Original instructions

Electric pallet truck

EXU-S 22
EXU-S 24

first in intralogistics
Preface

Address of manufacturer and contact details

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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
Introduction

Forklift data

We recommend that you record the principal forklift data in the following table so that they are available if required by the sales network or authorised service centre.

<table>
<thead>
<tr>
<th>Type</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Serial number</td>
<td></td>
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<tr>
<td>Date of delivery</td>
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</table>

General information

- This manual contains "Original Instructions" provided by the manufacturer.
- The "operator" is defined as the person driving the forklift.
- The "user" is the physical or legal person who has the forklift truck used by the operators.
- For correct use of the forklift and in order to avoid accidents, the operator is obliged to read, understand and apply the contents of this manual, the "Rules for the use of industrial vehicles" and the labels and plates applied to the forklift.
- This manual and the attached "Rules for the use of industrial vehicles" must be kept carefully and must always be on the forklift for fast consultation.
- The manufacturer assumes no responsibility for any accidents to persons or damage to things due to the failure to observe the instructions in this manual, in the "Rules for the use of industrial vehicles" and on the labels and adhesive supplied to the forklift.
- The forklift may not be put to any use other than indicated in this manual.
- The forklift must be used by appropriately trained operators only. For the necessary operator training, contact the authorised sales network.
- Persons working near the forklift must also be instructed in the risks associated with use of the forklift.
- In the interests of clear information, some illustrations in this manual show the forklift without the safety equipment (guards, panels, etc.). The forklift may not be used without safety equipment.

How to Consult the Manual

There is a table of contents at the beginning of the manual for ease of use. The manual is divided into chapters with specific topics. The name and title of the chapter are given at the top of each page The following is found at the bottom of each page: the type of manual, the identifying code, the language and the manual version.

Some general information is provided in this manual. Please only consider the information relevant for your specific forklift.

The following symbols have been used to highlight some parts of this manual.

⚠️ DANGER

Failure to observe the instructions highlighted with this symbol may jeopardise safety.
**CAUTION**

Failure to observe the instructions highlighted with this symbol may cause damage to the forklift and, in some cases, result in warranty invalidity.

**ENVIRONMENT NOTE**

Failure to observe the instructions highlighted with this symbol may cause environmental damage.

**NOTE**

This symbol is used to provide additional information.
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.

Copyright and trademark rights

These instructions must not be reproduced, translated or made accessible to third parties—including as excerpts—except with the express written approval of the manufacturer.

Delivery of the forklift and documentation

Ensure that the truck has all of the options requested and that it has been delivered with the following documentation:

• Original instructions
• Rules for the compliant use industrial vehicles;
• EC Declaration of Compliance;
• Warranty book.

If the forklift has been delivered with a traction battery and/or battery charger, ensure that such products conform to the order and that the relative user and maintenance manual are included, as well as the EC declaration for the battery charger.

If applied equipment, other equipment or devices are present, ensure that they conform to the order and that the relative use and maintenance manual and of the relative EC declaration (if provided by regulations in effect) are included.

All of the above documentation must be kept for the entire operative life of the forklift. In the event that the documentation is lost or damaged, contact the authorised sales network for copies of the original documentation.
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.
Introduction

EC declaration of conformity in accordance with Machinery Directive

Declaration

STILL GmbH
Berzeliusstraße 10
D-22113 Hamburg Germany

We declare that the

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
Technical service and spare parts

For scheduled maintenance and any repairs to the forklift, contact only the authorised service network.

The authorised service network has personnel trained by the manufacturer, original spare parts and the tools necessary to carry out maintenance and repairs.

Servicing by the authorised service network and the use of original spare parts maintain the technical characteristics of the forklift over time.

Only original spare parts provided by the manufacturer may be used for forklift maintenance and repairs. The use of non-original spare parts invalidates the warranty and renders the user responsible for any accidents due to the inappropriateness of the non-original parts.

Type of use

"Normal use conditions" of the forklift are understood as:

- lifting and/or transport of loads using forks with weight and load centre within the values provided (see Chapter 6 - Technical Data).
- transport and/or lifting on smooth, flat and compact surfaces;
- transport and/or lifting of stable loads uniformly distributed on the forks;
- transport and/or lifting with the load centre approximately on the forklift's median longitudinal plane.

**DANGER**
The forklift must not be used for other purposes. Any other use renders the user solely responsible for injury/damage to persons and/or objects and voids the warranty.

The following scenarios are examples of incorrect use of the forklift truck:

- Transport on uneven (irregular or non-compact) surfaces
- loads that exceed the weight and/or load centre limits;
- transporting non-stable loads;
- transporting loads not equally distributed on the forks;
- transporting swinging loads;
- transporting loads whose load centre is considerably displaced with respect to the forklift's longitudinal median plane;
- transporting loads of dimensions such as to block the view of the operator when driving;
- transporting loads piled so high that they could fall onto the operator;
- travelling with a load over 300 mm off the ground;
- transporting and/or lifting people;
- pushing or pulling loads;
- moving upwards or downwards on a slope with the load facing downwards;
- turning at high speed;
- turning and/or moving sideways on slopes (upwards or downwards);
- colliding with stationary and/or mobile structures;

**DANGER**
Improper use of the forklift could cause it and/or at the load to overturn.

Working conditions

The forklift has been designed and built for internal transport.
Do not use beyond the limits of the climatic conditions indicated below:
• Maximum ambient temperature: +40°C
• Minimum ambient temperature: +5°C
• Altitude up to 2000 m
• Relative humidity between 30% and 95% (without condensation).

**CAUTION**
Do not use the forklift in dusty areas.
Using the forklift in environments with high concentrations of salty air or water could interfere with its proper operation and cause corrosion of metallic parts.

If the forklift must be used in conditions that exceed the limits indicated or, in any case, under extreme conditions (extreme weather, cold-storage rooms, presence of strong magnetic fields etc), appropriate equipment and/or use precautions are necessary. Contact the authorised sales network for more information.

**DANGER**
The forklift may not be used in environments in which there is a risk of explosion. It may not be used to handle explosive loads.

For forklifts that must operate in environments in which there is a risk of explosion or must handle explosive loads, appropriate equipment is necessary and must be accompanied by a specific EC Declaration of Compliance which replaces that of the standard forklift, and by the relevant User and maintenance manual.

Contact the authorised sales network for more information.

**Modifications to Forklift**

No modifications may be made to the forklift, otherwise the EC certificate and the warranty will become invalid, with the exception of:
• assembly of the options provided by the manufacturer
• assembly of applied equipment for which it is necessary to refer exclusively to the authorised sales network

**DANGER**
If the forklift is equipped at the factory or later with devices that emit non-ionising radiation (such as radio transmitters, RFID players, data terminals, scanners, etc), the compatibility of such devices must be verified with the presence of operators using medical devices (such as heart pacemakers).

**Applied equipment**

To use equipment that has not been applied, please contact the authorised sales network, in order to:
• verify feasibility
• install the equipment

• add a label with the new residual capacity is
• provide documentation on the equipment (user and maintenance manual and EC certificate).

**User obligations**

Users must comply with applicable local legislation governing forklift use and maintenance.
Environmental considerations

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.*
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.
Safety
Some safety regulations to be followed when using the forklift are listed below. These regulations integrate those in the manual "Rules for approved use of industrial vehicles".

General Safety Rules

- Only allow qualified, trained and authorized personnel to use the forklift.
- Do not install equipment on the forklift unless supplied or indicated by the manufacturer.
- Maintain the forklift in full working efficiency in order to limit any type of risk to the minimum.
- Do not use the truck with bonnets or doors open or with guards removed.
- The data plates found on the forklift must be kept in good condition and replaced if damaged.
- Carefully read and follow all of the safety indications found on the forklift.
- Make sure that the forklift has sufficient overhead clearance.
- Do not park the forklift in front of fire-fighting devices or fire escapes or anywhere that it blocks traffic.
- If the forklift shows signs of failure or breakage and there is reason to consider it unsafe, stop, park it, and notify the maintenance manager.
- Maintain appropriate distances from high voltage overhead cables. Comply with the safety distances established by the competent authorities.
- Never raise the load using just one fork.
- Place the load on the fork carriage or in such a way that the centre of gravity of the load is as close as possible to the fork carriage.
- The load must be placed on the fork arms so that the centre of gravity falls lengthwise on the mid point between the fork arms.
- Do not drive with loads off-centre laterally with respect to the forklift's median axis. Lack of compliance with this regulation can compromise forklift stability.
- Make sure that the surface on which the load rests is able to support its weight.
- Always use safety clothing compliant with current regulations and any personal protective equipment that may be applicable.
- Do not travel on loose or hilly ground or on steps.
- Do not drive with loads raised more than 300 mm from ground level.
- Do not turn or stack on slopes.
- Reduce speed on slopes.
- Do not overload the forklift beyond the capacity limits indicated on the capacity plates.
- Individuals under the influence of drugs and alcohol are not permitted to use the truck.
- The operator may not use an MP3 player or any electrical device that may distract their attention from the surrounding work environment.

Flooring requirements

The work floor must be even and free of holes or dips, which can be difficult to get around. Any steps must be equipped with ramps to prevent impacts with the wheels, which affect the entire structure of the truck.
CAUTION
Passing over cracks or damaged parts of the floor with the truck is prohibited. Dirt and any objects in the work path must be removed immediately.

Battery connection cables

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

Requirements for the traction-battery charging area

When the traction battery is being charged, the area must be sufficiently ventilated in order to download or eliminate the gases produced (EN 50272-3).

Safety Regulations Relative to Forklift Use

- The operator must familiarize himself with the forklift to be able to better describe any defects and assist maintenance personnel. The operator, trained and authorized to use the forklift, must be familiar with the controls and performances of the forklift.
- Any defect (squeaking, leaks, etc.) must be promptly reported because, if neglected, it could cause more serious failures/defects.
- Carry out the inspections indicated in the chapter on "Daily Inspections".

ENVIRONMENT NOTE
Report any oil and/or battery fluid leaks: they are dangerous and highly polluting.

CAUTION
If you notice a burning smell, stop the forklift and turn off the engine, then disconnect the battery.
Safety Guidelines

Safety Regulations Relative to Operating Materials

Rules for handling and disposing of operating materials

ENVIRONMENT NOTE

Improper use and disposal of operating and cleaning materials can cause serious damage to the environment.

Always use and handle the operating materials in a suitable manner and follow the manufacturer’s instructions for the product’s use.

Keep the operating materials only in containers intended for this purpose and in a location that satisfies the requirements.

The operating materials may be flammable, so avoid contact with hot objects or open flames.

When topping up the operating materials, only clean containers should be used.

Follow the manufacturer’s safety and disposal instructions regarding the operating and cleaning materials.

Do not disperse oils or other operating liquids! Any spilt liquid must be immediately collected and neutralised with a binding material (such as an oil binder) and then disposed of in accordance with current regulations.

Always comply with anti-pollution regulations!

Before carrying out work that involves lubrication, filter replacement or hydraulic equipment interventions, the area in question must be thoroughly cleaned.

The replaced parts must always be disposed of in accordance with the anti-pollution laws.

ENVIRONMENT NOTE

The incorrect or unlawful use of brake fluid is harmful to people’s health and the environment.

Oils

- Do not allow to come into contact with the skin.
- Do not inhale oil vapors.
- Wear appropriate means of individual protection during forklift maintenance operations (gloves, goggles, etc.) to prevent the oil from coming into contact with your skin.

ENVIRONMENT NOTE

The used oils and relative filters contain substances that are hazardous to the environment and must be disposed of according to current regulations. We advise you to contact the authorised service network.

DANGER

The penetration in the skin of hydraulic oil that has leaked under pressure from the forklift’s hydraulic system is dangerous. If this type of lesion should occur, contact a doctor immediately.

DANGER

Small high pressure jets of oil can penetrate the skin. Look for any leaks using a piece of cardboard.

Battery Acid

- Do not inhale the vapor: it is poisonous.
- Use adequate means of individual protection to prevent contact with the skin.
- Battery acid is corrosive: if it should come into contact with your skin, rinse abundantly with water.
- Explosive gas mixtures can form when charging the battery; therefore, the rooms in which the battery is charged must be in compliance with the specific regulations on the subject (e.g. EN 50272-3 etc.).
- DO NOT smoke or use open flames and lights within a 2 m radius from the charged battery and in the battery charging area.
NOTE

For greater information, consult the specific battery manual that comes with the battery.

ENVIRONMENT NOTE

The batteries contain substances that are hazardous to the environment. The replacement and disposal of the life-expired battery must be carried out as required by law. We advise you to contact the authorised service network that is equipped for eco-friendly disposal in accordance with current regulations.

Residual risks

Residual dangers, residual risks

Despite careful use and compliance with standards and regulations, the possibility of other risks occurring when using the truck cannot be entirely excluded.

The truck and all other system components comply with current safety requirements. Nevertheless, even when the truck is used for its proper purpose and all instructions are followed, some residual risks cannot be excluded.

Even outside the defined danger areas of the truck, residual risk cannot be excluded. Persons in this area around the truck must exercise a heightened degree of awareness, so that they can react immediately in the event of any malfunction, incident or breakdown etc.

WARNING

All persons that are in the vicinity of the truck must be instructed regarding the risks that arise through use of the truck.

In addition, we draw your attention to the Safety Guidelines in these operating instructions.

Risks can include:

• Escape of consumables due to leakages, rupture of lines and containers etc.
• Risk of accidents when driving on ramps or in conditions of poor visibility, etc.
• Falling, tripping etc. when moving the truck, especially in wet or icy conditions or when consumables are leaking.
• Fire and explosion risks due to batteries and electrical voltages.
Residual risks

• Human error resulting from failure to observe the safety guidelines.
• Unrepaired damage or defective and worn components.
• Insufficient maintenance and testing
• Use of incorrect consumables
• Maintenance intervals exceeded

The manufacturer shall not be held responsible for accidents involving the truck caused by the failure of the operating company to comply with these regulations either intentionally or due to negligence.

Stability

The stability of the truck has been tested in accordance with up-to-date technical regulations and is guaranteed if the truck is used correctly and in line with the intended purpose. These standards only take into account the static and dynamic tipping forces that can arise during use in accordance with the operating standards and intended purpose. In extreme cases there is a risk of exceeding the moment of tilt due to improper use or incorrect operation, which will affect stability.

Risks can include:
• loss of stability due to unstable or sliding loads etc.;
• turns at excessive speeds;
• moving with the load raised;
• moving with a load that is projecting to the side (e.g. side shift);
• turning and driving diagonally across slopes;
• driving on slopes with the load pointing downhill;
• oversized loads;
• swinging loads;
• steps or ramp edges.
**Electromagnetic radiation**

The limit values for electromagnetic emissions and for immunity relative to the forklift are those provided by the EN 12895 standard.

**Non-ionised radiation**

If the forklift is equipped at the factory or later with devices that emit non-ionising radiation (such as radio transmitters, RFID players, data terminals, scanners, etc), the compatibility of such devices must be verified with the presence of operators using medical devices (such as heart pacemakers).

**Noise**

<table>
<thead>
<tr>
<th>Sound pressure level in driver's seat</th>
<th>$L_{DAZ} &lt; 70 \text{ dB (A)}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncertainty factor</td>
<td>$K_{DA} = 4 \text{ dB (A)}$</td>
</tr>
</tbody>
</table>

The value is determined in a test cycle in accordance with Harmonised European Standard EN 12053 and declared according to EN ISO 4871 with weighted time percentages of the Transport, Lifting and Idling modes.

⚠️ **CAUTION**

The value expressed above can be used to compare forklift trucks of the same category. This cannot be used to determine the noise level in workplaces (daily personal noise exposure). Noise values that are lower or higher than those indicated above can occur during actual truck use, for example following different operating modes, different environmental conditions and additional noise sources.
Vibrations

Vibrations to which the hands and arms are exposed

The following value is valid for all truck models:
• $\ddot{a}_w < 2.5 \text{ m/s}^2$

**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

Regular safety inspection of the truck

Safety inspection based on time and extraordinary incidents

The operating company must ensure that the truck is checked at least once a year, or following noteworthy incidents.

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

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

- Arrange for the service centre to perform periodic safety inspections on the truck.
- Observe guidelines for checks carried out on the truck in accordance with FEM 4.004.

The operator is responsible for ensuring any defects are remedied without delay.

- Contact your service centre.

**NOTE**

*Observe the national regulations for your country!*
Safety tests
Overview
This robust stand-on electric pallet truck is ideal for loading and unloading lorries, and its high driving speed also makes it easy to transport over longer distances.

**Chassis**

- The EXU-S was designed for loading and unloading lorries and has excellent handling on slopes and in the confined spaces of lorries.
- The even chassis moves smoothly and never catches on protruding edges of ramps, whilst the platform's tapered sides protect the operator from colliding with side walls, even when working on the end two pallet rows.
- The platform is an integral part of the chassis and it has an enclosed, high-resistance structure providing extreme reliability, even on violent impacts on the dock.
- To optimise traction and braking, the centre-mounted drive unit is sprung and
features variable wheel pressure on the ground proportional to the load on the forks.
• For lateral stability, two exclusive STILL twin-wheels have been specially designed for the EXU-S for extreme reliability in the most arduous applications.

Steering
• Fully electric steering "with automatic return to neutral".
• In the centre angle range, any unintentional steering movements are damped by means of an electronic filter, guaranteeing precise steering.
• Automatic speed reduction during cornering combined with the stabilising wheels gives high lateral stability and reduces centrifugal force effects on the operator and the load.

Cockpit
• The new console "cockpit" contains all the functions for access, operation and control on the EXU-S.
• Due to the ergonomic layout of the controls, all functions can be operated with either hand.
• The following functions are integrated into the cockpit:
  • Steering and speed control
  • Raising/lowering of forks
  • Hour meter connected to functions
  • Battery discharge indicator with forklift cut-out
  • Operator profiles with two performance modes
  • Performance mode selection by electronic key
  • Service centre diagnosis for maintenance (by means of service codes)
• In addition, the cockpit provides a secure support for the operator whilst driving, so that he does not get tired or have to keep turning backwards and forwards.
Driver rides standing on "sprung" platform

- Depending on the application, the EXU-S is available with two platform types that are ergonomically suited to the operator’s needs. These needs are very different from one type of job to another, so we have designed two different platforms.
- For typical loading/unloading applications where pallet transfer or long runs require the driver to spend a long time standing on the truck, the platform with side access will offer the greatest comfort and safety for driving in both directions.
- If the driver has to step in and out frequently for any peripheral work, (scanning products, manual handling etc.), then the platform with rear access is best suited.
- Either EXU-S platform type always provides great comfort due to an innovative, unique, fully sprung platform floor.
- The truck incorporates various storage facilities and a holder for rolls of stretch wrap integrated within the hood.
- A clipboard is available as standard.

Driving

- The asynchronous traction technology is powerful and economical. Travel power is 3.0 kW.
- The latest generation of asynchronous controller combined with the cockpit offers the possibility of selecting two drive modes by touching one of the two performance mode buttons:
  - In "ECO" mode (Tortoise button), the controller supplies the travel motor with low current and it accelerates gradually. This results in 15 % more battery economy, but the same productivity as other machines of this type.
  - In "BOOST" mode (Hare button), the controller drives the travel motor to provide very high torque and acceleration, even when fully loaded. While economy remains unchanged, productivity increases by around 25 %.
• With each mode, the drive characteristics can be adjusted (speed, acceleration, braking) to precisely match the application or driver preference.

• Thanks to the controller's speed control system, the EXU-S will start smoothly and accelerate to maximum travel speed, regardless of the load on the forks.

• The service brake is activated by releasing the butterfly valves or by reversing the direction of travel.

• To avoid any unintentional movements whilst on a ramp, the (electromagnetic) parking brake is activated once the butterfly valves are in neutral position or the operator leaves the platform.

Hydraulic system

• A pump unit comprising a compact, 2.2-kW pump motor with built-in oil tank, solenoid valve and safety valve controlling electrical end-of-travel lift cut-out.

• This hydraulic system offers very short lift times, even with a full load, thereby providing high productivity for loading and unloading lorries with the EXU-S.

Brake circuit

• There are two independent brake circuits.

• Progressive service brake with energy recovery activated by releasing or reversing the butterfly valves.

• Emergency brake with electromagnetic disc activated by a button in the cockpit.

• Driving is only possible when the operator is on the platform, which acts as a contact switch.

Battery

• The battery is easily accessible which makes it easier to recharge or carry out maintenance work (for example, "filling the water up"). The batteries can be replaced
vertically with a sling, or from the side using rollers, if used for 2 or 3 work shifts.

- Two different battery compartments allow batteries with 450 Ah or 600 Ah capacities to be used.

---

**Overviews**

1. Forks
2. Battery compartment
3. Battery cover
4. Battery lock
5. Battery connector
6. Cockpit
7. Lift cylinder
8. Pump motor
9. Backrest
10. Hydraulic oil tank
11. Brake
12. Drive motor
13. Platform (interlock zone)
14. Stabiliser
15. Traction wheel
16. Gearbox
17. Stabiliser
18. Steering motor
19. Steering controller
20. Fuse mount
Definition of directions

The references forwards (1), backwards (3), right (2) and left (4) when describing the position are relative to the driver's seat. The load is at the front.

Sample graphics

This documentation explains the (usually sequential) sequence of certain functions or operations. Schematic diagrams of a truck are used to illustrate these sequences.

NOTE

These schematic diagrams are not representative of the constructed state of the documented truck. They serve only to illustrate the sequences.
Control and display elements

View of the control elements

1 Battery cover
2 Battery compartment lock
3 Cockpit
4 Document holder
5 Diagnostic connector
6 Glove compartment
7 Emergency isolator button
Cockpit

1 Lower button
2 Lift button
3 Horn button
4 Tortoise button
5 PRG ↑ (scrolling) button
6 Numbers 123 button
7 Display
8 ON button
9 Numbers 456 button
10 PRG ↵ input (enter) button
11 Numbers 789 button
12 Hare button
13 Horn button
14 Lift button
15 Lower button
16 Handle
17 Travel control
18 Emergency brake switch
19 Travel control
20 Handle
Dead man's zone

**CAUTION**

The pallet truck has a foot interlock zone which can cause the truck to be braked.

**Method of operation**

The driver must stand with one foot on the foot interlock zone (1) of the driver’s platform. The feet must stay in the area of this platform.

The pallet truck is braked as soon as the foot interlock is no longer activated (the driver leaves the platform).
Markings

Location of designation plates and labels

1  "Danger of crushing hands" label
2  "No hooking" label
3  "Operating and maintenance manual" label
4  Annual testing label (Germany only)
5  Nominal value designation plate
6  "Cold store" label (on cold store version only)
7  "Danger of crushing feet" label
8  "Hook" symbol

Description of labels

(1) The label indicates the danger and risk of crushing hands area.
3 Overview

Markings

(2) This label indicates that you must not lift the truck by hooking onto the cockpit.

(3) This label indicates that you should consult the operating and maintenance manual before using the truck and before carrying out any maintenance work.

(4) This label is only present on trucks sold in Germany. The label indicates the date of the truck's periodic safety inspection.

(5) This designation plate gives the identification data for the truck.

(6) This symbol, where present, indicates that the truck is set up for use in cold-storage (option).

(7) The label indicates the danger and risk of crushing feet area.

(8) This label indicates where to attach the truck's lifting hook.

Warning plates
Always observe the indications on the warning plates.

Chassis frame labelling
The truck's serial number is marked on the chassis frame (1).
### Data plate

**NOTE**

*Please indicate the serial number for all technical enquiries.*

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Model</td>
</tr>
<tr>
<td>2</td>
<td>Rated capacity in kg</td>
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<tr>
<td>3</td>
<td>Manufacturer</td>
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<tr>
<td>4</td>
<td>Serial no.</td>
</tr>
<tr>
<td>5</td>
<td>Unladen weight (without battery) in kg</td>
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<tr>
<td>6</td>
<td>Year of manufacture</td>
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<td>7</td>
<td>EC conformity symbol</td>
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<td>QR code</td>
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<tr>
<td>9</td>
<td>Battery voltage V</td>
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<tr>
<td>10</td>
<td>Nominal power rating in kW</td>
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<tr>
<td>11</td>
<td>Minimum battery weight</td>
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<tr>
<td>12</td>
<td>Maximum battery weight</td>
</tr>
<tr>
<td>13</td>
<td>Additional weight (ballast) in kg</td>
</tr>
</tbody>
</table>
Options

Models

1 Platform, access on left side

2 Platform, access at rear

Options

- Single load wheels
- Continuous operation hour meter (with own battery in the tiller head)
- Battery charge indicator (for gel battery)
- Battery charge indicator (for gel battery) with service interval indicator
- Battery charge indicator (for lead battery) with service interval indicator
• Cold store version
• Document holder
• Preparation for data input terminal
• FleetManager
• Tray 71
• Various fork gauges and fork lengths
• Various load rack sizes
• Various types of tyre for the drive wheel
• Slow speed with forks lowered
• Battery electrolyte level indicator LED

Accessories
• Master code (factory setting "1 2 3 4")
• Key for battery compartment (2 items)
Application
Authorised and safe use

Intended use of the trucks

CAUTION

This machine is intended for the transport of loads packed on pallets or in industrial containers designed for this purpose, as well as for placing pallets into and removing pallets from stock.

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

The table of characteristics and performance attached to this user manual gives you some of 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.

Safety instructions relating to use of the truck

Behaviour when driving

The operator must obey the same rules within the plant as on the road. The operator must drive at a speed appropriate for the driving conditions. For example, the operator should drive slowly around corners, when entering and travelling through narrow passageways, when driving through swing doors, at blind spots, or on uneven surfaces. The operator must always maintain a safe braking distance from vehicles and persons in front of him and must always have the truck under control. The operator must avoid sudden stops, making fast U-turns and overtaking other vehicles in potentially dangerous areas or areas with poor visibility.

WARNING

Driving the truck while sitting down is prohibited.

Please remember the following:

• Drive the truck as described in the "Operator positions" section.
• The truck must not be used as a stepladder.
• The truck has not been designed to transport anyone other than the operator and must not be used for this purpose.
• The operator must always stay within the truck clearance.
• Stay in the safety area (working area defined by the manufacturer).

**NOTE**

Using a telephone or radio in the truck is permitted, but avoid using these devices when driving as they may distract you.

**People in the danger area**

Before starting the truck and while you are working, ensure that no one is in the danger area. If people are in danger, warn them well in advance. Stop working with the truck immediately if the people do not leave the danger area despite the warnings.

**DANGER**

Risk of injury! There is a risk of physical injury inside the danger area. Danger of death from falling loads! Do not stand on the forks!

Standing or walking under the forks is strictly forbidden, even when they are not loaded!

**Danger area**

The danger area is the area in which people are in danger from the forklift truck movements, from its work equipment and from its load lifting devices (e.g. accessories) or from the load. The danger area also includes areas in which a load could fall or in which work equipment could lower or fall.

**Traffic route conditions**

The surface of traffic routes must be sufficiently level, clean and clear of objects. Drainage channels, railway crossings and other similar obstacles must be levelled and, if necessary, fitted with ramps so that the truck can cross without jolting.
There must be sufficient distance between the highest part of the truck or the load and the surrounding fixed installations. The height depends on the lift height and the dimensions of the load. Refer to the technical characteristics.

**Regulations regarding the traffic routes and the manoeuvring areas**

Only traffic routes authorised by the operator or his agent may be used. Traffic routes must be free of obstacles. Loads may only be unloaded and stored in places designed for this purpose. The operator or his agent must ensure that no unauthorised person approaches the working area.

**Hazards**

Hazards on the traffic routes must be signalled by standard road signs or possibly by additional warning notices.

---

**Truck transport and lifting**

**Transporting the truck**

The forklift is normally transported by road and rail. If the forklift's dimensions exceed the max. clearance size allowed, it is transported disassembled. The sales network is in charge of the disassembly and reassembly operations. The forklift must be secured to the transport means during transport using appropriate restraint systems. Block the wheels with wedges to prevent even the slightest movement.

**Transport**

- Shut down the truck with the key switch.
- Disconnect the battery connector.
Application 4

Breaking-In

**Chocking the truck**
- Secure the truck against rolling and sliding with chocks (1).

**Lashing down the truck**
- Attach the lashing ropes (2) at the frame.

---

Climatic Conditions for Transport and Storage

The forklift must be protected from atmospheric agents during transport and storage.

---

Breaking-In

This type of forklift does not require special breaking-in operations.
Checks and actions prior to use

Visual checks

⚠️ WARNING
Damage or other faults on the truck or attachments (special equipment) can result in accidents.
If damage or other faults are noticed on the truck or attachments (special equipment) during the following checks, do not use the truck until it has been properly repaired. Do not remove or disable the safety systems and switches. Do not change the pre-set values.

⚠️ CAUTION
Only use the truck if all of the covers are fitted correctly and the covers and doors are closed correctly.

⚠️ CAUTION
Perform checks on a flat surface. Make sure that there are no people or objects in the test area in front of and/or behind the truck.

⚠️ CAUTION
Drive very slowly during the operational tests.

Ensure that the vehicle is in good working condition prior to start-up. These checks supplement and do not replace the scheduled maintenance operations.
- No visible damage (e.g. deformation, cracks, heavy wear, hairline cracks) to forks (1) and other lifting devices.
- Inspect the wheels and load wheels (2) for strings, fibres and any other objects that could hinder their free rotation.

- The latch (4) must be closed.
– The battery cover (5) must be closed.

– The cover (3) must be fitted.

• Check that the warning and safety labels are complete and intact; see ⇒ Chapter "Location of designation plates and labels", P. 3-31.

• Replace any damaged or missing labels according to the overview of the location of plates and labels

• Attachments (optional) must be properly secured and operated in accordance with their user manual

• Inspect hydraulic pipes and hoses for visible damage and leakage. Replace damaged hoses

• Check that there are NO oil leakages in the area under the truck

• Visually check the uncovered sections of hydraulic hoses and pipes to ensure that they are in good condition and to detect any oil leakages

• Check that there are no objects (wires of various types, nails, screws, pieces of tape etc.) impeding the operation of the wheels and rollers. The wheels and the load rollers must roll freely

• The wheels must not show any sign of damage or heavy wear. They must be correctly mounted

• Check that the battery hood is fully and properly closed

• Check that all of the hoods and protective guards are present and check that they are correctly mounted

• There must be no objects on the truck that may limit visibility

• Check that NO stickers are missing or damaged. Replace damaged or missing stickers in compliance with the marking position table

• Visually check that the forks or other load-carrying equipment show NO obvious damage (e.g. bends, cracks, significant wear)

• Check that the battery male connector and female connector are fully intact and in good
condition. Check that they are working correctly
• Check that the start/stop key works correctly
• Check that the horn works correctly
• Check that the buttons and the control throttles on the tiller are working correctly
• One at a time, push the buttons and then release them. Check that the buttons return automatically to their initial positions. The buttons must not remain activated or stuck
• Turn the drive control throttle and then release it. Check that the throttle automatically returns to the initial position when it is released. The throttle must not remain activated or locked
• Test that the truck brakes and stops when the throttle is released during travel
• Check that the emergency stop button is operating correctly. Carry out the test when travelling towards the forks
• Check that the brake is operating correctly
• Test that the electromagnetic brake works effectively
• Check that the battery harness is in good condition
• Check and test the battery electrolyte level and density as indicated in the battery instructions
• The operator must be qualified to drive the truck. The operator must be able to reach the controls and operate them (especially the anti-crush protective device). Do not obstruct access to the controls
Connecting the battery plug (charging station)

- Disconnect the battery socket (1) from the charging station and insert into the plug on the truck.
- The latch (2) must be closed.
- Close the battery cover (3).

Start-up

Turning on the truck

**NOTE**

The pallet truck is equipped with a digital control and is taken into operation by entering a driver code. The driver code consists of four figures and is assigned by the pool manager. It is used for normal use and operation of the truck by the driver and operator. The knowledge of the code is like a key and should not be misused. Do not tell third persons your driver code except if expressly ordered to do so.

- It is possible to send other codes; see chapter: ⇒ Chapter "Digicode control", P. 4-71.
Entering the user code

– Press the key (6). The display (8) shows the message Code (8). This message switches off after approximately one second. You can then enter the 4-digit user code. The digits are entered in the same way as on a mobile phone.

– Press keys (1), (2) or (3) several times until the desired digit is shown;

for digits:
• 1-2-3, press key 123 (1),
• 4-5-6, press key 456 (2),
• 7-8-9, press key 789 (3).

After entering a digit, the display moves to the next position. The display shows a flashing line (9) (the illustration shows an example).

NOTE

If the digit entered is wrong, it is possible to cancel it by depressing the key (scroll) (7).
Start-up

– The digit will be deleted and the flashing line (9) will reappear. It is now possible to enter digits again.

– After the fourth digit has been entered, confirm this code by pressing [PRG] (5). The name of the truck manufacturer is displayed. It is now possible to activate the truck.

NOTE

If an error code is displayed, e.g. E380 (10), stop the truck by pressing the key (6) and carry out the activation procedure again.

NOTE

It is possible to show the following displays by repeatedly depressing the [PRG↑] key (scroll) (7).

• Hour meter ⇒ Chapter "Hour meter", P. 4-49
• Battery charging ⇒ Chapter "Battery charge", P. 4-49
• Servicing interval management ⇒ Chapter "Display of time to next servicing", P. 4-50

Starting with FleetManager (optional)

– Push the [ key (START) (6). Do not pay attention to the Code alert that appears in the display

– Start the truck directly via the FleetManager keyboard or reading device, depending on the version.
Hour meter

The operating hours (1) appear approx. 4 to 5 seconds after starting the truck, accompanied by the hourglass symbol (2). The total hours are indicated from when the truck is first commissioned. The hour meter totals during travel. Perform maintenance work according to the operating hours in accordance with the maintenance schedule.

NOTE

The meter goes to 9999.

Battery charge

WARNING

Do not place any metallic objects or tools on the battery. No naked lights, no smoking permitted! The battery could be damaged, shorted or an explosion could occur.

WARNING

The electrolyte (diluted sulphuric acid) is poisonous and caustic! Follow the safety precautions for handling battery electrolyte.

– Press the PRG↑ (scrolling) button (4) to display the available battery charge (3).

NOTE

After the battery is connected, the correct state of charge appears only after about 1 minute.

The charge is shown in per cent and changes in steps of 5 %.

NOTE

The factory setting of the battery charge indicator is for a lead battery. The indicator can also be set to a gel battery. Please contact your Service.

• If a residual charge of 20% is reached, the battery must be charged soon.
• The driving speed is reduced.
CAUTION
Deep discharging damages the battery. The battery must immediately be charged as deep discharging begins.

Display of time to next servicing
- Press the PRG button (4) to display the time remaining until the next scheduled servicing. The time is shown in hours (6) and with the symbol of a spanner (5). Have the maintenance carried out according to service hours specified in the maintenance schedule.

NOTE
The display of the time to the next servicing can be set by your Service. Please contact your Service in this regard.
- The display can show subsequent information ⇒ Chapter "Error code", P. 4-79.
Operating the horn
– Press the horn button (2) on the cockpit.

Check of brake and presence area
– Start the truck slowly with the throttle (1).
4 Application

Start-up

– Step off the presence area (2) while leaving the throttle actuated.

Checking the emergency brake button

– Drive the truck slowly using the traction control (4).
– Press the emergency brake button (5). The truck will be braked and remains stationary.
– The Stop signal appears on the display (6).

NOTE

Press the button "ON" "7" to resume work. After Stop disappears from the display, the truck is operational again.

CAUTION

Only use this brake system in the event of an emergency!
Driving

Driving safety rules

Behaviour when driving

The driver must drive the truck within the plant according to regulations for driving on public roads. The speed of the truck must be appropriate for local conditions. For example, speed must be reduced when cornering, in narrow passages, when driving through swing doors, in areas with reduced visibility and/or on uneven ground. A safe distance must always be maintained from people and any vehicles in front. Sudden braking, fast turns, overtaking in hazardous areas or areas with poor visibility must be avoided.

Do not sit on the truck when driving.

EXU-S 22/24 trucks are designed for operation in ride-on mode, therefore:

• Do not operate the truck when sitting.
• Never use the truck as a climbing aid.
• Never use the truck to transport persons.
• Do not lean out. Always stay within the truck profile.

The use of a mobile phone or radiophone when operating the vehicle is permitted. However, do not use these devices while driving, as this will reduce your concentration.

First practice driving in a clear area or on a free roadway.

Visibility when driving

The driver must look in the direction of travel and have a clear view of the route travelled on. He must always ensure that the way is clear, particularly when reversing. When transporting goods that obstruct visibility, the truck must be driven with the load trailing. If this is not possible, a guide must walk ahead of the truck. In this case, the truck may only be driven at walking pace and with the utmost caution. The truck must be stopped immediately when eye contact with the guide is lost.
Before driving

Persons in the danger area

Before and during operation of the truck, the driver must ensure that no person is standing in the danger area of the truck. A warning signal must be given in the event of danger to persons. If these persons refuse to leave the danger area despite the warning, the driver must stop working with the truck immediately.

WARNING
Risk of injury!! Within of the danger zone there is a risk of being injured.
Do not step on the forks.

DANGER
Risk of death through falling loads!
It is expressly forbidden to stand under the raised forks or to walk by beneath them, even if there is no load on the forks.

Danger zone

The danger zone is the area in which persons are endangered through the movement of the truck, its implements, load-lifting devices (e.g. attachments) or the carried load. This also includes the area within the range of falling loads or a descending implement.
Dimensions of roads and working aisles

The dimensions specified in the description section apply under established conditions and should ensure safe manoeuvring. Check in each case whether a wider aisle is required when, for example, the load dimensions deviate.

The required aisle widths (Ast) depend on the dimensions of the load and are calculated according to the following formula: Ast = Wa - X + length of pallet + 200 mm.

Observe your local and national regulations.

Please see ⇒ Chapter "VDI data sheet for standard EXU-S 22", P. 6-101.

The truck may only be used on roadways without any tight curves, excessive slopes or passages that are too narrow or too low.

The following inclines or slopes may be driven on with the truck:

The slopes must not exceed the above gradients and should have a rough surface.

Smooth passages at the top and lower end should prevent the load from touching the ground or damage to the truck.

Condition of roadways

Roadways must be solid enough, free of debris and fallen objects. Drainage ducts, tracks and the like must be level and, if necessary, provided with ramps so that they can be crossed without jolts, if possible.

There must be sufficient clearance between the highest parts of the truck or the load and the surrounding fixtures. The height depends on the lift height and the load dimension. Check the datasheet for the truck.

Rules for roadways and working area

Only roadways made available by the operator or his representative may be driven on. The roadways must be free of obstacles. The load may only be stacked and stored in the appropriate places. The operator and his
representative must ensure that unauthorized persons keep away from the working area.

**Hazard areas**

Hazardous areas on roadways must be marked with the usual traffic signs or, if necessary, by additional warning signs.

**Emergency stop procedure**

In an emergency, all truck functions can be cut off.

- To do so, depress the emergency isolator button (1). The truck comes to a stop.

![Diagram](image_url)

**CAUTION**

This safety feature may only be used in an emergency.

**NOTE**

*After pulling up the emergency isolator button re-enter the driver’s code to resume work.*
Driving in rider mode

– Step on the platform with both feet and step on the presence area (1).

**NOTE**

_The pallet truck is turned on._

**WARNING**

There should be no objects lying on the floor of the driver’s platform, whose weight could activate the dead man’s switch under the mat.

Driving forward

– Depress the top part of the throttle (2) or (3) with the thumb.
– Truck speed is increased by depressing the travel control further.
– When the travel control is released, the truck is braked electrically.

Reversing

– Depress the lower part of the throttle (2) or (3) with the thumb.
– Truck speed is increased by depressing the travel control further.
– When the travel control is released, the truck is braked electrically.

Reversing direction

– Allow the travel control to return to its neutral position.
– Operate the travel control progressively in the opposite direction of travel until the desired speed is reached.
Selecting the driving mode

**NOTE**

The pallet truck has 2 selectable driving modes.

- For normal travel, push the `Hare` button (3).
- To drive with gentle accelerations, push the `Tortoise` button (2).

**NOTE**

The travel control (4) and (5) can be operated with both the left and the right hand. Always operate the travel control slowly to avoid jerky starting, braking or reversing.

Steering

The truck is steered by turning the cockpit in range (1).

The turning radius (Wa) depends on the fork length and the battery. (See ⇒ Chapter "VDI data sheet for standard EXU-S 22", P. 6-101)

Brakes

**WARNING**

The surface finish influences the driving and braking behaviour of the truck. Therefore take this into account when driving and braking (eg: wet floor).
Soft braking

NOTE

The truck is braked electrically.

– Release throttle (3) or (4) when driving.

– Leave the presence area (5).

Average braking

– Operate the throttle (3) or (4) in the opposite direction.

Emergency braking

CAUTION

This type of braking may only be used in an emergency.

– Press the emergency brake button (2). The pallet truck stops.
– STOP appears in the display.

NOTE

Press the button "ON" (1) to resume work. After STOP disappears from the display, the truck is operational again.

The truck is operational again.

Parking brake

– Release traction control (3) or (4).
Lifting

The truck is braked by the electromagnetic brake.

**Automatic shutdown**

**NOTE**

*If you leave the truck with the control turned on, it will be shut off automatically after approx. 15 minutes. The truck can only be operated again after the driver code is entered. The delay time is adjustable. Please contact your Service Engineer in this regard.*

**Lifting**

**Operating the main lift**

**Elevating the forks**

– Press the lift button (2). The forks are raised. Their movement can be stopped at any time by releasing the button.


**Lowering the forks**

- Press the lower button (1). The forks are lowered. Their movement can be stopped at any time by releasing the button.
Load placement

Safety regulations when handing loads

⚠️ DANGER
Wear protective footwear.

⚠️ CAUTION
Transporting passengers is strictly prohibited.

⚠️ DANGER
Before picking up the load, make sure that its dimensions and weight fall within the truck specifications, as indicated in the "TECHNICAL DATA" chapter.

⚠️ DANGER
The loads must be arranged so that they cannot slip or overturn and fall to the ground. In order to guarantee load stability, make sure that the load is balanced and centred on the forks.

⚠️ CAUTION
Make sure that nobody stands in the truck’s area of operation.

⚠️ DANGER
Risk of injury and crushing for the operator and for any pedestrians! Risk of damage to the truck and the goods
During movement of the truck and the loads, especially in reverse gear, be careful not to hit any obstacles. You must maintain an adequate safety distance from obstacles (e.g. other pallets, protruding objects, shelving, pedestrians, other trucks in transit etc.).

⚠️ DANGER
Risk of injury and crushing for the operator!
The operator must always remain inside the envelope of the truck.

ℹ️ NOTE
Further information on the general rules of truck use and picking up and depositing loads is provided in the "Safety Regulations for Industrial Forklift Use" manual attached to this manual.
Before picking up a load

Load capacity

Do not exceed the load capacity of the truck. See ⇒ Chapter "VDI data sheet for standard EXU-S 22", P. 6-101.

⚠️ WARNING

Never exceed the stated maximum load capacities! Otherwise truck stability will not be ensured.
The load capacity plate must be observed. Do not mount additional weights to increase the load capacity. Do not exceed the stated maximum load capacities! Otherwise truck stability will not be ensured.

⚠️ WARNING

When small parts are transported, a protective guard must be attached to prevent goods from falling onto the driver.
Taking up load

- Approach the load with caution and with as much precision as possible.
- Lower the fork arms so that they can easily be inserted into the pallet.
- Slowly insert the forks at the centre of the load to be lifted.

⚠️ CAUTION
Insert the fork without bumping into either the shelving or the load.

- Insert the forks as far as possible below the load. If possible, the forks should be inserted far enough in that the load is resting against the fork carriage. The load centre of gravity must be centred between the forks.

⚠️ DANGER
Pay attention to the part of the forks protruding from the load to be lifted.
Do not strike the wall, the shelving or other loads and/or objects behind the load to be picked up.

- Lift the load a few centimetres from the ground and read the "Transporting loads" section.

Transporting a load

As a general rule, loads must be transported one by one (e.g. pallets). Transporting several loads at once is only authorised:

- If the safety requirements are met.
- On the orders of the supervisor in charge.

The operator must ensure that the load is properly packaged. The operator can only move loads that have been properly packaged and are safe and secure.

⚠️ WARNING
The load must be at a height that does not obstruct the driver's view of the front, otherwise drive with the load trailing. If this is not possible, work with a guide walking beside the truck. In this case, drive the truck only at walking speed and with the utmost caution. Stop the truck immediately if you lose contact with the guide.

⚠️ DANGER
Lower or raise the load until there is sufficient ground clearance.
Do not allow the load, the pallets or the container to trail along the floor.
When travelling and transporting the load, be aware of the side clearance of the load, particularly when cornering. Avoid hitting shelving and objects in your path.

Danger of load tipping over
Avoid sudden starts and stops. Approach corners slowly and carefully.

Depositing a load on the ground
- Approach the load deposit area.
- Lower the fork arms until the load is Deposited in the required area, then free the forks from any contact with the pallet or container.
- Look behind you before backing the truck away
- Check that the truck’s path is free of any objects, people and obstacles of any type
- Look behind you and back away very slowly to fully extract the forks from the load.

Risk of injury and crushing for the operator! Risk of damage to the truck and the goods
During the entire load placement operation, be careful not to hit any obstacles. You must maintain an adequate safety distance from obstacles (e.g. other pallets, protruding objects, shelving etc.).

Never leave the forklift with the forks raised whether loaded or not.

Further information on the general rules of forklift use is provided in the Rules for the Use of Industrial Vehicles Manual enclosed with this manual.
Load placement

Driving up and down on an incline

When driving up and down on an incline, the load must always be carried uphill.

It is only permitted to drive on inclines which are identified as suitable for traffic and which can be safely negotiated according to the technical data of the truck. The driver must satisfy himself that the ground is clean and provides enough grip. It is not allowed to turn on, park on or travel across inclines. Speed must be reduced when driving down on an incline.

Entering lifts

With this truck, the driver may only enter lifts having a sufficient load capacity and for which the operator of the lift has given permission to enter.

In the lift, the truck must be secured so that no parts touch the shaft walls.

The clearance to the shaft wall must at least 100 mm.

The maximum weight of the truck (dead weight without driver, the max. load.

| EXU-22  | 3320 kg |
| EXU-24  | 3520 kg |

Persons travelling with the lift at the same time may enter the lift only after the truck is standing securely and they must leave the lift first.
Driving on loading bridges

Before crossing a loading bridge, the operator must make sure it is properly attached and secured and its load capacity is sufficient.

Cross the loading bridge slowly and carefully. The driver must be sure that the vehicle to be entered is secured sufficiently against movement and that it can support the load of the forklift truck.

The lorry driver and lift truck operator must coordinate the departure time of the lorry.
Using the truck on inclines, loading bridges and lifts.

**Driving on inclines**
When driving the truck up or down inclines, you must not exceed the values for inclines indicated in the chapter "Technical data".
The operator must check that the ground is clear with a good grip.

**WARNING**
When driving up or down inclines, the speed of travel must be reduced.

**DANGER**
Risk of tipping!
When driving up or down inclines, do not turn, reverse and/or travel diagonally.

**WARNING**
When driving on an incline with a load, you must keep the load facing upwards.

**DANGER**
Risk of accident
Keep the truck at a safe distance from the edges of ramps, tailboards etc.

**CAUTION**
In certain cases, it is permitted to drive with the forks pointing towards the top of the incline even if the truck is not loaded.
In these cases, drive with utmost care and avoid turning until all the wheels are on a flat surface.

**DANGER**
Risk of accident
Do not park on an incline: if, in the event of an emergency, you have to do so, apply the parking brake and block the wheels with chocks.

**Using the truck on a lift**
Using the truck on lifts is only allowed if the lift has sufficient load capacity (check the maximum weight of the truck including the traction battery) and only with appropriate authorisation.

Slowly drive the truck onto the lift load-first.
Secure the truck in the lift so that no part comes into contact with the walls of the lift.
A minimum distance of 100 mm from the walls of the lift must always be observed.

**WARNING**
The truck must be correctly immobilised so that it cannot move inadvertently.

**CAUTION**
Personnel accompanying the truck onto the lift may only enter the lift once the truck is secure and must exit the lift first after transit.

**Using the truck on loading bridges**

**DANGER**
Risk of accident
Before driving on to a loading bridge, the operator must check that it has been properly fitted and secured and has sufficient load capacity.
You must drive onto the loading bridge slowly and carefully.
The operator must check that the vehicle to be loaded or unloaded is sufficiently secure so that it will not move and that it is suitable to support the strain of the truck.
The lorry driver and the forklift truck operator must agree on the time of departure of the lorry.

**Towing trailers**
The forklift is not qualified to tow trailers.
Cold store usage (optional)

Designation

Your truck is fitted with special equipment for use in cold stores. It can be used for two operating ranges and carries a cold store label.

The cold store equipment for the truck consists of using specialised oils (for the hydraulic installation and the gears) suitable for cold stores.

Proper usage

Operating range 1: permanent use in areas with temperatures of –5 °C and for short periods of time down to –10 °C. Parking outside the cold store.

Operating range 2: alternating use indoors and outdoors in compliance with the rules below, temperature range from –32 °C to +40 °C. Parking outside the cold store. This use requires hydraulic oil for cold stores as given on the list of maintenance characteristics.

Use

General

The change in temperature between the cold indoors and the heat outside causes condensation. This water can freeze when the truck goes back into the cold store and jam the moving parts of the truck. This is why the length of time the truck remains in the different temperature areas given below for the two operating ranges must be strictly adhered to.

The temperature of the traction batteries must never fall to the temperature of the cold store, otherwise they will stop working.

Prior to start-up

⚠️ CAUTION

The truck must be dry and at operating temperature before being used in the cold store.
Cold store usage (optional)

- Drive the truck for approximately 5 minutes and operate the brakes several times to ensure the truck operates safely.
- Operate all the lifting functions several times. This warming up phase is required to allow the oil to reach operating temperature.

Use

Operating range 1
Permanent use in areas with temperatures of –5 °C and for short periods of time down to –10 °C.

Operating range 2
Alternating use indoors with temperatures down to –32 °C and outside with temperatures up to +25 °C for short periods of time even up to +40 °C. The truck must not leave the cold area for more than 10 minutes, because this length of time is not long enough for the formation of condensation. If the truck stays outside for longer than 10 minutes, it must remain outside for long enough to allow the condensation to run away. This generally takes at least 30 minutes.

⚠️ DANGER
If the condensation freezes in the cold store, the moving parts that have become jammed must not be freed by hand.

Parking
- Always park the truck outside the cold store.

⚠️ CAUTION
The batteries must not remain discharged or unused in the cold store overnight.
- Charge the battery outside the cold store and use a spare battery.
Digicode

Digicode control

Access to the electronic control is granted with three different codes:

- Driver's code
- master code
- service code

Driver's code

The driver's code consists of four digits and must be created by the Pool Manager.

It is used for the regular utilisation and operation of the truck by the driver and operator.

The knowledge of the code should be regarded as a key and must not be misused. The driver's code must not be given to other persons without express order.

The control can store a maximum of 200 driver's codes. A driver's code can be added ⇒ Chapter "Adding a driver's code", P. 4-75 or deleted ⇒ Chapter "Deleting a driver's code", P. 4-77 with the master code.

Master code

The master code consists of four digits and is reserved for the Pool Manager.

The factory setting of this code is "1234". The pool manager is advised to replace this code with a new master code ⇒ Chapter "Deleting a master code", P. 4-73 or ⇒ Chapter "Adding the master code", P. 4-72.

Like the driver's code, it is used for the regular operation and use of the truck, but it also allows the addition or deletion of a driver's code. This control can store a maximum of five master codes.

NOTE

If master codes or driver's codes are forgotten or get lost, please contact the Service Engineer, for he alone can make the stored codes visible.
Service code

The service code is only intended for the after-sales service. It allows the diagnosis of the truck for inspections and the access to the driver’s and master code.

Adding the master code

**NOTE**

*The truck is turned off, the battery is connected.*

- Press the [ON] button (5).
- Enter a valid 4-digit master code with the buttons 123 (1), 456 (2) and 789 (3).
- Scroll with the [PRG↑] (scrolling) button (6) until Pin (7) appears in the display.
- Confirm with the [PRG↲] (enter) button (4) until Add (10) appears in the display.
– Confirm with the \textit{PRG \downarrow} (enter) button (4). A flashing line cursor (8) will appear in the display.

– Enter the desired new 4-digit master code with the buttons (1), (2) or (3) as described above.

\textbf{NOTE}

The controller can store a maximum of five master codes. If one attempts to add a sixth master code, \textit{Err} will appear in the display.

– Confirm with the \textit{PRG \downarrow} (enter) button (4) until the new master code (9) blinks (an example is shown).

– Then release the button. \textit{Add} (10) will appear again in the display.

– Press the \textit{PRG \uparrow} (scrolling) button (6) until a normal readout (11) (eg battery charge) appears in the display. The new master code is entered.

\textbf{Deleting a master code}

\textbf{NOTE}

The truck is turned off, the battery is connected.
– Press the I (ON) button (5).

– Enter the valid 4-digit master code with the buttons 123 (1), 456 (2) and 789 (3).

– Scroll with the PRG↑ (scrolling) button (6) until Pin (7) appears in the display.

– Confirm with the PRG↲ (enter) button (4) until dEL (10) appears in the display.

– Confirm with the PRG↲ (enter) button (4). A flashing line cursor (8) will appear in the display.

– Enter the 4-digit master code to be deleted with the buttons (1), (2) or (3) as described above.

**NOTE**

If one attempts to delete an erroneous master code, Err will appear in the display. If only one master code remains, None will appear in the display.
– Confirm with the \textbf{PRG} \textit{↓} (enter) button (4) until the master code (9) to be deleted blinks (an example is shown).

– Then release the button. \texttt{dEL} (10) will appear again in the display.

– Press the \textbf{PRG} \textit{↑} (scrolling) button (6) until a normal readout (11) (eg battery charge) appears in the display. The master code is deleted.

**Adding a driver’s code**

\textbf{NOTE}

*The truck is turned off, the battery is connected.*

– Press the \texttt{I} (ON) button (5).

– Enter the valid 4-digit master code with the buttons \texttt{123} (1), \texttt{456} (2) and \texttt{789} (3).
– Scroll with the PRG↑ (scrolling) button (6) until USER (7) appears in the display.

– Confirm with the PRG↲ (enter) button (4) until Add (10) appears in the display.

– Confirm with the PRG↲ (enter) button (4). A flashing line cursor (8) will appear in the display.

– Enter the new 4-digit driver’s code with the buttons (1), (2) or (3) as described above.

**NOTE**

*The controller can store a maximum of 200 driver’s codes. If one attempts to add a 201st driver’s code, Err will appear in the display.*

– Confirm with the PRG↲ (enter) button (4) until the new driver’s code (9) blinks (an example is shown).

– Then release the button. Add (10) will appear again in the display.

– Press the PRG↑ (scrolling) button (6) until a normal readout (11) (e.g., battery charge) appears in the display. The new driver’s code is entered.
Deleting a driver's code

**NOTE**

_The truck is turned off, the battery is connected._

- Press the [ ] (ON) button (5).
- Enter the valid 4-digit master code with the buttons 1231 (1), 4562 (2) and 7893 (3).

- Scroll with the PRG↑ (scrolling) button (6) until USER (7) appears in the display.

- Confirm with the PRG↲ (enter) button (4) until dEL (10) appears in the display.

- Confirm with the PRG↲ (enter) button (4). A flashing line cursor (8) will appear in the display.
- Enter the 4-digit driver's code to be deleted with the buttons (2), (3) or (3) as described above.

**NOTE**

_If one attempts to delete an erroneous driver's code, Err will appear in the display._
- Confirm with the \textit{PRG} \( \rightarrow \) (enter) button (4) until the driver's code (9) to be deleted blinks (an example is shown).

- Then release the button. \textit{dEL} (10) will appear again in the display.

- Press the \textit{PRG} \( \uparrow \) (scrolling) button (6) until a normal readout (11) (e.g., battery charge) appears in the display. The driver's code is deleted.
## Error codes

### Error code

If an error code such as **E380** (15) appears, shut the truck off by pressing button (10) and repeat the start-up ⇒ Chapter "Start-up", P. 46.

If the error code persists, call your Service.

<table>
<thead>
<tr>
<th>Error code</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>E350</td>
<td>Travel control operated at power-up.</td>
<td>Release the travel control (1).</td>
</tr>
<tr>
<td>E370</td>
<td>Left <strong>Lift</strong> button operated at power-up.</td>
<td>Release the left <strong>Lift</strong> button (2).</td>
</tr>
<tr>
<td>E371</td>
<td>Left <strong>Lowering</strong> button operated at power-up.</td>
<td>Release the left <strong>Lowering</strong> button (3).</td>
</tr>
<tr>
<td>E372</td>
<td>Left <strong>Horn</strong> button operated at power-up.</td>
<td>Release the left <strong>Horn</strong> button (4).</td>
</tr>
<tr>
<td>E373</td>
<td><strong>Tortoise</strong> button operated at power-up.</td>
<td>Release the <strong>Tortoise</strong> button (5).</td>
</tr>
<tr>
<td>E374</td>
<td>Button <strong>1-2-3</strong> operated at power-up.</td>
<td>Release the button <strong>1-2-3</strong> (6).</td>
</tr>
<tr>
<td>E375</td>
<td>Button <strong>4-5-6</strong> operated at power-up.</td>
<td>Release the button <strong>4-5-6</strong> (7).</td>
</tr>
<tr>
<td>E376</td>
<td>Button <strong>7-8-9</strong> operated at power-up.</td>
<td>Release the button <strong>7-8-9</strong> (8).</td>
</tr>
<tr>
<td>E377</td>
<td><strong>PROG</strong> button operated at power-up.</td>
<td>Release the button <strong>PROG</strong> (9).</td>
</tr>
<tr>
<td>E378</td>
<td><strong>ON</strong> button operated at power-up.</td>
<td>Release the <strong>ON</strong> button (10).</td>
</tr>
<tr>
<td>E379</td>
<td><strong>Hare</strong> button operated at power-up.</td>
<td>Release the <strong>Hare</strong> button (11).</td>
</tr>
</tbody>
</table>
Battery electrolyte level indicator LED (optional)

There are two versions of the LED:
- 1) Located on the battery
- 2) Located next to the battery plug.

The LED indicates whether it is necessary to top up the distilled water in the battery.

Operation:
- If the LED (1) or (2) is green, there is a sufficient level of electrolyte in the battery. The battery must not be topped up with distilled water.
- If the LED (1) or (2) is red, there is an insufficient level of electrolyte in the battery. The battery must be topped up with distilled water.

Handling the truck in specific situations

Towing and moving

The truck cannot be towed if there is no electrical power as the electric brake is applied.

If the brake of the towed truck is no longer functioning, the truck may only be towed with a fixed connection (tow bar). For towing you need a pulling vehicle with sufficient tractive and braking force for the truck being towed.
### Handling the truck in specific situations

#### Towing without a battery

**NOTE**

*In case of an electric failure or if no battery is installed, the brake can be released manually.*

**CAUTION**

This service must be carried out by your after-sales service.

#### Hoisting the truck

**CAUTION**

Only use a lifting gear and crane with a sufficient load capacity. See the vehicle identification plate for the loading weight.

- For hoisting with a crane, always attach the slings to the points identified with the hook symbol.

**CAUTION**

It is strictly forbidden to attach the lifting slings to the cockpit or to other points not intended for this purpose.

**CAUTION**

- Insert pieces of wood to prevent damage.

**DANGER**

Danger to life!
Do not step or stand under a suspended load.

#### Towing procedure

Towing the truck is only possible if there is still a power supply, otherwise the electric brake is still applied.

**NOTE**

*The brake can be released. Please contact your after-sales service.*
Handling the battery

Battery type

The pallet stacker can be equipped with different types of batteries. Observe the information on the battery type plate. Also refer to ⇒ Chapter “Technical data”, P. 99 for this purpose.

⚠️ WARNING

The weight and dimensions of the battery affect truck stability.
Do not change the weight conditions when changing the battery. Do not remove nor change the position of additional weights.

Damage to cables

⚠️ CAUTION

Take care not to damage the battery leads when removing and installing the battery.

Preparation

Maintenance personnel

The battery may only be changed by specially trained personnel, in accordance with the manufacturer’s instructions for the battery, the battery charger and the truck. The maintenance instructions for the battery must be observed.

Fire prevention measures

⚠️ WARNING

Do not smoke or use a naked flame when handling batteries. In the area designated for parking the truck to recharge the battery or battery charger, there should be no flammable materials or substances that can cause sparks within a radius of at least 2 metres. The charging area must be well ventilated. Keep a fire extinguisher at hand.
Safe parking

Park the truck securely before carrying out work on the battery. The truck can only be operated when the battery cover is closed and the battery outlet is inserted. If the truck is enabled for side removal of the battery, the truck can only be operated once the battery is fixed in place properly using the battery locking system.

Opening/closing the battery compartment

Opening the battery compartment

– Turn the lock (1) 90° and lift the battery cover (2).

Closing the battery compartment

⚠️ WARNING

Danger of crushing.

When closing the battery door, there should be nothing between battery door and edge of the frame.

– Lower the battery compartment and turn the lock 90°.

Battery charging with external battery charger

⚠️ CAUTION

Deep discharges damage the battery.

– The battery must be charged at once.

– Park the truck safely, refer to Chapter "Safe parking of the truck", P. 4-87.

– Open the battery compartment.

– Before charging, inspect the battery leads and charging cables for damage and replace them, if required.
Handling the battery

- Disconnect the battery connector (3).

**WARNING**
Switch the truck and charger off before disconnecting the male and female connectors.

- Connect the battery connector to the charger connector.

**NOTE**
*Observe the information in the operating instructions for your battery and battery charger (equalising charge).*

**WARNING**
Risk of damage, shorting and explosion.
Do not place any metallic objects or tools on the battery. No naked lights, no smoking permitted.

**WARNING**
The electrolyte (diluted sulphuric acid) is poisonous and caustic!
Observe the safety precautions for handling battery acid.

**WARNING**
Explosive gases are released during charging.
- Ensure that the room ventilation is adequate.

**Changing the battery**

There are two possibilities of replacing the battery:

- Vertically with a lifting tackle (all trucks).
- From the side using a battery trolley (optional - only for EXU 18 and 20 with side door).

In order to avoid short-circuits, it is recommended that batteries with polar terminals or unprotected connections be covered with a rubber mat.
**DANGER**

**Danger to life!**
No-one should be under a raised load.

---

**Changing the battery with crane**

Maintain a safe distance for battery removal to avoid damaging the truck.

- Open the battery compartment (1).
- Unplug the battery connector.

In order to avoid short-circuits, it is recommended that batteries with polar terminals or unprotected connections be covered with a rubber mat.

**DANGER**

**Danger to life!**
No-one should be under a raised load.

- Unlock the battery.

- Attach the lifting device (3) correctly to the battery (4) (see the lifting device user manual), then remove it from the truck.
- The lifting device must exercise vertical traction in order to avoid the boot being damaged. The hooks must be placed so that they cannot fall on the battery cells when the lifting device is slackened.
- Installation and connection of the charged battery is the reverse of removal. Make sure lateral cover (2) is properly put in place.
Handling the battery

Changing the battery with lateral removal trolley

⚠️ CAUTION
When removing or installing the battery keep your hands away from chassis and battery! There is an increased risk of squeezing your hands!

- Open the battery cover (1).
- Remove the side cover (2).

- Place a suitable trolley (4) next to the battery.
- Position yourself to the side opposite to the side cover and push the battery (3) onto the removal trolley (4).
- To install the new battery position yourself opposite to the side cover and pull the battery towards you into the battery compartment.
- Put the side cover (2) in place.
Decommissioning

Safe parking of the truck

- Park the truck in a dry, clean and well-ventilated area.

⚠️ WARNING

Do not park the truck on gradients. In exceptional cases, secure the truck with chocks.

- Lower the forks (1) on the ground.

⚠️ WARNING

- Before leaving the truck, lower the load fully.

- Depress the emergency isolator button (2).

ℹ️ NOTE

*If you leave the truck without disconnecting the battery connector, the control is shut off automatically after approx. 15 minutes.*

The truck can only be operated again after re-entering the driver code.
Storage

Measures when storing the stacker for a longer period of time

If the stacker is to be held in storage for a longer period of time, carry out the following corrosion protection measures. If the stacker is to be stored for over two months, park it in a clean and dry storage area, which is also well ventilated and frost-free. Also perform the following measures:

Measures before taking out of operation

- Clean the stacker thoroughly.
- Raise the forks several times as far as possible.
- Check the hydraulic oil level, adding oil if necessary.
- Lower the forks on to an appropriate support, for example a pallet, until the lift chains are relaxed.
- Coat all blank, moving parts with a thin film of oil or grease.
- Oil all moving parts and joints.
- Check the condition and electrolyte density of the battery, service the battery according to the instructions of the manufacturer. (Follow the battery manufacturer’s instructions.)
- Spray all naked electric contacts with a suitable contact spray.

⚠️ **CAUTION**

- Block up the truck so that the wheels are clear of the ground. This will prevent a permanent deformation of the tyres.

- Cover the pallet stacker with a cotton blanket and protect it against dust.

⚠️ **CAUTION**

We do not recommend using a plastic foil as this enhances the formation of condensate.
If the truck is to be taken out of service for an even longer period, contact your after-sales service.

**Taking back into service after storage**

If the pallet stacker has been out of service for over six months, it must be inspected carefully before it is taken back into service. The inspection, similarly to the safety inspection, should also include safety-related points on the truck.

– Clean the stacker thoroughly.
– Oil all moving parts and joints.
– Check the condition and acid density of the battery, charging it if required.
– Check the hydraulic oil for condensate and renew the oil, if necessary.
– Perform the services as before initial operation.
– Take the pallet stacker into operation.
– During the next commissioning, check in particular:
  • Traction drive, control, steering
  • Brake (service brake, parking brake)
  • Lifting device
5

Maintenance
General Information

To keep your forklift in good condition, carry out the servicing indicated regularly, within the times indicated and using the consumption materials provided for that purpose, as specified on the following pages. Please make sure that you keep a record of work done; this is the only way for the guarantee to remain valid.

Maintenance is divided into:
• Regular Service (scheduled by the user)
• Planned maintenance (to be performed by the service network authorised by the manufacturer)

**CAUTION**

Maintenance intervals are defined for standard use. In the following cases, it is necessary to reduce the interval between the various scheduled maintenance operations: in the event of use in dusty or salty environments, extremely high or low ambient temperatures, high levels of air humidity, particularly intense and heavy-duty uses, and specific national regulations for trucks or individual components.

Operations Preliminary to Maintenance

Do the following before performing maintenance operations:
• Place the truck on a flat surface and make sure that it cannot move accidentally.
• Lower the forks fully.
• Switch off the vehicle.
• Press the emergency stop button.

**DANGER**

Before performing any intervention on the electric system, disconnect the battery outlet from the relative plug.
### Scheduled maintenance

**Summary table of maintenance operations EXU-S**

<table>
<thead>
<tr>
<th>Operations</th>
<th>Intervals in hours</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 (a)</td>
<td>2000 (b)</td>
</tr>
<tr>
<td>Checks and tests prior to commissioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the oil level in the hydraulic system and the transmission gear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test the insulation between the chassis and the electric motors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test the insulation between the chassis and the electronic control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the condition of the battery and check that it is correctly mounted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the condition of the electrical system (wiring harnesses and fuses) and that it is correctly mounted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check for wear on the lift motor brushes and replace if necessary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the truck braking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check and adjust the electromagnetic brake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check that the forks are in good condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the condition of the piping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check for oil leakages from cylinders and hydraulic connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tyre wear check</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check the correct mounting of the electrical steering pinion gear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check wheel tightness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change the hydraulic oil and filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service the transmission gear</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1000 (a)** = To be repeated every 1000 hours (for example at 1000, 2000, 3000, 4000, 5000 etc.) or at least every 12 months (whichever comes first).

**2000 (b)** = To be repeated every 2000 hours. For example at 2000, 4000, 6000, 8000, 10,000 etc.)
Scheduled maintenance

5000 (c) = To be repeated every 5000 hours. For example at 5000, 10,000, 15,000, 20,000 etc.)

⚠️ ENVIRONMENT NOTE

During maintenance operations, follow the instructions provided in the section "Safety regulations relative to operating materials" in "Chapter 2".
Maintenance as required

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 petrils that could damage parts of the truck.

Fuses

⚠️ CAUTION

Before performing any work on the electrical installation, remove any power from the system by disconnecting the battery connector.

- Open the battery cover (1).
– Disconnect the battery connector (3).
– Remove the bonnet (2) to gain access to the fuse carrier.

The following fuses are located on the fuse carrier:

1. Main fuse 400 A
2. Fuse F3 7.5 A
3. Fuse F4 7.5 A
4. Fuse F5 20 A
5. Fuse F8 (Option) 3 A
Decommissioning

General Information

The operations to be performed for "Temporary decommissioning" and "Permanent decommissioning" are listed in this chapter.
Forklift Towing

The forklift may not be towed in the case of breakdown.

The forklift must be lifted with due caution, as described on the preceding pages.

Temporary Putting Out of Commission

The following operations must be performed when the forklift is not going to be used for a long time:

- Clean the forklift as indicated in the "Maintenance" chapter and put it in a dust-free and dry room.
- Lower the forks.
- Lightly grease all of the unpainted parts with oil or grease.
- Perform the lubrication operations indicated in the maintenance chapter.
- Remove the battery and put it in a room where there is no danger of freezing. Charge the battery at least once a month.
- Raise the forklift so that the wheels do not touch the ground; otherwise, the wheels will become flat at the point of contact with the floor.
- Cover the forklift with a NON-plastic sheet.

Checks and Inspections After a Long Period of Inactivity

**DANGER**

Perform the following operations before using the forklift:

- Clean forklift truck thoroughly.
- Check the battery charge level and re-assemble it in the forklift, making sure to spread Vaseline on the terminals.
- Lubricate all of the parts provided with lubricating nipples and the chains.
- Carry out the fluid level checks.
- Perform all of the functional maneuvers of the forklift and of its safety devices both loaded and unloaded.

**DANGER**

Follow the instructions provided in the maintenance chapter for the operations indicated previously.

Permanent Putting Out of Commission (Demolition)

The forklift must be demolished in compliance with local legislation. Contact the authorised service network or authorised companies to scrap the forklift according to local legislation.

**ENVIRONMENT NOTE**

In particular, batteries, fluids (oils, fuels, lubricants, etc), electrical and electronic components and rubber components must be disposed of in compliance with specific local legislation for each type of material.

**DANGER**

Disassembly of the forklift for scrapping is extremely hazardous.
Technical data
Dimensions
## VDI data sheet for standard EXU-S 22

### Characteristics

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 22</th>
<th>EXU-S 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of platform</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rear access</td>
<td>Side access</td>
</tr>
<tr>
<td>Drive: electric, diesel, petrol, LPG.</td>
<td></td>
<td>Electric</td>
</tr>
<tr>
<td>Driving mode: manual, pedestrian, ride-on standing, ride-on seated, order picking</td>
<td></td>
<td>Standing</td>
</tr>
<tr>
<td>Rated/load capacity Q (kg)</td>
<td>2200</td>
<td></td>
</tr>
<tr>
<td>Nominal load centre of gravity c (mm)</td>
<td>600 (1)</td>
<td></td>
</tr>
<tr>
<td>Load distance x (mm)</td>
<td>1023 (2)</td>
<td></td>
</tr>
<tr>
<td>Centre-to-centre distance y (mm)</td>
<td>1617 (2)</td>
<td></td>
</tr>
</tbody>
</table>

### Weights

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 22</th>
<th>EXU-S 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tare weight including battery kg</td>
<td>1120</td>
<td></td>
</tr>
<tr>
<td>Pressure on the axles, with load drive side/load side kg</td>
<td>1820/1500</td>
<td></td>
</tr>
<tr>
<td>Loads on the axles, without load drive side/load side kg</td>
<td>210/910</td>
<td></td>
</tr>
</tbody>
</table>

### Wheels and tyres

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 22</th>
<th>EXU-S 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyres Polyurethane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheel size drive side mm</td>
<td>250 x 100</td>
<td></td>
</tr>
<tr>
<td>Wheel size load side mm</td>
<td>85 x 80</td>
<td></td>
</tr>
<tr>
<td>Pivoting wheels drive side mm</td>
<td>140 x 54</td>
<td></td>
</tr>
</tbody>
</table>
### Technical data

**VDI datasheet for standard EXU-S 22**

<table>
<thead>
<tr>
<th>Number of wheels (x = drive)</th>
<th>drive side/load side</th>
<th>4/1x + 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track</td>
<td>drive side</td>
<td>b10 (mm)</td>
</tr>
<tr>
<td>Track</td>
<td>load side</td>
<td>b11 (mm)</td>
</tr>
</tbody>
</table>

### Dimensions

<table>
<thead>
<tr>
<th>Lift</th>
<th>h3 (mm)</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step plate height</td>
<td>h7 (mm)</td>
<td>225</td>
</tr>
<tr>
<td>Height of cockpit in operating position</td>
<td>h14 (mm)</td>
<td>1030</td>
</tr>
<tr>
<td>Height of forks when lowered</td>
<td>h13 (mm)</td>
<td>85</td>
</tr>
<tr>
<td>Overall length unladen</td>
<td>l1 [mm]</td>
<td>2415&lt;sup&gt;(3)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Length of the drive unit</td>
<td>l2 [mm]</td>
<td>1225&lt;sup&gt;(3)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall width</td>
<td>b1 (mm)</td>
<td>720</td>
</tr>
<tr>
<td>Dimensions of forks</td>
<td>s/e/l (mm)</td>
<td>55 (78 max)/172/1190</td>
</tr>
<tr>
<td>Fork arm external spread</td>
<td>b5 (mm)</td>
<td>520/560/670</td>
</tr>
<tr>
<td>Ground clearance, loaded, under mast</td>
<td>m2 (mm)</td>
<td>30</td>
</tr>
<tr>
<td>Aisle width for pallet 800 x 1200 lengthwise (b12 x l6)</td>
<td>Ast (mm)</td>
<td>2821&lt;sup&gt;(b)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Aisle width for pallet 1000 x 1200 lengthwise (b12 x l6)</td>
<td>Ast (mm)</td>
<td>2791&lt;sup&gt;(5)(6)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Bending radius</td>
<td>Wa (mm)</td>
<td>2125&lt;sup&gt;(5)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
### Performance data

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 22</th>
<th>EXU-S 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with/without load</td>
<td>km/h</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/12</td>
<td></td>
</tr>
<tr>
<td>Lifting speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with/without load</td>
<td>m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.043/0.062</td>
<td></td>
</tr>
<tr>
<td>Lowering speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with/without load</td>
<td>m/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.068/0.065</td>
<td></td>
</tr>
<tr>
<td>Surmountable gradient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with/without load</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10%/15%</td>
<td></td>
</tr>
<tr>
<td>Acceleration time (over 10 metres)</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>laden/unladen</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.2/4.6</td>
<td></td>
</tr>
<tr>
<td>Service brake</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>electromagnetic</td>
</tr>
</tbody>
</table>

### Electric motors

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 22</th>
<th>EXU-S 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel motor, rating S2 = 60min</td>
<td>kW</td>
<td>3.0</td>
</tr>
<tr>
<td>Lifting motor, rating S3 = 15%</td>
<td>kW</td>
<td>2.2</td>
</tr>
<tr>
<td>Battery in accordance with DIN 43 531/35/36 A, B, C, no</td>
<td>kW</td>
<td>no</td>
</tr>
<tr>
<td>Battery voltage/nominal capacity K5</td>
<td>V/Ah</td>
<td>24/465</td>
</tr>
<tr>
<td>Battery weight (+/- 5%)</td>
<td>kg</td>
<td>405</td>
</tr>
<tr>
<td>Energy consumption according to VDI cycle</td>
<td>kWh/h</td>
<td>1.05</td>
</tr>
</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 22</th>
<th>EXU-S 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed control</td>
<td></td>
<td>AC-controller</td>
</tr>
<tr>
<td>Average noise level measured at the driver's ear</td>
<td>dB (A)</td>
<td>&lt; 65</td>
</tr>
</tbody>
</table>

(1) For forks with l = 1190 mm
(2) With forks lowered. For the value with forks raised, deduct 113 mm
(3) With compartment 71: +85 mm
(4) Dimensions relating to fork length marked with an asterisk
(5) With forks raised
(6) Values calculated with $W_a$ and fork length $l$
   $= 990$ mm
Edition dated 22/10/2015
## VDI data sheet for standard EXU-S 24

### Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of platform</td>
<td>Rear access</td>
<td>Side access</td>
</tr>
<tr>
<td>Drive: electric, diesel, petrol, LPG</td>
<td></td>
<td>Electric</td>
</tr>
<tr>
<td>Driving mode: manual, pedestrian, ride-on standing, ride-on seated, order picking</td>
<td></td>
<td>Standing</td>
</tr>
<tr>
<td>Rated/load capacity Q (kg)</td>
<td></td>
<td>2400</td>
</tr>
<tr>
<td>Nominal load centre of gravity c (mm)</td>
<td></td>
<td>600 (1)</td>
</tr>
<tr>
<td>Load distance x (mm)</td>
<td></td>
<td>1005 (2)</td>
</tr>
<tr>
<td>Centre-to-centre distance y (mm)</td>
<td></td>
<td>1599 (2)</td>
</tr>
</tbody>
</table>

### Weights

<table>
<thead>
<tr>
<th>Weights</th>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tare weight including battery kg</td>
<td></td>
<td>1150</td>
</tr>
<tr>
<td>Pressure on the axles, with load drive side/load side kg</td>
<td></td>
<td>2233/1317</td>
</tr>
<tr>
<td>Loads on the axles, without load drive side/load side kg</td>
<td></td>
<td>232/918</td>
</tr>
</tbody>
</table>

### Wheels and tyres

<table>
<thead>
<tr>
<th>Wheels and tyres</th>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyres Polyurethane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheel size drive side mm</td>
<td></td>
<td>Ø250 x 100</td>
</tr>
<tr>
<td>Wheel size load side mm</td>
<td></td>
<td>Ø85 x 80</td>
</tr>
<tr>
<td>Pivoting wheels drive side mm</td>
<td></td>
<td>Ø140 x 54</td>
</tr>
<tr>
<td>Number of wheels (x = drive) drive side/load side</td>
<td></td>
<td>4/1x + 2</td>
</tr>
</tbody>
</table>
### Technical data

#### VDI data sheet for standard EXU-S 24

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track</td>
<td>drive side</td>
<td>b10 (mm)</td>
</tr>
<tr>
<td>Track</td>
<td>load side</td>
<td>b11 (mm)</td>
</tr>
</tbody>
</table>

#### Dimensions

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift</td>
<td>h3 (mm)</td>
<td>130</td>
</tr>
<tr>
<td>Height of cockpit in operating position</td>
<td>h14 (mm)</td>
<td>1030</td>
</tr>
<tr>
<td>Step plate height</td>
<td>h7 (mm)</td>
<td>225</td>
</tr>
<tr>
<td>Height of forks when lowered</td>
<td>h13 (mm)</td>
<td>85</td>
</tr>
<tr>
<td>Overall length unladen</td>
<td>l1 [mm]</td>
<td>2415 (3) 2487 (3)</td>
</tr>
<tr>
<td>Length of the drive unit</td>
<td>l2 [mm]</td>
<td>1225 (3) 1297 (3)</td>
</tr>
<tr>
<td>Overall width</td>
<td>b1 (mm)</td>
<td>720</td>
</tr>
<tr>
<td>Dimensions of forks</td>
<td>s/e/l (mm)</td>
<td>61 (78 max)/172 (4)/1190</td>
</tr>
<tr>
<td>Fork arm external spread</td>
<td>b5 (mm)</td>
<td>520/560/670</td>
</tr>
<tr>
<td>Ground clearance, loaded, under mast</td>
<td>m2 (mm)</td>
<td>24 (4)</td>
</tr>
<tr>
<td>Aisle width for pallet 800 x 1200 lengthwise (b12 x l6)</td>
<td>Ast (mm)</td>
<td>2814 (5) 2883 (5)</td>
</tr>
<tr>
<td>Aisle width for pallet 1000 x 1200 lengthwise (b12 x l6)</td>
<td>Ast (mm)</td>
<td>2781 (5) (6) 2851 (5) (6)</td>
</tr>
<tr>
<td>Bending radius</td>
<td>Wa (mm)</td>
<td>2107 (5) 2177 (5)</td>
</tr>
</tbody>
</table>

#### Performance data

<table>
<thead>
<tr>
<th></th>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving speed</td>
<td>with/without load</td>
<td>km/h</td>
</tr>
<tr>
<td>Lifting speed</td>
<td>with/without load</td>
<td>m/s</td>
</tr>
<tr>
<td>Lowering speed</td>
<td>with/without load</td>
<td>m/s</td>
</tr>
<tr>
<td>Surmountable gradient</td>
<td>with/without load</td>
<td>%</td>
</tr>
</tbody>
</table>
### Technical data

<table>
<thead>
<tr>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acceleration time (over 10 metres)</strong></td>
<td>laden/unladen</td>
</tr>
<tr>
<td><strong>Service brake</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Electric motors

<table>
<thead>
<tr>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel motor, rating S2 = 60min</strong></td>
<td>kW</td>
</tr>
<tr>
<td><strong>Lifting motor, rating S3 = 15%</strong></td>
<td>kW</td>
</tr>
<tr>
<td><strong>Battery in accordance with DIN 43 531/35/36 A, B, C, no</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Battery voltage/nominal capacity K5</strong></td>
<td>V/Ah</td>
</tr>
<tr>
<td><strong>Battery weight (+/- 5%)</strong></td>
<td>kg (+/- 5%)</td>
</tr>
<tr>
<td><strong>Energy consumption according to VDI cycle</strong></td>
<td>kWh/h</td>
</tr>
</tbody>
</table>

#### Other

<table>
<thead>
<tr>
<th>EXU-S 24</th>
<th>EXU-S 24</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speed control</strong></td>
<td>AC-controller</td>
</tr>
<tr>
<td><strong>Average noise level measured at the driver's ear</strong></td>
<td>dB (A)</td>
</tr>
</tbody>
</table>

1. For forks with l = 1190 mm
2. With forks lowered. For the value with forks raised, deduct 113 mm
3. With compartment 71: +85 mm
4. Dimensions relating to fork length marked with an asterisk
5. With forks raised
6. Values calculated with W_a and fork length l = 990 mm

Edition dated 22/10/2015
### Turning radius and load distance EXU-S

#### EXU-S 22

<table>
<thead>
<tr>
<th>Battery compartment</th>
<th>Battery compartment</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 (3PzS)</td>
<td>71 (4PzS)</td>
</tr>
<tr>
<td>345 - 465 Ah</td>
<td>560 - 620 Ah</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forks</th>
<th>Load</th>
<th>Rear</th>
<th>Side</th>
<th>Rear</th>
<th>Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>length</td>
<td>distance</td>
<td>access</td>
<td>access</td>
<td>access</td>
<td>access</td>
</tr>
<tr>
<td>l</td>
<td>x</td>
<td>Wa</td>
<td>Wa</td>
<td>Wa</td>
<td>Wa</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>990</td>
<td>823</td>
<td>2038</td>
<td>2108</td>
<td>2123</td>
<td>2193</td>
</tr>
<tr>
<td>1190</td>
<td>1023</td>
<td>2238</td>
<td>2308</td>
<td>2323</td>
<td>2393</td>
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#### EXU-S 24

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Legend:

a = for value with forks raised deduct 113 mm
b = available only when b5 = 560 mm
c = useful for transporting three Euro pallets on the short side
d = useful for transporting two Euro pallets on the long side

Wheels and tyres

Approved types of wheels

Only the wheel types listed in the parts catalogue may be used.
## Supply table EXU-S EXU-SF

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