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PowerGlide Chassis Phaeton Owner's Manual

Tiffin Motorhomes, Inc.

105 2nd Street NW

Red Bay, AL 35582 U.S.A.

Phone: (256) 356-8661 E-Mail: info@tiffinmotorhomes.com

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TIFFIN MOTORHOMES, INC.

105 2nd Street NW ♦ Red Bay, Alabama 35582 U.S.A.

PowerGlide® Owner's Manual

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Phaeton Chassis Owner's Manual

© Tiffin Motorhomes, Inc.
105 2nd Street NW, Red Bay, AL 35582 U.S.A.
Telephone 256.356.8661 • Facsimile 256.356.8219
E-Mail: info@tiffinmotorhomes.com

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Many of the features and appliances described in this manual may or may not be reflected in the actual motor home purchased, depending on the options and models selected by the motorhome owner. All items, materials, instructions, and guidance described in this manual are as accurate as possible at the time of printing. However, because of Tiffin Motorhomes' ongoing and dedicated commitment to excellence, improvement of Tiffin motorhomes is a continuing process. Consequently, Tiffin Motorhomes reserves the right to make substitutions and improvements in its makes and models of motorhomes without prior notification. Substitutions of comparable or better materials, finishes, appliances, instrumentation, and instruction may be made at any time it is deemed prudent to provide the customer with the best possible motorhome meeting the customer's requirements.

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**Phaeton Tiffin PowerGlide Chassis
Customer Support
256-356-0261
Monday-Friday
7 a.m. - 4:30 p.m. CST**

If you should require chassis service, *you should first contact your nearest Tiffin Powerglide® Chassis service center.* If for some reason this is not possible or if you would like to call the manufacturers direct, you can contact them at the following telephone numbers:

TIFFIN POWERGLIDE CHASSIS

256-356-0261

(Please have your VIN# ready)

COACH-NET

(Nights and weekends)

1-866-590-5937

CUMMINS ENGINE COMPANY

1-800-DIESELS (800-343-7357)

ALLISON TRANSMISSIONS

1-800-524-2303

MICHELIN TIRE

800-TIRE-HELP (800-847-3435)

Visit our website at www.tiffinmotorhomes.com

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TIRE CARE

TIRE CARE

- What is the most important component of tire care?

- ✓ TIRE PRESSURE

- Why?
 - ✓ Improved Ride
 - ✓ Improved Tire Wear
 - ✓ Improved Road Handling
 - ✓ Improved Braking



Tire Care

Maintaining the proper tire inflation pressure is the most important thing you can do to maximize the life of your tires. An under-inflated tire can build up excessive heat that may go beyond the prescribed limits of endurance of the rubber and the radial cords. Over-inflation will reduce the tire's footprint on the road, reducing the traction, braking capacity, and handling of your vehicle. An over-inflated tire will also cause a harsh ride, uneven tire wear, and will be more susceptible to impact damage.

Keep in mind that the pressure rating on the side wall of your tire is the maximum pressure for that tire. This is not necessarily the correct pressure for the tires when installed on your vehicle. Maintaining the correct tire pressure for your vehicle's loaded weight is extremely important and must be a part of regular vehicle maintenance.

Correct Tire Pressure

- How to determine the correct pressure
 - ✓ Weigh each wheel position
 - ✓ Set tire pressure according to chart



** This Chart Shows Cold Inflation Pressures*

275/80 R22.5 LRH Energy XZA2											
Load per Wheel-end											
PSI=>		70	75	80	85	90	95	100	105	110	Max Load per Tire
KPA=>		480	520	550	590	620	660	690	720	760	
Single	LBS	4,500	4,725	4,940	5,155	5,370	5,510	5,780	5,980	6,175	6,175
Dual	LBS	8,190	8,600	9,080	9,380	9,770	10,140	10,520	10,880	11,350	5,675
Single	KG	2,040	2,140	2,240	2,340	2,440	2,500	2,620	2,710	2,800	2,800
Dual	KG	3,720	3,900	4,120	4,260	4,440	4,600	4,780	4,940	5,150	2,575

To determine the correct air pressure for your tires, load your motor home as you would normally travel, including water and fuel. Go to a truck scale as found at most major truck stops and weigh **each wheel position** independently, with driver and passenger(s) in the vehicle as described in the ***Michelin Recreational Vehicle Tire Guide*** (MWLA3146 Rev. 6/07) to determine the correct air pressure for the weight on each wheel position. Then use the charts in the guide and adjust the pressure accordingly when the tires are cool or have not been driven for more than one mile. You may call 1-800-847-3435 for a copy of the ***Michelin Recreational Vehicle Tire Guide***.

NOTE: Never reduce the air pressure in a hot tire.

REMEMBER: For control of your RV, it is critical that the tire pressure be the same on both sides of the axle.

Allison Transmission Operation

Driving Conditions

- **Normal driving – best fuel economy**
 - Select “**D**” and “**Mode On**”
- **Performance**
 - “**Mode Off**”
 - For mountain driving, select lower gears to maintain **2000+ engine RPM**
- **Hill climbing on hot days**
 - Keep **RPMs** high to cool engine

Driving Tips with the Allison MD3060 3000MH Transmission:

The points at which shifts occur depend upon predetermined speeds and other operating conditions. A transmission “shift calibration” includes several sets of shift points used according to current or anticipated operating conditions, such as engine or transmission fluid temperature. You can change shift schedules using the **MODE** button.

The transmission control module (**TCM**) includes the capacity for two separate and distinct shift calibrations, one for use in “**Primary Mode**” of operation and one in “**Secondary Mode**.”

Primary – This shift schedule is typically used for all normal vehicle operations.

Secondary – This is an alternate shift schedule that the **TCM** uses upon request. This is operator-controlled using the **MODE** button.

When you are driving under normal road conditions, the **DRIVE** mode is recommended for the best performance and fuel economy. The **MODE** switch should be set to **ON** for economy mode, but **MODE off** should be used when climbing hills and when extra performance is required.

The display screen on the shift control pad will indicate the highest selected gear for the transmission. When mountainous or up-and-down terrain conditions are encountered, you should **manually select a lower gear**, preferably lower than 5th gear, and turn **OFF** the mode switch. This can be done at any road speed by pressing the down arrow repeatedly until the desired gear is indicated in the window of the shifter pad and then pressing the **MODE** button. When your road speed decreases to a safe point, the transmission will downshift at a higher **RPM** than normal. This will decrease the use of overdrive while pulling hills, which can result in excessive heat build-up in the transmission, and keeps the engine operating at peak horse power and performance.

When ascending a grade, maintain engine speed to within **400-500 RPM** of governed engine speed. Governed speed will be **2200 RPM** on your **ISC** engine model. Road speed may decrease, but the engine will be at its peak in the power curve.

It is especially pertinent to monitor your water temperature gauge when climbing hills. Keep in mind that it is not uncommon for the temperature to rise, especially in hot weather. If the gauge reaches the end zone or if the temperature warning light on the gauge panel should come on, reduce your road speed, shift to the next lower gear and keep your tachometer within **500 RPM** of engine governed speed. In many cases this will stabilize the water temperature. If the temperature gauge continues to rise, pull to the side of the road and shift the transmission into neutral. Bring the engine **RPM** to **1,700—2,000 RPM** until the temperature drops down into the normal range. This should occur in a relatively short period of time. If the temperature gauge does not begin to drop and stays in the red zone or continues to rise, shut down the engine and allow it to cool. After the engine is allowed to cool, check the fluid level in the reservoir and add a 50/50 coolant and water mixture if needed.

A good “**rule of thumb**” for descending grades is to **never** use a higher gear than was used to climb the same or similar grade. Try to keep the engine within **500 RPM** of governed speed. This will give the best engine braking and reduce the need to use the service brakes. Select a gear that will keep you at a safe speed with minimal brake application. **Never** ride your brakes when descending a grade since excessive brake heat will build up and your brakes could fade, leaving you with little or no braking power.

If your vehicle is equipped with an exhaust brake, this will also assist in slowing your vehicle on a downhill grade. With the exhaust brake switch in the **ON** position, when your foot is released from the accelerator, the transmission select number changes to “**2**.” The exhaust brake will engage and the transmission will begin to down-shift as soon as road and engine speed will safely allow. This will produce a slowing effect and will remain engaged until either the exhaust brake switch is **turned off**, the accelerator is **depressed**, or the transmission shifts to **second gear**. If your initial speed is high, you may have to step on the brake to slow the vehicle before the transmission will down-shift from **6th gear to 5th gear**. This is normal.

Always select (**N**) neutral on the transmission shift pad prior to turning off the vehicle engine.

Fluid Level Check



Figure 2-1: Fluid level display.

- Be sure transmission is at operating temperature (140° to 220° F)
- Vehicle is parked on level ground
- Transmission in neutral and engine at idle
- Wait until vehicle has been stationary for two minutes
- Simultaneously press the up and down arrow keys
- Display (Figure 2-1) indicates – OL
 - “OL followed by “OK” indicates good oil level
 - “OL followed by “HI” followed by number indicates quarts over-filled
 - “OL followed by “LO” followed by number indicates quarts under-filled
 - “OL followed by “--” proper conditions have not been met

Brake System

Brake System

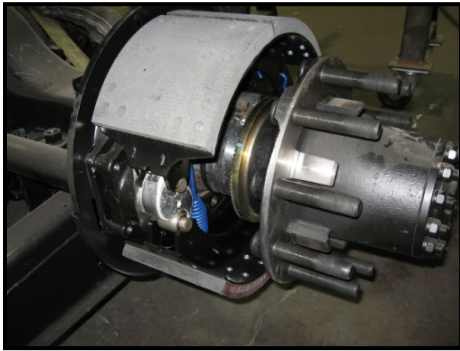


Figure 3-1: Rear Brakes

- Front brakes are 17" air applied disc
- Rear brakes (Figure 3-1) double as parking brake
 - Park brakes are spring applied – air released
 - Two large 16.5 x 7" drum brakes
 - Park brake remains applied even if air pressure is lost
- If air pressure is lost
 - A buzzer and warning lamp will alert you
- Chassis is equipped with automatic slack adjusters (Figure 3-2)
 - No brake adjustment required

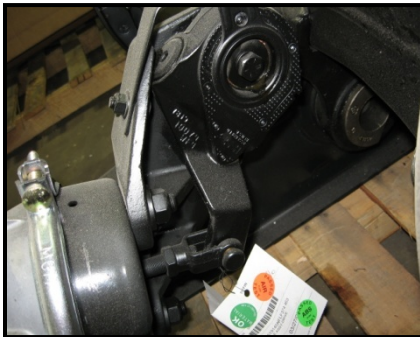


Figure 3-2: Automatic Slack Adjuster

The rear brakes on the PowerGlide chassis are also used as the parking brakes. This provides you the holding power of two large drum brakes to prevent your coach from rolling, even when fully loaded on a 20% grade.

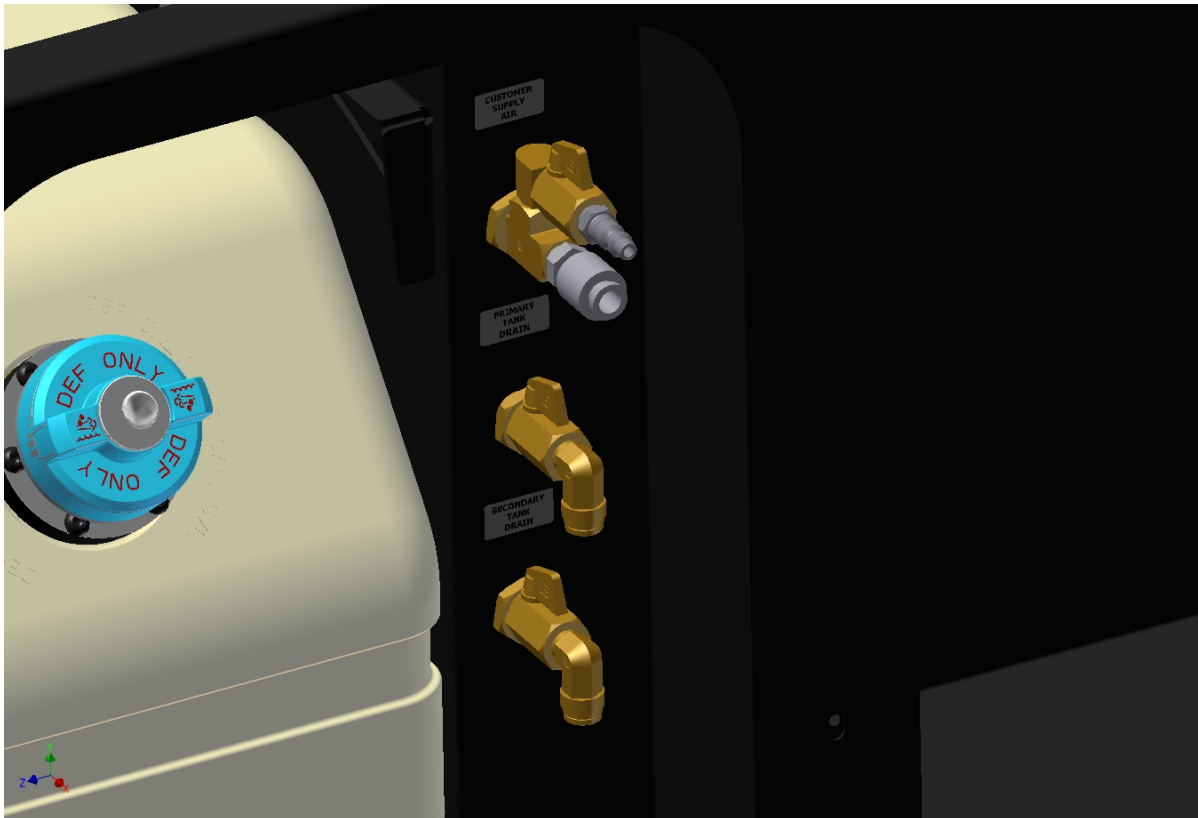
A decrease in air pressure will **not** cause an immediate loss of brakes. If a leak develops in the air system while driving (at approximately **60 to 65 PSI**), you will be alerted via a light on the instrument panel and an audible alarm. As you apply the brakes, the air supply holding the park brakes in the released position will gradually be depleted. When fully depleted (approximately **40 PSI to 45 PSI**), the rear brakes will set. This allows you sufficient time to pull over to the side of the road.

NOTE: The rear brakes have dual chambers – one for the service brakes and one for the park brake. The service brakes are air applied and spring released. The park brake is spring applied and air released.

The brake system is equipped with automatic slack adjusters that avoid the need to manually adjust your brakes. Each time you step on the brake pedal, if adjustment is needed, the adjusters will take up the slack.

Compressed Air System

36' and 40' Phaeton Non-Tag Tank Drains



The compressed air system is comprised of **multi-air storage tanks**. The **primary tank** stores and supplies air for the **rear brakes**, the secondary tank stores and supplies air for the **front brakes**.

When air is compressed it becomes hot. As it cools, condensed moisture forms in the system. The air system is equipped with an air dryer to remove most of this moisture. The dryer has an automatic moisture ejector that releases the trapped moisture back into the atmosphere. However, some moisture will form in the system beyond the dryer, and make its way into the storage tanks. As moisture collects in the **primary** and **secondary** tanks, it displaces the area needed for air storage, thus requiring that the tanks be **drained periodically**.

The air system is equipped with **air tank drains** conveniently located in the passenger side rear storage compartment. Each drain is attached to a different tank. These drains should be **opened daily** for a few seconds to **remove** any moisture trapped in the tanks.

Air Dryer

The Tiffin PowerGlide chassis air brake system features a Haldex Purest air dryer (Figure 3-3), which removes the condensed moisture from compressed air. The air dryer is equipped with a desiccant cartridge that needs to be changed **every 36 months**. The dryer is located on the driver's side (LH) frame rail (behind the rear axle).



Figure 3-3: Haldex Purest Air Dryer

Warning

Air tanks should be bled of all pressure any time you perform work on the air system.

Cummins Engines

EPA Mandates

The Environmental Protection Agency (**EPA**) mandates that all engines built after **December 31, 2009** must reduce the level of emissions exhausted by the engine to the following levels.

Nitrous Oxides (**NO_x**) – 0.2 g/bhp-hr

Particulate Matter (**PM**)- .01 g/bhp-hr

To meet **EPA** guidelines, diesel engines installed in **Tiffin Motorhomes PowerGlide chassis** for domicile in Canada and the USA use an after treatment system (**ATS**) with an after treatment device (**ATD**) and selective catalytic reduction (**SCR**) technology to reduce **NO_x** downstream of the engine..

Notice

Using non-specification fluids can result in serious damage to the ATS. It is extremely important that the following guidelines be followed for vehicles with EPA10-compliant engines, or damage may occur to the ATD, and the warranty may be compromised.

- Use "**ultra-low sulfur diesel (ULSD)**" with 15 ppm sulfur content or less.
- **Do not use fuel blended with used engine lube oil or kerosene.**
- Engine lube oil must have a sulfated ash level **less than 1.0 wt %**, currently referred to as **CJ-4 oil**.
- Use only certified diesel exhaust fluid (**DEF**) in the **DEF** tank.

Part **ATD**, is comprised of a diesel oxidation catalyst (**DOC**), and a diesel particulate filter (**DPF**). The **DPF** traps soot particles, and exhaust heat converts the soot to ash in the **DPF** in a process called **regeneration (re-gen)**. The harder an engine works, the better it disposes of soot. When the engine is running under load and **re-gen** occurs without input, it is called **passive re-gen**. If the engine isn't running hot enough, the electronic controls may initiate an **active re-gen**, whereby extra fuel is injected into the exhaust stream before the diesel particulate filter, to superheat the soot trapped in the filter and burn it to ash. Both types of **re-gen** occur **without driver input**.

Warning

Active regeneration can occur automatically any time the vehicle is moving. The exhaust gas temperature could reach 1500°F (800°C), which is hot enough to ignite or melt common materials, and to cause personal injury. The exhaust can remain hot after the vehicle has stopped moving.

Operating at reduced engine load will allow **soot** to accumulate in the **DPF**. When this occurs, the **DPF** lamp illuminates, indicating that a **re-gen** must be performed, and the **driver** must **bring the vehicle up to highway speed** to increase the load.

After the exhaust stream passes through the **ATD**, it flows through another canister housing the **SCR** device. A controlled quantity of diesel exhaust fluid (**DEF**) is injected into the exhaust stream, where heat converts it to ammonia (**NH₃**) gas. This mixture flows through the **SCR** device, where the ammonia gas reacts with the **NO_x** in the exhaust, to produce harmless nitrogen (**N₂**) and water vapor (**H₂O**), which then exits out of the tailpipe.

ATS Warning Lamps

Warning lamps in the driver's message center alert you of situations with the after-treatment system.

- An illuminated **DPF** lamp indicates a **re-gen** is needed.
- A slow, **10-second** flashing of the **HEST** lamp alerts the driver that a **parked re-gen** is in progress, but the exhaust temperatures are still relatively cool. It also indicates that the **high-idle speed** is being controlled by the engine software, **not the driver**.
- A steadily illuminated **HEST** lamp alerts the operator of **high-exhaust temperatures** when vehicle speed is below **5 mph (8 km/h)** while it is performing an **active re-gen**.
- An illuminated **DEF** warning lamp in the gauge indicates that the **DEF** tank should be refilled at the next opportunity.

DPF Maintenance

Eventually ash will accumulate in the **DPF** and the filter will require servicing. **DPF** servicing must be performed by an authorized technician, following the engine manufacturer's instructions. A record must be maintained for warranty purposes, which includes:

- Date of cleaning or replacement
- Vehicle mileage
- Particulate filter part number and serial number

Engine Aftertreatment

Operating Characteristics of an Engine with Aftertreatment Diesel Particulate Filter

General Information

The aftertreatment system is used to reduce emissions, and is composed of six main components:

- Aftertreatment inlet
- Aftertreatment diesel particulate filter differential pressure sensor
- Aftertreatment diesel oxidation catalyst
- Aftertreatment outlet
- Aftertreatment exhausts gas temperature sensors.

The components of the aftertreatment system perform the following functions:

- The aftertreatment inlet and outlet adapt the vehicle exhaust piping to the aftertreatment system, and also provide a mounting location for the aftertreatment gas temperature sensors.
- The aftertreatment diesel particulate filter differential pressure sensor measures the restriction across the aftertreatment diesel particulate filter.
- The aftertreatment diesel particulate filter captures the soot and ash from the engine exhaust.
- The aftertreatment diesel oxidation catalyst is used to oxidize fuel in the exhaust in order to create heat for the regeneration process.
- The aftertreatment exhaust gas temperature sensors are used to measure the exhaust gas temperatures at various points in the aftertreatment system.

Soot is composed of the partially burned particles of fuel that occur during normal engine operation (black smoke).

Ash is composed of the partially burned particles of engine oil that occur during normal engine operation.

Over time, both soot and ash accumulate in the aftertreatment diesel particulate filter and **must** be removed. Soot is removed by a process called regeneration. Ash is removed by removing the aftertreatment diesel particulate filter and cleaning it at specified intervals.

A vehicle with an aftertreatment system has up to two additional indicator lamps on the dashboard. The two additional lamps, along with the check engine lamp, alert the operator of the status of the aftertreatment diesel particulate filter.

Ultra low sulfur diesel fuel is required for an engine equipped with an aftertreatment diesel particulate filter. If ultra low sulfur diesel is **not** used, the engine might **not** meet emissions regulations, and the aftertreatment diesel particulate filter or aftertreatment diesel oxidation catalyst can be damaged.

To maximize the maintenance intervals of the aftertreatment diesel particulate filter, Cummins Inc. recommends the use of a lubricating engine oil meeting Cummins Engineering Standard 20081. The use of oil meeting CES 20081 also requires the use of ultra low sulfur diesel fuel to maintain the specified oil drain interval without risk of engine damage.

Regeneration

Regeneration is the process of converting the soot collected in the aftertreatment diesel particulate filter into carbon dioxide.

The regeneration process requires heat to occur, and can be classified into two different types: passive regeneration and active regeneration.

Passive Regeneration

Passive regeneration occurs when the exhaust temperatures are naturally high enough to oxidize the soot collected in the aftertreatment diesel particulate filter faster than the soot is collected.

Passive regeneration typically occurs when the vehicle is driven at high speeds (i.e., highway speeds) and/or under heavy loads.

Active Regeneration

Active regeneration occurs when the exhaust temperatures are **not** naturally high enough to oxidize the soot in the aftertreatment diesel particulate filter faster than it's collected.

Active regeneration requires assistance from the engine in order to increase the exhaust temperature. This is typically accomplished by the engine injecting a small amount of diesel fuel into the exhaust stream, which is then oxidized by the aftertreatment diesel oxidation catalyst, which creates the heat needed to regenerate the aftertreatment diesel particulate filter.

Active regeneration will occur more frequently in vehicles with low speed, low load, or stop and go duty cycles. Active regeneration only occurs if the engine ECM has detected that the aftertreatment diesel particulate filter restriction has reached a specified limit, and may only occur if the vehicle is moving above a speed threshold. The engine ECM will activate and de-activate active regeneration as needed.

The speed threshold for active regeneration to occur is dictated by the vehicle manufacturer, and can be set at vehicle speeds from 0 MPH to 25 MPH.

If the vehicle speed threshold for active regeneration is set to 0 MPH, active regeneration can occur at any vehicle speed.

If the vehicle speed threshold is set to greater than 0 MPH, the vehicle must reach 40 MPH for active regeneration to begin. The active regeneration event will then continue until the vehicle speed drops below the speed threshold.

Refer to the vehicle owner's manual for information for the speed threshold for active regeneration used for a specific vehicle.

Active regeneration is largely transparent to the vehicle operator, the vehicle operator may notice an increase in turbocharger noise during an active regeneration event, and may notice that the high exhaust temperature lamp is illuminated, if the vehicle is so equipped.

During active regeneration, the exhaust temperature can be hotter than when the engine is operating at full load. The exhaust temperature during a normal active regeneration event could reach 1100°F, and possibly 1500°F under certain conditions.

Warning

If the vehicle is not equipped with a High Exhaust System Temperature Lamp, follow these precautions for active regeneration whenever the vehicle is running and the vehicle slows or comes to a stop. Active regeneration can occur any time the vehicle is moving, and the exhaust temperature can remain hot after the vehicle has stopped moving. The exhaust temperature could reach 1500°F, which is hot enough to ignite or melt common materials, or to burn people.

Stationary (Parked) Regeneration

Under some operating conditions, such as low speed, low load, or stop and go duty cycles, the engine may **not** have enough opportunity to regenerate the aftertreatment diesel particulate filter during normal vehicle operation. When this occurs, the engine will illuminate the aftertreatment diesel particulate filter lamp to inform the vehicle operator that assistance is required, typically in the form of a stationary (parked) regeneration.

Stationary (parked) regeneration is a form of active regeneration that is initiated by the vehicle operator when the vehicle is **NOT** moving.

Stationary (parked) regeneration requires an elevated engine speed of approximately 1000 to 1400 RPM. The length of a stationary regeneration will vary depending on how full the aftertreatment diesel particulate filter is, but will typically take anywhere from 45 minutes to 1.5 hours to complete.

A stationary regeneration can be initiated one of two ways:

- A vehicle mounted stationary regeneration switch. Refer to the vehicle owners manual for the location and operation of this switch, if so equipped (this switch may also be called a “parked regeneration” switch or “start” switch). The vehicle mounted stationary (parked) regeneration

switch will only initiate a stationary (parked) regeneration when the aftertreatment diesel particulate filter lamp is illuminated.

- The INSITE electronic service tool can initiate a stationary regeneration by starting the “Aftertreatment Diesel Particulate Filter Regeneration Test.”

Warning

During regeneration, exhaust gas temperature could reach 1500°F, and exhaust system surface temperature could exceed 1300°F, which is hot enough to ignite or melt common materials, and to burn people. Engine speed will increase and could possibly reach between 1000 to 1500 RPM. Follow these instructions to avoid the risk of fire, property damage, burns, or other serious personal injuries.

To perform a stationary regeneration, follow the steps listed:

- Select an appropriate location to park the vehicle.
 - Preferably on a surface that will **not** burn or melt under high exhaust temperatures (such as clean concrete or gravel, **not** grass or asphalt).
- Park the vehicle away from anything that can burn, melt or explode.
 - Ensure there are no items within 2 feet of the exhaust outlet.
 - Items that can burn, melt or explode **must** be kept at least 5 feet from the exhaust outlet (such as gasoline, paper, plastics, fabrics, compressed gas containers, hydraulic lines).
 - Ensure that there are no gases or vapors nearby that could burn, explode or contribute to a fire (such as LP gas, gasoline vapors, oxygen, nitrous oxide).
- Park the vehicle securely. Place the transmission in park, if provided, otherwise in neutral. Set wheel chocks at front and rear of at least one tire.
- Set up a safe exhaust area. If bystanders might enter the area, set up barriers to keep people at least 5 feet from the exhaust outlet during the stationary regeneration. When indoors, attach an exhaust discharge pipe rated for at least 1500°F.
- Keep a fire extinguisher nearby.
- Check the exhaust system surfaces. Confirm that nothing is on or near the exhaust system surfaces (such as tools, rags, grease, or debris).

Verify the following conditions are met in the vehicle:

- The clutch pedal is released.
- The brake pedal is released.
- The transmission is in neutral or park.
- PTO or Remote PTO is off.
- The vehicle speed is 0 MPH.
- The throttle pedal is released.

- Initiate the stationary regeneration by toggling the vehicle mounted stationary regeneration switch or by using the INSITE electronic service tool.
- Once the stationary regeneration is initiated, the engine speed will increase, and turbocharger noise will increase.
- The High Exhaust System Temperature Lamp (if equipped) may illuminate during the stationary regeneration as the exhaust temperatures increase.
- When the engine ECM detects the aftertreatment diesel particulate filter has been regenerated, the engine will automatically return to normal idle speed.
- Monitor the vehicle and surrounding area during the stationary regeneration. If any unsafe condition occurs, shut off the engine immediately.

To stop a stationary (Parked) regeneration before it has completed, depress the clutch, brake, or throttle pedal, or turn off the engine.

Once the stationary (parked) regeneration is complete, exhaust gas and surface temperatures will remain elevated for 3 to 5 minutes.

NOTE: If a stationary (parked) regeneration is attempted, and the engine speed does **not** increase, contact an Cummins authorized repair facility for assistance.

Aftertreatment Warm-up

The aftertreatment warm up function is used to help prevent the buildup of water condensation in the aftertreatment system during extended idle operation.

After approximately four hours of engine idle operation, the engine speed will increase to 1000 to 1100 RPM, and remain at this speed for 10 minutes. During this time, the aftertreatment system is warmed up enough to evaporate any water that has condensed in the system.

The aftertreatment warm-up function can be stopped by depressing the throttle, clutch, or brake pedal. If the engine continues to idle, the aftertreatment warm-up function will try to raise the idle speed until the aftertreatment temperatures are suitable.

Engine Indicator Lamps

General Information

The following engine indicator lamps cover **only** the lamps controlled by the engine ECM. The vehicle manufacturer can provide additional indicator lamps. Please refer to the vehicle's owner's manual for additional lamp information.

Wait to Start Lamp

The WAIT TO START lamp illuminates when the intake air heater needs to warm the intake air prior to starting the engine. The WAIT TO START lamp on time will vary, depending on the ambient air temperature.

For vehicles equipped with an engine starting motor protection features, another function of the WAIT TO START lamp is to flash for two minutes if the starting motor is engaged for 30 seconds or more.

The WAIT TO START lamp can look like:

- The words WAIT TO START spelled out.



- A symbol similar to the graphic illustrated at right.
- The color of the symbol or words can vary based on the manufacturer of the vehicle, but will typically be red or amber.

Check Engine Lamp

The CHECK ENGINE lamp illuminates when the engine needs to be serviced at the first available opportunity.

The CHECK ENGINE lamp is amber, and can look like:

- The words WARNING or CHECK ENGINE spelled out.



- A symbol similar to graphic illustrated at right.

Another function of the CHECK ENGINE lamp is to flash for 30 seconds at key-on when one of the following occurs. This flashing function is referred to as the MAINTENANCE lamp. The MAINTENANCE lamp could flash for any of the following reasons:

- Maintenance required (if the Maintenance Monitor is enabled).
- Water-in-fuel is detected.
- Coolant level is low.

Stop Engine Lamp

The STOP ENGINE lamp indicates, when illuminated, the need to stop the engine as soon as it can be safely done. The engine **must** remain shutdown until the engine can be repaired.

For engines with the Engine Protection shutdown feature enabled, if the STOP ENGINE lamp begins to flash, the engine will automatically shut down after 30 seconds. The flashing STOP engine lamp alerts the operator to the impending shut down.

The STOP ENGINE lamp is red in color, and can look like:

- The words STOP or STOP ENGINE spelled out



- A symbol similar to the graphic illustrated at right.

Aftertreatment Diesel Particulate Filter Lamp

The AFTERTREATMENT DIESEL PARTICULATE FILTER lamp (below) indicates, when illuminated or flashing, that the aftertreatment diesel particulate filter requires regeneration.



An illuminated AFTERTREATMENT DIESEL PARTICULATE FILTER lamp indicates that the aftertreatment diesel particulate filter needs to be regenerated at the next possible opportunity. This can be accomplished by:

1. Changing to a more challenging duty cycle, such as highway driving, for at least 20 minutes.
2. Performing a stationary regeneration. Follow the instructions in Unique Operating Characteristics of and Engine with Aftertreatment, in Section 1.

NOTE: Stationary regeneration is considered a normal maintenance practice and is **not** covered by Cummins Inc. warranty.

A flashing AFTERTREATMENT DIESEL PARTICULATE FILTER lamp indicates that the aftertreatment diesel particulate filter needs to be regenerated at the next possible opportunity. Engine power may be reduced automatically.

When the lamp is flashing, the operator should:

1. Change to a more challenging duty cycle, such as highway driving, for at least 20 minutes.
2. Perform a stationary regeneration. Follow the instructions in Unique Operating Characteristics of an Engine with Aftertreatment, in Section 1.

A flashing AFTERTREATMENT DIESEL PARTICULATE FILTER lamp combined with an illuminated WARNING or CHECK ENGINE lamp indicates that the aftertreatment diesel particulate filter needs be regenerated immediately. Engine power will be reduced automatically.

When these lamps are illuminated, a stationary regeneration is required. Follow the instructions in Unique Operating Characteristics of an Engine with Aftertreatment, in Section 1.

NOTE: If a stationary regeneration is NOT performed, the STOP ENGINE lamp will illuminate and the vehicle will need to be taken to a Cummins Authorized Repair Location.



High Exhaust System Temperature Lamp

The HIGH EXHAUST SYSTEM TEMPERATURES lamp indicates, when illuminated, that exhaust temperatures are high due to regeneration of the aftertreatment diesel particulate filter. The lamp could illuminate during normal engine operation or during stationary regeneration.

NOTE: The OEM determines whether or **not** the HIGH EXHAUST SYSTEM TEMPERATURE lamp is installed on the vehicle. The OEM also specifies the temperatures, vehicle speeds, and other

conditions at which the lamp illuminates. Refer to the OEM service manual for additional information regarding this lamp.

When this lamp is illuminated, make sure the exhaust pipe outlet is **not** directed at any surface or material that will melt, burn, or explode.

Warning

When this lamp is illuminated, the exhaust gas temperature could reach 800°C [1500°F], which is hot enough to ignite or melt common materials, and to burn people.

- Keep the exhaust outlet away from people and anything that can burn, melt, or explode.
- Nothing within 0.6 m [2ft] of the exhaust outlet
- Nothing that can burn, melt, or explode within 1.5 m [5ft] (such as gasoline, wood, paper, plastics, fabric, compressed gas containers, or hydraulic lines).
- In an emergency, turn off the engine to stop the flow of exhaust.

NOTE: The HIGH EXHAUST SYSTEM TEMPERATURE lamp does **not** signify the need for any kind of vehicle or engine service; it merely alerts the vehicle operator to high exhaust temperatures, it will be common for the HIGH EXHAUST SYSTEM TEMPERATURE lamp to illuminate on and off during normal vehicle operation as the engine completes regeneration.



Aftertreatment Diesel Exhaust Fluid Lamp

The AFTERTREATMENT DIESEL EXHAUST FLUID lamp indicates, when illuminated or flashing, that the diesel exhaust fluid level is low.

An illuminated AFTERTREATMENT DIESEL EXHAUST FLUID lamp indicates that the diesel exhaust fluid level has fallen below the initial warning level. This can be corrected by filling the diesel exhaust fluid tank with diesel exhaust fluid.

NOTE: It is recommended that the diesel exhaust fluid tank be filled completely full of diesel exhaust fluid in order to correct any fault conditions.

A flashing AFTERTREATMENT DIESEL EXHAUST FLUID lamp indicates that the diesel exhaust fluid level has fallen below the critical warning level. This can be corrected by filling the diesel exhaust fluid tank with diesel exhaust fluid.

NOTE: It is recommended that the diesel exhaust fluid tank be filled completely full of diesel exhaust fluid in order to correct any fault conditions.

A flashing AFTERTREATMENT DIESEL EXHAUST FLUID lamp combined with an illuminated WARNING or CHECK ENGINE lamp indicates that the diesel exhaust fluid level has fallen below the initial derate level. The engine power will be limited automatically. This can be corrected by filling the diesel exhaust fluid tank with diesel exhaust fluid.

NOTE: It is recommended that the diesel exhaust fluid tank be filled completely full of diesel exhaust fluid in order to correct any fault conditions.

If the engine has been shut down or had idled for 20 hours after the diesel exhaust fluid tank has been emptied, the STOP ENGINE lamp will also be illuminated along with the flashing AFTERTREATMENT DIESEL EXHAUST FLUID lamp and illuminated CHECK ENGINE lamp. The engine vehicle speed will also be limited to 5 mph.

NOTE: In order to remove the 5 mph speed limit, the diesel exhaust fluid tank must be filled to at least 10 percent volume of the tank.

NOTE: It is recommended that the diesel exhaust fluid tank be filled completely full of diesel exhaust fluid in order to correct any fault conditions.

Operating Characteristics of an Engine with Airless Selective Catalyst Reduction (SCR)

General Information

The selective catalytic reduction system is used to decrease the NOx emissions from the vehicle tailpipe. The system is composed of several main components:

1. Aftertreatment DEF Controller
2. Aftertreatment DEF Dosing Unit
3. Aftertreatment DEF Dosing Valve
4. Aftertreatment SCR Catalyst

NOTE: It is unlawful to tamper with, modify, or remove any component of the SCR system. It is also unlawful to use diesel exhaust fluid that does not meet the specifications provided or to operate the vehicle/equipment with no diesel exhaust fluid.

Diesel exhaust fluid is required for an engine equipped with a selective catalytic reduction system. Diesel exhaust fluid (DEF) is a fluid that is sprayed into the exhaust gas prior to the aftertreatment SCR catalyst. The diesel exhaust fluid vaporizes and decomposes to form carbon dioxide and ammonia. The ammonia reacts with the NOx emissions over the aftertreatment SCR catalyst to form nitrogen and water.

Diesel exhaust fluid:

- May have a slight ammonia smell
- Is colorless
- Is non-toxic and non-polluting
- Is non-flammable
- Urea is naturally occurring and is biodegradable

Refer to Diesel Exhaust Fluid Recommendations and Specifications in Section V of the Cummins Engine Owner's Manual for diesel exhaust fluid specifications.

NOTE: Cummins Inc. supplies the aftertreatment diesel exhaust fluid controller, aftertreatment diesel exhaust fluid dosing unit and aftertreatment diesel exhaust fluid dosing valve, and the aftertreatment SCR catalyst. The vehicle manufacturer supplies the diesel exhaust fluid tank, the diesel exhaust fluid lines, the diesel exhaust fluid tank temperatures and level sensor, and all wiring between the components.

The aftertreatment diesel exhaust fluid dosing unit pumps diesel exhaust fluid from the diesel exhaust fluid tank to the aftertreatment diesel exhaust fluid dosing valve. The aftertreatment diesel exhaust fluid dosing unit is electrically heated, and contains a filter that is a maintenance item.

NOTE: Refer to the Maintenance Schedule for the aftertreatment diesel exhaust fluid dosing unit filter maintenance interval.

The aftertreatment diesel exhaust fluid dosing valve is coolant cooled, and sprays diesel exhaust fluid into the exhaust.

The aftertreatment diesel exhaust fluid controller controls the amount of diesel exhaust fluid sprayed into the exhaust. It also controls the diesel exhaust fluid tank heater, diesel exhaust fluid line heaters, and reports the diesel exhaust fluid tank temperatures and level back to the engine ECM.

The aftertreatment SCR catalyst uses diesel exhaust fluid to reduce the nitrogen oxide emissions from the engine out of the exhaust into nitrogen and water. The aftertreatment SCR catalyst itself requires no maintenance.

A vehicle with SCR will be equipped with an additional lamp on the dashboard, the aftertreatment diesel exhaust fluid lamp. This lamp, along with the check engine lamp and stop engine lamp, alert the operator to the level of diesel exhaust fluid tank. As the diesel exhaust fluid tank level approaches empty, the aftertreatment diesel exhaust fluid lamp will illuminate and engine power will be reduced. Attempting to operate the vehicle with no diesel exhaust fluid in the tank will result in the vehicle speed being limited to 5 mph.

Diesel exhaust fluid is sprayed into the exhaust when the temperature in the aftertreatment SCR catalyst reaches approximately 250°C [482°F]. The amount of diesel exhaust fluid consumed will differ from vehicle to vehicle, as diesel exhaust fluid consumption depends on engine speed and load.

Even though diesel exhaust fluid freezes at approximately -12°C [11°F], the SCR system is designed to be frozen and thawed. The diesel exhaust fluid tank is heated by engine coolant, and the diesel exhaust fluid lines and aftertreatment diesel exhaust fluid dosing unit are electrically heated. No operator interaction is needed when operating in cold temperatures; heating and thawing are controlled automatically by the engine ECM and aftertreatment diesel exhaust fluid controller.

After turning the key switch off on a vehicle with SCR, a pumping sound may be heard from underneath the vehicle. This sound is the aftertreatment diesel exhaust fluid dosing unit purging any unused diesel exhaust fluid from the system and returning it to the tank. This is normal system

operation. The purge process takes approximately 60 seconds to complete. Do not disconnect the vehicle batteries during this process to avoid system damage.

Under certain conditions (cold or very dry) water condensation, in the form of water vapor, can be seen coming from the vehicle tailpipe. This is normal operation and will clear within a few minutes of normal vehicle operation.

Engine Starting

Warning

Do not use any starting aid, such as ether, in engines with an air intake heater. This could cause an explosion and serious personal injury or death.

NOTE: For cold-weather starting, see “Cold-Weather Operation” in this chapter.

NOTE: Cummins electronic engines are run on a dynamometer before being shipped from the factory. They do not require a break-in period.

IMPORTANT: Special break-in oils are **not recommended** for new or rebuilt Cummins engines.

IMPORTANT: Before starting the engine, see detailed information on how to read the instruments and operate the controls. Also, before engine start-up, perform the engine pre-trip inspection and daily maintenance checks.

NOTICE

If a vehicle does not start on the first attempt, make sure that the engine has completely stopped rotating before reapplying the starter switch. Failure to do so can cause the pinion to release and re-engage, which could cause ring gear and starter pinion damage.

IMPORTANT: Ring gear and starter pinion damage caused by improper starting procedures is not warrantable.

NOTICE

Do not crank the engine for more than 30 seconds at a time. Wait two minutes after each try to allow the starter to cool. Failure to do so could cause starter damage.

NOTICE

If the engine is equipped with a turbocharger, protect the turbocharger during start-up by not opening the throttle or accelerating the engine above 1000 rpm until normal engine idle oil pressure registers on the gauge.

1. Set the parking brake.
2. Turn the key to the **ON** position.
3. Wait a minimum of **10 seconds**. If the “Wait-to-Start” lamp is still illuminated after **10 seconds**, continue to wait until the lamp is no longer illuminated.
4. Start the engine.
5. NOTE: See the Cummins Operation and Maintenance Manual for detailed information on starting procedures.

Cold-Weather Starting

The cold-start system approved for use on Cummins engines has been based upon starting aid capabilities to -25°F (-32°C). For more information, see the Cummins Operation and Maintenance Manual. Turn the ignition switch to the on position. If the engine doesn't start after 30 seconds of cranking, turn the key to the off position and wait two minutes; then repeat the starting procedure. Run the engine slightly above idle until oil pressure shows on the gauge. If oil pressure doesn't show on the gauge within 30 seconds of starting, turn the key to the off position and wait one minute; then repeat the starting procedure.

If the unit is equipped with a block heater, start the block heater 2 to 4 hours before travel.

Engine Braking (optional)

Exhaust Brake

Important: The exhaust brake is a vehicle slowing device, not a vehicle stopping device. It is not a substitute for the vehicle service brakes. Use of the exhaust brake for vehicle downhill control and slowing down on level terrain will allow the service brakes to remain cool and ready for an emergency.

Warning

Do not use the exhaust brake on wet, icy, or snow-covered roads. Using the exhaust brake could result in loss of vehicle control, possibly causing personal injury or death, or property damage.

To get the best result from the exhaust brake, it is necessary to observe several simple operating principles.

The exhaust brake is activated when the following conditions are satisfied.

1. The **ON/OFF** switch is in the **ON** position.
2. The engine is not being fueled.

The Allison transmission provides for optimum retarding downshift operation. When the exhaust brake is turned ON and your foot is removed from the throttle pedal, the transmission will immediately pre-select a lower gear. The transmission then starts to down-shift through gears to reach the pre-selected gear. Down-shifting occurs at a higher speed than is usual when the exhaust brake is not turned on. This allows the exhaust to provide the maximum retarding power.

Engine Operation

Operating vehicles with diesel engines in areas where there are concentrated flammable vapors (such as diesel, gasoline, or propane fumes) can create a hazardous situation. These vapors can be drawn into the engine through the air intake and cause engine overspeed. Be especially cautious of low-lying or closed-in areas, and always check for signs that flammable vapors may be present.

The driver should be familiar with the vehicle warning system in order to bring the vehicle to a safe stop if the engine malfunctions. See information on driver's controls.

1. Cummins engines produce high horsepower and peak torque characteristics at low rpm. Because of this, it is not necessary to operate the engine at high rpm to deliver the required horsepower at the wheels. These characteristics may also result in less shifting and make shifting at lower rpm (to peak torque) more practical.
2. Depending on the vehicle gearing, the posted speed limit can sometimes allow operation in either of the top two gears; however, for improved operating efficiency (fuel economy and engine life), operate in the top gear at reduced rpm, rather than in the next lower gear at the maximum rpm.
3. Cruise at partial throttle whenever road conditions and speed requirements permit. This driving technique permits operating within the most economical power range of the engine.
4. When approaching a hill, open the throttle smoothly to start the up-grade at full power (2000 rpm or higher is recommended), then shift down as desired to maintain the optimum vehicle speed. The high torque of Cummins engines may permit topping some grades without shifting.
5. Cummins engines are designed to operate over a wide speed range. More frequent shifting than necessary does not allow proper utilization of this flexibility. The driver who stays in top gear and uses the wider speed range will achieve the best fuel economy.
6. The Cummins engine is effective as a brake on downhill grades, but take care not to over-speed the engine going downhill.

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

NOTICE

Do not allow the engine to exceed its governed speed, or serious engine damage could result.

Cruise Control

Cruise control allows you to automatically control the speed of the vehicle above **32 MPH (50 km/h)**.

Warning

Do not use the cruise control system when driving conditions do not permit maintaining a constant speed, such as in heavy traffic or on roads that are winding, icy, snow covered, slippery, or roads with a loose driving surface. Failure to follow this precaution could cause a collision or loss of vehicle control, possibly resulting in personal injury or property damage.

NOTICE

Do not shift to Neutral (N) when using cruise control. This will cause the engine to over-speed, which can damage the engine.

Cruise On/Off

Press the cruise control **ON/OFF** switch to activate the cruise control or to turn it off.

Cruise Set

Press the cruise control **SET** switch to set the desired cruising speed.

Cruise Resume

Press the cruise control **RESUME** switch to resume cruise control activation.

Cruise Cancel

Press the cruise control **CANCEL** switch to disengage cruise control without losing the current speed setting.

High-Altitude Operation

Engines lose horsepower when operated at high altitude because the air is too thin to burn as much fuel as at sea level. Most turbocharged engines are rated for higher altitudes than naturally aspirated engines. An engine will have smoky exhaust at high altitudes unless a lower gear is used. Shift gears as needed to avoid excessive exhaust smoke.

Engine Shutdown

NOTICE

Except in an emergency, do not shut down the engine when the coolant temperature is above 194°F (90°C). To do so could damage the engine.

1. With the vehicle stopped, place the transmission in the Neutral (**N**) position and set the parking brake using the parking brake control knob.
2. It is **important** to idle an engine for **3 to 5 minutes** before shutting it down. This allows the lubricating oil and the water to carry heat away from the combustion chambers, bearings, shafts, etc. This is especially important with turbo-charged engines.
3. **Do not** idle the engine for excessively long periods. **Important:** Long periods of idling are not good for an engine because the combustion chamber temperatures drop so low that the fuel may not burn completely. This will cause carbon to clog the piston rings and may result in stuck valves.
4. If the engine is not being used, shut it down by turning the ignition key to the OFF position.

Towing Hitch

The Phaeton is fully capable of towing typical motor vehicles; the motor home is equipped with a Class 3, 10,000-pound towing hitch and associated wiring connector. The total weight of the motor home and any vehicle towed must not exceed the Gross Combined Weight Rating (GCWR). When the motor home is weighed, remember to account for passengers and their locations in the motor home. Any vehicles to be towed by the motor home should have adequate active braking.

Scheduled Maintenance

Scheduled Maintenance

SERVICE INTERVAL (Miles x 1,000)	Daily	5	10	15	20	Required Fluids, Lubricants, and Procedures
Air System:						
Air Dryer		X				Inspect for leaks and blockage of purge valve (6)
Air Intake	X					Inspect for blockage
Air Filter			X			Check restriction indicator - replace filter as needed (7)
Primary Air Tank Reservoir	X					Drain condensation daily
Secondary Air Tank Reservoir	X					Drain condensation daily
Brake Systems:						
ABS Sensors		X			X	Clean sensors & adjust into hub rings. (1)
Brake Pads, Rotors, Shoes & Drums					X	Inspect pads, shoes, rotors & drums for wear and cracks. (1)
Slack Adjusters					X	Inspect slack adjuster for proper adjustment & grease.
Brake Hoses/Whips, Front & Rear			X			Inspect for leaks, & cracking.
Cooling Systems:						
A/C Condenser Fins			X			Inspect for blockage and wash clean every 10k or as needed
Charge Air Cooler Fins			X			Inspect for blockage and wash clean every 10k or as needed
Fan & Fan Shroud			X			Inspect for blockage and cracks.
Radiator Fins/Grill			X			Inspect for blockage and wash clean every 10k or as needed
Radiator Hoses & Pipes			X			Inspect for kinks, chaffing wear and leaks.
Surge Tank Cap	X					Inspect for leaks daily
Surge Tank Vent Lines	X					Inspect for kinks and leaks daily
Fan Clutch					X	Inspect for correct alignment
Fan Drive Belt					X	Replace fan belt.
Fluid Level	X					Check sight glass for correct fluid level daily
Electrical Systems:						
Rear Electrical Compartment			X			Check for loose fuses and cables
Front Electrical Compartment			X			Check for loose fuses and cables
Generator Cables			X			Check for loose red & black cables connected to generator
Alternator Belt			X			Check for correct tension and wear
Batteries		X				Check for loose lugs / remove any corrosion

SCHEDULED MAINTENANCE

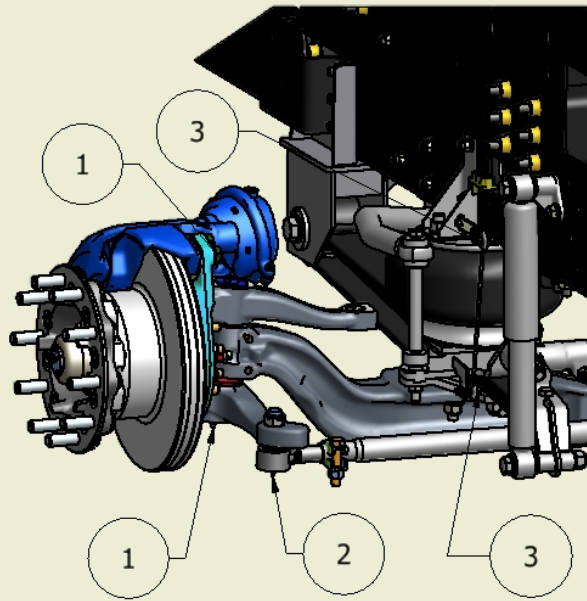
SERVICE INTERVAL (Miles x 1,000)	Daily	5	10	15	20	Required Fluids, Lubricants, and Procedures
Engine Systems:						
Engine Drive Belt Tension					X	Inspect belt & tension
Engine Oil Filter					X	Replace engine oil filter per engine manual (1)
Engine Oil					X	Change engine oil per engine manual (1)
Exhaust Muffler & Piping			X			Inspect for pinholes, rust and leaks
Diesel Fuel						Always use only ultra-low sulfur
Fuel Tank Vent Lines					X	Inspect for "P" traps that may cause air locks and slow filling
Fuel Tank & Lines			X			Inspect for leaks around fuel inlet nipples and hoses
Engine Coolant						Change engine coolant per engine manual
Primary Fuel Filter					X	Replace fuel filter per engine manual (1)
Secondary Fuel Filter					X	Replace fuel filter per engine manual (1)
Steering Systems:						
Steering Gear					X	Inspect mount bolts for looseness
Steering Gear Pump			X			Inspect for hydraulic hose leaks at fittings
Steering Shaft U-Joints					X	Inspect for loose fasteners & lube bearings w/NGLI #2 (1)
Steering Shaft Boot					X	Inspect for clearance between boot & shaft, lubricate w/ NGLI #2 grease (1)
Suspension & Axles:						
Coach Alignment				X		Align coach as needed (4)
Front Ride Height Adjust					X	Measure between center of upper and lower shock bolt 20 1/8 inches
Rear Ride Height Adjust					X	Adjust to 7" side to side from bottom of rail to centerline of axle
Ride Height Valve Linkages					X	Grease linkage grommets w/D.A. Stewart Aqualube
Air Suspension Bags			X			Inspect for leaks at fittings and inspect bags for leaks or cracks
Front Axle Bearings		X				Check fluid level through sight window, if low, repair leaks as necessary (1)
Front Axle Tie Rods - Inspect					X	Inspect for looseness
Front Axle King Pins					X	Lubricate W/NGLI #2 grease (1)
Front & Rear Shocks			X			Inspect for leaks on shock tube, replace as needed
Rear Axle Lube					X	Inspect for leaks & check fluid level. Use synthetic oil only 75W90 (3)
Wheel Lug Torque			X			Re-torque all wheels nuts - Torque 450-500 lbs (2)

Scheduled Maintenance

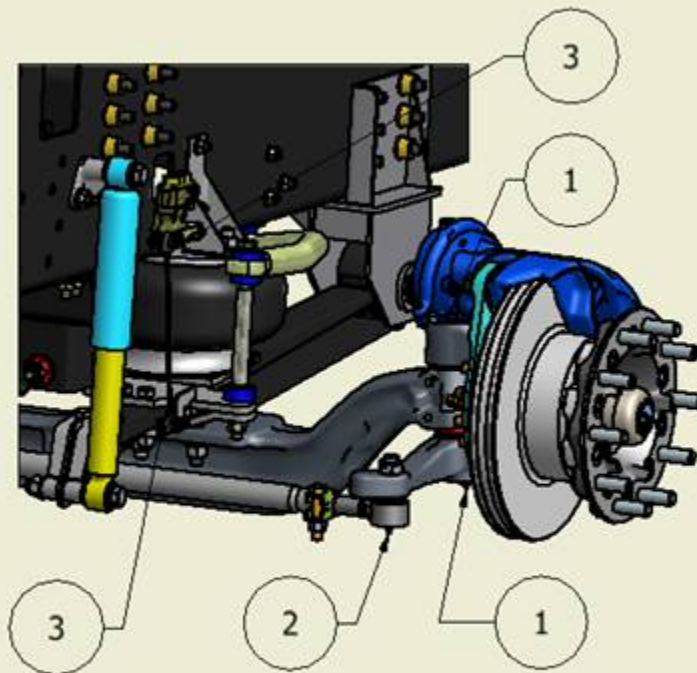
SERVICE INTERVAL (Miles x 1,000)	Daily	5	10	15	20	Required Fluids, Lubricants, and Procedures
Suspension & Axles:						
Automatic Slack Adjusters					X	Lubricate W/NGLI #2 grease (1)
Slack Adjuster Cam Shafts					X	Lubricate W/NGLI #2 grease (1)
Slack Adjuster Clevis Pins					X	Inspect for wear in clevis pin and cotter pins. Replace as necessary
Transmission & Driveline:						
Drive Shaft					X	Inspect u-joints & safety strap for loose bolts & wear, lubricate w/NGLI #2 grease (1)
Transmission Fluid						Replace fluid at 150,000 miles or 48 months, whichever occurs first (5)
Transmission Filters						Replace filters at 75,000 miles or 36 months, whichever occurs first (5)

- (1) Replace / inspect at stated mileage interval or every 12 months, whichever occurs first
- (2) Re-torque all wheel nuts after the first 100 miles, then every 10K miles thereafter.
- (3) Factory filled with synthetic oil. Do not mix with mineral oils.
- (4) For best tire life and handling, alignment of front axle is recommended every 15K miles.
- (5) Factory filled with TranSynd. To maintain these service intervals, fluid must not be mixed with Dexron or other fluids.
- (6) Replace desiccant cartridge every 36 months.
- (7) Replace filter when indicator shows 25 inches or every two years, whichever occurs first.

Lubrication Points

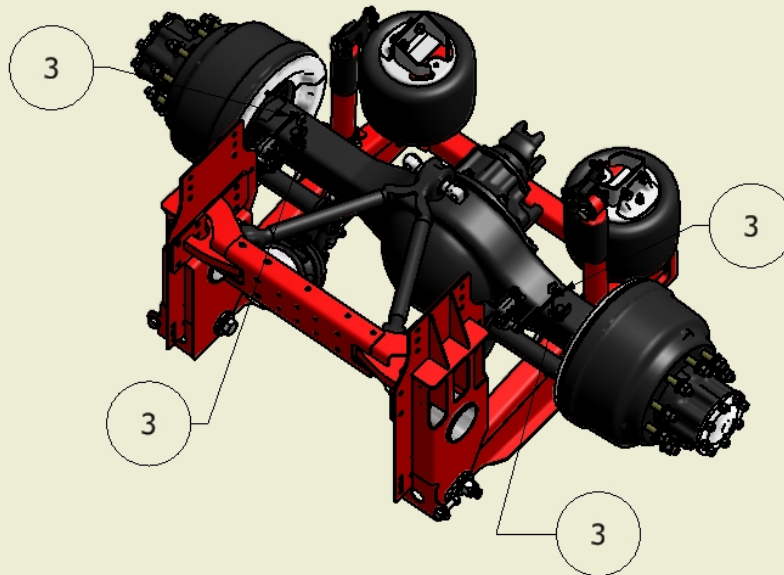


DRIVER SIDE REAR VIEW

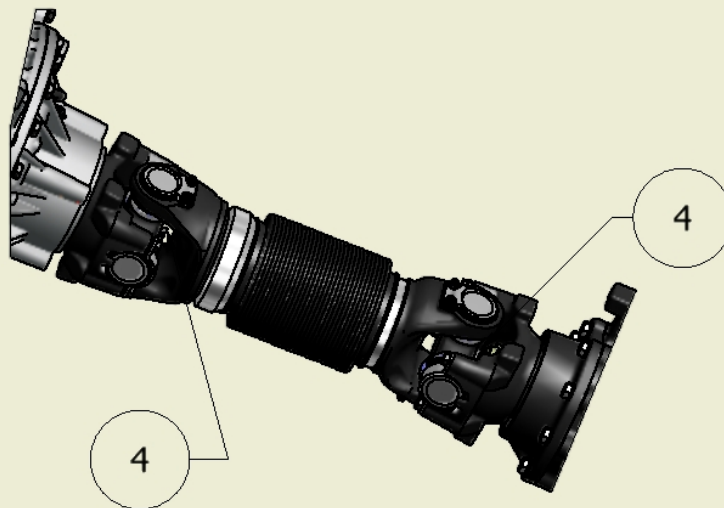


PASSENGER SIDE REAR VIEW

Lubrication Points

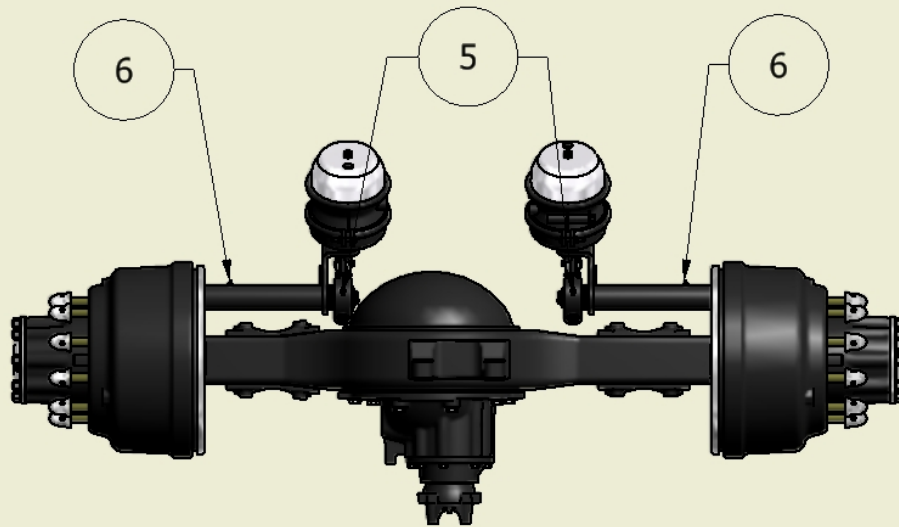


REAR SUSPENSION
HEIGHT CONTROL PIN GREASE

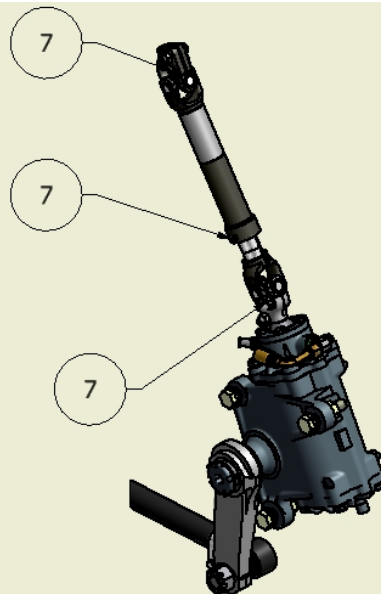


MAIN DRIVE SHAFT

Lubrication Points

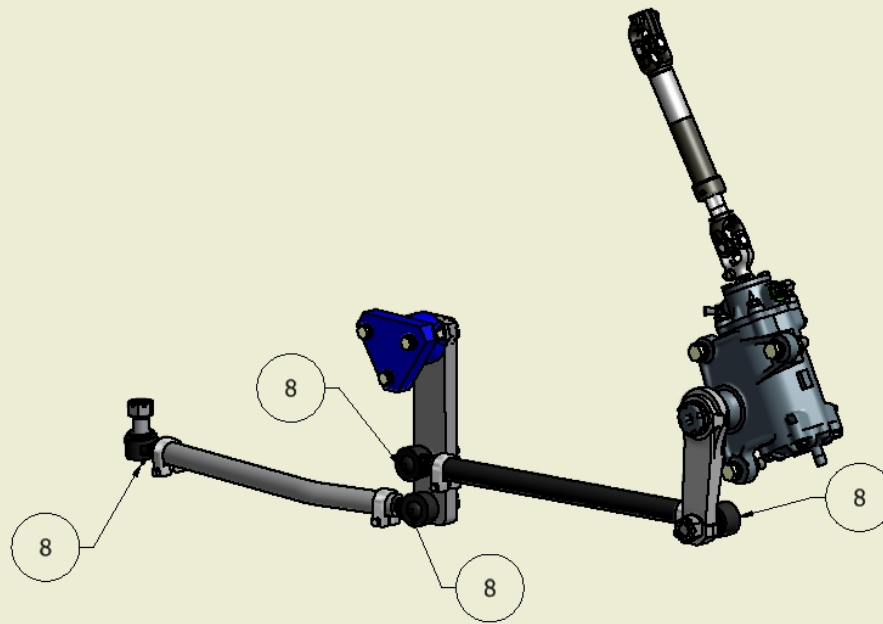


REAR AXLE GREASE POINTS



STEERING SHAFT GREASE POINTS

Lubrication Points



DRAG LINK GREASE POINTS

Lubrication Points

1	Dana I-Beam Axle Knuckle Pin	Two grease fittings; One on top & bottom of knuckle pin, lubricate both sides of axle	4
2	Steering Tie Rod	Two grease fittings on bottom of steering tie rod Lubricate both sides of axle.	2
3	Height Control Linkage Pins	Two grease pins per Linkage Front and Rear Suspension	8
4	Main Driveshaft	Two grease fittings; lubricate both universal joints.	3
5	Automatic Slack Adjusters	One grease fitting on each slack adjuster. One adjuster on each side of the rear axle.	2
6	Rear Brake Camshaft Bracket	One grease fitting on each bracket; Pump in grease until it appears at the slack adjuster end of the bracket. Lubricate both sides of the rear axle.	2
7	Steering Shaft	Three grease fittings Per Shaft lubricate both universal joints & slip joint.	3
8	Steering Drag Link	Two grease fittings per Drag link.	4

Maintenance Parts

Primary Fuel Filter/Water Sep W/WIF sensor

Cummins Filtration part # FS1003

Tiffin part # 31647

Secondary Fuel Filter

Cummins Filtration part # FF5636

Engine Oil Filter

Cummins Filtration part # LF9009

Engine Air Filter

Parker/Racor # 094973007

Tiffin part # 30596

Alternator/AC Belt

Gates part # K080755

Tiffin part # 5000139

Fan Drive Belt

Gates part # 9771-0314

Tiffin part # 5012187

**For assistance with your
Tiffin PowerGlide Chassis...**

Please contact one of the following
chassis specialists at Tiffin Motorhomes, Inc.

256-356-8661

Plant Manager
Gary Harris, extension 2288

Parts
Bobby Luther, extension 2382

Mechanical Engineer
Brad Warner, extension 2267

Electrical Engineer
Chris Struzik, extension 2363

Service
Anson Adams, 2173

Please have your **Chassis VIN #** ready
when you call.

Pre-Trip Inspection

Pre-Trip Inspection

- Check fluid levels & add as necessary
- Check tire inflation pressure
- Look for fluid leaks

Before starting your motor home daily, a few things must be checked. By doing so, you ensure that a safe trip is in order and lessen your chances of experiencing difficulties while on the road.

- Check the tires for proper inflation pressure and any damage. Also check the inner duals. Refer to the air pressure charts in this manual for proper inflation pressures.
- Look for fluid leaks under the motor home. This can prevent any serious problems from occurring later.
- Check the coolant level in the reservoir and add a 50/50 mix of coolant and water if necessary. This reservoir can be found on the rear of your vehicle.
- Check SCA (supplemental coolant additive) and freeze point every 6 months or 25,000 miles. Recharge as required.

Caution

If the water temperature in your engine is greater than 120 degrees, do not remove the radiator cap! You could be severely burned.

- Approximate COOLING SYSTEM CAPACITIES – does not include the heater core or other auxiliary systems added by coach manufacturer
- Cummins ISC – Side Radiator 56 qt. or 14 gallons
- Check transmission fluid level
- Check engine oil level
- Check for small animals in engine compartment, such as squirrels and cats
- Check the power steering fluid reservoir

Check fuel/water separator

ISC/ISL

- Check fuel/water separator and drain any water or contamination that may be present

After you have completed your inspection, you may now start your engine. Turn the key to the run position and wait for the wait to start light (in some cases it may read “Inlet heater”) to turn off. You may now start the engine. ***Never use ether or any other starting fluids to start the electronic engine. The inlet heater can ignite the fumes and cause an explosion in the air inlet system.*** Once you have started the engine, monitor your gauges carefully. Make sure that the oil pressure rises within 15 seconds. If it does not, shut down the engine and call a repair facility to determine the cause.



Figure 6-1: Filter Restriction Indicator

- Check air filter restriction indicator (Figure 6-1)

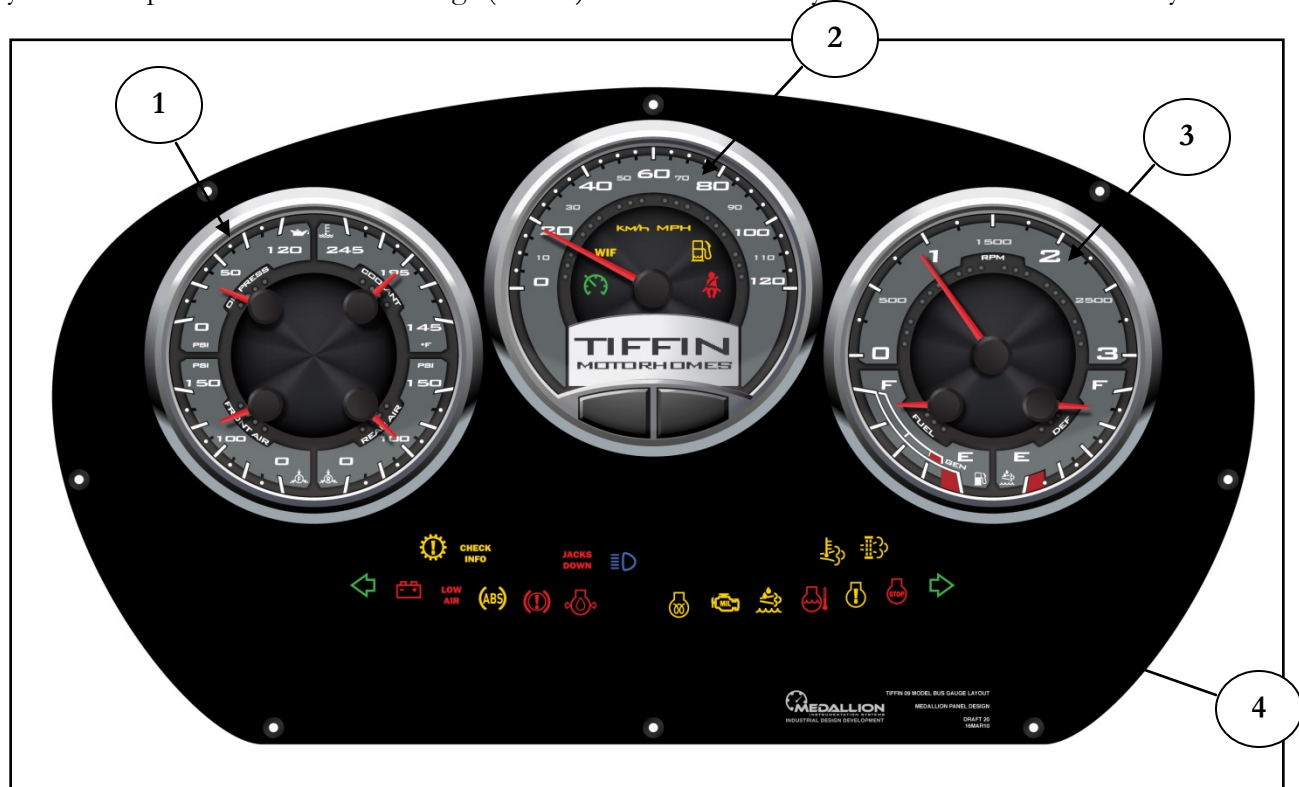
Brand New Air Cleaner
10” to 12” of Vacuum

- Engine air cleaner element should be changed when the air inlet restriction indicator reaches 25 inches of vacuum **or** every two years, whichever occurs first.

Instruments & Controls

Tiffin Instrument Panel

The Instrument Panel Assembly (IPA) of the Tiffin Phaeton is equipped with Medallion Instrumentation Systems' Graphical Data Interface Gauge (GDIG). This section briefly describes and illustrates the system.



1. 4N1 Gauge

- Front air
- Rear air
- Oil pressure
- Coolant temperature

2. Speedometer

- Instrument system controller for the Instrument Panel Assembly (IPA)
- Speedometer scale
- Two integral buttons for controlling the LCD
- Speedometer icons (Figure 7-1)







NAME	GRAPHIC	COLOR	CONTROL
SEAT BELT		RED	30 SEC
LOW FUEL		AMBER	ON SOLID
CRUISE		GREEN	ON SOLID
WATER IN FUEL		AMBER	ON SOLID
MPH		AMBER	ON SOLID
KM/h		AMBER	ON SOLID

Figure 7-1: Speedometer icons

3. 3N1 Gauge

- Tachometer (RPM)
- Fuel tank levels for main fuel tank and generator
- Diesel Exhaust Fluid (DEF) level

4. Chamelon Warning Lamp Assembly (Figures 7-2 and 7-3)

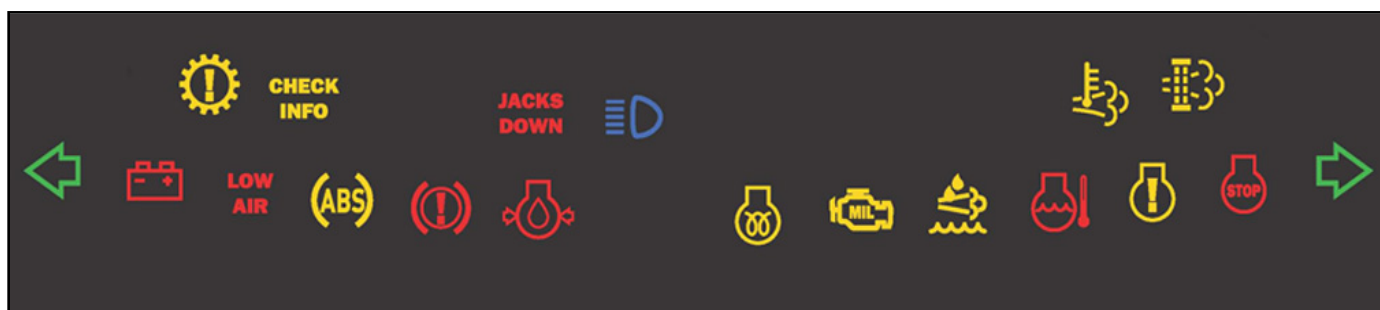
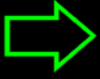








Figure 7-2: Warning lamp assembly

INSTRUMENTS & CONTROLS

ICON	NAME	GRAPHIC	COLOR	CONTROL
1	RIGHT TURN		GREEN	ON SOLID
2	STOP ENGINE		RED	ON SOLID
3	CHECK ENGINE		AMBER	ON SOLID
4	COOLANT TEMP		RED	ON SOLID
5	DEF LEVEL		AMBER	ON SOLID
6	MIL		AMBER	ON SOLID
7	WAIT TO START		AMBER	ON SOLID
8	SPARE			
9	OIL PRESSURE		RED	ON SOLID
10	PARK BRAKE		RED	ON SOLID
11	ABS		AMBER	ON SOLID
12	LOW AIR		RED	ON SOLID
13	LOW VOLTAGE		RED	ON SOLID
14	LEFT TURN		GREEN	ON SOLID
15	DPF STATUS		AMBER	ON SOLID






16	HOT EXHAUST (HET)		AMBER	ON SOLID
17	SPARE			
18	SPARE			
19	SPARE			
20	HIGH BEAM		BLUE	ON SOLID
21	JACKS DOWN		RED	ON SOLID
22	SPARE			
23	CHECK INFO		AMBER	ON SOLID
24	CHECK TRANS		AMBER	ON SOLID

Figure 7-3: Warning lamp descriptions

Driver's Information Center

The speedometer includes a Graphical Drivers Information Center. The functions of the Driver's Information Center can be broken down into four broad categories:

1. Display of user selectable pre-drive checklist items
2. Display of user selectable driver information screens
3. Display of warning messages
4. Display of utility screens

Pre-Drive Checklist

Note: This option is disabled by default. To activate, press and hold both LCD control buttons simultaneously and the setup menu will appear. Use the left button to scroll down to pre-drive checklist and right button to select. A menu of items will appear for the pre-drive checklist. Scroll to each item using the left button and use

right button to change item from off to on. To exit the setup menu, scroll down to exit setup and press right button, or turn the key switch off.

- The Pre-Drive Checklist is displayed immediately following the Tiffin Splash Screen each time the IPA is enabled.
- Pre-Drive Checklist Screens are easily identified by the “Pre-Drive Checklist” title bar across the top of the screen in reverse video.
- Each item in the list must be acknowledged by the operator by pressing either button on the DIG. When acknowledged, the screen scrolls to the next item in the checklist. When all items have been acknowledged, the DIG displays the last Driver Information Screen viewed.
- Edit Function: The checklist items actually displayed at start up shall be user selectable from a master list of items available in the set up menu. You can elect to display all of the items, some of the items, or none of the checklist items as desired.
- By default, the speedometers shall ship from the factory with all Pre-Drive Checklist Item de-selected.
- The Master Pre-Drive Checklist Items include:
 - JACKS / AIR LEVELER UP
 - CHECK TOW VEHICLE
 - TIRE PRESSURE
 - ENGINE MAINTAINANCE
 - DISCONNECT POWER
 - DISCONNECT WATER
 - DISCONNECT SEWER
 - BAY DOORS CLOSED
 - SHOWER DOOR LOCKED
 - ROOF VENTS CLOSED
 - AWINING ARMS LOCKED
 - COUNTERTOP CLEAR
 - ALL DOORS LOCKED
 - DRAWERS LATCHED
 - APPLIANCES SECURED
 - SLIDES IN AND SECURED
 - WINDOWS CLOSED
 - CB RADIO ON

Driver Information Screen

1. Driver Information Screens are provided to communicate important information about the vehicle and its performance to the driver.
2. Driver Information Screens are easily identified by the reverse video title bar across the top of each screen clearly identifying what is being displayed.
3. The available Driver Information Screens are:
 - Odometer & Gear
 - Engine Load
 - Transmission Temperature
 - Fuel Economy
 - Engine RPM
 - Engine Hours

- Battery Voltage

Note: The Odometer & Gear Screen may not be disabled and is always available. Other Driver Information Screens may be displayed or not displayed as desired by the driver. The factory default setting is all Driver Information Screens enabled.

Warning Messages

The following conditions will prompt warning messages:

ALARM CONDITION	SOURCE	NOTES
"LOW VOLTAGE"	J-1939	
"TRANSMISSION TEMP"	J-1939	
"COMMUNICATION ERROR"	J-1939	Engine, Trans, or ABS
"TURN SIGNAL ON"	DIG	Turn Signal "On" + 1 Mile Traveled
"GENERATOR LOW FUEL"	DIG	Generator "On" + Fuel \leq 20%

Notes:

1. Each of the above alarms will turn on the "Check Info" Warning Lamp.
2. Each of the above alarms will activate audible alarm 4.
3. Each of the above alarms require user acknowledgement to clear.

Utility Screens

1. The SETUP Menu shall be accessed by simultaneously pressing the left and right display buttons for 3 seconds. When this condition is sensed the Drivers Information Center shall briefly display the word SETUP and then display a list of menu items with the top item in the list highlighted in reverse video.
2. On each utility screen, the function of the left and right display switches shall be displayed in the LCD above each switch.
3. To exit the SETUP Menu, the operator must scroll down the list using the left display button until the EXIT SETUP menu item is highlighted and then press the right display button to SELECT the highlighted action. The LCD shall briefly display the word WAIT as the DIG resets.
4. The following Utilities shall be available in the SETUP Menu:
 - **UNITS:** Pressing the Right Display Button (CHANGE) while the UNITS menu item is highlighted shall toggle the units from English to metric or vice versa. The change shall be immediate and can be confirmed by viewing the speedometer units icons. MPH shall be illuminated when English units are selected and KM/h shall be illuminated when metric units are selected.

- **LCD ANIMATION:** Pressing the Right Display Button (CHANGE) while the LCD ANIMATION menu item is highlighted shall toggle the LCD Animation State from ON to OFF or vice versa. In the ON state, a TIFFIN MOTORHOMES Splash Screen shall be displayed when the system is starting up and each time the operator scrolls between Drivers Information Screens. In the OFF state, these screens shall not be displayed.
- **LCD SCREENS:** Pressing the Right Display Button (SELECT) while the LCD SCREENS menu item is highlighted shall bring up a master list of Drivers Information Screens showing the name and the display selection status of each screen (Enabled or Disabled). Pressing the Left Display Button (NEXT) shall allow the operator to scroll to each item in the list. Pressing the Right Display Button (Change) shall toggle the display selection status of the highlighted item from Enabled to Disabled or vice versa. If no button presses are sensed in 5 seconds, the display shall jump back to the SETUP Menu Screen.
- **PRE-DRIVE CHECKLIST:** Pressing the Right Display Button (SELECT) while the PRE-DRIVE CHECKLIST menu item is highlighted shall bring up a master list of Pre-Drive Checklist Tasks showing the task name and the selection status of each screen (ON or OFF). Pressing the Left Display Button (NEXT) shall allow the operator to scroll to each item in the list. Pressing the Right Display Button (Change) shall toggle the selection status of the highlighted item from OFF to ON or vice versa. If no button presses are sensed in 5 seconds, the display shall jump back to the SETUP Menu Screen.
- **LCD BACKLIGHT:** Pressing the Right Display Button (SELECT) while the LCD BACKLIGHT menu item is highlighted shall bring up a bar graph illustrating the LCD Backlight Brightness setting as a percentage of maximum brightness. Pressing the Left Display Button (DEC) decreases the display brightness and pressing the Right Display Button (INC) increases the display brightness. The change shall be immediate. If no button presses are sensed in 5 seconds, the display shall jump back to the SETUP Menu Screen.
- **LCD CONTRAST:** Pressing the Right Display Button (SELECT) while the LCD CONTRAST menu item is highlighted shall bring up a bar graph illustrating the LCD Contrast setting. Pressing the Left Display Button (DEC) decreases the display brightness and pressing the Right Display Button (INC) increases the display brightness. The change shall be immediate. If no button presses are sensed in 5 seconds, the display shall jump back to the SETUP Menu Screen.
- **ACTIVE FAULT CODES:** Pressing the Right Display Button (SELECT) while the ACTIVE FAULT CODES menu item is highlighted shall bring up a list of any active fault codes that are currently being broadcast. The SPN and FMI shall be displayed for each active code. Pressing the Right Display Button (NEXT) shall scroll to the next active fault in the list. Pressing the Left Display Button (EXIT) shall force a return to the SETUP Menu Screen.
- **GAUGE DIAGNOSTICS:** Pressing the Right Display Button (SELECT) while the GAUGE DIAGNOSTICS menu item is highlighted shall bring up a screen that lists all of the analog inputs to the DIG and their current input voltage expressed as an A/D count. From this screen, pressing either Display Button shall bring up a screen that lists all of the digital inputs to the DIG and their current state expressed as either High or Low. From this screen,

pressing either Display Button shall bring up a J1939 VEHICLE DATABUS Screen. From this screen, pressing either Display Button shall force a return to the SETUP Menu Screen.

- **IP TEST ROUTINE:** Pressing the Right Display Button (SELECT) while the IP TEST ROUTINE menu item is highlighted shall initiate the following sequence of events:
 1. The Drivers Information Center shall display the text: IP TEST and alternate between normal and reverse video
 2. All six icons in the speedometer shall be illuminated.
 3. Light Bar icons shall be illuminated
 4. Each gauge shall sweep from zero to mid-scale, from mid-scale to max-scale, and back to zero. This exercise shall be repeated twice.
 5. At the conclusion of the gauge exercise the test routine is terminated and the LCD returns to the SETUP Menu Screen.
- **SET ODOMETER:** Caution: This is a service function used to program a service replacement speedometer. Pressing the Right Display Button (SELECT) while the SET ODOMETER menu item is highlighted brings up a service utility that is used to load the vehicle's actual mileage should the speedometer ever have to be replaced. Pressing the Right Display Button (CANCEL) returns to the SETUP Menu Screen. This function is locked out when the reading reaches 100 miles.
- **GAUGE INFORMATION:** Pressing the Right Display Button (SELECT) while the GAUGE INFORMATION menu item is highlighted brings up a screen that displays the revision level and date of the firmware installed in DIG. Pressing either Display Button returns to the SETUP Menu Screen
- **RESTORE DEFAULTS:** Pressing the Right Display Button (SELECT) while the RESTORE DEFAULTS menu item is highlighted causes all user selections to revert to the factory default conditions of:
 - ENGLISH Units
 - LCD Animation ON
 - All LCD Screens ENABLED
 - All Pre-Drive Checklist items OFF
 After the button is pressed the display automatically returns to the SETUP Menu Screen.
- **EXIT SETUP:** Pressing the Right Display Button (SELECT) while the EXIT SETUP menu item is highlighted causes the DIG to reset and return to normal operation.

Trip Reset and Average Fuel Economy

You can reset your mileage for Trip 1 and Trip 2. With the odometer screen displayed, press and hold left button to reset trip 1; press and hold the right button to reset trip 2. To reset the average fuel economy, display the fuel economy screen. Push and hold the left button to reset the average fuel economy reading.

Modes of Operation

The Instrument Panel Assembly (IPA) has three operational modes:

- **OFF:** In the off state, the following ICONS are still operational:
 - Left turn signal
 - Right turn signal
 - High beam
 - Jacks down

All other IPA features are disabled.

- **Normal Mode:** The default operational mode is Normal Mode. In Normal Mode, all of the features of the IPA are available to the operator. The gauges, light bar, and driver's information center are all fully operational.
- **Limited Mode:**
 1. The DIG runs in limited mode when the following conditions are true:
 - The Wake Up Signal is high.
 - The ignition is off.
 - The Park Brake is on.
 2. The DIG exits Limited Mode and returns to normal mode when any of the following conditions occurs:
 - The ignition is turned on.
 - Communication is lost with the VMM module.
 - The engine is started.

Air Supply

Air Supply



Figure 8-1: Front Customer Air Supply



Figure 8-2: Rear Customer Air Supply

- Manifold provided for auxiliary air source
 - Up to 120 psi
 - Quick connect fittings already installed at rear
- Can be used for:
 - Air horn supply
 - Fill tires
 - Etc.

Note: All unused ports must be plugged.

The manifold is located in the left front electrical box. The customer quick connect fittings are located in the left rear of the coach in the compartment labeled “Phone Jacks / TV Cables.”

Warning

Air tanks should be bled of all pressure before any work is done on the air system!

Warranty

Warranty

- **Engine**
 - Cummins ISC: 5 Years or 100,000 miles

- **Transmission**
 - Allison 3000 MH Series: 5 Years or 200,000 miles

- **Chassis**
 - 3 Years or 50,000 miles

- **Drive Train**
 - 3 Years or 50,000 miles

- **Suspension**
 - 3 Years or 50,000 miles

Allegro Owner's Club

Allegro Owner's Club



The Allegro Owner's Club is an organization for Allegro motor home owners that provide access to rallies and more. Several rallies are organized throughout the year. The rallies are normally a package deal which includes your campground fees, entertainment, several meals, transportation to and from planned activities, suppliers exhibits, plenty of door prizes, and much more. Service technicians from Tiffin Motorhomes, Inc. are also available to do minor repairs to rally participants motor homes as well as sales representatives who can answer questions about your motor home and other issues. Of course, free time is scheduled into each rally for your personal leisure and interests.

If you purchase a new unit, Tiffin Motorhomes pays for your first year of membership. Club members are also eligible to purchase insurances at discounted rates as well as other companies that provide discounts to our Club members.

Local chapters are also set up throughout the country. These local chapters generally have monthly campouts which allow you to meet new friends and share information.

The Allegro Club also publishes a quarterly newsletter, *Side Roads*, which keeps members informed about rallies, caravans, chapter news, safety information, factory news, and much more. *Side Roads* is published in March, June, September, and December.

Allegro Club merchandise is also available at the Allegro Store in Red Bay, AL. You can purchase shirts, caps, jackets, and other accessories emblazoned with the Tiffin name brands.

For more information on the Allegro Club or to join, please contact membership coordination at 256-356-8522 or visit our web site: www.tiffinmotorhomes.com.

Suggestions

Send Us Your Suggestions

Please send us your suggestions on what you would like to see covered in this publication. These should be operation or maintenance items. When you have completed your suggestions, mail them to Tiffin Motorhomes, 105 2nd Street NW, Red Bay, AL 35582. Attention: Gary Harris.

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