This controlled document is the original instruction and should remain with the vehicle at all times.
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For further information on the subject matter detailed within this Operator Handbook, please refer to Terex Equipment Limited Service Manuals and Product Parts Books.

Alternatively, please contact;

Customer Support Department
Terex Equipment Limited
Newhouse Industrial Estate
Motherwell, ML1 5RY

Tel; +44 (0) 1698 732121
Fax; +44 (0) 1698 503210

http://constructionsupport.terex.com
www.terex.com

The illustrations, technical information, data and descriptive text in this manual, to the best of our knowledge, were correct at the time of print. The right to change specifications, equipment and maintenance instructions at any time without notice, is reserved as part of the Terex Equipment Limited policy of continuous development and improvement of the product.

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Please refer to TEREX Specification Sheets or consult Factory Representatives to ensure that information is current.
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ONLY TRAINED COMPETENT PERSONNEL SHOULD BE ALLOWED TO OPERATE THIS VEHICLE

The operator is responsible and must be familiar with the contents of the Operator's Handbook and any Local / National regulations prior to operating this vehicle.
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CALIFORNIA
Proposition 65 Warnings

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

WARNING: Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.
SPARE PARTS STATEMENT

When carrying out repairs, alterations or fitting attachments, it is important that only genuine spare parts are used to ensure the operating safety of the machine is not impaired.

It is only by using genuine parts that the technical requirements stipulated by the manufacturer can be maintained.

If a General Operating Approval is issued for this machine, it may be considered null and void if non-genuine parts are used.
<table>
<thead>
<tr>
<th><strong>EC DECLARATION OF CONFORMITY</strong></th>
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<tr>
<td><strong>MANUFACTURERS NAME AND FULL ADDRESS:</strong></td>
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<tr>
<td>Terex Equipment Limited, Newhouse Industrial Estate, Motherwell, Scotland. ML1 5RY</td>
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<td><strong>PERSON AUTHORISED TO COMPILE TECHNICAL FILE</strong></td>
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<tr>
<td><strong>DIRECTIVES COMPLIED WITH:</strong></td>
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<tr>
<td>Name: Paul Douglas, Address: Newhouse Industrial Estate, Motherwell, Scotland. ML1 5RY</td>
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<td><strong>MODEL/DESIGNATION:</strong></td>
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<tr>
<td>TR100 Rigid Truck</td>
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<tr>
<td><strong>INSPECTOR:</strong></td>
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<td><strong>UNIT SERIAL NUMBER:</strong></td>
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<td><strong>WE DECLARE THAT THE ABOVE MACHINERY FULFILS ALL THE RELEVANT PROVISIONS OF THE ABOVE DIRECTIVES</strong></td>
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<td><strong>FULL QUALITY ASSURANCE (Annex X):</strong></td>
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<tr>
<td>L.R.Q.A. Ltd., Hiramford, Middlemarch Office Village, Siskin Drive, Coventry, CV3 4FJ, England</td>
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<tr>
<td><strong>CERTIFICATE NUMBER:</strong></td>
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<td><strong>FOR AND ON BEHALF OF THE MANUFACTURER:</strong></td>
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<tr>
<td><strong>NAME:</strong> Paul Douglas</td>
</tr>
<tr>
<td><strong>POSITION:</strong> General Manager</td>
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<td><strong>PLACE:</strong> Motherwell, Scotland</td>
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**MANUFACTURERS NAME AND FULL ADDRESS:**
Terex Equipment Limited,  
Newhouse Industrial Estate,  
Motherwell,  
Scotland.  
ML1 5RY

**PERSON AUTHORISED TO COMPILE TECHNICAL FILE**
Name: Paul Douglas,  
Address: Newhouse Industrial Estate,  
Motherwell, Scotland. ML1 5RY

**DIRECTIVES COMPLIED WITH:**
- 2000/14/EC  
- 2004/108/EC  
- 2006/42/EC

**DESCRIPTION OF MACHINERY:**
**MAKE:** TEREX  
**MODEL/DESIGNATION:** TR100 Rigid Truck

**INSPECTOR:**

**UNIT SERIAL NUMBER:**

**WE DECLARE THAT THE ABOVE MACHINERY FULFILS ALL THE RELEVANT PROVISIONS OF THE ABOVE DIRECTIVES**

**FULL QUALITY ASSURANCE (Annex X):**
L.R.Q.A. Ltd.,  
Hiramford,  
Middlemarch Office Village,  
Siskin Drive,  
Coventry.  
CV3 4FJ.  
England

**CERTIFICATE NUMBER:** LRQ 0925301/A

**DATE OF MANUFACTURE:**

**FOR AND ON BEHALF OF THE MANUFACTURER:**
**NAME:** Paul Douglas  
**POSITION:** General Manager  
**PLACE:** Motherwell, Scotland

**SIGNATURE:**

**DATE:**
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INTRODUCTION

This Handbook is provided as a guide to familiarize the operator and serviceman with the controls, recommended inspections, start-up, operating, shutdown and parking procedures for a TR100 Rigid Truck.

Look for the safety alert symbol to point out important safety precautions. It means:
ATTENTION! BECOME ALERT! YOUR SAFETY AND THE SAFETY OF OTHERS IS INVOLVED!

SAFETY PRECAUTIONS

The machine should be properly operated and maintained to keep it in a safe, efficient operating condition. Be sure that all controls are free of mud, grease, or other matter that might cause slips hazardous to the operator, serviceman, or other personnel or equipment. Report all malfunctions to those responsible for maintenance, and, do not operate the equipment until corrected. Normal service or maintenance performed as required can prevent unexpected and unnecessary downtime.

This Handbook describes general inspections, servicing and operation with the normal safety precautions required for normal servicing and operating conditions. It is not a guide however, for other than normal conditions or situations, and therefore, servicemen and operators must be safety conscious and alert to recognize potential servicing or operating safety hazards at all times, and take, necessary precautions to assure safe servicing and operation of the machine.

WARNING
These machines are equipped with cylinders containing compressed nitrogen gas. Transportation of these machines by any method may require a special permit from the appropriate authority of the country involved. Consult your dealer for details.

All information, illustrations and specifications contained in this publication are based on the latest product information available at the time of publication. The right is reserved to make changes at any time without notice.

Continuing improvement and advancement of the design may cause changes to your machine which may not be included in this publication. Each publication is reviewed and revised, as required, to update and include these changes in later editions.

This Handbook contains lubrication and routine servicing instructions, most of which can be performed in the field. Maintenance manuals containing repair/rebuild procedures can be obtained from your dealer.
INTENDED USE OF MACHINE

This product and its approved attachments are primarily intended to be used as described in this manual. Use of this product in any other way is prohibited and contrary to its intended use.

Hazard Classification
Multi-tier hazard classification system is used to communicate potential personal injury hazards. The following signal words used with the safety alert symbol indicate a specific level of severity of the potential hazard. Signal words used without the safety alert symbol relate to property damage and protection only. All are used as attention getting devices throughout this handbook as well as on decals and labels fixed to the machinery to assist in potential hazard recognition and prevention.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

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

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Machine Identification
While reading this handbook you will notice references to controls and equipment which may not be found on all machines. It is important that you know your machine and its equipment and how to operate it properly.

Information regarding the machine model, code and chassis serial number is found on the unit serial number plate on the rear right of the front frame. The machine model and serial number should always be referenced in any correspondence with your dealer or factory.
There is a dealer serving every part of the world where these products are sold. Your dealer is ready to provide you with any additional information needed and should be consulted for additional publications for this machine.

THEFT DETERRENT PRACTICES

General
The owner/operator should take the following precautions to discourage theft, to aid in the recovery in the event that the machine is stolen, or to reduce vandalism.

Actions to Discourage Theft and Vandalism
Remove all keys any time the machine is left unattended.

At night lock all doors and attach, secure or lock all anti-vandalism and anti-theft devices on the machine.

Immobilise the machine by removing a critical electrical or starting system device.

Upon receipt of a machine, record the machine serial number and the serial numbers of all major components and attachments. Keep this list up to date and filed in a safe location for fast retrieval.

Place a decal or notice on the machine stating that all serial numbers are recorded.

Discourage the thief! Inspect the gates and fences of the machinery storage yard or construction site. Keep machines in well-lit areas and ask the local law enforcement authorities to make frequent checks around the storage yard or work site.

Establish liaison with neighbours and ask them to watch equipment left at job sites and to report any suspicious activities to the local law enforcement authorities.

Make frequent inventories of machines to promptly detect losses or vandalism.

Actions to Aid in Recovery of Stolen Machines

In the event of theft, immediately notify the law enforcement authorities having jurisdiction. Provide the investigating officer with name, type of equipment, chassis and serial numbers of major attachments and components. It is helpful to show the investigating officer an Operator’s Handbook, photographs, and advertising, to familiarize him with the appearance of the machine.

Report the theft to the insurance company. Provide the model and all serial numbers.

Report the model and serial numbers of the stolen machine to a dealer handling the respective line of equipment. Request that the dealer forward this same information to the equipment manufacturer.
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2 - Safety
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SAFETY

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SAFETY PRECAUTIONS

General

* Read this Operator’s Handbook and learn the operating characteristics and limitations of the vehicle. Know what operating clearances the vehicle requires.
  
  • Read and understand all the safety signs prior to operation.
  
  • If the safety signs are obstructed by dirt or debris, clean them using mild soap and water prior to operation.
  
  • If the safety signs are damaged or illegible, replace them immediately, prior to operation.

* Read the AEM Safety Manual and follow the recommended safety precautions.

* Know clearances of all side and overhead obstructions such as wires, bridges, etc., for operating safely.

* Be especially aware of overhead power lines.

* Always know all traffic rules, signs, flags and hand signals used on the job and know who has the responsibility for signalling.

* Be aware of operating hazards that weather changes can create on the job. Make yourself familiar with procedures that should be followed when a severe rain or electrical storm strikes.

* Never attempt to operate or work on a vehicle when not feeling physically fit.

* Know what safety equipment is required and use it. Such equipment may be: Hard hat, safety glasses, reflector type vests, respirators and ear plugs.

* Never wear loose clothing, rings, watches etc., that might catch levers and controls and cause loss of control.

* Keep hands and controls free from water, grease and mud to assure nonslip control.

* Handle fuels and lubricants carefully and clean up spills to avoid fire and slipping hazards.

* Clean any mud, grease or oil from controls, handrails, ladders and decks. Lash necessary tools securely and remove all loose items before operating the vehicle. Never rush. Walk, do not run.

* Never carry more than one person and only in the instructor/trainer seat.

⚠️ The protection offered by the roll over and falling object protective structure may be impaired if it has been subjected to any modification or damage. Unauthorized modification will void certification.
Vehicle Lifting Precautions

* Prior to lifting, the vehicle should be parked on a level surface, wheels blocked.

* The vehicle should be lifted using a spreader bar if possible. Lift using FOUR slings from the lifting points provided at the bumper end of the chassis and at the rear of the body.

Vehicle Tie Down Precautions

* The vehicle should be secured at the tie down points located at the front bumper and at the body safety pin location at the rear of the chassis.
PREVENTING FIRE HAZARDS

General Fire Precautions

* Make sure the vehicle has a fire extinguisher and that it is accessible and fully charged (Not furnished with the vehicle).

* Never use an open flame as a light anywhere on, or around, the vehicle.

* Clean all dirt, oil, grease and other fluids from systems and components to minimize fire hazards and aid in spotting loose or leaking lines, fittings etc..

* Check the engine compartment for rubbish, oily rags or other debris that could cause fires before starting the engine.

* Don’t let greasy, oily rags or similar hazards accumulate in the cab.

* If the vehicle has been operated with an under inflated tyre, make sure that the tyre has cooled sufficiently before parking and leaving the vehicle unattended.

Flammable Fluid Precautions

* Don’t use diesel fuel or other flammable fluids for cleaning purposes. Use approved, solvents only.

* Make sure all fluid system caps, drain cocks, valves, fittings, lines etc., are secure and leak free.

* Never use an open flame (match, lighter etc.) when checking fuel, lubricant, coolant and battery fluid levels or when checking for fluid leaks. Use a flashlight or other safe lighting only.

* Shut off engine and use extra caution if engine is hot when refuelling. Ground the hose spout to prevent sparks when spout is touched to fuel tank filler tube.

* Never smoke while checking or adding fuel or other fluids or handling fluid containers and lines.

* Use care and do not stand downwind when adding fuel or other flammable fluids to tanks and reservoirs to avoid fluids being blown or splashed onto clothing.

* Close fuel tank shut-off valves, if used, before servicing fuel system.

* When preparing vehicles or components for storage, seal and tape all openings and close containers tightly to seal in all volatile inhibitor fluids and compounds used.

* Follow manufacturer’s recommendations when handling and using engine - starting fluids and disposing of spent containers. Do not puncture or burn empty containers. These fluids are explosive and highly flammable.
Electrical Hazard Precautions

* Never smoke or allow open flames or sparks near batteries.

* Leave battery box open when charging batteries in the vehicle for adequate ventilation of explosive gas (hydrogen) produced.

* Always disconnect batteries before repairing electrical system to avoid danger of fire-causing sparks. Disconnect battery ground cable first and reconnect last.

* Always disconnect batteries & alternator leads before carrying out any welding on the vehicle.

* Never check battery charge by placing metal objects across battery posts to avoid sparks at battery posts.

* Use jumper cables only as recommended. Improper use can result in battery explosion or unexpected vehicle motion.

* Never operate engine starter for more than 30 seconds and allow two minutes between long cranking periods for cooling. An overheated starter could cause a fire.

* If electric coolant or lubricant heaters are used, be sure to follow heater manufacturer’s recommendations for use to avoid electrical and/or fire hazards.

Mounting and Dismounting

* Only use steps and hand holds provided to mount or dismount the vehicle. Do not grasp the steering wheel.

* Always face the access system and maintain at least three points of support to mount or dismount the vehicle (two hands and one foot, or two feet and one hand.

* Ensure walkways, stairways, platforms, handrails and handholds are free of frost, ice, oil, water or anything else that could cause slip, trip or falls.

* Never mount or dismount a moving vehicle. Never jump off the vehicle.
Safety

Pre-Starting

* If engine is to be started and run indoors, ensure proper ventilation to remove deadly exhaust gases.
* Always perform 'Pre-Starting Inspection' instructions described on page 4-3 to ensure the vehicle is ready for operation.
* Always walk around the vehicle to make sure no-one is working on, underneath or close to the vehicle before starting the engine or operating the vehicle.
* Adjust, secure and latch the seat and fasten the seat belt before starting the vehicle.
* Sound horn before starting the engine or beginning to move the vehicle; two blasts for forward and three blasts for reverse.

Starting

* Do not start the engine or operate any control if there is a 'DO NOT OPERATE' or similar warning sign attached to any control.
* Use jumper cables only as recommended. Improper use can result in battery explosion or unexpected vehicle motion.
* Always obey 'Starting the Engine' instructions described on page 4-8.
* Do not bypass the vehicle’s neutral-start system. The neutral start system must be repaired if it malfunctions.
* Start and operate the vehicle only from the operator’s seat.

Operating

* Ensure all cab glass, mirrors and light lenses are clean during vehicle operation for maximum visibility. Ensure mirrors are properly set / positioned.
* Always keep cab floor clear of anything that could restrict full operation of pedals.
* Always make sure all gauges, warning/indicator lights and controls are working properly before operating the vehicle.
* Always perform 'Pre-Operating Checks' described on page 4-11 to ensure the vehicle is ready for operating.
* Always wear seat belts when operating the vehicle.
* In the event of a loss of steering pump output pressure, a fully pressurized accumulator provides a maximum of two lock to lock turns of the front wheels. A red warning light on the instrument panel illuminates when steering pressure falls below 83 bar (1 200 lbf/in²). If this light illuminates, indicating a loss of steering power, the machine must be stopped immediately and no further operation attempted until the fault is corrected.
* Do not operate if exposed personnel enter the immediate work area.
* Sound horn before starting engine or beginning to move the vehicle; two blasts for forward and three blasts for reverse.

* Watch for ground crew and other personnel on foot. Sound horn as a warning before setting the vehicle in motion and when approaching ground crew.

* Be sure the body is fully down before moving the vehicle.

* Always try to face or look in the direction the vehicle is travelling.

* Use extreme caution and turn on lights at night or when fog, dust or similar hazards limit visibility. Do not overdrive your headlights.

* Observe instruments frequently. Report any defects or unusual noises in the vehicle during operation.

* Stay in gear when driving downhill. Do not coast with transmission in neutral. Select the proper gear and maintain safe speed with the service brakes or retarder. Always maintain safe speeds for haul road operating conditions for maximum control. Reduce speed before turning.

* In the event of a loss of electric power to the gear shift control, the transmission will automatically lock in a gear range. If this occurs, stop the vehicle using the service brakes, apply the parking brake and do not operate until the fault is corrected.

* Always operate straight up or down slopes whenever possible, side-hill operation can cause sideslip and possible roll-over.

* Slow down when moving in congested areas. Do not race with other vehicles. Stop in authorized areas only, except in emergency.

* Brake firmly in one application. Do not FAN the pedal. Never operate the vehicle if a warning light indicates a fault in the braking system.

* Always give loaded vehicles the right-of-way when your vehicle is empty.

* Always watch for holes, soft edges or other hazards when backing to dump over a spoil bank.

* Always apply the Spotting Brake when the vehicle is being loaded or when dumping a Load.

* Always stay in cab when being loaded.

* Always lower the body and shut down the vehicle according to the procedure under 'Stopping The Engine' described on page 4-14 before leaving the vehicle unattended. If on a grade wheels should be blocked.
Safety

Roading

* Match speed to road conditions.
* Yield the right of way when required. Obey the rules of the road.
* Stay as close to the side of the road as possible. Pass other equipment only when the road is clear and enough room / space to pass and reserve power is available.
* Stop at appropriate intervals to inspect the vehicle and allow the tyres to cool. Tyre air pressure will rise during operation. Do not reduce tyre pressure. Excess speed will cause tyres to heat up. Reduce your travel speed, not tyre pressure.
* Use accessory lights and devices at night or in poor visibility. Carry a flare kit. Do not overdrive your headlights.

Lubrication and Servicing

* Do not allow unauthorized personnel to service or maintain this vehicle. Study this Operator’s Handbook and the Maintenance Manual before starting, operating or servicing this vehicle. Always follow procedures and safety precautions detailed throughout the Maintenance Manual.
* Always attach a ‘DO NOT OPERATE’ or similar warning sign to the ignition switch or a prominent control before cleaning, lubricating or servicing the vehicle.
* Never allow anyone to work on the vehicle while it is moving. Make sure there is no one on the vehicle before working on it.
* Do not work under or near an unblocked or unsupported body. Always use the body safety pins.
* Do not work under or near any unblocked or unsupported linkage, part or vehicle.
* Always shut down the vehicle according to the procedure under ‘Stopping The Engine’ described on page 4-14 and turn off the master switch before cleaning, lubricating or servicing the vehicle except as called for in Operators Handbook or the Maintenance Manual.
* Always relieve pressure before servicing any pressurized system. Follow the procedures and safety precautions detailed in the relevant Maintenance Manual section.
* When changing oil in the engine, transmission and hydraulic systems, or removing hydraulic lines, remember that the oil may be hot and can cause burns to unprotected skin.
* When working on or around exhaust components, remember that the components may be hot and can cause burns to unprotected skin.
* Always deflate the tyre before attempting to remove any embedded objects or removing the tyre and rim assembly from the vehicle.
* Always use a self-attaching chuck with a long airline, and, stand to one side while the tyre is inflating. Refer to Section 160-0050, WHEEL RIM AND TYRE in the Maintenance Manual.

* Ensure any lifting devices are adequate for the job which they are intended.

Scraping the Machine

At the end of its life, the machine should be disassembled by a competent person using safe working practices, wearing the appropriate Personal Protective equipment and working in accordance with local regulations.

The appropriate lifting equipment, chocks and stands must be used to maintain a stable machine as components are removed and the machines centre of mass changes. Fluids must be drained off into suitable containers and if possible recycled or otherwise disposed of in an environmentally friendly in accordance with local regulations.

Care must be taken when dealing with flammable liquids and the machine parts that contained those liquids. Any process that could ignite flammable materials must not be used on components that have contained flammable liquids in them or have residual flammable liquids on them.

Fire extinguishers must be readily available if cutting/welding equipment is to be used.

When possible recyclable materials should be separated out and processed in accordance with local regulations using an authorised agent.
The operator must survey their surroundings before entering the machine, and check their field of vision prior to and during operation of the machine. All mirrors must be adjusted when installed, and prior to operating the machine, to achieve optimum visibility and thus minimize the risk of injury to themself and others. Site management should utilize appropriate jobsite organization to minimize hazards due to restricted visibility. Modifications made to the machine may restrict the visibility and compromise compliance with safety standards (ISO 5006:2006).

Ensure that all mirrors are installed and adjusted to optimize operator visibility. All mirrors are capable of adjustment in a similar fashion, by undoing their attachment bolts, manually repositioning them to the desired angle then retightening their attachment bolts. The three mirrors illustrated above (fitted to brackets mounted on the handrails), and to the right of this text (mounted on the top-right-hand corner of the radiator guard), are supplied loose and adjusted using the same method.
When the three loose mirrors (F, G and H) have been fitted, the machine has a total of eight mirrors, designated A to H respectively, and positioned generally as illustrated. The area surrounding the machine is to be considered as two distinct fields of view, illustrated below as areas 1 to 8 in the immediate vicinity, and areas 9 to 15 at a radius of 12 m from the operator when seated. The operator MUST adjust the mirrors, and set the CCTV camera, to achieve visibility as identified below:

- Areas 3, 11 and 12 can be directly viewed from the operator’s seating position without the need for mirrors.
- Adjust mirror A to maximize the view of Areas 14 and 15.
- Adjust mirror B such that Area 7 is fully visible.
- Set mirror C to enhance the view of the front right-hand step Area.
- Adjust mirror D to maximize the view of Areas 14 and 13.
- Adjust mirror E to facilitate vision of Area 5.
- Adjust mirror F to facilitate vision of Areas 8 and 10.
- Adjust mirror G to facilitate vision of Areas 1 and 9.
- Adjust mirror H to facilitate vision of Areas 2, 4 and 13.
- Set the CCTV to facilitate vision of Areas 6 and 14.
Installation of Mirrors A and B and Associated Brackets

Mirrors A and B and are supplied fitted, on brackets folded into the handrails. They must be installed by the customer in the positions defined by the illustration below. Mirror A is to be installed on the upper vertical extension immediately above the upper hand-rail. Mirror B is to be installed on the lower vertical member between the upper and lower hand-rails.

Installation of Bracket for Mirror F

The bracket provided for the mounting of mirror F is supplied as a loose item, and must be installed by the customer in the position defined by the illustration below.
Installation of Bracket for Mirror H

The bracket provided for the mounting of mirror H is supplied as a loose item, and must be installed by the customer in the position defined by the illustration below.

Installation of Bracket for Mirror G

The bracket provided for the mounting of mirror G is supplied as a loose item, and must be installed by the customer in the position defined by the illustration below.
Safety

Visibility

The visibility for this vehicle at a 1m area boundary from the outside surface of the vehicle at a height no greater than 1.5 m is shown in the diagram above. The hatched area (A) shows the area where the operator’s view is blocked by part of the machine, when mirrors and other CCTV visual aids are installed and adjusted correctly, when viewing from the operator’s seating position.

Please be fully aware that there are areas around the vehicle that cannot be seen when operating the vehicle in normal conditions and all operators should survey their surroundings and field of vision before and during vehicle operation.

⚠️

Site management should employ suitable jobsite organization to minimize hazards due to restricted visibility.

The visibility at a radius of 12 m from the Seat Index Point (SIP) is shown in the diagram below. The hatched area (B) shows the area where the view is blocked, when mirrors and other CCTV visual aids are installed and adjusted correctly.

⚠️

Site management should employ suitable jobsite organization to minimize hazards due to restricted visibility.
**CCTV**

Some machines are fitted with CCTV cameras at the rear, and a CCTV monitor in the cab for viewing the CCTV images. Operate the CCTV system in accordance with the manufacturer's instructions, provided in the cab.

---

**Option with Addition of Ground Level Isolation Switch**

Some machines are fitted with a ground level isolation switch, mounted at the front, on the left-hand side adjacent to the radiator. This switch is connected into the starter keyswitch circuit, and when operated prevents starting of the engine. This facility is provided to allow personnel in the vicinity of the vehicle to prevent operation of the engine, when carrying out fuelling operations. The switch is protected by a hinged cover that must be lifted to access the switch.

⚠️

The ground level isolation switch must ONLY be utilized when the vehicle is stationary, with the brakes applied, and the engine switched off. DO NOT return the switch to the unoperated position until it is safe to start the engine again.

The engine cannot be restarted by simply returning the switch to the 'unoperated' position. It is necessary to start the engine from the keyswitch in the cab, when it is safe to do so.
Wheels and Tyres

If tyres on the vehicle were inflated at the factory with dry nitrogen gas, the tyre walls will be marked 'N' and the following factory installed decal will be found mounted on the fenders.

**NOTICE**

TYRES ON THIS VEHICLE ARE FACTORY INFLATED WITH DRY NITROGEN. IT IS RECOMMENDED THAT DRY NITROGEN BE USED EXCLUSIVELY FOR ALL TYRE PRESSURE ADJUSTMENTS AS WELL AS INFLATION OF REPLACEMENT TYRES.

Nitrogen gas improves tyre pressure retention, increases tyre life by reducing carcass oxidation from within, minimizes rim rust, and has no known detrimental effect on the tyre. It also reduces the potential of a tyre explosion because it is an inert gas and will not support combustion inside the tyre. The same tyre inflation pressure used for air inflation should be used for nitrogen inflation. Refer to Section 160-0050, Wheel, Rim and Tyre of the vehicle Maintenance Manual for recommended procedures for inflating and pressure adjusting tyres with dry nitrogen gas. Only proper nitrogen charging equipment operated by personnel trained in its use should be used.

⚠️ **Never mix components of one manufacturer’s rims with those of another.** Using the rim base of one manufacturer with the lock ring of another or vice versa is dangerous. The lock ring of one may not fully engage with the lock ring groove of the other. Always consult the rim manufacturers for proper matching, assembly and safety instructions. Also, use and servicing of damaged, worn out or improperly assembled rim assemblies is a very dangerous practice. Failure to comply with the above warnings could result in an explosion from tyre pressure causing serious property damage and serious personnel injury or death.
Whenever a vehicle’s tyre(s) is (are) exposed to excessive heat, such as a vehicle fire or extremely hot brakes, the hazard of a subsequent violent tyre explosion must be recognized. All nearby persons must avoid approaching the vehicle, so as not to be physically endangered in the event of an explosion of the tyre and rim parts. The vehicle should be moved to a remote area, but only when this can be done with complete safety of the operator operating or towing the vehicle. All other persons should stay clear of the vehicle. The fire or overheated brakes, wheel, etc., should be extinguished or cooled from a safe distance. Do not attempt to extinguish the fire or cool the vehicle by use of hand-held fire extinguishers. If it is absolutely necessary to approach a vehicle with a suspect tyre, approach only from the front or the back. Stay at least 15 m (50 ft) from the tread area. Keep observers out of the area and at least 460 m (1500 ft) from the tyre sidewall. Refer to the accompanying sketch. The tyre(s) should be allowed at least eight (8) hours cooling time after the vehicle is shut down or the fire extinguished before approaching closer.
Safety

DECALS AND INSTRUCTION PLATES

Decals and instruction plates fitted to vehicles may vary from country to country to suit local needs. These pages contain a brief description and the location of the decals and instruction plates that may appear on your vehicle.

1. Tyre Warning
2. Accumulator Precautions
3. Accumulator Charging Instructions
4. Operating On A Grade Instructions
5. Vehicle Parking Instructions
6. Acoustic Foam Precautions
7. Symbol Identification Chart
8. Radiator Cap Warning
9. Radiator Fill Instructions
10. Air Cleaner Information
11. Vehicle Overall Height
12. Steering Wheel Lock
13. Negative Earth
14. Battery Cable Warning
15. Ride Strut Pressure Warning

1. Alternator Precautions
2. CEC (ATEC) Welding Warning
3. Engine Instructions
4. Body Control Lever Positions
5. Retarder Positions
6. CEC (ATEC) Switches
7. Pre-operating Instructions
8. Acoustic Foam Precautions
9. Pre-operating Instructions
10. Hydraulic Oil Decal
11. Sight Gauge Plate
12. Hydraulic Oil Pressure Plate
13. Anti-Syphon Instructions
14. Instruction Plate
15. Hydraulic Oil Level
16. Instruction Decal
17. Hydraulic Oil Level
18. Lubrication Chart
19. Pressure Test Points
20. Accumulator Charging Instructions
21. Accumulator Precautions
22. Pressure Test Points
23. Pressure Test Points
24. Ride Strut Pressure Warning
25. Machine Serial Plate
PICTORIAL DECAL SET

Safety Lift Instruction (1900)

Transmission Retarder (1934)

50% Front Brake Reduction (1898)

Transmission Retarder Lever Control (1961)

Hydraulic Oil Level (1962)

CEC2 Vehicle Interface Module (1967)

CEC2 Vehicle Interface Module (2193)

Vehicle Interface and Power Module (1966)

Terex
C. E. C. 2
V. I. M.

TEREX
C. E. C. 2
V. I. M.

Terex
C. E. C. 2
V. I. M.
### Fuse/Relay Chart (2195)

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### Fuse/Relay Chart (1927)

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**K23**

**K17**

**K4**

**K39**

**K35**

**K39**

**K34**

**K58**

**K38**

**K57**

**1/R**
### SAFETY DECAL SET ISO STANDARD

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**SAFETY DECAL SET ISO STANDARD**

- **ROPS and FOPS**, See handbook for procedure (1931)

#### Gradeability Chart, TR35 (1910)

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#### Gradeability chart, TR60 (1914)

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- **Suspension Strut (2198)**
- **Hydraulic Oil Sight Gauge (1906)**
- **Warning park brake (1925)**
- **Backalarm Warning, Operator must make certain back alarm is operating properly (1923)**
SAFETY DECAL SET ANSI STANDARD

**Warning, Crush hazard (1909)**

**Warning, Crush hazard (1908)**

**Caution Cab Foam, Do not weld or burn cab structure unless foam is removed (1928)**

**Gradeability chart, TR70 (1916)**

<table>
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<th>% KPH MPH</th>
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**Gradeability chart, TR100 (1918)**

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**Rim clamps, See handbook for procedure (1928)**

**Crush Hazard, Install support before servicing (1908)**

**Hot Radiator Steam Warning (1823)**

**Burn Hazard. Hot fluid under pressure can scald.**

**Allow to cool before opening.**

**NOTICE**

**Welding truck can seriously damage ECUs and components.**

**Disconnect the following in order, before welding:**
1. Turn off master switch.
2. Battery earth link.
3. Battery supply cable.
4. Alternator earth link.
5. Alternator supply cable.
7. Engine ECM.
8. Transmission ECU.
9. Cab bulkhead connectors.
**SAFETY DECAL SET ANSI STANDARD**

**WARNING**

TR35

Operating the truck outside the stated limits on the chart could result in death or serious injury.

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**WARNING**

TR45

Operating the truck outside the stated limits on the chart could result in death or serious injury.

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**NOTICE OF ROPS & FOPS CERTIFICATION**

This structure meets the following requirements for the machine and weights listed:

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<th>MODEL</th>
<th>STRUCTURE PART No.</th>
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</table>

**CAUTION**

Damage to ROPS may weaken structure and may cause injury.

If damaged, ROPS must be replaced. Do not repair. Unauthorised modification will void certification. Tighten fastners periodically.

**NOTICE**

Rim Clamps (1929)

Deflate tyre completely before loosening rim clamps. For dual assembly, deflate both tyres before loosening rim clamps.

**WARNING**

Decline Warning TR35 (1911)

Decline Warning TR45 (1913)

**WARNING**

TR25

Operating the truck outside the stated limits on the chart could result in death or serious injury.

<table>
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**WARNING**

TR26

Always secure when driving to minimize crush hazard. Drive slowly and use ROPS. Always ensure when starting / stopping engine to:

1. Apply park brake
2. Shift transmission into neutral.

**WARNING**

Use to stop only in emergency otherwise use parking brake.
### Safety

**WARNING**

**TR60**

**OPERATING THE TRUCK OUTSIDE THE STATED LIMITS ON THE CHART COULD RESULT IN DEATH OR SERIOUS INJURY.**

Do not operate truck outside the limits stated on the chart.

Select the correct gear for the gradient you are on.

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**WARNING**

**TR70**

**OPERATING THE TRUCK OUTSIDE THE STATED LIMITS ON THE CHART COULD RESULT IN DEATH OR SERIOUS INJURY.**

Do not operate truck outside the limits stated on the chart.

Select the correct gear for the gradient you are on.

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**WARNING**

**TR100C**

**OPERATING THE TRUCK OUTSIDE THE STATED LIMITS ON THE CHART COULD RESULT IN DEATH OR SERIOUS INJURY.**

Do not operate truck outside the limits stated on the chart.

Select the correct gear for the gradient you are on.

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**WARNING**

**NOTICE**

**OIL SHOULD BE VISABLE THROUGH THIS SITE.**

See maintenance manual for instructions.

**SIGHT GAUGE**

**WARNING**

**DECREASE WARNING TR60**

(1915)

**DECREASE WARNING TR70**

(1917)

**DECREASE WARNING TR100C**

(1919)

**WARNING**

**Read Operator Handbook Warning**

(1820)

**WARNING**

**Read and understand operator's manual and all safety signs before using or maintaining machine. If you do not understand the information in the manuals, consult your supervisor, the owner or the manufacturer.**

**WARNING**

**Improper operation or maintenance can result in serious injury or death.**

**WARNING**

**Operating the truck outside the stated limits on the chart could result in death or serious injury.**

**Do not operate truck outside the limits stated on the chart.**

**Select the correct gear for the gradient you are on.**

**WARNING**

**Decline Warning TR60**

(1915)

**Decline Warning TR70**

(1917)

**Decline Warning TR100C**

(1919)

**OPTIONAL ADDITIONAL SAFETY DECALS**

- **ITEMS 1, 2 AND 3 FITTED TO RHS OF TRUCK ONLY**

**Additional Safety Decals**

(2070)
This Page Intentionally Left Blank
3 - Controls and Operating
This Page Intentionally Left Blank
1. Face Vent/Side Window Demister
2. Warning Lights
3. Tachometer/Hourmeter
4. Engine Water Temperature Gauge
5. Engine Oil Pressure Gauge
6. Fuel Gauge
7. Warning Lights
8. Transmission Oil Pressure Gauge
9. Transmission Oil Temperature Gauge
10. Speedometer/Odometer
11. Warning Lights
12. Face Vent
13. Parking/Emergency Brake Control
14. Cup Location
15. Windscreen Demister
16. Side Window Demister
17. Document Holder
18. Fuse Box Cover
19. Transmission Gear Shift Selector
20. Retarder Control
21. Spotting Brake Control
22. Ignition and Starter Key Switch
23. Switches
24. Air Conditioner Control
25. Blower Control
26. Heater Control
27. Accessory Lamp Socket
28. Accelerator Control
29. Service Brake Control
30. Steering Wheel
31. Steering Wheel Adjustment Lock
32. Headlight Dipper, Direction Indicator, Windscreen Wiper/Washer and Horn Control
33. Radio/Cassette Player
34. Cold Start Pilot
35. Foot Rest
36. Body Control Lever
37. Electric Window Switch
38. Interior Light (Not Shown). Located above dash.
39. Cup Holder (Not Shown). Located on back wall.
Warning Lights

1. **Alternator Charging (Red)**
   Illuminates to indicate when the alternator is not charging.

2. **Engine Water Temperature (Red)**
   Illuminates when the engine water temperature rises above the safe operating temperature.

3. **Engine Water Level (Amber)**
   Illuminates when the engine water level drops below the safe operating level.

4. **Air Cleaner Restriction (Amber)**
   Illuminates to indicate that the air filters are needing cleaned or replaced.

5. **Engine Oil Pressure (Red)**
   Illuminates when the engine oil pressure drops below the safe operating pressure.

6. **Engine Stop Light (Red)**
   Not currently used on TR100.

7. **Engine Warning Light (Yellow)**
   Not currently used on TR100.

8. **Engine protection Fluid Light (Amber)**
   Not currently used on TR100.

9. **Front Brake Accumulator Pressure (Red)**
   Illuminates to warn of low pressure in the front brake system accumulator. Stop the machine if this light illuminates and do not operate until the fault is corrected.
10. Rear Brake Accumulator Pressure (Red)
   Illuminates to warn of low pressure in the rear brake system accumulator. Stop the machine if this light illuminates and do not operate until the fault is corrected.

11. Low Steering Pressure (Red)
   Illuminates when the steering system oil pressure drops below 83 bar (1200 lbf/in²). Stop the machine when this light illuminates and do not operate until the fault is corrected.

12. Steering & Braking Tank Low Oil Level (Red)
   Illuminates when the level in the tank falls below the safe operating level. Stop the machine when this light illuminates and do not operate until the fault is corrected.

13. Parking Brake (Green)
   Illuminates when the parking brake is applied.

14. Headlight Main Beam (Blue)
   Illuminates when headlights are operated on main beam.

15. Direction Indicator (Green)
   Flashes when the indicator lights are operating.

16. Body-up (Amber)
   Illuminates to indicate that the body is NOT resting on the chassis. Never move the machine until this light goes OUT.

17. Transmission Oil Temperature (Red)
   Illuminates when the transmission oil temperature rises above the safe operating temperature.

18. Brake Hydraulic Oil Temperature (Red)
   Illuminates if brake cooling hydraulic oil overheats. Reduce speed and shift transmission to the range that will maintain an engine speed as high as possible, without exceeding the maximum recommendation, to increase oil circulation and cooling. If the trouble persists, stop the machine and have the fault corrected.

19. Retarder Indicator (Amber)
   Illuminates when the retarder is applied.

20. In-converter Indicator (Green)
   Illuminates when the transmission is in Torque Converter drive. It goes OUT when Lockup is engaged.

21. Check Trans (Red)
   Illuminates to alert of a fault in the transmission shift system or abnormal transmission temperature. The light will illuminate when the ignition keyswitch is turned to position ‘i’ to provide a bulb and system check and should go off a few seconds after the engine is started.

22. Steering Filter Restriction (Amber)
   Illuminates when the filter is restricted, indicating that a filter change is required.

23. Transmission Oil Filter Restriction (Amber)
   Illuminates when the filter is restricted, indicating that a filter change is required. Transmission will not upshift from first gear while this light is illuminated.

   Note: This lamp may illuminate at initial start up, due to the viscosity of the oil when cold.
24. Engine Overspeed (Red)
Illuminates to alert the operator when the transmission ECU detects an engine speed of 2550 rev/min.

Note: For further information on items 21 and 24, refer to 'Transmission' section on pages 3-23 and 3-24.
INSTRUMENTS

1. **Tachometer/Hourmeter**
   Indicates the engine speed in revolutions per minute. The needle shows the variations in engine operating speed. Never accelerate the engine to speeds indicated by the red zone on the dial face. A digital hourmeter is incorporated in the tachometer to record total hours of engine operation. The readings can be used for operating and service records.

2. **Engine Water Temperature Gauge**
   This gauge should read in the green zone, after the engine has warmed. If gauge reads in the red zone, stop the engine until the fault is corrected.

3. **Engine Oil Pressure Gauge**
   This gauge should read in the lower end of the green zone at normal operating speeds (on machines with three colour zone, may fall to the lower end of the yellow zone at engine idle). If gauge reads in the red zone, stop the engine until the fault is corrected.

4. **Fuel Gauge**
   Indicates the level in the fuel tank. Fill the tank before parking the machine overnight to minimize condensation in the tank. Avoid a dry tank condition which requires bleeding the fuel system.

5. **Transmission Oil Pressure Gauge**
   Indicates transmission clutch application oil pressure. The reading will vary during shifts and with varying speeds and loads. The needle should remain in the green zone during normal operation but might rise into the upper red zone for short periods under heavy loading. When the load decreases, the needle should return to the green zone and may fall momentarily into the lower red zone. If the needle remains in either of the extreme zones for extended periods, stop the machine until the fault is corrected.

6. **Transmission Oil Temperature Gauge**
   This gauge should read in the green zone during normal operation. Refer also to 'General Transmission Operation' on page 3-24 and 'Retarder' section on page 3-14 for variations from normal.

7. **Speedometer/Odometer**
   Driven by a signal from the transmission ECU, the speedometer indicates travel speed in kilometres per hour and miles per hour. A digital odometer is incorporated in the speedometer to record the distance travelled by the vehicle at any given time.
SWITCHES

1. **Hazard Warning Lights**
   Press bottom of switch to make turn indicators flash simultaneously as hazard warning lights. The light in the switch and direction indicator warning light on the dash panel will flash. To switch hazard lights off; press the top of the switch.

2. **Position not used.**

3. **Position not used.**

4. **Position not used.**

5. **Front Brake Pressure Reduction**
   Press bottom of switch to give a 50% reduction in front brake pressure. The lower front pressure reduces the risk of wheel lockup in slippery conditions. To return to full front brake pressure; press the top of the switch.

6. **Retarder Selection Switch**
   Allows the operator to select which retarder is employed when using the retarder control lever.
   - Pressed at top = Disc Brake
   - Pressed at bottom = Transmission

7. **Sidelight and Headlight**
   Press bottom of switch to the first position to operate side, tail and panel lights. The lights in the other switches will illuminate. Press switch to the second position to operate the headlights. To switch lights off; press the top of the switch.

8. **Position not used.**

9. **Warning Light Test Switch**
   Pressing the switch with the ignition switched on will illuminate warning lights 1, 2, 3, 4, 5, 9, 10, 11, 12, 17, 18, 20, 22 and 23 and the buzzer will sound, to provide a bulb and system check. Refer to 'Warning Lights' section on pages 3-4, 3-5 and 3-6 for details. The light in the switch will illuminate with the panel lights.

10. **Position not used.**

11. **Position not used.**

12. **Position not used.**

13. **Manual Mode Switch**
    Allows the service technician to change the operation of the transmission from automatic to manual.
    - Automatic - Normal Operation.

14. **Mode Selection Switch**
    Allows the service technician to select between the transmission 'POWER' and 'ECONOMY' shift schedules.
15. Ignition and Starter Key Switch
The combined switch operates the ignition, pre-lube motor and starter motor. The key can only be withdrawn from position '0'.

'0' - Ignition switched off. Disconnects the batteries making all electrical systems inoperative (with the exception of a supply to the transmission ECU memory, interior light and to the radio).

'1' - Turn key clockwise to connect the batteries to the electrical systems.

'2' - Ignition switched on, instruments, gauges and warning lights register as appropriate. All electrical systems are operative. The key must remain in this position whilst operating the machine.

'3' - Initiates starting sequence. The engine pre-lube motor will run until engine oil pressure of 0.35-0.48 bar (5 - 7 lbf/in) is achieved. This will normally take 8 - 15 seconds, but can take up to 45 seconds in cold climates or with dry filters. 3 seconds after the pre-lube motor stops, the engine starter motors engage. Release the key as soon as the engine starts firing. The key will return to position '2'.

16. Electric Window Switch
Press bottom of switch to lower window; press top of switch to raise window.
CONTROLS

Headlight Dipper, Direction Indicator, Windscreen Wiper/Washer and Horn

1. **Headlight Dipper and Flasher:**
   - Control Downwards = Main Beam
   - Neutral Position = Dipped Beam
   - Control Upwards = Headlight Flash

2. **Direction Indicator:**
   - Control Rearwards = Left Indicators
   - Control Forwards = Right Indicators

3. **Windscreen Wiper/Washer:**
   - Position J = Not used
   - Position 0 = Neutral Position
   - Position 1 = Wiper Slow Speed
   - Position 2 = Wiper Fast Speed
   - Ring Pushed = Windscreen Wash

4. **Horn:**
   - Button Pushed = Horn Sounds

**Heater**
Blower control (2) is rotated to select one of three blower speeds. Temperature control (1) is rotated to vary heater output temperature. Heater output air is unheated with the control turned fully clockwise and heated by turning anti clockwise. Heater/air conditioner outlets (4) may be adjusted to control air flow output by opening and closing the control flaps. Air direction can be adjusted by rotating complete outlet.

**Air Conditioner**
Keep all windows and vents closed. Blower control (2) is rotated to select one of three blower speeds. The air conditioning will not operate if the blower control is not switched on. Temperature control (3) adjusts the air conditioner output temperature. Rotating the control to the left provides maximum cooling. Heater/air conditioner outlets (4) may be adjusted to control air flow output by opening and closing the control flaps. Air direction can be adjusted by rotating complete outlet.

**Air Condition Commissioning Procedure**
If the machine has been idle overnight or for an extended period of time, the refrigerant in the air conditioning unit converts from a gas to a liquid. This puts the compressor unit under a great deal of strain trying to compress a liquid instead of a gas and could cause a failure in the air conditioning unit. The following commissioning procedure allows the air conditioning unit to achieve normal operating parameters.

1. Start the machine and allow it to run until the engine is at a normal operating temperature of 80 °C (176 °F).
2. Turn the blower control to setting 1.
3. Turn on the air conditioning unit on for 5 seconds then off for 5 seconds.
4. Repeatedly switch the air conditioning on and off for at least 1 minute. This should be at least 12 repetitions.
5. Commissioning the air conditioning unit is complete and ready for use.

**NOTICE**
Follow the instructions given above, otherwise the machine may be damaged.

**OPERATOR’S SEAT - AIR SUSPENSION**
The air seat only reacts when the driver sits on the seat. When unoccupied the seat sinks to the lowest position to allow easier access. The incorporated suspension system maintains the seat in position for driving.

The following is the list of controls provided for the seat:

1. **Seat cushion tilt adjustment.** The operator removes their weight from the seat while lifting the handle. Raise or push down on the front of the seat cushion to adjust its angle. Release the handle at one of the three positions provided.

2. **Ride zone indicator.** When the operator is seated, the suspension height and weight adjustment (6) is pulled out to lower the seat, or respectively pushed in to raise it, until the white indicator (2) shows in the green zone.

3. **Forward and rearward positioning.** The operator has the facility to move the entire seat bodily forwards or rearwards, by first lifting this handle, adjusting the horizontal seat position, then releasing the handle in one of several positions provided.
Controls and Operating

Note: If the horizontal slide become loose, adjustment can be achieved by tightening of two gold coloured grub screws on the right-hand side of the slide plate, the access to which requires logitudinal movement of the seat to align access holes. Tighten the grub screws by ¼ turn increments until the looseness has been reduced to a minimum. Avoid overtightening of the grub screws, which will prevent the seat from horizontal movement altogether.

4. Seat cushion length adjustment. The operator can individually adjust the horizontal position of the base cushion, by first lifting this handle, moving the cushion forwards or rearwards, then releasing the handle in one of six positions provided.

5. Ride firmness adjustment. Push down on this button to increase the ride firmness, or conversely pull up on the button to decrease the ride firmness.

6. Combined height and weight adjustment. Push this knob in to raise the seat, or pull it outwards to lower the seat.

7. Rear cushion angle adjustment. Lift this handle and allow the rear cushion to spring forward, or lean back into the cushion to force it back. Release the handle at the desired position.

8. Lumbar adjustment. Rotate this control upwards to deploy increased lumbar support, or downwards to decrease applied lumbar support.

Do not attempt to adjust the seat or seat belt while the machine is moving. Loss of control may result. Stop the machine, apply the brakes, then carry out adjustments.

Seat Belt

The operator’s seat will be fitted with either a “three point harness” or a “retractable lap belt”. Both allow freedom of movement for proper manipulation of all controls. The instructor’s seat is fitted with a “retractable lap belt”.

To Fasten Three Point Harness:
Position belt over both shoulders and around waist and insert belt into buckle until an audible click is heard. Adjust the length of the belt as required using the adjusters. Ensure belt is secured.

To Unfasten Three Point Harness:
Press the red release button on the buckle.

To Fasten Lap Belt:
Pull belt from reel and position around waist and insert belt into seat buckle until an audible click is heard. Ensure the belt is secure. No external adjustment is required.

To Unfasten Lap Belt:
Press the red release button on the buckle. The belt will self retract into its reel.

The Trainer/instructor seat is NOT for continuous passenger
Always wear the seat belt when operating the machine.

Always check condition of seat belts and mounting hardware before operating the machine.

Any signs of looseness or wear should be reported to your Mainenance Department or Dealer for repair or replacement immediately.

Replace seat belts at least once every three years, regardless of appearance.

Do not attempt to adjust seat or seat belt while machine is moving. Loss of control may result. Stop machine; apply brakes; then adjust.
MACHINE CONTROLS

Braking
The dual circuit brake system is applied during normal operation by using the Service Brake Pedal or, in an emergency, by using the Parking/Emergency Brake Control.

A ‘Front Brake Accumulator’ warning light and a ‘Rear Brake Accumulator’ warning light are located on the instrument panel. If any of these lights illuminate during operation, stop the machine, apply the parking brake and do not operate until the fault is corrected.

Service Brake
This is a floor mounted pedal operated by the right foot. Depress the pedal as required by speed, load and road conditions to slow or stop the machine. Release the pedal as the machine slows until, when stopped, the pedal is depressed just enough to hold it stationary.

Park/Emergency Brake
Pushing the control in will apply the spring operated parking brakes within the rear brake assemblies and the service brakes at all wheels. The parking brake warning light on the instrument panel will illuminate when the control is pushed in. To release the brakes; turn the control clockwise and shift the transmission to "DRIVE" or "REVERSE".

**NOTICE**

The Parking/Emergency Brake Control should only be used to stop the machine in an emergency. For normal braking the service brake pedal should be employed. When stopped for loading or unloading the spotting brake control should be used.

Always apply the parking brake before leaving the operator’s seat.

Automatic Spotting Brake
Shifting the transmission to "NEUTRAL" when the machine is stopped will automatically apply the spring operated parking brakes and service brakes at the rear wheels to hold the machine stationary for loading or unloading. The parking brake warning light on the instrument panel will illuminate when the brakes are applied. To release the brakes, shift the transmission to "DRIVE" or "REVERSE".

**Note:** The automatic brake will apply automatically if the transmission is in "NEUTRAL" and the truck is travelling at less than 1 mile/hour. On Parking/Emergency brake application or engine shut down the Parking/Emergency brake will take priority and apply the front service brakes also.
Retarder

This control lever (1) is used to apply retardation to the truck. Retardation is the term used for applying a continuous braking force to hold the truck to a safe steady speed when descending grades.

The retarder is OFF when the lever is fully forward and is APPLIED as the lever is pulled back. Maximum retardation is obtained when the lever is in the fully back position. The retarder may be used anytime to slow down. If additional braking is required apply the service brakes. The retarder is not meant for bringing the machine to a halt, or for sudden deceleration - the service brakes should be employed for this purpose.

When the retarder is applied, the 'Retarder Indicator Light' on the instrument panel will illuminate and an orange coloured warning light at the rear of the truck will illuminate to warn following vehicles.

Retardation of this truck may be achieved by using the DISC BRAKE RETARDER or the TRANSMISSION RETARDER.

Machines fitted with Disc Brake and Transmission Retarders have a 'Retarder Selection Switch' (2). This selects which retarder will be employed when using the retarder control.
Pressed at top = Disc Brake, Pressed at bottom = Transmission.

The operator should select the correct gear range to match the site conditions. Application of the retarder gives the transmission enhanced retardation through 6th and 5th gears until 4th gear is attained.

Note: In order to obtain the maximum retardation and cooling effect during retardation, the engine speed should be maintained as high as possible without exceeding the maximum recommendation.

⚠️

Do not use the retarder for parking the vehicle. Only use the Parking/Emergency brake control for this purpose.
Retarder Operation
Before the machine crests the top of a grade and starts down, the operator should slow the machine with the service brakes and downshift to the gear range which would be used to ascend the grade. The retarder should be applied before starting the descent. Machine downgrade speed (with the retarder applied as required) in the gear range selected should be high enough to keep the engine operating at governed speed with the throttle closed (operator’s foot off the accelerator pedal). This will ensure maximum oil circulation and cooling. If the rate of descent is too slow, the transmission should be upshifted to the next highest gear range. If the rate of descent is too fast, the gear range selected is too high and the operator must slow the machine by using the service brakes, then downshift into a lower gear range which will allow a safe descent and efficient retarder operation.

⚠️ Great care should be used if applying the retarder when road surfaces are slippery. Retarder braking effect will occur only at the driving axle and could make vehicle control difficult.

Oil Temperature - Disc Brake
The disc brake hydraulic temperature warning light on the instrument panel will illuminate and an electric horn will sound if the oil flowing through the disc brake assemblies overheats. If alarm is activated, reduce downgrade travel speed. If the trouble persists, stop the machine and have the fault corrected.

Oil Temperature - Transmission
During normal operation the transmission oil temperature gauge should read in the green zone. However, during transmission retarder operation oil temperature can enter the yellow ‘RETARDER ON’ zone but should not enter the red zone. Do not allow the temperature to stay at or near the top of the yellow zone for more than 3 minutes. Reduce downgrade travel speed to avoid the oil overheating and possible damage to the transmission.
ENGINE

Accelerator
This is a floor mounted pedal operated by the right foot. Press the pedal down as required, to increase fuel flow to accelerate the engine.

NOTICE

Do not place the engine under full load at full speed immediately after starting. Always allow the engine to fully circulate lubricant and warm up gradually before operating at full speed and full load. Operate the engine at top rated speed when maximum power is needed for the load.
Steering
The steering wheel position can be adjusted as required for the most convenient operating position. To adjust, pull out adjustment lock and tilt steering wheel up or down as desired; release lever to lock adjustment.

The steering system provides full-time hydraulic power with a continuous running pump and a pressurized accumulator. The accumulator helps maintain a constant flow of hydraulic power to operate the steering cylinders.

To steer the front wheels, rotate the steering wheel in the desired direction to the required radius of turn. The front wheels will turn only as the steering wheel is turned and at a rate of turning directly proportional to steering wheel speed. The front wheels will stop and hold position when the steering wheel is stopped. To return the front wheels to the straight ahead position or to the opposite direction, turn the steering wheel in the opposite direction.

⚠️

In the event of loss of steering pump output pressure, a fully pressurized accumulator provides a maximum of two lock to lock turns of the front wheels. A red warning light on the instrument panel illuminates and a buzzer sounds when steering pressure falls below 83 bar (1200 lbf/in²). If this warning light illuminates, indicating a loss of steering power, the machine must be stopped immediately and no further operation attempted until the fault is corrected.

The accumulator slowly bleeds down after engine shut-off to prevent accidental steering. However, accumulator pressure should be dissipated after engine shut-off by turning the steering wheel in both directions to avoid accidental steering during bleed down.

Improper steering control unit repair or hose connections can cause sudden and forceful steering wheel movement when engine is started. Keep hands off steering wheel when starting engine.
Transmission
This machine is equipped with a CEC (Commercial Electronic Control) shift system, to operate the transmission. The CEC shift system continually monitors the transmission and shift system electrical components and warns the operator when a problem develops. It also takes action to prevent damage to the transmission, and provides the serviceman with diagnostic capabilities so that problems can be corrected quickly and easily.

| NOTICE | Before any welding is done on a machine equipped with a CEC shift system, disconnect battery equalizer ground cables, battery cables from terminal posts (ground cable first), battery equalizer positive cables and electrical connections at the ECU to avoid damage electrical components. Turn off ignition key switch to isolate batteries before disconnecting any components. |

In addition, CEC provides the following systems designed to protect the operator and mechanical components:

REVERSE INHIBIT
Prevents gear selection if engine is operating at more than 20% throttle.

HOIST INTERLOCK PRESSURE SWITCH
The ECU will shift the transmission from Reverse to Neutral if the body control lever is moved to the 'Raise' position. When this circuit has been activated, moving the transmission shift lever to Neutral, the re-selecting Reverse, will engage Reverse gear whilst the body is held in the 'Raise' position. This feature is only operational in the normal automatic driving mode, either power or economy. It is not activated during the manual mode.

| NOTICE | The standard procedure for raising the body must still be adhered to. |

BODY UP INTERLOCK
When the body is raised, the CEC system will only allow the transmission to operate in First gear. This feature is only operational in the normal automatic driving mode, either power or economy. It is not activated during the manual mode.

PARKING BRAKE INTERLOCK
If the parking brake control switch is applied while the transmission is in Neutral, the CEC system will prevent a shift out of Neutral to protect the brake components. If the parking brake control switch is applied while the transmission is in gear, the parking brake interlock will not function and normal shifts will occur.
LOCK-IN-GEAR
The lock-in-gear feature is designed to protect the transmission from damage should wheel spinning or lockup occur due to poor traction or panic braking. The ECU will delay making a shift for several seconds and then, if the condition fails to correct itself, locks in gear and prevents any further shifting. The Check Trans warning light will come on. If this occurs, the ECU must be reset before normal operation may be resumed.

To reset the ECU if the transmission has locked in gear because of wheel spinning or a panic stop, stop the machine, select 'Neutral', apply the parking brake control switch, and shut down the engine. Wait ten seconds, then restart the engine. Select 'Reverse', then 'Neutral'. The Check Trans warning light should go 'Off'.

COLD WEATHER STARTS
During cold weather starts, if the transmission temperature is below -24°C (-10°F) the Check Trans warning light will illuminate and the ECU will prevent the transmission from being shifted out of Neutral.

Between -24°C (-10°F) and -7°C (19°F) the light will go out and the ECU will only permit operation in First or Reverse gears. Above -7°C (19°F), normal operation will be permitted.
1. Electronic Control Unit (ECU)
Contains an electronic microcomputer. The ECU receives information in the form of electronic signals from the switches and sensors, processes the information, and sends electronic signals to the appropriate solenoids which control the transmission.

2. Electrical Control Box
Contains fuses and relays.

3. Gear Shift Selector
The shift selector is a remote mounted lever type. The gear shift selector is connected to the ECU by a wiring harness. The shift lever has 6 forward ranges and 1 reverse range, as well as a neutral position.

Do not allow the vehicle to coast in Neutral. This practice can result in severe transmission damage.

The shift selector has a single digit LED display, that during normal operation will display the gear selected (Not gear attained). Diagnostic information can be displayed on the single digit LED display by pressing the diagnostic display button. There is a hold override button that must be pressed when shifting between R, N and D. The hold override button is released when desired selector position is reached. The selector lever can move freely between D and the number ranges without pressing the hold override button.
The transmission provides six forward ranges, one reverse range and a neutral position. The transmission upshifts and downshifts automatically between first range and the highest range selected on the range selector in direct response to throttle position and transmission output speed.

When reverse range is selected the 'Reverse Alarm' sounds and the 'Reverse Light' illuminates at the rear of the truck. This feature warns personnel to the immediate rear of the truck that the operator has shifted the transmission to reverse.

When drive (D) is selected, the transmission automatically upshifts and downshifts through all six forward ranges as required by loads and travel speeds. Selecting a lower range (4th, 3rd etc.) limits the highest range to which the transmission will automatically upshift.

If a lower range is selected while moving forward, the transmission automatically downshifts sequentially to the selected lower range at maximum controlled engine speeds. Downshifts will not occur until machine is slowed by use of the service brakes and/or retarder.

When shifting from neutral to start from a standstill, or to reverse direction, decelerate the engine to idle speed. To move forward, select Drive (D) and accelerate the engine to the machine load and speed requirements. The transmission will automatically upshift from 1st through 6th ranges as travel speed increases.

With the throttle fully depressed, and the Mode Selection Switch in the 'POWER' position, the transmission upshifts to the next higher range when the engine attains maximum rated speed, since maximum power train output is needed under this condition. At lower throttle settings where minimum power train performance is required, the transmission will upshift to the next higher range at less than maximum rated engine speed.

Upgrades or soft spots might slow travel speed, even at full throttle, requiring transmission downshifts to maintain maximum powertrain performance. When this occurs, the transmission downshifts automatically.

Shift the transmission to the next lowest range if transmission 'Hunting' or 'Shift Cycling' occurs.

When temporarily stopped, such as for yielding the right-of-way to a loaded machine, the transmission can be left in the selected range and the machine held stationary with the service brakes.

When stopped for a more extended period with the engine left running, however, shift the transmission to Neutral to avoid unnecessary heat buildup, and apply the parking brake.

Always select neutral and apply the parking brake before leaving the operator's seat.
4. Mode Selection Switch
Gives the option to select between transmission ‘POWER’ and ‘ECONOMY’ shift schedules. The transmission must be in Neutral before the switch will function.

The transmission torque converter is equipped with a lockup clutch which, when engaged by the ECU, locks the converter pump and turbine together as a single unit and allows power to be transmitted mechanically from the engine directly to the transmission gearing on a 1 to 1 ratio. When the lockup clutch is disengaged, the torque converter acts as a fluid coupling, multiplying torque when engine speed is significantly higher than transmission output shaft speed.

When the Mode Selection Switch is in the ‘POWER’ position, the ECU controls operation of the lockup clutch according to signals received by the throttle position sensor (giving engine speed as a percent of throttle), the transmission output shaft speed sensor, and range selector. The ECU may delay application of the lockup clutch and allow torque multiplication by the torque converter to take place until a balance is achieved between engine speed and transmission output shaft speed before activating the lockup clutch.

Power versus Economy Mode
The POWER mode is designed for applications involving heavy loads and hilly duty cycles where performance rather than fuel economy is of prime importance.

The ECONOMY mode is designed for applications involving lighter loads and level duty cycles or where fuel economy is more important than performance.

In the ECONOMY mode, the ECU controls operation of the lockup clutch with a timed, preprogrammed schedule where in Second through Sixth gears the lockup clutch is disengaged only long enough to allow the torque converter’s fluid coupling to absorb shift shock. Otherwise, the lockup clutch is engaged and no torque multiplication takes place in Second through Sixth gears.

5. Manual Mode Switch
Allows the transmission operation to be changed from Automatic to Manual. When at the ‘ON’ position it is used to perform stall checks, clutch pressure checks and, if necessary, to move the machine to a repair area. The manual mode can only be used if the Mode Selection Switch is in the ‘POWER’ position and the transmission is in Neutral.

⚠️
Do not operate engine for more than 30 seconds at full throttle with transmission in gear and output stalled as this will result in severe overheat damage to the transmission.

⚠️
The manual mode is not intended to be used for normal operations. The machine should only be driven at very low speeds in first or reverse gears if the manual mode is activated, or damage to the transmission may result.
6. Manual Mode Warning Light
This light is located on the front face of the CEC-2 Interface Box. The warning light illuminates to alert the operator when the transmission has been switched to operate in the manual mode. The light should be 'Off' during normal operation.

7. Check Trans Warning Light
Illuminates to alert of a minor fault in the transmission shift system or abnormal transmission temperature. The warning light will come 'On' when the ignition keyswitch is turned to position '1' to provide a bulb and system check and should go 'Off' a few seconds after the engine is started and the transmission oil pressure rises.

The check trans warning light will come 'On' during operation if the ECU has detected a minor fault in an electrical component or abnormal transmission oil temperature. If transmission oil temperature is too high, stop the machine, select Neutral (N), and increase engine speed to allow a greater flow of oil to the oil cooler until oil temperature drops to normal operating range. In most cases, a minor fault triggering the check trans warning light will not prevent normal operation from continuing but, depending on the nature of the problem, the ECU could take action to protect the transmission from damage, such as preventing operation in high gear ranges. If the check trans warning light comes 'On', have the problem diagnosed and corrected at the earliest opportunity.

8. In-convertor Indicator Light
Illuminates when the transmission is in torque converter drive. It goes 'Off' when Lockup is engaged. In order to avoid unnecessary waste of fuel, if traffic or other road conditions permit, the operator should modify throttle position, or gear held to achieve a steady road speed with the torque converter lockup engaged (Indicator Light 'Off'). The Lockup relay in the interface box is also activated by the 20 bar (290 lbf/in²) pressure switch on the foot brake pedal. When this switch is activated the 'In- Converter' light will be illuminated due to the transmission dropping out of converter lock up, avoiding engine stall.

9. Digital Data Line
Located in the right hand side of the transmission control tower. Plug in connector for diagnostic data reader (DDR).

10. Engine Overspeed Light
Illuminates when the transmission ECU senses an engine speed above 2550 rev/min.
GENERAL TRANSMISSION OPERATION

Watch for wide deviations from normal readings on the transmission oil temperature gauge during machine operation. If the transmission oil temperature gauge, on vehicles which do not have a transmission retarder fitted, shows oil temperature consistently rising above the green zone (43 - 135° C; 100 - 275° F) under normal operating conditions; check for external causes. If none are evident shift to Neutral (N) and operate the engine at 1 200 - 1 500 rev/min. If the transmission oil temperature does not decrease into the green zone within 2 or 3 minutes, the cause of the overheating should be corrected before the machine is operated further. Watch the oil temperature gauge when operating on upgrades, also. If the oil temperature goes into the red zone (135 - 176° C; 275 - 350° F), select the range which will limit upshifts to the highest range in which the transmission will operate within the normal temperature range. If upshifting must be consistently limited to ranges lower than normal for the loads and the grades encountered to prevent overheating the transmission oil, the causes should be determined and corrected. On vehicles fitted with a transmission retarder, it is permissible to operate with the gauge showing in the yellow zone, during operation of the transmission retarder.

Retrieving Diagnostic Codes

Diagnostic fault codes can be retrieved from the CEC2 system using the gear shift selector or by plugging in the diagnostic data reader (DDR). To obtain diagnostic codes using the gear shift selector:

1. Check transmission warning light on dash will illuminate when ECU detects a fault.
2. Stop truck and select 'Neutral'.
3. Press diagnostic button (1) on gear shift selector. Display (2) on gear shift selector will flash one digit at a time.
4. Display starts with code position D1, D2, etc, followed by the two digit main code, then the two digit subcode.
5. To advance to the next code, press the mode button (3). Up to five codes can be stored.
6. Active codes are indicated by illumination of the mode light (4).

Clearing Diagnostic Codes

1. To clear active codes, press and hold mode button (3) for 3 to 5 seconds.
2. To clear inactive codes, press and hold mode button (3) for 8 to 10 seconds.
3. To exit diagnostic mode, press diagnostic button (1). Refer to table for diagnostic code description.
<table>
<thead>
<tr>
<th>Main Code</th>
<th>Sub Code</th>
<th>Description</th>
<th>Check Trans Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>12</td>
<td>ECU input voltage low</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>23</td>
<td>ECU input voltage high</td>
<td>Yes</td>
</tr>
<tr>
<td>21</td>
<td>12</td>
<td>Throttle sensor failed low</td>
<td>Yes</td>
</tr>
<tr>
<td>21</td>
<td>23</td>
<td>Throttle sensor failed high</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>14</td>
<td>Engine speed sensor</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>15</td>
<td>Turbine speed sensor</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>16</td>
<td>Output speed sensor</td>
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</tr>
<tr>
<td>23</td>
<td>12</td>
<td>Primary shift selector</td>
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<tr>
<td>23</td>
<td>14</td>
<td>Secondary shift selector</td>
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</tr>
<tr>
<td>23</td>
<td>15</td>
<td>Secondary shift selector mode function</td>
<td>No</td>
</tr>
<tr>
<td>23</td>
<td>16</td>
<td>Shift selector display line fault</td>
<td>Yes</td>
</tr>
<tr>
<td>24</td>
<td>12</td>
<td>Sump fluid temperature cold</td>
<td>Yes</td>
</tr>
<tr>
<td>24</td>
<td>23</td>
<td>Sump fluid temperature hot</td>
<td>Yes</td>
</tr>
<tr>
<td>25</td>
<td>11</td>
<td>Output speed sensor, zero speed, 1st</td>
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</tr>
<tr>
<td>25</td>
<td>22</td>
<td>Output speed sensor, zero speed, 2nd</td>
<td>Yes</td>
</tr>
<tr>
<td>25</td>
<td>33</td>
<td>Output speed sensor, zero speed, 3rd</td>
<td>Yes</td>
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<tr>
<td>25</td>
<td>44</td>
<td>Output speed sensor, zero speed, 4th</td>
<td>Yes</td>
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<tr>
<td>25</td>
<td>55</td>
<td>Output speed sensor, zero speed, 5th</td>
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<td>25</td>
<td>66</td>
<td>Output speed sensor, zero speed, 6th</td>
<td>Yes</td>
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<tr>
<td>25</td>
<td>77</td>
<td>Output speed sensor, zero speed, 7th</td>
<td>Yes</td>
</tr>
<tr>
<td>25</td>
<td>88</td>
<td>Output speed sensor, zero speed, 8th</td>
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</tr>
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<td>26</td>
<td>00</td>
<td>Throttle source not detected</td>
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</tr>
<tr>
<td>33</td>
<td>12</td>
<td>Sump fluid temperature sensor failed low</td>
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</tr>
<tr>
<td>33</td>
<td>23</td>
<td>Sump fluid temperature sensor failed high</td>
<td>Yes</td>
</tr>
<tr>
<td>34</td>
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<td>Factory calibration compatibility number wrong</td>
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<td>Factory calibration fault</td>
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<td>14</td>
<td>Power off fault</td>
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</tr>
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<td>15</td>
<td>Diagnostic queue fault</td>
<td>Yes</td>
</tr>
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<td>34</td>
<td>16</td>
<td>Real time fault</td>
<td>Yes</td>
</tr>
<tr>
<td>34</td>
<td>17</td>
<td>Customer modifiable constants fault</td>
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</tr>
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<td>35</td>
<td>00</td>
<td>Power interruption</td>
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</tr>
<tr>
<td>35</td>
<td>16</td>
<td>Real time write interruption</td>
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</tr>
<tr>
<td>36</td>
<td>00</td>
<td>Hardware/software not compatible</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>12</td>
<td>General solenoid failure - F</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>13</td>
<td>General solenoid failure - K</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>14</td>
<td>General solenoid failure - B</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>15</td>
<td>General solenoid failure - G</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>16</td>
<td>General solenoid failure - E</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>21</td>
<td>General solenoid failure - H/J</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>22</td>
<td>General solenoid failure - A</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>23</td>
<td>General solenoid failure - D</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>24</td>
<td>General solenoid failure - I</td>
<td>Yes</td>
</tr>
<tr>
<td>45</td>
<td>26</td>
<td>General solenoid failure - C</td>
<td>Yes</td>
</tr>
<tr>
<td>46</td>
<td>21</td>
<td>High-side overcurrent, H/J solenoid</td>
<td>Yes</td>
</tr>
<tr>
<td>46</td>
<td>26</td>
<td>High-side overcurrent, C, D, E solenoid</td>
<td>Yes</td>
</tr>
<tr>
<td>46</td>
<td>27</td>
<td>High-side overcurrent, A, B, F, G, I, K solenoid</td>
<td>Yes</td>
</tr>
<tr>
<td>56</td>
<td>11</td>
<td>Range verification ratio test, 1st</td>
<td>Yes</td>
</tr>
<tr>
<td>56</td>
<td>22</td>
<td>Range verification ratio test, 2nd</td>
<td>Yes</td>
</tr>
<tr>
<td>56</td>
<td>33</td>
<td>Range verification ratio test, 3rd</td>
<td>Yes</td>
</tr>
<tr>
<td>56</td>
<td>44</td>
<td>Range verification ratio test, 4th</td>
<td>Yes</td>
</tr>
<tr>
<td>56</td>
<td>55</td>
<td>Range verification ratio test, 5th</td>
<td>Yes</td>
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<tr>
<td>56</td>
<td>66</td>
<td>Range verification ratio test, 6th</td>
<td>Yes</td>
</tr>
<tr>
<td>56</td>
<td>77</td>
<td>Range verification ratio test, R1 or 7th</td>
<td>Yes</td>
</tr>
<tr>
<td>56</td>
<td>88</td>
<td>Range verification ratio test, R2 or 8th</td>
<td>Yes</td>
</tr>
<tr>
<td>65</td>
<td>00</td>
<td>Engine rating too high</td>
<td>Yes</td>
</tr>
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<td>66</td>
<td>00</td>
<td>Serial communications interface</td>
<td>No</td>
</tr>
<tr>
<td>69</td>
<td>27</td>
<td>ECU, inoperative A, B, F, G, I, K solenoid</td>
<td>Yes</td>
</tr>
<tr>
<td>69</td>
<td>28</td>
<td>ECU, inoperative H/J solenoid</td>
<td>Yes</td>
</tr>
<tr>
<td>69</td>
<td>29</td>
<td>ECU, inoperative C, D, E solenoid</td>
<td>Yes</td>
</tr>
<tr>
<td>69</td>
<td>33</td>
<td>ECU, COP fault</td>
<td>Yes</td>
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<td>69</td>
<td>34</td>
<td>ECU, EEPROM fault</td>
<td>Yes</td>
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<td>69</td>
<td>35</td>
<td>ECU, EEPROM fault</td>
<td>Yes</td>
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<tr>
<td>69</td>
<td>42</td>
<td>SPI output failure</td>
<td>No</td>
</tr>
<tr>
<td>69</td>
<td>43</td>
<td>SPI input failure</td>
<td>Yes</td>
</tr>
</tbody>
</table>
BODY CONTROL

The lever to the left of the operator’s seat controls the hydraulic valve which operates the body hoist cylinders. The four operating positions of the lever from front to rear are as follows:

'LOWER' - This position provides hydraulic force to power-down the body. It is needed when the body cannot be started downward from the fully raised position by gravity. When the body starts lowering by gravity, the lever should be moved to the 'FLOAT' position.

'FLOAT' - The lever should be moved to this position while the body is lowering by gravity and should remain in this position until the body must be operated again. The control lever should always be kept in 'FLOAT' while the machine is in motion.

'HOLD' - Moving the lever to this position while the body is being raised or lowered traps the oil in the body hoist cylinders to stop and hold the body at any desired height. The lever will remain in the detented 'HOLD' position when released.

'RAISE' - This position directs oil to extend the body hoist cylinders and raise the body. When released, the lever will be spring-returned to the 'HOLD' position.

Pressurized system. Before carrying out any maintenance on the body control system, pressure must be dissipated from the pilot valve accumulator. Shut-off the engine and operate the body control lever in both directions approximately 15 times to discharge the accumulator.

Raising the Body

Before raising the body, allow the engine to slow to idle, make sure the rear wheels are on firm level ground, shift the transmission to Neutral and hold the machine stationary by applying the brakes with the spotting brake control.

Move the body control lever all the way back to the 'RAISE' position and accelerate the engine. The body can be stopped at any point by moving the lever to 'HOLD'. Decelerate the engine as the last stages of the body hoists begin to extend to slow the raising speed as the body hoists cylinder approach their maximum extensions.

When the body has been raised to the desired height, move the control lever to the 'HOLD' position until the body is to be lowered.

Lowering the Body

To lower the body, move the control lever to the 'FLOAT' position to allow the body's weight to lower it to the frame. Body descent can be stopped at any position by moving the lever back to the 'HOLD' position. If the body does not begin to lower by its own weight, such as after dumping downgrade, move the control lever all the way forward to the 'LOWER' position and power the body downward until it begins lowering by gravity. Then move the lever to 'FLOAT' to allow the body to lower the rest of the way to the chassis.

Make sure that the body is completely lowered and the control lever is in 'FLOAT' before releasing the brakes and moving the machine.
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4 - Operating the Truck
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OPERATING THE TRUCK

Pre-Starting Inspection

* Make sure all safety signs are free of damage, and are fully readable, replace as necessary.

* Before the engine is started ensure the machine is ready for operation.

* The machine should be in a level position to permit accurate checking of fluid quantities in the engine and other components.

* Make sure parking brake is applied and block wheels securely to prevent accidental movement of the machine while checking component levels.

* Test all lights, warning signals, controls and instruments for proper operation.

* Walk around the machine and carry out the Inspections and Component Checks described in the drawing and on the following pages.

[Diagram of the truck showing various components and their inspection points]

ENGINE
Check oil level. Check for leaks.
FRONT RIDE CYLINDERS
Check for debris, leaks and damage.
WHEELS AND TYRES
Check condition, inflation, nuts and for damaged rims.
RADIATOR HEADER TANK
Check coolant level.
STEERING CYLINDERS
Check for debris, leaks and damage. Check lines for wear and leaks.
FUEL TANK
Check fuel level. Ensure fuel tank is full.
BODY CYLINDERS
Check for debris, leaks and damage. Check lines for wear and leaks.
DIFFERENTIAL
Check for leaks.
REAR RIDE CYLINDERS
Check for debris, leaks and damage.
COMPONENT CHECKS

1. Engine
With the engine off, check oil level. The oil level should be between the lower and upper marks on the dipstick. Add oil if low.

2. Fuel Pre-filters
Drain sediment and water from fuel pre-filters until fuel runs clear.

3. Radiator Header Tank
Check coolant level. Add if low.

⚠️ SCALDING HAZARD
Press button in centre of cap to bleed pressure before removing cap completely. Fill to bottom of filler neck.

NOTICE
In subfreezing temperatures, be sure that the coolant contains sufficient antifreeze.

4. Air Cleaner Vacuator Valve(s)
Check for proper operation. Clean if required.

5. Tyres
Carefully inspect all tyres for cuts, bruises, or other damage and proper inflation for the loads to be carried. Inflate all tyres to the recommended pressure while cold.
6. Fuel Level Gauge
Check fuel level. Tank should be filled at end of each shift to prevent condensation.

7. Body and Disc Brake Cooling Hydraulic Tank - Cold Oil Level
With the body fully lowered, the oil should be showing between the upper and lower lines on the sight gauge (on tanks with two sight gauges, the bottom gauge should show full). Add fluid, if low.

8. Steering and Braking Hydraulic Tank - Cold Oil Level
With the engine off, turn the steering left and right to discharge the steering accumulator. Operate the service brake continuously to discharge the brake accumulators. Oil should be showing between the upper and lower lines on the top sight gauge (on tanks with three sight gauges, oil should be showing in the middle gauge). Add fluid, if low.

9. Transmission - Cold Oil Level
This check is made only to determine if the transmission contains sufficient oil for safe starting. Make sure there is some oil showing on the sight gauge before starting the engine. Add oil if low.

10. Seat and Seat Belts
Adjust the seat position and lap belt as required to allow complete machine control at all times with minimum fatigue. Make sure the seat belt does not restrict movement for proper machine operation.
SUSPENSION RIDE STRUTS

Suspension ride struts are oiled and charged with nitrogen to ensure optimum ride comfort. However, ride struts may have been lowered during transportation of the machine. These struts must be correctly set prior to operating the machine.

The ride struts contain a mixture of nitrogen and oil, so when the struts are lowered, some oil will be lost along with the nitrogen. Although only a small amount of oil may be lost, this will still affect the final ride height, so it is important that ride struts contain the correct volume of oil.

To recharge the ride struts, nitrogen pressures are given in the table below. These pressures are dependant on oil levels being correct, refer to Section 180, SUSPENSION SYSTEM in the Maintenance Manual. Use suitable lifting equipment to fully extend ride struts and charge with nitrogen.

**Note:** The heights given are intended as reference only, cylinders should always be set according to pressure. Refer to Section 180, SUSPENSION SYSTEM in the Maintenance Manual for full details.

<table>
<thead>
<tr>
<th>Truck</th>
<th>TR35</th>
<th>TR40</th>
<th>TR45</th>
<th>TR60</th>
<th>TR70</th>
<th>TR100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Ride Struts - bar (lbf/in²)</td>
<td>11.7 (170)</td>
<td>13.8 (200)</td>
<td>13.8 (200)</td>
<td>13.8 (200)</td>
<td>17.2 (250)</td>
<td>16.3 (240)</td>
</tr>
<tr>
<td>Height - mm (in)</td>
<td>143 (5.6)</td>
<td>168 (6.6)</td>
<td>168 (6.6)</td>
<td>168 (6.6)</td>
<td>158 (6.2)</td>
<td>158 (6.2)</td>
</tr>
<tr>
<td>Rear Ride Struts - bar (lbf/in²)</td>
<td>5.5 (80)</td>
<td>7 (100)</td>
<td>7 (100)</td>
<td>8.3 (120)</td>
<td>8.3 (120)</td>
<td>8.3 (120)</td>
</tr>
<tr>
<td>Height - mm (in)</td>
<td>365 (14.4)</td>
<td>556 (21.9)</td>
<td>556 (21.9)</td>
<td>505 (19.9)</td>
<td>378 (14.9)</td>
<td>381 (15)</td>
</tr>
</tbody>
</table>

**Note:** It is advised to charge the ride struts by an additional 1.4 bar (20 lbf/in²) to allow for pressure lost while carrying out pressure checks. After recharging, the machine should be operated to allow ride struts to settle. Then if ride heights are incorrect, the oil levels should be checked.
ENGINE OPERATION

**NOTICE**

Do not place engine under FULL LOAD at FULL SPEED IMMEDIATELY after starting. ALWAYS allow the engine to fully circulate lubricate and warm up gradually before operating at full speed and full load.

Operate engine at top rated speed when maximum power is needed for the load. Operation of the engine below top rated speed can occur during gear shifting due to the difference of ratios between transmission gears, but engine operation MUST NOT be sustained more than 30 seconds at full throttle below top rated speed.

NEVER idle the engine more than 5 minutes at a time; shut it off.

If any gauge operates outwith its normal operating range or a warning light illuminates, shut engine down immediately and report to service or maintenance personnel.

**NOTICE**

Never start the engine indoors unless proper exhaust ventilation is provided to remove deadly exhaust gases. Once the engine is running, move the machine outdoors as soon as possible. Exhaust gases are hazardous and can cause unconsciousness and death.

Operating the engine beyond high idle speed can cause severe engine damage. The engine speed must not exceed 2 400 rev/min under any circumstances. When descending a steep grade, use a combination of transmission gears, retarder and service brakes to control the vehicle and engine speed.
Operating the Truck

STARTING THE ENGINE

Attention to the warning lights and instruments when starting the engine, and operating, will help the operator monitor the machine systems and components.

1. Make sure the parking/emergency brake control is in the 'PARK' position.

2. Insert switch key and turn clockwise to position '1'.

3. Make sure the body control lever is in the 'FLOAT' position.

4. Make sure the transmission shift selector is in the 'NEUTRAL' position.

5. Press horn control to sound horn.

**NOTICE**

Always sound horn before starting engine or operating any control.

6. Turn key switch to position '2' to switch on the ignition. Press warning light test switch to test operation of warning lights.

7. Turn key further clockwise against spring pressure to position '3' to initiate the
starting sequence. The engine pre-lube motor will run until engine oil pressure of 0.35 - 0.48 bar (5 - 7 lbf/in²) is achieved. This will normally take between 8 - 15 seconds, but can take up to 45 seconds in cold climates or with dry filters. After an interval of 3 seconds, the pre-lube motor stops and the engine starter motors engage. Release the key as soon as the engine starts firing.

**NOTICE**

Never crank the engine more than 30 seconds continuously. Allow starter(s) at least 2 minutes cooling time between cranking periods to avoid overheating.

8. Check the engine oil pressure gauge. Within 10 to 15 seconds at engine idle, the gauge needle should rise into the yellow zone. If the needle does not rise within 15 seconds, shut off the engine and do not operate until the fault is identified and corrected.

9. Observe the engine water temperature gauge. After a few minutes running time at moderate load and varying speed, the gauge needle should be in the green zone. If the needle moves into the red zone, the engine is over heated and should be shut down immediately.
STARTING THE ENGINE AT LOW AMBIENT TEMPERATURES (Below 0 °C (32 °F))

Follow steps 1 through 5 for ‘Starting the engine’ as described on page 4-8 then proceed as follows:

1. Fill starting aid reservoir if required. To fill, raise the cover of the reservoir and push the filler can, head downwards, firmly over the filler valve of the reservoir. Fill the transparent reservoir up to, but not over the 'MAXI' mark.

2. Turn key switch clockwise to position ‘2’. Press warning light test switch to test operation of warning lights. Turn key further clockwise against spring pressure to position ‘3’ to crank the engine. When cranking has commenced, operate the starting pilot pump. When the engine starts and runs, release starter key and stop pumping. If necessary, further short applications can be made in order to keep the engine running.

DO NOT use excessive starting fluid during starting or after the engine is running.

3. Follow normal starting procedures but limit engine speed to 1 200 rev/min and run for two to five minutes, depending on the temperature. Before moving, operate the body control lever to raise and lower the body with no load. Turn the steering wheel from lock to lock then straight ahead. These actions will circulate warm oil throughout the hydraulic systems.

Starting fluid is poisonous and flammable. Breathing vapours or repeated contact with skin can cause personal injury. Use only in well ventilated areas. Use with care to avoid fires. Do not smoke when changing cylinders. Do not store cylinders in the operators compartment, living areas, in direct sunlight or at temperatures above 49° C (102° F). Discard cylinders properly. Do not puncture or burn cylinders. Keep cylinders out of the reach of unauthorized personnel.

STARTING THE ENGINE WITH JUMPER CABLES

Batteries contain sulfuric acid and can emit hydrogen gas. Check for required voltage and polarity connections to discharged batteries.

Excessive booster voltage and/or incorrect jumper cable connections, open flames, lighted cigars, or other ignition sources can cause battery explosion/fire. Do not lean over batteries, and always wear safety glasses, face shield, safety gloves, and any other appropriate safety equipment when working with or near battery.

Do not jump start a vehicle by using arc welding equipment. Currents and voltages are dangerously high and cannot be sufficiently reduced to make the method safe.
Operating the Truck

1. Transmission - Hot Oil Level
   The parking brake must be applied and the road wheels securely blocked while carrying out this check. With the engine idling, transmission in 'NEUTRAL' and at normal operating temperature, the top of the oil column should be visible in the sight gauge. Add oil if low. If the top of the column is above the sight gauge, the transmission is overfull and oil should be drained.

2. Body and Disc Brake Cooling Hydraulic Tank - Hot Oil Level
   Operate the body hoist cylinders to their fully-extended positions to charge all cylinders and lines then lower the body. With the engine running, and body fully lowered, the oil level should be shown between upper and lower lines on the site gauge (on the tanks with two sight gauges, the bottom gauge should show full). Add fluid if low.

3. Steering and Braking Hydraulic Tank - Hot Oil Level
   With the engine running, oil at operating temperature and accumulators charged, oil must be between the bottom and top sight gauges. Shut down the engine and operate the steering left and right to discharge steering accumulator. Operate the service brake continuously to discharge the brake accumulators. Oil should be showing between the upper and lower lines on the top sight gauge (on the tanks with three sight gauges, oil should be showing in the top gauge). Add fluid if low.

NOTICE

Be sure machines are not touching each other. Use cables that are equal to cable size on the machine, for example (1/0) or (2/0).

If jumper cables are used to start an engine, be sure to follow this procedure:

Connect one end of a jumper cable, usually coloured red, to the discharged battery ‘POSITIVE’ (+) post. Connect the other end of the same cable to the ‘POSITIVE’ (+) post on the booster or charged battery.

Connect one end of the second cable, usually coloured black, to the ‘NEGATIVE’ (-) post of the booster battery. Connect the other end of the ‘NEGATIVE’ (-) cable to machine frame for grounding so that if a spark occurs, it is away from battery fumes (explosive hydrogen).

Check for cause of failure of the dead battery.

PRE-OPERATING CHECKS

Make sure all cab glass, mirrors and lights are clean. Test all controls to ensure they are functioning properly. Select 'REVERSE' momentarily on the transmission shift selector to make sure the reverse alarm sounds.
BRAKE FUNCTION CHECKS

In addition to the above checks, the following brake function checks can be carried out to determine if both the service and emergency brake systems are functional before operating the machine.

⚠️ Make sure the area around the machine is clear of personnel and obstructions before carrying out these checks.
If the machine moves during these checks, stop the machine, apply the parking brake and do not operate until the fault is corrected.

Note: The following checks are NOT intended to measure maximum brake holding ability. If NEW brake pads are fitted, they MUST be burnished as per the manufacturers recommendations before carrying out the checks.

Service Brake Holding Ability Check

Depress the service brake pedal and select 1st gear on the transmission shift selector. Pull the parking/emergency brake control out to release the brakes. Depress accelerator control and accelerate engine to 1350 rev/min. The machine should not move. Decelerate engine, shift transmission to ‘NEUTRAL’ and apply the parking brake control switch before releasing the service brake.

Emergency Brake Holding Ability Check

Depress the service brake pedal, release the parking/emergency brakes, select first gear, apply the park/emergency brakes and release the service brake pedal. Depress accelerator control and accelerate engine to 1350 rev/min. The machine should not move. Decelerate engine and shift transmission to ‘NEUTRAL’.

Note: Brake holding effort required to hold a machine static at a specific engine speed, can vary from machine to machine due to differences in engine performance, powertrain efficiency, etc., as well as differences in brake holding ability.

Note: As an indication of system deterioration, the engine speed at which point the machine moved, with the service or emergency brakes applied, can be compared against the engine speed your machine was able to hold to on a previous check.
DRIVING AND STOPPING

Before driving off observe all instruments and warning lights. All instruments should operate in their normal range and all warning lights should be out except possibly the Direction Indicator and Headlight Main Beam warning lights.

Make sure the area around the machine is clear of personnel and obstructions before driving off.

In the first few minutes of travel, check carefully for the required steering, braking, engine and transmission power response for maximum operating safety.

1. Make sure the body is fully down and body control lever is in the 'FLOAT' position.

2. Apply the service brake and release the parking brake.

3. Select the driving direction and the required range.

4. Sound horn; two blasts for forward and three blasts for reverse.

5. Release the service brake, apply the accelerator and move off.
Operating the Truck

6. To stop the machine release the accelerator and depress the service brake pedal. Release the service brake as the machine slows until, when stopped, the pedal is depressed just enough to hold the machine stationary.

7. When the machine has stopped, shift the transmission to Neutral, apply the parking brake and release the service brake.

8. If the service brake does not stop the machine. Apply the parking/emergency brake. This should only be applied to stop the machine in an emergency.

There is no mechanical connection between the engine and wheels on machines with converter transmissions. The parking brake must always be applied when the engine is switched off.

STOPPING THE ENGINE

1. Make sure the parking/emergency brake control is in the ‘PARK’ position.

2. Make sure the transmission is in ‘NEUTRAL’.
3. Allow the engine to idle 3 - 5 minutes after a full load operation before shutting it off. This allows the engine to cool gradually and uniformly.

4. Turn the steering wheel in both directions to dissipate the pressure in the steering accumulator to prevent accidental steering during bleed down.

5. Make sure the body control lever is in the ‘FLOAT’ position.

6. To stop the engine, turn the ignition key switch to position ‘1’.

7. Turn the ignition key switch to the ‘OFF’ position (‘0’).
PARKING

When parking the machine overnight, or for an extended period, the following procedure in addition to that given in 'Stopping the Engine' will help maintain it in good condition for subsequent use:

1. Fill the fuel tank completely, to prevent condensation. If security kit is supplied, keep it locked.

2. Always park the machine on level ground where possible. If the machine must be parked on a grade, position the machine at right angles to the grade and block the wheels securely.

3. If below freezing temperatures are expected, make sure the cooling system has sufficient anti-freeze to prevent the coolant freezing. If anti-freeze cannot be added to the cooling system, drain the cooling system completely.

4. Check all tyres, hoses, wiring, tubing and fittings for cuts, ply separation, abrasion, fraying, or other damage or deterioration. Inspect for structural damage to the cab, body and chassis. Attach warning signs to the steering wheel or to a control to alert others if lubricant has been drained, batteries removed, etc.
5 - Working the Truck
WORKING THE TRUCK

Off-highway trucks are used on a variety of hauling jobs, from mine overburden removal to dam building. Every truck operation, regardless of the type of job, can be divided into four phases; loading, hauling, dumping and the empty return.

**Note:** After coming to a stop for loading or unloading the truck, shifting the transmission to "NEUTRAL" will hold the brakes in the applied positions.

### Loading

The most common methods of loading trucks are with hydraulic excavators, rope shovels, and front end loaders. For maximum material movement, the truck operator must help the loading machine operator hold loading time to a minimum. The fewer manoeuvres the truck must make to get into loading position, the sooner loading can start. And the shorter the distance the loading unit bucket must travel between the cut, or stockpile and the truck body, the more passes it can make in a given period of time and the quicker the truck can be loaded.

Ideally, the hydraulic excavator or rope shovel should require 90° or less swing to dump into the truck body for best loading efficiency. Required turning and backing to position the truck for loading should be held to a minimum. A common loading method is to have trucks travel a semicircle in the loading area. This method eliminates all backing. Waiting machines should stay about two truck-lengths behind the one being loaded to avoid any spillage from the loading machine bucket or truck body. The operator of the waiting truck is also better able to judge the best spot for his truck when it is his turn to be loaded.

On some jobs, the loading machine might work most efficiently when trucks are positioned on both sides of the loader. Thus, while one truck is being loaded, another can move into position on the opposite side of the loader and the loading machine can swing over to load the next truck with a minimum of lost time. Since the truck is usually backed into the loading position with this method, the operator must be alert and careful while backing.

For fastest, most accurate loading when being loaded by a front end loader, the truck operator should spot his machine on the most level area and at an angle to the face of the bank or stockpile. This minimizes loader travel time, particularly with a raised, full bucket. Where possible, the truck should also locate downwind of the loader when dusty-type material is being loaded on a windy day. This practice improves both working conditions and visibility for the loader operator. A cleanup dozer or small loader is often working in conjunction with the main loading machine to keep the area clear of bucket spillage for maximum efficiency of the loading operation. The truck operator must always be alert to the position of the cleanup machine when entering the loading area to avoid congestion, and for maximum safety.
Working the Truck

The following precautions should be observed when approaching the loading area and while being loaded:

Avoid rocks and other shovel spillage that can needlessly damage tyres or other truck components. Allow the cleanup machine sufficient time to clear up such debris.

Do not move the truck into loading position with the shovel bucket swinging overhead. Large rocks that might fall from the bucket can be dangerous to both the truck and operator.

Keep your head and arms inside the cab during loading to avoid the danger of falling rocks or other shovel spillage.

When the loader operator signals that the truck is loaded, sound two blasts on the horn, release the brakes and shift the transmission to drive (D). Move out of the loading area and onto the haul road with the least possible delay to allow any waiting truck to move into the loading position as soon as possible.
Working the Truck

Hauling

While travelling the haul road, always maintain a safe speed for the haul road conditions and grades. Never allow the machine to move or coast with the transmission in 'NEUTRAL'!

When approaching downgrades, select the proper transmission range and use the retarder and service brakes as required to maintain safe descent speed without over-speeding the engine or gaining excess travel speed. Generally, the transmission range required for ascending is also correct for descending a grade.

Always remain a safe distance behind the machine ahead, particularly on downgrades. A good rule-of-thumb to follow is to allow two (2) truck-lengths between machines for each 15 km/h (10 mile/h) of travel speed under normal operating conditions. Under adverse conditions, allow more room for safe operation. On jobs on which minimum distance between machines is specified for the haul road, be sure to observe the regulations at all times. Such regulations would be established for the safety of everyone on the job.

Pay attention to haul road conditions to avoid rocks, holes, or other obstacles. Such obstacles not only present hazards to safe operation, but can needlessly damage tyres and suspensions if not avoided.

Be sure to reduce speed and come to a full stop, as required, at intersections, rail-roads, public highways etc. Where a 'FLAGMAN' is stationed to direct traffic, always stay alert and follow his directions.
Working the Truck

Dumping

The dumping operation usually depends upon the type of material being hauled. For instance, overburden and other waste material is usually dumped over a spoil bank or piled into large mounds. The dumping on a job of this type might be controlled by a dump 'SPOTTER', 'FLAGMAN' or 'BANKSMAN' or second person who directs the truck to its dumping area. The 'SPOTTER' is needed due to the limited rear visibility the operator has with a loaded truck of this size. While backing to dump, the operator must watch the 'SPOTTER' at all times and follow his direction. Under no circumstances should the operator leave his seat to gain better visibility while backing. Always remain seated to maintain maximum machine control.

Mineral ores, blasted rock etc., are usually dumped into a hopper or crusher where it is processed before shipment. When dumping into a hopper, the operator, in order to avoid excess wear on the tyres, must avoid hitting the protecting rail at the hopper. If a DRIVEOVER HOPPER is used, the operator must avoid rubbing the tyre inner sidewalls.

When hauling dirt or rock from a borrow pit into a fill area such as an earth-fill dam, the load is usually dumped in a string with other loads and the loads smoothed out with a crawler tractor. When dumping on a fill of this type, the operator usually works alone and picks his own dumping place. To save bulldozer work and cleaning up, the load should be dumped as close as possible to the preceding load. The operator should pull past the preceding load, turn in line with the string and back his truck until it is within a few feet of the last load. This assures that the load will fall in the right place.

No matter what kind of job the operator is working, there are a few things which are common to all jobs and which the operator should observe -

⚠️ When dumping over a spoil bank without a 'SPOTTER', know how close the machine can safely approach the edge under all weather conditions. If in doubt as to dumping safety, dump the load a safe distance from the edge so that it can be pushed over the edge later.

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2049 Watch Spotter
2050 Never Leave Seat
2051 Watch Inside Duals
2052 Keep Wheels Level
Before raising the body, make sure the rear wheels are on firm level ground. If one wheel is higher than the other, a twisting strain is imposed upon the body hinge pins, hoists and chassis. Stop the machine, allow the engine to slow to idle, shift the transmission to 'NEUTRAL' and apply the brakes with the Spotting Brake control to hold the machine stationary.

Push the body control lever back into the 'RAISE' position and accelerate the engine. Decelerate the engine to slow the raising speed as the body hoist cylinders approach their maximum extension. When the body has been raised to the desired height, release the control lever into the 'HOLD' position until the body is to be lowered. Do not hold the lever in the 'RAISE' position when the body hoist cylinders are fully extended to prevent unnecessary hydraulic system relief valve operation.

**NOTICE**

NEVER 'JUMP DUMP' the machine by bouncing the rear tyres against a stop block, or otherwise jarring the body in its raised position to dislodge stuck or frozen material. The tremendous loads that this practice develops on the body pin area, chassis and hydraulic system can cause needless, extensive stresses.

Once the load has been dumped, push the control lever down into the 'FLOAT' position to allow the body's weight to lower it to the chassis. If the body does not begin to lower by its weight, push the control lever down into the 'LOWER' position and power the body down until it begins to lower by gravity. Then release the control lever into the 'FLOAT' position.

**Empty Return**

Make sure the body is completely lowered, the body control lever is in the 'FLOAT' position, and the transmission is shifted to the correct range before releasing the brakes and moving away from the dump site.

**DO NOT drive the truck with the body up. Apart from affecting the stability of the truck, there can be severe danger from contacting overhead electric cables, trees, or bridges over the haul route.**

Except for the above, the procedure for returning empty to the loading area is the same as that given earlier for 'HAULING'.
6 - Roading
**ROADING**

⚠️

These machines are equipped with cylinders containing compressed nitrogen gas. Transportation of these machines by any method may require a special permit from the appropriate authority of the country involved. Consult your Dealer for details.

**General**

'ROADING' (operating a truck over public highways) requires special care and attention. Trucks, because of their large size, are slower and less manoeuvrable than most other vehicles encountered on the road. Yet, while on the road, they must be operated for extended periods of time at or near maximum speeds.

Before 'ROADING' a truck for an extended distance between jobs, or between widely scattered sections of a job, the machine must be properly equipped and in good condition. It is also recommended to carry a 'Warning Triangle'.

The operator must use extra care while on the public highways and remain constantly alert, especially for overhead cables and low bridges.

Necessary permits must be obtained from the proper authorities before the machine is 'ROADED' on public highways.

**PREPARATION PRIOR TO ROADING**

**Lubrication**

Thoroughly lubricate and service all components and systems as described under 'LUBRICATION AND SERVICING' in this handbook and/or Maintenance Manual for this machine.

**Inspection**

Perform all pre-starting and post-starting checks described in this Handbook. Pay particular attention to the function of all instruments and lights, and make any repairs necessary.

**NOTICE**

Improper tyre inflation during over-the-road operation can cause rapid tyre deterioration by overheating. Tyre pressures increase with heat. Always check pressures while tyre is cold. Consult your tyre dealer for proper pressures and tyre speed limits for roading.

Check the inflation pressures of all tyres, while cold, with an accurate tyre pressure gauge. Inflate tyres if necessary, while cold, to the recommended pressure for 'ROADING'. Inspect all tyres thoroughly and carefully for stones or other debris embedded in the treads or carcasses. Inspect for cuts, bruises, burned beads, abnormal wear and damaged wheels rims. Replace any damaged or excessively worn tyres.

Check all hoses, drain cocks, fuel level check cocks, and other potential sources of leaks. Make sure that all leaks are repaired and that all drain cocks are sufficiently tightened to avoid subsequent loosening. Make sure that all warning flags, oversize load signs, etc. are in place and secure.
Clean all glass and adjust the seat for proper operation of all controls.

Check all lights and other controls for proper operation.

Make sure the truck body is empty, fully lowered and the body control lever is in the ‘FLOAT’ position.

**Note:** Make sure the body control lever is in the ‘FLOAT’ position. Failure to comply to this caution could result in overheating the hydraulic oil and failure of the hydraulic system components.

**In Case of Trouble**
If trouble develops en route, move machine off the road at the first safe parking place, and shut off the engine. Carefully note as many of the symptoms of the trouble as possible, such as rough engine operation with loss of power and overheating, or, loss of speed and transmission clutch pressure with normal engine operation etc..

If the area in which the trouble occurs requires that the machine be left unattended while the trouble is reported by phone, disconnect a battery cable and apply security locks, if so equipped, before leaving the parked machine. Make sure body is completely lowered and the parking brake is applied.

Report the following data as soon as possible.

1. Exact location.
2. Destination.
3. The nature of the trouble (with as many details as possible) and the time and conditions under which it happened.
4. The telephone number at which the machine operator can be reached.

**NOTICE**

Do not attempt to restart or operate the machine unless instructed to do so. An engine, pump, transmission or other component that develops a minor defect can be completely destroyed in just a few extra minutes of unnecessary operation.
7 - Moving a Disabled Truck
MOVING DISABLED TRUCK

Any unusual power train noises noted while operating the truck should be reported to those responsible for maintenance. Should the power train, hydraulic or electrical systems fail, the machine should be stopped and shut down immediately until suitable repairs can be made. If the failure is in the power train and the truck must be moved to a service area or workshop to make required repairs, remove the drive flange covers from the drive wheels and pull the axle shafts and final drive planetary sun gears from the planetary assemblies. This will prevent any possible additional damage, which may be caused by the drive wheels turning the power train as the machine is towed. Replace the covers on the drive wheels to retain lubricant and prevent entry of dirt.

If possible, start the engine to provide the required hydraulic pressure for steering and braking. Never allow riders on a machine being towed without sufficient hydraulic pressure for safe steering and braking.

If the nature of the trouble prevents engine operation, repairs must be made on the site of the breakdown, or special arrangements made for towing the machine safely to the repair area without steering and braking power.

If the parking brake must be released, but the engine cannot be operated to provide the required hydraulic power needed to release the brake, refer to the machine Maintenance Manual 165-0030, for parking brake release with auxiliary hydraulic power source. See WARNING above.

Connect a suitable towing bar to one of the lugs on the front bumper of the disabled machine and reverse another machine, in a straight and in-line manoeuvre, towards the disabled machine. Connect the opposite end of the towing bar to the towing point on the rear axle of the recovery machine and ensure that it is securely locked.

Note: An alternative method of towing a disabled machine is by connecting an A-Frame arrangement to the lugs on the front bumper of the disabled machine and the towing point of the recovery machine.

- Uncontrolled machine movement hazard. There is no mechanical connection between the machine wheels and the engine when the parking brake is released. Before releasing the parking brake, make sure the machine wheels are secured with chock-blocks to prevent or restrict unexpected machine movement. When moving the machine with insufficient hydraulic pressure and power for safe steering and braking, use extreme caution to ensure personnel and property safety.

- If using a chain or cable, be sure it is strong enough for the expected load and properly secured. When pulling, take up the slack slowly to avoid jerking. A chain or cable which fails under load can cause serious injury. Stand clear. Do not pull through a kinked chain or cable. Do not pull or tow unless the operator’s compartment is guarded against or out of reach of a whipping chain or cable. Attach only to the towing points. Failure to follow these instructions could cause serious injury or death.

- Never allow riders on a vehicle being towed without sufficient hydraulic pressure for safe braking.
8 - Lubrication and Servicing
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**SAFETY PRECAUTIONS**

Do not allow unauthorized personnel to service or maintain this machine. Study the Operator’s Handbook and Maintenance Manual before starting, operating or servicing this machine. Always follow procedures and safety precautions detailed in the Maintenance Manual.

Always attach a ‘DO NOT OPERATE’ or similar warning sign to ignition switch or a control before cleaning, lubricating or servicing the machine.

Never allow anyone to work on the machine while it is moving. Make sure no one is on the machine before working on it.

Do not work under or near unblocked or unsupported body. Always use the body safety pins.

Do not work under or near any unblocked or unsupported linkage, part or truck.

Always shut down machine according to the procedure under ‘Stopping The Engine’, described on page 4-14, before cleaning, lubricating or servicing the machine except as called for in this Handbook or the Maintenance Manual.

Always relieve pressure before servicing any pressurized system. Follow the procedures and safety precautions detailed in the relevant Maintenance Manual section.

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**Escaping fluids under pressure can penetrate skin.**

When changing oil in the engine, transmission and hydraulic systems, or removing hydraulic lines, remember that the oil may be hot and can cause burns to unprotected skin.

When working on or around exhaust components, remember that the components may be hot and can cause burns to unprotected skin.

Always deflate tyre before attempting to remove any embedded objects or removing the tyre and rim assembly from the truck.

Always use a self-attaching chuck with a long airline, and stand to one side while the tyre is inflating. Refer to Section 160-0050 in the Maintenance Manual.

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**WARNING**

**Injection Hazard.**

Escaping fluid under pressure can penetrate skin, causing serious injury.

Relieve pressure before disconnecting hydraulic lines. Keep away from leaks and pin holes. Use a piece of cardboard or paper to search for leaks. Do not use hand.

Fluid injected into the skin must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene will result.

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**WARNING**

**When working around battery area, keep all flames and sparks away from batteries.**
LUBRICATION AND SERVICING

These trucks are fitted with engine and transmission oil pans which permit operation at maximum gradeability as designated in the ‘Performance Data’ section of the relevant Sales Specification Sheet.

Lubrication is an essential part of preventive maintenance. It is important that the instructions regarding types of lubricants and the frequency of their application be followed to prolong the useful life of the machine. Periodic lubrication of moving parts reduces to a minimum the possibility of mechanical failures.

All change and service periods are recommendations based on average operating conditions. Lubricants showing evidence of excessive heat, oxidation or dirt should be changed more frequently to prevent these conditions.

Lubricant change and service periods must be established on the basis of individual job conditions, utilizing oil sampling and recommendations from lubricant suppliers.

Thoroughly clean all fittings, caps, plugs, etc., to prevent dirt from entering any system while carrying out servicing procedures. Lubricants must be at operating temperature when draining.

**Note:** Do not operate any system unless the oil level is within the recommended operating levels as indicated on oil level dipstick, sight gauge or level plug.

Small circles on the following illustration represent points at which lubrication or servicing must take place, at the intervals indicated on the left-hand side of the lubrication chart. The numbers on the illustration contain reference numbers which is given in the ‘Ref. Points’ column of the Lubrication and Service chart.

TRANSMISSION FLUID - Transynd RD

For non TranSynd RD filled transmissions refer to the service schedule detailed from page 8-5 onwards.

**Note:** For units filled with TranSynd RD, the service schedule for the transmission differs from those which are filled with EO. The use of any other oil in units which are TranSynd RD filled may result in damage to the transmission.

Trucks filled with Allison TranSynd RD oil should only be filled with TranSynd RD oil at drain and refill intervals. Use of other oils or mixing of oils is prohibited and may cause damage to the transmission. If there is any uncertainty consult the manufacturer.

For TranSynd RD filled transmissions, refer to page 8-7 for service intervals and recommended lubricant details.
# Lubrication and Service Chart

<table>
<thead>
<tr>
<th>Interval Hours</th>
<th>Ref. Points</th>
<th>Identification</th>
<th>Service Instructions</th>
<th>No. of Points</th>
<th>Lubricant</th>
<th>Service/Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Engine</td>
<td>Check oil level. Add if low.</td>
<td>1</td>
<td>EO</td>
<td>As Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transmission</td>
<td>Check oil level. Add if low.</td>
<td>1</td>
<td>EO</td>
<td>As Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Main Hydraulic Tank</td>
<td>Check oil level. Add if low.</td>
<td>1</td>
<td>HO</td>
<td>As Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steering/Braking Hydraulic Tank</td>
<td>Check oil level. Add if low.</td>
<td>1</td>
<td>HO</td>
<td>As Required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Radiator Header Tank</td>
<td>Check coolant level. Add if low.</td>
<td>1</td>
<td>Antifreeze</td>
<td>See Page 8-7 / 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steering/Braking Hydraulic Tank Filter</td>
<td>Check W/Light. Replace element if reqd.</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear Disc Brake Filter(s)</td>
<td>Check indicator. Replace element if reqd.</td>
<td>-</td>
<td>-</td>
<td>See Page 8-7 / 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel Filter/Water Separator</td>
<td>Drain water and sediment.</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cooling Fan</td>
<td>Visually inspect for debris and damage.</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>8 and 9</td>
<td>Drive Belts</td>
<td>Visually inspect all belts.</td>
<td>-</td>
<td>-</td>
<td>See Page 8-7 / 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Front and Rear Ride Cylinders</td>
<td>Visually inspect heights.</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air Cleaner Restriction W/Light</td>
<td>Check. Replace element if reqd.</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air Cleaner Vacuator Valve(s)</td>
<td>Check for proper operation.</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tyres</td>
<td>Check condition. Check pressures when tyres are cold.</td>
<td>6</td>
<td>-</td>
<td>Maintenance Manual 160-0050 and Page 8-10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Controls, Instruments and W/Lights</td>
<td>Check for proper operation.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Inspection</td>
<td>Check for leaks and worn/damaged parts. Repair/replace as required.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Front Ride Cylinders</td>
<td>Lube.</td>
<td>2</td>
<td>EP, NLGI</td>
<td>20 Strokes</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Rear Ride Cylinder Spherical Bushings</td>
<td>Lube.</td>
<td>4</td>
<td>EP, NLGI</td>
<td>See Note A</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Steering Cylinders</td>
<td>Lube.</td>
<td>4</td>
<td>EP, NLGI</td>
<td>See Note A</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>Steering Linkage</td>
<td>Lube.</td>
<td>4</td>
<td>EP, NLGI</td>
<td>See Note A</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Steering Pivot Pin</td>
<td>Lube.</td>
<td>2</td>
<td>EP, NLGI</td>
<td>See Note A</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>A-Frame Nose Spherical Bushing</td>
<td>Lube.</td>
<td>1</td>
<td>EP, NLGI</td>
<td>See Note A</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Banjo Stabilizer Spherical Bushings</td>
<td>Lube.</td>
<td>2</td>
<td>EP, NLGI</td>
<td>See Note A</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Body Hinge Pins/Optional Tailgate Pins</td>
<td>Lube.</td>
<td>2</td>
<td>EP, NLGI</td>
<td>See Note A</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Body Hoist Cylinder Bushings</td>
<td>Lube.</td>
<td>4</td>
<td>EP, NLGI</td>
<td>See Note A</td>
</tr>
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</table>
## LUBRICATION AND SERVICE CHART (Continued)

<table>
<thead>
<tr>
<th>Interval Hours</th>
<th>Ref. Points</th>
<th>Identification</th>
<th>Service Instructions</th>
<th>Service/Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td></td>
<td>Engine Fuel Filters</td>
<td>Replace filters.</td>
<td>2 - Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine Coolant Additive</td>
<td>Check DCA concentration and replenish.</td>
<td>- DCA4 See Page 8-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine Coolant Filter(s)</td>
<td>Replace filter(s) if required.</td>
<td>- See Page 8-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engine Crankcase Breather</td>
<td>Clean.</td>
<td>1 - Maintenance</td>
</tr>
<tr>
<td>7</td>
<td>Engine Cooling Fan</td>
<td>Check condition.</td>
<td>1 - See Page 8-7</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Engine Power Takeoff</td>
<td>Drain and refill.</td>
<td>1 EPL See Page 8-8 / 9</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Differential</td>
<td>Check oil level. Add if low.</td>
<td>1 EPL -</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Wheel Planetaries</td>
<td>Check oil level. Add if low.</td>
<td>2 EPL -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Differential Breather</td>
<td>Clean.</td>
<td>1 - -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transmission Breather</td>
<td>Clean.</td>
<td>1 - -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alternator Drive Belt</td>
<td>Check belt tension. Adjust if required.</td>
<td>1 - See Page 8-7 / 8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accessory Drive Belts (if fitted)</td>
<td>Check belt tension. Adjust if required.</td>
<td>- - See Page 8-7 / 8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Front Brake Pads</td>
<td>Check wear. Replace as required.</td>
<td>2 - See Page 8-8</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Engine</td>
<td>Drain and refill</td>
<td>1 EO See Page 8-8 / 9</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Engine Oil Filters</td>
<td>Replace Filters</td>
<td>- - Maintenance</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Fuel Tank</td>
<td>Clean filler neck screen and cap.</td>
<td>- - -</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Accumulators</td>
<td>Check nitrogen pressures.</td>
<td>3 - -</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Driveline Universal Joints</td>
<td>Lube (if grease nipple fitted).</td>
<td>- *EP, NLGI See Note A</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Driveline Slip Joints</td>
<td>Lube (if grease nipple fitted).</td>
<td>- *EP, NLGI See Note A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steering Column Universal Joints</td>
<td>Lube.</td>
<td>3 *EP, NLGI See Note A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hydraulic &amp; Steering Tank Breather</td>
<td>Clean.</td>
<td>1 - -</td>
<td></td>
</tr>
<tr>
<td>1 000</td>
<td></td>
<td>Engine Crankcase Breather</td>
<td>Clean/Replace</td>
<td>1 - -</td>
</tr>
<tr>
<td></td>
<td>Differential</td>
<td>Drain and refill.</td>
<td>1 EPL See Page 8-8 / 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wheel Planetaries</td>
<td>Drain and refill.</td>
<td>2 EPL See Page 8-8 / 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fan Idler Pivot Arm</td>
<td>Lube</td>
<td>1 EP, NLGI See Note A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main Hydraulic Filter</td>
<td>Replace elements.</td>
<td>2 - See Page 8-8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transmission</td>
<td>Drain and refill.</td>
<td>3 - See Page 8-8 / 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transmission Oil Filter</td>
<td>Replace element.</td>
<td>1 - -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transmission In-line Filter</td>
<td>Replace element.</td>
<td>1 - -</td>
<td></td>
</tr>
<tr>
<td>1 500</td>
<td></td>
<td>Main Hydraulic Tank</td>
<td>Drain and refill</td>
<td>1 HO See Page 8-8 / 9</td>
</tr>
<tr>
<td></td>
<td>Main Hydraulic Tank Suction Screens</td>
<td>Remove and clean</td>
<td>3 - See Page 8-8 / 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steering / Braking Tank</td>
<td>Drain and refill.</td>
<td>1 EPL See Page 8-8 / 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steering / Braking Hydraulic Tank Filter</td>
<td>Replace element</td>
<td>1 - See Page 8-8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steering / Braking Tank Suction Screen</td>
<td>Remove and clean</td>
<td>1 - -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fuel Tank</td>
<td>Drain and refill</td>
<td>1 Diesel See Page 8-8 / 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rear Brake Packs</td>
<td>Drain and refill</td>
<td>2 HO -</td>
<td></td>
</tr>
<tr>
<td>4 000</td>
<td></td>
<td>Cooling System</td>
<td>Drain, flush and refill</td>
<td>1 Antifreeze See Page 8-8 / 9</td>
</tr>
<tr>
<td></td>
<td>Air Conditioning Compressor</td>
<td>Drain, flush and refill</td>
<td>1 PAG Oil See Page 8-8 / 10</td>
<td></td>
</tr>
<tr>
<td>5 000</td>
<td>Front Wheel Bearings</td>
<td>Repack</td>
<td>2 *EP, NLGI *</td>
<td></td>
</tr>
</tbody>
</table>

* - Fill compartment one half full.

Note A - Lubricate slowly until excess lube is seen.

EO - Engine Oil. Refer to chart under ‘Recommended Lubricants’.

EPL - Extreme Pressure Gear Lubricant meeting specification MIL-L-2105C.

HO - Hydraulic Transmission Oil meeting Specification EMS19058 Refer to chart under ‘Recommended Lubricants’.

EP, NLGI - Extreme Pressure Lithium No. 2 Grease. Refer to chart under ‘Recommended Lubricants’.

*EP, NLGI - Extreme Pressure Lithium No. 2 Grease (without ‘Molybdenum’). Refer to chart Under ‘Recommended Lubricants’.

PAG Oil - Polyalkene Glycol (PAG) Compressor Lubricating Oil - Low Viscosity (ISO46).
**RECOMMENDED LUBRICANTS- (TranSynd RD Specific)**

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>LUBRICANT</th>
<th>VISCOSITY (See Note 1*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission</td>
<td>TranSynd RD Allison Transmission Oil</td>
<td>Temp</td>
</tr>
<tr>
<td></td>
<td>Minimum operating Temperatures (without</td>
<td>-35°C SAE 0W-30 or TranSynd RD</td>
</tr>
<tr>
<td></td>
<td>preheat)</td>
<td>-30°C SAE 0W-20 (Arctic)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-28°C DEXRON-III</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-20°C SAE 15W-40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0°C SAE30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10°C SAE40</td>
</tr>
</tbody>
</table>

**LUBRICATION AND SERVICE CHART - (TranSynd RD Specific)**

<table>
<thead>
<tr>
<th>Interval</th>
<th>Ref. Points</th>
<th>Identification</th>
<th>Service Instructions</th>
<th>No. of Points</th>
<th>Lubricant</th>
<th>Service/Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2</td>
<td>Transmission</td>
<td>Check oil level. Add if low.</td>
<td>1</td>
<td>TranSynd RD</td>
<td>As Required</td>
</tr>
<tr>
<td>150</td>
<td>-</td>
<td>Transmission Oil Filter</td>
<td>Replace element</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>250</td>
<td>-</td>
<td>Transmission Breather</td>
<td>Clean</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4000</td>
<td>2</td>
<td>Transmission</td>
<td>Drain and Refill</td>
<td>1</td>
<td>TranSynd RD</td>
<td>See Page 8-8</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS SERVICING**

**INSPECTION AT DELIVERY OF A NEW VEHICLE**

Rear Ride Cylinders - check the extension of the rear ride cylinders, and recharge with with oil and nitrogen if necessary. This is required because in some circumstances nitrogen is evacuated from the cylinders to lower the body for transportation, and cylinder oil may be lost also during the evacuation process.

⚠️ Permanent damage may occur when operating the truck with inadequately charged rear ride cylinders, as the rear axle will impinge on the bump stops.

**WHEN REQUIRED**

Seat Belts - Inspect seat belts and replace if damaged.

⚠️ Replace seat belts at least once every three years, regardless of appearance.

Note: Replace seat belts at least once every three years, regardless of appearance.

Windscreen Wipers and Washers - Inspect wiper blades and replace if damaged. Top up washer reservoir.

Wheel Rim Nuts - After first 10 hours of operation re-torque nuts to 813 Nm (600 lbf ft). Check torque every 50 hours (weekly) thereafter.

**EVERY 10 HOURS OF OPERATION**

Walk Around Inspection - Inspect the machine as described in Section 4.

Engine - Visually check engine for damage, loose or frayed belts and listen for any unusual noises.

Engine Air Cleaner(s) - Check air cleaner piping, hoses and clamps. Change air cleaner element only when air cleaner flow restriction warning light illuminates. Service vacuum valves daily. Inspect and remove any obstructions from the vacuum valve lips. Valve lips should be open and pliable with engine stopped.

Note: Service air cleaner(s) more often under extremely dusty operating conditions.

Radiator Header Tank - Check the coolant level and replenish if low. Fill radiator header tank with coolant until coolant reaches the bottom of the filler neck and holds at that level.

**NOTICE**

Any time a significant amount of coolant is added, the DCA4 concentration MUST be checked. If the concentration is low, engine damage will result. Conversely, over-inhibiting antifreeze solutions can cause silicate dropout. Refer to Section 210-0000, Cooling System, in the Maintenance Manual.

Steering, Braking and Body Hoist Systems - Check for correct operation of all systems before operating the truck.

Steering Filter - Check steering filter restriction warning light with the truck empty, brakes released, oil at normal operating temperature, engine operating at 1 500 rev/min and while turning the steering wheel at one turn/sec. If the warning light illuminates, the filter element should be replaced.

Rear Disc Brake Filter(s) - Replace element(s) when indicator shows oil at the replace element level.

**AFTER FIRST 150 HOURS OF OPERATING NEW OR REBUILT COMPONENTS**

Transmission - Drain oil and refill (non TranSynd RD filled transmissions only), replace filters (all oil types).

Differential - Drain oil and refill.

Planetarys - Drain oil and refill.
Lubrication and Servicing

EVERY 1000 HOURS OF OPERATION

Hydraulic System Pressure Checks - Check all steering, body and braking system pressures.

Note: Instructions for checking pressure, and locations of pressure check points, are contained in the relevant Maintenance manual section. If the pressures are outwith the specified settings then components in the relevant system should be inspected, repaired or replaced to ensure the correct operation of the system. All safety instructions in the relevant sections should be strictly adhered to.

Main Hydraulic Filter - Clean filter housing and install new element.

Rear Disc Brake Filter(s) - Replace filter element(s) when indicator sight gauge shows replacement is necessary, or after 1 000 hours of operation, whichever comes first.

EVERY 2000 HOURS OF OPERATION

Steering Filter - Clean filter housing and install new element when indicated, or after 2000 hours of operation, whichever occurs first.

ENGINES AND TRANSMISSIONS

All information contained in the “Lubrication and Service Chart” was extracted from the relevant manufacturers ‘Operation and Maintenance Manual’, and was correct at time of publication. User should ensure that information contained in this chart reflects the information shown in the relevent manufacturers ‘Operation and Maintenance Manual’. Maintenance Procedures should be carried out in conjunction with any additional procedures in the relevant manufacturers ‘Operation and Maintenance Manual’, at the intervals specified.

SERVICE CAPACITIES

<table>
<thead>
<tr>
<th>Ref. Points</th>
<th>Identification</th>
<th>Lubricant</th>
<th>TR100</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Engine Crankcase and Filters</td>
<td>EO</td>
<td>134</td>
</tr>
<tr>
<td>2</td>
<td>Transmission and Filters</td>
<td>EO/TranSyndRD</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Main Hydraulic Tank</td>
<td>HO</td>
<td>297</td>
</tr>
<tr>
<td></td>
<td>Main Hydraulic System</td>
<td>HO</td>
<td>557</td>
</tr>
<tr>
<td>4</td>
<td>Steering Hydraulic Tank</td>
<td>HO</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Steering Hydraulic System</td>
<td>HO</td>
<td>72</td>
</tr>
<tr>
<td>27</td>
<td>Cooling System</td>
<td>Coolant</td>
<td>304</td>
</tr>
<tr>
<td>19</td>
<td>Fuel Tank</td>
<td>Diesel</td>
<td>1 275</td>
</tr>
<tr>
<td></td>
<td>Front Ride Cylinders (Each)</td>
<td>HO</td>
<td>27</td>
</tr>
<tr>
<td>9</td>
<td>Rear Ride Cylinders (Each)</td>
<td>HO</td>
<td>18</td>
</tr>
<tr>
<td>16</td>
<td>Engine Power Takeoff</td>
<td>EPL</td>
<td>1.5</td>
</tr>
<tr>
<td>17</td>
<td>Differential</td>
<td>EPL</td>
<td>61</td>
</tr>
<tr>
<td>18</td>
<td>Wheel Planetaries (Total)</td>
<td>EPL</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Air Conditioning Compressor</td>
<td>PAG Oil</td>
<td>0.135</td>
</tr>
</tbody>
</table>

EVERY 250 HOURS OF OPERATION

Oil Can Points - Oil accelerator linkage, hinges, and other working parts with engine oil.

Coolant Additive - Check and replenish DCA4 concentration as described in Section 210-0000, Cooling System, in the Maintenance Manual.

Coolant Filter(s) - Replace coolant filter(s) if required. When testing the DCA4 concentration, depending on the level of DCA4, the coolant filter(s) may not necessarily have to be changed. Refer to Section 210-0000, Cooling System, in the Maintenance Manual.

Engine Fuel Pre-filter - Replace fuel pre-filter.

Cooling Fan - Visually check the fan for cracks, loose rivets, and bent or loose blades. Check fan mounting and tighten if required. Replace any fan that is damaged.

Note: The fan belt is maintained to the correct belt tension by a spring-loaded idler arm, therefore, there is no need to check or adjust belt tension.

Drive Belts - Visually check the belts and replace if they are cracked or frayed. Adjust belts that have a glazed or shiny surface which indicates belt slippage. Correctly installed and tensioned belts will show even pulley and belt wear. Refer to Section 110-0030, Engine and Mounting, in the Maintenance Manual for drive belt tension and adjustment of new and used drive belts.

Front Brakes - Check pads and discs for wear and replace where necessary.

Note: This service interval applies to normal driving. Check more frequently under more severe conditions. Thickness of pad friction material should never be allowed to wear below 3 mm (0.12 in).
# RECOMMENDED LUBRICANTS

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>LUBRICANT</th>
<th>VISCOSITY (See Note 1*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>Engine oil with 1.00% sulphated ash is recommended.</td>
<td>Ambient Temp Recommendation</td>
</tr>
<tr>
<td></td>
<td>Sulphated ash must not exceed 1.85% limit.</td>
<td>0°C and above</td>
</tr>
<tr>
<td></td>
<td>API code CH-4, ACEA-E5. See Note 2*</td>
<td>-10°C and above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-25° to 35° C</td>
</tr>
<tr>
<td>Transmission</td>
<td>Allison C-4 Type Specification; Refer to <a href="http://www.allisontransmission.com">www.allisontransmission.com</a> for a complete list of C-4 approved oils. See Note 3*</td>
<td>Ambient Temp Recommendation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-35°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-30°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-28°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-20°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-15°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10°C</td>
</tr>
<tr>
<td>Cooling System</td>
<td>Heavy Duty Coolant. Refer to Section 210-0000, COOLING SYSTEM, in the Maintenance Manual.</td>
<td></td>
</tr>
<tr>
<td>Fuel Tank</td>
<td>Diesel Fuel Oil with maximum sulphur 0.5%.</td>
<td>DIN EN590</td>
</tr>
<tr>
<td>Differential Gear</td>
<td>Multipurpose Extreme Pressure type gear oil meeting MIL-L-2105C Specifications (No Zinc Additive). See Note 4*.</td>
<td>SAE 80W-90</td>
</tr>
<tr>
<td>Power Takeoff</td>
<td></td>
<td>at ambient temperatures of -18° to 32° C</td>
</tr>
<tr>
<td>Grease Fittings</td>
<td>Multipurpose Extreme Pressure Lithium Grease (which may or may not contain 'Molybdenum'), with a typical melting point of 190°C.</td>
<td>No. 2 Consistency</td>
</tr>
<tr>
<td>Drivelines</td>
<td>Multipurpose Extreme Pressure Lithium Grease (without 'Molybdenum'), with a typical melting point of 190°C.</td>
<td>No. 2 Consistency</td>
</tr>
<tr>
<td>Steering Column</td>
<td>Compressor Lubricating Oil - Low Viscosity</td>
<td>ISO46 SP 10</td>
</tr>
<tr>
<td>Wheel Bearings</td>
<td>Polyalkene Glycol (PAG)</td>
<td></td>
</tr>
<tr>
<td>Air Conditioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ride Cylinders</td>
<td>Hydraulic oil meeting MIL-L-2104B Specification.</td>
<td>SAE 10W</td>
</tr>
<tr>
<td>(Nitrogen/Oil)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic System</td>
<td>Hydraulic Transmission Oil meeting Specification EMS19058. See Note 5.</td>
<td>SAE 10W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at ambient temperatures of -18° to 32° C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAE 30W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at ambient temps of 32° C and above</td>
</tr>
</tbody>
</table>

**Note 1** - Consult your lubricant supplier for the correct viscosity of lubricant to use when ambient temperatures are consistently above or below those listed.

**Note 2** - Cummins Engine Co. do not recommend any specific brand of engine oil but the use of oils that meet API categories. Cummins recommend use of only the multi-graded viscosity oils shown for the various ambient temperatures listed.

**Note 3** - Operation below the minimum temperatures listed for the oil used without proper preheat or warm-up results in greatly reduced transmission life. If auxiliary heating is available, preheat the oil to the minimum temperature limit. If not available, run the engine at part throttle with the transmission in neutral to raise the fluid temperature.

**Note 4** - If rear axle has limited slip differential, an EP oil with limited slip additives should be used because using standard SAE 90 oil may result in very loud noise and jerking of the wheels when driving slowly round sharp corners.

**Note 5** - Typical SAE 10W oils complying with Specification EMS19058 are:

- KUWAIT TO4
- TEXACO TEXTRAN
- TOTAL TRANSMISSION AC
- SHELL DONAX TC
- MOBILTRAN HD
- BP AUTRAN 4
- ESSO TORQUE FLUID
- CASTROL TFC

Other lubricant suppliers may have comparable products and should be consulted for confirmation.

---

**Temperature Conversions**

<table>
<thead>
<tr>
<th>° Celsius</th>
<th>° Fahrenheit</th>
</tr>
</thead>
<tbody>
<tr>
<td>-32</td>
<td>-26</td>
</tr>
<tr>
<td>-30</td>
<td>-22</td>
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<tr>
<td>-27</td>
<td>-17</td>
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<tr>
<td>-25</td>
<td>-13</td>
</tr>
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<td>-20</td>
<td>-4</td>
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<td>-10</td>
<td>14</td>
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<td>0</td>
<td>32</td>
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<td>10</td>
<td>50</td>
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<tr>
<td>15</td>
<td>77</td>
</tr>
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<td>25</td>
<td>90</td>
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<td>32</td>
<td>95</td>
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<td>35</td>
<td>100</td>
</tr>
<tr>
<td>38</td>
<td>113</td>
</tr>
<tr>
<td>45</td>
<td>200</td>
</tr>
<tr>
<td>93</td>
<td>375</td>
</tr>
</tbody>
</table>

8-9
AIR CONDITIONING RE-START PROCEDURE

If the machine has been idle for an extended period of time (2 weeks), the refrigerant in the air conditioning unit converts from a gas to a liquid. This puts the compressor unit under a great deal of strain trying to compress a liquid instead of a gas and could cause a failure in the air conditioning unit. The following commissioning procedure allows the air conditioning unit to achieve normal operating parameters.

1. Start the machine and allow it to run until the engine is at a normal operating temperature of 80 °C (176 °F)
2. Turn the blower control to setting 1.
3. Turn on the air conditioning unit on for 5 seconds then off for 5 seconds.
4. Repeatedly switch the air conditioning on and off for at least 1 minute. This should be at least 12 repetitions.
5. Commissioning the air conditioning unit is complete and ready for use.

TYRE PRESSURES

Tyre pressures on this pages apply to the truck serial number range specified only, Gross Vehicle Weight (G.V.W.) and axle weights may vary between truck derivatives. Tyre pressure should be recalculated if not shown for a particular truck. Contact TEREX for assistance.

The tyre inflation pressures listed are manufacturers’ recommendations for G.V.W. travelling at maximum speed. TEREX advise that operators check tyre inflation pressures with tyre manufactures to ensure correct setting for each particular

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MANUFACTURE</th>
<th>SIZE</th>
<th>PATTERN</th>
<th>TYRE INFLATION PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FRONT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BAR</td>
</tr>
<tr>
<td>TR35</td>
<td>BRIDGESTONE</td>
<td>18.00-R25</td>
<td>VMTP</td>
<td>7.4</td>
</tr>
<tr>
<td>877</td>
<td>BRIDGESTONE</td>
<td>18.00-R25</td>
<td>VMTS</td>
<td>7.4</td>
</tr>
<tr>
<td></td>
<td>MICHELIN</td>
<td>18.00-R25</td>
<td>XHD1-A4</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>ALTURA</td>
<td>18.00-R25</td>
<td>GRIPMASTER ND</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>ALTURA</td>
<td>18.00-R25</td>
<td>GRIPMASTER XL</td>
<td>7.0</td>
</tr>
<tr>
<td>TR45</td>
<td>BRIDGESTONE</td>
<td>21.00-R35</td>
<td>VMTP</td>
<td>7.7</td>
</tr>
<tr>
<td>881</td>
<td>BRIDGESTONE</td>
<td>21.00-R35</td>
<td>VELS</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>MICHELIN</td>
<td>21.00-R35</td>
<td>XDT-A4</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>BELSHINA</td>
<td>21.00-35</td>
<td>BEL51-A</td>
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</tr>
<tr>
<td>TR60</td>
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<td>VRLS</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>MICHELIN</td>
<td>24.00-R35</td>
<td>XDT-A4</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>BELSHINA</td>
<td>24.00-35</td>
<td>FBEL-150</td>
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</tr>
<tr>
<td>TR70</td>
<td>BRIDGESTONE</td>
<td>24.00-R35</td>
<td>VMTP</td>
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<tr>
<td>913</td>
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<td>VRLS</td>
<td>7.9</td>
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<tr>
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<td>MICHELIN</td>
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<td>XDT-A4</td>
<td>7.2</td>
</tr>
<tr>
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<td>VMTP</td>
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<td>VRLS</td>
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<td>MICHELIN</td>
<td>27.00-R49</td>
<td>XDT-A4</td>
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<td>E4D</td>
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<td>MICHELIN</td>
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<td>XDT-A4</td>
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<tr>
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<td>PACETRONIC</td>
<td>27.00-49</td>
<td>E4D</td>
<td>6.6</td>
</tr>
</tbody>
</table>
9 - Technical Data
TECHNICAL DATA

ENGINE
Make/Model .................................................. Cummins KTA-38-C1050
Type ................................................ 4 Cycle Turbocharged/Aftercooled
Gross Power at 2 100 rev/min ................... 783 kW (1 050 hp, 1094 PS)
Net Power at 2 100 rev/min ........................... 692 kW (928 hp, 967 PS)

Note: Power ratings to SAE J1995 June 1990. Net Power is after
deductions for fan and alternator. Engine requires no derating up to
3 050m (10 000 ft) altitude.

Maximum Torque ....................... 4630 Nm (3415 lbf ft) at 1300 rev/min
Number of Cylinders/Configuration .................................................12V
Bore x Stroke .........................................159 x 159 mm (6.25 x 6.25 in)
Total Displacement ............................................... 37.7 litres (2300 in³)
Starting ....................................................... Electric
Maximum Speed, Full Load ........................ 2 100 rev/min
Maximum Speed, No Load ....................... 2 400 rev/min
Idle Speed ...................................................750 rev/min
TRANSMISSION

Make/Model .............................................................. Allison H 8610 AR CEC 2

DRIVE AXLE

Heavy duty axle with full floating axle shafts, single reduction spiral bevel gear differential and planetary reduction at each wheel.

<table>
<thead>
<tr>
<th>Ratios:</th>
<th>Standard</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differential............</td>
<td>2.16:1</td>
<td>2.16:1</td>
</tr>
<tr>
<td>Planetary................</td>
<td>13.75:1</td>
<td>10.50:1</td>
</tr>
<tr>
<td>Total Reduction.........</td>
<td>29.70:1</td>
<td>22.68:1</td>
</tr>
</tbody>
</table>

### Speeds with Standard Planetary

<table>
<thead>
<tr>
<th>Gear</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio</td>
<td>4.24</td>
<td>2.32</td>
<td>1.69</td>
<td>1.31</td>
<td>1.00</td>
<td>0.73</td>
</tr>
<tr>
<td>km/h</td>
<td>8.2</td>
<td>15.0</td>
<td>20.6</td>
<td>26.5</td>
<td>34.8</td>
<td>47.6</td>
</tr>
<tr>
<td>mile/h</td>
<td>5.1</td>
<td>9.3</td>
<td>12.8</td>
<td>16.5</td>
<td>21.6</td>
<td>29.6</td>
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</tbody>
</table>

Reverse

<table>
<thead>
<tr>
<th>Ratio</th>
<th>5.75</th>
</tr>
</thead>
<tbody>
<tr>
<td>km/h</td>
<td>6.0</td>
</tr>
<tr>
<td>mile/h</td>
<td>3.8</td>
</tr>
</tbody>
</table>

SUSPENSION

**Front:** King pin strut type independent front wheel suspension with self-contained, variable rate, nitrogen/oil cylinders.

**Rear:** Variable rate nitrogen/oil cylinders with A-frame linkage and lateral stabilizer bar.

### Maximum Strut Stroke

- **Front:** 229 mm (9.0 in)
- **Rear:** 175 mm (6.9 in)
- **Maximum Rear Axle Oscillation:** ± 7.0 Degrees

WHEELS AND TYRES

<table>
<thead>
<tr>
<th>Wheel Rim Width</th>
<th>19.5 in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Tyres (Front &amp; Rear)</td>
<td>27.00 R 49 Radial</td>
</tr>
<tr>
<td>Optional Tyres (Front &amp; Rear)</td>
<td>27.00-49 (48 PR) E-4</td>
</tr>
</tbody>
</table>

**Note:** It is recommended that for tyres both listed and unlisted, the user should consult the tyre manufacturer and evaluate all job conditions in order to make the proper selection.
BRAKES

Service
All hydraulic brake system control. Transmission mounted pressure compensating pump provides hydraulic pressure for brakes and steering. Independent circuits front and rear. Each circuit incorporates a nitrogen accumulator which stores energy to provide consistent braking response.

Front Brake Circuit Pressure .........................................159 bar (2 300 lbf/in²)
Rear Brake Circuit Pressure .......................................... 52 bar (750 lbf/in²)
Accumulators:
   Nitrogen Precharge Pressure ....................................... 55 bar (800 lbf/in²)

Front:
Type .................................................. Dry Disc with 1 calliper per wheel
Disc Diameter .......................................................... 965 mm (38 in)
Pad Area, Total ............................................................. 2 015 cm² (320 in²)

Rear:
Type .......................................................... Oil cooled, multiple friction discs, completely sealed from dirt and water.
Braking Surface, Total ............................................. 87 567 cm² (13 573 in²)

Parking
Application of rear brakes by springs in brake disc pack. Hydraulically released.
Hold-off Pressure .......................................................... 83 bar (1 200 lbf/in²)

Retardation
Modulated lever control of rear disc pack.
Retarder Actuation Pressure ......................................... up to 33 bar (480 lbf/in²)

Emergency
Push button solenoid control applies service and parking brakes. Automatically applies when engine is switched off. Parking brake applies should system pressure fall below a predetermined level.

Brakes conform to ISO 3450, SAE J1473.

STEERING SYSTEM

Independent hydrostatic steering with closed-centre steering valve, accumulator and pressure compensating piston pump.

Accumulator provides uniform steering regardless of engine speed. In the event of loss of engine power it provides steering of approximately two lock-to-lock turns. A low pressure indicator light warns of system pressure below 83 bar (1 200 lbf/in²). Steering meets ISO 5010, SAE J53.

System Pressure ..........................................................159 bar (2 300 lbf/in²)
Relief Pressure ........................................................... 207 bar (3 000 lbf/in²)
Steering Cylinders .................................................... Double Acting, Single Stage
Accumulator:
   Oil Capacity .......................................................... 16.4 litres (3.70 US gal)
   Nitrogen Precharge Pressure ....................................... 55 bar (800 lbf/in²)
Steering Angle (Left and Right) ........................................... 39°
Technical Data

Pump:
Type ................................................................. Piston
Capacity at 2 100 rev/min ...................... 1.57 litres/s (25 US gal/min)

BODY HYDRAULICS

Two body hoist cylinders are mounted between the frame rails. Cylinders are two-stage with power down in the second stage.

System Relief Pressure ......................... 190 bar (2 750 lbf/in²)
Pump:
Type ................................................................. Gear
Capacity at 2 100 rev/min .................. 365 litres/min (97 US gal/min)
Control Valve ........................................ Servo Controlled, Open Centre
Body Raise Time .................................... 14 Seconds
Body Lower Time ..................................... 18 Seconds

ELECTRICAL

Type ................................................................. 24 Volt, Negative Ground
Battery ....................................................... Four, 12 Volt, 210 Ah each, Maintenance Free
Accessories .............................................. 24 Volt
Alternator .................................................. 70 Amp
Starter ....................................................... Two 9 kW

BODY

Longitudinal 'V' type floor with integral transverse box-section stiffeners. The body is exhaust heated and rests on resilient impact absorption pads.

Body wear surfaces are high hardness (360-440 BHN) abrasion resistant steel. Yield strength of plates 1 000 MPa (145 000 lbf/in²).

Plate Thicknesses:
Floor ............................................................ 19 mm (0.75 in)
Side ............................................................. 10 mm (0.39 in)
Front, lower .............................................. 10 mm (0.39 in)

ROPS Cabguard SAE J1040 Feb 86. ISO 3471

Volumes:
Struck (SAE) ............................................. 41.6 m³ (54.4 yd³)
Heaped 2:1 (SAE) ................................. 57.0 m³ (74.5 yd³)
SERVICE CAPACITIES

Engine Crankcase and Filters ........................................... 134 litres (35.4 US gal)
Transmission and Filters .............................................. 100 litres (26 US gal)
Cooling System .......................................................... 304 litres (80.3 US gal)
Fuel Tank ................................................................. 1275 litres (336.8 US gal)
Steering Hydraulic Tank ............................................... 61 litres (16 US gal)
Steering System .......................................................... 72 litres (19 US gal)
Body and Brake Cooling Tank ....................................... 297 litres (78.5 US gal)
Body and Brake Cooling System ................................... 557 litres (147.1 US gal)
Planetary (Total) ......................................................... 57 litres (15.1 US gal)
Differential ................................................................. 61 litres (16.1 US gal)
Front Ride Strut (Each) ................................................ 27 litres (7.1 US gal)
Rear Ride Strut (Each) .................................................. 18 litres (4.8 US gal)
Power Takeoff ............................................................. 1.5 litres (0.4 US gal)
Air Conditioning Compressor ....................................... 0.135 litres (0.036 US gal)

<table>
<thead>
<tr>
<th>Sound Power Level ISO6395</th>
<th>TR100</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Weighted sound power level Lwa in decibels</td>
<td>88.5 dba</td>
</tr>
<tr>
<td>Uncertainty Kwa, in decibels</td>
<td>TBA</td>
</tr>
<tr>
<td>Sound Pressure Level at Operators Station ISO6396</td>
<td>TR100</td>
</tr>
<tr>
<td>A - Weighted emission sound pressure level Lpa in decibels</td>
<td>79</td>
</tr>
<tr>
<td>Uncertainty Kwa, in decibels</td>
<td>2.09</td>
</tr>
</tbody>
</table>

The sound level values are in compliance with Directive 2000/14/EC and BS EN 474.

**Note:** The above result is for the mode giving the highest exterior sound level when measured and operated as per the prescribed procedures of the standard. Results shown are for the vehicle in base configuration.

**Note:** Noise Exposure Level to the operator and bystander personnel may be higher depending upon proximity to buildings, rock piles, machinery, etc. The actual job site Noise Exposure Level must be measured and applicable regulations complied with in respect to Employee Hearing Protection.
Hands and Arm Vibration

The weighted root mean square acceleration to which hand and arms of the operator are exposed is less than 2.5 m/s² under normal operating conditions.

<table>
<thead>
<tr>
<th>Whole Body Vibration</th>
<th>TR100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration Emission Value a</td>
<td>0.73 m/s²</td>
</tr>
<tr>
<td>Uncertainty K</td>
<td>0.37 m/s²</td>
</tr>
</tbody>
</table>

Operating Mode:
Value Obtained under simulated field duty cycle.

Note: The whole body vibrations on construction machines are influenced by many factors independent of machine design, for example ground conditions, working methods, correct seat adjustment, operator input to vehicle speed.
The single whole-body emission value listed above is determined under particular operating and terrain conditions. In accordance with EN474, it is not intended to be used to determine the whole-body vibration exposure to the operator using the Machine.

<table>
<thead>
<tr>
<th>VEHICLE WEIGHTS (MASS)</th>
<th>kg</th>
<th>lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis, with hoists</td>
<td>53 240</td>
<td>11 7375</td>
</tr>
<tr>
<td>Body, standard</td>
<td>15 020</td>
<td>33 115</td>
</tr>
<tr>
<td>Net Weight</td>
<td>68 260</td>
<td>150 490</td>
</tr>
<tr>
<td><strong>PAYLOAD, maximum</strong></td>
<td><strong>40 825</strong></td>
<td><strong>90 000</strong></td>
</tr>
<tr>
<td>Maximum Gross Weight*</td>
<td>158 980</td>
<td>350 495</td>
</tr>
</tbody>
</table>

FOR UNIT EQUIPPED WITH OPTIONAL BODY LINER PLATES:

| Chassis, with hoists   | 53 240 | 117 380 |
| Body, heavy duty      | 20 550 | 45 300 |
| Net Weight            | 73 790 | 162 680 |
| **PAYLOAD, maximum**  | **85 190** | **187 815** |
| Maximum Gross Weight* | 158 980 | 350 495 |

*Maximum permissible gross vehicle weight with options, attachments, full fuel tank and payload.

WEIGHT DISTRIBUTION

<table>
<thead>
<tr>
<th>Front Axle</th>
<th>Rear Axle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty %</td>
<td>49</td>
</tr>
<tr>
<td>Loaded %</td>
<td>34</td>
</tr>
</tbody>
</table>

Note: It is recognized that the appropriate design of the operator’s seat is the most effective construction measure to minimize the whole-body vibration emission of a particular machine family.
This machine is equipped with an operator’s seat which meets the criteria of EN ISO 7096 representing vertical vibration under severe operating conditions.
The seat is this machine has been tested with input spectral class EMI and has a seat transmissibility factor SEAT > 1.1.
10 - Symbol Identification
These pages explain the meaning of symbols that may appear on your machine.

- **Basic Warning Symbol**
- **Pressurised Compartment**
- **Master Switch**
- **Switch 'On'**
- **Switch 'Off'**
- **Negative Ground**
- **Ammeter**
- **Circuit Breaker**
- **Hourmeter**