1411 series Forklift Truck

Linde Material Handling

Operating Instructions

Models HT100Ds - HT180Ds

1411 series – 14118011540 rv02 US – 03/2016

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With over 100,000 fork lift trucks and warehouse machines sold annually, Linde is one of the world's leading manufacturers of material handling equipment. There are many reasons for this success: Linde products are renowned not only for their innovative, cutting-edge technology, but also for their low energy and operating costs, which are up to 40 per cent lower than those of their competitors.

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Proposition 65

⚠ WARNING

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This product contains and emits chemicals known to the state of California to cause cancer, birth defects and other reproductive harm.

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1

Introduction

Scope

This manual contains operating and periodic maintenance instructions as well as specifications for the industrial truck to which it applies. If this manual applies to a trailer or other towed equipment, then operation or maintenance of the towing vehicle is outside the scope of this manual. Important safety rules and descriptions of some operating hazards and how to avoid them are also included. The manual is intended to assist the owner and operators in maximizing safety and efficiency in material handling while achieving maximum product life. It describes how to correctly and safely operate and maintain the truck and all standard variants available at the time of printing. Special designs, special attachments, or other custom modifications carried out by the manufacturer to meet specialized customer requests are not covered in this manual.

This manual is not a training manual and is not to be used as the basis for formal training. It is intended to supplement such training with information specific to this truck as well as applicable good practices and safety rules which may be general in nature. This manual cannot address every possible hazard or potential accident situation. Ultimately it is the responsibility of the owner and operator(s) of the equipment to avoid or correct such potential dangers.

To assist in keeping the truck in good operating condition, a separate section devoted to maintenance is included in this manual. This section contains a list of items to be checked daily by the operator. It also has a schedule for maintenance procedures to be performed at regular intervals by those responsible for truck maintenance. All of these procedures are essential for safe operation and maximum service life of the truck. Scheduled maintenance tasks or repairs must only be performed by qualified forklift technicians. Details and instructions for performing such work are outside the scope of this manual. This information is covered in the applicable service manual available from authorized dealers.

The descriptions and specifications included in this manual were in effect at the time of printing. KION North America Corporation reserves the right to make improvements and changes without notice and without incurring obligation. Please check with your authorized dealer for information on possible updates or revisions.

Obligations of the Equipment Owner

The Occupational Safety and Health Administration (O.S.H.A.) requires employers of industrial truck operators to adhere to a number of regulations regarding operation. These regulations are codified in section 1910.178 of title 29 of the Code of Federal Regulations. This section establishes a number of specific rules pertaining to truck operation, inspection and maintenance, and areas of use. It is up to the owner to ensure that use and maintenance of any powered industrial truck is consistent with these rules.

In addition, 29 CFR 1910.178 describes required operator training in detail. It requires employers to establish and maintain a training program to ensure that all operators of powered industrial trucks are competent and trained in the safe and proper operation of powered industrial trucks.

Many of the rules set forth in 29 CFR 1910.178 are based on the American National Standards Institute's (ANSI/ITSDF) B56 standards. The owner should be familiar with 29 CFR 1910.178 as well as the ANSI/ITSDF B56 standards. Other federal standards may apply depending on specific industry. Owners should also be aware of any state OSHA rules that may differ from the federal rule. This equipment meets all applicable requirements of the ANSI/ITSDF B56 standards at time of manufacture. 29 CFR 1910.178 prohibits any modifications and/or additions which affect

capacity or safe operation of industrial trucks without prior written approval of the manufacturer. An owner should consult the authorized dealer if the owner's intended application for a truck is inconsistent with the designated performance characteristics of that truck. KION North America Corporation will not assume, and expressly disclaims, any liability for injuries or damages arising from or caused by unauthorized modification, removal, disconnection or disengagement of any part from any of its trucks. It is recommended that all replacement parts be of OEM (Original Equipment Manufacturer) origin.

Operator Responsibilities

It is the responsibility of the operator to operate any powered industrial truck in a safe manner. In order to do this, all operators must have completed training in the safe operation of powered industrial trucks. Operators must know and understand all general safety rules as well as any safety information specific to the environment in which they will be working. They must then practice these safe operating procedures whenever using a truck.

In addition, all operators must be familiar with the specific truck they use. Therefore they must be familiar with the procedures for correct and safe operation explained in this manual. They must understand the potential hazards and safety precautions covered in the manual. This manual however, cannot cover all possible hazards. Operators must be able to identify any hazards that may exist or arise in their work environment and know how to avoid or correct them.

Finally, operators are responsible for identifying and reporting any truck that is in unsafe condition. They must know how to inspect the truck they operate and they must perform this inspection before placing a truck in service each day. Operators must not operate a truck found to be damaged or malfunctioning.

Proper use

The truck is designed for lifting, transporting and stacking palletized or other stable loads. The maximum load to be lifted is specified on the truck data plate. The truck is not designed or intended to lift personnel.

The truck may be operated outdoors or in buildings only on surfaces that are flat and stable. Transporting of loads (in the lowered position) on inclines and ramps is permitted if the incline surface is flat and stable. Lifting of loads or transport of elevated loads is prohibited on inclines and ramps. If the truck is operated on public roads it must be equipped with lights and any other devices as required by state or local law. If the truck is to be operated in refrigerated storage areas, it must be equipped with an optional cold storage package suitable for the specific application. (Not available on all models.) A truck must not be operated in any hazardous environment unless the truck carries the designation appropriate for that environment per 29 CFR 1910.178. It is the responsibility of the owner to ensure the safety of all operating areas and surfaces and to restrict the truck to the uses and areas for which it is designed and rated.

Hazard messages

Hazard symbols and messages are placed in this manual and on the truck to provide instructions and identify specific areas where potential hazards exist and special precautions should be taken. Operators must understand the meaning of these symbols and messages.

Hazard messages

Damage to the truck, as well as serious injury or death to the operator or others may result if the instructions conveyed by these symbols and messages are not followed.

⚠ CAUTION

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

⚠ WARNING

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

⚠ DANGER

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

NOTE

Indicates further information presented to ensure clarification of a particular item

ENVIRONMENT NOTE

The information contained herein must be observed, otherwise environmental damage may occur.

2

Safety

Before Operation

Before using the truck, inspect the work area. It should be neat, well lit, adequately ventilated, and free from hazardous material. Aisles and roadways should be unobstructed and well marked.

Operators must know the UL classification for the truck and use the truck only in permissible areas.

Ensure that there are no loose objects on the truck or in the operator compartment, especially on the floor plate where they could interfere with pedal operation (if equipped) or foot room.

Fire extinguishers and other emergency equipment should be visible and easy to reach. Wear safety equipment when required. Don't smoke in "No Smoking" areas, or while charging batteries or refueling combustion engine trucks.

Never operate the truck with greasy hands. This will make the controls slippery and result in loss of truck control.

Any questions or concerns about safety should be brought to the attention of a supervisor. If an accident should occur, it must be reported immediately.

⚠ WARNING

Unauthorized modifications to the truck can result in injury or death.

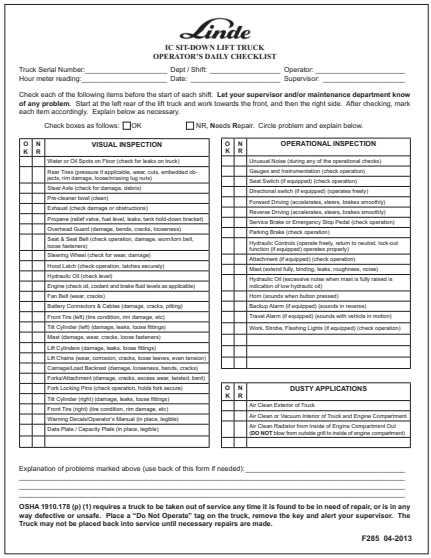
Do not remove, disable or modify any safeguards or other safety devices. These include any alarms, lights, mirrors, overhead guards, and load backrest extensions. If present, an overhead guard is intended to provide protection to the operator from falling objects, but cannot protect from every possible impact.

Operator Daily Checklist

At the beginning of each shift, inspect your truck by using the **Linde Operator's Daily Checklist**. If necessary, refer to the Maintenance section of this manual for details on how to carry out this inspection. Check for damage and maintenance problems. Any necessary repairs must be completed before the truck is operated. In addition to daily inspection, scheduled maintenance is vital to safe operation of the truck. Adhere to the inspection, lubrication and maintenance schedule given in the Maintenance section of this manual.

NOTE

Any repairs or maintenance to the truck must be performed only by trained and authorized technicians.



Linde

IC SIT-DOWN LIFT TRUCK
OPERATOR'S DAILY CHECKLIST

Truck Serial Number:_____ Dept / Shift: _____ Operator: _____
Hour meter reading:_____ Date: _____ Supervisor: _____

Check each of the following items before the start of each shift. **Let your supervisor and/or maintenance department know of any problem.** Start at the left rear of the lift truck and work towards the front, and then the right side. After checking, mark each item accordingly. Explain below as necessary.

Check boxes as follows: ☐OK ☐NR, **N**eeds **R**epair. Circle problem and explain below.

OK	NR	VISUAL INSPECTION
		Water or Oil Spots on Floor (check for leaks on truck)
		Rear Tires (pressure if applicable, wear, cuts, embedded objects, rim damage, loose/missing lug nuts)
		Steer Axle (check for damage, debris)
		Pre-cleaner bowl (clean)
		Exhaust (check damage or obstructions)
		Propane (relief valve, fuel level, leaks, tank hold-down bracket)
		Overhead Guard (damage, bends, cracks, looseness)
		Seat & Seat Belt (check operation, damage, worn/torn belt, loose fasteners)
		Steering Wheel (check for wear, damage)
		Hood Latch (check operation, latches securely)
		Hydraulic Oil (check level)
		Engine (check oil, coolant and brake fluid levels as applicable)
		Fan Belt (wear, cracks)
		Battery Connectors & Cables (damage, cracks, pitting)
		Front Tire (left) (tire condition, rim damage, etc)
		Tilt Cylinder (left) (damage, leaks, loose fittings)
		Mast (damage, wear, cracks, loose fasteners)
		Lift Cylinders (damage, leaks, loose fittings)
		Lift Chains (wear, corrosion, cracks, loose leaves, even tension)
		Carriage/Load Backrest (damage, looseness, bends, cracks)
		Forks/Attachment (damage, cracks, excess wear, twisted, bent)
		Fork Locking Pins (check operation, holds fork secure)
		Tilt Cylinder (right) (damage, leaks, loose fittings)
		Front Tire (right) (tire condition, rim damage, etc)
		Warning Decals/Operator's Manual (in place, legible)
		Data Plate / Capacity Plate (in place, legible)

OK	NR	OPERATIONAL INSPECTION
		Unusual Noise (during any of the operational checks)
		Gauges and Instrumentation (check operation)
		Seat Switch (if equipped) (check operation)
		Directional switch (if equipped) (operates freely)
		Forward Driving (accelerates, steers, brakes smoothly)
		Reverse Driving (accelerates, steers, brakes smoothly)
		Service Brake or Emergency Stop Pedal (check operation)
		Parking Brake (check operation)
		Hydraulic Controls (operate freely, return to neutral, lock-out function (if equipped) operates properly)
		Attachment (if equipped) (check operation)
		Mast (extend fully, binding, leaks, roughness, noise)
		Hydraulic Oil (excessive noise when mast is fully raised is indication of low hydraulic oil)
		Horn (sounds when button pressed)
		Backup Alarm (if equipped) (sounds in reverse)
		Travel Alarm (if equipped) (sounds with vehicle in motion)
		Work, Strobe, Flashing Lights (if equipped) (check operation)

OK	NR	DUSTY APPLICATIONS
		Air Clean Exterior of Truck
		Air Clean or Vacuum Interior of Truck and Engine Compartment
		Air Clean Radiator from Inside of Engine Compartment Out **DO NOT** blow from outside grill to inside of engine compartment)

Explanation of problems marked above (use back of this form if needed): _____

OSHA 1910.178 (p) (1) requires a truck to be taken out of service any time it is found to be in need of repair, or is in any way defective or unsafe. Place a "Do Not Operate" tag on the truck, remove the key and alert your supervisor. The Truck may not be placed back into service until necessary repairs are made.

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Operating position

Face the truck when mounting and dismounting. Maintain a three-point contact, one foot and two hands with the truck when mounting or dismounting. Never exit a moving truck.

The normal operating position is defined as being seated on the seat with the seat belt fastened and hands and feet inside the operator's compartment on or near the controls.

⚠ WARNING

Risk of injury!

Operate the truck only when you are in the normal operating position. Always keep hands and feet inside the operators compartment. during operation. Keep hands, feet and legs out of the upright.

⚠ WARNING

Risk of injury!

Do not place yourself between the mast and the body of the truck. Do not use the mast as a ladder. Do not transport personnel at any time. Do not lift personnel using the forks of the truck, or with a work platform. The truck is not designated to lift personnel.

Pedestrians

Watch out for pedestrians. Always yield the right-of-way to pedestrians. Do not drive the truck up to anyone standing in front of a rack or fixed object. Do not pass another truck travelling in the same direction at an intersection, blind spot or other dangerous location. Sound the horn at intersections and other locations where vision is obstructed. Always look in the direction of travel.

Never engage in stunt driving or horseplay. Use lights in dark and dim areas. Always ensure that there are no pedestrians in the truck's rear swing area before turning. Watch for pedestrians around the truck.

⚠ DANGER

Risk of injury!

Watch for people in your work area because they may not watch for you, even if you have lights or alarms.

⚠ WARNING

Risk of injury!

Do not walk under raised forks at any time.

110107_04

⚠ WARNING

Risk of injury!

Do not transport personnel at any time. Do not lift personnel using the forks of the truck, or with a work platform. The truck is not designed to lift personnel.

110107_05

Travel

The truck is designed for operation on smooth, dry surfaces such as warehouse and factory floors, loading docks or paved areas. Under all travel conditions operate the truck at a speed that will permit it to be brought to a stop in a safe manner. Avoid running over loose objects on the roadway surface.

⚠ WARNING

Loss of control!

Do not travel at excessive speeds; keep your truck under control at all times.

Travel with the forks near the floor, tilted back to cradle any load whenever possible.

Never begin travel before the mast is fully lowered and tilted into travel position. Never raise the mast during travel. During travel, always watch for overhead obstructions such as lights, wiring, pipes, sprinkler systems, doorways, etc.

When travelling in reverse, always turn around to face the direction of travel and ensure a direct view in the direction of travel. Do not rely on mirrors when travelling in reverse.

When handling bulky loads that restrict your vision, operate the truck in reverse to improve visibility. Unstable loads are a hazard to you and to your fellow workers. Make certain that all loads are secured and evenly positioned on the forks.

Do not move railroad cars or trailers with this truck, or use it to operate or close railroad car doors.

Lifting and Lowering

Always ensure there is adequate overhead clearance before raising the forks. Before lifting any load or retrieving one from an elevated location, make certain that the load is stable and evenly positioned on the forks. Never lift a load with one fork.

Use extreme care when maneuvering loads into or out of storage locations. Never turn the truck while maneuvering with the forks raised. Always check for mast or carriage hang-up before manueuvering out of any storage location with or without a load on the forks.

⚠ WARNING

Attempting to move the truck if the lift chains become slack can result in injury from carriage free-fall.

Always raise the forks before you move. Watch for slack chain condition. Slack chains indicate that the mast or carriage is hung-up. Do not attempt to repair this yourself, always get a trained mechanic.

Inclines, Ramps, Docks, Elevators

If you must travel on an incline, do so with caution. Do not operate truck on a wet incline.

Keep the forks **upgrade** to maintain control when travelling up or down an incline with a **loaded** truck.

Keep the forks **downgrade** when travelling up or down an incline with an **empty** truck.

⚠ DANGER

Tip-over will occur if you turn while travelling on a ramp or travel at an angle other than straight up or straight down a ramp.

Never turn on an incline or ramp either loaded or unloaded. Travel straight up or straight down.

Be aware that when descending an incline your stopping distance will be greater than when on a level surface. Reduce your speed, and ensure that there is adequate clear space at the bottom of the ramp to stop and turn.

To avoid hazards associated with a dock, you should personally check that the trailer brakes have been applied, wheel chocks are in place, and that any trailer-to-dock locking systems are being utilized. The impact of moving in and out of a trailer may cause the trailer to creep or move. Confirm that the driver will not move the trailer until you are done.

Do not drive the truck onto an elevator without specific authorization. Verify that the capacity of the elevator exceeds the weight of the truck and the weight of the load. Approach elevators slowly and ensure that the elevator car is level with the floor before entering. Enter elevators squarely with the load end leading. Ensure that no part of the truck or load contacts any part of the elevator other than the floor. Once on the elevator, neutralize the truck controls, shut off the power, and set the brakes. Any

other personnel should leave the elevator before the truck is allowed to enter or leave.

Be especially cautious when driving the truck on ramps or bridge plates. Be sure to maintain a safe distance from each edge. Before driving the truck over a ramp or bridge plate, verify that its position is secured to prevent movement. Never exceed the rated capacity of a ramp or bridge plate.

Avoiding Falls and Tip-overs

Lift truck tip-overs can cause serious injury or death. Following all safety rules when operating a lift truck is the best way to prevent injury.

- Never exceed the lifting capacity listed on the data plate.
- Extreme caution should be taken when working around docks, dock boards and trailers.
- Travel with the load or forks close to the ground and tilted back. Watch for overhead obstructions. Perform all truck movements smoothly and at a speed that will give you time to react in an emergency.
- An unloaded truck can tip over also. Caution must be taken when using an unloaded truck as well as a loaded one.
- Never travel with mast extended.
- Never turn while travelling on a ramp or incline
- Never travel up or down an incline at an angle to the incline direction. Always travel straight up or straight down any ramp or incline.

Lateral tip-over can occur with a combination of speed and sharpness of turn. This condition of instability is even more likely with an unloaded truck. With the load raised, lateral tip-over can occur while turning and/or braking when travelling in reverse or accelerating and turning while travelling forward. Lateral tip-over can occur loaded or unloaded on a ramp. Longitudinal tip-over can occur with a combination of overloading and load elevated. This condition is even more likely with forward tilt, braking in forward travel, accelerating rearward or mast extended.

⚠ WARNING

Jumping from the truck during a tip-over can result in severe injury or death.

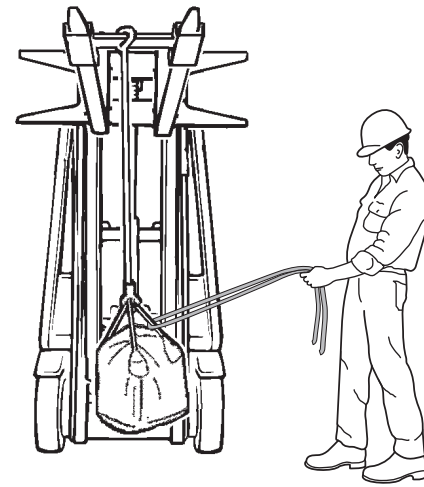
If the truck starts to tip over, DO NOT JUMP!

Stay in the seat, hold onto the steering wheel tightly, brace feet, and lean away from the direction of impact.

Suspended Loads

Traveling with suspended loads on cable or chain can induce swinging.

- Swinging of loads can cause truck tip over.
- Avoid suspending loads if possible.
- If necessary carry suspended loads low.
- Use a partner with a rope or tether to stop swinging.
- Operate truck slowly.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Parking

When you are finished with the truck, observe proper shutdown procedures.

- Never park on a grade.
- Always come to a complete stop before leaving truck.
- Place travel controls in neutral.
- Lower forks fully to the floor and tilt forward.
- Set parking brake.
- Turn key to **OFF** position. Remain with the truck until the engine shuts down completely.
- If the operator is more than 25 ft (7.5 m) away from the truck, or out of sight of the truck, the key should be removed.

⚠ DANGER

Exhaust gases can cause serious injury or death if not ventilated.

Do not continuously operate the truck or allow it to idle in any confined space or any place that is not well ventilated.

⚠ WARNING

Failure to properly shut down the truck may allow inadvertent movement and result in a collision.

Never park on a grade. Always set the parking brake and turn the key switch off. On single pedal trucks, always place the direction switch in neutral.

⚠ WARNING

Improper parking can interfere with emergency response.

Do not block stairways, main passageways or emergency routes. Do not block access to fire or emergency equipment.

Safety During Maintenance

Personnel Qualifications

Only qualified personnel authorized by the owner are permitted to perform maintenance or repair work. All items listed in the Scheduled Maintenance Charts must be performed by qualified forklift technicians only. They must have knowledge and experience sufficient to assess the condition of a forklift truck and the effectiveness of the protective equipment according to established principles for testing forklift trucks. Any evaluation of safety must be unaffected by operational and economic conditions and must be conducted solely from a safety standpoint.

Daily inspection procedures and simple maintenance checks, e.g. checking the hydraulic oil level or checking the fluid level in the battery, may be performed by operators. This does not require training as described above.

Diesel Exhaust Fluid

Diesel exhaust fluid (DEF) is a liquid necessary to operate vehicles with certain exhaust gas after-treatment systems. DEF may be clear or blue in color. It is carried in a separate tank on board the vehicle and is consumed during normal operation.

NOTE

DEF is sometimes referred to as "urea" or by the common brand name "Adblue®".

⚠ WARNING

Risk of skin, eye and nose and throat irritation.

Handle diesel exhaust fluid only in well ventilated areas and always use gloves and safety glasses. In case of skin or eye contact, rinse the affected areas with water immediately. Clothing contaminated with diesel exhaust fluid must changed immediately.

⚠ WARNING

If a diesel exhaust fluid tank is full, pressure compensation may occur when the tank lid is opened causing a sudden escape of liquid or vapor.

Always open tank caps carefully to avoid exposure.

Avoid contact, inhalation, or ingestion. If swallowed, seek medical assistance immediately. Keep out of the reach of children.

Hazardous Substances

Oils

⚠ WARNING

Oils are flammable!

- ➢ Always comply with applicable legal regulations.
- ➢ Do not allow oil to come into contact with hot engine parts.
- ➢ Do not smoke in areas where oils are used or stored.

⚠ WARNING

Oils are toxic!

- ➢ Avoid skin contact, inhalation, or ingestion.
- ➢ If oil mist or vapors have been inhaled, seek fresh air.
- ➢ If oil comes into contact with the eyes, flush thoroughly (at least 10 minutes) with water and then seek medical assistance.
- ➢ If oil is swallowed, do not induce vomiting. Seek medical assistance immediately.

⚠ WARNING

Prolonged intensive contact with the skin can result in loss of natural skin oils and irritate the skin.

- ➢ Avoid skin contact.
- ➢ Wear protective gloves, long sleeves, and eye protection.
- ➢ If oil contacts the skin, wash the affected area with soap and water.
- ➢ Change oil-soaked shoes or clothing immediately.

⚠ WARNING

Spilled oil presents a risk of slipping, particularly when combined with water.

- ➢ Immediately treat spilled oil with an oil binding agent, and then dispose of it according to local regulations.

ENVIRONMENT NOTE

All oils are potent contaminants of water.

- *Recycle used oil if possible.*
- *Always store oil in appropriate containers.*
- *Avoid spills.*
- *Spilled oil should be removed with oil-binding agents at once and disposed of according to local regulations.*
- *If recycling is not possible, dispose of used oil according to local regulations.*

Pressurized Hydraulic Oil

⚠ WARNING

Like other oils, hydraulic oil is flammable, toxic, and a skin irritant.

- ➢ Do not allow hydraulic fluid to come into contact with hot motor parts.
- ➢ Avoid inhalation or skin contact of hydraulic oil.
- ➢ Refer to the safety information under "Oils".

⚠ WARNING

Hydraulic oil is pressurized during operation of the forklift truck and may remain pressurized after shut down. An escaping stream of pressurized hydraulic oil can cause serious injury.

- ➢ If pressurized hydraulic oil is found to be escaping from the truck, shut down the truck immediately and have the leak repaired before returning the truck to service.
- ➢ Only trained service personnel should attempt to repair any portion of the hydraulic system.
- ➢ Do not allow hydraulic fluid to come into contact with the skin.
- ➢ Avoid inhaling spray or mist created by escaping hydraulic oil.
- ➢ Penetration of pressurized fluids into the skin is particularly dangerous if these fluids escape at high pressure due to leaks in the hydraulic system. In case of such injury, immediate medical assistance is required.
- ➢ To help prevent injury, use appropriate personal protective equipment (e.g. protective gloves, long sleeves and industrial goggles).

ENVIRONMENT NOTE

Hydraulic oil is a potent contaminant of water.

- *Recycle used hydraulic oil if possible.*
- *Always store hydraulic oil in appropriate containers.*
- *Avoid spills.*
- *Spilled hydraulic oil should be removed with oil-binding agents at once and disposed of according to local regulations.*
- *If recycling is not possible, dispose of used hydraulic oil according to local regulations.*

Battery Acid

⚠ WARNING

Battery acid contains dissolved sulfuric acid. This is toxic.

- Avoid contact and consumption.
- In case of injury, seek medical advice immediately.

⚠ WARNING

Battery acid contains dissolved sulfuric acid. This is corrosive.

- When working with battery acid, always wear protective clothing and eye protection.
- Do not allow any acid to get onto clothing or skin or into the eyes; if this does happen, rinse immediately with plenty of clean water.
- In case of injury, seek medical advice immediately.
- Immediately rinse away spilled battery acid with plenty of water.

ENVIRONMENT NOTE

- Dispose of used battery acid according to local regulations.

Coolant reservoir or radiator

⚠ WARNING

Engine coolant can reach high temperatures and pressures and cause severe burns.

Immediately after using the lift truck, the engine coolant is at high temperature and high pressure. Do not remove any radiator or reservoir cap or attempt work on the cooling system under these conditions. Hot water can escape suddenly and cause severe burns.

When checking the coolant level, stop the engine and wait for the engine and radiator to cool down before checking. When removing the radiator cap, turn it slowly to release any internal pressure.

For lift trucks equipped with a subtank or reservoir, check the level in the subtank. When adding water on lift trucks equipped with a subtank, add the water to the subtank.

Always allow the engine to cool before attempting any maintenance or repair on hoses or any other part of the cooling system. Disassembly of cooling system components while hot can allow hot, highly pressurized coolant to escape and cause injury.

Starting Battery

⚠ WARNING

Batteries contain dissolved sulfuric acid, which is poisonous and caustic. Batteries also can produce explosive gases.

Remain aware of the following information.

- Wear protective equipment (protective apron and gloves) and protective glasses when working with battery acid. If clothing, skin or eyes come into contact with battery acid, immediately flush the affected areas with water. If acid contacts the eyes, seek medical attention at once.**Clean spilled**

battery acid immediately with large amounts of water.

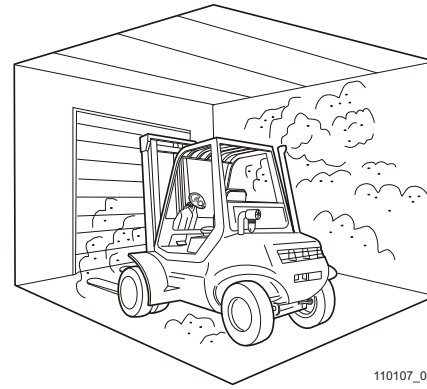
- Remove any metal rings, bracelets, bands, or other jewelry before working with or near batteries or electrical components.
- Never expose batteries to open flame or sparks.
- Areas in which batteries are stored or charged must be well ventilated to prevent concentration of explosive gases.
- If a battery is charged while installed in the truck, the hood or battery access door must remain completely open during the entire charging period.
- Shorting of battery terminals can cause burns, electrical shock, or explosion. Do not allow metal parts to contact the top surface of the battery. Make sure all terminal caps are in place and in good condition.
- Batteries may only be charged, serviced, or changed by properly trained personnel. Always follow all instructions provided by the manufacturers of the battery, charger, and forklift truck.
- When jump starting a vehicle with a discharged battery, make sure the booster battery is the same voltage as the vehicle battery. Do not connect the negative cable from the booster battery to the negative terminal of the discharged battery. Instead connect it to the frame of the vehicle being started to avoid the possibility of sparking near the battery. Make sure all jumper cables remain clear of all moving engine parts throughout the starting process.
- Never attempt to jump start a vehicle with a frozen battery. This can result in an explosion.

Vehicle exhaust

⚠ DANGER

Risk of injury or death!

Do not leave the engine running where there is poor ventilation. The engine exhaust gas contains carbon monoxide. There is danger that this will cause gas poisoning which may result in serious injury or death.



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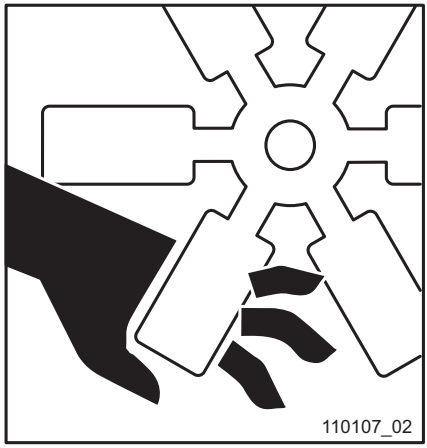
Rotating fan blades

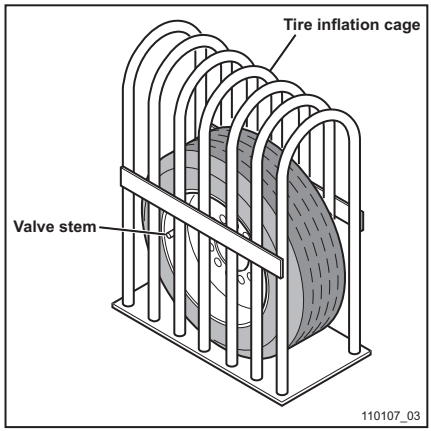


⚠ WARNING

Risk of injury!

It is extremely dangerous if you or any tool touches or gets caught in the fan or fan belt when the fan is rotating. Never touch the fan when it is rotating. Always stop the engine before inspecting rotating parts. When inspecting the areas around rotating parts, do not allow anything to come close which may get caught.

Wheels and Tires



⚠ WARNING

The tire inflation pressure on a forklift truck is several times higher than the pressure on an automobile. Also, multi-piece rim sets can present the hazard of explosive disassembly if not handled properly.

When working with wheels or tires, always observe the following safety rules. Failure to observe these rules could result in severe injury or death.

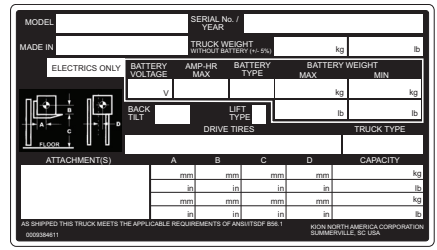
- **When inflating or deflating tires, a suitable safety cage or barrier shall be used.**
- **Always check for rim damage before inflating tires. Do not add air to tires with cracked or damaged rims. Adding air to tires with damaged rims can cause the rim to break with explosive force. If a damaged rim is discovered, have the wheel removed and repaired by trained and qualified personnel before using the truck.**
- **When checking tire pressure, place your body in front of the tread face of the tire. Do not check from the side face of the tire.**
- **Always inflate tires to the correct pressure. Incorrect tire pressure can cause premature wear or explosive separation of multi-piece rim sets.**

- **Always wear safety glasses when inflating tires to avoid possible eye injury from dust or dirt.**
- **Only properly trained personnel should replace pneumatic tires on multi-piece rim sets.**
- **Always use correct procedures when servicing or replacing pneumatic tires on multi-piece rim sets. Failure to use proper procedures can result in explosive separation of the tire and rim set and cause severe injury or death.**
- **OSHA safety procedures must always be followed. Refer to OSHA 1910.177.**
- **Do not mix different sizes or tire types, this could affect stability.**
- **If the procedures listed above are not followed the result could be death or serious injury.**

Operator Warning Decals

Data plate

The data plate is designed to inform personnel of truck capacity and other important truck specifications. The operator should locate, read, and understand the data plate prior to using the forklift truck.



⚠ DANGER

Risk of tip-over.

Never attempt to lift a load greater than the maximum capacity listed on this plate.

Parking brake warning decal

This decal reminds operators to engage the parking brake lever whenever it is necessary to set the parking brake as it is not automatically applied.

Operator warning decal

This decal lists a number of fundamental safety points that are crucial to safe operation. Operators must understand these items and remain aware of them during truck operation.

WARNING

SIT-DOWN RIDER TRUCK OPERATOR WARNINGS

1. **CHECK YOUR TRUCK** - The truck should be checked daily before being placed in service. If found to be in need of repair, defective, or in any way unsafe it should be reported immediately to the proper authority and removed from service until restored to a safe operating condition.
2. **KNOW YOUR TRUCK** - Do not operate this truck unless you have been trained and authorized to do so. Read all warnings and instructions in the Operator's manual on this truck; or obtain them from plant Safety Director or the local Linde representative.
3. **KEEP INSIDE** - Operate truck only when you are in the normal operating position and seated in the operator's seat. Never place any part of your body into the mast structure, between the mast and the truck, or outside the truck. Do not carry passengers.
4. **PROTECT YOURSELF** - Do not operate truck without overhead guard.
5. **SEAT BELT** - MAKE SURE YOUR SEAT BELT IS FASTENED BEFORE OPERATING THE TRUCK.
6. **LATERAL TIPOVER** - Can occur loaded or unloaded by a combination of speed and sharpness of turn. SLOW DOWN BEFORE TURNING. With the mast raised, lateral tipover also can occur by turning and/or braking when moving rearward, turning and/or accelerating forward or turning on an incline or ramp. TRAVEL WITH THE MAST LOWERED. The potential for lateral tipover will be further increased by overloading, excessive rearward tilt or off-center positioning of the load. Don't risk injury or death. Drive smart.
7. **LONGITUDINAL TIPOVER** - Can occur by driving with the load down slope on an incline or ramp, overloading, excessive forward tilt or aggressive braking when moving forward or accelerating rearward with the mast elevated. TRAVEL WITH THE MAST LOWERED. Don't risk injury or death. Drive smart.
8. **LATERAL OR LONGITUDINAL TIPOVER** - Can occur if the truck is driven over objects on the floor or ground, off the edge of improved surfaces, or into potholes, or by impacting overhead obstacles or collision with other objects. Don't risk injury or death. Drive smart.
9. **DON'T JUMP OFF** - If your truck begins to tip over, DON'T JUMP. Hold the steering wheel tightly, brace feet, and lean away from tip. Stay in the seat to avoid being trapped between the truck and the ground.
10. **HIGH LOADS** - Do not handle loads which are higher than the load backrest or load backrest extension unless load is secured so that no part of it could fall backward.
11. **STABILIZE YOUR LOAD** - Do not handle unstable or loosely stacked loads. Use special care when handling long, high, or wide loads to avoid losing the load, striking bystanders, or tipping truck.
12. **CENTER YOUR LOAD** - When using forks, space forks as far apart as load will permit. Before lifting, be sure load is centered and forks are completely under load.
13. **NEVER OVERLOAD** - Do not overload truck. Check capacity plate for load weight and load center information.
14. **AVOID SUDDEN MOVEMENTS** - Start, stop, travel, steer, and brake smoothly. Sudden movements can endanger yourself and others.
15. **LOOK OVERHEAD** - Elevate forks or other lifting mechanism only to pick up or stack a load. Lift and lower with mast vertical or slightly back - NEVER FORWARD. Watch out for obstructions, especially overhead.
16. **MINIMUM TILT** - Operate tilting mechanism slowly and smoothly. Do not tilt forward when elevated except to pick up or deposit a load. When stacking use only enough backward tilt to stabilize load.
17. **EYES AHEAD** - Travel with load or lifting mechanism as low as possible and tilted back. Always look in direction of travel. Keep a clear view, and when load interferes with visibility, travel with lifting mechanism trailing (except when climbing ramps).
18. **CARE ON RAMPS** - Use special care when operating on ramps, travel slowly, and do not angle or turn. When truck is loaded, travel with load uphill. When truck is empty, travel with lifting mechanism downhill.
19. **SLOW DOWN** - Observe applicable traffic regulations. Yield right-of-way to pedestrians. Slow down & sound horn at cross aisles and whenever vision is obstructed.
20. **WATCH PEOPLE** - Do not allow anyone to stand or pass under lifting mechanism, directly behind truck or within rear swing area when turning.
21. **WORK PLATFORMS** - DO NOT LIFT OR CARRY PERSONNEL USING THE FORKS OF THE TRUCK, not even with a work platform. The truck is de-signed for transporting, warehousing and stacking of material, not personnel.
22. **SHUT DOWN COMPLETELY** - Before getting off truck, neutralize travel control, fully lower lifting mechanism and set the parking brake. Shut off power when leaving truck unattended. Block wheels if truck is parked on an incline.
23. **ENGINE EXHAUST** on gas or diesel trucks contains carbon monoxide (CO). Exposure can cause severe injury or death.

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Failure to comply with these warnings will create an unreasonable risk of injury to yourself and others.

Trained operator warning decal

This decal states the requirement that only trained and authorized personnel are to operate truck.

WARNING

TRAINED AND AUTHORIZED OPERATORS ONLY.

MISUSE OF THIS TRUCK COULD CAUSE INJURY TO YOURSELF OR OTHERS WORKING WITH YOU.

READ INSTRUCTIONS IN OPERATOR'S MANUAL.

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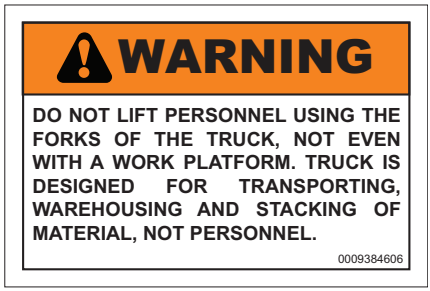
Never stand or walk under forks warning decal ▷

This decal warns personnel not to stand or walk on, or under, the forks at any time. This applies to operators as well as all others.

Do not lift personnel warning decal ▷

This decal states that the operator should never use the forks for lifting personnel for any reason. Even if special work platforms for lifting personnel are available, they are not to be used with this truck to lift personnel.



Crushed fingers warning decal ▷

This decal is placed in areas where parts move close together during normal truck operation. The decal warns personnel to keep hands clear of these areas at all times.

No step warning decal

This decal warns personnel of moving parts that are unsafe to step or stand upon.

Tip-over warning decal

This decal warns operators that tip-over accidents can be avoided by operating the truck as instructed in the operator's manual. Operators are reminded to fasten the seat belt to minimize the risk of injury if a tip-over does occur. This decal also reminds operators to slow down while turning to avoid tip-over. In case of tip-over, the decal instructs operators to stay in the seat, hold onto the steering wheel tightly, brace feet, and lean away from the direction of impact.

⚠ WARNING

Jumping from the truck during a tip-over can result in severe injury or death.

If the truck starts to tip over, DO NOT JUMP!

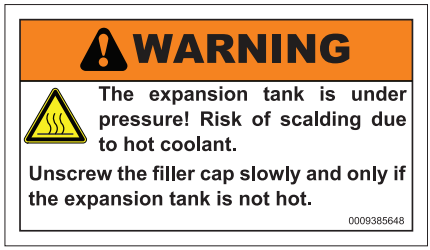
Stay in the seat, hold onto the steering wheel tightly, brace feet, and lean away from the direction of impact.

Back up alarm warning decal

This decal is present if the truck is equipped with a back-up alarm. The decal reminds the operator that the alarm must sound anytime the truck is moving in reverse. It also warns the operator to maintain a clear view in the direction of travel.

Hot coolant warning decal

This decal warns personnel not to unscrew the radiator or expansion tank cap while it is under pressure. Scalding could occur due to hot coolant.



3

Overview

Technical Description

General

The 1411 series of forklifts are sit-down IC counterbalanced models (ITA class 5). They are designed for handling loads up to:

10 tons for HT 100

12 tons for HT 120

14 tons for HT 140

15 tons for HT 150

16 tons for HT 160

These capacities are nominal values and are based on a 24 inch (600 mm) load center.

The following models are designed for a 48 inch (1200 mm) load center. They are designed for handling loads up to:

10 tons for HT 100-1200

12 tons for HT 120-1200

14 tons for HT 140-1200

15 tons for HT 150-1200

16 tons for HT 160-1200

All models may be downrated depending on mast height and/or attachments. Exact capacity limits for individual vehicles are found on the data plate.

Drive Train

The drive train is comprised of a four-cylinder, turbocharged, common rail direct injection diesel engine directly coupled to a torque converter transmission. The engine is cooled through a closed-loop coolant circuit with an expansion reservoir. A force feed lubrication system is provided with the oil pump driven directly off the crank shaft. Oil is cooled through heat exchange with the engine coolant in a heat exchanger at the front of the engine. A dry air filter with a paper cartridge cleans the combustion air.

The engine is fitted with an selective catalytic reduction (SCR) exhaust aftertreatment system. This system relies on continuous injection of urea into the exhaust stream to provide a source of ammonia necessary for the reduction reactions to occur in the exhaust catalysts. Urea is stored in a separate tank on board the truck in the form of diesel exhaust fluid (DEF).

The transmission is a three-speed reversing design. Shifting is accomplished through electronically controlled, hydraulically actuated multi-disk clutches. Transmission monitoring, control, and fault detection occurs through a dedicated transmission control unit.

The transmission is connected through a short drive shaft to a mechanical drive axle mounted transversly in the chassis. Input torque passes through a central differential to planetary reduction gear units located at each outboard wheel hub. Spring-activated wet-running disc brakes are incorporated into the wheel hubs. Vehicle speed and direction (forward and reverse) are controlled by the operator through a direction lever on the armrest and a conventional throttle pedal. An additional brake pedal is provided to maintain low-speed functionality for operators accustomed to a separate "inching" pedal for their left foot.

Hydraulic System

The hydraulic system utilizes fluid pressurized by a variable displacement pump driven by the transmission. The pump is gravity fed from a fluid reservoir incorporated into the vehicle frame. Pressurized hydraulic fluid from the pump is routed to a priority valve which distributes flow between the steering system and working hydraulics based on demand. Working hydraulics are controlled by a multi-spool proportional hydraulic valve (depending on options) which diverts fluid to power a given hydraulic function when selected by the operator via controls mounted on the armrest. This system enhances smoothness and precision and also allows programmable control over hydraulic function characteristics.

An additional auxiliary gear pump is attached to the main pump assembly to provide hydraulic pressure to operate the drive axle brakes and release the parking brake. This auxiliary pump also provides working pressure to the cabin tilt system.

Steering

The rear-wheel steering system is hydraulically operated and controls the rear wheel angle through a hydraulic cylinder mounted to the steering axle assembly. Positioning of the cylinder is based on steering wheel movement which actuates a proportional valve at the base of the steering column.

Brake System

Separate systems are provided for general service braking and the parking brake. Service braking is accomplished through wet-running multi-disc brake assemblies incorporated into each final drive gear unit. These brakes are hydraulically activated and spring released. The system is actuated through a foot pedal connected to a brake valve that controls system pressure. Whenever the truck is started, hydraulic pressure becomes available to apply the service brake. Brake pressure is applied in proportion to the amount of pedal movement. An accumulator is incorporated into the brake system to store pressure so that the brake pedal can continue to function if engine power is lost.

An inching function is also present. As the brake pedal is initially pressed, working pressure is bled away from the transmission allowing creep speeds for maneuvering or high throttle speeds to meet hydraulic demand without increasing vehicle speed. A brake pedal extension is positioned for operation with the left foot for operators accustomed to conventional inching operation.

The parking brake assembly is separate from the service brakes. It is a spring-applied, hydraulically released disc brake located at the drive axle input shaft. When the truck is running and the brake switch is off, hydraulic pressure is applied to the caliper to release the brake. When the truck is switched off or if the parking brake switch is turned on, hydraulic pressure is removed and the parking brake is applied by the internal springs.

Lift Mast

Two styles of masts are available with varying height capabilities - simple and double.

The simple mast consists of an inner and outer upright and a fork carriage. A pair of lift cylinders raises and lowers the inner upright during lifting and lowering. Lift chains attached to the fork carriage and anchored to the stationary outer upright are routed over pulleys on the inner upright to raise the carriage. This arrangement results in a telescopic relationship between the carriage and mast uprights.

The double mast maintains the inner and outer uprights of the simple mast. The carriage chains however are anchored to the inner upright and routed over an additional lift cylinder dedicated to raising and lowering the fork carriage only. Hydraulic fluid does not power the mast lift cylinders until the free lift cylinder has reached maximum extension. This establishes a free-lift function that allows the fork carriage to move independently to the top of the uprights before they begin to move. Once the uprights begin to move, the carriage remains at the tip of the inner upright throughout the remainder of the lift range. The free-lift function allows lifting through the lower part of the lift range in areas where overhead clearance is limited.

Integral side shifting and fork positioning are standard on the carriages.

Electrical System

A 24-volt battery-powered electrical system provides current for starting and control functions. Two 12-volt heavy duty batteries, connected in series, are provided to power the electrical system. The batteries are recharged through an engine-driven alternator with solid-state rectifier and charge control unit. A pair of control units processes signals from

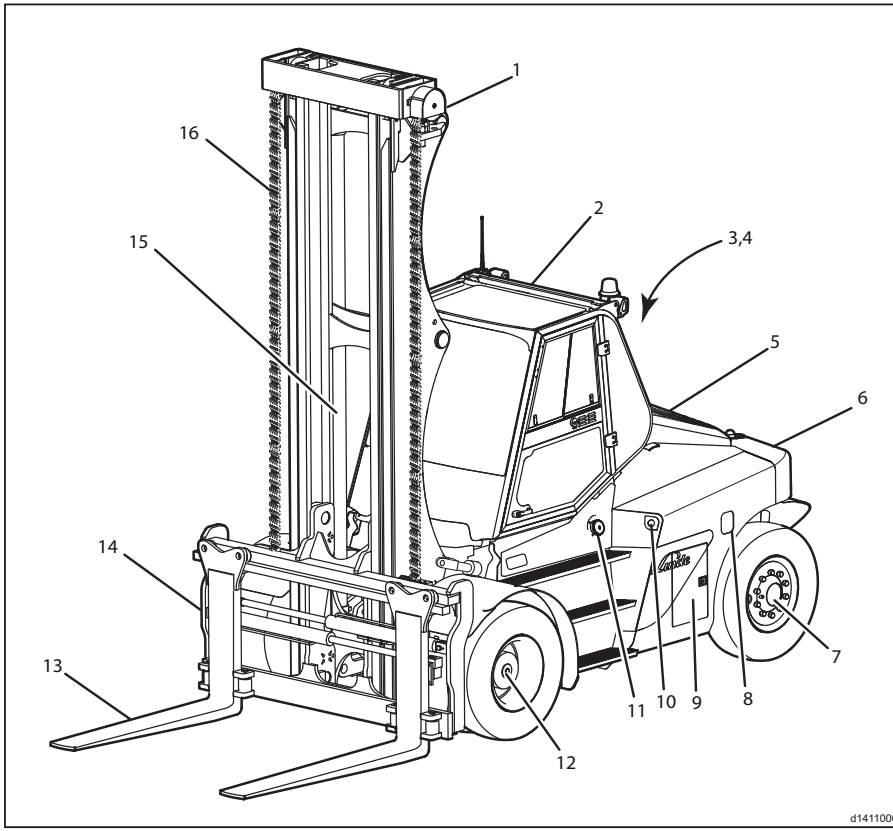
sensors, interlocks, and operator controls and generates the appropriate release and output signals to truck functions or the operator display unit. A separate engine control unit monitors and adjusts the fuel system and ignition. A separate transmission controller monitors and engine and throttle signals and controls transmission function. By connecting a laptop to a computer connection port provided in the wiring harness, vehicle parameters can be set and diagnostic operations performed.

Operator Compartment

The operator compartment frame forms the overhead guard. The standard version provides an open operator compartment with a weatherproof seat and switches.

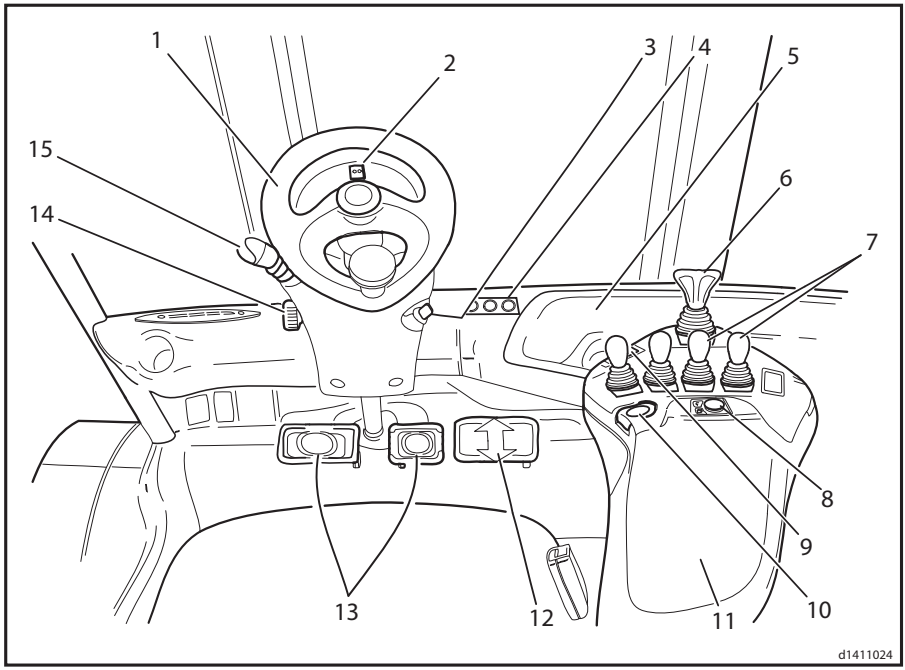
The optional enclosed cabin includes front, rear, side and top glazing with glazed entry doors. Windshield wiper and washers are fitted to the front, top and rear glazing. A heater and forced air ventilation system is standard on the enclosed cabin. Full climate control with air conditioning is an additional option. Either of these systems provides defrost functions for the cabin glazing.

General view of Truck



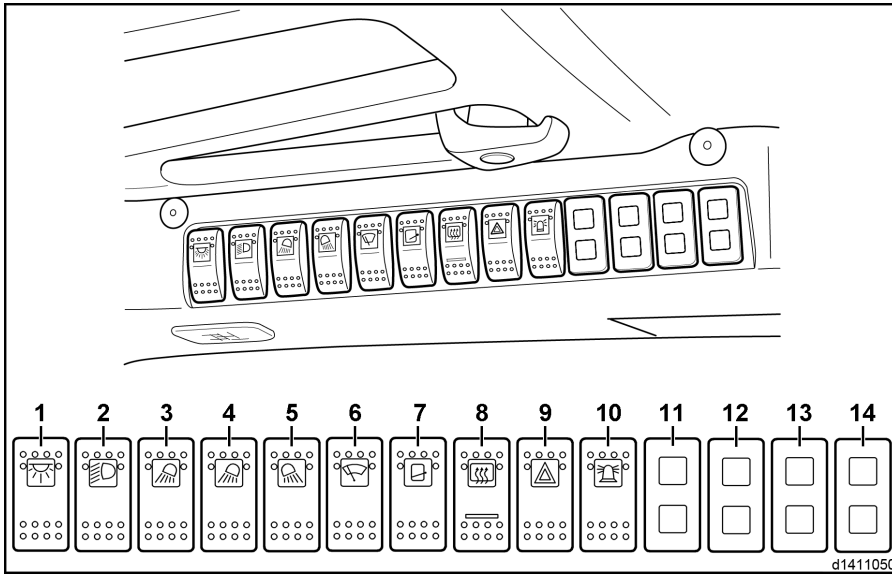
1	Lift Mast	10	Adblue® filler
2	Cab	11	Fuel filler
3, 4	Hydraulic cooler, Radiator	12	Drive axle
5	Radiator Grille	13	Forks
6	Counterweight	14	Fork carriage
7	Steer axle	15	Lift cylinder
8	Battery isolator	16	Lift chains
9	Battery compartment		

Controls



1	Steering wheel	9	Parking brake switch
2	Turn indicator	10	Horn
3	Ignition key switch	11	Armrest
4	Heater control (Climate control)	12	Accelerator pedal
5	Storage area	13	Brake pedals
6	Direction lever	14	Clamping screw for steering column adjustment
7	Central control levers (joysticks)		
8	Linde driver controller (option)	15	Multiple function electrical control lever

Switch panel



The switch panel is mounted at the top right of the overhead guard.

1 Terminal board light and interior lighting
2 Standard or higher lighting
3 Working spotlight position 1/2
4 Working spotlight position 3/4 or working spotlight position 5/6
5 Working spotlight position 7/8
6 Front windscreen wiper and rear window wiper — continuous operation on/off (interval depends on the drive direction and the washer system is always activated)
7 Roof panel wiper - intermittent mode or continuous operation on/off (washer system is activated)
8 Rear window heating
9 Strobe beacon
10 Rotating beacon, flashing beacon or Blue-Spot
11 Blank
12 Blank
13 Blank
14 Blank

NOTE

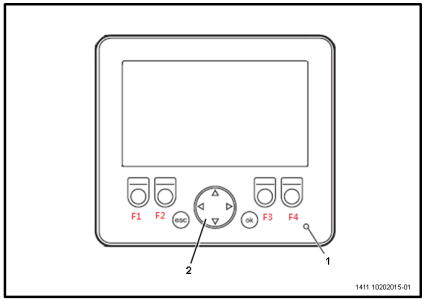
The configuration of the switch panel and arrangement of individual switches may vary, depending on the version. Observe the switch symbols.

Display Unit

The display unit is mounted to the top right-hand side of the cabin. It is positioned within the driver's field of vision and provides centralised information about all functions of the truck. Once the key switch has been switched on, a self-test of the display unit is then performed. During the self-test, all indicator lights and the displays are activated.

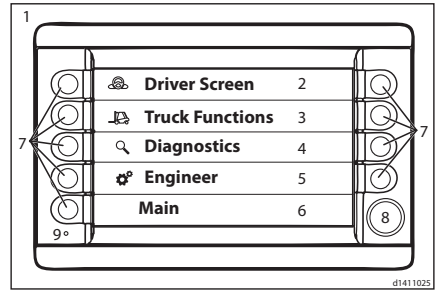
There are two versions of display unit available. One is standard equipment and the other is optional. Both are explained further in chapter four.

Standard Display



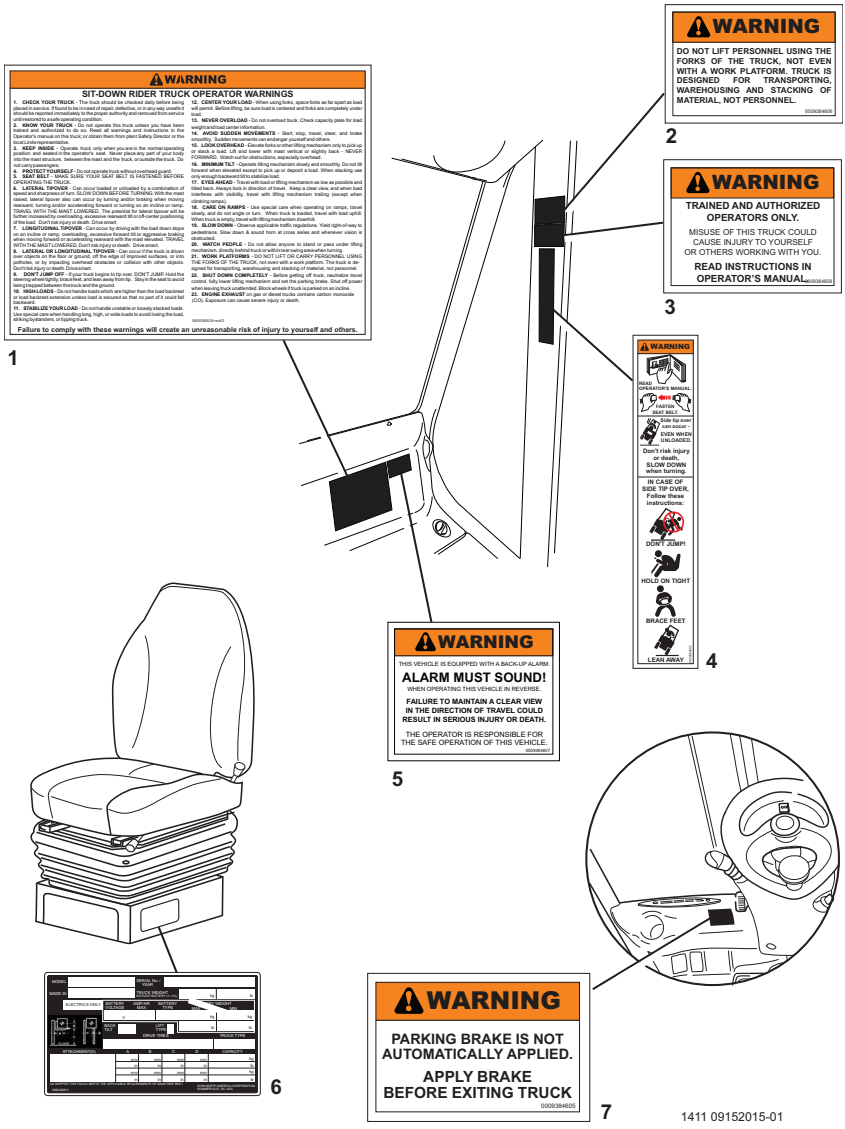
Display element	Function
(1) Power indicator	Indicates the display unit status - on / off.
(2) Navigation button	Allows the operator to scroll selections.
(F1 to F4) Truck functions menu.	Used to enter engine, transmission, and hydraulic valve sub-menus
(esc) Escape button	Used to return to previous page
(ok) OK button.	Used to make menu selections

Optional Display



Display element	Function	Displayed information
(1) Display unit.	As described below	As described below
(2) Driver screen menu.	Allows the operator to view the status of the truck.	Engine rpm, reverse camera, truck status, engine and hydraulics status.
(3) Truck functions menu.	Allows the operator to setup personal preferences.	Parking brake status, 'idrive' setup, screen brightness, units, language, date and time, factory reset.
(4) Diagnostics menu.	Allows the operator to view the status of the truck.	Engine status, transmission status, hydraulics status, joystick status, canbus status, error logs.
(5) Engineer menu.	NOTE: the operator does not need to access this menu.	Calibration menus, parameter settings, service menus.
(6) Selected screen.	Displays the active screen.	Depending on screen selected.
(7) Select buttons.	Activates the required function.	Depending on function selected.
(8) Scroll and select knob.	Activates the required function.	Depending on function selected.
(9) Power indicator	Indicates the display unit status - on / off.	

Decal and Data Plate Location - Interior



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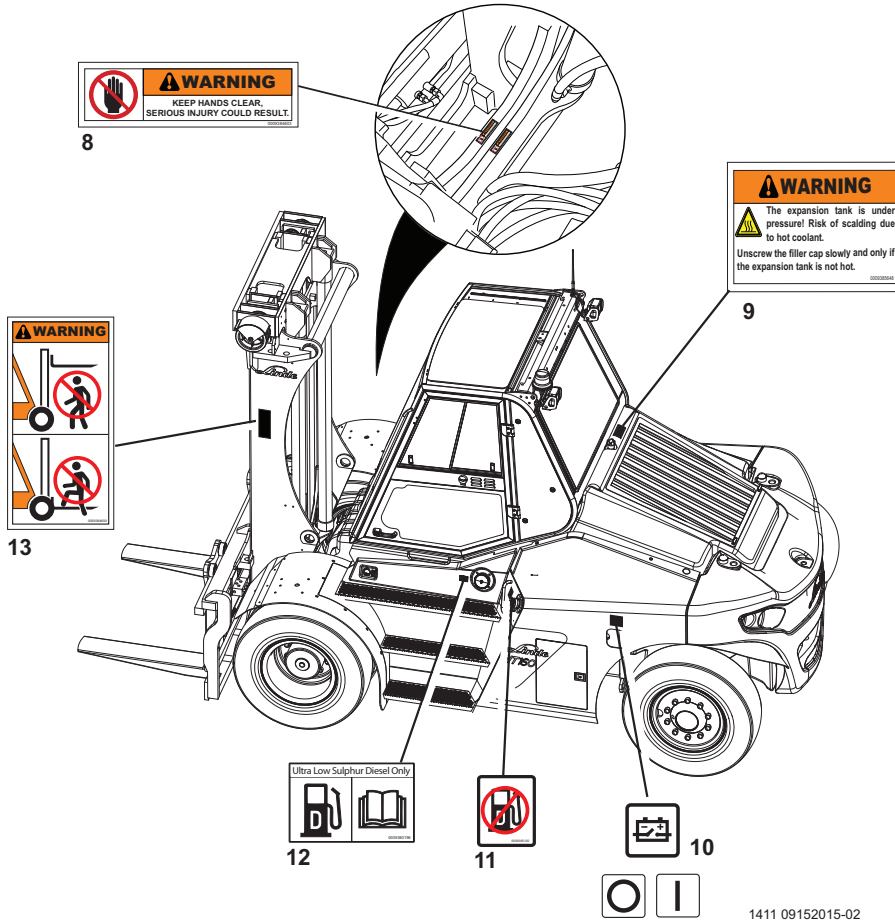
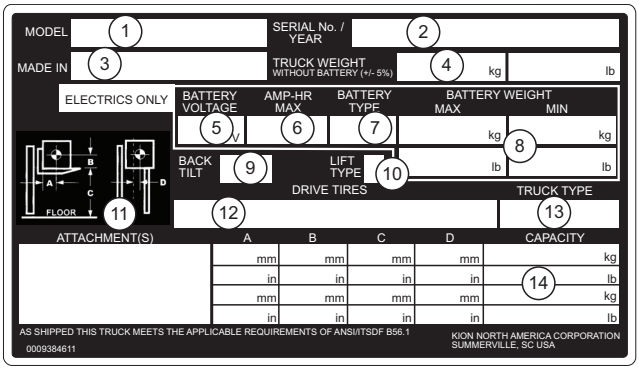
Decal and Data Plate Location - Exterior



1	Warning Decal, Sit-Down Rider	7	Warning Decal, Parking Brake
2	Warning Decal, Do Not Lift Personnel	8	Warning Decal, Crushed Fingers (2X)
3	Warning Decal, Trained & Authorized Operator	9	Warning Decal, Hot Coolant
4	Warning Decal, Tip-Over, Sit-Down Rider Truck	10	Decal, Battery Disconnect
5	Warning Decal, Backup Alarm	11	Decal, No Diesel Fuel in DEF tank
6	Data Plate	12	Decal, Ultra Low Sulpher Fuel only
		13	Warning Decal, Personnel/Forks

Data Plate



(1) **MODEL** – shows the model designation of the truck.

(2) **SERIAL No./Year** – shows the serial number and year of manufacture of the individual truck.

(3) **MADE IN** – shows the country in which the truck was originally manufactured.

(4) **TRUCK WEIGHT** – shows the weight of the truck (in pounds and kilograms) with forks. This weight does not include the battery on electric trucks.

(5) **BATTERY VOLTAGE** – (electric trucks only) – shows the system voltage of the truck.

(6) **AMP-HR MAX** – (electric trucks only) – shows the maximum current capacity in amp-hrs for any battery to be used in the truck.

(7) **BATTERY TYPE** – (electric trucks only) – shows the required battery designation, as outlined in ANSI B56.1. A battery of the correct designation must be installed in order for the TRUCK TYPE designation to be valid.

(8) **BATTERY WEIGHT** – (electric trucks only) – shows the allowable weight range (MAX and MIN) for the battery in pounds and kilograms.

(9) **BACK TILT** – shows the maximum angle that the mast can be tilted back.

(10) **LIFT TYPE** – shows a letter corresponding to the type of mast construction as follows:
S for single masts
D for double masts
T for triple masts
Q for quad masts

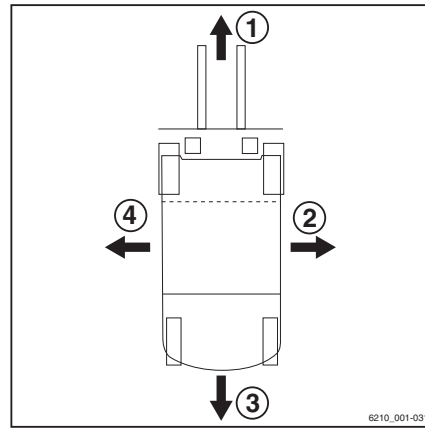
(11) **(Diagram)** – illustrates the dimensions A, B, C, and D used in CAPACITY chart (14).

(12) **DRIVE TIRES** – shows the required size and type of drive tire.

(13) **TRUCK TYPE** – shows the designation of the truck with respect to hazardous environments as outlined in 29CFR1910.178. This designation corresponds to the environment(s) in which the truck is approved for use.

(14) **CAPACITY** – shows the maximum load weight (in pounds and kilograms) that can be safely lifted for the corresponding devices listed under ATTACHMENT(S). In order to achieve a listed capacity safely, the lift height must be kept within the corresponding value shown in column C and the load center of gravity must be within the corresponding values shown in columns A, B, and D.

Definition of directions



(1)	Forwards
(2)	Right
(3)	Backwards
(4)	Left

Directions as seen from the driving position; the load is at the front.

Definition of directions

4

Operation

Unloading and Preparing a New Truck for Operation

Before placing a new truck into service, perform the Daily Maintenance Inspection as found in the Maintenance section.

The truck can then be operated at full speed immediately upon being placed in service. However, during the first 50 operating hours, avoid subjecting the engine or hydraulic system to high continuous loads.

⚠ WARNING

Wheel mounting hardware sometimes requires several cycles of tightening before it fully seats. For this reason, wheel mounting screws or nuts will often work loose in the period immediately following initial tightening.

When placing a new truck into service, the wheel mounting screws or nuts must be checked for tightness every 10 hours until no further loosening is detected. See the procedure for checking wheels and tires in the Maintenance section.

Initial Maintenance Interval

There is a 50-hour maintenance interval in the Scheduled Maintenance chart (chapter five) for newly commissioned trucks. This initial interval only applies after the first 50 hours, not every 50 hours.

Filling Fuel and Diesel Exhaust Fluid ▷

The engine requires both diesel fuel and diesel exhaust fluid (DEF) in order to run.

NOTE

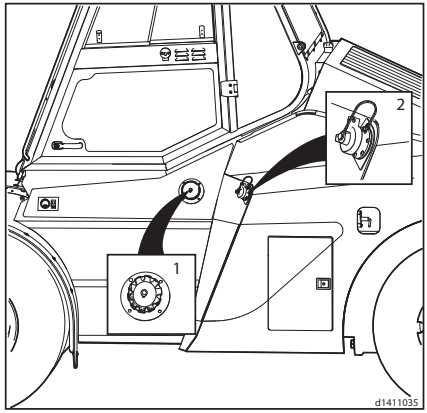
DEF is sometimes referred to as "urea" or by the common brand name "Adblue".

Fuel and DEF are stored in separate tanks on board the truck. The filler caps for the two tanks are shown in the figure. The DEF tank cap is blue in color. Fuel and DEF must only be added to their assigned tanks.

CAUTION

Fuel in the diesel exhaust fluid tank will destroy the exhaust after-treatment system. Diesel exhaust fluid in the fuel tank will damage the fuel system.

Always ensure that fuel and diesel exhaust fluid are added to the correct tank.



1. Fuel
2. Diesel exhaust fluid (blue cap)

Filling Fuel

WARNING

Diesel fuel is flammable.

Do not allow diesel fuel to contact hot surfaces. Do not attempt to refuel in any area where open flame is present. Do not smoke during refueling.

- ➢ Ensure the truck is parked in a well ventilated area and the engine is off.
- ➢ Remove the fuel tank cap (1).
- ➢ Fill the tank with clean ultra low sulpher diesel fuel. All fuel must meet the requirements specified in chapter five.
- ➢ Replace the fuel tank cap.

Filling Diesel Exhaust Fluid

⚠ WARNING

Risk of skin, eye and nose and throat irritation.

Handle diesel exhaust fluid only in well ventilated areas and always use gloves and safety glasses. In case of skin or eye contact, rinse the affected areas with water immediately. Clothing contaminated with diesel exhaust fluid must changed immediately.

➢ Ensure the truck is parked in a well ventilated area and the engine is off.

⚠ WARNING

If a diesel exhaust fluid tank is full, pressure compensation may occur when the tank lid is opened causing a sudden escape of liquid or vapor.

Always open tank caps carefully to avoid exposure.

➢ Carefully remove the diesel exhaust fluid tank cap (2).

⚠ CAUTION

If diesel exhaust fluid is stored in aluminum, copper, or plain steel or galvanized containers, it will absorb constituents of these metals and damage the exhaust after-treatment system.

Use only diesel exhaust fluid from containers made of the following materials:

• polypropylene

• polyethylene

• stainless steel meeting DIN EN10 088-1/2/3

➢ Fill the tank with clean diesel exhaust fluid.

➢ Replace the diesel exhaust fluid tank cap.

⚠ CAUTION

Diesel exhaust fluid will damage painted surfaces or aluminum surfaces.

Wipe up any spilled diesel exhaust fluid immediately and wash any affected surfaces with fresh water.

Standard equipment

Mirrors

⚠ CAUTION

Risk of collision.

Do not operate the truck if visibility is impaired.

Rear view mirrors should be cleaned and adjusted to suit the operator before commencement of operation, and it should be noted that they are only provided for checking the vicinity of the truck before moving off, and to monitor the rear traffic area.

Reversing is only allowed with a direct view in the reverse direction of travel.

Entering and exiting the truck

Entering the cab

- Open the cab door.
- Use handrails where fitted to climb the steps and enter the cab.
- Enter the cab in a forward direction.
- Close the cab door.

Exiting the cab

- Open the cab door.
- Exit the cab in a backwards direction.
- Use handrails where fitted to climb down the steps and exit the cab.
- Close the cab door.

⚠ WARNING

Risk of injury from entering and exiting the truck incorrectly.

Face the truck when entering and exiting.

Driver's cab

Opening the cab door

➢ Push handle (3) upwards.

➢ Open driver's door outwards.

Closing the cab door

NOTE

To make it easier to close the door, open the side window slightly.

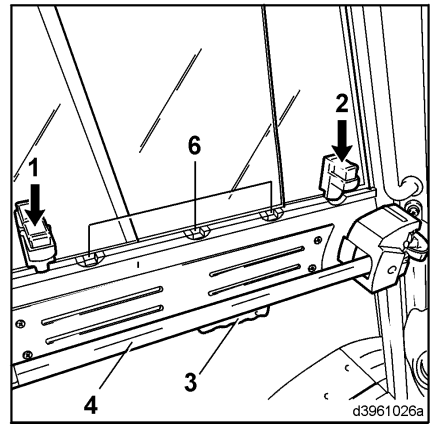
➢ Grip the rod (4) and pull the door towards you until the interlock engages.

Opening/closing the side window

➢ Press button (1) or (2).

➢ Keep the knob pressed, slide the side window into the desired position until it engages in one of the grooves (6).

Follow a similar procedure to close the side window.



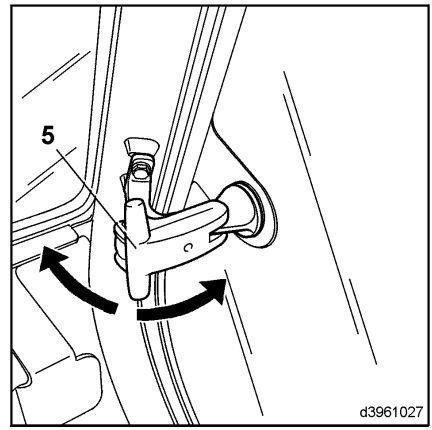
Opening the quarter window

➢ Pull the lever (5) forwards.

The window will open.

➢ Push the lever (5) backwards.

The window will close.



Standard driver's seat and comfort driver's seat

⚠ WARNING

If the seat is not adjusted correctly, this may cause injury to the driver's back. The adjustment controls for the driver's seat should not be used during operation.

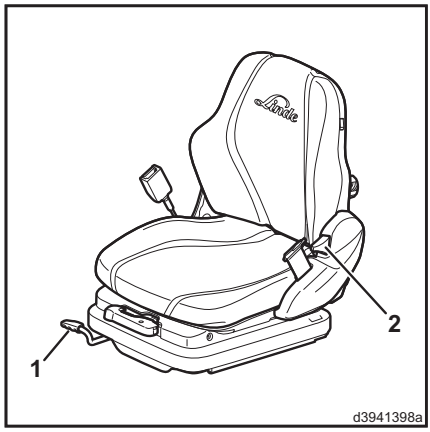
Before starting the truck and whenever changing drivers, adjust the seat to correspond to the driver's weight and make sure that the settings have all engaged properly. Do not place any objects in the driver's rotation range.

NOTE

Sitting for long periods of time puts a lot of pressure on the spine. Try to compensate for this by performing regular simple gymnastic movements.

Longitudinal adjustment

▷

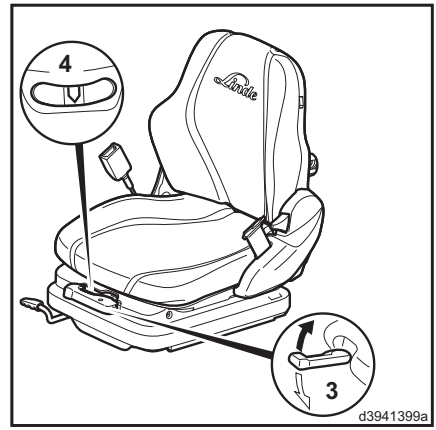


- Pull lever (1) upwards.
- Move the driver's seat backwards or forwards on the runners to find the most comfortable position for the driver in relation to the steering wheel and the accelerator pedals.
- Allow lever (1) to snap into place.

Adjusting the seat backrest

- Push lever (2) upwards and hold in place.
- Move the seat backrest forwards or backwards until a comfortable seating position for the driver is found.
- Release lever (2).

Setting the driver's weight



NOTE

The individual driver's weight must be set when the driver's seat is under load.

➢ Check the weight setting in the inspection window (4).

The correct driver's weight has been set when the arrow is in the centre position in the inspection window (4).

Adjust the driver's weight as necessary.

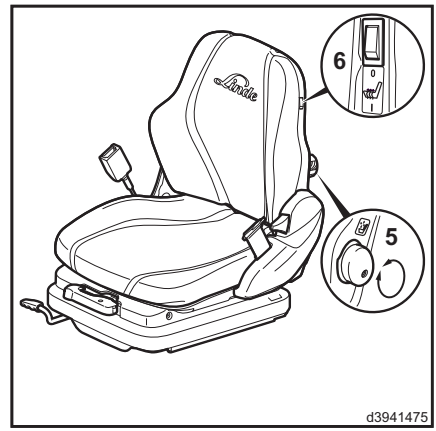
➢ Pull out the lever (3).

Move the lever to set the driver's weight for the suspension.

➢ Move the lever (3) upwards for a heavier weight.

➢ Move the lever (3) downwards for a lighter weight.

Adjusting the lumbar support (only with a comfort driver's seat)



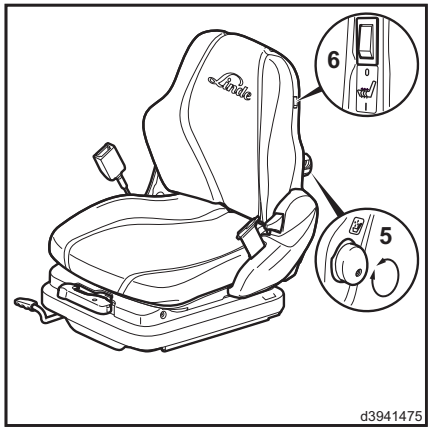
NOTE

The lumbar support enables optimum configuration of the seat back contour to the driver's body.

➢ Turn knob (5) to the left or right.

The extent to which the lower and upper areas of the backrest are curved is adjusted individually.

Activating the seat heater (comfort driver's seat only)



- Push the switch (6) downwards to activate the seat heater.
- Push the switch (6) upwards to deactivate the seat heater.

NOTE

The maximum temperature is predefined.

Luxury driver's seat with automatic weight adjustment

WARNING

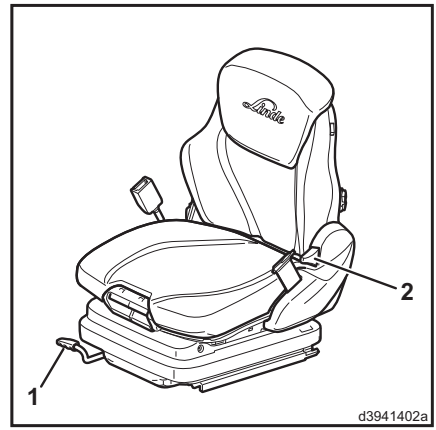
If the seat is not adjusted correctly, this may cause injury to the driver's back. The adjustment controls for the driver's seat should not be used during operation.

Before starting the truck and whenever changing drivers, adjust the seat to correspond to the driver's weight and make sure that the settings have all engaged properly. Do not place any objects in the driver's rotation range.

NOTE

Sitting for long periods of time puts a lot of pressure on the spine. Try to compensate for this by performing regular simple gymnastic movements.

Longitudinal adjustment



- Pull lever (1) upwards.
- Move the driver's seat backwards or forwards on the runners to find the most comfortable position for the driver in relation to the steering wheel and the accelerator pedals.
- Allow lever (1) to snap into place.

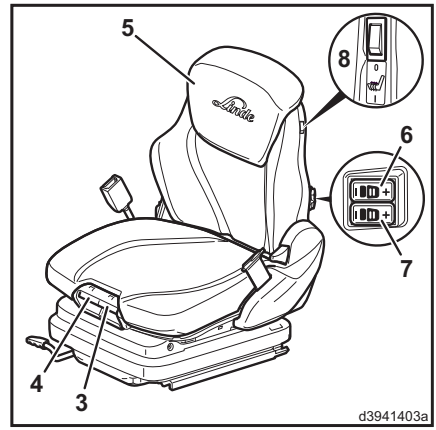
Adjusting the seat backrest

- Push lever (2) upwards and hold in place.
- Move the seat backrest forwards or backwards until a comfortable seating position for the driver is found.
- Release lever (2).

Setting the driver's weight

The correct driver's weight will be set automatically if the ignition is switched on and the driver's seat is occupied.

Adjusting the seat angle



- Pull lever (3) upwards.

The seat surface is moved to the desired position by applying pressure to the seat surface or removing pressure from it.

Adjusting the seat depth

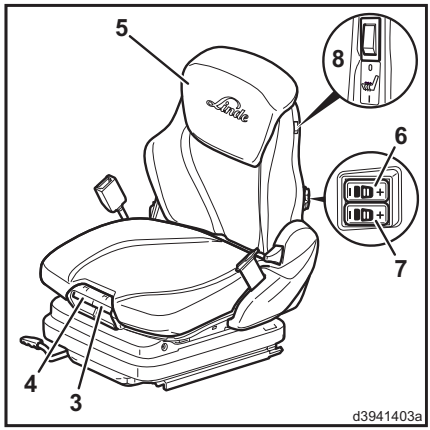
- Pull lever (4) upwards.

The seat surface can be moved to the desired position by sliding the seat surface forwards or backwards.

Adjusting the backrest extension

- Push backrest extension (5) in or pull it out for individual adjustment.

Adjusting the lumbar support



NOTE

The lumbar support enables optimum configuration of the seat back contour to the driver's body.

➢ Press button (6).

The extent to which the upper area of the backrest is curved is adjusted individually.

➢ Press button (7).

The extent to which the lower area of the backrest is curved is adjusted individually.

Activating the seat heater (luxury driver's seat)

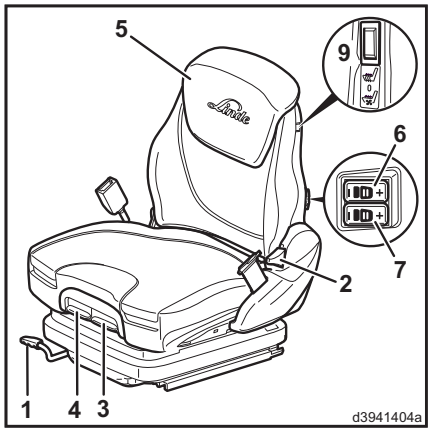
➢ Push the switch (8) downwards to activate the seat heater.

➢ Push the switch (8) upwards to deactivate the seat heater.

NOTE

The maximum temperature is predefined.

Luxury active driver's seat with automatic weight adjustment



The luxury active driver's seat is operated in the same way as the luxury driver's seat. Only the activation of the seat heater is different.

Activating the seat heater (luxury active driver's seat)

➢ Push the switch (9) upwards to activate the seat heater.

➢ Push the switch (9) to the centre position to deactivate the seat heater.

Activating the seat air conditioning (luxury active seat)

➢ Push the switch (9) downwards to activate the seat air-conditioning.

➢ Push the switch (9) to the centre position to deactivate the seat air conditioning.

NOTE

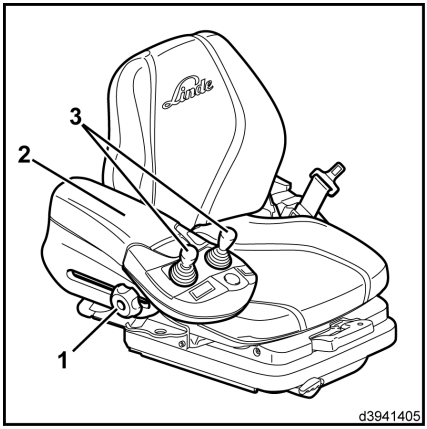
The maximum temperature is predefined.

Adjusting the armrest

➢ Sit on the driver's seat and release clamping screw (1).

➢ Move armrest (2) upwards/downwards and forwards/backwards until the arm is comfortably supported and the joysticks (3) can be easily reached.

➢ Tighten clamping screw (1).



Adjusting the steering column

DANGER

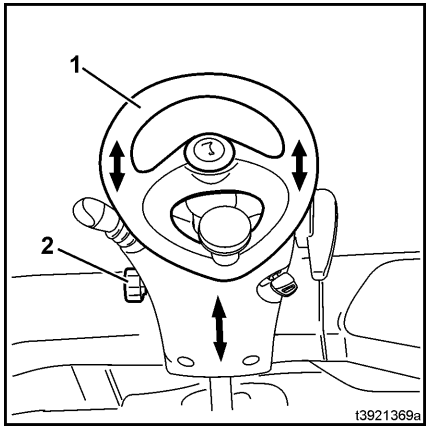
Safe driving is not guaranteed with the clamping screw open.

Only adjust the steering column when the vehicle is stationary.

Before attempting to drive the truck, ensure that the steering column is screwed firmly in place with the clamping screw (2).

Angle adjustment

- ➢ Undo the clamping screw (2) anticlockwise. ▷
- ➢ Move the steering wheel (1) into the required position.
- ➢ Tighten the clamping screw (2) clockwise.



Height adjustment (special equipment)

- ➢ Undo the clamping screw (2) anticlockwise.
- ➢ Move the steering wheel (1) into the required position by pulling it upwards or pushing it downwards.
- ➢ Tighten the clamping screw (2) clockwise.

Seat belt

⚠ DANGER

There is a risk to life if the driver leaves the vehicle in an uncontrolled manner.

For this reason, the seat belt must always be worn when operating the truck! The seat belt should only be worn by one person.

⚠ WARNING

The seat belt must function perfectly.

For this reason, the belt should not become twisted, trapped or tangled. The belt buckle and belt retractor should be protected from foreign bodies, damage and dirt.

NOTE

Driver's cabs with fixed closed doors or bracket doors meet the safety requirements for driver restraint systems. The seat belt may also be used. It must, however, be fastened when driving with doors that are open or have been removed. PVC doors do not constitute a driver restraint system. For trucks with the "speed reduction" special function, the seat belt must be worn even at the reduced speed.

The automatic blocking mechanism prevents the belt from being extended whenever the industrial truck is on a steep slope. It is then not possible to pull the belt any further out of the retractor. To release the automatic blocking mechanism, carefully move the industrial truck so that it is no longer positioned on a slope.

While using the truck (e.g. driving, operating the lift mast etc.), the driver should adopt a sitting position as far back as possible so that his/her back rests against the seat backrest. The automatic blocking mechanism for the belt retractor offers sufficient freedom of movement on the seat for normal use of the truck.

Fastening the seat belt

- Pull the seat belt (2) smoothly out of the retractor to the left.
- Position belt over the lap, not over the stomach.
- Snap the buckle guide (1) into place in the buckle (4).
- Check seat belt tension.

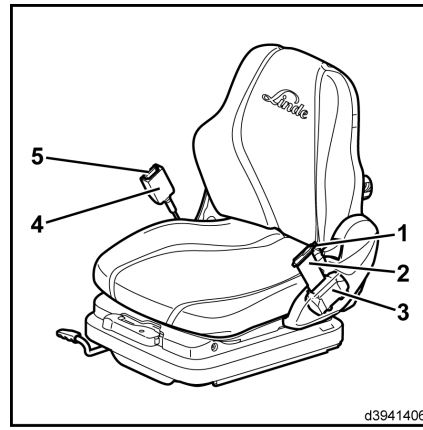
The belt must fit close to the body.

Unfastening the seat belt

- Push the red button (5) on the buckle (4).
- Manually feed the buckle guide (1) back into the retractor (3).

NOTE

The automatic blocking mechanism may be triggered if the web belt runs in too quickly and the buckle guide strikes the housing. The web belt cannot be pulled out with the usual force.



Window heater

Switching on the rear window heating

➢ Press push button (1).

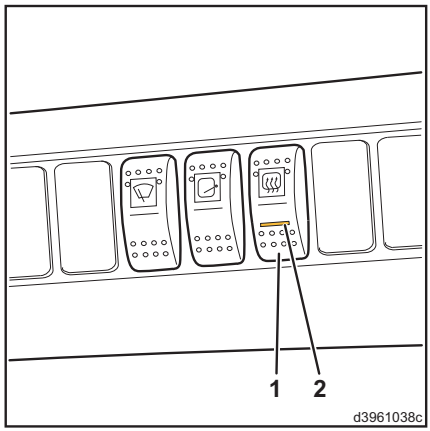
Dummy (2) test.

➢ Dummy (1) test.

The rear window heating is switched off.

➢ Dummy (1) test.

The rear window heating is in operation for a further 15 minutes.



Heating system, air conditioning

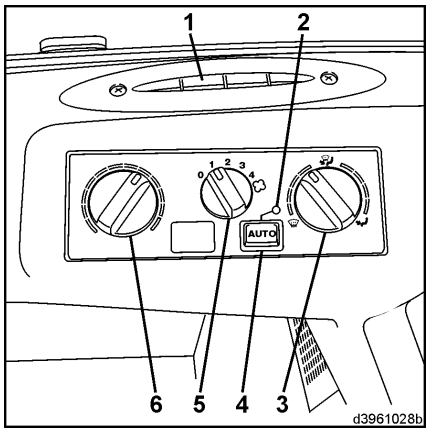
Automatic heating

The heating system has two different operating modes:

- Manual heating system
- Automatic heating system

Controls

- Cab air vents (1)
- Function display (2)
- Turning knob (3) for setting the vent positions for windscreen defrosting / footwell ventilation
- Pressure switch (4) for switching automatic heating on and off
- Rotary switch (5) for setting the blower positions
- Turning knob (6) for temperature control



Manual heating operation:

➢ Push-button (4) for automatic operation must be switched off.

Switching on the heating system

➢ Turn switch (5).

The blower is switched on and there are four air flow settings.

For normal heating operation, the following rules apply:

- Select the temperature using turning knob (6) (far left → cold / far right → hot)
- Use blower switch (5) (level 1 to 4), air distribution vent (turning knob (3)), cab air vents (1) and the two vents on the left and right to select the most comfortable temperature and temperature distribution.

Defrosting the windows

➢ For maximum defrosting, set the

- Turning knob (6) to the far right position
- Turning knob (3) to the far left position
- Rotary switch (5) to level 4
- Open the left and right cab air vents and set the fins towards the windscreen.

Automatic heating operation:

➢ Set the desired temperature using turning knob (6).

➢ Press push-button (4).

The automatic heating is switched on and function display (2) lights up green. The blower setting is now controlled automatically.

⚠ CAUTION

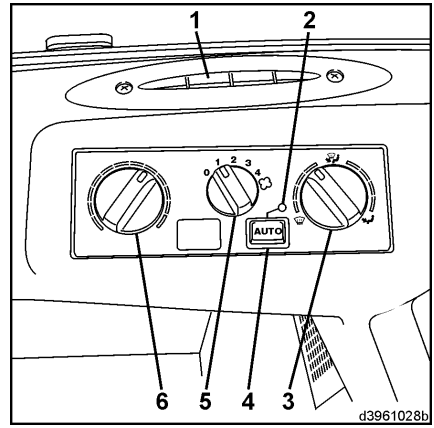
If the function display (2) flashes 5x after switching on and then goes out, there is an error in the automatic heating.

Contact your service partner.

NOTE

If the position of rotary switch (5) for the blower setting is changed manually, the system reverts immediately to "manual heating operation".

▷



Automatic heating/air conditioning

⚠ CAUTION

The moving parts must be lubricated and the compressor prevented from seizing.

For this reason, the air conditioning must be switched on briefly every 3 months. In addition, the air conditioning must be serviced once a year by your service partner, preferably before the season starts, and a record must be kept of the servicing. Otherwise, the warranty will be void.

NOTE

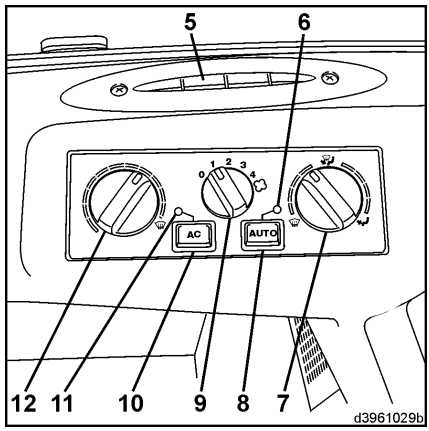
It is normal for condensation water to build up in the hoses and under the truck when the air conditioning is in operation.

The automatic heating/air conditioning has four different operating modes:

- Manual air conditioning
- Automatic air conditioning
- Manual heating system
- Automatic heating system

Controls

▷



- Cab air vents (5)
- Function display (6)
- Turning knob (7) for setting the vent positions for windscreen defrosting / footwell ventilation
- Push-button (8) for switching the automatic function on and off
- Rotary switch (9) for setting the blower positions
- Push-button (10) for switching the air conditioning on
- Function display (11)
- Turning knob (12) for temperature control

Manual air conditioning operation

➢ Push-button (8) for automatic operation must be switched off.

Switching on the air conditioning

NOTE

The air conditioning operates only when the engine is running and the blower switch is

switched on (setting 1, 2, 3 or 4). The fans in the roof switch on when necessary. They can come to a standstill from time to time.

➢ Turn switch (9).

The blower is switched on and there are four air flow settings.

➢ Press push-button (10).

The function display (11) lights up green.

⚠ CAUTION

If the function display (11) flashes 5x after switching on and then goes out, there is an error in the air conditioning.

Contact your service partner.

To raise the temperature in the cab:

➢ Turn turning knob (12) clockwise and reduce the blower speed using switch (9).

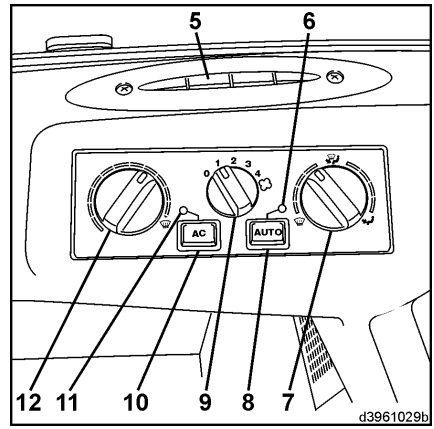
To lower the temperature in the cab:

➢ Close windows and doors, turn turning knob (12) anti-clockwise and increase the blower speed using switch (9).

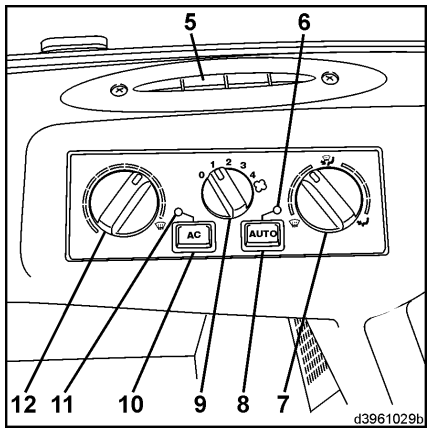
NOTE

To achieve maximum cooling in the cab:

- *the air conditioning must be switched on,*
- *the turning knob (12) must be fully turned to the left stop,*
- *the blower must be set to its highest blower position,*
- *the left and right cab air vents must be open,*
- *the windows and doors must be closed.*



Automatic air conditioning operation



➢ Set the desired temperature using turning knob (12).

➢ Press push-button (8).

The automatic air conditioning is switched on and function displays (6) and (11) light up green. The blower setting is now controlled automatically.

⚠ CAUTION

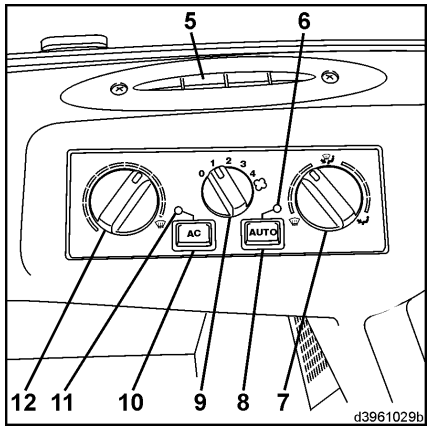
If the function display (6) or (11) flashes 5x after switching on and then goes out, there is an error in the automatic heating/air conditioning or in the air conditioning.

Contact your service partner.

NOTE

If the position of rotary switch (9) for the blower setting is changed manually, or the automatic function is switched off by pressing push-button (8), the system reverts immediately to "manual air conditioning operation". If the air conditioning function is switched off by pressing push-button (10), the system switches to "automatic heating operation".

Manual heating operation:



➢ Push-buttons (10) for the air conditioning function and (8) for automatic function must be switched off.

Switching on the heating system

➢ Turn switch (9).

The blower is switched on and there are four air flow settings.

For normal heating operation, the following rules apply:

- Select the temperature using turning knob (12) (far left → cold / far right → hot)
- Use blower switch (9) (level 1 to 4), air distribution vent (turning knob (7)), cab air vents (5) and the two vents on the left and right to select the most comfortable temperature and temperature distribution.

Defrosting the windscreen/demisting the windows

➢ To achieve maximum windscreen defrosting or demisting, set

- Turning knob (12) to the far right position
- Turning knob (7) to the windscreen defrosting position (far left position)
- Rotary switch (9) to level 4
- Open the left and right cab air vents and set the fins towards the windscreen.

Automatic heating operation

➢ Push-button (10) for the air conditioning function must be switched off.

➢ Push-button (8) for automatic function must be switched on.

The function display (6) lights up green

⚠ CAUTION

If the function display (6) flashes 5x after switching on and then goes out, there is an error in the automatic heating.

Contact your service partner.

➢ Set the desired temperature using turning knob (12).

Automatic heating is switched on and the blower setting and temperature are controlled automatically.

NOTE

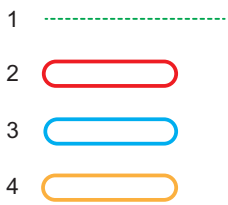
If the position of rotary switch (9) for the blower setting is changed manually, the system reverts immediately to "manual heating operation". Windscreen defrosting can be performed only in manual operation.

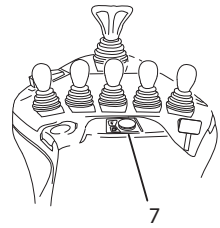
Software Navigation

The truck software is accessed through the display unit. A standard display unit (5) or an optional larger display unit (6) is available depending on how the truck was ordered. If the optional larger display unit is ordered, then three of its controls may be duplicated in a convenience group (7) on the armrest as a further option.

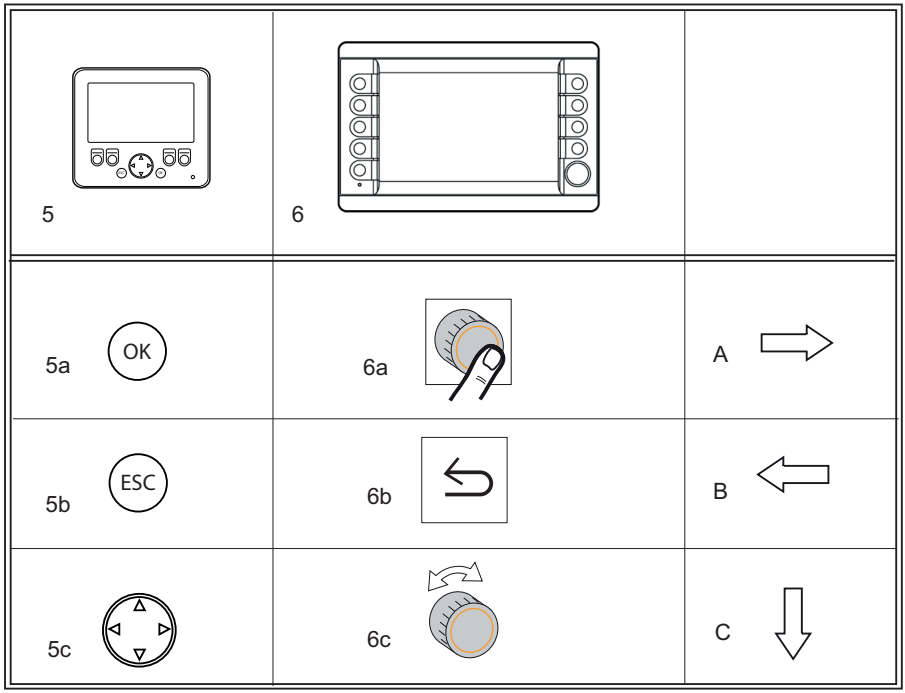
The software is arranged into three levels of menus or screens. These are identified in the chart by color. When the truck is first started, the software displays a start-up screen, then displays the service screen for a few seconds before defaulting to the tachometer screen. Note that the tachometer screen is at mid-level. This is the screen that should be present during routine operation of the truck.

Display Control Functions



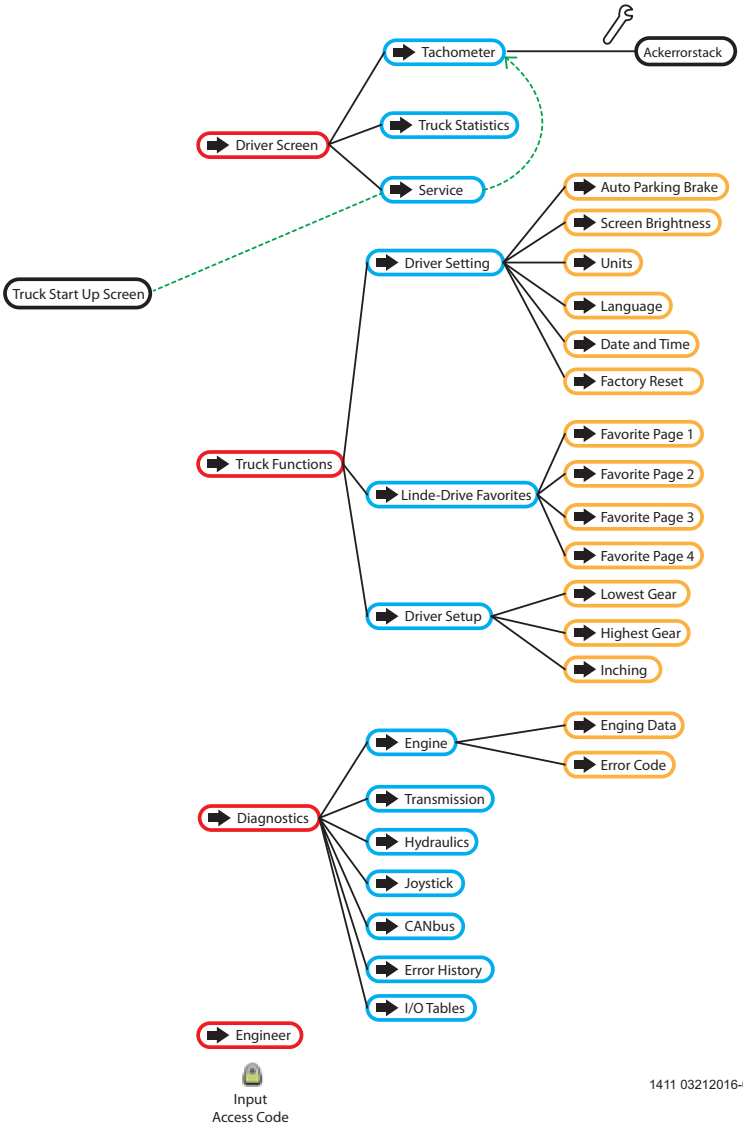


1411 03212016-01

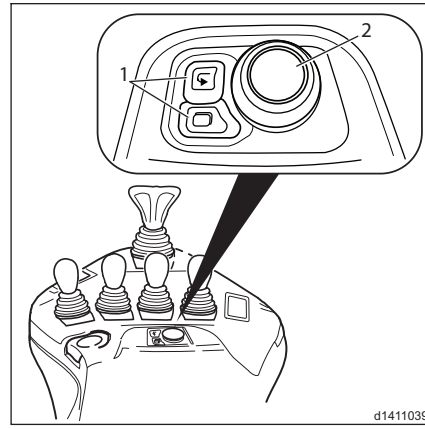


1-4	**Items 1 to 4 refer to menu chart on next page**	4	Lower level menus
A	Action 5a or 6a moves between colors to the right in the menu chart on next page	5	Standard display
		5a	OK button (standard display)
B	Action 5b or 6b moves between colors to the left in the menu chart on next page	5b	ESC button (standard display
		5c	Navigation button (standard display)
C	Action 5c or 6c scrolls vertically within a color group in the menu chart on next page	6	Optional display
		6a	Knob (push) (optional display)
1	Start-up sequence	6b	Back button (optional display)
2	Top level menus	6c	Knob (rotate) (optional display)
3	Mid level menus	7	Items 6a, b, & c on armrest as further option

Software Menus



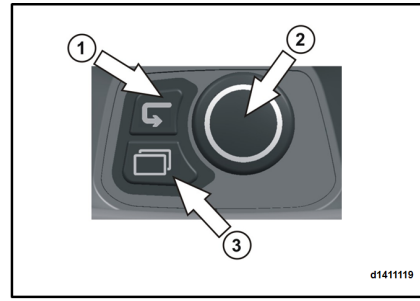
Linde driver controller



NOTE

The truck status display unit can be navigated in two ways, described below is using the buttons on the armrest. The Linde drive controller can also be used to navigate using the buttons (1) and rotary / push button(2).

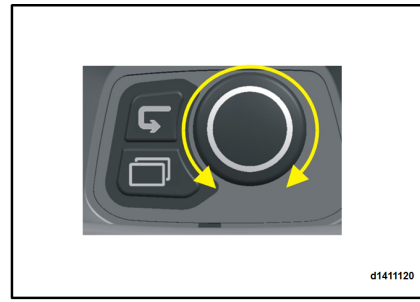
The Linde drive controller is operated using the rotary/push button (2), the "Back" button (1) and the "Switch" button (3).



Turning the rotary/push button

Turning the rotary/push button to the left or right allows the following actions to be carried out:

- Scroll between menu items
- Change values continuously or in increments (brightness, digit value or numerical value)



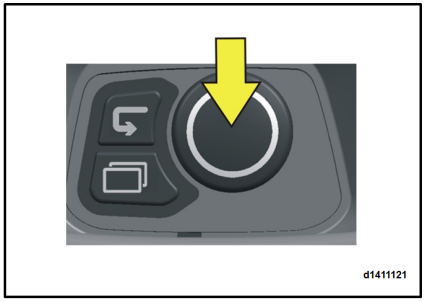
Pressing the rotary/push button

Briefly pressing the rotary/push button allows the following actions to be carried out:

- Select menu item
- Activate or deactivate a function
- Acknowledge a message

Pressing the rotary/push button for longer than two seconds activates the following functions:

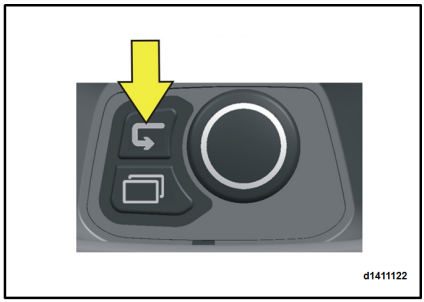
- Program position (tilt angle, lift height, lift limits)
- Assign or overwrite favourite position
- Select function or display after entering the PIN code
- Delete programmed values
- Delete favourite
- Set new time/date or PIN code
- Reset consumption



"Back" button

Briefly pressing the "Back" button allows the following actions to be carried out:

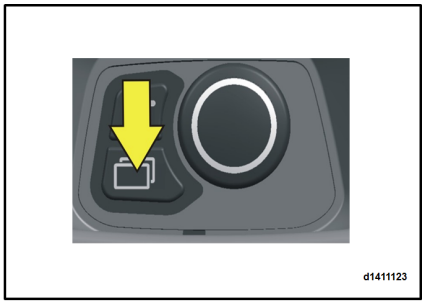
- Go back one menu level
- Acknowledge a message



"Switch" button

Briefly pressing the "Switch" button allows the following actions to be carried out:

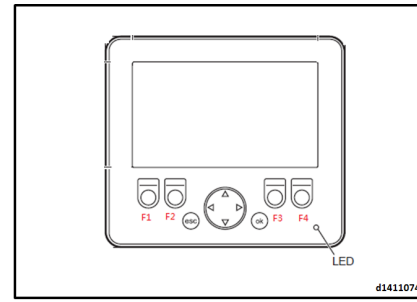
- Switch between favourites
- Jump from the menu item to the favourites last used



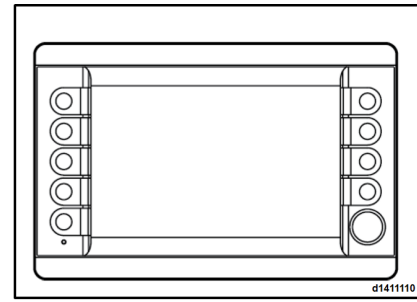
Basic introduction of the display

Types of the display

➢ 4.3 inches display (standard) ▷

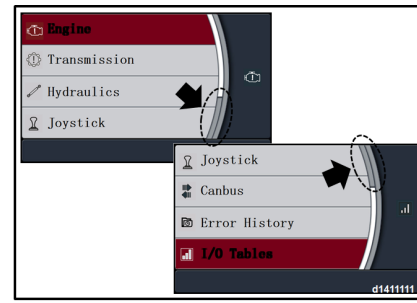


➢ 7 inches display (option) ▷



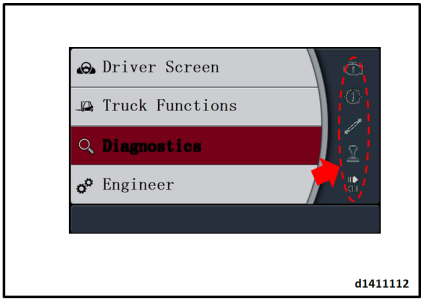
Pattern introduction (For two displays)

➢ The scroll bar on the right side means there are other items can be selected. ▷

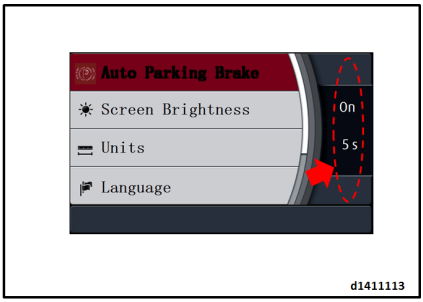


Standard equipment

➢ The bright icon on the right side means the item is selected. ▷

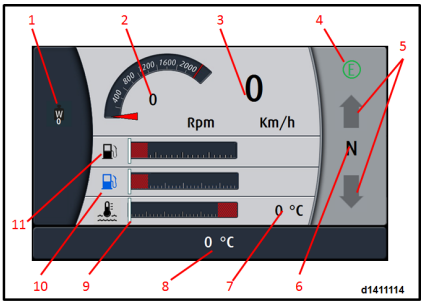


➢ The parameter on the right side is the current value of the setting. ▷



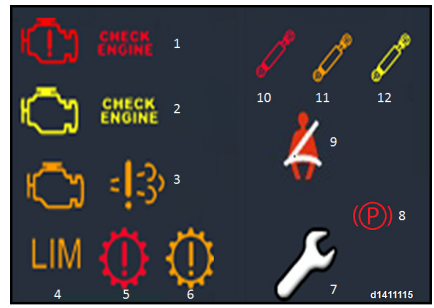
Icons description

➢ Icon description 1 ▷



- 1 The weight of the load
- 2 Engine speed meter
- 3 Truck speed meter
- 4 ECO mode (option)
- 5 Truck driving direction
- 6 Current gear
- 7 Coolant temperature
- 8 Ambient air temperature
- 9 Coolant temperature meter
- 10 Ad-blue meter (only for ad-blue engine)
- 11 Fuel meter

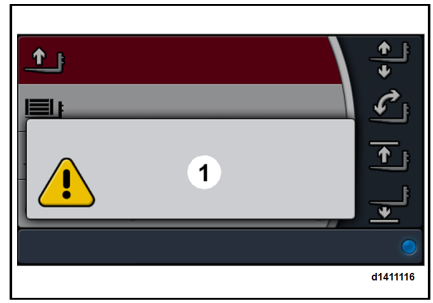
➢ Icons description 2



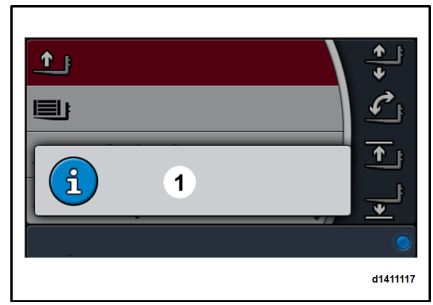
- 1 Engine error indicator (high level)
- 2 Engine error indicator (low level)
- 3 Exhaust emission error indicator
- 4 LIM symbol
- 5 Transmission error indicator (high level)
- 6 Transmission error indicator (low level)
- 7 Error active indicator
- 8 Parking brake indicator
- 9 Safety belt indicator
- 10 Hydraulic system error indicator (high level)
- 11 Hydraulic system error indicator (medium level)
- 12 Hydraulic system error indicator (low level)

Popup errors (for two displays)

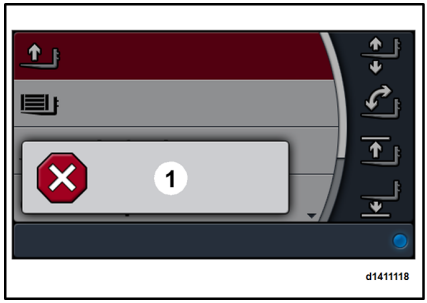
Warnings (1) indicate events that are relevant to safety. A warning is always shown immediately on the display by the symbol illustrated and the corresponding message text (1).



User notifications are used to aid understanding of the system functionality. A user notification appears on the display in the form of the illustrated symbol and corresponding message text (1) as soon as an event occurs.



Error messages indicate functional or programming errors. An error message appears on the display in the form of the illustrated symbol and corresponding message text (1) as soon as an event occurs.



Error messages are saved in the error list at the time at which they occur. The error list includes the error code, date and time, operating hours of the display and operating hours of the truck.

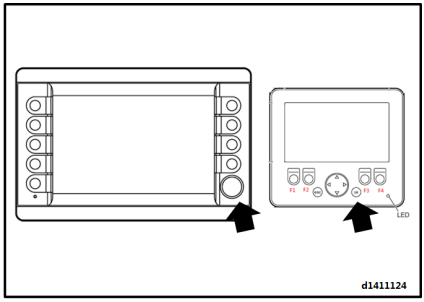
➢ To display the error list, switch to the "Dashboard - Diagnostics" menu.

The content of the error list can be deleted only by the service partner via the truck diagnostics.

Warnings, user notifications and error messages appear on top of the current display. Messages with a higher priority appear on top of those with a lower priority. Messages with the same priority appear in chronological order.

➢ Read the message carefully.

➢ Press the knob or "OK" button to acknowledge the message and switch to next message.



Or

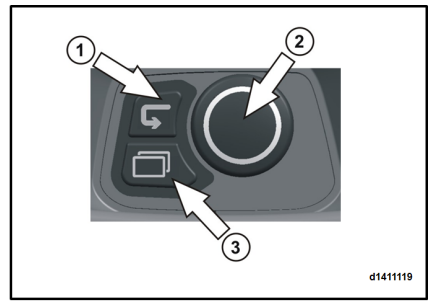
➢ Press the "Back" button (1) to acknowledge the message and switch to the function that was most recently carried out. (only for the trucks equipped with Linde driver)

Or

➢ Press the "Switch" button (3) to acknowledge the message and switch to the most recently used favourite. (only for the trucks equipped with Linde driver controller)

Or

➢ Press the rotary/push button (2) to acknowledge the message and switch to the function that was most recently carried out. (only for the trucks equipped with Linde driver controller)



NOTE

The message cannot be acknowledged in the first two seconds that it appears.

If events are pending for a long period, the corresponding message appears only once.

➢ Switch the truck to a safe operational state by switching it off and on again.

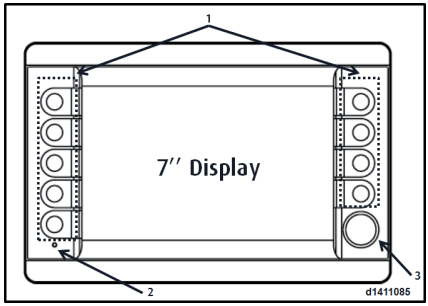
If an error occurs repeatedly, contact your service partner.

Truck status display - Large display

Display 7 inches

The display has 9 function buttons and 1 knob:

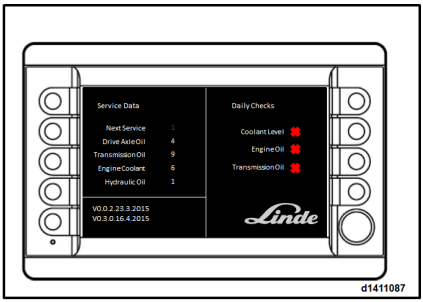
- Function buttons: used for entering the submenu.
- Knob: used for select items or adjust the parameter.



1 Function buttons
2 LED indicator
3 Knob

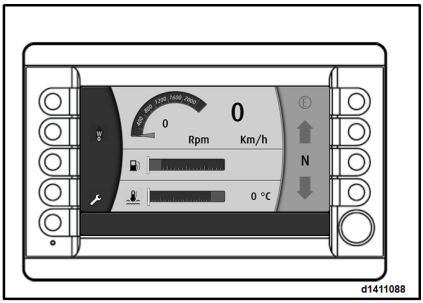
On start

➢ When power is on, the figures display to show the service information of the truck.

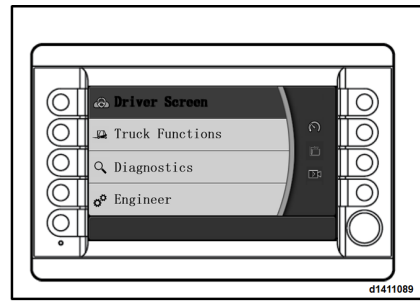


Drive Screen

➢ After power on, the display will enter the driver screen automatically.



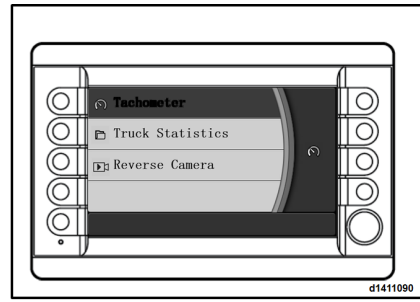
➢ Press the lower left side bright button will appear the main menu. ▷



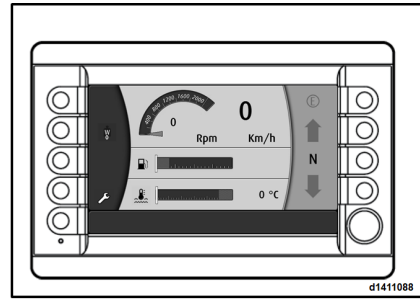
➢ Rotate the knob to select the Driver Screen item. Then press the knob to enter the sub menu. ▷

Driver Screen

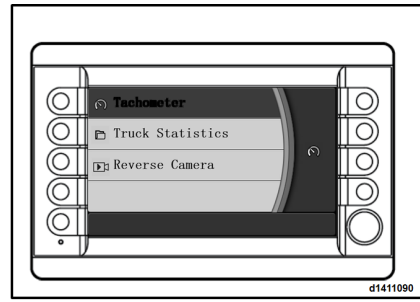
- Tachometer
- Truck statistics
- Reverse Camera



➢ Rotate the knob to select the Tachometer item. Then press the knob to enter and view: engine RPM, fuel level, ad-blue level (If equipped), engine temperature, traction direction, gear position. ▷



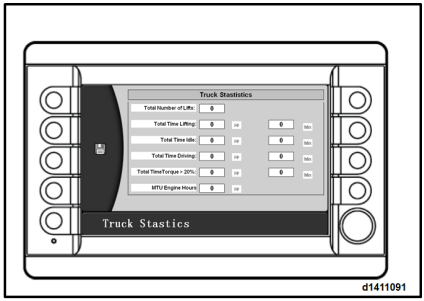
➢ Press the lower left side bright button to return to the upper menu. ▷



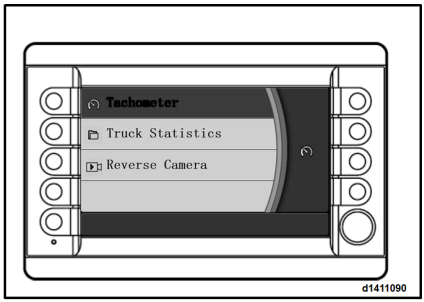
Standard equipment

➢ Rotate the knob to select the Truck Statistics item. Then press the knob to enter and view.

This page shows the total number of lifts / total time lifting / total time idle / total driving / total time torque > 20% / Mtu engine hours (if equipped with MTU engine)



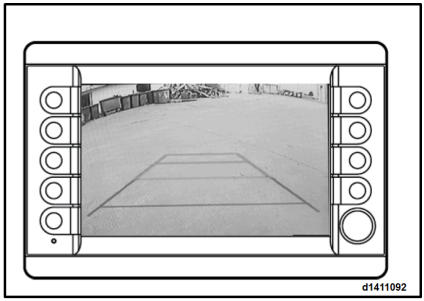
➢ Press the lower left side bright button to return to the upper menu.



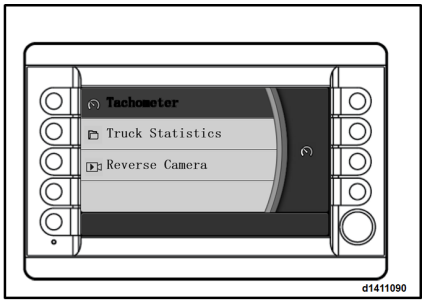
➢ Rotate the knob to select the Reverse Camera item. Then press the knob to enter and view the reverse camera.

NOTE

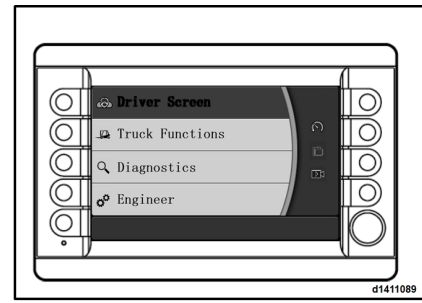
This is the optional item. It won't display if not order.



➢ Press the lower left side bright button to return to the upper menu.

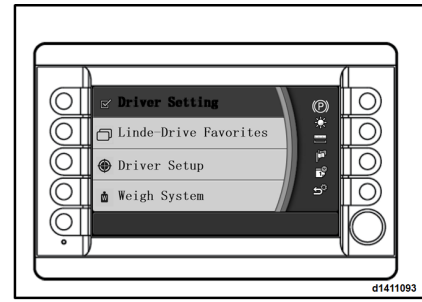


➢ Press the lower left side bright button to return to the main menu. ▷

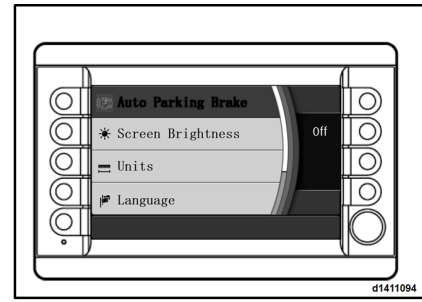


Truck Functions

➢ Rotate the knob to select the Truck Functions. Then press the knob to enter the sub menu. ▷



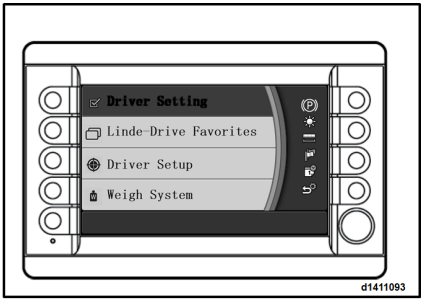
➢ Rotate the knob to select the Driver Setting. Then press the knob to enter the sub menu. ▷



Driver setting menu

- Auto Parking Brake: Set the Auto parking brake function. (on / off, if on, set the delay time)
- Screen Brightness: Set the brightness of the screen.
- Units: Set the units of the speed. (Imperial / Metric)
- Language (English / German / French / Spanish)
- Date and Time
- Factory Reset

➢ Press the lower left side bright button to return to the upper menu. ▷

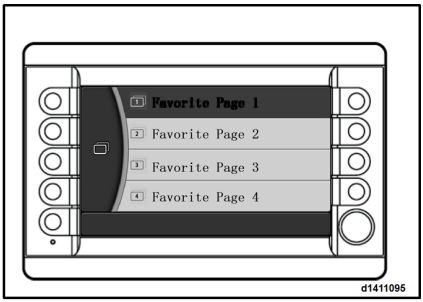


➢ Rotate the knob to select the Linde-Drive Favorites. Then press the knob to enter the sub menu. ▷

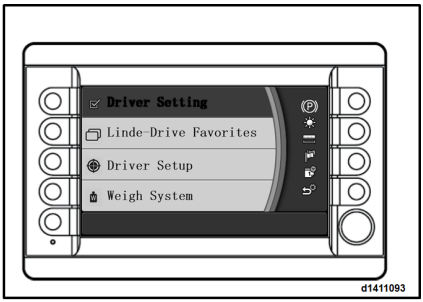
Linde-Drive Favourites

- Favorite Page 1
- Favorite Page 2
- Favorite Page 3
- Favorite Page 4

Favourite page can setting the shortcut function of the Linde driver (option).



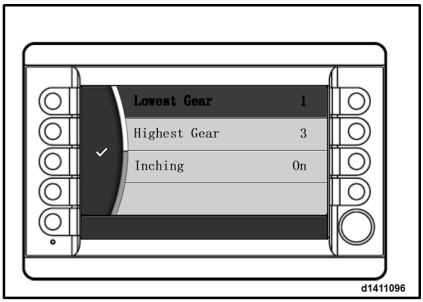
➢ Press the lower left side bright button to return to the upper menu. ▷



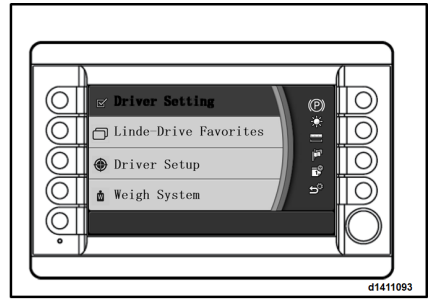
➢ Rotate the knob to select the Driver Setup item, and press the knob to enter the sub menu. ▷

Driver Setup

- Lowest Gear: Setting the lowest gear of the transmission.
- Highest Gear: Setting the highest gear of the transmission.
- Inching: On or off the inching function.



➢ Press the lower left side bright button to return to the upper menu.

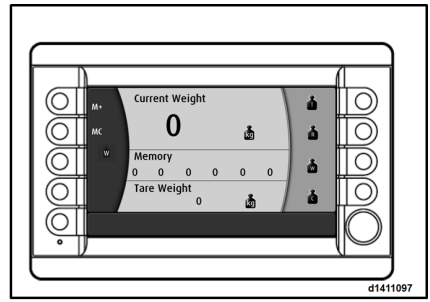


➢ Rotate the knob to select the Weight system. Then press the knob to enter the sub menu.

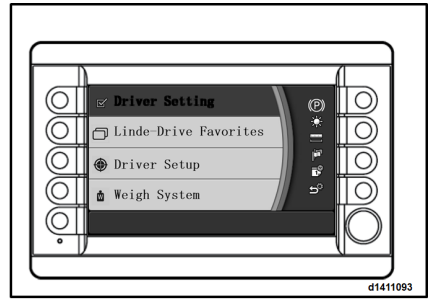
This page shows the weight information of the loads.

NOTE

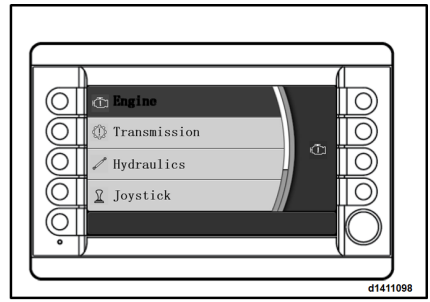
This is the optional item. It won't display if not order.



➢ Press the lower left side bright button to return to the upper menu.

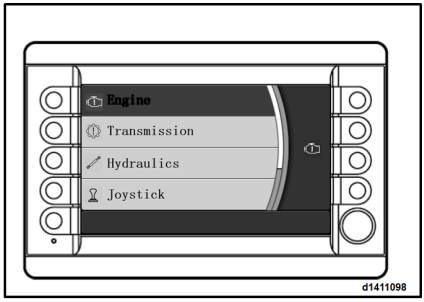


➢ Press the lower left side bright button to return to the main menu.

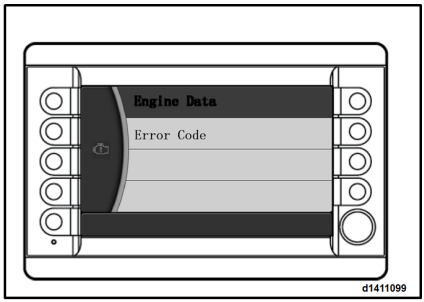


Diagnostic

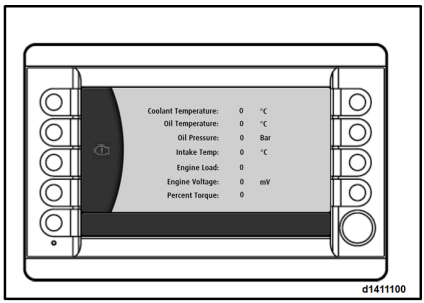
➢ Rotate the knob to select the Diagnostic item. Then press the knob to enter the sub menu. ▷



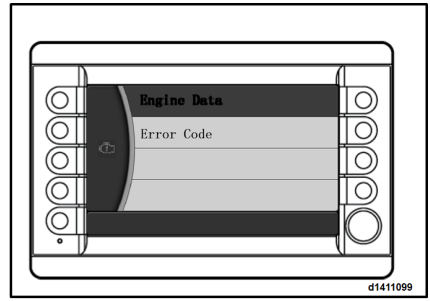
➢ Rotate the knob to select the Engine item. Then press the knob to enter the sub menu. ▷



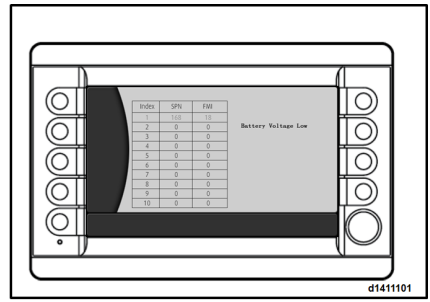
➢ Rotate the knob to select the Engine Data item. Then press the knob to enter and view the engine data. ▷



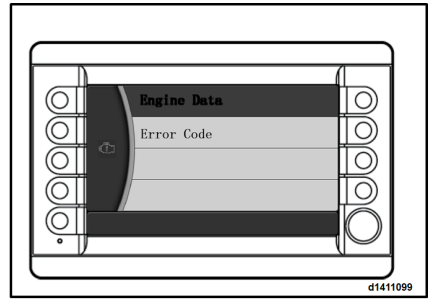
➢ Press the lower left side bright button to return to the upper menu. ▷



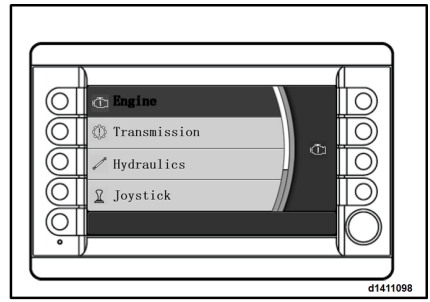
➢ Rotate the knob to select the Error Code item. Then press the knob to view the error code of the truck. ▷



➢ Press the lower left side bright button to return to the upper menu. ▷

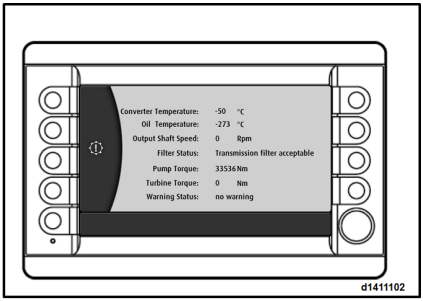


➢ Press the lower left side bright button again to return to the upper menu. ▷

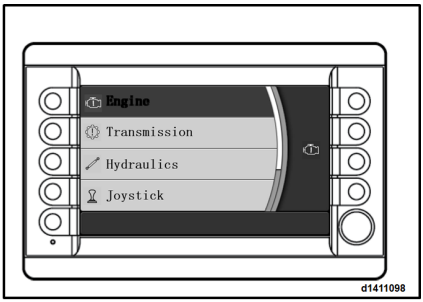


Standard equipment

➢ Rotate the knob to select the Transmission item. Then press the knob to view the transmission diagnostic information. ▷

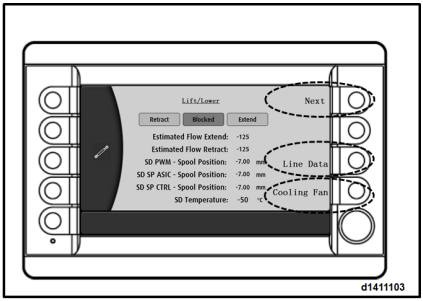


➢ Press the lower left side bright button to return to the upper menu. ▷

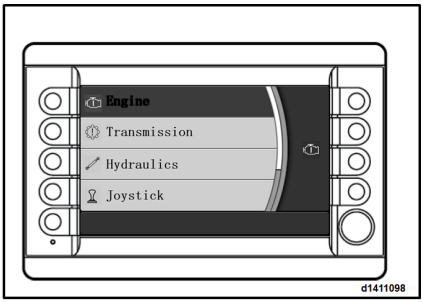


➢ Rotate the knob to select the Hydraulics item. Then press the knob to view the hydraulic diagnostic information. ▷

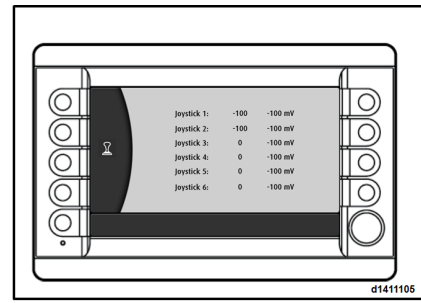
The 3 function button on the right side can be pressed and enter to view the related information.



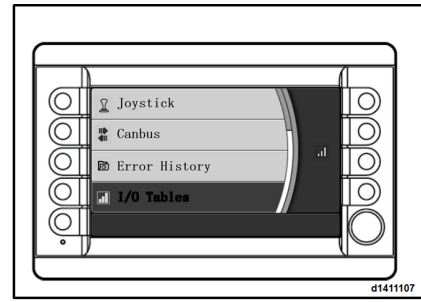
➢ Press the lower left side bright button to return to the upper menu. ▷



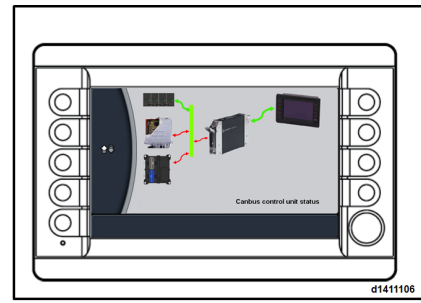
➢ Rotate the knob to select the Joystick item. Then press the knob to view the voltage of the joystick potentiometers. ▷



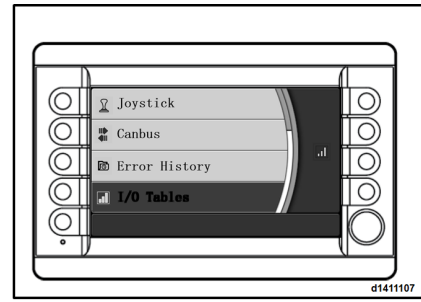
➢ Press the lower left side bright button to return to the upper menu. ▷



➢ Rotate the knob to select the CanBus item. Then press the knob to view the CanBus connections' status.. ▷

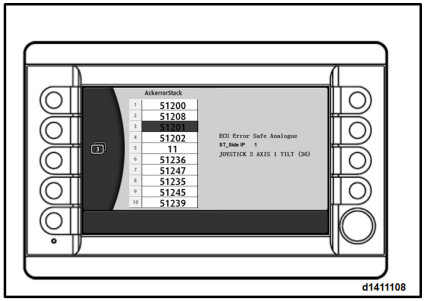


➢ Press the lower left side bright button to return to the upper menu. ▷

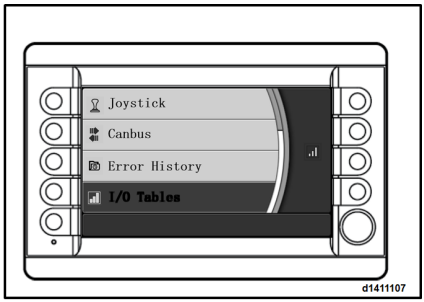


Standard equipment

➢ Rotate the knob to select the Error History item. Then press the knob to view the error history of the truck. ▷



➢ Press the lower left side bright button to return to the upper menu. ▷

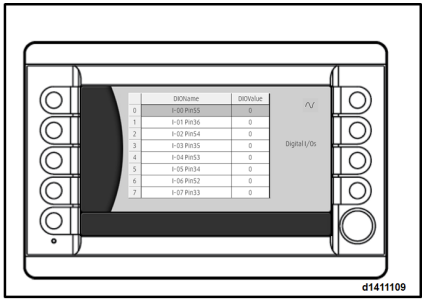


➢ Rotate the knob to select the I/O tables to view the Input and output status. ▷

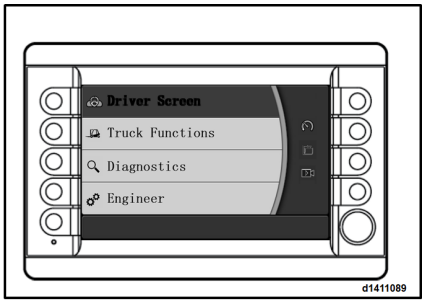
NOTE

Press the bright function buttons on the right side and change the view of the information.

➢ Press the lower left side bright button to return to the upper menu.



➢ Press the lower left side bright button to return to the main menu. ▷



Engineer

NOTE

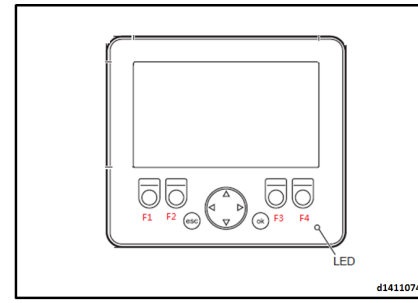
This operation must be carried out by the service centre.

Truck status display unit - Small display

Display 4.3 inches

The display has 10 buttons:

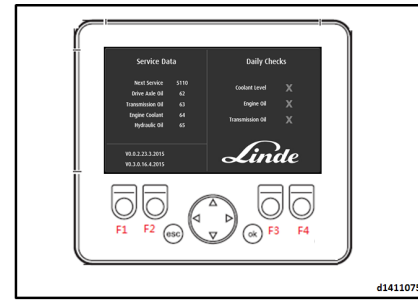
- F1 - F4: Function buttons, used for entering the submenu.
- ESC button, used for returning to last screen.
- OK button
- 4 navigate keys, used for choosing the related item.



F1 Function button 1
F2 Function button 2
F3 Function button 3
F4 Function button 4

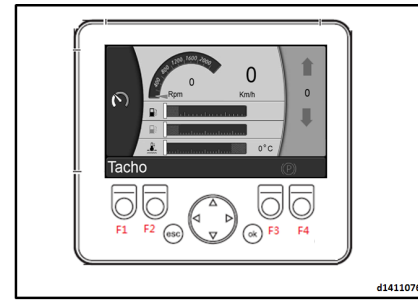
On start

➢ When power is on, the figures display to show the service information of the truck.

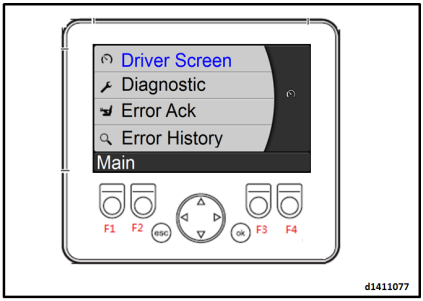


Operation of the display

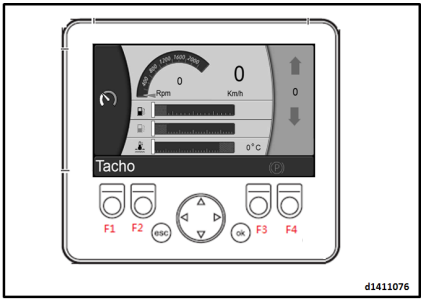
➢ The display will enter the driver screen automatically.



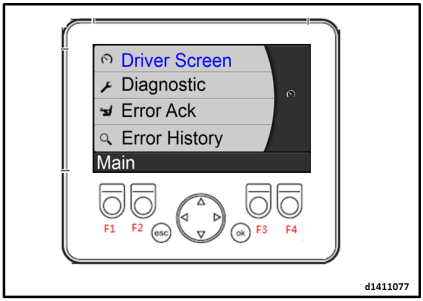
➢ Press the esc button will appear the main menu. ▷



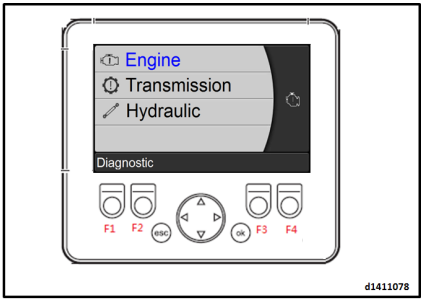
➢ Press the navigate button to select the Driver Screen item. then press OK to enter and view: engine RPM, fuel level, ad-blue level (if equipped), engine temperature, truck speed, traction direction, gear position. ▷



➢ Press the esc button to return to the main menu. ▷



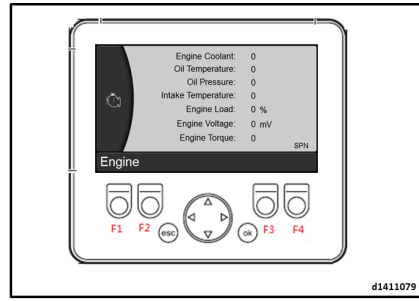
➢ Press the navigate button to select the Diagnostic item. then press OK to enter 2nd level menu. ▷



➢ Press the nevigate button to select the Engine item, then press OK to see the engine information..

This page shows the engine coolant temperature / engine oil temperature/ engine oil pressure / intake temperature / engine load / engine voltage / engine torque.

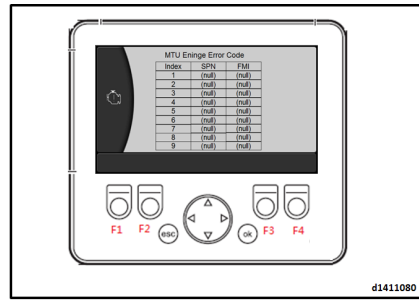
▷



➢ Press F1 will enter the other page for the engine.

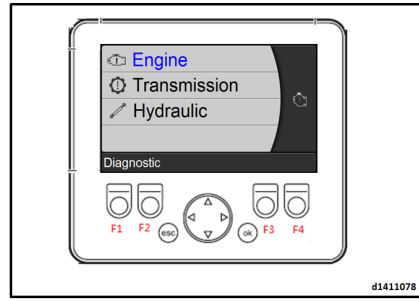
This page shows the error code of the engine.

▷



➢ Press esc button to return to Diagnostic menu.

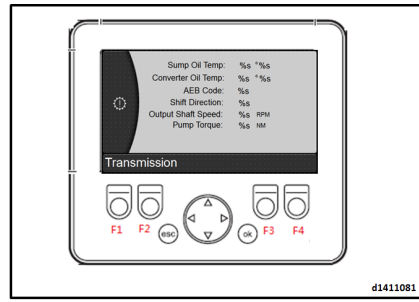
▷



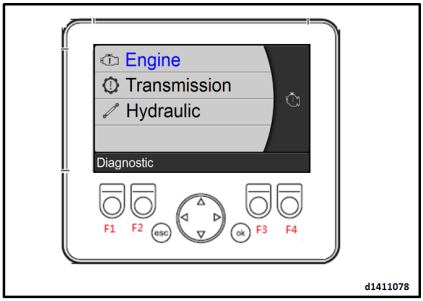
➢ Press the nevigate button to select the Transmission item, then press OK to enter 2nd level menu.

This page shows the sump oil temp / converter oil temp / aeb code / shift direction / output shaft speed / pump torque.

▷



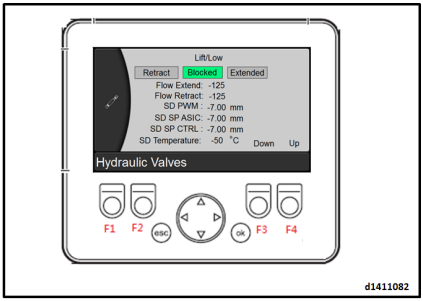
➢ Press esc button to return to diagnostic menu. ▷



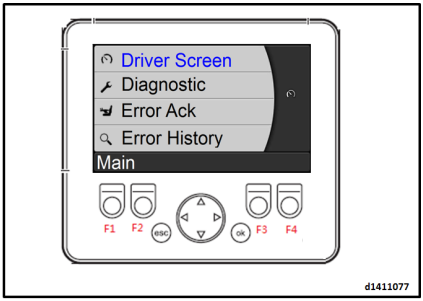
➢ Pressure the nevigate button to select the Hydraulic item, then press OK to enter 2nd level menu. ▷

This page shows the status of the hydraulic valves.

➢ Press F3 button or F4 button to check the other valves' data.

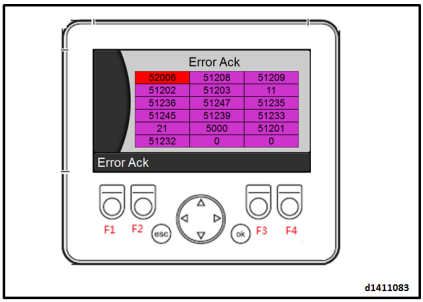


➢ Pressure esc button to return to Diagnostic menu. press esc again to return to the main menu. ▷

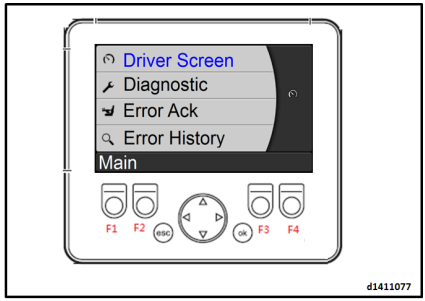


➢ Press the nevigate button to select the Error Ack item. then press OK to enter and view. ▷

This page shows the active error codes of the truck. ACK means active. contact the service engineer to check the truck with the error codes.

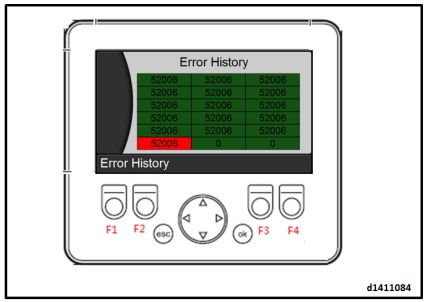


➢ Press esc to return to the main menu. ▷



➢ Press the nevigate button to select the Error History item, then press OK to enter and view. ▷

History error means the truck record the error. Record the error code and contact the service engineer to check the truck with the error code.



Engine Starting and Shut-down

Starting the engine

DANGER

The engine exhaust contains carbon monoxide (CO). Exposure to concentrated CO will cause injury or death.

Do not allow the engine to run in unventilated areas.

NOTE

Where possible, avoid frequently starting and stopping the engine over short periods of time, since this prevents the internal combustion engine reaching operating temperature. Frequent cold starts increase wear.

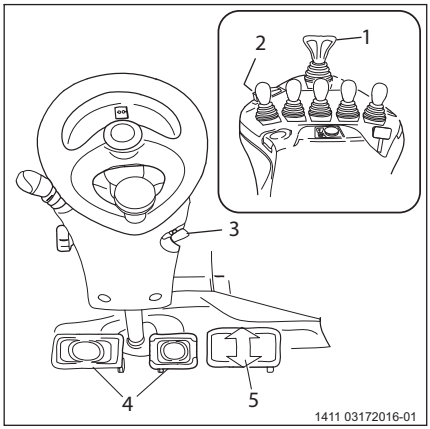
- Occupy the driver's seat.
- Fasten the seat belt.
- Ensure the directional lever (1) is in the neutral position.
- Insert the ignition key into the ignition switch (3) and turn it clockwise to its first position.

The electrical system is switched on.

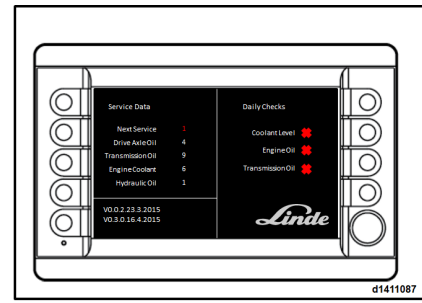
- Observe the display unit and wait for it to begin initializing. It will perform a self-test and then an audible tone will be emitted. The engine may be started at any time after the tone. The display will continue to progress through its initialization routine.
- Turn the ignition key to the next position to start the engine.
- Hold the key against the spring until the engine starts and then release it to its first position.

NOTE

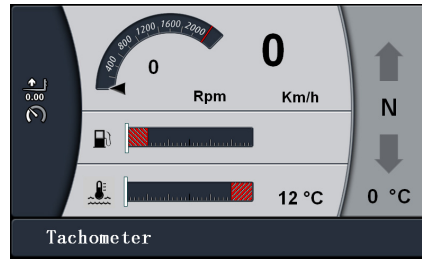
If any operating condition is not satisfied, the engine will not start. Also the key switch will be locked out of the start position on subsequent attempts. If this occurs, the key switch must be turned back to the off position and the condition corrected.



➢ The display will show the start-up screen for a few seconds. ▷

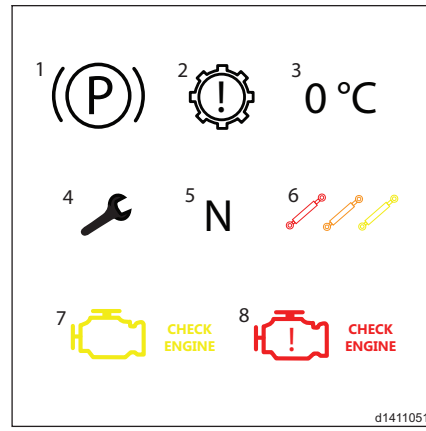


➢ The display unit will then show the tachometer screen displaying: engine rpm, fuel level, exhaust fluid level, engine temperature, directional lever position, and park brake status. At this point the display is fully initialized and the truck may be driven. ▷



➢ Confirm that the battery charge and engine oil pressure indicators and the "Check Engine" light go out as soon as the engine is running smoothly.

➢ During operation observe the following symbols: ▷



- 1 Parking brake indicator
- 2 Transmission error indicator
- 3 Ambient temperature
- 4 Service required indicator
- 5 Gear position indicator
- 6 Hydraulic system error indicator
- 7 Engine error indicator (low level)
- 8 Engine error indicator (high level)

To protect the battery, wait at least one minute between starting attempts.

Switching off the engine

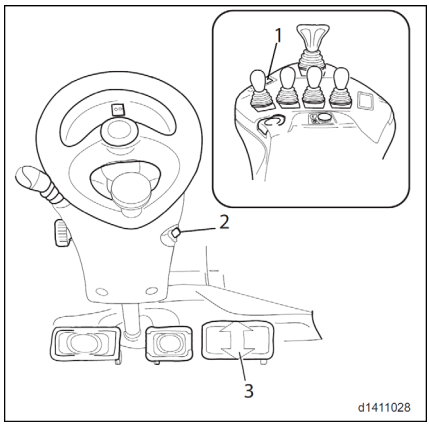
⚠ CAUTION

Switching the engine off under load can cause undue wear on the turbocharger.

Do not switch off engine under full load. Allow it to reach idle speed before switching it off.

➢ Remove your foot from the accelerator pedal (3).

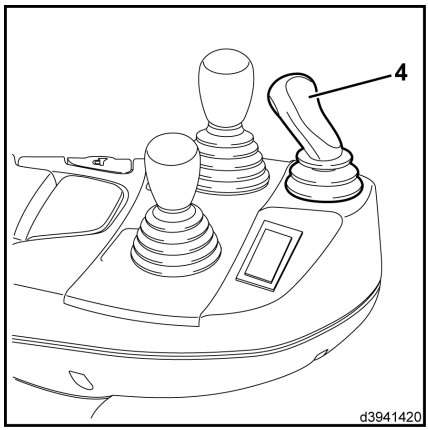
▷



➢ Move the direction selection lever to the neutral position.

➢ Turn the ignition key to the zero position.

▷



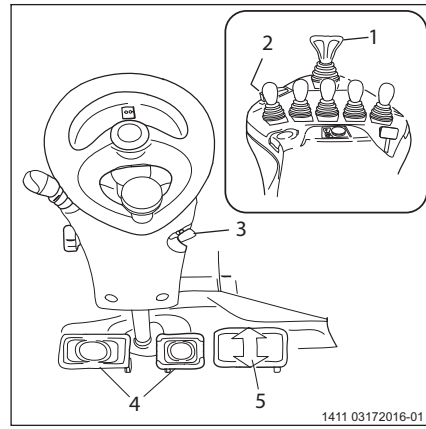
NOTE

The brake is applied automatically when the engine is switched off.

➢ Remove the ignition key when leaving the truck.

Driving

▷



⚠ WARNING

Operators must be familiar with all safety procedures that apply to forklift operation before driving.

Read and understand all safety information in Section 2 before operating the truck.

NOTE

The truck will not travel unless the seat is occupied. If the seat becomes unoccupied while the engine is running, the directional lever (1) must be returned to the neutral position, then to the desired drive direction again after the seat is occupied, before the truck will move.

- Start the engine.
- Elevate the forks slightly and tilt the mast back.
- Ensure that the parking brake is released. If not, release the parking brake by pressing the service brake pedal (4) and then pressing the parking brake toggle switch (2) on the armrest. The service brake pedal must be pressed before the parking brake will release.

Each use of the parking brake switch (2) will toggle the parking brake on/off. Observe the parking brake symbol on the display to determine parking brake status. When the parking brake is applied, the symbol will be visible continuously. If the symbol is not present, the parking brake is released.

⚠ WARNING

Failure to apply the parking brake can result in unintended vehicle movement. The parking brake is not automatically applied when the truck is stopped with the engine running. If the truck is left idling without the parking brake applied, it will roll if it is left on a gradient or if it is pushed or struck by another vehicle.

If it is necessary to exit the truck with the engine running (for example to perform some brief action in close vicinity to the truck such as opening a gate, unhitching a trailer, etc.), always apply the parking brake. Shut down the engine if making a longer stop.

NOTE

If the auto parking brake function is active, the parking brake switch will toggle between function control and brake fully applied. When the parking brake is under control of the auto parking brake function, it will engage (symbol flashing) after a delay when the truck becomes stationary and will release when the drive pedal is pressed again.

Forward Travel

➢ Move the directional lever (1) forwards.

➢ Carefully press drive pedal (5). Truck speed depends on how far the pedal is pressed.

NOTE

Quick flooring of the drive pedal will have no effect as the maximum acceleration rate is controlled automatically.

If the pedal is released, the truck will coast. Use either part of the service brake pedal (4) to slow or stop the truck as necessary.

NOTE

The operator must remain seated throughout travel. If the seat becomes unoccupied, the seat switch will cause the transmission to disengage and the truck will coast.

Reverse Travel

➢ Move the directional lever (1) backwards.

➢ Carefully press drive pedal (5).

Control of speed and braking in reverse is the same as for forward motion.

Changing Direction

➢ Release the drive pedal.

➢ Bring the truck to a stop with the brake pedal.

➢ Move the directional control lever through neutral to the opposite direction of travel.

NOTE

Moving the lever while the truck is still moving will have no effect on deceleration.

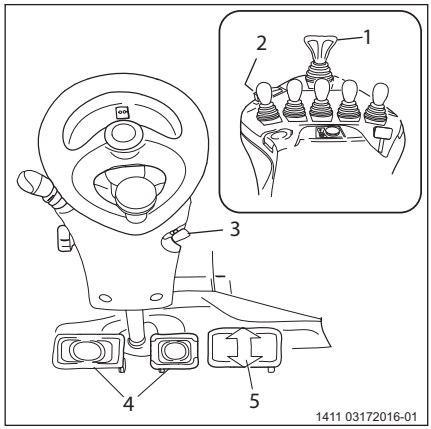
➢ Press the drive pedal again. The truck will accelerate in the new direction.

Inching

If the inching function is enabled, the drive and brake pedals may be used at the same time to aid in low speed maneuvering (inching). When the brake pedal is pressed, the brakes are applied in proportion to pedal travel and hydraulic pressure is bled from the transmission. Pressing the drive pedal during braking will partially overcome the transmission losses and allow controlled low-speed travel. The left-most part of the brake pedal is provided to facilitate this technique.

Inching can be enabled or disabled from the Tachometer screen by moving back one menu level to reach the top level menu. From there navigate to Truck Functions>Driver Setup>Inching. Select the present setting ("on" or "off") to turn it green. Once the setting is green, it may be toggled on/off via the navigation button (or knob on the large display). When finished, select the setting again to turn it white and then navigate back out to the tachometer menu.

Braking



The truck has a set of hydraulically operated disc brakes at each outboard end of the drive axle that function as service brakes. When the foot pedal is pressed, hydraulic pressure is proportionally applied to the brakes through a proportioning valve depending on pedal position. Supply pressure is provided by a pump whenever the engine is running. In addition, pressure availability is maintained by an accumulator so that braking pressure remains available when the engine is off. The accumulator can provide enough residual pressure to allow the truck to be braked fifteen to twenty times.

A separate disc brake is provided as a parking brake. It has a large disc and caliper visible behind the mast at the point where the input shaft from the transmission enters the drive axle. This brake is spring applied whenever the engine is off. When the engine is running, the parking brake can be released by the operator.

Service Brake

To operate the service brake, release the drive pedal (5).

Press either part of the brake pedal (4).

Parking Brake

The truck is equipped with an auto parking brake function which may be enabled through the truck display unit. The parking brake will function differently depending on whether this function is enabled.

NOTE

The parking brake is always applied when the engine is off and remains applied upon start-up regardless of whether the auto parking brake function is enabled. Also, the service brake pedal must always be pressed while using the parking brake switch to release the parking brake.

Auto Parking Brake function OFF

If the Auto Parking Brake function is off, the brake is toggled on/off at the red parking brake switch (2) on the armrest. This is a spring-return momentary switch. The state of the parking brake must therefore be determined by observing the display.

- When the engine is running, observe the display to determine whether the parking brake is applied or released. If the parking brake symbol is visible in the display, then the brake is applied.
- To release an applied parking brake, press the service brake pedal (4) then press the parking brake switch (2) momentarily.
- Observe the display to confirm the change.
- To apply the parking brake, press the parking brake switch again momentarily.
- Observe the display to confirm the change.

Auto Parking Brake function ON

If the Auto Parking Brake function is on, the parking brake can still be applied with the red parking brake switch (2) at any time. Release however is determined by the truck control software. The parking brake switch therefore toggles the brake between being immediately applied or being under system control. The table summarizes behavior of the Auto Parking Brake function.

Auto Parking Brake summary			
Toggle switch choices	Parking brake on	Parking brake under system control	
Parking brake symbol in display	on continuously	flashing	off
State of parking brake	Brake applied	Brake applied	Brake released
Conditions	Operator discretion	Parking brake applied if the truck becomes stationary for time greater than the set delay	Parking brake will only release when a direction is selected and the drive pedal is pressed. See note below.

NOTE

If the seat is vacated with a direction selected, the directional lever must be returned to neutral and the direction reselected before the

parking brake will release. Otherwise the truck may remain in gear and the parking brake will release upon drive pedal pressure alone.

Enabling the Auto Parking Brake function

The Auto Parking Brake function can be enabled or disabled from the Tachometer screen by moving back one menu level to reach the top level menu. From there navigate to Truck Functions>Driver Setting>Auto Parking Brake. Select the present setting ("on" or "off") or the time delay as desired, The selection may then be toggled on/off or the time incremented via the navigation button (or knob on the large display). Navigate back out to the tachometer menu when finished.

Absent drivers seat switch

Absent driver seat switch

NOTE

This switch will not prevent the startup of the truck whether the driver is seated or not.

This is activated when the driver leaves the seat while driving. When this happens the transmission will disengage and the truck will come to rest quickly.

To reset the switch

- Sit back on the drivers seat
- Put the gear lever into neutral
- Select forward or reverse gear

Normal operation is restored.

Steering

Hydrostatic steering means that very little effort is required to turn the steer wheels of the truck. This is particularly advantageous when driving in narrow aisles.

- Start the truck.
- Turn the steering wheel to the left and right through the full cycle.

NOTE

The truck is fitted with steering acceleration which automatically adjusts the turning speed according to the speed that the steering wheel is turned.

⚠ CAUTION

Risk of accident.

Do not rely on the steering wheel position.

If the steering wheel is turned to the left three times quickly, and then three times to the right slowly, the truck will not return to its original direction.

➢ Always look at the direction of the truck. Do not rely on the steering wheel position.

NOTE

To avoid unnecessary tyre wear, turn the steering only when the truck is moving.

Contact your service partner if steering requires too much effort or if there is too much play in the steering.

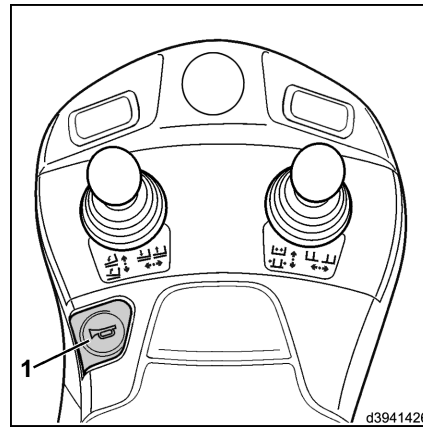
➢ Do not continue to operate the truck with faulty steering.

Horn

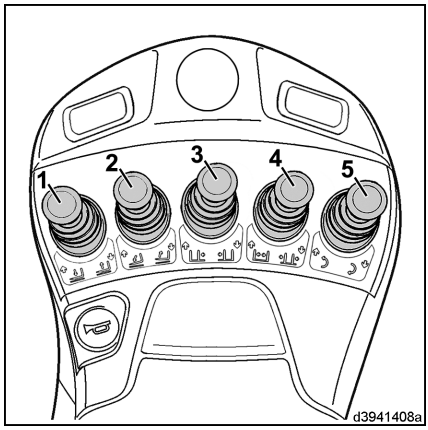
Operating the horn

When operating at blind corners and junctions, a horn serves as warning signal.

➢ Press the horn button(1) on the armrest.



Hydraulic Controls



⚠ WARNING

Operators must be familiar with all safety procedures that apply to forklift operation before operating hydraulic functions.

Read and understand all safety information in Section 2 before operating the truck.

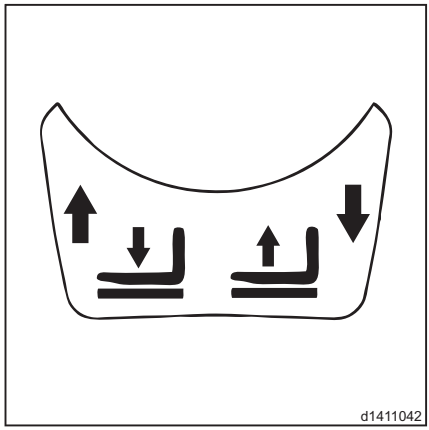
Actuating levers should always be operated smoothly. Function speed is proportional to lever movement. When released, levers automatically return to the neutral position.

➢ Note the function symbols on the control lever decals.

NOTE

The lifting system will only function with the truck switched on and the operator's seat occupied.

Lifting the fork carriage



➢ Pull the joystick (1) backwards.

Lowering the fork carriage

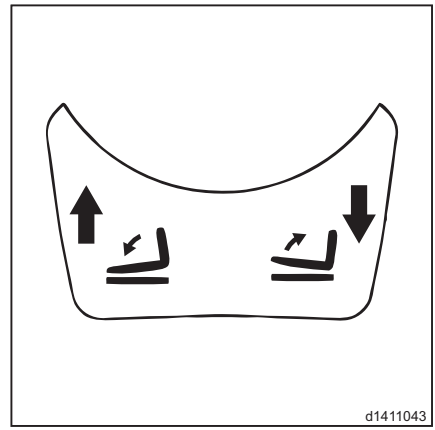
➢ Push the joystick (1) to forwards.

Tilting the lift mast forwards

➢ Push the joystick (2) forwards.

Tilting the lift mast backwards

➢ Pull the joystick (2) backwards.



Operating the sideshift

NOTE

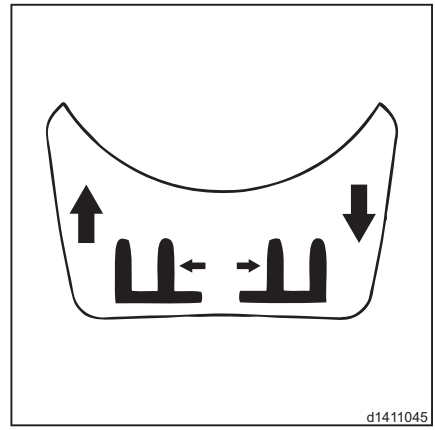
To prevent damage, do not operate the sideshift when the fork arms are on the ground.

➢ Push the joystick (3) forwards.

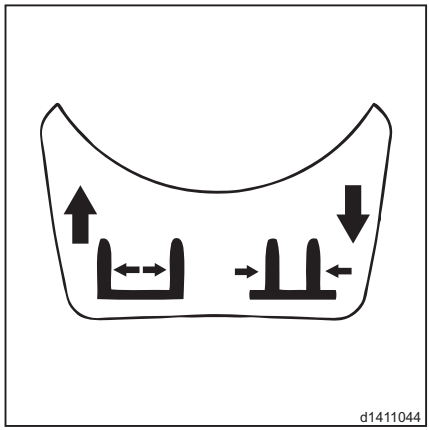
The sideshift moves to the left.

➢ Pull the joystick (3) backwards.

The sideshift moves to the right.



Operating the fork positioner



NOTE

To prevent damage, do not operate the fork positioner with a load or when the fork arms are on the ground. Do not use the fork positioner as a clamp.

➢ Push the joystick (4) forwards.

The fork arms move outwards.

➢ Pull the joystick (4) backwards.

The fork arms move inwards.

Operating Special Attachments

A variety of attachments may be installed on the truck as special equipment. These attachments may be configured to operate with either the third, fourth, or fifth position hydraulic levers. As with the other hydraulic functions, observe the function decal when operating the attachment.

NOTE

Trucks equipped with a clamp or similar attachment will have a locking lever for the hydraulic circuit that operates that attachment. This type of lever requires two distinct movements for operation. Before the lever will move, it must be unlocked by pressing down on it slightly. The dual-motion condition is intended to prevent accidental operation of the attachment. If present, the locking lever will be slightly longer than the other function levers.

Battery access - opening

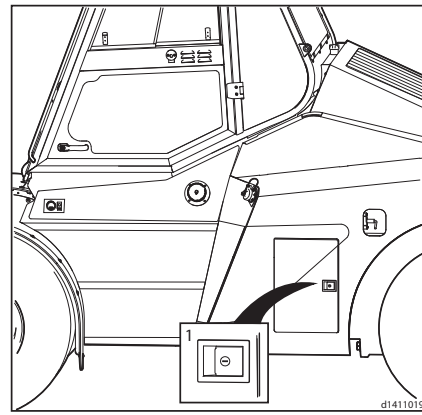
➢ Batteries are located in a compartment on the rear left side of the truck.

➢ Check that door swing area is free from obstruction.

➢ Open door.

Battery access - closing

➢ Close door.

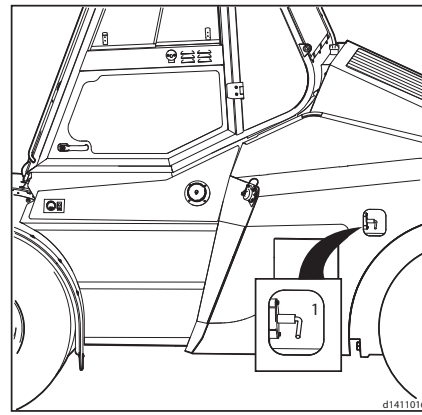


Batteries - isolate

The battery isolator is located to the rear of the battery access compartment.

➢ To isolate the batteries, rotate handle (1) 90° anti clockwise. The batteries are now isolated.

➢ To restore battery power, return handle (1) to original position.



Tilting the Cabin

The cabin may be tilted forward to access the engine compartment.

To tilt the cabin forward

⚠ CAUTION

The cabin will be damaged if it contacts the mast during tilting.

Ensure the mast is tilted fully forward before tilting the cabin.

- Raise the forks approximately 3 feet (1 m) and tilt the mast fully forward.
- Turn the engine off and exit the cabin.
- Remove any loose items from the cabin.
- Remove the cover panel from the tilt control compartment. The cover is located on the right-hand side of the truck immediately above the top step. Grasp the panel at its forward end and pull firmly.
- Place the tilt handle so that its notched end engages the cabin tilt valve as shown in position (1). Rotate the valve to the lift position by turning counter-clockwise.
- Press the electric switch (2) to tilt the cabin fully forward. Hold the switch until the cabin is fully tilted.
- Place the tilt handle through the safety ring with the tab down until the tab contacts the frame (arrow). This will lock the cabin into position.

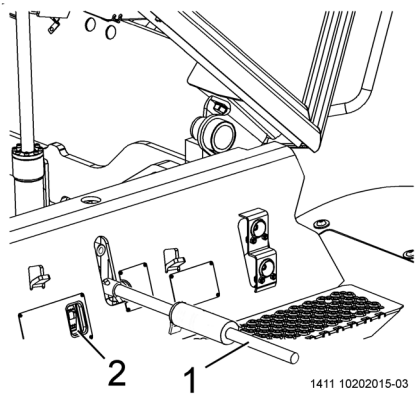
⚠ WARNING

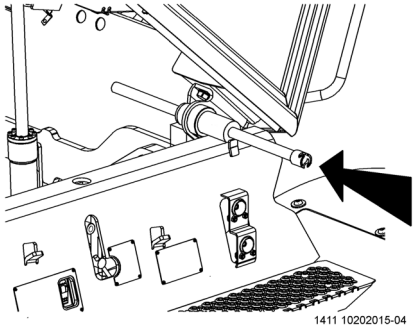
The cabin is heavy and will cause injury if personnel are beneath it when lowered.

Never reach under the cabin when partially tilted, or while being raised or lowered. The cab must be fully tilted and locked into position with the tilt handle properly installed through the safety ring before access is allowed.

To lower the cabin

- Remove the tilt handle from the safety ring and place it back into position (1).





- Turn the cabin tilt valve clockwise to the lowering position.
- Press the electric switch (2) to lower the cabin back into the operating position. Hold the switch until the cabin is fully lowered.

Manual Tilting of the Cabin

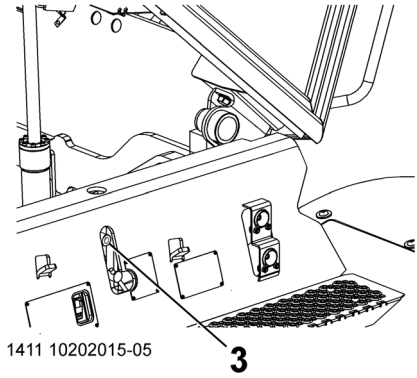
If the electric switch is not functional, the cabin may be tilted and lowered manually. The mast must be still be tilted fully forward before the cabin can be tilted.

⚠ CAUTION

The cabin will be damaged if it contacts the mast during tilting.

Ensure the mast is tilted fully forward before tilting the cabin.

- Raise the forks approximately 3 feet (1 m) and tilt the mast fully forward.
- Turn the engine off and exit the cabin.
- Remove any loose items from the cabin.
- Remove the cabin tilt compartment cover panel from the right-hand side of the truck immediately above the top step. Grasp the panel at its forward end and pull firmly.
- Place the tilt handle so that its notched end engages the cabin tilt valve as shown in position (1). Rotate the valve to the lift position by turning counter-clockwise.
- Remove the handle and insert its other end into the manual pump receiver (3). Pump the handle vertically until the cabin is fully tilted.
- Place the tilt handle through the safety ring with the tab down until the tab contacts the frame (arrow). This will lock the cabin into position.



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⚠ WARNING

The cabin is heavy and will cause injury if personnel are beneath it when lowered.

Never reach under the cabin when partially tilted, or while being raised or lowered. The cab must be fully tilted and locked into position with the tilt handle properly installed through the safety ring before access is allowed.

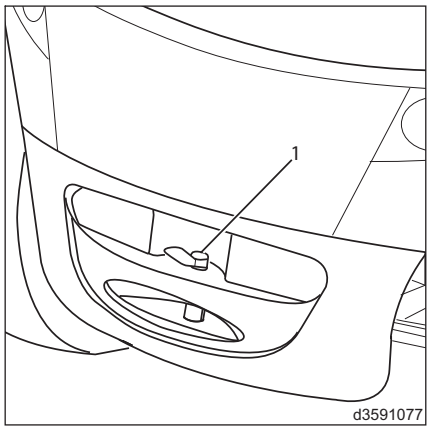
- To lower the cabin, remove the tilt handle from the safety ring and place it back into position (1).
- Turn the cabin tilt valve clockwise to the lowering position.
- Remove the handle and insert its other end into the manual pump receiver (3). Pump the handle vertically until the cabin is fully lowered.

Trailer coupling

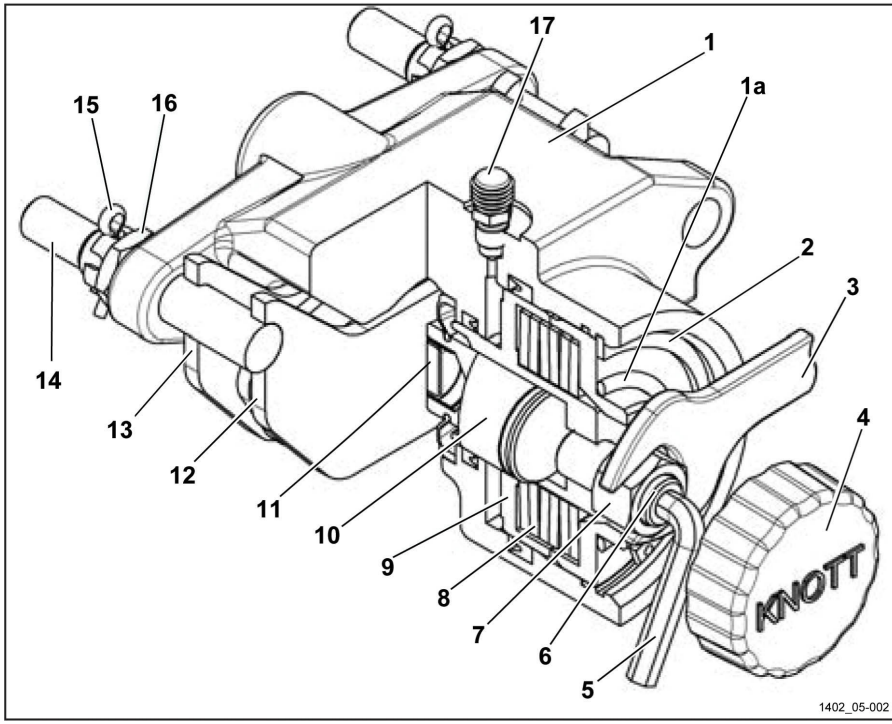
NOTE

The trailer coupling should only be used to tow light trailers inside the plant working area.

- Lift tow pin (1).
- Place towbar in coupling recess.
- Push tow pin (1) down to engage the drawbar and the lower retaining hole.



To tow the truck



1	Caliper body	9	Piston
1a	O-ring seal	10	Thrust bolt
2	Circlip	11	Magnet
3	Wrench (24/30 mm)	12	Friction pad
4	Screw-cap	13	Friction pad
5	Allen key wrench (8/10 mm)	14	Guide bolt
6	Adjusting screw	15	Split-pin
7	Lock-nut	16	Castellated nut
8	Spring stack	17	Bleed nipple

NOTE

Read and understand this maintenance procedure before starting any work. If you are unsure of any aspect of this procedure, contact your service partner.

Safety conditions

The maintenance procedures that follow may involve the assembly and or movement of

heavy hydraulic equipment, excitation of hydraulic systems and movement of heavy vehicles. It is the responsibility of all personnel concerned with these procedures to maintain safe working practices.

NOTE

Unless otherwise stated all component parts must be inspected at disassembly for re-use if serviceable.

Emergency release of parking brake

DANGER

Risk of crush injuries and or death

Do not work on or under a truck unless it is prevented from any movement.

- Park truck on suitable level ground.
- Before any maintenance is started, make sure the truck is completely immobilised, (not able to move).
- Place chocks under wheels.
- Remove ignition key from cab of truck.
- Do not allow unauthorized personnel to enter the cab.

WARNING

Risk of personal injury.

Brake disc rotors and friction pads can become **very hot**.

- make sure all component parts are cool before starting any maintenance.
- Release screw-cap (4).
- Release lock-nut (7).

NOTE

40 to 70 Nm is required to release the brake using adjustment screw (6).

- Turn adjustment screw (6) anticlockwise until brake disc rotor is free.
- If the truck is to remain in this condition for any length of time, refit screw-cap (4)

hand tight to protect the mechanism from contaminants.

NOTE

Before the truck can be used, the parking brake must be re-adjusted - refer to the training manual.

Emergency exit

The right side cab door can be used as the emergency exit.

- Open the cab door.
- Exit the cab in a backwards direction.
- Use handrails where fitted to climb down the steps and exit the cab.
- Close the cab door.

WARNING

Risk of injury from entering and exiting the truck incorrectly.

Face the truck when entering and exiting.

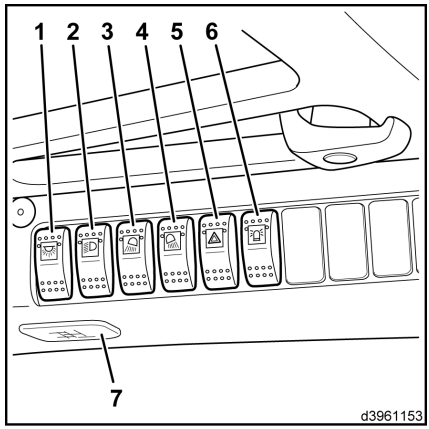
Optional equipment

Lighting

NOTE

The arrangement of the individual switches on the console on the upper right-hand side of the overhead guard may vary, depending on the version. Observe the switch symbols.

Switching on the terminal board and interior lighting

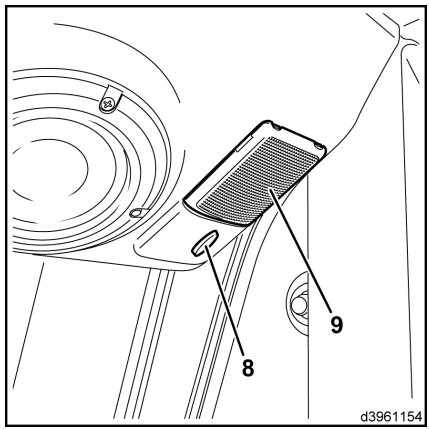


➢ Move the toggle switch (1) to the centre position.

The terminal board lighting is switched on.

➢ Switch the toggle switch (1) as far as it will go.

The interior lighting (7) is switched on.



➢ Press the push button(8).

➢ The interior lighting (9) is switched on.

NOTE

If the pressure switch (8) has previously been actuated, the two interior lights (7) and (9) may be switched on and off via toggle switch (1).

Switching on the lighting

➢ Move the toggle switch (2) to the centre position.

The sidelights and licence plate lamp are switched on.

➢ Switch the toggle switch (2) as far as it will go.

The dipped beams, sidelights and licence plate lamps are switched on.

Switching on the working spotlight

➢ Press toggle switch (3) or (4) (depending on the version).

Switching on the hazard warning system

➢ Press the toggle switch (5).

Switching on the rotating beacon/flashing beacon

Depending on the equipment, there are three different versions.

Version 1

➢ Press the toggle switch (6).

Set the toggle switch (6):
- Level 0: light "OFF"
- Level 1: light "ON" for reverse travel
- Level 2: light in continuous operation

Version 2

➢ Switch on the key switch.

The light is always in operation.

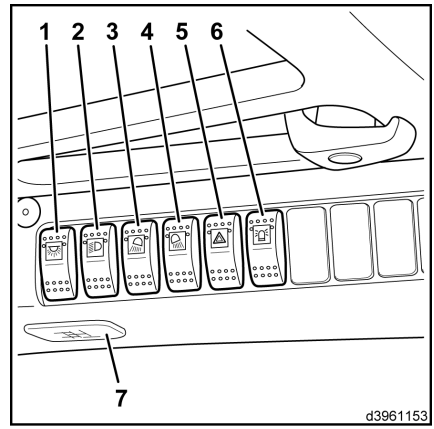
Version 3

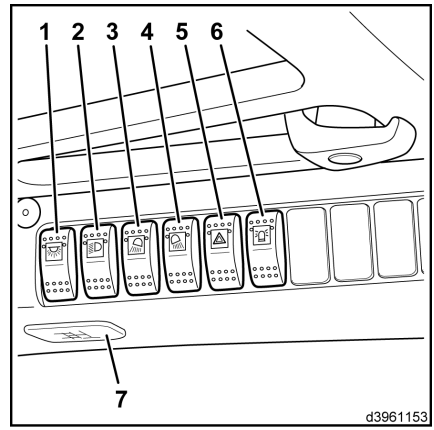
➢ Switch on the key switch and press the reverse pedal.

The light is in operation for reverse travel only.

NOTE

If the truck is to be operated on public roads, the rotating beacon/flashing beacon must be switched off.





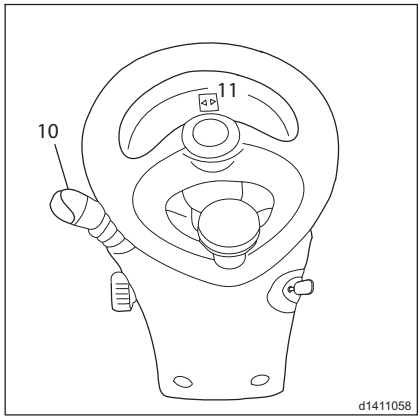
Switching on the direction indicators

➢ Push lever (10) up.

The direction indicators flash on the right of the truck. Indicator (11) flashes.

➢ Push lever (10) down.

The direction indicators flash on the left of the truck. Indicator (11) flashes.



Operating optional attachments

Attachments can be installed as optional equipment. Observe the working pressure and operating instructions for the attachments.

NOTE

Affix a label indicating the truck load capacity with attachment, and a symbol label of the respective attachment on the windscreen to the right of the driver for every attachment. Symbols on the label can vary, depending on the controlled function.

⚠ CAUTION

Danger of damage to equipment.

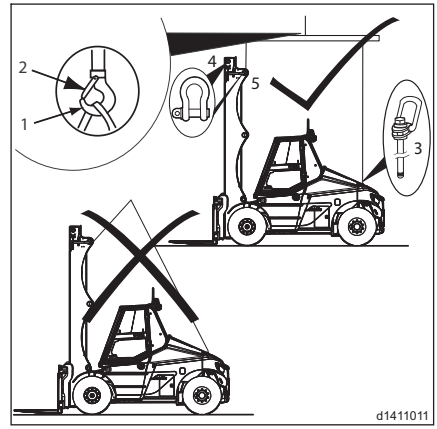
Attachments not supplied with the truck may only be employed if an authorised dealer ascertains that safe operation is assured in respect of load capacity and stability.

NOTE

If the installation of an attachment changes the normal sequence of operation as described in this manual, follow the instructions supplied by Linde or the manufacturer of the attachment. If the customer desires the attachment operation with the central control levers, a label showing the movements possible with the control levers must be affixed on the screen to the right of the driver.

Loading/transportation

Hoisting the truck



NOTE

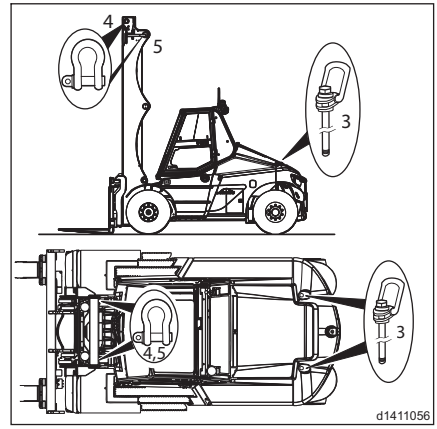
When loading the truck by crane make sure nobody are within the working range of the crane! Only use hoisting equipment and loading crane with sufficient lifting capacity. For the truck weight see the manufacturer's name plate.

⚠ WARNING

Danger of personal injury and damage.

Do not step under the elevated load!

Attach lifting slings at the four points shown.



➢ Attach appropriate load rings to lifting points (3 & 4).

NOTE

If the truck is fitted with a 5 m mast or lower, use upper lifting point (5). If the truck is fitted with 5 m mast or higher use lifting point (4).

➢ Attach two appropriate lifting shackles to the front lifting points (4 or 5) (see note above).

➢ Attach the slings to crane hook (1).

⚠ CAUTION

After attaching slings to the lifting hook, safety lock (2) must close to prevent 'lash slip'.

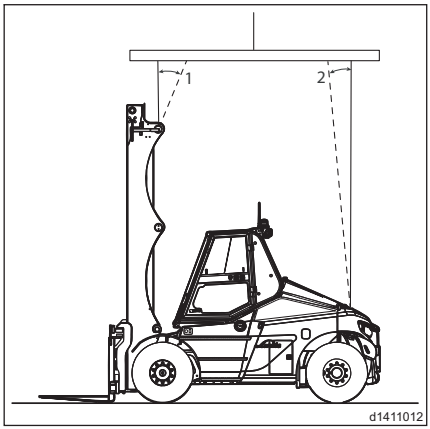
When the truck is hoisted the slings must not foul the cabin or any attachments fitted.

⚠ WARNING

Danger of truck tipping over and damage to truck lifting points.

The maximum angle for sling (1) is 40°. The maximum angle for sling (2) is 16°. Do not exceed these angles.

➢ Observe maximum sling angles when hoisting the truck. ▷



Transporting the truck

⚠ WARNING

Danger of damage and personal injury.

Do not step under the elevated load.

➢ When loading the truck make sure a safe distance is observed.

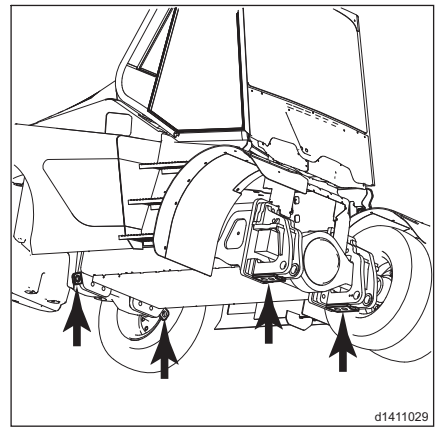
⚠ CAUTION

Danger of damage.

Only use transportation equipment with sufficient load capacity. For the truck weight see the manufacturer's name plate.

➢ Attach appropriate load chains to tie down points as shown, and appropriate tie down points on the transport device.

▷



5

Maintenance

Personnel Qualifications

Only qualified personnel authorized by the owner are permitted to perform maintenance or repair work. All items listed in the Scheduled Maintenance Charts must be performed by qualified forklift technicians only. They must have knowledge and experience sufficient to assess the condition of a forklift truck and the effectiveness of the protective equipment according to established principles for testing forklift trucks. Any evaluation of safety must be unaffected by operational and economic conditions and must be conducted solely from a safety standpoint.

Daily inspection procedures and simple maintenance checks, e.g. checking the hydraulic oil level or checking the fluid level in the battery, may be performed by operators. This does not require training as described above.

Cleaning

Cleaning the Truck

The need for cleaning depends on use of the truck. If highly aggressive media are involved, e.g. salt water, fertilizer, chemicals, cement etc., thorough cleaning is required after finishing the work assignment.

Hot steam or cleaning materials with a powerful degreasing effect should only be used with great caution as this will affect the grease filling of bearings with lifetime lubrication, causing it to escape. As re-lubrication is not possible, the bearings will be irreparably damaged.

When using compressed air for cleaning, remove stubborn soiling with cold cleaner .

During cleaning pay special attention to the oil filler openings and the surrounding areas as well as the lubricating nipples prior to greasing.

Run the truck immediately after cleaning to aid in drying and check operation.

⚠ CAUTION

Never wash truck when switched on.

Switch the truck off before any cleaning operations.

⚠ CAUTION

When cleaning with a water jet (high-pressure or steam cleaner etc.), it should not be applied directly to the area of the front axle, electric and electronic components, connector plugs or insulating material. Water should not be used for cleaning in the area of the central electrical system and switch console.

If this is unavoidable, the parts concerned should be covered up beforehand or only cleaned with a dry cloth or clean compressed air.

NOTE

If the truck is equipped with a sideshifter (optional equipment), its top and bottom bearings should be greased after the truck is washed. Use lubricating grease complying with the recommendations for working materials.

Cleaning the Lift Chains

If the lift chains are so dirty that lubricant penetration is not assured, the chains must be cleaned.

⚠ WARNING

Lift chains are safety elements. Incorrect cleaning materials can damage them.

Do not use cold/chemical cleaners or fluids that are corrosive or contain acid or chlorine. Note the manufacturer's safety information. When cleaning with a steam jet, do not use additives.

- Place a collection vessel under the mast.
- Clean lift chains with a paraffin derivative such as petroleum ether.
- Immediately after cleaning, dry the chains with compressed air to remove any water remaining on the surface and in the chain joints. Flex the chains while drying to ensure thorough moisture removal.
- Immediately apply chain lubricant to the chains. Flex the chains while applying the chain lubricant to ensure lubricant penetration.

NOTE

Lift chains on trucks used in the food industry must be lubricated with an oil approved for the food industry.

Operator Inspection and Maintenance

Daily Inspection Overview

The following inspection tasks in this section should be carried out by the operator or designated service personnel before each shift or at least daily. This inspection is not part of the regularly scheduled maintenance listed elsewhere in this chapter and is not intended to replace any of it. Regularly scheduled maintenance must be performed by a qualified forklift technician at the intervals indicated.

If any problem affecting safety is noted, it must be repaired immediately by a trained forklift technician. The truck must not be operated until such repairs are complete. This list does not cover attachments or other truck modifications not manufactured by Linde. Refer to the respective manufacturer's documentation for maintenance information pertaining to such items.

⚠ WARNING

To prevent accidents during maintenance activities, the truck must be secured against unintentional movement or start-up. Before beginning any maintenance, the mast should be fully lowered, the parking brake should be on and the key switch turned off. The truck must remain in this state throughout the maintenance process except for individual maintenance activities that specifically require otherwise.

Daily Inspection Checklist

IC SIT-DOWN LIFT TRUCK
OPERATOR'S DAILY CHECKLIST

Truck Serial Number:_____ Dept / Shift: _____ Operator: _____
Hour meter reading:_____ Date: _____ Supervisor: _____

Check each of the following items before the start of each shift. **Let your supervisor and/or maintenance department know of any problem**. Start at the left rear of the lift truck and work towards the front, and then the right side. After checking, mark each item accordingly. Explain below as necessary.

Check boxes as follows: ☐OK ☐ NR, **N**eeds **R**epair. Circle problem and explain below.

OK	NR	VISUAL INSPECTION
		Water or Oil Spots on Floor (check for leaks on truck)
		Rear Tires (pressure if applicable, wear, cuts, embedded objects, rim damage, loose/missing lug nuts)
		Steer Axle (check for damage, debris)
		Pre-cleaner bowl (clean)
		Exhaust (check damage or obstructions)
		Propane (relief valve, fuel level, leaks, tank hold-down bracket)
		Overhead Guard (damage, bends, cracks, looseness)
		Seat & Seat Belt (check operation, damage, worn/torn belt, loose fasteners)
		Steering Wheel (check for wear, damage)
		Hood Latch (check operation, latches securely)
		Hydraulic Oil (check level)
		Engine (check oil, coolant and brake fluid levels as applicable)
		Fan Belt (wear, cracks)
		Battery Connectors & Cables (damage, cracks, pitting)
		Front Tire (left) (tire condition, rim damage, etc)
		Tilt Cylinder (left) (damage, leaks, loose fittings)
		Mast (damage, wear, cracks, loose fasteners)
		Lift Cylinders (damage, leaks, loose fittings)
		Lift Chains (wear, corrosion, cracks, loose leaves, even tension)
		Carriage/Load Backrest (damage, looseness, bends, cracks)
		Forks/Attachment (damage, cracks, excess wear, twisted, bent)
		Fork Locking Pins (check operation, holds fork secure)
		Tilt Cylinder (right) (damage, leaks, loose fittings)
		Front Tire (right) (tire condition, rim damage, etc)
		Warning Decals/Operator's Manual (in place, legible)
		Data Plate / Capacity Plate (in place, legible)

OK	NR	OPERATIONAL INSPECTION
		Unusual Noise (during any of the operational checks)
		Gauges and Instrumentation (check operation)
		Seat Switch (If equipped) (check operation)
		Directional switch (if equipped) (operates freely)
		Forward Driving (accelerates, steers, brakes smoothly)
		Reverse Driving (accelerates, steers, brakes smoothly)
		Service Brake or Emergency Stop Pedal (check operation)
		Parking Brake (check operation)
		Hydraulic Controls (operate freely, return to neutral, lock-out function (if equipped) operates properly)
		Attachment (if equipped) (check operation)
		Mast (extend fully, binding, leaks, roughness, noise)
		Hydraulic Oil (excessive noise when mast is fully raised is indication of low hydraulic oil)
		Horn (sounds when button pressed)
		Backup Alarm (if equipped) (sounds in reverse)
		Travel Alarm (if equipped) (sounds with vehicle in motion)
		Work, Strobe, Flashing Lights (if equipped) (check operation)

OK	NR	DUSTY APPLICATIONS
		Air Clean Exterior of Truck
		Air Clean or Vacuum Interior of Truck and Engine Compartment
		Air Clean Radiator from Inside of Engine Compartment Out (**DO NOT** blow from outside grill to inside of engine compartment)

Explanation of problems marked above (use back of this form if needed):_____

OSHA 1910.178 (p) (1) requires a truck to be taken out of service any time it is found to be in need of repair, or is in any way defective or unsafe. Place a "Do Not Operate" tag on the truck, remove the key and alert your supervisor. The Truck may not be placed back into service until necessary repairs are made.

F285 04-2013

Check for fluid leakage

Check the entire truck as well as the surface beneath it for signs of fluid leakage.

Check overhead guard

Check the condition of the overhead guard for deformity, looseness, or other obvious damage.

Check hydraulic cylinders

Inspect lift, tilt, and any attachment cylinders for damage or leakage.

Check lift chains

Inspect the mast lift chains for broken link plates, broken or deformed pins, rust, and stiffness. Inspect the chain anchor and hardware for damage as well.

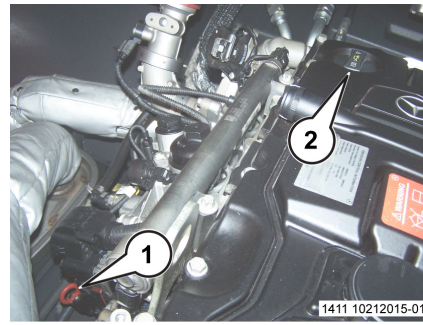
Check fork carriage

Inspect the forks, carriage and load backrest for deformity, cracks, or other damage. Check fork latch pins for correct operation. (Trucks equipped with a fork positioner will not have fork latch pins.)

Check engine fan

Inspect the fan for damage and cleanliness. Remove any debris or deposits of grease or dirt. Check especially for long pieces of debris wrapped around the fan shaft and remove if found. Debris around the fan shaft, such as fibers or plastic, can damage the shaft seal and destroy the fan.

Check engine oil level



- Park the truck on level ground.
- Tilt the cabin.
- Withdraw the oil dipstick (1) from the engine.
- Wipe the dipstick with a clean cloth.
- Re-insert the dipstick fully and remove it again. The oil level should be between the marks on the dipstick.
- If necessary to add oil, remove filler cap (2) from the filler opening. Pour oil into the opening until the level reaches the upper mark on the dipstick.

⚠ WARNING

Engine oil is flammable.

Do not allow engine oil to contact hot engine components. Use care when adding oil to avoid spilling.

⚠ CAUTION

Incorrect oil can damage the engine.

Use only oil that meets the specifications given in the Fluid and Lubricant Specifications section.

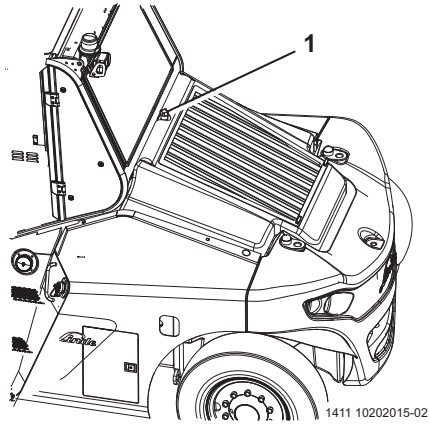
⚠ CAUTION

Overfilling the engine with oil can cause engine damage.

Do not overfill the engine with oil. Drain excess engine oil if necessary.

- After adding oil, replace the filler cap and turn to tighten it.

Check coolant level



⚠ WARNING

If heat is still present in the cooling system, the radiator will be under pressure and its contents will be hot. Unscrewing the cap (1) while the system is still warm can result in serious burns due to hot, pressurized coolant.

Do not attempt to add coolant while the engine is still hot. Always carefully feel the temperature of the expansion tank before unscrewing the cap. Unscrew the cap only when the tank is cool. Always unscrew the cap slowly to ensure contents are no longer pressurized. If pressure is detected during opening, tighten the cap and wait for the system to cool further.

⚠ WARNING

If the truck is equipped with a glazed cabin, it will be necessary to climb into position to access the radiator cap.

Use extreme caution while climbing and always use hand holds provided.

⚠ CAUTION

Incorrect coolant types will not give maximum engine protection.

Use only coolant that meets the specifications given in the Fluid and Lubricant Specifications section.

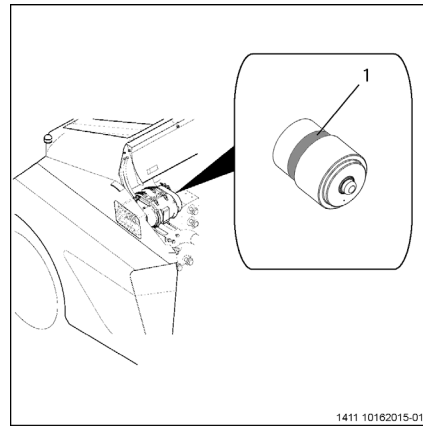
- Slowly unscrew the radiator cap (1) to check the coolant level. Coolant level should be at the bottom of the filler neck.
- If necessary, add coolant until the level becomes visible just below the filler neck.
- Allow some time for the level to stabilize after adding coolant and recheck.
- Replace the filler cap.

Check air filter restriction indicator ▷

Observe the mechanical restriction indicator attached to the air filter housing. If the red surface (1) on the collar is exposed, then the air filter is clogged and must be replaced.

NOTE

The air filter element must always be replaced at the scheduled maintenance interval regardless of indicator status.

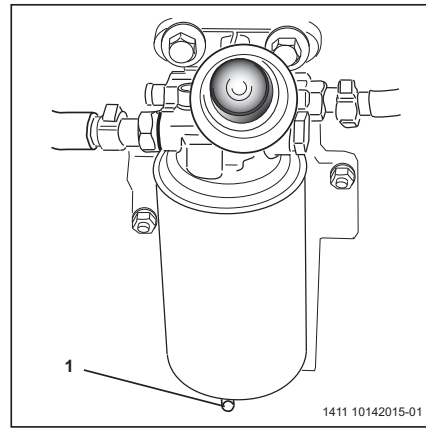


Check water separator ▷

Any moisture condensed in the fuel will be separated and collected in a reservoir. The reservoir is located on the left-hand side of the chassis beneath the fuel pre-filter. Collected water must be periodically drained. To drain the water, hold a container beneath the separator and open the drain plug (1). Allow water to drain until pure fuel emerges.

NOTE

Often this is not required on a daily basis unless operating in very cold ambient conditions.



Transmission oil level check

⚠ CAUTION

Follow the precautions for handling fluids and lubricants.

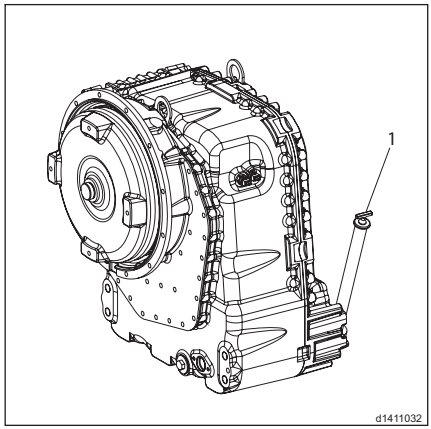
Wear protective equipment.

NOTE

Check the oil at operating temperature >40°C and with engine running. Do not check when the engine is cold.

Make sure truck is on level ground. Park brake on and wheels chocked. Engine must be running

- Tilt the cab and open the engine access covers.
- Remove dipstick (1) and wipe with a clean cloth.
- Fully re-insert dipstick (1) and remove it again.
- The oil level should be between the Min. and Max. markings.
- Add oil if required.
- Replace engine covers and lower the cab.



NOTE

When transmission oil level is low a warning is displayed on the truck status display unit, the engine management system restricts the truck to low speed operation.

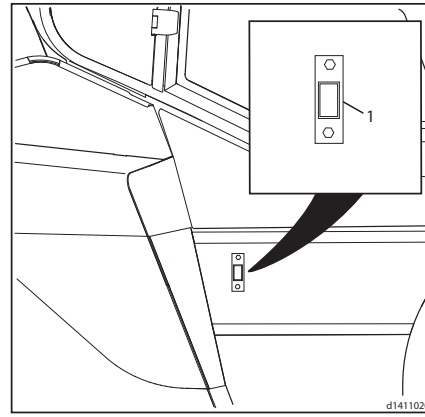
Hydraulic system: oil level check

➢ Park the truck on level ground and lower the forks to the ground.

➢ Check sight glass (1) on the right side of the chassis. Add oil if necessary.

NOTE

Mast should be vertical when checking oil level.



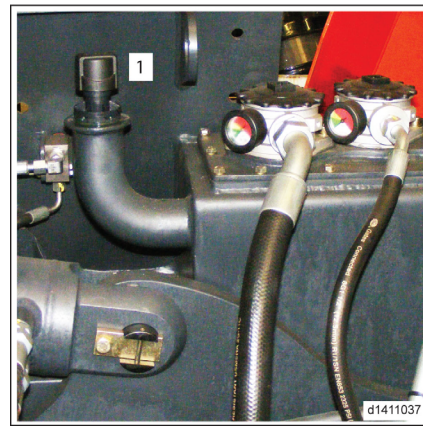
Adding Hydraulic oil

➢ Remove hydraulic tank breather/filler (1) to add oil.

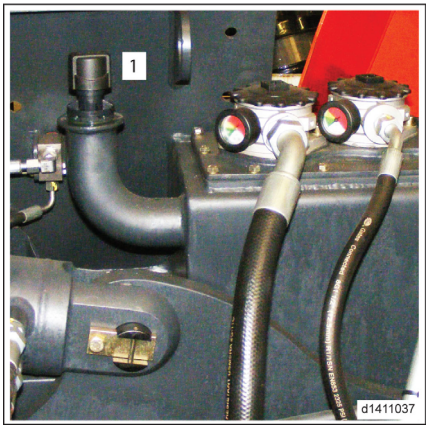
NOTE

Observe the sight glass and fill to maximum.

Hydraulic tank capacity - 210 l approx.



Hydraulic tank breather filter - check ▷



NOTE

The truck should be at normal operating temperature, and the oil level should be correct. Raise and lower the mast twice in quick succession before performing this check.

- Slowly unscrew breather filter (1) located on the top of the hydraulic oil tank, allowing the air to escape before removing fully.

NOTE

In a dusty atmosphere it may be necessary to renew the filter earlier.

- If air is not heard to escape, replace breather filter (1).
- Discard used filter according to local authority guidelines

Check decal condition

Inspect all decals and the data/capacity plate for condition and legibility. Decal locations are given in the Overview section of this manual. Refer to the decal descriptions in the Safety section of this manual if necessary. Any damaged or unreadable decals must be replaced.

Check control lever bellows

Inspect the flexible bellows on each hydraulic control lever for correct position and condition. Torn or otherwise damaged bellows must be replaced.

Check wheels and tires

⚠ WARNING

Uneven wear or excessive damage to the tires can reduce stability as well as brake performance. On pneumatic tires, this can also result from insufficient air pressure as well. Reduced stability can cause tip-over. Reduced brake performance can cause collisions.

Have worn or damaged tires changed immediately. Ensure pneumatic tires have the correct inflation pressure.

⚠ WARNING

This truck may be equipped with pneumatic tires. If handled incorrectly, pneumatic tires on heavy equipment present an explosion hazard due to high inflation pressures.

Pneumatic tires must only be inflated or changed by personnel trained in handling pneumatic heavy equipment tires and then only when the proper protective equipment is used. Always deflate tires before wheel or tire removal or disassembly. Always use protective equipment when inflating tires.

Inspect the tires for damage, excessive wear, or low pressure. Correct tire pressure is 145 psi (10 bar).

Check wheel mounting hardware for looseness. This is especially important if a wheel has recently been removed and reinstalled for repairs, replacement, or any other reason. Have any loose wheel mounting hardware tightened to the following torque before operation.

Drive wheel and steer wheel fasteners should both be tightened to 502 ft-lb (680 Nm).

⚠ WARNING

Wheel mounting hardware sometimes requires several cycles of tightening before it fully seats. For this reason, wheel mounting screws or nuts will often work loose in the period immediately following initial tightening.

Whenever a wheel is removed and replaced for any reason, the wheel mounting screws or nuts must be checked for tightness every 10 hours thereafter until no further loosening is detected.

Check the seat and seat belt

Check the seat condition and mounting. Verify that seat mounting hardware is tight and that the seat is stable.

Pull the seat belt completely out and inspect it for fraying or damage. Buckle the belt and check that the buckle holds securely and that it releases easily and completely when the release button is pressed. With the truck on a horizontal surface, quickly pull the belt out of its retractor and verify that the locking mechanism prevents rapid extension.

⚠ WARNING

A malfunctioning or defective seat belt can result in injury or death in case of accident.

Do not use the truck if the seat belt is defective. If any defect in the function of the seat or seat belt is noticed, the truck must be removed from service until the cause is corrected.

The seat belt must be replaced after an accident. For seat belts integrated into the driver's seat, the seat and its fastening must also be checked by trained technicians after an accident.

Check the steering axle

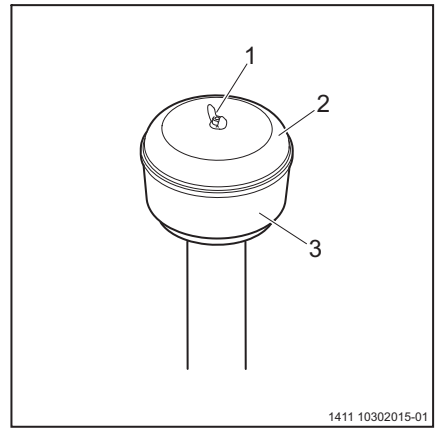
Check for any debris entangled or wrapped around the steer wheels and remove it.

Check the steering cylinder for leakage at its seals and fittings.

Check pre-filter bowl (optional equipment)

Trucks equipped with the optional high-mounted pre-filter have a transparent filter bowl at the top right rear of the overhead guard. Visually check the bowl to determine the amount of collected dust. The bowl should never be allowed to become more that half full. In dusty environments, it may need to be checked and emptied more than once per day.

To empty the bowl, unscrew the wing nut (1) and remove the cover (2). Lift the bowl (3) off of its supporting collar and empty it into a suitable waste container. When finished, refit the bowl and cover and install the wing nut.



Operational checks

Before returning the truck to service, conduct an operational check of the following items:

- Parking brake (must hold on 15% grade with maximum load)
- Seat switch
- Multi-function display/battery discharge indicator
- Working lights
- Horn
- Forward and reverse travel
- Back-up alarm if equipped
- Service brake
- Mast, tilt, and any other hydraulic functions (operate through complete range of motion)
- Fuel level

⚠ CAUTION

Excessive noise during hydraulic function operation indicates low hydraulic fluid.

This condition must be checked and corrected immediately to avoid damage to the hydraulic pump.

Routine Lubrication and Inspection

Routine Lubrication and Inspection Intervals

The items in this section must be performed based on usage and environment. They do not need to be performed daily but may require completion more frequently than the major scheduled maintenance intervals. These intervals can often be based on maintenance experience by those familiar with equipment in the given environment. Intervals given herein for specific items however must not be exceeded in any case. Your Linde dealer will be able to provide application-specfic interval recommendations if required.

Steering Axle Lubrication

Check for any debris entangled or wrapped around the steer wheels and remove it.

Check the steering cylinder for leakage at its seals and fittings.

Clean the steering axle thoroughly.

Lubricate the tie rod bearings and stub axle bearings at their grease fittings. Frequency of tie rod and axle bearing lubrication will vary depending on severity of the application. At a minimum, this lubrication must occur at least every 500 hours. The rear of the truck should be supported on jacks to unload steer axle bearings during lubrication. This will allow more effective penetration of the grease.

Tilt and Carriage Bearing Lubrication

The tilt cylinder bearings, mast pivots, carriage cylinder bearings, and fork slider pads must be lubricated with grease based on usage and environment but at least every 750 hours.

Lubricate the mast and tilt cylinder pivots

Lubricate the mast pivot pins

⚠ CAUTION

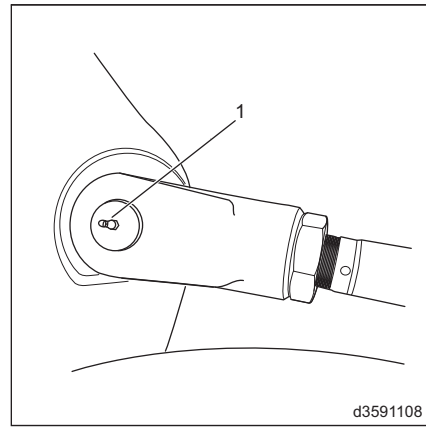
Danger of damage to the truck.

Take the weight off each pivot pin in turn using a suitable jack to ensure the optimum ingress of grease.

NOTE

Lubricate with grease according to the lubricant recommendations.

- Lubricate mast pivot pin (1) through the front of the mast.
- Lubricate with grease gun until new grease is visible at the bearing.



⚠ CAUTION

Danger of accident.

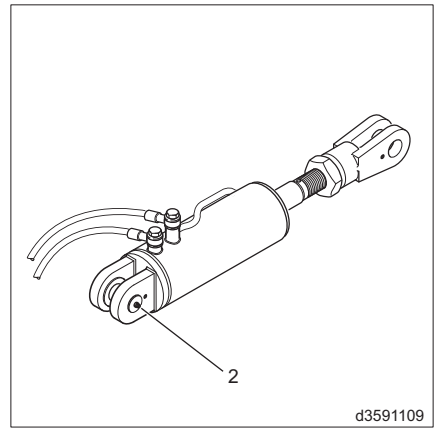
Refer to safety notes on securing the mast when working on the front of the machine.

Lubricate the tilt cylinder pivots

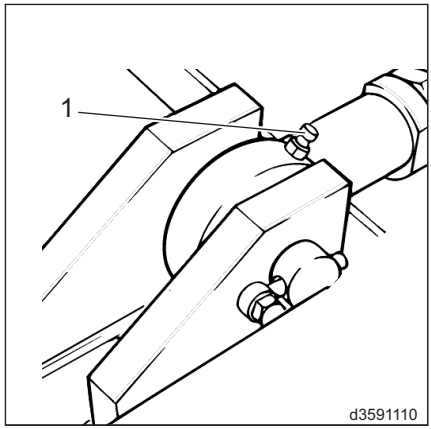
NOTE

Lubricate with grease according to the lubricant recommendations.

- Lubricate tilt cylinder pivots (2), two points.
- Access to the bottom two points is from the side of the tilt cylinder recess under the cab.
- Access to the top two points is on either side of the mast.
- Lubricate with grease gun until new grease is visible at the bearing.



Lubricate fork carriage cylinder bearings ▷

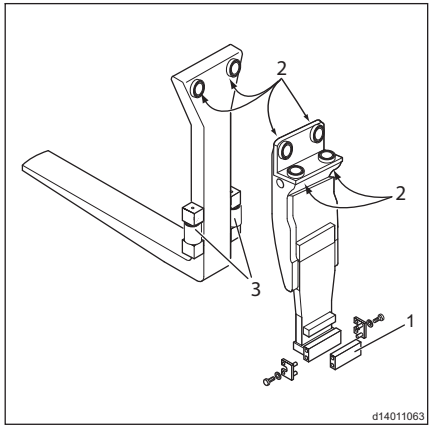


NOTE

Ensure that the forkspread is retracted sufficiently to allow access to the greasing points.

- Lubricate the universal carriage cylinders bearing (1). Two points each cylinder.
- Lubricate with grease gun until new grease is visible at the bearing.

Check the fork carrier slider pads ▷



- Check the clearance at slider pads (1), fitted to the base of the fork carriers.
- Slider pads (1) should be changed when clearance exceeds 2 mm.

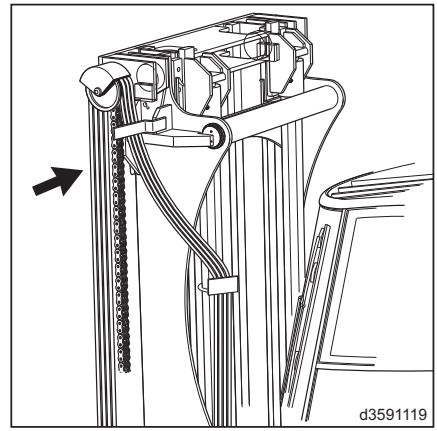
Lubricate the fork roller bearings

- Lubricate the fork roller bearings (2). Four points each fork carrier
- Lubricate with grease gun until new grease is visible at the bearing.

Lubricate the fork lower rollers

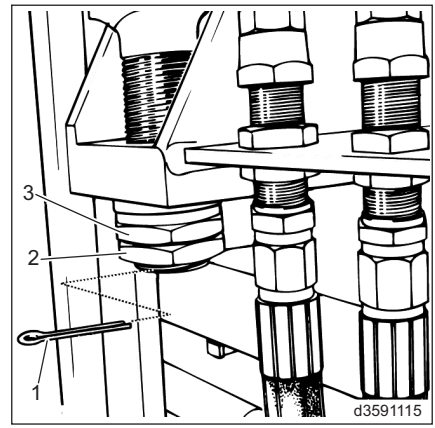
- Lubricate the fork lower rollers (3).
- Lubricate with grease gun until new grease is visible at the bearing.

Check the tension of double hoses ▷



- The tension of the double hoses should be 5-10 mm per meter, referred to initial length.
- Adjust the tension of the hoses to the specified dimension by sliding them in the clamps.

Check and adjust mast chains, lubricate with chain spray ▷



NOTE

After some time in service the lifting chains stretch and therefore must be checked and adjusted as necessary on the left and right sides of the mast.

- Clean the mast chains.
- Put the mast vertical.
- Remove split pin (1).
- Release locknuts (2).
- Using nuts (3), adjust the chains to allow a clearance of 12 mm (1/2 inch) between the fork heels and the floor.
- Tighten locknuts (2).
- Fit new split pin (1).

NOTE

Ensure both chains are adjusted equally.

- Spray channel surfaces, pulleys and chains with Linde chain spray.

Routine Lubrication and Inspection

NOTE

Trucks in service in the food industry must be lubricated with an oil approved for the food industry instead of chain spray.

Scheduled Maintenance

General Maintenance Information

This section contains all information required to determine when the truck must be serviced and what must be done. This information is presented as scheduled maintenance charts on the following pages. Be sure to perform maintenance within the time limit given in the maintenance charts. Proper and timely maintenance is essential to obtain the full operability, performance and service life from the truck, and is a prerequisite for any warranty claims.

Maintenance Intervals

Maintenance intervals are based on operating hours but are also subject to the maximum intervals (based on years in service) listed at the top of each chart.

All lubrication and service intervals must be reduced for dusty conditions, large temperature fluctuations or intensive use.

Scheduled Maintenance Charts

The scheduled maintenance charts provide a list of maintenance tasks and associated time intervals at which they must be carried out. Tasks listed under successive intervals are not cumulative; only the additional tasks required are listed under successive intervals.

Use only high-quality lubricants or other materials meeting the specifications listed in Fluid and Lubricant Specifications. All work must be performed only by qualified forklift technicians. Custom-fitted equipment is not covered by the scheduled maintenance charts. If such equipment is installed, refer to the manufacturer's documentation for maintenance requirements.

Service plan

Note regarding servicing work
Specialist knowledge is required for servicing work. Special tools may also be required. Contact your service partner.

Preparatory tasks
Clean the truck.
Read the error memory.

Note regarding oil change intervals
Engine, drive line and hydraulic activities are recorded. This data is then used to schedule service intervals. Engine oil, drive line oil and hydraulic oil change intervals will be displayed on the truck display unit. If in doubt contact your service partner.

Service work at first 50 h.
Engine
Change fuel filter (engine mounted)
Change fuel/water separator (chassis mounted)
Check charge-air cooler and piping
Check the coolant concentration
Check the dust discharge valve
Check the intake and exhaust lines for leaks
Transmission
Change oil filter
Check the transmission, pumps, valves and lines for leaks
Check the axle mounting
Hydraulics
Change brake pressure filter
Change brake return filter
Change main hydraulic return filter
Change cooler return filter
Check the oil level in the hydraulic system

Service work at first 50 h.
Check the hydraulic system, pumps, valves and lines for leaks
Check the pre-load of the mast hoses

Service work every 750 h.
Engine
Change the engine oil and filter (or when instructed by the display).
Hydraulics
Change the brake return filter (or when instructed by the display).

Additional service work every 1500 h.
Engine
Change fuel filter (engine mounted)
Change fuel/water separator (chassis mounted)
Change the Adblue® filter.
Check the condition of the engine support and engine mounting, and check that they are securely attached.
Check charge-air cooler (CAC) and piping.
Clean the radiator - check for leaks.
Check the coolant concentration.
Check the dust discharge valve.
Check the intake and exhaust lines for leaks.
Transmission
Change the transmission line oil and filter (or when instructed by the display).
Check the transmission, pumps, valves and lines for leaks.
Check the axle mounting.
Check prop shaft slip and mounting flanges.
Check drive axle oil level.
Note regarding drive line oil change intervals

Additional service work every 1500 h.
Drive line oil change intervals will be displayed on the truck display unit. Check the hours on the display regularly. Do not change the oil if 250 h or more is left before the drive line oil change is required. If in doubt contact your service partner.
Chassis, bodywork and fittings
Check the condition and function of the seat belt (if fitted).
Check the mounting of the chassis.
Clean and lubricate all bearings, pivots and joints.
Clean and lubricate door hinges.
Check the cab mountings.
Check functionality of cab tilt (manual pump and electric).
Check security of cab tilt pump handle and safety lock pin.
Check condition of welded structures / components.
Check central lubrication lubricating points (option).
Chassis frame
Check and adjust the steer stops if necessary.
Check mounting of the steer axle and steering king pin.
Check pedals for smooth operation and ensure there is no excessive play.
Clean and lubricate the steering axle.
Operating devices
Check the functionality of the braking system (park brake and service brake).
Check the functionality of the absent driver seat switch (if fitted).
Electrics
Check the condition of the electric cables, cable connectors and connections, and check that they are securely fitted.
Check the condition of the batteries.
Hydraulics
Change the brake pressure filter.
Change the main hydraulic return filter.
Change the cooler return filter.
Check the oil level in the hydraulic system.

Additional service work every 1500 h.
Check the hydraulic system, drive motors, pumps, valves and lines for leaks.
Check the pre-load of the double hoses.
Load lift system
Check the condition of the lift mast, lift mast chain, lift cylinders and end stops, and check that they are correctly mounted and working correctly.
Check the fork arms and arm safety devices.
Clean and lubricate the mast and tilt cylinder pivots and bearings.
Clean, lubricate and check for proper operation of the side shift function.
Lubricate the lift mast bearings.

Additional servicing work every 3000 h.
Engine
Change the V belt.
Change the air filter and safety element.
Check and adjust the valve clearance.
Change the DEF filter.
Change the DEF suction strainer.
Change the coolant.
Transmission
Change the differential gearbox oil.
Hydraulics
Change the hydraulic breather filter.
Change the hydraulic oil (or when instructed by the display).
Check the hydraulic pump mounting bolts.
Load lift device
Check the forks.
Check the mounting of the mast.
Check the tension of mast hoses.

Additional servicing work every 6000 hours, but as a minimum every 3 years. (Exceptions in brackets)
Load lift device
Replace the lift chains (at least every 6000 hours or when 2 % stretch has been attained)

Final tasks
Clear the error memory.
Reset the maintenance counters.
Carry out a functional test, including a test drive.
Affix a maintenance sticker.

Fluids and Lubricants

Capacities

No	Assembly	Fluid or lubricant	Capacity
1	Engine	Engine oil	Approx. 20.5 l
2	Fuel tank	Diesel fuel	Approx. 250 l
3	Diesel exhaust fluid tank	Diesel exhaust fluid (DEF)	Approx. 19 l
4	Cooling system	Antifreeze / water	Approx. 21 l
5	Working hydraulic system oil tank	Hydraulic oil	approx. 210 l
6	Transmission	Transmission oil	approx. 20 l
7	Drive axle	Gear oil	Approx. 29 l
8	Battery	Maintenance free	Maintenance free

Fuel

Only use commercially available ultra low sulphur diesel fuel which complies with the following standards:

- EN 590 as of 2010 - maximum 0.001% sulphur by weight (10 ppm)
- ASTM D975 (maximum 0.0015% sulphur by weight (15 ppm)

The following fuel types **are not** permitted:

- Sulphurous fuels with a sulphur content greater than 0.005% by weight (50 ppm).
- Marine diesel fuel
- Aviation turbine fuel
- Heating oils
- Fatty acid methyl ester FAME (bio-diesel fuel)

These fuel types cause irreversible damage to the engine and the exhaust after treatment system, as well as also significantly reducing the expected service life.

Only use fuel additives that are approved by your Linde dealer. If in doubt, contact your dealer.

Fluid and Lubricant Specifications

ENVIRONMENT NOTE

Lubricants and coolants can contaminate drinking water and have other harmful effects on the environment. Do not allow these substances to get into sewage or storm water systems or seep into the ground. Used fluids must be disposed of in accordance with all applicable laws and regulations.

Diesel Exhaust Fluid (Adblue®)

Only use diesel exhaust fluid that meets DIN 70070/ISO 22241.

Do not use any additives or dilute with water. This will destroy the exhaust after-treatment system.

CAUTION

If diesel exhaust fluid is stored in aluminum, copper, plain steel or galvanized containers, it will absorb constituents of these metals and damage the exhaust after-treatment system.

Use only diesel exhaust fluid from containers made of the following materials:

- polypropylene
- polyethylene
- stainless steel meeting DIN EN10 088-1/2/3

Engine Oil

Only use engine oils in accordance with Sheet No. 228.51, 228.31, 228.5 or 228.3 of the Mercedes-Benz specifications for service products which are distinctly marked with the label indicating the approval of Mercedes-Benz, e.g. “MB-Approval 229.51. Some examples of approved engine oils commonly available are listed below:

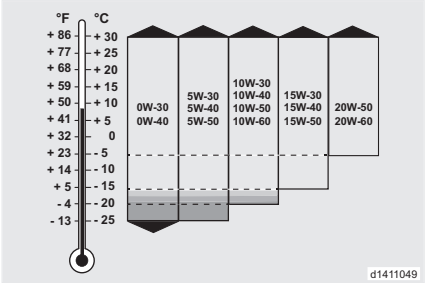
- Chevron Delo 400 LE Synthetic 5W-40
- Chevron Delo 400 SD 15W-30
- Chevron Delo 400 XLE Synblend 10W-30
- Chevron Delo 400 XLE Synthetic 5W-30
- Mobil Delvac MX ESP 10W-30
- Mobil Delvac MX ESP 15W-40
- Mobil Delvac XHP ESP 10W-40
- Shell Rotella T3 15W-40
- Shell Rotella T5 10W-30
- Shell Rotella T5 10W-40

Engine oils of API classification CD are not recommended for the first 50 hours of operation or for extra light duty.

During engine operation, part of the oil serving as piston lubricant is burned (consumed). The products of combustion combined with the high temperatures lead to oil ‘wear’, especially of the chemical additives. Since this oil wear depends on operating conditions and the quality of oil (productivity of oil) and fuel used, oil change intervals of different lengths result.

The longest possible oil change interval for lubricating oil in engines is one year, i.e. change oil at least once every year of operation independent of the oil change intervals.

Oil operating temperatures



Since the viscosity of lubricants varies with temperature, the ambient temperature at the locality of the truck’s use is the determining factor in selection of the viscosity range (SAE class) of the engine oil (see diagram).

If the ambient temperature occasionally falls below the temperature limit (e.g. using SAE 15W-40 down to -15 °C), the cold start capability of the engine is reduced, but no damage to the engine will result.

NOTE

Oil additives of any kind must not be added to any of the above mentioned engine oils. Their use invalidates the warranty.

Mixing of different oil brands should be avoided.

Hydraulic oil

Recommended oil is Shell Spirax S4 TXM, SAE 10W-30 UTTO.

If it is difficult to obtain hydraulic oils that must be imported, use a similar high quality UTTO oil of a different brand.

If in doubt, contact your dealer. Recommendations of representatives of the oil industry should also be checked with your dealer.

Only the above-mentioned oils are approved by the manufacturer. If other hydraulic oils are used or mixed, costly damage can result.

Driveline oils

Gearbox

Recommended oil is Shell Spirax S4 TXM, SAE 10W-30 UTTO. Only use oils according to ZF-List of lubricants TE-ML 03,(go to www.zf.com), for Powershift transmissions 3 WG-116/131/161/171. Only the above-mentioned oils are approved by the manufacturer. If other hydraulic oils are used or mixed, costly damage can result.

Drive axle

Recommended (SAE 85W/140) hypoid gear oils corresponding to MIL-L 2105 B/API GL5, MIL-L 2105 C/D/API GL 5.

NOTE

Important – On axles with self locking differentials a noise is produced if normal oils are used. In case of abnormal noise or vibration, use gear oil EP with additives of the "Limited Slip" type conforming to specification M 2C - 104 A

Lubricating grease

Linde heavy duty grease with additives EP and MOS2. Designation acc. to DIN 51825-KPF 2K-20 (see the Parts Catalogue for the order number). Any mixing with grease types other than lithium-based greases is not allowed.

Coolant

Recommended coolant is Glysantin G40, a Nitrate, Amine and Phosphate-free mono Ethylene glycol with inhibitors. Zerex G 40-91 is also an approved coolant commonly available.

When renewing the coolant, ensure that it contains 50% corrosion inhibitor/antifreeze by volume. This corresponds to antifreeze protection down to -37°.

Do not exceed 55% by volume (antifreeze down to approximately -45°).

The heat dissipation and antifreeze may otherwise be negatively affected. If there is a loss of coolant, do not top it up by using only water, but also add an approved corrosion inhibitor/antifreeze agent.

Good quality water is important for cooling system performance. Excessive levels of calcium and magnesium contribute to scaling problems, and excessive levels of chlorides and sulphates cause cooling system corrosion.

Battery grease

Non-acidic grease (pole grease).

Chain spray

Linde chain spray.

Electrical contact grease

For use on all electrical connections.

Troubleshooting

Locations for jacks when changing wheels

⚠ CAUTION

Danger of accident.

Only use a jack with sufficient lifting capacity. The capacity of the jack should be 25,000 kg minimum.

⚠ CAUTION

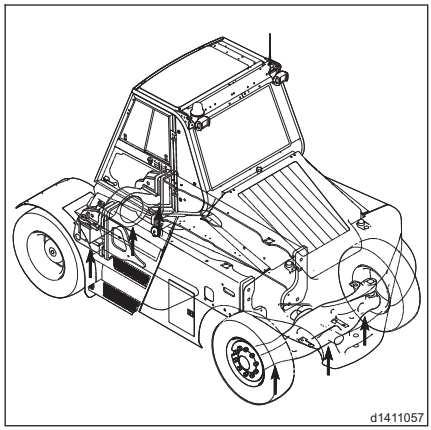
Danger of accident.

When working under the truck secure the chassis with wooden blocks, do not rely just on the jack.

NOTE

The truck should only be jacked up at jacking points indicated (↑). When jacking up the front of the truck, chock the rear wheels.

- To jack up front of truck, place jack under drive axle mounting plate, or the centre of the drive axle.
- To jack up rear of truck, place jack under main plate of steer axle, or the centre of the steer axle.



Troubleshooting guide (Diesel engine)

Trouble	Possible cause	Correction
Engine will not start.	Fuel tank empty.	Refill the tank.
	Fuel filter clogged, in winter by paraffin deposit.	Renew the filter, use winter fuel.
	Water in fuel system prefilter.	Drain the prefilter.
	Fuel line leaking.	Check all pipe connections for leaks and tighten fittings.
	Discharge indicator light not illuminated although lamp is okay.	Tighten connecting clamps at battery, check cable connections.
	Preheating system defective.	Check the power supply.
	Fuel pump defective.	These faults should always be checked and corrected by skilled staff. Please contact your service partner.
	Fuel shut-off solenoid fails to open.	
	Injection nozzles defective.	
	Injection pump defective.	
	Engine idling speed incorrect.	
Engine starting performance is poor.	Battery power is too low. Battery terminal is poor loose or oxidized, causing the starter to turn only slowly.	Check battery, clean battery terminals, tighten clamps and cover with non-acidic grease. Check the air filter.
	Fuel supply insufficient. Restriction or air in fuel system due to paraffin deposits in winter.	Renew the fuel filter. Check the fuel line connections for leaks and tighten fittings. Renew the air filter. Use winter fuel in the cold season.
	Particularly in winter: Engine oil viscosity too high.	Use engine oil appropriate for the ambient temperature.
	Speed setting incorrect.	Contact your service partner.

Trouble	Possible cause	Correction
Engine running unevenly with poor performance.	Fuel supply insufficient.	Renew the fuel filter.
		Clean and inspect fuel prefilter and fuel filter.
		Check the fuel line connections for leaks and tighten fittings.
		Renew the air filter.
	Restriction or air in fuel system due to paraffin deposits in winter.	Use winter fuel in the cold season.
	Engine oil level too high.	Drain oil to the top mark on the dipstick.
	Adblue® supply insufficient.	Refill the tank.
	Injection pump overflow valve not functioning correctly.	Contact your service partner.
	Valve clearance not as specified.	
	Injection nozzles defective.	
Engine stops inadvertently.	The power supply to the engine management (MCM) or the exhaust gas after treatment (ACM) control modules is interrupted or there is a short circuit in the wiring.	Check the electrical fuses.
		Check the power supply - contact your service partner.
	Leak or insufficient pressure in the low pressure fuel circuit.	Check for leaks (visual check).
		Check the fuel pressure - contact your service partner.
Excessive exhaust smoke.	Poor compression due to burned-in or broken piston rings or incorrect valve clearance.	Contact your service partner.

Trouble	Possible cause	Correction
Engine running in emergency running mode.	There is an interruption to the control units data flow.	Check the connectors on the control units for secure seating and corrosion.
		Read out the control unit error log - contact your service partner.
		Contact your service partner.
	Adblue® supply insufficient.	Refill the tank.
Engine overheating, red warning light in composite instrument illuminated. Stop the engine immediately.	Coolant level low.	Check cooling system for leaks, seal if necessary. Add coolant.
	Drive belt either slack or broken.	Tighten or renew drive belt.
	Radiator fins restricted due to dirt or foreign objects.	Clean the radiator.
	Injection system setting incorrect.	Contact your service partner.
Engine oil pressure too low. Stop the engine immediately.	Oil level too low.	Add lubricating oil.
	Leaks in the lubricating system.	Contact your service partner.
Discharge indicator light illuminated during operation.	Alternator RPM too low.	Check drive belt tension.
	Alternator not charging the battery because alternator or relay defective.	Contact your service partner.

Troubleshooting guide (Hydraulic system)

Abnormal noise	Suction filter restricted.	Renew the filter.
	Suction hoses leaking, oil foaming.	Tighten lines. Replace suction hoses. Check oil level, top up if necessary.
	Incorrect oil viscosity, low oil level in tank or in hydraulic pump.	Change oil, be sure to use the correct viscosity, top up oil.
	Hydraulic pump or motor failure, seals defective, causing air intake.	Contact your service partner.
No or too low pressure in system	Pipe broken or leaking.	Replace or tighten line.
	Oil of low viscosity, causing high leakage losses.	Change oil, be sure to use oil of correct viscosity.
	Oil temperature warning lamp illuminated.	Check oil level, clean oil cooler.
	Pump suction defective, noise.	Change oil, top up oil. Contact your service partner.
	Pump failure, leakages, pressure valves do not close, valve seat damage.	Contact your service partner.
Oil pressure fluctuating	Mast does not extend completely or retracts slightly after being extended.	Top up hydraulic oil.
	Cause as under abnormal noise.	See abnormal noise.
	Pressure limiting valves or boost pressure valves sticking.	Contact your service partner.
	Lift and tilt cylinders have tight spots.	Contact your service partner.
No oil flow or low oil flow	Filter restricted (if accompanied by noise).	Clean or replace filter.
	Pipe broken or leaking.	Tighten or replace line.
	Hydraulic system overheating.	Check oil level, use specified oil, clean oil cooler, if needed.
	Valves restricted.	Contact your service partner.
	Pump failure, leakages, pressure limiting valves do not close, valve seat damaged.	Contact your service partner.

Hydraulic oil temperature too high	Oil level too low or oil cooler defective.	Check oil level, if necessary top up oil. Clean cooler and check for leaks. If defective, contact your service partner.
	Pump failure, valves leaking.	Contact your service partner.

Taking the truck out of service

Measures before taking the truck out of operation

If the truck is taken out of operation for over 2 months, it must be parked in a well ventilated, frost-free, clean and dry room and the following measures must be carried out.

- Thoroughly clean the truck.
- Fully elevate the fork carriage several times, tilt the mast forward and back and if fitted, operate the attachment several times.
- Lower the forks on a support until the chains are slack.
- Check the hydraulic oil level and add oil, if needed.
- Add diesel fuel.
- Apply a thin film of oil or grease on all unpainted mechanical parts.
- Lubricate the truck as described in the maintenance section of this manual.
- Check the condition and electrolyte level of the battery. Coat the battery terminals with non-acidic grease. (Follow the instructions of the battery manufacturer).
- Spray all open electrical contacts with a suitable contact spray.

⚠ CAUTION

Danger of tyre deformation.

Block up the truck so that all wheels are clear of the ground.

NOTE

Do not use plastic foil as this enhances the formation and collection of condensation water.

NOTE

If the vehicle is to be taken out of operation for a week or more, isolate the battery.

NOTE

If the vehicle is to be taken out of operation for over 6 months, contact your service partner for further measures.

Mast and load lifting device removal

⚠ DANGER

Danger of damage or injury.

This work must only be carried out by the trained personnel of your authorised dealer. Do not attempt to remove the mast or lifting device.

Putting the truck back into operation

- Thoroughly clean the truck as described in the maintenance section of this manual.
- Lubricate the truck.
- Coat the battery terminals with non-acidic grease.

- Check the condition of the battery / batteries.
- Check the engine oil for condensation water and change the oil, if necessary.
- Check the hydraulic oil for condensation water and change the oil, if necessary.
- Reconnect the battery.

NOTE

The digital clock display must be reset whenever the battery isolator has been used.

- Perform the same services as for commissioning.
- Return the truck to service.

To jump start the truck

NOTE

If there is insufficient power in the batteries to start the truck, follow the procedure below to correctly jump start the truck.

NOTE

In the following procedure, dead battery truck = truck 1. Live battery truck = truck 2.

- Make sure that both trucks are in neutral, with the park brake applied and not touching each other.
- Turn on the heater on truck 1 to protect the electronics from any possible voltage surge.
- Make sure that all other electrical accessories on truck 1 are switched off.
- Connect the red jump lead to the + positive terminal of the battery on truck 1.
- Connect the other end to the + positive terminal of the battery on truck 2.
- Connect the black cable to the - negative terminal of the battery on truck 2.

⚠ CAUTION

Danger of damage to the electrical system.

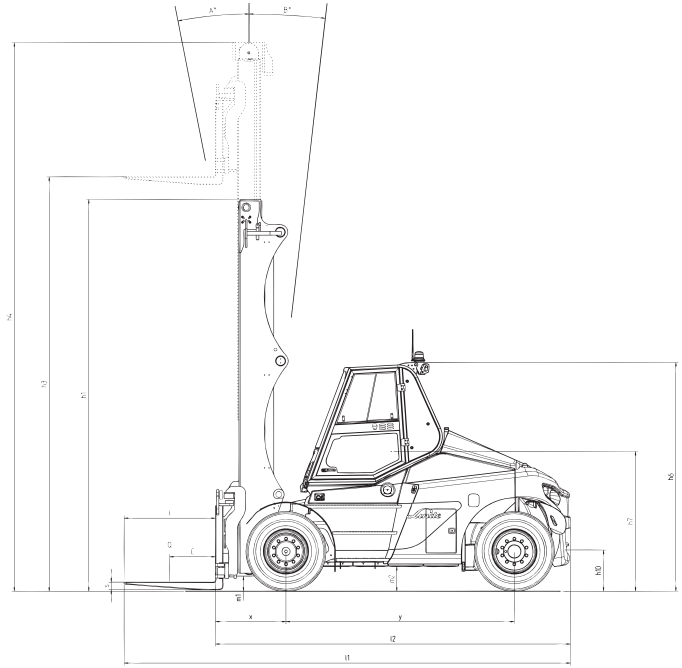
A spark may cause a power surge in the electronics. DO NOT connect the clamp of the black cable to the - negative terminal of the battery on truck 1. Connect it to an unpainted, metallic part of truck 1

- Start the engine on truck 2.
- Start the engine on truck 1, and let them both idle for about two minutes. More if the battery has been dead for a while.
- Turn off the engine on truck 2 (leave truck 1 engine running).
- Disconnect the black cable from the unpainted metal part of truck 1.
- Disconnect the black cable from the - negative battery terminal of truck 2.
- Disconnect the red cable from the + positive terminal of both trucks batteries.
- Drive truck 1 for at least 15 minutes to ensure the battery is sufficiently charged to start independently.

6

Technical data

Truck dimensions



Specifications (24-inch load center models)

1 Key data				
1.1	Manufacturer			Linde
1.2	Manufacturer's type designation			HT100/600
				HT120/600
				HT140/600
				HT150/600
				HT160/600
				HT180/600
1.3	Drive			Diesel
1.4	Operation			Seated
1.5	Nominal load capacity/load	HT100	Q	22,000 lbs (10 metric ton)
		HT120		26,000 lbs (12 metric ton)
		HT140		31,000 lbs (14 metric ton)
		HT150		33,000 lbs (15 metric ton)
		HT160		35,000 lbs (16 metric ton)
		HT180		40,000 lbs (18 metric ton)
1.6	Load center of gravity	HT100, H120, H140, H160, H180	c	24 in (600 mm)
1.8	Load distance	HT100, HT120	x	33.3 in (847 mm)
		HT140, HT150, HT160, HT180		34.8 in (884 mm)
1.9	Wheelbase	HT100, HT120, HT140	y	118.1 in (3000 mm)
		HT150, HT160, HT180		127.9 in (3250 mm)

Specifications (24-inch load center models)

2 Weight		
2.1	Net weight	Refer to vehicle data plate

3 Wheels, chassis frame				
3.1	Tire type (Front/Rear)			pneumatic/pneu-matic
3.2	Front tire size	HT100, HT120		10.00 x 20/16pr
		HT140, HT150, HT160, HT180		12.00 x 20/20pr
3.3	Rear tire size	HT100, HT120		10.00 x 20/20pr
		HT140, HT150, HT160, HT180		12.00 x 20/20pr
3.4	Wheels, number, front/rear (x = driven)	HT100, HT120, HT140, HT150, HT160, HT180		4x/2
3.6	Front track width	HT100, HT120, HT140, HT150, HT160, HT180	b_{10}	73.8 in (1874 mm)
3.7	Rear track width	HT100, HT120, HT140, HT150, HT160, HT180	b_{11}	77.6 in (1970 mm)

4 Basic dimensions				
4.1	Lift mast/fork carriage tilt, forwards/backwards		α/β (°)	See mast heights table
4.2	Height with mast retracted		h_1	See mast heights table
4.3	Free lift		h_2	See mast heights table
4.4	Lift		h_3	See mast heights table
4.5	Height with mast extended		h_4	See mast heights table

4 Basic dimensions				
4.7	Height above overhead guard (cab)	HT100, HT120	h_6	118.5 in (3010 mm)
		HT140, HT150, HT160, HT180		119.5 in (3035 mm)
4.8	Seated height/standing height	HT100, HT120	h_7	77.7 in (1974 mm)
		HT140, HT150, HT160, HT180		78.9 in (2004 mm)
4.12	Coupling height	HT100, HT120	h_{10}	21.6 in (550 mm)
		HT140, HT150, HT160, HT180		22.8 in (580 mm)
4.19	Total length	HT100, HT120	l_1	235.6 in (5984 mm)
		HT140		238.8 in (6066 mm)
		HT150, HT160		248.7 in (6316 mm)
		HT180		256.5 in (6516 mm)
4.20	Length including fork back	HT100, HT120	l_2	180.5 in (4584 mm)
		HT140		183.7 in (4666 mm)
		HT150, HT160		193.5 in (4916 mm)
		HT180		201.5 in (5116 mm)
4.21	Total width	HT100, HT120	b_1	99.6 in (2530 mm)
		HT140, HT150, HT160, HT180		101.0 in (2565 mm)

Specifications (24-inch load center models)

4 Basic dimensions				
4.22	Fork arm dimensions	HT100, HT120	s/e/l	3.5 x 7.8 x 55.1 in (90 x 200 x 1400 mm)
		HT140, HT150, HT160, HT180		3.9 x 7.8 x 55.1 in (100 x 200 x 1400 mm)
4.23	Fork carriage according to ISO 2328, class/form A, BHyd			Hydraulic fork positioner
4.24	Fork carriage width	HT100, HT120, HT140, HT150, HT160, HT180	b_3	100.2 in (2545 mm)
4.25	Fork spread	HT100, HT120	b_5	24.0 in (610 mm) / 89.5 in (2274 mm)
		HT140, HT150, HT160, HT180		24.4 in (620 mm)/ 87.4 in (2220 mm)
4.31	Ground clearance with load under lift mast	HT100, HT120	m_1	6.8 in (172 mm)
		HT140, HT150, HT160, HT180		7.9 in (200 mm)
4.32	Ground clearance at center of wheel-base	HT100, HT120	m_2	13.6 in (346 mm)
		HT140, HT150, HT160, HT180		14.8 in (376 mm)
4.33	Aisle width without load (zero clearance)	HT100, HT120	A_{st}	195 in (4949 mm)
		HT140		196.3 in (4986 mm)
		HT150, HT160		205.6 in (5222 mm)
		HT180		212.5 in (5398 mm)

4 Basic dimensions				
4.35	Turning radius	HT100, HT120, HT140	W_a	161.5 in (4102 mm)
		HT150, HT160		170.8 in (4338 mm)
		HT180		177.7 in (4512 mm)

5 Performance data				
5.1	Driving speed with/without load	HT100		17.3 / 18.1 mph (27.9/29.1 km/h)
		HT120		17.1 / 18.1 mph 27.6/29.1 km/h)
		HT140, HT150		17.6 / 18.8 mph 28.3/30.2 km/h)
		HT160		17.5 / 18.7 mph 28.1/30.1 km/h)
		HT180		17.5 / 18.5 mph 28.1/29.8 km/h)
5.2	Lifting speed with/without load	HT100, HT120, HT140, HT150, HT160, HT180		82.7 / 82.7 fpm (0.42/0.42 m/s)
5.3	Lowering speed with/without load	HT100, HT120, HT140, HT150, HT160, HT180		82.7 / 82.7 fpm (0.42/0.42 m/s)
5.5	Tractive force with/without load	HT100		(98.5 / 100.5 kN)
		HT120		(98.3 / 100.6 kN)
		HT140		(92.8 / 95.5 kN)
		HT150		(103.0 / 105.9 kN)
		HT160		(102.7 / 105.8 kN)
		HT180		(102.6 / 105.3 kN)

Specifications (24-inch load center models)

5 Performance data				
5.7	Climbing capability with/without load	HT100		41.3 / 80.8 %
		HT120		37.6 / 79.7 %
		HT140		29.8 / 59.3 %
		HT150		32.2 / 67.7 %
		HT160		30.6 / 65.3 %
		HT180		30.3 / 55.6 %
5.9	Acceleration time with/without load	HT100, HT120		5.5 / 4.6 s
		HT140, HT150, HT160, HT180		6.2 / 5.4 s
5.10	Service brake			Wet disc

6 Battery voltage, rated capacity				
6.1	Voltage/capacity	HT100, HT120 HT140, HT150, HT160, HT180		2 x 12 V/ 95 aH

7 Drive/engine			
7.1	Engine manufacturer/model		Mercedes MTU 4R1000
7.2	Engine power rating in accordance with ISO 1585	HT100, HT120, HT140	173 hp (129 kW)
		HT150, HT160, HT180	201 hp (150 kW)
7.3	Nominal speed		2200 rpm
7.4	Number of cylinders/displacement		4/ 311.1 cu in (5100 cc)

8 Other			
8.1	Traction controller type		Torque converter 3/3
8.2	Working pressure for attachments		3626 psi (250 bar)
8.3	Oil flow for attachments		1.3 - 34.3 gpm (5-130 l/min)

8 Other			
8.4	Noise level at the driver's ear		70 dB (A)
8.5	Tow coupling diameter		2 in (50 mm)

Specifications (48-inch load center models)

1 Key data				
1.1	Manufacturer			Linde
1.2	Manufacturer's type designation			HT100/1200
				HT120/1200
				HT140/1200
				HT150/1200
				HT160/1200
1.3	Drive			Diesel
1.4	Operation			Seated
1.5	Nominal load capacity/load	HT100	Q	22,000 lbs (10 metric ton)
		HT120		26,000 lbs (12 metric ton)
		HT140		31,000 lbs (14 metric ton)
		HT150		33,000 lbs (15 metric ton)
		HT160		35,000 lbs (16 metric ton)
1.6	Load center of gravity	HT100, HT120, HT140, HT160	c	48 in (1200 mm)
1.8	Load distance	HT100, HT120	x	34.8 in (884 mm)
		HT140, HT150, HT160		36.6 in (929 mm)
1.9	Wheelbase	HT100	y	118.1 in (3000 mm)
		HT120, HT140		127.9 in (3250 mm
		HT150, HT160		137.8 in (3500 mm)

2 Weight		
2.1	Net weight	Refer to vehicle data plate

3 Wheels, chassis frame				
3.1	Tire type (Front/Rear)			pneumatic/pneumatic
3.2	Front tire size	HT100, HT120, HT140, HT150, HT160		12.00 x 20/20pr
3.3	Rear tire size	HT100, HT120, HT140, HT150, HT160		12.00 x 20/20pr
3.4	Wheels, number, front/rear (x = driven)	HT100, HT120, HT140, HT150, HT160		4x/2
3.6	Front track width	HT100, HT120, HT140, HT150, HT160	b_{10}	73.8 in (1874 mm)
3.7	Rear track width	HT100, HT120, HT140, HT150, HT160	b_{11}	77.6 in (1970 mm)

4 Basic dimensions				
4.1	Lift mast/fork carriage tilt, forwards/backwards		α/β (°)	See mast heights table
4.2	Height with mast retracted		h_1	See mast heights table
4.3	Free lift		h_2	See mast heights table
4.4	Lift		h_3	See mast heights table
4.5	Height with mast extended		h_4	See mast heights table
4.7	Height above overhead guard (cab)	HT100, HT120, HT140, HT150, HT160	h_6	119.5 in (3035 mm)

Specifications (48-inch load center models)

4 Basic dimensions				
4.8	Seated height/standing height	HT100, HT120, HT140, HT150, HT160	h_7	78.9 in (2004 mm)
4.12	Coupling height	HT100, HT120, HT140, HT150, HT160	h_{10}	22.8 in (580 mm)
4.19	Total length	HT100	l_1	275.0 in (6984 mm)
		HT120		288.0 in (7316 mm)
		HT140		295.9 in (7516 mm)
		HT150, HT160		305.8 in (7766 mm)
4.20	Length including fork back	HT100	l_2	180.5 in (4584 mm)
		HT120		193.5 in (4916 mm)
		HT140		201.5 in (5116 mm)
		HT150, HT160		211.3 in (5366 mm)
4.21	Total width	HT100, HT120, HT140, HT150, HT160	b_1	101.0 in (2565 mm)
4.22	Fork arm dimensions	HT100, HT120	s/e/l	3.9 x 7.8 x 94.5 in (100 x 200 x 2400 mm)
		H140, HT150, HT160		3.9 x 9.8 x 94.5 in (100 x 250 x 2400 mm)
4.23	Fork carriage according to ISO 2328, class/form A, BHyd			Hydraulic fork positioner
4.24	Fork carriage width	HT100, HT120, HT140, HT150, HT160	b_3	100.2 in (2545 mm)

4 Basic dimensions				
4.25	Fork spread	HT100, HT120	b_5	24.4 in (620 mm)/ 87.4 in (2220 mm)
		HT140, HT150, HT160		28.3 in (720 mm)/ 90.2 in (2290 mm)
4.31	Ground clearance with load under lift mast	HT100, HT120, HT140, HT150, HT160	m_1	7.9 in (200 mm)
4.32	Ground clearance at center of wheel-base	HT100, HT120	m_2	13.6 in (346 mm)
		HT140, HT150, HT160		14.8 in (376 mm)
4.33	Aisle width without load (zero clearance)	HT100	A_{st}	196.3 in (4986 mm)
		HT120		205.6 in (5222 mm)
		HT140		214.2 in (5441 mm)
		HT150, HT160		223.7 in (5683 mm)
4.35	Turning radius	HT100	W_a	161.5 in (4102 mm)
		HT120		170.8 in (4338 mm)
		HT140		177.7 in (4512 mm)
		HT150, HT160		187.2 in (4512 mm)

5 Performance data				
5.1	Driving speed with/without load	HT100		17.9 / 18.7 mph (28.8/30.1 km/h)
		HT120		17.6 / 18.6 mph (28.4/29.9 km/h)
		HT140		17.5 / 18.5 mph (28.1/29.8 km/h)
		HT150		17.3 / 18.5 mph (27.9/29.8 km/h)
		HT160		17.2 / 18.4 mph (27.7/29.7 km/h)

Specifications (48-inch load center models)

5 Performance data				
5.2	Lifting speed with/without load	HT100, HT120, HT140, HT150, HT160		82.7 / 82.7 fpm (0.42/0.42 m/s)
5.3	Lowering speed with/without load	HT100, HT120, HT140, HT150, HT160		82.7 / 82.7 fpm (0.42/0.42 m/s)
5.5	Tractive force with/without load	HT100		21,019.7 / 21,469.4 lb (93.5 / 95.5 kN)
		HT120		20,884.9 / 21,401.9 lb (92.9 / 95.2 kN)
		HT140		23,065.5 / 23,672.5 lb (102.6 / 105.3 kN)
		HT150		23,020.5 / 23,695.0 lb (102.4 / 105.4 kN)
		HT160		22,953.1 / 23,650.0 lb (102.1 / 105.2 kN)
5.7	Climbing capability with/without load	HT100		34.4 / 58.5 %
		HT120		30.2 / 53.0 %
		HT140		30.3 / 55.6 %
		HT150		29.4 / 56.0 %
		HT160		27.8 / 53.4 %
5.9	Acceleration time with/without load	HT100, HT120		6.2 / 5.4 s
		HT140, HT150, HT160		6.1 / 5.3 s
5.10	Service brake			Wet disc

6 Battery voltage, rated capacity				
6.1	Voltage/capacity	HT100, HT120 HT140, HT150, HT160		2 x 12 V/ 95 aH

7 Drive/engine			
7.1	Engine manufacturer/model		Mercedes MTU 4R1000
7.2	Engine power rating in accordance with ISO 1585	HT100, HT120, HT140	173 hp (129 kW)
		HT150, HT160	201 hp (150 kW)
7.3	Nominal speed		2200 rpm
7.4	Number of cylinders/displacement		4/ 311.1 cu in (5100 cc)

8 Other			
8.1	Traction controller type		Torque converter 3/3
8.2	Working pressure for attachments		3626 psi (250 bar)
8.3	Oil flow for attachments		1.3 - 34.3 gpm (5-130 l/min)
8.4	Noise level at the driver's ear		70 dB (A)
8.5	Tow coupling diameter		2 in (50 mm)

Mast Heights

Height Dimensions

Mast height dimensions in inches are rounded to the nearest 1/2 inch conservatively, ie h1 and h4 are rounded up; h2 and h3 are rounded down. Metric mast height dimensions (mm) are design values. If a mast serial number indicates a height not listed below, then the mast has a custom height and is outside the scope of this manual.

Mast heights - Simple - HT100Ds/600, HT120Ds/600				
Lift height (h3)	Free lift stroke (h2)	Mast height, fully lowered (h1)	Extended height (h4) See Note 1.	Tilt angle forward / back
137.5 in (3500 mm)	N/A	121.5 in (3080 mm)	190.5 in (4830 mm)	15 deg / 10 deg
157.5 in (4000 mm)	N/A	131.5 in (3330 mm)	210.0 in (5330 mm)	15 deg / 10 deg
177.0 in (4500 mm)	N/A	141.0 in (3580 mm)	230.0 in (5830 mm)	15 deg / 10 deg
196.5 in (5000 mm)	N/A	151.0 in (3830 mm)	249.5 in (6330 mm)	15 deg / 10 deg
216.5 in (5500 mm)	N/A	161.0 in (4080 mm)	269.0 in (6830 mm)	15 deg / 10 deg
236.0 in (6000 mm)	N/A	170.5 (4330 mm)	289.0 in (7330 mm)	15 deg / 10 deg
256.0 in (6500 mm)	N/A	180.5 in (4580 mm)	308.5 in (7830 mm)	15 deg / 10 deg
275.5 in (7000 mm)	N/A			

Mast heights - Double - HT100Ds/600, HT120Ds/600				
Lift height (h3)	Free lift stroke (h2)	Mast height, fully lowered (h1)	Extended height (h4) See Note 1.	Tilt angle forward / back
137.5 in (3500 mm)	64.0 in (1620 mm)	126.0 in (3200 mm)	190.5 in (4830 mm)	15 deg / 10 deg
157.5 in (4000 mm)	74.0 in (1870 mm)	136.0 in (3450 mm)	210.0 in (5330 mm)	15 deg / 10 deg
177.0 in (4500 mm)	83.5 in (2120 mm)	146.0 in (3700 mm)	230.0 in (5830 mm)	15 deg / 10 deg
196.5 in (5000 mm)	93.5 in (2370 mm)	155.5 in (3950 mm)	249.5 in (6330 mm)	15 deg / 10 deg
216.5 in (5500 mm)	103.0 in (2620 mm)	165.5 in (4200 mm)	269.0 in (6830 mm)	15 deg / 10 deg
236.0 in (6000 mm)	113.0 in (2870 mm)	175.5 in (4450 mm)	289.0 in (7330 mm)	15 deg / 10 deg

Mast heights - Double - HT100Ds/600, HT120Ds/600				
256.0 in (6500 mm)	123.0 in (3120 mm)	185.0 in (4700 mm)	308.5 in (7830 mm)	15 deg / 10 deg
275.5 in (7000 mm)				

Mast heights - Simple - HT140Ds/600, HT150Ds/600, HT160Ds/600, HT180Ds/600 HT100Ds/1200, HT120Ds/1200, HT140Ds/1200, HT150Ds/1200, HT160Ds/1200				
Lift height (h3)	Free lift stroke (h2)	Mast height, fully lowered (h1)	Extended height (h4) See Note 1.	Tilt angle forward / back
137.5 in (3500 mm)	N/A	134.5 in (3410 mm)	203.5 in (5160 mm)	15 deg / 10 deg
157.5 in (4000 mm)	N/A	144.5 in (3660 mm)	223.0 in (5660 mm)	15 deg / 10 deg
177.0 in (4500 mm)	N/A	154.0 in (3910 mm)	243.0 in (6160 mm)	15 deg / 10 deg
196.5 in (5000 mm)	N/A	164.0 in (4160 mm)	262.5 in (6660 mm)	15 deg / 10 deg
216.5 in (5500 mm)	N/A	174.0 in (4410 mm)	282.0 in (7160 mm)	15 deg / 10 deg
236.0 in (6000 mm)	N/A	183.5 in (4660 mm)	302.0 in (7660 mm)	15 deg / 10 deg
256.0 in (6500 mm)	N/A	193.5 in (4910 mm)	321.5 in (8160 mm)	15 deg / 10 deg
275.5 in (7000 mm)	N/A	203.5 in (5160 mm)	341.0 in (8660 mm)	15 deg / 10 deg

Mast heights - Double - HT140Ds/600, HT150Ds/600, HT160Ds/600, HT180Ds/600 HT100Ds/1200, HT120Ds/1200, HT140Ds/1200, HT150Ds/1200, HT160Ds/1200				
Lift height (h3)	Free lift stroke (h2)	Mast height, fully lowered (h1)	Extended height (h4) See Note 1.	Tilt angle forward / back
137.5 in (3500 mm)	69.0 in (1750 mm)	134.5 in (3410 mm)	203.5 in (5160 mm)	15 deg / 10 deg
157.5 in (4000 mm)	79.0 (2000 mm)	144.5 in (3660 mm)	223.0 in (5660 mm)	15 deg / 10 deg
177.0 in (4500 mm)	88.5 (2250 mm)	154.0 in (3910 mm)	243.0 in (6160 mm)	15 deg / 10 deg
196.5 in (5000 mm)	98.5 in (2500 mm)	164.0 in (4160 mm)	262.5 in (6660 mm)	15 deg / 10 deg
216.5 in (5500 mm)	108.0 in (2750 mm)	174.0 in (4410 mm)	282.0 in (7160 mm)	15 deg / 10 deg
236.0 in (6000 mm)	118.0 in (3000 mm)	183.5 in (4660 mm)	302.0 in (7660 mm)	15 deg / 10 deg

Mast heights - Double - HT140Ds/600, HT150Ds/600, HT160Ds/600, HT180Ds/600 HT100Ds/1200, HT120Ds/1200, HT140Ds/1200, HT150Ds/1200, HT160Ds/1200				
256.0 in (6500 mm)	128.0 in (3250 mm)	193.5 in (4910 mm)	321.5 in (8160 mm)	15 deg / 10 deg
275.5 in (7000 mm)	138.0 in (3500 mm)	203.5 in (5160 mm)	341.0 in (8660 mm)	15 deg / 10 deg

Note 1. Extended height h4 will differ with certain carriage types.

Frequency characteristic for human body vibrations

The values are determined in conformance with EN 13059 on trucks with standard equipment according to the technical data sheet (driving over test course with bumps).

Frequency characteristics acc. to EN 12096

Measured frequency characteristic aw,ZS = 0.5 m/s² Uncertainty K = 0.2 m/s².

Frequency characteristic for hand arm vibrations.

Frequency characteristic < 2.5 m/s².

NOTE

The frequency characteristic for the human body cannot be used to determine the actual frequency load during operation. This load depends on the working conditions (conditions of roadway, type of operation, etc) and must therefore be determined at the site, if necessary. The specification of hand and arm vibration is required by law, even if the values, as in this case, do not indicate any danger.

Noise emission data

Determined in the test cycle according to EN 12053 from the weighted data in the operating modes DRIVING, LIFTING, IDLE.

Noise level at the driver's station

- 1411 LPAZ = 73.2 dB(A).
- While lifting LPa = 75.6 dB(A) (to be confirmed)
- While Idling LPb = 65 dB(A) (to be confirmed)
- While driving LPc = 77.1 dB(A) (to be confirmed)
- Uncertainty KPA = 4 dB(A) (to be confirmed)

Noise emission levels as determined by EN 12053 and DIN EN ISO 4751

- Guaranteed Sound Power level - 103 dB.

Higher noise emissions can exist during operation of the truck, e.g. different operation, influence of the surroundings and additional noise emission sources.

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