CAPACITY

Operator's Handbook

Trailer Spotting Tractor

WARNING!

Failure to read, understand, and fully comply with the important information contained in this Operator's Handbook may result in hazardous conditions or cause a hazardous condition to develop.

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Table of Contents

Section 3. (Continued)

Section 4. Service & Diagnostics. 35

Section 5. Specifications & Capacities. 105

Cautions & Warnings

Procedures throughout this manual contain cautions and warnings to alert the operator to the following conditions:

⚠ Warning

A warning advises the operator of conditions that may result in damage to the vehicle, property, serious injury or possibly death. Pay special attention to items identified with the warning label.

⚠ Caution

A caution advises you of conditions that could result in damage to your vehicle or property.

Study this manual carefully. Do not operate your vehicle until you are completely familiar with the contents of this manual. Always retain this manual in your vehicle for reference. If you sell the vehicle, make sure the manual goes with it.

Safety Summary

⚠Warning

California Proposition 65 - Diesel engine exhaust and some of its constituents are known to the State of California to cause cause cancer, birth defects, and other reproductive harm.

⚠Warning

Battery posts, terminals, and related accessories contain lead and lead components, and other chemicals known to the State of California to cause cancer, birth defects, and other reproductive harm.

⚠Warning

In order to add electrical devices to your Trailer Jockey, you must use the circuit breaker protected ignition and battery power locations on the power distribution center (PDC). Failure to use these locations for additional electrical accessories can result in circuit overload conditions and cause electrical damage and/or fire in your vehicle. Failure to use these locations for additional electrical connections will void the factory warranty.

⚠Warning

Before welding on any vehicle equipped with an electronic engine (ISB, ISC, QSB, QSC, CAT3126), power must be disconnected from the engine computer. This can be done at the battery or at the power connection to the computer on the engine. Failure to do so can result in damage to the engine computer and may cause engine malfunction or failure.

⚠Warning

Your Trailer Jockey has gross axle weight, gross vehicle weight, and gross combination weight ratings. Do not exceed these ratings. Exceeding maximum weight ratings by overloading can cause component failure resulting in personnel injury and property damage.

⚠Warning

The Trailer Jockey is designed for efficient one-person operation by propery trained, experienced operators. Do not allow passengers in or on the Trailer Jockey while in operation.

Reporting Safety Defects

If you believe that your vehicle has a defect that could cause a crash or cause injury or death, you should immediately notify the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Capacity of Texas, Inc.

If the NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall campaign. However, the NHTSA cannot become involved in individual problems between you, your dealer, or Capacity of Texas, Inc.

To contact the NHTSA, you may either call the Auto Safety Hotline toll free at 800-424-9393 or write to them at: NHTSA, U.S. Department of Transportation, Washington, DC 20590.

You can also obtain other information about motor vehicle safety from the Hotline or at the NHTSA website at www.nhtsa.dot.gov.

Notice

To comply with environmental regulations limiting top speed to 25 miles per hour on industrial engines, your Trailer Jockey may have transmission gear selections electronically inhibited or mechanically blocked, preventing operators from shifting into higher gears.

Restricted range selection will not affect the performance or the warranty of the transmission. If you have any questions or require additional information, contact Capacity of Texas at 800-323-0135.

SECTION 1. INTRODUCTION

1-1 GENERAL

This handbook contains information designed to familiarize the operator with the controls and operation of the Trailer Jockey. Be sure the operator is completely familiar with all controls and indicators and their functions BEFORE attempting to operate the tractor. Failure to do so could cause hazardous conditions to develop.

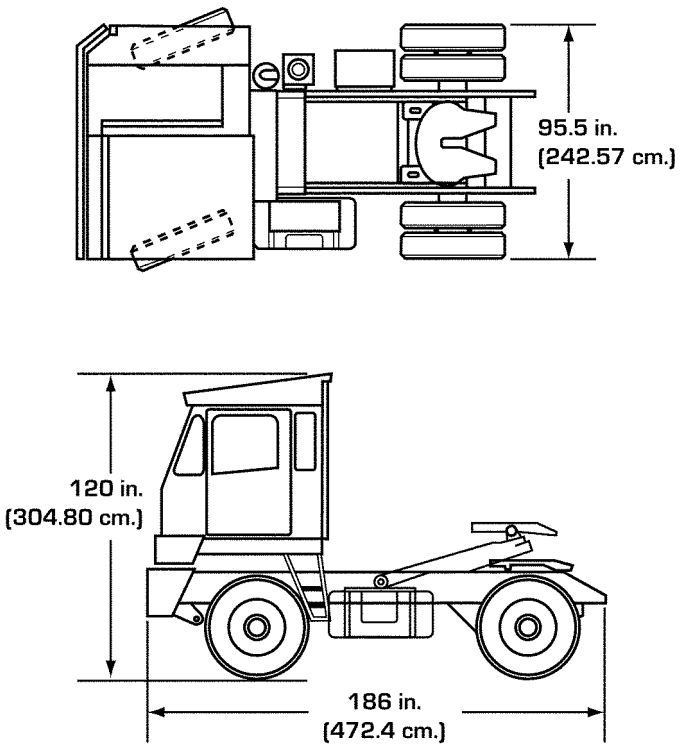


Figure 1. Truck Dimensions

1-2 SPECIFICATIONS.

Item	Value
Engines	Cummins ISB07-200 HP Cummins ISB07-220 HP Cummins ISLG (LNG) 250HP Cummins QSBT3 6.7 L Elite 167 HP Cummins QSBT3 6.7 L Elite 183 HP
Transmission	Allison RDS3000
Hydraulic System	Transmission direct-mounted PTO with direct moutned gear pump and 8-gallon (30.3 liter) reservoir
Fuel Tank	50 gallon (189.25 liter) step tank
Electrical	12-Volt, negative ground circuit breaker protection color-coded wiring removable harnesses
Cooling	Heavy duty fin-and-tube construction radiator filled with 50/50 solution of permanent type antifreeze Transmission oil cooler mounted in front of radiator
Air System	15.2 CFM (4.4 cmm) compressor three-tank reservoir system
Brakes	Air brakes on all wheels Parking/emergency spring-type brakes on rear wheel Tractor-trailer protection valve and color-coded air lines with glad-hand brackets
Wheels	22.5 X 8.25 steel disc, 10-hole
Tires	11 X 22.5, 16-ply LRH tubeless, highway tread
Fifth Wheel	Lift Rating: 70,000 lbs (31,750 Kg) Lift Height: 16 in. (40.64 cm)
Dimensions:	Height: 120 in. (304.80 cm) Length: 186 in. (472.44 cm) Width: 95.5 in. (242.57 cm) Wheelbase: 110 in. (279.40 cm)

1-3 Major Components

Figure 2 illustrates the major components of the Trailer Jockey.

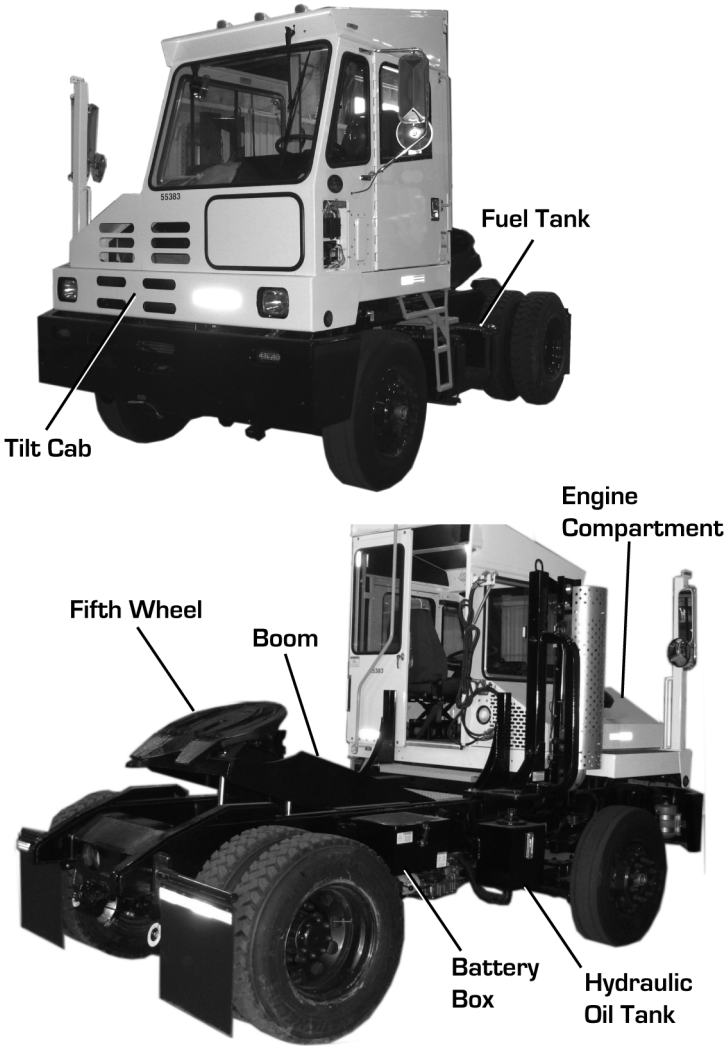


Figure 2. Major Components

1-4 Fuel Recommendations

Your Trailer Jockey's engine is manufactured by Cummins, Inc. To ensure optimum reliability and performance from your vehicle, follow these recommendations regarding fuel.

⚠Caution

Due to the precise tolerances of diesel injection systems, it is extremely important that your fuel be kept clean and free of dirt or water. Dirt or water can cause severe damage to both the fuel pump and the fuel injectors.

⚠Caution

Lighter fuels can reduce fuel economy and possibly damage fuel system components.

Cummins recommends the use of ASTM number 2D fuel for optimum engine performance. The engine in your vehicle has been optimized to meed U.S. Environmental Protection Agency (EPA) regulations. To meet these regulations, ultra-low sulfur diesel fuel is required. If ultra-low sulfur diesel fuel is not used, the engine may not meet EPA emission regulations and damage to your engine's aftertreatement system may result.

Ultra-low sulfur diesel is defined by ASTM S-15 as diesel not exceeding 0.0015 (15 ppm) mass percent sulfur content. There is no acceptable substitute.

SECTION 2.
CONTROLS & INDICATORS

2-1 INTRODUCTION

The controls and indicators for the Trailer Jockey are illustrated on the following pages. The name and function of each control and indicator are listed in Table XREF. The index numbers in the figure correspond to the item numbers in the table. The operator should know the location and function of each control and indicator and have a thorough knowledge of their functions before operating the tractor.

REMEMBER!

A careful operator is the best safety device!

⚠Warning

The Trailer Jockey is equipped with an operator seat belt. The seat belt should be worn at all times during operation to prevent injury to the operator in the event of an accident.

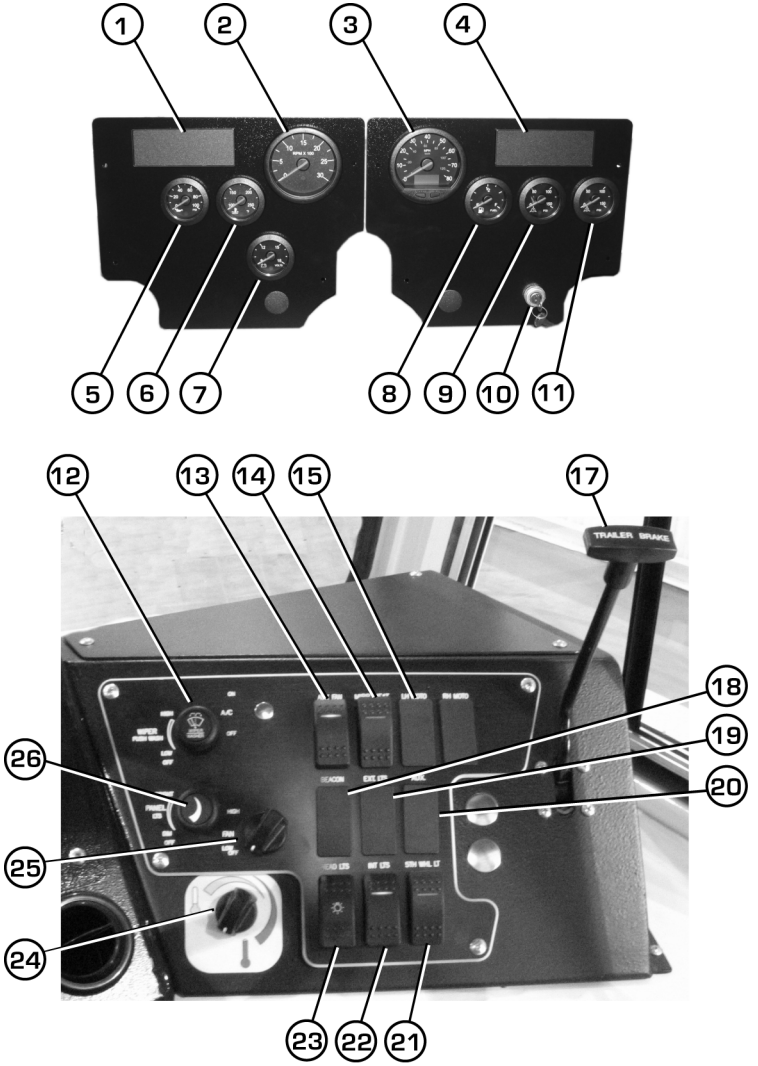


Figure 2-1 Controls and Indicators.

Table 2-1 Controls & Indicators

Item	Name	Function
1	Status LED Panel 1	Multiple LEDs indicate various conditions. Refer to Figure 2-2 for more information
2	Tachometer	Indicates engine speed in RPM

Table 2-1 Controls & Indicators (Cont.)

Item	Name	Function
3	Speedometer / Alphanumeric Display	Indicates vehicle speed in MPH and KPH. Digital alphanumeric display below speedometer dial displays additional information. Refer to XREF for more information
4	Status LED Panel 2	Multiple LEDs indicate various conditions. Refer to Figure 2-2 for more information
5	Oil Pressure Gauge	Indicates engine oil pressure. Red indicator light indicates potentially damaging low pressure.
6	Water Temperature Gauge	Indicates temperature of engine coolant in ºF and ºC. Normal reading should be 180 ºF to 205 ºF.
7	Voltmeter	Indicates voltage in electrical system. Low voltage may indicate problem with battery and/or alternator.
8	Fuel Gauge	Indicates fuel remaining in tank.
9	Air System Pressure Gauge 1	Indicates pressure in air brake system in PSI and KPa. Normal reading should be
10	Key Switch	Three-position, key-operated switch. In OFF position, electrical system is de-energized and key can be removed. In ON position, the electrical system is energized. In START position, starter is engaged to start engine. Release to ON position when engine is started.
11	Air System Pressure Gauge 2	Indicates pressure in air brake system in PSI and KPa. Normal reading should be
12	Windshield Wiper Control Knob	Turns to activate variable speed wipers. Push to activate windshield washers.
13	Auxiliary Fan Switch	Rocker switch that controls the auxiliary fan .
14	Mirror Heat Switch	Rocker switch that contols the outside rear-view mirror heaters
15	LH Mirror Motor Switch	Rocker switch that adjusts the left hand rear view mirror.
16	RH Mirror Motor Switch	Rocker switch that adjusts the right hand rear view mirror.
17	Trailer Brake Lever	Activates the trailer brake.
18	Beacon Light Switch	Rocker switch that activates the beacon light.

Table 2-1 Controls & Indicators (Cont.)

Item	Name	Function
19	Exterior Lights Switch	Rocker switch that activates exterior lights
20	Auxiliary	Rocker switch that activates auxliliary lights
21	Fifth Wheel Floodlight Switch	Rocker switch that activates the fifth wheel light on the rear of the cab.
22	Cab Interior Light Switch	Rocker switch that activates the interior cab lights.
23	Headlight/Tail Light Switch	Rocker switch that activates the headlights and tail lights
24	Heater Control Knob	Rotary knob that adjusts the temperature level of the cab heater.
25	Heater Fan Control Knob	Rotary knob that sets the heater fan HIGH, LOW, or OFF
26	Panel Lights Control Knob	Rotary knob that adjusts the brightness of the dash control lights.
27	Brake Pedal	Pedal that controls the application of the brakes. Depress pedal to apply brakes. Brakes should be applied slowly except in emergency situations. Trailer brakes are also operated by the pedal if both trailer air hoses are connected.
28	Brake Pedal	
29	Throttle Control Pedal	Pedal that controls the engine throttle. Depress pedal to increase engine speed. Release pedal to reduce engine speed.

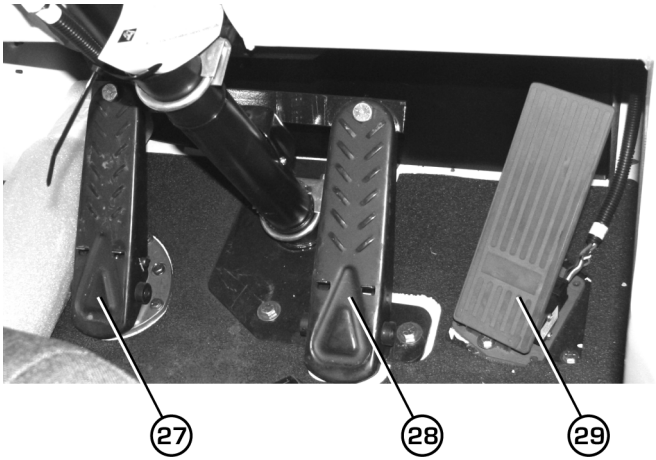
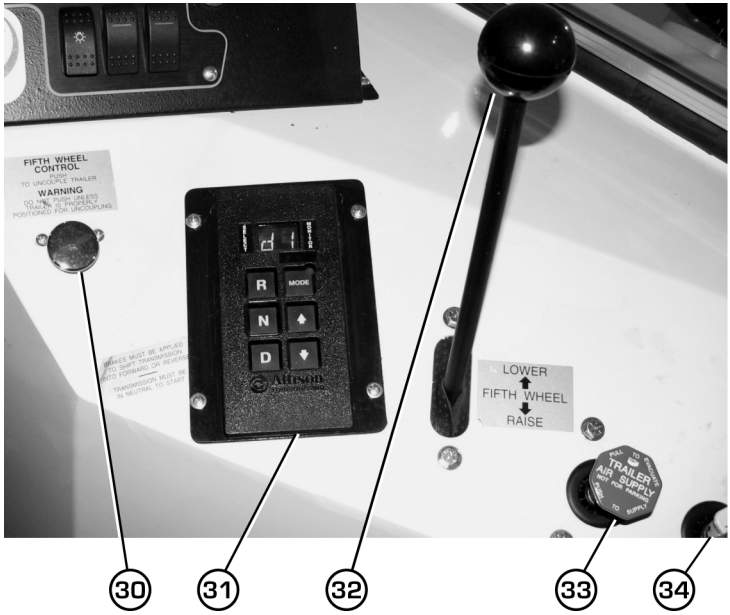


Figure 2-1 Controls and Indicators (Cont.



Warning

Do not depress the fifth wheel lock pushbutton unless the trailer is properly positioned and does not pose a threat to personnel or property.

Table 2-1 Controls & Indicators (Cont.)

Item	Name	Function
30	Fifth Wheel Lock	Pushbutton control that releases fifth wheel locks when pressed, releasing trailer.
31	Transmission Control	Pushbutton control pad that controls the transmission. Refer to Figure 2-3 for details.
32	Fifth Wheel Control Lever	Three-position control lever that positions the fifth wheel. LOWER - moves fifth wheel down. HOLD - Maintains fifth wheel elevation RAISE - Elevates fifth wheel
33	Trailer Air Supply Valve	Push-pull knob that applies air pressure to trailer brake system when depressed; pull knob out to evacuate air from trailer brake system
34	Parking Brake Control	Push-pull knob that applies parking brake when pulled out. Depress knob to release parking brake.

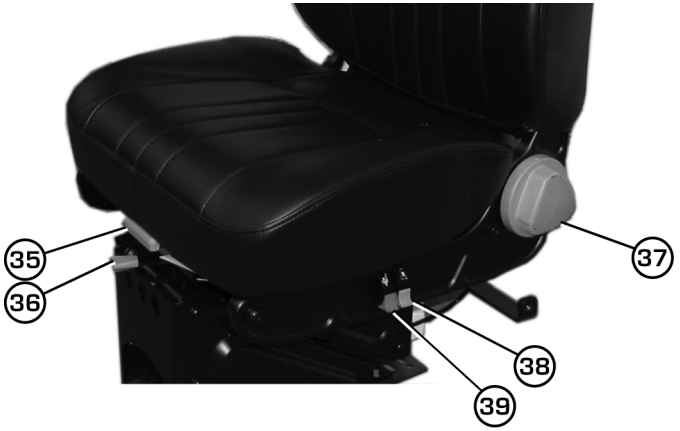


Figure 2-1 Controls & Indicators (Cont.)

⚠Warning

Due to vertical motion of suspension-type seats the seatbelt set should be adjusted to allow for adequate head clearance when the seat is adjusted to the top of upward travel.

SEAT BELTS SHOULD BE WORN AT ALL TIMES TO AVOID INJURY! ADJUST SEAT POSITION BEFORE FASTENING SEAT BELT.

Table 2-1 Controls & Indicators (Cont.)

Item	Name	Function
35	Seat Position Control	Lever that is used to adjust front-to-rear position of the seat
36	Seat Suspension Lock	Lever that is used to control the seat suspension.
37	Seat Back Control Knob	Knob that can be turned to adjust the tilt of the seat back.
38	Lumbar Control Switch	Switch that controls the adjustment of the lumbar support
39	Seat Height Adjustment Switch	Switch that is used to adjust the height of the seat
40	Seat Belt/Shoulder Harness (not shown)	See seat belt notes below

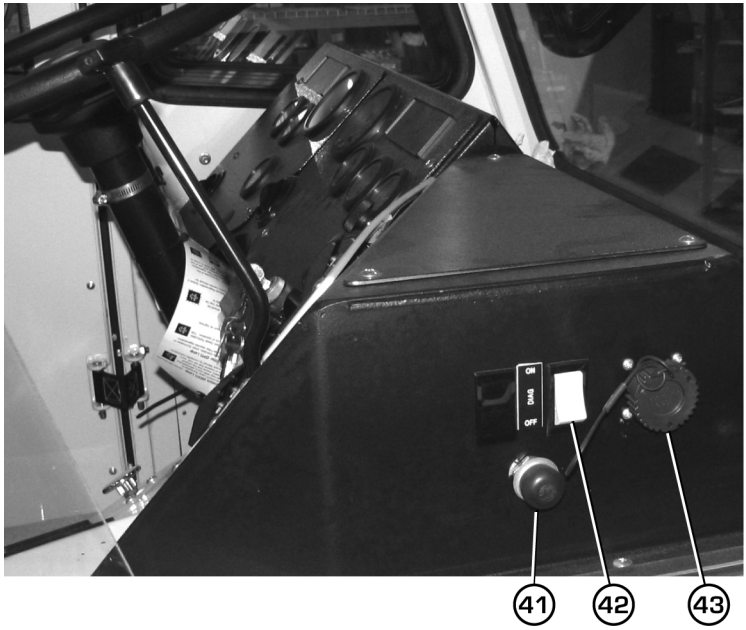


Figure 2-1 Controls & Indicators (Cont.).

Table 2-1 Controls & Indicators (Cont.)

Item	Name	Function
41	ABS Diagnostic Button	Pushbutton control that activates the diagnostic codes for the anti-lock brake system (ABS)
42	Engine Diagnostic / Regeneration Switch	Dual-purpose switch. When engine is turned off, activates engine diagnostic mode (refer to XREF for more information. When engine is turned on, activates the engine regeneration cycle (refer to XREF for more information).
43	Diagnostic Connector	Deutsch connector that is used to connect engine diagnostic computer to truck for maintenance activities.

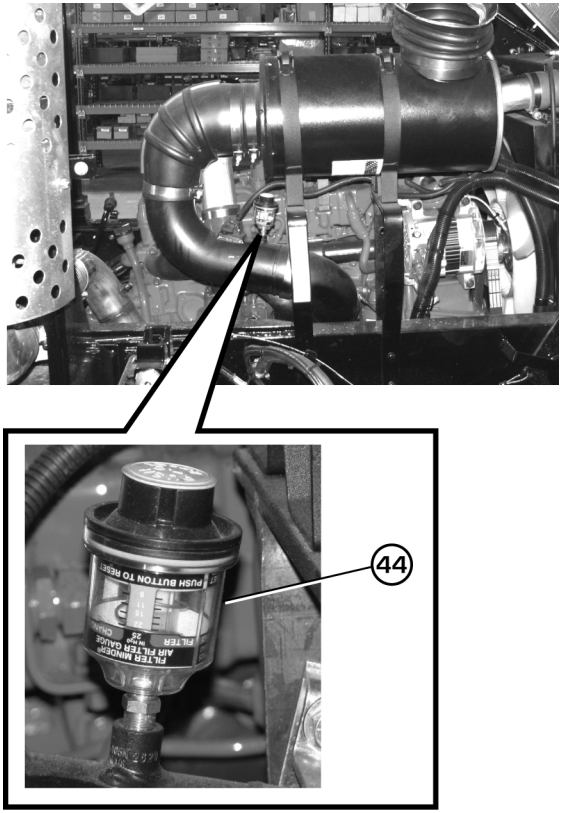
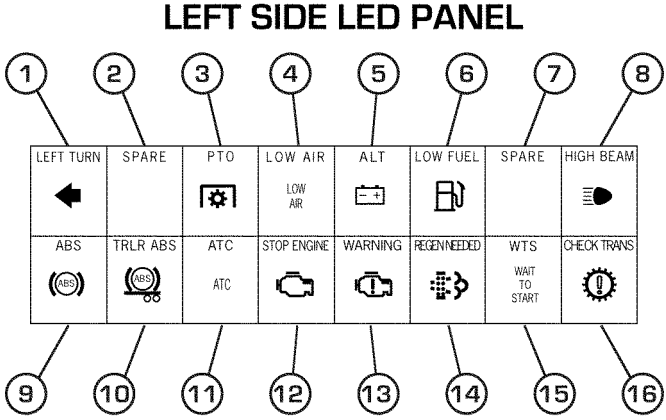


Figure 2-1 Controls & Indicators (Cont.).

Table 2-1 Controls & Indicators (Cont.)

Item	Name	Function
44	Air Filter Indicator	Indicates the restriction (clogging) of engine air filter, measured in inches of Mercury (in. Hg). Press reset button on top of indicator after replacing air filter.



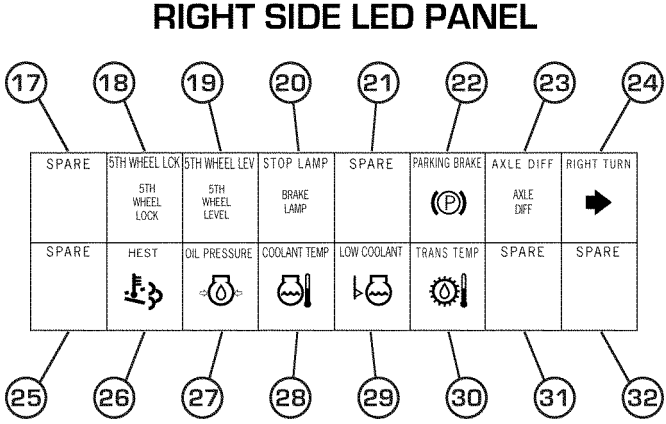


Figure 2-2 Dash LED Indicators

Table 2-2 Dash LED Indicators

Item	Name	Description
1	Left Turn Indicator Light	Flashing light indicates left turn signal is operating.
2	Spare	Position not used.
3	PTO Light	Indicates PTO is engaged
4	Low Air Warning Light	Illuminates to warn when air system pressure drops below 60 PSI. Buzzer will also sound.
5	Alternator Light	Illuminates when the alternator is not charging battery; battery is being discharged.
6	Low Fuel Light	Illuminates to indicate low fuel level.
7	Spare	Position not used.
8	High Beam Light	Illuminates when headlights are on high beam
9	ABS Warning Light	Illuminates when a fault with the antilock brake system (ABS) system is detected.
10	Trailer ABS Warning Light	Illuminates when a fault with the trailer's ABS system is detected.
11	ATC Warning Light	Illuminates when a fault with the automatic traction control (ATC) system is detected.
12	Stop Engine Warning Light	Illuminates when conditions exist that could seriously damage the engine. Operator should turn the engine off immediately.
13	Engine Warning Light	Illuminates when one or more of the following conditions exist: Low Oil Pressure, Engine Coolant Overheating, Low Coolant Level
14	Regeneration Needed Light	Illuminates to indicate that the engine requires a regeneration cycle. Refer to XREF for more information.
15	Wait To Start Light	Illuminates to indicate operator should not start engine until engine grid heaters are heating for a specific time prior to ignition.
16	Check Transmission Light	Illuminates when a fault with the transmission has been detected. Refer to XREF for more information.
17	Spare	Position not used.
18	Fifth Wheel Lock Light	Illuminates when fifth wheel is locked.

Table 2-2 Dash LED Indicators (Cont.)

Item	Name	Description
19	Fifth Wheel Level Light	Illuminates when fifth wheel is level.
20	Stop Lamp Indicator	Illumates when brake lights are illuminated
21	Spare	Position not used.
22	Parking Brake Light	Illuminates when parking brake is engaged.
23	Axle Differential Light	Illuminates when differential is locked.
24	Right Turn Indicator Light	Flashing light indicates right turn signal is operating.
25	Spare	Position not used.
26	HEST	
27	Oil Pressure Light	Illuminates when engine oil pressure falls below safe level. Operator should turn engine off to prevent possible engine damage and check oil level.
28	Coolant Temperature Light	Illuminates when coolant temperature has risen to an unsafe level. Operator should turn engine off to prevent possible engine damage and check coolant level and water pump.
29	Low Coolant Light	Illuminates when coolant level falls below safe level. Operator should turn engine off to prevent possible engine damage and check coolant level.
30	Transmission Temperature Light	Illuminates when transmission fluid temperature has risen to an unsafe level. Operator should turn engine off to prevent possible damage and check transmission fluid level.
31	Spare	Position not used.
32	Spare	Position not used.

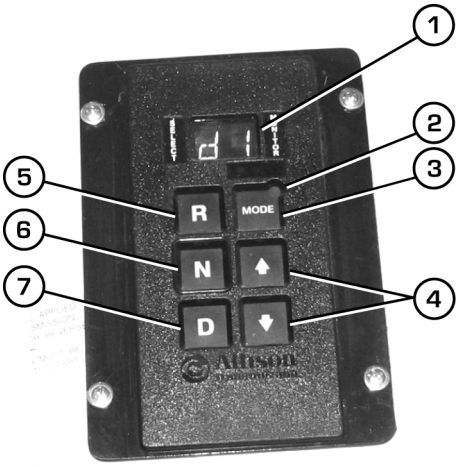


Figure 2-3 Transmission Control

Table 2-3 Transmission Control

Item	Name	Function
1	Digital Display	Displays currently selected gear, status, and diagnostic information. See XREF for more information.
2	Mode Indicator LED	Indicates special operation mode
3	Mode Select Button	Activates special operation modes for the transmission
4	Shifter Buttons	When transmission is in D (drive), pressing these buttons shifts the transmssion into higher (⇑) or lower (⇓) gears. Also used to enter transmission's diagnostic mode. See XREF for more information.
5	Reverse Select Button	Shifts the transmission into reverse.
6	Neutral Select Button	Shifts the transmission into neutral.
7	Drive Select Button	Shifts the transmission into drive.

SECTION 3. OPERATION

3-1 SAFETY PRECAUTIONS

⚠Warning

The Trailer Jockey is equipped with operator seat belts that should be worn at all times when the vehicle is in operation. Failure to properly wear seat belts at all times can greatly increase the possibility of injury in an accident.

⚠Caution

Face inward and always use grab handles when entering or exiting the vehicle.

Keep interior of cab clean and free of obstacles or obstructions that could impair safe operation of the vehicle.

Keep windows and mirrors clean.

Do not allow mud or road grime to accumulate on floor of cab or exterior steps and walkways. A slippery surface is hazardous.

This vehicle has been engineered and manufactured to be as safe and trouble-free as possible. Vehicle design and the parts used to manufacuture this vehicle undergo extensive testing and research to guarantee that acceptable, safe service lift is realized.

However, the vehicle owner plays an important part and determines, in large part, the extent to which this vehicle will provide trouble-free operation. It is the owner's responsibility to see that the vehicle receives proper care by following all the prescribed scheduled maintenance procedures detailed in this manual. Proper maintenance will ensure that parts subject to normal wear and tear are repaired or replaced in a timely fashion.

⚠Warning

Failure to exercise due care when entering and exiting vehicles can result in personal injury. Entry and exit should be made slowly, deliberately and carefully. A three-point stance should be used (three out of four extremities should be in contact with the vehicle at all times). Face inward toward steps and handholds when entering and exiting. Always keep steps and handholds in continuous good repair. Keep steps, grab handles and shoes free of grease, mud, dirt, fuel, ice and snow. Use extra care during inclement weather.

3-2 SERVICE ON RECIEPT

Upon receipt of this Trailer Jockey, inspect for any damage and parts shortages that may have occurred during shipment. Make certain that all assemblies are present and undamaged. Note and report any discrepancies immediately to your dealer or Capacity of Texas, Inc.

3-2.1 PRELIMINARY SERVICE

Before placing this Trailer Jockey in operation, perform complete lubrication, inspection and daily preventative maintenance operations listed later in this book. Use lubricants and antifreeze solutions suitable for lowest expected temperatures. Note and comply with any special instruction tags. Be sure that date of delivery and start-up is reported to factory on warranty registration card to validate warranty. Fill in and mail engine warranty registration slip.

3-2.2 OPERATOR ORIENTATION

Before operating this Trailer Jockey, the operator should familiarize himself with the controls and indicators described in Section 2. Read this manual to learn the vehicle's operational and maintenance characteristics, capacities and limitations. Refer to the engine manufacturer's manual for information and maintenance of the engine, and to the transmission manufacturer's manual for details on the operation of the transmission. Only when the operator is confident he understands the controls, should he start the engine and begin operation. Watch closely for signs of improper operation. Allow the engine to warm up to normal operating temperature, check brakes, steering and transmission controls. Correct any trouble before proceeding.

⚠Caution

Know the operating clearances and load limitations of your Trailer Jockey before you begin operation to prevent damage to property or injury to personnel.

3-3 Pre-Operation Inspection

Inspect your machine according to your operator's manual and your foreman's instructions. Report any defects to your supervisor immediately. Pre-operation inspection should include, but not be limited to, the following items:

- leaks
- frayed hoses
- worn insulation
- loose or missing parts
- tire damage
- proper tire inflation
- guards and other protective devices in place and secure

3-4 Vehicle Refueling

⚠Warning

Do not smoke when refueling the vehicle. Keep all cigarettes, cigars, pipes, sparks, flames, or other sources of possible ignition at least 50 feet away from vehicle during fueling operations.

Avoid standing downwind where spilled fuel could spill on you.

Replace fuel cap securely.

3-5 VEHICLE START UP

Observe the following items when starting the vehicle.

- Transmission controls must be in neutral before starting engine.
- Ensure parking brake control is pulled out to engage brakes before starting engine.
- Start the engine from the operator's seat only. It is good practice to make sure no one is in a dangerous position relative to the Trailer Jockey before starting the engine.
- Check all gauges and instruments for proper operation after the engine is started.

⚠Warning

Never allow anyone to stand outside the cab, on any step or walkway when operating the Trailer Jockey. He could fall off or be crushed by a trailer.

⚠Warning

Exhaust fumes can cause sickness and death. If necessary to start an engine in an enclosed area, be sure to provide adequate ventilation.

⚠Warning

To avoid loss of vehicle control and possible personal injury, never operate the vehicle when insufficient air pressure (less than 70 PSI (483 KPa) is indicated for either system since the volume of air required to stop the vehicle may be greater than that available. Have the brake system checked off and repaired before returning the vehicle to service.

⚠Warning

If jumper cables are used to start an engine, connect negative to negative and positive to positive. Be careful not to create sparks that could cause an explosion.

To start the vehicle, follow these steps:

a. Pull out on yellow parking brake control knob to insure that parking brakes are set.

b. Position the transmission selector in neutral (N)

c. Depress the accelerator pedal slightly and hold.

d. Turn ignition key to START and hold until the engine starts (not to exceed 30 seconds.

e. As soon as the engine starts, allow the engine to idle and check the oil pressure gauge to be sure the engine is getting lubrication. If oil pressure doesn't begin rising from 0 PSI within five seconds, stop engine. Determine the problem before attempting to start again.

f. Allow air pressure to build to normal operating pressure.

! Note

The parking brake cannot be released until the air system exceeds 60 PSI.

3-5.1 Engine and Transmission Warmup

The greatest wear occurs when a cold engine is started as the oil has drained off the moving parts. Do not start engine and immediately accelerate the engine or put it under load. It needs to be run at low idle for a few minutes to warm up and lubricate itself before being accelerated or placed under load.

! Note

The transmission is programmed to restrict full operation in temperatures below 19 ºF (-7 ºC) until the transmission fluid reaches suitable operating temperature.

3-5.2 Cold Weather Starting Aids

When using other than Capacity-supplied cold weather starting aids, follow the manufacturer's recommendations.

⚠Warning

DO NOT USE ETHER IN A WARM ENGINE OR WHEN AN ENGINE IS RUNNING. Some starting aids are highly flammable and pose a fire or explosion hazard. Do not more than the recommended amout. Never smoke while using starting aids. When disposing of a container, avoid burning or puncturing the container to prevent fire or explosion.

3-6 Pre-Operation Checks

The following paragraphs contain procedures that should be performed prior to operating you Trailer Jockey. Don't take a chance with a defective machine. Report it to your supervisor.

3-6.1 Proper Seat Belt Usage

Observe the following steps when adjusting and buckling seat belt to prevent injuries.

⚠Warning

The belt should fit snugly and as low as possible around the hips, not around the waist. Failure to do so may increase the risk of injury in the event of a collision.

⚠Warning

Always inspect safety belts, resolve any issues, and tighten tethers before starting vehicle.

a. Loosen tether belts and adjust the seat so that you can sit up straight. After adjustment make sure the tether belts are snug.

b. Pick up the latch plate and pull the belt across you. Do not let it get twisted.

c. Push the latch plate into the buckle until it clicks. Make sure the release button on the buckle is positioned for easy access in the event you need to release it quickly.

d. To unfasten the belt, press the red release button on the buckle.

3-6.2 Steering

Turn the steering wheel to the right and to the left to check that steering is functioning properly.

Be alert to any change in the feel of the steering mechanism when driving. A change in the feel would include increased steering efforts, unusual sounds when turning, excessive wheel play or pulling to either side.

If the feel has changed significantly, check tie rod and drag link end clamp bolts. They must be tight. Ask a service techni-

cian to examine the steering mechanism. Minor adjustments could head off further problems.

Check power steering system for leaks or hose chaffing. Repair at once. Maintain proper steering gear and power steering pump lubricant levels. Regularly inspect all steering linkage, particularly for body-to-chassis clearance.

3-6.3 Brakes and Transmission

Test service and parking brakes to make sure you will be able to stop and stay stopped.

Be sure you can control direction of travel and speed. Shift the transmission control lever in both directions. **The brake must be applied when shifting from neutral to forward or reverse.**

With the transmission in neutral and the brakes applied, accelerate and decelerate the engine to make sure the throttle works correctly and returns to idle properly.

3-6.4 Final Checks

Recheck lights, mirrors, horn and other safety devices. Sit properly and in an alert position and make sure your seat belt and shoulder belt are fastened and positioned properly.

3-7 Driving Precautions

⚠Warning

REMEMBER
It only takes one unsafe act to cause an accident. Use these safety rules, your employer's safety rules and follow your employer's instructions to develop safe working habits.
A CAREFUL OPERATOR IS THE BEST SAFETY DEVICE THERE IS!

Remember these rules when traveling:

- Pull out of your space slowly, making sure your load is following properly if you have a trailer attached.
- Look in all directions as you pull out of a blind area.
- No passengers on or in Trailer Jockey.
- Go slow in congested areas, over rough ground and on slopes. Keep your speed slow enough so you are in complete control at all times.
- Give loaded vehicles the right of way. Follow your employer's traffic rules on the job. Watch out for other vehicles.
- Do not make sudden maneuvers with elevated trailer.
- Avoid crossing obstacles such as ridges, curbs, lumber, railroad tracks and chocks.

⚠Warning

Before backing up, check that area behind vehicle is clear of people, animals and objects. Use a spotter whenever possible and always keep that person in sight. Failure to do so may result in severe personal injury, death or property damage. Don't back into an area in which you cannot see. Get an experienced assistant to guide you if you can't see.

⚠Caution

Never descend a grade faster than the Trailer Jockey and load could climb that same grade.

3-8 If You Have A Problem

Remember, even a minor defect can become serious. Report all defective equipment immediately.

⚠Caution

Prop shaft MUST be disconnected for towing to prevent damage to transmission.

If possible, haul a defective machine to the repair area. Avoid towing it. If towing is unavoidable, the parking brakes may be released by pushing the cab parking brake control in, provided adequate air pressure is available. The parking brakes may be released manually at the rear brake chambers. These manual releases must be removed when the towing is completed in order to re-engage the parking brakes.

⚠Warning

To avoid personal injury or property damage when manually releasing the spring brakes, be sure to block the wheels so that vehicle cannot move when the brakes are released.

⚠Warning

Under no circumstances should a spring brake chamber assembly be disassembled without following the procedures described in the service manual. Bypassing these procedures may result in severe personal injury or death.

To manually release parking brakes for towing, remove cover plug and special bolt from housing and insert bolt in chamber and turn 1/4 turn. Tighten nut with 3/4-inch wrench until spring is compressed - releasing brakes.

⚠Warning

This is an emergency procedure only. The spring brake chamber must be returned to automatic application by removing special bolt and replacing bolt and cap in proper places before operating the Trailer Jockey. A flashing red light is provided to warn the operator that the parking brake is applied.

3-9 Engine Operation

Follow the engine manufacturer's recommendations on starting, stopping and maintaining the engine in your Trailer Jockey. Capacity of Texas, Inc. offers a choice of engine options to be specified by the customer.

⚠Warning

Do not smoke around ether system. Avoid breathing vapor and contact with skin. Do not dispose of cylinder in burnable trash. Keep away from heat, sparks, open flame and temperatures above 200° F.

⚠Warning

Maintain adequate clearance between all parts of the exhaust system and all hoses, wires and lines for engine cooling, brake system, fuel system, power steering system and electrical system. Heat damage to hoses, wires or lines may cause vehicle malfunction that could result in property damage or severe personal injury.

3-9.1 Stopping the Engine

Shift the transmission to neutral, set the parking brake and turn the key off. Engines which are hot or have been under a heavy load should be allowed to idle to cool down before stopping.

⚠Warning

Do not remove the radiator cap on any Trailer Jockey engine that is hot. All cooling systems are pressurized and severe burns can result from pressurized coolant and steam escaping when the radiator cap is loosened or removed from an engine that is running or has been recently stopped.

3-10 TRANSMISSION OPERATION

⚠Caution

The Trailer Jockey is equipped with an Allison automatic transmission. Have a qualified technician occasionally check operation of transmission neutral start switch. If unit starts in gear, have it repaired.

The Allison transmission installed in your Trailer Jockey is completely electronically controlled. It is not necessary to select the right moment to upshift or downshift during changing road and traffic conditions. The transmission does it for you. The pushbutton shift selector also provides the ability to monitor transmission fluid levels and display diagnostic codes.

Having a thorouogh knowledge of the shift selector positions, available ranges, and when to select them will make vehicle control and your job easier. Select lower ranges when descending long grades to reduce wear and tear on service brakes.

! Note

Visually check the digital display whenever a button is pushed to be sure the range selected is shown. For example, if you press **N** (Neutral), the digital display should indicate **N**.

If the digital display is flashing, this indicates the gear selected was not attained due to an active inhibit.

3-10.1 Pushbutton Shift Selector Operation

Figure 3-1 Pushbutton Shift Selector

Table 3-1 Shift Selector Controls

Item	Description
R (Reverse)	Press this button to select Reverse gear
N (Neutral)	Press this button to select Neutral, disengaging the gears
D (Drive)	Press this button to select Drive. The forward range available will appear in the digital display. The transmission will start out in the lowest available forward range and advance automatically to the highest range.
⇑(Up arrow)	Press this button when in Drive to request the next higher range. Continuously pressing the up arrow will request the highest range possible
⇓(Down arrow)	Press this button when in Drive to request the next lower range. Continuously pressing this button will request the lowest range possible.
MODE	This button accesses special functions of the transmission, and is used in diagnostic mode to scroll and toggle through diagnostic codes. See XREF for more information.
Digital Display	Two-digit display shows the range selected.

3-10.2 R - REVERSE

⚠Warning

Reverse gear may not be attained due to an active inhibitor. Apply service brakes when selecting **R** (Reverse) to prevent unexpected vehicle movement and because a service brake inhibit may be present. When the R indicator is flashing, it indicates the shift to Reverse is not attained.

⚠Caution

Do not idle in **R** (Reverse) for more than five minutes. Extended idling in **R** (Reverse) can cause transmission overheating and damage. Always select **N** (Neutral) whenever idle time exceeds five minutes.

Completely stop the vehicle and let the engine return to idle before shifting from a forward range to **R** (Reverse).

3-10.3 N - NEUTRAL

Use **N** (Neutral) when starting the engine, to check vehicle accessories, and for extended periods of engine idle operation (longer than five minutes). The transmission will automatically select N when starting the engine.

3-10.4 D - DRIVE

⚠Warning

Drive gear may not be attained due to an active inhibitor. Apply service brakes when selecting **D** (Drive) to prevent unexpected vehicle movement and because a service brake inhibit may be present. When the D indicator is flashing, it indicates the shift to Drive is not attained.

⚠Caution

Do not idle in **D** (Drive) for more than five minutes. Extended idling in **D** (Drive) can cause transmission overheating and damage. Always select **N** (Neutral) whenever idle time exceeds five minutes.

The transmission will initially shift into first range when **D** (Drive) is selected. As vehicle speed increases, the transmission will upshift automatically through each range. As the

vehicle slows, the transmission will downshift automatically through each range. The digital display will show the highest range available in **D** (Drive).

Lower ranges provide greater engine braking for descending grades (the lower the range, the greater the braking effect.) Occasionally, it may be desirable to restrict automatic shifting to a lower range due to road conditions, load, traffic, or other factors. The pushbutton shift selector arrow buttons access individual forward ranges. Push the ⇑ (Up arrow) or ⇓(Down arrow) for the desired range. Even though a lower range is selecte, the transmission may not downshift until vehicle speed is reduced in order to prevent excessive engine speed in the lower range.

⚠Warning

The transmission must not be shifted from one direction to the other without coming to a complete stop. The brakes must be applied to shift from neutral to forward - neutral to reverse - forward to reverse - reverse to forward. A safety device on the Trailer Jockey requires that the brakes be applied to shift out of neutral. If this device is not operating, repair or adjust it at once.

⚠Warning

If you leave the vehicle and the engine is running, the vehicle can move unexpectedly and you or others could be injured. If you must leave the engine running, do not leave the vehicle until you do all of the following:

1. Put the transmission in Neutral
2. Ensure engine is at a low idle speed (500 to 800 RPM)
3. Apply parking brake and emergency brake
4. Chock wheels and take any other necessary steps to keep vehicle from moving

3-11 Power Take-Off (PTO)

The PTO is pressure lubricated by transmission fluid and is designed to drive the hydraulic pump under normal terminal operating conditions. It should be disengaged to increase PTO and pump life when driving the machine on trips in excess of 5 miles one way at highway speeds. The MT Transmission PTO may be disengaged by rotating the lever on the PTO cover to the rear. The engine must be stopped to re-engage the PTO by

moving the lever forward. Forcing the lever forward with the engine running will damage the transmission and PTO gears.

The MT Transmission PTO, when engaged will operate only when the transmission is in neutral or when the machine is traveling. The hydraulic pump

! Note

To operate hydraulic pump when the machine is stopped, the transmission must be shifted to neutral.

3-12 Trailer Pickup and Movement

⚠ Warning

Never allow passengers on or in the Trailer Jockey while in operation.

⚠ Warning

Attempting to couple with the trailer at an improper height could result in a false or improper coupling and cause damage to the Trailer Jockey fifth wheel and/or trailer.

a. Raise fifth wheel, if necessary, to pick up the trailer slightly when backing under trailer.

b. Back under trailer until the fifth wheel latches securely.

c. Raise the trailer landing gear just off the ground. Place shift selector in "D" and make test pull.

⚠ Caution

Move forward just enough to be sure the king pin is locked in the fifth wheel. Make sure transmission selector is in the neutral position before lifting.

⚠ Warning

If you do not obtain a proper coupling, pull away and line up the fifth wheel with the trailer again. Do not use any fifth wheel that fails to operate properly.

d. Hook up both service and trailer brake release air lines and electrical connections.

⚠Warning

Always make these connections even if trailer is only to be towed a short distance.

e. Raise the fifth wheel high enough to clear any obstacle that may be encountered to prevent damage to the trailer landing gear.

f. Push in the red trailer air supply knob to release the trailer brakes. Check that any wheel chocks and obstructions are clear of the trailer wheels.

g. The trailer may now be pulled to desired location.

⚠Warning

Do not make sudden changes of direction while hauling elevated trailer. Sudden load shifts can cause accidents.

When using Trailer Jockey with trailer on public roads, the fifth wheel manual secondary lock must be used. Check to see that it is properly engaged.

⚠Caution

When operating this vehicle on public highways, the fifth wheel highway lock must be engaged and the fifth wheel must be in the lowered position with the trailer landing gear cranked up to comply with overall height regulations.

! Note

The PTO should be disengaged when driving the machine on trips in excess of 10 miles one way to increase PTO and pump life. The MT Transmission PTO may be disengaged by pushing the lever on the PTO cover to the rear. The engine must be stopped to re-engage the PTO. Reengage PTO by moving the lever forward.

⚠Caution

Forcing the lever forward with the engine running will damage the transmission and PTO gears.

3-13 TRAILER SPOTTING (PARKING)

a. Position the trailer in the desired location. Pull out the red trailer air supply knob to set the trailer brakes.

b. Move the fifth wheel lever to the DOWN position and lower the trailer and fifth wheel until the trailer rests on its landing gear. Allow the lever to return to center position after lowering.

⚠Caution

The trailer must rest solidly on its landing gear.

c. Disconnect the air and electrical connections from the trailer.

d. Disengage fifth wheel manual secondary lock.

e. Push the fifth wheel release valve to UNLOCK and hold it down. Slowly drive the Trailer Jockey away from the trailer.

3-14 SHUTDOWN

a. When the Trailer Jockey is positioned in its parking area, pull out on the yellow parking brake knob to apply the parking brakes.

b. Turn the ignition key to OFF to shut down the engine.

c. If the vehicle is to remain idle for several hours, the fuel tank should be filled to prevent condensation.

3-15 TOWING

Any time the Trailer Jockey is to be towed, the driveline must be disconnected or the rear wheels lifted off the ground.

⚠Caution

Failure to disconnect the driveline or remove the axle shafts before towing or pushing can cause serious transmission damage. The engine cannot be started by towing or pushing. Before towing or pushing a vehicle, disconnect the driveline or lift the drive wheels off the road. An auxiliary air supply will usually be required to actuate the vehicle brake system.

3-16 Dash Gauge Operation

The Trailer Jockey is equipped with a multifunction digital speedometer/odometer. The alphanumeric display is activated when the vehicle ignition switch is turned on. Successively pressing the Mode button will toggle the display through its various operating modes. The display will revert back to odometer mode 15 seconds after other modes are chosen..

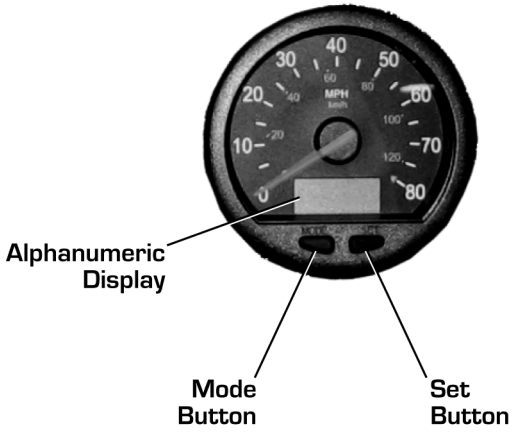


Figure 3-2 Dash Gauge

3-16.1 Odometer Mode

By default, the display starts in odometer mode, showing the vehicle's cumulative mileage. To switch between miles and kilometers, press the Set button.

3-16.2 Trip Odometer Mode

The display incorporates two independent trip odometers, identified as TRIP1 and TRIP2. To reset a trip odometer, press the Set button while in trip odometer mode. To switch between miles and kilometers, press the Set button.

3-16.3 Hourmeter Mode

The display will show the cumulative number of hours the engine has been running.

3-16.4 Diagnostic Mode

The display can be used to read system diagnostic codes from the electronics control unit. Refer to "System Diagnostics" on page 44 for more information.

SECTION 4.
SERVICE & DIAGNOSTICS

4-1 MINOR MAINTENANCE

Regular inspections of the Trailer Jockey will help increase its service life. Inspections before after operation and at regular preventive maintenance intervals will disclose minor maintenance problems and the operator should report any problems he is aware of at the end of each shift. If all minor maintenance and service is performed promptly as it becomes necessary, major maintenance should seldom be required.

4-2 TILTING THE CAB

The cab can be tilted forward to gain access to the engine, transmission and hydraulics.

⚠Warning

Never get under a raised cab unless the safety latch bar is engaged. Stay clear of descending cab and platform.

a. Push lever down on cab, lift pump to raise cab.

b. Be sure safety latch bar is locked securely into any one of the six holding positions before proceeding to do inspection or repair work.

c. Prior to lowering the cab make sure everyone is clear of the cab area and that tools and equipment have been removed.

d. Raise cab slightly, then pull safety latch bar cable with right hand while lowering the cab by lifting cab tilt lever.

4-3 Regular Maintenance Schedule

4-3.1 General

A program of periodic on the job preventive maintenance is necessary to insure maximum performance and availability of your Capacity tractor. The Capacity tractor will serve its owner efficiently throughout a long and active service life if a few basic inspections and services are regularly performed. The following suggested preventive maintenance program is intended as a guide for the maintenance personnel assigned to this tractor.

! Note

See "Engine Oil and Filter Changes" on page 39 for details on changing the engine oil.

4-3.2 Daily Maintenance

⚠Warning

Never remove cap from hot radiator. Allow radiator to cool.

- Record hourmeter reading
- Check coolant level and add coolant if necessary (use caution).
- Check transmission oil level and add oil if necessary (engine running).
- Check engine oil level add oil if necessary (engine stopped).
- Check power steering oil level and add oil if necessary.
- Check all belts for tension and condition.
- Check hydraulic oil level and add oil if necessary (boom down).
- Drain water from all air tanks.
- Check tire pressure and condition.
- Check for leaks, broken or damaged parts.
- Apply grease to fifth wheel jaws, locks, cylinders, etc.
- Check lights working and clean.
- Check mirrors clean, tight and unbroken.
- Check fuel/water separator
- Check charge air connection

4-3.3 Weekly Maintenance

The following checks should be made weekly, or after every 50 hours of operation.

- Perform all daily checks.
- Check auto lube.
- Check oil in rear axle.

4-3.4 Monthly Maintenance

The following checks should be made monthly, or after every 250 to 300 hours of operation.

⚠Caution

Never service air cleaner with engine running to prevent dirt from being drawn into intake.

- Service air cleaner when indicator shows red
- Change engine oil and filter
- Change hydraulic oil filter
- Check wheel nut torque
- Change transmission external filter
- Check fuel filters when fuel reaches 1/2" from top of clear bowl
- Check adjustment on all brakes with manual slack adjuster.

4-3.5 Quarterly Maintenance

The following checks should be made quarterly, or after every 500 hours of operation.

- Check air cleaner restriction and replace filter if necessary
- Check charge-air piping
- Check charge-air cooler
- Check wheel bearing oil
- Check brake linings for wear and adjust cams or replace linings if necessary
- Check oil in rear axle
- Check oil in transmission (Oil sampling analysis recommended)
- Change fuel filter (spin-on type)

4-3.6 1000-Hour Maintenance

The following checks should be made after every 1000 hours of operation.

- Change internal transmission filter and change fluid. (Oil sampling analysis recommended)
- Change steer reservoir filter and fluid.
- Change hydraulic oil and clean strainer.
- Check drive belt, cooling fan, cooling fan belt tensioner
- Check air dryer cartridge.
- Check and adjust fifth wheel jams
- Change cab tilt oil.
- Test fuel injection nozzles - Manufacturer Repair Facility
- Check and clean automatic drain on wet air tank.
- Check Dura-Ride center bearing
- Check Dura-Ride air bags
- Check Dura-Ride height adjustment

4-3.7 2000-Hour Maintenance

The following checks should be made after every 2000 hours of operation.

- Flush cooling system
- Check viscous vibration damper
- Steam clean engine
- Check radiator hoses
- Inspect crankcase ventilation filter. Replace if necessary.

4-3.8 Overhead Set Adjustment

Overhead set adjustment should be performed at 5000 hours or 4 years of operation.

4-3.9 Three-Year / 6000 Hour Checks

The following checks should be made every three years or after every 6000 hours of operation. Capacity recommends a preventive overhaul be performed by an authorized repair facility.

- Change oil in rear axle
- Change oil in wheel bearings

- Change oil in transmission
- Change air dryer cartridge
- Change brake linings
- Clean aftertreatment diesel particulate filter.

4-4 Service Procedures

4-4.1 Fluid Levels

The engine, power steering, and transmission oil levels may be checked by raising the hood.

- The engine oil level must be checked with the engine stopped.
- The transmission oil level must be checked with the engine idling and the oil at normal operating temperature.
- Engine, power steering and transmission oils may be added without tilting the cab.
- The main hydraulic system oil level may be visually checked by sight gauge at the right side of the Trailer Jockey. The oil level must be maintained above the half way mark when the fifth wheel is lowered.

⚠Caution

The main hydraulic system is pressurized. Remove the pressure cap slowly to relieve the pressure before adding oil. Be sure the area around the cap is clean before removing it.

4-4.2 Engine Oil and Filter Changes

Engine oil should be changed at:

- Six (6) months
- 550 hours
- 12,000 miles (19,000 kilometers)

whichever comes first. Cummins recommends using a high-quality SAE 15W-40 heavy duty engine oil. Use of synthetic oils (those made with API group 3 or group 4 base stocks) is permitted. The same engine oil change intervals must be applied to synthetic oil.

! Note

Always use engine oil that meets Cummins Engineering Standard (CES) 20081 or API CJ-4/SL.

! Note

While the preferred viscosity grade is 15W-40, lower viscosity multigrade oils may be used in colder climates, provided these oils meet the CES 20081 requirements. For operation in winter conditions.

! Note

Special break-in engine oils or aftermarket oil additives are NOT necessary and are not recommended.

4-4.3 REGENERATION

There are two types of regeneration that occur as the engine operates. Passive regeneration occurs naturally when the heat of exhaust burns off the soot. Active regeneration becomes necessary when the temperature is too low to completely burn off the soot. If soot accumulates in the filter, a parked regeneration cycle is required. The driver is alerted to the need to perform a regeneration cycle by the diesel particulate filter (DPF) indicator on the left side of the dash (Figure 4-1).

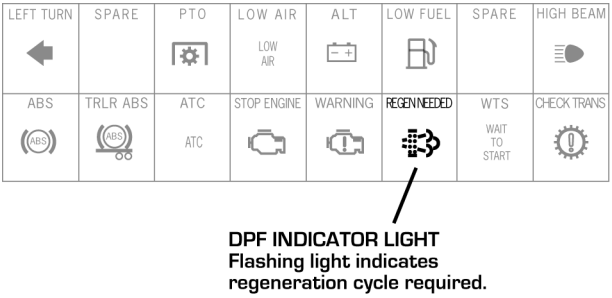


Figure 4-1 Regeneration Indicator Light

⚠Caution

If the driver does not respond to the regeneration indicator light and perform a manual regeneration, the CHECK ENGINE light will also be illuminated. If regeneration is still not performed, after a period of time the STOP ENGINE light will be illuminated. Move the vehicle to a safe location, stop the engine and call for service.

If the DPF indicator light starts to flash, a manual regeneration cycle must be performed, using the following procedure.

1. Drive the truck to a safe area and stop the truck.
2. Set parking brake and shift transmission to **N** (Neutral).
3. Verify that no other indicator lights are illuminated (in particular, the Check Engine light).
4. Depress the regeneration switch on the right side of the cab control panel (). The engine speed will increase to approximately 1600 RPM. Once the engine temperature has been raised to an appropriate level, the regeneration cycle will be started.
5. After approximately 20 to 40 minutes, the regeneration cycle will be complete and the engine speed will drop to idle (approximately 700 RPM).

Figure 4-2 Regeneration Switch

⚠Warning

Do not go near the engine exhaust system during regeneration, as temperatures can exceed 1,100 ºF (593 ºC).

4-4.4 Checking Transmission Fluid Level

The transmission pushbutton shift pad (Figure 3-1) can be used to check the transmission fluid level. Follow these procedures to check fluid level.

a. Park vehicle on a level surface and shift the transmission to **N** (Neutral).

! Note

The fluid level will not be displayed until the following conditions are met:

Engine at idle
Fluid temperature between 140 ºF and 220 ºF (60 ºC to 104 ºC)
Transmission in **N** (Neutral)
Vehicle stationary for approximately two minutes

b. Simultaneously press the ⇑ (Up arrow) and ⇓(Down arrow) buttons. After a few seconds, the digital display will cycle between three codes, as listed in Table 4-1.

For example, a display that flashes OL - LO - 02 is two quarts low.

Table 4-1 Transmission Fluid Level Display Codes

Sequence	Code	Description
1	OL	Fluid (Oil) Level being displayed
2	LO	Fluid Level Low
	HI	Fluid Level High
	- -	Fault
3	0x	Number of quarts to be added or number of quarts overfilled. For example, if the display flashes OL followed by LO followed by 02, the fluid level is two quarts low.
	50 or EL	Engine speed too low
	59 or EH	Engine speed too high
	65 or SN	Transmission not in Neutral
	70 or TL	Fluid temperature too low
	79 or TH	Fluid temperature too high
	89 or SH	Output speed high
	95 or FL	Fluid level sensor failure

4-4.5 Transmission Fluid and Filter Changes

! Note

Only Allison-approved, TES 295 compliant synthetic transmission fluid should be used. Products that are described as "are designed to meet", "are equivalent to", or "meet or exceed" may not be Allison approved. Using any transmission fluid other than those approved by Allison can reduce the transmission's warranty. For a list of approved fluids, refer to the Allison web site (http://www.allisontransmission.com).

Change filter and oil at prescribed intervals. Check for leaks upon starting the engine. Perform "cold check" of oil level immediately upon starting and add oil if necessary to bring level into prescribed range. Once oil is up to normal operating temperature. Recheck oil level - add oil if necessary.

⚠Caution

Flush oil cooler and lines thoroughly when changing or overhauling the transmission.

4-4.6 Hydraulic System Fluid

Change oil and filter at prescribed intervals. Check for leaks.

⚠Caution

Flush reservoir, suction screen, lines and cylinders thoroughly when replacing or rebuilding damaged parts, especially pumps and cylinders.

4-4.7 Battery Service

Check to see if water level is above plates in all cells. Add distilled water if necessary - with non-maintenance free batteries. Check battery fluid specific gravity. A reasonably charged battery should be 1.240.

⚠Warning

To avoid personal injury and property damage, if a wheel must be changed, obtain expert tire service help. Mounting and demounting of tires should only be performed by qualified personnel using necessary safety procedures and equipment

4-5 DIAGNOSTICS

4-5.1 SYSTEM DIAGNOSTICS

The alphanumeric display on the speedometer (Figure 3-2) can be used to display diagnostic codes from the engine control unit (ECU). There are three diagnostic functions available:

- Driver-Initiated Diagnostics
- Manual Diagnostics
- Fault Display

4-5.2 DRIVER -INITIATED DIAGNOSTICS

This function exercises all display modules automatically when initiated. To initiate this function, perform the following steps:

a. Stop vehicle and set parking brake.

b. Press the Mode button on the gauge until it displays "DIAGTST".

c. Press the Set button. The display will read "AUTO" indicating it is in automatic diagnostic mode.

d. Press the Set button again to start the test. The gauges will all move in unison to mid-scale, to full-scale, back to mid-scale, and then back to zero. All indicator LEDs (Figure 2-2) will flash and then turn on.

4-5.3 MANUAL DIAGNOSTIC

This function is similar to the Driver-Initiated Diagnostic mode, except the operator can select individual modules to test. To initiate this function, perform the following steps:

a. Stop vehicle and set parking brake.

b. Press the Mode button on the gauge until it displays "DIAGTST".

c. Press the Set button twice, until the display reads "MANUAL" indicating it is in manual mode.

d. Press the Mode button to cycle through the individual modules to test. When the desired module's name is displayed, press the Set button to start the test.

e. Press the Mode switch to end the test.

4-5.4 FAULT DISPLAY

This function is used to retrieve fault codes that have been raised by the engine control unit (ECU). The fault code will be displayed in two parts. The first code displayed is the device ID, followed by a specific failure code after a three second pause. Table 4-2 shows a list of the fault codes and their meanings for Cummins CM850 engines. Table 4-3 shows a list of the fault codes and their meanings for Cummins CM850 engines. To retrieve the fault codes, perform the following procedure.

a. Stop vehicle and set parking brake.

b. Press the Mode button on the gauge until it displays "DIAGTST".

c. Press the Set button twice, until the display reads "FAULTS" indicating it is in fault code mode.

d. Press the Set button. The first active fault will be displayed.

e. After the first fault is recorded, press the Mode button to cycle to the second fault.

f. Repeat the process until the display reads "FAULTS", indicating that all codes have been displayed.

Table 4-2 CM850 System Fault Codes

Fault Code	Reason	Effect
629 {12}	Engine Control Module - Critical Internal Failure. ECM internal hardware error.	Possible no effect or engine could possibly run rough or **not** start.
190 {2}	Engine Speed/Position Sensor Circuit - Lost Both of Two Signals from the Magnetic Pickup Sensor. The ECM has detected that the primary engine speed sensor (crankshaft position sensor) and the backup engine speed sensor (camshaft position sensor) signals are reversed.	Fueling to injectors is disabled and the engine can **not** be started.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
102 {3}	Intake Manifold Pressure Sensor Number 1 Circuit- Shorted High. High signal voltage detected at the Intake Manifold Pressure Circuit.	Engine power derate.
102 {4}	Intake Manifold Pressure Sensor Number 1 Circuit- Shorted Low. Low signal voltage detected at the Intake Manifold Pressure Circuit.	Engine power derate.
91 {3}	Accelerator Pedal/Lever Position Sensor Circuit - Shorted High. High signal voltage detected at the Accelerator Pedal/Lever Position Circuit.	Severe derate in power output of the engine. Limp home power **only**.
974 {3}	Remote Throttle Pedal/Lever Position Sensor Circuit - Shorted High. High signal voltage detected at the Remote Accelerator Pedal/Lever Position Circuit.	Remote accelerator will **not** operate. Remote accelerator position will be set to zero percent.
974 {4}	Remote Throttle Pedal/Lever Position Sensor Circuit - Shorted Low. Low signal voltage detected at the remote Accelerator Pedal/Lever Position Circuit.	Remote accelerator will **not** operate. Remote accelerator position will be set to zero percent.
110 {3}	Engine Coolant Temperature Sensor Circuit - Shorted High. High signal voltage detected at the Engine Coolant Temperature Sensor Circuit.	Possible white smoke. Fan will stay ON if controlled by the ECM. No engine protection for engine coolant temperature.
110 {4}	Engine Coolant Temperature Sensor Circuit- Shorted Low. Low signal voltage detected at the Engine Coolant Temperature Sensor Circuit.	Possible white smoke. Fan will stay ON if controlled by the ECM. No engine protection for engine coolant temperature.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
110 {0}	Engine Coolant Temperature High - Critical. Engine temperature signal indicates engine coolant temperature is above engine protection critical limit.	Progressive power derate increasing in severity from time of alert. If engine protection shutdown feature is enabled, engine will shutdown 30 seconds after red stop lamp starts flashing.
105 {3}	Intake Manifold Air Temperature Sensor Number 1 Circuit - Shorted High. High signal voltage detected at the intake manifold air temperature sensor.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for intake manifold temperature.
105 {4}	Intake Manifold Air Temperature Sensor Number 1 Circuit - Shorted Low. Low signal voltage detected at the intake manifold air temperature sensor.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for intake manifold temperature.
105 {0}	Intake Manifold Air Temperature Number 1 High - Critical. Intake Manifold Air Temperature Signal indicates intake manifold air temperature is above the engine protection critical limit.	Power and/or speed derate and possible engine shutdown if engine protection shutdown feature is enabled.
1080 {4}	Sensor Supply Voltage Number 2 Circuit - Shorted Low. Low voltage detected at the Sensor Supply Number 2 Circuit.	Engine power derate.
111 {3}	Engine Coolant Level Sensor Circuit - Shorted High. High signal voltage detected at the Engine Coolant Level Sensor Circuit.	None on performance.
111 {4}	Engine Coolant Level Sensor Circuit - Shorted Low. Low signal voltage detected at the Engine Coolant Level Sensor Circuit.	None on performance.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
108 {3}	Barometric Pressure Sensor Circuit - Shorted High. High signal voltage detected at the Barometric Pressure Sensor Circuit.	Engine power derate.
108 {4}	Barometric Pressure Sensor Circuit - Shorted Low. Low signal voltage detected at the Barometric Pressure Sensor Circuit.	Engine power derate.
1080 {3}	Sensor Supply Voltage Number 2 Circuit - Shorted High. High voltage detected at Sensor Supply Voltage Number 2 Circuit.	Engine power derate. No engine protection for Intake Manifold Air Temperature.
190 {0}	Engine Speed High - Critical. Engine Speed Signal indicates engine speed has exceeded the engine protection limit.	Fuel injection disabled until engine speed fails be- low the engine protection limit.
111 {1}	Engine Coolant Level Low - Critical. Engine coolant sensor signal indicates that the coolant level is below the engine protection limit.	None on performance.
84 {2}	Vehicle Speed Sensor Circuit - Data Incorrect. The ECM lost the vehicle speed signal.	Engine speed limited to "Maximum Engine Speed without VSS". Cruise control, gear-down protection and the road speed governor could possibly **not** work.
84 {01}	Vehicle Speed Sensor Circuit - Tampering has Been Detected. Invalid or inappropriate vehicle speed signal detected. Signal indicates an intermit- tent connection or VSS tampering.	Engine speed limited to "Maximum Engine Speed without VSS". Cruise control, gear-down protection and the road speed governor could possibly **not** work.
647 {4}	Fan Control Circuit - Shorted Low. Low signal volt- age detected at the Fan Control Circuit.	The fan can be on continuously or **not** run at all.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
94 {2}	Fuel Pressure Sensor Circuit - Data Incorrect. The ECM has detected that the fuel pressure signal is **not** changing.	The ECM will estimate fuel pressure and power will be reduced.
1347 {4}	High Fuel Pressure Solenoid Valve Number 1 - Shorted Low. Low signal voltage detected at the EFC Actuator Circuit.	Engine will run poorly at idle. Engine will have low power. Fuel pressure will be higher than commanded.
1347 {3}	High Fuel Pressure Solenoid Valve Number 1 - Shorted High. High signal voltage detected at the EFC Actuator Circuit.	Engine will **not** run or engine will run poorly.
1043 {4}	Engine Speed/Position Sensor Number 1 (Crank- shaft) Supply Voltage Circuit - Shorted Low. Low voltage detected on the ECM voltage supply line to the engine speed sensor.	Possible hard starting and rough running.
639 {9}	SAE J1939 Multiplexing PGN Timeout Error. The ECM expected information from a multiplexed device but did **not** receive it soon enough or did **not** receive it all.	At least one multiplexed device will **not** operate properly.
639 {13}	SAE J1939 Multiplexing Configuration Error. The ECM expected information from a multiplexed device but **only** received a portion of the necessary information.	At least one multiplexed device will not operate properly.
91 {19}	SAE J1939 Multiplexing Accelerator Pedal Sensor System Error. The OEM vehicle electronic controls unit (VECU) detected a fault with its accelerator pedal.	The engine will **only** idle.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
974 {19}	SAE J1939 Multiplexing Remote Throttle Data Error. The OEM vehicle electronic control unit (VECU) detected a fault with the remote accelerator.	Engine will **not** respond to the remote throttle.
108 {2}	Barometric Pressure Sensor Circuit - Data Incorrect. An error in the barometric pressure sensor signal was detected by the ECM.	Engine power derate.
251 {2}	Real Time Clock - Power Interrupt. Real time clock lost power.	None on performance. Data in the ECM will **not** have accurate time and date information.
651 {5}	None on performance. Data in the ECM will **not** have accurate time and date information.	Engine can possibly misfire or run rough.
655 {5}	Injector Solenoid Valve Cylinder Number 5 Circuit - Open Circuit. High resistance detected on Injector Number 5 Circuit or no current detected at Number 5 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.
653 {5}	Injector Solenoid Valve Cylinder Number 5 Circuit - Open Circuit. High resistance detected on Injector Number 5 Circuit or no current detected at Number 5 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.
565 {5}	Injector Solenoid Valve Cylinder Number 6 Circuit - Open Circuit. High resistance detected on Injector Number 6 Circuit or no current detected at Number 6 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
652 {5}	Injector Solenoid Valve Cylinder Number 2 Circuit - Open Circuit. High resistance detected on Injector Number 2 Circuit or no current detected at Number 2 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.
654 {5}	Injector Solenoid Valve Cylinder Number 4 Circuit - Open Circuit. High resistance detected on Injector Number 4 Circuit or no current detected at Number 4 injector driver or return pin when the voltage supply at the harness is on.	Engine can possibly misfire or run rough.
630 {2}	Engine Control Module - Data Lost. Severe loss of data from the ECM.	Possible no noticeable performance effects engine dying, or difficulty in starting the engine. Fault information, trip information, and maintenance monitor data can be inaccurate.
629 {12}	Engine Control Module - Warning Internal Hardware Failure. Internal ECM failure.	Possible none on performance or severe derate.
629 {12}	Injector Power Supply - Bad Device. The ECM measured injector boost voltage is low.	Possible Low Power, Smoke, Miss, Runs Rough Engine May **Not** Start, or no effect.
1079 {4}	Sensor Supply Voltage 1 Circuit - Shorted Low. Low voltage detected at Sensor Supply Number 1 Circuit.	Engine power derate.
1079 {3}	Sensor Supply Voltage 1 Circuit - Shorted High. High voltage detected at Sensor Supply Number 1 Circuit.	Engine power derate.
1043 {3}	Accelerator Pedal Position Sensor Supply Voltage Circuit - Shorted High. High voltage detected at the sensor supply circuit for the Accelerator Pedal Position Sensor.	Engine will **only** idle.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
608 {2}	SAE J1587/J1922 Datalink - Cannot Transmit. The ECM cannot transmit over the SAE J1587 datalink.	None on performance. Devices on the SAE J1939 datalink may **not** operate.
100 {1}	Engine Oil Pressure Low - Critical. Oil pressure signal Indicates oil pressure below the very low engine enabled.	Power and/or speed derate and possible engine shutdown if engine protection shutdown feature is protection limit.
97 {15}	Water in Fuel Indicator High - Maintenance. Water has been detected in the fuel filter.	Possible white smoke, loss of power, or hard starting.
639 {2}	SAE J1939 Datalink - Cannot Transmit. Communication between the ECM and another device on the SAE J1939 datalink has been lost.	None on performance. Devices on the SAE J1939 datalink may **not** operate.
97 {3}	Water in Fuel Sensor Circuit - Shorted High. High voltage detected at the Water-In-Fuel Circuit.	None on performance. No water-In-fuel warning available.
97 {4}	Water in Fuel Sensor Circuit - Shorted Low. Low voltage detected at the Water-in-Fuel Circuit.	None on performance. No water-in-fuel warning available.
558 {2}	Accelerator Pedal Idle Validation Circuit - Data Incorrect. Idle validation signals indicate no voltage detected simultaneously on both idle and off-idle validation switches.	Engine will **only** idle.
558 {13}	Accelerator Pedal Idle Validation Circuit - Out of Calibration. Voltage at idle validation on-idle and off-idle circuit does **not** match accelerator pedal position.	Engine will **only** idle.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
102 {2}	Intake Manifold Pressure Sensor Circuit - Data Incorrect. Voltage signal at the Intake Manifold Pressure Sensor Circuit indicates high intake manifold pressure but other engine characteristics indicated intake manifold pressure **must** be low.	Engine may run derated.
627 {2}	Power Lost without Ignition Off. Supply voltage to the ECM fell below 6.2 volts momentarily, or the ECM was **not** allowed to power down correctly (retain battery voltage for 30 seconds after key OFF).	Possibly no noticeable performance effects, engine dying, or hard starting. Fault information, trip information, and maintenance monitor data may be in accurate.
100 {2}	Engine Oil Pressure Switch Circuit - Data Incorrect. An error in the Engine Oil Pressure Switch signal was detected by the ECM.	Engine will run derated.
168 {18}	Battery Number 1 Voltage Low - Warning. Voltage detected at ECM power supply pins indicates low ECM supply voltage.	Engine could possibly die or run rough.
168 {16}	Battery Number 1 Voltage High - Warning. Voltage detected at ECM power supply pins indicates ECM supply voltage is above the maximum system voltage level.	None on performance.
1043 {4}	Accelerator Pedal Position Sensor Supply Voltage Circuit - Shorted Low. Low voltage detected at the Sensor Supply Circuit to the Accelerator Pedal Position Pedal.	Engine will **only** idle.
94 {16}	Fuel Pressure High - Warning. Fuel pressure signal indicates that fuel pressure has exceeded the maximum limit for the given engine rating.	Possible engine runs rough.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
157 {3}	Injector Metering Rail Number 1 Pressure Sensor Circuit - Shorted High. High signal voltage detected at the Rail Pressure Sensor Circuit.	Power and/or speed derate.
157 {4}	Injector Metering Rail Number 1 Pressure Sensor Circuit - Shorted Low. Low signal voltage detected at the Rail Pressure Sensor Circuit.	Power and/or speed derate.
558 {4}	Accelerator Pedal Idle Validation Circuit - Shorted Low. No voltage detected simultaneously on both the idle validation off-idle and on-idle circuits.	Engine will **only** idle.
677 {3}	Starter Relay Circuit - Shorted High. High voltage detected at the Starter Lockout Circuit.	Either the engine will **not** start or the engine will **not** have Starter Lockout Protection.
677 {4}	Starter Relay Circuit - Shorted Low. Low voltage detected at the Starter Lockout Circuit.	Either the engine will **not** start or the engine will **not** have Starter Lockout Protection.
103 {16}	Turbocharger Number 1 Speed High - Warning Level. High turbocharger speed has been detected.	Engine power derate. The ECM will use an estimated turbocharger speed.
167 {16}	Electrical Charging System Voltage High - Warning Level. High voltage detected by the battery voltage monitor feature.	Amber Warning Lamp illuminated until high battery voltage condition is corrected.
167 {18}	Electrical Charging System Voltage Low - Warning Level. Low voltage detected by the battery voltage monitor feature.	Amber Warning Lamp illuminated until low battery voltage condition is corrected.
167 {1}	Electrical Charging System Voltage Low - Critical Level. Very low voltage detected by the battery volt- age monitor feature.	Red Stop Lamp illuminated until very low battery voltage condition is corrected.
1378 {31}	Change Lubricating Oil and Filter.	None on performance. Maintenance reminder **only**.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
103 {18}	Turbocharger Number 1 Speed Low - Warning Level. Low turbocharger speed has been detected	Engine power derate. The ECM will use an estimated turbocharger speed.
190 {2}	Primary Engine Speed Sensor Error.	Engine power derate.
1172 {3}	Turbocharger Number 1 Compressor Inlet Temperature Sensor Circuit - Shorted High. High signal voltage detected at the Turbocharger Compressor Inlet Air Temperature Sensor Circuit.	Engine power derate.
1172 {4}	Turbocharger Number 1 Compressor Inlet Temperature Sensor Circuit - Shorted Low. Low signal voltage detected at the Turbocharger Compressor Inlet Air Temperature Sensor Circuit.	Engine power derate.
723 {7}	Engine Speed/Position Number 2 - Mechanical Misalignment Between Camshaft and Crankshaft Sensors. Engine position signal from the engine speed sensor and camshaft position sensor do **not** match.	Engine power derate.
723 {2}	Secondary Engine Speed Sensor Error. The ECM has detected an error in the camshaft position sensor signal.	Engine power derate.
1590 {2}	Loss of Communication with Adaptive Cruise Control.	Adaptive Cruise Control will **not** operate.
166 {2}	Cylinder Power imbalance Between Cylinders. A power imbalance between cylinders was detected by the ECM.	Engine could possibly have a rough idle or misfire.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
102 {2}	Engine Coolant Temperature - Data Valid but Above Normal Operating Range - Moderately Severe Level. Engine coolant temperature signal indicates coolant temperature is above the engine coolant temperature engine protection warning limit.	EGR valve will be closed.
651 {0}	Injector Cylinder Number 1 - Mechanical System **Not** Responding Properly or Out of Adjustment. Unintended fueling detected in cylinder Number 1.	Engine will shut down.
652 {0}	Injector Cylinder Number 2 - Mechanical System **Not** Responding Properly or Out of Adjustment. Unintended fueling detected in cylinder Number 2.	Engine will shut down.
652 {0}	Injector Cylinder Number 3 - Mechanical System **Not** Responding Properly or Out of Adjustment. Unintended fueling detected in cylinder Number 3.	Engine will shut down.
653 {0}	Injector Cylinder Number 4 - Mechanical System **Not** Responding Properly or Out of Adjustment. Unattended fueling detected in cylinder Number 4.	Engine will shut down.
655 {0}	Injector Cylinder Number 5 - Mechanical System **Not** Responding Properly or Out of Adjustment. Unattended fueling detected in cylinder Number 5.	Engine will shut down.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
656 {0}	Injector Cylinder Number 6 - Mechanical System **Not** Responding Properly or Out of Adjustment. Unattended fueling detected in cylinder Number 6.	Engine will shut down.
27 {0}	EGR Valve Position Sensor Circuit - Data Erratic, Intermittent, or Incorrect.	Possible low power EGR valve will be closed.
2795 {0}	Variable Geometry Turbocharger Position Sensor Circuit - Data Erratic, Intermittent, or incorrect.	Possible low power. Power to the turbocharger actuator will be limited.
094 {18}	Fuel Pump Delivery Pressure Data Valid but Below Normal Operational Range - Moderately Severe Level. The ECM has detected that fuel pressure in the fuel rail is lower than commanded pressure.	Possibly hard to start, low power, or engine smoke.
094 {16}	Fuel Pump Delivery Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level. The ECM has detected fuel pressure in the fuel rail is higher than the commanded pressure.	None or possible engine noise associated with higher injection pressures (especially at idle or light load).
1075 {3}	Fuel Priming Pump Control Signal Circuit - Shorted High. High signal voltage detected at the Electric Supply/Lift Pump Circuit.	Engine will **not** run or runs poorly.
1075 {4}	Fuel Priming Pump Control Signal Circuit - Shorted Low. Low signal voltage detected at the Electric Supply/Lift Pump Circuit.	Engine will run poorly at idle. Engine will have low power. Fuel pressure will be higher than commanded.
027 {3}	Exhaust Gas Recirculation Valve Position Circuit - Shorted High. High signal voltage detected at the EGR Valve Position Sensor Circuit.	Possible low power. EGR valve will be closed.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
027 {4}	Exhaust Gas Recirculation Valve Position Circuit - Shorted Low. Low signal voltage detected at the EGR Valve Position Sensor Circuit.	Possible low power. EGR valve will be closed.
0 {3}	Exhaust Gas Recirculation Valve Delta Pressure Sensor Circuit - Shorted High. High signal voltage detected at the EGR Differential Pressure Sensor Circuit.	EGR Valve will be closed.
0 {4}	Exhaust Gas Recirculation Valve Delta Pressure Sensor Circuit - Shorted Low. Low signal voltage detected at the EGR Differential Pressure Sensor Circuit.	EGR Valve will be closed.
0 {16}	Fuel Inlet Meter Device - Flow Demand Higher Than Expected. The ECM has detected that fuel pressure in the fuel rail is higher than the commanded pressure.	Possibility hard to start, lower power, or engine smoke.
0 {18}	Fuel Inlet Meter Device - Flow Demand Lower Than Expected. The ECM has detected that fuel pressure in the fuel rail is lower than the commanded pressure.	None or possible engine noise (especially at idle or light load).
633 {31}	Fueling Actuator Number 1 Circuit Error. EFC Actuator Valve Circuit resistance too high.	None or possible derate if pressure control is affected.
190 {31}	Engine Speed Sensor Number 1 - Engine Speed Glitch Detect. Crankshaft Engine Speed Sensor Intermittent Sync.	Possible low power.
723 {31}	Engine Speed Sensor Number 2 - Engine Speed Glitch Detect. Camshaft Engine Speed Sensor Intermittent Sync.	Possible low power.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
103 {10}	Turbocharger Speed - Invalid Rate of Change Detected.	Engine power derate.
2789 {15}	Turbocharger Turbine Inlet Temperature (calculated) - Data Valid but Above Normal Range - Least Severe Level.	Engine power derate.
2629 {15}	Turbocharger Compressor Outlet Temperature (calculated) - Data Valid but Above Normal Range - Least Severe Level.	Engine power derate.
027 {13}	EGR Valve Position Failed Automatic Calibration Procedure.	Possible low power. Power removed from the EGR valve motor.
2791 {3}	EGR Valve Control Circuit - Shorted High or Open. High voltage or open circuit detected at the EGR Valve Motor Circuit.	Power removed from the EGR valve motor.
2791 {4}	EGR Valve Control Circuit - Shorted Low. Low volt- age detected at the EGR Valve Motor Circuit.	Power removed from the EGR valve motor.
2791 {3}	EGR Valve Control Circuit - Shorted High. High voltage detected at the EGR Valve Motor Circuit.	Possible low power. EGR motor will be powered down.
2791 {6}	EGR Valve Control Circuit - Excessive Current Detected. Excessive current detected at the EGR Valve Motor Circuit.	Possible low power. EGR motor will be powered down.
2791 {7}	EGR Valve Control - Mechanical System **not** Responding Properly or Out of Adjustment. EGR valve **not** responding or slow to respond.	Possible low power. EGR motor will be powered down.
411 {16}	EGR Differential Pressure Sensor - Data Valid but Above Normal Operating Range Moderately – Severe Level. EGR differential pressure sensor failed and automatic calibration procedure.	EGR valve will be closed.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
1072 {4}	Engine Brake Actuator Circuit Number 1 - Shorted Low. Low voltage detected at the Engine Brake Circuit.	Engine brakes will **not** operate.
1072 {3}	Engine Brake Actuator Circuit Number 1 - Shorted High. Open circuit or low voltage detected at the Engine Brake Circuit.	Engine brakes will **not** operate.
1209 {3}	Exhaust Pressure Sensor Circuit - Shorted High. High signal voltage detected at the Exhaust Pressure Circuit.	Engine power derate.
1209 {4}	Exhaust Pressure Sensor Circuit - Shorted Low. Low signal voltage detected at the Exhaust Pressure Circuit.	Engine power derate.
412 {3}	EGR Temperature Sensor Circuit - Shorted High. High signal voltage detected at the EGR Temperature Sensor Circuit.	EGR valve will be closed.
412 {4}	EGR Temperature Sensor Circuit - Shorted Low. Low signal voltage detected at the EGR Temperature Sensor Circuit.	EGR valve will be closed.
647 {3}	Fan Control Circuit - Shorted High. Open circuit or high voltage detected at the Fan Control Circuit.	The fan may stay on continuously or **not** run at all.
2795 {3}	Turbocharger Position Sensor Circuit - Shorted High. High signal voltage detected at the turbocharger position sensor circuit.	Possible low power. Turbocharger will be fully open.
2795 {4}	Turbocharger Position Sensor Circuit - Shorted Low. Low signal voltage detected at the turbocharger position sensor circuit.	Possible low power. Turbocharger will be fully open.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
641 {5}	Variable Geometry Turbocharger Actuator Circuit - Current Below Normal or Open Circuit.	Possible low power. Power will be removed from the turbocharger actuator motor.
641 {4}	Variable Geometry Turbocharger Actuator Driver Circuit - Voltage Below Normal, or Shorted to Low Source.	Possible low power. Power will be removed from the turbocharger actuator motor.
641 {3}	Variable Geometry Turbocharger Actuator Driver Circuit - Voltage Above Normal, or Shorted to High Source.	Possible low power. Power will be removed from the turbocharger actuator motor.
641 {6}	Variable Geometry Turbocharger Actuator - Current Above Normal. Excessive current detected at the turbocharger actuator motor.	Possible low power. Power will be removed from the turbocharger actuator motor.
641 {7}	Variable Geometry Turbocharger Actuator - Mechanical system **not** Responding Properly or Out of Adjustment. Turbocharger Actuator **not** responding or slow to respond.	Possible low power. Power will be removed from the turbocharger actuator motor.
641 {2}	Variable Geometry Turbocharger Number 1 Actuator Position Sensor - Out of Calibration. Turbocharger actuator failed automatic calibration.	Variable geometry turbocharger possible low power. Variable geometry turbocharger actuator will remain either open or closed.
1209 {2}	Exhaust Gas Pressure Sensor Circuit - Data Erratic, Intermittent or Incorrect. Exhaust Pressure Sensor Circuit data invalid.	Engine power derate. EGR valve will be closed.
729 {3}	Intake Air Heater Number 1 Circuit - Shorted High. High voltage detected at the Intake Air Heater Signal Circuit.	The intake air heaters may be ON or OFF all of the time.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
729 {4}	Intake Air Heater Number 1 Circuit - Shorted Low. Low voltage detected at the Intake Air Heater Signal Circuit.	The intake air heaters may be ON or OFF all of the time.
697 {3}	PWM Output Device Driver (Transmission Shift Modulation) - Shorted Low. No voltage is detected when voltage is commanded.	The engine and transmission interface will possibly **not** function properly.
697 {4}	PWM Output Driver (Transmission Shift Modulation) - Shorted Low. No voltage is detected when voltage is commanded.	The engine and transmission interface will possibly **not** function properly.
412 {15}	EGR Temperature - Data Valid but Above Normal Operating Range - Least Severe Level.	Engine power derate.
412 {16}	EGR Temperature - Data Valid but Above Normal Operating Range - Moderately Severe Level.	Engine power derate.
110 {15}	Engine Coolant Temperature High - Warning. Engine temperature signal indicates engine coolant temperature is above engine protection warning limit.	Power derate and possible engine shutdown if engine protection shutdown feature is enabled.
105 {15}	Intake Manifold Air Temperature High - Warning. Intake manifold air temperature signal indicates intake manifold air temperature is above the engine protection warning limit.	Engine power derate.
102 {2}	Intake Manifold Pressure - Data Incorrect. The ECM has detected an intake manifold pressure signal that is too high or low for current engine operating conditions.	Engine power derate.

Table 4-2 CM850 System Fault Codes (Cont.)

Fault Code	Reason	Effect
2791 {0}	EGR Valve Actuator Over Temperature (Calculated) - Data Above Normal Range - least severe level.	EGR valve will be closed.
641 {0}	Variable Geometry Turbocharger Actuator Over Temperature (Calculated) - Data Above Normal Range - Least Severe Level.	Possible low power. Power to turbocharger actuator will be limited.

Table 4-3 CM2150 System Fault Codes

Fault Code	Reason	Effect
629 {12}	Electronic Control Module Critical Internal Failure – Bad Intelligent Device or Component. Error internal to the electronic control module (ECM) related to memory hardware failures or internal ECM voltage supply circuits.	Engine may **not** start.
612 {2}	Engine Magnetic Speed/ Position Lost Both of Two Signals – Data Erratic, Intermittent, or Incorrect. The electronic control module (ECM) has detected that the primary and backup speed sensor signals are connected backwards.	None on performance.
102 {3}	Intake Manifold 1 Pressure Sensor Circuit – Voltage Above Normal or Shorted to High Source. High signal voltage detected at the intake manifold pressure circuit.	Derate in power output of the engine.
102 {4}	Intake Manifold 1 Pressure Sensor Circuit – Voltage Below Normal or Shorted to Low Source. Low signal voltage or open circuit detected at the intake manifold pressure circuit.	Derate in power output of the engine.
91 {3}	Accelerator Pedal or Lever Position Sensor 1 Circuit – Voltage Above Normal or Shorted to High Source. High voltage detected at accelerator pedal position number 1 circuit.	Severe derate in power output of the engine. Limp home power **only**.
91 {4}	Accelerator Pedal or Lever Position Sensor 1 Circuit – Voltage Below Normal or Shorted to Low Source. Low voltage detected at accelerator pedal position number 1 signal circuit.	Severe derate in power output of the engine. Limp home power **only**.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
974 {3}	Remote Accelerator Pedal or Lever Position Sensor 1 Circuit – Voltage Above Normal or Shorted to High Source. High signal voltage detected at remote accelerator position signal circuit.	Remote accelerator will **not** operate. Remote accelerator position will be set to 0 percent.
974 {4}	Remote Accelerator Pedal or Lever Position Sensor 1 Circuit – Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at remote accelerator position signal circuit.	Remote accelerator will **not** operate. Remote accelerator position will be set to 0 percent.
110 {3}	Engine Coolant Temperature 1 Sensor Circuit – Voltage Above Normal or Shorted to High Source. High signal voltage or open circuit detected at engine coolant temperature circuit.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for engine coolant temperature.
110 {4}	Engine Coolant Temperature 1 Sensor Circuit – Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at engine coolant temperature circuit.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for engine coolant temperature.
110 {16}	Engine Coolant Temperature – Data Valid but Above Normal Operational Range – Moderately Severe Level. Engine coolant temperature is above engine protection warning limit.	Power derate and possible engine shutdown if Engine Protection Shutdown feature is enabled.
110 {0}	Engine Coolant Temperature – Data Valid but Above Normal Operational Range – Most Severe Level. Engine coolant temperature signal indicates engine coolant temperature above engine protection critical limit.	Progressive power derate increasing in severity from time of alert. If Engine Protection Shutdown feature is enabled, engine will shut down 30 seconds after red STOP lamp starts flashing.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
105 {3}	Intake Manifold 1 Temperature Sensor Circuit – Voltage Above Normal or Shorted to High Source. High signal voltage detected at intake manifold air temperature circuit.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for engine coolant temperature.
105 {4}	Intake Manifold 1 Temperature Sensor Circuit – Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at intake manifold air temperature circuit.	Possible white smoke. Fan will stay ON if controlled by ECM. No engine protection for engine coolant temperature.
105 {0}	Intake Manifold 1 Temperature – Data Valid but Above Normal Operational Range – Most Severe Level. Intake manifold air temperature signal indicates intake manifold air temperature above engine protection critical limit.	Progressive power derate increasing in severity from time of alert. If Engine Protection Shutdown feature is enabled, engine will shut down 30 seconds after red STOP lamp starts flashing.
111 {3}	Coolant Level Sensor 1 Circuit – Voltage Above Normal or Shorted to High Source. High signal voltage detected at engine coolant level circuit.	None on performance.
111 {4}	Coolant Level Sensor 1 Circuit – Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the engine coolant level circuit.	None on performance.
111 {18}	Coolant Level – Data Valid but Below Normal Operational Range – Moderately Severe Level. Low engine coolant level detected.	None on performance.
108 {3}	Barometric Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at barometric pressure circuit.	Engine power derate.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
108 {4}	Barometric Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at barometric pressure circuit.	Engine power derate.
190 {0}	Engine Crankshaft Speed/ Position - Data Valid but Above Normal Operational Range - Most Severe Level. Engine speed signal indicates engine speed above engine protection limit.	Fuel injection disabled until engine speed falls be- low the overspeed limit.
3511 {4}	Sensor Supply 3 Circuit - Voltage Below Normal or Shorted to Low Source. Low voltage detected on the + 5 volt sensor supply circuit to the engine speed sensor.	Possible hard starting and rough running.
3511 {3}	Sensor Supply 3 Circuit - Voltage Above Normal or Shorted to High Source. High voltage detected at sensor supply number 3 circuit.	Possible hard starting and rough running.
84 {2}	Wheel-Based Vehicle Speed - Data Erratic, Intermittent, or Incorrect. The ECM lost the vehicle speed signal.	Engine speed limited to Maximum Engine Speed without VSS parameter value. Cruise control, Gear Down Protection, and Road Speed Governor will **not** work.
84 {10}	Wheel-Based Vehicle Speed Sensor Circuit, Tampering Has Been Detected - Abnormal Rate of Change. Signal indicates an intermittent connection or VSS tampering.	Engine speed limited to Maximum Engine Speed without VSS parameter value. Cruise control, Gear- Down Protection, and Road Speed Governor will **not** work.
647 {4}	Fan Control Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the fan control circuit when commanded ON.	The fan can possibly stay on continuously or **not** run at all.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
171 {3}	Ambient Air Temperature Sensor 1 Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at ambient air temperature circuit.	None on performance.
98 {2}	Engine Oil Level - Data Erratic, Intermittent, or In-correct. An intermittent signal is being received from the oil level sensor.	Oil level sensor operation will be disabled.
98 {1}	Engine Oil Level - Data Valid But Below Normal Operational Range - Most Severe Level. Very low oil level has been detected by the oil level sensor.	The engine may derate. Possible low oil pressure. Possible severe engine damage.
171 {4}	Ambient Air Temperature Sensor 1 Circuit - Voltage Below Normal or Shorted to Low Source. Low voltage detected at ambient air temperature circuit.	None on performance.
1347 {4}	Fuel Pump Pressurizing Assembly 1 Circuit - Volt- age Below Normal or Shorted to Low Source. Low signal voltage detected at the fuel pump actuator circuit.	Engine will run poorly at idle. Engine will have low power. Fuel pressure will be higher than commanded.
1347 {3}	Fuel Pump Pressurizing Assembly 1 Circuit - Volt- age Above Normal or Shorted to High Source. High signal voltage or open circuit detected at the fuel pump actuator circuit.	Engine will **not** run or engine will run poorly.
639 {9}	SAE J1939 Multiplexing PGN Timeout Error - Abnormal Update Rate. The ECM expected information from a multiplexed device but did **not** receive it soon enough or did **not** receive it at all.	One or more multiplexed devices will **not** operate properly. One or more symptoms will occur.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
639 {13}	SAE J1939 Multiplexing Configuration Error - Out of Calibration. The ECM expected information from a multiplexed device but **only** received a portion of the necessary information.	At least one multiplexed device will **not** operate properly.
91 {19}	SAE J1939 Multiplexed Accelerator Pedal or Lever Sensor System - Received Network Data In Error. The OEM vehicle electronic control unit (VECU) detected a fault with its accelerator pedal.	Engine may **only** idle or engine will **not** accelerate to full speed.
974 {19}	SAE J1939 Multiplexing Remote Accelerator Pedal or Lever Position Sensor System - Received Network Data In Error. The OEM vehicle electronic control unit (VECU) detected a fault with the remote accelerator.	The engine will **not** respond to the remote throttle. Engine may **only** idle. The primary or cab accelerator may be able to be used.
108 {2}	Barometric Pressure - Data Erratic, Intermittent, or Incorrect. The ambient air pressure sensor is reading an erratic value at initial key-on.	Engine power derate.
651 {5}	Injector Solenoid Driver Cylinder 1 Circuit - Current Below Normal or Open Circuit. Current detected at injector Number 1 when the voltage is turned off.	Current to injector is shut off. Engine can possibly misfire or run rough.
655 {5}	Injector Solenoid Driver Cylinder 5 Circuit - Current Below Normal or Open Circuit. Current detected at injector Number 5 when the voltage Is turned off.	Current to injector is shut off. Engine can possibly misfire or run rough.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
653 {5}	Injector Solenoid Driver Cylinder 3 Circuit - Current Below Normal or Open Circuit. Current detected at injector Number 3 when voltage is turned off.	Current to injector is shut off. Engine can possibly misfire or run rough.
656 {5}	Injector Solenoid Driver Cylinder 6 Circuit - Current Below Normal or Open Circuit. Current detected at injector Number 6 when voltage is turned off.	Current to injector is shut off. Engine can possibly misfire or run rough.
653 {5}	Injector Solenoid Driver Cylinder 2 Circuit - Current Below Normal or Open Circuit. Current detected at injector Number 2 when voltage is turned off.	Current to injector is shut off. Engine can possibly misfire or run rough.
654 {5}	Injector Solenoid Driver Cylinder 4 Circuit - Current Below Normal or Open Circuit. Current detected at injector Number 4 when voltage is turned off.	Current to injector is shut off. Engine can possibly misfire or run rough.
629 {12}	Electronic Control Module Warning Internal Hard- ware Failure - Bad Intelligent Device or Component. ECM power supply errors have been detected.	Possible no noticeable performance effects or engine dying or hard starting. Fault information, trip information, and maintenance monitor data can be inaccurate.
627 {12}	Injector Power Supply - Bad Intelligent Device or Component. The CM measured injector boost voltage is low.	Possible low power, engine misfire, and/or engine will **not** start.
3509 {4}	Sensor Supply 1 Circuit - Voltage Below Normal or Shorted to Low Source. Low voltage detected at sensor supply number 1 circuit.	Engine power derate.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
3509 {3}	Sensor Supply 1 Circuit - Voltage Above Normal or Shorted to High Source. High voltage detected at sensor supply number 1 circuit.	Engine power derate.
100 {1}	Engine Oil Rifle Pressure - Data Valid but Below Normal Operational Range - Most Severe Level. Oil pressure signal indicates oil pressure is below the engine protection critical limit.	Progressive power derate increasing in severity from time after alert. If the Engine Protection Shut down feature is enabled, engine will shut down 30 seconds after the red STOP lamp starts flashing.
97 {15}	Water-In-Fuel Indicator - Data Valid but Above Nor- mal Operational Range - Least Severe Level. Water has been detected in the fuel filter.	Possible white smoke, loss of power, or hard starting.
639 {9}	J1939 Datalink - Abnormal Update Rate. Communication between the electronic control module (ECM) and another device on the SAE J1939 data link has been lost.	Engine speed will ramp down and remain at idle.
97 {3}	Water-in-Fuel Indicator Sensor Circuit - Voltage Above Normal or Shorted to High Source. High voltage detected at the water-in-fuel circuit.	None on performance. No water-in-fuel warning available.
97 {4}	Water-in-Fuel Indicator Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low voltage detected at the water-in-fuel circuit.	None on performance. No water-in-fuel warning available.
100 {2}	Engine Oil Rifle Pressure - Data Erratic, Intermittent, or Incorrect. The engine oil pressure sensor is reading an erratic value at key-on.	None on performance. No engine protection for oil pressure.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
168 {18}	Battery 1 Voltage - Data Valid but Below Normal Operational Range - Moderately Severe Level. ECM supply voltage is below the minimum system voltage level.	Engine may stop running or be difficult to start.
168 {16}	Battery 1 Voltage - Data Valid but Above Normal Operational Range - Moderately Severe Level. ECM supply voltage is above the maximum system voltage level.	Possible electrical damage to all electrical components.
157 {0}	Injector Metering Rail 1 Pressure - Data Valid But Above Normal Operating Range - Most Severe Level. Fuel pressure signal indicates that fuel pressure has exceeded the maximum limit for the given engine rating.	The engine may be derated.
157 {3}	Injector Metering Rail Number 1 Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at rail fuel pressure sensor circuit.	Power and or speed derate.
157 {4}	Injector Metering Rail Number 1 Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the rail fuel pressure sensor circuit.	Power and or speed derate.
98 {17}	Engine Oil Level - Data Valid But Below Normal Operational Range - Least Severe Level. Low oil level has been detected by the oil level sensor.	The engine may derate. Possible low oil pressure. Possible severe engine damage.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
98 {4}	Engine Oil Level Sensor Circuit - Voltage Below Normal or Shorted to Low Source. The engine oil level sensor has detected an internal failure.	Oil level sensor operation will be disabled.
157 {16}	Injector Metering Rail 1 Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level. The ECM has detected that fuel pressure is higher than commanded pressure.	None or possible engine noise associated with higher injection pressures (especially at idle or light load). Engine power is reduced.
157 {2}	Injector Metering Rail 1 Pressure - Data Erratic, Intermittent, or Incorrect. The ECM has detected that the fuel pressure signal is **not** changing.	The ECM will estimate fuel pressure and power is reduced.
101 {16}	Crankcase Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level. The crankcase breather filter requires maintenance.	None on performance.
101 {0}	Crankcase Pressure - Data Valid but Above Normal Operational Range - Most Severe Level. The crankcase breather filter requires maintenance.	Engine power derate.
94 {18}	Injector Metering Rail 1 Pressure - Data Valid but Below Normal Operational Range - Moderately Severe Level. The ECM has detected that fuel pressure is lower than commanded pressure.	Possibly hard to start, low power, or engine smoke.
677 {3}	Starter Relay Driver Circuit - Voltage Above Normal or Shorted to High Source. Open circuit or high voltage detected at starter lockout circuit.	Either the engine will **not** start or the engine will **not** have starter lockout protection.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
677 {4}	Starter Relay Driver Circuit - Voltage Below Normal or Shorted to Low Source. Low voltage detected at starter lockout circuit.	The engine will **not** have starter lockout protection.
167 {16}	Electrical Charging System Voltage - Data Valid but Above Normal Operational Range - Moderately Severe Level. High battery voltage detected by the battery voltage monitor feature.	Amber warning lamp illuminated until high battery voltage condition is corrected.
167 {18}	Electrical Charging System Voltage - Data Valid but Below Normal Operational Range - Moderately Severe Level. Low battery voltage detected by the battery voltage monitor feature.	Amber lamp will light until low battery voltage condition is corrected.
167 {1}	Electrical Charging System Voltage - Data Valid but Below Normal Operational Range - Most Severe Level. Very low battery voltage detected by the battery voltage monitor feature.	Red lamp illuminated until very low battery voltage condition is corrected.
1378 {31}	Engine Oil Change Interval - Condition Exists. Change engine oil and filter.	Maintenance reminder **only**.
103 {2}	Turbocharger 1 Speed - Data Erratic, Intermittent, or Incorrect. An invalid turbocharger speed signal has been detected by the ECM.	None on performance. The ECM uses an estimated turbocharger speed.
103 {18}	Turbocharger 1 Speed - Data Valid but Below Normal Operational Range - Moderately Severe Level. Low turbocharger speed detected by the ECM.	Engine power derate. The ECM uses an estimated turbocharger speed.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
98 {0}	Engine Oil Level - Data Valid but Above Normal Operational Range - Most Severe Level. High oil level has been detected by the oil level sensor.	Possible low power, excessive smoke, oil dilution, contamination, or severe engine damage. The engine may derate.
190 {2}	Engine Crankshaft Speed/ Position - Data Erratic, Intermittent, or Incorrect. Loss of signal from primary camshaft engine position sensor.	Engine can run rough. Possibly poor starting capability. Engine runs using backup speed sensor. Engine power is reduced.
1172 {3}	Turbocharger 1 Compressor Inlet Temperature Sensor Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at the turbocharger compressor inlet air temperature circuit.	Engine power derate.
1172 {4}	Turbocharger 1 Compressor Inlet Temperature Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the turbocharger compressor inlet air temperature sensor circuit.	Engine power derate.
1136 {3}	ECM Internal Temperature Sensor Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage or open circuit detected at the internal ECM temperature sensor.	None on performance.
1136 {4}	ECM Internal Temperature Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the internal ECM temperature sensor.	None on performance.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
723 {7}	Engine Speed/Position Camshaft and Crankshaft Misalignment - Mechanical System Not Responding Properly or Out of Adjustment. Engine position signal from the engine speed sensor and camshaft position sensor do **not** match.	Engine will run derated. Hard start and rough idle possible.
723 {2}	Engine Camshaft Speed/ Position Sensor - Data Erratic, Intermittent, or Incorrect. The ECM has detected an error in the camshaft position sensor signal.	Engine can run rough. Possibly poor starting capability. Engine runs using primary engine position sensor.
703 {11}	Auxiliary Equipment Sensor Input 3 - Root Cause Not Known	Possible engine derate.
1590 {2}	Adaptive Cruise Control Mode - Data Erratic, Intermittent, or Incorrect. Loss of communication with adaptive cruise control.	Adaptive cruise control will **not** operate. Standard cruise control may **not** operate.
627 {2}	Power Supply Lost With Ignition On - Data Erratic, Intermittent, or Incorrect. Supply voltage to the ECM fell below 6.2 volts momentarily or the ECM was **not** allowed to power down correctly (retain battery voltage for 30 seconds after key OFF).	Possible no noticeable performance effects or engine dying or hard starting. Fault information, trip information, and maintenance monitor data can be inaccurate.
2623 {3}	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage Above Normal or Shorted to High Source. High voltage detected at accelerator pedal position number 2 signal circuit.	Severe derate in power output of the engine. Limp home power **only**.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
2623 {4}	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage Below Normal or Shorted to Low Source. Low voltage detected at accelerator pedal position number 2 signal circuit.	Severe derate in power output of the engine. Limp home power **only**.
91 {2}	Accelerator Pedal or Lever Position Sensor 1 and 2 - Data Erratic, Intermittent, or Incorrect. Accelerator position sensor number 1 and number 2 are reading different values.	The engine will **only** idle.
3241 {31}	Catalyst Inlet Temperature Sensor Swapped with Outlet - Condition Exists. The inlet and outlet catalyst temperature sensor connections are swapped.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3050 {31}	Catalyst Missing - Condition Exists. The aftertreatment catalyst in the exhaust system is **not** present.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3241 {4}	Aftertreatment Exhaust Gas Temperature 1 Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the catalyst inlet sensor circuit.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3241 {3}	Aftertreatment Exhaust Gas Temperature 1 Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at the catalyst inlet temperature sensor circuit.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3241 {2}	Aftertreatment Exhaust Gas Temperature 1 - Data Erratic, Intermittent, or Incorrect. The aftertreatment diesel oxidation catalyst inlet temperature sensor is not changing with engine operating conditions.	Active aftertreatment diesel particulate filter regeneration will be disabled.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
3249 {4}	Aftertreatment Exhaust Gas Temperature 2 Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the aftertreatment diesel particulate filter inlet temperature sensor circuit.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3249 {3}	Aftertreatment Exhaust Gas Temperature 2 Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at the aftertreatment diesel particulate filter inlet temperature sensor circuit.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3249 {2}	Aftertreatment Exhaust Gas Temperature 2 - Data Erratic, Intermittent, or Incorrect. The aftertreatment diesel particulate filter inlet temperature sensor is not changing with engine operating conditions.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3050 {13}	Catalyst Efficiency - Out of Calibration. The temperature increase across the aftertreatment diesel oxidation catalyst is lower than expected.	None on performance.
3513 {3}	Sensor Supply 5 - Voltage Above Normal or Shorted to High Source. High voltage detected at sensor supply number 5 circuit in the OEM harness.	Severe derate in power output of the engine. Limp home power **only**.
3513 {4}	Sensor Supply 5 - Voltage Below Normal or Shorted to Low Source. Low voltage detected at sensor supply number 5 circuit in the OEM harness.	Severe derate in power output of the engine. Limp home power **only**.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
101 {3}	Crankcase Pressure Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at the crankcase pressure circuit.	No engine protection for high crankcase pressure.
101 {4}	Crankcase Pressure Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the crankcase pressure circuit.	No engine protection for high crankcase pressure.
411 {2}	Exhaust Gas Re-circulation Valve Delta Pressure - Data Erratic, Intermittent, or Incorrect. An error in the EGR delta pressure signal was detected at initial key-on or the sensor failed the auto-zero test.	EGR valve actuation will be disabled.
3245 {3}	Aftertreatment Exhaust Gas Temperature 3 Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at the catalyst inlet temperature sensor circuit.	None on performance.
3245 {4}	Aftertreatment Exhaust Gas Temperature 3 Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the aftertreatment diesel particulate filter outlet temperature sensor circuit.	None on performance.
3245 {2}	Aftertreatment Exhaust Gas Temperature 3 - Data {Amber} {2} {2} Erratic, Intermittent, or Incorrect. The aftertreatment diesel oxidation catalyst inlet temperature sensor is not changing with engine operating conditions.	None on performance.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
3251 {3}	Aftertreatment Particulate Filter Differential Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at the aftertreatment differential pressure sensor circuit.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3251 {4}	Aftertreatment Particulate Filter Differential Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage or open circuit detected at the aftertreatment differential pressure sensor circuit.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3251 {2}	Aftertreatment Particulate Filter Differential Pressure Sensor - Data Erratic, Intermittent, or Incorrect. The aftertreatment diesel particulate filter differential pressure sensor is reading an erratic value at Initial key-on or during engine operation.	Active aftertreatment diesel particulate filter regeneration will be disabled.
2791 {13}	EGR Valve Controller - Out of Calibration. The EGR valve has failed the automatic calibration procedure at initial key-on.	EGR valve actuation will be disabled.
411 {18}	Exhaust Gas Re-circulation Valve Delta Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level. The EGR differential pressure sensor has detected low EGR gas flow or the EGR differential pressure reading is **not** valid for engine operating conditions.	EGR valve actuation will be disabled.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
157 {0}	Injector Metering Rail Number 1 Pressure - Data Valid But Above Normal Operating Range - Most Severe Level. Fuel pressure signal indicates that fuel pressure has exceeded the maximum limit for the given engine rating.	None or possible engine noise associated with higher injection pressure, especially at idle or light load. Engine power is reduced.
3251 {16}	Aftertreatment Particulate Filter Differential Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level. The soot load of the aftertreatment diesel particulate filter has exceeded the recommended limits.	The aftertreatment dash lamp will flash. Engine protection derate.
3251 {0}	Aftertreatment Particulate Filter Differential Pressure - Data Valid but Above Normal Operational Range - Most Severe Level. The soot load of the aftertreatment diesel particulate filter has exceeded the recommended limits.	Severe engine derate.
3597 {18}	ECU Power Output Supply Voltage 1 - Data Valid but Below Normal Operational Range – Moderately Severe Level. Low battery voltage detected by the VGT actuator.	None on performance.
101 {2}	Crankcase Pressure - Data Erratic, Intermittent, or Incorrect. The ECM has detected that the crankcase pressure signal is **not** changing with engine operating conditions.	None on performance.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
3555 {17}	Ambient Air Density - Data Valid but Below Normal Operational Range - Least Severe Level. Engine torque has been reduced because the vehicle was operating at a high altitude condition.	Possible engine derate.
641 {15}	VGT Actuator Driver Over Temperature (Calculated) - Data Valid but Above Normal Operational Range - Least Severe Level. High internal VGT actuator temperature has been detected.	None on performance.
3249 {16}	Aftertreatment Exhaust Gas Temperature 2 - Data Valid but Above Normal Operational Range - Moderately Severe Level. The aftertreatment diesel particulate filter inlet temperature sensor reading has exceeded the maximum temperature limit.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3249 {0}	Aftertreatment Exhaust Gas Temperature 2 - Data Valid but Above Normal Operational Range - Most Severe Level. The aftertreatment diesel particulate filter inlet temperature sensor reading has exceeded the maximum engine protection temperature limit.	Engine power derate. Active aftertreatment diesel particulate filter regeneration will be disabled.
3245 {16}	Aftertreatment Exhaust Gas Temperature 3 - Data Valid but Above Normal Operational Range - Moderately Severe Level. The aftertreatment diesel particulate filter outlet temperature sensor reading has exceeded the maximum temperature limit.	Active aftertreatment diesel particulate filter regeneration will be disabled.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
3245 {0}	Aftertreatment Exhaust Gas Temperature 3 – Data Valid but Above Normal Operational Range - Most Severe Level. The aftertreatment diesel particulate filter outlet temperature sensor reading has exceeded the maximum engine protection temperature limit.	Engine power derate. Active aftertreatment diesel particulate filter regeneration will be disabled.
101 {15}	Crankcase Pressure - Data Valid but Above Normal Operational Range - Least Severe Level. The crankcase breather filter requires maintenance.	None on performance.
3251 {15}	Aftertreatment Particulate Trap Differential Pressure - Data Valid but Above Normal Operational Range - Least Severe Level. The aftertreatment differential pressure has exceeded the maximum operating limits or the diesel particulate filter is plugged.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3064 {31}	Aftertreatment Particulate Trap Missing - Condition Exists. The aftertreatment diesel particulate filter in the exhaust system is **not** present.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3512 {3}	Sensor Supply 4 Circuit - Voltage Above Normal or Shorted to High Source. High voltage detected at + 5 volt sensor supply circuit to the accelerator pedal position sensor.	Engine will **only** idle.
3512 {4}	Sensor Supply 4 Circuit - Voltage Below Normal or Shorted to Low Source. Low voltage detected at the +5 volt sensor supply circuit to the accelerator pedal position sensor.	Engine will **only** die.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
703 {14}	Auxiliary Equipment Sensor Input 3 Engine Protection Circuit - Special Instructions. Unisolated failure modes are causing issues with Auxiliary Equipment Sensor Input channel 3.	Engine may shut down.
641 {11}	VGT Actuator Driver Circuit - Root Cause Not Known. Intermittent communication between the smart VGT controller and the ECM has been detected. The VGT controller is **not** interpreting the J1939 message from the ECM correctly.	VGT actuation will be disabled.
27 {4}	EGR Valve Position Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage has been detected at the EGR position sensor circuit.	EGR valve actuation will be disabled.
411 {3}	Exhaust Gas Recirculation Valve Delta Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at the EGR differential pressure sensor circuit.	EGR valve actuation will be disabled.
411 {4}	Exhaust Gas Recirculation Valve Delta Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the EGR differential pressure sensor circuit.	EGR valve actuation will be disabled.
103 {15}	Turbocharger 1 Speed - Data Valid but Above Normal Operational Range - Least Severe Level. High turbocharger speed has been detected by the ECM.	Engine power derate to lower the turbocharger speed.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
633 {31}	Electronic Fuel Injection Control Valve Circuit - Condition Exists. Fuel pump actuator circuit resistance too high or too low.	Possible low power.
190 {2}	Engine Crankshaft Speed/ Position - Data Erratic, Intermittent, or Incorrect. Crankshaft engine speed sensor intermittent synchronization.	Engine can exhibit misfire as control switches from the primary to the backup speed sensor. Engine power is reduced while the engine operates on the backup speed sensor.
723 {2}	Engine Camshaft Speed/ Position Sensor - Data Erratic, Intermittent, or Incorrect. Camshaft engine speed sensor intermittent synchronization.	None on performance.
103 {10}	Turbocharger 1 Speed - Abnormal Rate of Change. The turbocharger speed sensor has detected an erroneous speed value.	None on performance. The ECM uses an estimated turbocharger speed.
2789 {15}	Turbocharger Turbine Inlet Temperature (Calculated) - Data Valid but Above Normal Operational Range - Least Severe Level. Turbocharger turbine inlet temperature has exceeded the engine protection limit.	Fuel is limited in an attempt to decrease the exhaust gas temperature entering the turbocharger.
2790 {15}	Turbocharger Compressor Outlet Temperature (Calculated) - Data Valid but Above Normal Operational Range - Least Severe Level. High turbocharger compressor outlet air temperature has been calculated by the electronic control module (ECM).	Fuel is limited in an attempt to decrease the calculated turbocharger compressor outlet air temperature.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
2791 {5}	EGR Valve Control Circuit - Current Below Normal or Open Circuit. Motor terminal or motor coil open circuit has been detected by the smart EGR controller.	EGR valve actuation will be disabled.
2791 {4}	EGR Valve Control Circuit - Voltage Below Normal or Shorted to Low Source. Motor terminal or motor coil short circuit to ground, or power supply has been detected by the smart EGR controller.	EGR valve actuation will be disabled.
2791 {7}	EGR Valve Control Circuit - Mechanical System Not Responding Properly or Out of Adjustment. The EGR motor has exceeded the duty cycle limit, indicating a stuck open EGR valve.	EGR valve actuation will be disabled.
411 {16}	Exhaust Gas Recirculation Valve Delta Pressure - Data Valid but Above Normal Operational Range - Moderately Severe Level. The EGR differential pressure sensor has detected high EGR gas flow or the EGR differential pressure reading is **not** valid for engine operating conditions.	EGR valve actuation will be disabled.
1209 {3}	Exhaust Gas Pressure Sensor Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at the exhaust gas pressure circuit.	None on performance.
1209 {4}	Exhaust Gas Pressure Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at the exhaust gas pressure circuit.	None on performance.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
412 {3}	Exhaust Gas Recirculation Temperature Sensor Circuit - Voltage Above Normal or Shorted to High Source. High signal voltage detected at EGR temperature circuit.	EGR valve actuation will be disabled.
412 {4}	Exhaust Gas Recirculation Temperature Sensor Circuit - Voltage Below Normal or Shorted to Low Source. Low signal voltage detected at EGR temperature circuit.	EGR valve actuation will be disabled.
647 {3}	Fan Control Circuit - Voltage Above Normal or Shorted to High Source. Open circuit or high voltage detected at the fan control circuit.	The fan may stay on continuously or **not** run at all.
641 {7}	VGT Actuator Driver Circuit (Motor) - Mechanical System Not Responding Properly or Out of Adjustment. The smart VGT controller has detected incorrect stop limits, or the VGT is unable to move to the closed position.	VGT travel may be limited.
111 {17}	Coolant Level - Data Valid but Below Normal Operational Range - Least Severe Level. Low engine coolant level detected.	None on performance.
641 {13}	VGT Actuator Controller - Out of Calibration. The VGT has failed the automatic calibration procedure at initial key-on. VGT will be in the open position.	Low intake manifold pressure.
2789 {16}	Turbocharger Turbine Inlet Temperature (Calculated) - Data Valid but Above Normal Operational Range - Moderately Severe Level. Turbocharger turbine inlet temperature has exceeded the engine protection limit.	Fuel is limited in an attempt to decrease the calculated exhaust gas temperature entering the turbo- charger.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
1209 {2}	Exhaust Gas Pressure - Data Erratic, Intermittent, or Incorrect. The exhaust gas pressure sensor is reading an erratic value at initial key-on.	The ECM will estimate the exhaust gas pressure.
729 {3}	Intake Air Heater 1 Circuit - Voltage Above Normal or Shorted to High Source. High voltage detected at the intake air heater signal circuit.	The intake air heater may be ON or OFF all the time.
729 {4}	Intake Air Heater 1 Circuit - Voltage Below Normal or Shorted to Low Source. Low voltage detected at the intake air heater signal circuit.	The intake air heater may be ON or OFF all the time.
641 {12}	VGT Actuator Controller - Bad Intelligent Device or Component. An internal error has been detected by the smart VGT controller.	VGT actuation will be disabled.
641 {31}	VGT Actuator Driver Circuit - Condition Exists. A calibration mismatch between the VGT actuator and the ECM has been detected.	VGT actuation will be disabled.
641 {9}	VGT Actuator Driver Circuit - Abnormal Update Rate. No communications on the J1939 datalink between the engine ECM and the smart VGT controller.	VGT actuation will be disabled.
3050 {11}	Catalyst Face Plugged - Root Cause Not Known. The front face of the aftertreatment diesel oxidation catalyst has been detected to be plugged with soot.	Active aftertreatment diesel particulate filter regeneration will be disabled.
3050 {13}	Catalyst Efficiency - Out of Calibration. The temperature increase across the aftertreatment diesel oxidation catalyst is lower than expected.	None on performance.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
3251 {15}	Aftertreatment Particulate Filter Differential Pressure - Data Valid but Above Normal Operational Range - Least Severe Level. The soot load of the aftertreatment diesel particulate filter has exceeded the recommended limits.	The aftertreatment dash lamp will be illuminated and will begin to flash as the severity of the soot load increases. Possible engine protection derate based on severity.
110 {31}	Engine Coolant Temperature - Condition Exists. The EGR valve was closed to reduce engine coolant temperature.	EGR valve actuation will be disabled.
3556 {16}	Aftertreatment Fuel Injector 1 - Data Valid but Above Normal Operational Range - Moderately Severe Level. Excessive fuel injection into the aftertreatment system has been detected.	None on performance.
3249 {17}	Aftertreatment Exhaust Gas Temperature 2 - Data Valid but Below Normal Operating Range – Least Severe Level. The temperatures in the aftertreatment system can not reach the required temperatures for stationary regeneration.	None on performance.
3249 {17}	Aftertreatment Exhaust Gas Temperature 2 - Data Valid but Below Normal Operating Range – Moderately Severe Level.	None on performance.
81 {16}	Engine Particulate Trap Inlet Pressure - Data Valid but Above Normal Operational Range – Moderately Severe Level. Excessive black smoke has been detected exiting the engine and entering the aftertreatment diesel particulate filter.	None on performance.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
3703 {31}	Particulate Trap Active Regeneration Inhibited Due to Inhibit Switch - Condition Exists. Regeneration of the diesel particulate filter has been prevented due to the inhibit switch being activated.	Active aftertreatment diesel particulate filter regeneration has been disabled.
3481 {16}	Aftertreatment Fuel Rate - Data Valid but Above Normal Operational Range - Moderately Severe Level	None on performance.
412 {15}	Exhaust Gas Recirculation Temperature - Data Valid but Above Normal Operational Range - Least Severe Level. EGR temperature has exceeded the engine protection limit.	Slight fueling derate to bring EGR temperature under the maximum limit.
412 {16}	Exhaust Gas Recirculation Temperature - Data Valid but Above Normal Operational Range - Moderately Severe Level. EGR temperature has exceeded the engine protection limit.	Severe fueling derate to bring EGR temperature under the maximum limit.
110 {15}	Engine Coolant Temperature - Data Valid but Above Normal Operational Range - Least Severe Level. Engine coolant temperature is above the engine coolant temperature engine protection warning limit.	Power derate and possible engine shutdown if engine protection shutdown feature is enabled.
105 {15}	Intake Manifold 1 Temperature - Data Valid but Above Normal Operational Range - Least Severe Level. Intake manifold air temperature signal indicates intake manifold air temperature is above engine protection warning limit.	Progressive power derate increasing in severity from time of alert.

Table 4-3 CM2150 System Fault Codes (Cont.)

Fault Code	Reason	Effect
102 {2}	Intake Manifold 1 Pressure - Data Erratic, Intermittent, or Incorrect. The ECM has detected an intake manifold pressure signal that is too high or low for current engine operating conditions.	Engine power derate.

4-5.5 Transmission Diagnostics

The transmission pushbutton shift pad (Figure 3-1) can be used to display transmission diagnostic codes to assist in troubleshooting transmission problems. Follow these procedures to access the diagnostic codes. Table 4-4 contains a list of codes and their meanings.

! Note

Be sure to record all codes as they are displayed. More than one code may be indicated.

a. Stop vehicle and apply parking brake.

b. Simultaneously press the ⇑ (Up arrow) and ⇓(Down arrow) buttons TWICE. After a few seconds, the digital display will cycle between three codes, as listed in Table 4-4.

c. To advance to the next code, press the MODE button for approximately three seconds.

Table 4-4 Transmission Diagnostic Codes

Code	Description	Check Trans Light	Description
C1312	Retarder Request Sensor Failed Low	No	May inhibit retarder operation if not using
C1313	Retarder Request Sensor Failed High	No	May inhibit retarder operation if not using
P0122	Pedal Position Sensor Low Voltage	No	Use default throttle values. Freezes shift adapts.

Table 4-4 Transmission Diagnostic Codes (Cont.)

Code	Description	Check Trans Light	Description
P0123	Pedal Position Sensor High Voltage	No	Use default throttle values. Freezes shift adapts.
P0218	Transmission Fluid Over Temperature	No	Use hot mode shift schedule. Holds fourth range. TCC is inhibited.
P0602	TCM Not Programmed	Yes	Lock in Neutral
P0610	TCM Vehicle Options	Yes	Use TID A calibration
P0613	TCM Processor	No	All solenoids off
P0614	Torque Control Data Mismatch—ECM/	Yes	Allows operation only in reverse and second range.
P0634	TCM Internal	Yes	SOL OFF (hydraulic
P063E	Auto Configuration	Yes	Use default throttle values
P063F	Auto Configuration Engine Coolant Temp	No	None
P0658	Actuator Supply	Yes	DNS, SOL OFF (hydraulic
P0659	Actuator Supply	Yes	DNS, SOL OFF (hydraulic
P0702	Transmission Control	Yes	Uses TID A calibration
P0703	Brake Switch Circuit Malfunction	No	No Neutral to Drive shifts for refuse packer. TCM inhibits retarder operation if a TPS code is also active.
P0708	Transmission Range	Yes	Ignore defective strip
P070C	Transmission Fluid	No	None
P070D	Transmission Fluid	No	None
P0711	Transmission Fluid Temperature Sensor	Yes	Use default sump temp
P0712	Transmission Fluid Temperature Sensor	Yes	Use default sump temp
P0713	Transmission Fluid Temperature Sensor	Yes	Use default sump temp
P0716	Turbine Speed Sensor	Yes	DNS, Lock in current
P0717	Turbine Speed Sensor	Yes	DNS, Lock in current

Table 4-4 Transmission Diagnostic Codes (Cont.)

Code	Description	Check Trans Light	Description
P0719	Brake Switch ABS	No	TCM assumes ABS is
P071A	RELS Input Failed On	Yes	Inhibit RELS operation
P071D	General Purpose Input	Yes	None
P0721	Output Speed Sensor	Yes	DNS, Lock in current
P0722	Output Speed Sensor	Yes	DNS, Lock in current
P0726	Engine Speed Sensor	No	Default to turbine speed
P0727	Engine Speed Sensor	No	Default to turbine speed
P0729	Incorrect 6th Gear	Yes	DNS, Attempt 5th, then
P0731	Incorrect 1st Gear	Yes	DNS, Attempt 2nd, then
P0732	Incorrect 2nd Gear	Yes	DNS, Attempt 3rd, then
P0733	Incorrect 3rd Gear	Yes	DNS, Attempt 4th, then
P0734	Incorrect 4th Gear	Yes	DNS, Attempt 5th, then
P0735	Incorrect 5th Gear Ratio	Yes	DNS, Attempt 6th, then 3rd, then 2nd
P0736	Incorrect Reverse Gear	Yes	DNS, Lock in Neutral
P0741	Torque Converter	Yes	None
P0776	Pressure Control	Yes	DNS, RPR
P0777	Pressure Control	Yes	DNS, RPR
P0796	Pressure Control	Yes	DNS, RPR
P0797	Pressure Control	Yes	DNS, RPR
P0842	Transmission Pressure	Yes	DNS, Lock in current
P0843	Transmission Pressure	Yes	DNS, Lock in current
P0880	TCM Power Input	No	None
P0881	TCM Power Input	No	None
P0882	TCM Power Input	Yes	DNS, SOL OFF (hydraulic
P0883	TCM Power Input	No	None
P0894	Transmission	Yes	DNS, Lock in first
P0960	Pressure Control Solenoid Main Mod	Yes	None

Table 4-4 Transmission Diagnostic Codes (Cont.)

Code	Description	Check Trans Light	Description
P0962	Pressure Control Solenoid Main Mod	Yes	DNS, SOL OFF (hydraulic default)
P0963	Pressure Control Solenoid Main Mod	Yes	None
P0964	Pressure Control Solenoid 2 (PCS2)	Yes	DNS, SOL OFF (hydraulic default)
P0966	Pressure Control	Yes	DNS, SOL OFF (hydraulic
P0967	Pressure Control Solenoid 2 (PCS2)	Yes	DNS, SOL OFF (hydraulic default)
P0968	Pressure Control Solenoid 3 (PCS3)	Yes	DNS, SOL OFF (hydraulic default)
P0970	Pressure Control	Yes	DNS, SOL OFF (hydraulic
P0971	Pressure Control Solenoid 3 (PCS3)	Yes	DNS, SOL OFF (hydraulic default)
P0973	Shift Solenoid 1 (SS1)	Yes	DNS, SOL OFF (hydraulic
P0974	Shift Solenoid 1 (SS1)	Yes	DNS, SOL OFF (hydraulic
P0975	Shift Solenoid 2 (SS2)	Yes	7-speed: Allow 2 through
P0976	Shift Solenoid 2 (SS2) Control Circuit Low	Yes	7-speed: Allow 2 through 6, N, R. Inhibit TCC
P0977	Shift Solenoid 2 (SS2)	Yes	7-speed: Allow 2 through
P0989	Retarder Pressure	No	None
P0990	Retarder Pressure	No	None
P1739	Incorrect Low Gear Ratio	Yes	Command 2nd and allow shifts 2 through 6, N, R
P1891	Throttle Position	No	Use default throttle values
P1892	Throttle Position	No	Use default throttle values
P2184	Engine Coolant	No	Use default engine coolant
P2185	Engine Coolant Temperature Sensor	No	Use default engine coolant values
P2637	Torque Management	Yes	Inhibit SEM
P2641	Torque Management	Yes	Inhibit LRTP
P2670	Actuator Supply	Yes	DNS, SOL OFF (hydraulic

Table 4-4 Transmission Diagnostic Codes (Cont.)

Code	Description	Check Trans Light	Description
P2671	Actuator Supply	Yes	DNS, SOL OFF (hydraulic
P2685	Actuator Supply	Yes	DNS, SOL OFF (hydraulic
P2686	Actuator Supply	Yes	DNS, SOL OFF (hydraulic
P2714	Pressure Control	Yes	DNS, RPR
P2715	Pressure Control	Yes	DNS, SOL OFF (hydraulic
P2718	Pressure Control Solenoid 4 (PCS4)	Yes	DNS, SOL OFF (hydraulic default)
P2720	Pressure Control	Yes	DNS, SOL OFF (hydraulic
P2721	Pressure Control Solenoid 4 (PCS4)	Yes	DNS, SOL OFF (hydraulic default)
P2723	Pressure Control	Yes	DNS, RPR
P2724	Pressure Control	Yes	DNS, RPR
P2727	Pressure Control Solenoid 1 (PCS1)	Yes	DNS, SOL OFF (hydraulic default)
P2729	Pressure Control	Yes	DNS, SOL OFF (hydraulic
P2730	Pressure Control Solenoid 1 (PCS1)	Yes	DNS, SOL OFF (hydraulic default)
P2736	Pressure Control Solenoid 5 (PCS5)	Yes	Inhibit retarder operation
P2738	Pressure Control Solenoid 5 (PCS5)	Yes	Allow 2 through 6, N, R. Inhibit retarder and TCC
P2739	Pressure Control Solenoid 5 (PCS5)	Yes	Inhibit retarder operation
P2740	Retarder Oil	No	None
P2742	Retarder Oil	No	Use default retarder temp
P2743	Retarder Oil	No	Use default retarder temp
P2761	TCC PCS Control	Yes	Inhibit TCC operation
P2763	TCC PCS Control	Yes	Inhibit TCC operation
P2764	TCC PCS Control Circuit Low	Yes	7-speed: allow 2 through 6, N, R. Inhibit TCC
P278A	Kickdown Input Failed	No	Inhibit kickdown

Table 4-4 Transmission Diagnostic Codes (Cont.)

Code	Description	Check Trans Light	Description
P2793	Gear Shift Direction Circuit	Yes	Ignores PWM input from shift selector
P2808	Pressure Control	Yes	DNS, RPR
P2809	Pressure Control	Yes	DNS, RPR
P2812	Pressure Control Solenoid 6 (PCS6)	Yes	DNS, SOL OFF (hydraulic default)
P2814	Pressure Control	Yes	DNS, SOL OFF (hydraulic
P2815	Pressure Control Solenoid 6 (PCS6)	Yes	DNS, SOL OFF (hydraulic default)
U0001	Hi Speed CAN Bus	No	Use default values, inhibit
U0010	CAN BUS Reset	No	Use default values, inhibit
U0100	Lost Communications	Yes	Use default values
U0103	Lost Communication With Gear Shift Module	Yes	Maintain range selected, observe gear shift
U0115	Lost Communication	Yes	Use default values
U0291	Lost Communication With Gear Shift Module	Yes	Maintain range selected, observe gear shift
U0304	Incompatible Gear	Yes	Ignore shift selector inputs
U0333	Incompatible Gear	Yes	Ignore shift selector inputs
U0404	Invalid Data Received From Gear Shift	Yes	Maintain range selected, observe gear shift
U0592	Invalid Data Received From Gear Shift	Yes	Maintain range selected, observe gear shift

4-5.6 ABS System Diagnostics

Your Trailer Jockey vehicle is equipped with an anti-lock braking system (ABS) for additional safety. The ABS system has a self-diagnostic feature to aid troubleshooting problems. The following procedure allows you to retrieve the diagnostic codes for the ABS system. Once activated, the ABS indicator on the dash will blink in a specific pattern. Figure 4-3 shows an example of a blink code.

! Note

The system may display more than one code. Be sure to read and record all codes.

Refer to Table 4-5 to interpret the diagnostic blink codes.

a. Stop vehicle and apply parking brake.

b. Turn ignition key to "ON".

c. Press and hold the diagnostic button for at least one second, but not more than three seconds.

d. Record the two-digit blink codes as they are displayed.

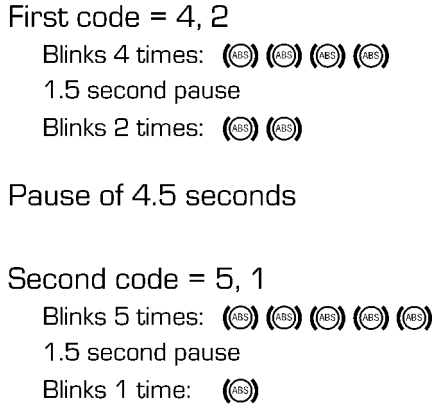


Figure 4-3 ABS Diagnostic Code Example

To clear the ABS diagnostic codes, perform the following steps:

a. Turn ignition switch to "OFF".

b. Press and hold diagnostic button down and turn ignition switch to “ON”.

c. Continue holding diagnostic button down and release after two seconds.

d. Press and release brake pedal.

! Note

Active fault conditions will be reestablished until the ABS system is repaired.

Table 4-5 ABS Diagnostic Codes

Digit 1	Digit 2	Description
2	1	Sensor air gap too large
2	2	Air gap too large or sensor shorted
2	3	Speed sensor noisy
2	4	Wheel locked for excessive period of time during an ABS cycle
2	5	Excessive rate of deceleration found at wheel site or sensor shorted
2	6	Sensor connection shorted low or high or sensor open
2	7	Internal error at sensor port of ECU
2	8	Sensor found in wrong location for system configuration
3	1	Sensor air gap too large
3	2	Air gap too large or sensor shorted
3	3	Speed sensor noisy
3	4	Wheel locked for excessive period of time during an ABS cycle
3	5	Excessive rate of deceleration found at wheel site or sensor shorted
3	6	Sensor connection shorted low or high or sensor open
3	7	Internal error at sensor port of ECU
3	8	Sensor found in wrong location for system configuration
4	1	Sensor air gap too large
4	2	Air gap too large or sensor shorted
4	3	Speed sensor noisy
4	4	Wheel locked for excessive period of time during an ABS cycle
4	5	Excessive rate of deceleration found at wheel site or sensor shorted
4	6	Sensor connection shorted low or high or sensor open
4	7	Internal error at sensor port of ECU

Table 4-5 ABS Diagnostic Codes (Cont.)

Digit 1	Digit 2	Description
4	8	Sensor found in wrong location for system configuration
5	1	Sensor air gap too large
5	2	Air gap too large or sensor shorted
5	3	Speed sensor noisy
5	4	Wheel locked for excessive period of time during an ABS cycle
5	5	Excessive rate of deceleration found at wheel site or sensor shorted
5	6	Sensor connection shorted low or high or sensor open
5	7	Internal error at sensor port of ECU
5	8	Sensor found in wrong location for system configuration
6	1	Sensor air gap too large
6	2	Air gap too large or sensor shorted
6	3	Speed sensor noisy
6	4	Wheel locked for excessive period of time during an ABS cycle
6	5	Excessive rate of deceleration found at wheel site or sensor shorted
6	6	Sensor connection shorted low or high or sensor open
6	7	Internal error at sensor port of ECU
6	8	Sensor found in wrong location for system configuration
7	1	Sensor air gap too large
7	2	Air gap too large or sensor shorted
7	3	Speed sensor noisy
7	4	Wheel locked for excessive period of time during an ABS cycle
7	5	Excessive rate of deceleration found at wheel site or sensor shorted
7	6	Sensor connection shorted low or high or sensor open
7	7	Internal error at sensor port of ECU
7	8	Sensor found in wrong location for system configuration
8	1	Short between release solenoid and supply voltage
8	2	Short between release solenoid and ground
8	3	Open circuit at release solenoid
8	4	Open circuit in common line to valve
8	5	Short between hold solenoid and supply voltage
8	6	Short between hold solenoid and ground
8	7	Open circuit at hold solenoid
8	8	Valve found wired in wrong location
9	1	Short between release solenoid and supply voltage
9	2	Short between release solenoid and ground

Table 4-5 ABS Diagnostic Codes (Cont.)

Digit 1	Digit 2	Description
9	3	Open circuit at release solenoid
9	4	Open circuit in common line to valve
9	5	Short between hold solenoid and supply voltage
9	6	Short between hold solenoid and ground
9	7	Open circuit at hold solenoid
9	8	Valve found wired in wrong location
10	1	Short between release solenoid and supply voltage
10	2	Short between release solenoid and ground
10	3	Open circuit at release solenoid
10	4	Open circuit in common line to valve
10	5	Short between hold solenoid and supply voltage
10	6	Short between hold solenoid and ground
10	7	Open circuit at hold solenoid
10	8	Valve found wired in wrong location
10	10	Diagonal 1 (common side of valves SR.LR.LRR) shorted to bat
10	11	Diagonal 1 (common side of valves SR.LR.LRR) shorted to ground
11	1	Short between release solenoid and supply voltage
11	2	Short between release solenoid and ground
11	3	Open circuit at release solenoid
11	4	Open circuit in common line to valve
11	5	Short between hold solenoid and supply voltage
11	6	Short between hold solenoid and ground
11	7	Open circuit at hold solenoid
11	8	Valve found wired in wrong location
11	10	Diagonal 2 (common side of valves SR.LR.LRR) shorted to bat
11	11	Diagonal 2 (common side of valves SR.LR.LRR) shorted to ground
12	1	Short between release solenoid and supply voltage
12	2	Short between release solenoid and ground
12	3	Open circuit at release solenoid
12	4	Open circuit in common line to valve
12	5	Short between hold solenoid and supply voltage
12	6	Short between hold solenoid and ground
12	7	Open circuit at hold solenoid
12	8	Valve found wired in wrong location
13	1	Short between release solenoid and supply voltage
13	2	Short between release solenoid and ground
13	3	Open circuit at release solenoid

Table 4-5 ABS Diagnostic Codes (Cont.)

Digit 1	Digit 2	Description
13	4	Open circuit in common line to valve
13	5	Short between hold solenoid and supply voltage
13	6	Short between hold solenoid and ground
13	7	Open circuit at hold solenoid
13	8	Valve found wired in wrong location
14	1	Not used
14	2	Not used
14	3	Not used
14	4	Not used
14	5	Solenoid in ATC valve shorted high
14	6	Solenoid in ATC valve shorted to ground
14	7	ATC valve open circuit
14	8	ATC valve found when it should not be present
14	9	Not used
14	10	Not used
14	11	Not used
14	12	Time-out or no connection found to engine link
15	1	ECU internal fault
15	2	ECU internal fault
15	3	ECU internal fault
15	4	ECU internal fault
15	5	ECU internal fault
15	6	ECU internal fault
15	7	ECU internal fault
15	8	ECU internal fault
15	10	ECU internal fault
15	11	ECU internal fault
16	1	Excessive voltage on diagonal pin 1 (Pin A-9)
16	2	Low voltage found on diagonal pin 1 (Pin A-9)
16	3	No voltage found on diagonal pin 1 (Pin A-9)
16	4	No ground found on diagonal pin 2 (Pin A-11)
16	5	Excessive voltage on diagonal pin 2 (Pin A-8)
16	6	Low voltage found on diagonal pin 2 (Pin A-8)
16	7	No voltage found on diagonal pin 2 (Pin A-8)
16	8	No ground found on diagonal pin 1 (Pin A-12)
16	9	Excessive voltage found on switched ignition point (Pin A-7)
16	10	Low voltage found on switched ignition point (Pin A-7)
16	11	Voltage difference between diag. 1 and diag. 2 supply is too high (Pin A-9-8)

Table 4-5 ABS Diagnostic Codes (Cont.)

Digit 1	Digit 2	Description
17	1	Retarder control relay shorted high or open circuit
17	2	Retarder control relay relay shorted low
17	3	J1922/939 date link not functioning
17	4	J1922/939 date link time out
17	5	Tire size, front to rear out of range
17	6	Tire size out of range or parameter fault
17	7	Brake light switch not pushed at this power cycle
17	8	ATC system disabled for dynamometer test
17	12	Sensor fault memory bit is set. Drive vehicle above 5 mph to clear.

4-6 LUBRICATION

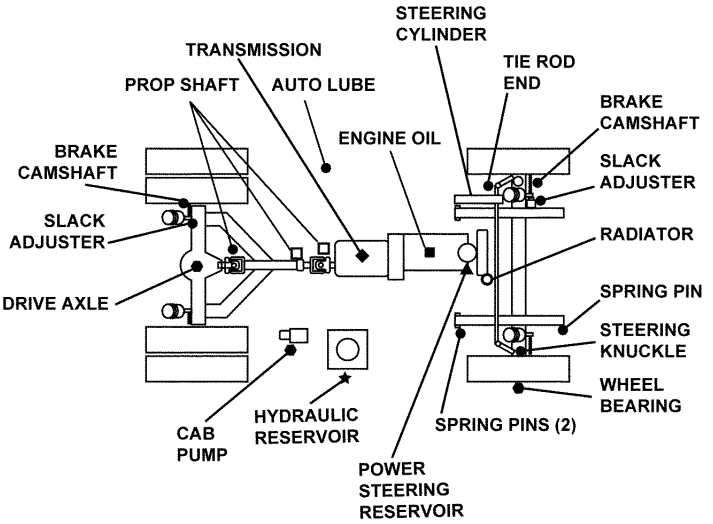
The following paragraphs provide recommendations for lubricating your Trailer Jockey.

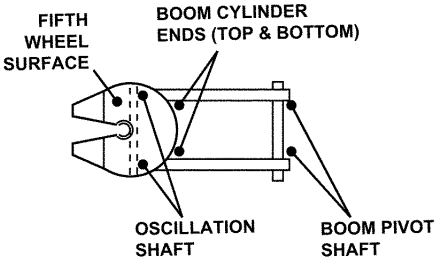
! Note

All recommendations and lubrication intervals are based on average operating conditions. Lubricants showing signs of excessive heat oxidation, dirt, or contamination should be changed more frequently to prevent these conditions from occurring. Lubrication and fluid change intervals must be established on the basis of your individual job conditions.

Table 4-6 Lubrication Recommendations

Frequency	Item	Lubricant/Fluid
Daily	Fifth Wheel Surface	NLGI-00 Grease
	Oscillation Shaft (2 pl)	NLGI-00 Grease
	Boom Pivot Shaft (2 pl)	NLGI-00 Grease
	Slack Adjusters (2 front, 2 rear)	NLGI-00 Grease
Monthly or 200 Hrs	Rear Axle	Synthetic Gear Lube
	Dura Ride Pivot Shaft	NLGI-00 Grease
	Brake Camshaft (2 front, 2 rear)	NLGI-00 Grease
	Lift Cylinder	NLGI-00 Grease
	Prop Shaft	Multipurpose Grease
	Auto Lube	NLGI-00 Grease
	Transmission	NLGI-00 Grease
	Hydraulic Reservoir	NLGI-00 Grease
	Steering Knuckles	NLGI-00 Grease
	Engine Oil	NLGI-00 Grease
	Spring Pins	NLGI-00 Grease
	Power Steering Pump	NLGI-00 Grease
	Tie Rod Ends	NLGI-00 Grease
	Wheel Bearings	NLGI-00 Grease
	Cab Tilt Pump	NLGI-00 Grease





- □ MULTI-PURPOSE GREASE
- ☆ HYDRAULIC FLUID
- ● NLGI-00 GREASE
- ■ ENGINE OIL
- ▲ AUTOMATIC TRANS. FLUID
- ⬢ SYNTHETIC GEAR LUBE
- ◆ SYNTHETIC TRANS. FLUID
- ○ PERMANENT ANTIFREEZE

SECTION 5.
SPECIFICATIONS & CAPACITIES

5-1 GENERAL

Battery	G31, 700CCA Low Maintenance (2)	
Fuel Tank	50 Gallon Rectangular	
Fifth Wheel	Holland FW35 - 70,000 lb. Holland FW2870 - 100,000 lb. (TJ9000 models only)	
Lift Cylinders	5-inch, 70,000 lb. Hydraulic	
Wheelbase	116 inches 140 inches (TJ6500 DOT model only) 132 inches (TJ9000 Off Road/On Road model only)	
Hydraulic System	Oil Capacity: Recommended Fluid:	10 gal. (37.85L) Chevron AW-32 or equal Anti-wear, anti-foam 10-15W
Power Steering	Fluid Capacity: Recommended Fluid:	4 qts. (3.78L) Dexron III Automatic Transmission Fluid
Tilt Cab Pump	Fluid Capacity: Recommended Fluid:	2 qts. (1.89L) Dexron III Automatic Transmission Fluid

5-2 TJ5000 OFF ROAD

Engine	Cummins QSB T3 6.7L Elite 167 HP EPA Industrial Turbo Diesel	
Transmission	Model:	Allison RDS3000 Electronic Automatic
	Transmission Oil:	Synthetic TES 295 Approved
	Capacity:	19 qts. (18L)
Front Axle	Dana Eaton E1322I, 13,2000 lb.	
Rear Axle	Model:	Dana Eaton 23082P 9.08:1 ratio 30,000 lb.
	Recommended Fluid:	SAE 80W-90 Gear Oil
	Capacity:	41 pints (19.4L)

5-3 TJ5000 DOT

Engine	Cummins ISB07-200 HP EPA Highway Turbo Diesel	
Transmission	Model:	Allison RDS3000 Electronic Automatic
	Transmission Oil:	Dexron-IV Automatic
	Capacity:	19 qts. (18L)
Front Axle	Model:	Eaton E1322I, 13,2000 lb.
Rear Axle	Model:	Eaton 23-170 7.17:1 ratio
	Recommended Fluid:	SAE 80W-90 Gear Oil
	Capacity:	41 pints (19.4L)

5-4 TJ6500 DOT

Engine	Cummins ISB07-220 HP EPA Highway Turbo Diesel	
Transmission	Model:	Allison RDS3000 Electronic Automatic
	Transmission Oil:	Dexron-IV Automatic
	Capacity:	19 qts. (18L)
Front Axle	Meritor FF961, 12,000 lb.	
Rear Axle	Model:	Meritor RT-44-145 7.17:1 ratio 40,000 lb. tandem
	Recommended Fluid:	SAE 80W-90 Gear Oil
	Capacity:	25.1 pints (11.9L)

5-5 TJ7000 Off Road

Engine	Cummins QSB T3 6.7L Elite 183 HP EPA Industrial Turbo Diese	
Transmission	Model:	Allison RDS3000 Electronic Automatic
	Transmission Oil:	Dexron-IV Automatic
	Capacity:	19 qts. (18L)
Front Axle	Meritor FF961, 12,000 lb.	
Rear Axle	Model:	Meritor RS-30-380 10.62:1 ratio 42,000 lb. Double Reduction
	Recommended Fluid:	SAE 80W-90 Gear Oil
	Capacity:	56 pints (26.46L)

5-6 TJ9000 Off Road

Engine	Cummins QSB T3 6.7L Elite 183 HP EPA Industrial Turbo Diesel	
Transmission	Model:	Allison RDS3000 Electronic Automatic
	Transmission Oil:	Dexron-IV Automatic
	Capacity:	19 qts. (18L)
Front Axle	Dana E1462I 14,600 lb.	
Rear Axle	Model:	Sisu SRDP-30-S 12.28:1 ratio 70,000 lb. Planetary Reduction
	Recommended Fluid:	SAE 80W-90 Gear Oil
	Capacity:	38 pints (17.9L)

5-7 TJ9000 Off Road/On Road

Engine	Cummins ISLG (LNG) 250HP Hwy. 2010 Emission Compliant	
Transmission	Model:	Allison RDS3500 Electronic Automatic
	Transmission Oil:	Dexron-IV Automatic
	Capacity:	19 qts. (18L)
Front Axle	Dana E1462I 14,600 lb.	
Rear Axle	Model:	Sisu SRDP30S 12.28:1 ratio 70,000 lb. Planetary Reduction
	Recommended Fluid:	SAE 80W-90 Gear Oil
	Capacity:	38 pints (17.9L)