



Original instructions

Electric Pallet Stacker

ECV 10 C
ECV 10i C
ECV 10



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first in intralogistics

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Rules for the operating company of industrial trucks

In addition to these operating instructions, a code of practice containing additional information for the operating companies of industrial trucks is also available.

This guide provides information for handling industrial trucks:

- Information on how to select suitable industrial trucks for a particular area of application
- Prerequisites for the safe operation of industrial trucks
- Information on the use of industrial trucks
- Information on transport, initial commissioning and storage of industrial trucks

Internet address and QR code



The information can be accessed at any time by pasting the address <https://m.still.de/vdma> in a web browser or by scanning the QR code.



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Introduction

Your industrial truck

Your industrial truck

General

The truck described in these operating instructions corresponds to the applicable standards and safety regulations.

If the truck is to be operated on public roads, it must conform to the existing national regulations for the country in which it is being used. The driving permit must be obtained from the appropriate office.

The truck has been fitted with state-of-the-art technology. Following these operating instructions will allow the truck to be handled safely. By complying with the specifications in these operating instructions, the functionality and the approved features of the truck will be retained.

Get to know the technology, understand it and use it safely - these operating instructions provide the necessary information and help to avoid accidents and to keep the truck ready for operation beyond the warranty period.

Therefore:

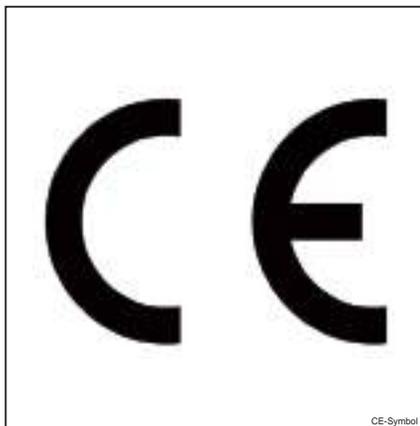
- Before commissioning the truck, read the operating instructions and follow the instructions.
- Always follow all of the safety information contained in the operating instructions and on the truck.

CE labelling

The manufacturer uses CE labelling to indicate that the truck complies with the standards and regulations valid at the time of marketing. This is confirmed by the issued EC declaration of conformity. The CE labelling is attached to the nameplate.

An independent structural change or addition to the truck can compromise safety, thus invalidating the EC declaration of conformity.

The EC declaration of conformity must be carefully stored and made available to the responsible authorities.



Information about documentation

EC declaration of conformity

Declaration	
STILL GmbH Berzeliusstraße 10 22113 Hamburg Germany	
We declare that the machine	
Industrial truck	according to these operating instructions
Model	according to these operating instructions
conforms to the latest version of the Machinery Directive 2006/42/EC	
Personnel authorised to compile the technical documents:	
See EC compliance declaration	
STILL GmbH	

EC declaration of conformity

The manufacturer declares that the truck complies with the requirements of the EC machinery directive and any other EC directives, if applicable, that are valid at the time of placing on the market. This is confirmed by the EC declaration of conformity and by the CE labelling on the nameplate.

The EC declaration of conformity document is delivered with the truck. The declaration

shown explains the conformity with the requirements of the EC machinery directive.

An independent structural change or addition to the truck can compromise safety, thus invalidating the EC declaration of conformity.

The EC declaration of conformity must be carefully stored and made available to the responsible authorities if applicable. It must also be handed over to the new owner if the truck is sold on.

Information about documentation

Documentation scope

- Operating instructions
- Operating instructions for attachment parts (special equipment)
- Spare parts list
- VDMA rules for the proper use of industrial trucks (EU countries only)

These operating instructions describe all measures necessary for the safe operation and

proper maintenance of the truck in all possible variants at the time of printing. Special designs to meet customer requirements are documented in separate operating instructions. If you have any questions, please contact your service centre.

Enter the production number and the year of production located on the nameplate in the field provided:

Production no.
Year of production

Please quote these numbers for all technical enquiries.

Operating instructions are provided with each truck. These instructions must be stored carefully and must be available to the driver and operator at all times.

Copyright and property rights

This manual - and any excerpts thereof - may not be reproduced, translated or transmitted in any form to third parties without the express written permission of the manufacturer.

If the operating instructions are lost, the operator must immediately request a replacement from the manufacturer.

The operating instructions are included in the spare parts list and can be reordered there as a spare part.

Personnel responsible for operating and maintaining the equipment must be familiar with these operating instructions.

The operating company (see ⇒ Chapter "Definition of terms used for responsible persons", P. 22) must ensure that all operators have received, read and understood these instructions.

Thank you for reading and complying with these operating instructions. If you have any questions or suggestions for improvements, or if you have found any faults, please contact your service centre.

Information about documentation

Explanation of symbols used

DANGER

Compulsory procedure that must be followed to avoid danger to life or physical harm.

WARNING

Compulsory procedure that must followed to avoid injury.

CAUTION

Compulsory procedure that must be followed to avoid material damage and/or destruction.

NOTE

For technical requirements that require special attention.

ENVIRONMENT NOTE

To prevent environmental damage.

Date of edition and latest update of this manual

The publication date of these operating instructions is printed on the cover sheet.

The manufacturer makes continuous efforts to improve its industrial trucks, and therefore reserves the right to implement changes and to accept no claims concerning the information provided in this manual.

To receive technical assistance, please contact the service centre authorised by your closest manufacturer.

List of abbreviations



NOTE

This list of abbreviations applies to all types of operating instructions. Not all of the abbreviations that are listed here will necessarily appear in these operating instructions.

Abbreviation	Meaning	Explanation
ABE	Display operating unit	
ArbSchG	Arbeitsschutzgesetz	German implementation of EU occupational health and safety directives
Betr-SichV	Betriebssicherheitsverordnung	German implementation of the EU working equipment directive
BG	Berufsgenossenschaft	German insurance company for the company and employees
BGG	Berufsgenossenschaftlicher Grundsatz	German principles and test specifications for occupational health and safety
BGR	Berufsgenossenschaftliche Regel	German rules and recommendations for occupational health and safety
DGUV	Berufsgenossenschaftliche Vorschrift	German accident prevention regulations
CE	Communauté Européenne	Confirms conformity with product-specific European directives (CE mark)
CEE	Commission on the Rules for the Approval of the Electrical Equipment	International commission on the rules for the approval of electrical equipment
DC	Direct Current	Direct current
DFÜ	Datenfernübertragung	Remote data transmission
DIN	Deutsches Institut für Normung	German standardisation organisation
EG	European Community	

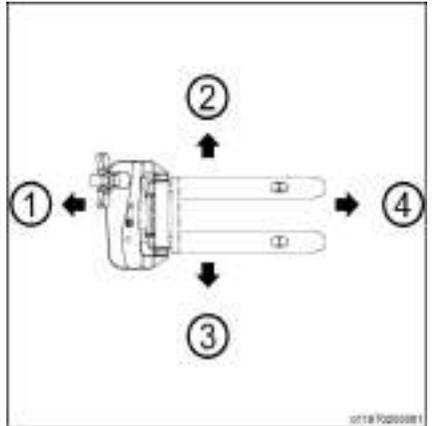
Information about documentation

Abbreviation	Meaning	Explanation
EN	European standard	
FEM	Fédération Européene de la Manutention	European Federation of Materials Handling and Storage Equipment
F_{max}	maximum Force	Maximum power
GAA	Gewerbeaufsichtsamt	German authority for monitoring/issuing regulations for worker protection, environmental protection, and consumer protection
GPRS	General Packet Radio Service	Transfer of data packets in wireless networks
ID no.	ID number	
ISO	International Organization for Standardization	International standardisation organisation
LAN	Local Area Network	Local area network
K_{pA}	Uncertainty of measurement of sound pressure levels	
LED	Light Emitting Diode	Light emitting diode
L_p	Sound pressure level at the workplace	
L_{pAZ}	Average continuous sound pressure level in the driver's compartment	
LSP	Load centre of gravity	Distance of the centre of gravity of the load from the front face of the fork backs
MAK	Maximum workplace concentration	Maximum permissible air concentrations of a substance at the workplace
Max.	Maximum	Highest value of an amount
Min.	Minimum	Lowest value of an amount
PIN	Personal Identification Number	Personal identification number
PPE	Personal protective equipment	
SE	Super-Elastic	Superelastic tyres (solid rubber tyres)
SIT	Snap-In Tyre	Tyres for simplified assembly, without loose rim parts
StVZO	Straßenverkehrs-Zulassungs-Ordnung	German regulations for approval of vehicles on public roads
TRGS	Technische Regel für Gefahrstoffe	Ordinance on hazardous materials applicable in the Federal Republic of Germany
VDE	Verband der Elektrotechnik Elektronik Informationstechnik	German technical/scientific association

Abbreviation	Meaning	Explanation
VDI	Verein Deutscher Ingenieure	German technical/scientific association
VDMA	Verband Deutscher Maschinen- und Anlagenbau e.V.	German Mechanical Engineering Industry Association
WLAN	Wireless LAN	Wireless local area network

Drive directions

The drive directions of the vehicle are forward (1), reverse (4), left (2) and right (3). ▷

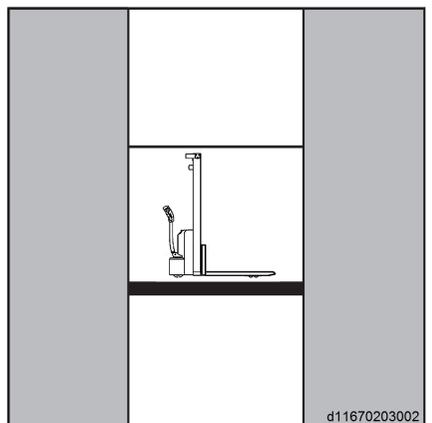


Illustrations

At many points in this documentation the (mostly sequential) operation of certain functions or operating procedures is explained. To illustrate these operations, schematic representations of a truck are used. ▷

i NOTE

These schematic representations do not represent the design state of the documented truck. They only serve to illustrate operating procedures.



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Environmental considerations

Environmental considerations

Packaging

During delivery of the truck, certain parts are packaged to provide protection during transport. This packaging must be removed completely prior to initial start-up.

ENVIRONMENT NOTE

The packaging material must be disposed of properly after delivery of the truck.

Disposal of components and batteries

The truck is composed of different materials. If components or batteries need to be replaced and disposed of, they must be:

- disposed of,
- treated or
- recycled in accordance with regional and national regulations.

NOTE

The documentation provided by the battery manufacturer must be observed when disposing of batteries.

ENVIRONMENT NOTE

We recommend working with a waste management company for disposal purposes.

Series

The electric Pallet Stacker is suitable for stacking operations in narrow aisles and confined spaces.

This series of electric pallet stacker includes the following models:

- 0342_ECV 10 C: simplex narrow electric pallet truck with rated load of 1000 kg.
- 0343_ECV 10i C: simplex narrow electric pallet truck with initial lift and rated load of 1000 kg.
- 0344_ECV 10 duplex narrow electric pallet truck with rated load of 1000 kg.

Technical description

This product has a compact chassis, 4-point ground contact, balanced tiller and a microprocessor electronic control system. The machine is lightweight, highly efficient and easy to handle.

Design

The latest ergonomic and practical design, adaptable to all operators and working conditions.

The polyurethane cowling provides superior stability and shock resistance, and has a variety of storage spaces.

The frame is made of thick steel plate and is suitable for the harshest working conditions.

Steering system

Extremely smooth steering makes the vehicle easier to manoeuvre in tight spaces.

A gas spring enables the tiller to quickly return to the vertical position after it is released.

Tiller

The composite construction tiller head provides excellent impact resistance.

The ergonomic control layout is suitable for left-handed and right-handed operators.

The horn, lifting and lowering devices can be operated using one hand without changing grip.

The walking, lifting and lowering devices, harnesses and components are IP65 dust- and water-resistant.

The anti-crush button integrated into the tiller head protects the operator if the vehicle recoils.

Driving

The MOSFET electronic control unit ensures comfortable use and lower costs.

Precise control of driving speed.

Jolt-free starting and smooth acceleration to maximum speed.

Simply release or turn the drive direction switch to brake.

Booster circuit prevents the truck rolling back when starting on a gradient.

Hydraulics

Gear pump driven by fully enclosed air-cooled motor.

Safety valve and lowering brake protect the hydraulic system.

Brake system

The electromagnetic brake with dust protection function can be used as a safety brake and parking brake. Braking is controlled by the drive controller, the brake's electromagnet acts on the motor shaft and automatic braking is activated when the tiller is in the horizontal or vertical position (end stop brake).

Battery

2 x 12 V/85 Ah batteries. The display instrument indicates the battery's remaining charge.

Use of the truck

Use of the truck

Intended use of the trucks

⚠ CAUTION

This machine was designed for the transport and storage on racks (pallet stackers only) of loads packed on pallets or in industrial containers designed for this purpose.

The dimensions and capacity of the pallet or container must be adapted to the load being transported and must ensure stability.

The table of characteristics and performance attached to this user manual gives you the information you need to check that the equipment is suitable for the work being carried out.

Any specific usage must be authorised by the site manager; an analysis of the potential risks associated with this usage will enable him to put in place any necessary additional safety measures.

Unauthorised use

Any danger caused as a result of unauthorised use becomes the responsibility of the operator or driver and not that of the manufacturer.

Use for purposes other than those described in these operating instructions is prohibited.

Transporting people is prohibited.

The forklift truck should not be used in areas where there is a risk of fire, explosion or corrosion, or in areas that are particularly dusty.

Stacking or unstacking is not permissible on inclined surfaces or ramps.

Place of use

The truck only can be used in indoors.

The sites on which the truck is used must comply with the applicable regulations (condition of the ground, lighting etc.).

The ground must have sufficient load capacity (concrete, asphalt).

The truck is suitable for indoor use (temperatures ranging from 5°C to +40°C). The maximum operation altitude is up to 2000 m.

The operator (see chapter entitled "Definition of terms used for responsible persons") must ensure that appropriate fire protection is available in the vicinity of the truck during operation.

Depending on the application, additional fire protection must be provided on the industrial truck. If in doubt, please contact the relevant authorities.

Residual risks

Residual risks

Despite careful operation and compliance with all applicable standards and regulations, the possibility of other dangers when using the truck cannot be entirely excluded.

The truck and additional equipment comply with applicable safety regulations. However, residual risks cannot be excluded even if the truck is used correctly and instructions are carefully followed.

Even beyond the danger areas of the truck itself, residual risks remain. Persons in the area around the truck must exercise particular caution. They must react immediately in the event of malfunction, incident, breakdown etc.

They must be informed of the risks associated with the use of the forklift.

These operating instructions also contain additional safety instructions.

Residual risks can include:

- Escape of consumables due to leakages or the rupture of lines, hoses or containers.
- Risk of accident when driving over difficult ground such as gradients, smooth or irregular surfaces, or with poor visibility etc.
- Risk of falling, tripping or slipping during movement of the truck, especially on wet or icy surfaces or in the event of consumable leaks.
- Risk of fire and explosion due to the battery and electrical voltages.
- Human error.
- Disregarding the safety regulations.
- Risk caused by unrepaired damage.
- Risk caused by insufficient maintenance and testing.
- Risk caused by using unsuitable consumables.

Special risks associated with using the truck and attachments

The manufacturer's approval is required as soon as:

- The truck is used differently from its normal use
- The driver is not sure if he can use the truck correctly and without risk of accident

Residual risks

Overview of hazards and counter-measures

 NOTE

This table is intended to help evaluate the hazards in your facility and applies to all drive types. It does not claim to be complete.

- Observe the national regulations for the country in which the truck is being used.

Hazard	Measure	Check note ✓ Complete - Not applicable	Notes
Truck equipment does not comply with local regulations	Test	○	If in doubt, consult competent factory inspectorate or employers' liability insurance association
Lack of skills and qualification of driver	Driver training (sit-on and stand-on)	○	BGG 925 VDI 3313 driver permit
Usage by unauthorised persons	Access with key only for authorised persons	○	
Truck not in a safe condition	Recurrent testing and rectification of defects	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Risk of falling when using working platforms	Compliance with national regulations (different national laws)	○	German Ordinance on Industrial Safety and Health (BetrSichV) and employer's liability insurance associations
Impaired visibility due to load	Resource planning	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Contamination of respiratory air	Assessment of diesel exhaust gases	○	Technical Regulations for Hazardous Substances (TRGS) 554 and the German Ordinance on Industrial Safety and Health (BetrSichV)
	Assessment of LPG exhaust gases	○	German threshold limit values list (MAK-Liste) and the German Ordinance on Industrial Safety and Health (BetrSichV)

Hazard	Measure	Check note √ Complete - Not applicable	Notes
Impermissible usage (improper usage)	Issuing of operating instructions	○	German Ordinance on Industrial Safety and Health (BetrSichV) and German Health and labour protection law (ArbSchG)
	Written notice of instruction to driver	○	German Ordinance on Industrial Safety and Health (BetrSichV) and German Health and labour protection law (ArbSchG)
	Note the German Ordinance on Industrial Safety and Health (BetrSichV), the operating instructions and the German Engineering Federation (VDMA) rules	○	
When fuelling			
a) Diesel	Note the German Ordinance on Industrial Safety and Health (BetrSichV), the operating instructions and the German Engineering Federation (VDMA) rules	○	
b) LPG	Note German Social Accident Insurance (DGUV) regulation D34, the operating instructions and the German Engineering Federation (VDMA) rules	○	

Residual risks

Hazard	Measure	Check note ✓ Complete - Not applicable	Notes
When charging the traction battery	Note the German Ordinance on Industrial Safety and Health (BetrSichV), the operating instructions and the German Engineering Federation (VDMA) rules	○	Association for Electrical, Electronic and Information Technologies (VDE) regulation 0510: In particular - Ensure adequate ventilation - Insulation value within the permissible range
When using battery chargers	Note the German Ordinance on Industrial Safety and Health (BetrSichV), employers' liability insurance association regulation 104 and the operating instructions	○	German Ordinance on Industrial Safety and Health (BetrSichV) and employers' liability insurance association regulation 104
When parking LPG trucks	Note the German Ordinance on Industrial Safety and Health (BetrSichV), employers' liability insurance association regulation 104 and the operating instructions	○	German Ordinance on Industrial Safety and Health (BetrSichV) and employers' liability insurance association regulation 104
With driverless transport systems			
Roadway quality inadequate	Clean/clear driveways	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Load carrier incorrect/slipped	Reattach load to pallet	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Drive behaviour unpredictable	Employee training	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Driveways blocked	Mark driveways Keep driveways clear	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Driveways intersect	Announce right-of-way rule	○	German Ordinance on Industrial Safety and Health (BetrSichV)
No person detection during depositing and retrieval	Employee training	○	German Ordinance on Industrial Safety and Health (BetrSichV)

Danger to employees

The operating company must identify and evaluate the dangers involved in using the truck. It must also establish which occupational health and safety measures are required to protect employees. Appropriate operating instructions must be drafted and provided for the driver accordingly. A person responsible for health and safety must be appointed.

Construction and equipment of the truck correspond to the Machinery Directive 2006/42/EC and they are therefore identified with the CE symbol. As a result, these factors are not included in the hazard assessment; nor are the attachments, which have their own CE labelling. The operating company must, however, select the type and equipment of the truck so as to comply with the local provisions for deployment.

The results must be published. In the case of truck deployment involving similar hazard situations it is permitted to summarise the results. This overview (see chapter entitled "Overview of hazards and countermeasures") is intended to facilitate compliance with the conditions of these regulations. The overview indicates the main causes of accidents in the event of non-compliance. If other major operational hazards are involved, they must also be taken into consideration.

The working conditions for the trucks are largely similar for many sites. The dangers can therefore be summarised in a single overview. It is recommended that the information provided by the relevant employers' liability insurance association be observed in this respect.

2

Safety

Definition of terms used for responsible persons

Definition of terms used for responsible persons

Operating company

The operating company is the natural or legal person or group who operates the truck or on whose authority the truck is used.

The operating company must ensure that the truck is only used for its intended purpose and in compliance with the safety guidelines set out in these operating instructions.

The operating company must ensure that all users read and understand the safety information in these instructions.

The operating company is responsible for the scheduling and correct performance of regular safety checks.

It is recommended that these checks comply with national performance specifications.

Specialist

A specialist is deemed to be:

- A person whose experience and technical training has allowed him to develop relevant knowledge of industrial trucks
- A person who is also familiar with national health and safety regulations and generally recognised technical directives and

conventions (standards, VDE regulations, technical regulations of other European Union member states or countries that are signatories to the treaty that established the European Economic Area). This expertise allows him to assess the condition of industrial trucks in terms of health and safety

Drivers

This truck may only be driven by suitable persons who are at least 18 years of age, have been trained in driving, have demonstrated their skills in driving and handling loads to the operating company or an authorised representative, and have been specifically instructed to drive the truck. Specific knowledge of the truck to be operated is also required.

The training requirements under §3 of the Health and Safety at Work Act and §9 of the plant safety regulations are deemed to have been satisfied if the driver has been trained in accordance with BGG (General Employers' Liability Insurance Association Act) 925. Observe the national regulations for your country.

Driver rights, duties and rules of behaviour

The driver must be trained in his rights and duties.

The driver must be granted the required rights.

The driver must wear protective equipment (protection suit, safety footwear, safety helmet, industrial goggles and gloves) that is appropriate for the conditions, the job and the load to be lifted. Solid footwear should be worn to ensure safe driving and braking.

The driver must be familiar with the operating instructions and have access to them at all times.

The driver must:

- have read and understood the operating manual
- have familiarised himself with safe operation of the truck
- be physically and mentally able to drive the truck safely

DANGER

The use of drugs, alcohol or medications that affect reactions impair the ability to drive the truck!

Individuals under the influence of the aforementioned substances are not permitted to perform work of any kind on or with the truck.

Prohibition of use by unauthorised persons

The driver is responsible for the truck during working hours. He must not allow unauthorised persons to operate the truck.

When leaving the truck, the driver must secure it against unauthorised use, e.g. by pulling out the key.

Basic principles for safe operation

Basic principles for safe operation

Insurance cover on company premises

The company premises are very often restricted public traffic areas.

NOTE

It is advisable to review the operational liability insurance so that insurance covers the truck with respect to third parties in the event of damage caused in restricted public traffic areas.

Modifications and refitting

If your truck is to be used in specific conditions (e.g. refrigerated warehouse or flameproof protection), it must be specially equipped and approved for this purpose, if applicable.

If your truck is used for work that is not specified in the guidelines or in these instructions, and it must be modified or refitted for this purpose, it is important to remember that any structural modification could affect truck handling while driving as well as the stability of the truck, and could lead to accidents. You should therefore contact the manufacturer before carrying out any modification. Permission from the manufacturer is required for any modification that may affect the truck's stability.

Any constructional modification or transformation of your truck is forbidden without prior written permission from the manufacturer. Authorisation from the relevant authority may also be required.

Warning regarding non-original parts

Original parts, attachments and accessories are specially designed for this truck. We draw your attention to the fact that parts,

SPECIAL CASE: if the manufacturer of the truck is no longer in business and its activity is unlikely to be taken over by a successor

In this specific case, you may plan a modification or alteration to your truck provided that:

- The modification or alteration is designed, tested and implemented by one or more engineers who are experts in the field of industrial trucks and their safety
- A record is kept of the design, the different tests and the implementation of the modification or alteration
- Appropriate changes are approved and made to the capacity plate, decals, labels and operating instructions
- a permanent and clearly visible label is attached to the truck indicating the nature of the modification or alteration as well as the date of the modification or alteration, and the name and address of the company that carried out the work.

attachment parts and accessories supplied by other companies have not been tested or approved by STILL.

⚠ CAUTION

The installation or use of such products may have a negative impact on the design of the truck and thus impair active or passive driving safety.

We recommend that you obtain approval from the manufacturer and, if applicable, from the relevant regulatory authorities before installing such parts. The manufacturer accepts no liability for any damage caused by the use of non-original parts and non-original accessories.

Damage, faults

Any damage or faults observed on the truck or the accessories must be reported immediately to the responsible personnel. The truck and accessories must never be used before they are correctly reconditioned as they cannot be guaranteed to be safe for operating or driving.

The safety mechanisms and switches must never be removed or disabled. The predefined setpoint values must not be modified.

Work on the electric installation (e.g. connecting a radio, additional lights or other accessories) is permitted only with the approval of the manufacturer.

Medical devices

The operation of medical devices, for example pacemakers or hearing aids, can be impaired. Check with your doctor or manufacturer if the medical devices are sufficiently protected against electromagnetic interference.

Basic principles for safe operation

Vibrations

Vibrations to which the hands and arms are exposed

The following value is valid for all truck models:

- $\bar{a}_w < 2.5 \text{ m/s}^2$



NOTE

It is mandatory to specify the hand-arm vibrations, even where the values do not indicate any danger, as in this case.

CAUTION

The value expressed above can be used to compare forklift trucks of the same category. It cannot be used to determine the operator's daily exposure to vibrations during real operation of the truck; these vibrations depend on the conditions of use (floor conditions, method of use etc.) and therefore daily exposure must be calculated using data from the place of use.

Safety tests

Carrying out regular inspections on the truck

The operating company must ensure that the truck is checked by a specialist at least once a year or after particular incidents.

As part of this inspection, the technical condition of the truck must be completely tested with regard to accident safety. In addition, the truck must be thoroughly checked for damage that may have been caused by improper use. A test log must be created. The results of the inspection must be retained at least until a further two inspections have been carried out.

The inspection date is indicated by an adhesive label on the truck.

- Arrange for the authorised service centre to perform regular testing on the truck.
- Observe the guidelines for tests carried out on the truck in accordance with FEM 4.004.

The operating company is responsible for ensuring that any defects are remedied without delay.

- Notify your authorised service centre.



NOTE

In addition, observe the national regulations for the country of use.

Insulation testing

The insulation of the truck must have sufficient insulation resistance. For this reason, insulation testing in accordance with DIN EN 1175 and DIN 43539, VDE 0117 and VDE 0510 must be conducted at least once yearly as part of the FEM testing.

The insulation testing results must be at least the test values given in the following two tables.

- For insulation testing, contact the authorised service centre.



Safety tests

The exact procedure for this insulation testing is described in the workshop manual for this truck.

NOTE

The truck's electrical system and drive batteries must be checked separately.

Test values for the drive battery

Component	Recommended test voltage	Measurements		Nominal voltage U_{Batt}	Test values
Battery	50 VDC	Batt+ Batt-	Battery tray	24 volts	> 1200 Ω
	100 VDC			48 volts	> 2400 Ω
	100 VDC			80 volts	> 4000 Ω

Test values for the entire truck

Nominal voltage	Test voltage	Test values for new trucks	Minimum values over the duration of the service life
24 volts	50 VDC	Min. 50 k Ω	> 24 k Ω
48 volts	100 VDC	Min. 100 k Ω	> 48 k Ω
80 volts	100 VDC	Min. 200 k Ω	> 80 k Ω

Safety regulations for handling consumables

Permissible consumables

WARNING

Consumables can be dangerous.

It is necessary to follow the safety regulations when handling these substances.

Refer to the maintenance data table for the permissible substances necessary for operation.

Oils



DANGER

Oils are flammable!

- Follow the statutory regulations
- Do not allow oils to come into contact with hot motor parts.
- No smoking, fires or flames!

WARNING

There is a risk of slipping on spilled oil, particularly when combined with water!

- Collect spilled oil immediately using an oil-binding agent and dispose of it in accordance with regulations.



DANGER

Oils are toxic!

- Avoid contact and consumption
- In case of inhalation of steam or fumes, breathe fresh air immediately.
- After contact with the eyes, rinse thoroughly with water (for at least 10 minutes) and then consult an eye specialist.
- If swallowed, do not induce vomiting. Seek immediate medical attention.



ENVIRONMENT NOTE

Oils are water pollutants!

Always store oil in containers that comply with the applicable regulations.

Avoid spilling oils.

Collect spilt oil immediately using an oil binding agent and dispose of it in accordance with regulations.

Dispose of old oils according to the applicable regulations.



WARNING

Prolonged intensive contact with the skin can result in loss of skin oils and cause irritation.

- Avoid contact and consumption.
- Wear protective gloves!
- After any contact, wash the skin with soap and water and then apply a skin care product.
- Immediately change soaked clothing and shoes.

Safety regulations for handling consumables

Hydraulic fluid

**⚠ WARNING**

During operation of the forklift truck, hydraulic fluids are pressurised and are hazardous to your health.

- Do not spill these fluids!
- Follow the statutory regulations
- Do not allow the fluids to come into contact with hot motor parts.
- Do not allow to come into contact with the skin.
- Avoid inhaling the spray
- Penetration of pressurised 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, seek medical advice immediately.
- To avoid injury, use appropriate personal protective equipment (e.g. protective gloves, industrial goggles, skin protection and skin care products).

Hydraulic fluid is a water-polluting substance!

Always store hydraulic fluid in containers complying with the regulations.

Avoid spilling.

Spilt hydraulic fluid should be removed with oil-binding agents at once and disposed of according to the regulations.

Dispose of old hydraulic fluid according to regulations.

**ENVIRONMENT NOTE**

Battery acid

**⚠ WARNING**

Battery acid contains dissolved sulphuric acid. This is toxic.

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

**⚠ WARNING**

Battery acid contains dissolved sulphuric acid. This is corrosive.

- When working with battery acid, always wear protective clothing and eye protection.
- Do not allow any acid to get onto the 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 spilt battery acid with plenty of water.
- Follow the statutory regulations

**ENVIRONMENT NOTE**

- Dispose of used battery acid in line with the applicable regulations.

Disposal of consumables



ENVIRONMENT NOTE

Materials that have to be disposed of following maintenance, repair and cleaning must be systematically collected and disposed of in accordance with regulations. Observe the national regulations for your country. Work may only be carried out in areas designated for this purpose. Take care to minimise, as far as possible, any impact on the environment.

- Any spillage of fluids such as hydraulic oil, brake fluid or gear lubricant oil must be immediately soaked up with an oil-binding agent.
- The regulations for disposal of used oil are applicable.
- Any spillage of battery acid must be neutralised immediately.

Safety devices

Damage, faults

Any damage or faults observed on the truck or the accessories must be reported immediately to the responsible personnel. The truck and accessories must never be used before they are correctly reconditioned as they cannot be guaranteed to be safe for operating or driving.

The safety mechanisms and switches must never be removed or disabled. The predefined setpoint values must not be modified.

Work on the electric installation (e.g. connecting a radio, additional lights or other accessories) is permitted only with the approval of the manufacturer.

Battery connection cables

CAUTION

Using sockets with NON-ORIGINAL battery connection cables can be dangerous (see purchase references in the parts catalogue)

EMC – Electromagnetic compatibility

EMC – Electromagnetic compatibility

Electromagnetic compatibility (EMC) is a key quality feature of the truck.

EMC involves

- limiting the emission of electromagnetic interference to a level that ensures the troublefree operation of other equipment in the environment.
- ensuring sufficient resistance to external electromagnetic interference so as to guarantee proper operation at the planned usage location under the electromagnetic interference conditions to be expected there.

An EMC test thus firstly measures the electromagnetic interference emitted by the truck and secondly checks it for sufficient resistance to electromagnetic interference with reference to the planned usage location. A number of electrical measures are taken to ensure the electromagnetic compatibility of the truck.

⚠ CAUTION

The EMC regulations for the truck must be observed.

When replacing truck components the protective EMC components must be installed and connected again.

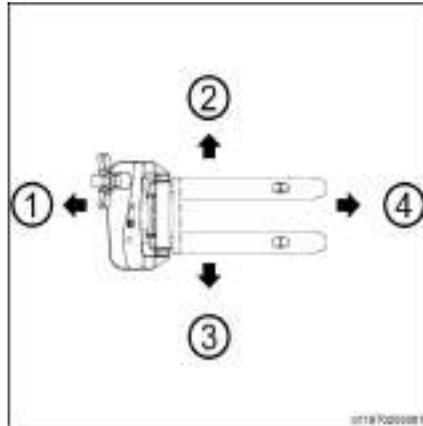
3

Views

Drive directions

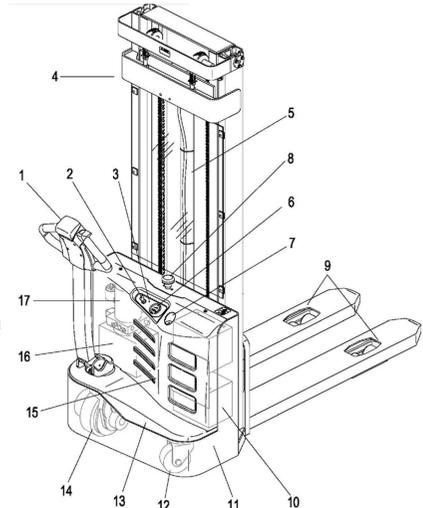
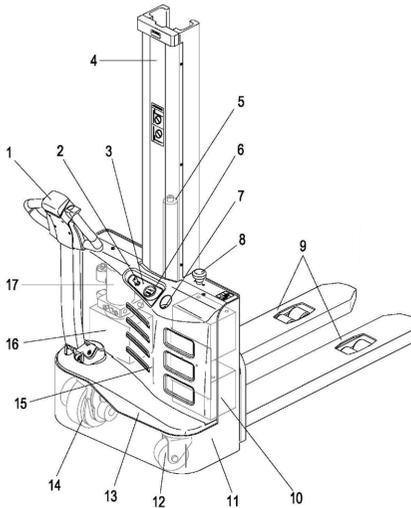
Drive directions

The drive directions of the vehicle are forward (1), reverse (4), left (2) and right (3).



Main Components

Truck Assemblies



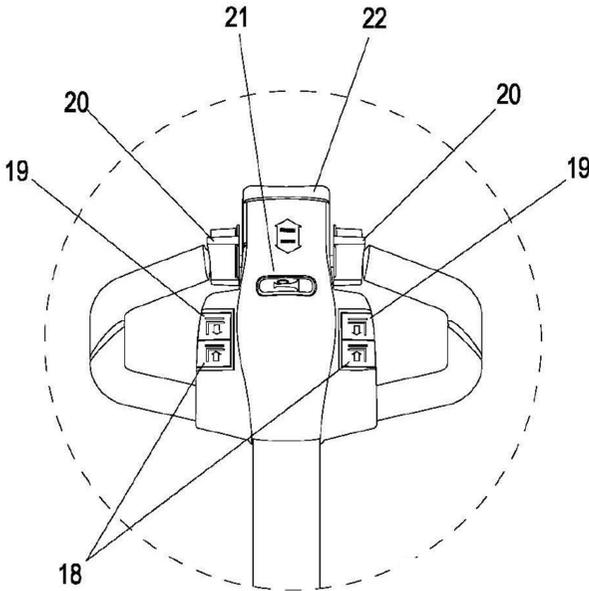
d11670203002

- 1 Tiller
- 2 Key switch
- 3 LED Lamp
- 4 Mast cover
- 5 Lift Cylinder
- 6 Battery discharge indicator
- 7 Battery charge connector
- 8 Emergency brake switch
- 9 Lift mechanism

- 10 Battery
- 11 Chassis
- 12 Balance wheel
- 13 Cover (nether)
- 14 Driving wheel
- 15 Cover(upper)
- 16 Tank
- 17 Hydraulic Pump

Main Components

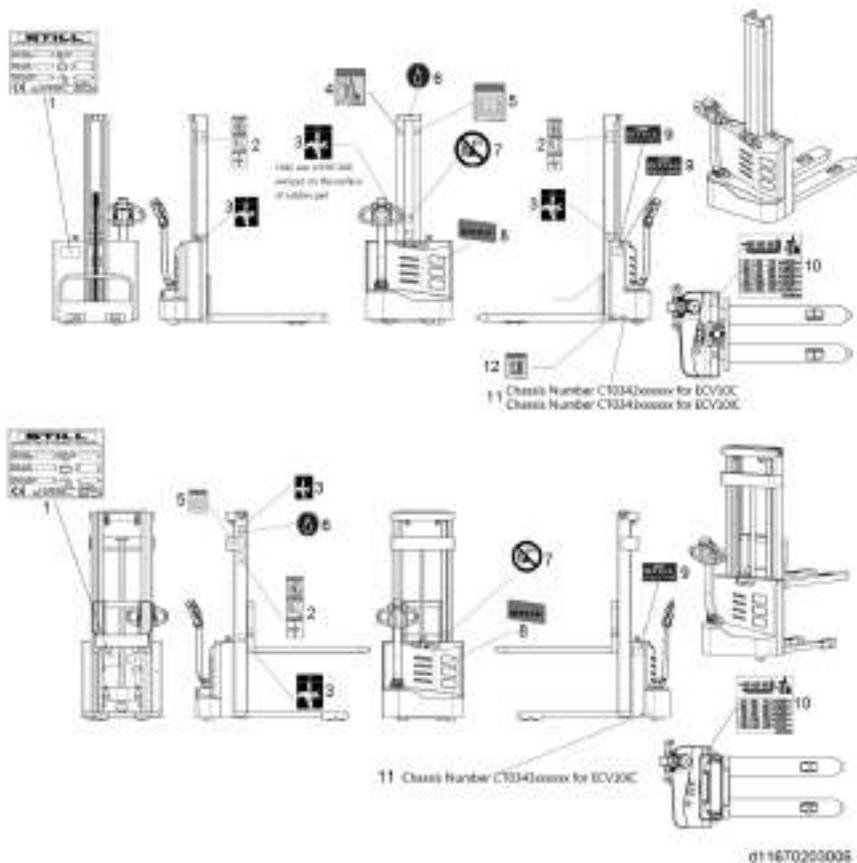
Tiller



d11670203003

- 18 "Lower" button
- 19 "Lift" button
- 20 Travel switch
- 21 Warning signal button
- 22 Collision safety switch

Dataplate and safety labels



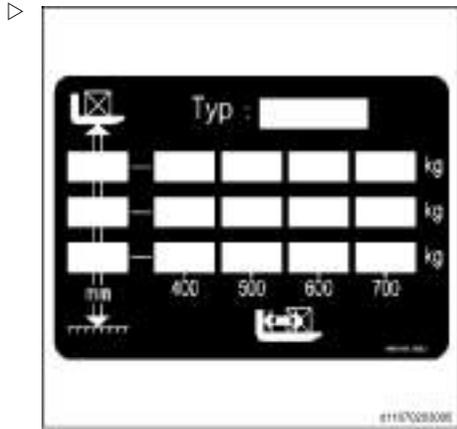
- | | | | |
|---|---|----|--|
| 1 | Truck identification plate | 7 | Driving safety label (Adjust position for initial lift version only) |
| 2 | Prohibition label | 8 | Company logo |
| 3 | Mast safety label | 9 | LOGO sticker |
| 4 | Warning label (For initial lift version only) | 10 | Load curve |
| 5 | Indicator label | 11 | Vehicle body number |
| 6 | Truck slinging label | 12 | Warning label (For initial lift version only) |

Load label

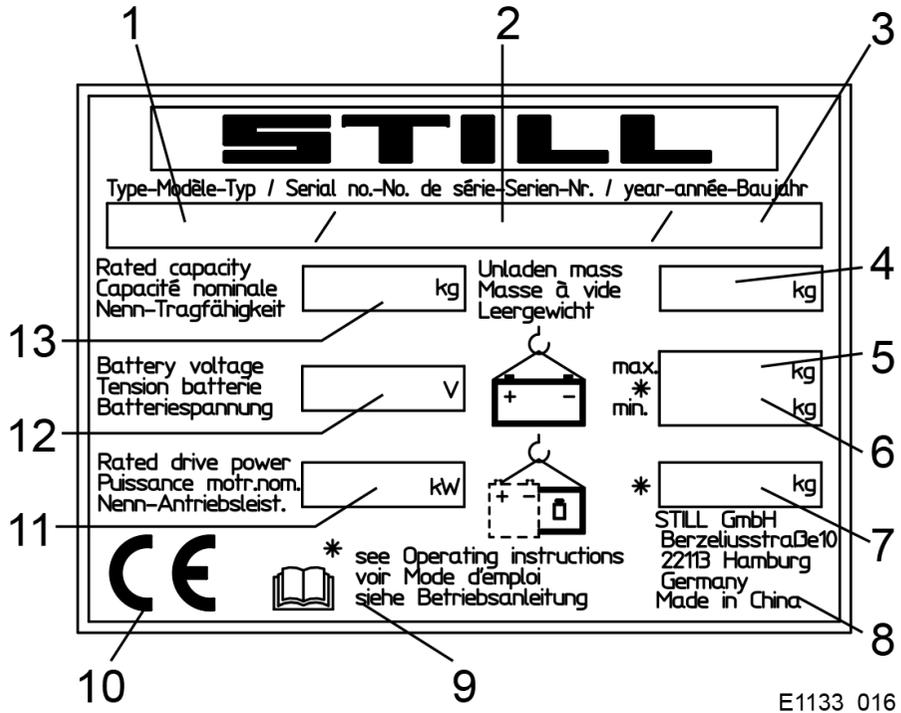
Load label

This label shows the relationship between the position of the load centre and the maximum load.

Before loading, check that the load and load centre distance are within the range permitted by the bearing capacity icons.



Identification plate



1 Type

2 Serial number

E1133_016

Identification plate

3	Year of manufacture	8	Manufacturer
4	Unladen mass in kg	9	Refer to technical data listed in this operating instructions for more detailed information
5	Max. permissible battery weight in kg (for electric trucks only)	10	CE label
6	Min. permissible battery weight in kg (for electric trucks only)	11	Rated drive power in kW
7	Own mass (self weight) in kg without battery	12	Battery voltage in V
		13	Rated capacity

Identification plate

4

Operation

Intended use of the trucks

Intended use of the trucks

⚠ CAUTION

This machine was designed for the transport and storage on racks (pallet stackers only) of loads packed on pallets or in industrial containers designed for this purpose.

The dimensions and capacity of the pallet or container must be adapted to the load being transported and must ensure stability.

The table of characteristics and performance attached to this user manual gives you the information you need to check that the equipment is suitable for the work being carried out.

Any specific usage must be authorised by the site manager; an analysis of the potential risks associated with this usage will enable him to put in place any necessary additional safety measures.

First use

	Carried out	
	✓	✗
Check forward and reverse driving control functions.		
Check lifting and lowering control functions.		
Check meter status.		
Check brake system function.		
Check the emergency off switch.		
Check horn.		
Check safety reverser function.		
Check battery status.		
Check steering function.		
Check for oil leakage.		
Check whether wheels are tightened.		

Daily checks before use

	Carried out	
	✓	✗
Check operation switch, display equipment and component functions.		
Check alarm system function.		
Check the function of the interlock switch.		
Check emergency power off function of emergency stop switch.		
Check the function of the steering system.		
Check travel switch setting function.		
Check the battery charging connector.		
Check that the battery cable connections are tight and grease the battery poles if necessary.		
Check the drive wheels and rollers for wear and damage.		
Check the hydraulic functions.		
Check brake function of electromagnetic brakes.		
Check whether optional functions are operating normally.		

Checking the working environment

Remember to check the working environment carefully before use.

There must not be any trace of leakage of consumables under the equipment.

The work area must be kept clear. There must not be any obstacles or people on the driving route.

The driver must be vigilant about anything that could hinder safe operation:

- There must not be any people in the vicinity of the vehicle
- There must not be any people under the forks after they have been lifted

- The driver must not use a media player or any other electronic device that may affect their peripheral awareness
- There must be no trace of grease on the floor

The driver must be particularly careful when transporting goods. The size of the goods may affect vehicle handling and obstruct visibility. The driver must slow down when braking or turning, because the truck may tip over.

The driver must slow down when passing obstacles, to prevent the truck from losing balance and driver hand-arm vibration.

Cleaning the Forklift

Cleaning the Forklift

Cleaning depends on the type of use and the workplace. Should the truck come into contact with highly aggressive elements such as salt water, fertilizers, chemical products, cement, etc., it should be cleaned as carefully as possible after every work cycle. It is preferable to use cold compressed air and detergents.

Use water-dampened rags to clean the parts of the body.

CAUTION

Do not clean the truck with direct jets of water; DO NOT use solvents and petrols that could damage parts of the truck.

General information on batteries

You can choose different types of batteries. These must strictly comply with manufacturer instructions.

Please comply with the details and properties indicated on the battery type label.

NOTE

- *Battery maintenance or charging can only be performed by qualified personnel in accordance with these instructions and the battery manufacturer's instructions.*
- *Refilling batteries with an electrolyte solution is prohibited if they are a type that does not require maintenance.*
- *Batteries are recycled in accordance with national regulations; please comply with the relevant regulations.*
- *Open flames are prohibited when handling batteries, as the gas may cause an explosion.*

- *Non-flammable materials or liquids may be stored in locations where batteries are charged. Smoking is prohibited in these locations, which must also be kept ventilated.*
- *Please stop the vehicle before starting to charge or install/replace batteries.*
- *Before completing maintenance work, please ensure that all cables are connected correctly and do not interfere with other parts of the vehicle.*
- *Fire-fighting equipment must be prepared.*

NOTE

The truck must be parked in a suitable and safe place when batteries are being handled.

CAUTION

Metal or conductive objects must not be placed on top of the battery in order to prevent the battery from short circuiting.

Charging and discharging batteries

NOTE

Charging precautions

- *The vehicle must be parked in a well-ventilated room.*
- *There must be no metal parts on the surface of the battery.*

- Before starting to charge, check all cable connections and plug connectors for obvious damage.
- The related safety regulations of the battery and charging device manufacturer must be strictly observed.

Introduction to battery indicators (with hour meter)

The battery meter displays the remaining charge and number of hours.

After turning on the device with the key switch, the remaining charge and total run time will be displayed.

The remaining charge indicator will change colour based on charge changes.

Indicator colour	Remaining charge (reference value)
Green	70 — 100%
Orange	30 — 60%
Red flashing	0 — 20%

i NOTE

When 70% of the battery has been discharged, the indicator will start flashing red and give a "Battery Low" warning.

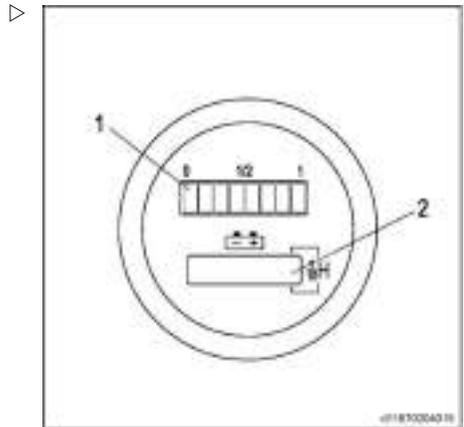
i NOTE

When 80% of the battery has been discharged, the last two indicator lights will flash red and give a "Battery Depleted" warning. The battery must be charged.

i NOTE

This vehicle has a low-voltage protection function. When the vehicle slows down but the fork is still able to lift, the vehicle will indicate that the battery voltage is insufficient and the controller will activate the low-voltage protection function. The battery now needs to be charged.

The hour meter (2) displays the total run time. Its display range is from 0.0 to 9999.0 hours



1 Remaining charge indicator
2 Hour meter (displays total run time)

Charging and discharging batteries

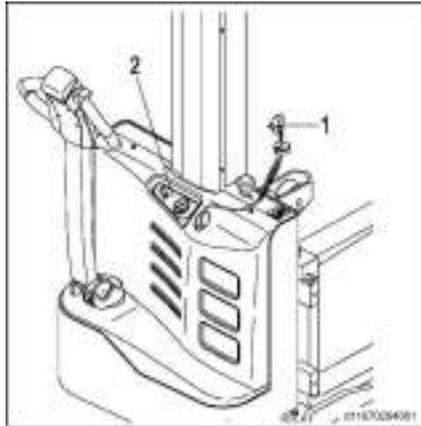
and it records the total time spent on driving and lifting operations. This is displayed in the background.

Charging procedure

- Control precautions Check for compliance with charging requirements.
- Park the truck as specified.
- Unplug the mains plug(1), then plug it into a suitable power supply. ▷

⚠ CAUTION

There is a risk of damage to the equipment. The charging voltage range is 100-240V. Please do not exceed this voltage range.



Charging indicator(2)

Charging indicator(2)	Description	Malfunction analysis
Red light remains lit	Charger is charging	Normal status
Green light remains lit	Battery charging is complete	Normal status
Yellow light remains lit	Battery fault	Battery voltage is less than 13V or greater than 32.5V
Flashing yellow light	Charging equipment fault	Output overcurrent; output overvoltage; charging equipment temperature is too high.
Flashing red light	No output current from charging equipment	Charging equipment damaged; remove battery.
Indicator lights fail to light up	Charging equipment fault	The input power cable is disconnected or the charging equipment is damaged.

Drive operations

Description

This device is designed for non-hazardous indoor environments. Its working temperature should be within the specified range.

These models comply with the EN 12895 standard on electromagnetic compatibility. Correct operation can no longer be guaranteed in areas where the electromagnetic fields could exceed the thresholds specified by the standard.

The trucks must be used on dry, clean, flat ground.

Low-lift stackers without initial lift can go over ramps and gentle slopes. Low-lift stackers with initial lift can go over larger obstacles.

Loads must be homogenous, with a maximum recommended height of 2 m.

⚠ CAUTION

Always adapt your driving to the ground conditions (uneven surfaces, etc.), particularly hazardous working areas and the load.

⚠ CAUTION

- To prevent the bottom of the lifting system from scraping the ground, always raise the forks halfway up before setting off.
- Remember to turn off the power supply before leaving the equipment.
- For effective protection, wearing safety footwear is compulsory.
- When travelling, the mast must be tilted backward and the load must be in the lowered position.

⚠ CAUTION

Driving safety instructions

- The driver must drive slowly around corners and when entering narrow passageways.
- The driver must always maintain a safe braking distance from vehicles or persons in front of him.
- The driver must avoid braking suddenly, making U-turns too quickly and overtaking in areas with poor visibility.

⚠ CAUTION

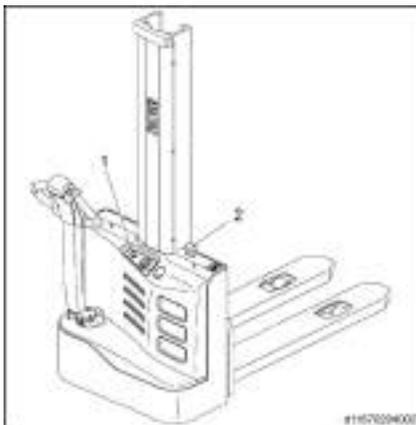
The working area of the truck must be adequately lit.

If the working area is not sufficiently illuminated, working spotlights must be installed to ensure that the driver can see properly.

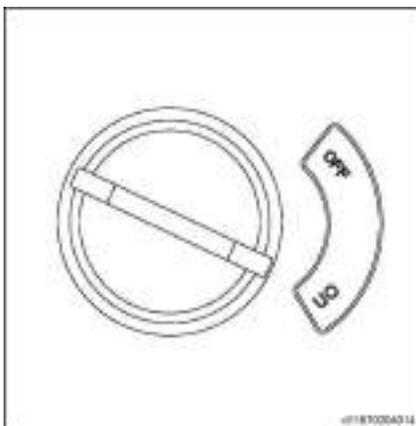
Drive operations

Starting

- Pull the emergency off switch (2) to the raised position. ▷



- Turn the key switch (1) to the ON position; the battery indicator light will come on. ▷



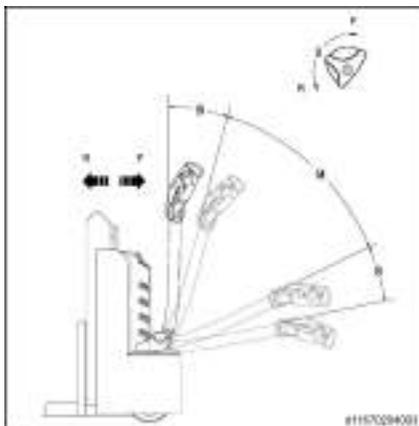
- Put the tiller in the drive position(M) and use the drive switch to control direction and speed.

i NOTE

- *F* is forwards.
- *R* is reverse.
- *B* is brake.
- *M* is drive.

i NOTE

When the tiller is in the brake position(M), the electromagnetic brake is locked and the vehicle cannot be driven.



Forward travel/reverse travel

Forward travel

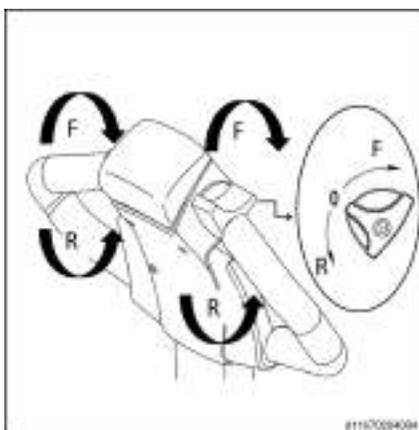
- Use your thumb to press the drive switch, gently and gradually increasing the force in the (F) direction.

The vehicle will accelerate and move forwards according to the pressure applied to the drive switch.

Reverse drive

- Use your thumb to press the drive switch, gently and gradually increasing the force in the (R) direction.

The vehicle will accelerate and move backwards according to the pressure applied to the drive switch.



Drive operations

Brake

NOTE

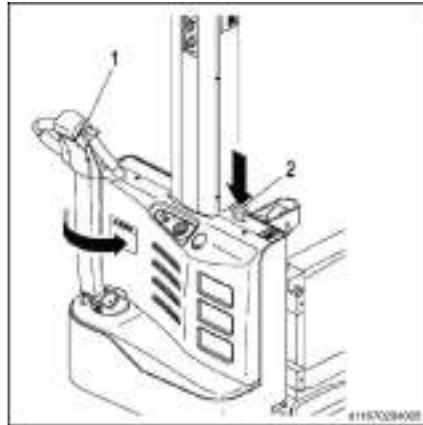
The braking performance of the equipment depends very much on the condition of the floor surface. This should be taken into consideration when driving.

NOTE

The driver must drive carefully and cautiously. When there is no danger, the driver must use moderate braking to avoid the load moving or the trailer becoming detached.

Braking can be done in the following ways:

- Emergency stop brake
- Automatic braking
- Regenerative braking
- Reverse braking



Emergency stop brake

- Press the emergency off switch (2); the equipment power supply will be cut off.

Automatic braking

- Releasing the tiller (1) will initiate forced braking.

Slackening the tiller (1) will cause it to move to the braking area (B). Alternatively, lowering the tiller to the brake area (B) at the bottom will also initiate forced braking.

CAUTION

If the tiller moves slowly into the brake position, identify the cause and rectify the fault.

If necessary, replace the gas spring!

Regenerative braking

- Release the drive switch. The drive switch will automatically return to the initial position and the vehicle will begin to enter the regenerative braking state. When it decelerates to <math><1\text{ km/h}</math>, the electromagnetic brake will bring the motor to a stop.

⚠ CAUTION

Open the drive switch; if the drive switch cannot quickly return to the initial position or resets very slowly, identify the cause and rectify the fault.

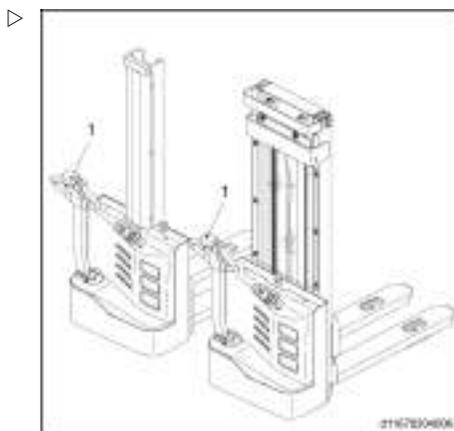
Reverse braking

- Switching the drive switch to the opposite direction while travelling brakes the vehicle by reverse current until it starts moving in the opposite direction.

Safety reverser

To protect the driver from any risk of being trapped between an obstacle and the machine, the end of the tiller is fitted with a safety reverser.

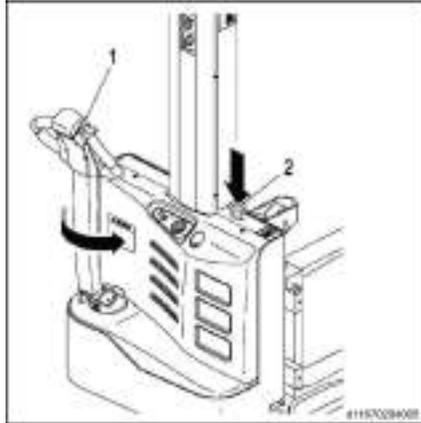
Once the safety reverser is triggered(1), the equipment will stop immediately, then slowly move back in the direction of the fork.



Drive operations

Steering

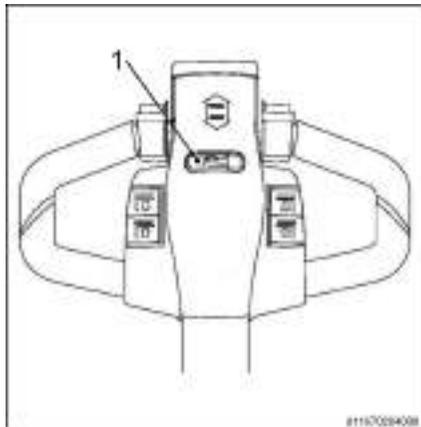
- Turn the tiller (1) left or right according to the desired direction. ▷



Horn operation

The horn must be used on routes with poor visibility and at junctions.

- Press the horn button (1) located on the tiller arm. ▷



Using the truck on a slope

NOTE

Incorrect use of the truck on slopes is not recommended. It places particular stress on the traction motor, brakes and battery.

Ramps must always be approached with great caution:

- Never attempt a slope with a gradient greater than that specified in the truck's datasheet
- Make sure that the ground is clean and has a non-slip surface, and that the route is clear

Ascending slopes

Travel up slopes must always be in reverse, with the load uphill.

Without a load, we recommend that you ascend slopes forwards.

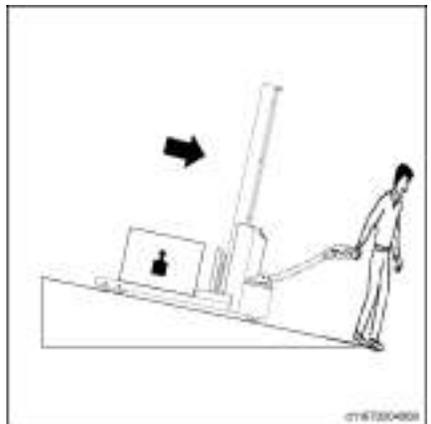


Descending slopes

Travel down slopes must always be forwards, with the load uphill.

Without a load, it is recommended that slopes are descended forwards.

In all cases, you must travel at a very low speed and brake very gradually.



⚠ DANGER

Risk to life and/or risk of serious damage to equipment.

Never park the truck on a slope. Never make a U-turn or take shortcuts on a slope. The driver must drive very slowly on slopes.

⚠ CAUTION

Risk of serious injury and/or serious damage to equipment.

Driving on a slope that exceeds the specified gradient is prohibited due to limited braking capacity.

Hydraulic operations

Starting on a slope

- Activate the direction control button in the required direction.
- Put the tiller in drive.
- Release the control button in order to brake.

Hydraulic operations

Use of the mast

⚠ CAUTION

Only the specified lifting device can be used. The driver must receive guidance related to the operational aspects of the lifting device.

⚠ CAUTION

Never put your hands near the lifting mechanism.

⚠ CAUTION

The mast protective screen must always be in place, correctly fixed and clean to provide good visibility.

⚠ DANGER

Loads that are not positioned and secured in accordance with the regulations pose an accident risk.

- Instruct all personnel to vacate the hazard area. If any person is located in the hazard area, stop the equipment immediately.
 - Only transport loads that have been positioned and secured in accordance with regulations. Adopt appropriate protective measures if the load is at risk of tipping over or falling during transport.
 - Do not use damaged handling tools to handle a load.
 - Never stay under raised load components.
 - Personnel are prohibited from entering load components.
 - This equipment must not be used to lift people.
 - Try to move the forks until they are under the goods.
-

⚠ CAUTION

Before picking up the goods, the driver must ensure that the goods have been coded correctly and stacked up well.

The weight must not exceed the rated load of this equipment.

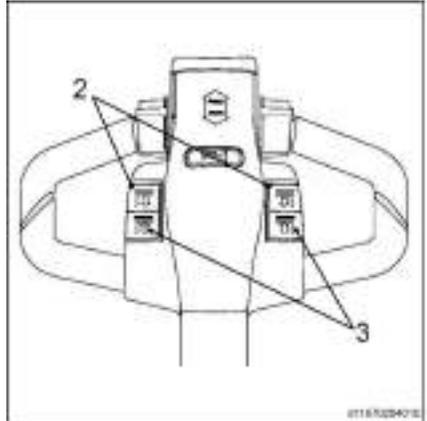
Do not place long loads sideways across the forks.

Mast lifting and lowering

- Press the lift button(2) until the goods reach the required height, then release the button.
- Press the lower button(18) until the goods are lowered to the required height, then release the button.

⚠ CAUTION

To avoid shortening the service life of the cylinder, try to avoid raising the forks to maximum height when lifting.

**Working with loads**

- Before picking up a load

Ensure that its weight does not exceed the equipment's lift capacity.

- Refer to the nominal capacity specified on the equipment's capacity rating plate.
- Also make sure that the load is stable, well-balanced and centred between the forks to avoid dropping any part of the load.
- Check that the width of the load is compatible with the width of the forks.

⚠ CAUTION

Safety footwear must be worn.

⚠ CAUTION

Transporting people is strictly prohibited.

Hydraulic operations

⚠ DANGER

It is essential to slow down when approaching a corner or on wet floors.

⚠ CAUTION

Do not touch nearby loads or loads positioned at the side or in front of the load being handled.

Arrange the loads with a small space between them to prevent them coming into contact with one another.

Picking up a load from the ground

- Approach goods carefully when driving the vehicle.
- Lower the forks so that they can easily be inserted into the pallet.
- Insert the forks below the pallet.
- If the goods are shorter than the forks, move the goods a few centimetres from the end of the forks so as not to scratch the goods in front.
- Lift the goods a few centimetres.

Carrying a load

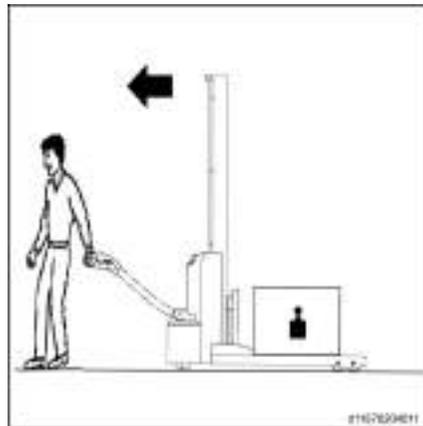
⚠ DANGER

Personnel must not stand under or near the truck when the load is in the raised position.

⚠ DANGER

Never transport a load with the forks in the raised position as the equipment may become unstable.

- Always drive forwards for optimum visibility.
- When carrying a load on a slope, always climb and descend with the load uphill. Never travel diagonally across the slope or make a U-turn.
- Reverse gear must only be used for depositing a load. Since visibility in this direction is restricted, you should only travel at very low speed.



- Never drive with an unstable load.
- If visibility is poor, let someone guide you.
- Be careful of low passageways, low doorways, scaffolding, pipes etc.
- To facilitate movement over obstacles, increase the ground clearance.
- Check that the width of the load is compatible with the width of the aisle.

Setting a load down on the ground

- Carefully move the load into the deposit area.
- Lower the load until the fork arms are free.
- Move the forks straight back.
- Lift the forks a few centimetres again.

CAUTION

Be careful not to touch nearby loads or those behind the equipment.

CAUTION

Do not touch nearby loads or loads positioned behind the equipment.

CAUTION

Before you remove the load, ensure that there are no people in the vicinity.

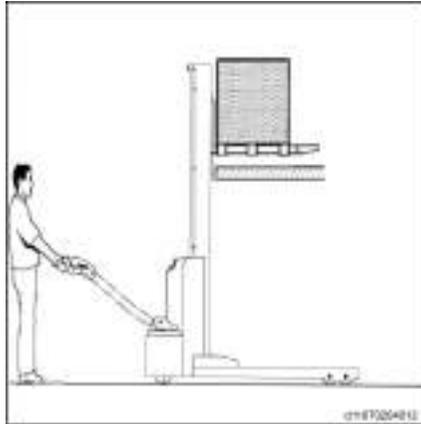
Hydraulic operations

Stacking a load

- Carefully drive the machine to the required location.
- Raise the forks clearly above the level where the load is to be placed.
- Drive the truck forward into the racking.
- Lower the load until the fork arms are free.
- Move the forks straight back.
- Lower the forks again until they are a few centimetres away from the ground.

⚠ DANGER

Personnel must not stand under or near the truck when the load is in the raised position.

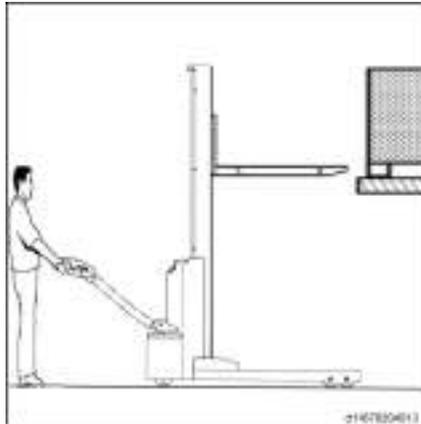


Picking up a load at height

- Carefully drive the machine to the required location.
- Raise the forks to the height of the pallet.
- Carefully move the forks forward under the pallet.
- Lift the forks until the pallet moves away from the racking.
- Reverse the truck to free the pallet.
- Lower the goods again until they are a few centimetres away from the ground.

⚠ CAUTION

If the equipment has an initial lift control, separate the goods from the racking. To maintain maximum stability, never use the initial lift control, to avoid overloading the equipment.



Emergency lowering

The solenoid valve is equipped with an emergency lowering screw for manual emergency lowering. This operation can be executed if the hydraulic system develops a fault. The solenoid valve with the emergency lowering screw is located on the valve body of the hydraulic pump.

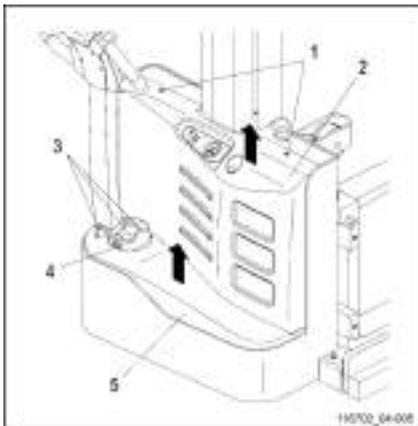
⚠ CAUTION

Do not stand in the vicinity of the forks when the fork arms are being lowered.

Always keep your hands on the screw during lowering, so you can stop the lowering operation at any time.

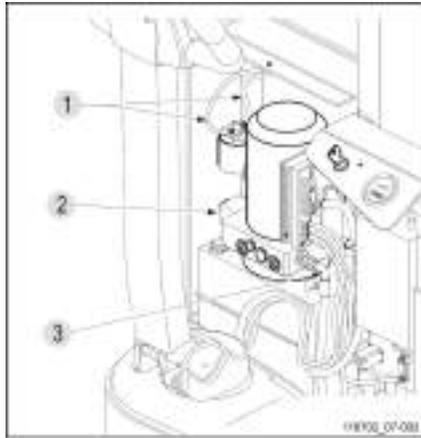


- Unscrew the two large flat-head screws(1) and pull out the cover(2).



Before leaving the equipment

The emergency lowering screw is located on the solenoid valve(2). ▷



Before leaving the equipment

⚠ CAUTION

Always stop the machine on level ground away from traffic routes.

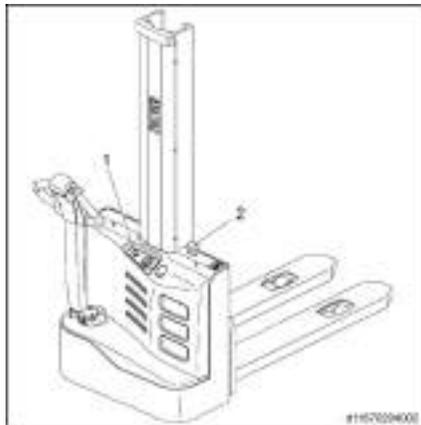
- Lower the fork arms to the lowest position.
- Turn off the key switch (1).
- Press the emergency off switch (2).
- If the machine is to be taken out of service for an extended period, disconnect the battery connections.

i NOTE

If the truck is to be decommissioned for more than two months, it must be parked in a dry, frost-free location.

i NOTE

On decommissioning, the truck must be jacked up so that all the wheels are clear of the ground. This is the only way of ensuring that the wheels and wheel bearings are not damaged.



i NOTE

Precautions prior to decommissioning

- *Thoroughly clean the truck.*
- *Check the brakes.*
- *Check the hydraulic oil level. Top up if required.*
- *Apply a thin layer of oil or grease to all unpainted mechanical components.*
- *Lubricate the truck in accordance with the lubrication schedule.*
- *Disconnect the battery plugs, clean the battery and apply specialised grease to the terminals.*
- *Spray all exposed electrical contacts with a suitable contact spray.*

i NOTE

The battery must be charged every month to avoid depletion of the battery through self-discharge, as the sulfation would destroy the battery.

Putting the equipment back into operation

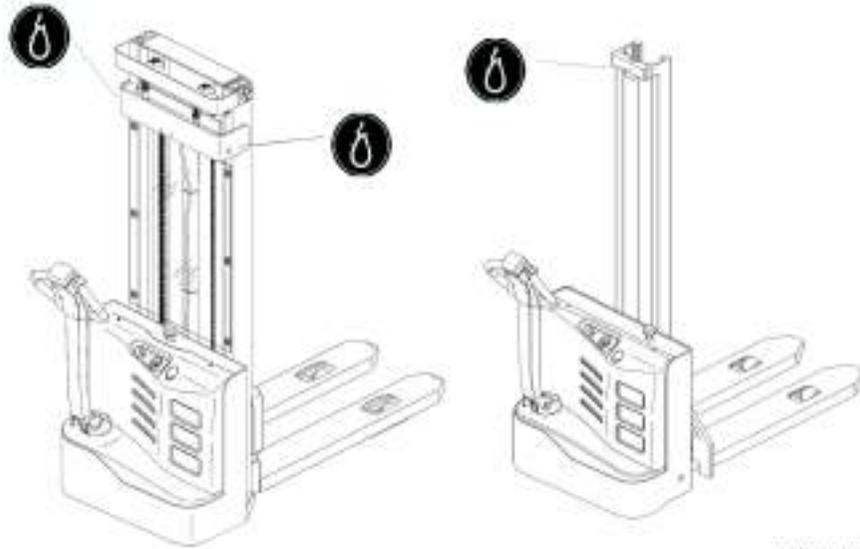
- Thoroughly clean the truck.
- Lubricate the equipment according to the lubrication and servicing requirements.
- Clean the battery, apply special grease to the electrode studs, and install and fix the terminals on the battery.
- Charge the battery.
- Check whether the hydraulic oil contains condensation water. Change the hydraulic oil according to requirements.

- Put the equipment back into use.

If there are difficulties with operating electrical system switches, you should apply contact spray to the exposed contact surfaces and remove the oxide layers on the surfaces of the operating component contacts by performing repeated switch operations. After putting the equipment into operation, the driver should immediately perform repeated brake performance tests.

Slinging

Slinging



411670204016

⚠ CAUTION

Only use slings (1) and a hoist of sufficient capacity. Protect all parts in contact with the lifting device. Correctly install the hook according to the lifting label shown in the figure.

Machine weight (with battery): See Technical Data sheet.

⚠ DANGER

Personnel must not stand under or next to the truck when it is being lifted.

Do not sling the truck by the tiller.

Transporting the truck

⚠ CAUTION

When transporting the truck, check that it is properly supported on wooden blocks and correctly tied with rope.

Single-column mast tie points and position

- Lower the fork arms to the lowest position.
- Use wooden chocks (1) to secure the front and rear of the vehicle.

Standard mast tie points and position

- Lower the fork arms to the lowest position.
- Use wooden chocks (1) to secure the front and rear of the vehicle.
- Pass the tensioner through the inner and outer masts and secure the masts to the upper fixing points of the vehicle, as indicated by position (2) in the figure. Tighten by pulling in the direction of the arrow.



Transporting the truck

5

Maintenance

General maintenance information

General maintenance information

General

The following instructions contain all the information required for servicing your truck. Carry out the various maintenance work in compliance with the maintenance plan. This will ensure that your truck is reliable and in good working order and that the warranty remains valid.

Maintenance should only be carried out by authorised technicians, or by authorised dealers in accordance with a signed maintenance contract.

Modifying or installing additional equipment on the forklift truck is prohibited without the agreement of the manufacturer.

NOTE

If the data plates or affixed labels are incomplete or damaged, they should be replaced with new ones. For locations and reference numbers, please see the spare parts catalogue.

CAUTION

If the forklift truck is used in an extreme environment (such as excessive heat, excessive cold or areas with high dust concentrations), the time intervals given in the maintenance tables should be reduced accordingly.

ENVIRONMENT NOTE

Please comply with regulations regarding the use, handling and disposal of fuel and lubricating oil.

Servicing and maintenance personnel training and qualification

Truck maintenance must only be carried out by qualified and authorised personnel.

The annual inspection for prevention of accidents at work must be carried out by a person qualified to do so. The person carrying out this inspection must provide their expertise and opinion without being influenced by

The forklift must undergo functional testing and a trial run after each inspection.

Service plan

Maintenance work must be carried out according to the maintenance checklist.

The service plan is followed by advice to facilitate work.

Maintenance intervals must be reduced if the truck is used under harsh conditions (extreme heat or extreme cold, large quantities of dust).

Grade and quantity of lubricants and other consumables

Only lubricants and other consumables specified in these operating instructions are authorised for use during maintenance work.

Lubricants and other consumables required for truck maintenance are listed in the maintenance specifications table.

Never mix different qualities of grease or oil. If it is absolutely necessary to change brands, make sure to flush thoroughly beforehand.

Before changing any filters or working on the hydraulic system, thoroughly clean the surface and the areas around the part.

All containers used to pour oil must be clean.

economic factors or company internal issues. Safety is the only critical deciding factor.

The person responsible for carrying out the inspection must have sufficient knowledge and experience to be able to assess the condition of the truck and the efficiency of the protective installations in accordance

with the technical regulations and principles established for checking industrial trucks.

Battery maintenance staff

Batteries must only be recharged, maintained and changed by specially trained personnel.

It is essential to follow the battery maintenance instructions and the battery charger operating instructions.

Personnel must follow the manufacturer's instructions of the battery, the battery charger and the truck.

Maintenance operations that do not require special training

Simple maintenance operations such as checking the hydraulic fluid level or checking the battery electrolyte level can be carried out by persons with no special training.

Complicated maintenance operations such as replacing the battery, replacing the wheels and so on should be carried out by the authorised service centre.

A specific qualification is not necessary.

Refer to the maintenance section of this manual for further information.

Technical inspection and maintenance data

Assembly	Item/oil	Capacity/standard value
Main hydraulic circuit	Hydraulic oil	3.8L to 4.8L
	Pressure max.	150 bar
Brake system	Electromagnetic brake air gap	0.2 mm to 0.4 mm
Fuses	FU01	150 A
	FU02	10 A

Maintenance - 1000 hours / every 12 months

At operating hours								Carried out	
1000		3000		5000		7000		9000	
11000		13000							
Functions and controls									
Check fault information record and run time.									
Check that cables are free from damage and that terminals are firmly attached.									

Maintenance - 1000 hours / every 12 months

At operating hours								Carried out	
1000	3000	5000	7000	9000	11000	13000	✓		
Check and fasten the controller and contactor.									
Power and drive system									
Check driving speeds.									
Check and lubricate the bearings between the drive motor and gearbox.									
Check the wheel bearings and their mounting.									
Check whether battery cables are damaged and replace if necessary.									
Clean or add gearbox grease.									
Check the gearbox for abnormal sound and leakage.									
Check drive axle for damage or breakage.									
Check bearing positions for noise.									
Brake system									
Check that electromagnetic brakes are installed and connected.									
Check braking distance of electromagnetic brakes.									
Check the electromagnetic brake air gap.									
Hydraulic system									
Check cylinders for damage and leakage and ensure that they are properly secured.									
Check that the oil tank is fixed and check it for leaks.									
Check the hydraulic oil level.									
Check hoses, pipes and interfaces for damage and ensure their tightness and sealing.									
Check overflow pressure.									
Lifting system									
Check whether mast is damaged.									
Check lifting and lowering speeds.									
Clean and lubricate the rolling surface on the lift mast.									
Check and lubricate the rollers on the mast and fork carriage.									
Check whether the hose connections are intact and whether there is oil leakage.									
Check and lubricate chains.									
Check that the lift mast is properly secured.									
Check the lifting chain and chain guide piece for wear. Adjust and apply grease.									

At operating hours									Carried out		
1000		3000		5000		7000		9000		✓	*
11000		13000									
Check the load backrest for damage and ensure that it is properly secured.											
Check fork arms for wear and damage.											
Visually inspect the rollers, wear strips and stoppers.											
Other											
Check chassis for cracks or damage.											
Check cover for cracks.											
Check connections between nuts and bolts.											
Check that all support components are intact.											
Check that labels are clear and complete.											
Check caster for wear and tear.											

Maintenance - 2000 hours / every 2 years

At operating hours									Carried out		
2000		4000		6000		8000		10000		✓	*
12000		14000									
Note											
Perform all 1000-hour maintenance work.											
Hydraulic system											
Change the hydraulic oil.											
Replace oil tank air filter and filter.											

Maintenance work

Changing the battery

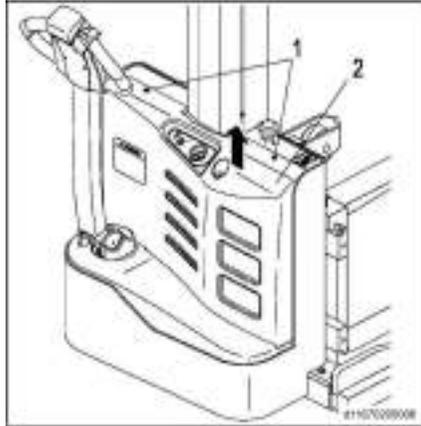
NOTE

Always park the vehicle according to regulations and turn off the power before removing and installing batteries.

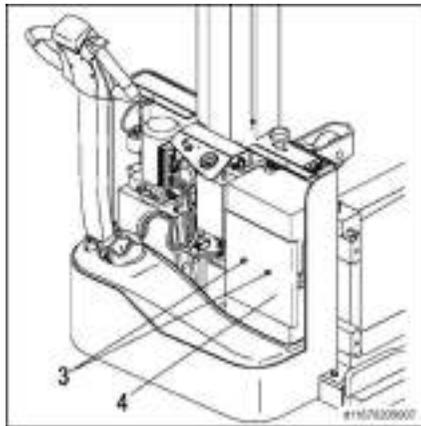
Maintenance work

Removing batteries

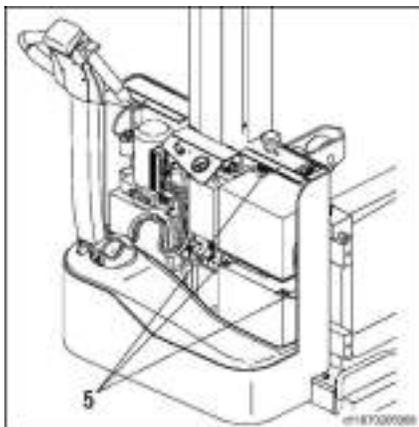
- Unscrew the 2 screws (1) and remove the cover(2). ▷



- Unscrew the 2 screws(3) and remove the battery cover(4). ▷



- Remove the three battery cables shown in the image(5). ▷



- Remove the battery(6). ▷

i NOTE

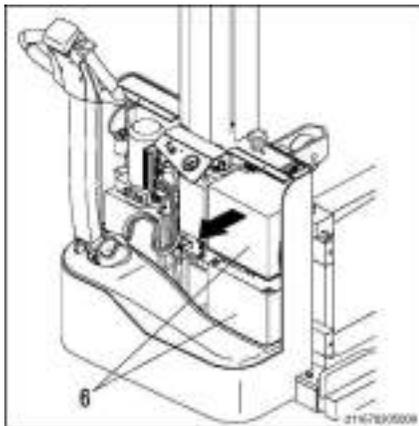
Pay attention to the operation of the battery to avoid short circuits.

Installing the battery

- Install the batteries in reverse order, paying attention to the location where the batteries are installed and whether the wiring is correct.

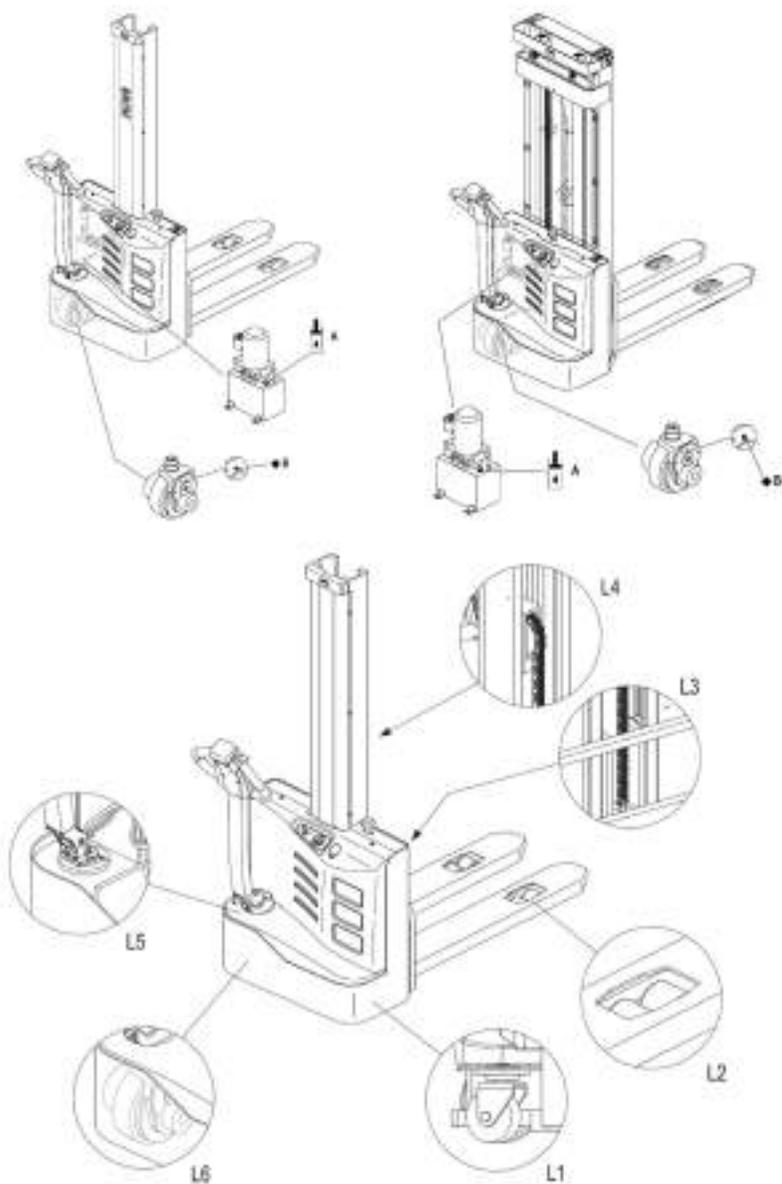
i NOTE

Route the battery cable so that it is not trapped when the battery is inserted.



Maintenance work

Lubrication point



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Lubricant

Location code	Oil name	Model no.	Amount added	Comment
A	Antifriction hydraulic oil	L-HM46	Lift height 1600 mm: 3.8 L Lift height 2000 mm:3.8L Lift height 2300 mm:4.0L Lift height 2500 mm:4.2L Lift height 2700 mm:4.2L Lift height 3000 mm:4.5L Lift height 3300 mm:4.8L Lift height 3600 mm:4.8L	Hydraulic system
	Antifriction hydraulic oil (cold stores)	L-HV32		
B	Multi-purpose grease	Polylub GA352P	As appropriate	Sliding surfaces
C	Moly lithium grease no. 3	-	100 g	Transmission

Table for lubrication of sliding surfaces

Code	Position used
L1	Caster
L2	Rollers
L3	Channel and rollers
L4	Chains
L5	Steering bearing
L6	Drive wheel

Check the hydraulic oil level

**NOTE**

If there are popping noises coming from the tubing when lifting, this indicates that the hydraulic oil is insufficient and should be promptly replenished.

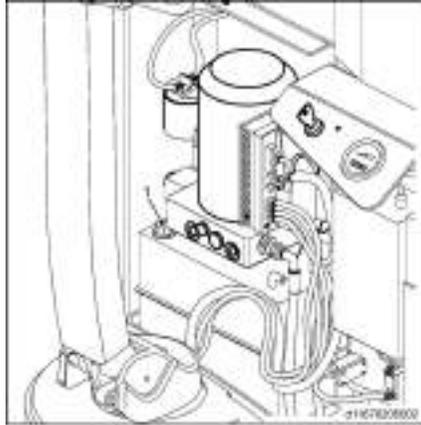
CAUTION

Do not add hydraulic oil that contains impurities.

- Fully lower the mast.
- Press the emergency off switch.
- Remove the front hood.

Maintenance work

- Unscrew the oil cap(1).This oil cap has a dipstick. ▷



- Use a clean cloth to dry the dipstick. ▷
- Reinstall the oil cap, then remove it again and check whether the traces of oil on the dipstick are between the maximum and minimum marks.



NOTE

You can lift again after you have finished adding the oil. You must continue checking the hydraulic oil level if there is still a banging noise.

- Reinstall the disassembled parts in reverse order.



NOTE

Only use hydraulic oil that meets the specifications. Refer to "Lubricants".



Topping up the gear oil

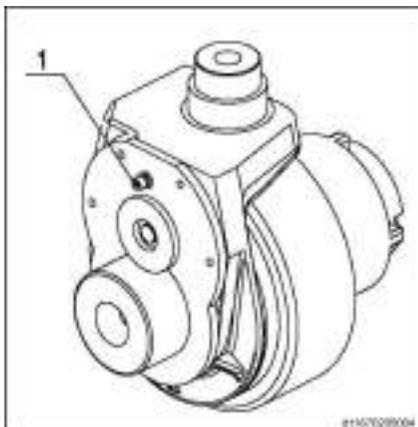
⚠ CAUTION

Do not add gear oil that contains impurities.

- Pour gear oil into the grease fitting (1) correctly to replenish it according to specifications. ▷

i NOTE

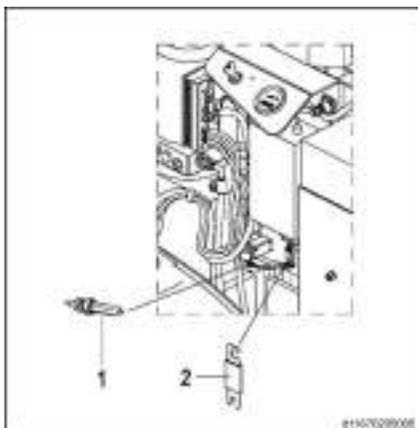
Top up every 1,000 operating hours or annually, whichever occurs first.



Checking the fuses

- Fully lower the mast. ▷
- Press the emergency off switch.
- Remove the front hood.
- Check that all fuses are in working order. If necessary, replace them with fuses that match the parameters specified in the table below.

No.	Checking fuses for the following functions or components	Value
1	Traction/lift motor fuse	150A
2	Control system fuses	10A



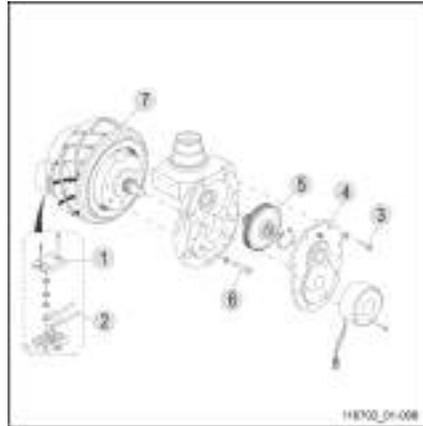
Tyre operation

Tyre operation

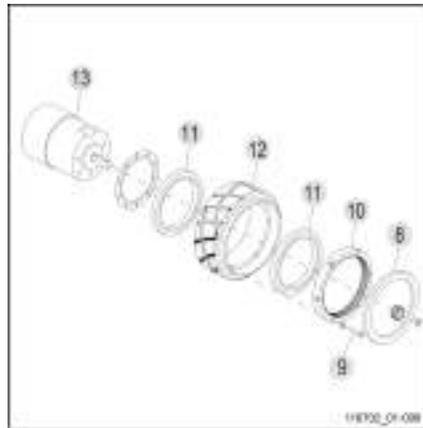
Drive Wheel

Removal

- Remove the drive assembly.
- Dismantle the motor cable mounting base(1), and remove the motor cables(2);
- Loosen the eight screws(3) with a wrench, and remove the gearbox cover(4) and gear set(5);
- Unscrew the five screws(6) and knock out the assembly from the gearbox(7);



- Knock out the drive motor(13), and remove the oil seal(8);
- Loosen the six screws(9) with a wrench, and dismantle the large ring gear(10), bearing(11) and drive wheel(12) by order.



Installation

- Install according to the reverse order of removal.

⚠ CAUTION

Tyre wear can affect the stability of the truck, adjust the caster with minor wear on a regular basis, or replace the caster with heavy wear.

Quality of tyres directly affects the stability and driving performance of the device. If you need to replace the factory-fitted tyres, please use original spare parts provided by the equipment manufacturer to reach the original design performance of the truck.

Faults and Causes

1	Fault	Drive wheel slipping or jumping
	Cause	Wear

2	Fault	Drive wheel cracking or degumming
	Cause	Improper use

Load Wheels - Removal and Installation

Removal

- Lift the vehicle carefully with lifting equipment through the lifting holes at back;

⚠ CAUTION

Make sure the lifting equipment is solid and secure, and the load capacity should be greater than the total weight of the vehicle.

- Place a wooden wedge under the chassis near load wheel, make the load wheel off the ground;

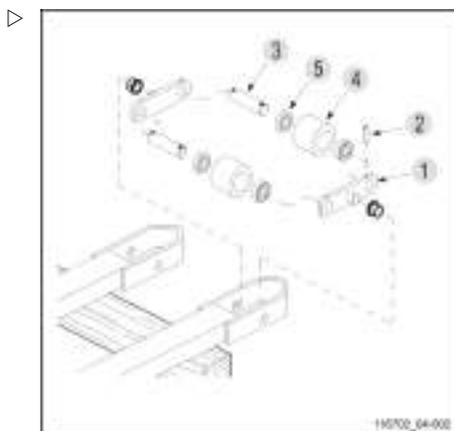
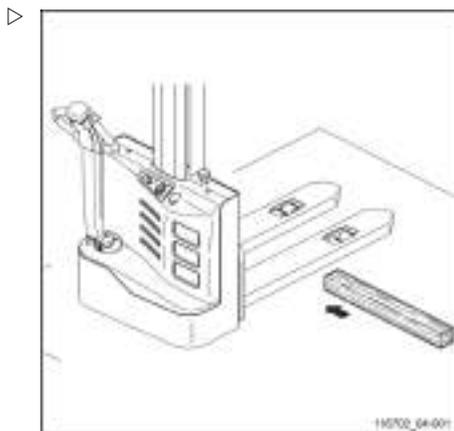
⚠ CAUTION

When replacing wheels, be sure that the truck won't tilt.

- Remove the coiled elastic cylindrical pin(2) within the wheel bridge(1) with an ejector pin of 4mm in diameter;
- Turn the wheel bridge to vertical direction, knock out the wheel pin shaft(3) from side, and remove the load wheel and bearing assembly;
- Remove the bearing(5) of load wheel(4) with hammer and jacking equipment.

Installation and Commissioning

- Install according to the reverse order of removal;
- Run the truck to see if the load wheel is functioning properly. If there is blocking or noise, please install again.



Tyre operation

⚠ CAUTION

When installing, please apply appropriate amount of grease on the axle first.

⚠ CAUTION

Quality of tyres directly affects the stability and driving performance of the device. If you need to replace the factory-fitted tyres, please use original spare parts provided by the equipment manufacturer to reach the original design performance of the truck.

Caster - Removal and Installation

Removal

- Remove the cover;
- Lift the vehicle carefully with lifting equipment through the lifting holes at front and back;

⚠ WARNING

Make sure the lifting equipment is solid and secure, and the load capacity should be greater than the total weight of the vehicle. Lifting height of not more than 300mm, to prevent the hazards to the maintenance personnel working under the vehicle for caster removal and installation.

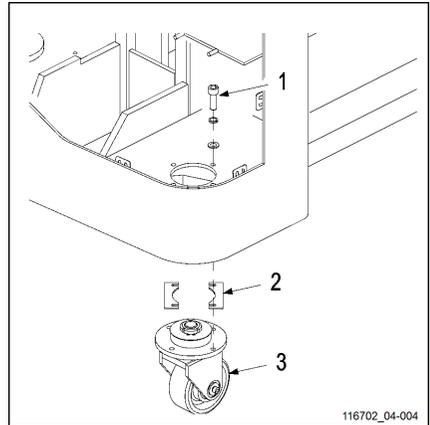
- Unscrew four screws(1), then remove the caster(3) and adjustment shim(2).

Installation

- Install according to the reverse order of removal.

Adjustment

- Park the truck with replacement completed on level ground to see if the casters and drive wheel can both be in contact with the ground;
- When the truck is running, check if the three wheels are functioning properly.



⚠ CAUTION

After long time of use, the drive wheel will wear and tear to certain level, at this time, adjust the height of caster(3) through increasing or decreasing the number of adjustment shims(2) to make the two casters and drive wheel to be in close contact with the ground.

⚠ CAUTION

Tyre wear can affect the stability of the truck, adjust the caster with minor wear on a regular basis, or replace the caster with heavy wear. Quality of tyres directly affects the stability and driving performance of the device. If you need to replace the factory-fitted tyres, please use original spare parts provided by the equipment manufacturer to reach the original design performance of the truck.

Malfunction analysis

Upon maintenance or replacement for parts of the caster, please refer to Figure 116702_04-006. ▷



Malfunction analysis

Symptoms	Possible reason	Solution
Unable to drive	The key switch lock is in the OFF position	Put the key switch in the ON position
	Battery power is too low	Check the battery charge status and charge the battery according to requirements
	Blown fuse	Check the fuse device
	Equipment is in charge mode	Stop charge mode
Unable to lift	The hydraulic oil level is too low	Check the hydraulic oil level
	The load is overweight	Pay attention to the rated load (refer to the model identification plate)

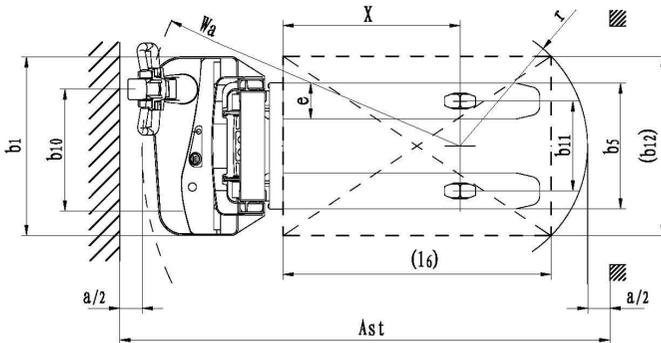
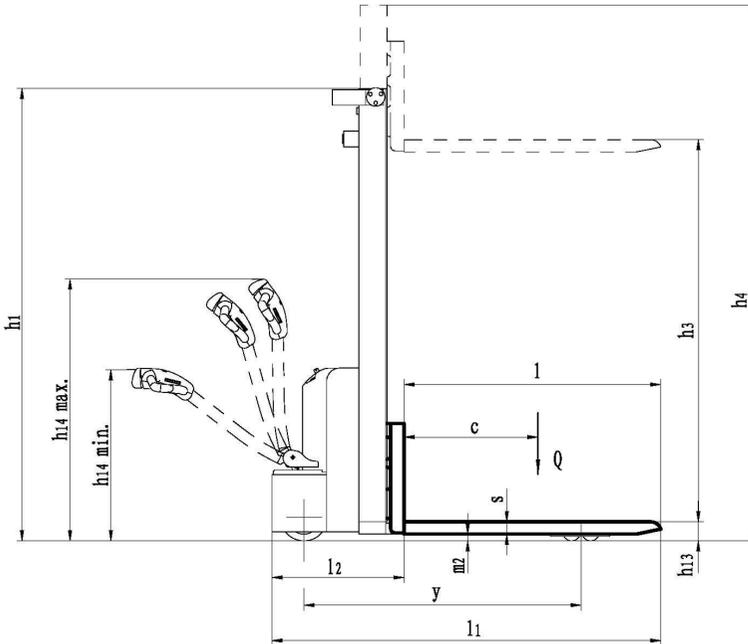
NOTE

Please contact an authorised dealer if you have performed all of the steps listed in the table above but are still unable to eliminate the fault. Further fault identification and elimination operations must be performed by after-sales service personnel who have undergone special training.

Technical data

ECV 10 Technical Datasheet

ECV 10 Technical Datasheet



Characteristics			ECV 10
1.1	Manufacturer		Still
1.2	Model no.		ECV 10
1.3	Drive: electric, diesel, petrol, LPG, mains electric		Electric
1.4	Operation		Pedestrian
1.5	Nominal loading capacity	Q (kg)	1000
1.6	Load centre of gravity distance	c (mm)	600
1.8	Front overhang, distance from the vertical surface of the forks to the centre of the front axle	x (mm)	795
1.9	Wheelbase	y (mm)	1240

Weight			ECV 10
2.1	Service weight (with battery)	kg	598
2.2	Axel load when fully loaded, drive side, load side	kg	596 / 1002
2.3	Axel load when unloaded, drive side, load side	kg	446 / 152

Wheels			ECV 10
3.1	Tyres, drive side/load side:C=solid rubber, P=polyurethane		PU/PU
3.2	Tyre size, drive side	(mm)	Ø210 X 70
3.3	Tyre size, load side	(mm)	Ø80 X 60
3.5	Number of wheels, front/rear (X = drive)		1x + 1/4

Dimensions			ECV 10
4.2	Lowered mast height	h1 (mm)	2097
4.3	Free lift height	h2 (mm)	150
4.4	Lift height	h3 (mm)	2927
4.5	Maximum mast height when in operation	h4 (mm)	3487
4.9	Tiller height when driving (minimum/maximum)	h14 (mm)	800 / 1250
4.15	Lowered fork height	h13 (mm)	88
4.19	Overall length	l1 (mm)	1740
4.20	Head length (without forks)	l2 (mm)	590

ECV 10 Technical Datasheet

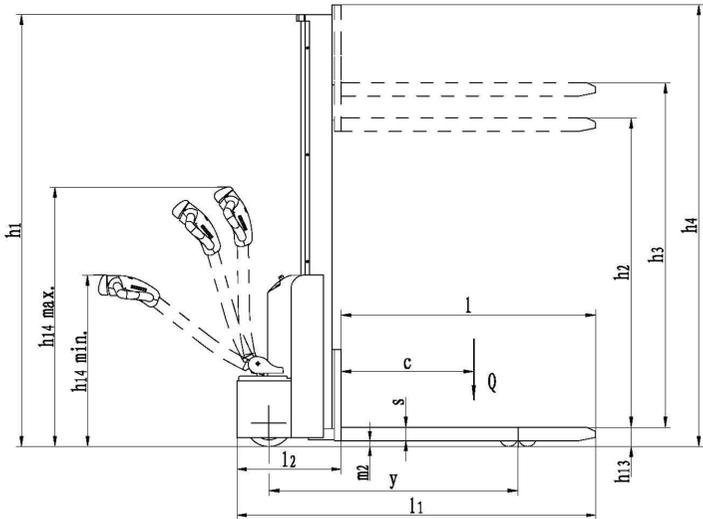
Dimensions			ECV 10
4.21	Body width	b1/b2 (mm)	800
4.22	Dimensions of forks	s/e/l (mm)	55 / 160 / 1150
4.24	Width of the fork carriage	b3 (mm)	600
4.25	Width across forks	b5 (mm)	560
4.32	Ground clearance, centre of wheelbase, min./max.	m2 (mm)	30
4.34	Aisle width, 800 x 1200 pallet, lengthwise	Ast (mm)	2219
4.35	Turning radius	Wa (mm)	1450

Performance			ECV 10
5.1	Travel speed, with/without load	km/h	4.5 / 4.8
5.2	Lifting speed, with/without load	m/s	0.12 / 0.22
5.3	Lowering speed, with/without load	m/s	0.2 / 0.13
5.8	Climbing ability, with/without load	%	5 / 15
5.10	Brake type		Electromagnetic brake

Drive			ECV 10
6.1	Drive motor (60 minutes)	kW	0.65
6.2	Lift motor 10% power	kW	2.2
6.3	Battery to DIN 43 531/35/36 A, B, C, no		-
6.4	Battery voltage/capacity (5-hour discharge)	V/Ah	2 x 12 / 125
6.5	Battery weight	kg	2 x 33

Other			ECV 10
8.1	Control method		DC
8.4	Noise level at driver's ear	dB(A)	74

ECV 10i C / ECV 10 C Technical Datasheet



d11670206001

Characteristics		ECV 10 C	ECV 10i C
1.1	Manufacturer	Still	Still
1.2	Model no.	ECV 10C	ECV 10 iC

ECV 10i C / ECV 10 C Technical Datasheet

Characteristics			ECV 10 C	ECV 10i C
1.3	Drive: electric, diesel, petrol, LPG, mains electric		Electric	Electric
1.4	Operation		Pedestrian	Pedestrian
1.5	Nominal loading capacity	Q (kg)	1000	1000
1.6	Load centre of gravity distance	c (mm)	600	600
1.8	Front overhang, distance from the vertical surface of the forks to the centre of the front axle	x (mm)	805	805
1.9	Wheelbase	y (mm)	1126	1260

Weight			ECV 10 C	ECV 10i C
2.1	Service weight (with battery)	kg	462	520
2.2	Axel load when fully loaded, drive side, load side	kg	530 / 950	580 / 1140
2.3	Axel load when unloaded, drive side, load side	kg	350 / 120	350 / 170

Wheels			ECV 10 C	ECV 10i C
3.1	Tyres, drive side/load side:C=solid rubber, P=polyurethane		PU/PU	PU/PU
3.2	Tyre size, drive side	(mm)	Ø210 X 70	Ø210 X 70
3.3	Tyre size, load side	(mm)	Ø80 X 60	Ø80 X 60
3.5	Number of wheels, front/rear (X = drive)		1x + 1/4	1x + 1/4

Dimensions			ECV 10 C	ECV 10i C
4.2	Lowered mast height	h1 (mm)	1940	1940
4.3	Free lift height	h2 (mm)	1505	1480
4.4	Lift height	h3 (mm)	1517	1513
4.9	Tiller height when driving (minimum/maximum)	h14 (mm)	800 / 1250	800 / 1250
4.1 5	Lowered fork height	h13 (mm)	88	88
4.1 9	Overall length	l1 (mm)	1615	1750
4.2 0	Head length (without forks)	l2 (mm)	465	600
4.2 1	Body width	b1/b2 (mm)	800	796

Dimensions			ECV 10 C	ECV 10i C
4.2 2	Dimensions of forks	s/e/l (mm)	60 / 170 / 1150	60 / 190 / 1150
4.2 4	Width of the fork carriage	b3 (mm)	680	680
4.2 5	Width across forks	b5 (mm)	550	560
4.3 2	Ground clearance, centre of wheelbase, min./max.	m2 (mm)	28	26
4.3 4	Aisle width, 800 x 1200 pallet, lengthwise	Ast (mm)	2100	2260
4.3 5	Turning radius	Wa (mm)	1337	1500

Performance			ECV 10 C	ECV 10i C
5.1	Travel speed, with/without load	km/h	4 / 4.5	4 / 4.5
5.2	Lifting speed, with/without load	m/s	0.10 / 0.17	0.10 / 0.14
5.3	Lowering speed, with/without load	m/s	0.2 / 0.13	0.2 / 0.13
5.8	Climbing ability, with/without load	%	5 / 15	5 / 15
5.1 0	Brake type		Electromagnetic brake	Electromagnetic brake

Drive			ECV 10 C	ECV 10i C
6.1	Drive motor (60 minutes)	kW	0.65	0.65
6.2	Lift motor 10% power	kW	2.2	2.2
6.3	Battery to DIN 43 531/35/36 A, B, C, no		-	-
6.4	Battery voltage/capacity (5-hour discharge)	V/Ah	2 x 12 / 85	2 x 12 / 85
6.5	Battery weight	kg	2 x 25	2 x 25

Other			ECV 10 C	ECV 10i C
8.1	Control method		DC	DC
8.4	Noise level at driver's ear	dB(A)	74	74

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