



Operating and maintenance manual

PANTHER T14R(H)

Vehicle numbers: **935320010 & Up**

41572356 REV03

Pinault[®]

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1 Introduction

This Operating and Maintenance Manual is intended to help you to become familiar with the numerous performance and safety features of the vehicle.

Proper operation and meticulous care are essential to maintain the vehicle in top condition with minimal downtime. This instruction manual is an integral part of the vehicle. It promotes the best and safest way to use the product.

The instructions have been written for an off-road dumper or a flat deck transport application. Other use of the vehicle could require additional instructions/precautions not available in this manual.

Ensure this Operating and Maintenance Manual remains in the cab at all times as it is an important part of the vehicle. Replacement manuals are available through the Parts Department.

Refer to the last section of this manual for a list and description of the abbreviations used throughout the text.

1.1 About this Manual

PRINOTH has made every attempt to provide the correct technical information for the manual at the time of issue. As part of our ongoing development programme and changing legal requirements, we reserve the right to make technical changes to our products. PRINOTH will endeavour to always keep the information up to date in this manual.

PRINOTH publishes this information in good faith and is not liable for how it is interpreted or applied.

Consult the PRINOTH warranty documents for complete details on warranty coverage. PRINOTH is not responsible for failures resulting from attachments, systems, equipment and parts not sold nor approved by PRINOTH.

1.2 Options - Special Installations

Some items or components shown in this manual may be optional or installed only on vehicles intended for specific countries or regions.

1.3 Important Notes

The information provided in the present manual is subject to change. PRINOTH publishes this information in good faith and is not liable for how it is interpreted or applied.

Consult the PRINOTH warranty documents for complete details on warranty coverage. PRINOTH is not responsible for failures resulting from attachments, systems, equipment and parts not sold nor approved by PRINOTH.

1.4 Contact Us

To help you get your vehicle up and running or to help you find your local distributor, call the After-sales Product support.

In Europe, Russia, Turkey and Africa, please call:

+43-5262-62121-3120

In North America, South America, Asia Pacific, please call:

+1 450 776-3663

In Japan

+81 (0)3 3864 3915

PRINOTH Website

Consult our website at prinoth.com or contact us at:

utilityvehicles@prinoth.com

2 Safety

The seat has a rear pocket where the Operator's manual can be stored.

Safety messages are incorporated in the present manual and on labels placed directly on the vehicle.

2.1 Messages in the Manual

The safety information is based on the ANSI Z535 series of standards. The safety messages contained in the present operating and maintenance manual are structured as follows:



WARNING

Naming of risk

Naming of possible consequences

- a) Naming of avoidance options

Example:



WARNING

Explosion hazard

Fumes from refuelling could ignite and cause severe injuries or burns.

- a) Always switch off the heater BEFORE refuelling the vehicle.

2.2 Information on Signal Words

Signal word or icon	Description
	The general danger symbol warns of serious injury when used with the signal words CAUTION, WARNING and DANGER. Follow all instructions to avoid injuries or death.
NOTICE	Indicates a situation that may result in damage or destruction of a component or system.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.
DANGER	Indicates an immediate hazardous situation which, if not avoided, will result in death or serious injury.
ENVIRONMENTAL PROTECTION	Indicates information in the area of environmental management.

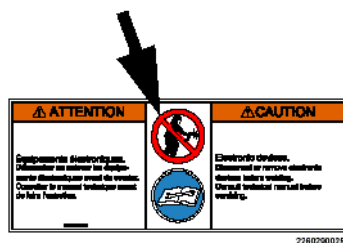
2.3 Safety Labels on the Vehicle

Some stickers on the vehicle carry the same information as the safety messages in the manual and incorporate pictograms to add a visual component to the message. Each pictogram contains three types of information: shape, colour and symbol.



INFORMATION

The information on the vehicle (stickers) incorporates ANSI Z535 standard format and pictograms based on the ISO 3864 standards.



The pictograms indicate:

- **a risk:** an exclamation mark inside a black triangle on a yellow background (shown here is the general safety alert pictogram);



- **an interdiction:** an icon inside a red circular band and a 45° diagonal red band from upper left to lower right on a white background (shown here is the “avoid contact between posts” pictogram);

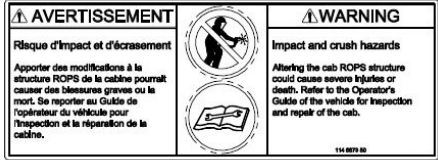
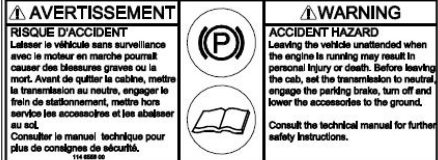
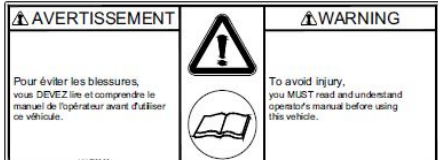


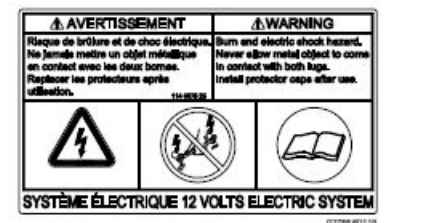
- **a command:** an icon inside a circle with a blue background (shown here is the “consult the manual” pictogram).

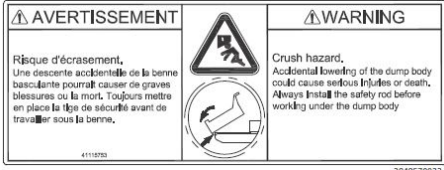
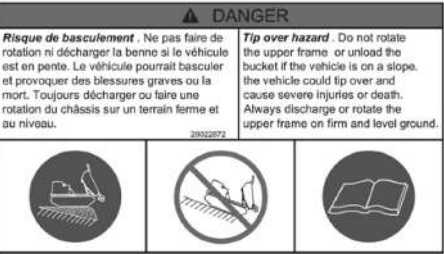
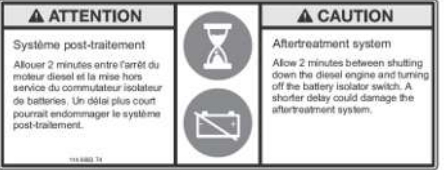


2.3.1 Message of Important Labels

This section provides the content of each of important label installed on the vehicle. Use this information to replace any damaged or missing label. Use the next section for location

Description	Label
Risk of impact or crushing Alteration of the ROPS structure could lead to severe injuries or death. Refer to the Operator's Guide of the vehicle for complete information.	
Risk of impact Unbuckling the safety belt of the driver will automatically apply the parking/emergency brake. Refer to the Operator's Guide of the vehicle for complete information.	
Risk of accident Leaving the vehicle unattended when the engine is running could result in personal injuries or cause an accident. Refer to the Operator's Guide of the vehicle for complete information.	
Risk of impact The driver must wear the seat safety belt at all times when driving the vehicle.	
Fire hazard Do not smoke, do not refuel if engine is warm or running, avoid physical contact with fuel.	
To avoid injuries One must read and understand the operator's manual before driving the vehicle. The manual contains important safety information and guidelines for safe and efficient use of the vehicle.	
Risk of falling, crushing and cutting Always ride inside the cab. Allow no passenger on the vehicle.	
Risk of crushing and entanglement Keep clear from rotating and moving parts. Do not wear loose clothing.	

Description	Label
Hot surface hazard Some surfaces could be hot, allow the surfaces to cool before performing maintenance.	
Risk of drowning The vehicle is very heavy. Do not drive over frozen body of water.	
Risk of severe burn and electric shock Never allow metal objects to contact both battery lugs or boosting lugs. Install caps or protectors on lugs when not in use.	
Risk of severe burn Hot surface, content under pressure. Do not open when hot, do not touch. Allow fluid to cool before performing maintenance.	
Cutting hazard Rotating parts could cause severe injuries. Do not operate without guards.	
Impact and crush hazard Rotating structure could cause severe injuries or death. Keep off swing area.	
Risk of burn Hot surface. Do not touch when hot. Allow to cool before opening or use protective gloves.	
Emergency Exit Open window or break glass with hammer	

Description	Label
Crush hazard Accidental lowering of the dump body (or tilt deck) could cause serious injury or death. Always install the safety rod before working under the dump body (or tilt deck).	 The label consists of three parts: a French warning section on the left, a central warning symbol, and an English warning section on the right. The French text reads: 'AVERTISSEMENT Risque d'écrasement. Une descente accidentelle de la benne basculante pourrait causer de graves blessures ou la mort. Toujours mettre en place la tige de sécurité avant de travailler sous la benne.' The English text reads: 'WARNING Crush hazard. Accidental lowering of the dump body could cause serious injuries or death. Always install the safety rod before working under the dump body.' The label number 3848570033 is at the bottom right.
Tip over hazard Avoid rotating the upper frame or discharging the load on a slope. The vehicle could lose its balance and tip over.	 The label features a central 'DANGER' header. It has two main text sections: French on the left and English on the right. The French text states: 'Risque de basculement. Ne pas faire de rotation ni décharger la benne si le véhicule est en pente. Le véhicule pourrait basculer et provoquer des blessures graves ou la mort. Toujours décharger ou faire une rotation du châssis sur un terrain ferme et au niveau.' The English text states: 'Tip over hazard. Do not rotate the upper frame or unload the bucket if the vehicle is on a slope. The vehicle could tip over and cause severe injuries or death. Always discharge or rotate the upper frame on firm and level ground.' Below the text are three circular icons: a vehicle tipping, a vehicle on a slope, and an open book. The label number 1105310056 is at the bottom right.
Aftertreatment system Allow a few minutes between shutting down the diesel engine and turning off the battery isolator switch. A shorter delay may damage the aftertreatment system.	 The label is divided into two main sections: 'ATTENTION' on the left and 'CAUTION' on the right. The 'ATTENTION' section contains French text: 'Système post-traitement. Attendez 2 minutes entre l'arrêt du moteur diesel et la mise hors service du commutateur isolateur de batteries. Un délai plus court pourrait endommager le système post-traitement.' The 'CAUTION' section contains English text: 'Aftertreatment system. Allow 2 minutes between shutting down the diesel engine and turning off the battery isolator switch. A shorter delay could damage the aftertreatment system.' The label number 376926001 is at the bottom right.
Remote control hazard The vehicle can be controlled by remote control. Maintain a safe distance. This is a CE label.	 The label is a yellow rectangular sign. It features a triangular warning symbol at the top showing a vehicle with a remote control signal. Below the symbol is a pictogram of a person standing next to a vehicle with a double-headed arrow between them, indicating a safe distance. The label is a CE mark.
Remote control hazard (North American sign) The vehicle can be controlled by remote control. Maintain a safe distance.	 The label is a yellow rectangular sign. It features a triangular warning symbol at the top showing a vehicle with a remote control signal. Below the symbol is a pictogram of a person standing next to a vehicle with a double-headed arrow between them, indicating a safe distance. At the bottom, there is text in French and English: 'CE VEHICULE PEUT ÊTRE ACTIONNÉ PAR TÉLÉCOMMANDE' and 'THIS VEHICLE CAN BE OPERATED BY REMOTE CONTROL'. The label number 41572356 is at the bottom right.

Description

Label

Dump box capacity warning

Do not overload the dump box capacity.

⚠ AVERTISSEMENT : BENNE DOMPEUSE

Bien qu'une benne basculante à hayon permette de transporter une plus grande quantité d'un matériel léger, la capacité maximale de la benne basculante demeure la même. L'opérateur doit s'assurer que le véhicule ne soit pas surchargé. Voir le volume maximal estimé ci-dessous:

⚠ WARNING : DUMP BOX

While a tailgate equipped dump body allows carrying more volume of a light material, the maximum payload capacity of the dump body remains the same. The operator must make sure the vehicle isn't overloaded. See approximated volume below:

	Standard capacity Capacité standard		High capacity Grande capacité	
MAXIMUM CAPACITY: CAPACITÉ MAXIMALE:	29 100lb / 13 200 Kg		29 100lb / 13 200 Kg	
MAX HEAPED VOLUME: VOLUME MAXIMAL:	8,5 yd ³ / 6,5 m ³		10,1 yd ³ / 7,7 m ³	
	VOLUME MAX*		VOLUME MAX*	
MATERIAL / MATIÈRE	yd ³	m ³	yd ³	m ³
Clay, Natural / Argile Naturelle	8,5	6,5	8,5	6,5
Clay, Dry / Argile, Sèche	8,5	6,5	9,4	7,2
Clay, Wet / Argile, Mouillée	8,3	6,4	8,3	6,4
Clay & Gravel, Dry / Argile et Gravier, Sec	8,5	6,5	10,1	7,7
Clay & Gravel, Wet / Argile et Gravier, Mouillés	8,5	6,5	9,4	7,2
Earth, Dry, Packed / Terre, Sèche, Tassée	8,5	6,5	9,1	7,0
Earth, Wet, Excavated / Terre, Mouillée, Excavée	8,5	6,5	8,5	6,5
Earth, loam / Terreau	8,5	6,5	10,1	7,7
Gravel, Pit run / Voyage de Gravier	8,0	6,1	8,0	6,1
Gravel, Dry / Gravier Sec	8,5	6,5	10,1	7,7
Gravel, Dry, 1/4" to 2" / Gravier, Sec 1/4" à 2"	8,5	6,5	9,1	7,0
Gravel, Wet, 1/4" to 2" / Gravier, Mouillé 1/4" à 2"	7,6	5,8	7,6	5,8
Sand, Dry, Loose / Sable, Sec, Lâche	8,5	6,5	10,1	7,7
Sand, Damp / Sable, Humide	8,5	6,5	9,1	7,0
Sand, Wet / Sable, Mouillé	8,3	6,4	8,3	6,4
Sand & Gravel, Dry / Sable et Gravier, Sec	8,5	6,5	8,9	6,8
Sand & Gravel, Wet / Sable et Gravier, Mouillé	7,7	5,9	7,7	5,9
Stone, Crushed / Pierre, Concassée	6,5	4,9	6,5	4,9
Top, Soil / Terre végétale	8,5	6,5	10,1	7,7

* Volumes are approximative / Les volumes sont approximatifs

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Table 1: Message of Important Labels

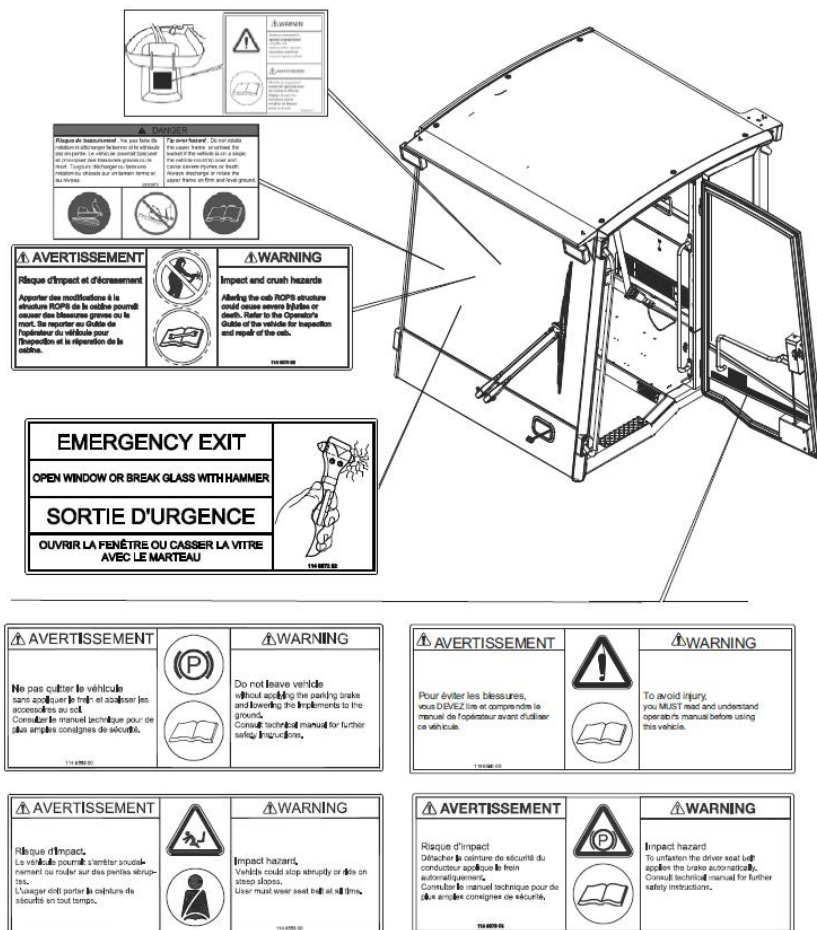
2.3.2 Location of Important Labels

This section provides the content and the location of each of important label installed on the vehicle. Use this information to replace any damaged or missing label.

Please read all labels and observe the recommendations before operating the vehicle or performing maintenance.

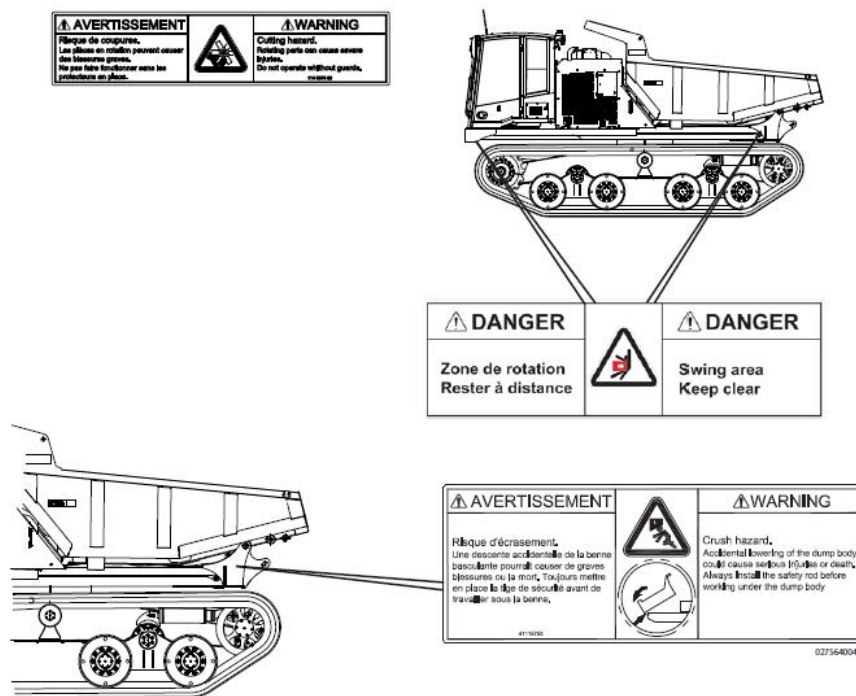


Illustration 1: Location of Important Labels



0275640050

Illustration 2: Location of Important Labels



82273006

Illustration 3: Location of Important Labels

2.4 General Safety Recommendations



DANGER

Hazard of serious injury including death

Failure to observe the warnings and follow instructions on the vehicle may result in serious injury including death to the operator and/or bystanders.

- a) Observe the warnings.
- b) Follow the instructions.

Read and understand all of the safety precautions and warnings in this manual before performing operation or maintenance. The following list contains the general safety precautions that must be followed to provide personal safety. Special safety precautions are included in the procedures when they apply.

This manual is indispensable for the proper use of the vehicle, and should be kept with the vehicle at all times.

If the vehicle is equipped with a special device, read and understand all of the safety precautions and warnings in the manual of the equipment manufacturer before performing operation or maintenance.

The following guidelines may help minimize hazards associated with the use of tracked vehicles. Not all situations may apply since vehicle operation and configuration as well as topography vary considerably.

2.4.1 Operation

- Visually inspect vehicle and check function of all lighting equipment before operation.
- Operator, and passenger if applicable, must be completely within cab while vehicle is operating.
- The vehicle is designed for one person per seat inside the cab. No other passenger should be carried by the vehicle.
- Driver should have sufficient rest periods to remain alert and focused while operating.
- Sound volume of the radio should be kept low to ensure operator hears audible signals or other noises to stay aware of the work environment.
- Do not operate vehicle when bystanders are in the vicinity.
- Never operate the vehicle except from operator's seat.
- Never bypass safety features. Never fasten the seat belt directly on the seat to avoid wearing it.
- Driver or passenger must not jump out of the vehicle unless it has performed a complete stop and brake is applied.
- Maintain good visibility at all times. Keep windows and mirrors clean, ensure windshield washer fluid is available.
- Operate at moderate speed. Avoid harsh and abusive operation.
- Always back-up the vehicle at walking speed to compensate for reduced visibility.
- Do not operate vehicle and equipment beyond its rated capacity.
- Avoid sharp turns whenever possible.
- While hauling equipment, remember to brake or turn slowly to avoid the possibility of "Jack-Knifing".

- Never leave engine running while vehicle is unattended. Shut off engine and remove key when leaving vehicle.
- The vehicle is heavy. Do not operate on frozen bodies of water.
- Bush or snow-covered terrain could conceal dangerous obstacles. Proceed slowly and with caution.
- Unless vehicle can safely descend as well as ascend a slope, or an alternate descent path is known, do not attempt a climb.
- Small obstacles on steep slopes should always be considered a hazard.
- Keep cowling or any hot surface free of wood chips, leaves, or any object that could create a fire hazard. Cleaning must be done at least daily and as often as necessary depending on worksite.

2.4.2 Swinging the Vehicle Upper Frame

- The upper section of the vehicle will extend beyond the track width when swinging. Always check that the surrounding area is clear before swinging the upper section of the vehicle.
- Check the inverted configuration icon and LED before setting the vehicle in motion. The transmission lever and steering wheel operation could be inverted.
- Check the alignment indicator icon before setting the vehicle in motion. It indicates that the upper structure of the vehicle is aligned, or not aligned, with the tracks.
- To engage movement, press the trigger switch on the joystick, which prevents accidental vehicle movement by requiring intentional activation.
- Use the cameras and the monitor to improve precision and safety.
- Before turning off the engine, it is recommended (not mandatory) to align the vehicle in the normal configuration if it is possible/safe. It permits to use the step when leaving the cab and start the vehicle in the normal configuration for the next driver.

2.4.3 Dump Body Operation

Always dump the load of the dump body on a flat, level and stable ground.

2.4.4 Maintenance

1. Prior to proceed to the maintenance tasks, position the vehicle on a firm and level surface.
2. Unless a raised position is required, lower the dump body or tilt deck, if applicable. If raised position is required make sure the safety pin is installed.
3. Turn off the engine and apply the parking brake. Remove the key and install a "maintenance warning tag" on the steering column.

If required:

1. Block the tracks (immobilize the vehicle).
2. Wait until the Amber Light turns off and switch off the Battery Isolator Switch.
3. Release hydraulic pressure.
4. Install an exhaust gas extraction system if running the engine in a workshop.

2.5 Danger Zones

The area around the vehicle is divided into various danger zones. The figure below shows the danger zones while the table indicates the dangers existing in the individual zones. Equipment by third party installer is not covered in the table. Some of the components referred to are optional.

A	Front	B	Sides and/or bottom
C	Rear	D	Top

TYPE OF DANGER	ZONE				ACTIVITY			
	A	B	C	D	1*	2*	3*	4*
(*1=Operation, 2=Cleaning, 3=Maintenance, 4=Disposal)								
Risk of crushing								
Falling / swinging engine access panel		X		X		X	X	
Opening / closing cab door		X			X	X	X	
Crushed under tracks	X	X	X		X		X	
Crushed under dump body		X	X	X	X	X	X	
Hitting interior cab surfaces (e.g. seat belt not fastened)	inside cab				X			
Hit by unfasten objects in the cab	inside cab				X			
Being hit by something while driving with the door "latched-open"	inside cab				X			
Crushed or pinched while the track tensioner piston extends		X	X				X	
Hit by the upper frame of the vehicle when swinging	X	X	X		X		X	
Accident caused by steering/transmission inversion when upper frame is rotate'	X	X	X		X		X	
Risk of cut and amputation								
Cooling fans		X					X	
Risk of entanglement								
Tracks (undercarriage)	X	X	X		X		X	
Engine drive belt		X					X	
Risk of tip over								
Dumping the load while the vehicle is on a slope	X	X	X		X			
Raising the dump body with a sticking load that will not discharge	X	X	X		X			

TYPE OF DANGER	ZONE				ACTIVITY			
	A	B	C	D	1*	2*	3*	4*
Dumping a load while the vehicle is on an unstable ground or any other prohibited situation	X	X	X		X			
Risk of collision								
Emergency drive module lack of precision	X	X	X		X		X	
Vehicle in inverted configuration, inverted transmission controls	X	X	X		X		X	
Engine stop (various reasons / failures)	X	X	X		X		X	
Detracking	X	X	X		X			
Brake failure / worn brake discs	X	X	X		X		X	
Disengaged planetary gearboxes	X	X	X		X		X	
Tipping of vehicle	X	X	X		X			
Skidding of vehicle	X	X	X		X			
Running over people / personnel	X	X	X		X		X	
Electronic microcontroller (or related component) failure	X	X	X		X			
Swinging of upper frame	X	X	X		X			
Risk of ejection of solid/liquid material								
From bulk material falling from dump body (option)			X		X	X		
Risk of ejection of fluid under pressure								
From hydraulic hoses, fittings or connectors	X	X	X	X	X		X	
Risk of slipping								
Climbing to the cab		X			X	X	X	X
Climbing to the frame or on equipment (slipping on slippery surface)	X	X	X	X	X	X	X	X
Risk of contact with power lines / cables								
When using cables to jump start the vehicle		X	X	X	X		X	
Raised dump body (option) comes in contact with power lines				X	X	X	X	
Risk of burn / splash from melted material								
When using cables to jump start the vehicle	X	X			X		X	
Risk of permanent hearing damage								

TYPE OF DANGER	ZONE				ACTIVITY			
	A	B	C	D	1*	2*	3*	4*
Through noise from vehicle (long exposure to moderate noises)	inside cab				X			
Through noise from vehicle (short exposure to loud noises)	outside cab						X	
Risk to health from vibration								
Through vibration from the driver/passenger seat	inside cab				X			
Risk of burn and scalding								
Contact with the engine or sub-system components		X		X		X	X	
Contact with the muffler or exhaust pipe (or aftertreatment system)		X		X		X	X	
Contact or splash with hot hydraulic oil, engine coolant or heating/ventilation/AC fluid		X	X	X			X	
Risk of burn and poison								
Exhaust fumes entering the cab	inside cab				X		X	
Exhaust fumes from the diesel engine (outside the cab)	outside cab				X		X	
Contact with battery gases / acids	X	X					X	
Contact with hydraulic oil		X	X				X	
Contact with fuel (or DEF/AdBlue®)		X			X		X	
Risk of fire or explosion								
Fire in the cab	inside cab				X		X	
Ignition of fuel during refuelling		X			X			
Explosion of battery gases	X	X			X		X	
Risk to health from physiological effects								
Controls layout unsuitable for operator physique					X			
Seat unsuitable for operator physique					X			
Continuous operating hours too long					X			
Risk to health from psycho-physiological								
Visibility problems in the work area (blind spots, glare, darkness, etc.)					X			
Health problems from ergonomic issues					X			
Risk of human errors								

TYPE OF DANGER	ZONE				ACTIVITY			
	A	B	C	D	1*	2*	3*	4*
Driving in area or terrain not suitable for vehicle					X			
Unauthorized use of the vehicle and equipment					X			
Lack of training or faulty operation					X			
Operating while personnel are in the danger zone of the veh. or equipment					X			
Faulty maintenance					X			
Risks of polluting the environment								
Loss of fuel or spilling of fuel while refuelling or from water separator		X			X		X	
Loss of hydraulic oil (planetaries, hubs, hoses, fittings)		X			X		X	
Loss of coolant from the engine		X			X		X	
Harmful emission from the engine		X			X		X	
Loss of refrigerant gas from air conditioning circuit		X					X	
Spilling battery acid		X					X	X
Loss of oil filter / fuel filter		X					X	X
Spilling oil / fuel / DEF-AdBlue® / lubricant / coolant out of their canister					X		X	X
Not collecting water when washing components						X	X	

2.6 Emergency Exits

If applicable, the vehicles can be equipped with two different cabs:

- Wide cab
- Narrow cab

2.6.1 Emergency Exit - Wide Cab

If the door becomes unusable, the alternate way to exit is to break the side window with the escape tool and exit through the opening.

Using the Emergency Exit with the Escape Tool

If the cab door cannot be opened, exit the cab by breaking the side window:



INFORMATION

The windshield (front glass) is laminated and holds together even when shattered. The escape tool is not designed to be used on this glass surface.

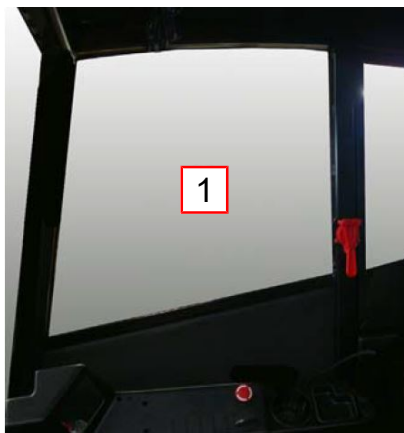


Illustration 4: Wide cab

1	Right side window emergency exit		
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Illustration 5: Escape tool on right side window pillar

Use the escape tool to break the glass:

1. Look for the bright orange handle. It is located on the vertical post between the right side windows inside the cab.
2. Pick up the tool from its support bracket and hold the tool by the handle, with the hammer head pointing up.
3. Shield eyes (or wear safety glasses) and face and smash the window by swinging the tool overhand, like a household hammer. One or two strikes should shatter the glass. Any of the two heads of the hammer can be used for this purpose.
4. Using the surface between the two heads of the tool, scrape the remaining glass from the window edges.
5. If not already done, unbuckle the seat belt.
6. Exit the cab through the opening.



INFORMATION

Unbuckling the driver's seat belt will bring the vehicle to a complete stop but opening the door alone will not.

2.7 Safety Items Inside the Cab

Ensure all items are located in the cab and are in good condition and ready to be used. Refer to the previous section for instructions on how to use the escape tool or escape system.

2.7.1 Escape Tool - Wide Cab

The escape tool is located in the cab. Ensure it is in good condition and ready to be used.



0274670011

Illustration 6: Escape tool

2.7.2 First Aid Kit



0274670023

Illustration 7: First aid kit (may differ from picture)

The first aid kit is located in the cab.



INFORMATION

The first aid kit could lack items after use. Always refurbish the kit after use. An annual inspection is recommended.

2.7.3 Fire Extinguisher



Illustration 8: Fire extinguisher (may differ from picture)

A fire extinguisher is located on the floor at the left of the operator's seat in the cab. Ensure that extinguisher is full and ready to be used before starting engine.

- Do not place objects on or near the extinguisher so it remains easy to reach at all times.
- Agitate the fire extinguisher vigorously to loosen caked chemical compound at regular intervals.
- If replacing the unit, use one of the same type.

Additionally:

- If equipped, ensure the pressure indicator shows the extinguisher is ready and operational. If not, have the extinguisher checked and refill by experts.
- Have the extinguisher checked by experts every year to ensure proper operation.
- Extinguisher must be refilled after each use by a certified facility.
- Ensure extinguisher is held firmly in place while the vehicle operates.



INFORMATION

The extinguisher has to be replenished after each use. Always have the unit sent to a certified fire equipment dealer or service company. An annual inspection is recommended.

2.7.4 Seat Belt



Illustration 9: Seat belt latch

The seat belt system is a crucial component for the safety of the driver (and passenger if applicable).

Refer to the section for full details on this item.



INFORMATION

The seat, seat belt and cab have to be inspected and returned to factory specifications in case of an accident. A replacement may be required. An annual inspection is recommended.

2.7.5 ROPS and FOPS Cab



INFORMATION

ROPS (Roll Over Protective Structure), FOPS (Falling Object Protective Structure).

The cab complies with the ROPS certification. FOPS is available as an option or with specific vehicle configurations.

The ROPS certification does NOT exempt the operator, and passenger if applicable, from wearing the seat belt.

- See the label inside the cab for the applicable ROPS rating.

3 Safety - Remote Control

3.1 Battery charger: General safety



CAUTION

Risk of explosion

The battery can explode, if you replace the battery by an incorrect type.

- a) Use only original batteries.
- b) If you use a different battery, the warranty will be void.

The battery lifespan is estimated to 500 recharging cycles and is largely dependent on the conditions of use. To maximize the lifespan of the batteries and battery charger, follow these recommendations:

- Do not recharge the battery until it is completely flat, as shown with red LED slow pulse on the transmitter.
- Always charge the batteries at temperatures between 0°C (32°F) and 45°C (113°F). The batteries will not become fully charged at temperatures exceeding 45°C (113°F).
- Do not leave the battery charger or batteries in a direct sunlight.
- Charge batteries at least once every six months.
- Avoid short circuits between the battery contacts.
- Do not carry charged batteries in toolboxes or next to other metal objects (keys, coins, etc.).
- Always keep contacts clean.

3.2 Remote control: General safety



WARNING

Hazard of damage to operator and product

When you do not observe the general safety indications you can be injured, or the equipment and environment can be damaged.

- a) Do not use this remote control on vehicles in potentially explosive atmospheres unless the model is ATEX/RATEX certified to work in such conditions.

This remote control complies with Industry Canada's RSS for license-exempt radio equipment. Operation is permitted under the following two conditions:

1. The remote control must not cause interference.
2. The user must accept any interference received, including interference that may cause undesired operation.

Read the following safety instructions carefully to install and use the remote control properly, to keep it in perfect working conditions, and to reduce the risk of misuse.

- Strictly adhere to the installation instructions in this document.
- Make sure that professional and competent personnel or the PRINOTH Service carry out the installation.
- Ensure that all site and prevailing safety regulations are fully respected.

- Make sure that this document is permanently available to the operator and maintenance personnel.
- Keep the transmitter out of reach of non-authorized personnel.
- Check each working day the **STOP** button and other safety measures. When in doubt, press the **STOP** button.
- Whenever several sets have been installed, make sure that the transmitter is the right one.
- Identify the vehicle controlled on the label for this purpose on the transmitter or by using the display.
- Maintain the equipment periodically.
- Use original spare parts only.
- Use the remote control with the manufacturer's battery and battery charger.
- Only allow qualified personnel to use the remote control.
- Always set the **STOP** button in the off position when you do not use the remote control.
- Do not use the remote control when the visibility is limited.
- Make sure that the remote control is compatible with the vehicle.
- Do not knock or drop the remote control.
- Do not use the remote control if you detect a failure.

3.3 Safety before and during operation

- You must be properly trained and authorized to use the vehicle equipped with the remote control system on a Panther crawler carrier. Do not allow unqualified individuals to operate the vehicle.
- Operate only with a direct view of the vehicle and its surroundings, with a clear visibility.
- Keep a minimal safety distance of 20 m (66 ft) to the vehicle at any time when you use the remote control.
- Keep a maximal distance of 100 m (328 ft) to keep a proper connection between the remote control and the vehicle.

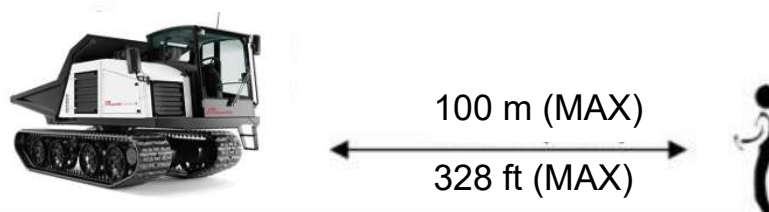


Illustration 10: Distance

- Do not operate the remote control while individuals are standing inside the minimal required safety distance range of 20 m (66 ft).
- Use both audible and visual signaling devices available on the remote control in case of needs to enhance safety on the work site.

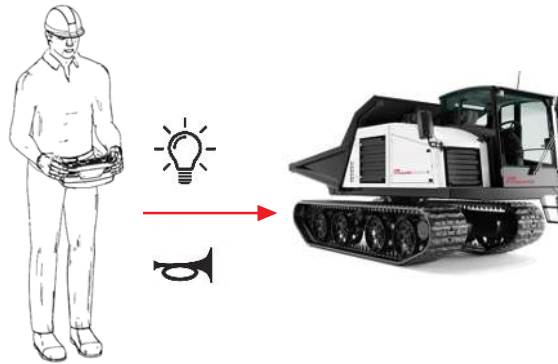


Illustration 11: Audible and visual signaling devices

- Wear the belt provided with the remote control.

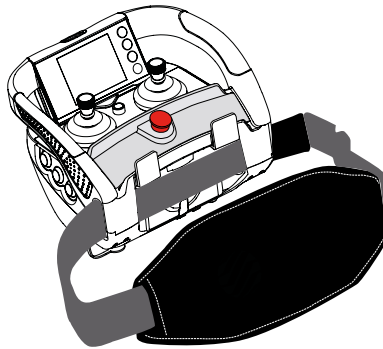


Illustration 12: Remote control belt

3.4 Safety label

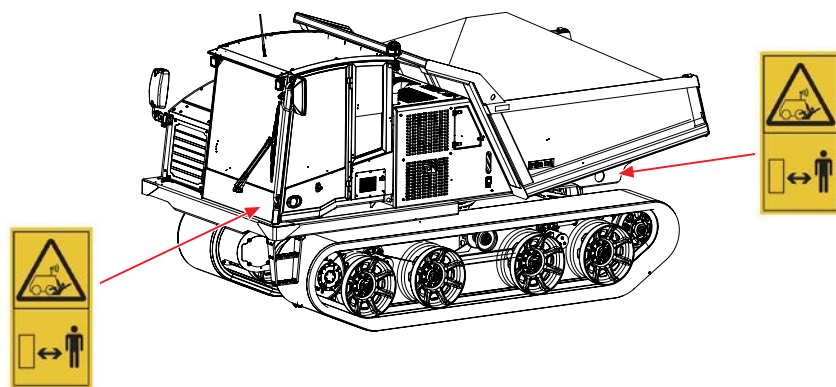


Illustration 13: Labels location

The safety label is already positioned on the vehicle if the kit is already attached.

1. Check that the safety labels are attached.
 2. If the safety labels are not attached or must be replaced, position the safety labels visibly on each side of the vehicle.
- ⇒ It indicates that the vehicle is operable via remote control.

⇒ It emphasizes the necessity to maintain a safe distance from the vehicle.

4 Recommended Use and Practices

4.1 Product Application



INFORMATION

The description and operation detailed in the present manual are exclusively applicable to this vehicle.

The vehicle is designed to be used as a crawler dumper with a rotating upper structure. In this application, the vehicle is equipped with a dump body and carries bulk material (mainly soil) on construction sites.

Any other application not in line with the above has to be approved in writing by PRINOTH.

Installation of equipment must be performed according to the guidelines provided by PRINOTH.

This all-terrain carrier is designed for rough terrain and off-road work in all seasons. With the appropriate options selected and genuine PRINOTH parts installed at the factory, the cab complies with R.O.P.S. standards (ISO 3471: 2008) and (if applicable) with the F.O.P.S. standard (ISO 3449: 2005, level II).

The vehicle and its accessories are only to be used for off-road driving and are not approved for use on public roads.

The vehicle may only be operated in accordance with the operating and maintenance instructions.

The vehicle and its equipment can represent a threat to the user and/or third party. **The user has to determine whether special hazards exist in his application and take the required safety precautions.** Only qualified persons approved by PRINOTH are allowed to drive and use. In addition to the safety precautions detailed in this manual, consult the literature of the manufacturer of the equipment for safety precautions specific to this device.

Operating aerial devices or drilling equipment may present specific dangers. Read and understand all safety precautions prior to operation.

Operating a dump body or tilt deck may present specific dangers. Read and understand all safety precautions prior to operation.

Operating a recovery winch may present specific dangers. Read and understand all safety precautions prior to operation.



INFORMATION

PRINOTH reserves the right to make changes in design and specifications and/or to make additions to, or improvements in its products without any obligation to install them on previously manufactured vehicles.

4.2 Changing the Vehicle Configuration

Changing the configuration or the use of the vehicle must be carefully considered. The final configuration and use must follow all the recommended guidelines. Failure to comply with the recommendations could lead to severe injuries or death in case of an accident or rollover.

Any configuration or use of the vehicle that is not intended as described in this section could void the warranty.



⚠ WARNING

Crush hazard

Do not attach an equipment, a device or another object in the dump body of wide cab vehicle. Doing so will invalidate the ROPS certification.

- a) Carry only bulk material in the dump body.

The vehicle has been designed to transport loose material. Do not modify the dump body in any way.

4.3 Proper Use and Safety Regulations

Use of the vehicle and its accessories require compliance with all instructions for use and safety regulations formulated by PRINOTH in the present manual.

In addition to the operating instructions, compliance is also required with the general legal requirements relating to accident prevention and environmental protection in each country. That also applies to the provision and wearing of personal protective equipment.

The operating and maintenance manual must be kept for the whole service life of the vehicle and be available to drivers and service personnel at any time.

4.4 Warranty Coverage

Genuine spare parts and special accessories have been produced for the vehicle. The vehicle components are tested to ensure reliability, operational security and efficiency of the vehicle.

Spare parts and accessories not supplied by PRINOTH can adversely affect the operational security and reliability of the vehicle. Warranty claims will only be recognized if PRINOTH's genuine spare parts and genuine accessories are used exclusively.

Any warranty obligations lapse in the following cases:

- Failure to carry out prescribed maintenance work
- Absence of completed control sheets or maintenance records
- Damage or breakdowns that are not due to the service work or settings authorized by PRINOTH
- Installation of non-approved components as well as the use of third party spare parts
- Installation of components that will set the vehicle outside of the recommended specifications (noise, C.G. location, payload, gradeability, etc.)
- Any use of the vehicle other than the one recommended by PRINOTH (unless a written approval is obtained from PRINOTH).

The limited warranty of the vehicle is provided on a separate document, included with the vehicle at the time of original purchase.

Refer to that document for more details on the warranty.

4.5 Qualification of Operators

Only qualified persons, trained for track vehicle driving, are allowed to drive and use the vehicle.

Operators must meet the following characteristics:

- Have reached the age of maturity in the country where the vehicle is used (recommended)
- Possess a valid motor vehicle driving license (recommended)
- Be physically and mentally fit
- Received training on track vehicle driving and demonstrate that he/she can operate safely
- Have knowledge of the vehicle, its characteristics, knowledge of the terrain and the working environment. Knowledge of the risks of off-road driving. Knowledge of the applicable laws and regulations. Knowledge applicable to the activity related to the operation of the accessory installed on the vehicle.

4.6 Qualification of Service Personnel

Installation, repair and some maintenance work requires the use of in-house service personnel or of service personnel trained by PRINOTH.

Technical intervention such as fault detection, diagnostic and repairs (these issues are not dealt with in the present manual) to mechanical and hydraulic as well as electrical/electronic components must only be undertaken by specialized staff who have been trained by PRINOTH.

Scrapping of the vehicle at the end of its service life must be undertaken by authorised breakers yards. Vehicle and its accessories must be disposed of in connection with relevant legal requirements.

4.7 Maintenance

Maintenance work outlined in the Maintenance sections may be performed by an operator with a good general knowledge of heavy equipment or machinery and standard tools. For more specialized tasks, refer to the After-sales Service of your PRINOTH distributor.

4.8 Parts, Accessories and Modifications

PRINOTH does not accept liability for death, personal injury or damage that occurs if non-approved accessories are installed or non-approved modifications are made.

4.9 GVWR, ROPS Rating and Payload



WARNING

Crush hazard

Vehicle rollover could cause serious injuries or death if the cab is crushed. To avoid accidents:

- a) Drive safely,
- b) Do not alter the ROPS cab structure,
- c) Follow GVWR, payload and ROPS guidelines. Comply to all of the following guidelines that apply to the specific configuration of the vehicle.

The vehicle has a certain GVWR value and a certain ROPS rating value.

Depending on the model and the cab option, these two values may not be the same. In this situation, exceeding the ROPS rating with attached payload is not allowed since the ROPS has not been designed and tested to withstand a greater loads. Exceeding the GVWR value is hazardous and may cause premature wear to the vehicle.

If ROPS rating and GVWR are identical values, the ROPS has been certified up to the GVWR value. Exceeding the GVWR is hazardous since the ROPS has not been designed and tested to withstand a greater load. Exceeding the GVWR value may also create premature wear to the vehicle.

The GVWR and ROPS rating indicated on vehicle's identification label inside the cab (refer to the sub-section "Identification labels" in the present manual) prevails over all payload capacities indicated on the vehicle (dump body or tilt deck label) and over all capacities indicated elsewhere (brochure, Website, etc.).

For GVWR, ROPS Ratings and Payload refer to "Technical Data – Performance" section.

4.10 Identification Labels

The vehicle carries two identification labels. A third label is present if a FOPS structure is installed on the top of the cab. Located in the cab, they can be found on the left side of the storage net. Refer to the next figures for the information found on the labels.

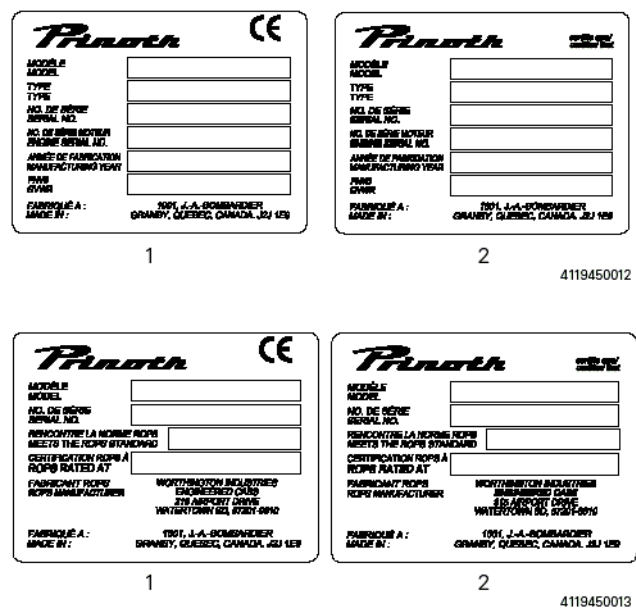
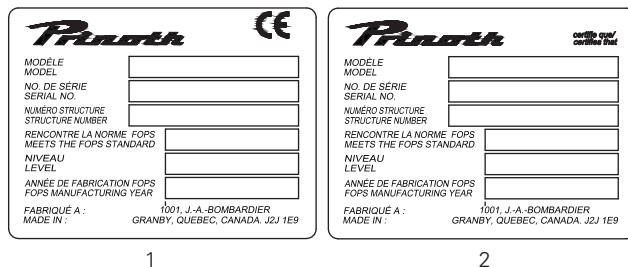


Illustration 14: Identification labels in the cab of the vehicle

1	With CE marking, if applicable	2	Without CE marking
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4119450014

Illustration 15: Identification label dedicated to the FOPS structure

1	With CE marking, if applicable	2	Without CE marking
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Other identification plates can be found:

- On the diesel engine
- On the hydrostatic motors
- On the hydrostatic pumps
- On the pump drive
- On custom equipment (if installed).

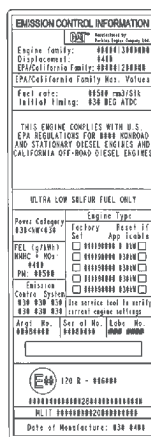
When inquiring about service or ordering parts, please quote the vehicle serial number, engine serial number and hourmeter reading.

4.11 Engine Type

This manual has been developed for vehicles, that are equipped with an engine meeting EPA Tier 4 Final/EU Stage V regulations.

- Keep in mind that a Tier 4 final / Stage V engine requires ultra-low sulfur diesel fuel (ULSD) and diesel exhaust fluid (DEF or AdBlue®).
- DO NOT operate this vehicle with conventional diesel fuel or without diesel exhaust fluid (DEF or AdBlue®).
- In case that the vehicle is built with a special configuration (Tier II, Tier III, etc.) an annex will be provided.

4.12 Emission Control Information Label



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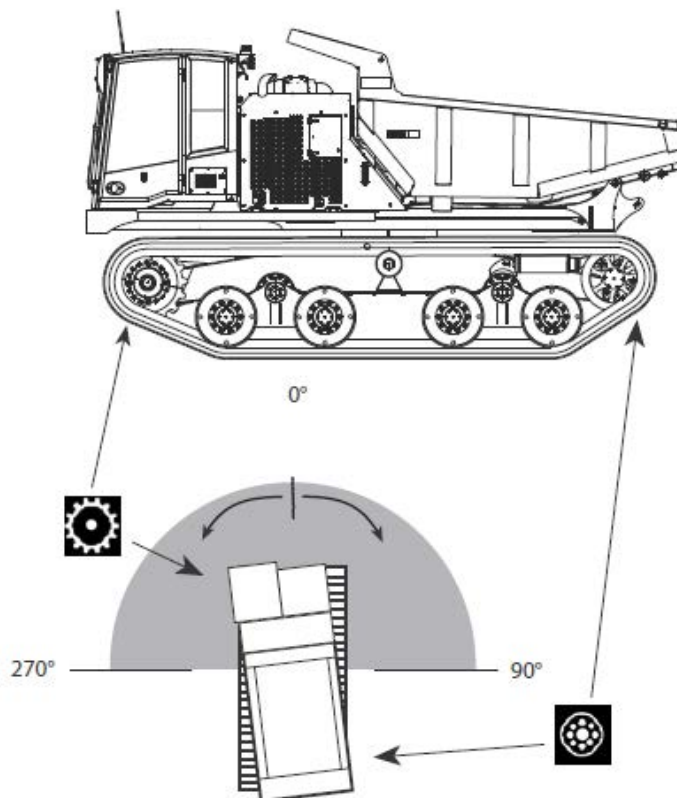
Illustration 16: Emission control label

The Emission Control Label provides information on the emission control system of the engine.

4.13 Left and Right Designation

Since the vehicle has a rotating upper structure, designation of left/right, forward/backward is very important. When the upper and lower frames are aligned:

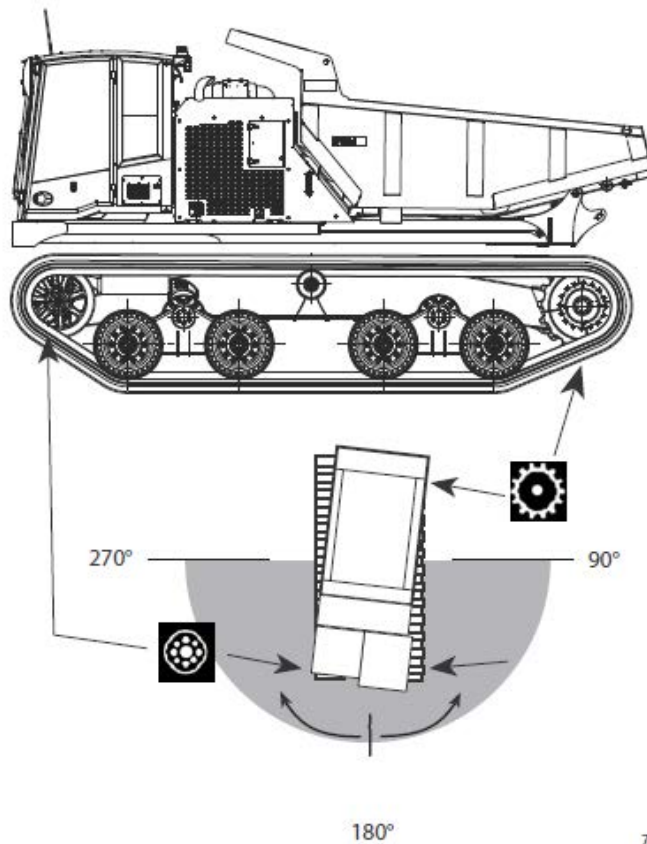
- In a normal configuration, the drive sprockets are located under the cab and cowl.



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Illustration 17: Normal configuration

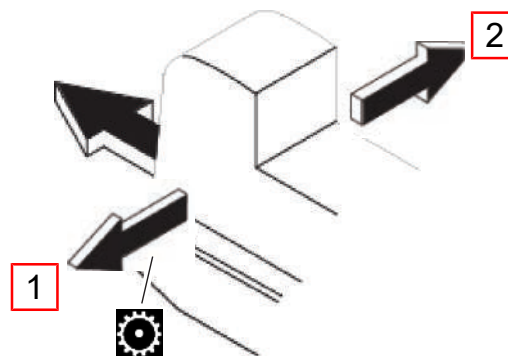
- In the inverted configuration the idler wheels are located under the cab and cowl.



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Illustration 18: Inverted configuration

In this manual, the terms, “left” and “right” refer to the direction as seen from driver’s seat, looking forward in the normal configuration (with the drive sprockets located under the cab). For the fault log or other subjects of this manual, the left and right designations will not change, regardless of the position of the upper frame or transmission setting.



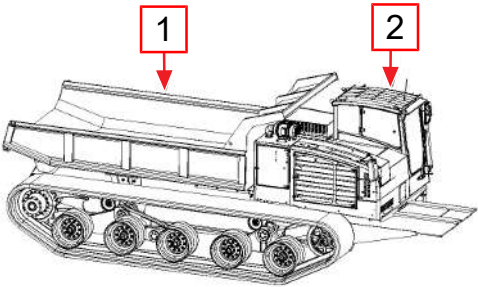
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Illustration 19: Direction Designation

1	Left side	2	Right side
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4.14 Vehicle Configuration

The vehicle incorporates numerous components and systems to perform its functions. Use the following figures to identify the configurations and some of the main parts.



Some of the components shown are optional

42627610

Illustration 20: Shown: dumper configuration, rubber tracks, modular frame and 300 HP diesel engine

1	Dump body	2	FOPS
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4.15 Vehicle Main Components (Rubber track)

The vehicle incorporates numerous components and systems to perform its functions. Use the following figure to identify some of the main parts.

5 Pre-Operation Inspection

5.1 Inspection Before Starting the Engine

Ensure all fluid levels are checked when the vehicle is on a flat and level surface. A cool engine and components will reduce burn hazard.

If a fluid low level is noticed, top off while observing recommendations in the “General Safety Recommendations” section. If a low level is observed in a repetitive fashion, report the problem to the maintenance personnel.

5.2 Engine Oil Level

Check oil level when the engine is cool. (See “Engine Oil Dipstick [► 124]”).

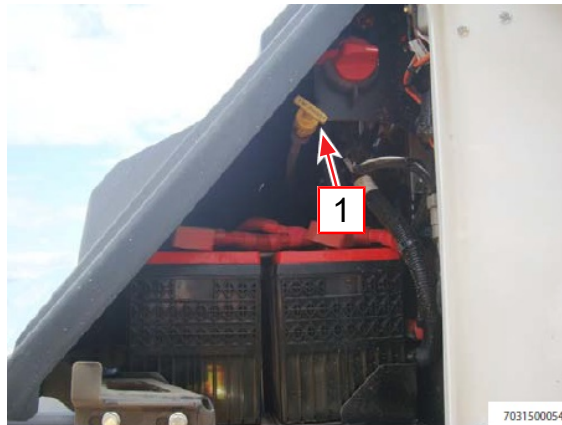


Illustration 21: Engine Oil Level

1	Engine oil dipstick		
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1. To unlock the dipstick, push the handle and turn it a quarter of a turn counter-clockwise.
⇒ The oil level should always remain within the marks on the dipstick.
2. Allow 10 minutes between engine stop and oil level check.
3. Top up with recommended oil if level is low. The filling cap is located on the top of the engine valve cover.

5.3 Engine Coolant Level



⚠ WARNING

Burn hazard

Never remove the coolant reservoir cap when the engine is hot. To avoid severe burns, do not inspect the coolant system or attempt to add coolant if the engine is hot.

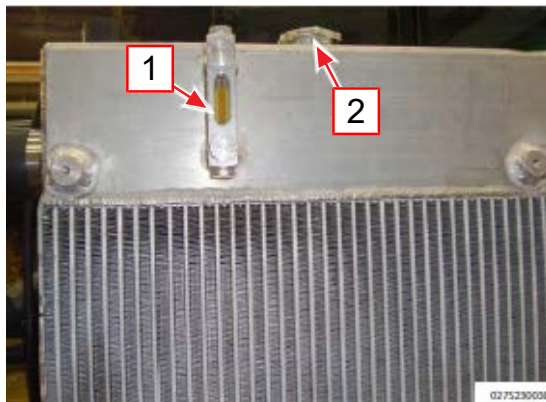


Illustration 22: Engine Coolant Level

1	Engine coolant and fluid sight glass	2	Coolant reservoir filler neck and cap
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1. Ensure the coolant temperature is cool before checking the level.
2. Check engine coolant level using the coolant level sight glass (see “*Radiator Filler Neck, Cap and Sight Glass* [► 124]”).
 - ⇒ To reach the filler neck and cap of the reservoir, remove the round cover on top of the cowl.
 - ⇒ At ambient temperature (cold fluid), the coolant level should reach the “MIN” mark on the sight glass.
3. Top up with recommended fluid if level is low.
4. Check for leaks.

5.4 Hydrostatic Oil Level

1. Check oil level on the sight glass which is visible on the oil tank.
 - ⇒ The oil level should reach between the “low” and “full” marks on the sight glass.
 - ⇒ If tracks are loose, double check oil level when the engine is running and tracks are under tension. If equipped, the dump body should be in lower position.
2. Top up with recommended oil if level is low.
 - ⇒ Retraction or extension of any cylinder on the vehicle will change the quantity of oil in the reservoir.

5.5 Fuel Filter / Water Separator



SAFETY INSTRUCTIONS

Environmental protection

Spilling fuel could harm the environment. Use a recipient to collect water and fuel, stop drainage as soon as the clear bowl is empty of water.

1. Check for presence of water (see “*Water Separator Drain Valve* [► 123]”).
2. If water is detected in the clear bowl, position a recipient under the valve and turn the valve knob to drain the water.
3. Return the valve knob to its original position once water is drained.
 - ⇒ Water is heavier than fuel and will flow to the bottom of the clear bowl.

5.6 Pump Drive Oil Level



CAUTION

Burn hazard

Reaching for the oil level dipstick could expose to hot components when the engine/ aftertreatment unit are hot. Take precautions when pulling out and re-inserting the dipstick.

Check oil level. Access the oil dipstick.

To check the oil level perform the following:

1. Pull out the dipstick.
2. Using a clean rag, wipe oil from the dipstick.
3. Insert the dipstick in the receptacle, push the dipstick completely in.
4. Pull it out again and check the level.



INFORMATION

The level must be between the marks of the dipstick at ambient temperature. Top up with recommended oil if level is low.

5. Insert the dipstick in its receptacle completely.

5.7 Planetary Gearboxes Oil Level

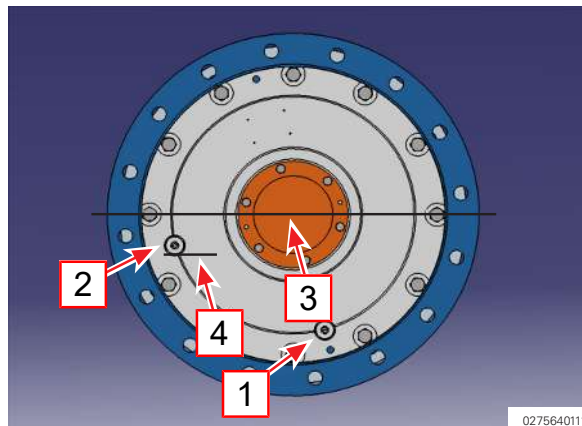


Illustration 23: Planetary Gearboxes Oil Level

1	Fill / drain plug	2	Level plug
3	Imaginary housing center line (align with bolts)	4	Recommended oil level

Check oil level on both planetary gearboxes on a regular basis as follows:

1. Rotate the planetary gearbox to position the drain plug.
2. Level the plug as shown on the previous figure.
3. Ensure the imaginary horizontal line is aligned with the bolts at the circumference (as shown).
4. Re-adjust level with the recommended oil if required.
5. Ensure no foreign matter enters the housing as contamination could cause irreversible damage.

6. Do not overfill as this could lead to overheating and cause permanent damage.



INFORMATION

Replace the brass washer of the plug at every removal.

5.8 Windshield Washer Fluid Level

1. Check fluid level on a daily basis.
2. Top up as required with standard windshield washer fluid.

5.9 Track and Undercarriage Condition

5.9.1 Rubber Tracks



Illustration 24: Track and undercarriage

Before operating the vehicle, check track and undercarriage condition on a daily basis:

1. Check track general condition;
2. Check track rubber for wear (see next figure);
3. Check track rubber for cracks, delamination or local damage. Check also for cuts, chunking, punctures or exposed cables;
4. Check track guides for wear and damage, check for missing track guides;
5. Check wheels, idler wheels, top rollers and sprockets for wear and damage;
6. Check lubricant level on wheel hubs, idler wheel hubs and top roller hubs as per maintenance chart.
7. Check sprocket condition and wear.

Material that is abrasive or sticky like clay, mud or gravel should be cleaned from the undercarriage to minimize component wear.

Corrosive material (fuel, DEF/AdBlue®, oil, salt, fertilizers and others) can corrode the metal embedded in the rubber track. Flush with clean water at beginning and end of each work shift.

5.9.1.1 Tension Verification

The tensioning system of the rubber track is automatic. As soon as the engine is turned on, the track tensioning cylinders will be energized.

- Check the tension release valve if the tracks are not under tension when the engine runs.

5.9.1.2 Rubber Track Wear

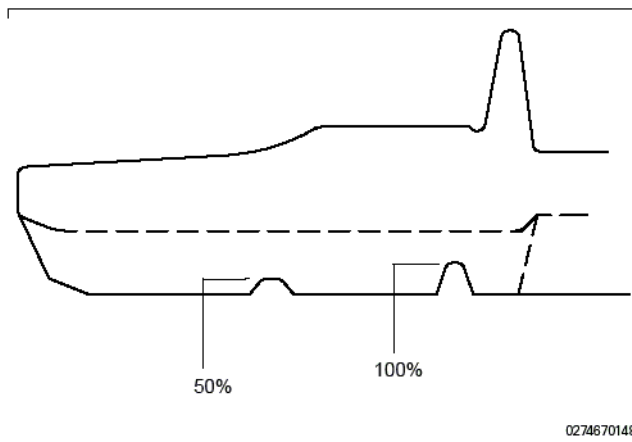


Illustration 25: Track wear indicators (outer groove 50%, inner groove 100%)

The outer groove from the center of the track indicates 50 percent wear of the thread pattern. The inner groove indicates 100 percent wear and mandatory track replacement.

Depending on the traction requirement for the vehicle, replacement of the track should be carried out between the 50 and 100 percent wear.

1. Replace the track when the 50 percent wear mark is reached to keep maximum traction.



Illustration 26: Rubber Track Wear

1	Outer track wear indicator (50% wear)	2	Inner track wear indicator (100% wear)
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2. When traction is not critical or when the vehicle travels mostly on level ground, replace the track later but not past the 100 percent wear mark.
 - ⇒ If the track is kept past the 100 percent wear mark, traction will be minimal and the track will slowly destroy itself, possibly damaging the undercarriage components at the same time.

5.10 Oil Level in Wheel Hubs and Roller Hubs

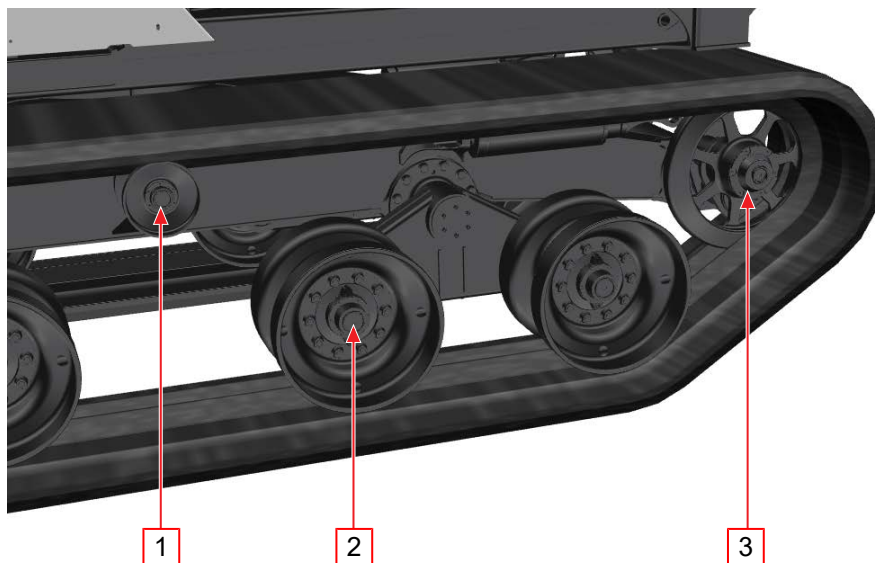


Illustration 27: Wheel and roller hubs

1	Top roller hub	2	Wheel hub
3	Idler hub		

1. Inspect for leaks in wheel hubs, idler wheel hubs and top roller hubs.

5.11 Lubrication

Lubrication is an important part of the pre-operation inspection/lubrication routine.

Refer to “MISCELLANEOUS MAINTENANCE” in the Maintenance Section for the location of grease points and frequency of lubrication.

5.12 Walk Around Check

- Check the vehicle carefully for the presence of dead leaves, pine needles, waste paper, grease, oil, or other flammable material around the batteries, muffler, or other component that reach high temperature. These could cause fire.
- Check for leaks of oil or fuel from hoses and check for spills on the ground.
- Check for abnormal situations like missing bolts, nuts connecting pins, hanging electrical wires, connectors or suspicious bulges on hydraulic hoses.
- Correct these problems before operating the vehicle.

5.13 Safety Equipment

Verify safety equipment condition and presence in the cab:

- fire extinguisher;
- escape tool;
- first aid kit;
- emergency drive module.

5.14 Safe Work Environment

Always perform the following tasks to keep the vehicle clean and safe:

1. keep the cab floor, step and grab handles clean to prevent slipping and falling;
2. do not leave tools or parts lying on the floor or loose in the cab, they could become flying objects in case of emergency stop;
3. remove wood chips, debris, grass, oil or flammable material to eliminate the risk of fire;
4. remove mud or rocks stuck in the tracks that could cause injuries or damage.

5.15 Inspection after Engine Start

Perform the following verifications while the engine runs.

5.15.1 Fuel Level



Illustration 28: Fuel level on LDC screen

Once the engine is running, check the fuel level on the display main screen.

- Check before operating the vehicle.

The level is indicated by the blue bar.

When the level is low, you will hear a buzz and see the bar turn red.

5.15.2 DEF/AdBlue® Level

1. Once the engine is running, check the DEF/AdBlue® (Diesel Emission Fluid) level on the display main screen.

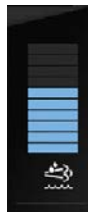


Illustration 29: DEF/AdBlue® level on LCD screen

2. Check before operating the vehicle.
3. Refill as required.

The level is indicated by the blue bar.

When the level is low, you will hear a buzz and see the bar turn red.

5.15.3 Hydrostatic Oil Level

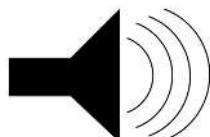
1. Double check the oil level when the diesel engine is running.
2. Ensure the oil level is correct when the track tensioning cylinders are extended.



INFORMATION

The position of any cylinder rod (extended or retracted) will influence the level of oil in the tank.

5.15.4 Backup Alarm and Park Brake Verification



The back-up alarm activates automatically when the vehicle moves in the direction of the dumping edge of the dump body. Additionally, the alarm will sound when the upper frame of the vehicle is in rotation.



⚠ WARNING

Impact and crush hazard

The back-up alarm must operate when the transmission lever is set in the reverse position. If the alarm fails, severe injury or death may occur to bystanders.

1. Ensure the backup alarm functions normally before operating the vehicle.



1. Ensure the parking brake operates normally before riding the vehicle.

On the display, the (P) icon indicates that the brake has been applied with the park button.

The (A) icon indicates that the brake has been applied automatically by the micro-controller (vehicle immobilized a few seconds, safety belt unbuckled, etc.).

5.15.5 Lights

- Check light operation prior to start the work shift.

5.15.6 Track Tension



⚠ WARNING

Accident hazard

The vehicle loses its braking ability and is more prone to detracking when the tracks are loose. Braking problems could cause accident and injuries to the operator or bystanders. Ensure the tracks are under tension before driving.

1. Check track tension before operating the vehicle.
 - ⇒ To check track tension, ensure the brake is applied, the engine is running and the tension release button is in the “in” position (pressure applied).
 - ⇒ The top section of the track above the top roller should be straight, no sag in front or behind the roller.
2. Ensure track tension is the same on both sides of the vehicle. While driving, remain vigilant.

The track tensioning system is designed to apply the appropriate tension automatically as soon as the engine runs. A lack of tension is likely to be caused by an “pulled out” track tension release button, a hydraulic failure, a mechanical problem or a foreign object in the undercarriage. Do not drive the vehicle if one or both tracks are not under tension.

Air trapped in the tensioning cylinders could contribute to loose tracks, bad performance and even detracking.

5.15.7 Main Screen on the Display

1. Verify the main screen of the display and its color coded LED to check for possible problems.
2. Ensure the fluid temperatures and quantities are in the blue zone.

It is recommended to solve problems as soon as possible to avoid further deterioration.

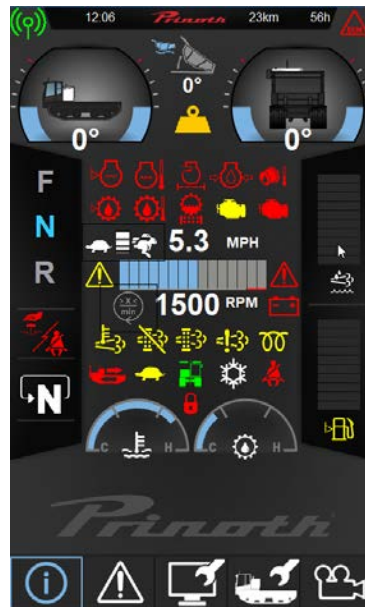


Illustration 30: Main screen (see also main screen indications)

6 Steering Column and Pedal

This section describes the controls mounted on the steering column and speed pedal on cab floor.

6.1 Steering Wheel



WARNING

Accident hazard

When the upper frame is rotated left or right to more than 90 degrees from the tracks, the steering wheel commands are inverted unless the transmission is set to Neutral to reset the commands.

- a) Ensure no one is near the vehicle. Always check to ensure the vehicle moves in the desired direction. Refer to the Driving section for details and instructions.

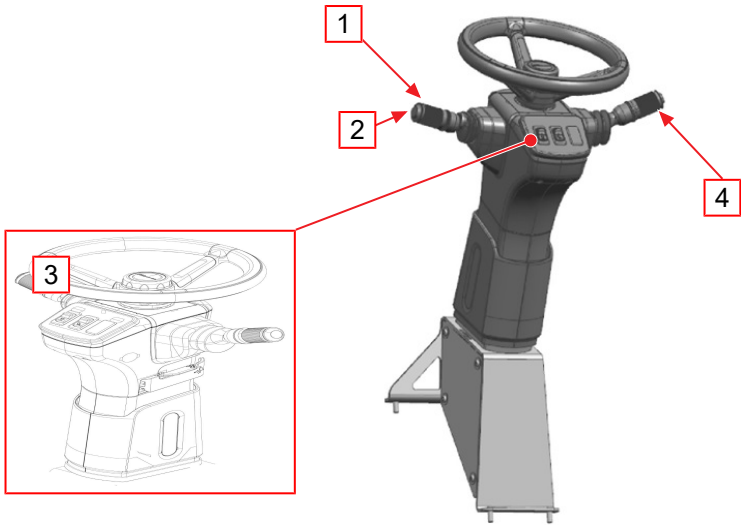


Illustration 31: Steering Wheel

1	FNR on left arm	2	Cruise control on left arm
3	Column switches: Beacon light, Rear light, Mirror defrost (option)	4	Accessory arm: Front lights, Front wipper functions, Flashers (Option), Horn

The steering wheel is linked to a potentiometer which sends a signal to the microcontroller. Using this signal, the microcontroller controls the left and right drive pumps that propel and steer the vehicle.



INFORMATION

Do not grab the steering wheel to enter or exit the cab, use the steps on the undercarriage and handles on the door and door frame.

In any case, cycling the transmission lever to the Neutral position will permit to drive the vehicle in a normal way.

Refer to the DRIVING section for more details on frame rotation and operation.

6.2 Cruise Control

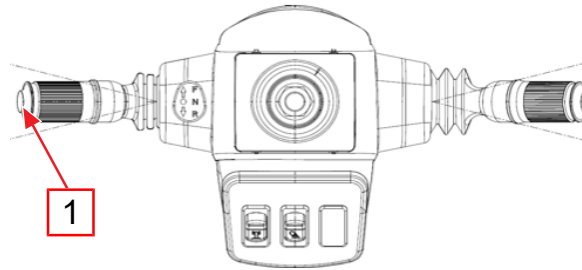


Illustration 32: Cruise control

1	Cruise control On/Off button		
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1. Press and hold the cruise button for 2 seconds to activate the function.

⇒ The icon will turn gray, and a short buzzer will sound.



2. To set the speed maintain a constant speed with the pedal, then press the cruise button once.

⇒ The icon will turn blue, and a short buzzer will sound.



To cancel the cruise control function, perform any of the following actions:

1. Touch the foot throttle.
2. Press the cruise button again.
3. Change the FNR (Forward, Neutral, Reverse) status.
4. Apply the parking brake.
5. Reach a maximum angle of 15 degrees longitudinally or laterally.
6. Reach 90% of the steering wheel to left or right.

Any fault in the pedal or in the EDC system will also cancel the cruise function.

The cruise function will reset automatically upon restarting the engine.

6.3 Steering Column Adjustment Lever



⚠ WARNING

Accident hazard

Adjusting the steering column while driving could cause loss of control.

- a) Always adjust the steering column when the vehicle is stopped and brakes are applied.

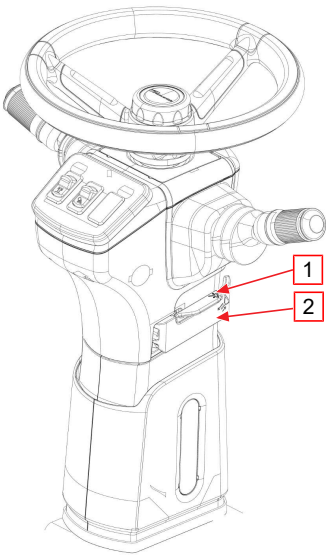


Illustration 33: Steering column adjustment lever

1	Tilting adjustment lever	2	Telescopic adjustment lever
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6.4 Transmission Lever

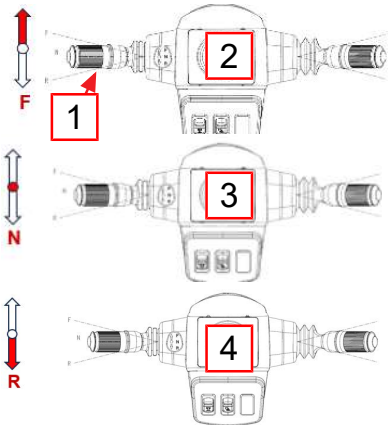


Illustration 34: Transmission lever

1	Transmission lever	2	Forward
3	Neutral	4	Reverse

The transmission lever, on the steering column, selects the Neutral or determines the direction of travel, Forward or Reverse.

On the display in the cab, an arrow will indicate the current position of the transmission lever. If there is no arrow, the transmission is in Neutral.

Rely on the sign on the steering column to help with the direction.



⚠ WARNING

Accident hazard

When the upper frame is rotated left or right to more than 90 degrees from the tracks, the transmission setting is inverted unless it is set to Neutral to reset the commands.

- a) Ensure no one is near the vehicle.
- b) Always check to ensure the vehicle moves in the desired direction. Refer to the Driving section for details and instructions.

Refer to the DRIVING section for more details on frame rotation and operation.

6.5 Accessory Lever

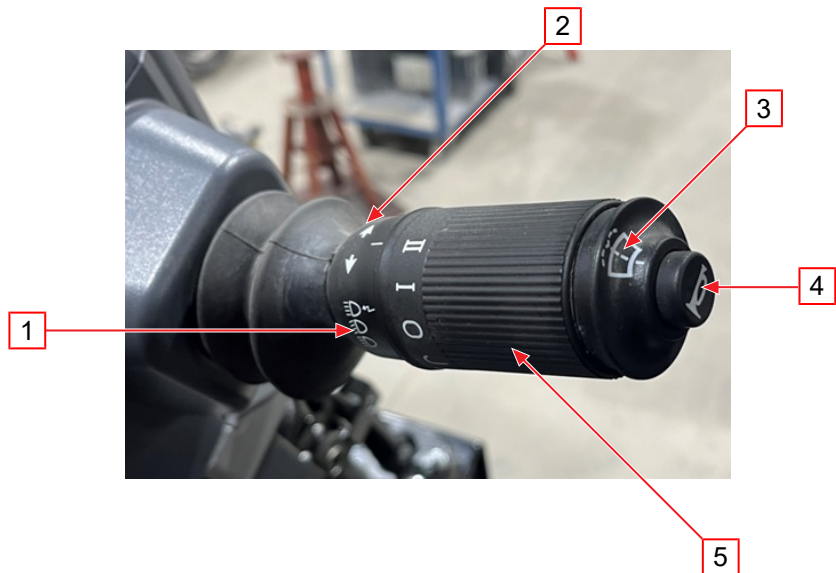


Illustration 35: Accessory lever

1	Front head light switch	2	Flasher (up = left and down = right)
3	Windshield washer ring button	4	Horn
5	Wiper functions		

6.6 Speed Pedal



Illustration 36: Speed Pedal

1	Throttle pedal	2	Pressure applied
3	Pressure released		

The throttle pedal controls the engine rotation speed (RPM) and the speed of the vehicle. The vehicle speed increases when pressure is applied to the pedal, the vehicle speed decreases when pressure on the pedal is released.

Release pedal completely prior to engine start and engine shut down.



INFORMATION

The vehicle will not move until the diesel engine reaches 1000 rpm.

7 Lateral Console

This section describes the controls mounted on the lateral console. Some items or components shown in this section may be optional or installed only on vehicles intended for specific countries or regions.

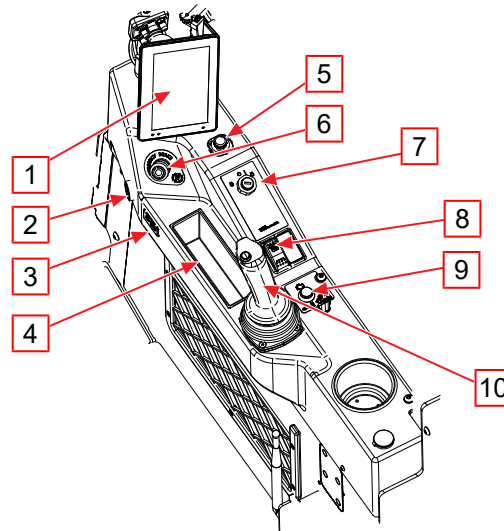


Illustration 37: Lateral console

1	LCD display	2	Audible signal buzzer
3	USB A and USB C outlets	4	Large storage
5	Mirror knob adjustment	6	E-STOP
7	Ignition switch	8	Park button
9	RPM button	10	Joystick

7.1 Ignition Switch and Key

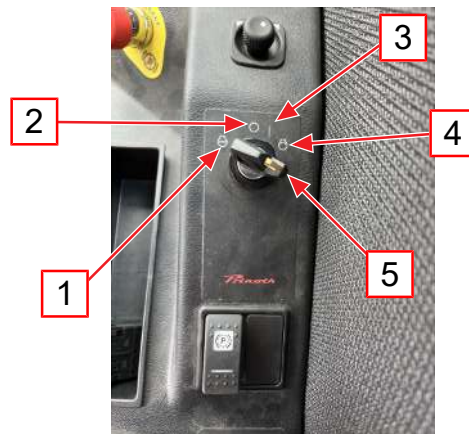


Illustration 38: Ignition Switch and Key

1	"Off" position	2	"Accessories" position
3	"Run" position	4	"Start" position
5	Ignition key		

Insert the key in the slot of the ignition switch and turn it clockwise to select the appropriate function.

“Off” Position (1)

The “OFF” position stops the engine and turns off some accessories in the cab.

Refer to for more information on stopping the engine.

“Accessories” Position (2)

In the “Accessories” position, power is supplied to most auxiliary systems but the engine does not run with the key in this position.



INFORMATION

Leaving the lights, the radio or any other electrical accessory in operation when the diesel engine is not running could drain the batteries. When the engine is not running, turn off all accessories that are not needed.

“Run” Position (3)

The “RUN” position supplies power to the vehicle. If the engine is already running, it keeps running at this position.

“Start” Position (4)

The “START” position is used to start the engine. Check the LCD display for messages before engaging the starter.



INFORMATION

From the “Off” position, the key will go only once all the way to the “Start” position to prevent starter damage when the engine is running. If the engine fails to start the first time (in the “Start” position), return the key to the “Off” position and repeat the operation.

7.2 LCD Display

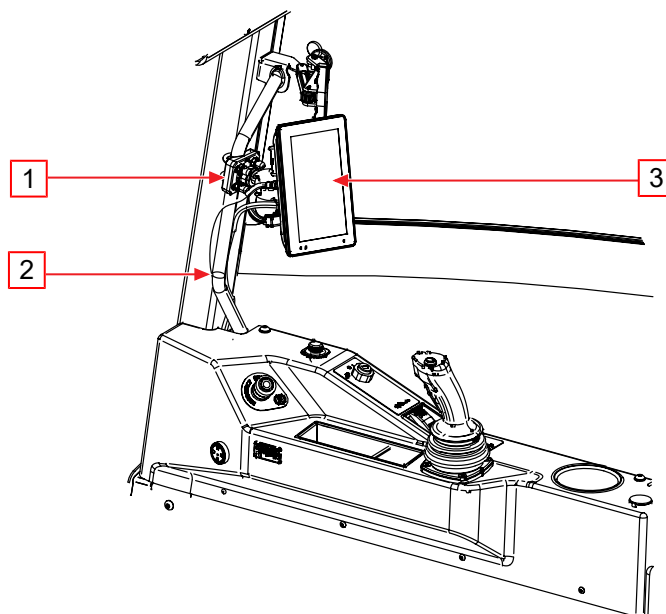


Illustration 39: LCD display

1	Adjustable screen holder	2	Accessory rod for LCD display height adjustment
3	7" touch screen display		

The display shows information about the vehicle and the engine to help the driver operate the vehicle.

7.3 Joystick

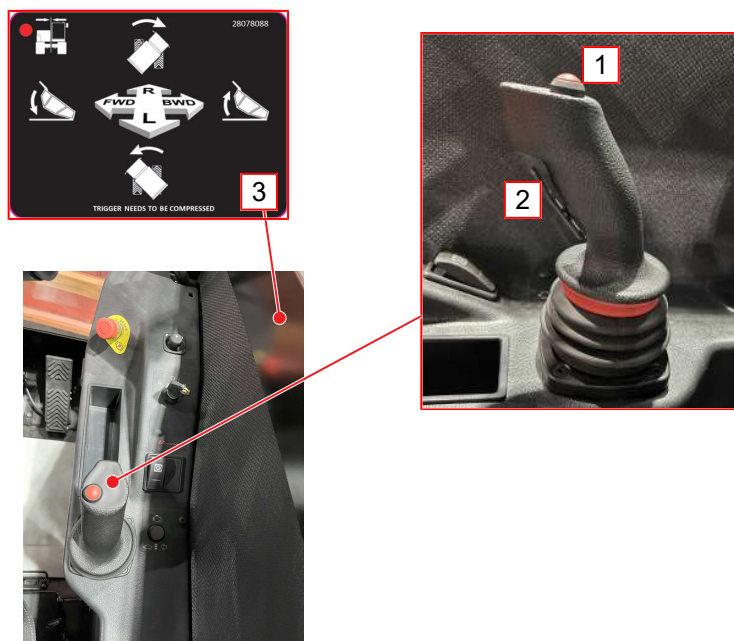


Illustration 40: Joystick

1	Alignment switch	2	Trigger
---	------------------	---	---------

7.3.1 Swing and Dump Body Control

With the joystick you can perform the following swing movements:

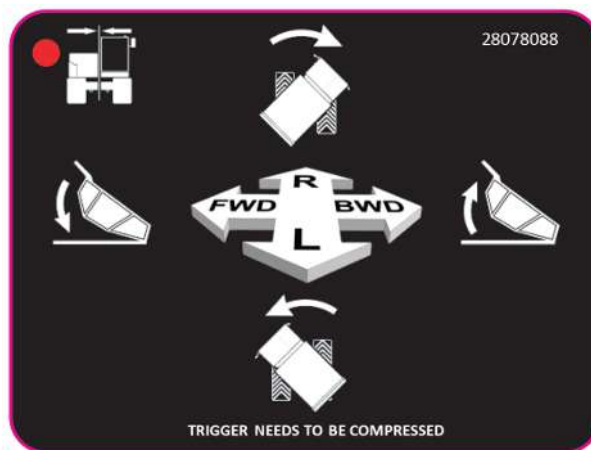


Illustration 41: Joystick sticker

1. Press the Trigger switch.
2. Move the joystick in the following directions:
 - ⇒ Left: The vehicle rotates to the left side.
 - ⇒ Right: The vehicle rotates to the right side.
 - ⇒ Backward: The dump body raises.
 - ⇒ Forward: The dump body lowers.

7.4 Emergency Stop Switch



WARNING

Crush hazard

An operator (and passenger if applicable) without a seat belt fastened could be injured if the brakes are applied while the vehicle moves.

- a) Braking distance is extremely short. Always wear the seat belt.



Illustration 42: Emergency stop switch

1	Emergency stop switch		
---	-----------------------	--	--

1. In case of emergency push down the emergency stop switch (red knob) to cut the signal to the drive pumps and apply the brakes.
 - ⇒ The vehicle will stop in a very short distance but the engine will keep running.

2. Rotate the switch clockwise (see arrows) in order to release it and resume vehicle operation.
3. Once the E-STOP is disengaged, return the transmission lever to the Neutral position.
4. Release the speed pedal before a new command signal (forward or reverse) can be issued to the drive system.



NOTICE

Premature wear

Pressing the emergency stop switch while the vehicle is in motion could cause premature wear of the brake components.

- a) Use only in case of emergency or when the vehicle is motionless.



WARNING

Accident hazard

Failure to verify the brake efficiency after an emergency stop could lead to vehicle movement even with the brake applied.

- a) This could cause severe injuries or even death to bystanders or to the operator.

The brakes installed on the vehicle are intended for use once the vehicle has stopped moving. If used with the vehicle in motion, the brake units must be tested at once. If the brakes cannot hold the vehicle, perform brake maintenance before using the vehicle again.



INFORMATION

The brake verification is described in the designated section.

7.5 Engine Speed Control Button

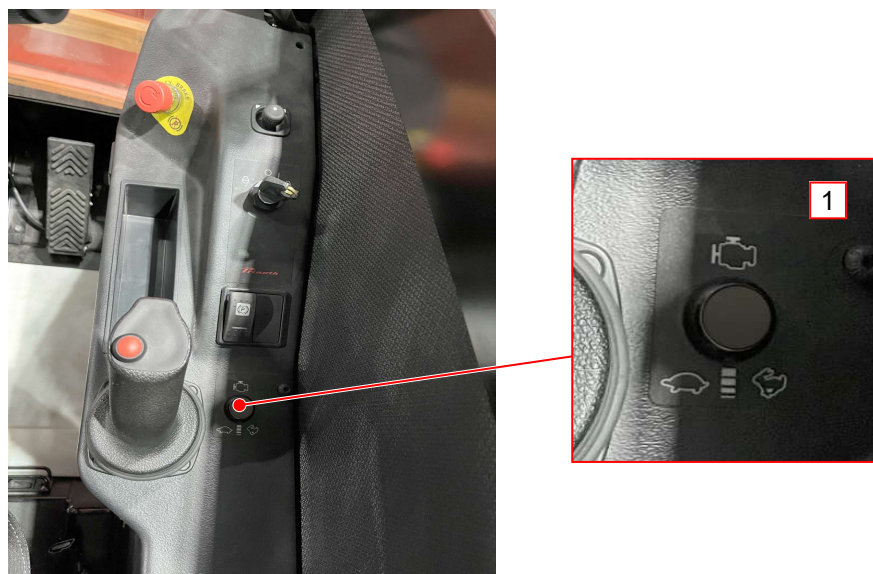


Illustration 43: Engine speed control button

1	Engine speed control button		
---	-----------------------------	--	--

This button is used to toggle between high idle and low idle engine speeds. Initially, the engine runs at low idle (800 RPM).

Use the engine speed control button as follows:

1. Press the engine speed control button.
 - ⇒ The engine speed increases to the high idle value (RPM in memory).
 - ⇒ The RPM adjustments window is displayed on the touch screen.
2. Adjust the high idle within a range of 1100 to 1400 RPM using the +/- buttons on the touch screen. The high idle value can stay in memory for future use.
 - ⇒ You can close the window by touching X.

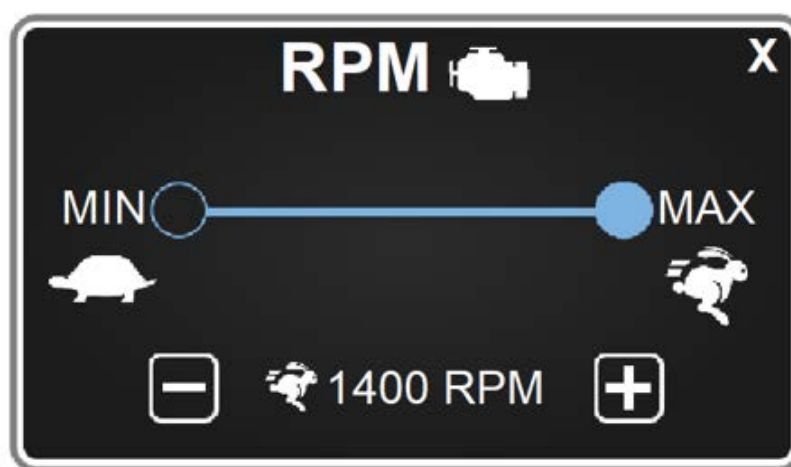
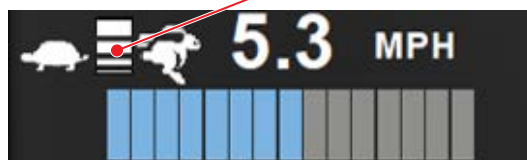
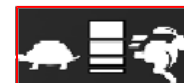


Illustration 44: RPM adjustments window

3. Reopen the RPM adjustment window by clicking the rabbit icon in the menu while the high idle function is active.



4. Return to 800 RPM by clicking the button again.
⇒ This action toggles the engine speed back to the low idle setting of 800 RPM.



INFORMATION

- a) Leave the setting to the minimum for normal driving. Use a higher setting only for more power when getting the vehicle in motion.

7.6 Parking switch



Illustration 45: Parking switch

1	Parking switch	2	Press P (upper section) to disengage the parking brake
3	Press lower section for parked position		

The vehicle is equipped with a parking brake that is applied with a parking switch.

Use the parking switch as follows:

1. Select a safe and level location.

2. Completely immobilize the vehicle.
3. Apply the parking brake by pressing the upper section of the parking switch.

⇒ The parking brake icon appears on the screen whenever the parking brake is applied.



Illustration 46: Parking brake icon

4. Shut off the engine.



INFORMATION

- a) Take all necessary precautions when parking the vehicle.
- b) If you press the parking switch while the vehicle is in motion, it will gradually slow down and come to a stop.

7.7 Switches for Equipment and Options

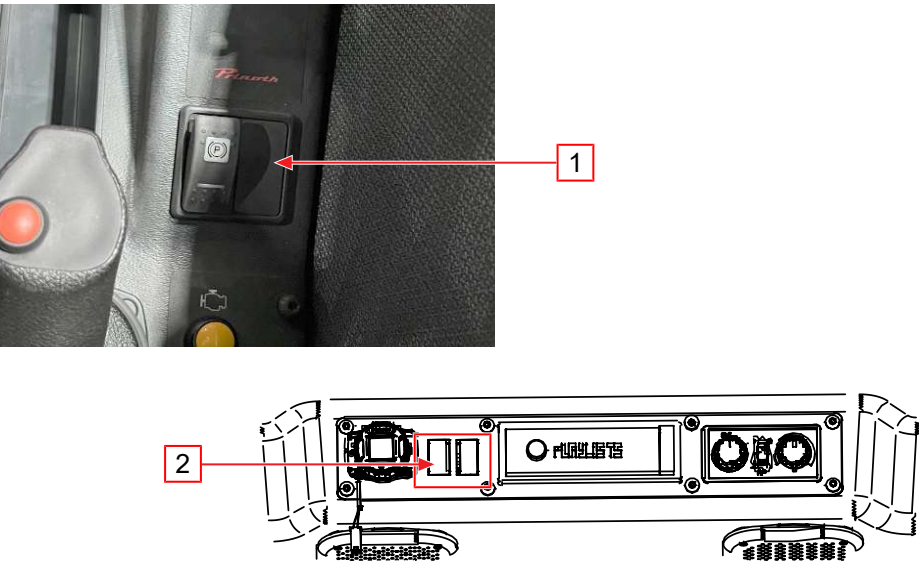


Illustration 47: Switches for Equipment and Options

1	Available space for future custom switch (beside the parking switch)	2	2 available space for future custom switch (beside the radio)
---	--	---	---

According to the options and equipment installed on the vehicle, various switches and controls will be installed on the dashboard, in the cab or even outside the cab. On that particular aspect, every vehicle is unique.

7.8 Mirror Control Knob



Illustration 48: Mirror Control Knob

1	Right side mirror adjustment knob		
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The position of the right side mirror can be adjusted remotely using this knob.

7.9 Power Supply Outlets

The cabin is equipped with several power supply outlets.

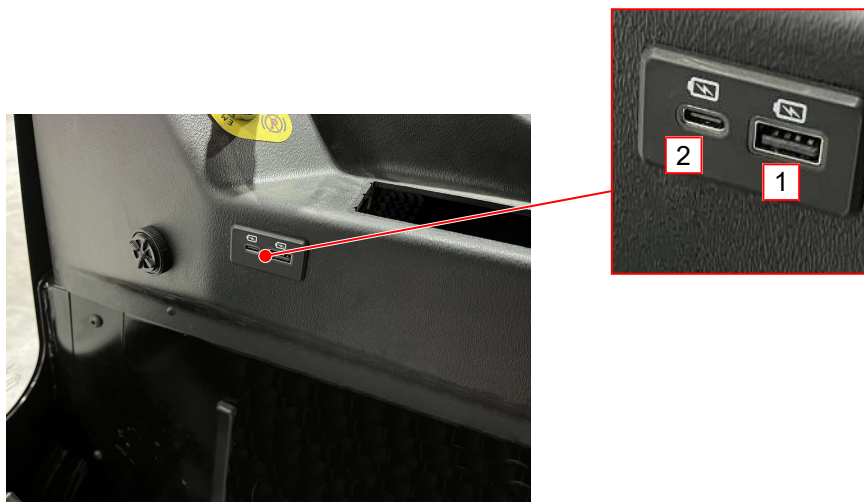


Illustration 49: USB connectors

1	USB A outlet	2	USB C outlet
---	--------------	---	--------------

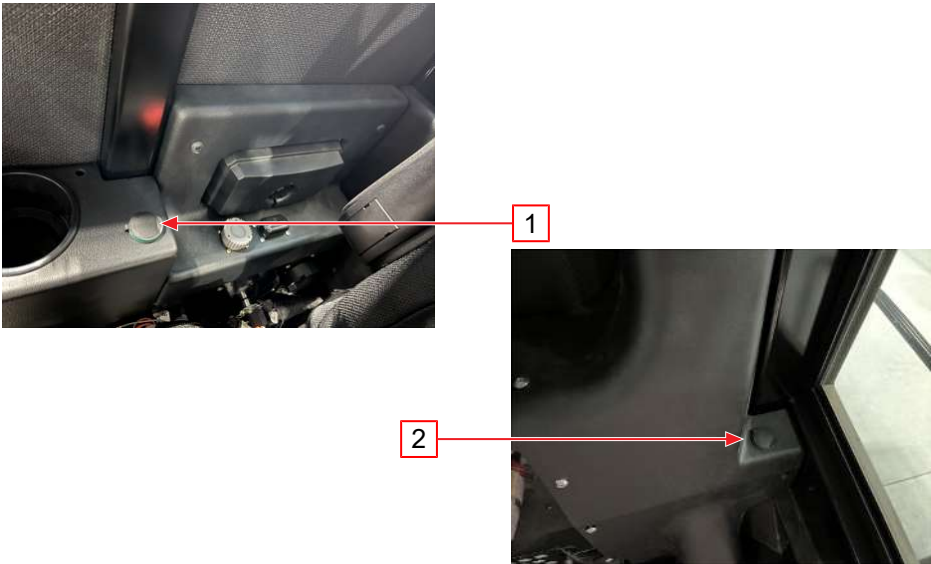


Illustration 50: 12V outlets

1	12 V outlet (powered when key or accessory is on)	2	12 V outlet (always hot (12V) - View from the rear of the cab
---	---	---	---

The 12 V outlet on the lateral console provides power only when the key is rotated to the “accessories” or “run” position. The other 12 V outlet provides continuous power even when the key is not in the ignition switch.



NOTICE

Damage hazard

Leaving accessories plugged to the 12 V outlets when the diesel engine is not running could drain the batteries.

- a) Always unplug the accessories when not needed.

All outlets will be without power when the battery isolator switch of the vehicle is “OFF”.

7.10 Connectors

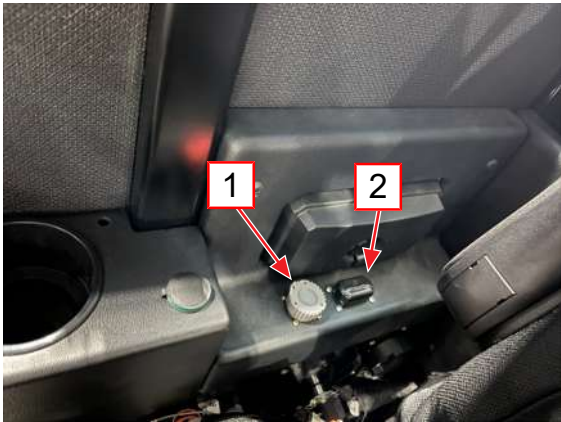


Illustration 51: Connectors

1	Connector for diagnostic and programming of the engine	2	Emergency drive module connector (shown without its cover)
---	--	---	--



NOTICE

Damage hazard

A foreign object or liquid could provoke a connector failure.

- a) Always keep the cover on a connector that is not in use.

7.11 Storage Compartment

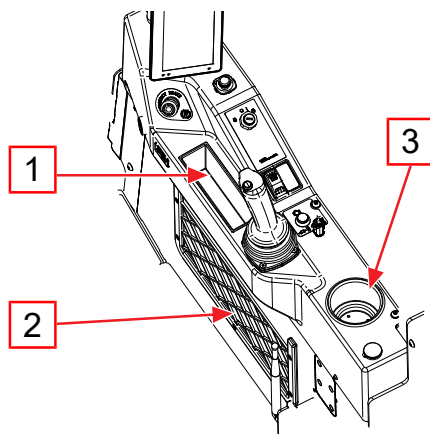


Illustration 52: Storage

1	Storage	2	Storage Net
3	Cup holder		

A cup holder and a storage space is provided on the lateral console.

Do not place an opened bottle or an object from which liquid could spill and damage electrical components.

7.12 Audible Signal Buzzer

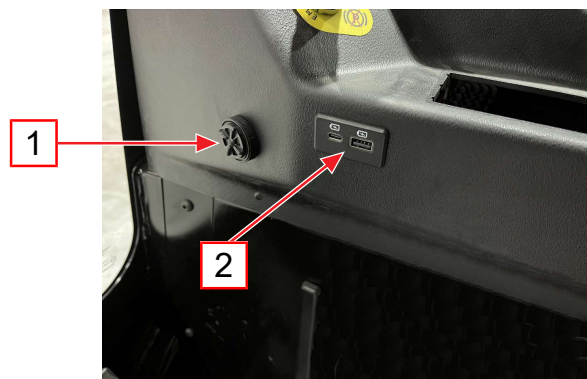


Illustration 53: Audible Signal Buzzer

1	Buzzer	2	USB ports
---	--------	---	-----------

Most faults, minor or major, will trigger an audible signal to prompt the operator to check the LCD screen. The buzzer is located on the lateral console.

7.13 WEBASTO Pre-Heater Control Unit



0275580014

Illustration 54: Engine pre-heater control unit

This unit controls the engine coolant heater system that may be used to help start the engine in cold weather. The system uses the same fuel and fuel tank as the diesel engine and does not require outside electrical power to operate.



WARNING

Explosion hazard

Fumes from refueling could ignite and cause severe injuries or burns. Always switch off the heater BEFORE refueling the vehicle.

- a) Do not operate the heater in an area where toxic or explosive materials or fumes may be present.



WARNING

Asphyxiation hazard

Breathing exhaust gases from the heater could cause severe injuries or even death.

- a) Always use the heater when the vehicle is outside or in a well ventilated area.



NOTICE

Damage by freezing

Damage could occur if the heater is operated while the coolant is frozen in the hoses.

- a) Ensure the coolant is compatible with the heater specifications.

Use the pre-heater system only when the vehicle is outside (or well ventilated area) and not being refuelled. Operation is unrestricted below 1500 m (5000 ft) of altitude. Consult a PRINOTH representative for operation above 1500 m (5000 ft).

It is not recommended to operate the pre-heater when the diesel engine is running.

Refer to the heater supplier literature for safety precautions and other tips on operation/maintenance of the unit.

7.13.1 Preselected starting times

The preselected starting time is the time at which the timer switches the heater on automatically. The Webasto SmarTemp Control fx allows for preset start-up cycles of your Webasto heater up to 7 days in advance with 4 unique programs for each day.

7.13.2 Operating time

The period of time during which the heater is in operation is referred to as operating time. The heater remains in operation for as long as the operating time has been preset. Heater operation can be preselected for any time from as little as 10 minutes to a maximum of 120 minutes (factory preset is 60 minutes).

7.13.3 Remaining Operating Time

The remaining operating time refers to the period of time the heater still continues to remain in operation. This can be changed with duration menu feature.

7.13.4 Setting the SmarTemp Control fx



0275580015

Illustration 55: Setting the SmarTemp Control fx

1	ON/OFF button	2	LCD screen
3	Rotary knob	4	Screw cap
5	Status indicator lights	6	Selection button
7	Micro USB service port		

The Webasto SmarTemp Control fx can be operated using a single rotary dial around the outside of the unit to browse through different menu options (6). Simply click the selection button to make your choice. The following sections will define each menu item and its default setting.

Once the power has been connected, the time and date must be set. This can be done by using the rotary knob and the selection button as mentioned above. Within the timer menu, select the day or the specific timer program (T1 - T4) using the rotary knob. Once the day, time, and duration have been entered within the calendar table, press the selection button to set. A checkmark will confirm the program has been saved. Each program can be edited or removed simply by selecting the box again.



INFORMATION

The micro USB Service Port is used for the heater diagnostic purposes only. This adaptor cannot be used to charge cell phones or other electronic devices.

Refer to the next table for additional information on the pre-heater operation.

7.13.5 Smartemp Control fx / Operation instructions

	Definition	Default
Time and date	Time & Date allows user to properly set the current date and time. User also has the ability to switch between AM/PM and 24 hour modes.	AM/PM (12 hour)
Mode	Two modes are possible: - Auto mode will allow the heater to turn ON/OFF based on the pre-defined timer programs. Manual ON/OFF operation is still possible while in this mode. - Manual Mode allows the heater to be manually operated via the Webasto button on the SmarTemp Control fx. While in Manual Mode, all Auto Mode functionality is disabled (Timers inactive). Note: While in manual mode the heater will continue to operate based on the pre-defined "Duration" set by the user.	Manual
Duration	Duration allows for the selection of timed heater run-time. Set range is between 10 - 120 minutes selectable by 10 minute increments. While using Manual Mode, the "Duration" setting will be used for the run-time of the heater when the Webasto button is pressed.	60 minutes
Timer	Timer allows the user to set 4 heater start-up cycles per day up to 7 days in advance. Select the day or the specific timer program (T1 - T4) using the rotary knob and the selection button. Once the day, time, and duration have been entered, press the selection button to set. A checkmark will confirm the program has been saved. Each program can be edited or removed simply by selecting the box again. Note: Setting the Duration run-time before setting a timer program will default all new programs to the user defined duration time.	No presets
Skip	The Skip feature looks similar to timer programming; however when a specific timer program is selected, it will update the checkmark to an "s" for skipped. When a program has been skipped, it will disable that specific timer program for one cycle (7 day period). Preset timer programming will reactivate after this one-time skip cycle.	N/A
LVD	LVD "Low Voltage Disconnect" allows the user to adjust the battery voltage level at which the Webasto SmarTemp Control fx will shut down heater functionality. If battery voltage is equal to or less than the threshold selected +0.1v, the heater will not start. i.e. if an 11.5v threshold is selected the heater cannot be started until B+ has reached 11.7v. 12 volt - Range between 11v - 12.5v 24 volt - Range between 21v - 25.5v	12.1 v 24.2 v
Error codes	This section will log the last 5 error codes and the date that it was set. Highlight and select an error code for a full description. If the heater produces an error code, the status indicator lights will flash red and the error will display on the main screen. Error codes cannot be reset through the Webasto SmarTemp Control fx. Refer to the heater service manual for resetting an error code. Note: Error code functionality does not apply to Thermo Top C heaters. Errors codes for this product can still be obtained using PC Diagnostics. Refer to the applicable service manual by visiting www.techwebasto.com for detailed PC diagnostics information	No errors

	Definition	Default
Hour meter	The hour meter logs the operating hours that the heater is commanded "ON" from the SmarTemp Control fx. Note: For warranty purposes a diagnostic printout is still required where applicable. This hour meter is for reference only	N/A
Default	Default allows the user to perform a factory reset of the control settings and saved timer program data.	N/A
SW version	This displays the firmware version of the Webasto SmarTemp Control fx.	Installed version
Back	Select this to return to the previous screen.	N/A

8 LCD Display

The LCD display provides information to the operator about the vehicle operation and diesel engine operation.

When the key is inserted in the ignition switch and turned to the “run” position, the introduction screen appears for a few seconds. Then, the main screen comes into view. Use the navigation area below to navigate through the various menus available on the display. Access to some of the menus and screens is restricted to authorized personnel.

8.1 Main screen indications

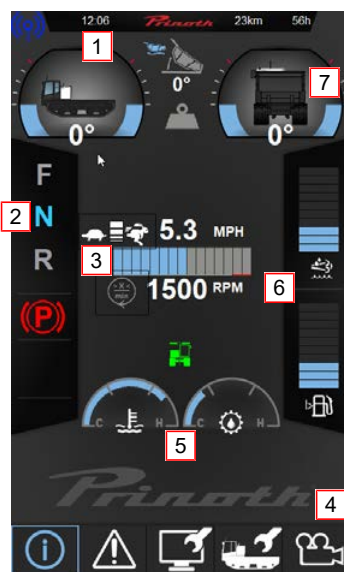


Illustration 56: Main screen

No.	Name	Functions
1	Information	– Time – Odometer – Engine operating hours – Remote status
2	Drive status	– FNR – Park and Auto Park – Cruise Control
3	Usage	– Speed – RPM
4	Menus	– Information – Alarm – Screen Setup – Vehicle Setup – Camera Screen

No.	Name	Functions
5	Temperature	– Coolant – Oil
6	Levels	– DEF – Fuel
7	Angles	Front and back Dump body Side to side

Table 2: Main screen display

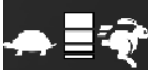
In the following you will find the descriptions of the icons.

Icon	Indication	Remarks
	Release E-STOP or buckle safety belt	
	Auto-brake icon: brake applied by the controller	
	Parking brake icon: brake applied by the operator (Parking switch)	
	Dumpbox angle	Consult the Dump Body Operation section
	Dumpbox float (Automatic dump body lowering system activated)	Consult the Dump Body Operation section
	Hydraulic oil temperature (-10 °C / 14 °F) is below allowed range for upper frame rotation Hydraulic oil temperature (+10 °C / 50 °F) is below allowed range for maximum vehicle speed	Consult the Dump Body Operation section
	Weak battery indication: check the batteries. Recharge them or replace as required. Check the drive belt and the alternator operation	Consult the Navigating in the Menus subsection
	The upper frame is centered	Consult the Steering Column, Pedal Controls

Icon	Indication	Remarks
	The upper frame is inverted	Consult the Steering Column, Pedal Controls
	Swing function is disabled; oil temperature is below -10 °C (14 °F)	
	Joystick trigger is not pressed or park activated (all joystick functions are disabled)	(when park is on , you cannot rotate the cab or dump)
	Buckle passenger safety belt	
	Hydrostatic oil temperature gauge	
	Hydrostatic oil temperature gauge if high	
	Release pedal	
	Set transmission to neutral	
	Cruise control function selected	
	Cruise control function activated	
	CAN fault : diesel engine ECM	
	CAN fault : main microcontroller	
	CAN fault : second microcontroller	

Icon	Indication	Remarks
	No overload alert	
	Overload sensor in fault	
	Overload limit alert	
	Engine coolant temperature too high Stop the vehicle in a safe location and run the engine at idle speed until the temperature drops to an acceptable level. The engine could sustain permanent damage. Check the coolant level in the reservoir when the engine will be cold. Check / clean the radiator. The alarm will sound intermittently	
	Engine coolant temperature gauge	
	Hydraulic oil filter clogged Stop the vehicle in a safe location and turn OFF the diesel engine as soon as possible. The drive system could sustain permanent damage	Consult the Navigating in the Menu subsection
	ECM minor fault. The maximum speed of the vehicle could be reduced. Possible engine shut down. Drive the vehicle in the repair shop as soon as possible	
	ECM major fault. Drive the vehicle to the repair shop without delay and then turn OFF the engine as soon as possible.	Consult the Navigating in the Menu subsection
	Minor fault. The vehicle is still functional but requires attention, otherwise permanent damage could occur	Consult the Navigating in the Menu subsection

Icon	Indication	Remarks
	Major fault. The vehicle is no longer operational. One or more critical component has failed. Have the vehicle in the repair shop without delay	Consult the Navigating in the Menus sub-section
	Front and back angle value	
	Side to side angle value	
	Hot hydraulic oil (in the planetary): slow down to allow the oil to cool. The maximum speed of the vehicle will be reduced	Consult the Driving Instruction section
	Clogged air filter indication: check and clean or replace the filters. Ensure the air intake is clean and unobstructed	Consult the Navigating in the Menus sub-section
	Engine oil pressure too low . Stop the vehicle in a safe location and turn OFF the diesel engine without delay. The engine could sustain permanent damage. The alarm will sound continuously	TURN OFF THE ENGINE IMMEDIATELY
	Engine coolant temperature too high . Stop the vehicle in a safe location and run the engine at idle speed until the temperature drops to an acceptable level. The engine could sustain permanent damage. Check the coolant level in the reservoir when the engine will be cold. Check / clean the radiator. The alarm will sound intermittently	
	Engine coolant level alarm	
	Hot hydraulic oil (in the tank) Slow down to allow oil to cool and reduce the workload. The maximum speed of the vehicle will be reduced. Check if oil cooler is dirty	Consult the Driving Instruction section

Icon	Indication	Remarks
	Low hydraulic oil level Stop the vehicle in a safe location and turn OFF the diesel engine as soon as possible. The drive system could sustain permanent damage. Verify oil level in the tank	Consult the Navigating in the Menus sub-section
	Fuel level gauge	
	Flashing fuel pump icon activates when fuel level is very low	
	Exhaust temperature alarm	
	Emission control system malfunction. The maximum speed of the vehicle could be reduced. Possible engine shut down. Have the vehicle in the repair shop as soon as possible	
	DEF/AdBlue level	
	DEF/AdBlue low level. Refill the DEF tank as soon as possible. Engine power could be reduced or shut down could occur. Possible emission	
	Regeneration cycle activated by the emission control system.	
	Regeneration cycle deactivated by the emission control system	
	Rabbit icon for RPM adjustments	

Icon	Indication	Remarks
	Indicates that the vehicle is ready to be paired with the remote control	
	Indicates that the connection has been established with the vehicle	
	Remote CAN devices in fault	
	Glow plug activated. Wait until the icon disappear before cranking the starter	
	Limp home mode there is a reduction of the power of the drive system Check the main screen for a problem / fault or component failure	Consult the Driving instructions section
	Maximum vehicle speed limitation activated	Consult speed limitation section
	Maximum vehicle speed limitation selected	Consult speed limitation section

Table 3: Screen Indication

8.2 Navigating

In order to enable or disenable the functions, touch on the icons. If the function is selected the icon gets blue.

	Icon not selected (example)
---	-----------------------------

	Icon selected (example)
---	-------------------------

Table 4: Selected icon - example

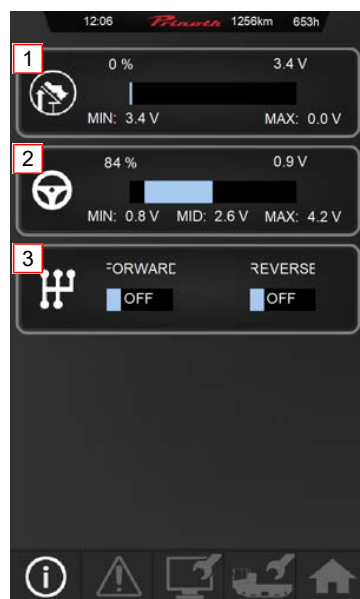


Illustration 57: Current value of potentiometers and transmission selector

1	Throttle pedal potentiometer current value	2	Steering wheel potentiometer current value
3	Transmission lever current selection		



Illustration 58: Microcontroller and display software part numbers

1	MP1: Number of the main microcontroller software	2	MP2: Number of the second microcontroller software
3	Display: Number of the software	4	P1D: Number of the software parameter



Illustration 59: Top menu layout

8.2.1 Vehicle Data

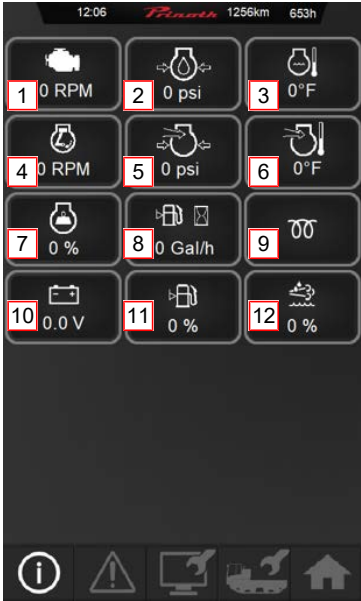


Illustration 60: Engine and battery data

1	Diesel engine current rpm	2	Diesel engine oil pressure
3	Diesel engine coolant temperature	4	Diesel engine rpm setting
5	Diesel engine air intake pressure	6	Diesel engine inlet air temperature
7	Diesel engine load (in percent)	8	Diesel engine fuel consumption
9	Glow plug activated	10	Battery voltage
11	Fuel level	12	DEF level



Illustration 61: Vehicle data

1	Left hydrostatic motor rpm	2	Right hydrostatic motor rpm
---	----------------------------	---	-----------------------------

3	Hydraulic oil temperature	4	Left hydraulic pump current
5	Right hydraulic pump current	6	Cooling fan speed in percentage
7	Vehicle forward speed	8	Distance covered by vehicle
9	Clogged filter for hydraulic oil (icon change to red if clogged)	10	Slope indicator - up/down
11	Slope indicator - lateral	12	Hydraulic oil level (icon change to red of oil level too low)
13	Hydraulic oil temperature (in the planetary	14	Dumpbox angle (floating)

8.2.2 Fault Log

The Fault Log provides information and records about faults. There is a microcontroller log and there are ECM logs (DM1 and DM2).

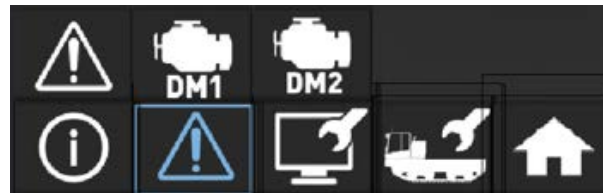


Illustration 62: Fault log

8.2.2.1 Microcontroller Fault Log

Once in the fault log, selecting the microcontroller faults will give access to fault information on selectors, potentiometers and sensors installed on the vehicle.

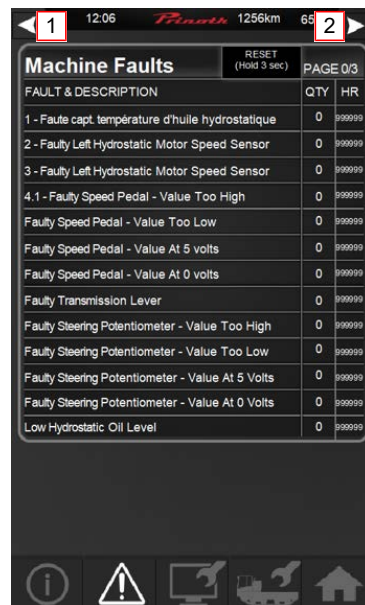


Illustration 63: Machine faults

1	Previous page	2	Next page
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Write down the information about the failure and contact your Prinoth authorized dealer to solve the problem.

On this pages, QTY is the number of times the fault occurred. HR (hour) is the engine operating hours when the last fault occurred.

8.2.2.2 DM1 Log (active faults)

Once in the fault log, selecting the Electronic Control Module (ECM) faults will give access to information on the active engine faults.

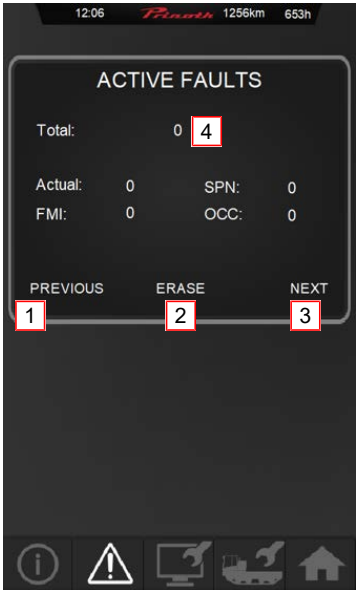


Illustration 64: DM1

1	Previous active fault	2	Erase the fault
3	Next active fault	4	Number of active faults that are currently detected

Procedure:

- 1. Enter the DM1 log screen
- 2. Select the desired fault (previous, next or erase)
- 3. Read the result on the screen

The screen provides information:

Actual	Current fault selection
FMI	Failure Mode Identifier
SPN	Suspect Parameter Number
OCC	Occurrence (how often the fault occurred)

Write down the code and contact your engine technician (authorized representative) to solve the problem.

8.2.2.3 DM2 Log (passive faults)

Once in the fault log, selecting the Electronic Control Module (ECM) faults will give access to information on the previous engine faults

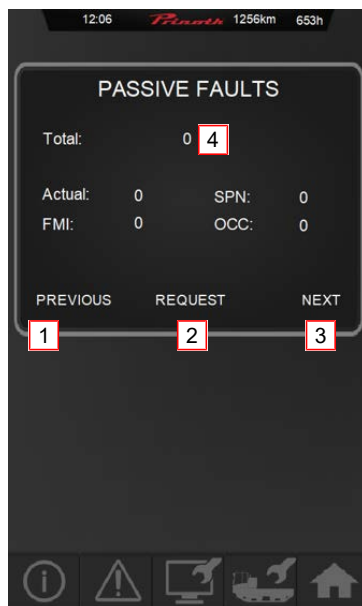


Illustration 65: DM2

1	Previous inactive fault in the log	2	Request function
3	Next inactive fault in the log	4	Number of inactive faults (that are no longer detected)

Procedure:

1. Enter the DM2 log screen
2. Select Request
3. Select the desired fault (previous or next)
4. Read the result on the screen

Actual	Current fault selection
FMI	Failure Mode Identifier
SPN	Suspect Parameter Number
OCC	Occurrence (how often the fault occurred)

Write down the code and contact your engine technician (authorized representative) to solve the problem.

8.2.3 Speed options

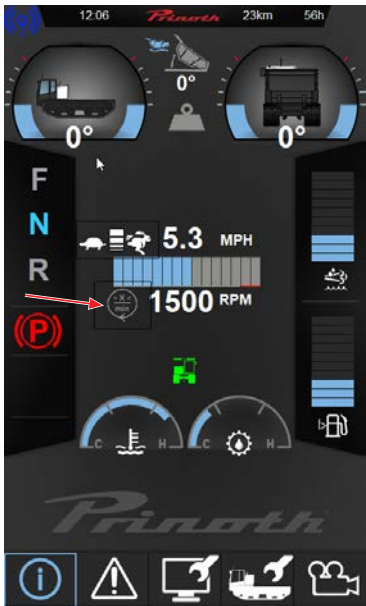
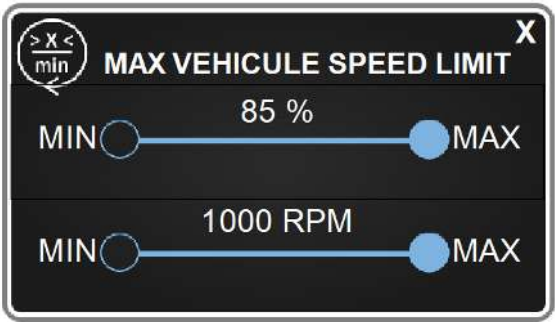


Illustration 66: Maximum speed limitation

- Tap to activate the function and hold for 2 seconds to select maximum vehicle speed limitation.

	Maximum vehicle speed limitation activated
--	--



This function allows you to scale the maximum speed desired to a specific RPM:

- Select maximum vehicle speed over RPM.

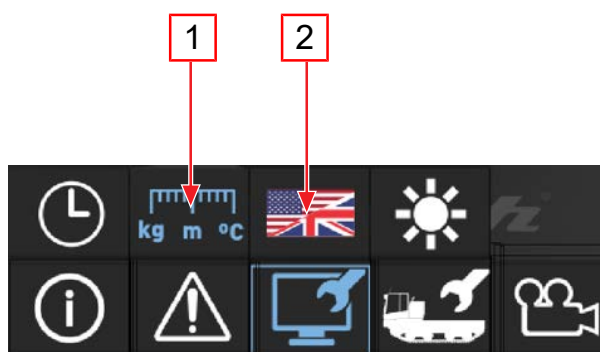
8.2.4 Set Up



Illustration 67: Input/Output signals - Microcontroller No.1

8.2.5 Measuring units, time and language

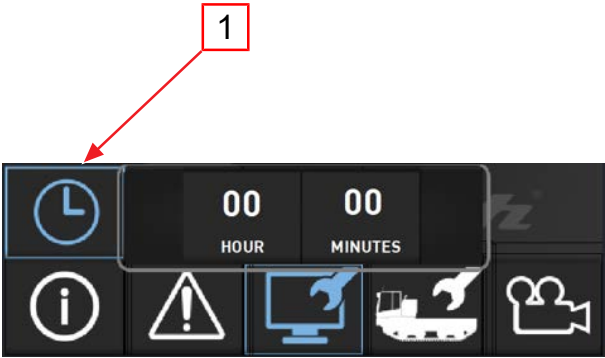
You find the following settings:



1	Select measuring units: metric/imperial	2	Language
---	---	---	----------



1	Brightness adjustment		
---	-----------------------	--	--



1	Set time		
---	----------	--	--

8.2.6 Menus with restricted access

There is a set of menus with restricted access. These menus cover calibration, acceleration and deceleration parameter, inclinometer settings. An other level of restricted menus provides access to advanced parameters only to be used by service technicians



Illustration 68: Access icon



Illustration 69: Enter the password to access to restricted menus

8.2.7 Clearing faults

A fault is an anomaly indicated by an icon, a high hydraulic oil temperature for example. Some anomalies also trigger flashing LEDs. Yellow LEDs are for minor faults while red LEDs are for major faults.



INFORMATION

All faults are not treated the same way by the microcontroller. Some have little impact (like fuel low level), some will generate a 50% cut in the drive signal to the drive pumps while some will prevent the vehicle from being set in motion.

The operator may dismiss the problem and continue to operate the vehicle. In that case, the warning indications on the screen will re-appear periodically.

To make the fault disappear:

1. Turn off the engine and re-start it, or:
2. Just activate the park switch and then deactivate it.

8.3 Audible Alarm

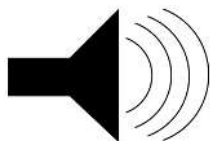


Illustration 70: Audible Alarm

Minor and major faults will trigger an audible alarm to alert the operator of an abnormal situation.

Other situations, if occurring, will trigger the alarm:

- Reaching the limit set on the inclinometer;
- Pressing the speed pedal when the parking brake is set;
- Moving the transmission lever when the parking brake is set;
- Detection of a low level on the DEF/AdBlue reservoir;
- Setting the vehicle in motion while the bump body (if equipped, Europe model) is not completely lowered;
- Microcontroller faults.
- Cold hydraulic oil (snow flake icon) ready to be cleared;
- High oil temperature in the planetaries.

8.4 Information Messages

To alert the driver, messages (popup) may appear on the display if a situation or a problem occurs.

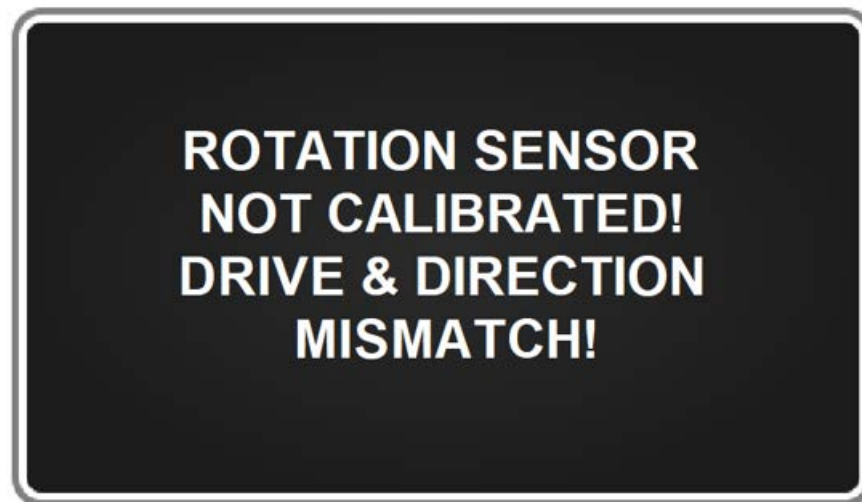


Illustration 71: Drive and direction mismatch message on the display

The message shown in the previous figure may occur when the rotation sensor fails or if its signal is no longer received by the microcontroller.

In this situation the upper frame can still rotate but :

- The alignment function is cancelled;
- The minor fault icon will appear on the display;
- The buzzer will sound;
- The default value is used by the microcontroller (the default value is the “normal configuration” regardless of the real configuration);
- The red inverted configuration icon will flash on the display;
- The green alignment icon will not appear;
- An entry will be logged in the fault log.

If this message appears, consult a mechanic at once for a service procedure. If the sensor is replaced, it will require a calibration.

8.5 Rear and right side view camera screen

The rear and right side cameras use the main display. The display will switch automatically to the camera view when the FNR is in reverse or when you tap the camera icon on the main screen. Use the rear view system to enhance dumping precision and to provide additional viewing angles for detecting potential obstacles.



WARNING

Crush hazard

Do not use the rear view camera as a safety feature. Bad lighting conditions or dirt on the lens could impair rear vision.

- a) Look directly at the rear or use a spotter to back up the vehicle or to safely dump a load.

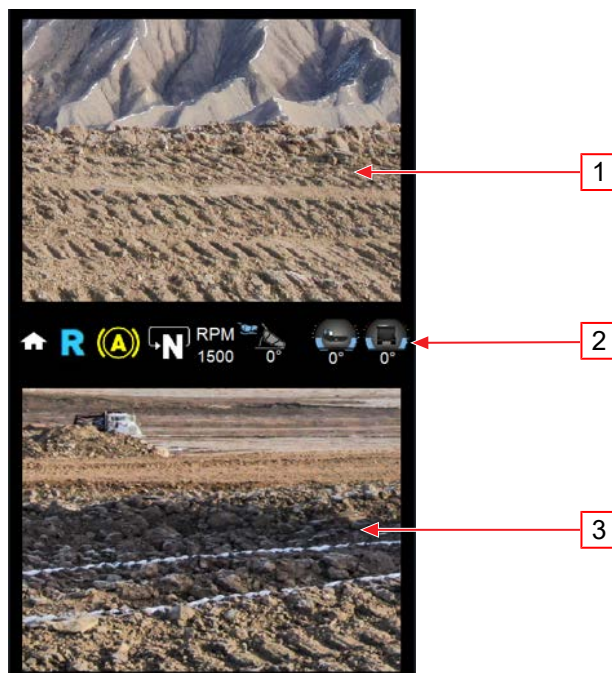


Illustration 72: Rear view camera screen

1	Side view camera display	2	Display of key information
3	Rear view camera display		

Access the rear view camera as follows:

1. Press the icon on the top menu to access the camera.



Illustration 73: Top menu layout

1	Rear view camera icon		
---	-----------------------	--	--

2. Check that you have access to the rear view camera.

9 Overhead Console

This section describes the controls mounted on the overhead console. Some items or components shown in this section may be optional or installed only on vehicles intended for specific countries or regions.

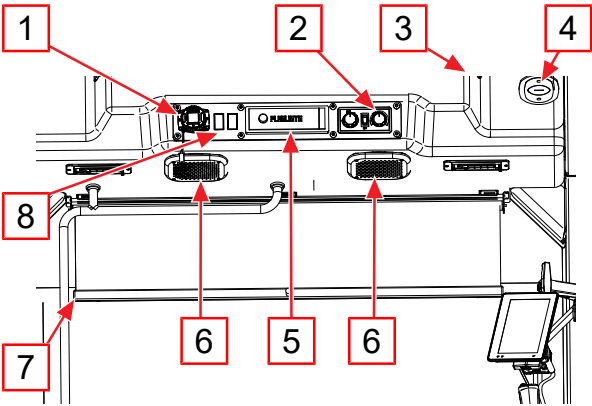


Illustration 74: Overhead console

1	Webasto coolant heater control	2	HVAC controls
3	Ceiling air vent (both sides)	4	Ceiling lamp
5	Radio (option)	6	Speakers
7	Roll down sun visor (option)	8	Space for extra switches (switches shown only for reference)

9.1 Radio Unit



Illustration 75: Radio (may differ from picture)

The radio is equipped with two loudspeakers and an antenna. Refer to the supplier literature for detailed operating instructions.

It is recommended to keep the volume adjusted so the operator is able to hear horn, alarm and other sounds which could help avoid an incident/accident.

Switch off the radio when not in use.

9.2 Directional Light Controls

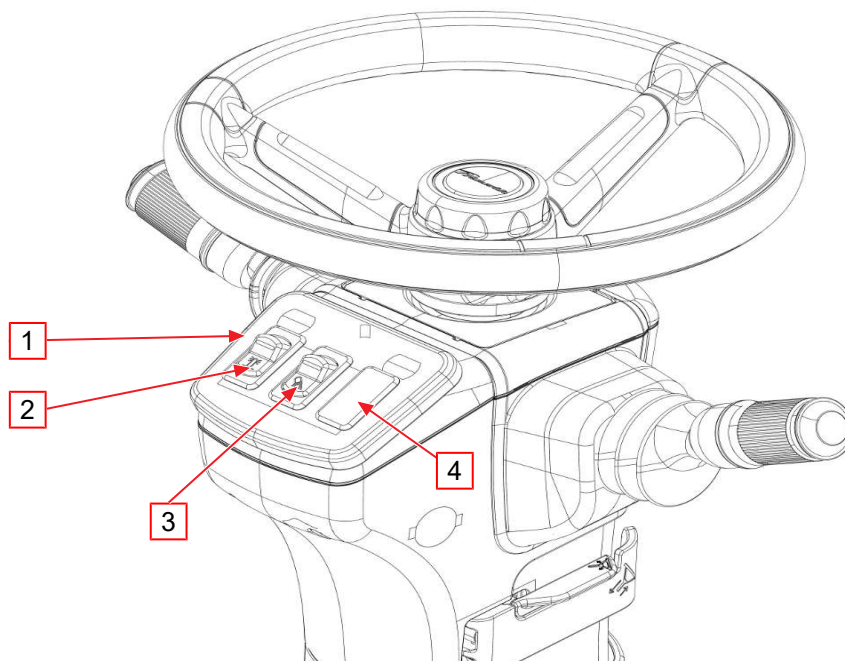


Illustration 76: Directional light controls

1	(Direction column)	2	Beacon light switch
3	Rear light switch	4	Mirror defrost (option)

9.3 Switches

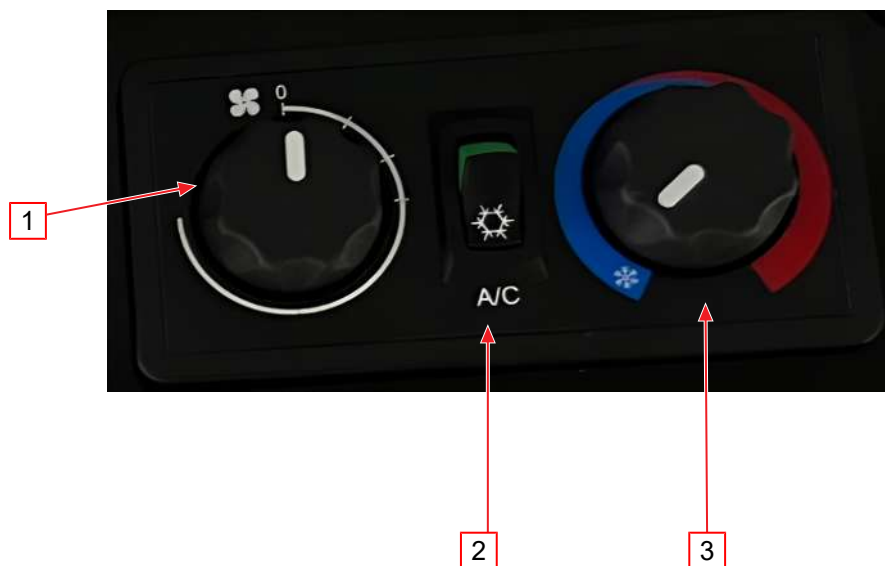


Illustration 77: Switches

1	Fan speed control knob	2	Air conditioning switch
3	Heater temperature control knob		

10 Components Inside the Cab

Some items or components shown in this section may be optional or installed only on vehicles intended for specific countries or regions.

10.1 Key



Illustration 78: Vehicle key

One key is required to operate the vehicle. It permits access/operate the following components:

- Ignition switch
- Cab door lock
- Cowling access panel
- Fuel tank filler cap, if applicable.

Copies of the key are available from the PRINOTH parts department.

10.2 Dome Light

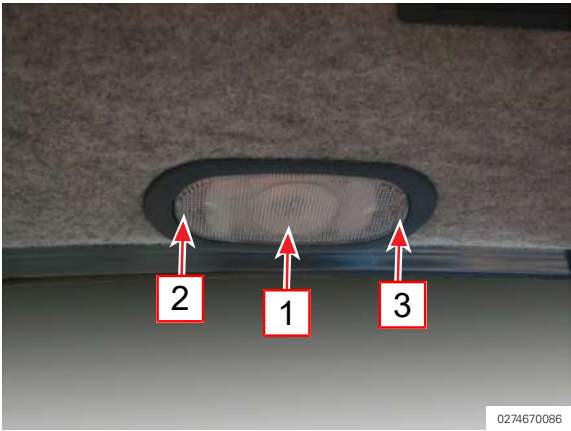


Illustration 79: Dome Light

1	Center position	2	Always ON position
3	Always OFF position		

Push on the front or rear edges of the lens to turn on or off the dome lamp.



INFORMATION

Leaving the dome light “on” when the diesel engine is not running could drain the batteries. Always turn off the dome light when not needed.

- a) Switch off the lamp when not in use.

10.3 Door

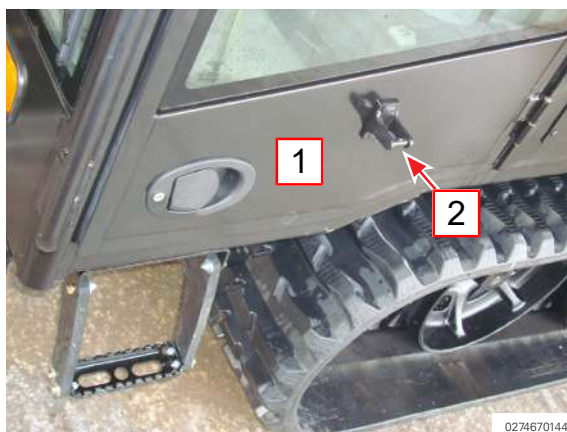


Illustration 80: Door

1	Cab door	2	Exterior door latch
---	----------	---	---------------------



⚠ CAUTION

Crush and impact hazard

An unsecured (unlatched) door could swing open or close and hurt someone in the process. Always secure the door fully opened or closed (with respective latches) before operating the vehicle.



⚠ CAUTION

Accident hazard

Driving the vehicle with the door opened could allow foreign objects to enter the cab and hit or distract the driver (or passenger) which could cause an accident.

- a) Always drive with the door fully closed unless work conditions requires an open door.

The door is equipped with two latches so it can be secured in the fully opened or fully closed position.

Unless required by the type of work, it is recommended to drive the vehicle with the door closed.

10.3.1 Exterior door handle



Illustration 81: Exterior door handle with key hole

Pull out the door handle to open the door. To lock or unlock the door, insert the key and turn 90°. The door lock uses the same key as the ignition switch.

10.3.2 Exterior door latch



Illustration 82: Exterior door latch (to secure door in a "latched-open" position)

The exterior door latch is used to secure the door completely opened. Push the door firmly on the cab side wall to engage the latch.

10.3.3 Interior door handles



Illustration 83: Interior door knob

To open a fully closed door from the interior of the cab, push down the interior door knob and push out the door.

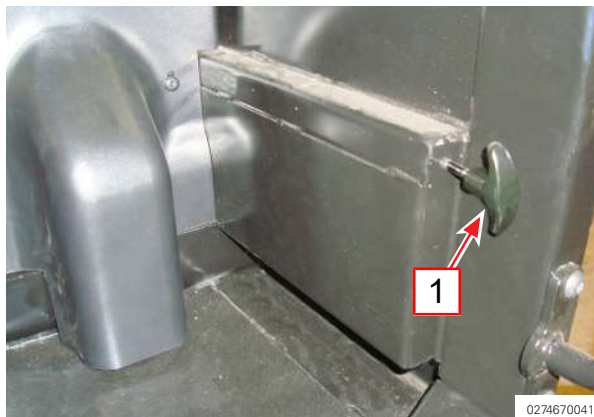


Illustration 84: Interior door T-handle

1	Interior door T-handle (to release a "latched-open" door)		
1	Interior door T-handle (to release a "latched-open" door)		

To close a "latched-open" door, pull forward the T-handle at the bottom of the left cab wall and swing the door to close it.

10.4 Left Lateral Window

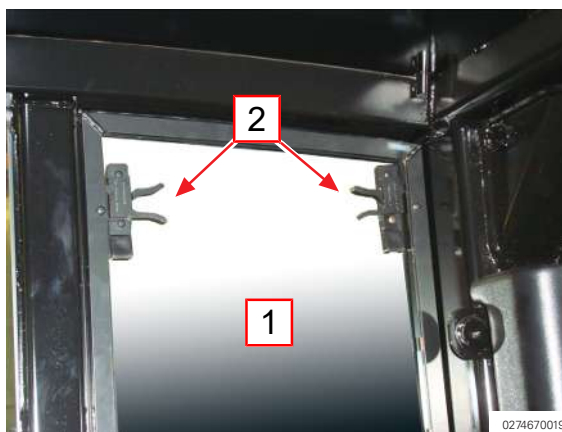


Illustration 85: Left Lateral Window

1	Lateral window	2	Tabs
---	----------------	---	------

Use the tabs to open, close or lock in position the left lateral window.

To slide the window up or down, squeeze together the top and bottom tabs on each side of the window, then move the window up or down as desired. Release the tabs to lock in position on the nearest notch.

10.5 Right Side Front Window



Illustration 86: Right Side Front Window

1	Window latch	2	Right side front window
---	--------------	---	-------------------------

The right side front window can be opened partially to allow fresh air in the cab. Use the latch to lock the window opened or closed.

The latch may be disconnected by pulling out the locking pin.

10.6 Cab Storage Net



Illustration 87: Storage net

There is a storage net on the right side of the cab, under the window.

10.7 Cab Air Vents and Grill

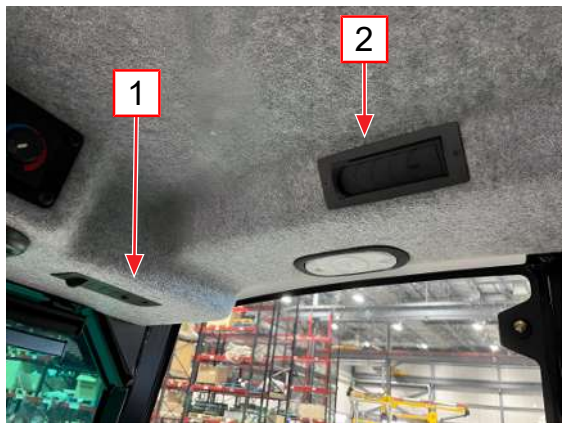


Illustration 88: Cab

1	Ceiling air vents (on both sides)	2	Ceiling air vents (on both sides)
---	-----------------------------------	---	-----------------------------------

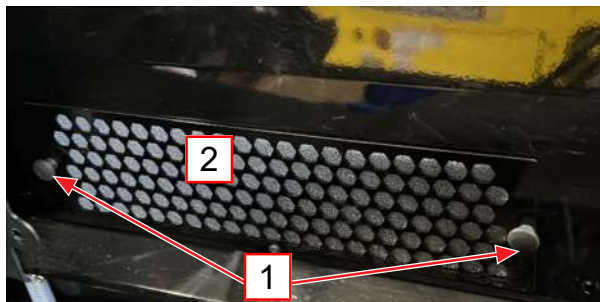


Illustration 89: Grill

1	Grill locking nuts	2	Air filter
---	--------------------	---	------------

The space behind the seat contains a housing with some of the heating/air conditioning components. The cab interior air filter is located behind the grill.



INFORMATION

Do not block the air inlet grill, as it will affect the ventilation performance.

1. Adjust the cab air vents as desired for air circulation. The air vents are located on the ceiling liner and on the floor.



NOTICE

Damage hazard

The difference in temperature could break the glass.

Do not block the grill with rags, gear or objects that could disrupt the air flow. Blocked air flow will prevent good ventilation and proper operation of the air conditioner.

- a) Do not direct a hot air flow from the air vents directly on a cold windshield or cold window.

Ensure the change of temperature on the windows is gradual.

10.8 Tilt Sensor

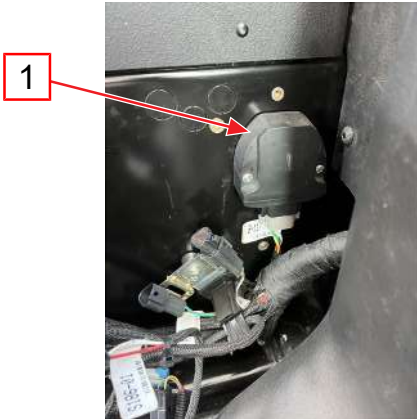


Illustration 90: Tilt Sensor

1	Vehicle tilt sensor		
---	---------------------	--	--

If installed, the tilt sensor will emit a warning sound when the vehicle reaches a pre-selected angle while riding on a slope. It helps the driver to be more vigilant, to better evaluate the steepness of the terrain and to select the best path for the vehicle.

The factory default setting for the slope indicator please refer to the technical data section “Performance [► 196]”.



 WARNING

Tip over hazard

Exceeding the gradeability of the vehicle could result in tip over. Equipment installed could lower vehicle capability.

- a) Remain vigilant when approaching critical angles and when the tilt sensor sounds.

If equipment is installed, it could lower the vehicle capability and the equipment itself may have limitations different from the ones of the empty vehicle. The equipment installer should ensure the tilt sensor is re-programmed if required.

10.9 Standard Driver Seat



Illustration 91: Standard driver seat

1	Seat net	2	Handwheel for lumbar support adjustment
3	Headrest detachable and adjustable vertically	4	Handwheel for armrest angle adjustment
5	Handle for backrest angle adjustment	6	Air suspension
7	Handle for fore and aft adjustment	8	Weight and height indicator
9	Handle for weight and height adjustment	10	Handle for seat pan angle adjustment
11	Handle for seat depth adjustment		

For further information check the Grammer manual.

10.9.1 Standard seat adjustments

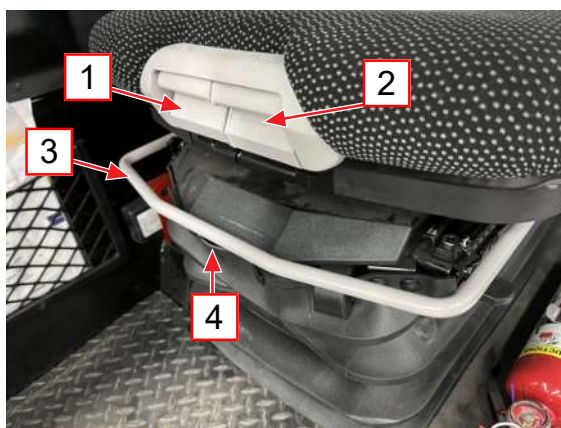


Illustration 92: Seat adjustments

1	Handle for seat depth adjustment	2	Handle for seat pan angle adjustment
---	----------------------------------	---	--------------------------------------

3	Handle for fore and aft adjustment	4	Handle for weight and height adjustment
---	------------------------------------	---	---

Seat depth adjustment:

1. Pull the right handle upwards to adjust the depth of the seat cushion.
⇒ By moving the seat cushion backwards or forwards you can reach the desired seating position.

Seat pan angle adjustment:

1. Pull the left handle upwards to adjust the seat cushion and angle adjustment.
⇒ By exerting pressure on or off the front or rear part of the seat pan you can move it to the desired angle position.

Fore/aft adjustment:



⚠ WARNING

Risk of accident

- Locking the handle while driving can cause an accident.
- a) Do not operate the locking lever while driving.



⚠ CAUTION

Crush hazard

- Adjusting the seating position carelessly can pinch your fingers.
- a) Move slowly while adjusting the seating position.

1. Lift the Fore/aft adjustment handle to release the adjustment.
⇒ After the adjustment you should not be able to move the driver's seat into another position.

Do not lift the handle with your leg or calf.

Weight and height adjustment:

1. Sit in the driver's seat to make weight adjustments.
2. You can adjust the weight and the seat height by pulling out or pushing in the handle.
⇒ You should see the green marking in the weight and height indicator.

To avoid damage, do not operate compressor for more than 1 minute.

10.9.2 Armrest and backrest angle adjustment



Illustration 93: Armrest and backrest adjustment

1	Handwheel for armrest angle adjustment	2	Handle for backrest angle adjustment
---	--	---	--------------------------------------

Armrest adjustment:

1. Move the Handwheel to adjust the armrest

Backrest adjustment:

1. Move the backrest Handle in the desired position to adjust the backrest,
⇒ You should not be possible to move the backrest into another position when it is locked.

10.9.3 Handwheel for lumbar support adjustment



Illustration 94: Lumbar support adjustment

1	Handwheel for lumbar support adjustment		
---	---	--	--

To increase the seating comfort and the performance:

1. You can turn the handwheel to the left or right to adjust both, the height and curvature of the backrest cushion.

10.10 Premium Driver Seat

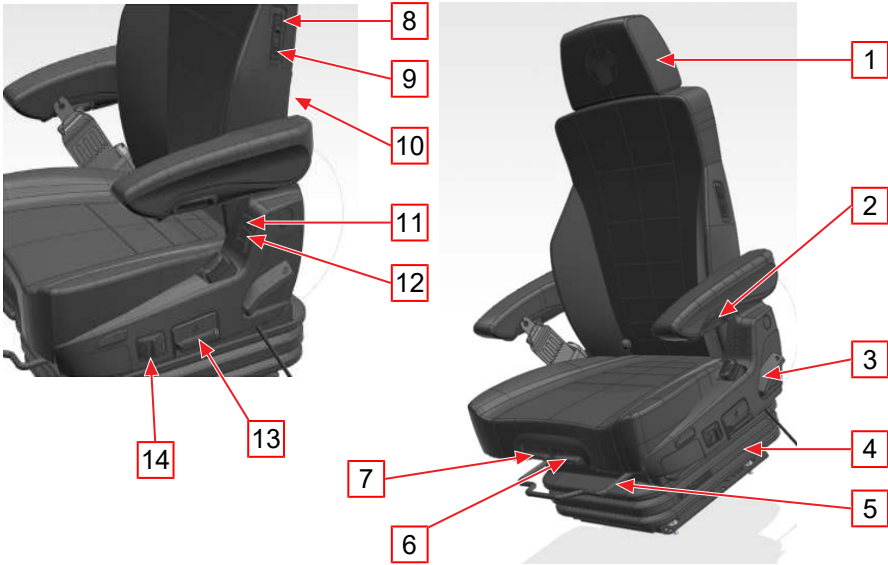


Illustration 95: Premium driver seat

1	Headrest detachable and adjustable vertically	2	Handwheel for armrest angle adjustment
3	Handle for backrest angle adjustment	4	Air suspension
5	Handle for fore and aft adjustment	6	Handle for seat pan angle adjustment
7	Handle for seat depth adjustment	8	Switch for active climate
9	Switch for air conditioning	10	Seat net (behind seat)
11	Rocker switch for side contour adjustment	12	Two rocker switches for lumbar support
13	Handle for height and weight adjustment	14	Handle for vertical shock absorber adjustment

For further information check the Grammer manual.

10.10.1 Weight and height adjustment

Pull out or press in the handle to alter the seat height as follows:



Illustration 96: Height adjustment

1	Handle for height and for weight adjustment		
---	---	--	--



INFORMATION

To avoid damage, do not operate the compressor for more than 1 minute.

10.10.2 Headrest height/angle and backrest adjustment

You can adjust the height of the headrest extension individually by pulling it upwards over the various increments up to the end stop or pulling on it:



Illustration 97: Headrest extension

1	Backrest extension		
---	--------------------	--	--



INFORMATION

To remove the headrest extension, pull it over the end stop.

Backrest adjustment:

Adjust the backrest using the locking lever as follows:



Illustration 98: Backrest adjustment

1	Backrest adjustment		
---	---------------------	--	--



INFORMATION

Ensure the locking lever latches into the desired position. The headrest should not be movable when locked.

10.10.3 Bottom cushion weight adjustment (suspension seat)

To prevent damage to health, check and adjust the setting for the driver's weight as necessary before driving the vehicle. Adjust the seat for the driver's weight while the driver is sitting on it by pulling out or pushing in the handle.



INFORMATION

To avoid damage, do not operate the compressor for more than 1 minute.

10.10.4 Fore and aft adjustment

Activate the fore/aft handle under certain driving conditions to better absorb shock impacts in the driving direction with the driver's seat as follows:



⚠ WARNING

Risk of accident!

Locking the handle while driving can cause an accident.

- a) Do not operate the handle while driving.



⚠ CAUTION

Crush hazard

Adjusting the seating position carelessly can pinch your fingers.

- a) Move slowly while adjusting the seating position.



Illustration 99: Fore/aft adjustment

1	Handle for fore and aft adjustment		
---	------------------------------------	--	--

1. Lift the handle to release the fore/aft adjustment for the driver's seat and the control carrier equipment.
2. After making the adjustment, ensure the locking lever latches into the desired position with an audible click.
⇒ The driver's seat do not be movable once it is locked.
3. Do not lift the locking lever with your leg or calf.

10.10.5 Armrest angle adjustment

Fold up the armrests if required and individually adjust the height as follows:



Illustration 100: Armrest adjustment

1	Handwheel for armrest angle adjustment		
---	--	--	--



INFORMATION

Adjust the inclination of the armrests by turning the handwheel.

10.10.6 Seat cushion depth and angle adjustment

Individually adjust the angle and depth of the seat pan as follows:

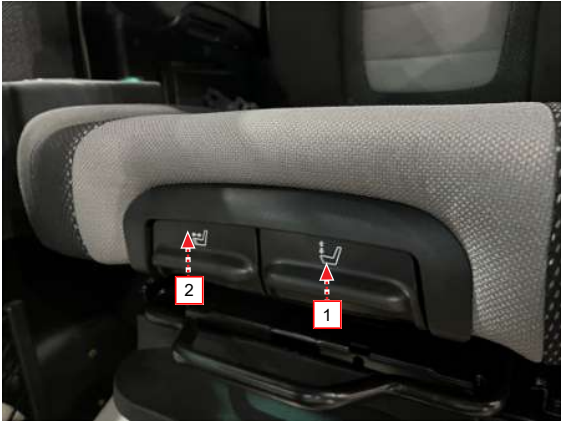


Illustration 101: Seat pan angle and depth adjustment

1	Seat pan angle adjustment	2	Seat depth adjustment
---	---------------------------	---	-----------------------



INFORMATION

To adjust the angle of the seat pan, pull the left handle upwards (1) and exert pressure on the front or rear part of the seat pan to move it to the desired angle.

To adjust the depth of the seat cushion, pull the right handle (2) upwards and move the seat cushion backward or forward to reach the desired seating position.

10.10.7 Lumbar Support Adjustment

Move the switch to individually adjust the height, side contour and curvature of the backrest cushion:



Illustration 102: Lumbar and side support

1	Rocker switches for lumbar support	2	Rocker switch for side contour adjustment
---	------------------------------------	---	---



INFORMATION

This enhances both seating comfort and driver performance

10.10.8 Seat Damper



Illustration 103: Dampening mode

1	Handle for dampening mode adjustment		
---	--------------------------------------	--	--

10.10.9 Seat Heating and active climate

Press the switches for the respective function:



Illustration 104: Heating and cooling

1	Switch for seat heating	2	Switch for active climate
---	-------------------------	---	---------------------------

10.10.10 Seat Storage Pocket

The seat net is located behind the seat.

10.11 Passenger Seat



Illustration 105: Passenger seat

1	Handle for backrest angle adjustment	2	Handle for weight adjustment
3	Handle for fore and aft adjustment		

If it is required to break the rear window on a two-seat cab for an emergency exit, tilting forward the backrest of the passenger seat may help to obtain a better access.

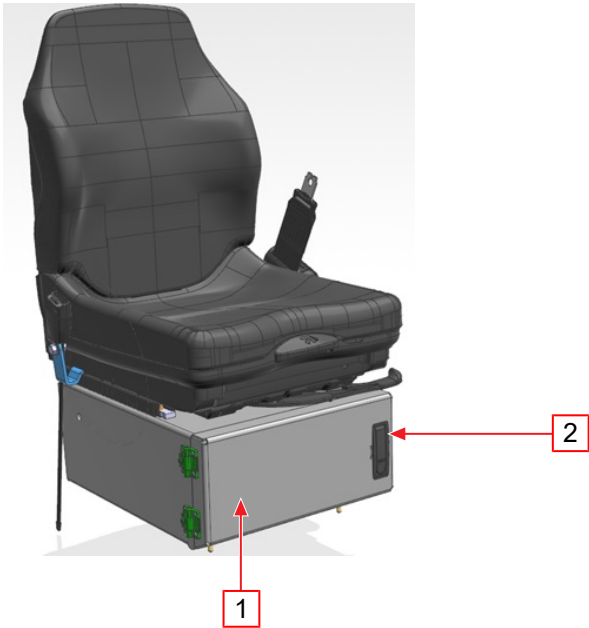


Illustration 106: Passenger seat storage

1	Storage box	2	Lever
---	-------------	---	-------

10.11.1 Fore and aft adjustment



1	Fore/aft adjustment handle		
---	----------------------------	--	--

You can release the fore/aft adjustment by lifting the locking lever:



⚠ CAUTION

Crush hazard

Adjusting the seating position carelessly can pinch your fingers.

a) Move slowly while adjusting the seating position.

1. Latch the locking lever into the desired position.

⇒ You should not be able to move the driver seat into another position when it is locked.

10.12 Seat Belts



Illustration 107: Seat belts

1	2 points, 3" seat belt for all seats		
---	--------------------------------------	--	--

Each seat is equipped with three point seat belt.



⚠ WARNING

Impact and crush hazard

The operator (and passenger if applicable) must wear the safety belt at all times.

a) Failure to do so may result in severe injury or death.

The vehicle is capable of very short braking distance, especially when the parking/emergency brakes are engaged. Therefore all occupants must wear their seat belt at all times when riding the vehicle.

Do not unfasten the seat belt while the vehicle is moving, brakes will be applied instantly.

Never drive the vehicle with the seat belt buckled behind the driver to avoid wearing it and to bypass the safety system. Never modify the seat belt systems in any way.

The safety belt of the driver seat is equipped with a contact switch. If the safety belt of the driver is not fasten, then:

- The transmission system is disabled and the brakes are applied;
- A fault on the micro-controller cannot be cleared;
- An warning icon will appear on the LCD display;
- If already in motion, the vehicle will stop.

If the vehicle was stopped because of an unfasten seat belt, it is required to return the transmission to the neutral point and release the speed pedal before a new drive command can be executed.

If the vehicle was involved in an accident and repaired, the seat belt, seat and cab should be inspected by trained personnel.

Ensure the belt is well adjusted:

- The seat belt should be worn as low as possible on the hips;
- Ensure the belt is not twist on itself.

Use proper maintenance techniques:

- Perform regular inspection on every parts of the belt system;
- Never modify or disassemble the seat belt;
- Never bleach, dye or use strong cleanser on the seat belts, chemicals can weaken them;
- If seat in not working properly, see a PRINOTH authorized dealer for repair or replacement;
- Inspect the belt, its anchor point and related components yearly. Replace at the first sign of damage or wear.

10.13 Fire Extinguisher



Illustration 108: Fire extinguisher (may differ from picture)

A fire extinguisher is located on the floor at the left of the operator's seat in the cab.

1. Ensure that extinguisher is full and ready to be used before starting engine.
2. Do not place objects on or near the extinguisher so it remains easy to reach at all times.
3. Agitate the fire extinguisher vigorously to loosen caked chemical compound at regular intervals.
4. If replacing the unit, use one of the same type.

Additionally:

1. If equipped, ensure the pressure indicator shows the extinguisher is ready and operational. If not, have the extinguisher checked and refill by experts;
2. Have the extinguisher checked by experts every year to ensure proper operation;
3. Extinguisher must be refilled after each use by a certified facility;
4. Ensure extinguisher is held firmly in place while the vehicle operates.

10.14 First Aid Kit



Illustration 109: First aid kit

A first aid kit is included with the vehicle and located in the cab. Use as required.

Ensure the kit is good condition (inspect yearly) and refurbish after each use.

10.15 Cab Accessories

Cab accessories are provided for the comfort and safety of the operator. It includes the following:

- Coat hooks;
- Radio speakers;
- Handles to enter/exit the cab.

10.16 Manuals, Tools and Accessories

10.16.1 Document case and literature



Illustration 110: Document case

The document case contains a paper version of the Operating and Maintenance Manual (present manual).

The Parts Catalogue of the vehicle is provided in an electronic format on the USB flash drive (the present manual is provided as well).



Illustration 111: USB flash drive

The files (in pdf format) can be consulted on a computer equipped with the Adobe® Reader® software. The software is available free of charge and can be downloaded from Adobe's web site.

Also in the document case is the Limited Warranty Policy Form, the Delivery Inspection Form and a pencil.



INFORMATION

Adobe® Reader® are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.



INFORMATION

The USB flash drive is not write protected and thus the files it contains can be erased or deleted. It is recommended to make a backup copy of the files.

10.16.2 Terminal extractor

A terminal extractor is included with the vehicle to extract terminals from an electrical connector if needed for a repair, troubleshooting or installation of equipment.

Also with the vehicle is a key holder, a quick reference card (engine start procedure) and some hand tools.

10.17 Emergency Drive Module



Illustration 112: Emergency drive module

In the event of an emergency involving the failure of the steering wheel potentiometer, the transmission selector, the speed pedal potentiometer or the microcontroller, the emergency drive module can be used. **This module must only be used for an emergency return to base or to test the brakes. Do not use it under any other circumstance.**



WARNING

Collision hazard

The emergency drive module does not provide the same precision as the steering wheel. The operator could lose control of the vehicle which may result in severe injuries or death.

- a) Read and understand all operation procedures before using the emergency drive module.



WARNING

Accident hazard

If the vehicle is in the inverted configuration, the controls of the emergency drive module will be inverted.

- a) Use extreme caution when selecting the direction of motion.

Do not perform work with a partially disabled vehicle. Refer to the Maintenance section for instructions on how to use this device.

11 Components Outside the Cab

Some items or components shown in this section may be optional or installed only on vehicles intended for specific countries or regions.

11.1 Battery Isolator Switch

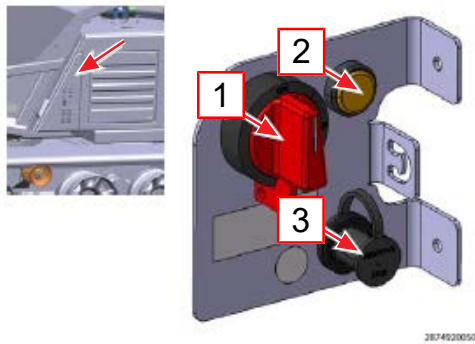


Illustration 113: Battery Isolator Switch

1	Battery isolator switch (in the “ON” position)	2	Electric circuit shutdown indicator
3	Negative battery post (remote)		

The battery isolator switch is located behind the rear access panel on the right side of the cowl. The switch connects (ON) or disconnects (OFF) the positive poles of the batteries from the electric circuit of the vehicle. In the OFF position, a padlock can be installed to secure the switch setting. Its function is as follows:

- Prevent a battery discharge during vehicle shipping or storage;
- Protect service technicians from danger caused by inadvertent engine crank or start.



NOTICE

Freezing hazard

If the battery isolator switch is turned off immediately, the DEF/AdBlue® could be trapped in hoses and freeze in cold temperature, causing damage to the system components.

- a) Wait until the amber light turns off before turning off the battery isolator switch after the diesel engine shut down.

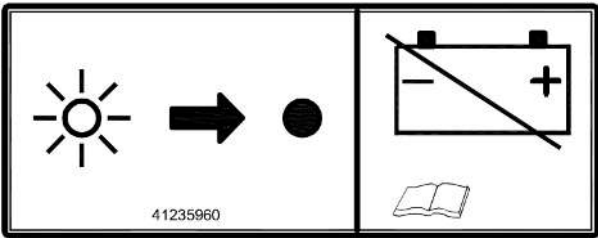


Illustration 114: Amber light warning sticker

Before turning OFF the battery isolator switch, wait until the amber light turns off. The delay enables some specific components to complete a full shutdown.

When turning ON the battery isolator switch, allow 30 seconds before switching ON the ignition.

Unless an emergency occurs, do not turn off the battery isolator switch if the engine is running. A voltage peak could damage electronic components.

If welding is performed on accessories attached to the vehicle, turn off the battery isolator switch AND disconnect the batteries. Refer to the maintenance section for further precautions.

11.2 Auxiliary Control Valve

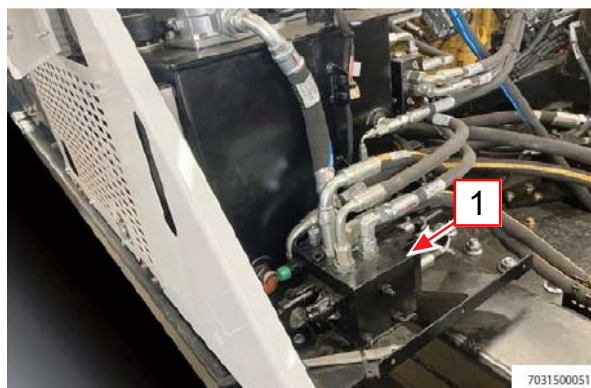


Illustration 115: Auxiliary Control Valve

1	Auxiliary control valve		
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The auxiliary control valve is located behind the panel on the left side of the cowling, aft of the hydraulic reservoir. It can be used to lower the dump body when the diesel engine does not run. However, the valve will operate only if the vehicle has good batteries and the ignition key is in the ACC position.



WARNING

Crush hazard

Lowering the dump body could crush someone or objects located underneath.

- Observe all safety precautions when operating the dump body.
- Ensure nobody is around and that no object lies underneath.

To operate the valve, proceed as follows:

- Locate and get hold of the removable lever (usually attached by a cable tie on the upper right corner of the access panel on the cowling left side).
- Gain access to the auxiliary control valve.
- Install the lever on the valve actuating pivot.
- Turn the ignition key to the ACC position.
- Ensure the dump body can be safely lowered;
- Ensure the dump body safety rod is removed and stowed;
- Operate the lever to lower the dump body.
- Return the ignition key switch to the OFF position.
- Remove and stow the removable lever.

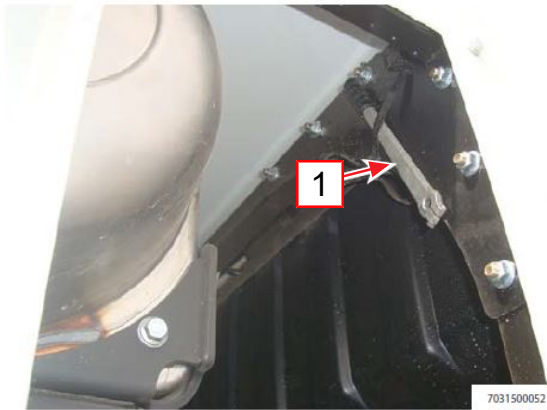


Illustration 116: Auxiliary Control Valve

1	Removable lever for auxiliary control valve - stowage location		
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11.3 Track Tension Release Levers

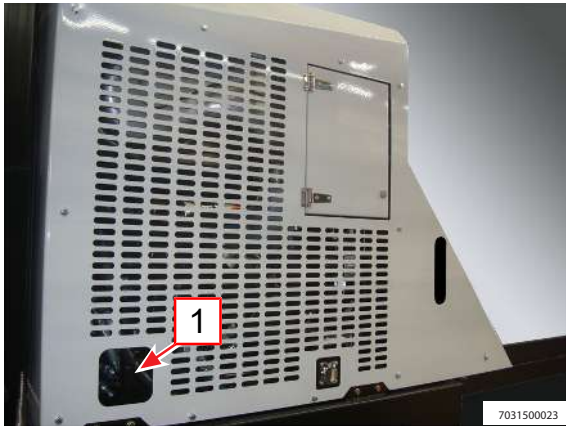


Illustration 117: Track Tension Release Levers

1	Location of the track tension control levers		
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The pressure control levers are located inside the cowling, through the opening on the left side. One lever controls the right track tension, the other controls the left track tension.

When the lever is in the vertical position, the track will be under tension while the engine runs.



NOTICE

Risk of damage

Leaving the engine running for more than a few minutes could cause permanent damage. Track tension should be activated if the diesel engine runs.

a) Turn off the diesel engine if the track tension is released.

When the lever is in the horizontal position, the track tension is released.

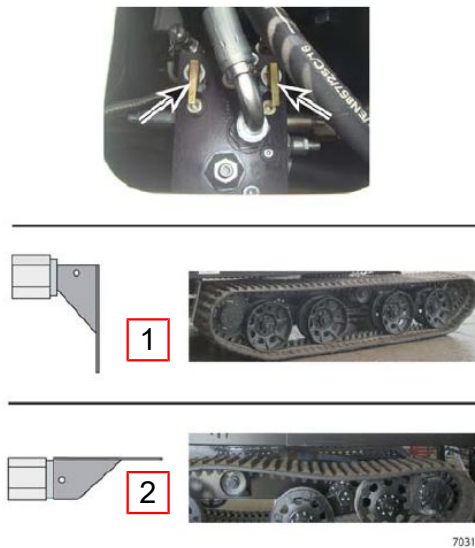


Illustration 118: NOTE: Panther generic picture

1	Lever in the vertical position (track tension applied)	2	Lever in the horizontal position (track tension released)
---	--	---	---

Ensure the track tension levers are in the vertical position before driving the vehicle. Setting the vehicle in motion with loose tracks could lead to detracking.

Track tension adjustment is automatic once the diesel engine is running and the vehicle rides a short distance.



INFORMATION

Use these levers to release track tension. Useful to facilitate removal of the sun gear when disengaging the planetary gearboxes.

11.4 Standard Air Filter



Illustration 119: Engine air Filter

1	Engine air filter		
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The engine air filter is located on top of the cowling. Refer to the Maintenance section for information on replacement of the filter cartridges. There is a rubber valve underneath the housing to purge the excess dirt without opening the housing.

11.5 Heavy Duty Air Filter

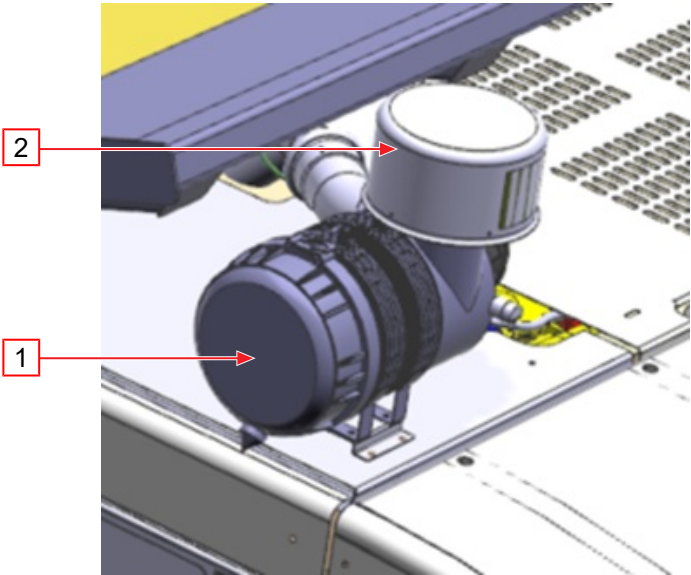


Illustration 120: Heavy duty filter

1	Cartridge filter	2	Pre-filter top spin to remove dust prior to enter the filter
---	------------------	---	--

The engine air filter is located on top of the cowling. Refer to the Maintenance section for information on replacement of the filter cartridges. There is a rubber valve underneath the housing to purge the excess dirt without opening the housing.

11.6 Fuel Filler Neck and Cap

On a vehicle with a modular frame the fuel tank filler cap is located behind the right side lateral access panel at the front of the cowling.

On a vehicle with a tub frame the fuel tank filler cap is located behind the cab on the vehicle left side.

In both cases, if the fuel cap is equipped with a lock, use the same key as for the ignition switch to open.

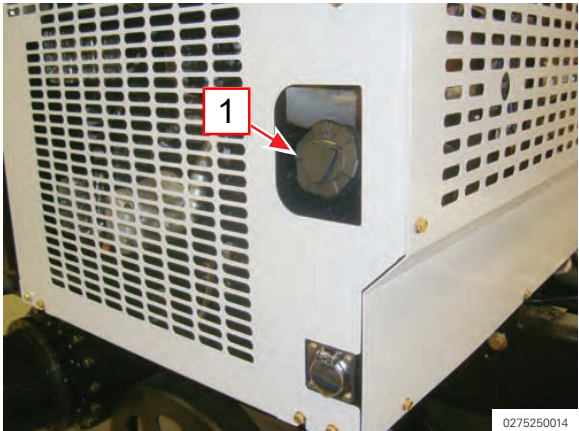


Illustration 121: Fuel Filler Neck and Cape

1	Fuel filler cap (may differ from picture) on a tub frame		
---	--	--	--

**⚠ DANGER****Explosion and fire hazard**

Fuel is flammable and explosive under certain conditions.

- a) Always manipulate in a well ventilated area.
- b) Do not smoke or allow open flames or sparks in the vicinity of the vehicle.
- c) Do not operate the engine cooling heater while refuelling. Failure to do so may cause injuries or death.

**SAFETY INSTRUCTIONS****Environmental protection**

Spilling fuel could harm the environment.

- a) Refuel the vehicle on level ground, avoid overfilling.

Use fresh diesel fuel of the appropriate type when refueling the vehicle. Observe following common safety practices when refueling:

1. Always manipulate fuel in a well ventilated area;
2. Do not smoke or allow open flames or sparks in the vicinity of fuel;
3. Do not refuel if engine is hot or running;
4. Avoid physical contact with fuel;
5. Regularly inspect fuel system components;
6. Wipe up any spilled fuel;
7. If fuel or fumes are noticed while driving, cause must be determined and corrected without delay;
8. Never open the fuel lines or remove the injectors if the engine runs out of fuel.

It is recommended to fill the tank at the end of each day of operation. This helps to prevent moisture from collecting in the fuel system.

If the engine shuts down because it ran out of fuel, refill the tank and crank the engine. Do not crank for more than 2 minutes as this could cause permanent damage to engine components.

11.6.1 Ultra low sulfur fuel

Ensure to use only ULSD (ultra low sulfur diesel) fuel.

**⚠ WARNING****Fire and explosion hazards**

Avoid static electricity risk when refuelling. Ultra low sulfur diesel (ULSD) poses a greater static ignition hazard than diesel formulation with a higher sulfur content.

- a) Follow fuelling standards for proper grounding and bonding practices.

Take all necessary precautions when refuelling with ULS diesel fuel.



NOTICE

Damage hazard

The engine must run on ultra low sulfur diesel (ULSD) fuel otherwise the engine may sustain permanent damage.

- a) Do not run the engine with regular diesel fuel.

Ultra Low Sulphur Diesel (ULSD) with a maximum fuel sulphur level of either 15 or 20 ppm is required. Fuel sulphur levels in excess of 20 ppm will rapidly damage the diesel particulate filter (DPF) and diesel oxydation catalyst (DOC), likely resulting in the need to replace the aftertreatment unit. Damage to the DPF and/or DOC may impact emissions.

Bio-diesel fuel may be used up to B20 (80% standard ULSD with 20% bio-fuel dilution by volume), provided an appropriate approved additive is used, refer to engine supplier for the acceptable specification. Use of a higher concentration will affect performance, durability and warranty conditions.

As bio-fuel is chemically more reactive than the mineral oil used in diesel fuel, it is imperative to consider the effects of this fuel on all components that it may come into contact with.

Obtain the advice from the your Prinoth representative if the use of bio-diesel is required.

11.7 DEF/AdBlue® Filler Cap

The DEF/AdBlue® (Diesel Exhaust Fluid) tank and filler cap are located behind the access panel at the front of the right side cowl.

Keep the cap closed to prevent contaminant intrusion and evaporation of the fluid.

Use only DEF/AdBlue® (urea solution) compliant with the ISO 22241-1 standard. Fluid that does not meet this standard could damage the emission control system.



NOTICE

Damage hazard

The operator should NEVER top off the DEF/AdBlue® tank.

- a) Fill until the nozzle stops flowing. Expansion from freezing temperature could damage the unit in case of overfill.
- b) Clean any spill since the DEF/AdBlue® solution is corrosive.

The DEF/AdBlue® level in the tank is indicated on the cab LCD display. Engine power adjustment and eventual shut down will occur in the event of insufficient or poor quality DEF/AdBlue® supply.

DEF/AdBlue® solution is typically colourless and clear. Changes to colour or clarity are indicators of quality problems.

11.8 Water Separator Drain Valve

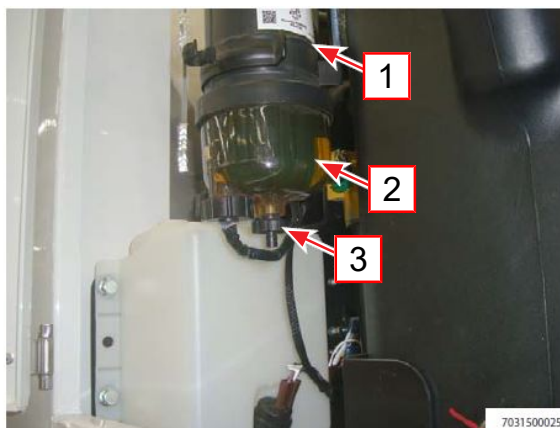


Illustration 122: Water separator drain valve

1	Fuel filter/water separator	2	Transparent bowl
3	Drain valve		

The valve is located behind the access panel at the front of the right side cowling. To drain the water in the clear bowl of the water separator, turn the valve knob. Return the valve knob to its original position once all the water is drained.

Check for presence of water daily (according to the local conditions).



SAFETY INSTRUCTIONS

Environmental protection

Spilling fuel could harm the environment.

- a) Use a recipient to collect water and fuel, stop drainage as soon as the clear bowl is empty of water.



INFORMATION

Water is heavier than fuel and will flow to the bottom of the clear bowl.

11.9 Radiator Filler Neck, Cap and Sight Glass

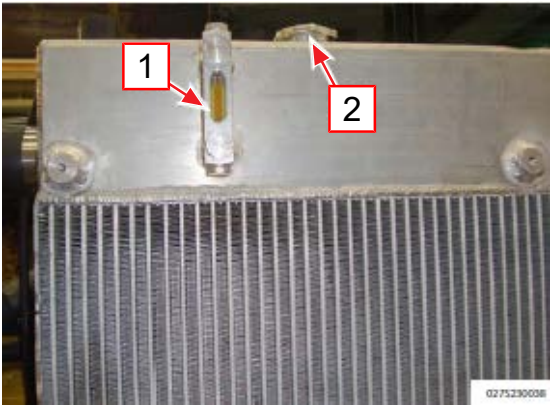


Illustration 123: Radiator filler neck

1	Engine coolant and fluid sight glass	2	Coolant reservoir filler neck and cap
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The radiator cap is accessible by removing a round cover on top of the cowling.

The engine coolant sight glass is visible through an oblong opening in the cowling lateral wall.

(Right side).



WARNING

Burn hazard

Never remove the coolant reservoir cap when the engine is hot.

a) To avoid severe burns, do not inspect the coolant system or attempt to add coolant if the engine is hot.

Ensure the coolant temperature is cool before checking the level or adding coolant in the radiator. Refer to “Engine Coolant Level” for details on the coolant level.

11.10 Engine Oil Dipstick

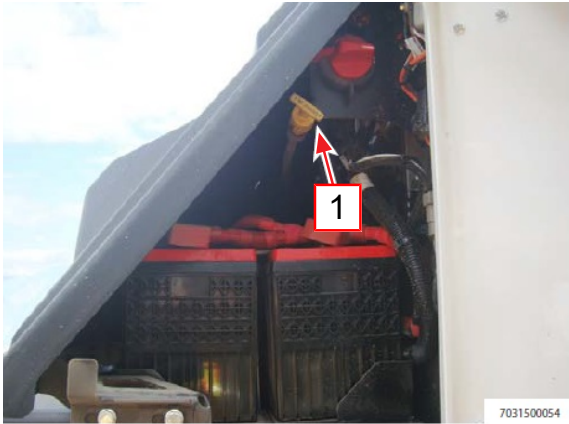


Illustration 124: Engine Oil Level

1	Engine oil dipstick		
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Check oil level when the engine is cool. To access the oil dipstick, open the rear access panel on the right side of the cowling. To unlock the dipstick, push the handle and turn it a quarter of a turn counterclockwise.

Allow 10 minutes between engine stop and oil level check.

The oil level should always remain within the marks on the dipstick.

Top up with the recommended oil if the level is low. The filling cap is located on the top of the engine valve cover. Access to the filling cap is done through the removable round cover on top of the cowl.

11.11 Heater Connector

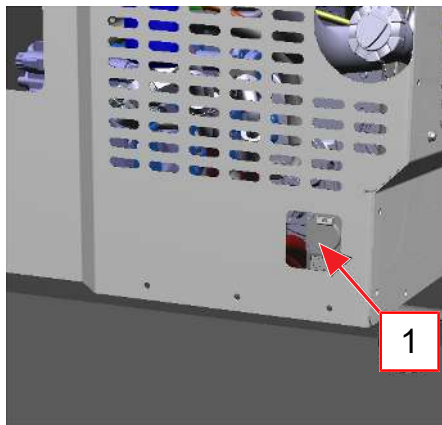


Illustration 125: Heater Connector

1	Heater connector under spring loaded cover		
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It is recommended to connect the heaters to an external electric power source for at least a few hours if the outside temperature drops below the freezing point. This will ease engine start, shorten time to set in motion and reduce wear on several components.

The vehicle heater connector is located behind the door, on the left side of the cab. Electric heaters are located in the engine block (to warm the coolant fluid) and in the hydrostatic oil reservoir.



NOTICE

Remember to disconnect the vehicle from the external power source before starting and getting the vehicle in motion.

11.11.1 Power cord for heater connector



NOTICE

Fire hazard

A power cord with an insufficient rating could overheat and cause a fire.

- Always select a power cord as short as possible and with a capacity higher than the combined heaters.

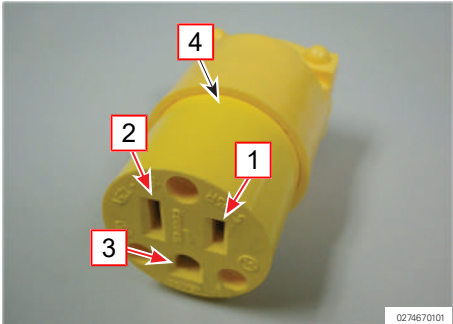
Heaters on the vehicle are either 120 or 240 volts. The vehicle electrical connector for the external power source is of North America type.

In North America, use a standard power cord.

In other parts of the world, proceed as follows to modify a power cord:

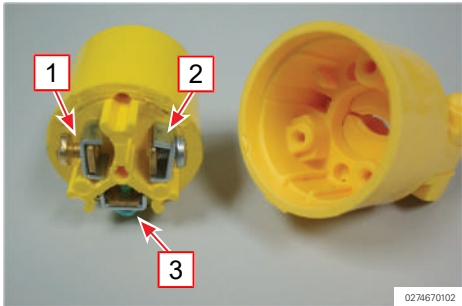
Ensure the voltage rating of the external power source is the same as the voltage rating of the heaters. The power cord is not supplied with the vehicle.

1. Find a power cord with the proper connectors for the external power source.
⇒ Follow all applicable standards for electrical cords or devices.
2. Cut and remove the female connector of the power cord and reconnect the wires to the supplied female connector. See the following figure for polarity.



1	L1 - Positive	2	L2 - Neutral
3	Protective earth - ground	4	Female connector for power cord

3. With the modified power cord, connect the female connector (shown here) to the vehicle and the male connector to the external power supply.



1	L1 - Positive (gold screw)	2	L2 - Neutral (silver screw)
3	Protective earth - ground		

4. Use the following power requirement to calculate the rating of the power cord according to its length:
⇒ With 240 volt heaters: about 5 amperes,
⇒ With 120 volt heaters: about 10 amperes.

11.12 Cab Heating Manual Valve (Option)

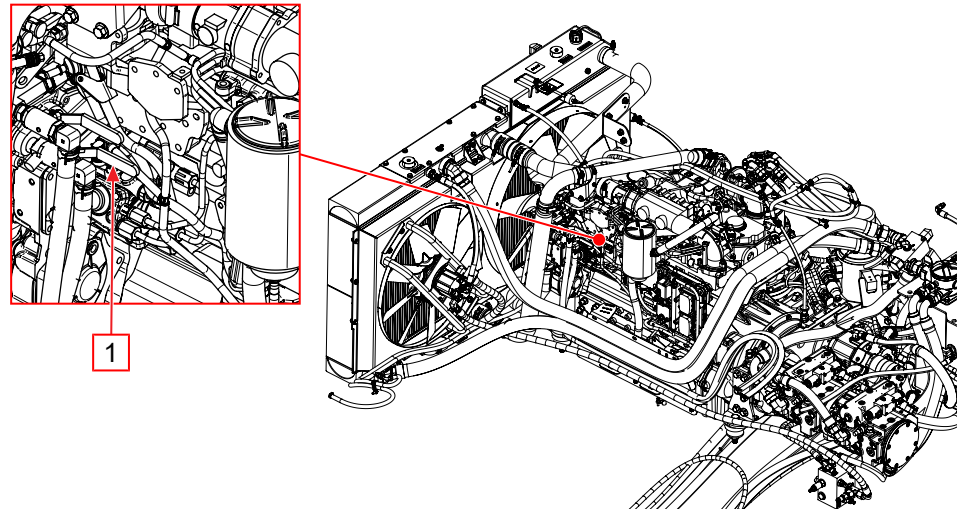


Illustration 126: Cab Heating Manual valves

1	Valves for cab heating		
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These valves are located behind the identified cowling panel.

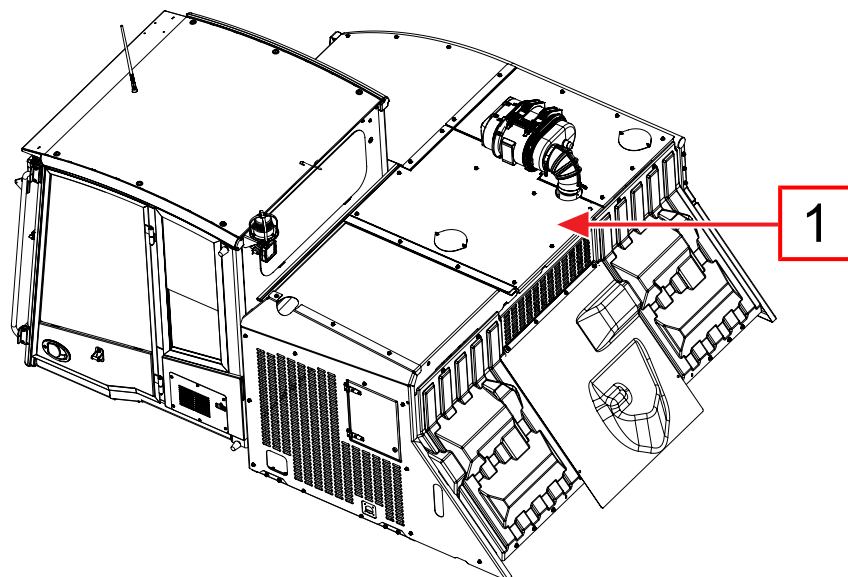


Illustration 127: Panel Cab heating manual valves

1	Panel for cab heating manual valves		
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If installed, the vehicle is fitted with a shutoff valves on the engine coolant line to the cab heater. Closing the valve will prevent the coolant from circulating in the cab heater unit.

11.13 Beacon Light



Illustration 128: Beacon light

If installed, the beacon light is located on top of the cab and is activated by a switch located on the over-head console.

11.14 Exterior Mirrors



Illustration 129: Exterior Mirrors

1	Left side exterior mirror		
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The left exterior mirror can be adjusted manually. The right exterior mirror is electrically adjusted with the knob on the right console.

Electrical heating, if installed, can be used for defrosting. Switch off the system when not in use. Non heated mirrors with flasher are an option.

11.15 Rear and right view Camera



Illustration 130: Exterior camera with low light capability

There are two rear view cameras. One is located below the right side mirror, the other is located under the rear end of the dump body.

Use the cameras to enhance the dumping precision and as additional viewing angles to detect potential obstacles.

Keep the lens clean on both cameras to ensure a clear image on the monitor in the cab. Do not clean with strong chemical. Wipe carefully with a damp cloth.

The cameras are equipped with infrared LED night vision system and heating elements to provide low temperature operation.

11.16 360 view cameras (optional)

The vehicle has 4 cameras in order to provide a 360 view.

The cameras are in the following positions:

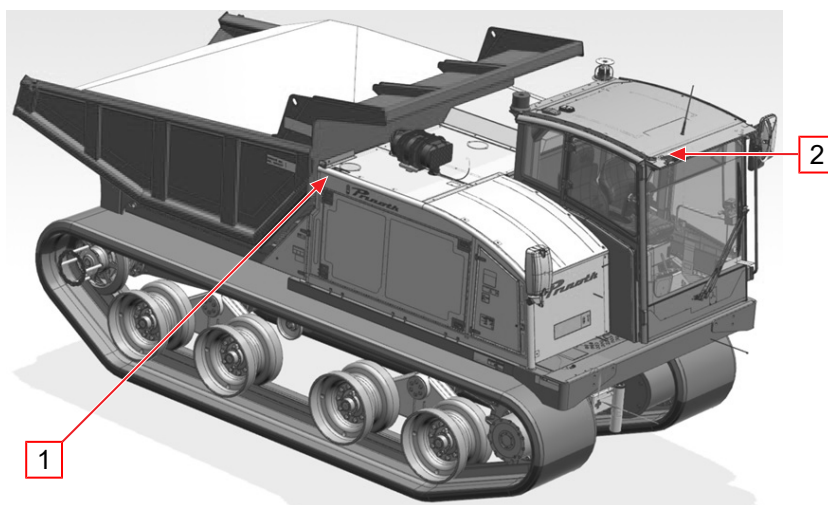


Illustration 131: Position 360 view cameras

1	Right camera	2	Front camera
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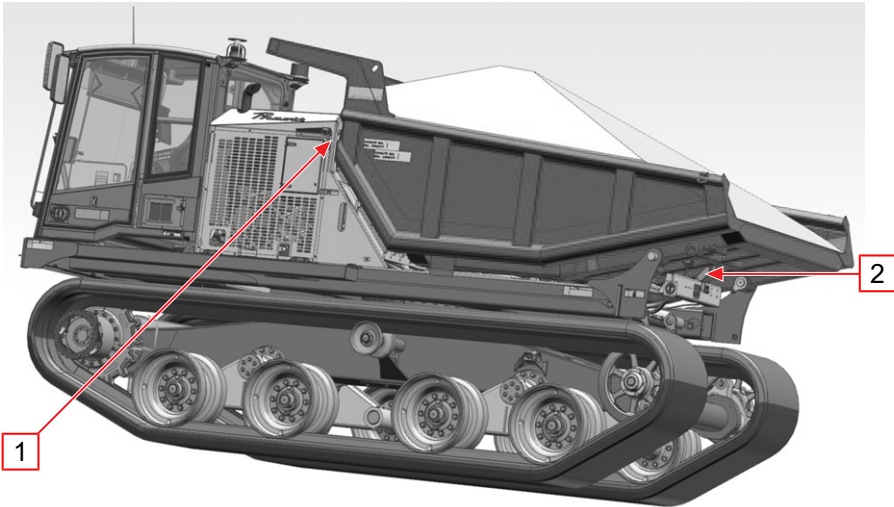


Illustration 132: Position 350 view cameras

1	Left camera	2	Rear camera
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In the cabin the operator can check the 360 visualization on the following 360 camera screen:

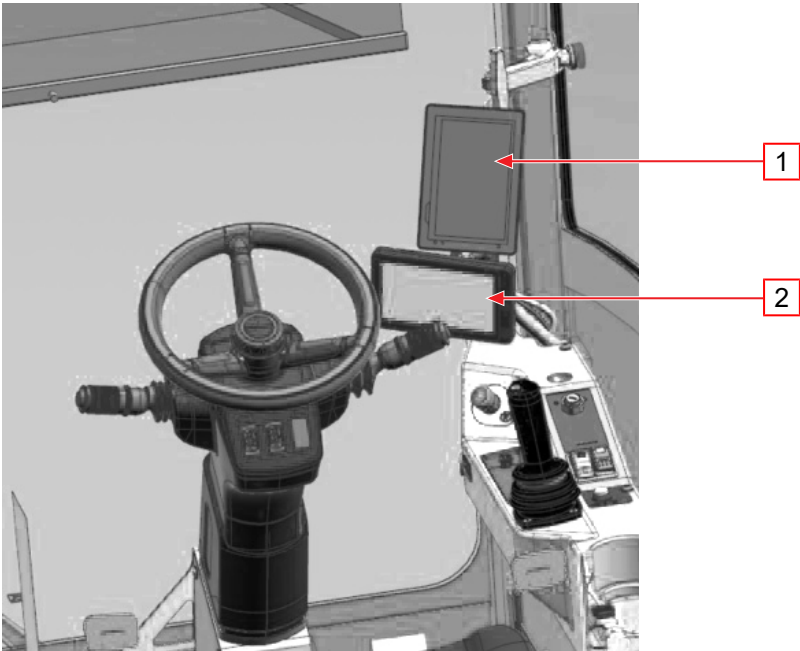
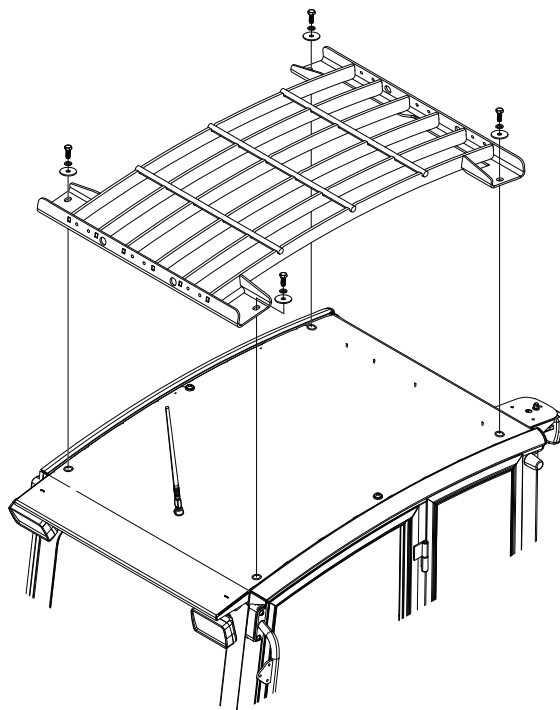


Illustration 133: Screens in the cabin

1	Vehicle screen	2	360 camera screen
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11.17 FOPS Structure



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Illustration 134: FOPS structure

A cab in compliance with the FOPS standard is available as an option or with specific vehicle configurations.

A grill adapted to the curve of the roof may be installed over the cab to conform with the FOPS (Falling Objects Protective Structure) standard. It is designed for areas where falling objects pose hazards to the occupant in the cab.

Do not alter the FOPS (Falling Objects Protective Structure) or its attaching hardware in any way as this could reduce its resistance to an impact.



DANGER

Crush hazard

Altering the roof grill structure (FOPS) could reduce its resistance to falling objects and cause severe injuries or death.

- a) Do not modify the grill and its attaching hardware in any way.

Never install a grill and attaching hardware other than the genuine PRINOTH parts.



INFORMATION

Failure to follow these directions and requirements will invalidate the FOPS certification.

11.18 Brush Guard

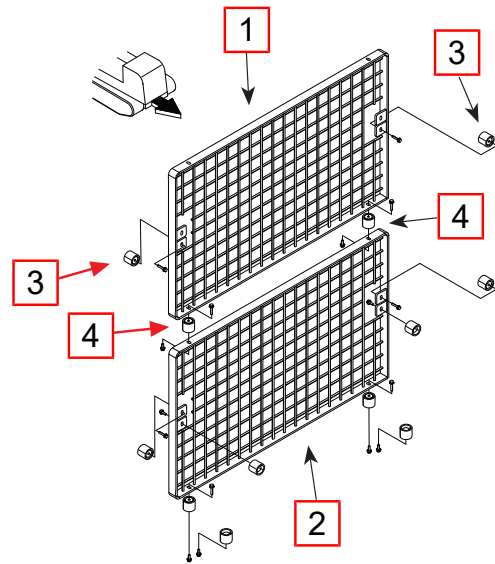


Illustration 135: Brush Guard

1	Brush guard upper section	2	Brush guard lower section
3	Upper fasteners	4	Lower fasteners

The front brush guard is divided in two removable sections (to provide better visibility if protection is temporarily not required). The top section can be stowed (“snapped”) in front of the bottom section.

To remove the top section, pull it forward to disconnect the top fasteners (item 3 on figure). Then, pull the unit upward to disconnect the lower fasteners (item 4 on figure). Store the section in a suitable location or relocate it in front of the bottom section (using the dedicated fasteners).

The brush guard is highly recommended when a winch is installed in front of the cab.

11.19 Cowling Access Panels and Openings

There are several access panels and openings on the cowling. Refer to the following for location and description.



⚠ WARNING

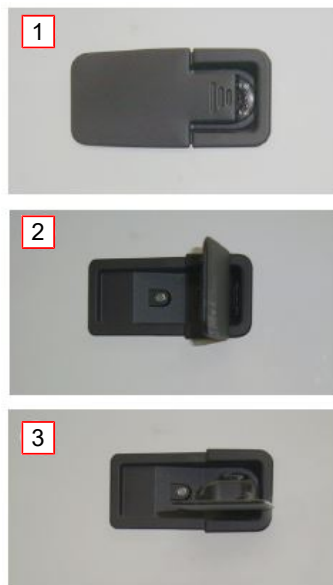
Burn hazard

Opening the engine cowling access panels or reaching in access holes of the cowling exposes hot components that can cause severe burns.

- a) Stop the diesel engine and let it cool down before opening access panels or reaching in the access holes of the cowling.

Ensure all access panels are closed and secure when operating the vehicle. Ensure the grills allow free air circulation (air and coolant radiator, oil cooler and cab air filter).

The following figures show the openings and the panel closing hardware.



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Illustration 136: Cowling Access Panels and Openings

1	Latch closed	2	Pull out the flap
3	Rotate the flap 90 degrees clockwise to open the panel		



Illustration 137: Cowling Access Panels and Openings - Key lock

1	Key lock		
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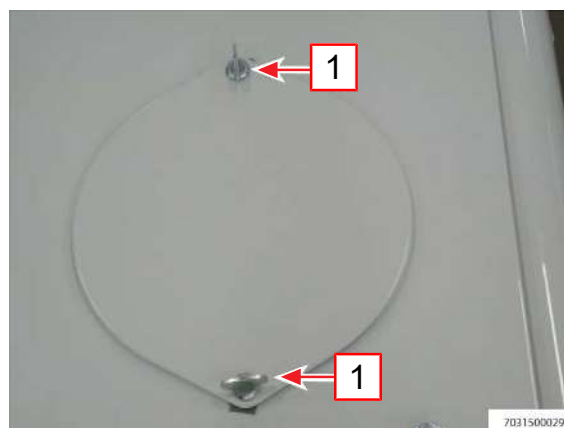


Illustration 138: Cowling Access Panels and Openings - Butterfly latches

1	Butterfly latches (unscrew/screw to open/close)		
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11.19.1 Right Side Access Panels

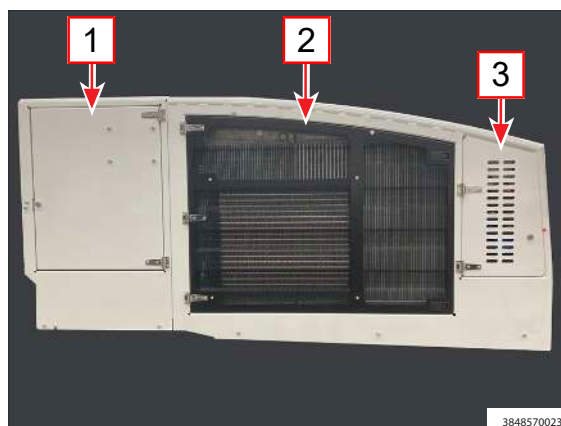


Illustration 139: Right Side Access Panels

1	Rear access panel	2	Radiator/cooler grill
3	Front access panel		

11.19.2 Top Access Openings and Covers

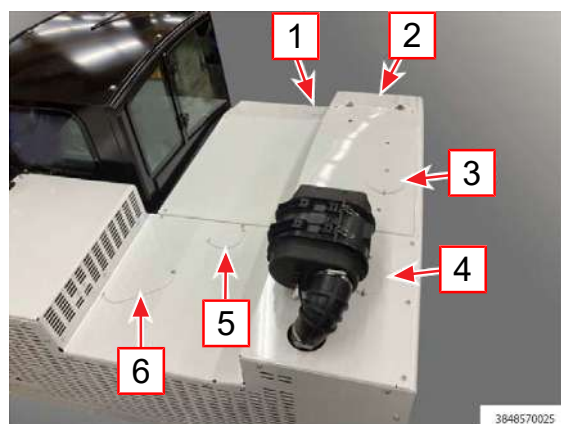


Illustration 140: Top Access Openings and Covers

1	Opening/cover for the track tension release buttons	2	Access panel for batteries and fuses/relays
3	Opening/cover for the coolant tank filler neck/cap	4	Opening/cover for the hydraulic tank filter cover
5	Opening/cover for the crankcase breather filter	6	Opening/cover for the engine oil filler neck/cap and transfer case dipstick

11.19.3 Rear Access Opening

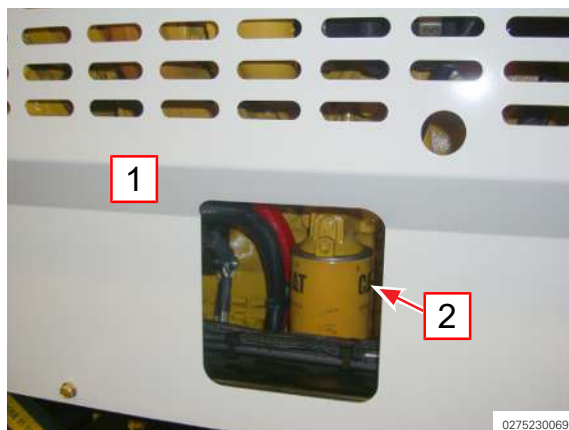


Illustration 141: Rear Access Opening

1	Rear wall of cowling	2	Opening to access the engine oil filter
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All other panels of the cowling are bolted.

11.20 Steps and Grab Handles

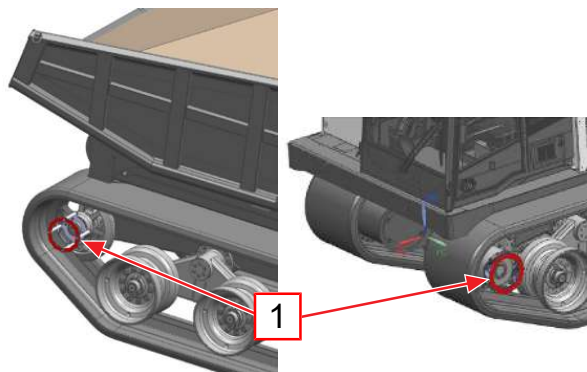


Illustration 142: Steps and grab handles

1	Step (toothed ring) to enter/exit the cab - on sprocket		
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Use the larger toothed ring (item 1 on previous figure) on the sprocket to enter or exit the cab. The smaller toothed ring (item 2 on previous figure), on the idler wheel, should be used only as an auxiliary step if the vehicle is inverted.

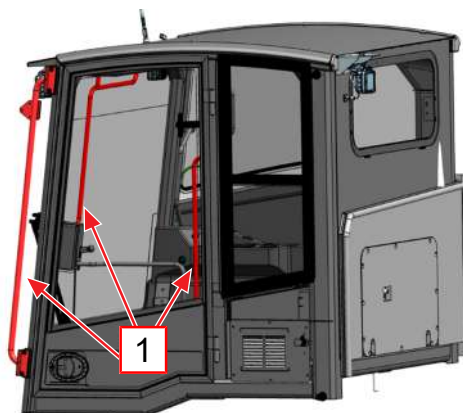


Illustration 143: Handles

1	Handles		
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There are two grab handles on the cab, one for each hand. To avoid a fall, use the three point rule to enter the cab. Always face the vehicle when entering or exiting the cab.

When exiting, always face the vehicle, grab both handles and ensure to put a foot on the track and then on the notched red ring before releasing one of the handles.

Always keep the handles free of dirt, oil, grease or mud. Slipping on these items may cause injuries.



INFORMATION

The three-point system means three of your four limbs are in contact with the vehicle at all times: two hands and one foot, or two feet and one hand.

11.21 Backup Alarm

Repositioning the backup alarm may be required when installing equipment on the rear section of the vehicle. At delivery of a new vehicle, the backup alarm is temporarily attached to the hydraulic hoses of the motors with plastic ties.

To facilitate the relocation of the alarm, extra long electrical cables are provided.

11.22 Lubrication Ports

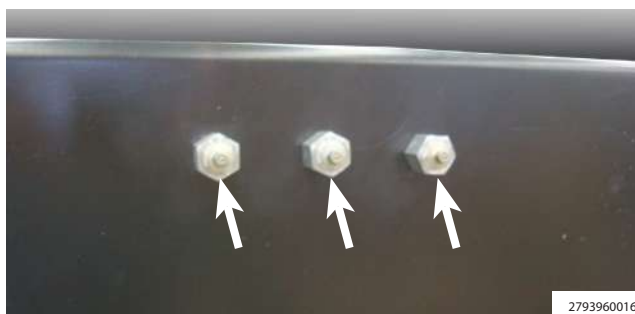
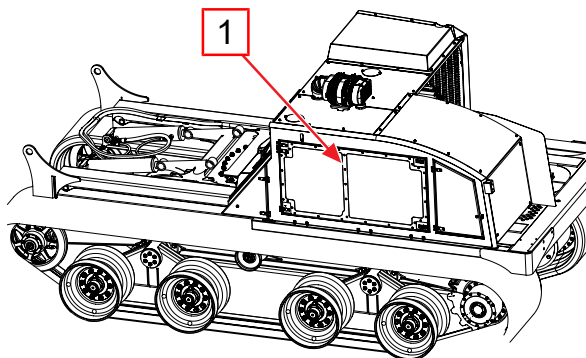


Illustration 144: Grease fittings

The lubrication ports for some of the components are located at the back of the vehicle. Refer to the “Miscellaneous Maintenance [► 256]” for information on the lubrication intervals and to locate components to be lubricated.

11.23 Dust screen (Option)

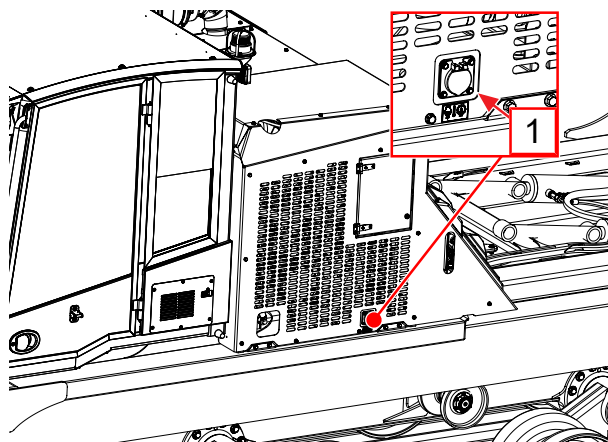
An optional dust screen is available to protect the radiator from dust and debris:



1	Radiator dust screen (option)		
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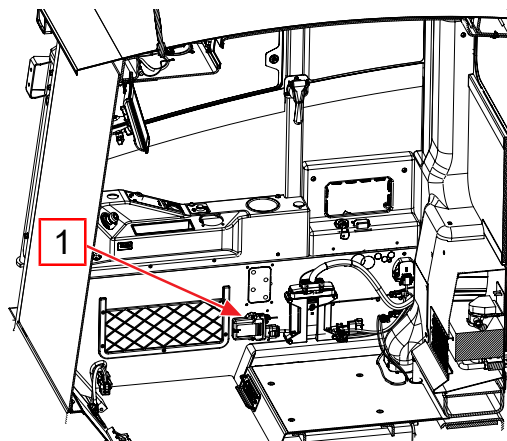
11.24 Cold start kit (Option)

The cold start kit heats the hydraulic and engine oil when the vehicle is connected to an electrical outlet. It helps you start the vehicle in cold conditions by reducing the oil's viscosity, keeping it thin for better lubrication. This reduces wear and tear, extending the life of the engine and hydraulic system.

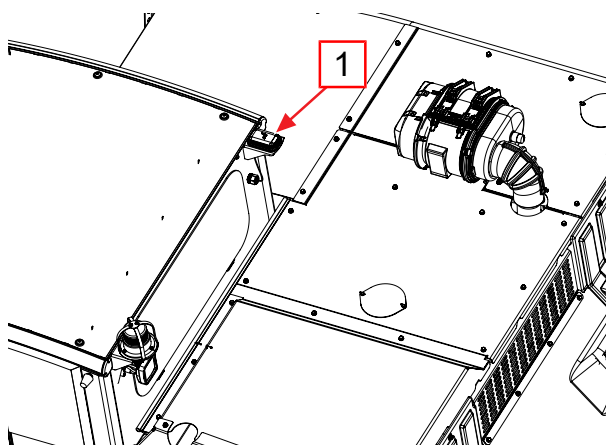


1	Cold start kit electrical connection (offered in 120v or 230v)		
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11.25 Fleet manager (Option)



1	Fleet manager module		
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1	Fleet manager antenna		
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Efficient file transfer and data security are critical components of fleet management in modern machine operations. The CANlink mobile series offers advanced functionality to streamline these processes, ensuring seamless communication and robust protection for your valuable data:

File transfer functionality:

You can use the CANlink mobile to transfer files between the DataPlatform and the machine's CANopen network. Performing controller updates without being physically on-site is an increasingly important application for many OEMs.

Steps to transfer files:

- Upload the User File:
 - Transfer a user file, such as a configuration file, from the Proemion DataPlatform via the internet and the cellular network to a CANlink mobile.
- Transfer to ECU:
 - From the CANlink mobile, transfer the file to an Electronic Control Unit (ECU) via CAN bus.

Transfer user files via the DataPlatform to the ECU and vice versa:

With CANlink mobile, you can efficiently transfer user files between the Proemion DataPlatform and your machine's ECU. This process enables remote updates and configuration changes, enhancing operational efficiency and reducing the need for on-site presence.

CAN 3 functionality for CANlink Mobile 3600:

Simultaneously access three separate CAN networks on your mobile machines through three CAN ports. This feature not only allows you to access more subsystems of your machines but also helps you retrieve even more machine data for analysis and insight generation to improve your business.

Key benefits:

- **Multiple Network Access:** Access three separate CAN networks simultaneously.
- **Comprehensive Data Retrieval:** Retrieve extensive machine data for better analysis.

Keep your data secure:

Data is valuable, which is why the CANlink mobile series includes a built-in focus on security: the TPM-security chip. All communication is encrypted with TLS 1.2, protecting your data from unauthorized access and corruption.

Security features:

- **Encryption:** All communication is encrypted with TLS 1.2.
- **TPM-Security Chip:** Ensures data protection.
- **Independent verification:** All security measures, such as firmware authentication, have been audited and verified by independent security experts.

12 Description of the remote control

12.1 Power supply and charger

The remote control includes two rechargeable batteries, a charger and a power supply.



Illustration 145: Charger

The system also includes a 12V socket to charge the batteries directly from the vehicle's cabin. This option allows you to recharge the spare battery while you operate the remote control.

12.2 Remote control console option **WITH JOYSTICK & AUTO-CENTER**

for rotator vehicles:



Illustration 146: Remote control with joystick and auto-center

12.3 Remote control console



Illustration 147: Remote control functions

Number	Component	Description
1	DEAD MAN'S SWITCHES	Prevents any unintended movement of the vehicle in order to enhance the operator's safety
2	FNR LEVER	Forward and Backward direction
3	JOYSTICK	Rotators: Controls the dump body and the angular position of the upper section of the frame
4	STEERING LEVER	Steers the vehicle to the left or right
5	HORN	
6	AUTO-CENTER	Controls the dump body and the angular position of the upper section of the frame
7	PARK BRAKE	
8	SPEED LIMITER	50% and 100% of the maximum speed value
9	EMERGENCY BUTTON	The vehicle stops its movement - the vehicle's engine does not stop

Number	Component	Description
10	LIGHT BUTTON	Vehicle's lights on or off
11	DISPLAY INFORMATION	12 LED signals

Table 5: Remote control functions



INFORMATION

The controls on the remote are clearly marked. The arrows indicate the directional orientation and movement direction of the vehicle.

12.4 Remote control display

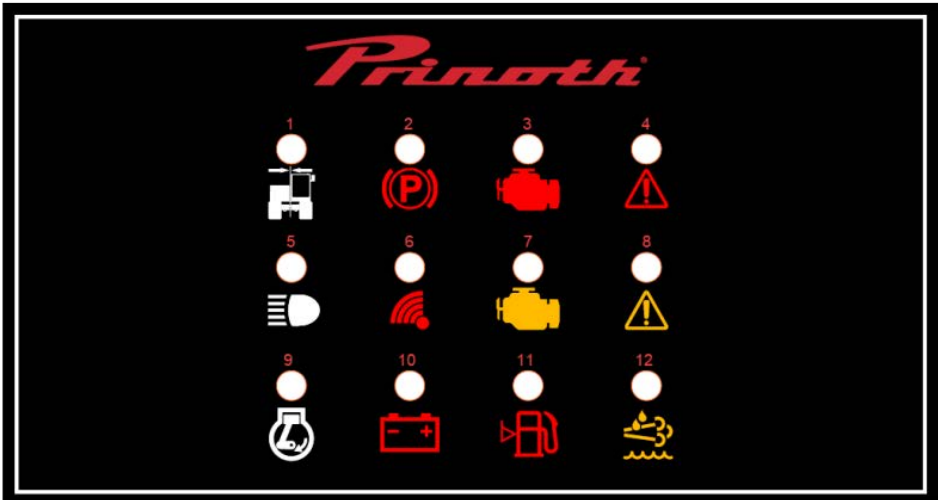


Illustration 148: Remote control display

Number	Icon	Description
1	AUTO-CENTER	Green: Indicates the vehicle's top frame is centered with the lower.
2	PARK BRAKE	Red: Indicates that the vehicle is in PARK mode. Yellow: Indicates that vehicle is in AUTO-PARK mode.
3	ENGINE ERROR	Red: Indicates a critical engine fault.
4	VEHICLE ERROR	Red: Indicates a critical system fault.

Number	Icon	Description
5	LIGHTING	Blue: Indicates the vehicle's lights are ON.
6	LOW RC SIGNAL	Not active
7	ENGINE ERROR	Yellow: Indicates a non-critical engine fault
8	VEHICLE ERROR	Yellow: Indicates a non-critical system fault.
9	ENGINE STATUS ON/OFF	Indicates whether the vehicle's engine is running or stopped.
10	LOW BATTERY VOLTAGE	Indicates that the vehicle's battery level is low.
11	LOW FUEL LEVEL	Indicates that the vehicle's fuel level is low.
12	LOW DEF LEVEL	Indicates the level of the catalytic reduction fluid (DEF or ADBLUE)

Table 6: Remote control display functions

13 Driving Instruction

13.1 Setting the Vehicle in Motion



INFORMATION

In cold weather, allow the engine to run at idle speed for about 10 minutes before operating at full load.

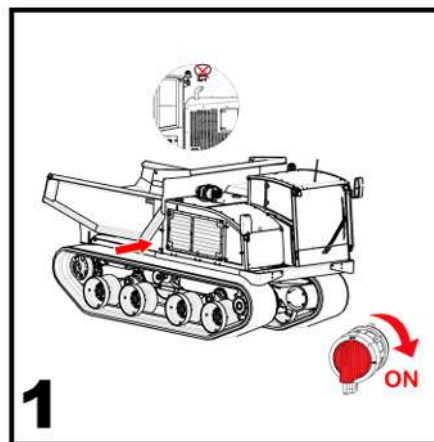


INFORMATION

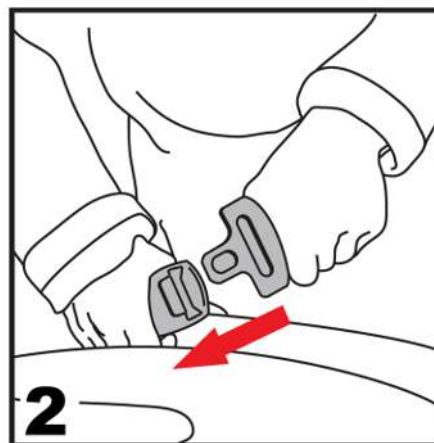
Remember to disconnect the vehicle from the external power source before starting and getting the vehicle in motion.

To set the vehicle in motion, follow these steps:

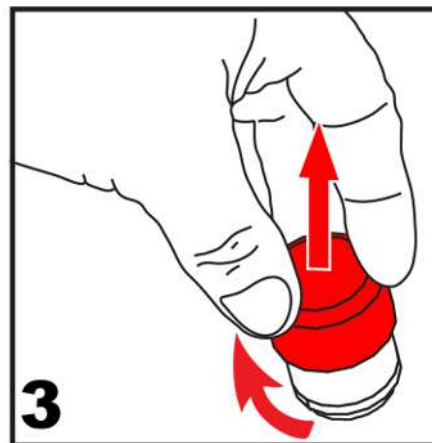
1. Turn on the master switch.



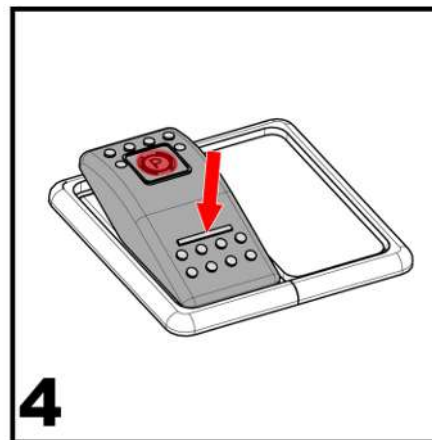
2. Fasten the seat belt.



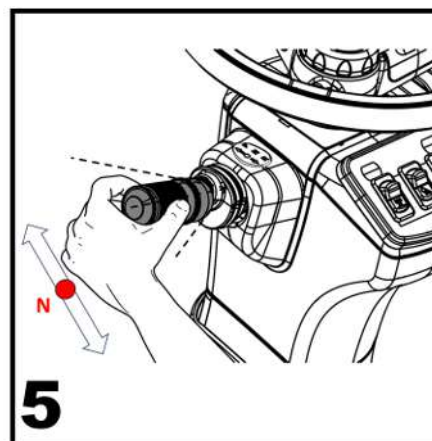
3. Ensure that the emergency stop button is released.



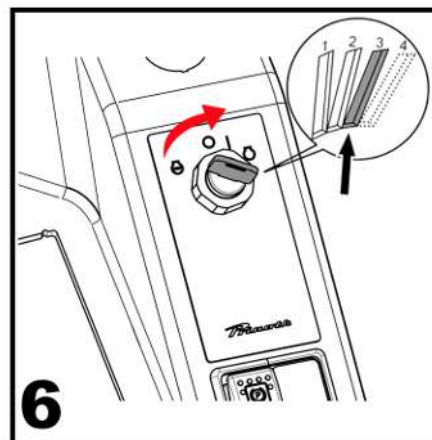
4. Ensure that the vehicle is in parking mode.



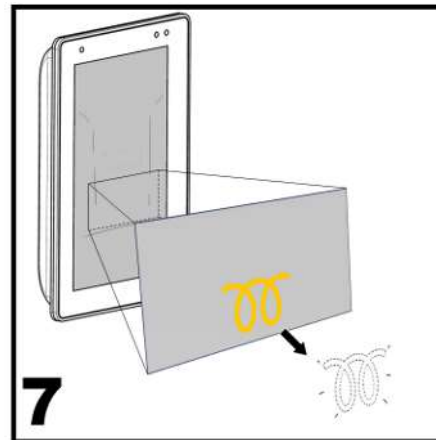
5. Ensure that the transmission lever is set to neutral (N).



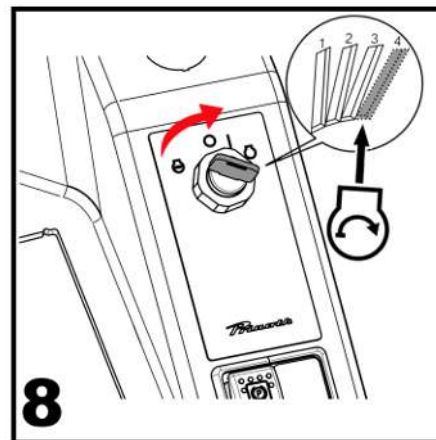
6. Move the ignition key to the third position.



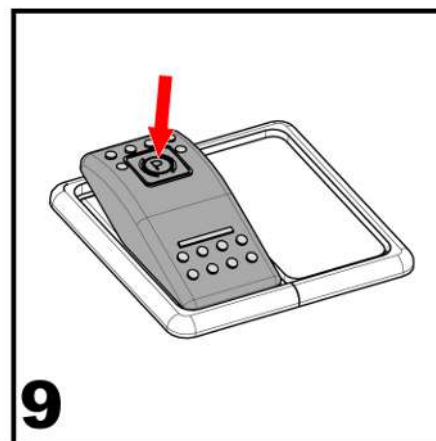
7. Wait for the glow plug symbol to turn off.



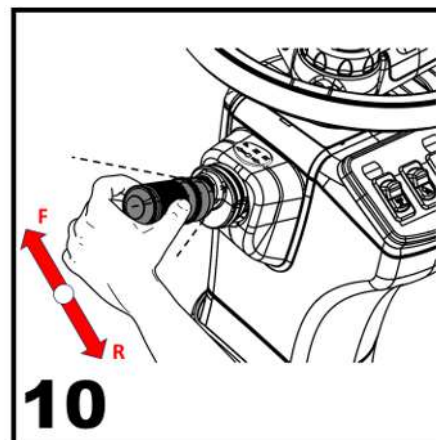
8. Move the ignition key to the fourth position to start the engine.



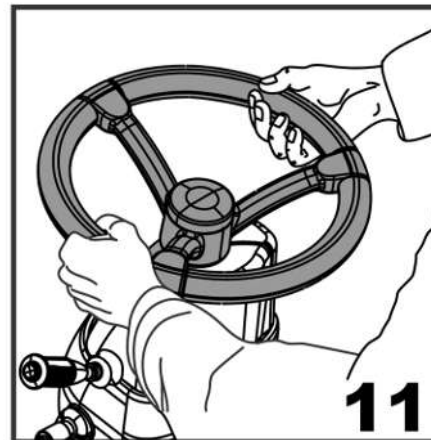
9. Disable the parking mode.



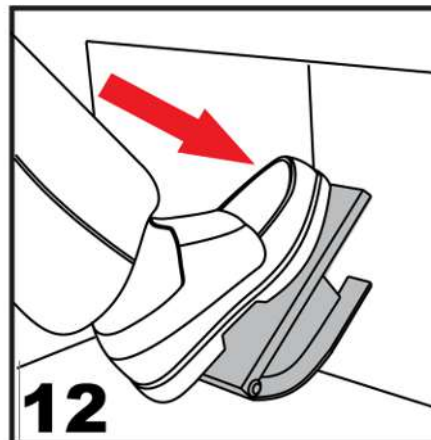
10. Move the transmission lever forwards (F) to move forwards or backwards (R) to move backwards.



11. Use the steering wheel to steer the vehicle in the desired direction.



12. Press the accelerator pedal to get the vehicle moving.



13. Drive the vehicle.

13.2 Forward Motion



WARNING

Accident hazard

The operator should be thoroughly familiarized with the steering and handling of the vehicle before operating. Abrupt changes in direction will occur when the steering wheel is moved quickly and could cause loss of control. Lack of training may result in severe injury or death.



WARNING

Crush hazard

The operator must wear the seat belt at all times. Failure to do so may result in severe injury or death.

1. Check the display to see if the vehicle is in the normal configuration or in the inverted configuration.
 - ⇒ The reverse direction icon must not be displayed.

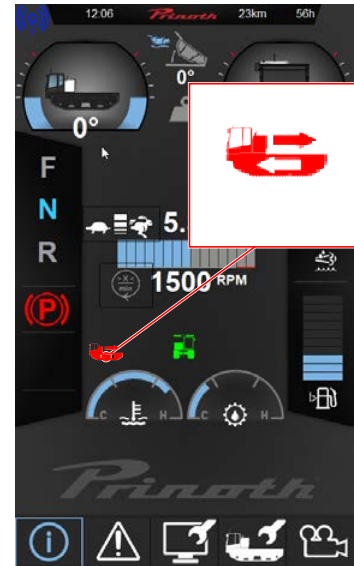


Illustration 149: Icon reverse direction

2. Push the transmission forward:

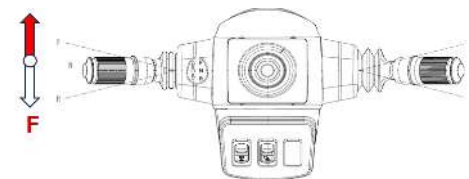


Illustration 150: Transmission forward

3. Slowly apply pressure on the speed pedal:

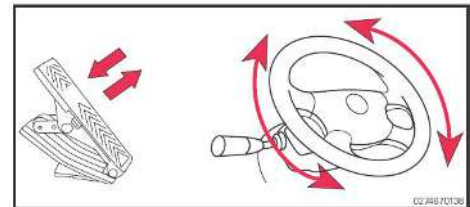


Illustration 151: Speed pedal

4. To turn right, turn the steering wheel to the right.
5. To turn left, turn the steering wheel to the left.
6. To brake or slow down, gradually release pressure on the speed pedal.
7. In case of emergency, press the emergency stop button.

13.3 Reverse Motion

- Check the display to see if the vehicle is in the normal configuration or in the inverted configuration. The reverse direction icon must not be displayed:



- To go into reverse, stop the vehicle, then, pull back on the transmission lever:

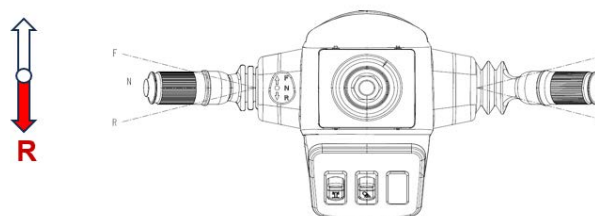


Illustration 152: Backward motion

- Slowly press the speed pedal:

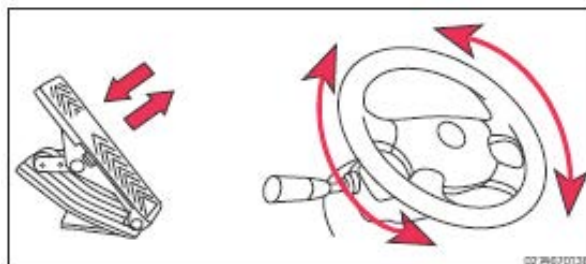


Illustration 153: Reverse motion

- To turn, turn the steering wheel in the desired direction.
- To brake or slow down, gradually release pressure on the speed pedal or bring the transmission lever to neutral.
- In case of emergency, press the emergency stop button.

Ensure the backup alarm operates while the vehicle moves in reverse. Observe all warnings and safety precautions listed in the Forward Motion section.

13.4 Steering Wheel Handling

- For smooth operation, do not turn the steering wheel suddenly or hit the stop with force at the end of the turn.
 - Sharp turns of the steering wheel will produce jerking motion and possibly over-correction on the next move of the steering wheel.
- Adjust the amplitude of the steering movement with the speed of the vehicle.
 - The faster the speed of the vehicle, the slower the steering inputs should be, except for an emergency situation.
- At slow speed, turning the wheel slightly will decrease track speed on one side and increase it on the other side.
- Turning the wheel further will stop one track and keep the other one running.
- Turning the wheel to the stop will produce counter-rotation.
 - Turning one track in one direction while turning the other track in the opposite direction.
- At full speed, both tracks may already be at maximum speed so the vehicle is likely to slow down slightly when turning.

13.5 Swinging



⚠ DANGER

Crushing hazard

The upper section of the vehicle will extend beyond the track width when swinging. While doing so, it could hit someone and cause severe injuries or death.

- a) Always check that the surrounding area is clear before swinging the vehicle.



⚠ WARNING

Accident hazard

Swinging the vehicle while it is in motion could cause a flip over if the vehicle exceeds its slope limit.

- a) Always use caution when driving on a slope.

To swing the upper frame of the vehicle, use the joystick alone or the joystick with the alignment switch. Proceed as follows:

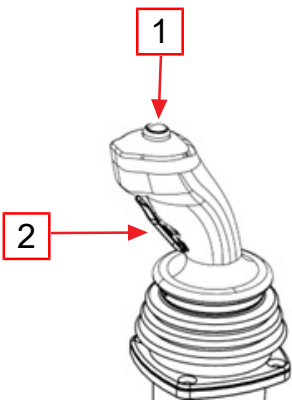


Illustration 154: Joystick

1	Alignment switch	2	Trigger switch
---	------------------	---	----------------

1. Perform a visual verification with the mirrors and the 360 deg cameras (option) that it is safe and clear for the vehicle to swing.
2. To swing, press the trigger switch and tilt to left or right in the desired direction.
⇒ Rely on the sign locate near the joystick for indications.

13.5.1 Alignment Switch

While rotating the vehicle, you have the option to stop it aligned with the chassis:

1. Press once on the alignment switch.
2. Keep the joystick in the desired direction until it automatically stops.
⇒ The vehicle will automatically stop aligned with the chassis.



13.6 Transmission and Steering Auto Inversion

To facilitate the driving of the vehicle, the inversion of the FNR (transmission lever) and steering wheel will occur automatically after a specific sequence of control inputs.

Use the following sequence when the upper frame is rotated past 90 degrees left or right:

- Move the vehicle slowly forward with the transmission lever in the forward direction;

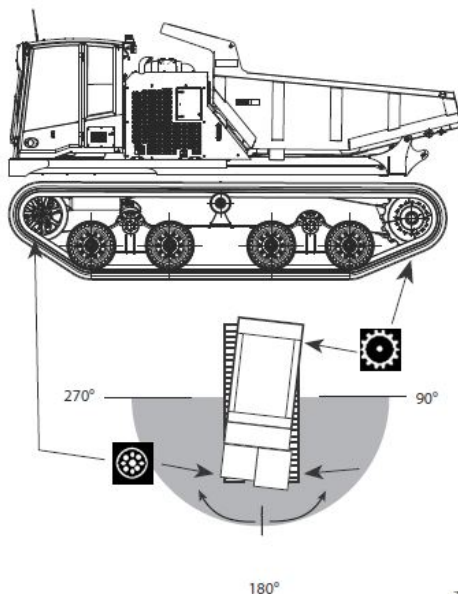


Illustration 155: Normal configuration

- Tilt the joystick sideways to rotate the upper frame.
 - When a left or right rotation exceeds 90 degrees from the tracks, the red inversion icon will appear on the display and the buzzer will sound two times in a rapid sequence.



- Brings the transmission lever (FNR) in the Neutral position.
- Bring the transmission lever in the forward position (toward the windshield).

- The red inversion icon will disappear (if it was present).

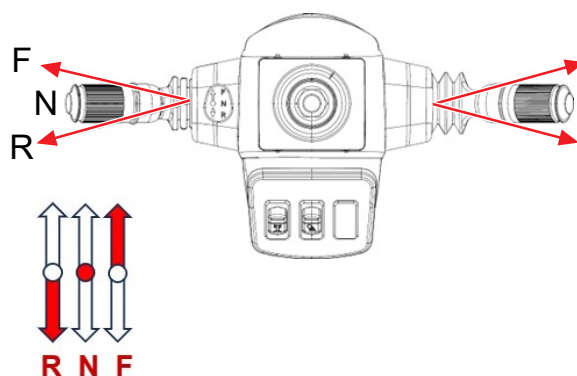


Illustration 156: Transmission and steering

- The steering and FNR controls are now re-initialized and the operator can drive normally (left-right steering and forward-reverse motions).

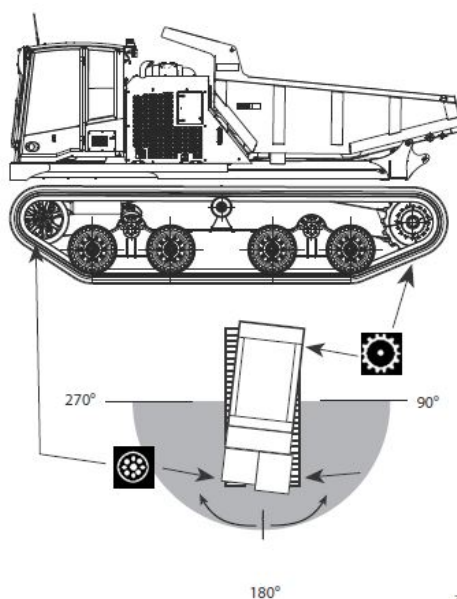


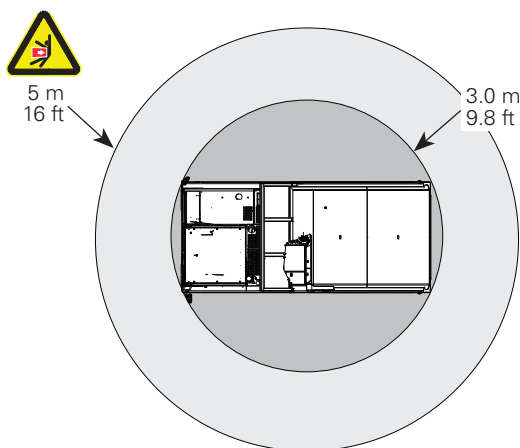
Illustration 157: Inverted configuration

If you start the sequence in the inverted configuration, the same will occur

In any case, cycling the transmission lever to the Neutral position will permit to drive the vehicle in a normal way.

When the diesel engine is turned off, and then turned on again, a sensor detects the position of the upper frame and re-initialize the controls if required. The operator can drive the vehicle in a normal way without any special intervention.

13.7 Upper Frame Rotating Radius



2700480016

Illustration 158: Vehicle view from top to show the required space for rotation and safety radius (not to scale)

The upper frame of the vehicle has a rotating radius of 2990 mm (118 in).

- When rotating the upper frame, take all required precautions and ensure there is enough space around the vehicle.
- Check for presence of personnel before rotating the vehicle.
- If rotating the upper frame for maintenance in a repair shop or hangar, establish a safety perimeter of at least 5 m (16 ft) around the vehicle.

13.8 Slowing Down and Braking



WARNING

Impact hazard

Do not use the emergency stop button as a standard brake while the vehicle is in motion. The operator could lose control of the vehicle and cause an accident.

- a) Do not use the emergency stop button as a standard brake.



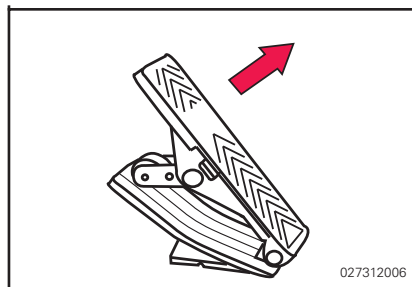
WARNING

Impact hazard

The vehicle loses its braking ability when:

- a) the planetary gearboxes are disengaged,
- b) the vehicle is untracked,
- c) the tracks are loose.
- d) Braking problems could cause accident and injuries to the operator, passengers or bystanders. Ensure the track tension is correct at all times.

1. To brake while the vehicle is in motion, gradually release pressure on the speed pedal.
 - ⇒ The drive system will act as a brake and cause the vehicle to progressively slow down and come to a complete stop.
 - ⇒ Never brake suddenly, especially when going down hill. Harsh operation at high speed will cause unnecessary jars to the vehicle and could cause loss of control.



1. Ensure the track tension is correct otherwise the brake operation will be impaired.

13.9 Auto-Brake



Illustration 159: The icon shown above appears on the LCD display whenever the auto-brake function is activated.

If the vehicle is immobilized for a few seconds, the auto-brake function is activated and brakes are applied automatically. This is to prevent the vehicle from creeping backwards on a slope.

- Press the speed pedal.
 - The auto-brake function is deactivated.
 - The brakes are released.

13.10 Parking the Vehicle



WARNING

Accident hazard

Failure to do the following actions could cause injury or death.

- a) Never leave the vehicle without setting the parking brake and always shut off the engine.
- b) Do not park the vehicle on a slope where it could start to roll or slide.
- c) Always check the parking brake system for proper function before operating the vehicle.

When parking the vehicle, select a safe and level location. Avoid sloped terrain. If parking the vehicle outside for extended periods of time, consider water or snow accumulation on the vehicle.

Protect the tracks from direct sunlight if parking outside for long periods of time. Sunlight can cause damage to the rubber of the tracks.

13.11 Shutting Down the Engine



WARNING

Accident hazard

Never shut down the engine while the vehicle is in motion. Loss of control could occur. Stop the vehicle completely and apply the parking brake before shutting down the engine.

Stopping the engine applies the brakes instantly. Ensure the vehicle is immobilized before shutting down the engine.



NOTICE

Engine and lubricant life will be shortened if the engine is not properly cooled before shutdown. Allow the engine to run at idle speed for five minutes to allow a gradual and uniform cooling.

Before shutting down the engine, perform the following:

1. Perform a complete stop of the vehicle;
2. Set the transmission lever to the neutral position;
3. If not already done, deactivate the equipment (if installed);
4. Engage the parking brake;
5. Turn rpm to idle to cool down the turbo. Let the engine run at idle for a few minutes.
6. To stop the engine, turn the key in the ignition switch to the "off" position.
7. If it is required to turn OFF the Battery Isolator Switch, wait until the amber light turns off. The delay enables some specific components to complete a full shutdown.



NOTICE

The engine may be damaged and warranty declared void if the battery isolator switch is turned off before the required delay.

13.11.1 General Information on Shutdown



WARNING

Accident hazard

Never leave the vehicle unattended while the engine is running. If getting out of the cab, apply the parking brake, set the transmission to neutral, deactivate and lower the equipment to the ground.

Leaving the vehicle unattended while the engine runs may result in fatal injury or property damage in case of a malfunction or unauthorized operation. Take all required precautions to prevent an accident. Monitoring of the vehicle is strongly recommended.

1. Remove load from the engine. Reduce the engine speed to low idle. Allow engine to idle for 5 minutes in order to cool the engine.
2. Turn off the engine by turning off the key in the ignition switch.



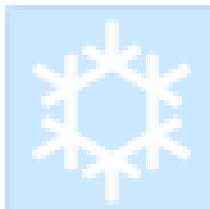
INFORMATION

In any case, when the engine stops, do not turn off the Battery Isolator Switch for at least 2 minutes (power is required for the PETU unit).

13.12 Oil Temperature and Drive System

13.12.1 Low oil temperature

Low hydraulic oil temperature will trigger a warm up sequence of the drive system.



The icons shown above appear on the LCD display whenever the oil temperature reaches critical low level.

When the oil temperature is colder than +10 °C (+50 °F), there is a warm up curve of the drive system that limits the diesel engine maximum speed to 1400 rpm. The snowflake icon appears on the display in that oil temperature range.

- When a low oil temperature indication occurs, leave the engine running at idle speed until the oil returns to normal operating temperature or work while applying only a light load to the engine.
- When the oil temperature increases above +10 °C (+50 °F), the buzzer will sound and the snow icon will flash. The accelerator pedal must be released before the vehicle can regain its full speed capacity (2200 rpm max.).

13.12.2 High oil temperature

High hydraulic oil temperature could cause permanent damage to the hydraulic circuit and to several components. To prevent this, heat sensors and the vehicle micro-processor will trigger a cooling sequence to lower the oil temperature. High hydraulic oil temperature can cause oil degradation and, eventually, bring premature failure of the components operating with that fluid.



As the oil temperature increases, its viscosity decreases. Therefore, a hydraulic system is operating too hot when it reaches the temperature at which oil viscosity falls below that required for adequate lubrication.

Hot oil can destroy hydraulic components, seals, hoses and the oil itself when high-temperature operation is allowed. Avoid this situations as much as possible.

13.12.2.1 Oil temperature in the tank

The maximum diesel engine speed is allowed within a normal hydraulic oil temperature range. When the hydraulic oil temperature raises above the normal limit, allowed maximum engine speed will be gradually reduced to prevent damage.

Additionally, when the oil temperature rises above the highest critical value, the drive system will be limited to 50% of maximum speed until the hydraulic oil temperature goes down to a safe level.



Illustration 160: This icon appears on the LCD display whenever the oil temperature reaches a critical levels.

13.12.2.2 Regaining speed capability after a hydraulic oil temperature alarm (red oil icon)



Once the oil temperature drops below the critical level (the red icon will flash), release the accelerator pedal completely to enable the vehicle to regain full speed capability.

13.12.3 Oil temperature in the planetary gearboxes

The maximum diesel engine speed is allowed within a normal planetary oil temperature range. At higher planetary oil temperature, the allowed maximum engine speed will be gradually reduced to prevent damage.

If the planetary red temperature icon illuminates : the maximum vehicle speed is reduced by 50%.



INFORMATION

The operator must stop the vehicle to prevent damage if the alarm sounds. Inspect :

- a) Oil level and quality in the planetaries;
- b) Planetary housings and components.



The icons shown above appear on the LCD display whenever the oil temperature reaches a critical level in the planetary gearboxes.

13.12.3.1 Regaining speed capability after a second level alarm (flashing red planetary icon)



Once the planetary oil temperature drops below the critical level (the red planetary icon will flash), release the accelerator pedal completely to enable the vehicle to regain full speed capability.

13.13 Oil Temperature and Swing System

Low hydraulic oil temperature will result in a disabled swing system.



The snowflake and rotation padlock icons appear when the oil temperature is below -10 °C (14 °F).

When a low oil temperature indication occurs, the swing system is temporarily disabled. Drive the vehicle without swinging the upper frame or wait until the oil temperature raises above -10 °C (14 °F).

The padlock icon will start to flash and the buzzer will sound for 5 seconds to signal the operator that the oil temperature has raised above the critical temperature and thus the rotation system becomes operational.

The dump body system is not affected by the hydraulic oil temperature.

13.14 Temperature Sensor Failure

The failure of a temperature sensor (in the tank or in the planetary) could lead to undetected high oil temperature.

13.15 Torque Limiter Function

The Torque Limiter function helps to protect the diesel engine from possible damage caused by overheating (excessive engine load, high outside temperature, radiator leakage or failure, etc.). When a high coolant temperature is detected, the engine power is reduced which helps to lessen further temperature increase. The power reduction is gradual and proportional to the intensity of the overheating. Power is restored progressively as the detected temperature drops towards the normal range.

While the torque limiter function provides some protection against overheating, the operator must follow all general guidelines to avoid as much as possible the overheating situations. Engine faults or hydraulic/hydrostatic system faults are major problems that can lead to irreversible damage.

**NOTICE**

If an overheating indication occurs, always check the functionality of the radiator.

13.16 Driving a Partially Disabled Vehicle

In the event of a component failure, the operator will be informed of the situation by the LCD display. According to the severity of the failure, three possibilities exist:

- Driving with the “Limp Home” Mode;
- Driving with the emergency drive module;
- Towing the vehicle.

**⚠ WARNING****Accident hazard**

Operating the vehicle as a dumper or carrier with the emergency drive module is unsafe. Do not work with a partially disabled vehicle. Return to the repair station by the shortest path possible.

A partially disabled vehicle should stop any work in progress and be brought to a repair station at once.

13.16.1 Driving with the “Limp Home” Mode



The icon shown above appears on the LCD display whenever the limp-home function is activated by the micro-controller.

In the event of a minor failure, the microcontroller can still control the drive system:

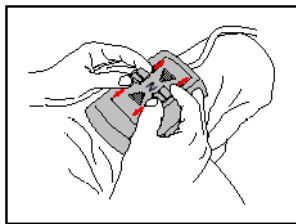
- High temperature of hydrostatic oil in the planetary gearboxes;
- Interruption of communication with the ECM (Electronic Control Module) of the engine.

For the failures listed above, the vehicle maximum speed will be cut by 50 and the anti-stall feature will be cancelled. The “Limp Home” mode is indicated with the yellow turtle icon on the main screen of the display.

**INFORMATION**

On vehicles equipped with the dump body position detector, the Limp Home mode is activated each time the vehicle moves while the dump body is not completely lowered.

13.16.2 Driving with the Emergency Drive Module



The microcontroller cannot control the drive system, in the event of a failure such as:

- Microcontroller failure;
- Transmission selector failure;
- Speed pedal potentiometer failure;
- Steering wheel potentiometer failure.

If one of these situations occurs, use the emergency drive module to drive to the nearest repair facility. Refer to “Using the Emergency Drive Module” for complete instruction on how to use the module.



INFORMATION

With the use of the emergency drive module the anti-stall feature is cancelled and maximum speed is reduced.

13.16.3 Completely Disabled Vehicle



In case of a major failure, tow the vehicle to the nearest repair facility. Refer to “Towing” form complete instructions.

13.17 Regeneration

Regeneration is the cycle where the burning of particulate matter occurs to clean the Diesel Particulate Filter of diesel engines. In some rare occasions, the elevated idle regeneration will be required. In most cases, this occurs after a long period of the engine running at idle speed.

When the vehicle is immobilized and one of the conditions is present to allow a regeneration cycle, the diesel engine will automatically increase its speed from idle to approximately 1200 rpm for a certain amount of time. The conditions are:

- Parking brake is engaged («P» icon on the display), and/or;
- Seat belt is unbuckled, and/or;



INFORMATION

The regeneration icon appears on the display during the cycle. Unless required, do not turn off the engine while the icon is shown on the display. Turning off the engine could generate an entry in the engine fault log.



The vehicle can be used without any problem or restriction while the regeneration is active.

If a regeneration happens to be in progress while the vehicle is immobilized, setting the vehicle in motion will automatically stop the regeneration cycle.

14 Using the remote control



INFORMATION

The operator must routinely test the functionality of the warning devices (blue strobe, light, horn) according to ISO 15817.



INFORMATION

Operate the vehicle only with one remote control!

14.1 Daily checks and tips

This product is designed for a use in an industrial environment that can shorten the product's lifespan. Use the following daily checks and tips to maximize the lifespan of the product.

- Do not clean the transmitter with solvents or pressurized water.
- Use a damp cloth or soft brush for cleaning.
- If the push buttons show signs of deterioration, contact the PRINOTH service.
- Check if the battery contacts are correct.
 - Otherwise replace them.
- Use only original BT27IK batteries.
- Recharge or replace the battery regularly.

14.2 Activating the remote control system



WARNING

Risk of injury

The remote control controls the vehicle. In case of wrong use, the vehicle can perform uncontrolled actions.

- a) Always maintain a clear line of sight to the vehicle.
- b) Keep a safe distance from the vehicle of 20 m (66 ft).

The following steps are required to activate the remote control system.

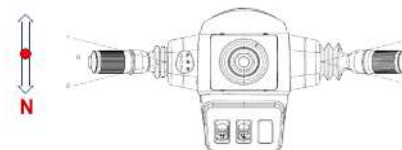
14.2.1 Preparing the vehicle

1. Start the engine.

2. Activate the remote control switch on the dash



3. Press the emergency STOP switch on the remote control before you proceed to next steps.
4. Place the FNR lever in neutral position.



5. Release the emergency STOP switch on the dashboard in the **UP** position.
6. Fasten the seat belt.
7. Check that a blue signal icon appears on the left side of the display with an audible beep in the cabin.
⇒ The vehicle display indicates that the vehicle is ready to be paired with the remote control.



INFORMATION

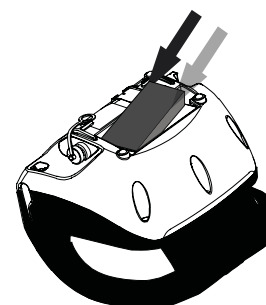
Note that the conventional driving functions from inside the cabin are completely disabled at this point, except for the emergency STOP switch, to prevent any unintended movement.

8. When you have activated the remote control, a blue strobe indicator on the vehicle's roof lights up.
9. Move away from the vehicle at a safe distance.

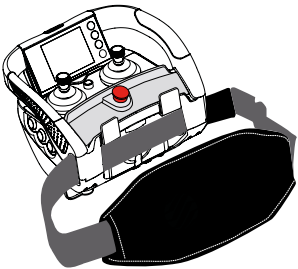
14.2.2 Preparing the remote control

In order to turn the remote controller **ON** (operation mode), follow these steps:

1. Place a charged battery in the transmitter.



- 2. Fasten the belt around your waist so that it is snug and secure.
⇒ That prevents excessive movement or loss of the remote control during the operation.



- 3. Turn the switch on the right side of the controller to the position I.



- 4. Activate and release the emergency STOP switch.
⇒ Push and pull out the emergency STOP switch.
⇒ The LED blinks blue until it reaches the stand-by mode after a few seconds. Then the LED lights up continuously.



- 5. Press the **START** button, available on the right side of the remote control.



- 6. Wait that the LED turns to solid green.
⇒ The connection has been established.



1	LED turns green		
---	-----------------	--	--



INFORMATION

The icon on the screen will turn green and the vehicle's horn signal and lights will be activated (twice) to indicate that the connection has been established with the vehicle.

7. Make sure all the maneuvers work in a coherent way with the expected movements before you start the operations.



8. Set the engine speed control knob in the vehicle to preset the speed limit.



9. Observe the following speed limits:
 - ⇒ Use the vehicle at a maximum speed of 10 km/h (6 mi/h), when you or an operator travel with the vehicle.
 - ⇒ If you do not travel with the vehicle, higher speeds are be permissible based on site conditions.
10. Now you can control the vehicle with the remote control.
11. Use the remote control only in controllable situations.
12. Check that you can bring the vehicle to an immediate stop.

14.3 Deactivating the remote control system

1. Press the emergency STOP switch on the remote control before you enter inside the minimal required safety distance range (20 meters/66 ft).
2. Enter in the vehicle's cabin.
3. Deactivate the remote control mode switch located on the right dashboard to get back to the usual operation mode.

Illustration 161: Deactivating switch

4. Check that the usual operation mode is activated.

14.4 Loading the battery



NOTICE

Damage hazard

The battery can be damaged!

- a) Charge batteries in environments with temperatures between 0°C (32°F) and 45°C (113°F).
-
1. Use the information below to properly set up the CB70 battery charger.
 2. The battery charger has two charging compartments that can simultaneously charge two batteries.
 3. Connect the charger to a power source using the supplied cable.
⇒ The red LED switches on.
 4. Place the batteries in the compartments of the battery charger.
 5. If you charge multiple batteries, wait at least 5 seconds before you place the second battery in the other compartment.
 6. Check the battery status.

Battery status

Each battery compartment has an LED that indicates the status of the batteries' charge.

Green LED	Meaning
Pulsing	Battery is excessively depleted
Continuous	Normal charging operation mode
Off	Battery charging process is complete

Table 7: Battery status

14.5 Controlling the vehicle with the remote control

You can control the vehicle by means of the following remote control functions:



Illustration 162: Remote control functions

1. DEAD MAN'S SWITCHES

- Press one of the two dead man's switches on the side of the remote control before you start controlling the vehicle.
- Release the dead man's switch afterwards.
- Press the dead man's switch again, if all the controls are in the neutral position and a new movement is required. This feature prevents any unintended movement of the vehicle.

2. FNR LEVER

- With this lever you can control the forward and reverse movements of the vehicle.
- Position the pedal forward to make the vehicle move forward and backward to make it reverse.
- Move the FNR lever to set the vehicle's speed from 0% to 100%. You can set the speed for forward and reverse movement.
- When you release the lever the speed comes back to 0% and the vehicle stops.

3. JOYSTICK

- Use the joystick to control the dumped and rotate the cabin of the vehicle.
- Move the joystick in the desired direction to raise, lower, and rotate the bucket as needed. Simultaneous functions are possible.
- During the dumping process, if the vehicle remains stationary, the engine RPM increases to dump faster.

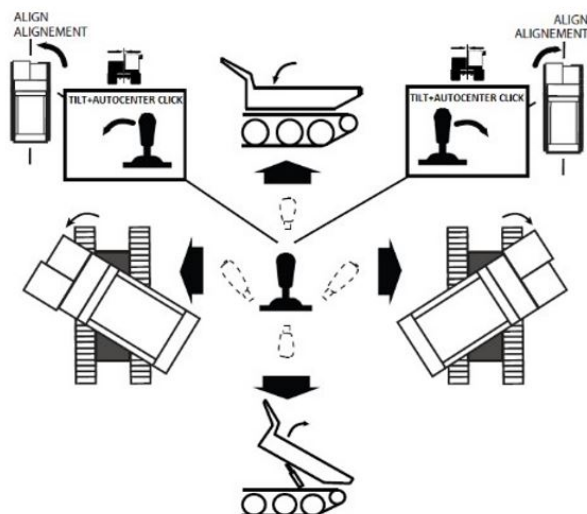


Illustration 163: Joystick movements

4. STEERING LEVER

- You can steer the vehicle to the left or right by means of the steering lever.
- When you position the steering pedal proportionally (0%-100%) towards the desired direction while holding the FNR pedal, the vehicle will steer in the desired directions.

5. HORN

- Press this button to sound the vehicle's horn.

6. AUTO-CENTER

- Press this button to automatically center the vehicle's cabin during its rotation. This ensures precise alignment and facilitates the use of the remote control.

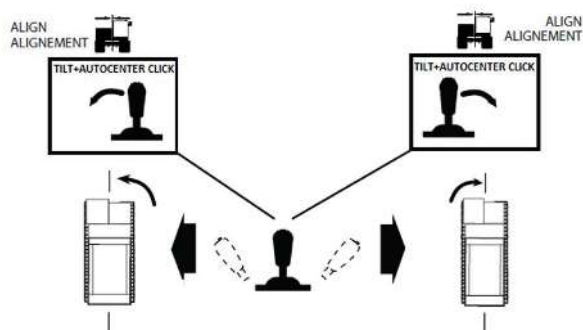


Illustration 164: Auto-center

7. PARK BRAKE

- With this button you can activate the parking mode.

8. SPEED LIMITER

- Use the speed limit switch to choose between two options: 50% and 100% of the maximum speed value.

9. EMERGENCY STOP SWITCH

- Press the emergency STOP switch to disconnect and turn off the vehicle's remote control. The vehicle stops its movement. The vehicle's engine is not stopped.

10. LIGHT CONTROL SWITCH

- Use this switch to control the vehicle's lights.

11. DISPLAY

- Check the LEDs to check the vehicle settings and status.

15 Advanced Guidelines for Driving and Transport

15.1 Loss of Control of the Vehicle



WARNING

Accident hazard

The following actions lead to vehicle imbalance which could ultimately result in loss of control, tip-over and/or roll-over of the vehicle.

- a) Avoid abrupt changes of vehicle's motion, such as but not limited to, applying the parking brake while in motion, rapid movement of the steering wheel, etc.

Skidding on a slope can lead to loss of control.

- To regain control of vehicle, adjust speed of each track until control is regained.
- To brake when skidding, regain control of vehicle; then slow down gradually.

15.2 Off-Highway Operation

The off-highway operation carries potential risks. Any terrain, which has not been specially prepared to carry vehicles, presents a danger where surface, dirt substance and exact steepness are unpredictable.

An operator who takes a vehicle off-road should always exercise the utmost care in selecting the safest path and keeping close watch on the terrain ahead. The vehicle should not be operated by anyone who is not completely familiar with the driving instructions applicable of the vehicle, nor should it be operated in steep or treacherous terrain by anyone who has not become thoroughly familiar with the vehicle performance.

- Never assume that one off-road all-terrain vehicle has the same capabilities as another. There are a wide variety of different sizes and designs of off-road all-terrain vehicles. Each is built with differing abilities.
- One must remember that, with a tracked vehicle, the traction is so great that it can propel itself beyond its own limits of stability. This can occur on all types of terrain.

Moreover the vehicle can continue to move, even when much of its traction is no longer supported by the ground. As a result, the vehicle can be driven over a drop-off without any prior warning that tip-over is about to occur.

The vehicle is capable of sharp turns as well as zero turn radius. However, performing these manoeuvres frequently may cause premature wear on undercarriage components, including the tracks. Wide radius turns will minimize wear.

15.3 General Safety Precautions

Care, caution, experience and driving skill are the best precautions against the hazard of off-road all-terrain vehicle operation.

Whenever there is the slightest doubt that the vehicle can safely negotiate an obstacle of a particular piece of terrain, always choose an alternate route.

In off-road operation, power and traction, not speed, are important. Never drive faster than visibility and operator ability to select a safe route permits.

- Constantly watch the terrain ahead for sudden changes in slopes or obstacles, such as rocks or stumps, that may cause loss of stability, resulting in tip-over or roll-over.
- Never jump out of the vehicle while it is still moving. When driving the vehicle with the cab door “latched-opened”, always stop the vehicle completely before getting out. The same applies to the passenger, if applicable.

15.4 Guidelines for Vehicle Gradeability Limit



WARNING

Tip over hazard

The specifications for the vehicle may state maximum performance limit guidelines for uphill, downhill, and sidehill operations. These limit guidelines are determined with the vehicle being stationary on a firm, flat surface. The extent to which the vehicle can operate safely on such slopes will depend on the expertise of the operator and his familiarity with the vehicle. The loading of the vehicle will also affect the vehicle performance on slopes.

Moreover, under actual operating conditions, the slope of the terrain is constantly changing and sudden local variation may result in slopes which exceed operational limit guidelines, although the overall slope of the terrain is within safe operational limits.

- a) Adapt operation of the vehicle to actual terrain conditions.
- b) Failure to do so could lead to loss of control and potentially severe injuries or death.

For more details see “*Performance* [► 196]”.

These specifications apply to a new empty vehicle as delivered from the factory.

- Be aware: Any addition of equipment or modification may change these limits.

15.4.1 Transmission Lever Handling

1. Always stop the vehicle before switching the transmission lever from Forward to Reverse and vice versa.
 - ⇒ If the direction of travel is reverse suddenly, the hydrostatic drive system may sustain damage.
2. Move the transmission lever smoothly and slowly.
3. Do not perform unnecessary counter-rotation turns or sudden turns at high speed.
 - ⇒ Such frequent maneuvers could cause damage, premature wear or increase risk of hitting objects/obstacles.

15.4.2 Tilt sensor Alarm Sounding

Due to configuration, off-road all-terrain vehicles have excellent climbing ability, so much so that tip-over is possible before traction is lost. For example, it's common to encounter terrain situations where the top of the hill has eroded to a point that the hill peak rises very sharply. The tracked vehicle can readily negotiate such a condition, however, in doing so, when the front of the vehicle is driven to a point that the vehicle's balance changes rearward roll over can occur.

The same situation may apply if an embedded object causes the front of the vehicle to climb more than desired. If such a situation occurs take an alternate route. Be aware of sidehilling dangers when doing so.

It is also wise to know the terrain condition on the other side of the hill or bank. All too often there exists a sharp drop-off that is impossible to negotiate or descend.

15.5 Uphill Driving

Due to configuration, off-road all-terrain vehicles have excellent climbing ability, so much so that tip-over is possible before traction is lost. For example, its common to encounter terrain situations where the top of the hill has eroded to a point that the hill peak rises very sharply. The tracked vehicle can readily negotiate such a condition, however, in doing so, when the front of the vehicle is driven to a point that the vehicle's balance changes rearward roll over can occur.

The same situation may apply if an embedded object causes the front of the vehicle to climb more than desired. If such a situation occurs take an alternate route. Be aware of sidehilling dangers when doing so.

It is also wise to know the terrain condition on the other side of the hill or bank. All too often there exists a sharp drop-off that is impossible to negotiate or descend.

If the vehicle is equipped with a dump body, always evaluate load stability before riding steep uphill slopes.

For maximum operation angle see "*Performance* [► 196]".

15.6 Downhill Driving

As a rule, off-road all-terrain vehicles can climb slopes that are steeper than they can safely descend. Therefore, it is essential to assure that a safe route exists to descend a slope before you climb it.

Decelerating while negotiating a slippery downhill slope could bring the vehicle into a slide. Maintain steady speed and/or accelerate slightly to regain control.

For maximum downhill operation angle see "*Performance* [► 196]".

15.7 Side Hill Driving

Whenever possible, such operation should be avoided. If necessary, do so with extreme caution. Driving sidehill on steep inclines could result in roll-over. In addition, slippery or soft surfaces could result in uncontrollable side sliding. A side-slide may be overcome by attempting to turn the vehicle uphill and accelerating forward out of the slide. Do not attempt to turn the vehicle downhill with the slide. Avoid all objects or depressions that will intensify the raising of one side of the vehicle higher than the other, thus causing roll-over.

For maximum uphill side hill operation see "*Performance* [► 196]".

15.8 Drop-Offs

The operation of tracked vehicle differs greatly from that of a four wheeled vehicle. For example, a four wheeled vehicle will "bottom-out" and usually stop if either the front or rear wheels are driven over a drop-off.

**⚠ WARNING****Accident hazard**

Failure to do the following actions may lead to accident and cause injury or death.

- a) Avoid negotiating drop-offs.
- b) Reverse and select an alternate route.

A tracked vehicle, however will continue to proceed over the drop-off until its center of gravity passes the edge of the drop-off and the vehicle plunges forward. If the drop is sharp or deep, the vehicle will nose dive and tip-over.

15.9 Detracking

**⚠ WARNING****Collision hazard**

Failure to do the following actions may lead to accident and cause injury or death.

- a) Detracking can lead to loss of control or skidding.
- b) Maintain tracks in top condition, check track tension and drive carefully.

Loose tracks, combined with other factors could lead to detracking.

This could provoke an accident, especially on sloped terrain.

- Avoid these situations as much as possible.

15.10 Rotation Brake

**⚠ WARNING****Accident hazard**

In a slope with the vehicle fully loaded, the brake may fail to prevent unwanted rotation of the upper frame.

- a) Always travel on a perpendicular path.

The upper structure of the vehicle will stop to swing when the joystick is released by the operator or when the alignment function had completed its rotation.

The swing brake will be applied automatically when there is no command to activate the swing system.

15.11 Ice Hazard

Snow and ice can be slippery for rubber tracks.

- Be careful on these surfaces and avoid lateral slopes as much as possible.

**⚠ WARNING****Drowning hazard**

The vehicle is very heavy. It could break the ice on a frozen body of water and sink.

- a) Never drive on frozen bodies of water.
- Keep a safe distance with frozen bodies of water.



⚠ WARNING

Accident hazard

Rubber tracks may provide low grip on a smooth slippery surface such as an icy patch, a metal sloped ramp, etc.

- a) Drive with care on such surfaces.

Driving on these surfaces must be undertaken with great precautions as well as riding the vehicle sidehill. If the maneuver cannot be avoided, consider the following before proceeding:

- Angle of the ramp/slope;
- Path of vehicle on a sloped surface;
- Dryness/wetness and temperature of the metal surface (for example, icy surface);
- Load on the vehicle, C.G. position;
- Experience of the driver.

15.12 Riding on Rough or Hazardous Grounds

Extremely rough rocky grounds, places with tree stumps, steel rods, metal scrap, sharp objects or rough concrete can damage the rubber tracks.

River beds or job site with rocks of different sizes can lead to rocks getting caught in the undercarriage/track and cause damage.

- Do not ride on oil, fuel or chemical solvent which could react with the rubber of the tracks.
- Do not drive on surfaces at high temperature such as asphalt or steel plates that have been a long time in the sun or where there have been fires or where ground fire remains.
- Avoid turning in places where there is a large ridge. Approach such obstacles at a right angle.

15.13 Crossing in Shallow Water



INFORMATION

Keep vehicle speed under 5 km/h (3 mph) to prevent creation of a wave.



⚠ WARNING

Drowning hazard

Driving in water means driving without knowledge of the type of surface under the tracks.

- a) Never ride in areas where the driver and passenger can be at risk.

An operator should always exercise the utmost care in selecting the safest and shallowest path if crossing water.

- Never proceed ahead if the bottom is not visible or if the bottom is soft and the vehicle could sink in.
- Select an alternate path if possible.

While the vehicle crosses the water, drive slowly, remain vigilant and stop at the first sign of trouble or if the water level rises above the wheels. The vehicle is not designed for long distance driving in shallow water.

- When the vehicle is parked at the end of the day, perform a short inspection to ensure no remaining water could cause damage.
- If crossing shallow bodies of salt water or if operating near salt water, thoroughly clean the vehicle to prevent corrosion.

For maximum fording depth “Performance [► 196]”.

15.14 Center of Gravity

Through a service request, Prinoth can provide basic vehicle center of gravity. This information may be helpful to determine stability and tip over limits. To provide an accurate center of gravity location, Prinoth will need the vehicle serial number. Prinoth accessories and Prinoth custom items will be considered in the figures provided. Modification done by an implement installer, rental house, or end user won't be considered in the figures provided.

15.15 Overspeed on Downhill Slopes

Overspeed situations usually occur when the vehicle is loaded and travels at or near full speed on a flat terrain and then enters a downhill slope.

In overspeed, the hydrostatic motors will suddenly fail and thus withdraw the braking capacity of the vehicle. This situation is to be avoided at all costs.



NOTICE

Damage hazard

Overspeed can cause permanent damage to the drive system.

- a) Remain vigilant and avoid path that could lead to this situation.

To prevent this dangerous situation, the operator must:

1. travel at moderate speed when the vehicle is heavily loaded and the path it follows has portions with downhill slopes;
2. slow down before driving on down slopes;
3. take an alternate path.

15.16 Anti-Stall

The anti-stall feature is activated automatically if there is a difference between the required engine rpm (position of the throttle pedal) and the rpm the engine produces. The anti-stall feature derates the hydrostatic drive system to prevent an engine stall.

When the required and actual engine rpm return to the same level, the anti-stall is deactivated.

15.17 Special Situations

- Towing the vehicle requires special precautions. Refer to “Towing procedure” in the Drive System Maintenance Section for detailed information.
- If the vehicle becomes stuck, the track can be damaged by excessive material packing in the track/undercarriage. This is likely to occur when the track is spinning and begins to dig below the surface level. To minimize possible damage, it

is recommended to tow the vehicle instead of trying to move it on its own. Attempting to clear excess material by driving is likely to cause some wear or damage.

- Spinning the tracks or making frequent zero radius turns may cause premature wear. Constant operation on a hill or slope could also accelerate wear. This could be especially hard on track guides.
- Working along a transition where one track is not fully supported by the ground could cause damage. If the side of the track comes in contact with curb lines or hard surfaces, it could damage the track or bend it severely on a permanent basis.

15.18 Front Counterweight

The front counterweight, if installed, improves the stability of the vehicle while unloading the dump body. However, the presence of the counterweight does not change the allowed range of slope angles for operating the vehicle and dump body.



Illustration 165: Front counterweight

1	Front counterweight bolted to the upper frame		
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15.19 Retrieval Point



⚠ WARNING

Impact, pinch and crush hazard

- A vehicle towed could loose its braking capacity.
- a) Never tow a vehicle with someone aboard.
 - b) Before proceeding, establish a safety zone around the vehicle to avoid injuries if the vehicle or its load slides, flips or crashes.



NOTICE

Risk of damage

- Using any other point than the retrieval point on the vehicle could result in permanent damage to the structure or other components.
- a) Always use the retrieval point to move or tow the vehicle on a short distance.

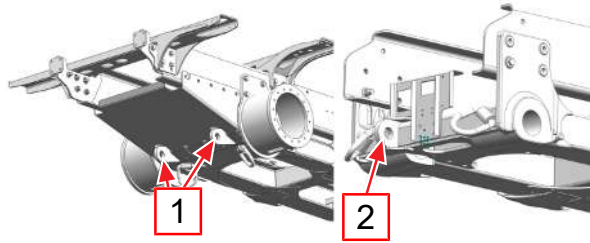


Illustration 166: Retrieval points

1	Front retrieval point	2	Rear retrieval point
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- Keep towing distance and speed to the minimum to prevent accident and damage to the drive system.
- The angle between the longitudinal axis of the vehicle and the pull force must not exceed 20 degrees (any direction).



WARNING

Impact, pinch and crush hazard

A vehicle towed could lose its braking capacity.

- a) Never tow a vehicle with someone aboard.
- b) Before proceeding, establish a safety zone around the vehicle to avoid injuries if the vehicle or its load slides, flips or crashes.

Refer to “Towing” for details and safety precautions before proceeding.

- Do not pull, push or tow the vehicle using the frame extensions (if installed).
- Towing distances should be short. For long distances, secure the vehicle on a suitable trailer.

15.20 Tie Down Points



DANGER

Crush hazard

The vehicle could move unexpectedly, turn over, or crash causing severe injuries or death.

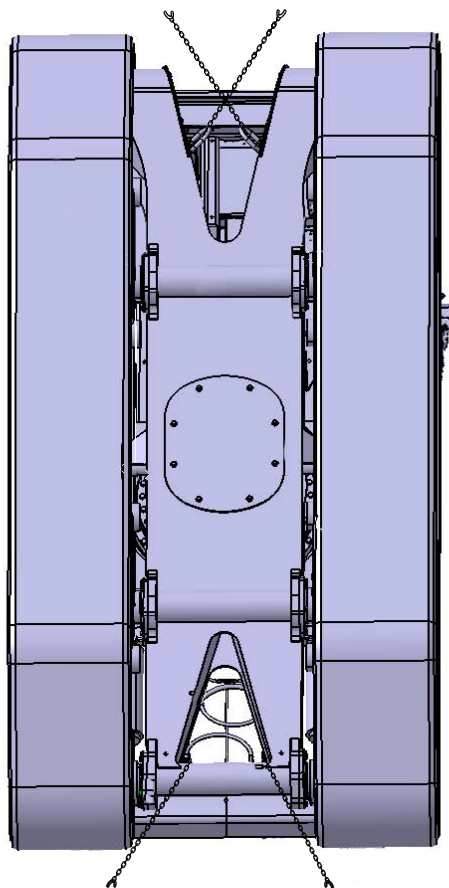
- a) Never use the “D” rings to lift, move or tow the vehicle.

1. When transporting the vehicle, first tie down the lower chassis to secure the vehicle on the transporting platform.
2. If the surface is not flat, follow the guidelines of the next sub-section.
3. Secondly, secure the upper chassis as described.

15.20.1 Lower Chassis

At the front, when tying down the vehicle during transport, it is recommended to attach the chains to the “D” rings in an “X” pattern at the front to ensure maximum stability.

At the back, pass the chains around the cylindrical beam and secure to the ground or platform.



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Illustration 167: Lower frame tie down points - view from underneath the frame

15.20.2 Upper Chassis

Secure the upper frame at the front or at the back to prevent any unwanted rotation. At the front, use the «D» rings of the upper chassis, or, at the rear, use the «D» rings at the back of the dump body. In each case, chains must be tied in an «X» pattern.

Always use strong chains to secure the vehicle. Securing the upper chassis does not exempt from securing the lower chassis, both must be secured.

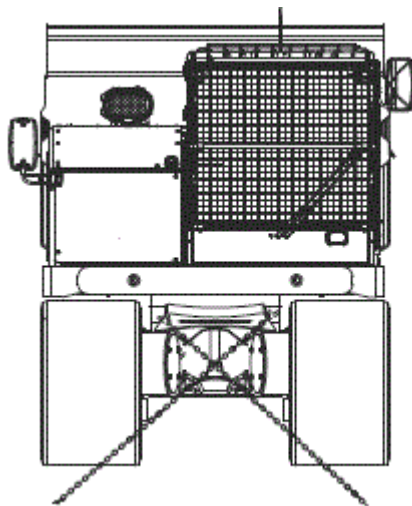


Illustration 168: Chains in an X pattern to secure the upper frame using the «D» rings at the front

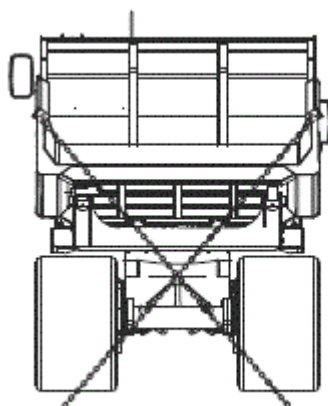


Illustration 169: Chains in an X pattern to secure the upper frame using the «D» rings on the dump body



⚠ WARNING

Accident hazard

If the brake of the rotation system slips or fails and the upper frame of the vehicle is not secured, the upper section could rotate and hit objects, vehicles or personnel nearby. Always secure the upper frame before transporting the Panther T14R on a platform, a trailer or other.

Before transporting the vehicle on a flat bed or other transport system, it is recommended to secure the upper frame to prevent an unwanted rotation.

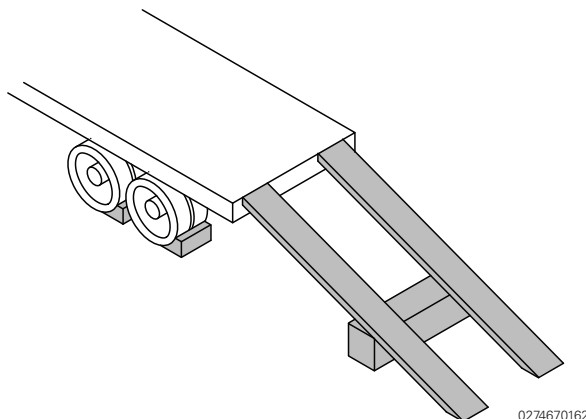
Install chains in a way they do not cause damage to the tracks, to the frame or to other vehicle components.

Additionally, always ensure that the dump body is fully lowered, empty and that nobody is present in the cab. Observe the tie down point guidelines so the vehicle is secure on the transport platform.

15.21 Loading and Unloading Vehicle on Ramps

When driving on ramps to load or unload the vehicle from a transport trailer, check the following to reduce the risk of accident:

- The ramps are strong enough to support the weight of the vehicle (and its load if applicable);
- Each ramp is wider than the tracks that will ride on it;
- The angle of the ramps is moderate (maximum of 15°);



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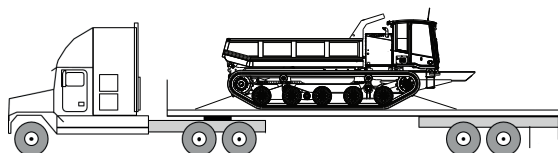
Illustration 170: Moderate angle of the loading/unloading ramps

- The ramps are not too long;
- The ramps are well hooked to the transport trailer;
- The ramps have a non-slip surface;
- The ramps are clean and free of grease, oil, ice or loose material.

When driving on ramps to load or unload the vehicle from a transport trailer, observe the following precautions:

- Perform the loading and unloading on firm ground only;
- Stop the engine or the haulage truck, apply the brake and block the tires;
- Arrange the ramps so they are parallel and in line;
- Attach the ramps securely to the trailer;
- Position the Panther vehicle in line with the ramps and approach at low speed;
- Do not change direction once on the ramps. If required, drive off the ramps, re-align and drive again on the ramps;
- After loading, put blocks at the front and the rear of the tracks of the Panther vehicle. Tie down in an “X” pattern using the “D” rings on the vehicle and strong chains.

15.22 Guidelines for Transport



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Illustration 171: Transporting the Panther on a trailer (generic view)



DANGER

Risk of accident

Failure to observe the warnings and follow instructions in this section may result in serious injury or death if the Panther vehicle unexpectedly moves or falls.

- Observe the warnings and follow instructions.

Read and understand all of the safety precautions and warnings in this section before transporting a Panther vehicle on a flatbed or platform.

Precautions for the tracks:

1. The surface under the tracks must be flat and cover the full width of each track, or, if narrower, cover the width of the double steel wheels (for rubber tracks). If the tracks are supported by the edges, they could sustain damage;
2. Ensure the surface supporting the tracks will not cause damage to the rubber. A sharp edge causing the tracks to bend inward could cause damage;
3. Ensure that each track section under the centerline of the sprocket is at least 5 cm (2 inches) above the platform surface. A hit to the sprocket/planetary gear-box could damage the bearings and internal parts of the planetary;

General precautions and guidelines:

1. Never allow a person to stand on the Panther vehicle or to sit in the cab during transport;
2. Never move the transport vehicle if the Panther is not properly tied down;
3. Ensure the transport vehicle, trailer, platform or other device has the proper capacity, width and length to safely support the Panther vehicle;
4. Check the total height of the Panther vehicle when loading is complete on a flatbed. Ensure to clear maximum allowable height (and other allowed dimensions);
5. According to the type and conditions of the transport operation, install adequate protection to the Panther windshield (or position the Panther facing backward), windows, muffler opening, mirrors, wipers, etc.;
6. Ensure the cab door and cowling access panels are closed and locked;
7. Ensure the dump body/tilt deck, if installed, is empty, fully lowered and secured;
8. Follow all legislations and laws applicable to the transport operation;
9. Ensure the quick reference card is present in the cab to instruct how to drive the Panther out of the flatbed at final destination.
10. Secure vertical post safely on deck for road transport using straps or tie-downs.

16 Dump Body Operation

This section applies exclusively to the genuine PRINOTH dump body installed at the factory.

16.1 Blind Spots

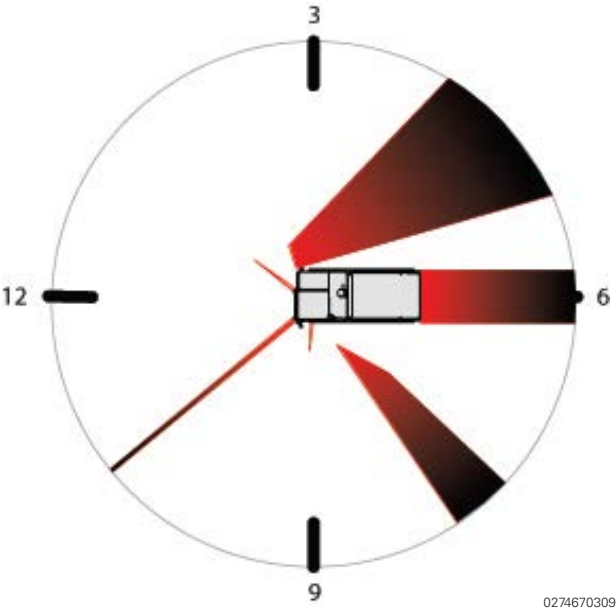


Illustration 172: Vehicle view from top in the center of the circle with red/black blind spots

- On the previous figure, 12 indicates front of vehicle (aerial view), 6 is rear, while 3 and 9 are the sides. The shaded dark areas are the blind spots of the vehicle.
- The operator must be aware of the blind spots that exist with the specific configuration of the cab and equipment installed on the vehicle.
 - The operator is responsible to maintain a good job site organization to insure a safe operation of the vehicle.

16.2 Dump Body Specifications

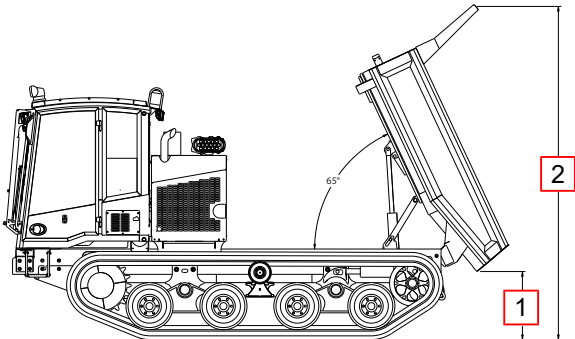


Illustration 173: Dump Body Specifications

1	Raised dump body lowest point	2	Raised dump body highest point
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The PRINOTH dump body has the following characteristics:

1. Interior dimensions:

- 2 110 mm (83 in) width.
 - 2 430 mm (95,5 in) length.
 - 552 mm (22 in) height (at side edges).
2. Maximum tilt angle: 65 degrees.
 3. Lower edge of dump body (item 1) to the ground when dump body is raised: 731 mm (28.75 in).
 4. Raised dump body highest point (item 2) : 3607 mm (142 in). See the previous figure.



INFORMATION

This measure is important when working under power lines.

5. Two drain holes (with removable plugs) to drain accumulated water;
6. In certain conditions, the diesel engine rpm may increase automatically when raising the dump body. If this is the case, the rpm will return to its original setting within approximately 30 seconds.
7. On vehicles intended for certain countries, a proximity sensor is installed to monitor the position of the dump body. This feature will sound a buzzer and limit the vehicle top speed (to approx. 10 km/h) if the vehicle moves while the dump body is raised.

16.3 Control Lever

The joystick operates the dump body position cylinders. You can rely on the sign locate near the joystick for indications. The speed of up/down operation increases as the joystick is pushed further in the selected direction.

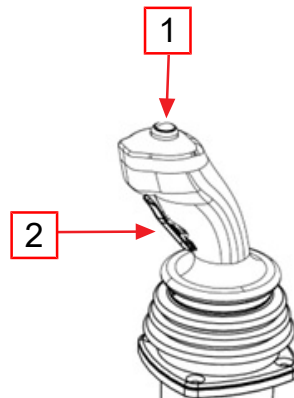


Illustration 174: Joystick

1	Alignment switch	2	Trigger switch
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To raise the dump body do as follows:

1. Activate the trigger.
2. Pull the joystick backward.

To lower the dump body do as follows:

1. Activate the trigger.
2. Push the joystick forward.

16.4 Automatic Dump Body Lowering System

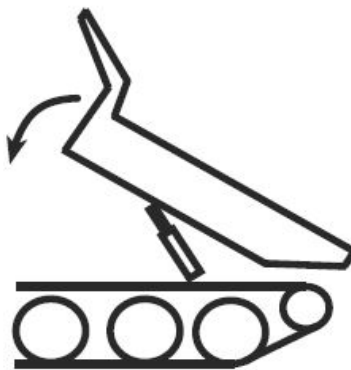


Illustration 175: Automatic dump body lowering system

The driver must always completely lower the dump body manually (with the joystick) before setting the vehicle in motion. The automatic lowering system is used only to lower the risk of not doing so.



DANGER

Crush hazard

The automatic system could lower the dump body and cause severe injuries or death.

- a) NEVER allow someone to go under the dump body if the safety pin is not installed or while the vehicle runs.



WARNING

Accident hazard

Riding the vehicle with a raised dump body could create instability, excessive loads to the structure or an accident if hitting an obstacle or a power line.

- a) Always lower the dump body completely before driving the vehicle.

Driving with a raised dump body should be avoided. A raised dump body could cause an accident if it hits a structure or a power line. Additionally, when the vehicle is in motion, it could generate damaging mechanical loads on the vehicle structure.

To lower the risk of such an occurrence, the vehicle is equipped with an automatic function that will lower the dump body when the vehicle is set in motion.

The lowering cycle of the dump body will start when all the following conditions are met:

1. The dump body lift function has been activated voluntarily or accidentally.
2. The vehicle moves at a speed of more than 3 km/h (2 mph).
3. The vehicle moves in the forward* direction for more than 3 seconds.

The lowering cycle is continuous, it will descend until the angle read by the inclinometer is 0 degree (level).



The automatic lowering cycle will be cancelled as soon as one of the conditions is not present.

The automatic dump body lowering function will not activate in case of:

- Failure of a hydrostatic motor speed sensor (MSS).
- Low hydraulic oil level (alarm).

* Forward : direction of the vehicle when it moves towards the terrain in front of the cab (regardless of the orientation of the lower frame).

16.5 Operating the Vehicle as a Dumper

16.5.1 Dump Body Verification

1. Be sure to check all components of the lifting system, for any deficiencies.
2. Correct any problem found before operating the vehicle and the dump body.

16.5.2 Inspect and Prepare the Work Area



WARNING

Electrical hazard

Contacting electric lines with the dump body can cause electric shock or burn.

- a) Keep away from electric lines or power sources.

The operator should be familiar with the work area where the vehicle will operate.

- If dumping will be done at the edge of a particular site or location, make that point as stable and level as possible.
- Since the load distribution at the time of dumping puts the weight primarily on the rear section of the vehicle, try to increase stability at that point of dumping by building a raised pile of material at the very edge.
- This is to avoid a downward slope.
 - If possible, avoid dumping right at the edge and dump short of that point, utilizing a bulldozer to push the material over the edge.
- Ensure the position of the raised body, when dumping, does not put it at risk of coming in contact with power lines.
- Check lighting if the work is to be performed at night or in the dark.

16.5.3 Aerial High-Voltage Cables



Illustration 176: Avoid contact with aerial power cables



⚠ WARNING

Electrical hazard

Contacting electric lines with the dump body can cause electric shock or burn.

- a) Keep away from electric lines or power sources.

Do not travel or operate the vehicle near electric cables. There is a hazard of electric shock which could cause severe injuries or death. If the vehicle has to get in motion near electric cables, observe the following:

- Before starting to work, inform the local power company and ask for the necessary actions;
- Electrocutation can occur even without contacting a cable. Always maintain a safe distance between the vehicle, the dump body and the aerial power line. The higher the voltage, the greater the safe distance needs to be.

Voltage of cables	Safety distance
125 kV	more than 3 m (10 ft)
125 to 250 kV	more than 5 m (16 ft)
250 to 550 kV	more than 8 m (26 ft)
more than 550 kV	more than 12 m (40 ft)



INFORMATION

Use this table as a guideline only, always contact the local power company.

- Use a signalman to give warning if the vehicle approaches too close to the electric cables;
- When working near high voltage cables, do not let anyone around the vehicle;
- If a part of the vehicle, or dump body, should come very close or directly in contact with the power lines, the operator should not leave the cab until it has been confirmed that the electricity has been shut off. Do not let anyone near the vehicle.
- Preventive actions include shoes with rubber soles for the operator and use of someone to signal a path to avoid power lines.

16.5.4 Dump body inclinometer

The dump body inclinometer tells the angle of the dump body on the display. The angles is given from a virtual level plane.

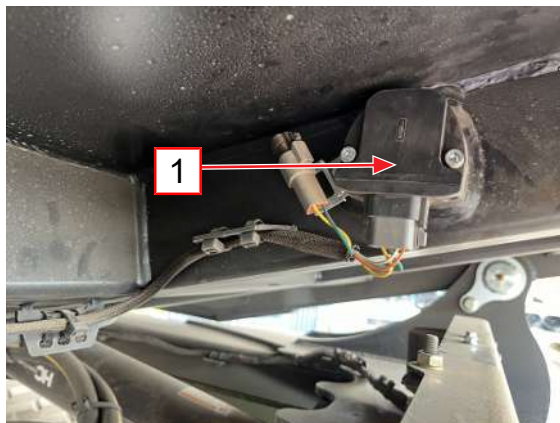


Illustration 177: Dump body inclinometer screen

1	Dumpbox angle		
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The dump body inclinometer has following icons:

	Dump body angle
	Dump body float (Automatic dump body lowering system activated)



1	Dump body inclinometer		
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16.5.5 Ventilation and Toxic Dust

When working in enclosed areas, ensure adequate ventilation is available. Take every precautions to prevent gas poisoning.

Certain types of dust (Asbestos for example) may be harmful to health and could be present on the work field. Take appropriate steps to prevent breathing airborne dust:

1. Spray water to keep down the dust when cleaning. Do not use compressed air for cleaning;
2. Do not allow unauthorized personnel to approach the work site;
3. Operate the vehicle in a position where the wind pushes the dust away from the vehicle

4. Observe local rules and environmental standards.

16.5.6 Distribute Load Properly

- Ensure the material is loaded onto the vehicle from the front near the cab/cowling to the back as evenly as possible.
- Do not load too heavily, especially if the material being dumped has the potential to floor poorly.

16.5.7 Driving with a Load

Some PRINOTH dump body models are not equipped with a tail gate, in this case, driving a steep incline could result in a loss of bulk material.

- Anticipate the path of the vehicle to avoid unwanted material loss before designated dumping site.

A loaded dump body changes the position of the center of gravity of the vehicle. This, with the additional weight must be taken into consideration for safe driving.

- Do not move or drive the vehicle until the dump body is lowered completely;

16.5.8 Driving to Reduce Vibration

Terrain in the work site could be rough and cause vibrations to be transmitted to the cab and ultimately to the operator.

Whenever possible, follow these recommendations to reduce vibration and fatigue to the minimum:

1. Select a path with less obstacles.
2. Reduce speed.
3. When possible, stop vehicle and take some rest.
4. Carefully adjust seating position and seat suspension.

16.5.9 Best Braking Performance

A loaded vehicle will require a longer braking distance.

- Anticipate vehicle reactions and follow a safe path that takes the load into consideration.

Best braking performance is highly related to the type of surface on the ground, the degree of slope, the load in the dump body and the track wear.

- Avoid sliding ground and try to decelerate while driving in straight line uphill or downhill. Braking while driving sidehill is less effective.

16.5.10 Driving to and from the Discharge Zone

- Always wear the seat belt.
- Lower the dump body before starting to travel.
- On rough terrain, travel slowly and avoid sudden change in direction.
- Do not overload the dump body.
- Avoid paths that require to travel over obstacles, otherwise take precautions and drive carefully.
- Stay away from the edge of cliffs, overhangs, and slide areas. Do not approach the edge of a cliff, an excavation, or an overhang.

- Avoid any situation that can lead to tipping the vehicle. The vehicle can tip when working on hills, on banks and on slopes. Be also careful when crossing ditches, ridges, or other obstacles.

16.5.11 Stability while Travelling

The skill and judgment of the operator is the most important criteria for safe driving. A well trained operator that follows the instructions in the Operation and Maintenance Manual has the greatest impact on stability. The following abilities are very important:

- Observation of working and environmental conditions;
- The identification of potential hazards;

On slopes, consider the following important points:

- Speed of travel : at higher speeds, forces of inertia tend to make the vehicle less stable;
- Roughness of terrain or surface : the vehicle may be less stable on uneven terrain;
- Direction of travel : avoid operating the vehicle across a slope. When possible, operate the vehicle up or down the slopes.
- Nature of surface : ground that has been newly filled with earth may collapse from the weight of the vehicle;
- Surface material : rocks and moisture of the surface material may drastically affect the vehicle traction and vehicle stability. Rocky surfaces may promote side slipping of the vehicle;
- Height of the payload in the dump body : when the payload is in higher position, the stability of the vehicle is reduced.

16.5.12 Precautions While Dumping



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Illustration 178: Do not carry out dumping operation on a slope



! WARNING

Impact hazard

Material falling from a raised dump body could crush someone.

- Observe all safety precautions when operating the dump body.



⚠ DANGER

Tip over hazard

The vehicle could lose its balance, tip over and cause severe injuries or death. It is especially risky to dump downhill.

- a) Never exceed the vehicle limit when driving on slopes or while dumping the load.
 - b) Do not carry out dumping operation on slopes.
 - c) Only dump if the vehicle is on firm, level ground.
-
- Ensure there are no bystanders or workers around the area where the material will be dumped.
 - Always apply the parking brake before starting to dump material.
 - Do not dump side-by-side with another vehicle; if one of the vehicles does tip over, it would most likely disrupt the next vehicle and cause an unanticipated accident.
 - Most importantly, check to make sure that there are not any other workers near the dumping site who may be working on other jobs and may not be totally aware of the dumping process.
 - Remember that the center of gravity of the vehicle continuously changes while the dump body raises, the load dumps and the dump body lowers. This could greatly affect the stability of the vehicle if ground is unstable.
 - After dumping, do not move the vehicle until the dump body is lowered completely.

Precautions summary:

1. Do not travel or operate the vehicle near electric cables.
2. Always dump on a firm and level ground;
3. Never exceed the payload.

16.5.13 Sticking Load

A sticking load is a kind of material that will partly or entirely stick to the dump body when it is raised to dump. Clay is a good example. A load that will freeze in the dump body is another. This situation presents disadvantages and raises the risk of accident because it increases the shift of the center of gravity thus potentially creating instability.

When possible, avoid leaving material that could freeze overnight in the dump body.



⚠ WARNING

Crush hazard

The load could loosen suddenly and crush someone.

- a) Never try to remove a sticking load manually on a partially or completely raised dump body.
 - b) Always remove a sticking load while the dump body is completely down.
-
- Keep the dump body surfaces as clean as possible.
 - Avoid loading material that could stick to the dump body.
 - Do not use the cylinders to loosen (“shake”) loads stuck in the dump box.

- Do not move the vehicle and apply the brakes while the cylinder is partially or fully extended to loosen loads stuck in the dump box.

If loading cannot be avoided:

1. Lower the dump body entirely with the cylinder control valve partially open (avoid lowering the dump box with the cylinder control valve completely open).
2. Turn off the engine.
3. Then unload the dump box manually or with the recourse to a mechanical aid (being careful not to damage the dump body).

16.5.14 Ground Stability

Ground stability is very important to ensure safety of dumping operation.

Raising the dump body moves the center of gravity of the vehicle higher and backward.

- Ensure the ground is strong enough to support the vehicle.

16.6 Dump Body Verification



NOTICE

Serious damage hazard

If a dump body cylinder disconnects at one end and a command is sent to raise the dump body, its rod will extend and could crush a component of the vehicle, causing serious damage.

- a) Proceed to a daily visual inspection to prevent a failure that could cause permanent damage. Correct any problem without delay.



INFORMATION

If the dump body is loaded with material such as salt, ammonium sulphate, potassium chloride, potassium sulphate or phosphates, the dump body, wash the frame and tracks thoroughly after each work shift.

The extension of a disconnected cylinder, or two cylinders, could cause serious damage.

A daily visual inspection is recommended once the dump body is raised and secured with the safety rod:

- Inspect the pins attaching the each end of each cylinder to the chassis and dump body. Ensure the bolts holding the pins are correctly torqued.
- Ensure the pins are in good condition.
- Check the lift cylinders for leaks once the dump body is raised and the safety rod is installed. Leak could indicate worn seals.
- Inspect the safety rod and dedicated surfaces and hardware.
- Inspect the surfaces where the dump body sits on the frame.
- Ensure all grease points are lubricated.
- Keep the interior of the dump body clean and smooth to prevent sticking load.

16.7 Safety Device



Illustration 179: Safety Rod.

1	Safety rod in the locked position		
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WARNING

Crush hazard

If the raised dump body is not secured with the safety device, an accidental activation of the control lever or a cylinder failure could lower the dump body and cause severe injuries or death.

- a) Always secure the dump body with the safety device before working under it.
-
- Never work under the raised dump body unless the safety device is installed and secure. A label should also be installed to lock-out/tag-out the control lever.
 - The safety device is designed to support an empty dump body. Always empty the dump body before installing the safety device.
 - Do not use the safety device to support the dump body when replacing the dump cylinders, hydraulic hoses or other equipment. In such cases, always support the dump body with a crane or lifting equipment.



WARNING

Accident hazard

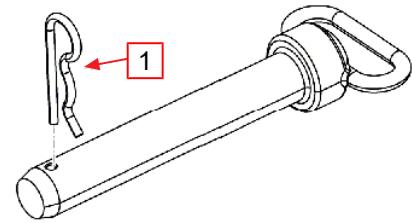
A raised dump body could contact aerial power lines, damage dump body/frame and generate instability.

- a) Always lower the dump body when driving the vehicle.
-
- Never drive the vehicle with the safety device installed. The rod is not design for dynamic forces and side loads.

16.7.1 Installing the Safety Rod

1. Set the vehicle on a firm and level ground.
2. Verify that the dump body is empty, if not, empty it.
3. Survey the area around and above the vehicle, ensure there are no power lines above, other obstacles or personnel close by.
4. Apply the parking brake, leave the engine running.
5. Using the lever in the cab, raise the dump body completely. Lock the lever with the safety latch.

6. Stop diesel engine.
7. Remove the safety rod locking pin and pull out the safety rod from its stowed position.



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Illustration 180: Installing the Safety Rod

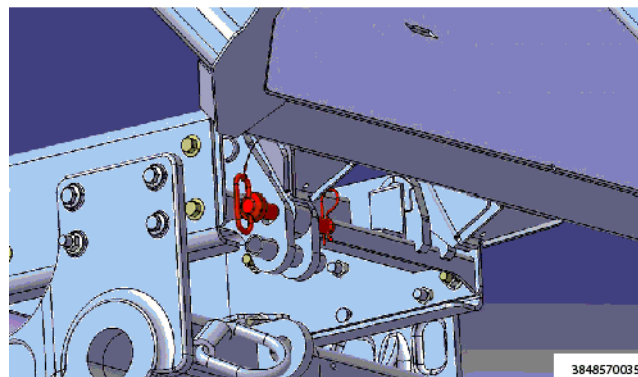
1	Safety rod locking pin	
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INFORMATION

The safety rod has a bright red color.

8. Insert the safety rod in the aligned cavities of the vehicle frame and dump body. Secure with the locking pin.



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Illustration 181: Safety rod (red) in the locked position, dump body raised



INFORMATION

It is a good habit to check the lift cylinders for leaks once the dump body is raised and the safety rod is installed. Always install the safety rod before having body parts under the dump body.

16.7.2 Removing the Safety Rod

1. Survey the area under the dump body, ensure there are no obstacles or tools left on the frame or personnel close by;
2. Remove the locking pin on the safety rod.
3. Remove the safety rod and reinstall it in the stowed position. Install the locking pin.



INFORMATION

If the safety rod cannot be removed because it is stuck in the aligned cavities, start the engine and raise the dump body slightly to free the safety rod.

4. Using the lever in the cab, lower the dump body completely;

16.8 Dump Body Modification and Use



INFORMATION

Do not attach an equipment, a device or another object in the dump body. Doing so will invalidate the ROPS certification. Carry only bulk material in the dump body.

The vehicle and dump body have been designed to transport loose material only.

- Do not modify the dump body in any way.

16.9 Safety Checklist

Operating the vehicle as a dumper carrier with known failures or with the emergency drive module is unsafe. Do not work with a partially disabled vehicle.

The operator is responsible to maintain a good job site organisation to insure a safe operation.

16.9.1 Daily Vehicle Check

- Perform a complete walk-around of the vehicle;
- Check track, wheel and sprocket condition;
- Check windshield cleanliness;
- Check mirror adjustment and cleanliness;
- Check all lights of the vehicle;
- Check operation of dump body, check cylinder tube and rod attaching points;
- If equipped, check tailgate locking system;
- Check underneath vehicle for oil leaks/spills;
- Check back-up alarm;
- Check brake operation;
- Check condition of the dump body safety rod;
- Check seat belt function.

16.9.2 Operator Protective Equipment

- Wear reflective, high visibility vest.
- Wear hard hat when working near equipment.
- Wear protective footwear.
- Check condition of first aid kit.
- Check fire extinguisher condition.
- Inspect safety rod periodically, replace if required.
- Provide cones for work area near traffic.

16.9.3 Backing Dump Vehicle

- Keep rear view mirrors clean.
- Never back faster than walking speed.
- Driver and backer must agree on a STOP signal.
- Get out of the cab and look if a backer is not available.

16.9.4 Good Practices

- Move the operating lever smoothly and slowly.
- When required, use the safety latch on the control lever to prevent unwanted activation.
- Never raise dump body on uneven or unstable ground.
- Check for overhead wires before raising dump body.
- Clear workers from area before dumping.
- Do not leave the vehicle during the dumping cycle. Remain at the controls.
- Never let anyone go under a raised loaded dump body.
- Never allow anyone to ride, work or stand in the dump body while the engine runs unless performing maintenance and observing all applicable safety precautions.
- Never drive the vehicle with the dump body safety rod installed.
- Always evaluate load stability before riding steep uphill slopes (the dump body has no tail gate).
- After dumping, do not move the vehicle until the dump body is lowered completely.
- When loading the dump body, do not exceed capacity in volume and weight.
- Observe all local and national regulations applicable to the work in progress.
- If exiting the cab, survey area for traffic before exiting.
- Never leave the dump body fully or partially raised while the vehicle is not under surveillance, waiting for maintenance or repair unless the safety rod or other robust lifting system is installed to secure it.

17 Technical Data

17.1 Category

Description	Value
Possible Use	Dumper
Working Environment	Humid region, forest, field, construction site
Season	Four Seasons
Type of Working Surface	Dry or wet mud, snow

Table 8: Category

17.2 Weight

Description	Value
Curb Weight Bare Chassis	-
Curb Weight Dumper	16961kg / 37392lb
Curb Weight - Modular	-
Curb Weight - Tub	-

Table 9: Weight

17.3 Performance

Description	Value
GVWR	30997kg/68336lb
GVWR - Modular	-
GVWR - Tub	-
ROPS Rating (Wide Cab)	16131kg/35562lb
ROPS Rating (Narrow Cab)	-
ROPS Rating - Modular	-
ROPS Rating - Tub	-
Payload - Dump Body	13200kg/29100lb
Dump Body Capacity Heaped	-
Dump Body Capacity Heaped (high density)	6.5m ³ / 8.5yd ³

Description	Value
Dump Body Capacity Heaped (high volume)	7.7m ³ / 10.1yd ³
Payload - Flat Deck	-
Flat Deck Length	-
Flat Deck Width	-
Maximum Speed Unloaded	13km/h / 8mph
Fording Depth	1200mm / 47.2in
Turning Radius	0m/0ft
Ground Pressure (6in suspension)	
Basic Vehicle	275g/cm ² / 3.91psi
Vehicle loaded to GVWR	499 g/cm ² / 7.10psi
Gradeability	
Uphill / Downhill	15deg/27%
Sidehill (loaded)	15deg/27%

Table 10: Performance

17.4 Engine

Description	Value
Make	Caterpillar
Model	C7.1
Type	Turbo Diesel, Electronic Fuel System
Emission Standard	EPS Tier 4 Final / EU Stage V
Clean Emission Module	DOC, DPF, and SCR
Regeneration	Passive
Number of Cylinders	6
Displacement	7.01L - 433.3in ³
Power @ 2200 RPM	205kw/275hp
Torque @ 1400 RPM	1257Nm - 927 lb.ft
Torque @ 1500 RPM	-

Description	Value
Ambient temperature operational limit	+46C / +115F
Cold start limit temperature with	-25C / -13F

Table 11: Engine

17.5 Transmission

Description	Value
Pump Type	Axial piston pump, variable displacement
Motor Type	Axial, variable displacement
Gearbox Type	Planetary gearbox
Dynamic Braking	Hydraustatic Transmission
Parking Brake	Multi-disc, Spring applied, pressure released

Table 12: Transmission

17.6 Control & Electronics

Description	Value
Communication	J1939

Table 13: Control & Electronics

17.7 Electrics

Description	Value
Alternator	12V - 150 amps
Battery	2 x 1150 CCA

Table 14: Electrics

17.8 Suspension

Description	Value
Type	Tandem Suspension

Table 15: Suspension

17.9 Wheels

Description	Value
Quantity	16 Half Wheels
Type	Steel

Table 16: Wheels

17.10 Tracks

Description	Values
Type	Metal Embedded Rubber Tracks (End-less)
Width	750mm - 29.5in
Tensioner	Hydraulic, Automatic

Table 17: Tracks

17.11 Capacities

Description	Value
Cooling System	33L / 8.7 US gal
Fuel Tank	300L / 79.3 US gal
DEF/AdBlue Tank	27L / 7.1 US gal
Engine Crank Case	18L / 4.6 US gal
Hydrostatic Tank	155L / 41 US gal
Planetaries	2.4L / 0.63 US gal
Pump Drive	1.4L / 0.36 US gal
Windshield Washer Tank	4L / 1.1 US gal
Idler Wheel hub	0.3L / 10oz
Wheel Hub	0.5L / 16.9oz
Top roller Hubs	0.2L / 7oz

Table 18: Capacities

17.12 Noise Emission Values

Description	Value
Sound power level (2000/14/EC, ISO 3744)*	105 dB
Sound pressure level at the operating position (ISO 6396: 2008) *	77 dB

Table 19: Noise emission values

*The stated noise emission values have been measured on a standard vehicle without any custom equipment installed. Use these values only as indications. The custom equipment fitter has the obligation of measuring noise emissions of vehicle with equipment installed before it is put in service, and declare conformity where appropriate as per the 2000/14/CE directives.

17.13 Vibration Emission Values

Description	Value
Hand-arm-vibration (2002/44/EC, ISO 5349-2: 2001)**	<2.5 m/s ²
Whole body-vibration (2002/44/EC, ISO 2631-1: 1997)**	<0.5 m/s ²

Table 20: Vibration emission values

**The stated vibration emission values have been measured on standard vehicles (without equipment) under particular operating conditions and terrain.

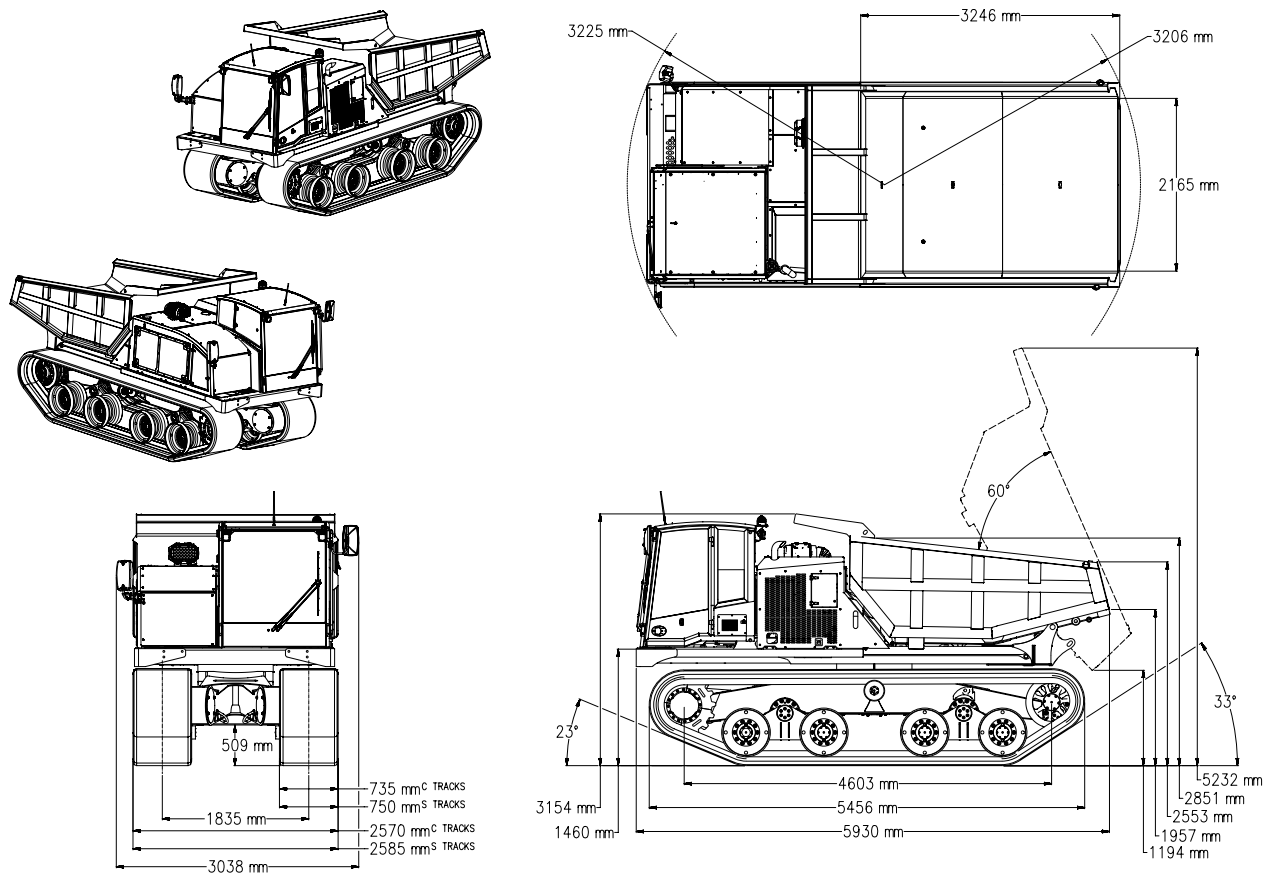
17.14 Fluid specifications

Fluid types	
Fuel	USLD (Ultra Low Sulfur Diesel) fuel with 0.0015% sulfur 15 ppm (mp/kg) or less
DEF / Adblue®	In compliance with ISO 22241-1 standard, AdBlue in Europe
Engine coolant NOTE: 50% water, 50% antifreeze for temperature below -31 °F (-35 °C). Contact the Prinoth service department	Preferred: CAT ELC (Extended Life Coolant)
Engine crankcase oil	CAT-DEO ULS (Diesel Engine Oil – Ultra Low Sulfur)
Planetary oil	Synthetic gear oil on PAO base (poly-alpha-olefin)
Pumps drive oil (splitter box oil)	Synthetic gear oil on PAO base (poly-alpha-olefin)

Fluid types	
Hydrostatic/hydraulic oil NOTE: VG 32: -25 °C (-13 °F) / +25 °C (+77 °F) VG 46: -10 °C (+14 °F) / +46 °C (+115 °F)	Mineral oil: DIN 51524 (HVL), viscosity grade 32 or 46 ATF oil: Dexron III, Dexron II, Type F, Type A suffix A Biodegradable oil: Panolin HLP Synth 46, York Bio VG 46
Swing system - gearbox oil	Synthetic gear oil on PAO base (poly-alpha-olefin)
Wheel and idler wheel hub oil	Synthetic gear oil on PAO base (poly-alpha-olefin) ISO viscosity grade 220 DIN 51517-3 CLP
Top roller oil	Synthetic gear oil on PAO base (poly-alpha-olefin)

Table 21: Fluid types

17.15 Dimensions



17.16 Remote Control

17.16.1 CB70 battery charger: Technical data

Specification	Value
Standard AC power supply	230 Vca $\pm$ 10%, 50
Optional AC power supply	115 Vca, 60 Hz
DC power supply	From 10.5 V to 35 V

Table 22: Technical data

17.16.2 Remote control and IK3 transmitter: Technical data

Description	Value
Stop function (400 - 900 MHz)	Cat. 3-PLd
Stop function (2.4 GHz)	Cat3 - PLe
Ingress protection rating	IP65/NEMA4
Frequency band - ERP	433.050 to 434.040 MHz; ERP<1 mW
	434.040 to 434.790 MHz; ERP<10mW
	869.700 to 870.000 MHz; ERP<5 mW
	902.000 to 928.000 MHz; ERP<1mW
	2405MHz to 2475MHz; ERP 20dBm/100mW
Range (normal conditions)	100m
Battery life	10 hours
Operating temperature range	-20°C to 70°C (-4°F to 158°F)
Storage temperature range (long periods)	-25°C to 55°C (-13°F to 131°F)
Relative humidity	Max. 95% without condensation
Weight (with battery)	1780 g
Dimensions L x W x H mm	245,04 x 216,56 x 181,16

Table 23: Technical data



NOTICE

Note:

Changes in design and specifications and/or additions or improvements in product may occur without any obligation to install them on previously manufactured vehicles. All quantities indicated are approximate. All products and company names are trademarks™ or registered® trademarks of their respective holders. Use of them does not imply any affiliation with or endorsement by them.

18 Troubleshooting - Remote Control

18.1 Troubleshooting (400-900 MHz)

The transmitter has status monitoring LED's which help identify irregularities. You will find the most common signals in the table below:

Color and frequency	Pulse frequency	Description	Action
Green continuous		– Working	Operate.
Green slow pulses		– Latency – No action has been taken for some time	Press START to return to operation mode.
Red slow pulses		– Low battery signal	Replace or recharge battery.
Red fast pulses		– EEPROM module missing or corrupt	Check EEPROM and reprogram if necessary.
Red double pulses		– A maneuver is activated at transmitter start up process – May indicate hardware damage if no order is active	Release maneuver or replace transmitter if necessary.
Red continuous		– General hardware failure	Replace transmitter.

Table 24: LEDs and pulse frequency

18.2 Troubleshooting 2.4 GHz

The transmitter has status monitoring LED's which help identify irregularities. You will find the most common signals in the table below:

LED color Frequency	Pulse Frequency	Description	Action
Blue fast pulses		– Starting the system, establishing communication with radio and EEPROM	Wait.
Blue continuous		– Stand-by – Setting up system – waiting for user's action	Press START to enter Operation mode.

Table 25: LED and pulse frequency

18.3 Connection loss protocol

If the connection is lost between the vehicle and the controller while operating, the vehicle will stop automatically.

If the remote control loses the connection, proceed as follows:

1. Deactivate the remote control immediately to prevent unforeseeable events.
2. Move in a proper operation range.
3. Release the emergency STOP switch.
4. Press on the START button on the right side of the remote control to reconnect.



1	LED turns green		
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5. If you cannot connect the remote control, check whether the battery is empty.
6. Then recharge the battery.
7. Try to reconnect.
8. If the problem has not been solved, contact PRINOTH service.

19 General Maintenance Guidelines

19.1 Introduction

This section describes basic maintenance procedures and simple troubleshooting to be accomplished for the normal operation of the vehicle. It does not include repair, adjustment or advanced troubleshooting procedures.

The tasks described in this section can be accomplished by a person with a good general knowledge of heavy equipment or machinery and standard tools.

- Refer to the “Maintenance Schedule” section for frequency of periodic maintenance.

Some items or components shown in the maintenance sections may be optional or installed only on vehicles intended for specific countries or regions.

19.2 Safety



WARNING

Burn hazard

Hot oil and hot components can cause severe burns. Oil escaping under pressure can penetrate skin and cause severe injuries or burns.

- a) Do not allow hot oil or hot components to contact the skin.
- b) Release pressure and use protective clothing or equipment before servicing the hydraulic/hydrostatic system.



WARNING

Poisoning hazard

Operating fluids (and gases) are hazardous to health. Touching or swallowing operating fluids can cause caustic burns or poisoning.

- a) In case of contact or ingestion, get medical attention immediately.
- b) Always work in a well ventilated area.



WARNING

Fire hazard

Operating fluids and their vapour can be flammable.

- a) Do not bring open fire or allow sparks in the vicinity.



WARNING

Burn and fire hazard

Battery cells contain hydrogen, a highly combustible gas and sulfuric acid, a corrosive fluid. To avoid injuries:

Keep flames and sparks away from the battery.

- a) Prevent contact between battery fluid and skin, eye, clothing and vehicle.
- b) If battery acid comes in contact with the skin or eyes, immediately flush the area with large amount of fresh water, then get medical attention right away.

Maintenance work requires the following protective equipment and precautions:

- Safety glasses
- Gloves
- Safety shoes
- Protective clothing (coverall)
- Hard hat and ear protection if required
- Remove jewels, loose clothing and attach long hair.

Maintenance work requires observation of numerous safety precautions to minimize the risk of injuries. Refer to the SAFETY section of the present manual for safe practices.

- Do not install equipment or disable devices that could impair safety of the operator or service personnel.
- Observe safe work practices, read safety labels and review procedures before executing them.

19.3 How to Wash and Clean the Vehicle



Illustration 182: Washing the vehicle

- Washing the vehicle is a good practice to reduce corrosion. It promotes a safe use of the vehicle.
- Do not use strong products, chemicals or solvents to clean the vehicle. Best results will be obtained with water or water with a small quantity of a mild soap. Rinse thoroughly after washing.
- Do not use a pressure washer on logos, stickers or filters. Do not splash water inside the exhaust pipe.



INFORMATION

If the dump body is loaded with material such as salt, ammonium sulphate, potassium chloride, potassium sulphate or phosphates, the dump body, frame and tracks should be washed thoroughly after each work shift.

The rubber track is made of a rubber compound and should not be exposed for long periods to chemicals or solvents that could react with it and weaken or damage it.

- Apply the same precautions for the dump body or tilt deck.



Illustration 183: Do not spray water directly on electrical components

- Do not spray water directly on electrical components when washing the vehicle. Cover the following parts to prevent water from getting on them:
 - Starting motor;
 - Alternator;

- Sensors;
- PETU;
- Aftertreatment components;
- Electrical connectors around the engine;
- Batteries, relays, fuses;
- Cab interior.
- To clean inside the cab, moisten a cloth with warm water and soap, wring the cloth and just wipe the surfaces.
- Repeat without soap to rinse. Water sensitive areas can be cleaned with compressed air, either from a can of compressed air or from a pressure pipe.

19.4 After Completion of Work

It is recommended to remove excess mud, water or foreign material from the tracks and undercarriage at the end of each shift. This will help:

- The walk around inspection for the next work shift.
- Freezing of the material.
- Accumulation of flammable material.
- Prevent damage to the seals of the hydraulic cylinders.

Additionally:

- Avoid parking the vehicle in a pool of water that could freeze overnight.
- Keep flammable material at a safe distance.
- Fill the fuel tank to capacity.
- Drain the water from the water separator in cold temperature.

20 Engine System Maintenance

20.1 Aftertreatment and Regeneration

The aftertreatment unit works in conjunction with the diesel engine to meet U.S. Environmental Protection Agency ("EPA") Tier 4 Final regulatory requirements.

The aftertreatment and exhaust system are not to be modified in any way or else the low emission certification will become invalid. All replacement parts must be genuine Prinoth parts.

20.1.1 Regeneration

Regeneration is the cycle where the burning of particulate matter occurs to clean the Diesel Particulate Filter of diesel engines.

The automatic maintenance regeneration does not required any intervention from the operator.

In some rare occasions, the elevated idle regeneration will be required. In most cases, this occurs after a long period of the engine running at idle speed. When the vehicle is immobilized and one of the conditions is present to allow a regeneration cycle, the diesel can increase the RPM for a certain amount of time. The conditions are:

- Parking brake is engaged («P» icon on the display), and/or
- Seat belt is unbuckled.



INFORMATION

The regeneration icon appears on the display during the cycle. Unless required, do not turn off the engine while the icon is shown on the display. Turning off the engine could generate an entry in the engine fault log.



The vehicle can be used without any problem or restriction while the regeneration is active. If a regeneration happens to be in progress while the vehicle is immobilized, setting the vehicle in motion will automatically stop the regeneration cycle.

20.2 DEF/AdBlue® and PETU

The DEF/AdBlue® (Diesel Exhaust Fluid), is a solution containing urea, used in the aftertreatment unit. The Pump Electronics Tank Unit (PETU) is the component that stores and doses the quantity of DEF/AdBlue® to inject in the aftertreatment system (among other functions).



⚠ CAUTION

Mild irritation hazard

Contact with DEF/AdBlue® can cause eye and skin irritation.

- a) Do not breathe vapor or mist, do not eat, drink or smoke when using this product.
- b) Avoid contact with eyes, skin and clothing.
- c) Wash thoroughly after handling.

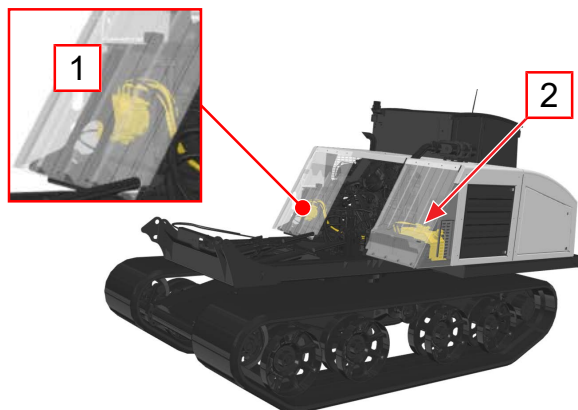


Illustration 184: Filler neck and cap

1	DEF pump and filter	2	DEF tank and fill
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20.2.1 Filler Neck and Cap with Filtered Vent

The DEF/AdBlue® tank cap (light blue colour coded) incorporates a 100 micron filter and is designed specifically to only fit on the DEF/AdBlue® tank and not on any other type of tank.

An overfill protection device is incorporated into the filler neck.

20.2.2 DEF/AdBlue® Filling



NOTICE

Damage hazard

DEF/AdBlue® is corrosive to some metals.

- a) Clean any spill immediately.

The 19 mm neck size prevents a standard diesel or gasoline fill nozzle from being inserted into the tank and a resulting miss fill.

1. Consult the LCD display in the cab to monitor DEF/AdBlue® quantity and refill as required.
2. Refill should be done every two or three times the diesel fuel tank is filled.
3. Check the level at each refuel of the diesel tank.
 - ⇒ Engine power adjustment and eventual shut down will occur in the event of insufficient or poor quality DEF/AdBlue® supply.

20.2.3 Overfill and Freezing Protection

The DEF/AdBlue® tank requires an expansion volume be maintained for when DEF/AdBlue® freezes in cold weather. An expansion volume of approximately 10% must be maintained. Overfilling of the tank will result in tank rupture upon freezing.

Overfill protection is provided by the design of the tank, allowing the flow to back-up into the nozzle and activating its auto shut-off. After the nozzle is shut off, a weep hole in the adapter will allow the DEF/AdBlue® to slowly settle out of the adapter down into the tank. If the operator then tops off the tank it will be subject to freeze expansion risk. **The operator should NEVER top off the DEF/AdBlue® tank.**



NOTICE

Freezing hazard

If the battery isolator switch is turned off immediately, the DEF/AdBlue® could be trapped in hoses and freeze in cold temperature, causing damage to the system components.

- a) Wait 2 minutes before turning off the battery isolator switch after the diesel engine shut down.

DEF/AdBlue® trapped in hoses could freeze and damage the PETU.

- Always take precautions to prevent damage and emission problems.

20.2.4 DEF/AdBlue® Filter Replacement

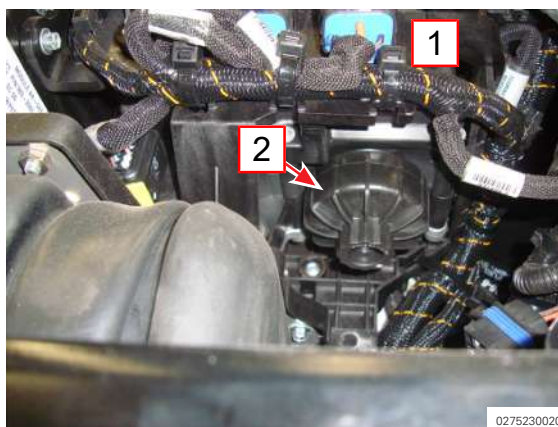


Illustration 185: DEF_AdBlue® filter replacement

1	DEF/AdBlue® tank assembly	2	DEF/AdBlue® filter cap
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Illustration 186: DEF/AdBlue® filter (left) and expansion device (right)

The PETU contains a serviceable filter. Refer to the “Maintenance Schedule [▶ 264]” for the replacement frequency.

1. Access to the filter assembly requires the removal of the front cowling panel.
2. Ensure to empty the tank before proceeding with the filter replacement.
3. To remove the filter cap, use a 27 mm Bi-Hex socket tool.
4. Remove the expansion device inside the filter element using the tool supplied with the new filter.
5. Remove and discard the used filter.
6. Install the new filter, expansion device and filter cap.
7. Tighten the filter cap to 20 N•m (15 ft-lb).

20.3 Maintain the Quality of the DEF/AdBlue®

The quality of DEF/AdBlue® is critical. Handling and storage must be tightly controlled. These precautions are necessary to:

- Maintain shelf life.
- Prevent injector clogging.
- Prevent formation of deposits.
- Prevent poisoning of the catalyst.

20.3.1 Tank cleaning

1. To clean the tank, reverse flush with distilled or de-ionized water through the drain, then flushed with fresh DEF/AdBlue® just before use.
 - ⇒ For detailed maintenance of the DEF/AdBlue® tank please refer to the engine Operating and Maintenance Manual of the engine supplier.
2. Use lint cloth and distilled water rinse.

20.3.2 Tank drain orifice

- Use the tank drain orifice for any dirt, debris, deposits or poor quality DEF/AdBlue® that may enter the tank to be flushed out.
 - Poor quality DEF/AdBlue® may occur by tank miss fill or poor storage control.

20.3.3 Long-term storage

- Drain the DEF/AdBlue® tank should before long term storage of the vehicle.

20.4 Engine Power Adjustment or Shutdown

The engine control system (ECM) is designed to monitor each engine and aftertreatment sensor/actuator and react to system critical or emissions critical failures. When a system error occurs, such as high engine coolant temperature, the engine monitoring system reacts by raising the appropriate engine diagnostic level and in some cases forces the engine into a power adjustment condition or controlled shutdown.

20.4.1 Warning

The Engine Monitoring warning is always active and can not be disabled. Activation of this engine monitoring option ensures that upon the engine measuring an engine parameter above the threshold level a warning is triggered (Event Code), which is logged by the engine ECM and the appropriate icon on the display appears.

20.4.2 Power Adjustment

Each monitored parameter that uses the power adjustment function has its own trigger threshold and map. If the threshold is equaled or exceeded by any parameter, a power adjustment protection will be set active and the engine power will be adjusted. The ECM will log these events and turn on the appropriate icon on the display. The level of engine power adjustment will vary depending upon the parameter being monitored.

20.4.3 Shutdown

The engine shutdown indication icon will be triggered when any parameter equals or exceeds its shutdown threshold for a time exceeding its shutdown indication guard time. The ECM will log these events and turn on the appropriate icon on the display.

20.4.4 Changing the Engine Oil and Oil Filter

Oil used in the engine must be approved by the engine supplier. For complete and detailed information on oil refer to the engine supplier documentation.

- Refer to “TECHNICAL DATA” for the recommended engine oil. Refer to the “Maintenance Schedule” for the replacement frequency.



INFORMATION

Using oil that is not recommended can cause premature wear and void the warranty.

20.4.4.1 Lubricant Viscosity Recommendations

The proper SAE viscosity grade of oil is determined by the minimum ambient temperature during cold engine start-up, and the maximum ambient temperature during engine operation.

- Refer to the following table to select the proper grade.

Engine oil viscosity for ambient temperatures		
Viscosity grade	Ambient temperatures	
	Minimum	Maximum
SAE 0W30	– 40°C (– 40°F)	30°C (86°F)
SAE 0W40	– 40°C (– 40°F)	40°C (104°F)
SAE 5W30	– 30°C (– 22°F)	30°C (86°F)
SAE 5W40	– 30°C (– 22°F)	50°C (122°F)

Engine oil viscosity for ambient temperatures		
Viscosity grade	Ambient temperatures	
	Minimum	Maximum
SAE 10W30	– 18°C (0°F)	40°C (104°F)
SAE 10W40	– 18°C (0°F)	50°C (122°F)
SAE 15W40	– 9,5°C (15°F)	50°C (122°F)

20.4.4.2 Oil Analysis

It is recommended (but not mandatory) to collect oil samples and perform analysis to monitor oil degradation and detect early signs of wear on internal components. An oil sampling valve on the oil filter base is provided for that purpose. Oil sampling intervals should be 250 hours of operation.

The oil filter can also be cut open to detect and analyse of metal debris.

20.5 Engine Oil and Oil Filter

20.5.1 Engine Oil

Oil used in the engine must be approved by the engine supplier. For complete and detailed information on oil refer to the engine supplier documentation.

- Refer to “Fluid specifications [► 200]” for the recommended engine oil.



INFORMATION

Using oil that is not recommended can cause premature wear and void the warranty.

20.5.2 Lubricant Viscosity Recommendations

The proper SAE viscosity grade of oil is determined by the minimum ambient temperature during cold engine start-up, and the maximum ambient temperature during engine operation. Refer to the following table to select the proper grade.

Engine oil viscosity for ambient temperatures		
Viscosity grade	Ambient temperatures	
	Minimum	Maximum
SAE 0W30	– 40°C (– 40°F)	30°C (86°F)
SAE 0W40	– 40°C (– 40°F)	40°C (104°F)
SAE 5W30	– 30°C (– 22°F)	30°C (86°F)
SAE 5W40	– 30°C (– 22°F)	50°C (122°F)

Engine oil viscosity for ambient temperatures		
SAE 10W30	– 18°C (0°F)	40°C (104°F)
SAE 10W40	– 18°C (0°F)	50°C (122°F)
SAE 15W40	– 9,5°C (15°F)	50°C (122°F)

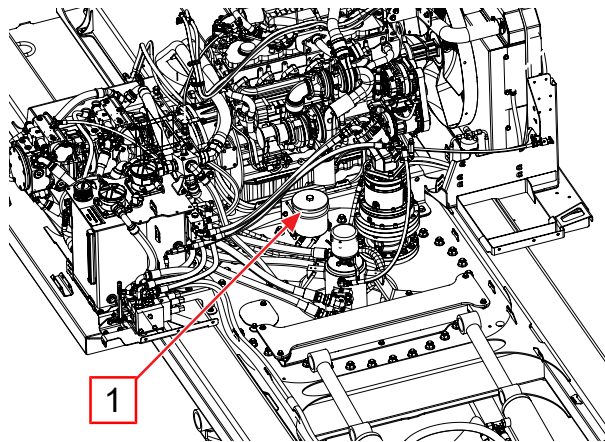
Table 26: Engine oil viscosity for ambient temperatures

20.5.3 Oil Analysis

It is recommended (but not mandatory) to collect oil samples and perform analysis to monitor oil degradation and detect early signs of wear on internal components. An oil sampling valve on the oil filter base is provided for that purpose. Oil sampling intervals should be 250 hours of operation.

The oil filter can also be cut open to detect and analyse of metal debris.

20.5.4 Bio oil (Option)



1	Additional bio oil filter		
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20.5.5 Changing the micro-filter insert for the bio-oil filter



⚠ CAUTION

Risk of scalding and burns

Operating fluids and filters may be very hot at operating temperature.

- Only change the filter when the machine is at standstill and the system is not under pressure.

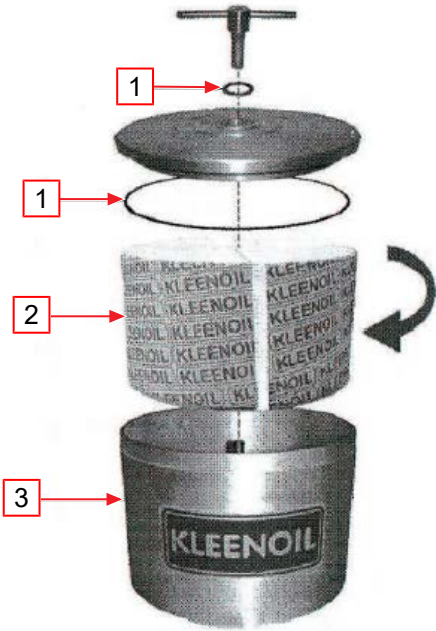


Illustration 187: Secondary bio-oil filter

1	Seal	2	Filter element
3	Filter housing		

To change the micro-filter insert, proceed as follows:

1. Using the carrier straps, turn the filter element briefly clockwise and lift slightly at the same time.
2. Wait a moment until the oil has escaped downward.
3. Pull out the filter element.
4. Check the inlet and outlet in the filter housing.
5. Insert a new filter element.



INFORMATION

Do not remove the cardboard jacking from the filter. The cardboard jacking is part of the filter.

6. Check the seal and replace it, if necessary.
7. Close the filter housing.
8. Top up **with 1 - 3 liters of** oil, depending on the type.

20.6 Changing the Engine Coolant

20.6.1 Engine Coolant

Refer to “TECHNICAL DATA” for the recommended engine coolant fluid. Refer to the “Maintenance Schedule” for the replacement frequency.

**INFORMATION**

Using a coolant fluid that is not recommended can cause premature wear and void the warranty.

Do not use automotive grade coolant fluid, use only coolant approved by the engine supplier.

It is recommended (but not mandatory) to collect coolant samples and perform analysis to monitor its condition. The goal is to optimize the life of the coolant while preventing potential problems as well as warranty issues caused by deficient maintenance.

1. Samples for Level 1 analysis will test the properties of the coolant fluid. Perform Level 1 analysis every 250 hours.
2. Samples for Level 2 analysis will test the chemical evaluation of the coolant fluid and provide information on the condition of the cooling system. Perform Level 2 analysis yearly.

Refer to your engine technician (authorized representative) for more details on the sample analysis program.

20.6.2 Coolant Fluid Replacement Procedure

**INFORMATION**

Vehicle must be on level ground whenever the cooling system is serviced. Inspect the water pump and the water temperature regulator after the cooling system has been drained. This inspection is a good opportunity to replace the water pump, the water temperature regulator, and the hoses, if necessary. Clean the cooling system and flush the cooling system before the recommended maintenance interval if the following conditions exist:

- a) The engine overheats frequently.
- b) Foaming is observed.
- c) The oil has entered the cooling system and the coolant is contaminated.

**INFORMATION**

When the cooling system is cleaned, only clean water is needed.

1. Turn off engine and allow to cool down.

**WARNING****Burn hazard**

Never remove the coolant reservoir cap when the engine is hot.

- a) To avoid severe burns, do not inspect the coolant system or attempt to add coolant if the engine is hot.
2. Using a clean rag, slowly open the cap on the filler neck of the surge tank to release pressure. Ensure no contaminant enters the reservoir.
 3. Gain access to the area of the drain valve. Install a flexible tube on the valve outlet.

4. Install a recipient to collect the existing coolant.
5. Open the valve. Wait until the cooling system is empty.



SAFETY INSTRUCTIONS

Environmental protection

Dispose of engine coolant according to prevailing legal requirements.

6. Flush the cooling system with clean water to remove debris.
7. Close the drain valve of the radiator.



INFORMATION

Fill the cooling system no faster than 5 L (1.3 US gal) per minute to avoid air locks.

8. Fill the system with a mixture of clear water and a cooling system cleaner (use a cleaner recommended by the engine supplier in the recommended proportions). Re-install coolant reservoir cap.
9. Start and run the engine for 30 minutes as per engine supplier recommendations. Coolant temperature should reach at least 82° C (180° F)
10. Stop the engine and allow to cool.



SAFETY INSTRUCTIONS

Environmental protection

Dispose of water and cleaner according to prevailing legal requirements.

11. Loosen the system filler cap to relieve pressure. Remove the cap.
12. Drain the cleaning mixture.
13. Flush the cooling system with clean water.
14. Close the valve and remove the flexible tube.
15. Fill the system with the recommended coolant fluid. Use the additive, if required, as per Caterpillar recommendation.
16. When the coolant has reached the recommended level in the reservoir, stop filling.
17. Start the engine and run at low idle. Increase engine speed in order to open engine thermostat. This will purge air from the cavities in the engine block. Decrease engine speed, then stop the engine.
18. Check engine coolant level. Maintain coolant level within the proper levels on the sight glass of the reservoir.
19. Wait until the system is cool. Clean and inspect reservoir cap. Replace if damaged or worn. Install it on the reservoir filler neck.
20. Start the engine. Re-check coolant level. Check for leaks and for proper operating temperature.



INFORMATION

Inspect the water pump and the water temperature regulator after the cooling system has been drained. Replace the water pump, the water temperature regulator, and the hoses if necessary.

20.7 Changing the Fuel Filters



⚠ WARNING

Fuel under pressure

The fuel system operates at very high pressure.

- a) On the engine has stop running, wait 10 minutes for the pressure to dissipate before working on the system.



⚠ WARNING

Explosion hazard

Fuel is flammable and explosive under certain conditions. Fumes emanating from fuel could ignite and cause severe injuries or burns.

- a) Always take precautions to prevent fire/explosion and clean up spills immediately.

- Take all necessary precaution to avoid igniting fuel or fumes and avoid skin contact with fuel as much as possible.

20.7.1 Changing the Primary Fuel Filter (Water Separator)

Refer to the "Maintenance Schedule" for the replacement frequency.



Illustration 188: Primary fuel filter

To replace the filter cartridge, proceed as follows:

1. Turn off the battery isolator switch.
2. Gain access to the filter by opening the cowling panel.
3. If equipped, disconnect fuel heater electrical connector from clear bowl.
4. Install a recipient under the fuel filter/water separator to collect fuel.
5. Clean area around the filter.
6. Install a suitable tube onto the drain. Open the drain valve and drain the content of the clear bowl.
7. Loosen the vent screw on the filter head.
8. Allow fuel to drain in the recipient.
9. Dispose of diesel fuel according to prevailing legal requirements.
10. Tighten the vent screw and close the bowl drain valve. Remove the tube.



INFORMATION

Do not allow dirt to enter the fuel system.

- a) Thoroughly clean the area around the fuel components.
- b) Fit a suitable cover on disconnected items.

11. Remove filter from head (unscrew assembly). Use a strap wrench if required.
 1. Discard existing filter cartridge.
 2. Clean the clear bowl
 3. To install the new filter, spin it on the drain valve threads inside the bowl. Ensure it is secure.
 4. Lubricate the upper O-ring of the new filter with clean engine oil. Do not fill the bowl with fuel.
 5. Install the new filter assembly on the filter head. Tighten by hand only.
 6. If equipped, re-connect fuel heater electrical connector to clear bowl.
 7. Proceed to change the secondary fuel filter.

20.7.2 Changing the Secondary Fuel Filter

Refer to the "Maintenance Schedule" for the replacement frequency. To replace the filter cartridge, proceed as follows:

1. Turn off the battery isolator switch.
2. Install a recipient under the fuel filter to collect fuel.



INFORMATION

Do not allow dirt to enter the fuel system.

- a) Thoroughly clean the area around the fuel components.
- b) Fit a suitable cover on disconnected items.

3. Clean area around the filter.
4. Install a suitable tube onto the drain. Open the drain valve and drain the content in the recipient.
5. Wait until the housing is empty, then close the valve. Remove the tube.



NOTICE

Environmental protection

Dispose of diesel fuel according to prevailing legal requirements.

6. Remove filter housing from head.
Use a strap wrench if required.

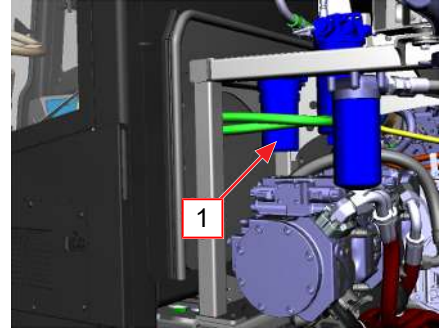


Illustration 189: Changing the secondary fuel filter

1	Fuel filter		
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7. Discard the used filter and spin the new one on the threads of the drain valve inside the filter housing.
8. Lubricate the upper top seal of the new filter cartridge with clean engine oil.



NOTICE

Damage hazard

Do not fill the secondary fuel filter with fuel before installing it.

- a) Fuel would not be filtered and could be contaminated.
9. Install filter housing cartridge on filter head. Tighten by hand only.
 10. Turn on the battery isolator switch.
 11. Prime the fuel system as it was done for the primary fuel filter replacement.
 12. Start engine and check for leaks.

20.8 Fuel System Verification



⚠ WARNING

Fuel under pressure

The fuel system operates at very high pressure.

- a) On the engine has stop running, wait 10 minutes for the pressure to dissipate before working on the system.
- Inspection of fuel lines, hoses, filters and system components should be undertaken periodically to check for wear and deterioration.

20.9 Priming the Fuel System

Priming of the fuel lines and filters is performed by an electrical pump and is automatic.

The fuel system will be primed under the following conditions:

- Running out of fuel

- Storage
- Replacement of the fuel filter, of a part on the circuit or partial drain of fuel in the circuit.

To prime, proceed as follows:

1. Turn ignition switch to “Run”.



INFORMATION

The switch will allow the electric pump to operate. The ECM will stop the pump after 2 minutes.

2. Turn ignition switch to “OFF”.



INFORMATION

Do not crank the engine for more than 30 second. Allow the engine to cool for two minutes before attempting to crank again.

3. Operate the engine starter and crank the engine. After, operate the engine for 5 minutes at low idle. Ensure the engine is running at stable idle and there are no leaks.



INFORMATION

After engine is stopped, always wait at least 10 minutes to allow fuel pressure to be purged from the high pressure fuel lines before any service or repair is performed.

20.10 Draining the Fuel Tank

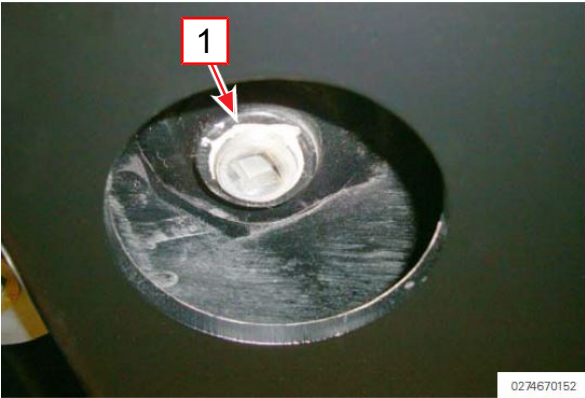


Illustration 190: Draining the Fuel Tank

1	Fuel tank drain plug		
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The fuel tank is equipped with a plug to drain water and sediment from its bottom.

1. Turn off the battery isolator switch.
2. Install a recipient under the drain plug of the tank.
3. Open the drain plug and wait until the water and sediments are drained from the tank.



SAFETY INSTRUCTIONS

Environmental protection

Dispose of the diesel fuel according to prevailing legal requirements.

4. Clean and re-install the drain plug. Check for leaks.
5. Turn on the battery isolator switch.

20.11 Replacing the Crankcase Breather Filter Cartridge

- Contact Prinoth customer service for replacing the crankcase breather filter cartridge.

20.12 Servicing the Engine Air Filter (Standard Duty)



NOTICE

Damage hazard

Dirt and debris could cause permanent damage to the engine.

- a) Do not run the engine without an air filter.

If the clogged air filter indication shows that filter replacement is required, proceed as follows:

1. Position a bowl under the dust purge valve. Squeeze the rubber valve to release the accumulated dust.
2. Unlatch and remove the cover on the filter housing.



Illustration 191: Replacing the Engine Air Filter

1	Main air filter element	2	Flat spot
3	Secondary filter element	4	Alignment tab element

3. Remove the existing filters and discard them.
 - ⇒ Push the primary filter toward the empty space in the housing and then pull it out.
 - ⇒ Pull the primary filter toward the empty space in the housing and then pull it out.
4. Inspect and clean the interior of the filter housing.



INFORMATION

If the housing is to remain without a filter for a while or if air is dusty, plug interior cavities and re-install cover to prevent contamination.

- 5. If required, remove temporary material that was used to protect cavities from contaminant.
- 6. Install the new filters in the housing.
 - ⇒ Install the secondary filter first, with the alignment tab toward the cavity at the bottom of the housing.
 - ⇒ Install the primary filter in the housing, the flat spot toward the cover.
- 7. Re-install the cover and engage the latches.

20.13 Servicing the Engine Air Filter (Heavy Duty)



NOTICE

Damage hazard

Dirt and debris could cause permanent damage to the engine.

- a) Do not run the engine without an air filter.

If the clogged air filter indication shows that filter replacement is required, proceed as follows:

- 1. Rotate the filter back cover to the left to unlock it.
- 2. Remove the filter back cover.



Illustration 192: Filter back cover removal

1	Filter back cover		
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- 3. Remove the primary filter first.



Illustration 193: Primary filter

1	Primary filter		
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4. Remove the secondary filter.

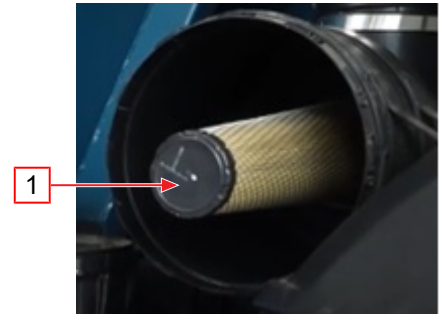


Illustration 194: Secondary filter

1	Secondary filter	
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5. Install new primary and secondary filters.
6. Reinstall the cover.
7. Make sure the arrow down is pointing down for appropriate drainage

20.14 Air Restriction Indication

There is no visual indication on the air filter sensor itself, the signal of the switch is sent to the LCD display in the cab.

When restriction is detected in the filter, the display in the cab will show a red engine icon with a white arrow.



Illustration 195: Icon indicating restriction on the engine air filter

20.15 Operating in a Dusty Environment

If operating in a dusty environment, it is very important to ensure that dust and debris do not restrict cooling and normal engine operation.

- Keep all radiators and oil cooler clean as much as possible and ensure the engine air intake filter remains unobstructed.
- Learn to identify critical components, indicators and routinely perform maintenance procedures to avoid component overheating and engine problems.

20.16 Inspecting the Cooling System



WARNING

Accident hazard

Contact between body and cooling fans could cause injury or death.

- a) Always perform inspection or cleaning when the engine is turned off.

1. Remove foreign bodies (dust, vegetation, etc.) from the radiator/cooler fins with a steam cleaner (max. 70°C or 160°F) or by blowing out with compressed air from the back of the radiator/cooler.
2. Inspect unit, drain valves, hoses and tubes and check for leaks.

- 3. Replace worn or damaged parts.

20.17 Inspecting the Engine Drive Belt

- 1. Gain access to the area around the engine drive belt.

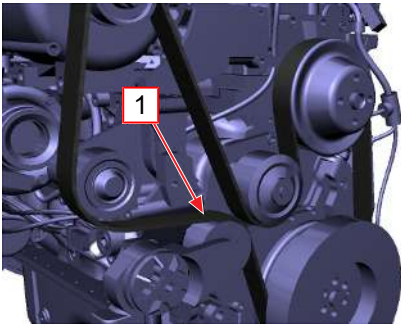


Illustration 196: Engine Drive Belt

1	Engine drive belt		
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- 2. Inspect the belt for cracks, splits, glazing, grease, wear or deterioration.
⇒ It should not be contaminated by grease, oil or other fluids.

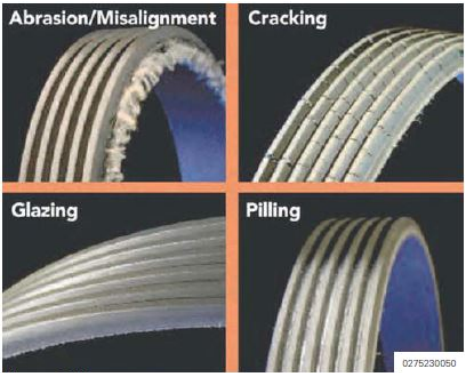


Illustration 197: Example of wear/damage on the engine drive belt

- 3. Inspect and replace the belt if required.
- 4. Check belt tension. Refer to the engine supplier for detailed information.
- 5. If required, re-install hardware and cowling panel.
⇒ Refer to the engine supplier for detailed information.

21 Drive System Maintenance

21.1 Changing the Oil of the Pump Drive

1. It is required to remove the left cowling panels to access the pump drive.
2. Install a recipient under the pump drive to collect oil.
3. Open the drain plug under the housing.

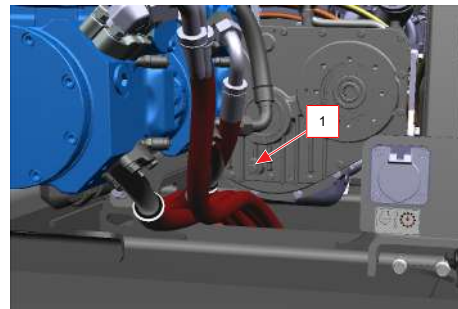


Illustration 198: Changing the oil of the pump drive

1	Pump drive drain plug		
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4. Wait until all oil is drained.



SAFETY INSTRUCTIONS

Environment protection

Dispose of hydrostatic oil according to prevailing legal requirements.

5. Close the drain plug.
6. Remove the dipstick and fill the housing with new oil. Refer to “*Technical Data* [► 196]” for information on the recommended oil. Re-install the dipstick.
7. Check level with the dipstick (for dipstick location see “Component outside the cab – Pump Drive Dipstick”).
8. Re-adjust the oil level if required.

21.2 Changing the Oil and Filter

Changing the hydrostatic oil, a filter or a component that is part of the hydraulic/hydrostatic circuit requires a subsequent system startup to purge the air introduced in the circuit by any of these procedures.

- Please refer to the Training Guide (or Service Guide) of the vehicle for details on the procedure.



INFORMATION

Using oil that is not recommended can cause premature wear and void the warranty. If not purged, air introduced in the circuit could cause irreversible damage.

Impurities in the circuit could cause irreversible damage. Always follow established work practices when performing repairs or maintenance.

- Refer to “Technical Data [► 196]” for the recommended hydraulic oil. Refer to “Maintenance Schedule” for the recommended frequency.

21.3 Parking Brake Verification

The brake operation has to be verified if brake was applied while the vehicle was in motion. Additionally, verify at every 50 hours of vehicle operation.

Verify if the parking brakes can hold the vehicle. Using caution, perform the following:

1. Secure the vehicle and shutdown the engine.
2. If not already done, set the engine rpm to the minimum and apply the parking brake (with the parking brake button on the dash). Set the transmission lever to neutral and release speed pedal.
3. Position the emergency drive module on a thigh with the strap and set the sliders on the module to the neutral position. Ensure the module switch is “off”.
4. Plug the emergency drive module cable into the connector on the lateral console.



INFORMATION

On the cable of the emergency drive module, only one of the male connectors will fit with the female connector of the dash. The other connector remains unused.

5. Start the engine.



INFORMATION

Engine will automatically turn at 1500 rpm.

6. Activate the emergency drive module by pressing the “ON - OFF” button. Leave the brakes applied.



⚠ WARNING

Impact and crush hazard

If the brakes slip or fail, the vehicle will move unexpectedly and may cause severe injuries or death to bystanders.

- a) Never perform this brake test with bystanders present.
 - b) Establish a safety perimeter around the vehicle before proceeding with the next step.
7. While taking all necessary precautions, test the brakes by trying to get the vehicle in a forward motion. To do so, push both sliders on the emergency drive module forward and hold for two or three seconds, then return the sliders to neutral.
 - ⇒ If the brakes hold and the vehicle does not move, the brakes are operational.
 - ⇒ If the brakes do not hold and the vehicle moves, do not operate the vehicle. Perform brake maintenance without delay.
 8. Turn off the emergency drive module and disconnect it from the vehicle.
 9. Turn off the engine.

22 Rubber Track and Undercarriage

22.1 Changing the Oil of the Planetaries

It is required to change the oil in the planetaries at regular intervals. To do so, proceed as follows:

1. Position the vehicle so the drain plug on the cover of the planetary is as shown on the next figure.
2. Ensure the imaginary horizontal line is aligned with the bolts at the circumference.

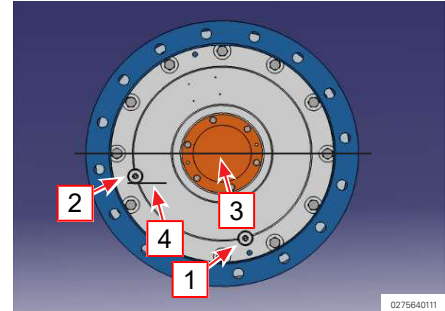


Illustration 199: Changing the Oil of the Planetaries

1	Fill / drain plug	2	Level plug
3	Imaginary housing center line (align with bolts)	4	Recommended oil level

3. Install a recipient under the planetary to collect oil.
4. Drain the oil by opening both plugs.



SAFETY INSTRUCTIONS

Environmental protection

Dispose of oil according to prevailing legal requirements.

5. Using a new seal, re-install the bottom/drain plug.
6. Refill with the recommended oil until the level reaches the level plug. Refer to "TECHNICAL DATA" for information on the recommended oil.
 - ⇒ Do not overfill as this could lead to overheating and cause permanent damage.
7. Ensure no foreign matter enters the housing as contamination could cause irreversible damage.
8. Using a new seal, re-install the level plug.
9. Repeat for the other planetary gearbox.

22.2 Changing the Oil of the Idler Wheel Hubs

It is required to change the oil in the wheel hubs and the idler wheel hubs at regular intervals. To do so, proceed as follows:

1. Install a recipient under the hub to collect used oil.

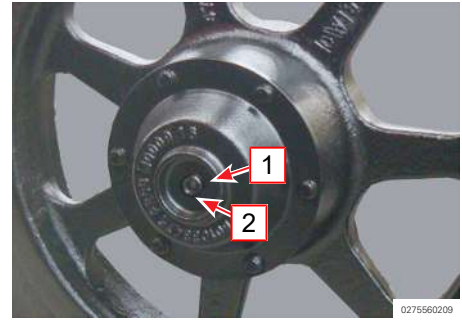


Illustration 200: Changing the Oil of the idler Wheel Hubs

1	Fill plug	2	Oil level
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SAFETY INSTRUCTIONS

Environmental protection

Dispose of oil according to prevailing legal requirements.

2. Loosen the hub cover (six bolts) and wait until the oil is drained.
3. Remove the six bolts and the hub cover.



Illustration 201: Wheel bearing

4. Inspect the cover internal surface and the bearing exposed parts.
5. Replace worn or damaged parts.
6. Remove and clean the center plug of the hub cover and clean the hub cover.
7. Using a new O'ring, re-install the cover on the hub.
8. Using the center plug cavity, fill the hub to the recommended level with oil. Refer to "TECHNICAL DATA" for information on the recommended oil.
9. Re-install the center plug on the hub using sealing compound.
10. Repeat for the other hubs.

22.3 Changing the Oil of the Wheel Hubs

It is required to change the oil in the wheel hubs and the idler wheel hubs at regular intervals. To do so, proceed as follows:

1. Position one of the fill/drain plug in the top position.

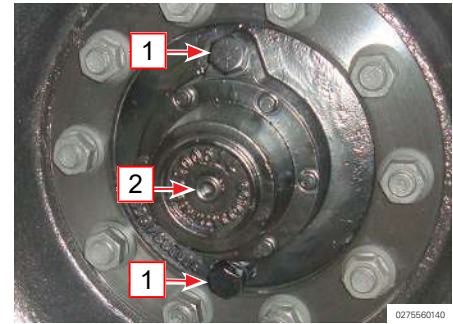


Illustration 202: Changing the Oil of the Wheel Hubs

1	Fill/drain plugs	2	Level plug
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SAFETY INSTRUCTIONS

Environmental protection

Dispose of oil according to prevailing legal requirements.

2. Install a recipient under the hub to collect used oil.
 - ⇒ Drain the oil by opening the top and bottom plugs;
 - ⇒ Remove the level plug;
 - ⇒ Using a sealing compound, re-install the bottom plug and refill by the top plug cavity so the oil level reaches the cavity of the level plug. Refer to "Specifications" for information on the recommended oil.
 - ⇒ Using new seals, re-install the top plug and the level plug.
3. Repeat for the other hubs.

22.4 Changing the Oil of the Top Roller Hubs

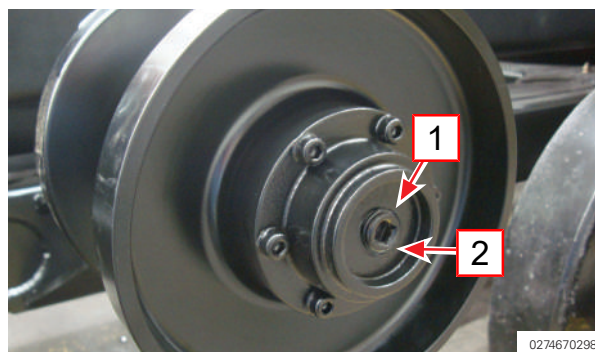


Illustration 203: Changing the Oil of the Top Roller Hubs

1	Top roller center plug	2	Recommended oil level in the hub
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It is required to change the oil in the top roller hubs at regular intervals. To do so, proceed as follows:

1. Install a recipient under the hub to collect used oil.



SAFETY INSTRUCTIONS

Environmental protection

Dispose of oil according to prevailing legal requirements.

2. Loosen the hub cover (six bolts) and wait until the oil is drained.



INFORMATION

Removing and positioning the filling plug at 6 o'clock will drain the oil faster.

3. Remove the six bolts and the hub cover.
4. Inspect the cover internal surface and the bearing exposed parts.
5. Replace worn or damaged parts.
6. Remove and clean the magnetic center plug of the hub cover and clean the hub cover.
7. Using a new O'ring, re-install the cover on the hub.
8. Torque attaching bolts to 20 N•m (15 lbf-ft).
9. If required, using suitable beams of wood or equivalent, slightly raise the track over the top roller being serviced.
10. Using the top plug cavity as shown on the following figure, fill the hub to the recommended level with oil. Refer to "Technical Data [▶ 196]" for information on the recommended oil.

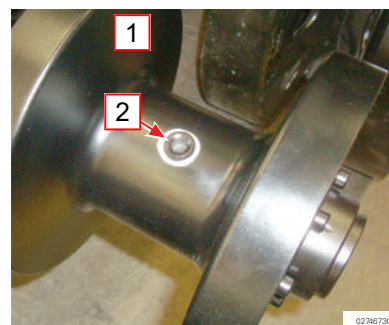


Illustration 204: Changing the Oil of the Top Roller Hubs

1	Top roller	2	Oil filling plug
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11. Re-install the center plug using a sealing compound.
12. Re-install the filling plug using a sealing compound.
13. Remove the support beams. Repeat for the other hub.

22.5 Verification of the Wheel Nut Torque

The recommended torque is 651 N•m (480 ft-lb).

1. Perform a verification of the nut torque on all the inter-mediate wheels after the first 50 hours of operation.
2. Repeat the 50 hours verification each time the nuts are reinstalled or replaced. After, an annual verification is sufficient.

22.6 Towing (Rubber Track)

22.6.1 Tips for towing the vehicle on an uneven terrain

In a situation where the vehicle has lost one track and has to be towed, it is recommended to install a chain on the undercarriage to prevent damage.



NOTICE

Damage hazard

The front tandem may flip over and the wheels could damage the accessory support frame if the vehicle is towed over a hole/bump with a missing track.

a) Chain the wheels before proceeding.

1. If the wheels of front and rear tandems are not chained together (on the side where the track came off), the front tandem may rotate when the vehicle is moved and cause severe damage to several components around the engine.

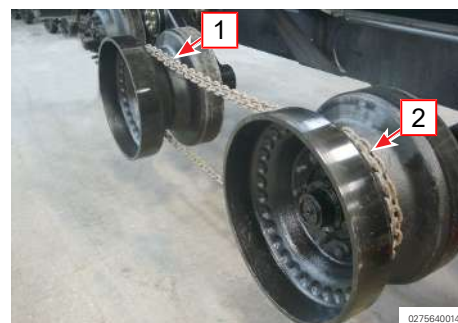


Illustration 205: Tips for towing the vehicle on an uneven terrain

1	Rear wheel of the front tandem	2	Front wheel of the rear tandem (on the tridem)
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2. Use about 6 m (20 ft) of chain and set the proper tension to prevent the chain from jumping off the wheels.



Illustration 206: Tips for towing the vehicle on an uneven terrain

1	Wheels chained together - note the chain tension		
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3. Check that the chain turn freely.

22.6.2 Towing procedure



⚠ DANGER

Impact, pinch and crush hazard

The vehicle loses its braking ability when the planetary gearboxes are disengaged.

- a) Ensure that the vehicle is immobilized before proceeding.
- b) Failure to do so may cause injury or death.



⚠ DANGER

Accident hazard

Downhill sliding or toboggan effect may occur during towing operation.

- a) Proceed carefully and maintain a safe distance.
- b) Do not allow operator or passenger in the towed vehicle. Failure to do so may cause injuries or death.



NOTICE

Damage hazard

Towing the vehicle without disengaging the planetary gearboxes could permanently damage the drive components.

- a) Never use the "D" rings for towing.
1. Attach the disabled vehicle to the tow cable or chain;
 2. Turn off the ignition switch on the towed vehicle.
 3. Disengage both planetary gearboxes on the disabled vehicle.
⇒ Refer to "Disengaging the Planetary Gearboxes" for instructions.



NOTICE

Damage hazard

Damage to the planetary gearboxes may occur if the towing distance is too long.

- a) Keep the towing distance as short as possible.
 - b) Damage to the planetary gearboxes may occur if the towing speed is too high.
 - c) Proceed very slowly when towing the vehicle.
4. While choosing the safest and shortest path for towing (no one on board the towed vehicle), slowly set the vehicles in motion.
 5. Upon arrival, re-engage each planetary gearbox, while the vehicle is securely immobilized, to restore braking ability.



INFORMATION

Towing distance and speed should be kept to the minimum.

22.6.3 Disengaging the Planetary Gearboxes



⚠ WARNING

Impact and crush hazard

The vehicle loses its braking ability when the planetary gearboxes are disengaged. Ensure that the vehicle is immobilized before proceeding. Failure to do so may cause injury or death.

The planetary gearbox can be disengaged. Proceed as follows.

1. Ensure that the vehicle is immobilized and secure. Turn off the engine.
2. Clean the area of the disconnect mechanism. Avoid contamination and foreign bodies.
3. Lower the oil level before using the disconnect mechanism.
4. Place a catch basin under the planetary gearbox.



NOTICE

Environmental protection

Dispose of oil according to prevailing legal requirements.

5. Remove the 6 hexagon bolts from the center cover.

6. Screw two M6 bolts (approx. 80 mm of length) into the release thread bores of the cover and evenly tighten them to their head support surface. Observe that the cover is not canted. Through evenly tightening the cover is pushed out from the flange.

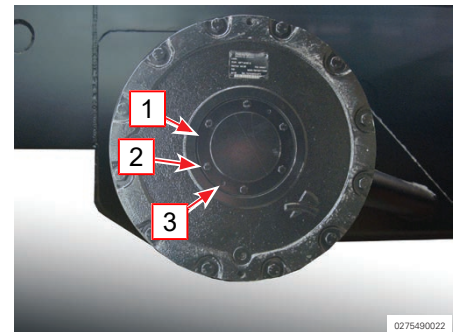


Illustration 207: Disengaging the Planetary Gearboxes

1	Planetary gear-box center cover	2	Center cover bolts
3	Release thread bores (qty 2) of the center cover		

7. Remove the cover with the O-ring and the cylinder roll.
8. Remove the two bolts from the center cover.
9. Screw a M8 bolt (approx. 80 mm of length) in the shaft thread center bore of the sun gear.
10. Pull out the sun gear using the temporary M8 bolt.
11. Check the O-ring of the center cover, replace if required.
12. Reinsert the center cover with the O-ring and the cylinder roll on the flange and secure with the 6 hexagon bolts.
13. Readjust the oil level before towing the vehicle.
14. Repeat for the other planetary gearbox. Then the vehicle is ready to be towed.

22.6.4 Re-engaging the Planetary Gearboxes

The planetary gearbox can be re-engaged. Proceed as follows.

1. Clean the area of the disconnect mechanism. Avoid contamination and foreign bodies.
2. Lower the oil level before using the disconnect mechanism.
3. Place a catch basin under the planetary gearbox.
4. Remove the 6 hexagon bolts from the center cover.
5. Screw 2 bolts M6 (approx. 80 mm of length) into the release thread bores of the center cover and evenly tighten them to their head support surface.
 - ⇒ Observe that the cover is not canted.
 - ⇒ Through evenly tightening the cover is pushed out from the flange.
6. Remove the cover with the O-ring and the cylinder roll.
7. Remove the two bolts from the cover.
8. Insert the sun gear using (use the temporary M8 bolt if required).
9. Check the O-ring of the center cover, replace if required.
10. Reinsert the center cover with the O-ring and the cylinder roll on the flange and secure with the 6 hexagon bolts.
11. Readjust the oil level. Use new seals on the plugs.
12. Repeat for the other planetary gearbox.

22.7 Rubber Track Tensioning system



WARNING

Crush hazard

The top part of the track will raise or lower when track tension is applied/released.

- a) To avoid injuries, ensure nobody stands near the tracks when the buttons are operated. Tension control is individual.



NOTICE

Damage hazard

Leaving the engine running for more than a few minutes could cause permanent damage.

- a) Turn off the diesel engine if the track tension is released

1. Replace a worn or damaged track.
 - ⇒ A damaged track could break during vehicle operation, thus requiring towing or on-site re-tracking.

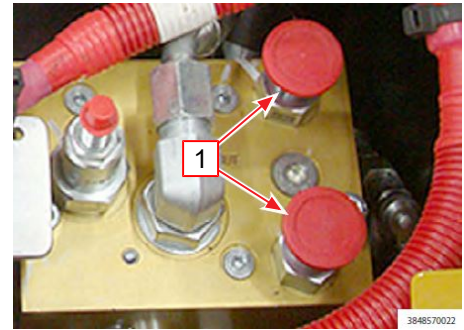


Illustration 208: Track tension

1	Track tension - pressure release knobs		
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2. Ensure the pressure relief button is in the running position ("pushed in" position) before returning the vehicle to normal operation.
 - ⇒ Putting the vehicle in motion with loose tracks could lead to detracking.
3. To perform a verification of track tension, start the engine and drive at least one vehicle length in straight line on level ground.
 - ⇒ Track tension adjustment is automatic once the diesel engine is running and the vehicle rides a short distance.
4. Then, engage the parking brake but keep the engine running.
 - ⇒ The upper section of the track should stand horizontal, with little or no sag fore between the top rollers (see next figure).

22.8 Track Tension Verification

1. Replace worn or damaged track.
 - ⇒ A damaged track could break during vehicle operation, thus requiring towing or on-site re-tracking.
2. Ensure the track tension levers are in the running position ("vertical" position) before returning the vehicle to normal operation.
 - ⇒ Putting the vehicle in motion with loose tracks could lead to detracking.
3. To perform a verification of track tension, start the engine and drive at least one vehicle length in straight line on level ground.
 - ⇒ Track tension adjustment is automatic once the diesel engine is running and the vehicle rides a short distance.
4. Then, engage the parking brake but keep the engine running.
 - ⇒ The upper section of the track should stand horizontal, with little or no sag fore and aft of the top roller (see next figure). While driving, remain vigilant.



Illustration 209: Correct track tension

5. Ensure track tension is the about the same on both sides of the vehicle.

22.9 Tips for Track Removal and Installation

22.9.1 Direction

1. Before installation, identify the correct orientation of the track.
 - ⇒ There are arrows stamped on the inner face of the track along the edge.



Illustration 210: Indication of rotation direction on internal surface of track

2. Think of the interior of the track as the interior of a tire, the arrows indicate the direction of rotation.
 - ⇒ The tracks can be swapped left to right but the direction of rotation cannot be inverted.

22.9.2 Installation

Once the tracks are set in the correct orientation on each side of the vehicle, they can be mounted. If not already done, remove the sprocket segments from the planetary gearboxes.

1. Ensure the tensioning cylinders are fully retracted before the installation begins.
2. Move the track in position around the wheels, top rollers, idler wheel and planetary gearbox.

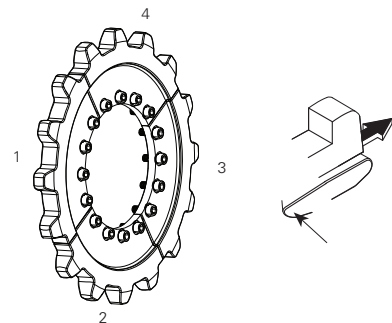


Illustration 211: Order of installation of the sprocket segments

3. Then, install the four segments of the sprocket one by one, rotating the track slightly between each segment installation to make room for the next.



Illustration 212: Track installed but not yet under tension (generic image)

4. While driving, remain vigilant.



Illustration 213: Track under tension (generic image)

5. Ensure track tension is the about the same on both sides of the vehicle.

22.10 Wheel Wear Verification and Wheel Permutation

As the vehicle accumulates working hours, the wheels will wear (see next figure) because they rub on the track guides of the track. The rear wheels will wear at a faster rate than the front wheels.

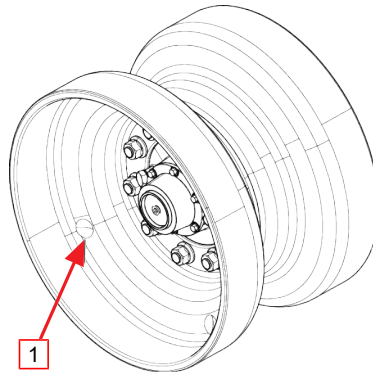


Illustration 214: Wheel wear verification and wheel permutation

1	One of the wheel wear indicators (circular dot pattern)		
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The wheels are designed with a dot pattern to give an indication of the degree of wear. Perforation of the wheel wear indicators signifies a worn wheel.

To extend their service life as much as possible, it is recommended to switch wheel position (permute the best wheel with the worst wheel) every 250 hours.



NOTICE

Damage hazard

A worn wheel will cause permanent damage to the track and to the undercarriage components.

- a) Do not operate the vehicle if the wheel wear is such that perforations can be seen in the dot pattern (wear indicator).

When perforations appear in the dot pattern, the wheel is worn and should NOT exchange position with an other wheel. REPLACE any wheel that is worn or could exceed the wear limit before the next permutation.

- Permute the wheels so the best wheels (less worn) are at the back and the worst wheels are at the front.



INFORMATION

When performing permutation of the wheels, keep wheel halves together, keep wheels on the same side of the vehicle. It is not required to remove the track to switch the wheels.

- After the permutation is performed, the wheels should be positioned as per the following figure.

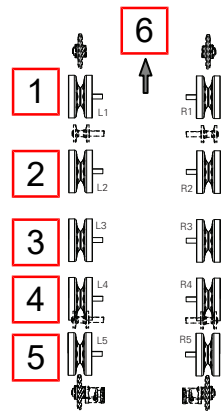


Illustration 215: Wheel Wear Verification and Wheel Permutation

1	Most worn (L=left, R=right)	2	More worn
3	Less worn	4	Less worn
5	Least worn	6	Forward direction

23 Electric System Maintenance



WARNING

Fire hazard

Replacing a fuse with one of higher rating could cause overheating or even fire.

- a) Always replace a fuse with one of the same rating.

23.1 Accessing the Cab Electrical Box

1. The cab electrical box contains fuses, breakers and relays.

⇒ To open the box cover, rotate the central knob toward the "UN-LOCK" indication and pull-out the cover.

⇒ To close the box cover, install in position, press the central knob and rotate toward the "LOCK" indication.



Illustration 216: Accessing the Cab Electrical Box

1	Electrical box locking knob		
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2. Always operate the vehicle with the cover installed.

⇒ Improper fuse rating could cause overheating and fire.



Illustration 217: Electrical box components

3. Change the fuses if necessary.

⇒ There are no spare fuse in the housing. A tool (yellow extractor) is provided in the box to extract fuses or breakers from the electrical box.

23.2 Replacing a Fuse in the Cab



NOTICE

Risk of damage

Improper fuse rating can cause overheating and fire.

- a) Always use a fuse of the identical type and rating.

Refer to the fuse identification sticker inside the cover of the electrical box for information. A repeatedly burning fuse could indicate a problem. Investigate if a fuse has to be replaced more than once in a short period of time.

A tool (yellow extractor) is provided in the box to extract fuses.

To change a fuse, proceed as follows:

- 1. If not already done, turn off the engine, remove the key from the ignition switch;
- 2. Turn off the battery isolator switch.
- 3. Remove the cover of the cab electrical box and identify the fuse to replace.
- 4. Extract the burned fuse.

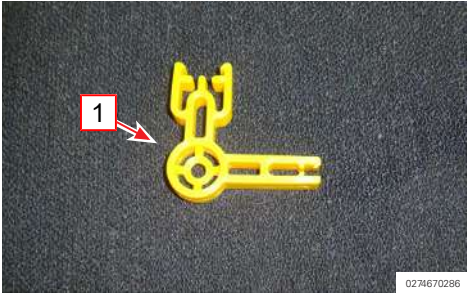


Illustration 218: Replacing a Fuse in the Cab

1	Fuse extractor	
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- 5. Replace with one of an identical type and rating.
- 6. Re-install the electrical box cover.
- 7. Turn on the battery isolator switch.
- 8. Check function of the repaired circuit.

23.3 Replacing the Fuse of the Cab Heater

The fuse of the cab heater unit is located below the electrical box of the cab.

To change the fuse, proceed as follows:

- 1. If not already done, turn off the engine, remove the key from the ignition switch;
- 2. Turn off the battery isolator switch.
- 3. Remove the cover of the cab electrical box.
- 4. Remove the two bolts holding the plastic liner. Gently pull out the liner and identify the fuse to replace.

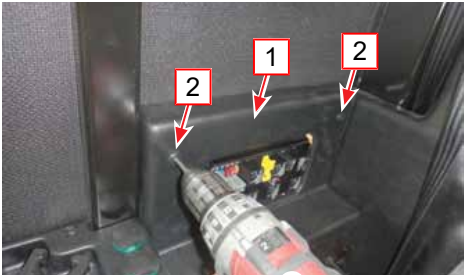


Illustration 219: Replacing the Fuse of the Cab Heater

1	Plastic liner around the electrical box	2	Holding screws
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5. Extract the burned fuse and replace with one of an identical type and rating.

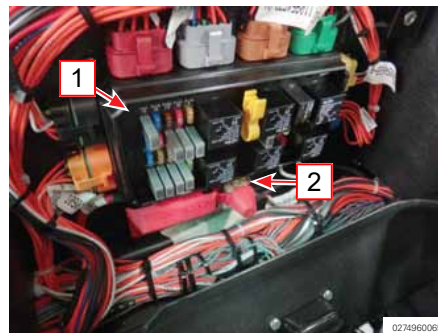


Illustration 220: Replacing the Fuse of the Cab Heater

1	Electrical box in the cab	2	Fuse of the cab heater unit
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6. Re-install the plastic liner.
7. Re-install the electrical box cover.
8. Turn on the battery isolator switch.
9. Check function of the repaired circuit.

23.4 Battery Maintenance



WARNING

Burn and fire hazard

Battery cells contain hydrogen, a highly combustible gas and sulfuric acid, a corrosive fluid. To avoid injuries:

- a) Keep flames and sparks away from the battery.
- b) Prevent contact between battery fluid and skin, eye, clothing and vehicle.
- c) If battery acid comes in contact with the skin or eyes, immediately flush the area with large amount of fresh water, then get medical attention right away.

When working around the batteries, always wear:

- Safety glasses
- Gloves
- Protective clothing.

23.4.1 Cleaning the batteries

Keep the batteries, terminals and terminal clamps clean:

1. Clean the terminal studs or posts, if required, loosen the terminals and clean the contact surfaces.
2. Smear the terminal studs with petroleum jelly or an acid-free, non-corrosive grease.
3. Re-tighten the battery terminals if required.

23.4.2 Changing the batteries



⚠ WARNING

Burn and electric shock hazard

A conducting material coming in contact with positive and negative battery posts simultaneously will become extremely hot and could cause the batteries to explode.

- a) Prevent contact between opposite polarity posts.
- b) Always wear protective gloves, goggles and clothing before using the lugs.
- c) Keep protective covers in place.

1. Turn off the battery isolator switch.
2. Remove the cowling panels as needed to reach the batteries.
3. Disconnect the wire(s) from the negative poles of the batteries.
4. Disconnect the wire(s) from the positive poles of the batteries.
5. Carefully remove the central aluminum battery holder. Ensure the holder does not come in contact with the battery posts.
6. Remove the batteries from the holder.
7. Install the new batteries.
 - ⇒ Do not mix new batteries with old batteries.
8. Carefully install the central aluminum battery holder.
 - ⇒ Ensure the holder does not come in contact with the battery posts.
9. Reconnect all the wires to the positive poles of the batteries.
10. Reconnect all the wires to the negative poles of the batteries.
11. Reinstall the cowling panels that were removed.
12. Turn on the battery isolator switch.

23.5 Starting the engine with boosting cables



NOTICE

Damage hazard

Different tension will result in damage of components.

- a) Make sure the electrical systems connected together are of the same voltage.

Ensure to connect batteries /circuits of the same voltage. Switch off all electric accessories of the disabled vehicle.

1. Ensure the battery isolator switches on both vehicles are in the ON position.
2. Connect the red jumper wire to the positive pole of the flat battery.
3. Connect the red jumper wire to the positive pole of the good battery.
4. Connect the black jumper wire to the negative pole of the good battery.
5. Connect the black jumper wire to a stable, unpainted metal part of the frame or the negative pole of the flat battery.
6. Start the engine of the vehicle with the good battery.
7. Start the engine of the vehicle with the flat battery. Do not activate the starter for more than 15 seconds.
8. If starting is successful, leave the vehicle with the flat battery running.

9. Disconnect the jumper cables in reverse order (first black, then red).

23.6 Electric Components and Water



Do not spray water directly on electrical components when washing the vehicle. Cover the following parts to prevent water from getting on them:

1. Instrument panel, fuses, switches, sensors and connectors;
2. Starting motor, alternator, sensors and connectors around the engine;
3. Batteries, relays, fuses.

24 Cab and Frame Maintenance

24.1 Upper Structure Swinging System

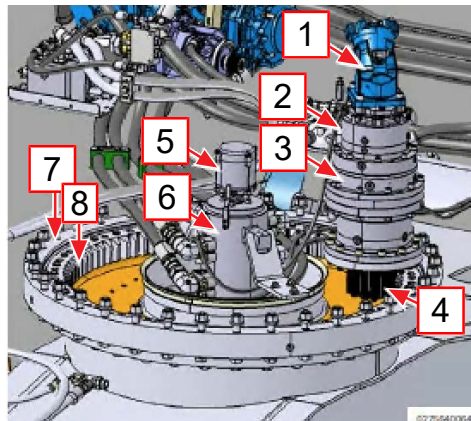


Illustration 221: Upper Structure Swinging system

1	Hydraulic motor	2	Brake unit
3	Gearbox unit	4	Pinion
5	Slip ring with integrated position sensor	6	Slip joint
7	Slewing bearing outer race	8	Slewing bearing inner race with gear

24.1.1 Raceway Lubrication of the Slewing Bearing

Raceways must be lubricated at intervals according to the actual operating conditions of the equipment.



INFORMATION

Make sure that the grease fittings are clean before connecting the tool and applying grease.

It is recommended to grease the raceway every 50 hours of use. Before and after long periods of idleness, the bearing must be greased again.

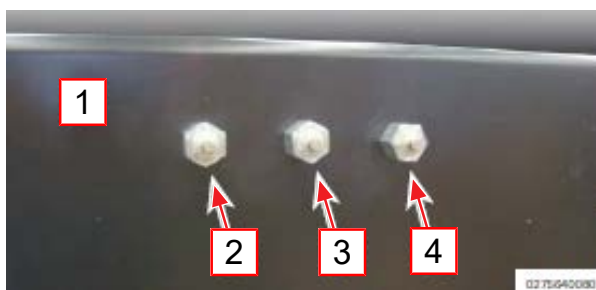


Illustration 222: Raceway lubrication of the slewing bearing

1	Grease fitting location under the rear edge of the dump body	2	Left grease fitting for the dump body cylinder rods
3	Center grease fitting for slewing bearing	4	Right side grease fitting for slewing bearing



INFORMATION

Two of the three grease fittings under the rear edge of the dump body are connected to hoses that bring the grease to four orifices around the slewing bearing.

To grease the raceway, proceed as follows:

1. Apply grease in each of the two grease fittings, the center one and the right one. See previous figure.
2. Then turn on the engine and perform one complete rotation.
3. Shutdown the engine and repeat the process one more time.

Greasing is considered completed when the grease overflows from the seal forming a light film, which also has a sealing effect.

Raceway standard grease corresponds to :Multi-season, lithium based, NLGI grade 1 EP rated with "MOLY" additives, water resistant, minimum service temperature of -40°C to 100°C (-40°F-212°F) approved for automobile wheel bearing and chassis.

24.1.2 Pinion Lubrication

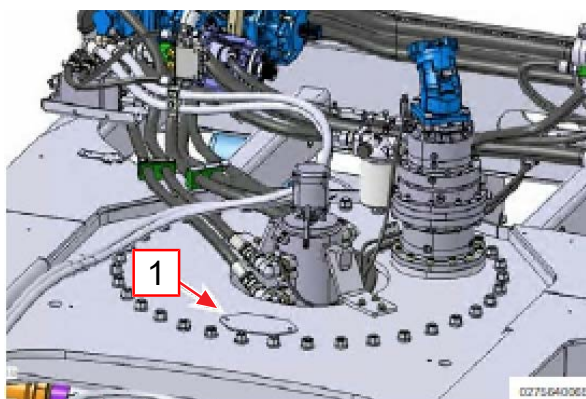


Illustration 223: Pinion lubrication

1	Access panel to insert grease sticks for pinion lubrication		
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The space where the drive pinion engages the teeth of the slewing ring must be lubricated.

It is recommended to grease the pinion cavity every 500 hours of vehicle operation. Before and after long periods of idleness, the pinion must be greased again.

1. To perform the lubrication, clean the area around the access panel.
2. Open the grease access panel and drop a grease “stick” inside the grease chamber. Reinstall the access panel.
3. To lubricate the pinion, use the following grease:
 - ⇒ Multi-season, lithium based, NLGI grade 1 EP rated with "MOLY" additives, water resistant, minimum service temperature of -40°C to 100°C (-40°F to 212°F) approved for automobile wheel bearing and chassis.

24.1.3 Gearbox and Brake Oil Replacement

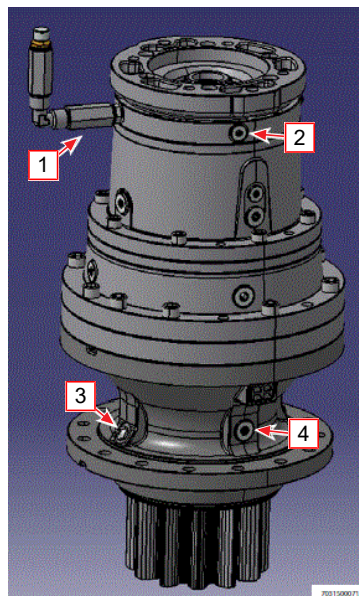


Illustration 224: Gearbox and brake oil replacement

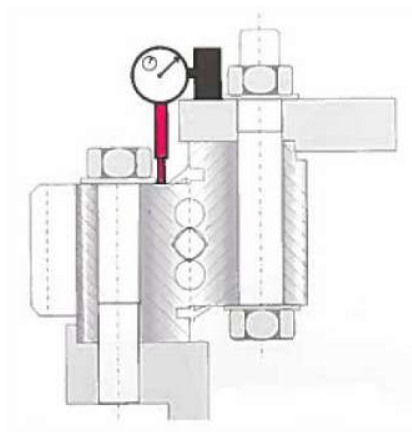
1	Breather plug (unscrew during filling) - not visible on image	2	Filling / level plug
3	Grease fitting	4	Drain plug (magnetic)

The unit contains oil for the brake (upper section of the unit) and for the gearbox (lower section of the unit).

1. Change the oil after the first 50 hours.
 - ⇒ Subsequent oil changes are to be made yearly.
2. Check that there is no metallic parts with unusual dimension in the magnetic plug.
3. Change the oil in the unit while it is hot so that it is easier to drain.

Refer to the “Maintenance Schedule” for verification intervals and to the “Vehicle Specifications” table for the type of oil.

24.1.4 Clearance Measurement



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Illustration 225: Comparator on slewing bearing

The best practice is to perform measurement once a year.

- Always use the first measurement as a reference to evaluate the wear of the slewing ring raceways and its rolling elements.
 - Normal limit of acceptable wear is 3 times the initial machine clearance.
- Ensure the measurement is made under the same conditions each time, otherwise the results are not usable.
 - The vehicle needs to be loaded, the load should be the same, as much as possible, at each measurement.



INFORMATION

To read the proper clearance value, install a 0.01 mm or 0.001 inch precision comparator close to the slewing bearing, pointing to read vertical clearance.

The comparator needs to be installed on the lifting side of the vehicle, in line with the middle of the upper frame.

Then, perform the following:

1. Adjust the comparator to 0 mm or 0 inch for reference.
2. Slowly lift the rear upper frame until the dial of the comparator stop increasing or the undercarriage starts to move up. Mark this value.
3. Move down and ensure the reference is still at 0 mm. Repeat a second time to ensure the reading is consistent.
4. Repeat all previous steps after rotating the upper frame 90 degrees three times to obtain 4 measures. The comparator has to be reinstalled at each rotation to follow the rear of the upper frame.

Lifting the rear of the upper frame

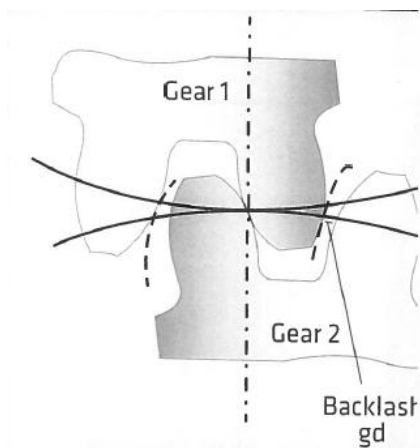
1. Using a 20-ton floor jack and spacer block, place the lifting point under the center of the rear beam.



Illustration 226: Floor jack and rear of upper frame

2. Stay out of the way when lifting and do not go under the vehicle when reading the value on the comparator.

24.1.5 Backlash Verification



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Illustration 227: Example of a backlash

24.1.6 Backlash of the Swing Gearbox Assembly

Total gearing backlash must be adjusted to obtain an indicative value of 0,47 to 0,90 mm measured at the pitch diameter of the pinion between the input spline and output shaft (including the brake).

24.1.7 Backlash between Pinion and Slewing Gear

Gearing backlash must be adjusted as to obtain an indicative value of 0,5 to 1,0 mm.



Illustration 228: Backlash measurement location

Total backlash measurement is the swing gearbox assembly backlash plus the pinion/slewing gear backlash.



INFORMATION

Make sure that the vehicle is in the normal configuration (cab and cowling above the drive sprockets) to perform the measurement. Any other position will lead to incorrect measures.

The total backlash measurement can be measured on one of the corners of the upper frame at the back (under the rear edge of the dump body).

When taking into consideration the distance between the center of the slewing bearing and one of the rear corner of the upper frame, the acceptable play must be $8,5 \pm 1,5$ mm. Maximum acceptable value is 20 mm.

Install a stepladder as a reference point besides a corner of the rear upper frame (vehicle in normal configuration). With a measuring tape and a helper, measure the total displacement of the upper frame. The helper needs to maintain a good pressure on the frame while the measure is taken.

- If the measurement is within the indicated values, resume operation normally.
- If the measurement is outside the indicated value (more than 20 mm), excessive wear is present. Consult the proper documentation and the Prinoth Service department to repair the rotating assembly.

24.2 Checking Cab Structural Integrity



⚠ WARNING

Crush hazard

Altering the cab structure could reduce its resistance to impacts and cause severe injuries or death in an accident.

- a) Do not modify the cab and its attaching hardware in any way.
 - Do not alter the cab structure, its support hardware or underlying frame in any way as this could reduce its resistance to an impact, a roll over, an object falling or other situation potentially harmful.
 - Do not drill, weld, cut or bend the cab structure, roof grill or the brush guard. Do not modify or remove the windows or door.

- If a window, door, grill or a part of the cab structure is damaged or worn out, replace by a trained mechanic with a genuine PRINOTH part. If a part of the cab support hardware is damaged or worn out, replace with a genuine PRINOTH part.
- If the cab structure is damaged, bent or cracked, it should be inspected without delay by a competent authority licensed to issue a new certification for the cab and vehicle. Replace the cab if it fails the inspection. The cab structure includes the cab, its support hardware and the underlying frame.
- An annual inspection of the cab is recommended to ensure there are no crack or other damage to the structure of the cab, attaching hardware and windows.



INFORMATION

Failure to follow these directions and requirements will invalidate the ROPS and/or FOPS certification.

24.3 Using the Threaded Holes on Cab Top



DANGER

Crushing hazard

Attaching a structure or equipment to the cab could change its weight and resistance to impact, resulting in serious injury or death.

- Never modify a ROPS cab in any way.

Each corner of the cab top is equipped with a threaded hole. These can be used exclusively to fasten the FOPS grill or to lift the cab for maintenance purposes (cab must be empty).

- Do not attach any other equipment using these holes.
- When not in use, leave a bolt in the hole to prevent corrosion.

24.4 Checking Frame Structural Integrity

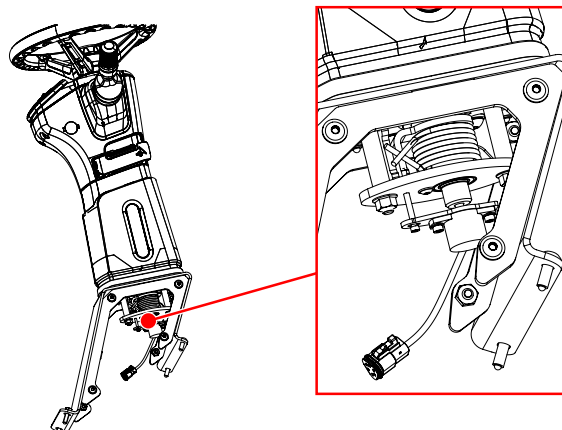
An annual inspection of the frame is recommended to ensure there are no crack or damage to the structure as this could compromise safety and performance.

In the same area, verification of the tightness of the bolts and nuts of the frame assembly is recommended. Check at least once a year, more often if type of operation requires it.

If applicable also check subframe structure integrity.

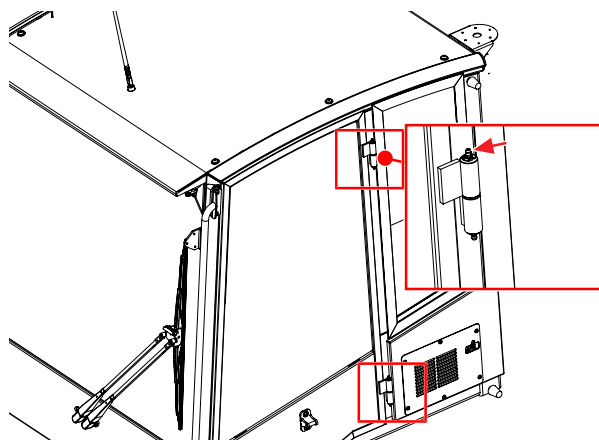
24.5 Steering column spring

Grease the steering spring every 500 hours and annually with Molykote 33 grease.



24.6 Cab door hinge shaft

Grease the 2 cab door hinges every 50 hours with Multi-season, lithium based, NLGI grade 1 EP rated with "MOLY" additives, water resistant, minimum service temperature of -40°C to 100°C (-40°F to 212°F) approved for automobile wheel bearing and chassis.



24.7 Precautions Against Salt Water and Corrosion

- If crossing shallow bodies of salt water or if operating near salt water, thoroughly clean the vehicle at regular intervals to prevent corrosion.

24.8 Welding

Welding on the vehicle is not recommended.

Welding can produce high voltage which could cause damage to the vehicle electronic components. Additionally, welding could affect the cab (or frame) structural integrity.

- Always obtain the permission of a PRINOTH Service Representative before performing any welding on the vehicle.

If welding is performed on accessories attached to the vehicle, turn off the battery isolator switch AND disconnect the batteries.

24.9 Replacing the External Cab Air Filters

One of the cab air filters is located outside the cab, forward of the exterior door latch. The other filter is located inside the cab, behind the seat.

1. Inspect the filters at regular intervals and clean or replace as required.



Illustration 229: Exterior cab air filter location

2. To replace the exterior filter, remove the bolts holding the air filter cover.

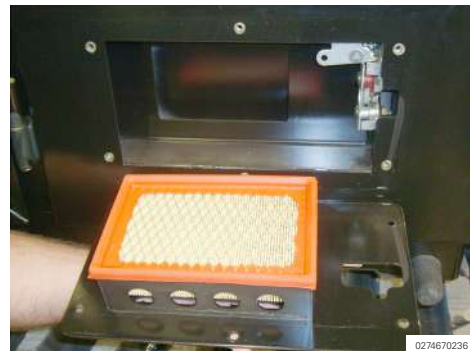


Illustration 230: Exterior cab air filter

3. Remove the existing filter and replace with a new one. Re-install the cover.

24.10 Replacing the Interior Air Filter

1. To replace the interior filter, pull-out the existing filter.



Illustration 231: Interior cab air filter location (wide cab shown)

2. Insert the new filter in position.



Illustration 232: Interior air filter (wide cab shown)

3. Check ventilation.
 - ⇒ Air conditioning and ventilation efficiency can be adversely affected if the filters are clogged.

24.11 Wiper Inspection

Inspect the front and rear rubber (if applicable) wiper blades and general wiper assemblies. Replace worn blade if assembly is in good condition.

Replace the complete unit if damage is detected.

1. To replace the front or rear wiper use a screwdriver.
2. Remove the holding screw.
3. Replace the wiper.
4. Re-install the holding screw.

24.12 Changing a Wiper Blade



Illustration 233: Front wiper blade



NOTICE

Damage hazard

Worn wiper blades could produce permanent marks on the windshield.

- a) Inspect blades regularly and replace as required.
- Keep the wipers in good condition to improve visibility in bad weather.

25 Miscellaneous Maintenance

25.1 Using the Emergency Drive Module



 DANGER

Accident hazard

The emergency drive module does not provide the same precision as the steering wheel. The operator could lose control of the vehicle which may result in severe injuries or death.

- a) Read and understand the following installation and operation procedures before using the emergency drive module.
- b) Proceed slowly with utmost care and caution on return trip to base.

In the event of an emergency involving the failure of the steering wheel potentiometer, the transmission selector, the speed pedal potentiometer or the microcontroller, the emergency drive module can be used. This module must only be used for an emergency return to base. Do not use it under any other circumstance.

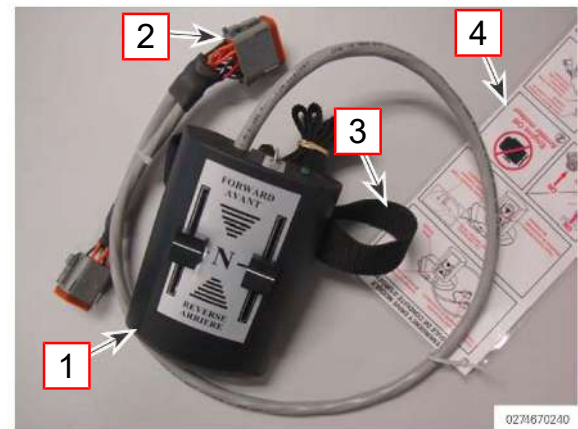


Illustration 234: 177 emergency drive module

1	Emergency drive module	2	Connector (the larger one is used on the PANTHER)
3	Thigh strap	4	Quick reference card

- 1. On arrival, secure the vehicle.
- 2. Then, remove the emergency drive module and repair the vehicle drive system as soon as possible.

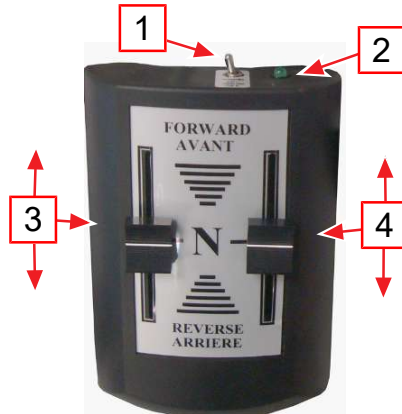


INFORMATION

When using the emergency drive module, the maximum speed of the vehicle is slightly reduced and the anti-stall feature is disabled. Additionally, the LCD display will show fewer information since the microcontroller is disabled while the module is in operation.

25.1.1 Installation and Operation

When experiencing problems with the vehicle, proceed as follows with the emergency drive module:



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Illustration 235: Installation and Operation

1	On/off switch	2	On/off indicator light
3	Left slider (left track control)	4	Right slider (right track control)

1. Secure the vehicle and shutdown the engine.
2. If not already done, set the sliders on the emergency drive module to the neutral position. Ensure the module power switch is "off".
3. Connect the cable of the module to the connector on the lateral console.
 - ⇒ On the cable of the emergency drive module, only one of the male connectors will fit with the female connector on the dash. The other male connector remains unused.

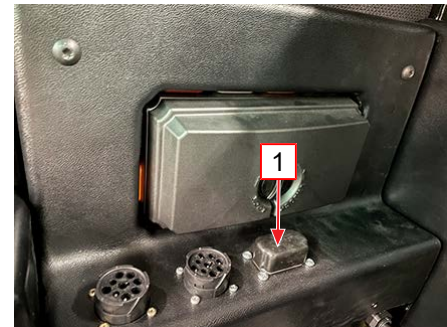


Illustration 236: Installation and Operation

1	Emergency drive module connector		
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4. Install the module on a thigh with the strap.
5. Start the engine.
 - ⇒ When the emergency module is connected, upon starting, the engine will automatically run at the preset speed of 1500 rpm and remain there.
6. Activate emergency drive module by pressing the "ON/OFF" button.
7. Disengage the brake.
8. If the sliders are not in the Neutral position when the module is turned on, the vehicle will not move. To set the vehicle in motion, return both sliders to Neutral, then move them slowly to drive the vehicle.



⚠ WARNING

Accident hazard

The emergency drive module does not provide the same precision as the steering wheel.

- a) The operator could loose control of the vehicle which may result in severe injuries or death.

9. Hold the module firmly with both hands and carefully drive the vehicle with the sliders.
⇒ The left slider controls the left track, the right slider controls the right track.
10. Return the vehicle to base by the shortest route.
⇒ When driving with the emergency drive module, the steering wheel, the transmission lever, the throttle and the speed pedal are no longer functioning.

Upon arrival, perform the following:

1. Perform a complete stop of the vehicle by setting the sliders to the neutral position.
2. Apply the parking brake.
3. Turn the engine speed control knob to the minimum.
4. Turn off and disconnect the emergency drive module.
5. Stop the engine by turning the key in the ignition switch to the “off” position.
6. Investigate the problem and repair the vehicle drive system at once.

25.2 Air Conditioning Maintenance

Air conditioning maintenance must be performed by a trained and certified technician.



CAUTION

Type and source of hazard

Eye, nose and throat irritation hazard Avoid breathing A/C refrigerant and lubricant vapour or mist. Exposure may irritate eye, nose and throat.

- a) If accidental system discharge occurs, ventilate work area before resuming service.
- b) This system is under pressure and should be serviced by qualified personnel only. Improper servicing could cause injury.

– Take all necessary precautions before performing maintenance on this system.

25.3 Lubrication

The use of a manual grease gun is recommended. Powered lubrication tools provide less precision and could even damage components if grease is pumped with too much pressure.

Dump body hinges and cylinders

Total: 5 grease points



Illustration 237: Lubrication point of the dump body cylinder upper hands (one fitting for both cylinder hands)



Illustration 238: Lubrication point of the dump body cylinder lower hand (one left, one right)



Illustration 239: Lubrication points of the dump body hinges (one left, one right)

Slewing bearing (swing system)

Total: 2 grease points



Illustration 240: Lubrications points of the vehicle slewing bearing
Pinion (swing system)

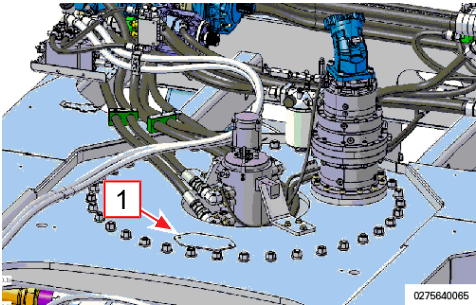


Illustration 241: Swing system

1	Access panel to insert grease sticks for pinion lubrication		
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25.4 Basic Troubleshooting

Refer to the following checklist to solve common problems often not related to fail-ures but on incorrect operation procedure:

The engine will not crank

- Emergency stop switch is engaged;
- Batteries are discharged;
- Battery isolator switch is in the OFF position;
- Fuse or relay is missing or blown.

The engine cranks but will not start

- Batteries are weak;
- Fuel tank is empty;
- DEF/AdBlue® tank is empty;
- Air in fuel lines;
- Lack of starting aid in cold temperature(or glow plugs are still operating);
- Fuse of engine ECM is blown or missing;
- Severe fault of emission control system/DEF/AdBlue®;
- Outside temperature is outside the operating range.

The engine runs but vehicle will not move

- Brake is engaged;

- Diesel engine RPM is too low (veh. will not move if engine is below 1000 rpm);
- Transmission is still in neutral;
- Transmission was not in neutral when engine was started;
- Speed pedal is not pressed;
- Speed pedal was not released when transmission was moved out of neutral;
- Safety belt on driver's seat is not buckled;
- Vehicle is overloaded;
- Tracks are not under tension, vehicle is not tracked, tracks are damaged, foreign objects in tracks;
- Planetaries are disengaged;
- Brake valve is disconnected;

Track will not tension upon engine start

- Hydraulic track tensioner button is disengaged;
- Plugs on tensioning cylinders are not installed.

Hydraulic oil overheat

- Operation above permitted temperature;
- Air circulation around oil cooler is impaired;
- Track tension is released while diesel engine runs.

Hydraulic oil cooling fan operates at full speed continuously

- Operation above permitted temperature;
- Air circulation around oil cooler is impaired;
- Emergency drive module is plugged in its connector;
- Failure of oil temperature sensor;
- Defective hydraulic valve.

Dump body will not operate

- The joystick trigger is not pressed;
- The emergency button is engaged;
- The seat belt is not fastened;
- The diesel engine is not running;
- Dump body is overloaded;
- Safety rod is installed & dump body will not lower;
- Foreign object between dump body and frame.

The upper frame will not swing

- The joystick trigger is not pressed;
- The emergency button is engaged;
- The seat belt is not fastened;
- The diesel engine is not running;
- Ambient temperature is lower than the operating range of the rotating system;
- The vehicle is on a slope steeper than the operating range;
- The vehicle is not on level ground and heavily loaded;
- The vehicle is overloaded.

Power of the engine or drive system is reduced, engine turns at fixed rpm

- Engine air filter is severely clogged;

- Emergency drive module is plugged in the vehicle connector;
- Vehicle operates in “Limp Home” mode because of a component failure;
- Vehicle operates in “Limp Home” mode because of high hydraulic oil temperature;
- Dump body is not completely lowered;
- Failure of engine RPM button;
- Low DEF/AdBlue® level, contaminated DEF/AdBlue® or problem on the aftertreatment unit.

Fault cannot be erased on LCD display

- Safety belt is not fastened;
- Sequence to erase fault is not complete;
 - Brake not applied;
 - Engine not stopped;
 - Buttons on display not pressed in sequence;
- Source problem not solved.

Radio will not operate or receive a station

- Radio is not set for country or region;
- Ignition key is not on “accessory” or “run” on ignition switch;
- Antenna is damaged or disconnected;
- Battery isolator switch is set to OFF;
- Station memory loss.

25.5 Daily Operator Verification Schedule

The tasks listed in the next table can be accomplished by the operator every day.

SYSTEM	DAILY TASK WITH ENGINE OFF
TRACKS	Check condition and wear (check wear indicators)
WHEELS, SPROCKETS & TENSIONERS	Check sprockets, wheels, idler wheels and top rollers for wear or damage
	Check for oil leakage in wheel hubs, idler wheel hubs and top roller hubs
FUEL	Drain water accumulated in fuel filter/water separator
PLANETARY GEARBOXES	Check for oil leakage
ENGINE	Check engine oil level
	Inspect, clean or change air filter elements (as required)
COOLING	Check engine coolant level, check radiators and oil cooler for leaks

SYSTEM	DAILY TASK WITH ENGINE OFF
COOLING	Check engine radiator, oil cooler and grills for dirt and debris. Clean if required.
PUMP DRIVE	Check for oil leakage
HYDRAULIC & HYDROSTATIC	Check oil level
CAB, COWLING and FRAME	Perform a visual inspection of cab & frame
	Check level of windshield washer fluid
	Check if access panels are secure
	Check presence of escape tool, fire extinguisher, first aid kit and emergency drive module in the cab. Ensure they are in operating condition.

Table 27: Before engine start

SYSTEM	DAILY TASK WITH ENGINE RUNNING
BRAKES	Check parking/emergency brake button operation (check icon on display when applying brake)
FUEL	Check fuel level on LCD display main screen, refuel if required
DEF/AdBlue®	Check DEF/AdBlue® level on LCD display main screen, refill if required
OTHER	Check LCD display for warning messages or other indications. Check backup alarm.

Table 28: After engine start

25.6 Severe Service Application

An engine that operates outside of normal conditions is operating in a severe service application.

In severe service application, an engine may need more frequent maintenance in order to maximize reliability and service life.

It is impossible to list all conceivable conditions that may lead to severe service application but most fall in the following categories:

- Severe environmental factors (such as altitude, high ambient temperatures, dirty air, etc.)
- Severe operating conditions (such as frequent cold starts, low quality fuel, hot shut downs, etc.)

- Improper maintenance procedure (for examples improper parts, improper fluids, extending maintenance intervals, etc.).

Contact your Prinoth representative for information on how to modify maintenance practices to minimize the impacts of these elements.

25.7 Engine Operating Hours

The hourmeter, which shows the operating hours on the LCD display, is activated when the ignition key is in the “Run” position.



1	Engine operating hours		
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The maintenance schedule is based on the number of hours logged by the engine ECM.

25.8 Maintenance Schedule

The tasks listed in the next table have to be accomplished by an experienced mechanic or technician according to the operating hours of the vehicle.

SYSTEM	TASK	First 150 hrs	Every 250 hrs	Every 500 hrs	Yearly
PLANETARY GEARBOXES	Change oil.	•		•	•
WHEELS, IDLERS & SPROCKETS	Change oil in wheel hubs, idler wheel hubs and top roller hubs.			•	
	Check torque on wheel and sprocket retaining bolts/nuts. Re-apply torque if required. Repeat if wheel or sprocket is replaced. Wheel torque (dry) is 650 Nm (480 ft-lb), Sprocket torque (dry) is 705 Nm (520 ft-lb).	•	•		
	Check wheel wear. Switch wheel position as recommended.		•		
PUMP DRIVE	Change oil.	•		•	

SYSTEM	TASK	First 150 hrs	Every 250 hrs	Every 500 hrs	Yearly
BRAKE	Check parking brake operation (using emergency drive module).		•		
FUEL	Change filter cartridge in fuel filter/water separator.			•	
	Change filter cartridge in the secondary fuel filter.			•	
	Change in-line filter.			•	
COOLING	If analyzing the coolant, obtain a sample (not mandatory).		•		
	Test/add Cooling System Supplemental Coolant Additive (SCA).	As per CAT user manual			
	Change engine coolant	Refer to Changing the engine coolant section			
	Check hydrostatic oil cooling system.			•	
	Check engine air and coolant radiators.			•	
ENGINE	Change engine oil and filter.			•	•
	Obtain an oil sample, if analysis is performed (not mandatory).		•		
	Change air filters.	Every 500 hrs or more frequently if required			
	Change crankcase breather filter.	Every 1500 hours			
	Change PETU filter.	As per Caterpillar user manual			
	Check intake and exhaust systems.	As per engine manufacturer specifications			
	Check drive belt for wear, replace if required. Check belt tensioner and water pump.				•

SYSTEM	TASK	First 150 hrs	Every 250 hrs	Every 500 hrs	Yearly
ENGINE	Check condition of rubber and bolt torque on engine support brackets. Check general conditions of engine accessories.			•	
	Check intake and exhaust valve clearance, adjust if required.	As per engine manufacturer specifications			
HYDRAULIC & HYDRO-STATIC	Change oil.				•
	Change hydraulic oil filter cartridge.	•			•
	Change filter cartridge in hydrostatic oil tank (after, perform hyd. system startup if required).	•			•
	Check condition of hoses and check routing.			•	•
	Check hydrostatic system for leaks. Check pressure cap.			•	
ELECTRICAL	Check condition of batteries.			•	•
	Check condition of wiring harnesses.			•	•
SWING SYSTEM	Change the oil of the gearbox and brake.			•	•
	Check the backlash of the slewing bearing.				•
	Check the clearance of the slewing bearing.				•
	Check pinion grease quantity. Add grease if required.	Every 50 hrs			
CAB & FRAME	Lubricate all grease points	Every 50 hrs			
	Lubricate the steering column spring	Every 500 hrs and yearly			

SYSTEM	TASK	First 150 hrs	Every 250 hrs	Every 500 hrs	Yearly
CAB & FRAME	Check cab and frame condition.			•	•
	Check door adjustment.			•	•
	Check fiberglass bushing wear in tandem and crank arm. Replace if required.				•
DUMP BODY	Clean and check dump body condition. Check cylinders for leaks. Check hoses for chafing.		•		•
ENGINE PRE- HEATER	Check for blockage of air inlet port and hot air outlet port. Check harnesses and hoses. Remove glow pin and inspect it. Clean or replace if required.			•	•

Table 29: Maintenance schedule

25.9 Break-In and Storage Guidelines

The engine has been broken-in at the factory. It does not require a further break-in period. Should a replacement engine be installed in the future, the break-in must be done in accordance with the procedure in the service manual of the supplier.

If the coolant or the hydraulic oil temperature rises above the specifications, reduce the engine load or stop the engine. If the engine oil pressure goes below specifications (see the service manual of the engine supplier) reduce the engine load.

In case of problem, find out the cause and repair before restarting engine.

25.9.1 50-Hour Inspection

As with any precision piece of mechanical equipment, the vehicle has to be checked by a specialized mechanic after the first fifty hours of operation.

25.9.2 Vehicle Storage

If a vehicle is to remain idle for a prolonged period of time, certain precautions should be taken to protect it from corrosion and accumulation of rust. The following storage procedure is recommended:

- Clean vehicle thoroughly, including the tracks.
- If possible, park the vehicle where water accumulation, in the dump body (if equipped), will not occur.
- Install an appropriate protector to prevent rainwater from falling in the muffler exhaust pipe.

- Make a thorough inspection and all necessary repairs.
- Check all points mentioned in the “Pre-Operation Inspection” section.
- Lubricate all points of lubrication.
- Park vehicle in a dry place or on coarse gravel.
- Release tension on both tracks.
- Protect the tracks from direct sunlight if storage period exceed three months.
- Turn off the battery isolator switch.
- Remove the batteries and connect them to a trickle charger or check and recharge monthly.
- Completely fill the fuel tank.
- Completely fill the DEF/AdBlue® tank.
- Drain water from the water separator.
- Change lubricating fluids.
- Apply a thin coat of grease on the exposed piston rods of cylinders.

25.9.3 Engine Storage

Putting an engine (within the vehicle) in storage without adequate preparation will cause damages to external as well as internal surfaces and components.

- Refer to the engine supplier documentation for the appropriate storage procedure.

25.10 Releasing Hydraulic Pressure

To release pressure before maintenance, perform the following:

25.10.1 Hydrostatic Reservoir

1. Turn off the diesel engine.
 2. Open the pressure cap of the hydrostatic reservoir (cap may be hot).
 3. Re-install the pressure cap.
 4. If working on a cylinder or hose, ensure there is no load applied to it before opening the circuit.
- ⇒ See the next two sub-sections.

25.10.2 Dump Body Hydraulic Circuit

1. Start the diesel engine.
2. Raise the dump body.
3. Install the safety device.
4. Turn off the diesel engine.
5. Push forward the dump body control lever and hold for one minute.

25.10.3 TrackTensioner Hydraulic Circuit

1. Turn off the diesel engine;
2. Open the cowling front access panel;
3. Pull out and turn 90° the track tension release knobs.

25.11 Replacement of Hoses and Fittings

- Follow all best maintenance practices when performing inspection, installation or maintenance of hydraulic hoses and fittings.
- Discard all worn or damaged hydraulic hoses and fittings.
 - Some fittings cannot be re-used, ensure they are replaced with genuine new Prinoth parts.

25.12 Connecting and Disconnecting Hydraulic Hoses

This section applies to hoses with quick connect couplings only.



WARNING

High pressure oil

Oil escaping under pressure can penetrate skin and cause severe injuries.

- Release pressure and use protective clothing or equipment before servicing the hydraulic/hydrostatic system.
- Prior to connection, release pressure as described in “Releasing Hydraulic Pressure”, wear protective glasses and clothing, always check for leaks with a piece of cardboard.



SAFETY INSTRUCTIONS

Environment protection

Work in a way to prevent oil losses and spills. Dispose of oil soaked material in an environmentally safe manner.

All types of circuits:

- Always turn off the engine before proceeding.
- Ensure all fittings are clean before connecting to a circuit.
- Use a cap to protect fittings from damage and dirt.

Hydrostatic circuits:

- When connecting hoses with quick connect couplers, always connect the drain hose first.
- When disconnecting hoses, always disconnect the drain hose last.

25.13 Fastener Torque Chart

The following chart provides a general guideline on the torque to apply to the bolts and nuts on the vehicle. Refer to the Maintenance/training manual for specific torque applicable to specific bolt/nut.

Filets impériaux / Imperial threads	Dimension Size	Classe 5 				Classe 8 			
		Lube		Dry		Lube		Dry	
		lb-po (in-lb)		Nm		lb-po (in-lb)		Nm	
		lb-pi (ft-lb)		Nm		lb-pi (ft-lb)		Nm	
Gros / Coarse	1/4 x 20	75	100	8	11	105	145	12	16
	5/16 x 18	13	17	17	23	18	25	24	32
	3/8 x 16	23	31	31	40	33	45	45	60
	7/16 x 14	35	50	50	65	50	70	70	90
	1/2 x 13	55	75	75	100	80	105	105	140
	9/16 x 12	80	110	110	145	115	155	150	200
	5/8 x 11	115	150	150	200	160	210	210	280
	3/4 x 10	200	270	260	350	280	380	370	500
	7/8 x 9	320	430	430	570	450	610	600	800
	1 x 8	480	640	640	850	680	910	900	1200
Fin / Fine	1/4 x 28	85	115	10	13	125	165	14	18
	5/16 x 24	14	19	19	25	20	27	27	35
	3/8 x 24	26	35	35	45	35	50	50	65
	7/16 x 20	65	90	85	115	95	125	125	165
	1/2 x 20	65	85	85	110	90	120	120	160
	9/16 x 18	90	120	120	160	130	170	170	230
	5/8 x 18	130	170	170	220	180	240	240	320
	3/4 x 16	220	300	290	390	310	420	420	550
	7/8 x 14	350	470	470	620	500	670	660	880
	1 x 12	530	700	700	930	750	990	980	1310

Les valeurs du tableau sont nominales et pour des filets plaqués zinc. La tolérance est de $\pm 10\%$.

The table values are nominal and for zinc plated threads. The tolerance is $\pm 10\%$.

Utiliser la valeur de gauche si le filet est lubrifié (**Loctite**, huile, etc.), et celle de droite s'il est sec.

Use the left value if the thread is lubricated (**Loctite**, oil, etc.), and the right if it is dry.

Pour **vérification**, utiliser un couple équivalent à **90%** de celui utilisé pour l'assemblage.

For **verification**, use a torque equivalent to **90%** of the one used for the assembly.

Illustration 242: Fastener Torque Chart

Filets métrique / Metric threads	Dimension Size	Classe 8,8 / Grade 8,8				Classe 10,9 / Grade 10,9				Classe 12,9 / Grade 12,9			
		Lube	Dry	Lube	Dry	Lube	Dry	Lube	Dry	Lube	Dry	Lube	Dry
		lb-po (in-lb)		Nm		lb-po		Nm		lb-po (in-lb)		Nm	
Gros / Coarse	M5 x 0.8	40	55	5	6	60	80	7	9	70	90	8	10
	M6 x 1	70	95	8	11	100	130	11	15	115	155	13	18
		lb-pi (ft-lb)		Nm		lb-pi (ft-lb)		Nm		lb-pi (ft-lb)		Nm	
	M8 x 1.25	15	19	20	26	20	27	27	35	23	31	32	45
	M10 x 1.5	29	40	40	50	40	55	55	70	45	60	65	85
	M12 x 1.75	50	65	70	90	70	95	95	125	80	110	110	145
	M14 x 2	80	105	110	145	110	145	150	200	130	170	175	230
	M16 x 2	125	165	170	230	170	230	230	310	200	270	270	370
	M18 x 2.5	170	230	230	310	240	320	320	430	280	370	380	500
	M20 x 2.5	240	320	330	440	340	450	460	610	390	520	530	710
Fin / Fine	M22 x 2.5	330	440	450	600	460	610	620	830	530	710	730	970
	M24 x 3	420	560	570	760	580	780	790	1050	680	910	920	1230
		lb-pi (ft-lb)		Nm		lb-pi (ft-lb)		Nm		lb-pi (ft-lb)		Nm	
	M8 x 1	16	21	21	28	22	29	29	40	25	34	34	45
	M10 x 1.25	30	40	40	55	40	55	55	75	50	65	65	90
	M12 x 1.25	55	75	75	100	75	100	105	140	90	120	120	160
	M14 x 1.5	85	115	120	160	120	160	165	220	140	185	190	250
	M16 x 1.5	135	175	180	240	185	240	250	330	210	290	290	390
	M18 x 1.5	195	260	260	350	270	360	360	480	310	420	420	570
	M20 x 1.5	270	360	370	490	370	500	510	680	440	580	590	790
	M22 x 1.5	360	480	490	660	500	670	680	910	590	780	800	1070
	M24 x 2	460	610	620	830	630	840	860	1150	740	990	1010	1340

Les valeurs du tableau sont nominales et pour des filets plaqués zinc. La tolérance est de $\pm 10\%$.

The table values are nominal and for zinc plated threads. The tolerance is $\pm 10\%$.

Utiliser la valeur de gauche si le filet est lubrifié (**Loctite**, huile, etc.), et celle de droite s'il est sec.

Use the left value if the thread is lubricated (**Loctite**, oil, etc.), and the right if it is dry.

Pour **vérification**, utiliser un couple équivalent à **90%** de celui utilisé pour l'assemblage.

For **verification**, use a torque equivalent to **90%** of the one used for the assembly.

Illustration 243: Fastener Torque Chart

26 Maintenance - Remote Control

LED color Frequency	Pulse Frequency	Description	Action
Green fast pulses		Trying to link with the receiver and waiting its answer	Wait.
Green continuous		- The transmitter works properly. - Operation mode is OK.	No action needed.
Green slow pulses		STANDBY mode - If transmitter is 4 minutes ON and no action has been taken.	Press START to return to Operation mode.
Red slow pulses		- EEPROM error - EEPROM module is missing or corrupted.	Check EEPROM module or reprogram if necessary.
Red double pulses		- Radio Error - Radio communication error	Replace transmitter.
Red continuous		- Hardware failure - Hardware damage	Replace transmitter.
Orange slow pulses		Battery signal is critical.	Replace batteries with charged ones.
Orange double pulses		A maneuver is activated.	Release maneuver or replace transmitter if necessary.

Table 30: LED and frequency for maintenance

27 Disposal

The following guidelines for hazardous waste materials must be observed when disposing of lubricant, harmful substances and other materials.

27.1 Hazardous Material



CAUTION

General hazard

Waste materials can exhibit one or more hazardous characteristics.

- a) Do not mix waste material under no circumstances together.
- b) Handle waste materials handled as per current packaging, storage and transport regulations.
- c) Take them only be to an appropriate waste disposal site.

Waste materials are to be considered as hazardous within the meaning of these instructions if they demonstrate one or more of the following characteristics:

- Explosive
- Highly flammable or self igniting
- Flammable
- Act as accelerant
- Toxic or highly toxic
- Irritating and corrosive
- Generally harmful to health
- Carcinogenic or suspected to be carcinogenic
- Mutagenic
- Harmful to water or harmful in any other manner.

27.2 Collect, Package and Label

Mixing waste materials usually makes recycling impossible or illegal.

Waste material are to be packaged according to current storage and transport regulations in such a way as to prevent leakage or evaporation and thus provide safe and secure transport.

Before being transported, the packaging, containers, and /or barrels must be clearly labelled and weatherproofed with the following information:

- Nature of hazard
- Name and description of contents
- Hazard category and numbers
- Consigner (name, address and dept.)
- Date.

Old contents information and/or supplier's labelling on containers and barrels must be removed or made illegible. The container and barrels must be rinsed out before they are filled with waste material. The only exception to this provision is if containers and barrels are filled with exactly the same waste material that they originally contained.

27.3 Shipping of Waste

Only properly packaged sealed and labelled, or approved by environmental health officials, containers and barrels may be transported to the relevant waste disposal site (waste separation).

27.4 Scrapping

Vehicle components, including the accessories, must be disposed of in line with relevant legal requirements.

28 Declaration of Conformity



DICHIARAZIONE DI CONFORMITÀ

Secondo la Direttiva Europea 2006/42/CE allegato II.B

KONFORMITÄTSERKLÄRUNG

Im Einklang mit der Europäischen Richtlinie 2006/42/EG gemäß Anhang II.B

EC DECLARATION OF CONFORMITY

According to the European Directives 2006/42/EC annex II.B

DÉCLARATION CE DE CONFORMITÉ

Selon la directive Européenne 2006/42/CE annexe II.B

PRINOTH SpA

Brennerstr. / Via Brennero 34, IT-39049 STERZING / VIPITENO (BZ)

dichiara che il veicolo VEICOLO UNIVERSALE CINGOLATO Mod. PANTHER T14R Telaio no. 935320000 è conforme alle disposizioni della Direttiva "Macchine" (2006/42/CE, e successive modifiche) e alle disposizioni di attuazione; è conforme alle disposizioni delle seguenti direttive: 2000/14/CE, 2016/1628, 2014/30/EC È anche conforme alle disposizioni delle seguenti Norme armonizzate: EN 474-1, EN 474-6 Questa dichiarazione si riferisce esclusivamente al veicolo nella condizione come è stato messo sul mercato ed esclude i componenti aggiunti e/o le modifiche effettuate successivamente dall'utente finale. Questa dichiarazione perde la sua validità se il prodotto viene adattato o modificato senza consenso. Delegato per la composizione della documentazione tecnica: Patrick Hebert	bestätigt hiermit, dass das Fahrzeug RAUPENNUTZFAHRZEUG Mod. PANTHER T14R Rahmennr. 935320000 die Richtlinien "Maschinen" (2006/42/EG, und die nachträglichen Abänderungen) als auch deren Durchführungsbestimmungen erfüllt; es erfüllt die Bestimmungen folgender Richtlinien: 2000/14/CE, 2016/1628, 2014/30/EC Und es erfüllt die Bestimmungen folgender harmonisierter Normen: EN 474-1, EN 474-6 Diese Erklärung bezieht sich nur auf die Maschine in dem Zustand, in dem sie in Verkehr gebracht wurde; vom Endnutzer nachträglich angebrachte Teile und/oder nachträglich vorgenommene Eingriffe bleiben unberücksichtigt. Die Erklärung verliert ihre Gültigkeit, wenn das Produkt ohne Zustimmung umgebaut oder verändert wird. Bevollmächtigter für die Erstellung der technischen Unterlagen: Patrick Hebert
confirms that the vehicle CRAWLER DUMPER mod. PANTHER T14R Frame no. 935320000 complies with the regulations laid down in the directives "Machines" (2006/42/EC, and later modifications) and with their implementing regulations; It complies with the regulations of the following directives: 2000/14/CE, 2016/1628, 2014/30/EC It complies additionally with the regulations of the following harmonized norms: EN 474-1, EN 474-6 This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user. The declaration is no more valid, if the product is modified without agreement. Authorized person to compile the technical file: Patrick Hebert	déclare que le véhicule TOMBEREAU À CHENILLES mod. PANTHER T14R Châssis no. 935320000 se conforme aux dispositions de la directive "Machines" (2006/42/CE, et modifications successives) et aux modalités d'application; se conforme aux dispositions des directives CE suivantes: 2000/14/CE, 2016/1628, 2014/30/EC Se conforme aussi bien aux dispositions des normes harmonisées: EN 474-1, EN 474-6 Cette déclaration concerne exclusivement la machine dans l'état dans lequel elle a été mise sur le marché et exclut les composants ajoutés et/ou les opérations effectuées par la suite par l'utilisateur final. Cette déclaration n'est plus valide si le produit est modifié sans autorisation. Personne autorisée pour l'assemblage des documents techniques: Patrick Hebert

Granby, 2024-06-27

29 List of Abbreviations

Abbreviations	Description
ANSI	American National Standard Institute
A/C	Air conditioner
ASTM	American Society for Testing Material
CAN	Controller Area Network
CAT or Cat	Caterpillar ®
CCA	Cold Cranking Ampere
CE	Conformité Européenne
CEM	Clean Emission Module
CG	Center of Gravity
CW/CCW	Clockwise / Counter Clock wise
DEAC	Diesel Engine Antifreeze Coolant
DEF/AdBlue	Diesel Exhaust Fluid /
DEO	Diesel Engine Oil
DM1/DM2	Diagnostic Message (1 = active, 2 = previous)
DOC	Diesel Oxydation Catalyst
DPF	Diesel Particulate Filter
EDC	Electronic Displacement Control
ECM	Electronic Control Module
ELC	Extended Life Coolant
EPA	Environmental Protection Agency
EU	European Union
FMI	Failure Mode Identifier
FOPS	Falling Object Protective Structure
GVW	Gross Vehicle Weight
GVWR	Gross Vehicle Weight Rating
HP	Horse Power

Abbreviations	Description
ISO	International Organization for Standardization
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MP1/MP2	Microcontroller 1 / Microcontroller 2
MSS	Motor Speed Sensor
ISO	International
OCC	Occurrence
PETU	Pump Electronics Tank Unit
ROPS	Roll Over Protective Structure
RPM	Rotation Per Minute
SAE	Society of Automotive Engineers
SCA	Supplemental Coolant Additive
SCR	Selective Catalytic Reduction
SPN	Suspect Parameter Number
Tier	Emission reduction for diesel engines
ULS / ULSD	Ultra Low Sulfur / Ultra Low Sulfur Diesel

Table 31: List of abbreviations



www.prinoth.com The Prinoth logo is the word "Prinoth" in a red, italicized, serif font with a registered trademark symbol.

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Prinoth France S.A.S.

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