

Operation Manual



Commander Chassis

BALTIMORE COUNTY FIRE DEPARTMENT

VIN: 54F2CB51XEWM10809

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Table of Contents

1	Legal notice.....	6
1.1	Copyright.....	6
1.2	Manufacturer and after sales address	6
2	Introduction	7
2.1	Welcome note	7
2.2	Liability and injury.....	7
2.3	Vehicle identification.....	8
2.4	Use of the operation manual.....	9
2.4.1	Validation	9
2.4.2	Signs and symbols.....	9
3	Safety.....	11
3.1	Proper usage.....	11
3.2	Markings and warning signs	11
3.3	Other regulations.....	11
3.4	Training and qualifications	12
3.5	General safety instructions	12
3.6	List of conventional signs	13
3.6.1	Warning signs	13
3.6.2	Prohibition signs.....	15
3.6.3	Mandatory safety signs	16
3.7	Warning notes	17
3.8	Safety labels.....	26
3.9	Reporting safety defects.....	27
3.10	Material safety data sheets (MSDS)	27
3.11	Seatbelts	27
3.12	Three points of contact rule	28
3.13	Do not move apparatus light.....	28
3.14	Vehicle data recorder	28
4	Product description	29
4.1	Vehicle side views	29
4.1	Vehicle front view	30
4.2	Driver's panel view	31
4.3	Driver's kick panel view	31

5	Technical description	32
5.1	Master power disconnect switch.....	32
5.2	Parking brake.....	33
5.3	Brake and throttle pedals	34
5.4	Steering column controls.....	35
5.4.1	Multifunction lever.....	35
5.4.2	Tilting / telescoping lever	35
5.4.3	Hazard light switch.....	35
5.5	Dash gauges and tell-tales.....	36
5.6	Transmission controls	38
5.7	Heating ventilation and air conditioning (HVAC) controls.....	39
5.7.1	Front HVAC controls.....	39
5.7.2	Rear HVAC controls	39
5.8	Ignition switch	40
5.9	Engine start switch	40
5.10	Dash panel dimmer control	40
5.11	Regeneration “regen” switch	40
5.12	Regeneration inhibit switch	40
5.13	Headlight and parking light controls.....	40
5.14	Windshield wiper controls.....	41
5.15	Window controls.....	41
5.16	Door lock controls	41
5.17	Engine brake controls.....	41
5.18	Engine high idle control	42
5.19	Master warning control	42
5.20	Power mirror controls	43
5.21	Vehicle data recorder	44
5.22	V-Mux controls	45
5.22.1	Warning light activation.....	45
5.22.2	Warning light menu.....	45
5.22.3	HVAC controls	46
5.22.4	Lighting.....	46
5.22.5	Secondary menu.....	46
5.22.6	Home.....	47

5.22.7	Seat belt status	47
5.22.8	Rear/side view camera.....	47
6	Operation	48
6.1	Preparation for use.....	48
6.1.1	Before entering the apparatus.....	48
6.1.2	Before driving the apparatus	48
6.1.3	Pre-start checklist	49
6.2	Starting and stopping the engine	50
6.2.1	Starting the engine.....	50
6.2.2	Stopping the engine	50
6.3	Driving the vehicle	51
6.3.1	General information	51
6.3.2	Begin driving	52
6.3.3	Select transmission range.....	52
6.3.4	Acceleration	53
6.3.5	Stopping and parking the vehicle	53
6.4	Braking the vehicle	54
6.4.1	Brake air pressure.....	54
6.4.2	Parking brake.....	54
6.4.3	Service brake.....	56
6.5	Cab tilt procedure	57
6.5.1	Remote electric operation	57
6.5.2	Manual pump operation	59
6.6	Emission control system.....	61
6.7	Diesel exhaust fluid (DEF) tank	65
7	Service and cleaning.....	66
7.1	Service plan	66
7.1.1	Inspection procedures.....	67
7.1.2	Oil and filter interval	69
7.2	Transmission maintenance.....	70
7.3	Filter information.....	71
7.4	Fluid capacities.....	71
7.5	Under cab overview.....	72
7.6	Engine oil level	73

7.7	Engine cooling system	73
7.8	Transmission fluid level	74
7.9	Power steering fluid level	75
7.10	Fuel filter/water separator.....	75
7.11	Windshield wipers and washer fluid.....	75
7.12	Batteries.....	76
7.13	Engine air filter	76
7.14	Tires and wheels	77
7.15	Normal operating range.....	79
7.16	Engine belt routing diagram.....	79
7.17	Spare parts list and wiring diagrams.....	79
7.18	Maintenance and repair record.....	80
7.19	Cleaning and washing	81
8	Troubleshooting	82
8.1	General troubleshooting	82
8.2	Cab tilt troubleshooting.....	83
8.2.1	Cab tilt pump fuse location.....	83
8.3	Fuse panel diagram	84
9	Environmental protection	85
9.1	Disposal of hazardous substances.....	85
10	Technical data	86
10.1	Chassis specifications	86
10.2	Engine specifications.....	86
10.3	Warranty and registration	87
10.3.1	Warranty procedures	87
10.3.2	Cab and chassis limited warranty	88
10.3.3	Cab paint warranty.....	88
10.3.4	Cab structural warranty.....	89
10.3.5	Front and rear axle warranty.....	90
10.3.6	Chassis frame warranty	90
10.3.7	Cummins engine warranty	91
10.3.8	Allison transmission warranty.....	96

1 Legal notice

1.1 Copyright

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Information out of this manual may not be passed or made accessible to third persons, especially competitors.

1.2 Manufacturer and after sales address



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Internet: www.rosenbaueramerica.com

Rosenbauer Emergency Customer Service Technical Support

Telephone number: 877-543-5591

Please have your vehicle identification number (VIN) ready when requesting information or assistance; this will allow us to assist you more quickly.

2 Introduction

2.1 Welcome note

Rosenbauer would like to thank you for your recent Commander purchase. We are confident that when properly operated, maintained and serviced your Rosenbauer fire apparatus will provide you with many years of reliable service.

Please fill out and return the Rosenbauer America Warranty Registration Form as soon as possible. This form can be found in the front pocket of this binder.

Please read this manual carefully before starting operation. Obey all instructions.

Some of the information compiled in this manual was derived using manufacturer's literature of purchased products. Rosenbauer does not claim any copyright privileges to this material nor does it guarantee the accuracy of this information. In addition to this manual also observe suppliers manuals (e.g. operation and service manuals for the generator, rescue equipment and firefighting equipment).

Only personnel familiar with this manual and equivalent qualified personnel may operate or service this product.

Keep this and other manuals with the apparatus. Keep for future use.

2.2 Liability and injury

Due to the information given within this manual, Rosenbauer strictly is not liable for any direct damage or consequential damages which are caused by improper use or service as well as caused by unauthorized modification of this product or in this manual.

Only personnel familiar with this manual, the vehicle inclusive equipment, according operation, local laws, local safety regulations and accident prevention may operate this product.

Rosenbauer is not liable for any injury or damage caused by personnel who are unfamiliar with the operational procedures described in this manual, failing to comply with the operation manual and/or failing to comply with regulations, subsequent procedures, safety and accident prevention.

If this manual shows technical failure or typing error, Rosenbauer reserves the right to make modifications anytime and without previous announcement.

This manual can include description and graphics, which are not mounted on the delivered product.

From data, graphics and description within this manual, no demands on modification to already delivered products could be made.

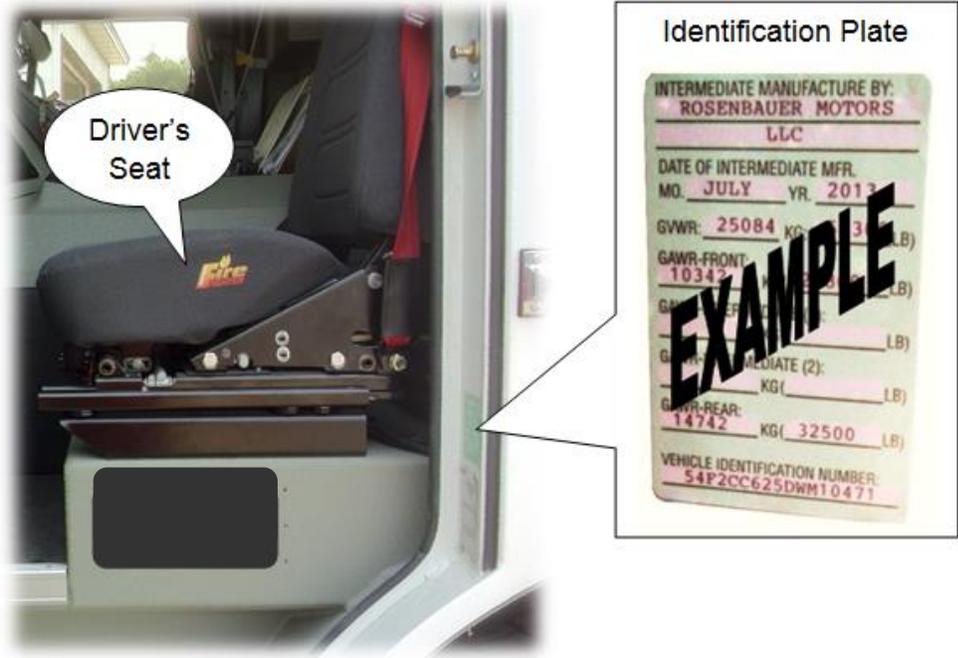
For your own safety, use only spare parts and accessories from Rosenbauer. Use of other products may result in injury, Rosenbauer assumes no liability!

Check the delivery immediately after arrival for completeness and transport damages.

- Defects, damages and loss of parts must be immediately submitted in written form.
- Take photos of damaged parts.
- Report the fault in written form to the manufacturer. Please refer to "Manufacturer and After Sales Service Address".

2.3 Vehicle identification

Every Rosenbauer Commander has a unique vehicle identification number (VIN). The VIN is located near the bottom of the identification plate. The identification plate is located on the driver's side door sill. Identifying the VIN is important when referring to the manufacturer in regards to parts and technical issues.



My VIN: 54F2CB51XEWM10809

2.4 Use of the operation manual

2.4.1 Validation

This manual provides information needed to operate the product.

This manual contains descriptions of special equipment as well as some abstractions and exemplary illustrations. The actual equipment of the product may therefore differ in part from the descriptions and illustrations.

2.4.2 Signs and symbols

Highlighted Text

To simplify legibility and clarity, various pieces of information are marked with symbols.

These symbols indicate the following:

- ▶ Perform action in the hierarchy to be maintained as described.
- ✓ Reactions to the actions performed (results).
- Lists.
- ⇒ Further Information about this topic.



Notes for additional information to operate the unit.



Read/obey additional information in the manufacturer documentation.

Figures

Where necessary, the text is illustrated with drawings. A caption is provided below the illustration. The reference from the text to a position within the illustration is given by inserted figures (e.g. S1).

Warning notices

Safety information alerts the user of hazards and informs the user how to be aware of the hazards.

Safety information is written at the beginning of each chapter, before any instructions to perform an action which assumes a hazardous situation. Further safety information is located at the beginning of this manual.

Safety instructions that must be observed are highlighted within this manual as follows:

DANGER!

This sign indicates an extremely hazardous situation which, if not avoided, will result in death or serious injury.

WARNING!

This sign indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION!

This sign indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

This sign is used to address practices not related to personal injury.

Additionally the information in the operation manual within the chapter “Technical data” and the safety information within the delivered supplier’s manuals should be observed.

3 Safety

3.1 Proper usage

Incorrect use of the product (vehicle, portable pump, etc.) may cause personal injury. In addition, the product or other property may be damaged.

Rosenbauer can only guarantee safety, reliability and performance of the product, if it is used as described in this manual.

Any unauthorized changes, modification or incorrect operation may affect the intended use and cause personal injury or property damage.

In the driver's cabin and crew cabin of fire fighting vehicles, there is a maximum passenger capacity, this rule must be obeyed.

⇒ Please refer to the operation manual chapter "Technical data".

The firefighting products may only be used in proper technical condition and by qualified staff for the following purpose:

- to fight fires using water (for firefighting)
- to rescue people from emergency situations
- to provide technical assistance

Modifications, changes and repairs may only be completed by persons authorized by the manufacturer. Unauthorized modifications, changes or improper usage will render all liability of the manufacturer void for any resultant damage.

3.2 Markings and warning signs

Safe use is only possible if all necessary information for safe operation is observed. This information includes obeying all safety and warning instructions.

In addition to the instructions in this operating manual, read and observe all the safety and warning signs affixed to the product.

- ▶ Replace missing or damaged signs.
- ▶ Keep the safety and warning signs clean and legible.

3.3 Other regulations

In addition to this operating manual observe and comply with relevant version of general laws, directives and regulations (e.g. protective clothing, road traffic act, national training regulations for the fire service, accident prevention regulations, fire service regulations, industrial medicine and environmental safety rules, state law for fire and disaster protection, etc.).

3.4 Training and qualifications

Improper operation due to a lack of qualification can cause serious accidents and failure in success of the task. Safe use is only possible if the product is operated and maintained exclusively by specially trained personnel.

Only ongoing practice and training by experienced firefighting personnel will ensure safe use. The various operation procedures must be practiced at regular intervals.

The vehicle driver must hold a valid current driver's license for the appropriate vehicle class.

Before use, the personnel must be made familiar with use of the product.

The operator is responsible for defining authorities, responsibility and for supervising the personnel as well as for providing adequate training and practice in compliance with all current regulations.

Even during operation, ensure that persons without specialist skills are never allowed to operate the product.

The personnel must have the physical and the mental aptitude necessary to operate the product. Minors and persons with no firefighting training must not operate the product.

Modification and changes of the product, firefighting vehicle and built-in equipment may be carried out only with written permission of Rosenbauer and by the manufacturer's authorized person.

3.5 General safety instructions

The following instructions provide an overview on the use of the product safely. This general overview is supplemented by the safety instructions in the detailed descriptions of the various sections.

Always remember the possibility of danger when operating machines. Always use the prescribed personal protective equipment.

The condition of the product must meet the local safety regulations and the local firefighting regulations. Ensure that the product is ready for action at all times.

In case of contact with dangerous chemicals, such as dry powder, obey material safety data sheet and information given by the manufacturer.

Pay attention to the operation and service manual from additional components.

If problems cannot be solved or if repairs cannot be carried out by specially trained personnel, contact Rosenbauer immediately.

3.6 List of conventional signs

3.6.1 Warning signs

	This warning sign indicates danger of electric shock hazard.
	This warning sign indicates fire hazards.
	This warning sign indicates explosion hazards.
	This warning sign indicates danger of oxidizing materials.
	This warning sign indicates danger of harmful or irritant materials.
	This warning sign indicates danger of corrosion.
	This warning sign indicates danger of hearing damage.
	This warning sign indicates danger of inhalation hazard.
	This warning sign indicates danger of hot liquids and steams.
	This warning sign indicates danger of hot surfaces.
	This warning sign indicates danger of crushing.
	This warning sign indicates danger of falling objects.

	This warning sign indicates danger of high pressure.
	This warning sign indicates danger of high vacuum.
	This warning sign indicates danger of overhead loads.
	This warning sign indicates a hazardous to environment.
	This warning sign indicates a risk of falling.
	This warning sign indicates danger of shearing.
	This warning sign indicates danger of impact.
	This warning sign indicates danger of local stability loss.
	This warning sign indicates danger of slipping on sloped surfaces due to reduced friction.
	This warning sign indicates danger of laser radiation.
	This warning sign indicates danger of stumbling.
	This warning sign indicates danger of hand injury.

3.6.2 Prohibition signs

	Do not smoke!
	Do not handle with open flames!
	Do not step here!
	No climbing for unauthorized personnel!
	Do not extinguish with water!
	Do not spray water!
	Do not linger under the rescue platform!
	Do not touch or grip inside!
	Do not linger in the danger zone!
	No access for unauthorized personnel!

3.6.3 Mandatory safety signs

	Wear ear protection.
	Wear goggles or protective face shield.
	Wear goggles and ear protection.
	Wear safety helmet.
	Wear safety gloves.
	Wear safety boots.
	Wear full body protection.
	Wear seat belts.
	Wear self-contained breathing apparatus.
	Hold handrail.
	Keep sufficient distance. Special attention.
	Emergency operation.
	Take care of environmental protection.

3.7 Warning notes

DANGER!

Danger of fatal or severe injury to the crew or pedestrians due to moving the vehicle or its components during service operations/maintenance and repair work.

Prior to service and repair works:

- ▶ Stop the engine with parking brake applied.
- ▶ Turn off the ignition switch.
- ▶ Chock the wheels of the vehicle with the attached wheel chocks before maintenance and repair work.
- ▶ Place a “Do not start” note over the steering wheel, or isolate the electrical system from the batteries (turn off the master power disconnect switch).

Loss of stability can lead to rolling over of the vehicle, causing personal injuries and damage to property.



- ▶ Test the stability before starting operation.
- ▶ Follow the instructions regarding setup (ground surface, max. inclination, wind force) in the operation manual.
- ▶ If a loss of stability seems imminent, immediately stop all work and restore stability.



Danger of fatal or severe injury due to failure to observe safety measures!

Persons who fail to fasten their seat belts can be thrown against hard surfaces in case of traffic accident or abrupt vehicle maneuvers.

- ▶ Before starting to drive, all persons must fasten their seat belts.

Danger of fatal or severe injury due to unintentional vehicle movements!

Unintentional vehicle movements can cause fatal injury to the crew or pedestrians. Before leaving the cabin, the driver must:

- ▶ Park the vehicle on a safe surface.
- ▶ Select transmission to Neutral.
- ▶ Apply the parking brake.
- ▶ Chock the wheels of the vehicle with the attached wheel chocks before maintenance and repair work.



Danger of fatal injury or health hazard due to inhalation of toxic exhaust fumes!

Combustion engines working in enclosed areas build toxic exhaust fumes. Is there the need of working in enclosed areas, obey following:

- ▶ Extract the exhaust fumes outside using exhaust hoses.
- ▶ Make sure for adequate ventilation.



WARNING!

Danger of fatal or severe injury due to improper use of the braking system!

Repeated braking, cadence braking, a leak in the compressed air system, or the use of the parking brake while driving, reduces the operating pressure; this in turn could result in locking of wheels and can cause severe accidents.

- ▶ Ensure correct compressed air system and braking system operations.
- ▶ Do not start driving if the compressed air pressure in the braking system is too low.
- ▶ If the warning lights of the brakes or the compressed air system comes on, stop the vehicle immediately and do not start it up again.
- ▶ Avoid repeatedly depressing and releasing the brake pedal.
- ▶ Never use the parking brake as a driving brake while driving.
- ▶ Report malfunctions to your work shop personnel as quickly as possible and make sure that the repair is performed.

Injury to persons and damage to property due to vehicle components not being in transport position.

Vehicle components that are not in transport position can impair the vehicle's maneuverability and cause serious accidents.

- ▶ If the pilot lamp lights illuminate while driving, stop the vehicle immediately and identify the cause before driving on.

Personal injuries and damage to property can occur due to a restricted view of movable machine parts.



- ▶ Do not linger in the danger zone.
- ▶ Follow the training and operation manual.



Failure to wear proper protective gear could result in death or serious injury.

- ▶ Wear protective gear.

Danger of falling!

Lingering on the roof during fire-fighting operations or vehicle movement could result in death or serious injury.



- ▶ Do not linger in the danger zone.
- ▶ Lingering on the roof is permitted only for manually operation of the roof turret or during the removal of equipment on the roof.
- ▶ The operator must secure himself with a safety line on the roof and/or put up the safety railing.
- ▶ Operate the roof turret with closed roof hatch only.
- ▶ Before extending the light mast make sure that there are no persons in the moving range of the light mast.

Potentially fatal injuries due to the engine taking in flammable gases!



- ▶ Do not operate the engine in areas with a heavy concentration of flammable vapors such as e. g. diesel, gas or propane.
- ▶ When handling flammable liquids and gases, always shut off the engine immediately.

Potentially fatal injuries and danger of explosion!



- ▶ Do not operate the generator in areas with a heavy concentration of flammable vapors such as e. g. diesel, gas or propane.
- ▶ When handling flammable liquids and gases, always shut off the generator immediately.
- ▶ Do not operate the generator in closed rooms.

Danger of fatal or severe injury due to incorrect use of the parking brake!

The use of the parking brake as a driving brake while driving, can block the vehicle's wheels and cause severe accidents.

- ▶ Never use the parking brake as a driving brake.

Danger of injury due to loose items in the cab.

Loose items in the cab can roll underneath the brake pedal and prevent braking, or damage the windscreen when tipping the cab.

- ▶ Do not leave tools or other objects in the cab.
 - ▶ Secure loose objects with destined fixtures.
-

**Danger of fatal or severe injury due to rolling over of the vehicle.**

Almost all fire fighting vehicles have systematical high points of gravity; additionally, they are typically loaded to a point just below their permissible total weight. Incorrect driving (even in emergency response situations) can lead to rolling over of the vehicle.

- ▶ Perform all steering movements carefully when traveling at high speeds.
- ▶ When driving on dirt tracks or off-road, drive slowly and extremely cautiously.
- ▶ Avoid driving over obstacles at high speed.
- ▶ If the vehicle threatens to tip on a slope, steer in downhill direction immediately to improve the vehicle's stability.

**Danger of fatal or serious injury!**

Breathing apparatus fixtures and harnesses in the cabin do not replace the standard installed safety seat belts.

- ▶ While driving the vehicle, the breathing apparatus must be in storage.
- ▶ Only when vehicle is stationary, open the breathing apparatus fixture and remove the breathing apparatus.
- ▶ During yearly inspection of the vehicle and especially after each use, check breathing apparatus fixtures for proper function.
- ▶ Always use your seat belts.

**Danger of crushing and sheering of limbs due to moving or rotating parts!**

- ▶ Do not reach into or grasp moving or rotating parts.
- ▶ Observe a safety distance to the danger zone.
- ▶ Use protective equipment.

**Danger of explosion due to flammable fuel!**

- ▶ During work on the fuel system, fuel can ignite and cause potentially fatal injuries.
- ▶ Do not smoke.
- ▶ Keep fuel away from open flame.
- ▶ When handling fuel, always keep a fire extinguisher at hand.

Danger of serious injury and accidents!

A tire blowout can cause the vehicle handling to be impaired.

- ▶ Be sure to know the top speed rating of your vehicle.
 - ⇒ Please refer to the chapter "Chassis specifications".
- ▶ In the case of a tire blowout, keep a firm hold on the steering wheel and slow the vehicle to a stop.



Danger of serious injury and damage due to explosion, fire and chemical burns!

When charging vehicle batteries, a highly explosive electrolytic gas mixture (hydrogen and oxygen) is released; it is easily flammable and may release highly acidic battery acid.

- ▶ Wear safety goggles whenever servicing a battery.
- ▶ Follow safety instructions on the outside of the battery.
- ▶ Do not smoke.
- ▶ Avoid fire, open flame and sparks.
- ▶ Avoid sparks when handling cables and electrical devices, and through electrostatic discharge.
- ▶ Do not connect the minus pole of the battery jumper cable near to the discharged battery (generates sparks).
- ▶ Always remove negative battery ground cables first and install them last to avoid sparks.
- ▶ The vehicles must not touch (sparks will occur on connecting the positive poles).
- ▶ Never short-circuit the battery.
- ▶ Ventilate batteries thoroughly before any external start.
- ▶ When connecting the connecting lead, do not bend over the battery.
- ▶ Avoid skin and eye contact with any battery acid that escapes.
- ▶ Keep unauthorized persons clear of the battery.
- ▶ Ensure that the battery voltage matches.
- ▶ Never disconnect the batteries while the engine is running.



Danger of fatal or severe injury due to falling down from an exposed location!

- ▶ Use safety/protection equipment.
- ▶ Be careful when climbing up or down the ladder.
- ▶ Use the ladder rungs and hand rails as intended.
- ▶ Be extremely cautious on uneven and slippery surfaces.
- ▶ Observe a safety distance to the roof edge.
- ▶ Obey the labels with safety procedures attached to the vehicle and its equipment.



Danger of fatal or serious injury from electrical shock!

Danger of electrical shock during a thunderstorm. People who are on or near the vehicle during a lightning strike could be seriously injured.

- ▶ Linger on the roof during a thunderstorm is prohibited.
 - ▶ The usage of the light mast during a thunderstorm is prohibited.
 - ▶ The usage of the ladder lowering device during a thunderstorm is prohibited.
 - ▶ The usage of the turret during a thunderstorm is prohibited.
-



Danger of fatal or serious injury from electrical shock!

Water, firefighting foam and metallic materials conduct electricity.

- ▶ Do not aim turret or nozzle (extinguishing agent jet) toward high voltage power lines or other high voltage electrical circuits.
- ▶ Keep a safe distance to energized components under all circumstances.
- ▶ Do not use foam compound while firefighting in electrical installations.
- ▶ Do not park vehicles underneath or near overhead power lines, should use caution.
- ▶ Vehicles with roof structures as e.g. extendable light tower or turrets.
- ▶ Do not load, unload or use metal ladders in areas where contact may be made with overhead power lines or high voltage electric circuits.

Safety clearance of materials conducting electricity to overhead lines

Voltage	Safety clearance
220 kV - 380 kV	16 ft (5 m)
110 kV - 220 kV	13 ft (4 m)
1 kV - 110 kV	9 ft (3 m)
up to 1 kV	3 ft (1 m)

Safety clearance with portable fire extinguisher, when extinguishing at low-voltage installations

Voltage	Kind of extinguishing	Safety clearance
up to 1 kV	Dry chemical powder (ABC, BC), CO2 and halon	3 ft (1 m)
	Water fire extinguisher, wall hydrant	9 ft (3 m)

 **CAUTION!**

Danger of injury for the operator due to performing action in wrong order!

- ▶ Individual operating instructions must be done in the prescribed order.



Danger of hearing damage due to extended presence in the vicinity of the running pump!

- ▶ Use hearing protection.
- ▶ Do not linger in the danger zone.



Danger of burns due to touching the hot engine and engine components!

- ▶ Do not linger in the danger zone.
- ▶ Do not touch hot parts of the engine.
- ▶ Do not touch any parts of the exhaust system.
- ▶ Wait until all parts have cooled down.



Danger of burns due to hot coolant system!

- ▶ After shut-down, do not start maintenance work until the coolant system has cooled down.

Danger of injury to persons or damage to the vehicle due to failure to perform a visual check!

Perform the visual checks before driving to make sure that:

- ▶ Roof turret is in transport position.
- ▶ Light mast is retracted.
- ▶ Moveable rapid intervention equipment is locked
- ▶ Ladder is locked.
- ▶ Equipment is stowed correctly.
- ▶ Tires and tire pressures are normal.
- ▶ All roller shutters are locked.
- ▶ All shorelines (power, compressed air) are disconnected.
- ▶ All doors and folding steps are closed.
- ▶ Indicator lights in the driver's display have been checked.

Danger of injury due to burns!

A short circuit releases powerful currents that can considerably heat up and even melt metals.



- ▶ Use only jump start cables in line with ISO 6722 and NATO connector.
- ▶ In case of jump start cables with crocodile clips, ensure correct polarity.
- ▶ Never short-circuit battery poles or the jump start cable.
- ▶ Avoid unintended connecting of the positive pole and electrically conductive vehicle parts by tools, watches, jewelry etc.
- ▶ Do not connect the jump-start cable to fuel, hydraulics or brake lines.

**Danger of crushing or material damage due to moving parts!**

Moving components that have not latched into position, or are not at their limit positions, can cause injury to persons or material damage.

- ▶ Only hold compartment doors and steps at suitable points.
- ▶ Before opening swing-out shelves and swivel reels, fully open the roller shutters in question.
- ▶ Observe spring and inertia effects when opening and closing compartment doors and the rear step.
- ▶ Pay attention while closing the seat box cover.

**Environmental and health hazard due to lubrication oils!**

Lubrication, transmission and hydraulic oils can cause permanent water pollution and endanger fauna and flora of all types.

- ▶ Avoid skin contact with hazardous oils.
- ▶ Avoid ground contact with lubrication oils.
- ▶ Collect used oils sorted by type and recycle.
- ▶ Observe local oil disposal regulations.

**Danger of burning!**

- ▶ Do not grip onto switched-on or recently switched-off search lights.

**Danger of crushing!**

Danger of crushing due to pneumatic cylinders and drives.

- ▶ Do not grasp moving parts.
- ▶ Do not reach into the danger zone.

NOTICE

Damage to the vehicle and equipment due to failure to observe visible or audible warning signals!

- ▶ Monitor all visible and audible warning signals, measured value displays and warning lights.
- ▶ Observe training and operating instructions.

Damage to property due to departure of the vehicle with a supply line attached!

To ensure readiness for operations, the pneumatic and electrical system can be energized by a supply line from the parking bay. Driving the vehicle out of the bay with the supply line attached can cause damage to the supply line and the receptacle.

- ▶ Manually disconnect the supply line before departure.
- ▶ When using types with an automatic disconnection function at the vehicle parking bay, use a self-retracting supply line.

Vehicle failure due to discharged batteries!

The vehicle battery discharges in case of continual use or while the engine is not running with the ignition on or off.

- ▶ Check the battery charge state regularly (every three months).
- ▶ Charge or replace the battery if the charge state is low.
- ▶ When the engine is shut down, switch off the ignition.
- ▶ Disconnect the vehicle's power supply in case of an extended period of disuse (main battery switch off).

Damage to electronic assemblies due to actuating the battery main switch!

The battery is an important part of the vehicle's electrical circuit even when the engine is running. If the vehicle power supply is interrupted at the battery main switch while the engine is running, power peaks can occur, this can destroy the electronic equipment of the chassis and superstructure.

- ▶ Only deactivate the battery main switch while the engine is shut off.

Damage to electronic components due to external charging!

An external, not electronic controlled battery charger can destroy electronic assemblies in the vehicle during external charging.

- ▶ To ensure the operational readiness of the vehicle, the battery must be isolated from the vehicle's electrical circuit (battery switch off) before connecting the battery charger. Disable battery main switch.
-

3.8 Safety labels

Locate, read, and understand all warning labels on the apparatus and identify the hazard that each label describes. If a label comes off or becomes hard to read, contact Rosenbauer for a replacement.

⚠ WARNING

Vehicle Ht:	10' 1"	Gross Vehicle Weight Rating:	
Vehicle Lg:	33'		21.0 Tons

Vehicle designed to carry max. 5 personnel.
As manufactured; vehicle owner must revise label for any vehicle height changes

⚠ WARNING

Death or serious injury might occur if proper operating procedures are not followed. The pump operator as well as individuals connecting supply or discharge hoses to the apparatus must be familiar with water hydraulics hazards and component limitations.

⚠ WARNING

Use caution when parking.
Hot exhaust can cause damage or start fires.



⚠ WARNING

To Prevent Serious Injury while entering & exiting the vehicle, face the cab and maintain three points of contact.

⚠ WARNING

Do Not Wear Helmet While Seated

⚠ WARNING

Do not ride on rear step while vehicle is in motion.
Death or serious injury may result.

⚠ CAUTION

TANK FILL PROCEDURE
Fill at 100 PSI maximum.
Pressure above 100 PSI may cause premature tank and tank fill failure and possibly void your warranty.

⚠ CAUTION

The operator must read the manual in its entirety prior to operation.



⚠ CAUTION

THIS IS NOT A WALKING SURFACE. DO NOT STEP ON THIS SURFACE. FAILURE TO FOLLOW THIS DIRECTION COULD RESULT IN SERIOUS INJURY.



⚠ WARNING

Do Not Ride On Tailboard



⚠ WARNING

Occupants must be seated and belted while apparatus is in motion

⚠ WARNING



Do Not Wear Helmet While Seated

3.9 Reporting safety defects

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Rosenbauer Motors, LLC.

If 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 and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Rosenbauer Motors, LLC.

To contact NHTSA, you may call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to <http://www.safercar.gov>; or write to:

Administrator, NHTSA
400 Seventh Street, SW.
Washington, DC 20590

You can also obtain other information about motor vehicle safety from <http://www.safercar.gov>.

3.10 Material safety data sheets (MSDS)

Material Safety Data Sheet information can be found on the reference CD supplied with this apparatus.

3.11 Seatbelts



DANGER!

Danger of fatal or severe injury due to failure to observe safety measures!

Persons who fail to fasten their seat belts can be thrown against hard surfaces in traffic accidents or abrupt vehicle maneuvers.

- ▶ All occupants must wear seatbelts when operating or riding in the vehicle.
- ▶ Seatbelts must be inspected regularly to ensure they remain in proper condition.



This apparatus uses a three point seat belt system. Occupants should always fasten seatbelts before driving. Fasten the three point seat belt by pushing the latch into the buckle until and audible click is heard. To ensure the belt is latched, give the seat belt a slight tug. The shoulder strap should be positioned diagonally across your chest, as shown in the illustration. Release the seat belt by pressing the release button.

3.12 Three points of contact rule

Always use the “3-Points of Contact Rule” when entering or exiting the apparatus.



Always keep three points of contact with the ground or the equipment until you are stable on the equipment or on the ground. This means that before you lift one of your legs to climb up on the equipment, you must have both hands firmly grasping the equipment to help pull yourself up; before you let go of one of the hand holds when dismounting, you need to make sure that both feet are firmly planted on the ground.

Additional safety rules for getting on or off equipment or climbing in the cab of a truck:

- Only climb on or get off when the equipment or vehicle is stationary.
- Always mount or climb down while facing the truck or the equipment.
- Only use points of contact that were intended to be used to climb on or dismount.

3.13 Do not move apparatus light



CAUTION!

Do Not Move Apparatus if the open door warning light is flashing. If flashing, verify that all doors and compartments are closed, and that all equipment is secured.



The “Do Not Move Apparatus” (door ajar) light is located on the center section of the roof of the cab. This light will blink if a cab or compartment door is open and the parking brake is not engaged.

If the “Do Not Move Apparatus” warning comes on while driving, stop the vehicle and secure the open door, open component or loose equipment.

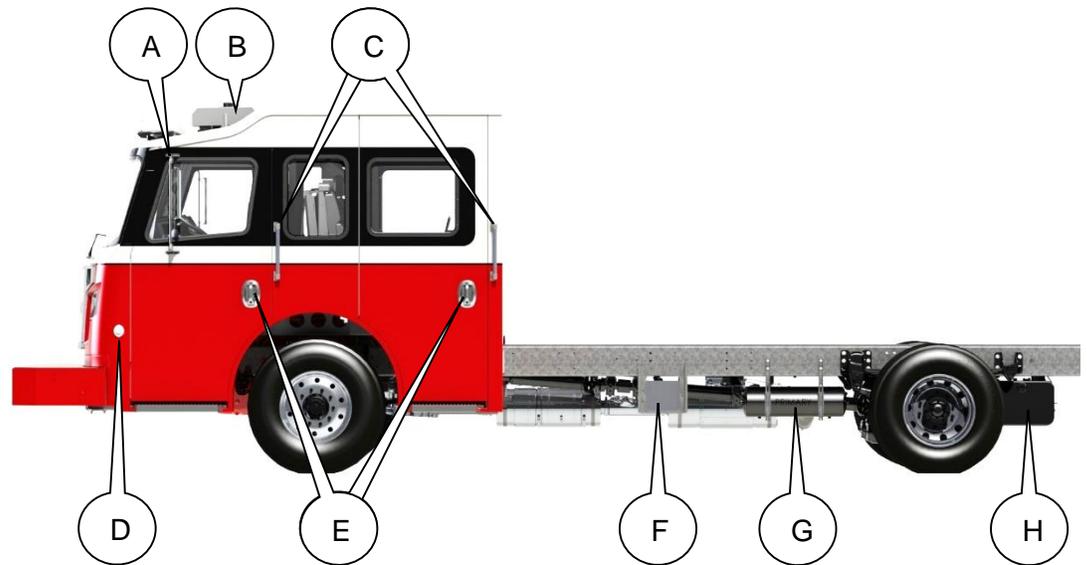
3.14 Vehicle data recorder

Your vehicle is equipped with a Vehicle Data Recorder (VDR) System. The VDR records the following information:

- Engine RPM
- Engine throttle percentage
- Vehicle speed
- ABS events
- Transmission range information
- Parking brake position
- Master warning switch position
- Seat occupied status
- Seatbelt status

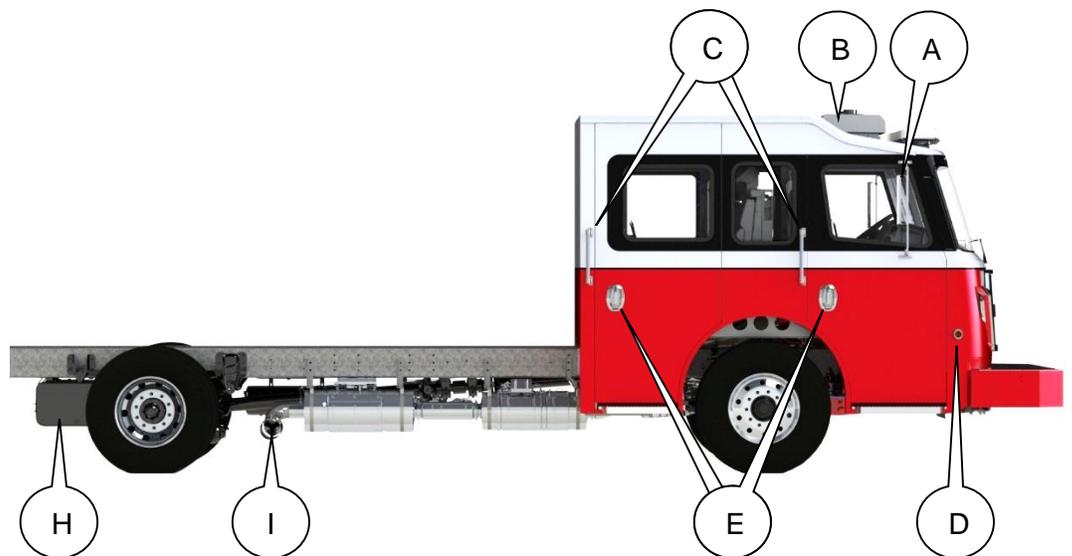
4 Product description

4.1 Vehicle side views

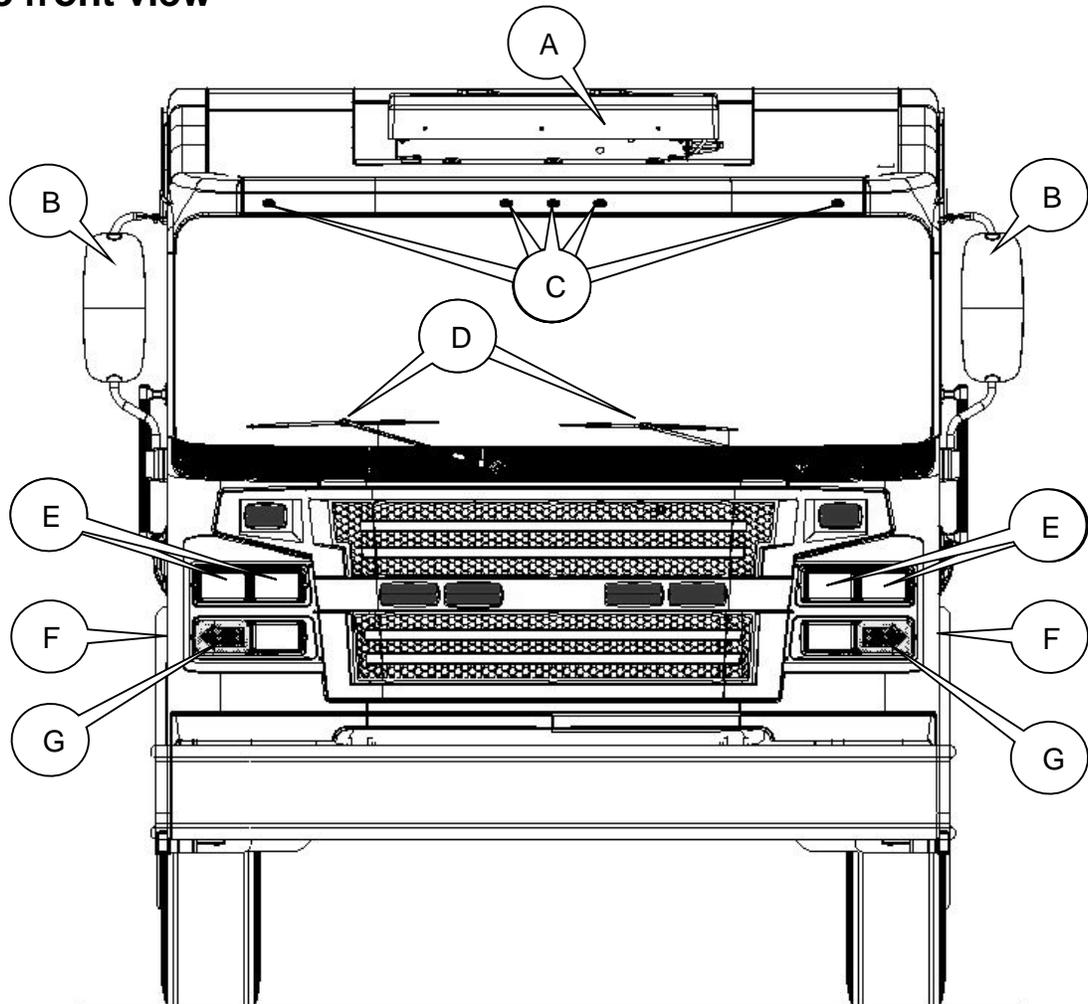


- A) Rear View Mirror
- B) A/C Condenser Unit
- C) Grab Handles
- D) Cab Side Marker Light
- E) Door Handles

- F) Diesel Fuel Cooler
- G) Air Tank
- H) Diesel Fuel Tank
- I) Engine Exhaust Outlet



4.1 Vehicle front view



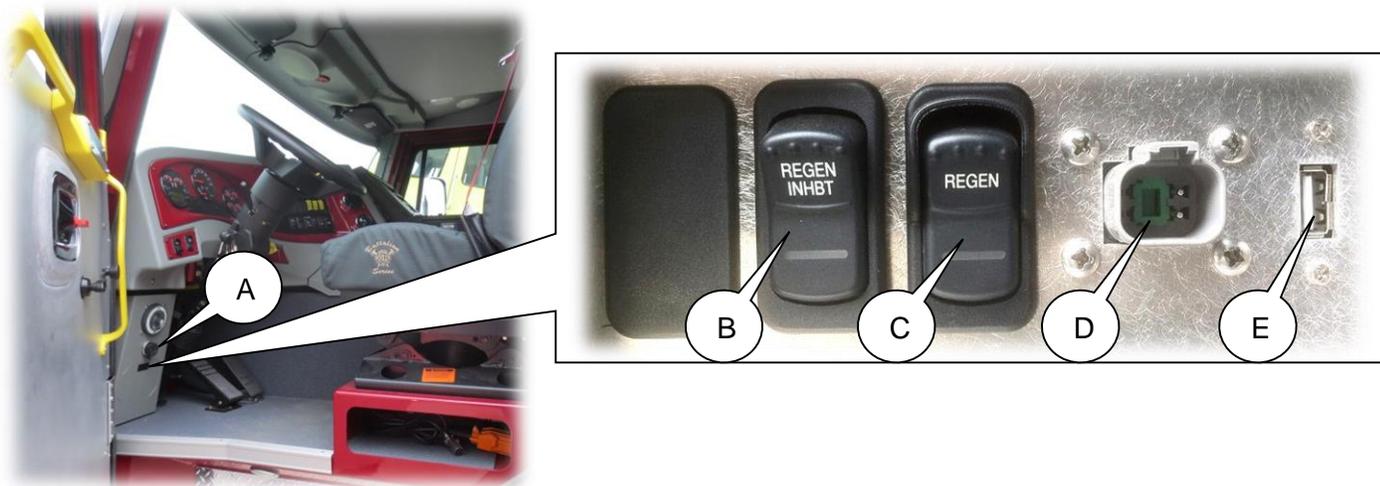
- A) Emergency Light Bar
- B) Rear View Mirrors
- C) Cab Clearance Lights
- D) Windshield Wipers
- E) Headlights
- F) Side Marker Lights
- G) Turn Signals

4.2 Driver's panel view



Please refer to individual switch descriptions in section 5 for more info.

4.3 Driver's kick panel view



- A) Engine and Transmission ECM Communications Port
- B) DEF Regeneration Inhibit Switch
- C) DEF Regeneration Switch
- D) V-Mux Communications Port
- E) Vehicle Data Recorder Port

5 Technical description

5.1 Master power disconnect switch

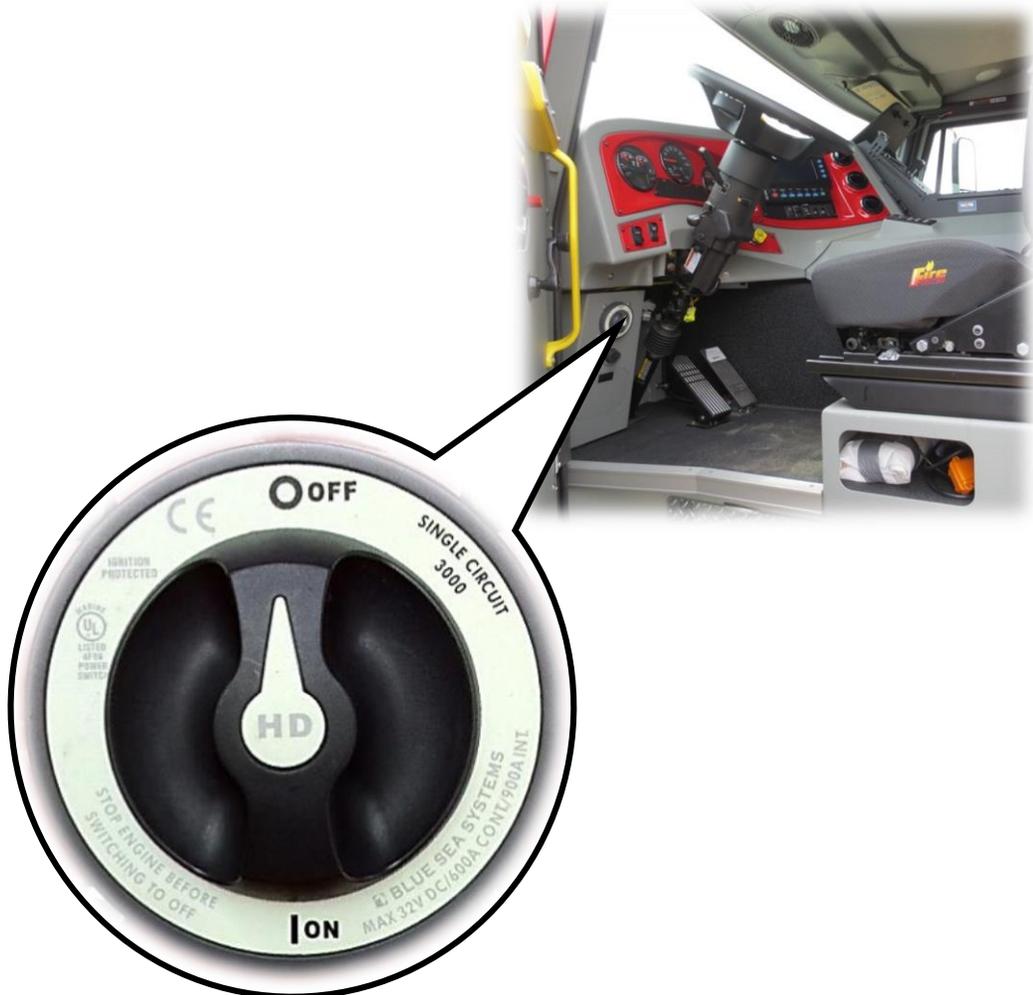
 **CAUTION!**

Damage to the alternator may result!

- ▶ Do not turn off the master power disconnect switch while the engine is running.

The master power disconnect switch is used to disconnect electrical power to the vehicle while the vehicle is not in use.

The master power disconnect switch is located on the front of the driver's kick plate. This switch must be turned on in order to operate the apparatus.



5.2 Parking brake

 **WARNING!**

Danger of injury and equipment damage!

- ▶ When parking on a grade, always chock wheels and turn the front wheels completely in the direction of the curb.
- ▶ The parking brake is only intended to hold the vehicle in a parked position.
- ▶ The parking brake may be used to assist the apparatus to a stop, but only in an emergency.
- ▶ The parking brake should not be used to stop the apparatus during normal driving.

The parking brake is applied by operation of the yellow parking brake valve shown.

- ▶ To apply the parking brake, PULL the parking brake valve.
- ▶ To release the parking brake, PUSH the parking brake valve.

While the master and ignition switches are on, an indicator lamp in the driver's display panel will illuminate when the parking brake is engaged.



SETTING THE PARKING BRAKE WILL AUTOMATICALLY PLACE THE TRANSMISSION IN NEUTRAL. The transmission selector must be put into neutral (by the driver) after this safety over ride has taken effect in order for system become fully functional.



5.3 Brake and throttle pedals

⚠ WARNING!

Danger of injury and equipment damage!

- ▶ Excessive use of the service brakes may result in overheating and brake fade which will decrease stopping ability.

The service brake pedal is located on the driver side floorboard of the apparatus. The service brake pedal is positioned on the left.

The throttle (accelerator) pedal is located on the driver side floorboard of the apparatus. The throttle pedal is positioned on the right.



5.4 Steering column controls

5.4.1 Multifunction lever

The multifunction lever is located on the left side of the steering column below the wheel. It operates the turn signals and headlight dimmer:

- ▶ Push the lever towards the dash to activate the right turn signal.
- ▶ Pull the lever towards the seat to activate the left turn signal.
- ▶ To turn the high beams on or off raise this lever until it clicks.

NOTE: Dashboard indicator lights will correspond to the function you have selected.

5.4.2 Tilting / telescoping lever

The tilting/telescoping lever allows you to adjust the steering wheel position for maximum comfort and control of the vehicle:

- ▶ Push lever down to adjust height of the steering wheel.
- ▶ Pull lever up to change the angle of the steering wheel.

NOTE: When you are finished driving, the steering wheel should be tilted forward and retracted inward for ease of exit and entry.

5.4.3 Hazard light switch

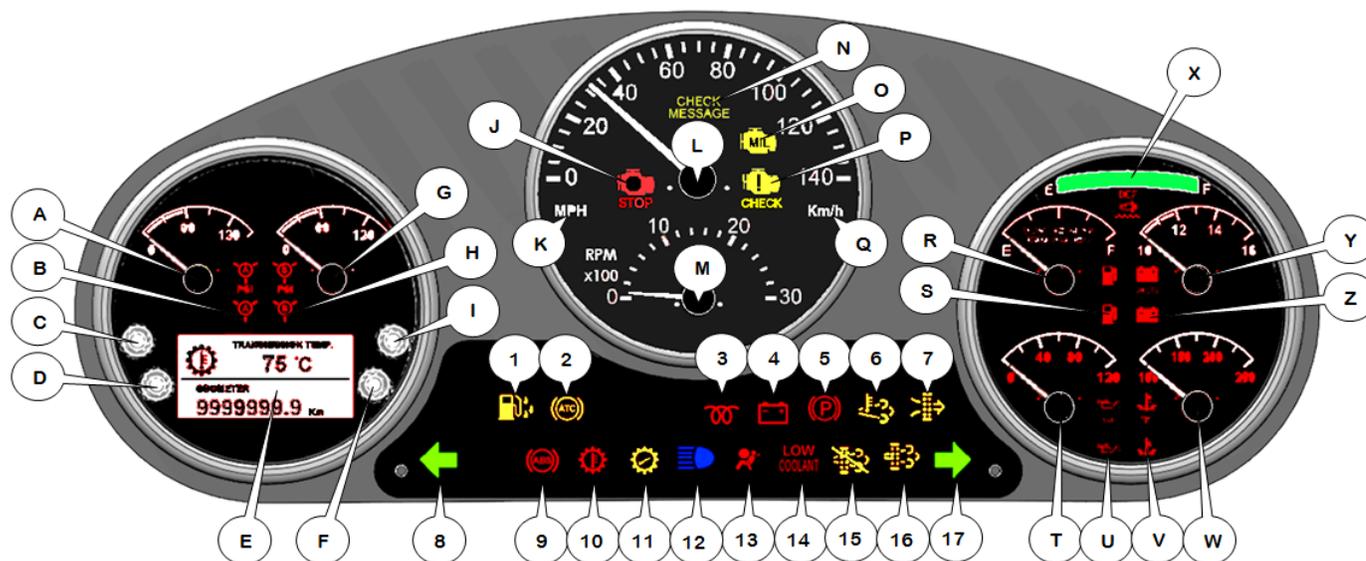
The hazard light switch is located on the steering column; it activates the four way hazard flashers.

- ▶ To activate, pull the switch outward from the steering column.
- ▶ To deactivate, push switch inward toward the steering column.

NOTE: The master power disconnect switch must be in the on position to operate the four way hazard flashers.



5.5 Dash gauges and tell-tales



- | | |
|---|--|
| A) Primary Air Pressure | W) Engine Coolant Temperature |
| B) Warning Light (Primary Air Pressure Low) | X) DEF Fluid Level |
| C) Upper Left Hand Button | Y) Voltage Meter |
| D) Lower Left Hand Button | Z) Warning Light (Voltage) |
| E) Multifunction Display | 1) Water In Fuel Indicator |
| F) Lower Right Hand Button | 2) Automatic Traction Control |
| G) Secondary Air Pressure | 3) Engine Pre-Heater (Wait to Start) |
| H) Warning Light (Secondary Air Pressure Low) | 4) Battery Power Indicator |
| I) Upper Right Hand Button | 5) Park Brake Engaged Indicator |
| J) Stop Engine Indicator Light | 6) High Exhaust System Temperature |
| K) MPH Mode Indicator Light | 7) Air Intake Restriction Indicator |
| L) Speedometer | 8) Left Turn Arrow Indicator |
| M) Engine Revolutions Per Minute (RPM) | 9) Anti-Lock Brake System Malfunction |
| N) Check Message Indicator | 10) High Transmission Temp Indicator |
| O) Malfunction Indicator | 11) Check Transmission Indicator |
| P) Check Engine Indicator | 12) High Beam Headlight Indicator |
| Q) Km/h Mode Indicator | 13) Airbag Malfunction Indicator |
| R) Fuel Level | 14) Low Engine Coolant Level Indicator |
| S) Warning Light (Low Fuel) | 15) Re-gen Inhibit Switch Engaged |
| T) Oil Pressure | 16) Particle Filter Regeneration |
| U) Oil Pressure Warning Light | 17) Right Turn Arrow Indicator |
| V) Engine Coolant Temperature Warning Light | |

Display functions will be controlled by 4 switches (C,D,F and I). In normal mode, the switch on the left side will control selection of heading for the corresponding line. The switch on the right side will control selection of parameter for the corresponding line. Pressing and holding the switch for 1 second will restore the previous line item. For full screen items, the switch functions will be displayed.

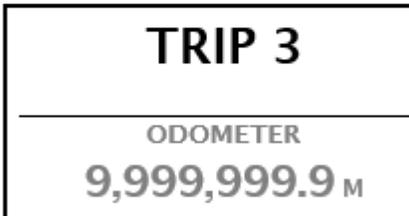


The multifunction display menu will include the following headings illustrated as they would appear on the display. Activation of the top left button will move to the next available heading selection. Activation of the top right hand button will select and scroll through the available options under that particular heading.



Under the **VEHICLE** heading, the following parameters will be displayed. Please note that parameters will not be displayed when no data is available.

- Transmission Oil Temp
- Battery Potential
- Vehicle Speed
- Fuel Level
- Engine Oil Pressure
- Engine Coolant Temp
- Engine Oil Temp
- Brake Secondary Air Pressure
- Engine Intake Manifold Pressure
- Aftertreatment Exhaust Gas Temp
- Engine Percent Load At Current Speed
- Actual Engine Percent Torque
- Instantaneous Fuel Economy
- Total Vehicle Distance
- Engine Hours
- Engine Speed
- DEF Catalyst Tank Level
- Battery Current
- Brake Primary Air Pressure
- Average Fuel Economy



Under the **TRIP** heading, the following parameters will be displayed.

- Total Fuel Used
 - Total Idle Fuel Used
- Trips 2 and 3 will display the same information as illustrated for trip 1. Trip Distance is reset by pressing and holding the upper right hand button (F) for a period of 2 seconds while trip mileage is displayed.



Under the **SETTINGS** heading, the following parameters will be displayed. Pressing and holding the right hand button will execute the function

- Select Units
- Select Contrast



An asterisk will appear next to the “DIAGNOSTICS” heading if active diagnostic codes are present.

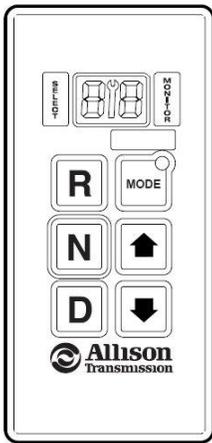
5.6 Transmission controls

WARNING!

Danger of severe injury due to unintentional vehicle movements!

- ▶ 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 have completed all of the following procedures:
 1. Put the transmission in **N** (Neutral).
 2. Be sure the engine is at low idle (500-800 rpm).
 3. Apply the parking brakes and emergency brake and make sure they are properly engaged.
 4. Chock the wheels and take any other steps necessary to keep the vehicle from moving.

The pushbutton shift selector has the following components:



- **R** (Reverse)—Press this button to select Reverse
- **N** (Neutral)—Press this button to select Neutral
- **D** (Drive)—Press this button to select Drive. The highest forward range available will appear in the digital display window. The transmission will start out in the lowest available forward range and advance automatically to the highest range.
- **↑ (Up) Arrow**—Press the **↑ (Up) Arrow** when in **D** (Drive) to request the next higher range. Continually pressing the **↑ (Up) Arrow** will request the highest range available.
- **↓ (Down) Arrow**—Press the **↓ (Down) Arrow** when in **D** (Drive) to request the next lower range. Continually pressing the **↓ (Down) Arrow** will request the lowest range available.



All drivers should read the ALLISON operators manual to familiarize themselves with the features of this transmission.

5.7 Heating ventilation and air conditioning (HVAC) controls

5.7.1 Front HVAC controls

The HVAC controls are accessed through the V-Mux control panel. These controls allow you to adjust the heating, ventilating, defrosting, and air conditioning functions. The V-Mux HVAC control panel is shown below.

To access the HVAC control panel, push the button under the “HVAC” heading (A).

To select heat or air conditioning, press the button located beside the “Heat / A/C” box (B).

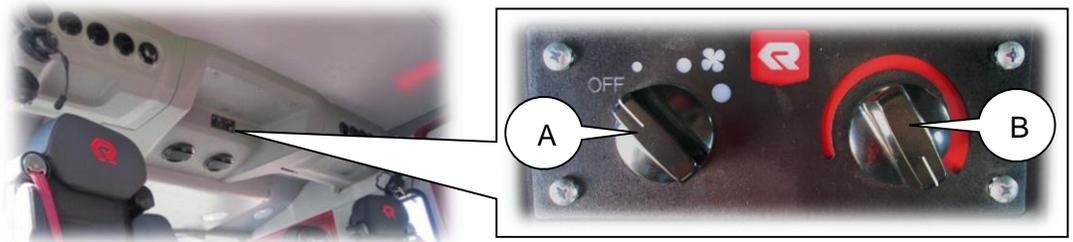
To adjust the fan speed, press the button beside the “Fan Speed” box (C). Fan speed selection consists of OFF, LOW, MEDIUM, OR HIGH.

To select defrost or vent settings, press the button beside the “Defrost / Vent” box (D). The vent settings consist of defrost, vent, and off.

To adjust the temperature, use the buttons beside both the “Temp UP” and “Temp Down” boxes (E and F). The temperature setting is displayed in the center of the V-Mux screen.



5.7.2 Rear HVAC controls



The rear HVAC controls are located on the roof mounted HVAC unit. Knob A adjusts the fan speed. To increase airflow, turn knob A clockwise. To shut the rear HVAC off, turn knob A to the “OFF” position. Knob B controls the air temperature of the rear HVAC unit.

5.8 Ignition switch



The ignition switch activates the main electrical systems of the vehicle. It provides power to the ignition system components and to some accessories. The master power disconnect switch must be on to operate the ignition switch.

5.9 Engine start switch



The engine start switch activates the starter motor which starts the engine. The master power disconnect switch and ignition switch must be on in order to operate the engine start switch.

5.10 Dash panel dimmer control



The dash panel dimmer control allows the driver to set the amount of light being emitted from the dash gauges. The brightness is adjusted by moving the slide on the dash panel dimmer control switch up for brighter dash lights or down for dimmer dash lights.

5.11 Regeneration “regen” switch



The manual regeneration or regen switch initiates the DPF regeneration process if the vehicle is stationary and the regeneration inhibit switch is not active. For more information on this switch, please refer to the emission control system section of this manual.

5.12 Regeneration inhibit switch



The regeneration inhibit switch, when in the on position, will stop an active regeneration or prevent an active regeneration from starting. For more information on this switch, please refer to the emission control system section of this manual.

5.13 Headlight and parking light controls



Parking lights are activated by toggling the headlight switch to the middle position. Headlights are activated by toggling the headlight switch past the middle position, to the fully on position. The rear taillights will also illuminate when the headlight switch is in the middle or fully on position. See “Multifunction Lever” section for information on switching between high and low beams.

5.14 Windshield wiper controls



To start or stop the windshield wipers, push the “ON/OFF” button on the windshield wiper switch. To adjust the speed of the windshield wipers, toggle the “ON/OFF” button upwards for faster wipe speed or downwards for a slower wipe speed. To initiate the windshield wash function, push and hold the “WASH” button until the windshield is clean.

5.15 Window controls



The windows of the apparatus can be raised or lowered using the mechanical hand crank located on the door panel of each door. Operate the hand crank to raise or lower each window.

5.16 Door lock controls



The door locks are operated by turning the red knob on the interior cab door handle. Turn the red knob downward to lock the door. Reverse this action to unlock the door. Each door must be locked or unlocked separately.

5.17 Engine brake controls



Engine braking is controlled using the V-Mux control panel. To activate or adjust the intensity of engine braking, press the button on the V-Mux control panel that corresponds with the “Engine Brake” title block. The engine brake title block is normally located on the home screen but it may be located on a different menu depending on your application.

There are four levels of engine brake intensity:

- Off
- Low intensity
- Medium intensity
- High intensity

5.18 Engine high idle control



The engine high idle control switch forces the engine to idle at an increased RPM. Elevating the engine RPM will increase engine temperature, exhaust temperature, and alternator charging ability.

To activate the high idle function, place the transmission in neutral (N), apply the parking brake, and press the button on the V-Mux display that corresponds with the “High Idle” title block.

To deactivate the high idle function, press the button on the V-Mux display that corresponds with the “High Idle” title block. Please note that releasing the parking brake or placing the vehicle in gear will also deactivate high idle.

The engine idle RPM will automatically increase if the vehicle senses low battery voltage.

5.19 Master warning control



The master warning control switch provides power to the warning lights on the apparatus.

To activate the master warning control, press the red button on the V-Mux display labeled “E-Master”.

To deactivate the master warning control, press the red button on the V-Mux display labeled “E-Master”.

Please note: any white warning lights will deactivate automatically when the parking brake is set per NFPA 1901.

5.20 Power mirror controls

 **CAUTION!**

Danger of injury or equipment damage!

- ▶ Always check mirrors to assure mounting hardware is secure. Drivers must always adjust mirrors to maximize visibility and to limit blind spots.
- ▶ Beware of blind spots (areas of obstructed view). Use a helper to walk around the vehicle to aid in identifying blind spots. This will help familiarize the driver with the vehicle's blind spots allowing for him/her to compensate for this lack of vision while driving, making turns, or changing lanes.



Mirror heat is activated by using the V-Mux control panel. Please refer to the V-Mux controls section of this manual for more information.

Mirror adjustment is achieved by using the power mirror adjustment knob. This knob must be turned clockwise or counterclockwise to select the mirror that needs adjustment. The left position selects the driver's side mirror, whereas the right position selects the officer's side mirror. The middle position is the off position. In the middle position, no adjustments to the mirrors can be made. Once a mirror is selected, the power mirror adjustment knob can be "rocked" in the given direction you wish the mirror to move. The mirror will move in the direction the knob is rocked.

If more than one power mirror adjustment knob is present your apparatus has a two-piece rear view mirror. In this case, the top and bottom mirrors are adjusted independently. The top and bottom mirror sections are controlled by the respective adjustment knob.

5.21 Vehicle data recorder

Your vehicle is equipped with a Vehicle Data Recorder (VDR) / Seatbelt Monitor System. The VDR monitors and records the following information:

- Engine RPM
- Engine Throttle Percentage
- Vehicle Speed
- ABS Events
- Transmission Range Information
- Parking Brake Position
- Master Warning Position
- Seat Occupied Status
- Seatbelt Status



The seat belt status screen will become visible if the park brake is released and an occupant in the cab is not wearing their seatbelt. The seatbelt icon will illuminate red for any occupant whose seatbelt is not fastened, green for any seated occupant whose seatbelt is fastened, and gray for any empty seat. To manually exit the seat belt status screen press any button except R4. The R4 button will override this popup until the master power has been reset.



For more information please refer to the VDR manufacturer's manual.

5.22 V-Mux controls

The vehicle has a centralized control system for most of the electrical items on the apparatus. The Weldon Vista Display “Interface” module is where switching for many components occurs, including the electrical lighting and HVAC controls on the vehicle. The Vista Display will begin each session with a start-up display once the Master Power Switch has been energized. The buttons surrounding the screen are “toggle switches” that turn a function on and off or allow options to be chosen. These buttons may also access additional screens. Since each V-Mux system is unique, some of the following instructions may vary for your apparatus.



- | | |
|-----------------------------------|--------------------------|
| A) Emergency Lights Master Button | E) System Info Screen |
| B) Warning Lights Screen | F) Secondary Menu Screen |
| C) HVAC (Climate Control Screen) | G) Home (Main Screen) |
| D) Lights Screen | |

5.22.1 Warning light activation

All warning lights can be activated through the press of a single button. The “E-Master” button (A) will switch all warning lights on and off per the selections made in the warning light menu (B).

NOTE: Any white warning lights will activate automatically with the release of the park brake while the master warn light switch (A) is active per NFPA 1901.

5.22.2 Warning light menu

To access the warning light menu, press the “Warning Lt Menu” button (B). Accessing this menu allows the user to switch certain warning lights on and off.

5.22.3 HVAC controls

By pressing the “HVAC” (C) button, the user can adjust several settings for the heating and cooling system. These settings include:



- Defrost Mode which activates the heat valve and closes the air damper to allow all heated air to pass over the windshield. This mode should be used whenever there is buildup of ice on the windshield.
- Heat Mode also activates the heat valve while the air damper remains open allowing the heated air to flow into the main portion of the cabin.
- A/C Mode activates the air conditioning condenser and freon compressor with the air damper open allowing cooled air to flow into the main portion of the cabin.

To select heat or air conditioning, press the button located beside the “Heat / A/C” box.

To adjust the fan speed, press the button beside the “Fan Speed” box. Fan speed selection consists of OFF, LOW, MEDIUM, OR HIGH.

To select defrost or vent settings, press the button beside the “Defrost / Vent” box. The vent settings consist of defrost, vent, and off.

To adjust the temperature, use the buttons beside both the “Temp UP” and “Temp Down” boxes. The temperature setting is displayed in the center of the V-Mux screen.

5.22.4 Lighting

The “Lighting” button (D) controls auxiliary lighting such as dome lights and scene lights. Press the button beside the box illustrating the light you would like to turn on or off.

5.22.5 Secondary menu



The Secondary Menu (F) is generally used to gain access to the date/time adjustment and backlight adjustment settings. To adjust the back light settings, press the button beside the “Vista Back Light” box, the brightness level consists of 4 possible settings. To set the clock, press the button beside the “Date/Time Adjust” box. Pressing this box will open up the date/time adjustment screen. To change the value of any setting, simply press the button located beside the setting you wish to change. Continue to press the button until the desired value is reached.

5.22.6 Home

The Home button (G) is used to return to the Main Menu when the user has gone to another menu. The main screen is unique to every apparatus. To adjust the state of any item on the home screen, press the button beside the desired box.

5.22.7 Seat belt status

The seat belt status screen will become visible if the park brake is released and an occupant in the cab is not wearing their seatbelt. The seatbelt icon will illuminate red for any occupant whose seatbelt is not fastened, green for any seated occupant whose seatbelt is fastened, and gray for any empty seat. To manually exit the seat belt status screen press any button except R4. The R4 button will override this popup until the master power has been reset.

5.22.8 Rear/side view camera



WARNING!

Camera/Monitor system aids in the use of, but does not replace vehicle side & rear view mirrors. Objects in camera/monitor view may be closer than they appear. When backing up, always be prepared to stop.

The V-mux will automatically display the rear view camera when the chassis is shifted into reverse. If equipped, it will also display the left or right side camera when the chassis turn signal is activated in the given direction.

6 Operation

6.1 Preparation for use

The following Pre-Start checklist is a guide for inspection after each operation. Any defects should be reported to the Maintenance personnel for disposition and, if necessary, corrected before the truck is placed back in service.

 **WARNING!**

Fire helmets shall not be worn by persons riding in enclosed driving and crew areas. Fire helmets are not designed for crash protection and they will interfere with the protection provided by head rests. The use of seat belts is essential to protecting fire fighters during driving.

 **CAUTION!**

Equipment improperly prepared for operation is unsafe for use. If something is noticed and requires attention, have it checked before the apparatus leaves for operation. Even minor mechanical defects can lead to accidents or personal injury. Pay attention to the operation manuals of equipment and apparatus carried in the vehicle.

6.1.1 Before entering the apparatus

- ▶ The Pre-Start Checklist (next page) should be completed after every operation.
- ▶ Unless the truck is equipped with optional auto ejects, unplug electric and air shorelines connected to apparatus.
- ▶ All occupants must understand the 3 points of contact for entering and exiting the cab safely. This means that at least three points of your body, either two hands and one foot or one hand and two feet, must be in touch with the apparatus or the ground while ascending into or descending out of the cab.

6.1.2 Before driving the apparatus



- ▶ Turn the master power disconnect switch to the “on” position.
- ▶ Start the engine, refer to “Starting and stopping the engine” section.
- ▶ While the engine is warming up, check all gauges and tell-tales to ensure all systems are operating within normal operating ranges.
- ▶ Adjust driver's seat for proper pedal position then adjust steering wheel.
- ▶ Make sure that all occupants have their seat belts fastened.
- ▶ Check door ajar light to ensure that all doors are securely closed.
- ▶ Check mirrors for proper alignment.
- ▶ In dark, low light, and/or foggy conditions, turn on headlights.
- ▶ If conditions require, turn on windshield wipers.
- ▶ Adjust HVAC controls to desired temperature and output setting.
- ▶ If emergency warning lights are required, switch on.
- ▶ While holding service brakes, release park brake.
- ▶ Place vehicle transmission into drive and release the service brakes to advance forward.

6.1.3 Pre-start checklist

Check all locks and hold down devices for proper operation.
Check vehicle exterior for dents or damage.
Clean all lights, reflectors and mirrors, and check for broken glass.
Check for missing bolts, loose or damaged hoses and damaged wires.
Take inventory of removable equipment. Replace any missing or damaged items.
Turn on all truck lights and check for correct function.
Check air system for leaks.
Inspect all fire-fighting equipment for corrosion, damage or other defects.
Inspect wheel hubs, axles, transfer casing, and transmission for signs of leakage.
Check under the vehicle for fuel, oil, or coolant leakage.
Check engine belts.
Check engine coolant level.
Check engine oil level.
Check transmission fluid level.
Inspect all glass for cracks and discoloration. Check operation of sliding windows in cab.
Check operation and condition of seat adjusting mechanism.
Inspect each tire for correct inflation.
Inflate every tire to the recommended air pressure when tires are cold.
Inspect tires for uneven wear, chinks, or cuts.
Inspect rims for damage and inspect lug nuts.
To prevent damage, tires must not be cleaned with a high pressure steam jet.
Observe operation of all gauges.
Operate windshield washer and wiper.
Operate warning lights and alarm system.
Operate the horn, heater, and defroster.
Check fuel level, add fuel if necessary.
Check level of windshield washing agent, add if necessary.
Check service brakes for proper function.
Check for uneven or spongy action, dragging, squealing, or chatter when braking.
Test parking brake for proper function.
Check operation and general condition of cabin and compartment doors.
Visually inspect seals around doors for looseness and/or damage.

6.2 Starting and stopping the engine

WARNING!

Danger of injury due to exhaust fumes and hot exhaust temperatures!

- ▶ Exhaust fumes are toxic. Ensure that the engine is shut down whenever the apparatus is inside an enclosed area, or steps are taken to evacuate the exhaust fumes.
- ▶ Diesel exhaust fumes are classified by the state of California to cause cancer, birth defects, and other reproductive harm.
- ▶ The engine exhaust system will become extremely hot during engine operation. DO NOT operate near flammable or explosive material. Hot exhaust components will cause severe burns.

CAUTION!

Damage to engine components!

- ▶ Do not use starting fluids such as ether.
- ▶ If the engine does not start within 20 seconds, release the engine start switch and allow the starter motor to cool for one minute before attempting to start the engine again.

6.2.1 Starting the engine



- ▶ Turn the master power disconnect switch to the “ON” position.
- ▶ Turn the ignition switch to the “ON” position. The apparatus will go through a series of self-checks; wait for the checks to complete and notify Maintenance of any problems. If the “wait to start lamp” is on, wait until it turns off, then proceed to the next step.
- ▶ Push the engine start switch.
- ▶ When engine starts, release the engine start switch.
- ▶ As the engine idles, check voltage, oil pressure, and all other gauges.

6.2.2 Stopping the engine

- ▶ Ensure that the park brake is set.
- ▶ Ensure that the transmission is in neutral.
- ▶ Turn the ignition switch to the “OFF” position to shut down engine.
- ▶ Turn the master power disconnect switch to the “OFF” position.



For further information please refer to your engine manufacturer’s manual.

6.3 Driving the vehicle

DANGER!

Danger of fatal or severe injury due to driving when the vehicle is not ready!

Danger of injury and accidents due to driving with the stop engine indicator light or low air pressure.

- ▶ Only drive the vehicle when the stop engine indicator light is inactive.
 - ▶ Ensure the vehicles pneumatic system is at operational pressure.
-

WARNING!

Danger of severe injury due to unintentional movement of the vehicle!

Vehicle can roll if the parking brake or service brakes are not applied.

- ▶ Always apply the parking brake when the apparatus is to be stationary.
 - ▶ Do not allow the vehicle to move while starting the engine.
 - ▶ Do not shift the transmission and throttle the engine simultaneously.
 - ▶ Never shift the transmission to neutral while driving, if no gear is selected there is no engine brake effect. This can cause the vehicle to accelerate and may cause an accident or serious injury.
-

NOTICE

Danger of transmission damage!

Transmission failure or damage due to a raised transmission oil temperature. Prolonged idling in drive mode or reverse gear may result in overheating of the transmission.

- ▶ Shift gear into neutral (N), if the vehicle is stopped for more than five minutes with the engine running.
 - ▶ Stop engine immediately if the check transmission indicator lamp is active.
-

6.3.1 General information

- ▶ Watch out for obstacles (e.g. rocks, potholes, ruts, tree stumps).
- ▶ Adjust speed to ground conditions. The steeper and rougher the terrain, the lower the speed.
- ▶ Adjust speed well ahead of obstacles, uphill or downhill gradients.
- ▶ Secure equipment that is fixed to the vehicle.

6.3.2 Begin driving

- ▶ Switch on the engine.
 - ▶ Please refer to the chapter “Starting and stopping the engine”.
- ✓ The transmission display indicates N for neutral gear selected.
- ⇒ Let the engine idle for a short time.
- ⇒ Do not drive under full load until proper operation temperature is reached (except in an emergency).
- ▶ Actuate the service brakes.
 - ▶ Please refer to the chapter “Braking”.
- ▶ Select desired transmission gear.
 - ▶ Please refer to the chapter “Transmission controls”.
 - ✓ The transmission display indicates the selected gear.
- ▶ Release parking brake.
 - ▶ Please refer to the chapter “Parking brake”
- ▶ Actuate throttle pedal and drive off.
 - ▶ Please refer to the chapter “Brake and throttle pedals”.
- ✓ Vehicle starts moving.

6.3.3 Select transmission range



WARNING!

Danger of injury to persons or damage to the vehicle due to open doors!

- ▶ Before starting to drive, close all cab and compartment doors.
- ▶ If the door ajar light activates while driving, stop the vehicle immediately and assess the situation before proceeding.

Select transmission range.

- ▶ Select the desired transmission range.
 - ▶ For normal driving conditions, select drive (D).
 - ⇒ Please refer to the chapter “Transmission controls”.
- ✓ The transmission display indicates the desired gear selected.

Change driving direction.

- ▶ Release the throttle pedal.
- ▶ Actuate the service brake and stop the vehicle, taking account the traffic situation.
- ▶ Let the engine idle.
- ▶ Select the desired mode by actuating the corresponding button.
- ▶ Release the service brakes.
- ▶ Actuate the throttle pedal and drive off.

6.3.4 Acceleration

Acceleration

- ▶ Actuate the throttle pedal to increase engine speed.
 - ✓ Engine speed increase.
- ▶ Release the throttle pedal to allow the engine to return to idle.
 - ✓ Engine speed decrease to idle.

6.3.5 Stopping and parking the vehicle

Parking the vehicle

- ▶ Stop the vehicle, taking account of the traffic situation.
- ▶ Set the parking brake.
- ▶ Shift the transmission to neutral (N).

Stopping the vehicle briefly

- ▶ If stopping briefly (e.g. traffic light), remain in the selected drive mode.
- ▶ Actuate the service brakes when stopping for a short period of time.
 - ▶ Set the parking brake whenever necessary.

6.4 Braking the vehicle

NOTICE

Damage to overheated brakes!

The brake drums or disks become very hot immediately after extended periods of driving down steep inclines, emergency braking, braking from high speed or repeated braking in quick successions. Incorrect handling can cause damage to the brakes.

- ▶ Before applying the parking brake, allow hot driving brakes to cool.
 - ▶ When parking the vehicle with hot brakes, always use chocks.
 - ▶ Do not drive through water when the brakes are hot.
-

6.4.1 Brake air pressure

If either the primary air pressure or secondary air pressure gauges indicate low pressure, respond as follows.

- ▶ Ensure the parking brake is applied and the transmission is in neutral (N).
- ▶ Run the engine at high idle and observe the air pressure gauges.
 - ▶ If the brake air pressure is not increasing, switch off the engine and obtain workshop assistance.

If an alarm condition remains active after the engine has started:

- ▶ Identify the fault.
- ▶ Take appropriate action to rectify the fault, or shut down the engine.
- ▶ Obtain workshop assistance.

6.4.2 Parking brake

DANGER!

Danger of fatal or severe injury due to unintentional vehicle movements!

Unintentional vehicle movements can cause fatal injury to the crew or pedestrians. Before leaving the cabin, the driver must:

- ▶ Park the vehicle on a safe surface.
 - ▶ Select transmission to neutral (N).
 - ▶ Apply the parking brake.
 - ▶ Chock the wheels of the vehicle with the attached wheel chocks before maintenance and repair work.
-

NOTICE

Damage due to frozen brakes!

Wet service brakes may freeze up in freezing temperatures.

- ▶ Do not use the parking brake in freezing temperatures, if the service brakes are wet.

Avoid stopping the vehicle immediately after heavy loading, when all systems are hot. If possible without endangering, continue driving with the vehicle so that the systems can drop back down to normal operating temperature.

- ▶ Continue driving slowly without pressing the service brake so that the brakes have enough time to cool down.
 - ▶ When the vehicle needs to be parked, secure the wheels with wheel chocks instead of applying the parking brake.
 - ▶ Wait until the brakes have cooled down.
 - ▶ Apply the parking brake and place the wheel chocks back into storage.
-

Apply parking brake.

- ▶ Pull parking brake valve.
 - ✓ Parking brake is applied.
 - ✓ Park brake engaged indicator is lit.

Release parking brake.

- ▶ Push parking brake valve.
 - ✓ Parking brake is released.
 - ✓ Park brake engaged indicator is off.

6.4.3 Service brake



WARNING!

Danger of injury and accidents! Vehicle cannot be driven!

An adequate braking effect cannot be assured if the air tank pressure in brake circuits 1 or 2 is too low.

- ▶ Stop immediately, observing the current traffic situation.
- ▶ Run engine in high idle until sufficient pressure builds up.
- ▶ If pressure does not build up, do not drive the vehicle.
- ▶ Troubleshooting and/or obtain workshop assistance.

Danger of fatal or severe injury due to improper use of the braking system!

Repeated braking, pulse braking, a leak in the compressed air system, or the use of the parking brake while driving, reduces the operating pressure; this in turn could result in locking up of the wheels and can cause severe accidents.

- ▶ Ensure correct compressed air system and braking system operations.
- ▶ Do not start driving if the compressed air pressure in the braking system is too low.
- ▶ If the warning lights for the brake system or compressed air system come on, stop the vehicle immediately and do not continue until the issue has been resolved.
- ▶ Avoid repeatedly depressing and releasing the brake pedal.
- ▶ Never use the parking brake as a service brake while driving.
- ▶ Report malfunctions to your work shop personnel as quickly as possible and make sure that the repair is performed.
- ▶ Avoid overheating the service brakes.



A large enough loss of air pressure puts the service brake out of operation and causes the parking brake to be applied automatically.

Apply service brakes.

- ▶ Actuate the service brake pedal.
 - ✓ Service brakes are applied.

Release service brakes.

- ▶ Release the service brake pedal.
 - ✓ Service brakes are released.

6.5 Cab tilt procedure

6.5.1 Remote electric operation



WARNING!

Danger of severe injury or death!

- ▶ Before raising or lowering the cab, safety precautions must be taken to avoid personal injury or equipment damage. Ensure frontal and overhead clearance is sufficient to fully raise cab without hitting electrical wires or dangerous overhead objects that could result in serious injury or death.
 - ▶ Failure to ensure that the mechanical support is in place may result in personal injury or death.
 - ▶ Remove loose items from cab and ensure the doors are closed and completely latched to avoid a shift in contents or sudden opening of doors.
-

CAUTION!

Danger of death, injury and equipment damage! Do not raise the cab until the following procedures have been followed:

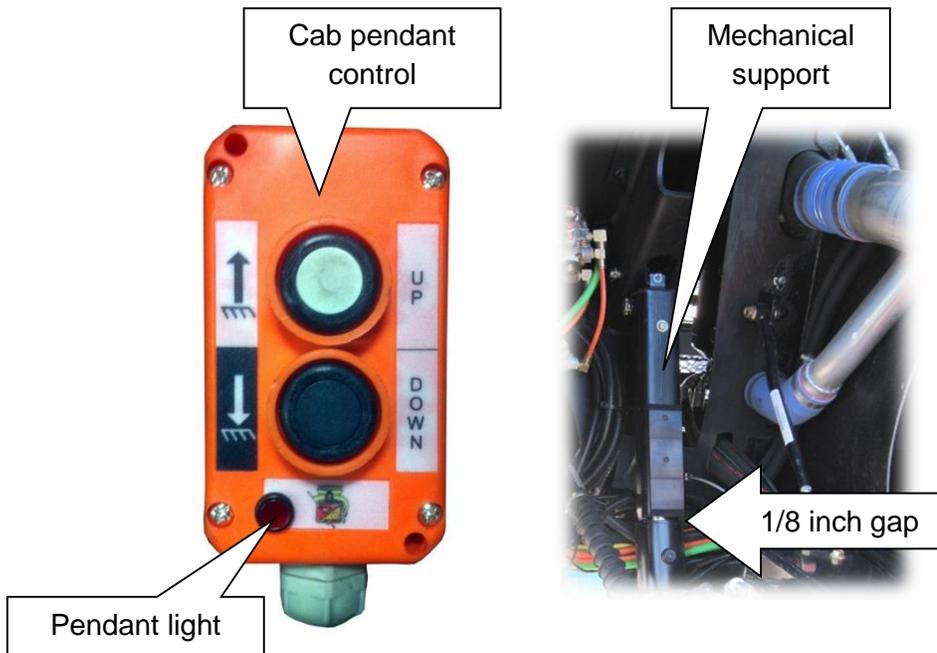
- ▶ Vehicle must be parked on level surface with park brake applied.
 - ▶ No personnel or loose equipment should remain in cab during tilt system operations.
 - ▶ Cab doors must be securely closed prior to the tilt operations.
 - ▶ Be sure there is adequate clearance in front of and overhead of cab to fully raise the cab without contacting objects including, but not limited to, items in or around the bumper and cab overhead (i.e. vehicle equipment, surrounding obstacles, power lines, etc.).
 - ▶ Master switch must be in the “ON” position.
 - ▶ Ignition switch may be in the “OFF” position, or “ON” position, with or without the engine running.
 - ▶ All personnel must stay clear of area under and in front of the cab at all times while the tilt system is in operation and until the mechanical support is engaged.
-

Raising cab (remote electric)

1. Locate the cab pendant control. Plug in if necessary.
2. Energize the electric/hydraulic pump by depressing and holding the "UP" button on the pendant until the mechanical support drops into place against the cylinder. The pendant light will come on indicating the latches are unlocked. Continue to raise the cab until there is a visible gap between the mechanical support and the top of the tilt cylinder housing (1/8 inch).
3. Deactivate the electric/hydraulic pump by releasing the "UP" button.
4. Do not lower the mechanical support onto the top of the cylinder! Visually confirm that the mechanical support is engaged before personnel move under the raised cab.

Lowering cab (remote electric)

1. Clear all personnel and equipment from chassis/under raised cab.
2. Pull the mechanical support release cable until the support clears the cylinder and until the bottom of the support is below the top of the cylinder as the cab is lowered.
3. Energize the electric/hydraulic circuit by depressing and holding the "DOWN" button on the pendant until the cab has completely lowered, the latches have engaged and the pendant light has been off for 15 seconds.
4. Deactivate the electric/hydraulic circuit by releasing the "DOWN" button.



6.5.2 Manual pump operation



WARNING!

Danger of severe injury or death!

- ▶ Before raising or lowering the cab, safety precautions must be taken to avoid personal injury or equipment damage. Ensure frontal and overhead clearance is sufficient to fully raise cab without hitting electrical wires or dangerous overhead objects that could result in serious injury or death.
- ▶ Failure to ensure that the mechanical support is in place may result in personal injury or death.
- ▶ Remove loose items from cab and ensure the doors are closed and completely latched to avoid a shift in contents or sudden opening of doors.

CAUTION!

Danger of death, injury and equipment damage! Do not raise the cab until the following procedures have been followed:

- ▶ Vehicle must be parked on level surface with park brake applied.
- ▶ No personnel or loose equipment should remain in cab during tilt system operations.
- ▶ Cab doors must be securely closed prior to the tilt operations.
- ▶ Be sure there is adequate clearance in front of and overhead of cab to fully raise the cab without contacting objects including, but not limited to, items in or around the bumper and cab overhead (i.e. vehicle equipment, surrounding obstacles, power lines, etc.).
- ▶ Master switch must be in the “ON” position.
- ▶ Ignition switch may be in the “OFF” position, or “ON” position, with or without the engine running.
- ▶ All personnel must stay clear of area under and in front of the cab at all times while the tilt system is in operation and until the mechanical support is engaged.

Raising cab (manual pump)

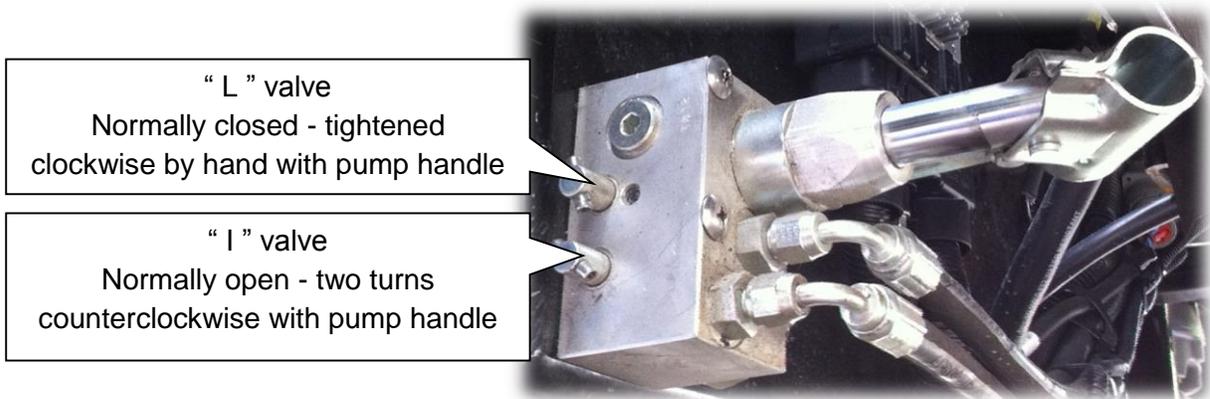
1. Close the “I” valve on the hand pump. Make sure the “L” valve on the hand pump is closed.
2. Operate the pump until the mechanical support drops into place against the cylinder. Continue to pump until there is a visible gap between the mechanical support and the top of the tilt cylinder housing (1/8 inch).
3. Do not lower the mechanical support onto the top of the cylinder! Visually confirm that the mechanical support is engaged before personnel move under the raised cab.

Lowering cab (manual pump)

1. Clear all personnel and equipment from chassis/under raised cab.
2. Pull the mechanical support release cable until the support clears the cylinder and until the bottom of the support is below the top of the cylinder as the cab is lowered.
3. Open the “L” valve to lower the cab. Leave the valve open until the cab has completely lowered and the latches have engaged, and the pendant light has been off for 15 seconds.
4. Close the “L” valve and open the “I” valve two full turns.



Make sure to reset the “I” and “L” valves to their normal positions after the cab has been lowered. If the “I” valve is left closed during normal operations (i.e. driving over a very bumpy road or under very hot conditions) the cab latches may open.



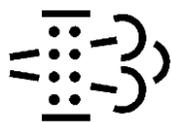
The manual pump has two valves—one marked “L” and one marked “I”. The “I” is for “isolation” valve and is normally open (two turns counterclockwise). The “L” is for “lower” valve and is normally closed (tightened clockwise by hand with the pump handle). The normal positions are for any operating mode except manual pump operation.

6.6 Emission control system

WARNING!

Danger of injury due to hot exhaust temperatures!

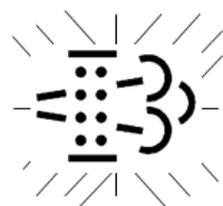
- ▶ Active regeneration can occur any time the vehicle is moving, and the exhaust temperature can remain hot after the vehicle has stopped moving. The exhaust temperature could reach 1500°F, which is hot enough to ignite or melt common materials, or to burn people.
- ▶ During regeneration, exhaust gas 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.
- ▶ The exhaust system can get extremely hot without warning. Do not park vehicle near flammable material. Do not touch exhaust pipes or parts. Stay clear of exhaust gas. Hot metal and exhaust gas can burn skin.
- ▶ **IMPORTANT:** See your engine operation manual for complete details and operation of the diesel aftertreatment system.



Overview

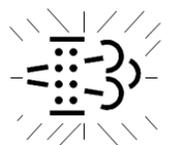
The aftertreatment diesel particulate filter lamp (**pictured**) indicates, when illuminated or flashing, that the aftertreatment diesel particulate filter requires regeneration. If illuminated indicates that the aftertreatment diesel particulate filter needs to be regenerated at the next possible opportunity. This can be accomplished by:

- ▶ Changing to a more challenging duty cycle, such as highway driving, for at least 20 minutes.
- ▶ Performing a stationary regeneration. Follow the instructions in the “Stationary (parked) Regeneration” section of this manual.



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 this lamp is flashing, the operator should:

- ▶ Change to a more challenging duty cycle, such as highway driving, for at least 20 minutes.
- ▶ Performing a stationary regeneration. Follow the instructions in the “Stationary (parked) Regeneration” section of this manual.



A flashing aftertreatment diesel particulate filter lamp combined with an illuminated warning or check engine lamp indicates that the aftertreatment diesel particulate filter needs to be regenerated immediately. Engine power will be reduced automatically. When these lamps are illuminated, a stationary regeneration is

required. Follow the instructions in the “Stationary (parked) Regeneration” section of this manual.

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.

EXHAUST AFTERTREATMENT SYSTEM INFORMATION					
INDICATOR LAMP(S)	(Solid) Level 1	(Flashing) Level 2	(Flashing) Level 3	(STOP) Level 4	WARNING HEST (High Exhaust System Temperature) Flashing A regeneration is in progress. Solid Exhaust components and exhaust gas are at high temperature. When stationary, keep away from people and flammable materials or vapors.
Indicator Lamp Message(s)	Filter Regeneration Recommended.	Filter Regeneration Necessary	Parked Regeneration Required – Engine Derate	Service Regeneration Required. Engine Derate To Idle Only.	
Diesel Particulate Filter Condition	Filter is reaching capacity.	Filter is now reaching maximum capacity.	Filter has reached maximum capacity.	Filter has exceeded maximum capacity.	
Required Action	Bring vehicle to highway speeds to allow for an Automatic Regeneration or perform a Parked Regeneration.	To avoid engine derate, bring vehicle to highway speeds to allow for an Automatic Regeneration, or perform a Parked Regeneration as soon as possible.	Vehicle must be parked, and a Parked Regeneration must be performed. Engine will begin derate.	Vehicle must be parked, and a Service Regeneration must be performed. Check engine operator’s manual for details. Engine will shut down.	

Passive and Active Regeneration

This aftertreatment system has many specialized parts in order to make our engines cleaner and more environmentally friendly. First, the particulate filter collects and oxidizes carbon to remove particulate matter from the exhaust. Then, the SCR catalyst converts NOx into harmless gas and water vapor.

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 (ie, highway speeds) and/or under heavy loads.

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

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 driver 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 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.



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 gasses or vapors nearby that could burn, explode or contribute to a fire (such as LP gas, gasoline vapors, oxygen, and nitrous oxide).
- ▶ Park the vehicle securely. Place transmission in neutral and set parking brake. 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 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 brake pedal is released.
 - The transmission is in neutral.
 - PTO or Remote PTO is off.
 - The vehicle speed is 0 MPH.
 - The throttle pedal is released.
- ▶ Initiate the stationary regeneration by toggling the REGEN switch.
 - Once the stationary regeneration is initiated, the engine speed will increase, and turbocharger noise will increase.
 - The High Exhaust System Temperature Lamp may illuminate during stationary regeneration as the exhaust temperatures increase.
 - When the engine ECM detects that 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.

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

NOTE: To stop a stationary regeneration before it has completed, depress brake or throttle pedal, or turn off the engine.

Regeneration Inhibit Switch



The “REGEN INHBT” switch is used to delay the regeneration process when it is unsafe to allow the process to proceed due to hazardous conditions, such as flammable or explosive conditions near the exhaust. Turning the switch on will prevent both active and parked regeneration from occurring. Once it is safe to proceed, manual activation should be activated, and may require 45 to 90 minutes to complete. Engine ECM will automatically turn off regeneration when completed.

The “REGEN INHBT” switch should only be used in hazardous situations. Failure to allow the engine to regenerate will eventually lead to engine damage.



For more information please refer to your Cummins manual.

6.7 Diesel exhaust fluid (DEF) tank



WARNING!

Danger of injury due to bodily contact!

- ▶ Do not allow diesel exhaust fluid (DEF) to contact the eyes. In case of contact, immediately flood eyes with large amounts of water for a minimum of 15 minutes.
- ▶ Avoid prolonged contact with skin. In case of contact, wash skin immediately with soap and water.
- ▶ Do not take internally. If fluid is ingested contact a physician immediately.

CAUTION!

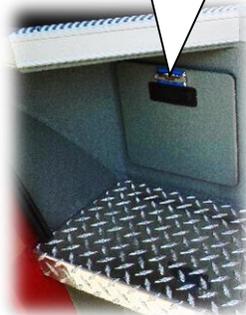
Damage to the engine or emission control system may result!

- ▶ It is unlawful to tamper, alter, or remove the after treatment system or use unapproved DEF solutions.



DEF tank

DEF tank access door



The Diesel Exhaust Fluid (DEF) tank is located under the cab on the driver's side near the battery compartment. This vehicle is equipped with an indicator on the dash that will alert the driver of the quantity of DEF on board (See Dash gauges and tell-tales section of this manual). If the vehicle is operated such that one would run completely out of DEF, vehicle power will be reduced enough to encourage the operator to refill the DEF tank. Once the tank has been refilled the engine will resume normal power levels.

Your apparatus may be equipped with a DEF tank access door. This access door is located in the step well of the rear door on the driver's side. The access door provides easy access to the DEF tank's fill cap. If your apparatus is not equipped with a DEF tank access door, the cab must be raised to access the DEF tank. Instructions on how to raise the cab can be found in the "Cab Lift Procedure" section of this manual.

7 Service and cleaning

7.1 Service plan

The following checklist helps to ensure that the vehicle parts are in a good operating condition.

Plan enough time for assessment and inspection work.

Assessment and inspection work may only be carried out by correspondingly trained fire-fighting personnel, who are familiar with the vehicle. Service must be carried out depending on the operating time or the hours of operation, whichever comes first.

If a system or a component does not pass this assessment, rectify the problem before starting up the vehicle. Always when equipment parts have to be adjusted, renewed or lubricant changed, see corresponding chapter or maintenance guide, there are instructions, specifications and other service intervals listed there.

Before servicing a vehicle, proceed as follows:

- ▶ Park the vehicle on a flat, even surface.
- ▶ Select neutral (N), activate the parking brake and secure the wheels with wheel chocks.
- ▶ Switch off the ignition.
- ▶ Set up and use guard rails
- ▶ Ensure that the battery main switch is deactivated and an instruction plate is attached.
- ▶ Ensure that the supply lines to the vehicle are disconnected.



To check the exterior of the vehicle, it is recommended to go around the vehicle clockwise, beginning with the right front wheel.



Observe the operation and maintenance manual of the engine manufacturer.

7.1.1 Inspection procedures

Testing and inspection work

- ▶ Service must be carried out depending on the operating time or the hours of operation, whichever comes first.

Work description	Daily	Weekly	Every 12 months or 450 hours	Every 24 months or 900 hours	Every 36 months or 1350 hours	Every 60 months or 2250 hours	Every 72 months or 2700 hours	Operator	Authorized specialist
Check compressed air lines.			•					•	
Check vehicle underside and planetary gears for fluid loss (visual check).	•							•	
Check the vehicle for obvious oil, coolant and fluid leaks.	•							•	
Check the vehicle underside for obvious damage.			•					•	
Check the tightening torque of the chassis (one-time during first service).			•					•	
Check the screw connection of the chassis for tight fit.			•					•	
Check supports and fastenings for tight fit and damage.			•					•	
Check lighting for damage and dirt. Clean if necessary.		•						•	
Check the condition of windshield wipers and windshield washer nozzles.		•						•	
Check the functionality of the windshield washer and wipers.		•						•	
Check level of windshield washing agent fluid. Fill if required.		•						•	
Check the condition and safety of the doors.	•							•	
Check axle location and suspension components.			•					•	
Check brake hoses and braking cylinder for damage.			•					•	
Check tires for damage.		•						•	
Check that tires are inflated to correct pressure.		•						•	
Check batteries, battery cables, and battery cover are in a safe condition.		•						•	
Check the oil level in the power-assisted steering container.		•						•	
Check engine oil level.		•						•	
Check engine for deposits, leaks and loose connections.		•						•	

Work description	Daily	Weekly	Every 12 months or 450 hours	Every 24 months or 900 hours	Every 36 months or 1350 hours	Every 60 months or 2250 hours	Every 72 months or 2700 hours	Operator	Authorized specialist
Check exhaust system (visual check)		•						•	
Check fuel/water separator for discolorations and drain water if present.		•						•	
Check power supply socket for safe condition.	•							•	
Check exterior of the radiator and the intercooler for leaks and deposits of dirt. Remove dirt if necessary.			•					•	
Check radiator and intercooler suction pipe for damage and/or deposits of dirt.		•						•	
Check air filter inserts and pilot lamp.			•					•	
Check steering components.			•					•	
Check gearbox oil level.		•						•	
Check engine coolant level.		•						•	
Check steering wheel for safe condition and excessive play.		•						•	
Check seats and safety belts for secure attachment and damage.		•						•	
Check the condition of the access points and the floor in the driver's cab.		•						•	
Check alarms, fittings, pilot lamps, and buzzer for correct functionality.	•							•	
Check front, middle and rear differential locks (if applicable)		•						•	
Check engine oil pressure and coolant temperature.	•							•	
Check the heating and/or air-conditioning fan.		•						•	
Check the functionality of the reversing alarm and reversing camera (if applicable).		•						•	
Operate the air conditioning for at least 10 minutes and check for proper functionality.		•						•	
Check hoses and clamps.			•					•	
Check the engine belts.			•					•	
Check the alternator and batteries.		•						•	
Inspect the suspension.			•					•	
Check the fluid level of the axles.			•					•	
Check the central lubrication of the axles.			•					•	
Check tightening torque of the wheel and rim nuts.			•					•	
Check air drier.			•					•	
Inspect brake drum and brake pads.			•					•	
Inspect brake disks and brake pads (if applicable).			•					•	

Work description	Daily	Weekly	Every 12 months or 450 hours	Every 24 months or 900 hours	Every 36 months or 1350 hours	Every 60 months or 2250 hours	Every 72 months or 2700 hours	Operator	Authorized specialist
Inspect the steering.			•					•	
Check the oil level in the power-assisted steering container.			•					•	
Drain compressed air tank.			•					•	
Inspect the cooling system anti-freeze.			•					•	

7.1.2 Oil and filter interval

Oil and filter replacement interval

- ▶ Service must be carried out depending on the operating time or the hours of operation, whichever comes first.

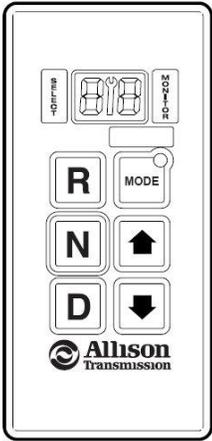
Work description	Daily	Weekly	Every 6 months or 500 hours	Every 24 months or 2000 hours	Every 48 months or 5000 hours	Every 6500 hours	Every 200,000 miles or 320,000 km	Every 3 rd to 4 th oil change interval	Authorized specialist
Replace engine oil and filter*			•						•
Fuel filter			•						•
Coolant filter			•						•
Overhead adjustment					•				•
Standard coolant change				•					•
DEF filter						•			•
Particulate filter cleaning							•		•
Coalescing filter								•	•

*Assuming severe duty cycle for fire/emergency vehicle applications.



Please refer to your engine manufacturer's manual for more information.

7.2 Transmission maintenance



This Allison Transmission has an available prognostics feature which monitors the transmission's fluid, filters, and overall health. The wrench icon illuminates when remaining fluid life reaches 1%. Afterwards, every time the vehicle is started and D (Drive) is selected the wrench icon illuminates again and stays on for two minutes to remind the operator a fluid change is needed. This occurs until service is performed and the oil life monitor is reset.

The wrench icon flashes on and off for two minutes after D (Drive) is selected. Once the filter life monitor mode has been accessed via the shift selector, the "oK" or "Lo" message is displayed in the selector display window. "oK" means the filters do not need to be changed, and "Lo" means the filters need to be changed.

Calendar based fluid requirements still apply with prognostics (refer to Allison manual). If the oil life monitor has not indicated the need for a fluid change before 60 months for TES 295 fluid, or 24 months for TES 389 fluid, it is necessary to change the fluid and filters per calendar requirements and then reset the oil life monitor.

Instructions on how to read and reset the oil life monitor and filter life monitor along with calendar based maintenance schedules can be found in the Allison® Transmission supplied operators manual.



Please refer to your Allison manual for more information.

7.3 Filter information

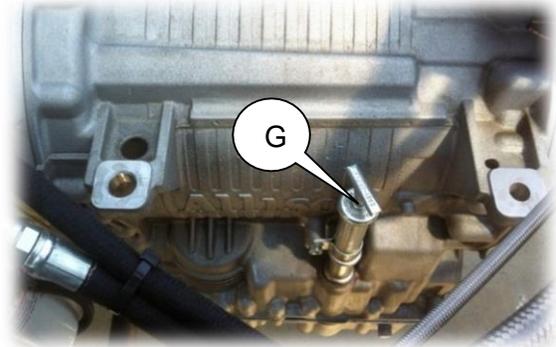
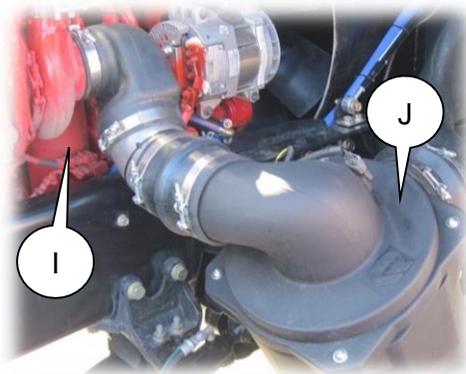
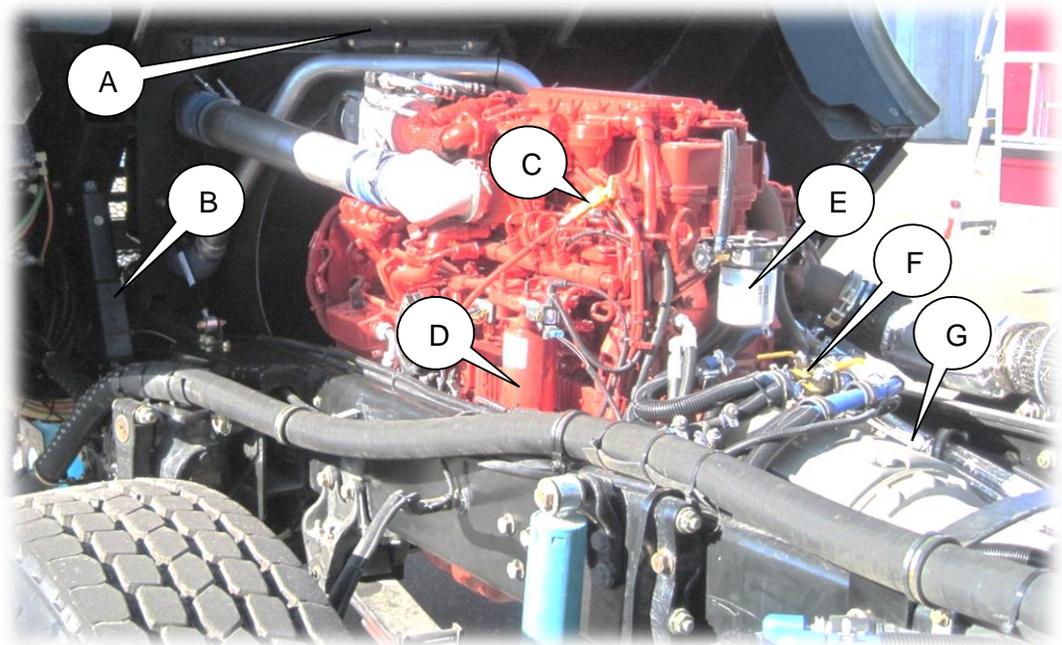
Air filter	Donaldson	P541575
Ember separator	Parker-Racor	123970012
Engine oil filter	Fleetguard	LF9009
Engine Coolant Filter	Fleetguard	WF2071
Secondary Fuel Filter	Fleetguard	FF63008
Fuel filter / water separator	Fleetguard	FS19764

7.4 Fluid capacities

Engine Oil	15W40	25.2 QTS	23.8 L
Engine Coolant	ELC	40.0 QTS	37.8 L
Transmission Fluid	ATF	29.0 QTS	27.4 L
Power Steering Fluid	ATF	8.00 QTS	7.57 L
Cab Tilt Mechanism Fluid	ELC	40.0 QTS	41.6 L
Air Conditioning Refrigerant	R-134A	7.00 LBS	3.18 KG
Air Conditioning Oil	PAG 46	7.00 OZ	0.21 L
Diesel Fuel Tank	Diesel	68.0 GAL	257 L
Diesel Exhaust Fluid	DEF	20.0 QTS	18.9 L
Steer Axle Fluid	80W90	1.00 PINT	0.47 L
Drive Axle Fluid	80W90	37.0 PINT	17.0 L

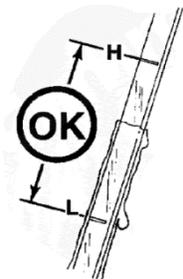
*Actual fluid capacities may be slightly different for your apparatus.

7.5 Under cab overview



- A) Engine coolant fill
- B) Cab lift mechanical support
- C) Engine oil dipstick
- D) Secondary fuel filter
- E) Engine coolant filter (optional)
- F) Cab heater shutoff valves
- G) Transmission oil dipstick
- H) Chassis air drier
- I) Engine oil filter
- J) Engine air filter housing

7.6 Engine oil level



The engine oil level should be checked prior to engine ignition. Follow these steps to inspect the engine oil level:

- ▶ Make sure the vehicle is parked on a level surface.
- ▶ Turn the engine off and wait 10 minutes for the oil to drain into the oil pan.
- ▶ Remove the engine oil dipstick and wipe it with a clean cloth.
- ▶ Replace the dipstick and remove it again to check the oil level.

Oil level should be between the low and high marks on the dipstick. Add or remove oil as necessary. Refer to the fluid capacities section for engine oil type.

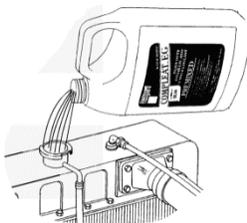


Refer to your engine manufacturer's manual for more information.

7.7 Engine cooling system

CAUTION!

Do not touch heater hoses, radiator hoses, or other engine components they can be very hot. Never remove radiator cap while engine coolant is hot.



A positive de-aeration cooling system comprised of a surge tank and vent line from the engine and radiator along with a fill line from the surge tank to the engine water pump is used on this apparatus.

Coolant type and filling instructions:

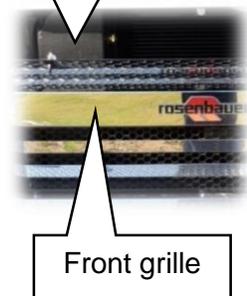
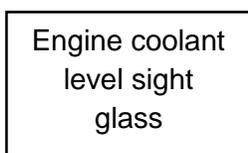
NOTE: Do not mix coolant types. If coolant type is changed, it is recommended that a complete coolant flush be done.

1. Refer to data provided in the chassis or engine manual for acceptable types of coolant and coolant capacity.
2. Use only approved coolant to fill coolant system through the fill neck on the top of the surge tank.
3. Run engine at max torque until the thermostat opens (190 – 195 F).

NOTE: It may be necessary to regulate the air flow through the radiator to get the coolant temperature high enough for the thermostat to open.

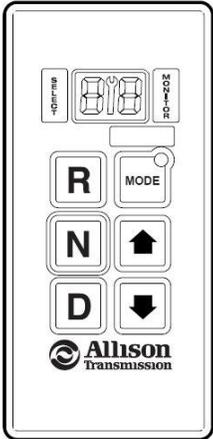
4. Once operating temperature is achieved, shut off engine and refer to sight glass to check the fluid level. (Coolant level should be in the middle of sight glass.)
5. Add necessary quantity of appropriate coolant to bring coolant level entirely into the sight glass.

NOTE: Coolant may need to be topped off after normal operation of the engine or if service work has been performed.



Refer to your engine manufacturer's manual for more information.

7.8 Transmission fluid level



CAUTION!

A low or high fluid level can cause overheating and irregular shift patterns. Incorrect fluid level can damage the transmission.

- Park the vehicle on a level surface.
- Shift to Neutral and apply the parking brake.
- Press the **Up** and **Down Arrow** buttons simultaneously once.

NOTE: The fluid level check may be delayed until the following conditions have been met:

- The fluid temperature is above 60°C (140°F) and below 104°C (220°F).
- The transmission is in Neutral.
- The engine is at idle.
- The transmission output shaft is stopped.
- The vehicle has been stationary for approximately two minutes to allow the fluid to settle. A delayed fluid level check is indicated by a “—” in the single digit display followed by a numerical countdown. The countdown, from 8 to 1, indicates the time remaining in the two minute waiting period.

- If the fluid level is correct, the display will show the following:

SELECT	MONITOR	Description
	o L	Represents Fluid (oil) Level Check Mode
	o K	Fluid level is within the correct fluid level zone

NOTE: The sensor display and the dipstick may not agree exactly because the OLS compensates for fluid temperature.

- If the fluid level is low, the display will show the following:

SELECT	MONITOR	Description
	o L	Represents Fluid (oil) Level Check Mode
L	o	Represents Low Oil Level
0	2	The number of quarts the transmission is low

- If the fluid level is high, the display will show the following:

SELECT	MONITOR	Description
	o L	Represents Fluid (oil) Level Check Mode
H	I	Represents High Oil Level
0	1	The number of quarts of fluid the transmission is overfull

- If there is a system problem, the display will show the following:

SELECT	MONITOR	Description
o	L	Represents Fluid (oil) Level Check Mode
-	-	The dashes are followed by a numerical display which is a fault code that indicates conditions are not proper to receive the fluid level information or there is a system malfunction.

- To exit the fluid level display mode, press any range button on the pushbutton shift selector.

Please refer to your Allison manual for more information.



7.9 Power steering fluid level



To check the power steering fluid reservoir level follow these steps:

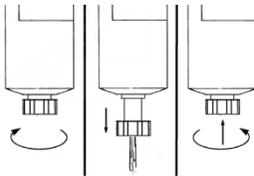
- Unscrew the fill cap/dipstick on top of the power steering fluid reservoir.
- Remove the fill cap/dipstick from the reservoir.
- Wipe the dipstick with a clean cloth.
- Replace the fill cap/dipstick and screw fill cap completely closed.
- Remove the fill cap/dipstick again to check the fluid level.

The fluid level should be between the low and high marks on the dipstick. Add or remove fluid as necessary. Refer to the fluid capacities section for power steering fluid type.

7.10 Fuel filter/water separator

CAUTION!

When closing the drain valve, do not over tighten the valve. Over tightening can damage the threads.



This apparatus is equipped with a fuel filter / water separator. The water and sediment that this filter collects should be drained daily. Follow these steps to drain the fuel filter / water separator.

- Shut off the engine.
- Use your hand to open the drain valve located on the bottom of the filter. Turn the valve counterclockwise to loosen until draining occurs.
- Drain the filter sump until clear fuel is visible.
- To close the valve, lift the valve and turn clockwise until it is hand-tight.

7.11 Windshield wipers and washer fluid



WARNING!

If your vehicle is operated in temperatures below 40°F (5°C), use washer fluid with antifreeze protection. Failure to use washer fluid with antifreeze protection in this environment could cause the windshield washing fluid to freeze which will inhibit windshield washing operations.

A well-conditioned set of windshield wipers is vital to any vehicle. Wiper blades should be inspected monthly and replaced when necessary. To check the wiper blades, run the tip of your fingers over the edge of the blade and check for roughness. To clean, wipe the blades with washer fluid, rubbing alcohol, or water applied to the tip of the blade with a clean cloth.

Add windshield washer fluid to the reservoir if the level is low. Remember to use a windshield washer fluid suitable for your weather conditions.

7.12 Batteries



WARNING!

Batteries can give off explosive gases. Do not allow flames, sparks or lighted substances to come near the battery.



Always wear protective clothing and eye protection. To reduce the risk of injury, vent battery compartment before servicing and always disconnect the negative ground (-) wire first and attach the negative ground (-) wire last.

CAUTION!

When using jumper cables to start the engine, make sure to turn master battery switch off and connect the positive (+) cable to the positive (+) terminal and the negative (-) cable to the negative (-) terminal.



Always keep the top of the batteries clean and dry. Also make sure that battery cables are always tightly fastened. If you notice any corrosion on the battery or battery terminals, remove the cables and clean with a wire brush. To ease clean up, the battery acid can be neutralized with a solution of baking soda and water. Battery terminals may be installed with a dielectric compound, coated with battery terminal spray, or clear polyurethane spray.

When battery replacement is required, the battery should only be replaced by a battery that meets the same electrical requirements as the original. Always remove all negative battery terminals first when disconnecting a battery. When installing a battery, install the positive terminals first. Install the negative terminals last. Clean all battery terminals to assure a proper connection.

7.13 Engine air filter

WARNING!

Do not start your engine with the air cleaner removed or remove your air filter while the engine is running.

The air filter should be inspected monthly. Follow these steps to remove and inspect the air filter.



- ▶ Remove the four screws holding the cover of the air filter housing.
- ▶ Carefully remove the cover to the air filter housing.
- ▶ Remove the air filter element from the air filter housing.
- ▶ Inspect air filter element, replace if necessary.
- ▶ Wipe any dirt or debris from the air filter housing and cover.
- ▶ Carefully place air filter element back into housing.
- ▶ Replace cover onto the air filter housing.
- ▶ Replace the four screws to hold the cover on the air filter housing.

7.14 Tires and wheels

WARNING!

Always make sure tires are in good condition and inflated to the correct tire pressure. Frequently check and maintain correct inflation pressures as specified by the tire manufacturer. Periodically examine tires for abnormal wear and other damage. Only properly trained personnel with the correct equipment and procedures should mount or remove tires.

CAUTION!

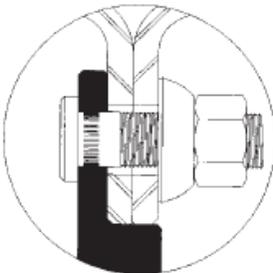
Check for proper inflation, tread depth, and the condition of the tires daily. Look for any bumps, blisters, cuts, punctures, cracks, or uneven wear. Tire condition and pressures must be monitored closely to assure safe operation of the vehicle.

Never use the hub piloted wheels which have straight holes with ball seat or spherical chamfer nuts. These parts are not engineered to work together and can cause premature wheel failure. On heavy truck dual wheels, this mismatch would not allow the inner cap nut to fit into the inner wheel, causing the inner cap nut to interfere with the outer wheel. This could cause premature cracking and failure of the outer dual wheel.

Stud piloted wheels should not be used with hub piloted hubs, wheels, or flange nuts. Chamfered stud piloted wheels do not have sufficient surface area near the bolt hole to support the flange nut. This type of mis-assembly may lead to loss of torque, broken studs, and cracked wheels.

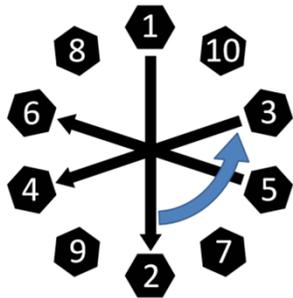
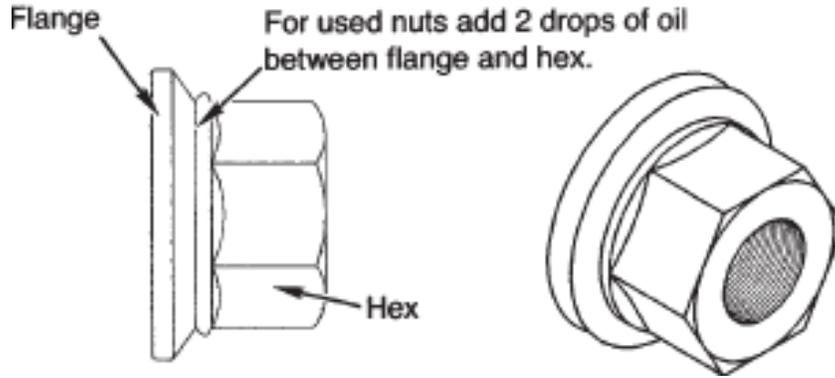
Hub Piloted Mounting

These wheels are often called hub mount wheels and center on the hub at the center hole or bore of the wheel. Because of this feature, they need a close tolerance in the center hole. Hub piloted wheels are used with two-piece flange nuts (see figure) which contact the disc face around the bolt hole and do not rely on contacting the bolt hole chamfer to function properly. Hub piloted wheels generally have straight-through bolt holes with no chamfers. This feature provides a visual way of identifying hub piloted wheels.



Before Installing Wheels

Completely remove rust, dirt, and other foreign materials from all surfaces. It is especially important to clean the areas used for mounting the wheel to the vehicle. Lubricate the hub pilot pads with a drop of oil to prevent galling. Also, apply two drops of oil to the last two or three threads at the end of each stud. Do not lubricate any other wheel or hub surfaces. If reusing flange nuts that have already been used in service, apply 2 drops of 30 weight oil at one point between the flange and the hex (see figure). This will allow the parts to rotate freely and provide the proper clamping force when tightened.



Installing Front Wheels

Slide front wheel over studs. Be careful not to damage the stud threads. Snug up 2 piece flange nuts in the sequence shown in figure. Do not tighten them fully until all have been seated. This procedure will permit the uniform seating of nuts and ensure the even, face-to face contact of wheels, hub, and drum. Tighten 2 piece flange nuts to 450-500 ft.-lbs. (dry) using the same crisscross sequence.

Installing Dual Rear Wheels

Slide the inner dual wheel over studs. Be careful not to damage the stud threads. Align the hand holes of the outer dual wheel to those of the inner dual wheel to allow access to the air valves. Slide the outer dual wheel over the studs, again being careful not to damage the stud threads. Snug up 2 piece flange nuts in the sequence shown in figure. Do not tighten them fully until all have been seated. This procedure will permit the uniform seating of nuts and ensure the even, face-to face contact of wheels, hub, and drum. Tighten 2 piece flange nuts to 450-500 ft.-lbs. (dry) using the same crisscross sequence. Hub mount wheels use two-piece flange cap nuts for both the front and rear applications. No inner cap nuts are required.

Note: After the first 50 to 100 miles of operation, recheck the torque level and retighten nuts to the proper torque level.

Replacement

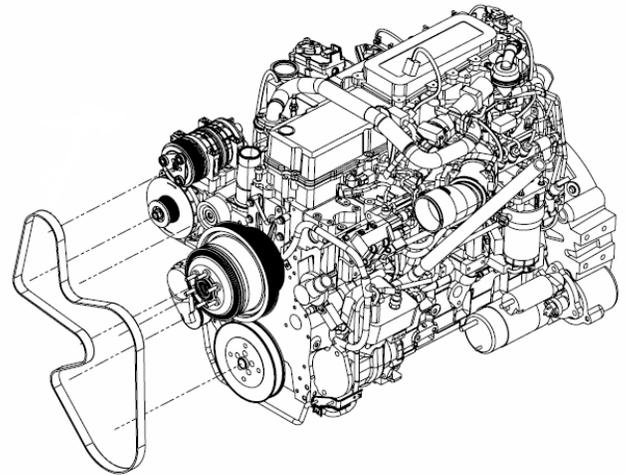
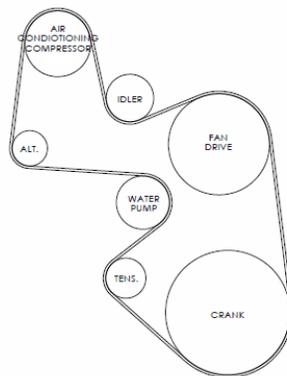
When replacing wheels and tires on this apparatus, the replacement equipment must have the same load carrying capacity as the original. Wheels must have the same characteristics such as rim width, rim offset, and mounting configuration, while tires must be of the same size and type, and must conform to government regulations.

Note: The front and rear wheels on this apparatus are NOT interchangeable. The front wheels are heavy duty and can withstand higher loads. Do not mix!

7.15 Normal operating range

Idle:	600 – 700 RPM
High Idle:	1250 RPM/Varies
Governor:	2100 – 2400 RPM
Min. Oil Pressure @ Normal Idle:	10 psi
Cooling System:	180 - 212°F
Transmission:	160 - 225°F
Air Pressure: Cut In:	105 – 110 psi
Air Pressure: Cut Out:	120 – 140 psi
Voltage:	13.2 / 14.0 Volts

7.16 Engine belt routing diagram



7.17 Spare parts list and wiring diagrams

The following information can be found on the reference CD supplied with this chassis:

- Spare part information
- Low voltage and line voltage systems including the following information:
 - Pictorial representation of circuit logic for all electrical components and wiring
 - Fuse identification and locations
 - Circuit identification
 - Connector pin identification
 - Zone location of electrical components
 - Safety interlocks
 - Alternator – battery power distribution circuits
 - Input / Output assignment sheets or equivalent circuit logic implemented in multiplexing systems

7.19 Cleaning and washing

NOTICE

Use of incorrect cleaning agents can cause damage to the surfaces of the vehicle.

Aggressive cleaning agents can cause surfaces, coatings and composite parts to decompose. Abrasive particles cause scratches.

- ▶ Do not use aggressive cleaning agents that contain benzol, acetone or softeners.
- ▶ Do not use household soaps or detergents to clean the vehicle.
- ▶ Do not use solvents to clean the dashboard, panels, or displays.
- ▶ Do not use dry towels to remove soiling from the vehicle's paintwork.
- ▶ Do not polish with crude oil or grease.

NOTICE

Damage to surfaces due to spraying with pressure washers.

Pressurized water from pressure washers can cause severe damage to surfaces and paintwork.

- ▶ Do not direct pressure washers or pressurized water at the vehicles surface.
- ▶ Do not spray U-joints with pressure cleaners.

Wash the vehicle frequently with cold or lukewarm water. Do not use household soap or detergent. The use of a reliable car shampoo will assist in dissolving traffic film.

After the surplus of dirt has been washed off, clean the body with a sponge and plenty of water. At the same time it is advisable to wash the windshield wiper blades by using clean water. Incorporate wheel wells into washing procedure. Pay attention to open drain holes. Rinse off the vehicle with cold water, then rub down with a clean chamois leather.

Twice a year, after washing and leathering the vehicle thoroughly, apply an approved body polish to impart a brilliant, water resistant and lasting finish to the paintwork.

Any tar or asphalt spots on the body may be removed with a tar cleaner and the use of a soft towel.

Use moist towels to clean the control panels and dash gauges. Excess water can damage electric components. Do not use solvents.

Keep the chrome plated parts clean and free from rust. These parts should be cleaned periodically with chrome cleaner.

Upholstery can be suitably cleaned with interior cleaner. Never use polishes, oils, petroleum, or a dry cleaning fluid.

8 Troubleshooting

8.1 General troubleshooting

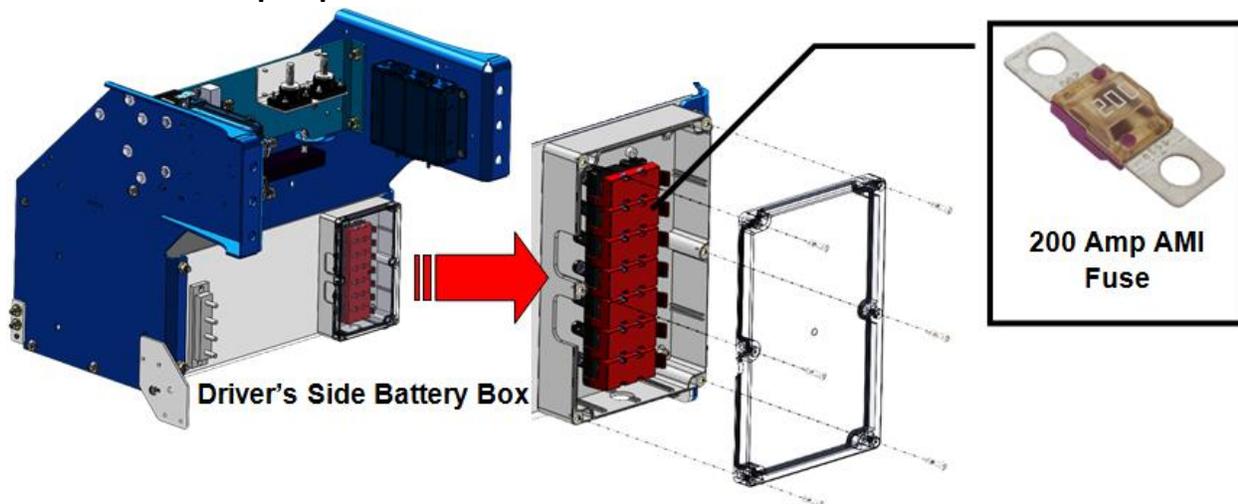
Symptom	Probable Cause	Corrective Action
Engine does not crank.	No cranking voltage. Transmission is not in neutral. Electrical system defect.	Check if the battery main switch is on. Check if the terminals on the batteries are clean and tight. Check battery voltage, if necessary charge or replace batteries. Shift transmission into neutral. Obtain workshop assistance.
Engine cranks but does not start.	No fuel. Engine or fuel system defect.	Top up fuel and prime fuel system. If the fuel gauge indicates sufficient fuel, obtain workshop assistance. Obtain workshop assistance/contact Rosenbauer customer service.
No gear engages in transmission.	Engine idle speed too high. Electronic Control Unit (ECU) in failure mode.	Reduce idle speed. Switch off ignition and start vehicle again. If symptom remains, obtain workshop assistance.
Vehicle does not move.	Parking brake activated. No gear selected. Transmission defect. Transmission oil level too low.	Deactivate parking brake. Select appropriate gear. Obtain workshop assistance Fill transmission oil to full level. If oil level is correct, obtain workshop assistance.
Steering characteristics vary noticeably from normal operation.	Low power steering fluid level.	Stop the vehicle and fill power steering fluid. If fluid level is correct, obtain workshop assistance.
Inconsistent service brake operation.	Brake system defect.	Stop the vehicle and obtain workshop assistance.

Symptom	Probable Cause	Corrective Action
Parking brake does not hold vehicle.	Brake system defect.	Do not drive the vehicle, chock the wheels and obtain workshop assistance.

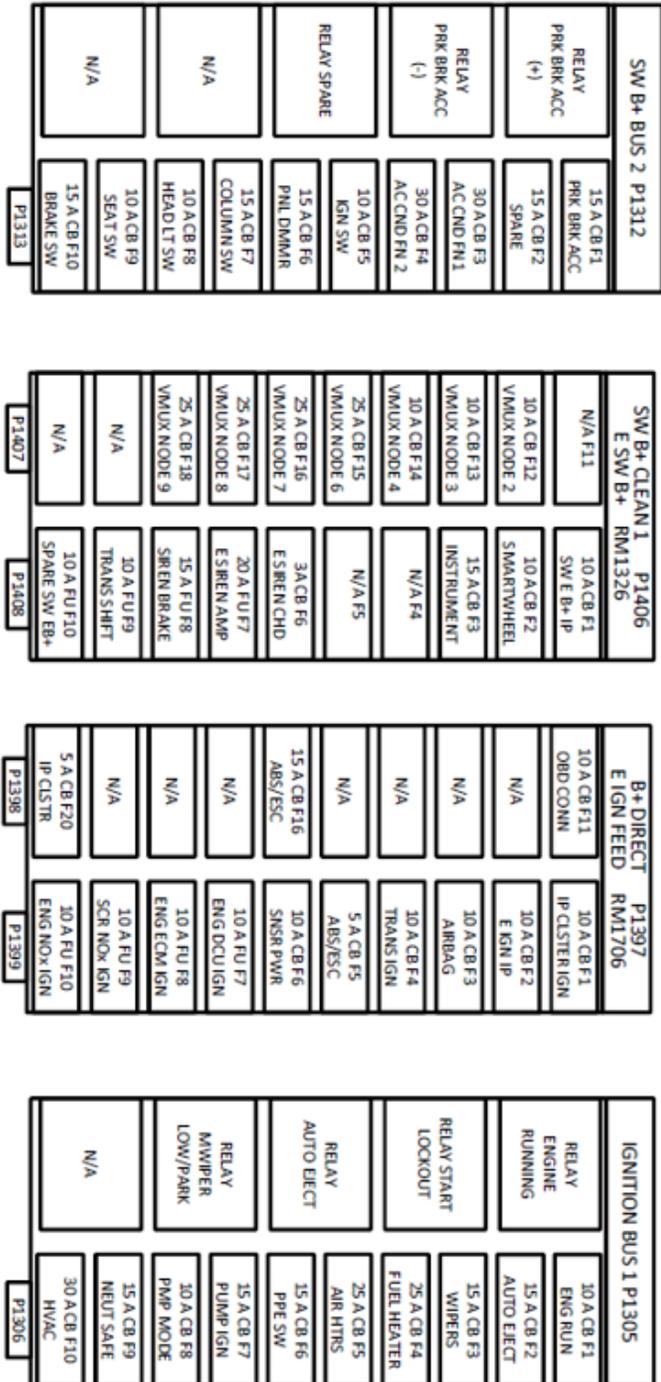
8.2 Cab tilt troubleshooting

Symptom	Probable Cause	Corrective Action
Electric/hydraulic pump does not energize when pendant buttons are depressed.	The master power disconnect switch may not be in the on position.	Turn the master power disconnect switch to the on position.
Electric/hydraulic pump does not energize when pendant buttons are depressed.	The parking brake may not be engaged.	Engage the parking brake.
Electric/hydraulic pump does not energize when pendant buttons are depressed.	Cab tilt pendant not plugged in or not plugged in properly.	Check that the cab tilt pendant control is properly connected to the cab tilt pendant outlet (usually located near the pump panel).
Electric/hydraulic pump does not energize when pendant buttons are depressed.	Electric/hydraulic pump fuse may be blown.	Check electric/hydraulic pump fuse, replace if necessary. See below for fuse location.

8.2.1 Cab tilt pump fuse location



8.3 Fuse panel diagram



MAIN IGN
200 AMP
MAX

E IGN
75 AMP MAX

- 70 AMP FUSE
IGN FEED
P1274
- 70 AMP FUSE
SW B+ MOD
P1273
- 70 AMP FUSE
CAB VMUX
P1272
- 2/0 SW B+
BAT FEED IN
P1275
- 70 AMP FUSE
NODE 5
P1271
- 70 AMP FUSE
IP E SW B+
P1270
- 50 AMP FUSE
IP E SW B+
P1269

9 Environmental protection

9.1 Disposal of hazardous substances

The used parts and materials resulting from repairs and operation must be disposed of in an environmentally responsible way.

Disposal of used oil, coolant and fuel

Used oil, coolant and fuel are among substances hazardous to waters. Ensure correct disposal of used oil and fuels.

- ▶ Don't pour used oil, coolant or fuel on the ground, in waters, or into sewer or sewage systems.
- ▶ Collect and dispose of used oil accordingly.
- ▶ Obey the locally valid environmental regulations.

Disposal of desiccant inserts, filter cartridges, filter boxes and filter inserts

Filter inserts, filter boxes and filter cartridges (oil filter, desiccant inserts of the air dryer) are hazardous waste and have to be disposed of professionally.

- ▶ Obey the locally valid regulations.

Disposal of batteries

Batteries are contaminant laden and they have to be disposed of professionally.

- ▶ Never dispose of used batteries in the garbage!
- ▶ Obey the locally valid regulations.

Disposal of sacrificial anodes

Sacrificial anodes have to be changed regularly, therefore the used sacrificial anodes have to be disposed of professionally.

- ▶ Dispose of sacrificial anodes with nonferrous metal.
- ▶ Obey the locally valid regulations.

Disposal of metal, rubber and plastic parts

Environmental pollution develops from false disposal of metal, rubber and plastic parts.

- ▶ Obey the locally valid regulations.

Disposal of adhesive, paint and coating material

Environmental pollution develops from incorrect disposal of adhesive, paint and coating material.

- ▶ Obey the locally valid regulations.

Disposal of control units

Control units are hazardous waste and have to be disposed of professionally.

- ▶ Obey the locally valid regulations.

10 Technical data

10.1 Chassis specifications

Vehicle Identification Number (VIN)	54F2CB51XEWM10809
Year of production	2014
Cab model number	8607851
Cab serial number	70946LG431
Engine make and model	Cummins ISL 9 L
Engine horse power rating	450 HP
Transmission make and model	Allison 3000 EVS
Front suspension	Hendrickson 9 Leaf Spring (20,000 lb)
Steer Axle	Meritor MFS Beam (20,000 lb)
Rear suspension	Reyco 79KB Spring Conv. (27,000 lb)
Rear axle	Meritor RS-25-160 (27,000 lb)
Gross vehicle weight rating (GVWR)	47,000 lb
Front Tires (2)	385-65R 22.5 Goodyear G296 MSA J
Front Wheels (2)	Alcoa Dura-Bright 22.5 x 12.25 Alum
Rear Tires (4)	12R 22.5 Goodyear G622 H
Rear Wheels (4)	Alcoa Dura-Bright 22.5 x 8.25 Alum
Vehicle top speed	70 MPH
Alternator	Leece-Neville 320 Amp

10.2 Engine specifications

Advertised Horsepower	270-450 hp	201-336 kW
Peak Torque	800-1250 lb-ft	1084-1695 N•m
Governed Speed	2100-2200 rpm	2100-2200 rpm
Clutch Engagement Torque	500-550 lb-ft	678-746 N•m
Number of Cylinders	6	6
System Weight	1,912 lb	867 kg
Engine (Dry)	1,695 lb	769 kg
Aftertreatment System*	217 lb	98 kg

*Increase over standard muffler and does not include chassis OEM-supplied components.



For further technical data please refer to your engine manufacturer's manual.

10.3 Warranty and registration

10.3.1 Warranty procedures

Warranty Registration

1. The Rosenbauer America warranty registration form must be completed and returned to Rosenbauer America upon receipt of the new vehicle. If the warranty registration form is not returned, the date on the invoice for the vehicle will apply as the “in service date”.
2. All other warranty registration forms must be completed and mailed to each respective manufacturer.

Warranty Pre-Authorization Procedure

1. Authorization is required prior to any repairs or parts replacement.
2. Customer / Dealer must contact Rosenbauer America to obtain authorization.
3. Information required for authorization:
 - a. Vehicle identification number (the last 6 digits)
 - b. In service date
 - c. Mileage
 - d. Description of problem or failure.
4. Rosenbauer America will determine if the problem is covered under warranty. In some cases this may require telephone troubleshooting with our service personal to help determine the problem source.
5. If it is determined to fall under another manufacturer’s warranty (such as non Rosenbauer components) Rosenbauer America will contact that manufacturer in order to obtain authorization to proceed. In some cases, the manufacturer will need to speak directly with the customer / dealer to aid in identifying the problem.
6. Rosenbauer America must authorize the repair facility at which the warranty repairs are to be performed. If another manufacturer’s warranty applies, that manufacturer must authorize the repair facility.
7. Rosenbauer America must be provided with an estimate of the costs associated with the repair, prior to any work being performed, at which time an approval will be given.

Warranty Claim Procedure

1. Contact your Rosenbauer Service Department or Rosenbauer Certified Dealer.
2. Rosenbauer Service Response System (SRS) to be populated with warranty claim information will notify the service department immediately.
3. Rosenbauer service department will make contact with customer or dealer immediately.

Warranty Invoicing Procedure

Upon completion of the approved repair, contact Rosenbauer America to obtain a warranty authorization number. This number is to be included on the invoice to Rosenbauer America.

10.3.2 Cab and chassis limited warranty

Rosenbauer Motors, LLC hereby warrants each new fire & rescue vehicle to be free from defects in material and workmanship for a warranty period of two (2) years or 36,000 miles starting on the date the vehicle is delivered to original purchaser.

Under this warranty Rosenbauer Motors, LLC agrees to furnish any item or items to replace those that have been found to defective in material or workmanship where there is no indication of abuse, neglect, unusual or other than normal service providing that such item or items are, at the option of Rosenbauer Motors, LLC, made available for our inspection at our request, returned to our factory or other location designated by us with transportation prepaid within thirty days after the date of failure or within one year from the date of delivery of the apparatus to the original purchaser, whichever occurs first, and inspection indicates the failure was attributed to defective material or workmanship. Written authorization for repair or item replacement must be sought from Rosenbauer Motors, LLC customer service prior to the repair or item replacement occurring.

This warranty shall not apply to or cover:

- Normal maintenance services or adjustments, including but not limited too; filters, screens, lubricants, light bulbs, belts, hoses, wiper blades and other incidentals.
- Any item that has been repaired, replaced or altered by a facility not approved in advance by Rosenbauer Motors, LLC, or in a manner which, at Rosenbauer Motors, LLC discretion, may adversely affect the safe operation or durability of the vehicle or item.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any malfunction resulting from misuse, negligence, alteration, accident or lack of operational knowledge, lack off normal maintenance or adjustments, exposure to corrosive agents, fire, severe environmental conditions or acts of God.
- Items which are manufactured by a party other than Rosenbauer Motors, LLC and which are separately warranted by that party, including but not limited to engine, transmission, driveline, axles and water pumps.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer Motors, LLC, 5190 260th St. Wyoming, MN 55092.

NOTE: Surety bond, if required, will cover the standard one year warranty period only and will not cover any extended warranties allowed by seller or other component warranties.

10.3.3 Cab paint warranty

Rosenbauer Motors, LLC hereby warrants the paint on the cab and body of each new fire & rescue vehicle to be free from blistering, peeling, corrosion or any other

adhesion defect caused by defective manufacturing methods or paint material selection for a warranty period of ten (10) years starting on the date the vehicle is delivered to original purchaser.

Under this warranty Rosenbauer Motors, LLC agrees to repair or refinish any painted surface that has been found to have an adhesion defect caused by defective manufacturing methods or paint material selection where there is no indication of abuse, neglect, unusual or other than normal service providing that such item or items are, at the option of Rosenbauer Motors, LLC, made available for our inspection at our request, returned to our factory or other location designated by us with transportation prepaid within thirty days after the date of failure or within five years from the date of delivery of the apparatus to the original purchaser, whichever occurs first, and inspection indicates the failure was attributed to an adhesion defect caused by defective manufacturing methods or paint material selection. Written authorization for repair or item replacement must be sought from Rosenbauer Motors, LLC customer service prior to the repair or item replacement occurring.

This warranty shall not apply to or cover:

- Normal maintenance services or adjustments, including but not limited to; filters, screens, lubricants, light bulbs, belts, hoses, wiper blades and other incidentals.
- Any item that has been repaired, replaced or altered by a facility not approved in advance by Rosenbauer Motors, LLC, or in a manner which, at Rosenbauer Motors, LLC discretion, may adversely affect the safe operation or durability of the vehicle or item.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any malfunction resulting from misuse, negligence, alteration, accident or lack of operational knowledge, lack of normal or required maintenance or adjustments, exposure to chemicals, UV fade, fire, severe environmental conditions or acts of God.
- Painted Items which are manufactured by a party other than Rosenbauer Motors, LLC and which are separately warranted by that party, including but not limited to engine, transmission, driveline, axles and water pumps, etc.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer Motors, LLC, 5190 260th St. Wyoming, MN 55092.

NOTE: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

10.3.4 Cab structural warranty

Rosenbauer Motors, LLC hereby warrants the cab of each new fire & rescue vehicle to be free from defects in material or workmanship for a warranty period of

10 years or 100,000 miles starting on the date the vehicle is delivered to original purchaser.

Under this warranty Rosenbauer Motors, LLC agrees to furnish any item or items to replace those that have been found to defective in material or workmanship where there is no indication of abuse, neglect, unusual or other than normal service providing that such item or items are, at the option of Rosenbauer Motors, LLC, made available for our inspection at our request, returned to our factory or other location designated by us with transportation prepaid within thirty days after the date of failure or within ten years from the date of delivery of the apparatus to the original purchaser, whichever occurs first, and inspection indicates the failure was attributed to defective material or workmanship. Written authorization for repair or item replacement must be sought from Rosenbauer Motors, LLC customer service prior to the repair or item replacement occurring.

This warranty shall not apply to or cover:

- Normal maintenance services or adjustments, including but not limited to; filters, screens, lubricants, light bulbs, belts, hoses, wiper blades and other incidentals.
- Any item that has been repaired, replaced or altered by a facility not approved in advance by Rosenbauer Motors, LLC, or in a manner which, at Rosenbauer Motors, LLC discretion, may adversely affect the safe operation or durability of the vehicle or item.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any malfunction resulting from misuse, negligence, alteration, accident or lack of operational knowledge, lack of normal or required maintenance or adjustments, exposure to corrosive agents, fire, severe environmental conditions or acts of God.
- Items which are manufactured by a party other than Rosenbauer Motors, LLC and which are separately warranted by that party, including but not limited to engine, transmission, driveline, axles and water pumps.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer Motors, LLC, 5190 260th St. Wyoming, MN 55092.

NOTE: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

10.3.5 Front and rear axle warranty

The front and rear axles shall be warranted by Meritor® for two (2) years with unlimited miles under the general service application.

10.3.6 Chassis frame warranty

Rosenbauer Motors, LLC hereby warrants to the original purchaser of a

Rosenbauer Motors, LLC chassis that the frame and cross members be free of defects in material and workmanship for the lifetime of the frontline service of the chassis.

Rosenbauer Motors, LLC's obligation under this warranty is to furnish any item or items of such frame or frame members, to replace those that have been found to defective in material or workmanship where there is no indication of abuse, neglect, unusual or other than normal service providing that such item or items are, at the option of Rosenbauer Motors, LLC, made available for our inspection at our request, returned to our factory or other location designated by us with transportation prepaid within thirty days after the date of failure and inspection indicates the failure was attributed to defective material or workmanship. Written authorization for repair or item replacement must be sought from Rosenbauer Motors, LLC customer service prior to the repair or item replacement occurring.

This warranty shall not apply to or cover:

- Normal maintenance services or adjustments, including but not limited to; filters, screens, lubricants, light bulbs, belts, hoses, wiper blades and other incidentals.
- Any item that has been repaired, replaced or altered by a facility not approved in advance by Rosenbauer Motors, LLC, or in a manner which, at Rosenbauer Motors, LLC discretion, may adversely affect the safe operation or durability of the vehicle or item.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any malfunction resulting from misuse, negligence, alteration, accident or lack of operational knowledge, lack of normal or required maintenance or adjustments, exposure to chemicals, fire, severe environmental conditions, corrosion or acts of God.
- Any cutting, welding, splicing, drilling or other alteration of frame rails or flanges without express written permission from Rosenbauer Motors, LLC or if this vehicle is involved in an accident, shall render this warranty null and void.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer Motors, LLC, 5190 260th St. Wyoming, MN 55092.

NOTE: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

10.3.7 Cummins engine warranty

Products Warranted

This Warranty applies to new diesel Engines sold by Cummins and delivered to the first user on or after April 1, 2007, that are used in fire apparatus truck and crash truck* applications Worldwide.

Base Engine Warranty

The Base Engine Warranty covers any failures of the Engine which result, under normal use and service, from a defect in material or factory workmanship (Warrantable Failure). This Coverage begins with the sale of the Engine by Cummins and ends five years or 100,000 miles (160,935 kilometers), whichever occurs first, after the date of delivery of the Engine to the first user.

Engine aftertreatment components included in the Cummins Critical Parts List (CPL) and marked with a Cummins part number are covered under Base Engine Warranty.

Additional Coverage is outlined in the Emission Warranty section.

These Warranties are made to all Owners in the chain of distribution and Coverage continues to all subsequent Owners until the end of the periods of Coverage.

Cummins Responsibilities

Cummins will pay for all parts and labor needed to repair the damage to the Engine resulting from a Warrantable Failure.

Cummins will pay for the lubricating oil, antifreeze, filter elements, belts, hoses and other maintenance items that are not reusable due to the Warrantable Failure.

Cummins will pay for reasonable labor costs for Engine removal and reinstallation when necessary to repair a Warrantable Failure.

Cummins will pay reasonable costs for towing a vehicle disabled by a Warrantable Failure to the nearest authorized repair location. In lieu of the towing expense, Cummins will pay reasonable costs for mechanics to travel to and from the location of the vehicle, including meals, mileage and lodging when the repair is performed at the site of the failure.

Owner Responsibilities

Owner is responsible for the operation and maintenance of the Engine as specified in Cummins Operation and Maintenance Manuals. Owner is also responsible for providing proof that all recommended maintenance has been performed.

Before the expiration of the applicable Warranty, Owner must notify a Cummins distributor, authorized dealer or other repair location approved by Cummins of any Warrantable Failure and make the Engine available for repair by such facility. Except for Engines disabled by a Warrantable Failure, Owner must also deliver the Engine to the repair facility.

Service locations are listed on the Cummins Worldwide Service Locator at cummins.com.

Owner is responsible for the cost of lubricating oil, antifreeze, filter elements and other maintenance items provided during Warranty repairs unless such items are not reusable due to the Warrantable Failure.

Owner is responsible for communication expenses, meals, lodging and similar costs incurred as a result of a Warrantable Failure.

Owner is responsible for non-Engine repairs and for “downtime” expenses, cargo damage, fines, all applicable taxes, all business costs and other losses resulting from a Warrantable Failure.

Owner is responsible for a \$100 (U.S. Dollars) deductible per each service visit under this plan in the 3rd, 4th and 5th years of Base Engine Warranty. The deductible will not be charged during the first 2 years of the Base Engine Warranty.

Limitations

Engines with an emissions certification listed below must be operated using only diesel fuel having no more than the corresponding maximum sulfur content. Failure to use the specified fuel (see also Cummins Fuel Bulletin #3379001) can damage the Engine and aftertreatment system within a short period of time. This damage could cause the Engine to become inoperable and failures attributable to the use of incorrect fuels will be denied Warranty Coverage.

Maximum sulfur levels by emissions certification level as listed on the engine's dataplate are:

EPA 2007	max. 15 parts per million
EPA 2010	max. 15 parts per million
EPA Tier 4 Interim / Final	max. 15 parts per million
EU Stage IIIB 2011	max. 15 parts per million
Euro 4/5	max. 50 parts per million

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine.

Any unauthorized modifications to the aftertreatment could negatively effect emissions certification and void Warranty.

Cummins is also not responsible for failures caused by incorrect oil, fuel or diesel exhaust fluid or by water, dirt or other contaminants in the fuel, oil or diesel exhaust fluid.

This Warranty does not apply to accessories supplied by Cummins which bear the name of another company. Such non-warranted accessories include, but are not limited to: alternators, starters, fans, air conditioning compressors, clutches, filters, transmissions, torque converters, vacuum pumps, power steering pumps, fan

drives and air compressors. Cummins branded alternators and starters are covered for the first two years from the date of delivery of the Engine to the first user, or the expiration of the Base Engine Warranty, whichever occurs first.

Failures resulting in excessive oil consumption are not covered beyond the duration of the Coverage or 100,000 miles (160,935 kilometers) or 7,000 hours from the date of delivery of the Engine to the first user, whichever of the three occurs first. Before a claim for excessive oil consumption will be considered, Owner must submit adequate documentation to show that consumption exceeds Cummins published standards.

Failures of belts and hoses supplied by Cummins are not covered beyond the first year from the date of delivery of the Engine to the first user or the duration of the Warranty, whichever occurs first.

Parts used to repair a Warrantable Failure may be new Cummins parts, Cummins approved rebuilt parts or repaired parts. Cummins is not responsible for failures resulting from the use of parts not approved by Cummins.

A new Cummins or Cummins approved rebuilt part used to repair a Warrantable Failure assumes the identity of the part it replaced and is entitled to the remaining Coverage hereunder.

Cummins Inc. reserves the right to interrogate Electronic Control Module (ECM) data for purposes of failure analysis.

CUMMINS DOES NOT COVER WEAR OR WEAROUT OF COVERED PARTS.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

**THIS WARRANTY AND THE EMISSION WARRANTY SET FORTH
HEREINAFTER ARE THE SOLE WARRANTIES MADE BY CUMMINS IN
REGARD TO THESE ENGINES. CUMMINS MAKES NO OTHER WARRANTIES,
EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A
PARTICULAR PURPOSE.**

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Emissions Warranty

Products Warranted

This Emission Warranty applies to new Engines marketed by Cummins that are used in the United States** in vehicles designed for transporting persons or property on a street or highway. This Warranty applies to Engines delivered to the first user on or after September 1, 1992.

Coverage

Cummins warrants to the first user and each subsequent purchaser that the Engine is designed, built and equipped so as to conform at the time of sale by Cummins with all U.S. federal emission regulations applicable at the time of manufacture and that it is free from defects in material or factory workmanship which would cause it not to meet these regulations within the longer of the following periods: (A) Five years or 100,000 miles (160,935 kilometers) of operation, whichever occurs first, as measured from the date of delivery of the Engine to the first user or (B) The Base Engine Warranty.

If the vehicle in which the Engine is installed is registered in the state of California, a separate California Emission Warranty also applies.

Limitations

Engines with an emissions certification listed below must be operated using only diesel fuel having no more than the corresponding maximum sulfur content.

Failure to use the specified fuel (see also Cummins Fuel Bulletin #3379001) can damage the Engine and aftertreatment system within a short period of time. This damage could cause the Engine to become inoperable and failures attributable to the use of incorrect fuels will be denied Warranty Coverage.

Maximum sulfur levels by emissions certification level as listed on the Engine's dataplate are:

EPA 2007	max. 15 parts per million
EPA 2010	max. 15 parts per million
EPA Tier 4 Interim / Final	max. 15 parts per million
EU Stage IIIB 2011	max. 15 parts per million
Euro 4/5	max. 50 parts per million

Failures, other than those resulting from defects in material or factory workmanship, are not covered by this Warranty.

Cummins is not responsible for failures or damage resulting from what Cummins determines to be abuse or neglect, including, but not limited to: operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the Engine.

Any unauthorized modifications to the aftertreatment could negatively effect emissions certification and void Warranty.

Cummins is also not responsible for failures caused by incorrect oil, fuel or diesel exhaust fluid or by water, dirt or other contaminants in the fuel, oil or diesel exhaust fluid.

Cummins is not responsible for non-Engine repairs, "downtime" expenses, cargo damage, fines, all applicable taxes, all business costs or other losses resulting from a Warrantable Failure.

CUMMINS IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

* Airport operated crash trucks and fire department operated trucks employed to respond to fires, hazardous material releases, rescue and other emergency-type situations.

** United States includes American Samoa, the Commonwealth of Northern Mariana Islands, Guam, Puerto Rico and the U.S. Virgin Islands.

10.3.8 Allison transmission warranty

Allison Transmission will provide for repairs or replacement, at its option, during the warranty period of each new Allison transmission listed below that is installed in an On-Highway Truck other than Automotive Fire Apparatus in accordance with the following terms, conditions, and limitations.

WHAT IS COVERED

- **WARRANTY APPLIES** – This warranty is for new Allison transmission models listed below installed in an On-Highway Truck other than Line Haul and Automotive Fire Apparatus and is provided to the original and any subsequent owner(s) of the vehicle during the warranty period.
- **REPAIRS COVERED** – The warranty covers repairs or replacement, at Allison Transmission's option, to correct any transmission malfunction resulting from defects in material or workmanship occurring during the warranty period. Needed repairs or replacements will be performed using the method Allison Transmission determines most appropriate under the circumstances.
- **TOWING** – Towing is covered to the nearest Allison Transmission Distributor or authorized Dealer only when necessary to prevent further damage to your transmission.
- **PAYMENT TERMS** – Warranty repairs including parts and labor, will be covered per the schedule shown in the chart contained in section "APPLICABLE MODELS, WARRANTY LIMITATIONS, AND ADJUSTMENT SCHEDULE."
- **OBTAINING REPAIRS** – To obtain warranty repairs, take the vehicle to any Allison Transmission Distributor or authorized Dealer within a reasonable amount of time and request the needed repairs. A reasonable amount of time must be allowed for the Distributor or Dealer to perform necessary repairs.
- **TRANSMISSION REMOVAL AND REINSTALLATION** – Labor costs for the removal and re-installation of the transmission, when necessary to make a warranty repair, are covered by this warranty.
- **WARRANTY PERIOD** – The warranty period for all coverages shall begin on the date the transmission is delivered to the first retail purchaser, with the following exception:
 - **Demonstration Service** – A transmission in a new truck or bus may be demonstrated to a total of 5000 miles (8000 kilometers). If the vehicle is within this limit when sold to a retail purchaser, the warranty start date is the date of purchase. Normal warranty services are applicable to the demonstrating Dealer. Should the truck or bus be sold to a retail purchaser after these limits are reached, the warranty period will begin on the date the vehicle was

first placed in demonstration service and the purchaser will be entitled to the remaining warranty.

The warranty period for all coverages shall end at the expiration of the coverage set forth below:

APPLICABLE MODELS, WARRANTY LIMITATIONS, AND ADJUSTMENT SCHEDULE

APPLICABLE MODELS	WARRANTY LIMITATIONS (Whichever occurs first)		ADJUSTMENT CHARGE TO BE PAID BY THE CUSTOMER	
	Months	Transmission Miles Or Kilometers	Parts	Labor
MD, MT, HD, HT, 3000, 3500, 4000, 4500, 4700, 4800, 3000 HS, 4000 HS, 4500 HS, 3000 RDS, 3500 RDS, 4000 RDS, 4500 RDS, 4700 RDS	0-24*	No Limit	No Charge	No Charge
AT, 1000 Series™, 2000 Series™, 2400 Series™, 1000, 2100, 2200, 2500, 1000 HS, 2100 HS, 2200 HS, 2350 HS, 2500 HS, 2550 HS, 1000 RDS, 2100 RDS, 2200 RDS, 2350 RDS, 2500 RDS, 2550 RDS	0-36*	No Limit	No Charge	No Charge
<u>Emergency Vehicle Use Only</u> 1000 EVS, 2100 EVS, 2200 EVS, 2500 EVS, 3000 EVS, 3500 EVS, 4000, 4000 EVS, 4500, 4500 EVS, 4700, 4700 EVS, 4800, 4800 EVS	0-60	No Limit	No Charge	No Charge

* Effective July 2006, the Allison transmission in your vehicle may be covered by additional extended coverage, dependent on the Original Equipment Manufacturer (OEM) which manufactured your vehicle. **This additional coverage requires continued use of Allison TranSynd™ synthetic transmission fluid and genuine Allison filters.** Please consult your OEM Dealer or authorized Allison Transmission Distributor or Dealer for specific information.

WHAT IS NOT COVERED

- **DAMAGE DUE TO ACCIDENT, MISUSE, or ALTERATION**

- Defects and damage caused as the result of any of the following are not covered:
 - Flood, collision, fire, theft, freezing, vandalism, riot, explosion, or objects striking the vehicle;
 - Misuse of the vehicle;
 - Installation into unapproved applications and installations;
 - Alterations or modification of the transmission or the vehicle, and
 - Damage resulting from improper storage (refer to long-term storage procedure outlined in the applicable Allison Service Manual)
 - Anything other than defects in Allison Transmission material or workmanship

NOTE: This warranty is void on transmissions used in vehicles currently or previously titled as salvage, scrapped, junked, or totaled.

- **CHASSIS, BODY, and COMPONENTS** – The chassis and body company (assemblers) and other component and equipment manufacturers are solely responsible for warranties on the chassis, body, component(s), and equipment they provide. Any transmission repair caused by an alteration(s) made to the Allison transmission or the vehicle which allows the transmission to be installed or operated outside of the limits defined in the appropriate Allison Installation Guideline is solely the responsibility of the entity making the alteration(s).
- **DAMAGE CAUSED by LACK of MAINTENANCE or by the USE of TRANSMISSION FLUIDS NOT RECOMMENDED in the OPERATOR'S MANUAL** – Defects and damage caused by any of the following are not covered:
 - Failure to follow the recommendations of the maintenance schedule intervals applicable to the transmission;
 - Failure to use transmission fluids or maintain transmission fluid levels recommended in the Operator's Manual.

- **MAINTENANCE** – Normal maintenance (such as replacement of filters, screens, and transmission fluid) is not covered and is the owner’s responsibility.
- **REPAIRS by UNAUTHORIZED DEALERS** – Defects and damage caused by a service outlet that is not an authorized Allison Transmission Distributor or Dealer are not covered.
- **USE of OTHER THAN GENUINE ALLISON TRANSMISSION PARTS** – Defects and damage caused by the use of parts that are not genuine Allison Transmission parts are not covered.
- **EXTRA EXPENSES** – Economic loss and extra expenses are not covered. Examples include but are not limited to: loss of vehicle use; inconvenience; storage; payment for loss of time or pay; vehicle rental expense; lodging; meals; or other travel costs.
- **“DENIED PARTY” OWNERSHIP** – Warranty repair parts and labor costs are not reimbursed to any participating or non-participating OEMs, dealers or distributors who perform warranty work for, or on behalf of, end users identified by the United States as being a “denied party” or who are citizens of sanctioned or embargoed countries as defined by the U.S. Department of Treasury Office of Foreign Assets Control. Furthermore, warranty reimbursements are not guaranteed if the reimbursement would be contrary to any United States export control laws or regulations as defined by the U.S. Department of Commerce, the U.S. Department of State, or the U.S. Department of Treasury.

OTHER TERMS APPLICABLE TO CONSUMERS AS DEFINED by the MAGNUSON-MOSS WARRANTY ACT

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Allison Transmission does not authorize any person to create for it any other obligation or liability in connection with these transmissions. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE APPLICABLE TO THESE TRANSMISSIONS IS LIMITED IN DURATION TO THE DURATION OF THIS WRITTEN WARRANTY. PERFORMANCE OF REPAIRS AND NEEDED ADJUSTMENTS IS THE EXCLUSIVE REMEDY UNDER THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY. ALLISON TRANSMISSION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES (SUCH AS, BUT NOT LIMITED TO, LOST WAGES OR VEHICLE RENTAL EXPENSES) RESULTING FROM BREACH OF THIS WRITTEN WARRANTY OR ANY IMPLIED WARRANTY.**

** Some states do not allow limitations on how long an implied warranty will last or the exclusion or limitation of incidental or consequential damages, so the above limitations of exclusions may not apply to you.

OTHER TERMS APPLICABLE TO OTHER END-USERS

THIS WARRANTY IS THE ONLY WARRANTY APPLICABLE TO THE ALLISON TRANSMISSION MODELS LISTED ABOVE AND IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALLISON TRANSMISSION DOES NOT AUTHORIZE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH SUCH TRANSMISSIONS. ALLISON TRANSMISSION

SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM BREACH OF THIS WARRANTY OR ANY IMPLIED WARRANTY.

QUESTIONS

If you have any questions regarding this warranty or the performance of warranty obligations, you may contact any Allison Transmission Distributor or Dealer or write to:

Allison Transmission
General Motors Corporation
P.O. Box 894
Indianapolis, IN 46206-0894
Attention: Warranty Administration 462-470-PF9
Form SE0617EN (200606)