Introduction

This manual provides information needed to operate and understand the vehicle and its components. More detailed information is contained in the *Owner's Warranty Information for North America* booklet and in the vehicle's workshop and maintenance manuals.

Custom-built Cargo vehicles are equipped with various chassis and cab components. Not all of the information contained in this manual applies to every vehicle. For details about components in your vehicle, refer to the chassis specification pages included in all new vehicles and to the vehicle specification decal, located inside the vehicle.

For your reference, keep this manual in the vehicle at all times.

IMPORTANT: Descriptions and specifications in this manual were in effect at the time of printing. Freightliner LLC reserves the right to discontinue models and to change specifications or design at any time without notice and without incurring obligation. Descriptions and specifications contained in this publication provide no warranty, expressed or implied, and are subject to revisions and editions without notice.

Environmental Concerns and Recommendations

Whenever you see instructions in this manual to discard materials, you should first attempt to reclaim and recycle them. To preserve our environment, follow appropriate environmental rules and regulations when disposing of materials.

Event Data Recorder

This vehicle is equipped with one or more devices that record specific vehicle data. The type and amount of data recorded varies depending on how the vehicle is equipped (such as the brand of engine, if an air bag is installed, or if the vehicle features a collision avoidance system, etc.).

Customer Assistance Center

Having trouble finding service? Call the Freightliner Customer Assistance Center at 1-800-385-4357 or 1-800-FTL-HELP, or the Sterling Customer Assistance Center at 1-800-785-4357 or 1-800-STL-HELP. Call night or day, weekdays or weekends for dealer referral, vehicle information, breakdown coordination, or Fleetpack assistance. Our people are knowledgeable, professional, and committed to following through to help you keep your truck moving.

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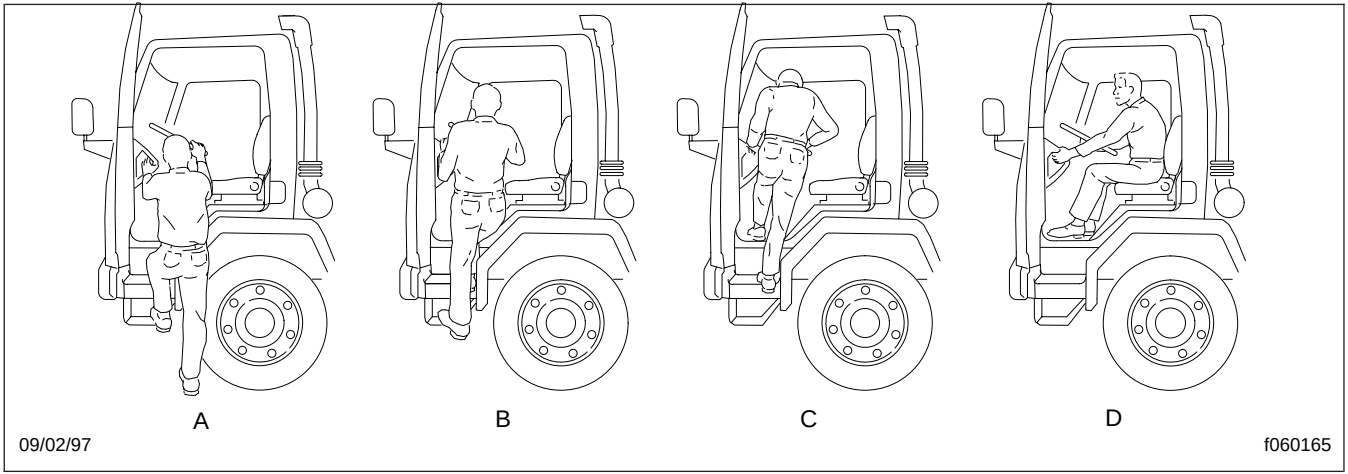


Fig. 2.3, Driver's Side Steps and Grab Handle

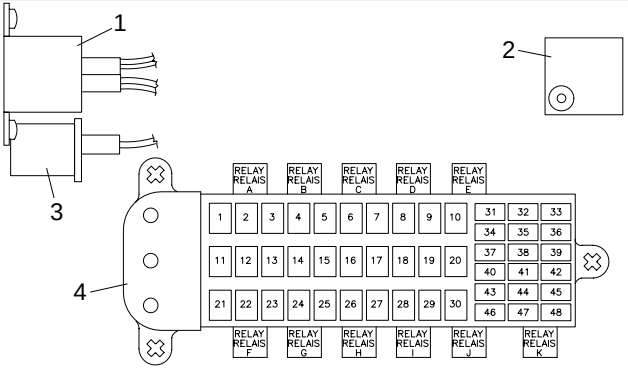
5. Place your right foot into the cab and seat yourself (Ref. D).
6. To exit the cab on the driver's side, grasp the instrument panel grab handle with your left hand and the steering wheel with your right hand.

IMPORTANT: Do not attempt to exit the cab while carrying any items in your hand.

7. Place your right foot on the top step.
8. Bring your left foot to the bottom step.
9. Bring your right foot down to the ground, then bring your left foot down to the ground.

Passenger's Side Entry and Exit

When entering or exiting the passenger's side of the cab, use the grab handles and access steps as follows, refer to **Fig. 2.4**.



1. Signal Flasher (located at upper left of fuse panel)
2. Warning Chime (located at right side of fuse panel)
3. Warning Buzzer (located at lower left of fuse panel)
4. Fuse/Relay/Circuit Breaker Panel

Fig. 2.13, Fuse/Relay/Circuit Breaker Identification

To Tilt the Cab

WARNING

Do not release the cab until the transmission has been put into neutral, the ignition turned off, and the parking brake set. Failure to observe these precautions could result in serious personal injury.

WARNING

Do not allow loose clothing to get near moving engine parts. To do so could result in serious personal injury.

CAUTION

Ensure the shift lever will clear the floor opening when the cab is tilted to prevent damage to the shift lever.

Do not raise the cab until all loose items inside the cab are removed or fastened down and the doors are closed. If the cab is equipped with exterior air lines, be sure the air lines will be clear of the body lock.

1. Apply the parking brakes and chock the tires.
2. The handle for the cab lock control is located on the lower front face of the driver's seat (**Fig. 2.14**). Remove the handle from the housing.
3. Insert the cab lock handle in the lock control located on the passenger's side of the rear cab panel (**Fig. 2.15**). Push the safety hook knob inward, then rotate the handle counterclockwise and pull the handle outward. The handle will still be engaged.

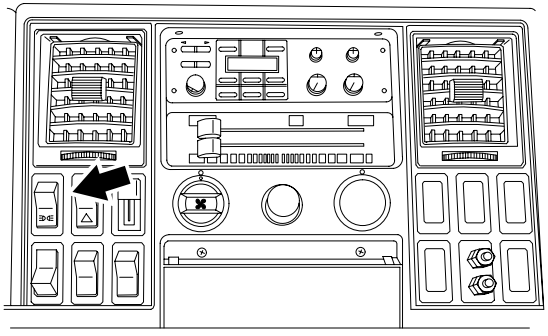


Fig. 3.8, Interrupt Switch

lights will come on and stay on as long as the problem exists.

If the yellow engine check light comes on while driving, some engine features will not work, but the vehicle can still be driven. If the red engine stop light comes on while driving, and if the engine will not accelerate, pull off the road and shut down the engine. In either situation, have the problem repaired as soon as possible. See **Group 54** in the *Cargo Workshop Manual* for troubleshooting procedures.

Cruise control and PTO governor are controlled with two switches. An ON/OFF switch allows the driver to select cruise control or to drive using the foot throttle. A spring-loaded SET/RESUME switch allows the driver to select the cruise speed or to resume the cruise speed after slowing down.

The power takeoff mode of operation is also controlled with the cruise control switches, when the vehicle is stationary. The engine speed can be set in the 800 to 1600 rpm range by placing the ON/OFF switch in the ON position, then pressing the SET/RESUME switch when the desired rpm is reached. See **Chapter 4** for detailed operating instructions.

Parking Brake Control Valve Knob

A diamond-shaped knob in the control panel operates the parking brake control valve. See **Fig. 3.9**. When the knob is out, the truck's spring parking brakes are applied. When the knob is in, the parking brakes are released. Before the parking brakes can be released, air pressure in either brake system must be at least 65 psi (447 kPa).

See **Chapter 7** for instructions on the use of the parking brake valve.

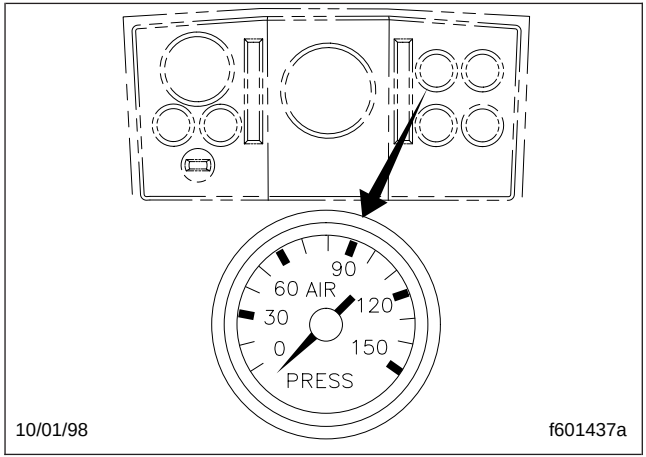


Fig. 3.20, Air Pressure Gauge

NOTE: Avoid opening the air cleaner and disturbing the seals or filter element until the yellow signal stays locked at or above the value shown in **Table 3.3**. When this occurs, the air cleaner needs replacing; however, immediate engine shutdown is not necessary.

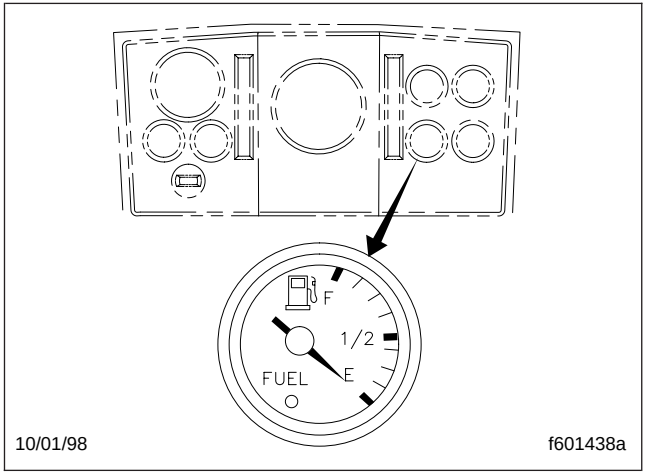


Fig. 3.21, Fuel Gauge

Intake-Air Restriction	
Engine Model*	**Service at or Above**
Cummins	25 inH_2O

* Turbocharged engines must be checked at full load and governed engine speed.

Table 3.3, Intake-Air Restriction

Follow the directions in the *Cummins Operation and Maintenance Manual* and in this manual for trouble-free, economical vehicle engine operation.

1. Cummins diesel engines produce high horsepower and peak torque characteristics at low rpm. Because of this, it is not necessary to keep the engine "wound up" to deliver the required horsepower at the wheels. These characteristics may also result in less shifting, and make shifting at lower rpm (to peak torque) more practical.
2. Depending on the vehicle gearing, the posted speed limit can sometimes allow operation in either of the top two gears; however, for improved operating efficiency (fuel economy and engine life), operate in the top gear at reduced rpm, rather than in the next lower gear at the maximum rpm.
3. Cruise at partial throttle whenever road conditions and speed requirements permit. This driving technique permits operating within the most economical power range of the engine.
4. When approaching a hill, open the throttle smoothly to start the upgrade at full power, then shift down as desired, to maintain the optimum vehicle speed. The high torque of Cummins engines may permit topping some grades without shifting.
5. Cummins engines are designed to operate over a wide speed range. More frequent shifting than necessary does not allow proper utilization of this flexibility. The driver who stays in top gear and uses the wider speed range will achieve the best fuel economy.
6. The Cummins diesel engine is effective as a brake on downhill grades, but care must be used not to overspeed the engine going downhill. The governor has no control over engine speed when the engine is being pushed by the loaded vehicle.

   Never turn off the ignition switch while going downhill. With the engine still in gear, fuel pressure will build up against the shutdown valve and may prevent it from opening when the ignition key is turned on.

⚠ CAUTION

Engine overspeed (engine speed exceeds high idle, no-load rpm) can damage the engine.

7. Use a combination of brakes and gears to keep the vehicle under control at all times, and to keep the engine speed below the rated governed rpm.

Cruise Control

The cruise control is activated by the ON/OFF and SET/RESUME switches. The minimum speed at which cruise

Clutches

General Information

The major reason clutches wear out too soon is excessive heat. Clutches are designed to absorb and dissipate more heat than encountered in typical operation. The temperatures developed in typical operation will not break down the clutch friction surfaces. However, if a clutch is slipped excessively, or required to do the job of a fluid coupling, high temperatures develop quickly and destroy the clutch. Temperatures generated between the flywheel, driven discs, and pressure plates can be high enough to cause the metal to flow and the friction facing material to char and burn.

Slipping and excessive heat are practically nonexistent when a clutch is fully engaged. But during the moment of engagement, when the clutch is picking up the load, it generates considerable heat. An incorrectly adjusted or slipping clutch will rapidly generate sufficient heat to destroy itself.

The most important items that a driver should be aware of to ensure long service life of the clutch include: starting in the right gear, recognizing clutch malfunctions, and knowing when to adjust a clutch.

Clutch Operation

Starting the Vehicle in the Correct Gear

To drive forward, always start in first gear. After the clutch is fully engaged, the engine should be accelerated to the correct rpm for the upshift into the next higher gear.

Gear Shifting Techniques

Many drivers upshift into the next gear, or even skip-shift into a higher gear, before the vehicle has reached the correct speed. This type of shifting is almost as bad as starting off in a gear that is too high, since the engine rpm and vehicle speeds are too far apart, requiring the clutch to absorb the speed difference by generating heat. For transmission operating instructions, see **Chapter 5**.

Vehicle Overload, or Overloading the Clutch

Clutches are designed for specific vehicle applications and loads. These limitations should not be exceeded.

⚠ CAUTION

Overloading will not only result in damage to the clutch, but also to the entire powertrain.

IMPORTANT: If any of the ABS warning lights do not work as described above, or come on while driving, repair the ABS system immediately to ensure full antilock braking capability.

During emergency or reduced-traction stops, fully depress the brake pedal until the vehicle comes to a safe stop; *do not pump* the brake pedal. With the brake pedal fully depressed, the ABS system will control all wheels to provide steering control and a reduced braking distance.

Although the ABS system improves vehicle control during emergency braking situations, the driver still has the responsibility to change driving styles depending on the existing traffic and road conditions. For example, the ABS system cannot prevent an accident if the driver is speeding or following too closely on slippery road surfaces.

Automatic Slack Adjusters

Automatic slack adjusters are required on all vehicles equipped with air brakes manufactured after October 20, 1994. Automatic slack adjusters should never be manually adjusted except during routine maintenance of the foundation brakes (e.g., replacing shoes), during slack adjuster installation or in an emergency situation.

When the brake pushrod stroke exceeds the legal brake adjustment limit on a vehicle, there is likely a mechanical problem with the foundation brake components or the adjuster is improperly installed.

Visit a repair facility as soon as possible when brakes equipped with automatic slack adjusters are determined to be out of adjustment.

⚠ WARNING

Manually adjusting an automatic slack adjuster to bring the pushrod stroke within legal limits is likely masking a mechanical problem. Adjustment is not repairing. In fact, continual adjustment of automatic slack adjusters may result in premature wear of the adjuster itself. Further, the improper adjustment of some automatic slack adjusters may cause internal damage to the adjuster, thereby preventing it from properly functioning.

37. Check the tire inflation pressures and inspect each tire for bulges, cracks, cuts, and penetrations.
38. Check for indications of loose wheel nuts or rim nuts and examine each rim and wheel component.
39. Check the air brake system for proper operation.
40. Test the service brakes before leaving the lot.
41. Test the parking brakes on a 20 percent grade.

Pretrip Inspection and Daily Maintenance Procedures

Whenever equipment requires adjustment, replacement, repair, addition of lubricants, or a change of lubricants, refer to the *Cargo Workshop Manual* for repair procedures and specifications, and to the *Cargo Maintenance Manual* for lubricant recommendations, specifications, and maintenance intervals and procedures.

1. *Drain the air brake system air reservoirs.*

   Air reservoirs serve as storage tanks for compressed air. They collect water condensed from the air and small amounts of oil from the air compressor. Water and oil normally enter the reservoir in the form of vapor because of the heat generated during compression.

   After the water and oil condense, they collect near the tank drain valves. Drain the resulting emulsion as follows:

⚠ WARNING

Failure to drain the air reservoirs as instructed could cause sludge formation in the air brake system. Sludge could adversely affect braking, causing loss of control, which could cause death, personal injury, or property damage.

NOTE: If the air reservoirs are not equipped with automatic drain valves, they must be drained daily. If they are equipped with automatic drain valves, they must be drained in this same manner at least once a week.

1.1 Open the wet tank valve (the drain cock or pull-chain drain located on the forward end of the supply air reservoir, which is connected directly to the air compressor). Block the valve open.

⚠ WARNING

When draining the air reservoir, do not look into the air jets or direct them toward anyone. Dirt or sludge

such as cracks or breaks, to one leaf causes hidden damage to other leaves. Replacement of only the visibly damaged part(s) is no assurance that the spring is safe. If cracks or breaks exist on front spring assemblies in either of the two top leaves, a loss of vehicle control could occur. Failure to replace a damaged spring assembly could cause an accident resulting in serious personal injury or property damage.

23. *Clean the headlights, rearview mirrors, and the outside of the windshield and all window glass. Check the condition of the windshield wiper arms and blades.*

    Be sure the windshield wiper blades are tensioned against the windshield. Inspect the wiper blades for damage and deteriorated rubber. Replace the wiper arms if the wiper blades are not tensioned against the windshield. Replace damaged or deteriorated wiper blades.

⚠ WARNING

Replace wiper arms and blades when necessary to maintain good visibility. Poor visibility could interfere with the driver's ability to control the vehicle, possibly resulting in serious personal injury or death.

24. *Clean the inside of the windshield, the gauges on the dash, and all window glass.*

25. *Check the steering wheel for excessive play.*

    With the front tires straight ahead, turn the steering wheel until motion is observed at the front wheels. Align a reference mark on a ruler, then slowly turn the steering wheel in the opposite direction until motion is again detected at the wheels. Measure the lash (free play) at the rim of the steering wheel. See **Fig. 9.2**.

    Excessive lash exists if steering wheel movement exceeds 4-3/4 inches (121 mm) with a 20-inch (470-mm) steering wheel. If there is excessive lash, check the steering system for wear or incorrect adjustment of the linkage and steering gear before operating the vehicle.

26. *Adjust the driver's seat, then align the rearview mirrors.*

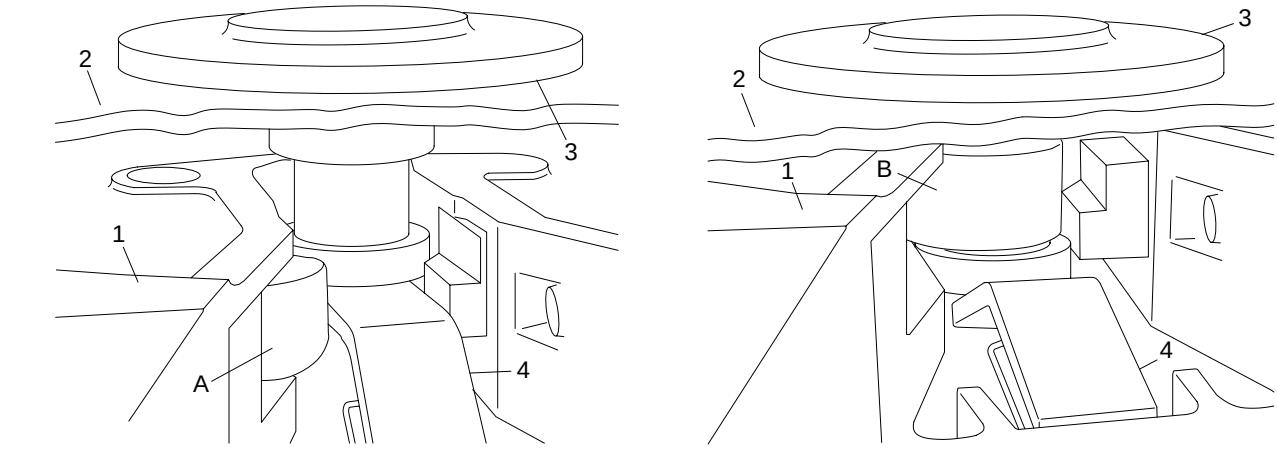
27. *Inspect the seat belts and tether belts if so equipped. See* **Fig. 9.3**.

⚠ WARNING

Inspect and maintain seat belts as instructed below. Worn or damaged seat belts could fail during a sudden stop or crash, possibly resulting in serious injury or death.

10

In an Emergency



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A. Locks open.
B. Locks closed.
C. Kingpin correctly entering the lock. Note how the depressed tongue allows lock halves to close completely around the neck and shoulder of the kingpin.
D. Kingpin incorrectly entering the lock. Note how the steel tongue prevents lock halves from closing, preventing false lockup.

1. Fifth Wheel Plate
2. Trailer
3. Kingpin
4. Lockguard

Fig. 11.3, Lockguard Mechanism (rear view)