OPERATOR CAB AND CONTROLS

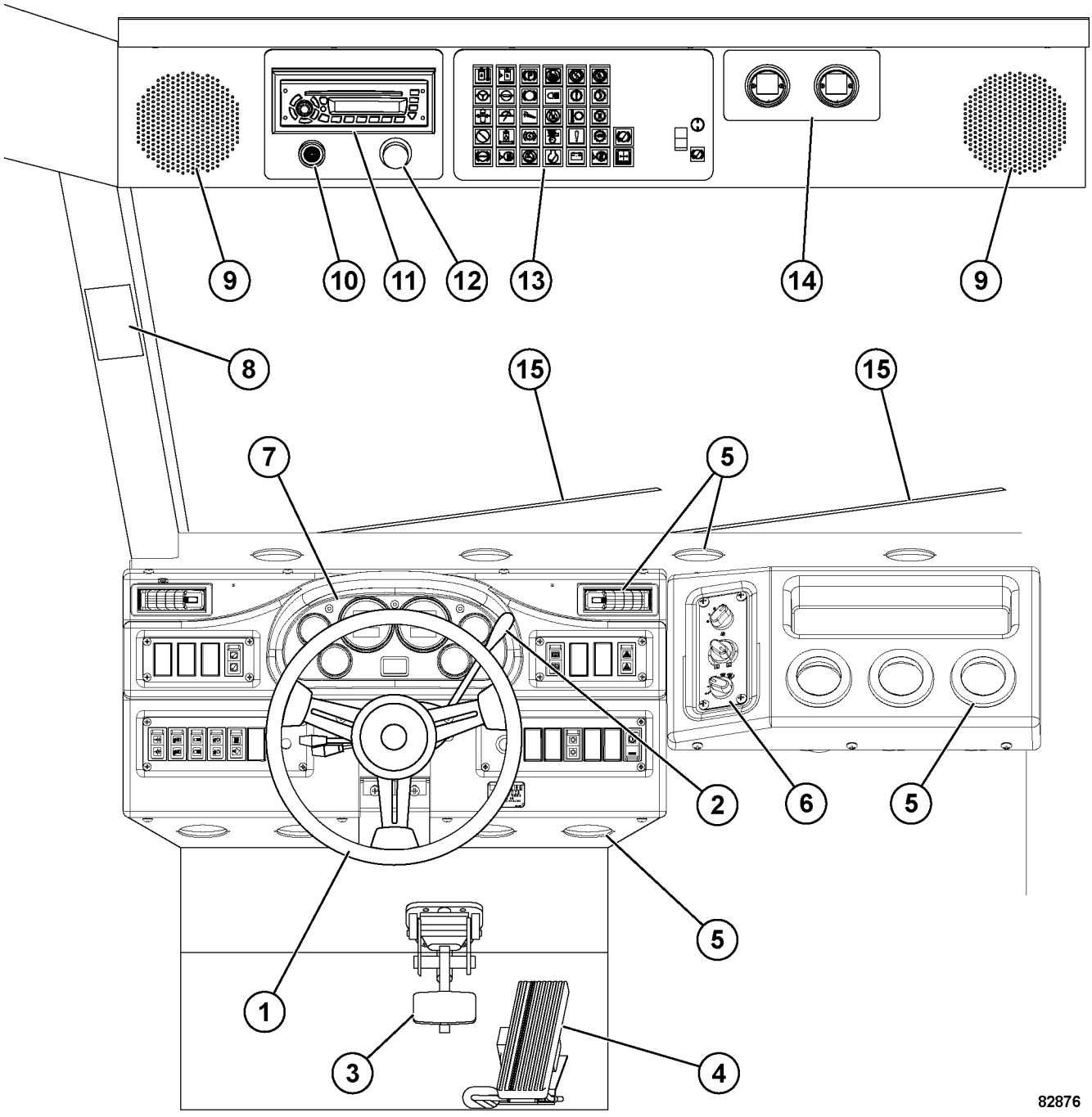


FIGURE 5-1. CAB INTERIOR - OPERATOR VIEW

1. Steering Wheel
2. Retarder Lever
3. Brake/Retarder Pedal
4. Throttle/Accelerator Pedal
5. Heater/Air Conditioner Vents
6. Heater/Air Conditioner Controls
7. Instrument Panel
8. Grade/Speed Chart
9. Radio Speakers
10. Warning Alarm Buzzer
11. Radio/CD Player
12. Warning Lights Dimmer Control
13. Warning/Status Indicator Lights
14. Air Cleaner Restriction Gauges
15. Windshield Wipers

STEERING COLUMN

Removal

1. Turn the key switch OFF. Allow at least 90 seconds for the steering accumulators to bleed down. Turn the steering wheel to ensure that no pressure remains.
2. Activate the battery disconnect switch.
3. Remove access cover (15, Figure 5-2) from the front of the cab.

NOTE: Do not remove hydraulic lines from the steering control unit unless necessary.

4. Loosen capscrews (10) on steering control unit (7) and move it out of the way.
5. Disconnect the steering column wire harness.
6. Remove the screws that secure trim cover (14) where the steering column enters the instrument panel. Remove the cover.
7. Remove capscrews (12) and brackets (8) and (9).
8. Remove four capscrews (4) with flat washers (5) and lockwashers (6). Access these capscrews from the front of the cab through the access opening.
9. Lift the steering column from the instrument panel.

Inspection

Whenever the steering column or steering control unit is removed for service, the steering column shaft splines should be inspected for excessive wear.

1. With the column assembly removed from the truck, thoroughly clean the splines on the steering column shaft. Inspect for damage and excessive wear.
2. Use an outside micrometer or dial caliper to measure the outside diameter of the male splines on the steering column shaft.

Minimum diameter: 24.13 mm (0.95 in.)

3. If the splines are smaller than the minimum diameter specification, replace the steering column.

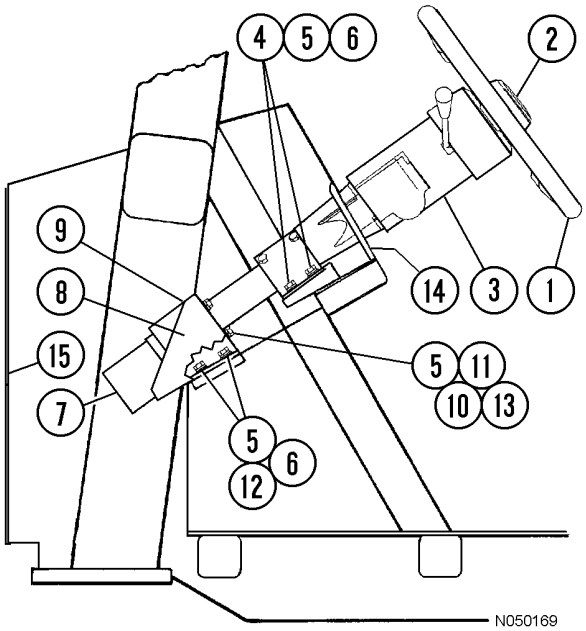


FIGURE 5-2. STEERING COLUMN INSTALLATION

1. Steering Wheel
2. Button Horn
3. Steering Column
4. Capscrew
5. Flat Washer
6. Lockwasher
7. Steering Control Unit
8. Bracket - L.H.
9. Bracket - R.H.
10. Capscrew
11. Lockwasher
12. Capscrew
13. Nut
14. Trim Cover
15. Access Cover

Installation

1. Insert capscrew (10, Figure 5-2) with lockwashers (11) and flat washers (5) through brackets (8) and (9), then through the steering column flange. Add second flat washer (5) and nut (13) to each capscrew to hold the parts together. Tighten the nuts securely.
2. Slide the entire assembly down the tapered blocks until brackets (8) and (9) contact the mounting surface in the cab. Install capscrews (4) and (12) with flat washers (5) and lockwashers (6). Tighten capscrews (4) only.
3. Inspect brackets (8) and (9) to see whether they contact the mounting surface evenly and are flat and inline with the surface. If they are, tighten capscrews (12). If brackets are not quite parallel, install flat washers as needed between the brackets and mounting surface to eliminate any gaps. Tighten capscrews (12) to the standard torque.
4. After capscrews (4) and (12) are tightened to the standard torque, remove nuts (13) and flat washers (5) that were holding the steering column to the two brackets. Do not remove capscrews (10) from the brackets.
5. Lubricate the male splines on the end of the steering column shaft.

Note: There is no lower end bearing in this steering column assembly. Therefor, the male end of the shaft will have to be guided into the mating female part of the steering control unit.

6. Without removing capscrews (10) from the holes, move steering control unit (7) into place and start each of the capscrews.
7. Tighten four capscrews (10) to the standard torque.
8. Ensure that the steering wheel turns properly without binding and that the steering wheel returns to its centered position after rotating 1/4 turn to the left and to the right.
9. If disconnected, reconnect the hoses to the steering control unit.
10. Connect the steering column wire harness to the harness in the cab.
11. Install access cover (15) and trim cover (14).

STEERING WHEEL

Removal

1. Turn off the battery disconnect switch to remove battery power from the horn circuit.
2. Use a pocket screwdriver to pry horn button (4, Figure 5-3) from steering wheel (1).
3. Disconnect horn wire (3) and set the horn button aside.
4. Remove nut (2).
5. Pull the steering wheel from the column. If the steering wheel will not slide off the shaft it may be necessary to install a puller into the tapped holes (5/16" - 24NF) in the steering wheel.

Installation

NOTE: A new, more relable horn contact is available. Some trucks may have the previous horn contact, which is a stick design (1, Figure 5-4). The new horn contact uses a roller (2). Install the new horn contact as shown in Figure 5-5.

1. Place steering wheel (1, Figure 5-3) into position on the steering column shaft while guiding horn wire (3) through the access hole in the steering wheel. Align the serrations and push the steering wheel onto the shaft.
2. Install nut (2). Tighten the nut to **81 ± 7 N·m (60 ± 5 ft lb)**.
3. Connect horn wire (3) to horn button (4).
4. Install the horn button onto the steering wheel. Turn on the battery disconnect switch and verify that the horn functions properly.

FIGURE 5-3. STEERING WHEEL RETAINER NUT

1. Steering Wheel
2. Nut
3. Horn Wire
4. Horn Button

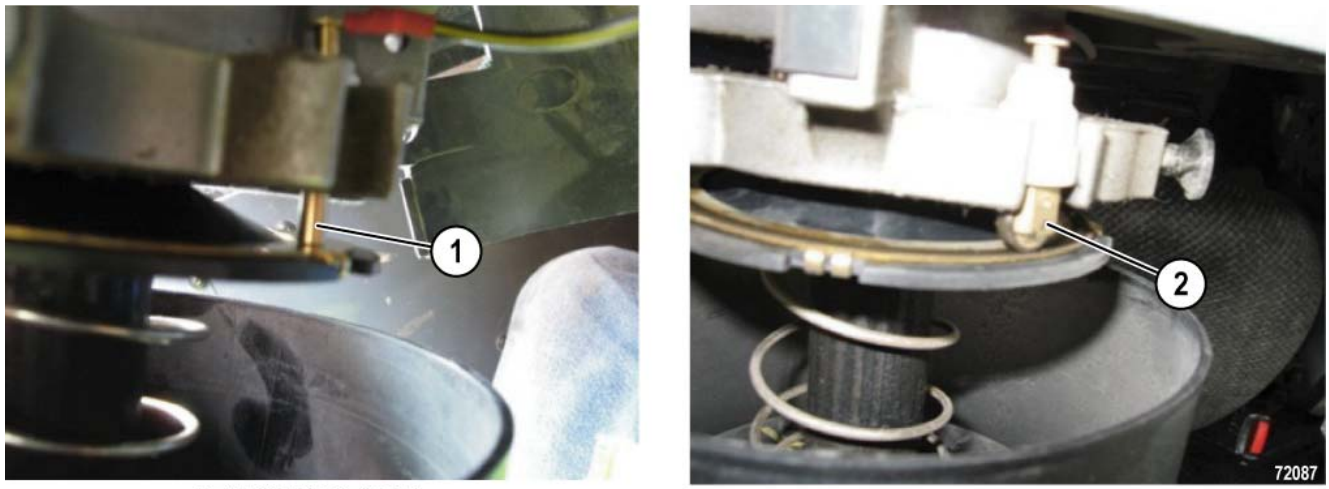


FIGURE 5-4. HORN CONTACTS

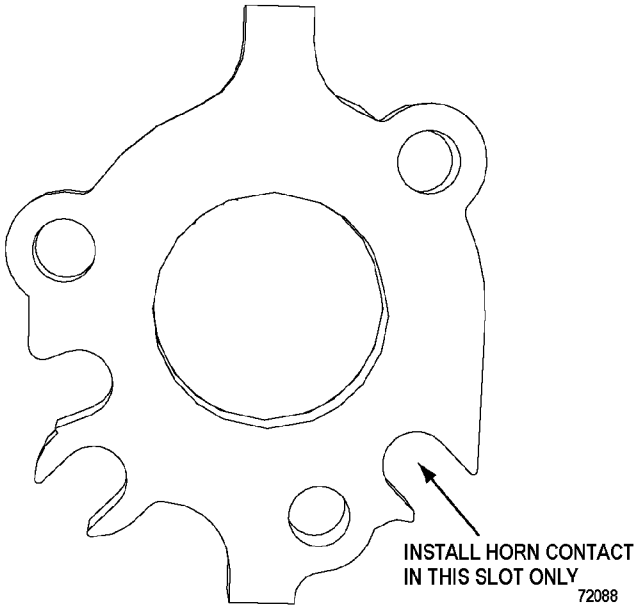


FIGURE 5-5. INSTALLATION LOCATION

STEERING WHEEL AND CONTROLS

Steering wheel (1, Figure 5-6) can be telescoped in and out, and the lilt angle can be adjusted to provide a comfortable steering wheel position for most operators.

Horn Button

Actuate the horn by pushing horn button (2, Figure 5-6) in the center of the steering wheel. Ensure that the horn operates before moving the truck. Observe all local safety rules regarding the use of the horn as a warning signal device before starting the engine and moving the vehicle.

Tilt / Telescope Lever

The steering column can be telescoped and the steering wheel can be tilted with lever (3, Figure 5-6) in front of the turn signal lever.

Adjust the tilt of the steering wheel by pulling the lever toward the steering wheel and moving the wheel to the desired angle. Releasing the lever will lock the wheel in the desired location.

Adjust the steering column by pushing the lever forward to unlock the telescoping function. After positioning as desired, release the lever to lock the steering column in position.

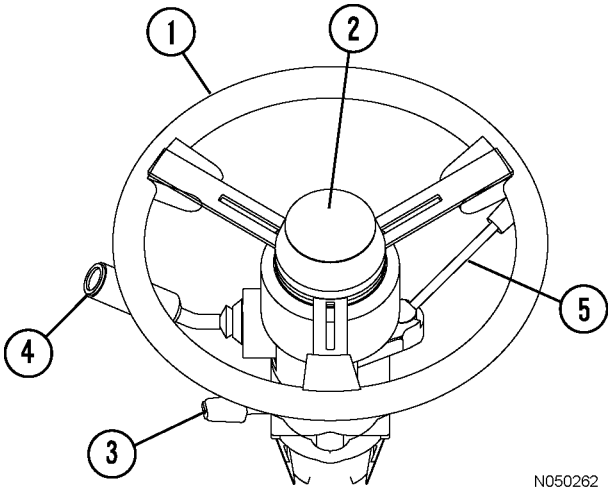


FIGURE 5-6. STEERING WHEEL & CONTROLS

1. Steering Wheel
2. Horn Button
3. Tilt/Telescope Lever
4. Multi-Function Turn Signal Switch
5. Retarder Lever

Multi-Function Turn Signal Switch

Multi-function turn signal switch (4, Figure 5-6) is used to activate the turn signal lights, the windshield wipers, and to select high or low beam headlights.

Turn Signal Operation

Move the lever upward to signal a right turn.

Move the lever downward to signal a left turn.

An indicator in the top center of the instrument panel will illuminate to indicate the selected turn direction. Refer to Instrument Panel later in this section.

NOTE: The turn signal does not automatically cancel after the turn has been completed. The turn signal lever must be manually returned to the neutral position.

High Beam Headlight Operation

Pulling the lever inward (toward the rear of the cab) changes the headlights to high beam. When the high beams are selected, the indicator in the top center of the instrument panel will illuminate. Moving the switch back to the original position will return the headlights to low beam.

Windshield Wiper Operation

- Windshield Wipers OFF
- Intermittent - Long Delay
- Intermittent -Medium Delay
- Intermittent -Short Delay
- Low Speed
- High Speed
- Depressing the button at the end of the lever will activate the windshield washer.

NOTE: The wipers will not come on automatically when activating the washer. This must be done manually.

DYNAMIC RETARDING

Dynamic retarding is a braking torque (not a brake) produced through electrical generation by the wheel motors when the truck motion (momentum) is the propelling force.

For normal truck operation, dynamic retarding should be used to slow and control truck speed.

Dynamic retarding is available in FORWARD/ REVERSE at all truck speeds above 0 kph/mph. However, as the truck speed slows below 5 kph (3 mph), the available retarding force may not be effective. Use the service brakes to bring the truck to a complete stop.

Dynamic retarding will not hold a stationary truck on an incline.Use the parking brake or wheel brake lock for this purpose.

When in NEUTRAL, dynamic retarding is available only when truck speed is above 5 kph (3 mph).

When dynamic retarding is in operation, engine rpm will automatically go to an advance retard speed setting. This rpm will vary depending on temperature of several electrical system components.

Dynamic retarding will be applied automatically if the speed of the truck obtains the maximum speed setting programmed in the control system software.

When dynamic retarding is activated, an indicator light in the overhead display will illuminate. The grade/speed retard chart should always be used to determine safe downhill speeds. Refer to Grade/ Speed Chart in this chapter.

Retarder Lever

Retarder lever (5, Figure 5-6) mounted on the right side of the steering column can be used to modulate retarding effort. The lever will command the full range of retarding and will remain at a fixed position when released.

- When the lever is rotated to full “up” (counterclockwise) position, it is in the OFF/no retard position. An adjustable detent holds the lever in the OFF position. Refer to Section J in the service manual for adjustment procedures.
- When the lever is rotated to full “down” (clockwise) position, it is in the full ON/retard position.
- For long downhill hauls, the lever may be positioned to provide desired retarding effort, and it will remain where it is positioned.

NOTE: The retarder control lever must be rotated back to the OFF position before the truck will resume the propel mode of operation.

The lever and foot-operated retarder/service brake pedal can be used simultaneously or independently. The Propulsion System Controller (PSC) will determine which device is requesting the most retarding effort and apply that amount.

Brake/Retarder Pedal

Brake/retarder pedal (3, Figure 5-1) is a single, foot-operated pedal that controls both retarding and service brake functions. The first portion of pedal travel commands retarding effort through a rotary potentiometer. The second portion of pedal travel modulates service brake pressure directly through a hydraulic valve. Thus, the operator must first apply, and maintain, full dynamic retarding in order to apply the service brakes. Releasing the pedal returns brake and retarder to the OFF position.

When the pedal is partially depressed, the dynamic retarding is actuated. As the pedal is further depressed, to where dynamic retarding is fully applied; the service brakes (while maintaining full retarding) are actuated through a hydraulic valve which modulates pressure to the service brakes. **Completely depressing the pedal causes full application of both dynamic retarding and the service brakes.** Indicator light (B3, Figure 5-10) in the overhead panel will illuminate, and an increase in pedal resistance will be felt when the service brakes are applied.

For normal truck operation, **dynamic retarding** (lever or foot-operated pedal) should be used to slow and control the speed of the truck.

Service brakes should be applied only when dynamic retarding requires additional braking force to slow the truck speed quickly or when bringing the truck to a complete stop.

Throttle/Accelerator Pedal

Throttle/accelerator pedal (4, Figure 5-1) is a foot-operated pedal which allows the operator to control engine rpm depending on pedal depression.

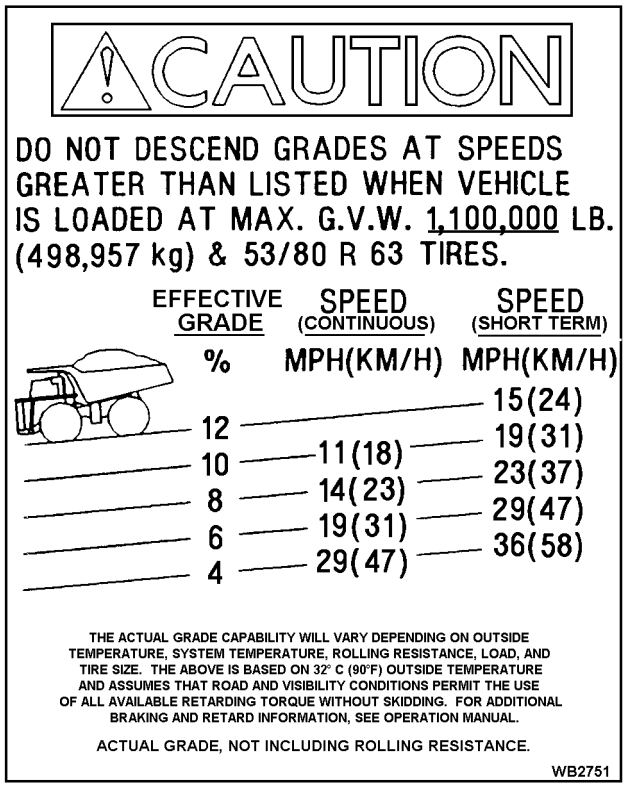
It is used by the operator to request torque from the motors when in forward or reverse. In this mode, the propulsion system controller commands the correct engine speed for the power required. In NEUTRAL, this pedal controls engine speed directly.

GRADE/SPEED CHART

Grade/speed chart (8, Figure 5-1 and shown below) provides the recommended MAXIMUM retarding limits at various truck speeds and grades with a fully loaded truck.

This decal in the truck may differ from the decal below due to optional truck equipment such as: wheel motor drive train ratios, retarder grids, tire sizes, etc. Always refer to this decal in the operator's cab and follow these recommendations for truck operation.

The operator should reference this chart before descending any grade with a loaded truck. Proper use of dynamic retarding will maintain a safe speed.



Two speed lists are provided, one for *continuous* retarding, and the second for *short term* retarding. Both lists are matched to the truck at maximum Gross Vehicle Weight (GVW). The two ratings are guidelines for proper usage of the retard function on downhill grades.

The “short term” numbers listed on the chart indicate the combination of speeds and grades which the vehicle can safely negotiate for a short duration before system components reach the maximum allowable temperature during retarding. These speeds are faster than the “continuous” values, reflecting the short term thermal capacity of various system components.

NOTE: The “short term” rating will successfully accommodate most downhill loaded hauls.

If the vehicle is operated at "short term" grade and speed limits for a period of time, it is possible to reach the thermal capacity of the drive system components. The Propulsion System Controller (PSC) will then gradually reduce the retarding effort from "short term" to "continuous". The "retard @ continuous" indicator light will flash for 15 seconds, then illuminate steadily alerting the operator of the reduction in retarding performance and the need for a reduction in speed. The operator must control the speed of the truck in accordance to the “continuous speeds” on the grade/speed chart. The operator must use the service brakes to **quickly** slow the truck to the maximum "continuous" retarding limits (or less) based on the grade the truck is currently on.

CAUTION

Do not LIGHTLY apply the service brakes when attempting to slow the truck on a downhill grade. Overheating of the brakes will result. Apply the brakes (within safe limits for road conditions) in order to quickly slow the truck to maximum “continuous” retarding limits or less.

The “continuous” numbers on the chart indicate the combination of speeds and grades which the vehicle can safely negotiate for unlimited time or distance during retarding.

DO NOT exceed these recommended MAXIMUM speeds when descending grades with a loaded truck.