

General Description (See Fig. 1)

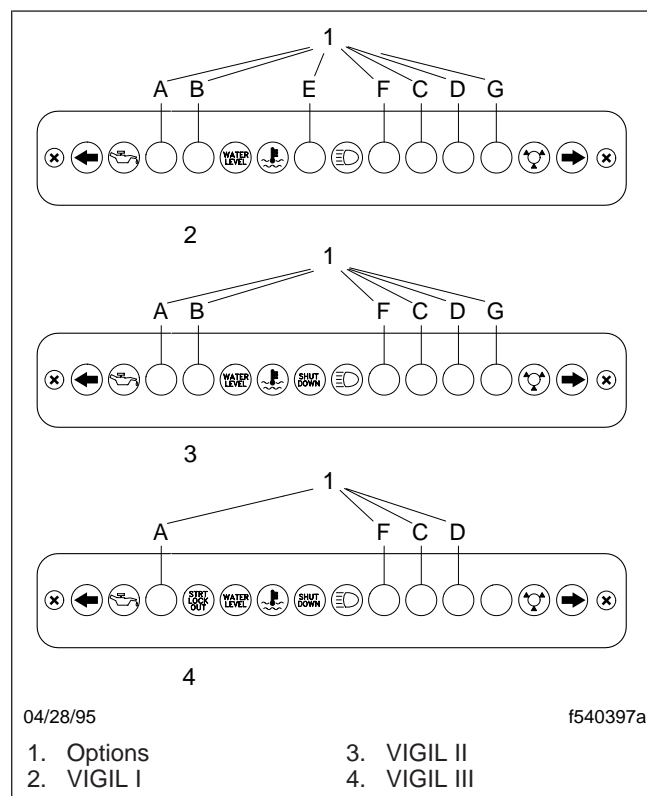


Fig. 1, VIGIL Lightbar Models

The Freightliner VIGIL system consists of a solid-state lightbar located in the instrument panel above the speedometer and tachometer, and the wiring circuits needed to monitor vehicle operations. There are three models of VIGIL:

- VIGIL I
- VIGIL II
- VIGIL III

All models include the following functions:

- Turn Signal Indicators
- High Beam Indicator
- Low Oil Pressure Warning
- Low Air Pressure Warning
- Low Coolant Level Warning
- High Coolant Temperature Warning

VIGIL I activates a warning light and/or buzzer when any of the above impending engine or brake failure conditions occur, but VIGIL I does not shut down the engine.

VIGIL II activates a warning light and buzzer when an impending engine or brake failure condition occurs, and shuts down the engine by stopping fuel flow if the condition worsens. Earlier models of VIGIL II have DIP switches that allow the vehicle operator to cancel the automatic engine shutdown feature and use the lightbar as a warning system only.

VIGIL III includes the warning and engine shutdown features of VIGIL II, plus an automatic starter lock-out to protect the starter from overheating and from being engaged into a running engine, a road speed governor to prevent the operator from driving above a pre-set speed, and an overspeed indicator light.

The overspeed indicator light serves two purposes. First, it indicates if the road speed governor or the speedometer sensor is malfunctioning or has been disconnected. If the vehicle is driven for two minutes at 5 mph (8 km/h) faster than the maximum speed allowed by the road speed governor, or if the engine maintains 1700 rpm for 15 minutes with no speedometer reading, the overspeed light will come on and stay on until the engine is shut down. Until it is cleared, the light will flash on for ten seconds each time the engine is started.

The light should not be cleared until the road speed governor and the speedometer sensor have been checked and repaired as needed. For instructions, see [Subject 115](#).

The overspeed indicator light also comes on to indicate the vehicle is being driven faster than a preset speed. That speed can be less than, equal to, or greater than the maximum speed for the road speed governor. Once the vehicle slows to below the preset speed, the light goes out.

The engine shutdown feature on both VIGIL II and VIGIL III has an automatic override: if the vehicle must be moved to a safe place after shutdown, crank the engine and it will run for about 30 seconds before shutting down again.

In addition, VIGIL III has six outputs for driving the speedometer, odometer, trip recorders, fuel economy gauge, or satellite navigation device with vehicle speed information from the same transmission-mounted magnetic sensor.

General Information

Besides the standard warning, shutdown, and engine control features described above, the VIGIL systems may include indicator lights for the following optional features:

- Transmission Temperature
- Fifth Wheel Lock
- Utility Light
- Sludge Ejector
- Alternator No Charge
- Engine Heater
- Mirror Heater
- Sand
- Axle Temperature
- Parking Brake
- Cruise Control
- PTO

NOTE: Except for the high beam and turn signal indicators, none of the other lightbar lights stay on when the ignition is switched off. An operator will have to make sure that non-ignition controlled options such as heated mirrors and utility lights are shut off.

Identification (See Fig. 1)

To determine which VIGIL system is in a vehicle, first turn on the key. If the low air and low oil pressure warning lights and the buzzer come on until system air and oil pressures build to operating levels, the lightbar is VIGIL I.

If the lights and the buzzer come on for two one-second pulses, the system is VIGIL II or III. This is a self-check of the lightbar. The low air and oil pressure lights will stay on, but the buzzer will not come on again until the starter button is pressed. When the starter button is pressed, the low air and oil pressure lights and the buzzer will stay on until the system air and oil pressures build to operating levels. If this is the case, examine the lightbar. If it includes lights for the starter lock out or road speed governor the system is VIGIL III. If not, it's VIGIL II.

If there is a heavy frame around the lightbar face and the warning buzzer doesn't sound until the starter

button is pressed, the system is a Kysor VIP. For more information, see [Section 54.06](#).

Principles of Operation

The warning lights and buzzer in the Freightliner VIGIL system are activated by switches that control three types of circuit: floating-activated, ground-activated, or power-activated.

On a floating-activated circuit like the air pressure circuit, the switches are normally open. During operation, air pressure holds the switches closed and grounds the circuit. If the air pressure drops below a critical level, the switches return to their normally open state, the circuit loses ground, and the warning light and buzzer activate.

On ground-activated and power-activated circuits, the switches are normally closed. During operation, the switches open and respond to changes in vehicle operating conditions by returning to their normally closed positions. The ground-activated circuit grounds, while the power-activated circuit connects with a 12-volt power source. In either case, the warning light and buzzer activate.

ENGINE WARNING AND SHUTDOWN SYSTEMS

The low air pressure warning circuit is a floating-activated circuit controlled by two low-air-pressure switches, one in the primary air system and one in the secondary air system. Both switches are held closed by air pressure greater than 64 psi (440 kPa). If pressure in either the primary or secondary air system falls, the applicable switch opens, the circuit loses ground, and the warning light and buzzer come on.

The low oil pressure warning and shutdown systems use floating-activated circuits, like those for the low air pressure warning system. For this warning circuit, oil pressure holds a switch closed and grounds the circuit via wire 34. When oil pressure drops below a pre-set level, the switch opens, the circuit loses ground, and the warning light and buzzer come on.

If equipped with the shutdown feature, the engine will shut down when oil pressure drops further. A similar switch on wire 325 opens, the shutdown circuit loses ground, and the VIGIL system interrupts fuel delivery to the engine.

The coolant level sensor also controls a floating-activated circuit by grounding wire 173 through the engine coolant in the radiator. If the coolant level drops below the sensor, the circuit loses ground and activates the warning light and buzzer. To prevent a false alarm caused by sloshing coolant, the sensor must be exposed for five seconds before it activates the lightbar alarms. In VIGIL II or III, the engine will shut down if the sensor is exposed for 30 seconds.

The coolant temperature circuit in VIGIL I and II uses a different type of switch to ground its floating-activated circuit. This switch (alarmstat in VIGIL II) is normally closed, and opens as the coolant temperature rises above 215°F (101°C). The circuit loses ground, and the warning light and buzzer come on.

NOTE: On vehicles equipped with a Cummins M11 or N14, the coolant temperature switch opens at 220°F (104°C).

If equipped with the shutdown feature, the engine will shut down when coolant temperature reaches 220°F (104°C) and the switch that grounds wire 324 opens. Cummins M11 and N14 engines, however, are set to shut down when coolant temperature reaches 225°F (107°C).

The coolant temperature circuit in VIGIL III uses a thermistor (variable resistor) that changes resistance as the coolant around it changes temperature. The lightbar monitors the thermistor resistance, and uses that information to determine the coolant temperature. When the resistance indicates the coolant is above a predetermined temperature, the lightbar activates the coolant temperature warning light.

If thermistor resistance indicates the coolant temperature has continued to rise above a second predetermined temperature, the lightbar shuts down the engine.

The road speed governor in VIGIL III allows the vehicle's maximum speed to be set anywhere between 45 and 85 mph (72 and 137 km/h). This maximum speed is set at the factory according to the buyer's specifications, and the vehicle must be returned to a Freightliner dealer for resetting the road speed governor.

When the vehicle reaches the maximum speed, the lightbar activates the road speed governor relay through wire 351. The relay closes and activates the road speed governor solenoid through wire 251G. The solenoid constricts fuel delivery pressure from

about 100 psi (690 kPa) to about 20 psi (140 kPa). Excess fuel is returned to the fuel tank through the fuel return line. There is a 2 mph (3 km/h) lag in the system, for example: if the maximum speed were set at 62 mph (100 km/h), the governor would cut fuel pressure at 62 mph (100 km/h) and return pressure to normal at 60 mph (97 km/h).

STARTER LOCK OUT (VIGIL III)

VIGIL III protects the starter by preventing cranking if any of the following conditions exist:

- A. Voltage at the key switch is greater than 18 volts.
- B. Voltage at the key switch is less than 9 volts before the starter button is pressed.
- C. If the starter button has been pressed within two seconds (this prevents the starter cranking the engine as the engine is rocking back from a previous start attempt).
- D. When engine speed exceeds 350 rpm (to prevent engaging the starter with the engine running).
- E. If the starter has been cranking for a total of 30 seconds within a one-minute period. (The starter button is locked out for two minutes to allow the starter to cool).

NOTE: The starter lock-out warning light will be lit during the two-minute cooling period after 30 seconds of cranking; otherwise, it will light while the starter button is pushed within two seconds of a previous start attempt.

TURN SIGNALS

See **Fig. 2** for the turn signal circuits.

With a left turn selected, wire 314 is connected through the turn signal switch to wire 60, the tractor left front turn signal and trailer left turn signal, and to wire 38B, the tractor left rear turn signal.

Wire 350 connects with wire 314, so wire 350 is grounded through the turn signal bulbs. The lightbar gives a pulsing ground to wire 326. Wire 326 is grounded whenever the pulse is on.

The flasher relay already has voltage from wire 37, which comes from the battery via a 20-amp circuit breaker. When the flasher relay is grounded through wire 326 and the VIGIL lightbar, the flasher relay

General Information

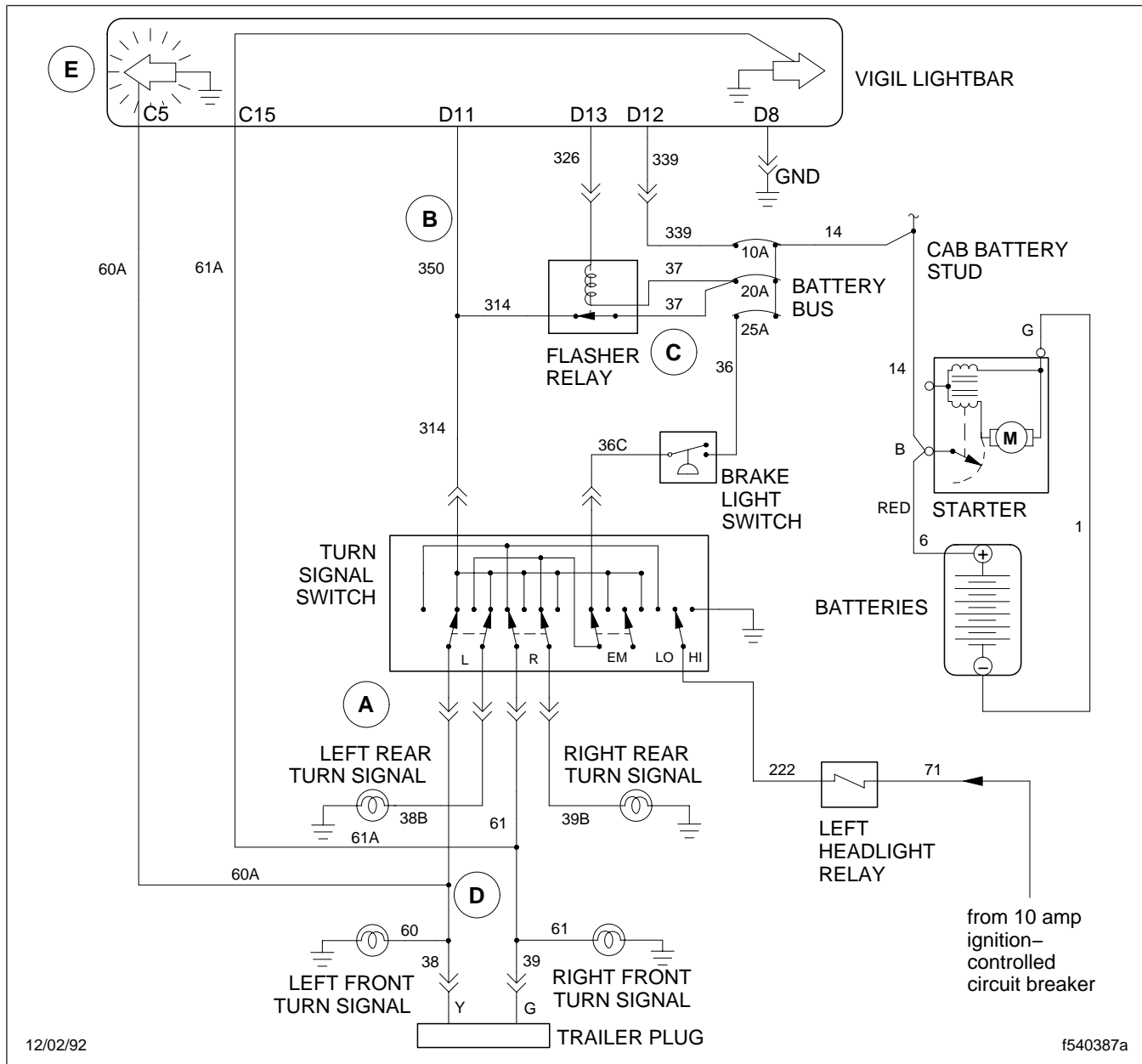


Fig. 2, Turn Signal Circuits

closes and connects wire 37 to wire 314, sending voltage to the signal bulbs.

The voltage in wire 60 that turns on the bulb also reaches wire 60A through the junction of those two wires. Through wire 60A, the voltage reaches the lightbar and causes the left turn indicator arrow in the lightbar to light up.

Wire 339, which is a battery circuit, also provides power to the lightbar. This allows the turn signals and four-way flashers to work even when the ignition is off.