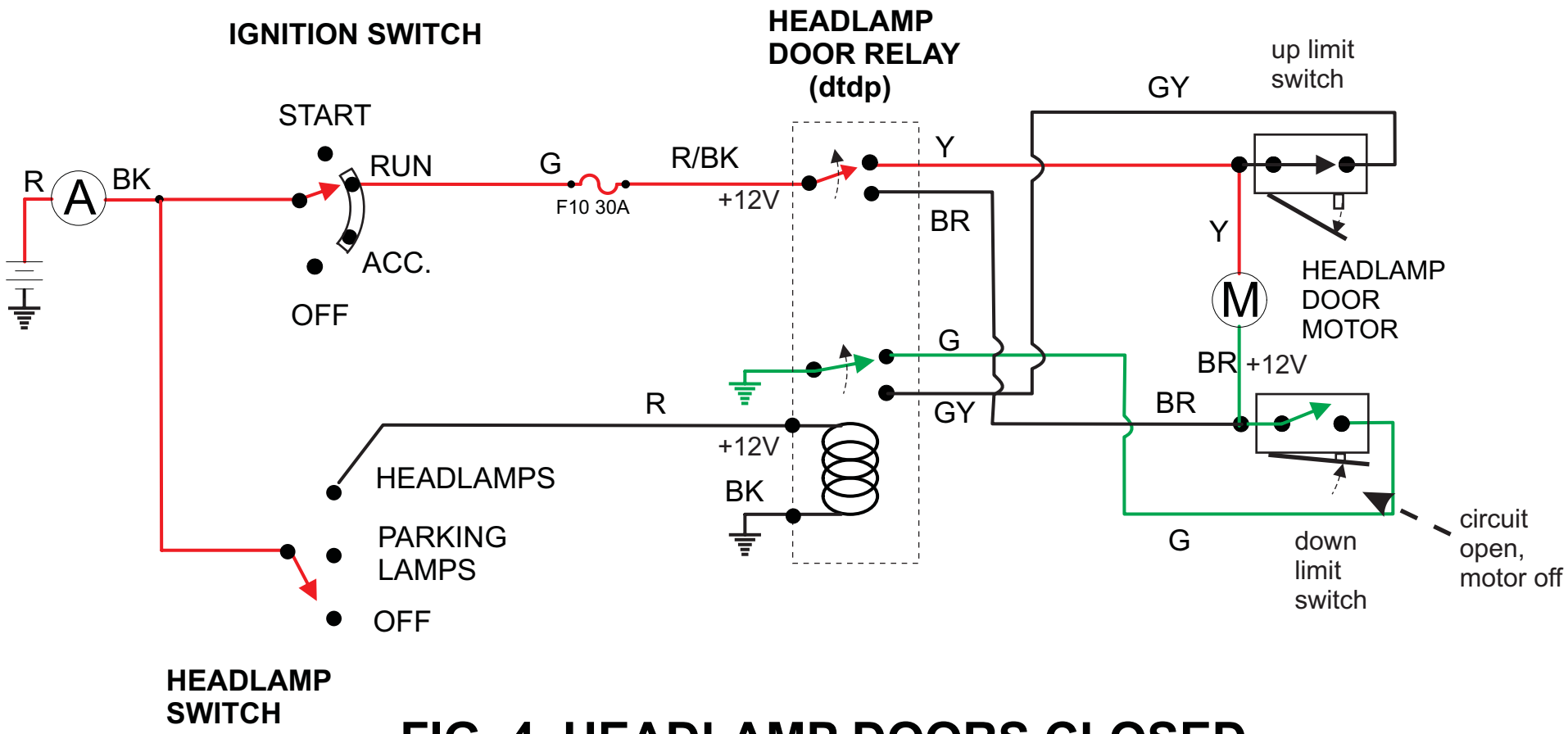

FIG. 4, HEADLAMP DOORS CLOSED

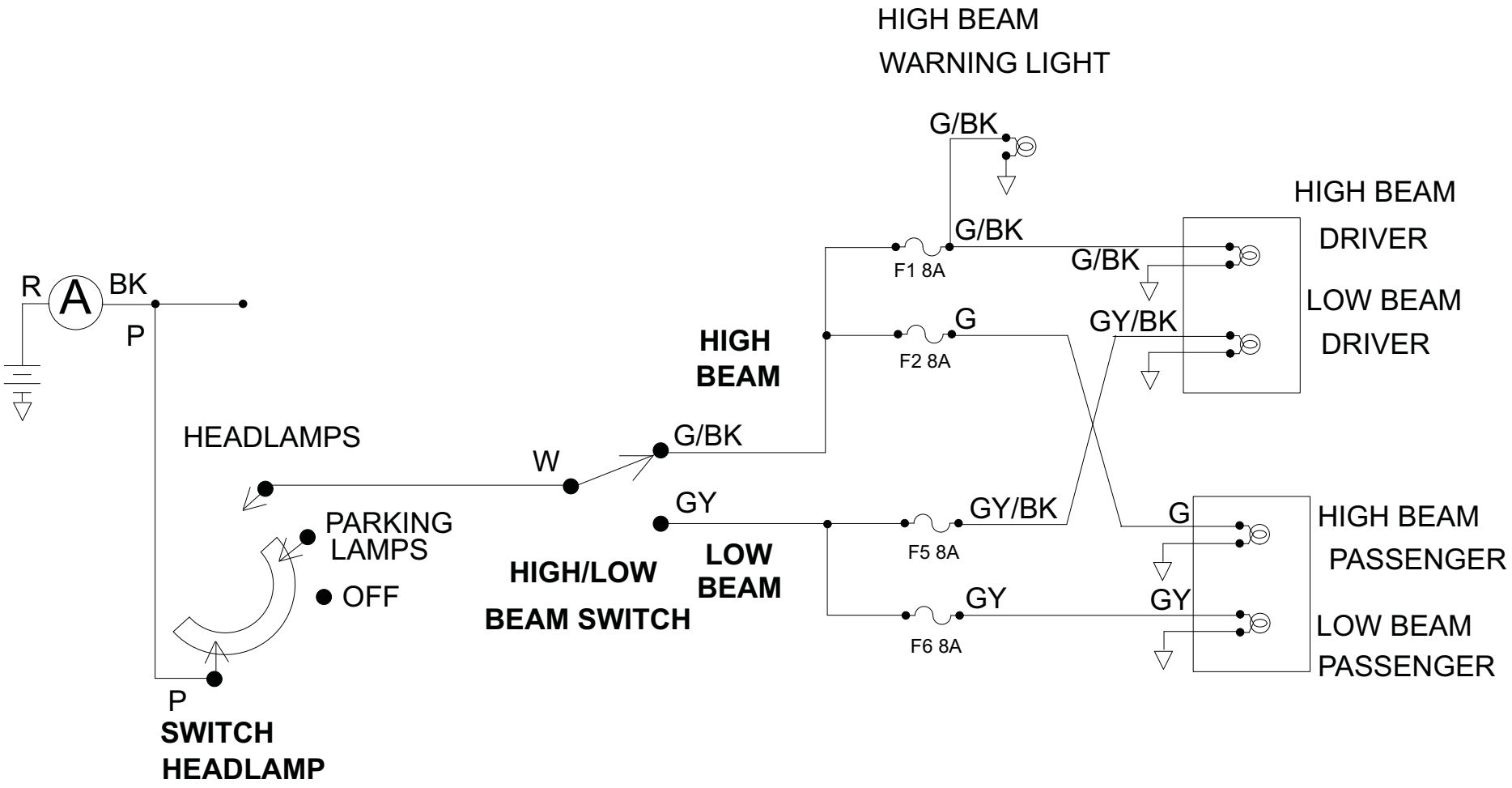

FIG. 5, HEADLAMPS