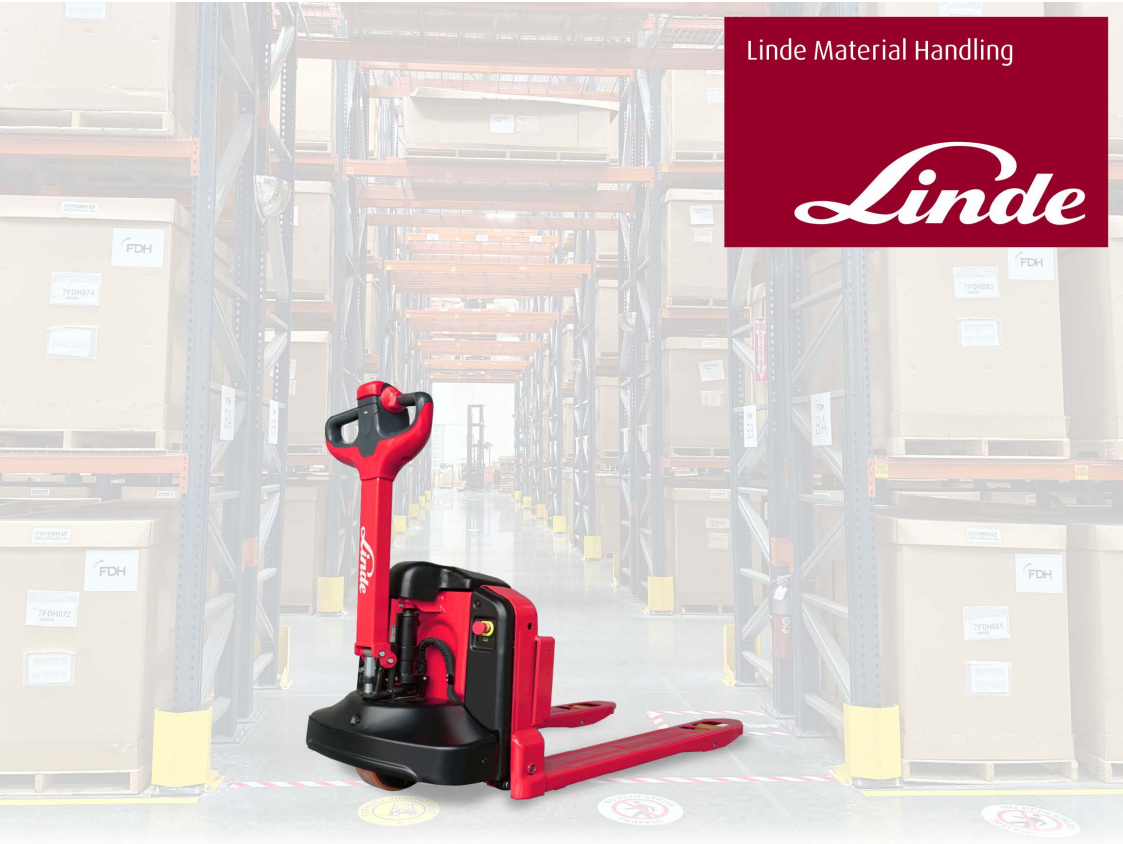
Linde Material Handling



1133-03 series Electric Pallet Truck

Operating Instructions

Model MT18

1133-03 series 11338011640 US -

04/2021 - 01

Linde – Your Partner

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.

The high quality of Linde products is also matched by the quality of our service. With ten production plants worldwide and an extensive network of sales partners, we are at your service around the clock and around the world.

Your local Linde partner can offer you a complete package from a single source; ranging from expert advice on all aspects of sales and service through appropriate finance options.

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.

Copyright and proprietary rights

1 Introduction

2 Safety

3 Overview

4 Operation

5 Maintenance

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1

Introduction

Scope

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

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

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

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

Obligations of the Equipment Owner

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

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

Many of the rules set forth in 29 CFR 1910.178 are based on the American National Standards Institute's (ANSI/ITSDF) B56 standards. The owner should be familiar with 29 CFR 1910.178 as well as the ANSI/ITSDF B56 standards. Other federal standards may apply depending on specific industry. Owners should also be aware of any state OSHA rules that may differ from the federal rule. This equipment meets all applicable requirements of the ANSI/ITSDF B56 standards at time of manufacture. 29 CFR 1910.178 prohibits any modifications and/or additions which affect capacity or safe operation of industrial trucks without prior written approval of the

manufacturer. An owner should consult the authorized dealer if the owner's intended application for a truck is inconsistent with the designated performance characteristics of that truck. KION North America Corporation will not assume, and expressly disclaims, any liability for injuries or damages arising from or caused by unauthorized modification, removal, disconnection or disengagement of any part from any of its trucks. It is recommended that all replacement parts be of OEM (Original Equipment Manufacturer) origin.

Operator Responsibilities

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

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

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

Proper use

The truck is designed for lifting, transporting, and, if equipped with a mast, stacking of 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 or transport personnel.

The truck may be operated outdoors or in buildings only on surfaces that are flat and stable. Transporting of loads on inclines and ramps is permitted if the incline surface is flat and stable. If the truck is equipped with a mast, the carriage must always remain in the fully lowered position during transport on such inclines and ramps. 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 if the instructions conveyed by these symbols and messages are not followed.

⚠ CAUTION

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

⚠ WARNING

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

⚠ DANGER

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

NOTE

Indicates further information presented to ensure clarification of a particular item

ENVIRONMENT NOTE

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

2

Safety

Before Operation

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

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

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

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

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

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

⚠ WARNING

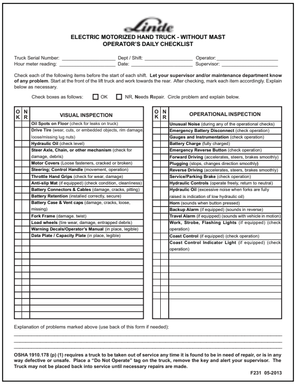
Unauthorized modifications to the truck can result in injury or death.

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

Operator daily checklist

▷

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



ELECTRIC MOTORIZED HAND TRUCK - WITHOUT MAST
OPERATOR’S DAILY CHECKLIST

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

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

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

OK	NR	VISUAL INSPECTION
		Oil Spots on Floor (check for leaks on truck)
		Drive Tire (wear, cuts, or embedded objects, rim damage, loose/missing lug nuts)
		Hydraulic Oil (check level)
		Steer Axle, Chain, or other mechanism (check for damage, debris)
		Motor Covers (Loose fasteners, cracked or broken)
		Steering; Control Handle (movement, operation)
		Throttle Hand Grips (check for wear, damage)
		Anti-slip Mat (if equipped) (check condition, cleanliness)
		Battery Connectors & Cables (damage, cracks, pitting)
		Battery Retention (installed correctly, secure)
		Battery Case & Vent caps (damage, cracks, loose, missing)
		Fork Frame (damage. twist)
		Load wheels (tire wear, damage, entrapped debris)
		Warning Decals/Operator's Manual (in place, legible)
		Data Plate / Capacity Plate (in place, legible)

OK	NR	OPERATIONAL INSPECTION
		Unusual Noise (during any of the operational checks)
		Emergency Battery Disconnect (check operation)
		Gauges and Instrumentation (check operation)
		Battery Charge (fully charged)
		Emergency Reverse Button (check operation)
		Forward Driving (accelerates, steers, brakes smoothly)
		Plugging (stops, changes direction smoothly)
		Reverse Driving (accelerates, steers, brakes smoothly)
		Service/Parking Brake (check operation)
		Hydraulic Controls (operate freely, return to neutral)
		Hydraulic Oil (excessive noise when forks are fully raised is indication of low hydraulic oil)
		Horn (sounds when button pressed)
		Backup Alarm (if equipped) (sounds in reverse)
		Travel Alarm (if equipped) (sounds with vehicle in motion)
		Work, Strobe, Flashing Lights (if equipped) (check operation)
		Coast Control (if equipped) (check operation)
		Coast Control Indicator Light (if equipped) (check operation)

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

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

F231 05-2013

NOTE

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

Operating Position

The truck may be operated in either direction while walking. When operating in reverse (forks leading), always keep both hands on the control handle. When operating forwards (forks trailing) keep one hand on the controls and, if possible, walk ahead and to the side of the truck.

During operation, always grasp the handle at the travel control. Keep fingers within the protected area of the handle at all times.

⚠ WARNING

Injury to hands can occur if the handle is grasped incorrectly.

Keep hands and fingers within the protected area of the handle.

When walking with the truck, remain at arm's length from the control handle. Keep feet clear of the truck at all times.

⚠ WARNING

Injury can occur if the truck contacts any part of the body.

Remain clear of the truck frame at all times.

Operators must not ride the truck unless it is designed for riding. Trucks designed for riding have a dedicated riding platform as well as a dedicated grab bar, seat, or body support. Always sit in the seat or brace against the body support before riding. If the truck has a grab bar, always grasp it before riding. Maintain contact with the seat, body support, or grab bar throughout riding operation.

Passengers are not permitted.

Travel

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

⚠ WARNING

Loss of control!

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

Always watch for pedestrians. When travelling in reverse (load end leading) be careful of drive end swing. The drive end of the truck will swing out if a turn is made while travelling in reverse. Always use caution when turning into an aisle. The load wheels can cut the corner sooner than expected.

Unstable loads are hazardous. Ensure all loads are secure and evenly positioned across both forks. Never lift a load with only one fork. Never carry anything on any part of the truck except the forks unless a specific area has been provided by the manufacturer.

During travel, always watch for overhead obstructions such as lights, wiring, pipes, sprinkler systems, doorways, etc. Never overtake another truck at an intersection, blind spot or other dangerous location. Use the horn at intersections and any location where visibility is limited.

Inclines, Ramps, Docks, Elevators

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

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

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

⚠ DANGER

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

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

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

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

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

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

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.

Hazardous Substances

Oils

⚠ WARNING

Oils are flammable!

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

⚠ WARNING

Oils are toxic!

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

⚠ WARNING

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

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

⚠ WARNING

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

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

ENVIRONMENT NOTE

All oils are potent contaminants of water.

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

Pressurized Hydraulic Oil

⚠ WARNING

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

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

⚠ WARNING

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

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

ENVIRONMENT NOTE

Hydraulic oil is a potent contaminant of water.

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

Battery Acid

⚠ WARNING

Battery acid contains dissolved sulfuric acid. This is toxic.

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

⚠ WARNING

Battery acid contains dissolved sulfuric acid. This is corrosive.

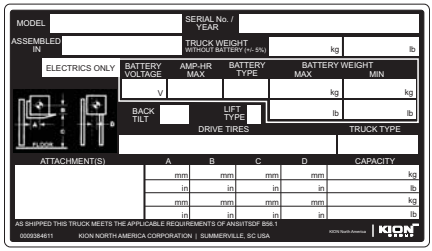
- When working with battery acid, always wear protective clothing and eye protection.
- Do not allow any acid to get onto clothing or skin or into the eyes; if this does happen, rinse immediately with plenty of clean water.
- In case of injury, seek medical advice immediately.
- Immediately rinse away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

ENVIRONMENT NOTE

- Dispose of used battery acid according to local regulations.

Operator Warning Decals

Data plate



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

⚠ DANGER

Risk of tip-over.

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

No riding decal

This decal warns personnel that riding is not permitted anywhere on the truck. This applies to operators as well as all others.

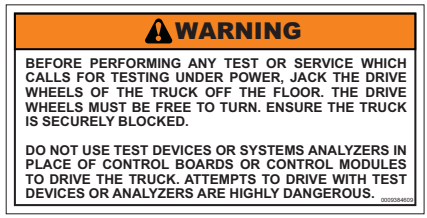
Some pallet trucks are designed for riding. If so, this decal will not be present.

Trained operator warning decal

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

Test or service warning decal

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



Operator Warning Decals

3

Overview

Technical Description

General

The 1133-03 series pallet truck is a pedestrian type electric pallet truck (ITA class 3). It is designed for handling loads up to 4000 pounds (1800 kg). This capacity may be downrated above certain fork lengths. Exact capacity limits for individual vehicles are found on the data plate.

Drive unit

The drive unit is comprised of a permanent-magnet drive motor mounted transversely to a reduction gear unit. The drive unit pivots in the chassis via the control handle to determine drive wheel direction. An electromagnetic brake is installed at the end of the drive motor for use as a parking brake.

Travel control

Travel speed and direction is controlled through a butterfly type travel control at the top of the control handle. When the control is released, the truck will decelerate via regenerative braking. More aggressive slowing is available by rotating the travel control in the opposing direction.

Hydraulic system

The hydraulic system utilizes fluid pressurized by a hydraulic pump driven by a permanent-magnet motor. The pump motor is integrated into a hydraulic pump unit which also contains the pump, a lift and lower solenoid valve, and a hydraulic oil reservoir. During lifting, pressurized hydraulic fluid from the pump is routed by the solenoid valve to a lift cylinder. The lift cylinder operates the tie bar linkage to elevate the forks. Lowering occurs by gravity, with the weight of the forks (and any load) acting through the linkage to force hydraulic fluid out of the cylinder and back to the reservoir.

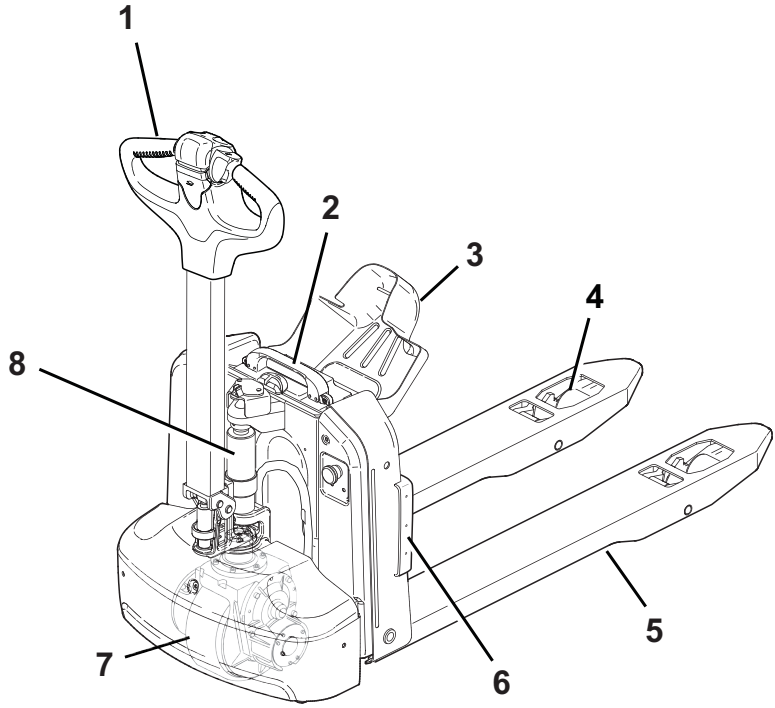
Load lifting system

Load on the forks is elevated through a hydraulically activated linkage. The linkage consists of a lift shaft at the base of the battery compartment connected through tie bars to toggles at each load wheel. The lift shaft is rotated by the hydraulic lift cylinder described previously. The linkage geometry keeps the forks level throughout the lift range.

Electrical system

The truck is equipped with a 48-volt electrical system. A line contactor controls power to the system once the key switch is on. All travel and lift function is controlled by a transistorized main controller. The main controller contains both control logic and an array of power transistors for the motors. The control logic processes signals from sensors, interlocks, and operator controls and generates the appropriate release and speed signals to the power transistors to operate the motors. A connection port is provided at the controller to connect a laptop computer or programming handset to set vehicle parameters or perform diagnostic operations. Power is supplied by a removable lithium-ion battery. The battery may be recharged in an external charger included with the truck.

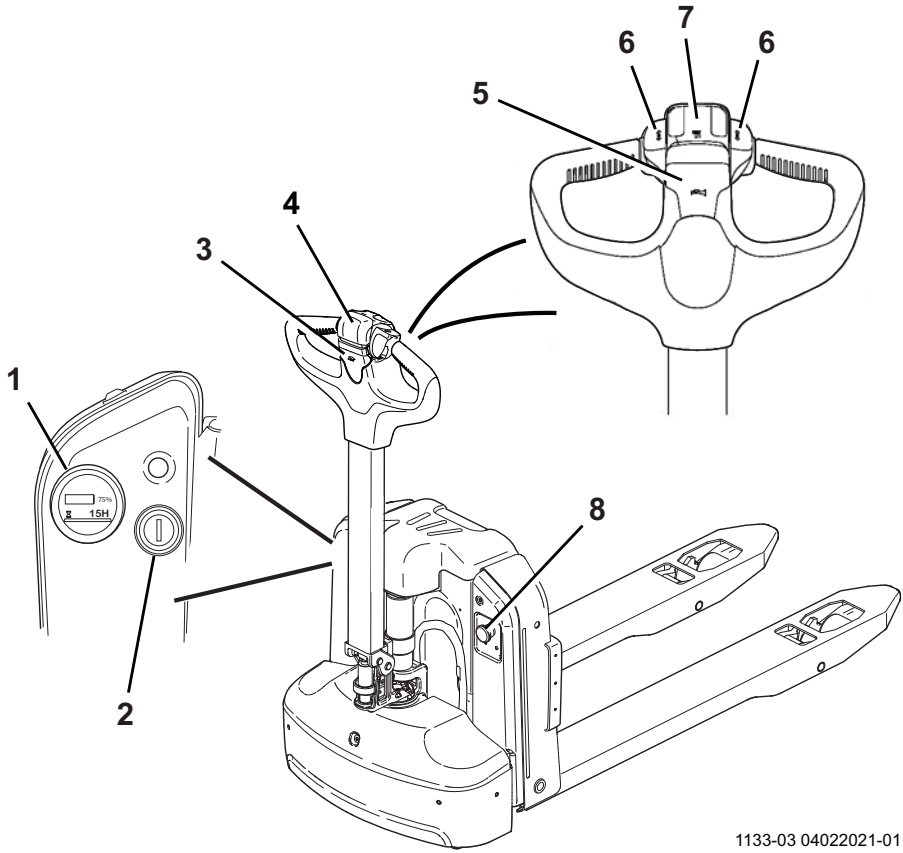
Truck Components



1133-03 04052021-02

1	Control handle	5	Forks
2	Battery	6	Mount for optional load backrest
3	Battery cover	7	Drive wheel
4	Load wheel	8	Lift cylinder

Controls



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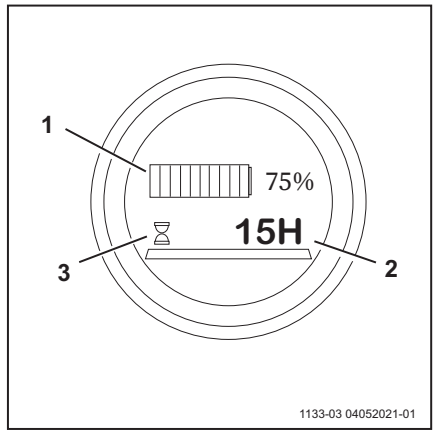
1	Display unit	5	Horn button
2	Key switch	6	Travel control
3	Creep-speed button	7	Lift and lower toggle button
4	Emergency reverse button	8	Emergency stop button

Display Unit



The display unit is located at the key switch. It displays battery charge, accumulated hours, and fault codes.

Battery Charge

The state of the battery charge is given by the segments (1). When the battery is fully charged, all ten segments will be illuminated in white. As the battery discharges, the segments will extinguish toward the left. Battery state of charge is also shown as a numerical value beside the segments.

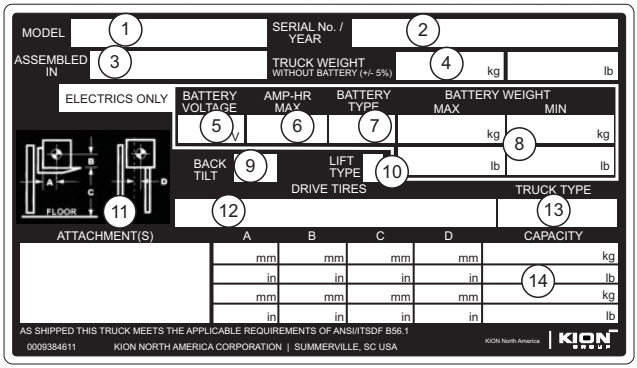
Accumulated Hours

Total hours accumulated on the truck are shown in the lower portion of the display unit (2). The hour meter accumulates time only when the truck is switched on and the control handle is moved into the operating range. The hourglass symbol (3) will illuminate continuously whenever the truck is switched on. It will flash whenever the truck is accumulating hours.

Fault Codes

If a fault occurs, the hour reading will be replaced with a fault code. Fault codes are explained in the Troubleshooting section of this manual.

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

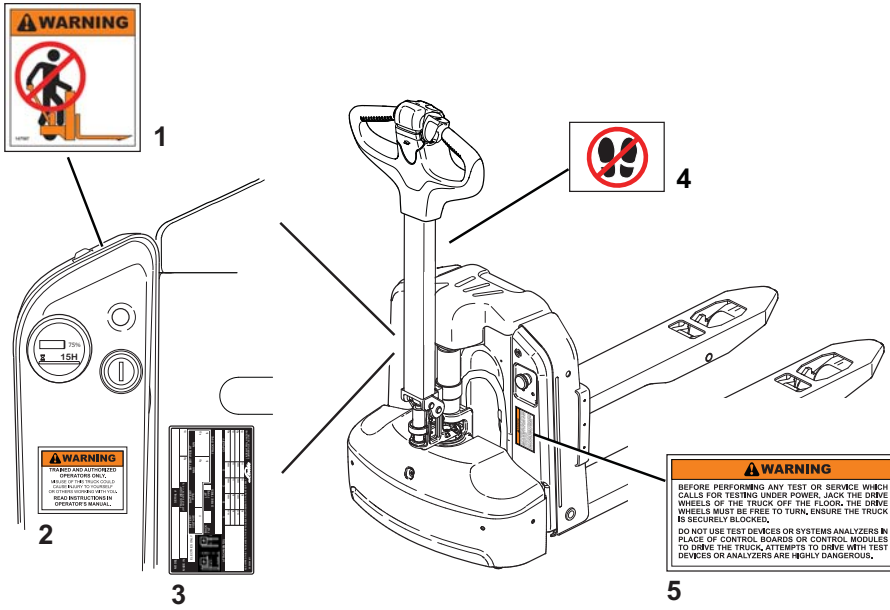
(11) **(Diagram)** – illustrates the dimensions A, B, C, and D used in CAPACITY chart (14).

(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 ATTACHMENT(S). In order to achieve a listed capacity safely, the lift height must be kept within the corresponding value shown in column C and the load center of gravity must be within the corresponding values shown in columns A, B, and D.

Decal and Data Plate Location



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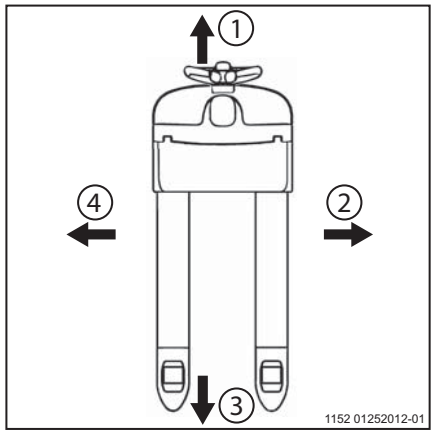
1	Warning Decal, No Riders	4	Decal, No step
2	Warning Decal, Trained Operator	5	Warning Decal, Service Work
3	Data plate		

Definition of Directions



(1)	Forward
(2)	Right
(3)	Reverse
(4)	Left

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

4

Operation

Unloading and Preparing a New Truck for Operation

When unloading a new truck, it may be necessary to lift the truck. See the corresponding sections in this manual for instructions regarding hoisting.

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

During the first 100 operating hours, observe the following conditions:

- Limit load weight to 80% of rated capacity.
- Do not allow battery charge state to fall below 20% before recharging.
- Avoid sudden full acceleration or hard stops.

⚠ 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 the drive wheel in the Maintenance section.

Turning the Truck On and Off ▷

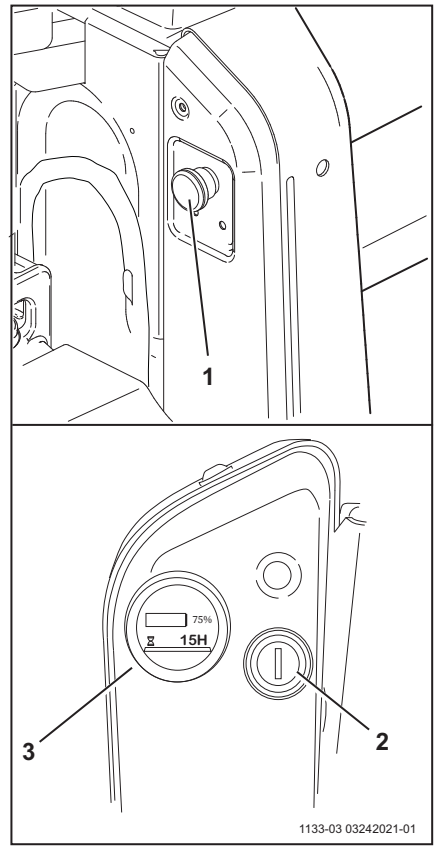
Switching the truck on

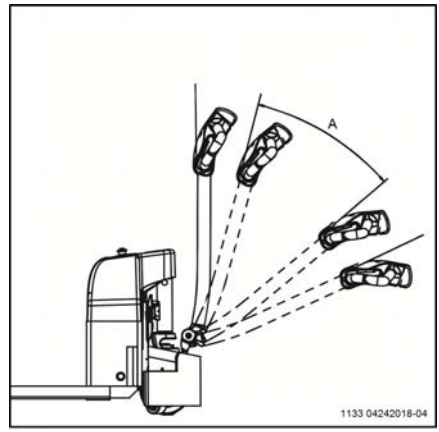
To turn the truck on, make sure the emergency stop button (1) is not pushed in and the control handle is released to its vertical position. Turn the key switch (2) clockwise. The indicator unit (3) should display accumulated hours.

The truck is equipped with a static-return-to-neutral function. If the control handle is held in its working range (A) when the truck is turned on, the travel function will not operate. The control handle must then be briefly returned to either end position and then moved back into its working range to enable travel.

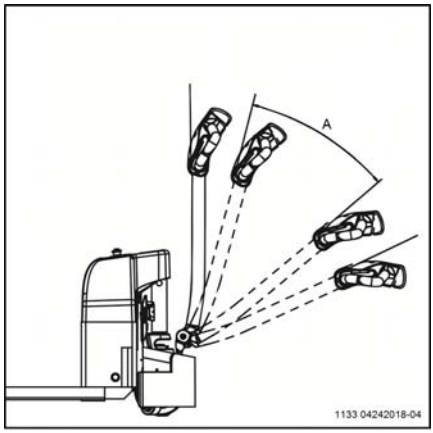
Switching the truck off

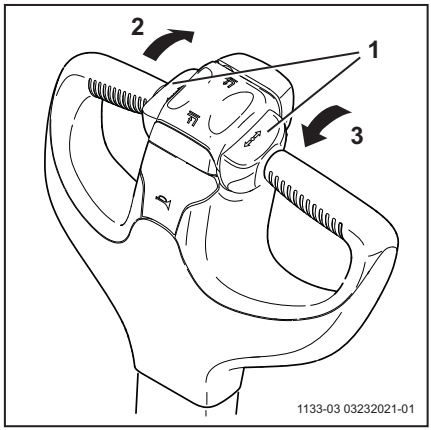
To turn the truck off, turn the key switch counter-clockwise to the off position. The indicator unit display will turn off.





Driving





⚠ WARNING

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

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

Forward is defined as forks trailing. Reverse is defined as forks leading. See section three if necessary.

- Switch the truck on. See "Turning the truck on and off" if necessary.
- Raise the fork arms so that any load is clear of the ground.
- Move the control handle into its operating range (A).

Forward

- Press the travel control (1) so that it rotates in the direction shown (2).

The truck will move forward. The speed is proportional to both the amount of control rotation and handle position. Remain at arm's length beside the truck during forward motion. Use only the hand nearest the truck to operate the travel control.

The truck is equipped with a static-return-to-neutral feature. If the truck does not move, then the control handle has probably been moved into the operating range (A) too early while switching on the truck. Release the control handle to the vertical position briefly, and then move it back into the operating range. This should enable the travel function.

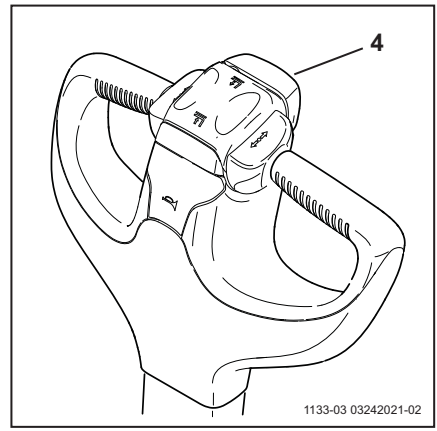
Reverse

- With the control handle in the working range, press the travel control so that it rotates in the direction shown (3).

The truck will move in reverse. The speed is again proportional to the amount of control rotation and handle position. Remain in front of the truck while operating in reverse. Keep two hands on the control handle.

Emergency Reverse Function

To protect the operator from becoming pinned against an obstacle by the control handle, an emergency reverse button (4) is provided at the end of the control handle. If this button is pressed during operation, the truck will move off in reverse until the button is released. The mechanical brake will then engage to immediately stop the truck. The travel control must then be returned to neutral before the truck can again be operated.



Changing Direction

- To change direction at any time during travel, release the travel control and press it in the opposite direction. This can be done while the truck is still moving in the original direction. The truck will be electrically braked to a stop and then begin moving in the new direction.

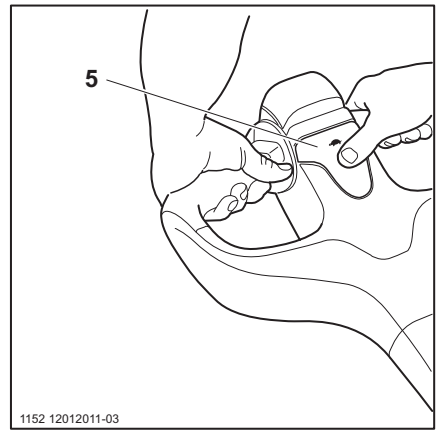
Creep Speed Function

The creep speed function can be used to aid in maneuvering in tight spaces. This function allows travel at low speed with the control handle in the vertical position, out of its normal operating range (A).

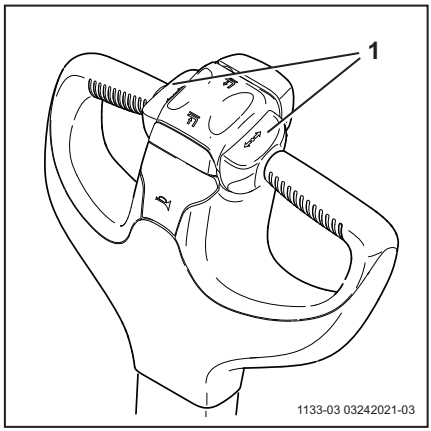
- To engage the creep speed function, press and hold the creep speed button (5) on the back side of the control handle.
- While holding the creep speed button, operate the travel control forwards or backwards as needed.

If the creep speed button is released during creep speed operation, the mechanical brake will engage and immediately stop the truck.

Creep speed automatically changes to normal speed if the control handle is moved into its normal operating range (A).



Braking



The truck has electric braking built in to the motor control equipment and mechanical braking through an electromagnetic disc brake on the drive unit. Electric braking is controlled by the position of the travel control (1). The mechanical brake is controlled by the position of the control handle and the travel control.

Electric Braking

There are two modes of electric braking. The first mode activates when the truck is in motion and the travel control (1) is simply released to the neutral position as if coasting. The second mode activates when, after the travel control is released, it is rotated further toward the opposing direction. 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.

- While travelling, release the travel control (1).

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

NOTE

Slow or quick release of the travel control into the neutral position allows the braking action to be sensitively controlled, from gentle to hard braking.

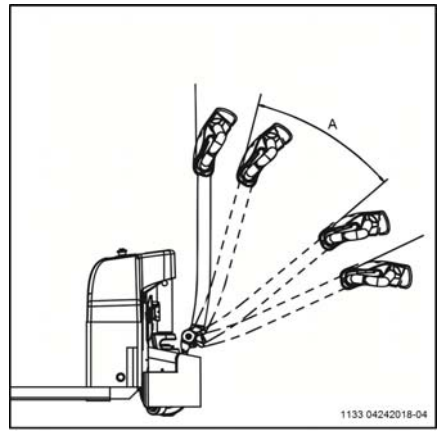
- While travelling, rotate the travel control toward the opposite direction until the truck has been electrically braked to a stop.

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

Mechanical Brake

The mechanical brake is applied by spring force acting on the brake disc in the brake assembly. With the control handle in its operating range (A), initial movement of the travel control (1) will apply current to the brake coil. The coil then creates electromagnetic force to overcome the spring force and release the brake. The mechanical brake makes an audible click when engaging or disengaging. Whenever the travel control is released, the brake will engage when truck speed reaches zero. This provides an automatic parking brake.

The brake will also be applied if the handle is moved out of its operating range (A). If the truck is moving, it will immediately stop. Any time the key switch is turned off or the emergency stop button is pushed, the brake will be applied to stop the truck.

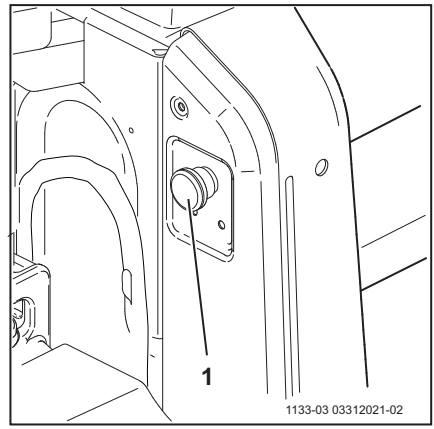


Emergency Stop Button

Pressing the emergency stop button (1) will shut the truck off at any time. The battery will be disconnected and the electromagnetic brake will immediately engage. If the truck is moving, it will immediately stop.

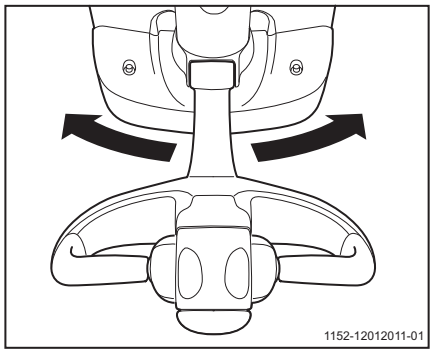
- To stop the truck, push the emergency stop button (1) in.

To resume operation, switch the truck off and twist the button clockwise slightly. It will pop back up into the operating position and the battery will be connected. The truck may then be switched on normally.



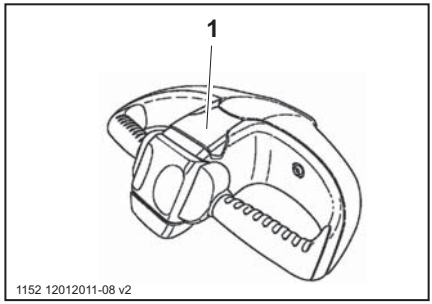
Steering

Steering the truck is done using the control handle. Manually moving it to the left or right will swivel the drive wheel. The truck then turns in forward or reverse according to the handle direction.



Horn

Press the horn button (1) on the control handle to sound the horn.



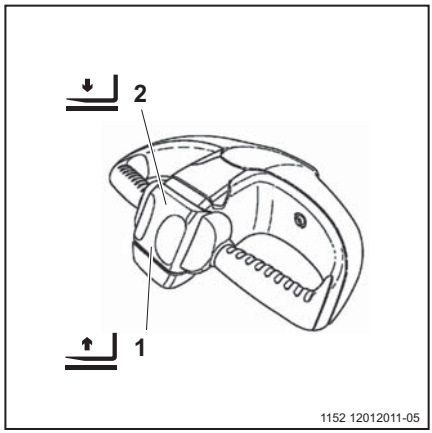
Raising and Lowering the Forks

⚠ WARNING

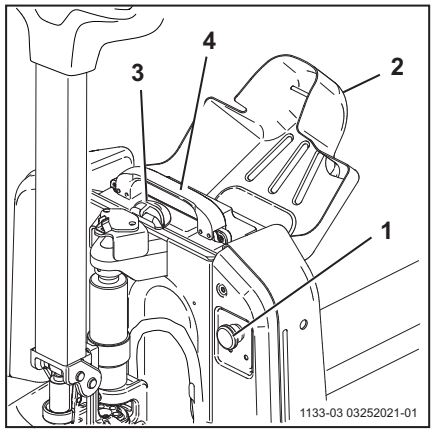
When lowering the forks, feet can become pinched against the floor.

Make sure all personnel are clear of the forks before lowering them.

Raising and lowering of the forks is controlled with a rocker switch on the end of the control handle. To raise the forks, press the bottom portion of the switch (1). To lower the forks, press the top portion of the switch (2). Note the symbols on the switch.



Battery Removal and Installation ▷



⚠ 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 truck is equipped with a lithium-ion battery. The battery is easily removed and replaced by hand.

⚠ WARNING

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

Battery terminals are on the bottom of the battery. Do not place the battery on any conductive surface.

Battery Removal

- Switch the truck off by removing the key.
- Press the emergency stop button (1).
- Open the battery cover (2).
- Twist the battery retainer knob (3) to clear the battery.
- Grasp the battery handle (4) and pull the battery straight up.
- If storing the battery, store it in a dry area away from direct sunlight. Temperature must be above freezing but less than 104ºF (40C).

NOTE

If the battery is not used for an extended period, it must receive a supplementary charge every two months to prevent permanent damage to the battery. State of charge should be maintained at approximately 80% during extended storage.

Battery Installation

The battery can only be installed in the truck one way. The arrangement of the contacts on the bottom of the battery must align with the

contacts in the battery compartment. Guide ridges are provided on the battery sides to align with recesses in the battery compartment.

- Ensure that the battery and especially its contact area is clean, dry, and free from damage.
- Ensure that the battery compartment and especially the contact area is clean and dry.
- Ensure that the truck is off and the emergency stop button (1) is pressed.
- Position the battery (4) over the battery compartment with the guide ridges aligned correctly.
- Lower the battery straight down into the battery compartment until it is firmly seated.
- Twist the battery retainer knob (3) to secure the battery.
- Close the battery cover (2) and press it slightly to engage its spring clip.
- Twist the emergency stop button slightly until it pops out.
- The truck may now be operated when switched on with the key.

Charging the Battery

The truck is supplied with an external charger for the battery.

⚠ WARNING

Specialized training is required to handle batteries safely.

Batteries may only be charged by properly trained personnel in accordance with the following procedure.

Charging Procedure

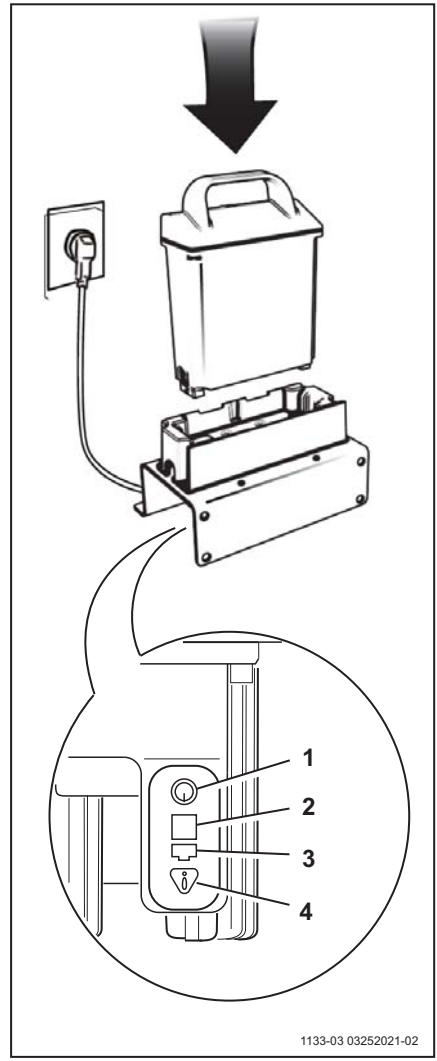
- Ensure the temperature of the area where charging will occur is between -4ºF and 140ºF (-20 and 60C)
- Plug the charger into a standard 110VAC wall outlet.
- Observe the LED group on the charger base. Confirm that the blue power light (1) on the charger illuminates.
- Remove the battery from the truck and insert it into the charger.

NOTE

The battery will only go into the charger one way. Note the position of the contacts on the bottom of the battery and align with those on the charger before inserting the battery. Guide ridges are provided on the battery sides to align with recesses in the sides of the charger.

Confirm that the lights (2 and 3) flash green to indicate that the battery is charging. These lights will become continuously green as charging completes. Charging should require about 2.5 hours. Charging time must not exceed 24 hours.

LED	LED description	Function
1	Power	Continuous blue when AC power available.
2	Partial charge	Flashing green during initial charging; Continuous green when battery is partially charged.



Charging the Battery

3	Full charge	Flashing green during final charging; Continuous green when battery is completely charged.
4	Warning	Flashing green when UBS port active; Solid green when download complete. Flashing amber indicates external error such as battery over temp or other fault. Solid red indicates charger fault.

- Remove the battery from the charger when charging is complete.

NOTE

A fully charged battery will provide approximately 3 hours of continuous use. Capacity will be reduced when used in low-temperature environments.

- Unplug the charger when not in use.

NOTE

If the battery is not used for an extended period, it must receive a supplementary charge every two months to prevent permanent damage to the battery.

Hoisting the Truck

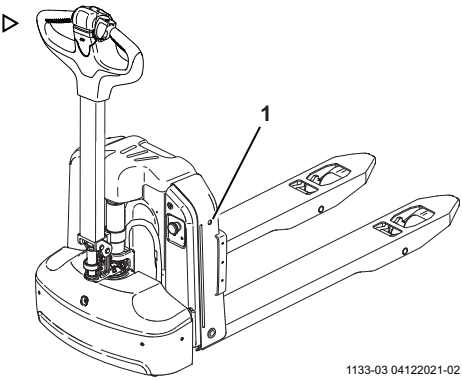
This section explains the attachment of lifting equipment to the truck for the purpose of hoisting. Many methods of rigging to a crane or hoist are possible. Explanation of such methods as well as operation of lifting equipment is outside the scope of this manual. Both the attachment of lifting equipment 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.

- Switch the truck off and press the emergency stop button.
- Attach lifting equipment to the holes (1) in each side of the chassis.



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Hoisting the Truck

5

Maintenance

Personnel Qualifications

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

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

Cleaning 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 check operation and to aid in drying in case any motors became exposed to moisture.

⚠ CAUTION

Never wash truck when switched on.

Switch the truck off and disconnect the battery before any cleaning operations.

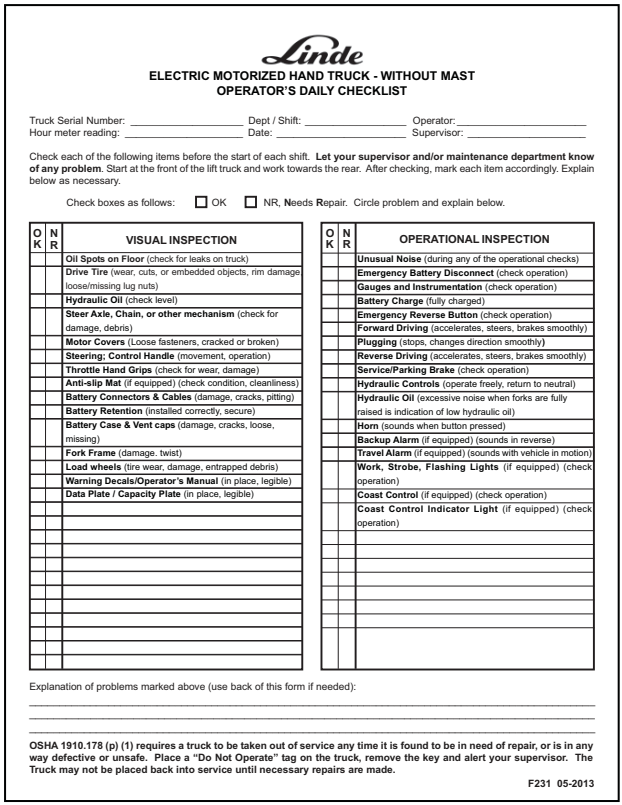
⚠ CAUTION

When cleaning with a water jet (high-pressure or steam cleaner etc.), it should not be applied directly to the drive unit, any electric or electronic components, connector plugs or insulating material. High pressure water also should not be applied directly to the operator controls on the control handle.

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

Daily Inspection

Daily Inspection Overview



ELECTRIC MOTORIZED HAND TRUCK - WITHOUT MAST
OPERATOR'S DAILY CHECKLIST

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

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

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

OK	NR	VISUAL INSPECTION
		Oil Spots on Floor (check for leaks on truck)
		Drive Tire (wear, cuts, or embedded objects, rim damage loose/missing lug nuts)
		Hydraulic Oil (check level)
		Steer Axle, Chain, or other mechanism (check for damage, debris)
		Motor Covers (Loose fasteners, cracked or broken)
		Steering; **Control Handle** (movement, operation)
		Throttle Hand Grips (check for wear, damage)
		Anti-slip Mat (if equipped) (check condition, cleanliness)
		Battery Connectors & Cables (damage, cracks, pitting)
		Battery Retention (installed correctly, secure)
		Battery Case & Vent caps (damage, cracks, loose, missing)
		Fork Frame (damage. twist)
		Load wheels (tire wear, damage, entrapped debris)
		Warning Decals/Operator's Manual (in place, legible)
		Data Plate / Capacity Plate (in place, legible)

OK	NR	OPERATIONAL INSPECTION
		Unusual Noise (during any of the operational checks)
		Emergency Battery Disconnect (check operation)
		Gauges and Instrumentation (check operation)
		Battery Charge (fully charged)
		Emergency Reverse Button (check operation)
		Forward Driving (accelerates, steers, brakes smoothly)
		Plugging (stops, changes direction smoothly)
		Reverse Driving (accelerates, steers, brakes smoothly)
		Service/Parking Brake (check operation)
		Hydraulic Controls (operate freely, return to neutral)
		Hydraulic Oil (excessive noise when forks are fully raised is indication of low hydraulic oil)
		Horn (sounds when button pressed)
		Backup Alarm (if equipped) (sounds in reverse)
		Travel Alarm (if equipped) (sounds with vehicle in motion)
		Work, Strobe, Flashing Lights (if equipped) (check operation)
		Coast Control (if equipped) (check operation)
		Coast Control Indicator Light (if equipped) (check operation)

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

_____
_____
_____

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

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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.

A checklist such as the one illustrated may be helpful in performing daily inspection. The checklist illustrated is intended for a range of

pallet truck types, so some items may not apply.

⚠ WARNING

To prevent accidents during maintenance activities, the truck must be secured against unintentional movement or start-up.

Before beginning any maintenance, the forks should be fully lowered, 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.

Check for Fluid Leakage

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

Check Forks and Chassis

Inspect the forks, chassis, and if equipped, the load back rest for deformity, cracks, or other damage.

Check Battery Connector

Disconnect and reconnect the battery to confirm smooth operation. Inspect the battery connector and its cables for damage.

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. Any damaged or unreadable decals must be replaced.

Check Control Handle Pivot

Check the pivot point where the control handle attaches to the chassis for smooth operation by moving the handle through its entire range.

Check Operating Controls

Return Spring

Pull the control handle down into its operating range and release it. It should return to the vertical position under spring tension.

Brake Interlock - Handle

Operate the truck in forward or reverse. Move the control handle all the way up or down out of the operating range without releasing the travel control. The drive system should switch off and the brake should engage after a delay.

Brake Interlock - Travel Control

Operate the truck in forward or reverse. Release the travel control without moving the control handle out of its operating range. The truck should slow to a stop using electric braking.

Emergency Reverse Button

Operate the truck forwards and press the emergency reverse button. The truck should stop and then move in the opposite direction until the button is released.

Perform Operational Check

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

- Electro magnetic brake (audible sound during engage/release)
- Multi-function display/battery discharge indicator
- Horn
- Forward and reverse travel
- Electric braking (plugging)
- Fork lift and lower function (operate through complete range of motion)
- Working lights (if equipped)

⚠ 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-specific interval recommendations if required.

Check Drive Wheel and Fasteners

⚠ WARNING

Uneven wear or excessive damage to the tires can reduce stability as well as brake performance. Reduced stability can cause loss of control. Reduced brake performance can cause collisions.

Have worn or damaged tires changed immediately.

Inspect the drive tire for damage or excessive wear.

Check drive 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.

⚠ 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.

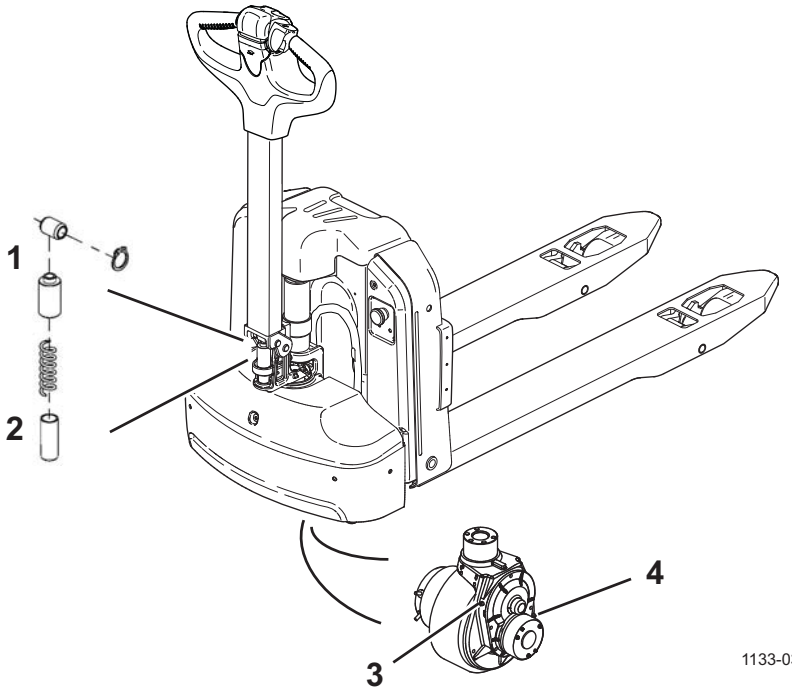
Drive Wheel Fastener Torque
7 ft-lbs (9.5 Nm)

Routine Lubrication and Inspection

Lubrication Points

The illustrated components must be lubricated every 500 hours.

Components Requiring Lubrication



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1	Handle pivot roller	3	Transmission
2	Handle pivot slide mechanism	4	Drive wheel bearings

Scheduled Maintenance

General Maintenance Information

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

Maintenance Intervals

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

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

Scheduled Maintenance Charts

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

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

Maintenance Schedule

Maintenance every 1000 hours, but at least every 6 months.
Functions and controls
Check mounting of controller and contactor.
Check that cables are free from damage and that terminals are firmly attached.
Power and drive system
Check battery and battery compartment for damage and liquid ingress.
Check the wheel bearings and their mounting.
Inspect the drive unit support casting for damaged or loose mounting.
Check the gearbox for abnormal sound and leakage.
Hydraulics
Check hoses, pipes and interfaces for damage and ensure their tightness and sealing.
Check lift cylinder for leaks.
Check pump unit for leaks.
Check the hydraulic oil level.
Brake system
Check the electromagnetic brake air gap (0.4 mm).
Lifting system
Check link mechanism for wear or damage.
Check whether pin shaft is fixed securely.
Check and lubricate moving parts on link mechanism.
Other
Check connections between nuts and bolts.
Check that labels are clear and complete.
Check covers for cracks.

Maintenance every 2000 hours, but at least every 12 months.
Functions and controls
Check error message record and operating time.
Power and drive system
Check bearing positions for noise.
Add gearbox grease.
Check driving speeds.
Hydraulics
Check lift cylinder for damage and ensure that they are properly secured.
Change hydraulic oil and filter.
Check relief pressure.
Brake system

Maintenance every 2000 hours, but at least every 12 months.
Check braking distance of electromagnetic brakes.
Lifting system
Check lifting and lowering speeds.
Other
Check chassis for cracks or damage.

Fluids and Lubricants

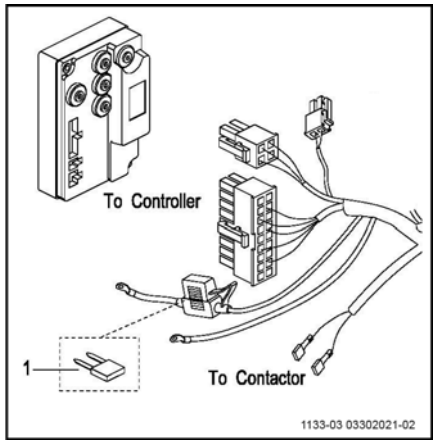
Lubricant Specifications and Capacities

Fluid or Lubricant	Specification	Capacity	Position used
Hydraulic oil	L-HM32	0.19-0.21 qt (0.18–0.20 L)	Hydraulics
Hydraulic oil (cold stores)	L-HV32		
Multi-purpose lubricating grease	Polylub GA352P	As appropriate	Sliding surfaces
Moly lithium grease no. 3	–	39 oz (110 g)	Transmission

Troubleshooting

Fuses

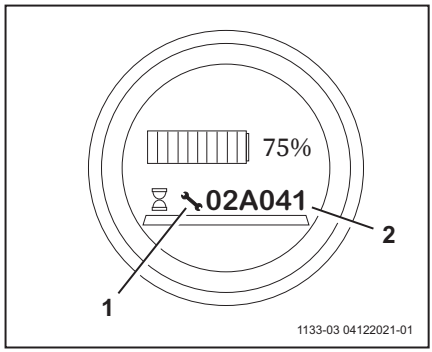
A single 5A fuse (1) is located in a fuse holder incorporated into the wiring harness near the truck controller.



Fault Codes

If the truck experiences a fault condition, a wrench symbol (1) will appear in the display unit and the hour reading will be replaced by a fault code (2). Fault codes are six digits. The first three digits are always 02A and can therefore be ignored. The specific fault is given by the final three digits. The last of these digits is to the right of the decimal in the table below. (The decimal is not shown in the display.)

Example: Fault code 02A041 corresponds to 4,1 in the table below.



Fault Code	Fault	Possible Cause
1,2	SEVERE UNDERVOLTAGE	1.A system other than the controller is draining the battery
		2.The battery is disconnected
		3.The B+ fuse is blown
		4.The main contactor did not close
		5.The User undervoltage parameter is incorrectly configured
1,2	UNDERVOLTAGE CUTBACK	1.The battery needs recharging
		2.A system other than the controller is draining the battery
		3.The battery is disconnected
		4.The B+ fuse is blown
		5.The main contactor did not close
		6.The User undervoltage parameter is incorrectly configured
1,3	SEVERE UNDERVOLTAGE	1.The User Overvoltage parameter is incorrectly configured
		2.The battery resistance is too high for the regen current
		3.The battery is disconnected during regen braking
1,3	OVERVOLTAGE CUTBACK	1. The regen braking current elevated the battery voltage
		2.The User overvoltage parameter is incorrectly configured
		3.The battery is disconnected during regen braking
1,4	CONTROLLER OVERTEMP CUTBACK	1. The controller is operating in an extremely hot environment
		2. There is excessive load on the vehicle

		3.The controller is incorrectly mounted, which is preventing the controller from cooling
1,4	CONTROLLER SEVERE UNDERTEMP	The heatsink temperature is below 40°C; the controller is operating in an extremely cold environment
1,4	CONTROLLER SEVERE OVERTEMP	The heatsink temperature is above 85°C; the controller is operating in an extremely hot environment
1,5	MOTOR TEMP SENSOR	1. The motor thermistor is incorrectly connected
		2. The sensor polarity is incorrect
		3. The motor temperature and sensor parameters are incorrectly configured
1,5	MOTOR TEMP HOT CUTBACK	1. The motor temperatue is at or above the temperature specified with the Temperatue Hot parameter
		2. The temperature Hot parameter is incorrectly configured
2,1	THROTTLE	1. The throttle pot's resistance is outside the range of 0-6k OHM
		2. One or more of the throttle wires are open
2,1	HPD SEQUENCING	The keyswitch, interlock, direction and throttle inputs were not cycled in the correct order after an HPD action
2,2	MAIN CONTACTOR WELDED	1. The main contactor tips are welded closed
		2. An alternate voltage path, such as an external circuit to B+, is providing current to the capacitor bank
2,2	MAIN CONTACTOR DID NOT CLOSE	1. The main contactor tips are oxidized, burnt or not making good contact
		2. An external load on the capacitor bank is preventing the capacitor bank from charging
		3. Blown B+ fuse
		4. The pull in voltage and holding voltage parameters are incorrectly configured
		5. The main contactor opened even though the controller commanded the contactor to close
		6. The wiring to the contactor's coil was removed
		7. The coil is defective
2,2	MAIN DRIVER FAULT	1. The main driver is open or shorted
		2. The connector pins for controller or contactor coil are dirty
		3. Bad connector crimps or faulty wiring
		4. The controller is defective
2,2	PRECHARGE FAILED	1. An external load on the capacitor bank prevents the capacitor bank from charging
		2. The controller is defective

2,3	ENCODER	The controller detected a motor encoder phase failure
2,3	STALL DETECTED	The controller did not detect motor movement
2,4	MOTOR OPEN	The controller detected that motor phase U,V or W is open
2,5	OVER CURRENT	The current detected by the controller exceeds the maximum current limit
3,1	EM BRAKE DRIVER	1. The controller's EM brake coil's or controller's pins are dirty
		2. Bad connector crimps or faulty wiring
3,1	EM BRAKE FAILED TO SET	The vehicle is moving even though the controller commanded the EM brake to engage and the number of subsequent motor revolutions has exceeded the EM brake Fault motor Rev parameter value
3,1	EMER REV TIMEOUT	An emergency reverse operation stopped because the operation exceeded the time limit specified with the EMR Time Limit parameter
3,2	EMER REV HPD	The throttle, direction and interlock inputs were not returned to neutral after an emergency reverse operation
3,2	EMR SRO	The emergency reverse switch was on when the keyswitch was powered on
3,3	PUMP DRIVER FAULT	1. The connector pins for the controller or contactor coil are diry
		2. Bad connector crimps or faulty wiring
		3. The contactor coil is shorted
		4. The controller is defective
3,4	PUMP SRO	The hydraulic lift switch was on when the keyswitch was powered on
3,5	VALVE DRIVER FAULT	1. The connector pins are dirty
		2. Bad connector crimps or faulty wiring
		3. The valve coil is shorted
		4. The controller is defective
3,6	VALVE SRO	The valve switch was on when the keyswitch was powered on
3,7	Hydraulic SWITCH	The controller detected that two or more Hydraulic switches are activated
4,1	5V SUPPLY FAILURE	The internal +5V power supply's voltage is higher or lower than the threshold voltage
4,1	15V SUPPLY FAILURE	The internal +15V power supply's voltage is higher or lower than the threshold voltage
4,1	EXTERNAL SUPPLY OUT OF RANGE	The load on the external +5V or +15V supply is higher or lower than the threshold voltages listed in External Power supply

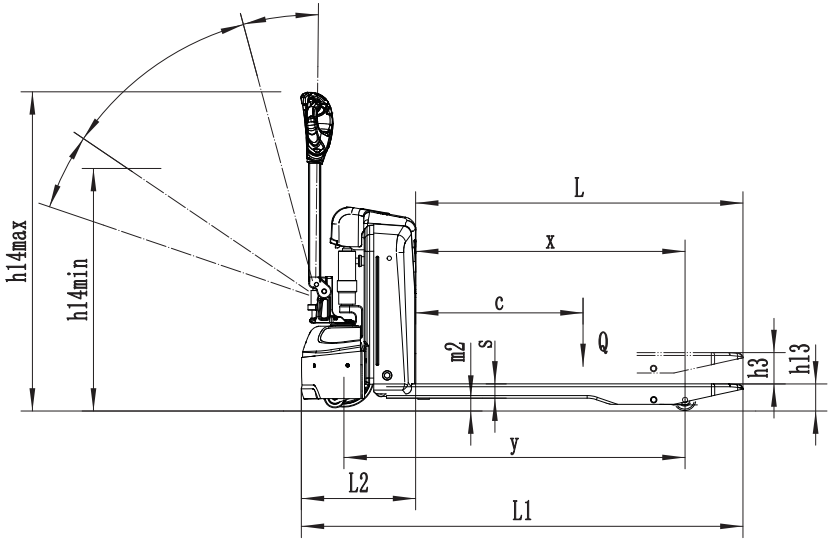
4,2	PDO TIMEOUT	The time between PDO messages exceeded the time specified by the PDO's Event Time parameter
4,2	PDO MAPPING ERROR	A PDO is mapped to an invalid object or the total size of its mapped objects exceeds 8 bytes.
4,3	HW FAILSAFE	An internal controller fault occurred
4,4	SW FAULT	1. Defective controller
		2. A CRC check failed
4,5	INTERLOCK SRO	The interlock was on when the keyswitch was turned on
4,8	STEERING HANDSHAKE FAULT	1. The steering controller node ID parameter does not specify the correct node
		2. The baud rate is incorrect
		3. The 1220E controller is not powered on
		4. The 1220E controller is not connected to the CAN bus
8,1	PARAMETER MISMATCH	Parameters have conflicting values
8,1	PARAMETER CHANGE	A parameter that requires the keyswitch to be cycled was changed
8,3	NV FAILURE	The controller's operating system was not able to read or write to EEPROM memory
8,4	SUPERVISION	1. The controller's supervisor module is damaged
		2. The supervisor module detects discrepancies in data read by the primary and secondary microprocessors
8,7	TILLER HEAD HANDSHAKE FAULT	The handshake with the EP CAN Tiller head failed
8,8	GAUGE HANDSHAKE FAULT	The handshake with the EP CAN gauge failed
8,8	PASS WORD FAULT	Password is incorrect

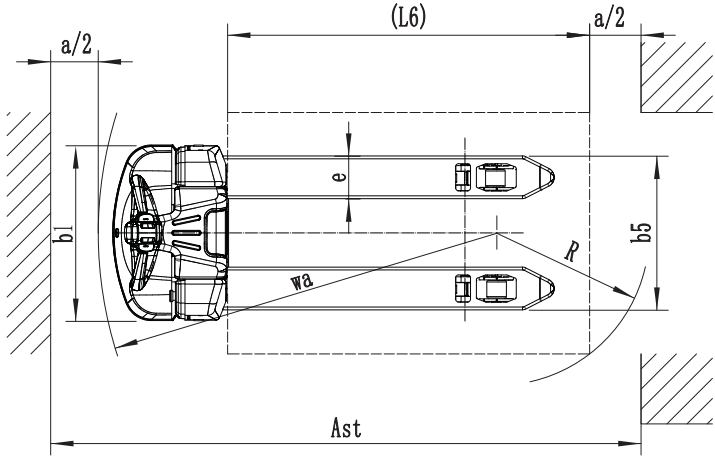
Troubleshooting

6

Technical Data

Specifications





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Description		
1.1	Manufacturer	Linde
1.2	Model	MT18
1.3	Drive type	Electric
1.4	Operation: manual, accompanied, standing, seated, order picking	Accompanied
1.5	Nominal load capacity (Q)	4000 lb (1800 kg)
1.6	Load center (c)	24 in. (600 mm)
1.8	Axle center to fork face (x) (raised/lowered) See note 1	36 / 39 in (915/980 mm)
1.9	Wheelbase (y) (raised/lowered) See note 1	47 / 49 in (1175/1240 mm)

Weight		
2.1	Service weight	Refer to vehicle data plate

Wheels		
3.1	Tire type (drive/load)	poly/poly
3.2	Drive wheel size Ø x w	8.25 x 2.75 in (210 x 70 mm)
3.3	Load wheel size Ø x w	3 x 2.5 in (80 x 60 mm)
3.4	Caster wheel size Ø x w	2.9 x 1.2 in (74 x 30 mm)
3.5	Wheels, number drive/load (x=traction)	1x+/2

Dimensions		
4.4	Lift height (h3)	4.5 in (115 mm)
4.9	Handle height, travel position (min./max.) (h14)	25.6/46 in (650/1170 mm)
4.15	Fork height, lowered (h13)	3 in (80 mm)
4.19	Overall length (l1) See note 1	61.8 in (1570 mm)
4.20	Length to fork face (l2)	15.7 in (400 mm)
4.21	Total width, standard forks (b1)	27.4 in (695 mm)
4.22	Dimensions of forks (s/e/l)	2x6x46 in (nom) (50x150x1170 mm) 36 in (915 mm) fork length is optional
4.25	Fork spread (outside of forks) (b5) standard/optional	27 in (685 mm) / 22 in (559 mm)
4.32	Ground clearance at centre of wheelbase, with load (m2)	1.2 in (30 mm)
4.34.1	Aisle width with 1000 x 1200 mm pallet crosswise (Ast)	86 in (2175 mm)

Specifications

Dimensions		
4.34.2	Aisle width with 800 x 1200 mm pallet along forks (Ast)	82 in (2061 mm)
4.35	Turning radius (Wa)	54 in (1370 mm)

Performance data		
5.1	Driving speed, full load/no load	3.1/3.4 mph (5.0/5.5 km/h)
5.2	Lifting speed, full load/no load	3.9/4.9 fpm (0.02/0.025 m/s)
5.3	Lowering speed, full load/no load	12.8/5.9 fpm (0.065/0.03 m/s)
5.8	Maximum climbing ability, with/without load	6/16 %
5.10	Brake type	Electromagnetic

Drive		
6.1	Traction motor rating S2 60 min	1.2 hp (0.9 kW)
6.2	Lifting motor rating at S3 15%	1.1 hp (0.8 kW)
6.3	Battery according to DIN 43531/35/36 A, B, C, no	Lithium battery
6.4	Battery voltage, nominal capacity K5	48 V / 30 Ah
6.5	Battery weight (± 10%)	Refer to vehicle data plate

Other		
8.1	Drive type	DC
8.4	Noise level at operator’s ear	<74 dB(A)

Note 1. Subtract 10 inches (254 mm) if truck has 36-inch forks.

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KION North America Corporation

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