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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 percent lower than those of their competitors.

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Linde trucks are sold in North America by:

KION North America Corporation 2450 West 5th North Street Summerville, S.C. 29483 Phone (843) 875-8000 FAX (843) 875-8329



Parts and service

See your Linde dealer for genuine Linde parts (the only factory-authorized replacements), factory-trained service personnel and manuals for your equipment.

Proposition 65

WARNING

This warning is provided pursuant to California Health & Safety Code Sections 25249.5 et. seq.

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

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 gualified 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



Operator Responsibilities

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. Damage to the truck, as well as serious injury or death to the operator or others may result

1 Introduction



Hazard messages

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.

A DANGER

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

Indicates further information presented to ensure clarification of a particular item

NOTE ENVIRONMENT NOTE

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

2

Safety

Before Operation

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

 \triangleright

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.

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

| Truck | Serial Number: I meter reading: I | Dept / Shift: | | _ | Operator: |
|--------|--|---|--------|------|--|
| Hour | mean reading. | | _ | - | Supervisor. |
| of any | | k and work towar | dst | he f | r supervisor and/or maintenance department k ront, and then the right side. After checking, mark Circle problem and explain below. |
| | VISUAL INSPECTION | | 0 K | N | OPERATIONAL INSPECTION |
| | Oil Spots on Floor (check for leaks on truck) | | | | Unusual Noise (during any of the operational checks |
| H | Rear Tire(s) (pressure if applicable, wear, cut | ts, embedded | | | Emergency Battery Disconnect) (check operation) |
| | objects, rim damage, logse/missing lug nuts) | | | - | Gauges and Instrumentation (check operation) |
| H | Steer Axle (check for damage, dabris) | | | - | Battery Charge (fully charged) |
| H | Overhead Guard (damage, bends, cracks, lo | coseness) | | | Seat Switch (If equipped) (check operation) |
| H | Seat & Seat Belt (check operation, damage, | | | - | Directional Switch (if equipoed) (coerates freely) |
| | belt, loose fasteners) | | | - | Forward Driving (accelerates, steers, brakes smoot) |
| H | Steering Wheel (check for wear, damage) | | | - | Plupping (stops, changes direction smoothly) |
| H | Hood Latch (check operation, latches secure | (r) | | - | Reverse Driving (accelerates, steers, brakes smooth |
| H | Hydraulic Oil (check level) | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | - | Service Brake (check operation) |
| H | Front Tire (left) (tire condition, rim damage, | etc) | | - | Parking Brake (check operation) |
| H | Tilt Cylinder (left) (damage, leaks, loose fitti | | | - | Hydraulic Controls (operate freely, return to neutral, I |
| H | Mast (damage, wear, cracks, loose fasteners | 0 | | | out function (if equipped) operates properly) |
| H | Lift Cylinders (damage, leaks, loose fittings) | | | | Attachment (if equipped) (check operation) |
| H | Lift Chains (wear, corrosion, cracks, loose le | | | | Mast (extend fully, binding, leaks, roughness, noise) |
| | tension) | | | | Hydraulic Oil (excessive noise when mast is fully rai |
| H | Carriage/Load Backrest (damage, lossenes | is, bends, | | | is indication of low hydraulic oil) |
| | cracks) | | | | Horn (sounds when button pressed) |
| H | Forks/Attachment (damage, cracks, excess | wear, | | | Backup Alarm (if equipped) (sounds in reverse) |
| | twisted, bent) | | | | Travel Alarm (if equipped) (sounds with vehicle in mo |
| H | Fork Locking Pins (check operation, holds f | (ork secure) | | | Work, Strobe, Flashing Lights (if equipped) (cf |
| H | Tilt Cylinder (right) (damage, leaks, loose fi | tángs) | | | operation) |
| | Front Tire (right) (tire condition, rim damage | r, etc) | | | |
| H | Battery Connectors & Cables (damage, cran | cks, pitting) | | | |
| H | Battery Retention (installed correctly, secure | e) | | | |
| | Battery Case & Vent caps (damage, cracks, | loose, | | | |
| | missing) | | | | |
| | Warning Decals/Operator's Manual (in place | | | | |
| | Data Plate / Capacity Plate (in place, legible | 6) | | | |
| ГΓ | | | | | |
| Expla | nation of problems marked above (use baci | k of this form if n | eed | ed) | |





Operating position

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.

A 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.

A 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.

2 Safety

Travel

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.



Lifting and Lowering

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.

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 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.

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.

A 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

Avoiding Falls and Tip-overs

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

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

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.

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.

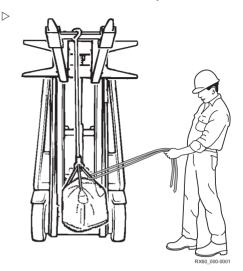




Suspended Loads

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.



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. If the forks can be tilted, tilt them forward.
- If the truck has a manual parking brake, apply it.
- Turn the truck off.
- If the truck has a key switch and the operator is more than 25 ft (7.5 m) away, or out of sight of the truck, the key should be removed.

WARNING

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

Never park on a grade. Ensure the parking brake is applied and turn the truck off. On trucks with a direction switch, always place it 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.

Battery Safety



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 battery cover 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.

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.



Safety During Maintenance

Hazardous Substances

Oils



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 oilbinding 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.

Operator warning decals

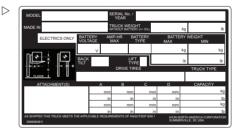
Data plate

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.

A 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.

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WARNING

PARKING BRAKE IS NOT AUTOMATICALLY APPLIED. APPLY BRAKE BEFORE EXITING TRUCK

Voltage decal

These decals indicate the proper battery voltage for the trucks electrical system. Using a battery of wrong voltage could damage the truck.



48 VOLT ONLY

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.



SIT-DOWN RIDER TRUCK OPERATOR WARNINGS

 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.

 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.

 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.

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. Down trisk injury or death. Drive smart.

 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.

A LATERAL OR LONGTUDINAL 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 isk injury or death. Drive smart.

 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.

 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. 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.

 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.

 WORK PLATFORMS - DO NOT LIFT OR CARRY PERSONNEL USING. THE FORKS OF THE TRUCK, not even with a work platform. The truck is designed for transporting, warehousing and stacking of material, not personnel.
 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.
 BIGNE EXHAUST on gas or diesel trucks contains carbon monoxide

(CO). Exposure can cause severe injury or death.

0009385529 rev 03

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

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Trained operator warning decal

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



OR OTHERS WORKING WITH YOU.

READ INSTRUCTIONS IN OPERATOR'S MANUAL.

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Test or service warning decal

This decal gives important safety information for personnel servicing or testing the truck.

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WARNING BEFORE PERFORMING ANY TEST OR SERVICE WHICH CALLS FOR TESTING UNDER POWER, JACK THE DRIVE WHEELS OF THE TRUCK OFF THE FLOOR. THE DRIVE WHEELS MUST BE FREE TO TURN. ENSURE THE TRUCK IS SECURELY BLOCKED.

DO NOT USE TEST DEVICES OR SYSTEMS ANALYZERS IN PLACE OF CONTROL BOARDS OR CONTROL MODULES TO DRIVE THE TRUCK. ATTEMPTS TO DRIVE WITH TEST DEVICES OR ANALYZERS ARE HIGHLY DANGEROUS.

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.

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WARNING

DO NOT LIFT PERSONNEL USING THE FORKS OF THE TRUCK, NOT EVEN WITH A WORK PLATFORM. TRUCK IS DESIGNED FOR TRANSPORTING. WAREHOUSING AND STACKING OF MATERIAL, NOT PERSONNEL.

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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.





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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.



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FAILURE TO MAINTAIN A CLEAR VIEW IN THE DIRECTION OF TRAVEL COULD RESULT IN SERIOUS INJURY OR DEATH.

THE OPERATOR IS RESPONSIBLE FOR THE SAFE OPERATION OF THIS VEHICLE.

Hood latch warning decal

This decal warns operators to ensure that the hood latch is fully engaged before operating the truck.



2 Safety

Operator warning decals



3

Overview

Technical Description

Technical Description

General

The 1347 series of forklifts are sit-down rider electric counterbalanced models (ITA class 1). They are designed for handling loads up to:

5000 lbs for E25 C and E25 CL

5500 lbs for E27 C and E27 CL

6000 lbs for E30 C and E30 CL

6500 lbs for E32 CL

These capacities are nominal values and are based on a 600 mm load center. They may be downrated depending on mast height and/or attachments. Exact capacity limits for individual vehicles are found on the data plate. E25, 27, 30 models are available in either short (C) or long (CL) chassis.

Drive axle

The drive axle is comprised of two drive motors and two reduction gear units. Both motors and reduction gear units are oriented transversely on a common axis with the gear units to the outside of each motor. Disc brakes are incorporated into the center of the drive axle. The drive motor armatures are contained in a single transverse housing. Power modules for the drive are mounted directly to the housing. The power modules are cooled by cooling fans controlled by the main control module based on temperature sensor signals.

Drive motors

The drive motors are three-phase cage rotor AC asynchronous motors. Each stator consists of a four-pole stator core and winding assembly pressed into the axle housing as a unit. The motor housing forms the center of the drive axle. No brushes are used.

Hydraulic system

The hydraulic system utilizes fluid pressurized by a hydraulic pump driven by a brushless AC pump motor. The pump motor is mounted ver-



tically to a bracket in the chassis. 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 three- or four-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.

Steering system

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. A steer angle sensor is mounted on the steering axle to signal the main control unit to reduce speed of the inside drive motor during turns.

Brake system

Electrical and mechanical forms of braking are both present. Electric braking utilizes a regenerative feature that activates whenever the travel pedal is released. This provides faster deceleration than simple coasting and puts energy back into the battery that would otherwise be wasted. More severe slowing through regeneration becomes available by depressing the travel pedal that opposes the direction in which the truck is travelling (or reversing the directional switch on optional single-pedal trucks). This also occurs whenever the foot brake pedal is depressed thereby providing deceleration to supplement the mechanical brake. The degree of deceleration from the regenerative braking function is adjustable through system programming.

Mechanical braking is accomplished through wet-running multi-disc brakes incorporated



Technical Description

into the drive axle. These brakes are activated via cable through a foot pedal during operation and a parking brake handle when the truck is not in use.

Masts

Four styles of masts are available with varying height capabilities - simple, dual, triple, and quad.

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 dual 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 (such as trailers).

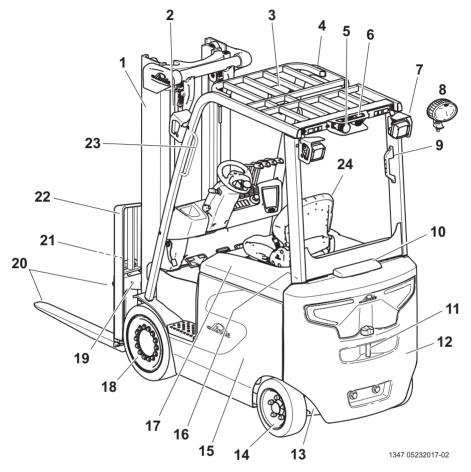
The triple mast maintains the inner and outer uprights of the simple and double masts, but has an intermediate upright added for additional height range. An additional pair of lift cylinders raises and lowers the intermediate upright in the same telescopic relationship to the other uprights as with the simple and double masts. Like the dual mast, the carriage chains are anchored to the inner upright and routed over an additional lift cylinder for a free-lift function.

Electrical system

The 1347 utilizes an 36 or 48-volt electrical system. The hydraulic pump motor and drive motors are both brushless AC motors. Both drive motors are powered through a dedicated power module. A second power module is dedicated to the hydraulic pump motor. Both power modules regulate current to the motors based on input from a main control unit. The main control unit processes signals from sensors, interlocks, and operator controls and generates the appropriate release and speed signals to the power modules through a CAN bus circuit. A second CAN bus circuit connects the main control unit to the operator display unit as well as a computer connection port. By connecting a laptop computer to this port, vehicle parameters can be set and diagnostic operations performed. A voltage transformer is also present to provide stabilized low voltage as control or reference signals or working power to various devices and sensors.

Truck Components

Truck Components

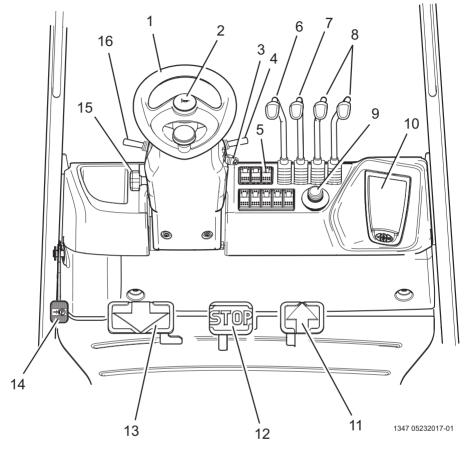


- 1 Mast
- 2 Lift cylinders
- 3 Rear-view mirror (optional equipment)
- 4 Overhead guard
- 5 Flashing light (optional equipment)
- 6 Reverse alarm (optional equipment)
- 7 Work lights (front & rear) (optional equipment)
- 8 Optical warning spot light (optional equipment)
- 9 Auxiliary horn
- 10 Fuse box in counterweight
- 11 Tow pin

- 12 Counterweight
- 13 Steering axle
- 14 Steer wheel
- 15 Battery compartment
- 16 Diagnostic connector
- 17 Battery cover
- 18 Drive wheel (left)
- 19 Fork carriage
- 20 Fork arms
- 21 Fork arm latch pins
- 22 Load backrest extension
- 23 Handrail for entering and exiting the truck
- 24 Operator seat



Controls

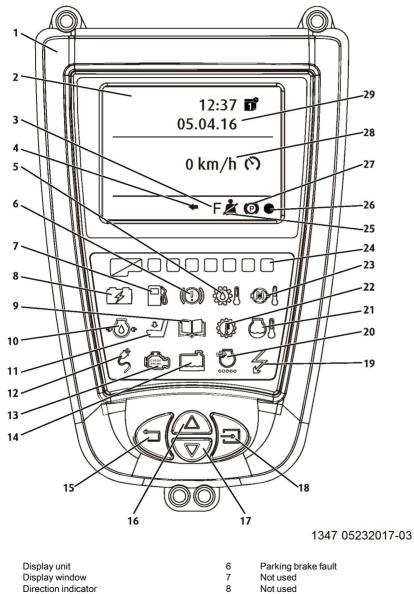


- 1 Steering wheel
- 2 Horn button
- 3 Key switch
- 4 Turn signals (optional equipment)
- 5 Accessory switches, (optional equipment)
- 6 Lift/lower control lever
- 7 Tilt control lever
- 8 Auxilliary control levers (optional equipment)
- 9 Emergency stop button
- 10 Display unit
- 11 Forward pedal
- 12 Brake pedal
- 13 Reverse pedal (dual pedal trucks only)
- 14 Parking brake
- 15 Steering column tilt adjusting knob
- 16 Directional switch (single pedal trucks only)



Display Unit

Display Unit



5 Hydraulic oil temperature high

9 Consult manual for generic errors
 10 Not used

1

2



Definition of directions

Motor temperature high/serious high

Battery discharge indicator

Parking brake indicator

Date and time display

CAN communication indicator

Seat belt indicator

Travel speed

- 11 Operator not seated warning
- 12 Not used
- 13 Not used
- 14 Not used
- 15 Back key 16
- Up/Increase scroll key Down/Decrease scroll key
- 17 18 Enter kev
- 19
- Electronic control fault 20 Not used

The display unit (1) is located on the right-hand side of the dash board and provides the driver with information about the truck. When the ignition switch is turned on, the display unit first conducts a self-test and then transmits information. During the self-test, all of the indicator lights on the instrument cluster will light up.

Definition of directions

- (1)Forwards
- (2)Riaht
- (3) Backwards
- (4)l eft

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

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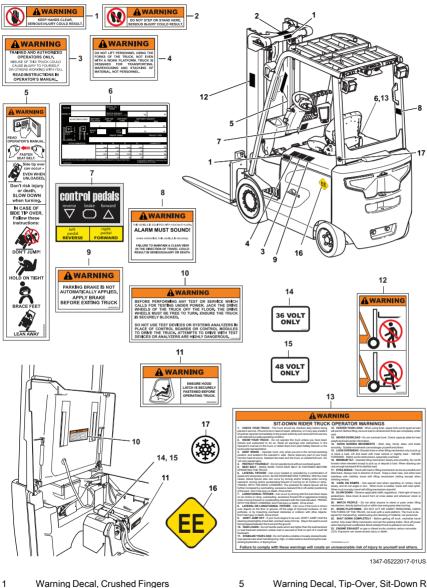
Not used

Not used



Decal and Data Plate Location

Decal and Data Plate Location



- 2 Warning Decal, Ordshert Ingels 5 Warning Decal, So Step 7 3 Warning Decal, No Step 7 3 Warning Decal, Trained & Authorized 6 Data Plate Operator 7 Decal, Contr
- 4 Warning Decal, Do Not Lift Personnel
- Warning Decal, Tip-Over, Sit-Down Rider Truck
- Decal, Control Pedals, Dual Pedal Only
- Warning Decal, Back-Up Alarm

8



Decal and Data Plate Location

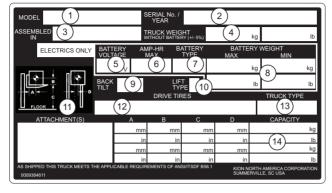
- 9 Warning Decal, Parking Brake
- 10 Warning Decal, Service Work
- 11 Decal, Hood latch warning
- 12 Warning Decal, Personnel/Forks
- 13 Warning Decal, Sit-Down Rider
- 14 Decal, 36 Volt (depending on model)

15 Decal, 48 Volt (depending on model)

- 16 Decal, "EE" (only on trucks equipped with optional EE rated protection for hazardous environments)
- 17 Decal, "Snowflake" (only on trucks equipped with optional cold storage protection)

Data Plate

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) ASSEMBLED 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 ATTACH-MENT(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.



Chassis Options

- Solid, cushion, or non-marking tires
- Battery rollers
- · Battery slides
- Anti-static strap (included with non-marking tires)



4

Operation

Unloading and Preparing a New Truck for 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 drive system 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.

Adjusting the Operator's Seat

WARNING

Adjusting the seat while driving can result in an accident due to loss of control.

Do not adjust the seat during operation.

Adjusting seat position

A CAUTION

There is a risk of pinching if the lever is grasped fully.

Only grasp the lever by the trough provided for this purpose.





- > Pull lever (1) up.
- Move the seat on the slide rails backwards or forwards to give the operator the best position in relation to the steering wheel and the accelerator pedals.

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> Allow lever (1) to snap back into place.

Adjusting seat suspension

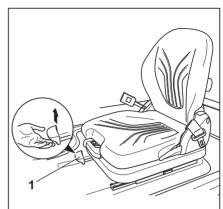
This adjustment depends on the individual operator's weight. Therefore this adjustment must be made with the operator sitting in the seat.

- Sit on the operator seat and pull out lever (2).
- Pump the lever to adjust the seat suspension.

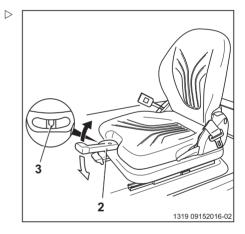
Pumping the lever (2) upwards adjusts the suspension to accommodate more weight.

Pumping the lever (2) downwards adjusts it for less weight.

The seat suspension is correctly adjusted to the operator's weight when the arrow(3) is in the middle of the viewing lens.



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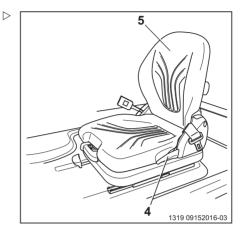
4 Operation



Adjusting the Operator's Seat

Adjusting seat back

- > Lift lever (4) and hold.
- Move the seat back (5) forward and back until a comfortable sitting position is found.
- Release lever (4) and allow seat back (5) to snap into the appropriate position.





Steering column tilt angle adjustment

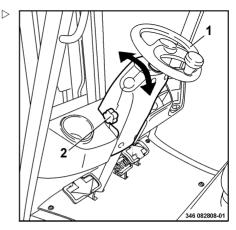
Steering column tilt angle adjustment

WARNING

Driving with the tilt angle locking knob loose can cause a collision due to loss of control.

Adjust the steering column tilt angle only when the vehicle is stationary.

- Loosen the locking knob (2) by turning it counter-clockwise.
- Move the steering wheel (1) into the desired position.
- Tighten the locking knob by turning it clockwise.



Seat Belt

Seat Belt

WARNING

Failure to properly wear the seat belt can result in death or serious injury in the event of an accident.

Always wear the seat belt when operating the truck.

WARNING

A malfunctioning or damaged seat belt can result in death or serious injury in the event of an accident.

Ensure that the belt always operates correctly. It must not become twisted, trapped or tangled up. The catch and belt retractor must be protected from dirt, damage, or foreign objects. A damaged or frayed seat belt must be repaired or replaced before operating the truck.

The automatic locking mechanism will prevent the belt from being pulled out of the retractor whenever the truck is on a steep slope. To release the locking mechanism, carefully move the truck so that it is no longer positioned at an angle.

While using the vehicle (e.g. driving, operating lift mast etc.), adopt a sitting position as far back as possible so that the driver's back rests against the seat back. The automatic locking mechanism of the belt retractor offers sufficient freedom of movement on the seat for normal use of the fork-lift truck.

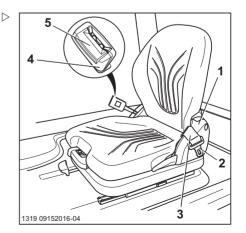
Fastening the seat belt

- Pull the seat belt (3) smoothly from the retractor on the left.
- > Position belt over lap, not over stomach.
- Ensure that buckle (2) snaps into place in the receiver (4).
- > Check seat belt tension.

Belt must fit close to the body.

Releasing the seat belt

- While holding the buckle, press red key (5) on the receiver(4).
- Hold onto the buckle (2) and slowly allow it to retract into the seat (1). Do not allow







the buckle to snap uncontrolled against the retractor housing.

If the belt snaps rapidly into the retractor housing, the automatic locking mechanism may lock the belt with the buckle against the housing. This will prevent the belt from being pulled out with normal force. To free the belt, pull it strenuously until slight movement is detected, then release it slowly. This should unlock the belt and allow it to be withdrawn normally from the retractor housing.

Operating the Display Unit

Operating the Display Unit

Information in the display unit is shown or configured through four main windows. These windows are represented by four symbols (1) down the left side of the screen. The current window symbol will be highlighted and the others dimmed.

Status Window (Forklift symbol) Speed Window (Dial symbol) Settings Window (Gears symbol) Faults Window (Warning symbol)

The Status window appears by default at start-up after a brief display of a logo window and truck hour window. The other windows may be accessed by using the scroll keys and pressing the enter key when the desired window symbol is highlighted. Always use the back key to return to the previous window.

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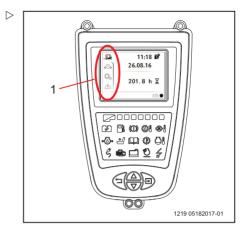
Status Window

This window is the default window after the start sequence is complete. The window is divided into an upper section and a lower section. Each section displays one of four available data sets. These data sets are as follows:

Time and date Service hours Truck speed Key switch hours

- To select a data set for display, press the enter key and use the scroll keys to highlight the upper or lower section as desired.
- With the desired section highlighted, press the enter key again. The highlighted section will begin to flash.
- Use the scroll keys to scroll through the five options until the desired option appears.
- Press the enter key a third time to select the displayed option.

The selected data will now appear in the selected (upper or lower) section of the status window whenever the truck is on.





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Operating the Display Unit

Speed Window

To select the speed window, scroll down to the dial symbol and press the enter key. This window displays the truck speed and steering angle. \triangleright

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Settings Window

To select the settings window, scroll down to the gears symbol and press the enter key. The settings window has four sub-menus:

1 Display settings - explained below 2 Diagnostic - read-only values for traction control or hydraulics; use scroll/enter to select traction or lift then scroll to view the listed values.

3 Supervisor login - for supervisor access 4 Service login - for service access

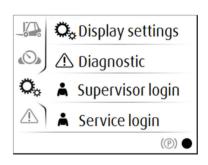
These menus are selected with the scroll keys and the enter key.

Display settings

This window allows the display to be configured as follows:

Language - four choices - highlight with scroll keys and press the enter key. Units - Imperial or metric - highlight with scroll keys and press the enter key. Date format - three choices - highlight with scroll keys and press the enter key. Date - highlight month, day, or year with the scroll keys and press the enter key to make the value flash, then edit with scroll keys. Press the enter key again to accept the new value.

Time - highlight hour, minute, or second with the scroll keys and press the enter key to make the value flash, then edit with scroll



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4 Operation

Operating the Display Unit

keys. Press the enter key again to accept the new value.

Backlight - as a percentage - press the enter key to make the value flash, then edit with scroll keys. Press the enter key to accept the new value.

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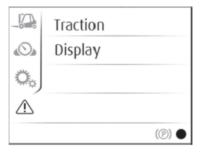
System Info (read-only)

Faults Window

To select the faults window, scroll down to the warning symbol and press the enter key. The faults window has two sub-menus:

Traction Display

If there are active faults, a +++ symbol will be displayed by the relevant menu. Use the scroll keys to highlight either choice and press enter. If an active fault is present, a pop-up window will appear. It may be cleared by pressing the back key. The first fault in the list will be highligted. Press enter to read the fault description.



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Turning the Truck On and Off

Turning the Truck On and Off

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Switching the Truck On

The hydraulic control levers (2) and accelerator pedal(s) (6 & 8) must remain in the neutral, released position throughout the startup sequence. For single pedal trucks, the direction selector (9) must be in neutral.

- > Sit on the operator seat.
- > Fasten the seat belt.
- Press the brake pedal (7).
- > Pull out the emergency stop switch (4).
- Insert the key in the key switch (5) and turn it clockwise.

The electrical system is switched on.

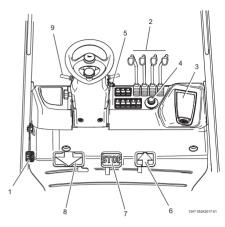
> Check display unit.

After the key switch has been switched on, the display unit (3) performs a self-test. All indicator lights are extinguished on the display unit after approximately 4 seconds.

The hydraulic control levers and accelerator pedals must remain in the neutral or released position until all indicator lights extinguish. For single pedal trucks, the direction selector must be in neutral. Otherwise the startup self-test will be interrupted, a fault code displayed, and the truck will have to be restarted. To restart, switch off and on again with the key switch.

Release the parking brake by depressing the parking brake pedal. Verify that the "P" symbol in the bottom of the display window is extinguished.

The truck is now ready for use.





Driving (single-pedal operation)

Driving (single-pedal operation)

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.

The operator's weight must remain on the seat while driving or the truck will shut off.

Switch the truck on with the key switch (5). See "Turning the truck on and off" if necessary.

The hydraulic control levers and/or accelerator pedals should not be used until the lights on the display unit (3) are extinguished. Otherwise the startup self-test will be interrupted, a fault code displayed, and the truck will have to be restarted. To restart, switch off and on again with the key switch.

- > Slightly raise fork arms and tilt lift mast back.
- Ensure that the parking brake is released. If not, release the parking brake by depressing the parking brake pedal. Verify that the "P" symbol in the bottom of the display window is extinguished.

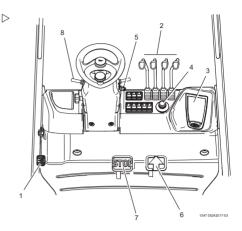
Forward motion

- Move the directional lever (8) forwards.
- > Carefully press accelerator pedal (6).

The driving speed of the forklift truck increases the further the pedal is pressed down.

NOTE

The maximum acceleration rate is set by the main control unit. Pressing the accelerator pedal down hard will not increase acceleration.





Driving (single-pedal operation)

If the pedal is released, the electric braking function will automatically slow the truck.

WARNING

If the emergency stop button (4) is pressed, the electric brake will not function.

The truck can then only be slowed with the brake pedal.

Reverse motion

- > Move the directional lever (8) backwards.
- Carefully press accelerator pedal (6).

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

Changing direction

Move the directional lever (8) to the opposite direction of travel. It is not necessary to release the accelerator pedal to change direction.

The truck will be electrically braked until stationary. If the accelerator pedal was not released, the truck will then accelerate in the new direction.



Driving (two-pedal operation)

Driving (two-pedal operation)

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.

The operator's weight must remain on the seat while driving or the truck will shut off.

Switch the truck on with the key switch (5). See "Turning the truck on and off" if necessary.

The hydraulic control levers and/or accelerator pedals should not be used until the lights on the display unit (3) are extinguished. Otherwise the startup self-test will be interrupted, a fault code displayed, and the truck will have to be restarted. To restart, switch off and on again with the key switch.

- > Slightly raise fork arms and tilt lift mast back.
- Ensure that the parking brake is released. If not, release the parking brake by depressing the parking brake pedal. Verify that the "P" symbol in the bottom of the display window is extinguished.

Forward motion

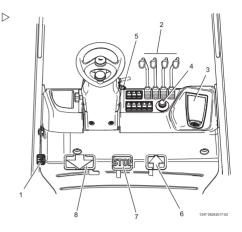
Carefully press the right-hand accelerator pedal (6).

The driving speed of the truck increases the further the pedal is pressed down.



The maximum acceleration rate is set by the main control unit. Pressing the accelerator pedal down hard will not increase acceleration.

If the pedal is released, the electric braking function will automatically slow the truck.



Linde Material Handling

Driving (two-pedal operation)

WARNING

If the emergency stop button is pressed, the electric brake will not function.

The truck can then only be slowed with the brake pedal.

Reverse motion

Carefully press the left-hand accelerator pedal (8).

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

Changing direction

- Release the accelerator pedal that is pressed.
- Press the other accelerator pedal (for the opposite direction of travel).

The truck will be electrically braked until stationary and then accelerated in the new direction.

Both feet should remain on the accelerator pedals so that the truck is easily controlled throughout operation.

Braking

Braking

The truck has electric braking built in to the motor control equipment and mechanical braking through brake discs in the drive axle housing. Electric braking is controlled by the position of the accelerator pedal(s). On single pedal trucks, the position of the directional lever also affects electric braking. The mechanical brake is controlled by the brake pedal or parking brake pedal.

Electric braking

There are two modes of electric braking. The first mode activates when the truck is in motion and the accelerator pedal is simply released to the neutral position as if coasting. The second mode activates when, after the accelerator pedal is released, the opposing accelerator pedal is pressed. (On single pedal trucks this occurs when the direction lever is moved to the direction opposite that of travel without releasing the accelerator pedal.) The braking force is greater with the second mode than with the first. The second mode is sometimes referred to as "plugging". Both modes are regenerative and therefore convert truck momentum back into energy to recharge the battery. The amount of braking force that occurs in each of these modes is adjustable in the truck control program. The first mode can be disabled completely in the program. In this case the truck would truly coast when the pedal is simply released. The second mode can be minimized but not disabled completely in the program.





Braking

➢ While travelling, release the accelerator pedal (6) (or (8) for dual pedal trucks).

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The truck will slow to a stop depending on the setting of the electric brake function.

Slow or quick release of the accelerator pedal (6) (or (8) for dual pedal trucks) into the neutral position allows the braking action to be sensitively controlled, from gentle to hard braking.

While travelling, press the accelerator pedal for the opposite direction (or move the directional lever (9) to the opposite direction for single pedal trucks) until the truck has been electrically braked to a stop.

The truck will slow to a stop faster than if the accelerator pedal is simply released. After stopping, the truck will accelerate in the new direction unless the pedal is then released.

Mechanical brake

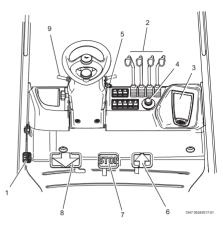
The mechanical brake is applied by cable actuation of a disc brake assembly in the drive axle. The same brake discs are used for the foot brake or the parking brake but they act through two separate cables. When both cables are released, internal spring pressure releases the brake. Whenever the brake pedal is pressed, electric braking as described above will also occur to assist in stopping as well as reduce brake wear. Whenever the parking brake is applied, the drive motor output is limited but remains available to assist for starting on an incline. Mechanical braking is always available with the pedal or parking brake regardless of truck power state.

A WARNING

The parking brake is not automatically applied by switching the truck off with the key switch or emergency stop button.

Always apply the parking brake using the parking brake pedal immediately after switching off the truck to prevent inadvertent truck movement.

> While travelling, press the brake pedal (7).



4 Operation

Steering System

The braking action will be greater or less depending on how hard the brake pedal is pressed.



For emergency braking, press the brake pedal (7) hard. This will result in full application of the brake.

Applying the parking brake

Depress the parking brake pedal (1) to engage the parking brake.

The parking braking symbol "P" will light up in the bottom of the window on the display unit (3). The parking brake has been applied.

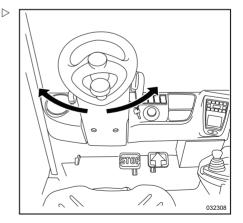
Releasing the parking brake

- Depress the parking brake pedal (1) again to release the parking brake.
- Verify that the "P" symbol in the bottom of the display window is extinguished.

Steering System

Turning the steering wheel will steer the truck via the rear wheels.

Turn the steering wheel clockwise to turn the truck to the right. Turn the steering wheel counter-clockwise to turn the truck to the left.







Emergency Stop Switch

Emergency Stop Switch

Pushing the emergency stop button (1) in will interrupt drive and hydraulic function. The emergency stop switch will open and the truck will be electrically braked to a stop. The foot brake and parking brake are completely mechanical so they will continue to function normally. If the foot brake is applied, the truck will stop faster. Also, increased effort will be required to turn the steering wheel.

WARNING

If the emergency stop switch is operated while in motion, the truck will decelerate without power assisted steering. More effort will be required for steering. Stopping distance may be longer than normal. For these reasons there may be an increased risk of collision.

Always be prepared to stop the truck with the brake pedal and increase the steering effort if the emergency stop button is pressed.

A WARNING

The emergency stop switch will not isolate the entire electrical system. In order to remove power from the entire truck electrical system, the battery must be disconnected at the battery connector.

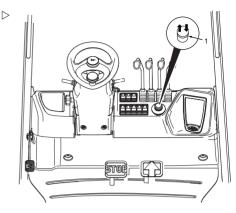
Always disconnect the battery at the battery connector before any maintenance, repair or other activity requiring a completely de-energized truck.

Emergency Stop Procedure

To stop the truck in an emergency, push in the emergency stop button (1).

The button will lock into the pressed position with an audible click. The emergency stop switch will open and the forklift truck will be switched off.

To resume operation, release the drive pedal and pull the emergency stop button out. For single pedal trucks, the directional lever must be moved to neutral before the truck will operate.



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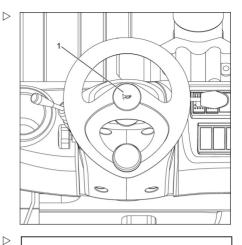
4 Operation

Horn

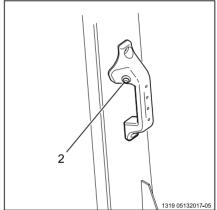
Horn

The horn is used as a warning signal, e.g. at blind spots and junctions.

Press the horn button (1) on the steering wheel to sound the horn.



For use while reversing, an auxiliary horn button (2) is provided at a handle on the right rear overhead guard leg.





Fork Position Adjustment

Fork Position Adjustment

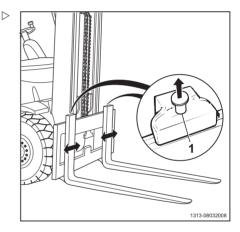
WARNING

Incorrect fork position can result in an unstable or unbalanced load.

Always position the forks so that the center of gravity of the load is centered between the forks. Both forks must be the same distance from the centerline of the truck.

The base of the latch pin knob is bevelled to facilitate the locking and unlocking process.

- Lift the forks slightly off the floor.
- Lift the fork latch pin knob(1) and twist it to hold the latch pin up.
- Slide the fork arms inwards or outwards until the latch pins align with the position notches that best fit the load.
- Lift and twist the knob and allow it to spring back down along its bevelled edge and seat fully. Ensure that each latch pin is engaged securely in a notch on the fork carriage. If the knob will not go back down, then the fork is not aligned with a notch or the bevelled edge is not twisted into the correct position. Wiggle the fork slightly if necessary until the latch pin seats fully.



Hydraulic Controls - Manual Valve

Hydraulic Controls - Manual Valve

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. When released, levers automatically return to the neutral position.

Note the function symbols on the control lever decals.

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



Raising the mast

> Pull actuating lever (1) backward.

Lowering the mast

Push actuating lever (1) forward.

Tilting the mast forwards

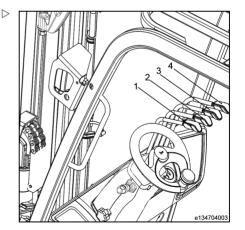
Push actuating lever (2) forward.

Tilting the mast backwards.

Pull actuating lever (2) backward.

Attachments (optional equipment)

Third- and fourth-function attachments can be fitted to the truck as optional equipment (e.g. sideshifter, clamps etc.). In this case additional actuating levers (3 and 4) are provided.







Hydraulic Controls - Manual Valve

If the truck is equipped with a clamp, it will have a locking button on the lever that operates the clamp. The button must be pressed while moving the lever in order to open the clamp. This double action requirement is intended to prevent accidental opening of the clamp.

Note the symbols on the lever decals. The symbols for the third function will appear in position (3). The symbols for the fourth-function will appear in position (4).

Operating the sideshifter or other third-function (optional equipment)

For a clamp or similar attachment, a locking button on the lever must be pressed before the clamp will open. See the note above.

Push actuating lever (3) forward.

Sideshifter moves to the left. (Third-function other than sideshifter operates according to the symbol arrows on the lever decal.)

> Pull actuating lever (3) backward.

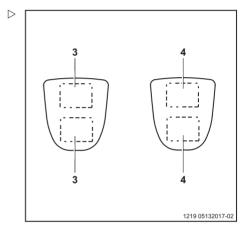
Sideshifter moves to the right. (Third-function other than sideshifter operates according to the symbol arrows on the lever decal.)

Operating the fourth-function (optional equipment)

For a clamp or similar attachment, a locking button on the lever must be pressed before the clamp will open. See the note above.

Move actuating lever (4) forward or backward.

Fourth-function operates according to the symbol arrows on the lever decal.



Hydraulic Controls - Proportional Valve

Hydraulic Controls - Proportio- ▷ nal Valve

On trucks equipped with the optional proportional hydraulic valve, the control levers are incorporated into the armrest.

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.



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

Raising the mast

> Pull actuating lever (1) backward.

Lowering the mast

> Push actuating lever (1) forward.

Tilting the mast forwards

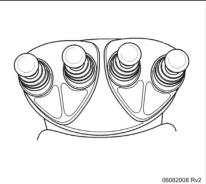
Push actuating lever (2) forward.

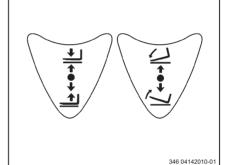
Tilting the mast backwards.

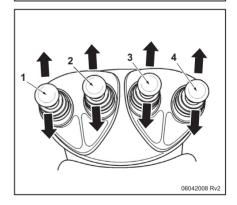
> Pull actuating lever (2) backward.

Attachments (optional equipment)

Third- and fourth-function attachments can be fitted to the truck as optional equipment (e.g. sideshifter, clamps etc.). In this case additional actuating levers (3 and 4) are provided.











Hydraulic Controls - Proportional Valve

If the truck is equipped with a clamp, it will have a locking lever in the corresponding position. Before the lever will move, it must be unlocked by pressing down on it slightly. This double action requirement is intended to prevent accidental opening of the clamp.

Note the symbols on the lever decals. The symbols for the third function will appear in position (3). The symbols for the fourth-function will appear in position (4).

Operating the sideshifter or other third-function (optional equipment)

For a clamp or similar attachment equipped with a locking lever, the lever must be pushed down slightly before it will move. See the note above.

Push actuating lever (3) forward.

Sideshifter moves to the left. (Third-function other than sideshifter operates according to the symbol arrows on the lever decal.)

Pull actuating lever (3) backward.

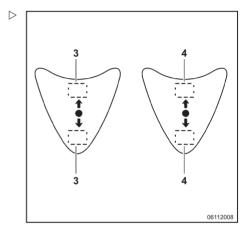
Sideshifter moves to the right. (Third-function other than sideshifter operates according to the symbol arrows on the lever decal.)

Operating the fourth-function (optional equipment)

For a clamp or similar attachment equipped with a locking lever, the lever must be pushed down slightly before it will move. See the note above.

Move actuating lever (4) forward or backward.

Fourth-function operates according to the symbol arrows on the lever decal.



Lights and Back-Up Alarm

Lights and Back-Up Alarm

The truck is equipped with two headlights as standard equipment. Additionally, a brake/tail light combination, one or two rear spotlights, and a flashing beacon are available as individual options. Lights may be configured to operate from a switch on the dash or continuously whenever the key switch is on. The rear spotlights and flashing beacon can be configured to illuminate only when the truck is travelling in reverse.

Other types or combinations of lighting may be fitted as custom options. Such custom options are not covered by this manual.

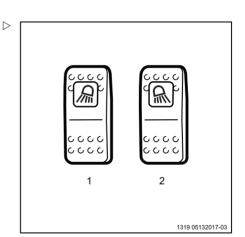
Toggle Switches

The truck may have one or more toggle switches to control the headlights and optional lights. If switches are not present, then the head lights (and tail lights if equipped) will illuminate continuously when the key switch is on. In the case of the optional rear spot light(s), if switches are not present, these lights may be configured to illuminate whenever the truck is travelling in reverse, or continuously via the key switch as with the head lights.

The arrangement of the individual toggle switches on the console may vary depending on options. Note the symbols on the switch lenses.

The toggle switch (1) is used to turn the front working headlights (3) on and off. The tail lights (5) (if equipped) will illuminate with the headlights.

The toggle switch (2) is used to control the rear work lights (4). In its center position, this switch will allow the rear light(s) to illuminate only when the truck is travelling in reverse. In the fully pressed position, this switch will illuminate the rear spot light(s) continuously.







Fan (optional equipment)

The other toggle switch positions are provided for optional additional functions.

Lighting Arrangement

The lights (and the optional back-up alarm) are mounted to the overhead guard.

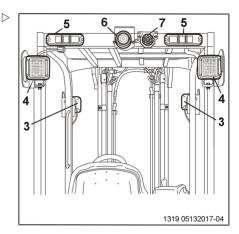
- (3) Front work lights
- (4) Rear work lights (one or two optional)
- (5) Brake/tail light assemblies (optional)
- (6) Flashing beacon (optional)
- (7) Back up alarm (optional)

Back-Up Alarm

The back-up alarm (7) (optional) is configured to automatically operate when the truck is travelling in reverse.

Fan (optional equipment)

A cooling fan for the operator is available as an option. The standard location for the fan is the front right-hand leg of the overhead guard. Use toggle switch (1) to turn the fan on or off.







Opening and Closing the Battery Cover

Opening and Closing the Battery Cover

Opening the battery cover is necessary when servicing or changing the battery.

- Remove any loose items from the battery cover or from under the driver's seat. Also ensure the operator's manual pouch flap is closed.
- Tilt the steering column fully forward and move the seat fully forward.



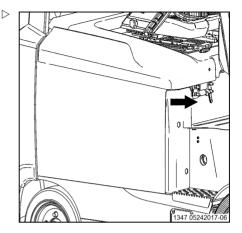
If the truck has a narrow overhead guard (for drive-through racking), the seat is equipped with a swivel mechanism. This allows the seat to rotate 90 degrees to clear the overhead guard as the battery cover is opened. To rotate the seat, pull the mechanism release chain at the front of the seat and pivot the seat to the right. Release the chain and allow the seat to lock into the rotated position.

- Move the locking lever (arrow) to the right and allow the battery cover to rise. The support struts will assist with the lifting.
- Slowly swing the battery cover until it is completely open. The struts will hold it in position.

Closing the battery cover

- Swing the battery cover against the pressure of the support struts and push it closed until the locking lever engages with an audible click.
- Lift up on the edge of the battery cover to ensure it is securely locked in the closed position.

If the truck is equipped with a narrow overhead guard, it will not operate unless the swivel seat is locked back into the straight-ahead position.





Battery Shims

Battery shims are included with the truck to accommodate smaller batteries. If necessary, the shims can be used to increase the effective thickness of the three battery spacers on the front wall of the battery compartment. This will allow a closer fit to smaller batteries.

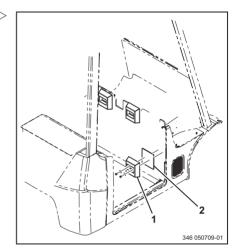
- To install battery shims, remove the battery spacers (1) by removing their mounting screws and washers.
- Position a shim (2) between the spacer and the wall of the battery compartment as shown.
- Reinstall the screws and washers.
- Repeat the above steps for each battery spacer.

If more than one shim per spacer is installed, longer mounting screws will be required.

A CAUTION

Unequal numbers of shims in the three spacer locations can result in battery shifting during operation.

Always use the same number of shims behind each spacer.



Changing the Battery

Changing the Battery

WARNING

Specialized training is required to handle batteries safely.

Batteries may only be changed by properly trained personnel in accordance with the instructions of the battery manufacturer and the following procedure.

The battery must always be changed on the right-hand side of the truck.

The battery can be changed in various ways:

- Using a crane (taking care to stay within the permissible load carrying capacity of the crane and the lifting gear)
- Using an additional truck (taking care to stay within the permissible load carrying capacity of the truck; see load diagram)
- Using specialized side extraction equipment if the truck is equipped with the optional battery roller tray.

WARNING

If any lifting equipment (forklift trucks or other lifting equipment) used to change a battery has insufficient load carrying capability and/or forks whose length is too short, there is a risk of accidental injury or death.

Use only equipment of sufficient size and load carrying capability to change batteries.

WARNING

Batteries must not be changed if the truck is bearing any load. The weight of the battery affects truck stability so there is a risk of the truck tipping over with injury to operators or bystanders if a battery is changed while the truck is loaded.

Always lower the forks fully so they are resting on the ground before changing a battery.

- > Park the truck safely.
- > Fully lower the fork carriage.
- Tilt the lift mast forwards until the fork arms touch the ground.
- > Apply the parking brake.





- > Switch off the key switch.
- Press the emergency stop button.
- Open the battery cover.
- Pull the battery plug (1) out of the battery socket (2).
- Swing the battery connector support(3) upwards out of the way.

WARNING

Shorting of battery terminals can cause burns, electrical shock, or explosion.

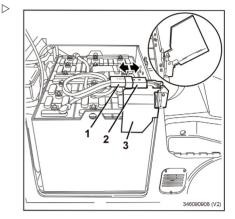
Do not allow metal parts to contact the top surface of the battery. Make sure all terminal caps are in place and in good condition.

- Using a crane or another truck, carefully move the lifting gear into position over the battery. If using specialized side extraction equipment, position it at the battery according to the manufacturer's instructions.
- Insert the hooks of the lifting gear into the openings provided for this purpose in the battery carrier. If using specialized side extraction equipment, attach it according to the manufacturer's instructions.
- Carefully lift the battery and move it slowly out of the truck chassis. The battery does not have to be lifted more than a few inches. (The battery does not have to be lifted at all if the truck is equipped with the optional battery roller tray.)
- Check the battery for leaking acid, cracked housing or raised plates.
- Check that the battery plug and cable are in good condition and leave the battery in a safe place.

MARNING

Batteries of incorrect size or weight will affect truck stability and cause the risk of tip-over.

Install only batteries whose weight meets the specification listed on the truck data plate.



4 Operation

Changing the Battery

WARNING

Use of a fuel cell can affect truck stability and cause the risk of tip-over.

Contact the factory for written approval for use of a fuel cell with the truck. Do not install a fuel cell in the truck without written approval.

- Carefully position the replacement battery in the battery box. Disconnect and remove all lifting equipment.
- Swing the support (3)down into its closed position.
- Plug the battery plug (1) into the battery connector socket(2).
- > Close the battery cover.
- Pull out the emergency stop button and the truck is ready for service.

WARNING

Batteries produce explosive gases. Always store batteries in well ventilated areas.





Connecting the Battery to an External Charger

WARNING

Specialized training is required to charge batteries safely.

Batteries may only be charged by properly trained personnel in accordance with the instructions of the charger manufacturer and the following procedure.

A WARNING

Explosive gases are released during battery charging.

Charge batteries only in well ventilated areas.

- > Park the truck safely.
- \succ Fully lower the fork carriage.
- > Tilt the lift mast forwards

The fork arms must touch the ground.

- > Apply the parking brake.
- Switch off the key switch.
- > Press the emergency stop button.
- Open the battery cover.

WARNING

Dangerous concentrations of explosive gases can occur during battery charging if the battery cover is not open.

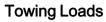
The battery cover must be left completely open during the entire charging period to allow ventilation.

- Remove the battery plug (1) from the connecting socket (2).
- Attach the connector plug of the external battery charger to the battery plug (1).
- Switch on the battery charger.

Connecting the Battery to an External Charger

 \triangleright

Towing Loads



The towing pin can be used to secure light loads for occasional towing by the forklift truck.

Towed load capacity is limited by the maximum rated towing force listed in section 6. No load may be towed that exceeds the maximum towing force, regardless of weight. Contact the factory for towed weight capacity if necessary.

▲ CAUTION

Exceeding the maximum rated towing force can damage the truck.

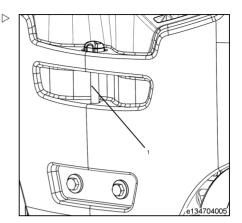
Refer to the specifications in section 6 for the maximum towing force. Do not tow any type of load that will exceed the maximum towing force. This specification only applies to loads towed on level surfaces (+/ 1%). If towing on gradients is required, contact the factory for load specifications.

WARNING

Incorrect attachment of towed loads can damage the truck and cause serious injury.

Never attach a load to any part of the truck other than the towing pin.

- \succ Lift the towing pin (1) up using the handle.
- Insert the tongue of the towed load into the coupling space.
- Allow the towing pin to drop back into place through the tongue of the towed load. Ensure that the towing pin engages its lower bore.
- Reverse the above procedure to uncouple loads from the truck.





Manual Lowering of Fork Carriage

Manual Lowering of Fork Carriage

If a malfunction occurs in the hydraulic system, the fork carriage can be lowered manually.

For this purpose, a manual lowering screw is located on the control valve block. On trucks with a manually actuated valve (levers on the dash board), the screw is located at position (1). On trucks with the optional electrically actuated valve, the screw is located at position (2). The screw is secured with a lock nut.

A DANGER

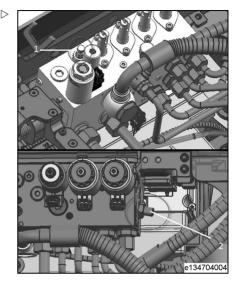
Injury or death will occur if personnel are beneath the fork arms during the manual lowering process.

All personnel must remain clear of the area beneath the fork arms while the fork carriage is being manually lowered.

Always leave the wrench on the screw(1) throughout the manual lowering process to enable lowering to be quickly interrupted at any time.

On trucks with the manually actuated valve, it may be possible to access the lowering screw through the gap between the floor plate and the overhead guard after only removing the floor mat. Otherwise, the left-hand section of the floor plate must be removed.

- If the floor plate must be removed, remove the mat and floor plate screws. Lift the floor plate, disconnect the pedal wiring and then set the floor plate aside.
- Loosen the lock nut . Using an 10 mm socket, slowly turn the lowering screw approximately 1.5 turns counter-clockwise. The carriage will begin to lower slowly. Do not turn the screw more than two complete turns. Turning further will not increase the lowering speed.
- When lowering is complete, turn the lowering screw clockwise and tighten to 11 ft-lb (15 Nm). This must be done to restore normal mast operation.
- > Tighten the lock nut.
- > Install the floor plate.







Towing the Truck

The power-assisted steering will not function if the truck is unable to be switched on. Increased effort will then be required for steering.

- Remove any load from the forks.
- If the hydraulic system is functional, raise the forks if necessary so they will not drag during towing. If the carriage cannot be raised hydraulically, remove the forks from the carriage.
- Attach the towing vehicle to the towing pin (1) using a tow bar.
- > Release the parking brake.
- > A driver must steer the truck during towing.
- Do not exceed the permissible running speed when towing away the truck.

Securing the Truck for Transport

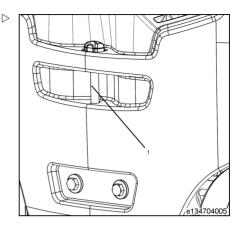
This procedure explains the attachment of equipment to the truck for the purpose of securing it for ground transport by tractortrailer or other vehicle. Securing the truck for transport must be performed by personnel experienced in rigging loads for transport.

WARNING

Transport vehicles, loading ramps, or other equipment of insufficient capacity can fail and cause severe injury or death.

Ensure that the transport vehicle as well as any loading ramps or other equipment has sufficient capacity to carry the weight of the truck. Refer to the truck data plate for truck weight.

Ensure that all surfaces on which the truck will be driven or carried can support the wheel load of the truck. Contact the factory for wheel load values if necessary.







Securing the Truck for Transport

WARNING

If the truck is to be driven onto the transport vehicle, the operator must be familiar with all safety procedures that apply to forklift operation before driving. Be aware that the truck has rear steering and that the rear end will move out during a turn. Failure to carefully monitor truck position while turning could cause the truck to fall during the loading process.

Read and understand all safety information in Section 2 before driving the truck onto a transport vehicle. Remain aware of truck position at all times especially if turning. If possible, align the truck with the transport vehicle so that it can be driven straight onto it without turning. Drive very slowly during the entire loading process.

- Once the truck is in position, lower the mast completely.
- Apply the parking brake.
- Disconnect the battery.
- Attach lashing straps or tie-downs to the front of the truck at the holes in the fenders.

A CAUTION

The holes in the front fenders are for securing the truck against movement during ground transport. They are not intended for lifting and will not support the free weight of the truck during lifting. If the truck is lifted using these holes, the chassis will be damaged.

Never lift the truck using the holes in the fenders.

- Attach lashing straps or tie-downs to the rear of the truck at the towing pin. Ensure that the towing pin is fully inserted through both of its bores in the counterweight.
- Ensure that all lashing straps or tie-downs are tight and securely attached to the transport vehicle.
- Chock the wheels.

Hoisting the Truck



Hoisting the Truck

This section explains the attachment of lifting equipment to the truck for the purpose of hoisting it. Many methods of rigging to a crane or hoist are possible. Explanation of such methods as well as operation of lifting equipment is outside the scope of this manual. Both the attachment of lifting equipment to the truck and the hoisting operation itself must be performed by personnel experienced in rigging.

WARNING

Lifting equipment of insufficient capacity can fail and cause severe injury or death.

Ensure that all lifting slings, hardware, or other equipment has sufficient capacity to carry the weight of the truck. Refer to the truck data plate for truck weight. If a battery is installed, its weight must be added to the truck weight listed on the data plate.

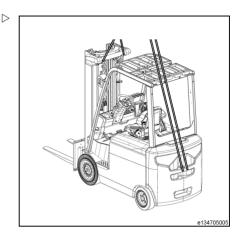
- > Lower the mast fully, and tilt it fully back.
- > Disconnect the battery.
- Attach lifting slings at the towing pin on the rear, and the outer sides of the top crossmember of the outer upright on the mast to provide a three-point lifting arrangement. Secure the slings on the mast so they will not slide together. Ensure that the towing pin is fully inserted through both of its bores in the counterweight.

A CAUTION

The holes in the front fenders are for securing the truck during ground transport. They are not intended for lifting and will not support the weight of the truck. If the truck is lifted using these holes, the chassis will be damaged.

Never attach any lifting equipment to the holes in the fenders.

Adjust the slings and lifting device so that they will not contact the overhead guard during the lifting process. If a spreader bar is not used, the truck can be lifted with the rear wheels higher than the front wheels to achieve clearance between the lifting equipment and the overhead guard or





its attached accessories such as lights. Remove the forks if necessary.

WARNING

The overhead guard will be damaged if it is contacted by lifting equipment that is under tension from lifting. This can result in later failure of the overhead guard and the risk of severe injury or death.

Ensure that no part of any lifting equipment contacts the overhead guard during lifting.

Ensure that slings or any other lifting equipment will remain clear of any sharp edges, hydraulic lines or hoses, or attached items such as lights or brackets throughout the lifting process.

Long term storage

Long term storage

Measures prior to storage

If the vehicle is to be stored for more than 2 months e.g. for operational reasons, it should only be left in a well ventilated, clean and dry room free of frost, and the following measures undertaken beforehand.

- Clean forklift truck thoroughly.
- Raise fork carriage several times to the end stop, move lift mast backwards and forwards a few times and operate any attachments several times.
- Lower the fork carriage to a supporting surface until the chains are relieved of load.
- Check the hydraulic oil level and top up if necessary.
- All unpainted mechanical components should be coated with a thin film of oil or grease.
- > Grease vehicle.
- > Check battery condition and density of acid.
- Lubricate battery terminals with acid-free grease. (Follow instructions of battery manufacturer.)



- Apply a suitable contact spray to all exposed electrical contacts.
- Jack up the vehicle so all wheels are off the ground.

This will prevent permanent deformation of the tires.



Do not cover with plastic film or this will encourage the formation and collection of condensed water.

Start up after storage

- > Clean forklift truck thoroughly and grease.
- Clean the battery and lubricate battery terminals with acid-free grease
- Check battery condition and density of acid and recharge if necessary.
- Check hydraulic oil for condensed water and change if necessary.
- Perform maintenance as before initial commissioning.
- Put forklift truck into service.

5

Maintenance



Personnel Qualifications

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.

A 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.

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.

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



Operator Inspection and Maintenance

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.



Operator Inspection and Maintenance

Daily Inspection Checklist

| | | OPERATOR'S I | | | |
|--|--------|---|-----------|--------|--|
| Truck Serial Number: Dept / Shift: Hour meter reading: Date: | | | Operator: | | |
| lou | r m | neter reading: Date: | | | Supervisor: |
| ofa | ny | each of the following items before the start of each shif problem. Start at the left rear of the lift truck and work to cordingly. Explain below as necessary. Check boxes as follows: OK NR, Neer | wards | he f | |
| | N R | VISUAL INSPECTION | | N R | |
| - | | Oil Spots on Floor (check for leaks on truck) | | | Unusual Noise (during any of the operational checks) |
| + | | Rear Tire(s) (pressure if applicable, wear, cuts, embedded | | | Emergency Battery Disconnect) (check operation) |
| | | objects, rim damage, loose/missing lug nuts) | | | Gauges and Instrumentation (check operation) |
| | | Steer Axle (check for damage, debris) | | | Battery Charge (fully charged) |
| | | Overhead Guard (damage, bends, cracks, looseness) | | | Seat Switch (If equipped) (check operation) |
| | | Seat & Seat Belt (check operation, damage, worn/torn | | | Directional Switch (if equipped) (operates freely) |
| | | belt, loose fasteners) | | | Forward Driving (accelerates, steers, brakes smoothly) |
| | | Steering Wheel (check for wear, damage) | | | Plugging (stops, changes direction smoothly) |
| | | Hood Latch (check operation, latches securely) | | | Reverse Driving (accelerates, steers, brakes smoothly) |
| | | Hydraulic Oil (check level) | | | Service Brake (check operation) |
| | | Front Tire (left) (tire condition, rim damage, etc) | | | Parking Brake (check operation) |
| | | Tilt Cylinder (left) (damage, leaks, loose fittings) | | | Hydraulic Controls (operate freely, return to neutral, lock- |
| | | Mast (damage, wear, cracks, loose fasteners) | | | out function (if equipped) operates properly) |
| | | Lift Cylinders (damage, leaks, loose fittings) | | | Attachment (if equipped) (check operation) |
| | | Lift Chains (wear, corrosion, cracks, loose leaves, even | | | Mast (extend fully, binding, leaks, roughness, noise) |
| _ | | tension) | | | Hydraulic Oil (excessive noise when mast is fully raised |
| | | Carriage/Load Backrest (damage, looseness, bends, | | - | is indication of low hydraulic oil) |
| _ | | cracks) | | | Horn (sounds when button pressed) |
| | | Forks/Attachment (damage, cracks, excess wear, | | - | Backup Alarm (if equipped) (sounds in reverse) |
| _ | | twisted, bent) Fork Locking Pins (check operation, holds fork secure) | _ | - | Travel Alarm (if equipped) (sounds with vehicle in motion) Work, Strobe, Flashing Lights (if equipped) (check |
| _ | | Tilt Cylinder (right) (damage, leaks, loose fittings) | | | |
| _ | | | _ | - | operation) |
| + | | Front Tire (right) (tire condition, rim damage, etc) Battery Connectors & Cables (damage, cracks, pitting) | - | - | |
| - | | Battery Connectors & Cables (damage, cracks, pitting) Battery Retention (installed correctly, secure) | | - | |
| + | | Battery Case & Vent caps (damage, cracks, loose, | - | - | |
| | | missing) | | + | |
| | | Warning Decals/Operator's Manual (in place, legible) | - | | |
| | | Data Plate / Capacity Plate (in place, legible) | | - | |
| + | | | - | - | |
| Exp | an | ation of problems marked above (use back of this form | if need | ded) |): : |

5 Maintenance

Operator Inspection and Maintenance

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 battery cover latch

Open and shut the battery cover and ensure the battery cover latch functions correctly and holds the cover closed securely.

Check battery connector

Inspect the battery connector and its cables for damage.





Operator Inspection and Maintenance

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Check hydraulic oil level

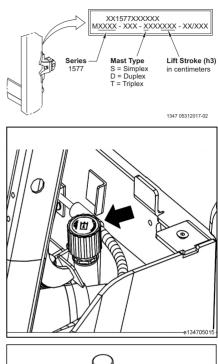
- > Park the truck on level ground.
- > Lower the fork carriage completely.
- Observe the mast identification number located on the rear surface of the left-hand outer upright. Determine the mast series, type, and lift stroke (h3) from the identification number. (This step is unnecessary if the truck is equipped with a quad mast.) Note that h3 is given in centimeters, so a zero must be added to match the table below.
- A dipstick is attached to the underside of the breather filter cap (arrow) on the hydraulic oil tank. Unscrew the cap and withdraw the dipstick from the tank.

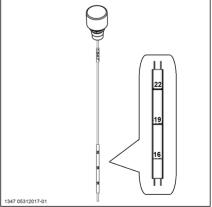
The tank is slightly pressurized so a small amount of air may be heard escaping.

> Wipe the dipstick with a clean cloth.

The dipstick has three marks on it. Each mark has a number showing the system volume in liters at that mark. The correct volume to use corresponds to the various masts available for the truck as follows:

| 1577 Series Masts | | | | |
|--|-------------------------|--|--|--|
| Mast Type | Dipstick mark/volume | | | |
| Double masts with h3 up to and including 3915 mm | 16 (16 liters) | | | |
| Triple masts with h3 up to and including 4690 mm | 19 (19 liters) | | | |
| Simple masts with h3 up to and including 6495 mm; Triple masts with h3 > 4690 mm up to and including 5955 mm All quad masts | 22 (22 liters) | | | |
| Mast heights higher than those listed are special equipment. Contact the factory for fill requirements. | | | | |





5 Maintenance

Operator Inspection and Maintenance

- Insert the dipstick back into the tank tube and screw the breather cap in fully.
- Remove it again and observe the oil level. If necessary, add hydraulic oil through the dipstick tube until the level is correct.

WARNING

Hydraulic oil is flammable.

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

▲ CAUTION

Incorrect hydraulic oil can damage the hydrostatic unit.

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

Reinstall the dipstick when finished and tighten the breather cap.

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 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.





Operator Inspection and Maintenance

Check wheels and tires

WARNING

Uneven wear or excessive damage to the tires can reduce stability as well as brake performance. Reduced stability can cause tip-over. Reduced brake performance can cause collisions.

Have worn or damaged tires changed immediately.

Inspect the tires for damage or excessive wear. Remove any foreign objects that may be embedded in the tire surface. Solid smooth tires must be replaced when worn down by one-third (33%) of the original outside diameter. (The first number of the tire size shown on the sidewall is the original diameter.) Solid treaded tires can be worn down to the wear mark (1) on the sidewall.

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 wheels: | 144 ft-lb (195 Nm) | |
|---------------|--------------------|--|
| Steer wheels: | 295 ft-lb (400 Nm) | |

WARNING

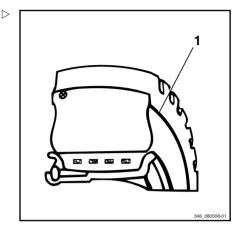
Wheel mounting hardware sometimes requires several cycles of tightening before it fully seats. For this reason, wheel mounting screws or nuts will often work loose in the period immediately following initial tightening.

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



5 Maintenance

Operator Inspection and Maintenance

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.

Anti-static strap (optional equipment)

An anti-static strap is typically installed on trucks with non-marking tires that are more prone to static electricity build-up. An antistatic strap may also be installed on trucks that operate in certain applications regardless of tires. If equipped, inspect the anti-static strap for wear or damage. The strap must maintain continuous contact with the driving surface. If any wear or damage preventing this contact is present, the strap must be replaced. Also check that the strap mounting is secure. Correct as required.

Operational checks

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

- · Emergency stop button
- · Parking brake
- · Seat switch
- Multi-function display/battery discharge indicator
- · Working lights
- Horn
- · Forward and reverse travel
- · Back-up alarm if equipped
- · Service brake





Operator Inspection and Maintenance

- · Electric braking (if applicable)
- Mast, tilt, and any other hydraulic functions (operate through complete range of motion)

A 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.

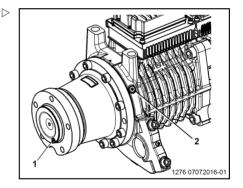
Checking Gear Oil Level

- Park the truck so that the level screw (1) is positioned between 5 and 6 o'clock.
- Turn off the truck and apply the parking brake.
- Clean the area around level screw and remove it.

Oil level must reach the bottom of the level screw opening.

Add gearbox oil as required via filler screw (2).

- Install the level screw and tighten to 15 ft-lbs (20 Nm). Tighten the filler screw to 25 ft-lbs (35 Nm) if removed.
- Repeat this procedure for the other side of the truck.

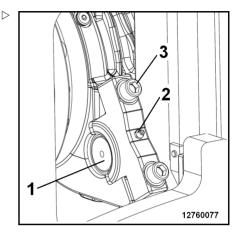






Lubricating Mast Bearing Blocks

- Lubricate the bearing (1) through the lubricating nipple (2).
- Check the bearing for wear and replace if necessary.
- Check tightness of the mounting bolts (3). Proper torque is 203 ft-lb (275 Nm).

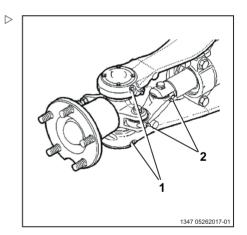


Steering Axle Lubrication

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. On each side of the truck, lubricate the king pin bearings at their grease fittings (1) and the tie rod bearings at their grease fittings (2). 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.



5 Maintenance

Routine Lubrication and Inspection

Hydraulic Tank Pressure Valve Test

The breather filter (arrow) is equipped with a bleeder valve that permits a slight over pressure in the tank.

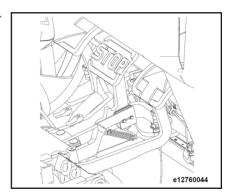
- > Switch on the truck.
- > Extend the lift mast to the stop and lower it again; repeat this step several times.
- > Switch off the truck.
- > Release the breather filter by slowly rotating the dipstick assembly a half-turn counterclockwise.

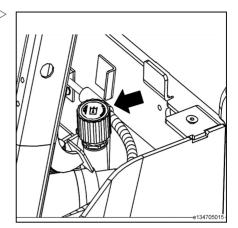
It must be possible to hear air escaping from the tank.

> If air cannot be heard escaping, the breather filter must be replaced.

Inspect and Lubricate Pedal Assembly

- > Remove the rubber mat from the floor plate.
- > Remove the four screws securing the floor plate.
- > Check mounting bolts and joint fastenings for secure positioning.
- > Test the movement of the mechanism for smooth operation and firm spring tension.
- > If necessary, lightly grease the bearings.









Testing and Cleaning the Fans

The truck is equipped with three fans on the drive axle to cool the power modules and drive motors.

All three fans must be cleaned and checked for normal operation periodically. The floor plate must be removed to access the fans.

The fans should be cleaned with oil-free compressed air and/or cleaning solvent. The truck must be switched off while cleaning the fans.

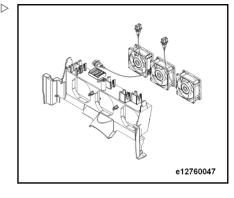
Operation of the fans can be confirmed by switching on the key switch. All fans should run at constant speed when the key is switched on.

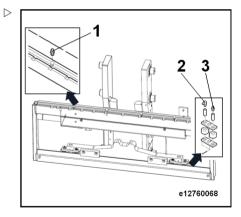
The fans can also be activated using a laptop computer equipped with Linde diagnostic software.

Lubricating the Sideshifter (optional equipment)

- Check cylinders and fittings for leakage and have repairs made as necessary.
- Clean the sideshifter according to the section "Cleaning the Truck".
- > Check hydraulic hoses for abrasion.
- Adjust the forks so that the grease fittings on the top rail (1) and the lower grease fittings (2 and 3) are accessible.
- Lubricate the sideshifter at all of the grease fittings.

The sideshifter must always be lubricated after any cleaning.





Adjusting and Lubricating Lift Chains

Lift Chain Lubrication



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

Apply Linde chain spray to each chain and guide surfaces.

Lift Chain Adjustment - Standard Mast



The lift chains stretch during operation and therefore must be periodically readjusted on the right-hand and left-hand sides.

- Tilt the mast to the vertical position and lower it completely.
- > Check that the forks do not contact the floor.
- Measure the distance that the lower carriage roller protrudes from the bottom of the inner upright.

The lower guide roller of the fork carriage must not protrude more than 1-3/8 inch (35 mm) from the bottom of the inner mast guide rail. If the roller protrudes farther or the forks contact the floor then the lift chains must be adjusted to pull the carriage back upward. Both chains must be adjusted so that chain tension remains equal.

WARNING

Chains that are stretched more than 3% must be replaced regardless of adjustability.

If chains require adjustment, always check the chains using a wear gauge. Replace all chains if any one is stretched 3 % or more.





- > Loosen the lock nut (2).
- Adjust each chain using the adjustment nut (1) of the chain anchor.
- Tighten the locknut (2).

A CAUTION

When extending the lift mast, it must not touch the end stops.

Fully extend the lift mast and check the clearance to the end stops.

Lift Chain Adjustment - Double Mast

- Tilt the mast to the vertical position and lower it completely.
- > Check that the forks do not contact the floor.
- Measure the distance that the lower carriage roller protrudes from the bottom of the inner upright.

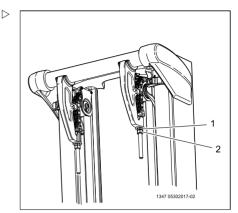
The lower guide roller of the fork carriage must not protrude more than 1-3/8 inch (35 mm) from the bottom of the inner mast guide rail. If the roller protrudes farther or the forks contact the floor then the lift chain must be adjusted to pull the carriage back upward.

WARNING

Chains that are stretched more than 3% must be replaced regardless of adjustability.

If chains require adjustment, always check the chains using a wear gauge. Replace all chains if any one is stretched 3 % or more.

Loosen the lock nut (4).



5 Maintenance

Routine Lubrication and Inspection

- Adjust the chain using the adjustment nut
 (3) of the chain anchor.
- ➤ Tighten the locknut (4).

A CAUTION

When extending the lift mast, it must not touch the end stops.

Fully extend the lift mast and check the clearance to the end stops.

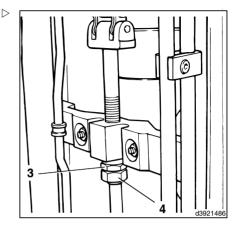
Lift Chain Adjustment - Triple Mast

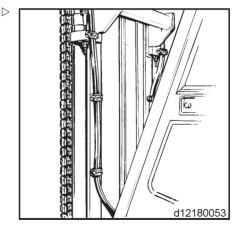
The triple mast has both primary and secondary chains. There are two secondary chains and one primary chain. The secondary chains are adjusted in the same manner as for the standard mast except that the protrusion of the roller on the bottom of the inner upright is being adjusted with these chains, not the carriage roller. The carriage roller protrusion is adjusted with the primary chain the same as for the double mast. Both adjustments must be checked on a triple mast.

Checking Reeving Hose Preload (optional equipment)

Preload tension must be maintained in any section of hose which operates over a sheave. Proper tension is necessary to prevent hoses from jumping the sheave.

- The reeving hoses should be preloaded 0.2 - 0.4 in (5-10 mm) per meter of original length.
- Move the hoses between the retaining clips and secure to obtain the required preload.









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.

Sideshifter Maintenance Intervals



The optional sideshifter has maintenance intervals in addition to those given in the standard maintenance charts. See Sideshifter Maintenance section.

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. **Scheduled Maintenance**



Scheduled Maintenance Chart

Preparations

Clean the truck (as required).

Read and clear the error memory.

Enter the next service interval.

Maintenance every 1000 hours, but at least every 12 months. (Exceptions in brackets)

Transmission system

Check tightness of reduction gear units to motor housing screws.

Check for leaks between the reduction gear units and the drive motor.

Change the oil in the reduction gear units. Clean magnetic plugs if necessary. (once after 1000 hours, again after 3000 hours and then every 3000 hours).

Visual inspect the reduction gear units for leaks.

Steering and Wheels

Check wheel fastenings and tighten if necessary.

Check tires for damage and embedded objects.

Clean and lubricate the steering axle.

Chassis, bodywork and fittings

Check other bearings and connections and lubricate if necessary.

Check the installation and tightness of the counterweight and overhead guard to the chassis. (once after 1000 hours, again after 3000 hours and then every 3000 hours).

Check tightness of bolts that mount the drive axle to the chassis.

Check tightness of steering axle mounting bolts.

Check condition and operation of the battery retainer.

Check operation of the battery cover locking mechanism. Replace if necessary.

Check operation and condition of the seat belt.

Control system

Calibrate the joysticks (if equipped).

Calibrate the accelerator pedal potentiometer.

Check braking system (pedal, parking brake) is working normally, and adjust if necessary.

Check the control handle or joystick bellows.

Check horn operation at steering wheel and handle.





Scheduled Maintenance

Maintenance every 1000 hours, but at least every 12 months. (Exceptions in brackets)

Check the pedal group for ease of movement, and lubricate.

Electrical system

Check the electrical terminal on the power module is correctly and firmly connected. (once after 1000 hours, again after 3000 hours and then every 3000 hours).

Check that all fans are working normally, check for dirt and clean if necessary.

Check for dirt on the drive unit, power module, hydraulic pump motor and clean if necessary.

Clean electrical components on the current contactor with dry, compressed air.

Check the condition and secure positioning of electric cables, plug connectors and cable connections.

Check the truck battery in accordance with manufacturer guidelines.

Check seat switch operation.

Hydraulic system

Visually inspect the hydraulic system for leaks.

Check the hydraulic oil level.

Check tilt cylinder mounting and tighten if necessary.

Lubricate tilt cylinder pivot bearings.

Mast

Check the mast pivot bearing condition at the drive axle and lubricate.

Check the tightness of the mast pivot bearing cap bolts to the axle and tighten if necessary.

Check the operation and installation of the lift mast, lift chain, lift cylinder and limit block. (once after 1000 hours, again after 3000 hours and then every 3000 hours).

Adjust length of the lift chain, clean and apply chain spray.

Check forks for wear or damage and check latch pin operation.

Check hose guides are firmly installed and that the hoses can be easily moved.

Optional equipment

Clean and lubricate the sideshift and attachments and check functionality and state of wear (in accordance with the procedures stipulated by the manufacturer).

Check the preload of the double hoses for the attachments and adjust if necessary.

Check the condition of the antistatic belt and ground (only when using tires that are not antistatic).

Subsequent tasks

Check and adjust the date and time of the display unit.

Carry out a functional test and test drive.

Attach the maintenance label.

5 Maintenance



Scheduled Maintenance

Additional maintenance every 3000 operating hours, but at least every 3 years. (Exceptions in brackets)

Transmission system

Change the reduction gearbox oil.

Chassis, bodywork and fittings

Check the installation and tightness of the counterweight and overhead guard to the chassis.

Electrical system

Check the electrical terminal on the power module is correctly and firmly connected.

Hydraulic system

Replace the breather filter, pressure filter and the suction filter.

Change the hydraulic oil.

Check the tilt cylinder bearing for wear, and replace as required.

Mast

Check the operation and installation of the lift mast, lift chain, lift cylinder and limit block.

Subsequent tasks

Check and adjust the date and time of the display unit.

Carry out a functional test and test drive.

Attach the maintenance label.



Sideshifter Maintenance (optional equipment)

The following maintenance items apply only to trucks equipped with the optional sideshifter.

Every 200 hours

- Check for loose or missing bolts, worn or damaged fasteners, hydraulic leaks or damaged fork position notches.
- Check the condition of the upper and lower sideshifter bearings.
- Inspect the lower retaining hooks for wear and proper clearance during operation. Tighten the lower hook bolts to 120 ft-lbs (165 Nm).

Every 500 hours

Lubricate the upper and lower sideshifter bearings.

Every 2000 hours

Measure the thickness of the upper and lower sideshifter bearings. Replace all bearings if any one is worn to 3/32 inch (2.5 mm) or less in thickness.

5 Maintenance

Fluids and Lubricants

Fluids and Lubricants

Capacities

| Assembly | Fluid or Lubricant | Capacity |
|-------------------|--------------------|--|
| Hydraulic system | Hydraulic oil | approx. 16.9 qts (16 I) Double masts h3 \leq 3915 mm approx. 20.1 qts (19 I) Triple masts h3 \leq 4690 mm approx. 23.2 qts (22 I) Simple masts h3 \leq 6495 mm, Triple masts h3 \leq 5955 mm, and all quad masts |
| Final drive units | Gear oil | approx. 0.48 qts (0.45 liter) for each unit |
| Drive axle brakes | Brake oil | approx. 0.63 qts (0.6 liter) |



Fluid and Lubricant Specifications

Original equipment specification

The following grades of hydraulic oil are supplied from the factory as original equipment:

ISO-L-HM 46 as per ISO 6743-4 (for standard trucks) ISO-L-HV 32 as per ISO 6743-4 (for cold storage trucks)

Other hydraulic oil grades are acceptable based on operating temperature range as follows:

Standard (mean continuous oil temperature 104°F (40C) to 140°F (60C)) ISO-L-HM 46 as per ISO 6743-4

Heavy duty (mean continuous oil temperature over 140°F (60C)) ISO-L-HM 68 as per ISO 6743-4

For cold storage only:

Light duty (mean continuous oil temperature below 104°F (40C)) ISO-L-HV 32 as per ISO 6743-4

Operation across one or more of the above ranges can be covered by one of the following multi-grade hydraulic oils (ie oils having a high viscosity index). ISO-L-HV 46 as per ISO 6743-4

A CAUTION

If incorrect hydraulic oils are used or mixed, damage to hydraulic components can result. Use only oils meeting the above specifications.

Final Drive Unit Gear Oil

SAE 80W-90 API GL4

Drive Axle Brake Oil

Shell Spirax S4 ATF HDX

Grease

EP (extreme pressure) lithium-based grease with MoS2 rated to 284 °F (140C).



Do not mix non-lithium-based greases with lithium-based greases.

Chain Spray

Use a high-quality commercially available penetrating chain spray specifically intended for forklift mast chains.



5 Maintenance

Troubleshooting

Troubleshooting

Fuses

The truck has main fuses and control fuses contained in separate enclosures. Control fuses are located in a fuse and relay box mounted beneath a cover on top of the counterweight (1). This cover may be removed without tools by lifting straight up on it. The main fuse enclosure is located just behind the right front wheel. It is accessed by removing the four screws and the panel (2).





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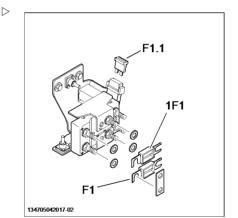
Main Fuses

The truck has the following main fuses:

- F1.1 (30A) protects the key switch circuit, fans and options
- 1F1 (355A) protects the right-hand drive motor and controller
- F1(500A) protects the left-hand drive motor and pump motor and controller

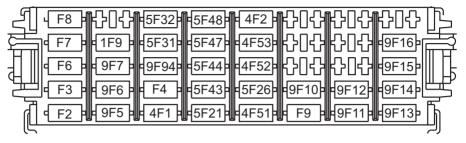
Control Fuses

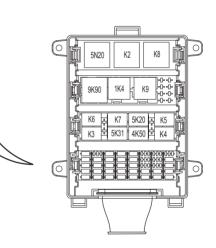
The control fuses are contained in one block in the control fuse box. Fuse identification and amperage is listed in the following illustration and table.





Control Fuse Arrangement





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- F2 15A/58V Key switch circuit
- F3 10A/58V Battery discharge indicator
- F6 5A/58V Condenser voltage (1A1)
- F7 10A/58V Charging circuit (A1)
- F8 5A/58V Condenser voltage (A3)
- 9F5 2A/58V Fan 9M1
- 9F6 2A/58V Fan 9M2
- 9F7 2A/58V Fan 9M3
- 1F9 2A/32V Seat switch 4F1 2A/58V Horn
- F4
- 5A/32V Voltage transformer U1 (secondary) 9F94
- 2A/32V Converter relay 9K90
- 5F31 2A/32V Optical warning spot light (option) 5F32 2A/32V Optical warning spot light (option)
- 5F21 2A/32V Turn signals (option)
- 5F43 5A/32V Left head light/tail light

- 5F44 5A/32V Right head light/tail light 5F47 5A/32V Work light (pos 7) (option)
- 5F48 5A/32V Work light (pos 8) (option)
- 4F51 2A/32V Flashing light (option)
- 5F26 2A/32V Brake lights (option)
- 4F52
- 2A/32V Back-up alarm/lights (option) 4F53
- 2A/32V Parking brake alarm timer (option)
- 4F2 2A/32V Rear horn switch
- F9 2A/58V Fleet management (option)
- 9F10 5A/32V Operator fan (option)
- 9F11 5A max 12V (option)
- 9F12 5A max 12V (option)
- 9F13 5A max 12V-switched (option)
- 9F14 5A max 12V-switched (option)
- 9F15 5A max 12V-switched (option)
- 9F16 5A max 12V-switched (option)

Troubleshooting

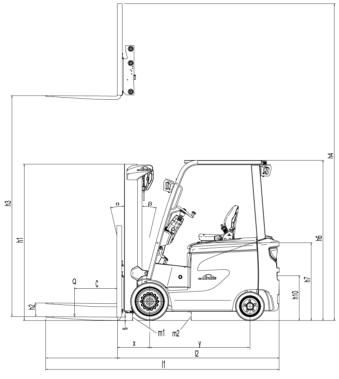


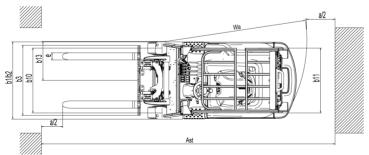
6

Specifications

Dimensions







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Specifications E25C and E25CL

| General | E25C | E25CL |
|--|----------------------|----------------------|
| Manufacturer (code designation) | Linde | Linde |
| Manufacturer's model designation | E25C | E25CL |
| Drive: electric, diesel, gas, LPG | Electric | Electric |
| Operation: manual, accompanied, standing, seated, order picking | Seated | Seated |
| Nominal load capacity (Q) (May be downrated for certain masts or attach- ments. Always refer to vehicle data plate.) | 5000 lbs (2272 kg) | 5000 lbs (2272 kg) |
| Load center of gravity distance (c) | 24 in (nom) (600 mm) | 24 in (nom) (600 mm) |
| Load distance (x) | 17.6 in (447 mm) | 17.6 in (447 mm) |
| Wheelbase (y) | 51.2 in (1300 mm) | 55.1 in (1400 mm) |
| | | |

| Weights | E25C | E25CL |
|-------------------------------------|--------------------------------|--------------------------------|
| Service weight with minimum battery | Refer to vehicle data plate | Refer to vehicle data plate |

| Wheels and tires | E25C | E25CL |
|---|-----------------------------|-----------------------------|
| Tire type, front and rear | Cushion (SE is optional) | Cushion (SE is optional) |
| Tire size, front (cushion) | 21x7x15 | 21x7x15 |
| Tire size, rear (cushion) | 16x6x10-1/2 | 16x6x10-1/2 |
| Number of wheels, front / rear (x = driven) | 2 x / 2 | 2x/2 |
| Track width, front (cushion) (b10) | 35.0 in (890 mm) | 35.0 in (890 mm) |
| Track width, rear (cushion) (b11) | 35.75 in (910 mm) | 35.75 in (910 mm) |

| Dimensions | E25C | E25CL |
|--|-----------------------------|-----------------------------|
| Tilt angle, forward / backward | 6.0/5.0 degrees | 6.0/5.0 degrees |
| Mast height, fully lowered (h1) | See "Mast Heights" table | See "Mast Heights" table |
| Free lift stroke (h2) or FLH for quad | See "Mast Heights" table | See "Mast Heights" table |
| Lift height (MFH) | See "Mast Heights" table | See "Mast Heights" table |
| Extended height (h4) | See "Mast Heights" table | See "Mast Heights" table |
| Height to top of the standard OHG (h6) | 88.0 in (2235 mm) | 88.0 in (2235 mm) |
| Seat height (h7) | 49.4 in (1255 mm) | 49.4 in (1255 mm) |



| Dimensions | E25C | E25CL |
|---|--------------------|--------------------|
| Coupling height (h10) | 23.5 in (597 mm) | 23.5 in (597 mm) |
| Overall length (I1) (42 inch forks) | 127.1 in (3229 mm) | 129.8 in (3296 mm) |
| Length to fork face (I2) | 85.0 in (2159 mm) | 87.6 in (2226 mm) |
| Overall width | 42.5 in (1080 mm) | 42.5 in (1080 mm) |
| Carriage class per ANSI/ITSDF B56 11-4-2005 | IIA | IIA |
| Carriage width (b3) | 38.6 in (980 mm) | 38.6 in (980 mm) |
| Ground clearance beneath mast, with load (m1) | 4.1 in (105 mm) | 4.2 in (106 mm) |
| Ground clearance, center of wheelbase (m2) | 4.4 in (112 mm) | 4.6 in (118 mm) |
| Aisle width (Ast) (Must add load length and desired clearance) | 90.2 in (2291 mm) | 93.0 in (2358 mm) |
| Turning radius (Wa) | 74.0 in (1880 mm) | 76.8 in (1951 mm) |

| Performance data | E25C | E25CL |
|--|--------------------------------------|--------------------------------------|
| | 9.6 mph (15.5 km/h) | 9.6 mph (15.5 km/h) |
| Maximum driving speed (36V) | with load | with load |
| (with/without load) | 9.3 mph (15.0 km/h) | 9.3 mph (15.0 km/h) |
| | without load | without load |
| Maximum driving speed (48V) | 10.9 mph (17.5 km/h) with load | 10.9 mph (17.5 km/h) with load |
| (with/without load) | 10.6 mph (17.0 km/h) without load | 10.6 mph (17.0 km/h) without load |
| | 63 fpm (0.32 m/s) with | 63 fpm (0.32 m/s) with |
| Lifting speed (36V) | load | load |
| Litting speed (30V) | 91 fpm (0.46 m/s) | 91 fpm (0.46 m/s) |
| | without load | without load |
| | 93 fpm (0.47 m/s) with | 93 fpm (0.47 m/s) with |
| Lifting speed (48V) | load | load |
| | 102 fpm (0.52 m/s) | 102 fpm (0.52 m/s) |
| | without load | without load |
| | 114 fpm (0.58 m/s) | 114 fpm (0.58 m/s) |
| Lowering speed | with load | with load |
| (applies to both 36V and 48V models) | 77 fpm (0.39 m/s) | 77 fpm (0.39 m/s) |
| | without load | without load |
| | 2630 lbs (11,700 N) | 2585 lbs (11,500 N) |
| Maximum drawbar pull (36V) | with load | with load |
| ······································ | 2607 lbs (11,600 N) | 2607 lbs (11,600 N) |
| | without load | without load |
| Maximum drawbar pull (48V) | 3147 lbs (14,000 N) | 3350 lbs (14,900 N) |
| | with load | with load |
| | 2473 lbs (11,000 N) | 3125 lbs (13,900 N) |
| | without load | without load |
| Maximum gradeability (36V) | 16% with load | 15% with load |
| · · · · · · · · · · · · · · · · · · · | 23% without load | 23% without load |



| Performance data | E25C | E25CL |
|----------------------------|------------|---------------------------------------|
| Maximum gradeability (48V) | | 20% with load 27% without load |
| Acceleration time (36V) | | 7.5 s with load 6.9 s without load |
| Acceleration time (48V) | | 7.0 s with load 6.8 s without load |
| Service brake type | Mechanical | Mechanical |

| Drive Motors and Battery | E25C | E25CL |
|--|--|--|
| Drive motor power rating (60 min) (36V) | 7.8 hp x 2 (6.9 kW x 2) | 7.8 hp x 2 (6.9 kW x 2) |
| Drive motor power rating (60 min) (48V) | 7.8 hp x 2 (6.9 kW x 2) | 7.8 hp x 2 (6.9 kW x 2) |
| Pump motor power rating (15%) (36V) | 22.8 hp (17.0 kW) | 22.8 hp (17.0 kW) |
| Pump motor power rating (15%) (48V) | 22.8 hp (17.0 kW) | 22.8 hp (17.0 kW) |
| Nominal battery voltage | 36 V / 48 V | 36 V / 48 V |
| Maximum battery capacity (6-hour rating) (36V) | | 1020 A-hrs for 25 plate 1190 A-hrs for 29 plate |
| Maximum battery capacity (6-hour rating) (48V) | 765 A-hrs for 19 plate 850 A-hrs for 21 plate | 765 A-hrs for 19 plate 850 A-hrs for 21 plate |

| Miscellaneous | E25C | E25CL |
|---|--------------------|--------------------|
| Drive type | AC | AC |
| Working pressure for attachments | 2600 psi (180 bar) | 2600 psi (180 bar) |
| Flow rate for attachments | 18.5 gpm (70 lpm) | 18.5 gpm (70 lpm) |
| Maximum noise level (average at driver's ear) | 68 dB (A) | 68 dB (A) |





Specifications E27C and E27CL

| General | E27C | E27CL |
|--|-----------------------------|--------------------------------|
| Manufacturer (code designation) | Linde | Linde |
| Manufacturer's model designation | E27C | E27CL |
| Drive: electric, diesel, gas, LPG | Electric | Electric |
| Operation: manual, accompanied, standing, seated, order picking | Seated | Seated |
| Nominal load capacity (Q) (May be downrated for certain masts or attach- ments. Always refer to vehicle data plate.) | 5500 lbs (2500 kg) | 5500 lbs (2500 kg) |
| Load center of gravity distance (c) | 24 in (nom) (600 mm) | 24 in (nom) (600 mm) |
| Load distance (x) | 17.6 in (447 mm) | 17.6 in (447 mm) |
| Wheelbase (y) | 51.2 in (1300 mm) | 55.1 in (1400 mm) |
| Weights | E27C | E27CL |
| Service weight with minimum battery | Refer to vehicle data plate | Refer to vehicle data plate |
| Wheels and tires | E27C | E27CL |
| Tire type, front and rear | Cushion (SE is optional) | Cushion (SE is optional) |
| Tire size, front (cushion) | 21x8x15 | 21x8x15 |
| Tire size, rear (cushion) | 16x6x10-1/2 | 16x6x10-1/2 |
| Number of wheels front (rear ($x = driven$) | 2 x 12 | 2 × 12 |

| Tire size, rear (cushion) | 16x6x10-1/2 | 16x6x10-1/2 |
|---|-------------------|-------------------|
| Number of wheels, front / rear (x = driven) | 2 x / 2 | 2 x / 2 |
| Track width, front (cushion) (b10) | 36.15 in (918 mm) | 36.15 in (918 mm) |
| Track width, rear (cushion) (b11) | 35.75 in (910 mm) | 35.75 in (910 mm) |

| Dimensions | E27C | E27CL |
|--|-----------------------------|-----------------------------|
| Tilt angle, forward / backward | 6.0/5.0 degrees | 6.0 / 5.0 degrees |
| Mast height, fully lowered (h1) | See "Mast Heights" table | See "Mast Heights" table |
| Free lift stroke (h2) or FLH for quad | See "Mast Heights" table | See "Mast Heights" table |
| Lift height (MFH) | See "Mast Heights" table | See "Mast Heights" table |
| Extended height (h4) | See "Mast Heights" table | See "Mast Heights" table |
| Height to top of the standard OHG (h6) | 88.0 in (2235 mm) | 88.0 in (2235 mm) |
| Seat height (h7) | 49.4 in (1255 mm) | 49.4 in (1255 mm) |



| Dimensions | E27C | E27CL |
|---|--------------------|--------------------|
| Coupling height (h10) | 23.5 in (597 mm) | 23.5 in (597 mm) |
| Overall length (I1) (42 inch forks) | 129.1 in (3280 mm) | 131.1 in (3329 mm) |
| Length to fork face (I2) | 87.0 in (2210 mm) | 88.9 in (2259 mm) |
| Overall width | 44.2 in (1123 mm) | 44.2 in (1123 mm) |
| Carriage class per ANSI/ITSDF B56 11-4-2005 | IIA | IIA |
| Carriage width (b3) | 38.6 in (980 mm) | 38.6 in (980 mm) |
| Ground clearance beneath mast, with load (m1) | 4.1 in (105 mm) | 4.2 in (106 mm) |
| Ground clearance, center of wheelbase (m2) | 4.4 in (112 mm) | 4.6 in (118 mm) |
| Aisle width (Ast) (Must add load length and desired clearance) | 90.2 in (2291 mm) | 93.0 in (2358 mm) |
| Turning radius (Wa) | 75.2 in (1910 mm) | 78.0 in (1980 mm) |

| Performance data | E27C | E27CL |
|--------------------------------------|--------------------------------------|--------------------------------------|
| | 9.6 mph (15.5 km/h) | 9.6 mph (15.5 km/h) |
| Maximum driving speed (36V) | with load | with load |
| (with/without load) | 9.3 mph (15.0 km/h) | 9.3 mph (15.0 km/h) |
| | without load | without load |
| Maximum driving speed (48V) | 10.9 mph (17.5 km/h) with load | 10.9 mph (17.5 km/h) with load |
| (with/without load) | 10.6 mph (17.0 km/h) without load | 10.6 mph (17.0 km/h) without load |
| | 61 fpm (0.31 m/s) with | 61 fpm (0.31 m/s) with |
| Lifting speed (36V) | load | load |
| Litting speed (30V) | 91 fpm (0.46 m/s) | 91 fpm (0.46 m/s) |
| | without load | without load |
| | 87 fpm (0.44 m/s) with | 87 fpm (0.44 m/s) with |
| Lifting speed (48V) | load | load |
| | 102 fpm (0.52 m/s) | 102 fpm (0.52 m/s) |
| | without load | without load |
| | 114 fpm (0.58 m/s) | 114 fpm (0.58 m/s) |
| Lowering speed | with load | with load |
| (applies to both 36V and 48V models) | 77 fpm (0.39 m/s) | 77 fpm (0.39 m/s) |
| | without load | without load |
| | 2675 lbs (11,900 N) | 2473 lbs (11,000 N) |
| Maximum drawbar pull (36V) | with load | with load |
| | 2653 lbs (11,800 N) | 2698 lbs (12,000 N) |
| | without load | without load |
| | 3035 lbs (13,500 N) | 3147 lbs (14,000 N) |
| Maximum drawbar pull (48V) | with load | with load |
| | 2698 lbs (12,000 N) | 3035 lbs (13,500 N) |
| | without load | without load |
| Maximum gradeability (36V) | 15% with load | 14% with load |
| | 23% without load | 22% without load |



| Performance data | E27C | E27CL |
|----------------------------|-----------------------------------|---------------------------------------|
| Maximum gradeability (48V) | 18% with load 23% without load | 18% with load 26% without load |
| Acceleration time (36V) | | 7.5 s with load 6.9 s without load |
| Acceleration time (48V) | | 6.9 s with load 6.6 s without load |
| Service brake type | Mechanical | Mechanical |

| Drive Motors and Battery | E27C | E27CL |
|--|--|--|
| Drive motor power rating (60 min) (36V) | 7.8 hp x 2 (6.9 kW x 2) | 7.8 hp x 2 (6.9 kW x 2) |
| Drive motor power rating (60 min) (48V) | 7.8 hp x 2 (6.9 kW x 2) | 7.8 hp x 2 (6.9 kW x 2) |
| Pump motor power rating (15%) (36V) | 22.8 hp (17.0 kW) | 22.8 hp (17.0 kW) |
| Pump motor power rating (15%) (48V) | 22.8 hp (17.0 kW) | 22.8 hp (17.0 kW) |
| Nominal battery voltage | 36 V / 48 V | 36 V / 48 V |
| Maximum battery capacity (6-hour rating) (36V) | | 1020 A-hrs for 25 plate 1190 A-hrs for 29 plate |
| Maximum battery capacity (6-hour rating) (48V) | 765 A-hrs for 19 plate 850 A-hrs for 21 plate | 765 A-hrs for 19 plate 850 A-hrs for 21 plate |

| Miscellaneous | E27C | E27CL |
|---|--------------------|--------------------|
| Drive type | AC | AC |
| Working pressure for attachments | 2600 psi (180 bar) | 2600 psi (180 bar) |
| Flow rate for attachments | 18.5 gpm (70 lpm) | 18.5 gpm (70 lpm) |
| Maximum noise level (average at driver's ear) | 68 dB (A) | 68 dB (A) |





Specifications E30C and E30CL

| General | E30C | E30CL |
|--|----------------------|----------------------|
| Manufacturer (code designation) | Linde | Linde |
| Manufacturer's model designation | E30C | E30CL |
| Drive: electric, diesel, gas, LPG | Electric | Electric |
| Operation: manual, accompanied, standing, seated, order picking | Seated | Seated |
| Nominal load capacity (Q) (May be downrated for certain masts or attach- ments. Always refer to vehicle data plate.) | 6000 lbs (2727 kg) | 6000 lbs (2727 kg) |
| Load center of gravity distance (c) | 24 in (nom) (600 mm) | 24 in (nom) (600 mm) |
| Load distance (x) | 17.7 in (450 mm) | 17.7 in (450 mm) |
| Wheelbase (y) | 51.2 in (1300 mm) | 55.1 in (1400 mm) |
| Weights | E30C | E30CL |

| Weights | E30C | E30CL |
|-------------------------------------|-----------------------|-----------------------|
| Service weight with minimum battery | Refer to vehicle data | Refer to vehicle data |
| Service weight with minimum battery | plate | plate |

| Wheels and tires | E30C | E30CL |
|---|-----------------------------|-----------------------------|
| Tire type, front and rear | Cushion (SE is optional) | Cushion (SE is optional) |
| Tire size, front (cushion) | 21x8x15 | 21x8x15 |
| Tire size, rear (cushion) | 16x6x10-1/2 | 16x6x10-1/2 |
| Number of wheels, front / rear (x = driven) | 2 x / 2 | 2x/2 |
| Track width, front (cushion) (b10) | 36.15 in (918 mm) | 36.15 in (918 mm) |
| Track width, rear (cushion) (b11) | 35.75 in (910 mm) | 35.75 in (910 mm) |

| Dimensions | E30C | E30CL |
|--|-----------------------------|-----------------------------|
| Tilt angle, forward / backward | 6.0/5.0 degrees | 6.0/5.0 degrees |
| Mast height, fully lowered (h1) | See "Mast Heights" table | See "Mast Heights" table |
| Free lift stroke (h2) or FLH for quad | See "Mast Heights" table | See "Mast Heights" table |
| Lift height (MFH) | See "Mast Heights" table | See "Mast Heights" table |
| Extended height (h4) | See "Mast Heights" table | See "Mast Heights" table |
| Height to top of the standard OHG (h6) | 88.0 in (2235 mm) | 88.0 in (2235 mm) |
| Seat height (h7) | 49.4 in (1255 mm) | 49.4 in (1255 mm) |



| Dimensions | E30C | E30CL |
|---|--------------------|--------------------|
| Coupling height (h10) | 23.5 in (597 mm) | 23.5 in (597 mm) |
| Overall length (I1) (42 inch forks) | 129.4 in (3286 mm) | 133.1 in (3380 mm) |
| Length to fork face (I2) | 87.5 in (2216 mm) | 90.9 in (2310 mm) |
| Overall width | 44.2 in (1123 mm) | 44.2 in (1123 mm) |
| Carriage class per ANSI/ITSDF B56 11-4-2005 | IIA | IIA |
| Carriage width (b3) | 38.6 in (980 mm) | 38.6 in (980 mm) |
| Ground clearance beneath mast, with load (m1) | 4.1 in (105 mm) | 4.2 in (106 mm) |
| Ground clearance, center of wheelbase (m2) | 4.4 in (112 mm) | 4.6 in (118 mm) |
| Aisle width (Ast) (Must add load length and desired clearance) | 90.2 in (2291 mm) | 93.0 in (2358 mm) |
| Turning radius (Wa) | 76.3 in (1938 mm) | 79.1 in (2009 mm) |

| Performance data | E30C | E30CL |
|--------------------------------------|-----------------------------------|--------------------------------------|
| | 9.6 mph (15.5 km/h) | 9.6 mph (15.5 km/h) |
| Maximum driving speed (36V) | with load | with load |
| (with/without load) | 9.3 mph (15.0 km/h) | 9.3 mph (15.0 km/h) |
| | without load | without load |
| Maximum driving speed (48V) | 10.9 mph (17.5 km/h) with load | 10.9 mph (17.5 km/h) with load |
| (with/without load) | 10.6 mph (17.0 km/h) without load | 10.6 mph (17.0 km/h) without load |
| | 59 fpm (0.30 m/s) with | 59 fpm (0.30 m/s) with |
| Lifting speed (36V) | load | load |
| | 91 fpm (0.46 m/s) | 91 fpm (0.46 m/s) |
| | without load | without load |
| | 87 fpm (0.44 m/s) with | 83 fpm (0.42 m/s) with |
| Lifting speed (48V) | load | load |
| Litting speed (40V) | 102 fpm (0.52 m/s) | 102 fpm (0.52 m/s) |
| | without load | without load |
| | 114 fpm (0.58 m/s) | 114 fpm (0.58 m/s) |
| Lowering speed | with load | with load |
| (applies to both 36V and 48V models) | 83 fpm (0.42 m/s) | 83 fpm (0.42 m/s) |
| | without load | without load |
| | 2585 lbs (11,500 N) | 2607 lbs (11,600 N) |
| Maximum drawbar pull (36V) | with load | with load |
| | 2473 lbs (11,000 N) | 2630 lbs (11,700 N) |
| | without load | without load |
| Maximum drawbar pull (48V) | 3260 lbs (14,500 N) | 3012 lbs (13,400 N) |
| | with load | with load |
| | 2698 lbs (12,000 N) | 2923 lbs (13,000 N) |
| | without load | without load |
| Maximum gradeability (36V) | 14% with load | 13% with load |
| | 21% without load | 22% without load |



| Performance data | E30C | E30CL |
|----------------------------|-----------------------------------|---------------------------------------|
| Maximum gradeability (48V) | 18% with load 23% without load | 16% with load 24% without load |
| Acceleration time (36V) | | 7.7 s with load 7.1 s without load |
| Acceleration time (48V) | | 6.9 s with load 6.7 s without load |
| Service brake type | Mechanical | Mechanical |

| Drive Motors and Battery | E30C | E30CL |
|--|--|--|
| Drive motor power rating (60 min) (36V) | 7.8 hp x 2 (6.9 kW x 2) | 7.8 hp x 2 (6.9 kW x 2) |
| Drive motor power rating (60 min) (48V) | 7.8 hp x 2 (6.9 kW x 2) | 7.8 hp x 2 (6.9 kW x 2) |
| Pump motor power rating (15%) (36V) | 22.8 hp (17.0 kW) | 22.8 hp (17.0 kW) |
| Pump motor power rating (15%) (48V) | 22.8 hp (17.0 kW) | 22.8 hp (17.0 kW) |
| Nominal battery voltage | 36 V / 48 V | 36 V / 48 V |
| Maximum battery capacity (6-hour rating) (36V) | | 1020 A-hrs for 25 plate 1190 A-hrs for 29 plate |
| Maximum battery capacity (6-hour rating) (48V) | 765 A-hrs for 19 plate 850 A-hrs for 21 plate | 765 A-hrs for 19 plate 850 A-hrs for 21 plate |

| Miscellaneous | E30C | E30CL |
|---|--------------------|--------------------|
| Drive type | AC | AC |
| Working pressure for attachments | 2600 psi (180 bar) | 2600 psi (180 bar) |
| Flow rate for attachments | 18.5 gpm (70 lpm) | 18.5 gpm (70 lpm) |
| Maximum noise level (average at driver's ear) | 68 dB (A) | 68 dB (A) |





Specifications E32CL

Specifications E32CL

| General | E32CL |
|--|--------------------------------|
| Manufacturer (code designation) | Linde |
| Manufacturer's model designation | E32CL |
| Drive: electric, diesel, gas, LPG | Electric |
| Operation: manual, accompanied, standing, seated, order picking | Seated |
| Nominal load capacity (Q) (May be downrated for certain masts or attach- ments. Always refer to vehicle data plate.) | 6500 lbs (2955 kg) |
| Load center of gravity distance (c) | 24 in (nom) (600 mm) |
| Load distance (x) | 17.7 in (450 mm) |
| Wheelbase (y) | 55.1 in (1400 mm) |
| Weights | E32CL |
| Service weight with minimum battery | Refer to vehicle data plate |
| Wheels and tires | E32CL |
| Tire type, front and rear | Cushion (SE is optional) |
| Tire size, front (cushion) | 21x8x15 |
| Tire size, rear (cushion) | 16x6x10-1/2 |
| Number of wheels, front / rear (x = driven) | 2 x / 2 |
| Track width, front (cushion) (b10) | 36.15 in (918 mm) |
| Track width, rear (cushion) (b11) | 35.75 in (910 mm) |
| Dimensions | E32CL |
| Tilt angle, forward / backward | 6.0 / 5.0 degrees |
| Mast height, fully lowered (h1) | See "Mast Heights" table |
| Free lift stroke (h2) or FLH for quad | See "Mast Heights" table |
| Lift height (MFH) | See "Mast Heights" table |
| Extended height (h4) | See "Mast Heights" |

Extended height (h4)

Seat height (h7)

Height to top of the standard OHG (h6)

table

88.0 in (2235 mm)

49.4 in (1255 mm)



Specifications E32CL

| Dimensions | E32CL |
|---|---|
| Coupling height (h10) | 23.5 in (597 mm) |
| Overall length (I1) (42 inch forks) | 133.3 in (3386 mm) |
| Length to fork face (I2) | 91.2 in (2316 mm) |
| Overall width | 44.2 in (1123 mm) |
| Carriage class per ANSI/ITSDF B56 11-4-2005 | II A |
| Carriage width (b3) | 38.6 in (980 mm) |
| Ground clearance beneath mast, with load (m1) | 4.2 in (106 mm) |
| Ground clearance, center of wheelbase (m2) | 4.6 in (118 mm) |
| Aisle width (Ast) (Must add load length and desired clearance) | 93.0 in (2358 mm) |
| Turning radius (Wa) | 79.1 in (2009 mm) |
| Performance data | E32CL |
| | |
| Maximum driving speed (36V) (with/without load) | 9.6 mph (15.5 km/h) with load 9.3 mph (15.0 km/h) without load |
| Maximum driving speed (48V) (with/without load) | 10.9 mph (17.5 km/h) with load 10.6 mph (17.0 km/h) without load |
| Lifting speed (36V) | 57 fpm (0.29 m/s) with load 91 fpm (0.46 m/s) without load |
| Lifting speed (48V) | 79 fpm (0.40 m/s) with load 102 fpm (0.52 m/s) without load |
| Lowering speed (applies to both 36V and 48V models) | 114 fpm (0.58 m/s) with load 83 fpm (0.42 m/s) without load |
| Maximum drawbar pull (36V) | 2563 lbs (11,400 N) with load 2540 lbs (11,300 N) without load |
| Maximum drawbar pull (48V) | 2923 lbs (13,000 N) with load 2473 lbs (11,000 N) without load |
| Maximum gradeability (36V) | 12% with load 19% without load |



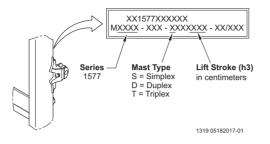
Specifications E32CL

| Performance data | E32CL |
|--|--|
| Maximum gradeability (48V) | 15% with load 19% without load |
| Acceleration time (36V) | 8.0 s with load 7.1 s without load |
| Acceleration time (48V) | 6.7 s with load 6.3 s without load |
| Service brake type | Mechanical |
| Drive Motors and Battery | E32CL |
| Drive motor power rating (60 min) (36V) | 7.8 hp x 2 (6.9 kW x 2) |
| Drive motor power rating (60 min) (48V) | 7.8 hp x 2 (6.9 kW x 2) |
| Pump motor power rating (15%) (36V) | 22.8 hp (17.0 kW) |
| Pump motor power rating (15%) (48V) | 22.8 hp (17.0 kW) |
| Nominal battery voltage | 36 V / 48 V |
| Maximum battery capacity (6-hour rating) (36V) | 1020 A-hrs for 25 plate 1190 A-hrs for 29 plate |
| Maximum battery capacity (6-hour rating) (48V) | 765 A-hrs for 19 plate 850 A-hrs for 21 plate |
| Miscellaneous | E32CL |

| Miscellaneous | E32CL |
|---|--------------------|
| Drive type | AC |
| Working pressure for attachments | 2600 psi (180 bar) |
| Flow rate for attachments | 18.5 gpm (70 lpm) |
| Maximum noise level (average at driver's ear) | 68 dB (A) |



Mast Heights **Mast Heights**



Single, Double, Triple Masts

Mast heights are listed by lift stroke h3. This number is found in the mast identification code as shown above. Note that it is given in centimeters in the code, so a zero must be added to match the table below. 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.

Single and double masts are not available at the time of this printing.

| Mast heights - Triple - 1577 Series | | | | |
|-------------------------------------|--------------------------|---------------------------------------|--|--|
| Lift stroke (h3) | Free lift stroke (h2) | Mast height, fully lowered (h1) | Extended height (h4) (with 48 inch LBR) | Tilt angle forward / back See Note 1. |
| 184.0 in (4680 mm) | 54.9 in | 86.0 in | 234.3 in | 6 deg / |
| | (1394 mm) | (2179 mm) | (5950 mm) | 8 deg |
| 190.0 in (4830 mm) | 56.8 in | 88.0 in | 240.2 in | 6 deg / |
| | (1444 mm) | (2229 mm) | (6100 mm) | 8 deg |
| 233.0 in (5930 mm) | 72.6 in(1844 | 104.0 in | 283.5 in | 6 deg / |
| | mm) | (2629 mm) | (7200 mm) | 8 deg |

Note 1. If equipped with optional bottler's tilt, then angle is 10 degrees forward and 5 degrees back. Bottler's tilt is available on all masts except quad. Other tilt angles are available as options.



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|---------------------------------------|------------|-------------------------|--|----|

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