



Linde Material Handling

Linde

8932 series Electric Pallet Truck

Operating Instructions

Model MT22 North America

8932 series MT22 89328011640 US -
01/2024 - 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.

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1	Introduction	
	Scope	2
	Obligations of the Equipment Owner	2
	Operator Responsibilities	3
	Proper use	3
	Hazard messages	3
2	Safety	
	Before Operation	6
	Operator daily checklist	6
	Operating Position	7
	Travel	7
	Inclines, Ramps, Docks, Elevators	7
	Parking	8
	Lithium-ion Battery Safety	8
	Safety During Maintenance	10
	Personnel Qualifications	10
	Hazardous Substances	10
	Operator Warning Decals	12
	Data plate	12
	No riding decal	12
	Trained operator warning decal	12
	Test or service warning decal	13
3	Overview	
	Technical Description	16
	Truck Components	17
	Controls	18
	Display Unit	19
	Data Plate	20
	Decal and Data Plate Location	21
	Definition of Directions	22

4 Operation

Unloading and Preparing a New Truck for Operation	24
Turning the Truck On and Off	25
Driving	26
Braking	28
Emergency Stop Button	29
Steering	30
Horn	30
Raising and Lowering the Forks	30
Battery	31
Battery Description	31
Charging the Battery with the On-board Charger	31
Hoisting the Truck	33

5 Maintenance

Personnel Qualifications	36
Cleaning the Truck	36
Daily Inspection	37
Daily Inspection Overview	37
Routine Lubrication and Inspection	39
Routine Lubrication and Inspection Intervals	39
Check Drive Wheel and Fasteners	39
Lubricate Handle Pivot	40
Check Hydraulic Oil Level	40
Scheduled Maintenance	41
General Maintenance Information	41
Maintenance Schedule	42
Fluids and Lubricants	44
Lubricant Specifications and Capacities	44
Troubleshooting	45
Fuses	45

6 Specifications

Dimensions	48
Specifications	49

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 re-

sponsibility 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

Operator Responsibilities

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 lia-

bility 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 man-

ual. 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 precau-

tions 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

Hazard messages

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

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

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.

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

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 _____
 Motor Number _____
 Fork Length _____

Operator _____
 Supervisor _____

Check each of the following items from left to right each time. Use your signature when information is required for any problem. Sign at the front of the lift truck and work towards the rear. After checking, mark each item accordingly. Explain items as necessary.

☐ OK, ☐ Not, ☐ Needs Repair. Circle problems and explain below.

No.	VISUAL INSPECTION
1	Exterior
2	Wheels
3	Wheels
4	Wheels
5	Wheels
6	Wheels
7	Wheels
8	Wheels
9	Wheels
10	Wheels
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100	Wheels

No.	OPERATIONAL INSPECTION
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86	Wheels
87	Wheels
88	



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.

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

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.

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.

Parking

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.

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.

Lithium-ion Battery Safety

- 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.
- Protect the battery from liquids and humidity. Exposure can cause short circuits and fire.
- Never allow any pressurized water or other liquid to contact any part of the battery. Do

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.

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.

Lithium-ion Battery Safety

- not steam-clean or pressure-wash the battery.
- Never continue to use any lithium-ion battery that is unusually warm, producing an odor, is discolored, or is obviously deformed or damaged. A battery with these symptoms is at risk for catching fire.
 - 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.
 - Do not disassemble or open a lithium-ion battery. Never modify any part of the battery or attach anything to the battery.
 - 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.
 - Charge lithium-ion batteries using only chargers approved by the battery manufacturer.
 - Never use any battery in any forklift truck for which the battery is not specifically approved by the forklift manufacturer.
 - Never touch a damaged lithium-ion battery with bare hands. Lithium can cause serious burns to skin.

Safety During Maintenance

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.*

Lithium Electrolyte

Lithium-based electrolytes and electrodes are used in lithium-ion batteries. Exposure can become a hazard if the battery is damaged or overheated.

WARNING

Lithium-ion batteries contain lithium compounds. Contact with lithium can cause serious skin burns. When subjected to high heat or external fire, the lithium electrolyte in the battery can release toxic vapor. This can cause injury to eyes and lungs as well as skin.

Avoid contact with internal battery cell parts and any liquid from a lithium-ion battery.

WARNING

The electrolyte used in the lithium-ion battery is flammable. A lithium-ion battery subjected to high heat may ignite and burn.

Do not subject lithium-ion batteries to high heat.

Operator Warning Decals

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.

In applications where forks or attachments are routinely changed, multiple data plates may be present. It is the responsibility of the operator to determine and use the correct data plate for the truck configuration in use.



MODEL		SERIAL No. / YEAR	
ASSEMBLED IN	TRUCK WEIGHT (WITHOUT BATTERY IN kg)		kg
ELECTRICS ONLY		BATTERY AMP-HR MAX	BATTERY TYPE
BATTERY VOLTAGE		BATTERY WEIGHT MAX	BATTERY WEIGHT MIN
V		kg	kg
BACK TILT		LIFT TYPE	TRUCK TYPE
DRIVE TIRES			
ATTACHMENT(S)			
A		B	C
mm		mm	mm
in		in	in
mm		mm	mm
in		in	in
CAPACITY			
kg			
lb			
kg			
lb			

AS SHIPPED THIS TRUCK MEETS THE APPLICABLE REQUIREMENTS OF ANSI/ISO 9001:2015
0009384611 KON NORTH AMERICA CORPORATION | SUMMERVILLE, SC USA

No riding decal

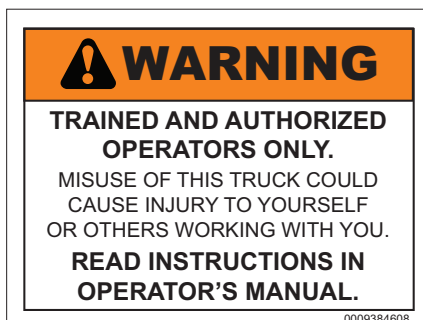
This decal warns personnel that riding is not permitted anywhere on the truck. This applies to operators as well as all others.

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



Trained operator warning decal

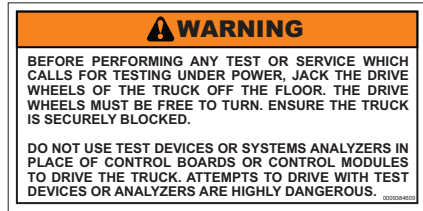
This decal states the requirement that only trained and authorized personnel are to operate truck.



Test or service warning decal



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





3

Overview

Technical Description

Technical Description

General

The 8932 series MT22 pallet truck is a "walkie" type electric pallet truck (ITA class 3). It is designed for handling loads up to 4400 pounds. Exact capacity limits for individual vehicles are found on the data plate.

Drive unit

The drive unit is comprised of a 24-volt brushless AC drive motor mounted vertically 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 DC pump 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, pressur-

ized 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.

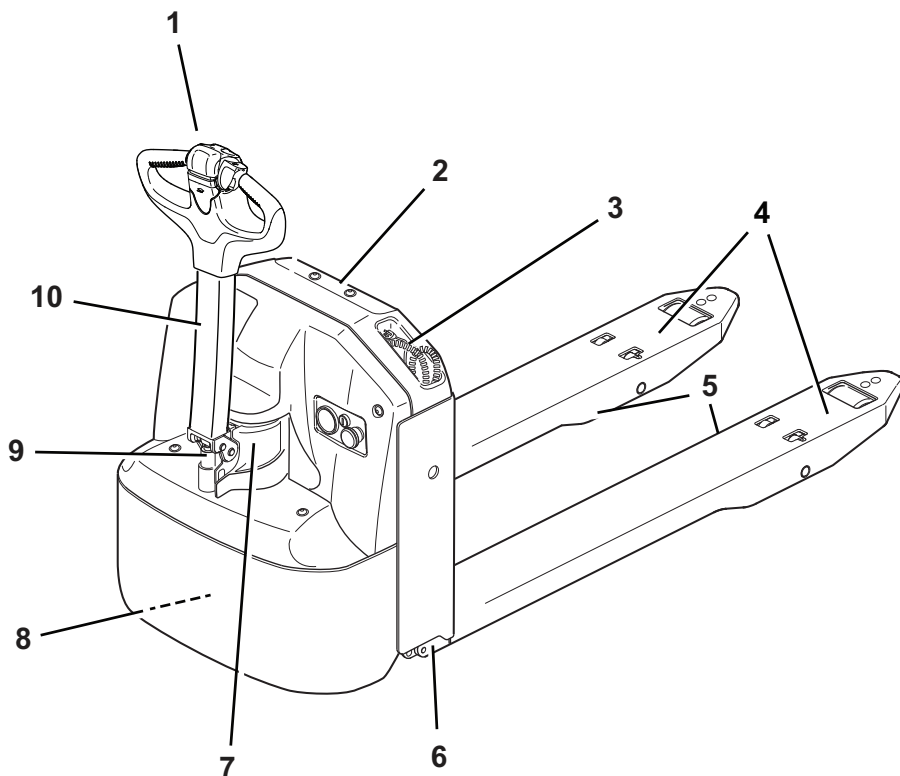
Load lifting system

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 24-volt electrical system, powered by a fixed lithium-ion battery. 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. The truck is supplied with an on-board charger that can recharge the battery from a standard 110V outlet.

Truck Components

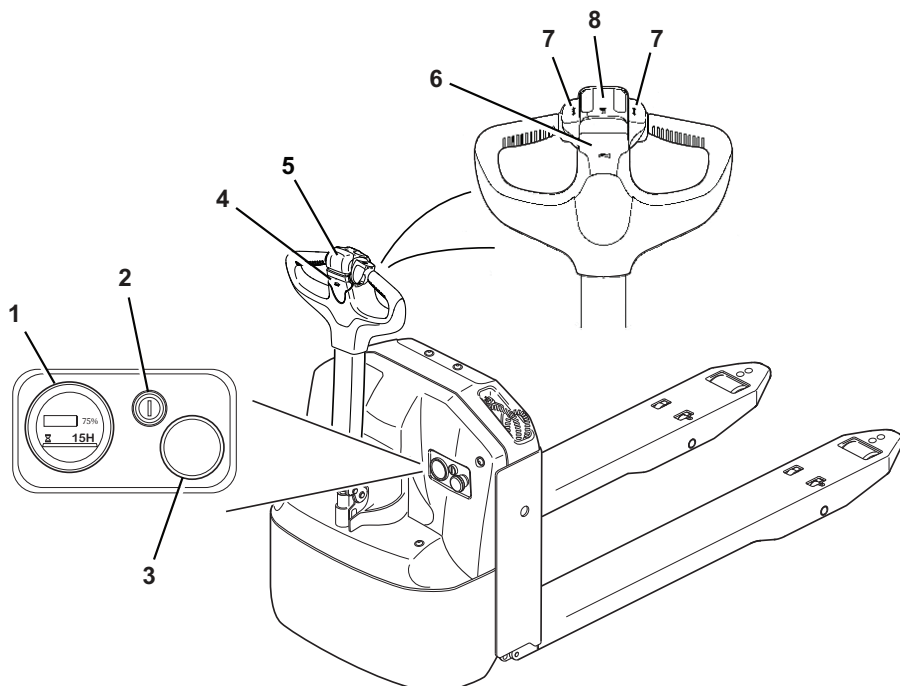


MT22 02162024-01

- | | | | |
|---|---------------------------------|----|-------------------------|
| 1 | Control head | 6 | Fork linkage |
| 2 | Battery compartment | 7 | Hydraulic pump unit |
| 3 | Power cord for on-board charger | 8 | Drive wheel |
| 4 | Load wheels | 9 | Handle return mechanism |
| 5 | Forks | 10 | Control handle |

Controls

Controls



MT22 02162024-02

- 1 Display unit
- 2 Key switch
- 3 Emergency stop button
- 4 Creep-speed button

- 5 Emergency reverse button
- 6 Horn button
- 7 Travel control
- 8 Lift and lower toggle button

Display Unit

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

Battery Charge

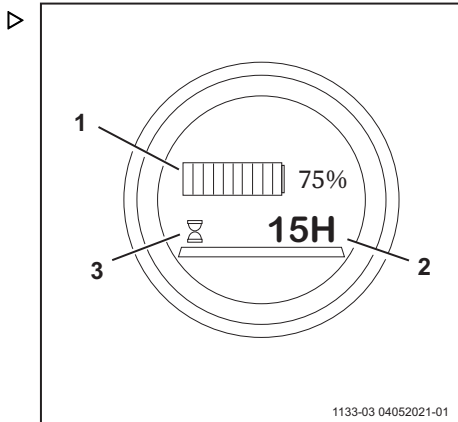
The state of the battery charge is given by the segments (1). When the battery is fully charged, all ten segments will be illuminated in white. As the battery discharges, the segments will extinguish toward the left. Battery state of charge is also shown as a numerical value beside the segments.

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 service manual.



Data Plate

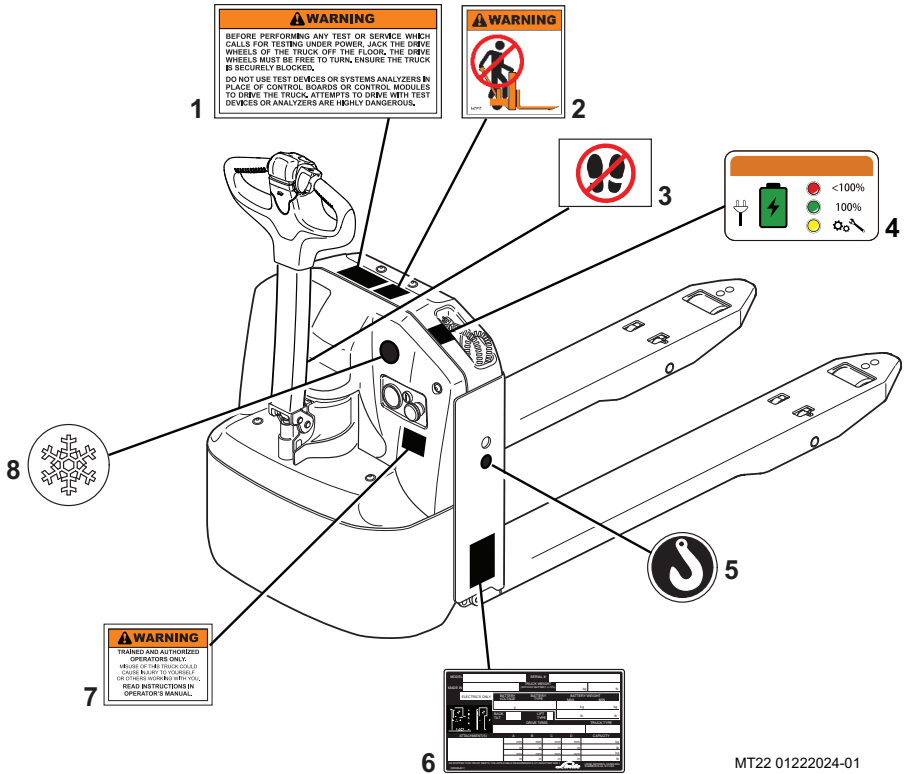
Data Plate

MODEL (1)		SERIAL No. / YEAR (2)	
ASSEMBLED IN (3)		TRUCK WEIGHT WITHOUT BATTERY (+/- 5%) (4) kg lb	
ELECTRICS ONLY		BATTERY WEIGHT MAX MIN	
BATTERY VOLTAGE (5) V	AMP-HR MAX (6)	BATTERY TYPE (7)	(8) kg lb
BACK TILT (9)		LIFT TYPE (10)	
DRIVE TIRES (12)		TRUCK TYPE (13)	
ATTACHMENT(S) (11)		CAPACITY (14)	
		kg lb	
		kg lb	
		kg lb	
		kg lb	

AS SHIPPED THIS TRUCK MEETS THE APPLICABLE REQUIREMENTS OF ANSI/ISO B56.1
0009384611 KION NORTH AMERICA CORPORATION | SUMMERVILLE, SC USA KION North America KION

- (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



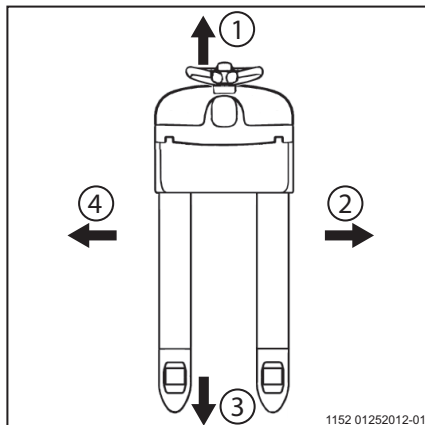
- | | | | |
|---|--------------------------------|---|---|
| 1 | Warning Decal, Service work | 5 | Decal, Lifting point (2X) |
| 2 | Warning Decal, No riders | 6 | Data plate |
| 3 | Decal, No step | 7 | Warning Decal, Trained operator |
| 4 | Decal, Charger LED description | 8 | Decal, Snowflake (cold storage option only) |

Definition of Directions

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

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.

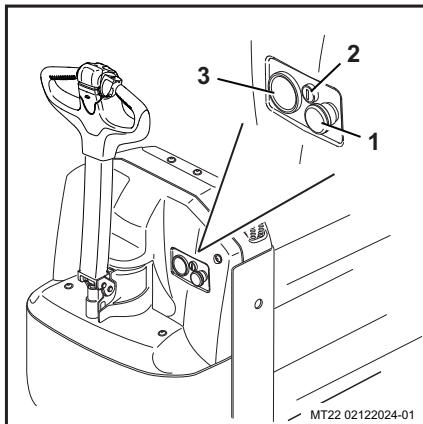
When placing a new truck into service, the wheel mounting screws or nuts must be checked for tightness every 10 hours until no further loosening is detected. See the procedure for checking wheels and tires in the Maintenance section.

Turning the Truck On and Off ▸

Switching the truck on

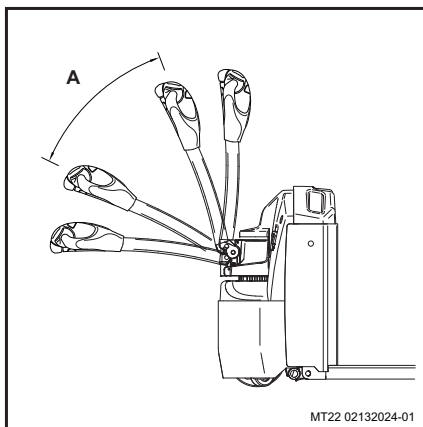
To turn the truck on, make sure the emergency stop button (1) is not pushed in and the control handle is released to its vertical position. Turn the key switch (2) clockwise. The indicator unit (3) should briefly display truck serial number before defaulting to accumulated hours.

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

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).

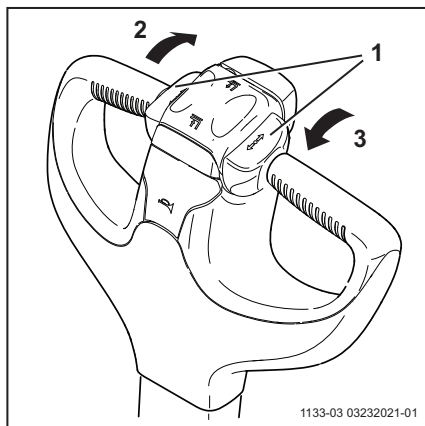
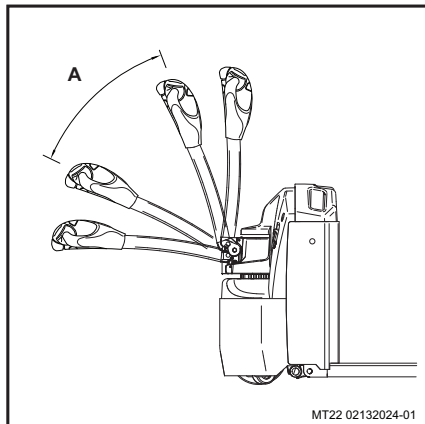
The truck will move forward. The speed is proportional to both the amount of control rotation and handle position. Remain at arm's length beside the truck during forward motion. Use only the hand nearest the truck to operate the travel control.

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

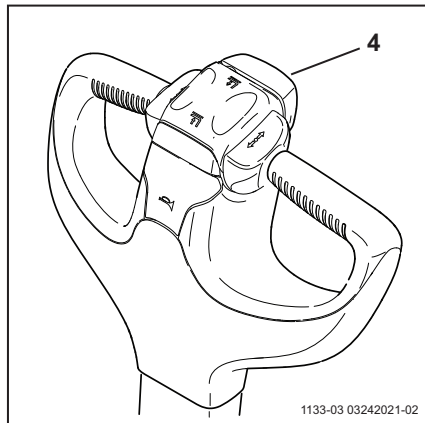
- With the control handle in the working range, press the travel control so that it rotates in the direction shown (3).

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 or for a pre-set time interval of a few seconds whichever occurs first. 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

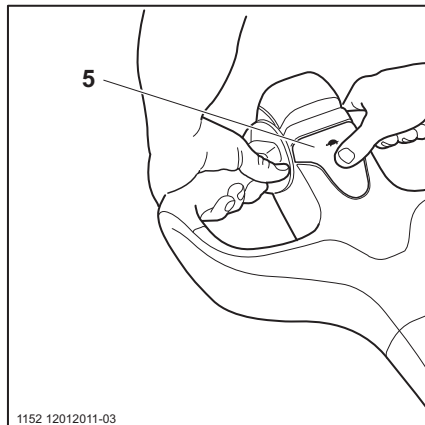
- To change direction at any time during travel, release the travel control and press it in the opposite direction. This can be done while the truck is still moving in the original direction. The truck will be electrically braked to a stop and then begin moving in the new direction.

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.



Braking

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.

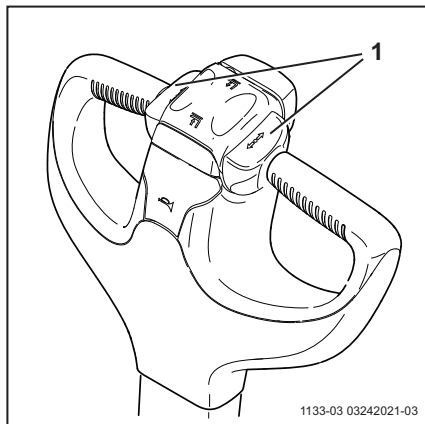


NOTE

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.

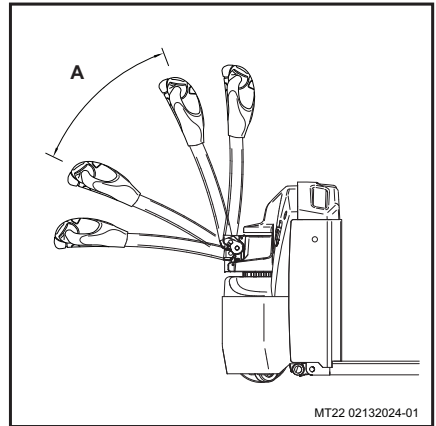


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Mechanical Brake

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.

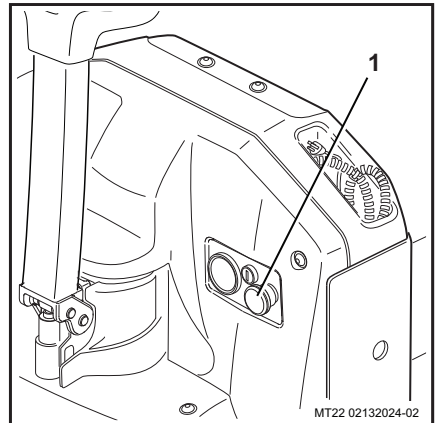


Emergency Stop Button

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.

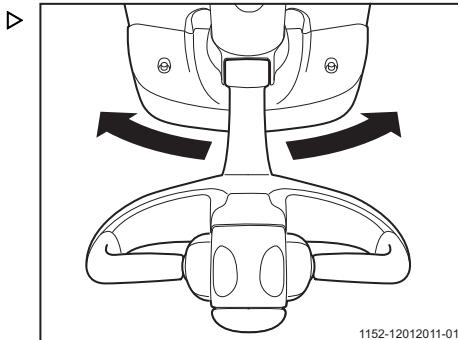
To resume operation, switch the truck off and twist the button clockwise slightly. It will pop back up into the operating position and the battery will be connected. The truck may then be switched on normally.



Steering

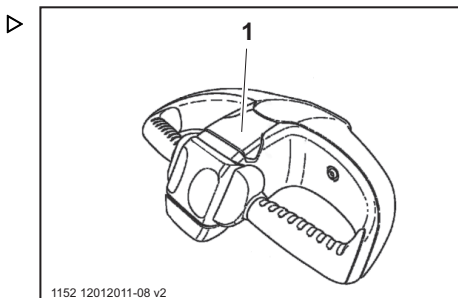
Steering

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.



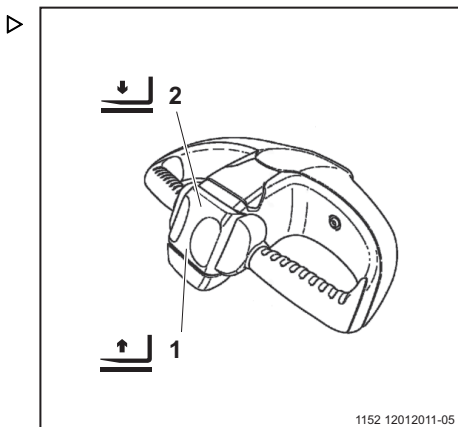
Raising and Lowering the Forks

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

Battery Description

The truck is powered by a 24-volt, 100 Amp-hour lithium-ion battery. It is positioned in a battery compartment just forward of the forks. The battery and charger may be accessed if necessary by removing the top cover. It is not necessary to access the battery compartment during normal operating procedures.

⚠ WARNING

The battery can deliver a harmful shock if contact occurs with terminals or wiring.

The top cover should only be removed by personnel trained in servicing powered industrial equipment and lithium-ion batteries.

Battery charge state is given by the display unit. The display unit is explained in chapter 3.

The battery is permanently installed in the chassis and is not intended to be routinely removed. The procedure for removal is beyond the scope of this manual but can be found in the service manual.

Charging the Battery with the On-board Charger

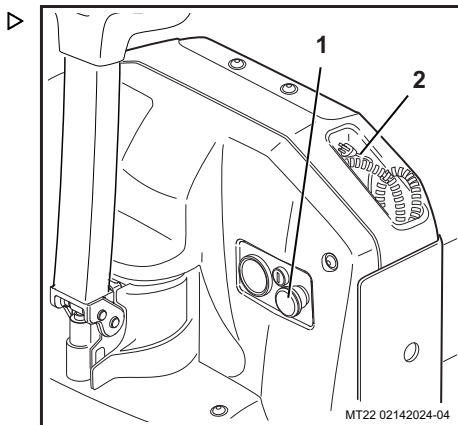
⚠ WARNING

Specialized training is required to handle batteries safely.

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

Follow these steps to charge a battery with the on-board charger.

- Park the truck in the designated charging area.
- Switch the truck off with the key switch.
- Press the emergency stop button (1).
- Pull the charger power cord (2) out of the truck and plug it into a 110 volt outlet.



Battery

- Confirm that the charger LED lights red to indicate charging. The charger LED is located in the storage compartment for the power cord.
- The LED will turn green when the battery is fully charged.



NOTE

At 80% discharge, full charge will require approximately 3 hours.

If the LED is continuous yellow, there is a fault with the battery. Flashing yellow indicates a fault with the charger.

- When charging is complete, unplug the charger from the 110 volt outlet and store the power cord.
- Twist the emergency stop button slightly to release it. The truck is now ready for service.

A fully charged battery can power the truck continuously for approximately four hours.

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.

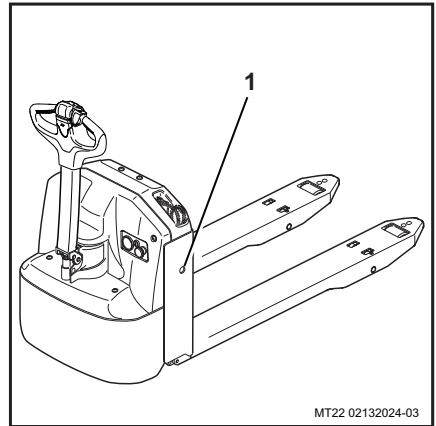
- Switch the truck off and press the emergency stop button.
- Ensure the power cord for the on-board charger is securely stored inside its storage compartment.
- Attach lifting equipment to the holes (1) in each side of the chassis. Ensure all lifting slings, hooks, or other equipment remains clear of the on-board charger power cord.

⚠ WARNING

Pinching the power cord of the on-board charger can cause damage that can result in shock or fire.

Ensure all lifting equipment remains out of contact with any part of the on-board charger during the entire hoisting procedure.

- Attach lifting equipment to the fork tips to keep the truck approximately horizontal as it is lifted.



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 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

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 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.

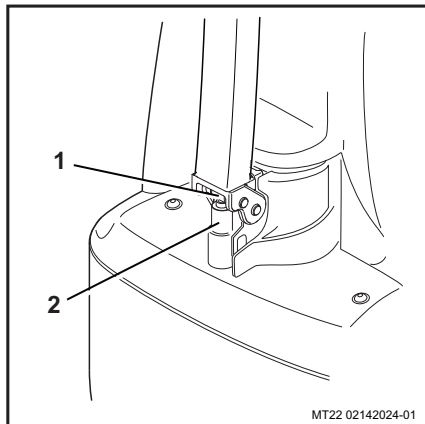
Drive Wheel Fastener Torque

88.5-103 ft-lbs (120-140 Nm)

Routine Lubrication and Inspection

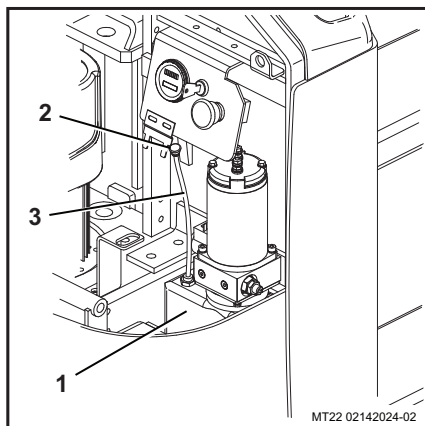
Lubricate Handle Pivot

Apply grease by hand or brush to the pivot roller (1) and the slide tube (2) of the handle pivot return mechanism.



Check Hydraulic Oil Level

Lower the forks completely and verify that there is adequate oil in the reservoir (1). Remove the cap (2) and add hydraulic oil as necessary through the flexible filler tube (3). See the Fluid and Lubricant Specifications section for oil specifications.



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.

Scheduled Maintenance

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.
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.

Additional 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.
Change the gear oil.
Check driving speeds.
Hydraulics
Check lift cylinder for damage and ensure that they are properly secured.
Change hydraulic oil.
Check overflow pressure.

Scheduled Maintenance

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



Fluids and Lubricants

Fluids and Lubricants

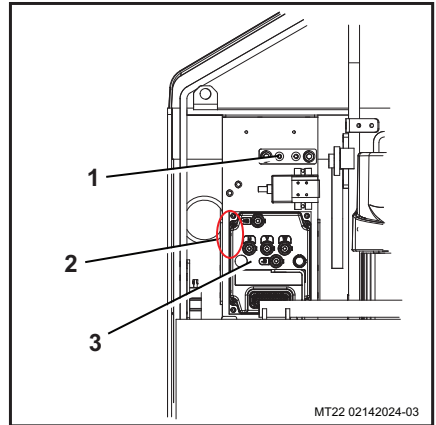
Lubricant Specifications and Capacities

Fluid or Lubricant	Specification	Capacity	Position used
Antifriction hydraulic oil	L-HM32	0.51 qt (0.48 L)	Hydraulic oil reservoir
Multi-purpose lubricating grease	Polylub GA352P	As appropriate	Sliding surfaces
Gear oil	GL-80W/90 (GL-5)	1.46 qt (1.38 L)	Transmission

Troubleshooting

Fuses

The truck has a 100 amp power fuse (1) mounted above the contactor. There are two 10 amp control fuses in holders in the wiring harness in the area (2) (shown by the red circle) near the main controller (3).

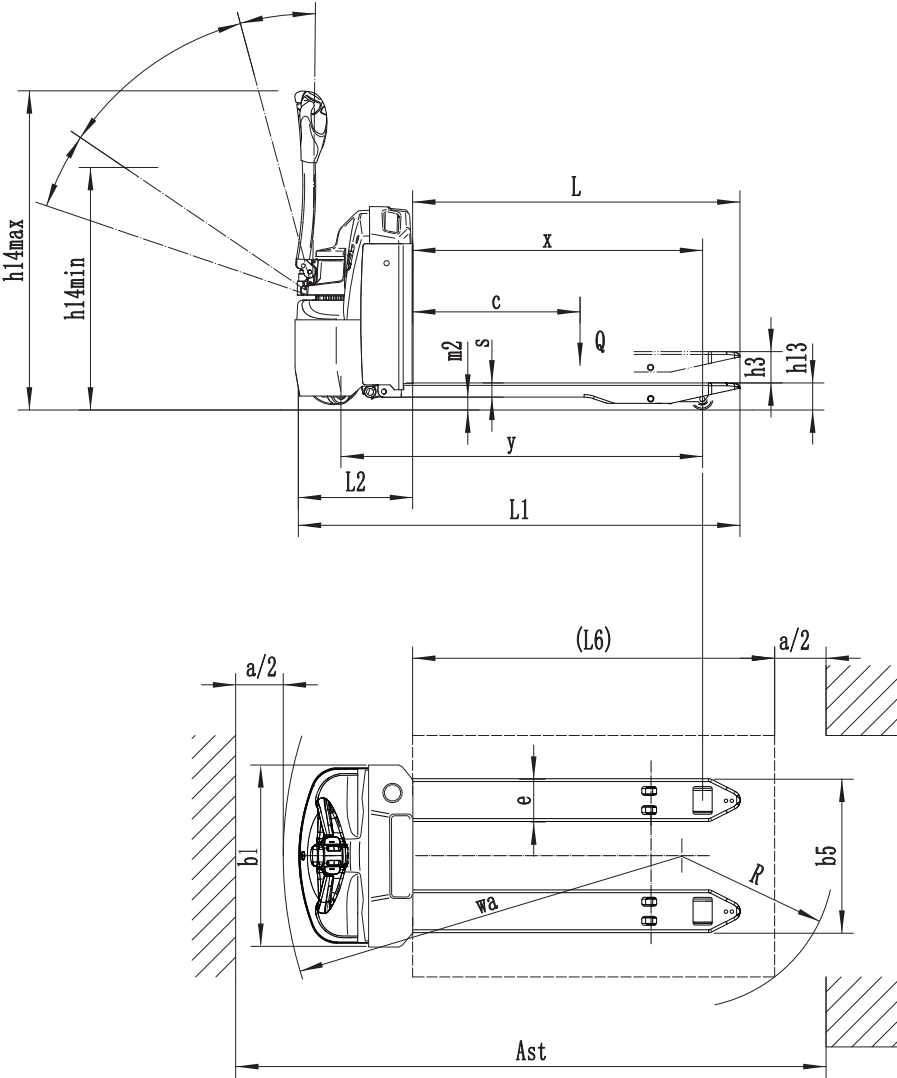


6

Specifications

Dimensions

Dimensions



MT22 02202024-01

Specifications

Description	
Manufacturer	Linde
Model	MT22
Drive type	Electric
Operation: manual, accompanied, standing, seated, order picking	Accompanied
Nominal load capacity (Q)	4400 lb (2000 kg)
Load center (c)	24 in. (600 mm)
Axle center to fork face (x) (lowered)	38.7 in (982 mm)
Wheelbase (y) (lowered)	51.2 in (1300 mm)

Weight	
Service weight	Refer to vehicle data plate

Wheels	
Tire type (drive/load)	poly/poly
Drive wheel size Ø x w	9 x 3 in (230 x 75 mm)
Load wheel size Ø x w	3.1 x 4.5 in (80 x 115 mm)
Caster wheel size Ø x w (optional)	2.9 x 1.2 in (74 x 30 mm)
Wheels, number drive/load (x=traction)	1x+2
Track width front, (casters) (b10)	19 in (483 mm)
Track width, rear, (load) (b11)	See Dimensions table

Dimensions	
Lift height (h3)	4.9 in (125 mm)
Handle height, travel position (min./max.) (h14)	35.4/48.4 in (900/1230 mm)
Fork height, lowered (h13)	3.25 in (82.5 mm)
Overall length (l1)	63.8 in (1620 mm)
Length to fork face (l2)	18.5 in (470 mm)
Total width, standard forks (b1)	28.1 in (714 mm)
Dimensions of forks (s/e/l)	2x6.7x45 in (nom) (55x170x1150 mm)
Fork spread, standard forks (outside of forks) (b5)	27 in (685 mm)
Track width, rear, (load) (b11)	14.6 in (370 mm)
Ground clearance at centre of wheelbase, with load (m2)	1.1 in (27 mm)
Aisle width with 800 x 1200 mm pallet along forks (Ast)	81.9 in (2080 mm)
Turning radius (Wa)	52 in (1320 mm)

Specifications

Performance data	
Driving speed, full load/no load	3.4/3.5 mph (5.5/5.6 km/h)
Lifting speed, full load/no load	4.33/4.33 fpm (0.022/0.022 m/s)
Lowering speed, full load/no load	7.68/7.68 fpm (0.039/0.039 m/s)
Maximum climbing ability, with/without load	8/16 %
Brake type	Electromagnetic

Drive	
Traction motor rating S2 60 min	2.14 hp (1.6 kW)
Lifting motor rating at S3 15%	1.07 hp (0.8 kW)
Battery type	Lithium battery
Battery voltage, nominal capacity K5	24 V / 100 Ah
Battery weight ($\pm 10\%$)	Refer to vehicle data plate

Other	
Drive type	AC
Noise level at operator's ear	<74 dB(A)

B

Battery	
description.	31
on-board charger.	31
Before operation.	6
Brake system.	28

C

California Health & Safety Code.	II
Capacities, lubricants.	44
Capacity, load	
lifting.	20
Cleaning the truck.	36
Commissioning, new truck.	24
Control handle	
steering with.	30
Controls	
creep speed button.	27
fork lift and lower button.	30
horn button.	30
key switch.	25
Creep speed function.	27

D

Daily maintenance inspection.	37
Data plate.	12, 20
Description, technical.	16
Dimensions.	48
Drive wheel fasteners	
tightening.	39
torque specification.	39
Driving.	26

E

Electric braking.	28
Emergency reverse button.	27
Emergency stop button.	29

H

Hazardous substances.	10
Hoisting the truck.	33
Horn.	30
Hydraulic oil	
safety information.	11

I

Inclines, Ramps, Docks, Elevators.	7
Initial commissioning (new truck).	24

L

Lifting.	30
Lifting capacity.	20
Lifting the truck.	33
Load capacity	
lifting.	20
Lowering the forks.	30
Lubricants, specifications and capacities.	44

M

Maintenance	
general information.	41
interval information.	41
Maintenance schedule.	42
Mechanical brake.	29

N

New truck, preparing for operation.	24
---	----

O

Oils	
safety information.	10

P

Parking.	8
Personnel qualifications for maintenance.	
10,	36
Preventive maintenance schedule.	42
Proposition 65.	II

Q

Qualifications for maintenance personnel.	
10,	36

R

Raising the forks.	30
Regenerative braking.	28

S

Scheduled maintenance charts.	42
Scheduled maintenance (see also Maintenance)	
charts.	41
general information.	41
Shut-down procedure.	25
Specifications.	49
Lubricants.	44
Start-up procedure.	25
Static-return-to-neutral.	25

W

Wheel fasteners, drive	
tightening.	39
torque specification.	39

KION North America Corporation

8932 series MT22 89328011640 US - 01/2024 - 01