20EPR-X / 25EPR-X

Electric Pallet Truck

Operator's Manual





Do not use the pallet truck before reading and understanding these operating instructions.

NOTE:

- Please check the designation of your present type at the last page of this document as well as on the ID-plate.
- Keep for future reference.

FOREWORD

Before operating the truck, read this ORIGINAL INSTRUCTION HANDBOOK carefully and understand the usage of the truck completely. Improper operation could create danger.

This handbook describes the usage of different electric pallet trucks. When operating and servicing the truck, make sure, that it applies to your type.

Keep this handbook for future reference. If this or the warning/ caution labels are damaged or got lost, please contact your local dealer for replacement.

This truck complies with the requirements according to EN 3691-1; -5 (Industrial trucks- safety requirements and verification, part 1; part 5), EN 12895 (Industrial trucks- electromagnetic compatibility), EN 12053 (Safety of industrial trucks- test methods for measuring noise emissions), EN 1175-1 (Industrial truck safety – electrical requirements), assumed the truck is used according to the described purpose. The noise level for this machine is 69 dB(A) according to EN 12053.

The vibration is 0,85 m/s2 (if equipped with a platform) according to EN 13059.

ATTENTION:

- Environmentally hazardous waste, such as batteries, oil and electronics, will have a negative effect on the environment, or health, if handled incorrectly.
- The waste packages should be sorted and put into solid dustbins according to the materials and be collected disposal by local special environment protection bureau. To avoid pollution, it's forbidden to throw away the wastes randomly.
- To avoid leaking during the use of the products, the user should prepare some absorbable materials (scraps of wooden or dry duster cloth) to absorb the leaking oil in time. To avoid second pollution to the environment, the used absorbable materials should be handed in to special departments in terms of local authorities.
- Our products are subject to ongoing developments. Because this handbook is only for the purpose of operating /servicing the pallet truck, therefore please have understanding, that there is no guarantee out of particular features out of this handbook.



NOTE: On this manual, the left sign means warning and danger, which can lead to death or serious injury if not followed.

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TABLE OF CONTENTS

1.	CORRECT APPLICATION	4
2.	DESCRIPTION OF THE PALLET TRUCK	5
а	. Overview of the main components	5
b	. Main technical data	6
с	. Description of the safety devices and warning labels (Europe and other, excepting USA)	8
d	. Identification plate	10
3.	WARNINGS, RESIDUAL RISK AND SAFETY INSTRUCTIONS	10
4.	COMMISSIONING, TRANSPORTING, DECOMMISSIONING	11
а	Commissioning	11
b	. Lifting/ transportation	11
С	. Decommissioning	12
5.	DAILY INSPECTION	12
6.	OPERATING INSTRUCTIONS	13
a	Parking	13
b	. Lifting	13
с	. Lowering	13
d	. Travelling	13
е	Steering	14
f.	Braking	14
g	Malfunctions	15
h	Emergency	15
7.	PIN-CODE PANEL	15
а	Introduction	15
b	. Main parameters	15
с	Main functions	16
d	. Operation	16
е	. Pin-code panel indicator	16
8.	BATTERY CHARGING AND REPLACEMENT	16
а	Replacement	17
b	. Battery indicator	18
с	Charging	19
9.	AQUAMATIC SYSTEM	27
a	Water After Charge	27
b	. Watering Intervals	27
с	. Operation	28
10.	REGULAR MAINTENANCE	29
а	Maintenance checklist	30
b	. Lubricating points	31
с	. Check and refill hydraulic oil	31

d.	Checking electrical fuses				
e.	Wheel replacement procedure				
f.	De-energizing of energy stored components	34			
11.	TROUBLE SHOOTING	35			
12.	WIRING/ CIRCUIT DIAGRAM				
a.	Electrical circuit diagram				
b.	Hydraulic circuit				
13.	DECLARATION OF CONFORMITY (valid, if sold within the EU)				
[GB]	[GB] CE Declaration of Conformity				
[D] I	D] EG-KONFORMITÄTSERKLÄRUNG				
[NL]	EG-CONFORMITEITSVERKLARING				

1. CORRECT APPLICATION

It is only allowed to use this electric pallet truck according to this instruction handbook.

The trucks described in this handbook are self propelled electric power pallet trucks, with electrically powered low height lifting function as well for trucks with mast-lift and initial lift. The trucks are designed to lift, lower and transport palletized loads.

A wrong usage can cause human injuries or can damage equipment.

The operator/ the operating company has to ensure the correct usage and has to ensure, that this pallet truck is used only by staff, which is trained and authorized to use this truck.

The pallet truck has to be used on substantially firm, smooth, prepared, level and adequate surfaces. The truck is intended to be used for indoor applications with ambient temperatures between +5°C and + 40°C and for various transportation applications without crossing permanent obstacles or potholes. Operating on ramps is not allowed. While operating, the load must be placed approximately on the longitudinal center plane of the truck.

Lifting or transporting people is forbidden.

If used on tail lifts or loading ramps, please ensure that these are used correctly according to the operating instructions.

The capacity is marked on capacity sticker as well on the Identification plate. The operator has to consider the warnings and safety instructions.

Operating lighting must be minimum 50 Lux.

Modification

No modifications or alterations to this pallet truck which may affect, for example, capacity, stability or safety requirements of the truck, shall be made without the prior written approval of the original truck manufacturer, its authorized representative, or a successor thereof. This includes changes affecting, for example braking, steering, visibility and the addition of removable attachments. When the manufacturer or its successor approve a modification or alteration, they shall also make and approve appropriate changes to capacity plate, decals, tags and operation and maintenance handbooks.

Only in the event that the truck manufacturer is no longer in business and there is no successor in the interest to the business, may the user arrange for a modification or alteration to a powered industrial truck, provided, however, that the user:

a) arranges for the modification or alteration to be designed, tested and implemented by an engineer(s) expert in industrial trucks and their safety,

b) maintains a permanent record of the design, test(s) and implementation of the modification or alteration,

c) approves and makes appropriate changes to the capacity plate(s), decals, tags and instruction handbook, and

d) affixes a permanent and readily visible label to the truck stating the manner in which the truck has been modified or altered, together with the date of the modification or alteration and the name and address of the organization that accomplished those tasks.

By not observing these instructions, the warranty becomes void.

2. DESCRIPTION OF THE PALLET TRUCK

a. Overview of the main components







- 1. Safety (belly) button
- 2. Tiller
- 3. Top cover
- 4. Pin-code panel
- 5. Middle cover
- 6. Protective arm cover
- 7. Protective arm
- 8. Platform
- 9. Emergency button
- 10. Key switch

- 11. Discharge indicator and charging indicating LED
- 12. USB port
- 13. Load roller
- 14. Main cover
- 15. Frame
- 16. Chassis
- 17. Roller
- 18. Driving wheel
- 19. Battery cover

b. Main technical data





Fig. 2: Technical data

Type sheet for industrial truck acc. to VDI 2198 1.2 Manufacturer's type designation 20EPR-X 25EPR-X **Distinguishing mark** 1.3 Power(battery, diesel, petrol gas, manual) Battery 1.4 Operator type Pedestrian 1.5 Load Capacity / rated load Q (t) 2.0 2.5 1.6 600 600 Load center distance c (mm) 892 1) 892 1) 1.8 Load distance, center of drive axle to fork x(mm) 1330 1) 2) 1435 ¹⁾ 1.9 Wheelbase y (mm) Weight 2.1 Service weight kg 620 770 Axle loading, laden front/rear 1110/1510 1370/1900 2.2 kg 2.3 500/120 610/160 Axle loading, unladen front/ rear kg

<u> Table 1:</u> I	Main	technical	data for	standard	version

	3.1	Tires		Polyurethan	e (PU)
6	3.2	Tire size, front	Ø x w (mm)	230X7	0
lassi	3.3	Tire size, rear	Ø x w (mm)	84X84	ļ
s, cl	3.4	Additional wheels (dimensions)	Ø x w (mm)	100x40	0
ïre;	3.5	Wheels, number front/ rear(x=driven wheels)		1×+2/4	1
F	3.6	Tread, front	b ₁₀ (mm)	540	
	3.7	Tread, rear	b ₁₁ (mm)	367/512	
	4.4	Lift height	h₃ (mm)	120	
	4.9	Height of tiller in drive position min. / max.	h14 (mm)	950/13	50
	4.15	Height, lowered	h ₁₃ (mm)	85	
	4.19	Overall length	l₁ (mm)	1790 ^{2) 3)}	1895
su	4.20	Length to face of forks	l ₂ (mm)	640 ²⁾³⁾	745 ³⁾
Isio	4.21	Overall width	b₁ (mm)	790	
nen	4.22	Fork dimensions	s/e/l (mm)	55/173/1	150
Dir	4.25	Distance between fork-arms	b₅ (mm)	540/685	
	4.32	Ground clearance, center of wheelbase	m2 (mm)	30	
	4.33	Aisle width for pallets 1000 x 1200 crossways	Ast(mm)	2400 ²⁾³⁾	2505 ³⁾
	4.34	Aisle width for pallets 1000X1200 lengthways	Ast(mm)	2290 ²⁾³⁾	2395 ³⁾
	4.35	Turning radius	Wa (mm)	1585 ²⁾³⁾	1690 ³⁾
Ð	5.1	Travel speed, laden/ unladen	km/h	7.5/8.0	6.0/7.0
anc	5.2	Lift speed, laden/ unladen	m/s	0.025/0.030	0.035/0.045
orma	5.3	Lowering speed, laden / unladen	m/s	0.030/0.025	0.045/0.050
erfo	5.8	Gradeability, laden/ unladen	%	8/15	
ď	5.10	Service brake		Electromagnetic	
	6.1	Drive motor rating S2 60min	kW	1.4	
	6.2	Lift motor rating at S3 10%	kW	0.8	2.2
ors	6.3	Battery acc. to DIN 43531 /35 / 36 A, B, C, no		1	/
Mot	6.4	Battery voltage, nominal capacity K5	V/Ah	24/210	24/350
	6.5	Battery weight (minimum)	kg	155~200	235~285
	6.6	Energy consumption acc. to VDI cycle	KWh/h	0.36	0.9
	8.1	Type of drive control		AC -Speed 0	Control
	8.4	Sound level at driver`s ear acc. to EN 12053	dB(A)	69	
	1) Load section lowered:+65mm; 2) With side battery removal: + 30 mm; 3) With unfolded platform: + 440 mm				

c. Description of the safety devices and warning labels

- A Sticker to read and follow this instruction
- B Warning sticker
- C Capacity sticker
- D Crane hook label
- E Identification plate (ID-plate)
- F Sign oil filling point
- G Indicating sticker
- H Warning information

The truck is equipped with an emergency switch (9) which stops all lifting-, lowering-, driving- functions and engages the failsafe electromagnetic brake when it is pushed. E (inside chassis) C max 2000kg B B B B C B C C D (both side) C D (b



By pulling this button, the truck

can be operated after the controller checked the functions. Before operating, insert the key and turn the switch (10) clockwise or, in case the truck is equipped with Pin-code panel, press the start-button and enter the Pin-code or use RFID access card. To prevent against unauthorized access, turn the key anti-clockwise and remove it if you do not operate this truck or, in case the truck is equipped with Pin-code panel, press the start-button or press the X button of pin-code panel. The truck is equipped with a safety (belly) button (1) which switches the driving function away from the operator, if the truck travels towards the operator and the tiller is activated in the tillers operating zone. Follow also the instructions given on the decals. Replace the decals if they are damaged or missing.

Sign read and follow this instruction (A)



Warning sticker (B)



Capacity sticker (C)

Q max. 2000kg

Crane hook label (D)



Sign oil filling point (F)



Indicating sticker (G)



Sign warning stay clear stop truck (H)

WARNING



It is law, you must be certified and trained to operate this truck. Misuse can result in

serious injury or death to you or others. All instructions and warnings on the truck and the instruction handbook must be obeyed.



Avoid being crushed. Keep head arms, hands, legs and feet within the operator area.While

operator area. While travelling be careful when parts extend the truck or its edges. Stop truck ompletely and set the parking brake, if equipped. Immediately exit and move away from truck in emergency. Look where you are going.

Never ride or stand on forks.Riding or standing on forks or lifted load can cause a fall resulting in serious injury or death.Use extreme caution near docks.

d. Identification plate

A TESOLOTION	MODEL :	
477, Bundangsuseo-ro, Bundang-gu,		
Seongnam-si, Gyeonggi-do, 13553, Korea	PRODUCT IDENTIFICATION NUMBER	
	Load capacity	kg
	Lift Height	mm
	Truck Weight (without battery)	kg
	Max Battery Weight	kg
	Min Battery Weight	kg
		1. 2.92.19

Fig. 4: Identification plate

3. WARNINGS, RESIDUAL RISK AND SAFETY INSTRUCTIONS

DO NOT

- Put foot or hand under or into the lifting mechanism.
- Allow other person than the operator to stand in front of or behind the truck when it is moving or lifting/lowering.
- Overload the truck.
- Put foot in front of the wheels, injury could result.
- Lift people. People could fall down and suffer severe injury.
- Push or pull loads
- Use this truck on ramps
- Side or end load. Load must be distributed evenly on the forks.
- Use the truck with unstable, unbalanced not stable load.
- Use truck without manufacturer's written consent.
- Lifted loads could become unstable at wind forces. In the case of wind forces do not lift the load if there is any influence to the stability

Watch difference in floor levels when driving. Load could fall down or the truck could get uncontrollable. Keep watching the condition of load. Stop operating the truck if load becomes unstable. Brake the truck and activate the emergency button (9) by pushing when sliding load on or off the truck. If the truck has any malfunctions, follow chapter 10.

Practice maintenance work according to regular inspection. This truck is not designed to be water resistant. Use the truck under dry condition. Prolonged continuous operation might cause damage of the power pack. Stop operation if temperature of hydraulic oil is too high.

- When operating the electric pallet truck, the operator has to wear safety shoes.
 - The truck is intended to be used for indoor applications with ambient temperatures between +5°C and + 40°C.
 - The operating lighting must be minimum 50 Lux.
 - It is not allowed to use the truck on ramps.
 - To prevent unintended sudden movements when not operating the truck (i.e. from another person, etc.), switch off the truck and remove the key.
 - In case of moving the load which overlap the field of view on forward/backward direction use visual assistance from trained personnel

4. COMMISSIONING, TRANSPORTING, DECOMMISSIONING

a. Commissioning

Table 2: Commissioning data			
Туре	20EPR-X	25EPR-X	
Commissioning weight [kg]	620 kg	770 kg	
Dimensions [mm]	1865x790x1390	1950x790x1390	

After receiving our new pallet truck or for re-commissioning you have to do following before (firstly) operating the truck:

- Check if are all parts included and not damaged
- Eventually installation of the multifunction tiller
- Eventually installation and charging the batteries (follow chapter 8)
- Do the work according to the daily inspections as well as functional checks.

b. Lifting/ transportation

For transporting, remove the load, lower the forks to the lowest position and fix the truck safe with dedicated lifting gear according to the following figures.

Lifting

USE DEDICATED CRANE AND LIFTING EQUIPMENT

DO NOT STAND UNDER THE SWAYING LOAD

DO NOT WALK INTO THE HAZARDOUS AREA DURING LIFTING

Park the truck securely and lash the truck according to the points identified in fig. 5. Lift the truck to its destination and place the truck securely before removing the lifting gear. The lashing points are according to the fig. 5.

Transportation



DURING TRANSPORTATION ON A LORRY OR TRUCK ALWAYS FASTEN THE TRUCK SECURELY

Lower the forks and park the truck securely.

Fasten the truck according to fig. 6 by fixing dedicated lashing belts to each side of the trucks crane hook holes and fasten the other side at the transporting truck.





Fig. 5: Lifting with a crane

Fig. 6: fixing points

c. Decommissioning

For storage, remove the load, lower the truck to the lowest position, grease all in this handbook mentioned greasing points (regular inspection), eventually protect the truck against corrosion and dust. Remove the batteries and jack the truck safely, so that there will be no flattening after storage.

For final decommissioning hand the truck to a designated recycling company. Oil, batteries and electric components must be recycled due to legal regulations.

5. DAILY INSPECTION

This chapter describes pre-shift checks before putting the truck into operation.

Daily inspection is effective to find the malfunction or fault on this truck. Check the truck on the following points before operation.

Remove load from truck and lower the forks.



DO NOT USE THE TRUCK IF ANY MALFUNCTION IS FOUND.

- Check for scratches, deformation or cracks.
- Check if there is any oil leakage from the cylinder.
- Check the vertical creep of the truck.
- Check the smooth movement of the wheels.
- Check the function of the emergency brake by activating the emergency button.
- Check, the tiller arm- switch braking function

- Check the lifting and lowering functions by operating the buttons.
- Check if all bolts and nuts are tightened firmly.
- Visual check if there are any broken hoses or broken electric wires.
- If supplied with a backrest extension, check it for damages and correct assembling.

6. OPERATING INSTRUCTIONS



BEFORE OPERATING THIS TRUCK, PLEASE FOLLOW THE WARNINGS AND SAFETY INSTRUCTIONS (CHAPTER 3).

Make sure, that the load is palletized and stable and that the daily inspection is carried out.

Insert the key switch (10), turn on it. Press the horn button (21) to activate the audible warning signal.





a. Parking

DO NOT PARK THE TRUCK ON INCLINED SURFACES

The truck is equipped with an electromagnetic failsafe stopping and parking brake. Always lower the forks fully. Press the emergency switch (9), turn the key anti-clockwise 90° and take away.

b. Lifting

DO NOT OVERLOAD THE TRUCK! THE MAXIMUM CAPACITY IS 2000/2500 $\rm kg$ WHEN THE LOAD CENTER IS 600MM .

Travel with the lowered forks fully underneath the pallet and press the lifting button (Fig. 7, 22) until you reached the desired lifting height.

c. Lowering

Press the lowering button (22) carefully. Lower the load until the forks are clear of the pallet, then drive the truck carefully out of the load unit.



Fig. 8: Load facing uphill

d. Travelling



TRAVEL ON INCLINES ONLY WITH THE LOAD FACING UPHILL(fig.8). DO NOT TRAVEL ON INCLINES MORE THAN SPECIFIED WITH THE TECHNICAL DATA. After starting the truck by turning on the key switch (10), or by activation from Pin-code panel, move the tiller to the operating zone ('F', fig.9).

Turn the accelerator button to the desired direction forward 'Fw.' or backwards Bw.'(fig. 9).



Fig. 9: Operating direction

Control the travelling speed by moving the accelerator button (20) carefully until you reached the desired speed. If you move the accelerator button back to the neutral position, the controller decelerates the truck until the truck stops. If the truck stopped, the parking brake will be engaged. Drive carefully the truck to the destination. Watch the route conditions and adjust the travelling speed with the accelerator-button.

e. Steering

OPTIONAL THE TRUCK CAN BE EQUIPPED WITH AN ELECTRIC STEERING SYSTEM. TAKE CARE BY OPERATING A TRUCK WITH THIS KIND OF SYSTEM; THE BEHAVIOR OF THE TRUCK MIGHT BE DIFFERENT WITH A TRUCK WITHOUT ELECTRIC STEERING SYSTEM.

You steer the truck by moving the tiller to the left or right side.

f. Braking



THE BRAKING PERFORMANCE DEPENDS ON THE TRACK CONDITONS AND TRHE LOAD CONDITONS OF THE TRUCK

The braking function can be activated on several ways:

- By moving the accelerator button (20) back to the initial '0' position or by releasing the button, the regenerative braking is activated. The truck brakes until it stops.
- By moving the accelerator button (20) from one driving direction directly to the opposite direction,

the truck brakes regenerative until it starts travelling into the opposite direction.

- The truck brakes, if the tiller is moved up or down to the braking zones ('B'). If the tiller is released, the tiller moves automatically up to the upper baking zone ('B').
 The truck brakes until it stops.
- The safety (belly) button (1) prevents the operator from being crushed. If this button is activated, the truck decelerates and/ or starts travelling into the backwards direction ('Bw.') for a short distance and stops. Please consider, that this button also operates, if the truck is not travelling and the tiller is in the operating zone.

g. Malfunctions

If there are any malfunctions or the truck is inoperative, please stop using the truck and activate the emergency button (9) by pushing it. If possible, park the truck on a safe area and remove the key, in case the truck is equipped with Pin-code panel, press the start-button or press the X button of pin-code panel. Inform immediately the manager and, or call your service. If necessary, tow the truck out of the operating area by using dedicated towing/ lifting equipment.

h. Emergency

In emergencies or in the event of tip over (or off dock), keep safe distance immediately. If possible push the emergency button (9). All electrical functions will be stopped.

7. PIN-CODE PANEL

The truck can be equipped optional with a pin-code panel (4), and a button (26) will replace the key switch (10) if equipped with pin-code panel.



Fig.10: Pin-code panel

Pin-code panel is an electronic system which is similar with an electronic alarm system. Truck will not able to operate before typing a correct password, the main function is to prevent unauthorized operation.

a. Main parameters

Working voltage: 12V-60V Ambient temperature: -40℃ to +90℃ IP grade: IP65

b.Main functions

Truck can be operated only when correct password is typed or card is properly swiped.



Please check the administrator password on the separated instruction. Default user password is 1234, you can use it immediately. If you need to change the password, please refer to separated instruction.

c. Operation

1. ID card

Put the ID card close to the code panel, there will be a short buzzer if it is a valid ID card, then the blue light is on, truck can be operated. (If the red light is on, means you made some mistakes during card start or card is not valid. The truck can't be used)

2. Password

- Type the password, press " $\sqrt{}$ " button. If the password is correct the truck can be operated.
- To turn off the truck press "×". The truck will go out from the operation mode.
- To start operation again need to re-enter the password.

d.Pin-code panel indicator

Red	fault code
Yellow	waiting for further instruction
Blue	active
Green	power on

8. BATTERY CHARGING AND REPLACEMENT



- Only qualified personnel are allowed to service or charge the batteries. The instructions of this handbook and from the battery- manufacturer must be observed.
- Lead-acid batteries and lithium batteries are allowed.
- Recycling of batteries undergoes national regulations. Please follow these regulations.
- By handling batteries, open fire is prohibited, gases could cause explosion!
- In the area of battery charging neither burning materials nor burning liquids are allowed. Smoking is prohibited and the area must be ventilated.
- Park the truck securely before starting charging or installing/changing the batteries
- Before finishing the maintenance work, make sure, that all cables are connected correctly and that there are no disturbing towards other components of the truck.

As standard batteries, the truck is equipped with following liquid acid traction battery- type:

Truck	Battery standard	Voltage	Capacity	Dimensions	Weight
20EPR-X	2 PZS	24V	160/210 Ah	624X212X627	155/185
25EPR-X	3PZS	24V	270/350 Ah	624X284X627	215/255



LEAD-ACID BATTERIES AND LITHIUM BATTERIES ARE ALLOWED. THE WEIGHT OF THE BATTERIES HAS AN INFLUENCE TO THE TRUCKS OPERATING BEHAVIOR. PLEASE CONSIDER THE MAXIMUM OPERATING TEMPERATURE OF THE BATTERIES.

a. Replacement

Without sideways

Park the truck securely and switch off the truck with the key (or start-button), and activate the emergency button (9). Open the battery cover and pull out its hinge. Then, remove the battery cover, pull out the battery plug (23), and take the battery out with a crane. The installation is in the reverse order.



Fig. 11: Battery replacement without sideways battery

Fig. 12: Battery replacement with sideways battery

With sideways battery

Park the truck securely and switch off the stacker with the key (or start-button) and activate the emergency button (9). Disconnect battery plug (23) and lock pin (24), turn up the battery locker, then pull out the battery from side. The installation is in the reverse order of the removal.

b.Battery indicator



Normal

Malfunction

Fig. 13: Battery indicator

The main interface displays as shown in the figure above.

Hour meter

The digital counter after Hourglass Symbol indicates the working hour of the truck.

Battery state of charge

It displays the battery symbol and the current battery level. The charge status of the battery is displayed in ten increments. Each is represented by a rectangle that corresponds to 10% of the battery charge.

Monkey Wrench Symbol

It displays the current fault code (TRA is for drive controller failure, STR is for steering controller failure).

Operating mode and truck speed

The number in the center of the battery indicator indicates the traveling speed (km/h).

Working state

The upper left corner of the battery indicator indicates the state of truck and the its mode.

c. Charging



- Before charging ensure that you are using an appropriate charger for charging the installed battery!
- Before using the charger, please fully understand the instructions of the charger instructions.
- Always follow these instructions!
- The room, where you are charging must be ventilated.
- The exactly charge status can be only checked from the discharge indicator. To control the status, the charging must be interrupted and the truck must be started.
- Optional build-in charger can only be used with 110V or 220V.

External charger

Park the truck at a dedicated secured area with a dedicated power supply.

Lower the forks and remove the load; if supplied remove the battery cover.

Switch the truck off and connect the battery plug (23) to the charging plug of the charger.

The charger starts charging the battery if the charger is connected to the main power supply. Disconnect the battery plug after the charger finished charging.

If supplied, assemble the battery cover. Connect the battery plug with the plug at the truck.

When charging is finished, disconnect the connector from the socket and place it in the designated pocket.



Fig.14: Battery charging

Manufacturer`s type designation Battery type		Capacity	Charger specification
	24 V battery	2PzS-160Ah	24V /SN30A
	24 V battery	2PzS-210Ah	24V /SN35A
ZUEPR-A	24 V battery Li-Ion	100Ah	24V60A
	24 V battery Li-Ion	150Ah	24V60A
	24 V battery	3PzS-270Ah	24V /SN35A
25EPR-X	24 V battery	3PzS-350Ah	24V /SN35A
	24 V battery Li-Ion	200Ah	24V80A

d. Description of the lithium-ion battery

The lithium-ion battery is a battery with rechargeable cells, the battery is designed for industrial trucks and can withstand related vibrations during operation. The battery is equipped with special connections for charging and discharging operations. Do not try to install or connected improper connectors to the battery.

The battery is equipped with BMS – battery management system, which performs the control of battery condition and implements related safety protocols to protect the battery and cells from damages caused by operation or environmental conditions. The BMS controls the following safety functions and conditions: voltage, temperature, under voltage, overvoltage, over temperature and over current.

Battery temperature range

Temperature range for using the battery is from $+5^{\circ}$ C to $+40^{\circ}$ C. Low temperatures reduce the effective battery capacity, high temperatures reduce the battery's life time. The temperature difference between the two sides of the battery shall not exceed 5° C.

Only approved battery chargers must be used to charge the lithium battery.

e. Battery Decals



ltem	Description
51	Identification plate
52	Bar code and two-dimensional
53	Warning Label

Identification plate and Warning label

54		
55	LOGO	
56	Model	LFPasaa
57	Nominal Voltage	xx V
58	Rated Capacity	xx Ah
50	Energy	xx kWh
60	Weight	xx kg±xx kg
00	HW REV	G-CH-FK-R
61	TCP	xx
62	Serial No.	XX
63	Date of manufacture	20xx.*
64	Maaufacturer:	
0 7	Address:	
00		





Item	Description	ltem	Description
54	Manufacturer logo	67	Rechargeable logo
55	Battery model	68	Vertical upward packing, transportation
56	Nominal voltage of battery	69	No putting into ordinary garbage bins
57	Rated capacity of battery	70	No long-term exposure to sunshine
58	Battery energy of battery	71	Stay away from fire
59	Weight of battery	72	Keep out of the rain
60	Configuration of battery	73	Guide to use
61	Protocol version of battery	74	Production date
62	Production serial No.	75	Battery information bar code
63	Production date	76	Bar code interpretation
64	Name of manufacturer	77	Software version of battery
65	Manufacturer's address	78	Battery information 2D code
66	Electrical hazard marker		

f. Safety Instructions, Warning Indications and other Notes

Safety regulations for handling lithium-ion batteries

Do not try to make any repairs or servicing of lithium batteries



Risk of electric shock and burning

The battery's charging and discharging connectors have open terminals, avoid any body contacts, contamination or direct contacts with objects which can cause short circuit connection of terminals. Use necessary pre-cautions and protective caps to secure the open terminals. The connectors should be maintained in clean and dry conditions.



Use only batteries designed and approved by the manufacturer for the truck. Do not try to modify or alter the battery.



Any damage or defects to the charger can result in accidents. Use only charger approved by the manufacturer of the truck, which is suitable for used battery

In case charger has any damages or defects, exclude the charger from operation and contact your service provider. Do not modify or try to repair the charger.

Proper use of charger or use of wrong charger can cause damages to a battery or charger. Follow the required charger specifications; If the operation voltage of the charger is out of the applicable voltage range, the charger or battery may be damaged causing serious safety risks. The charger in use must be approved by the battery (truck) manufacturer.

Reversed connection of charging plug is prohibited. Follow the instruction for correct connection. For disconnection of charging plug use dedicated grip and never pull out the plug by means of cable.

Stop charging immediately if any abnormalities are detected, e.g. severe temperature increase, deformation of battery case, smoke, noise etc.



Intermediate charging

Lithium batteries support so called opportunity charging. The lithium battery, which is not fully discharged can be charged in any time. However, frequent opportunity charging not to the full charging state and stop of charging process before the appearance of corresponding indication of charger may result in dis-balance voltage of cells which increases the battery BMS calculation error. In order to effectively deal with this phenomenon, charge the battery in full allowing the automotive balancing process to be completed at least once a week.

Do not charge a fully charged battery

Note that in order to prevent the battery from continuing restart of charging under fully charged condition causing reduction of battery lifetime, the BMS has a protection function that prohibits

recharging of fully charged battery. The charger will not work while battery is fully charged.

Potential hazards

If equipment is used according to its design purpose, following the correct operations procedures, there are no hazards anticipated.

The following hazards can arise in the event of improper use:

- Physical damage to the battery in case a battery falls or is deformed through impacts. Mechanical damages can cause leakages of harmful materials, fire or battery explosion.
- Short circuits may be caused by connecting the two battery terminals, for instance caused by water or intentional/unintentional connections.
- Temperature damages caused by location of batteries in overheated locations or being exposed to impact of fire, open sunlight etc. can cause leakages of harmful materials, fire or battery explosion.

In order to avoid fire, explosion and leakage of harmful materials, a safe place for storing batteries until the service arrives on site must satisfy the following criteria:

- Do not store in places where personnel is located.
- Do not store in places with valuable objects and close to valuable objects.
- A Class D fire extinguisher must be available on demand.
- There should not be any fire or smoke detectors in the storage area in order to ensure that an automatic fire detection system is only activated in the event of actual danger (e.g. naked flames).
- No ventilation intake pipes should be in the facility to exclude spreading of discharged content within a building.

Examples of where to store a non-functional battery:

- Roofed outdoor position.
- Ventilated container.
- Covered fire resistant box with pressure and smoke discharge option.

Symbols - Safety and Warnings

<u>/</u>	Caution! Battery short-circuit is prohibited.
\sum	The battery can be recharged cyclically
<u><u><u></u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	Vertical upward packing, transportation and use
X	Used lithium-ion batteries must be treated as hazardous waste. Lithium-ion batteries marked with the recycling symbol and the sign showing a crossed- out waste bin must not be disposed of with ordinary household waste.
	Avoid fire and short circuits causing overheating. Do not ignite or locate batteries close to open flame, heat sources or sparks. Keep lithium-ion batteries away from heat sources.
	Protect the lithium-ion battery from solar radiation or other forms of heat radiation. Do not expose the lithium-ion battery to heat sources.
	Keep out of the rain.

Explosion and fire hazard

 \triangle

Physical damage, thermal effects or incorrect storage in the event of a defect can result in explosions or fire. The battery materials can be flammable.

Particular hazard from combustion products

The lithium batteries may be damaged by a fire. When extinguishing a lithium battery fire, the following information must be taken into consideration.



Contact with combustion products can be hazardous

Fire produces combustion products, which can occur in the form of smoke, through leaking fluids, escaping gases, debris as well decomposition products of certain chemicals. These combustion products are substances that enter the body through the respiratory tract and/or the skin can produce and adverse effects such as choking.



Avoid contact with combustion products. Use protective equipment.

Special firefighting protective equipment

Use self-contained breathing apparatus. Wear protective equipment.

Additional firefighting instructions

To prevent secondary fires, the lithium-ion battery must be cooled from the outside. Fluids or solids must never be directed into the lithium battery.

Suitable extinguishing agents

- Carbon dioxide extinguisher (CO2)
- Water (not on mechanically opened or damaged batteries)

Unsuitable extinguishing agents

- Foam
- Grease fire extinguishing agents
- Powder extinguishers
- Metal fire extinguishers (PM 12i extinguishers)
- Metal fire powder PL-9/78 (DIN EN 3SP-44/95)
- Dry sand

Instructions for cooling an overheated, non-physically damaged battery

This type of damage may be caused by a short circuit inside the battery, which may result in leakage of harmful materials, fire or battery explosion.

Material discharge

Battery electrolyte fluid can be hazardous



Electrolyte fluid can be discharged if the battery is physically damaged. Avoid its contact with skin or eyes. If the contact happened:

- Rinse the affected parts with big amount of water and request for medical assistance immediately.
- In case of skin irritation or if any substances are breathed in request the medical assistance immediately.

Precautionary measures for personnel

- Keep personnel away, avoid any contact with smoke or discharged materials.
- Block off the affected area and ensure its reasonable ventilation.
- Wear personal protective equipment. If vapors, dust or aerosols are presented use selfcontained breathing apparatus.

Precautionary measures for the environment

Do not allow spilled fluids to enter the water system, drainage system or the underground water.

Cleaning measures

The leaked fluid must be removed professionally following the related protocols.

Battery lifetime and maintenance

The lithium-ion batteries are maintenance-free.

Full discharge can damage the battery

Self-discharge can cause the battery to fully discharged state. Full discharge shortens the service life of the battery and can cause deep discharge and activation of related safety protocols when battery will not be able to be charged anymore.

Before a long period of inactivity, the battery must be charged to at least 70%. Re-charge the battery at least every 12 weeks.

If the battery is deeply discharged or if the battery temperature is below the permissible level, the battery will not charge. Deep discharged batteries can never be charged. Due to the risk of condensate formation, batteries that have been stored at 0°C or below must only be charged after natural warming up to at least +5°C, forced heating is forbidden.

Storage and safe handling Storage of batteries

Deep Discharge can damage the battery

If the battery is not used for a long period of time, it can become damaged through discharge.

- Before a long period of inactivity, the battery must be charged to the level of at least 70%.
- Recommended to check and charge, if necessary, the battery every 4 weeks when not in use.
- The storage of fully charged battery reduces its lifetime. Recommended level of charge is in the range of 30% to 70%
- The temperature range for storing the battery is 0°C to 30°C.

Instructions for safe handling

New lithium-ion batteries are transported and stored with a charge status of at least <70 %.

- Do not modify the battery.
- Do not open, damage, drop, penetrate or deform the battery.
- Do not throw the battery into a fire.
- Protect the battery from overheating.
- Protect the battery from direct sun light.
- Follow storage and charging procedures

Failure to comply with these safety instructions can result in fire and explosion or the leakage of harmful materials.

Faults



If any damage is found to the battery or battery charger contact the service provider immediately. Do not open the battery.

Disposal and transport of a lithium-ion battery Instructions for disposal

Lithium-ion batteries must be disposed of in accordance with the relevant national environmental protection regulations. Batteries must be treated as hazardous waste. Batteries must not be disposed with ordinary waste.

Shipping information

The lithium-ion battery is a hazardous material. The applicable regulations must be fulfilled during transportation.

Shipping functional batteries

Functioning batteries can be shipped in accordance with the related regulations

Shipping faulty batteries

To transport faulty lithium-ion batteries, contact the service provider. Faulty lithium batteries require following of special transporting procedures.

9. AQUAMATIC SYSTEM

The truck can be equipped optional with aquamatic system.

a. Water After Charge

Electrolyte levels drop during discharge and rise during charge. In addition, charging generates heat, fluid expansion and explosive gases. Watering a battery before charge (or with a low charge level) can lead to boil over resulting in potential damage of the watering system, battery and vehicle.

Water, when needed, must be added to a fully charged battery. Prior to charging, there must be sufficient water to cover the plates. If the battery has been discharged (partially or fully), the water level should still be above the plates.

b. Watering Intervals

Watering intervals are dependent on the local climate, charging methods, application, and age of batteries. Flow-Rite recommends that new batteries be checked once a month and older batteries be checked weekly until you get a feel for your water consumption rate.

Typically for a heavy use application, watering a maximum of once per week is recommended, and for

light use applications once per month. Do not water a battery that has been sitting for an extended period of time with no activity (non-use or not on charge) such as a battery that has sat idle over the weekend. It is best to water a warm battery that has just been fully charged.

Water quality is important to maintain the life of your battery and watering system. Always use water that meets the quality requirements of your battery's manufacturer.

c. Operation

1. Remove dust cover





Fig.17: Mate couplers

2. Mate couplers

Insert the male coupler on the single point watering system into the female coupler on the end of the water supply.

3. Observe flow indicator

As the cells fill, the red balls inside the flow indicator will spin. As the valves close, the balls will begin to spin slower until they come to a stop. This indicates that all valves have closed and filling is complete.



Fig.18: Observe flow indicator



Fig.19: Disconnect couplers

4. Disconnect couplers

When the balls stop spinning, and not before, immediately disconnect the couplers by depressing the push button on the female coupler



If the water supply is left connected after the filling process is finished, it could lead to an overfill.

Disconnecting before the balls come to a complete stop will lead to underfilled cells.

5. Replace dust cover

Place dust cover back over the male coupler and place feed tube on top of battery.



Fig.20: Replace dust cover

10. REGULAR MAINTENANCE

- Only qualified and trained personnel are allowed to do maintenance on this truck.
- Before maintaining, remove the load from the forks and lower the forks to the lowest position.
- If you need to lift the truck, follow chapter 4b by using designated lashing or jacking equipment. Before working, put safety devices (for instance designated lift jacks, wedges or wooden blocks) under the truck to protect against accidental lowering, movement or slipping.
- Please pay attention by maintain the tiller arm. The gas pressure spring is preloaded by compression, carelessness can cause injury.
- Use approved and from your dealer released original spare parts.
- Please consider that oil leakage of hydraulic fluid can cause failures and accidents.
- It is allowed to adjust the pressure valve only from trained service technicians.

If you need to change the wheels, please follow the instructions above. The castors must be round and they should have no abnormal abrasion.

Check the items emphasized maintenance checklist.

a. Maintenance checklist

Table 5: Maintenance checklist

			Inspection			
MAINTENANCE CHECK LIST			Intervals			
			(Month)			
		1	3	6	1	
					2	
Нус	draulic					
1	Check the hydraulic cylinder(s), piston for damage noise and leakage		•			
2	Check the hydraulic joints and hose for damage and leakage		•			
3	Inspect the hydraulic oil level, refill if necessary		•			
4	Refill the hydraulic oil(12 month or 1500 working hours)				٠	
5	Check and adjust function of the pressure valve (2000kg /2500kg+0/+10%)				٠	
Mee	chanical system		<u> </u>			
6	Inspect the forks for deformation and cracks		•			
7	Check the chassis for deformation and cracks		•			
8	Check if all screws are fixed		•			
9	Check the push rods for deformation and damages		•			
10	Check the gearbox for noise and leakage		•			
11	Inspect the wheels for deformation and damages		•			
12	Inspect and lubricate the steering bearing				٠	
13	Inspect and lubricate the pivot points		•			
14	Lubricate the grease nipples	٠				
Electrical system						
15	Inspect the electric wiring for damage		•			
16	Check the electric connections and terminals		•			
17	Test the Emergency switch function		•			
18	Check the electric drive motor for noise and damages		•			
19	Test the display		•			
20	Check, if correct fuses are used		•			
21	Test the warning signal		•			
22	Check the contactor(s)		•			
23	Check the frame leakage (insulation test)		•			
24	Check function and mechanical wear of the accelerator		•			
25	Check the electrical system of the drive motor		•			
Bra	Braking system					
26	Check brake performance, if necessary replace the brake disc or adjust the air gap		•			
Bat	tery					
27	Check the battery voltage		•			
28	Clean and grease the terminals and check for corrosion and damage		•			
29	Check the battery housing for damages		•			
30	Check and if necessary refill the battery with distillated water	•				
Cha	Charger					

31	Check the main power cable for damages			•		
32	Check the start-up protection during charging			•		
Fun	ction					
33	Check the horn function	٠				
34	Check the air gap of the electromagnetic brake	٠				
35	Test the emergency braking	٠				
36	Test the reverse and regenerative braking					
37	Test the safety (belly) button function					
38	Check the steering function					
39	Check the lifting and lowering function					
40	Check the tiller arm switch function					
Ger	General					
41	1 Check if all decals are legible and complete					
42	2 Inspect the castors, adjust the height or replace these if worn out.					
43	Carry out a test run					

b. Lubricating points

Lubricate the marked points according to the maintenance checklist. The required grease specification is: DIN 51825, standard grease.



Load roller
 Bearing

- 3. Gear box
- 4. Hydraulic system
- 5. EPS
- 6. Connection point

Fig. 21: Lubricating points

c. Check and refill hydraulic oil

It is recommended to use hydraulic oil in connection with average temperature:

Environment temperature	5℃~25℃	>25℃
Туре	HVLP 32,	HLP 46,
	DIN 51524	DIN 51524
Viscosity	28.8-35.2	41.4 - 47
Amount	0.7	ΥL

Waste material like oil, used batteries or other must be probably disposed and recycled according to the national regulations and if necessary brought to a recycling company.

The oil level height shall be in the not lifted position min. 0.6L to 0.8L.

If necessary add oil at the filling point.

d. Checking electrical fuses

Remove the main cover. The fuses are located according to fig. 22; the size is according to table 6.



Table 6	Size	of the	fuses
	0120		10000

	Rate
FU 1	10A
FU 01	150A
FU 02	80A

e. Wheel replacement procedure

Drive wheel

Lift the truck with help of hydraulic jack	
Unscrew five nuts holding the tyre	
Remove the tire	Torque for pute OON
Assemble back with reversed order	Iorque for nuts 90Nm

Rollers

pos. 15



Assemble in the reversed order Sleeve pos. 14 must be inserted in bearings pos. 15



f. De-energizing of energy stored components

During maintenance of energy stored components the energy need to be released prior to any maintenance procedures to avoid injuries.

Gas spring: the gas spring of the tiller can be removed only when tiller is put to its upright position.

Electromagnetic brake: before disassembling of electromagnetic brake the braking disk needs to be fixed with two M6x40 screws through the special holes in the coil of brake. Slightly tighten the screws to fix the braking disk together with the coil. The brake can be removed afterwards.

After the brake is assembled back to the motor, the screws must be removed.



11. TROUBLE SHOOTING

• If the truck has malfunctions follow the instructions, mentioned in chapter 6.

TROUBLE	CAUSE	REPAIR		
	Load weight too high	Lift only the max. capacity, mentioned on the ID-plate		
	Battery discharged	Charge the battery		
Load can't be	Lifting fuse faulty	Check and eventually replace the lifting fuse		
lifted	Hydraulic oil level too low	Check and eventually refill hydraulic oil		
	Oil leakage	Repair the hoses and/or the sealing of the cylinder		
Oil leakage	Excessive quantity of	Reduce oil quantity.		
from air	oil.			
breathing				
	Battery is charging	Charge the battery completely and then remove the		
		main power plug form the electrical socket.		
Truck pot	Battery not connected	Connect the battery correctly		
Truck not	Fuse faulty	Check and eventually replace fuses		
operating	Low battery	Charge the battery		
operating	Combined emergency	De-activate the combined emergency switch by insert		
	switch is activated	and pull the knob.		
	Tiller in the operating	Move the tiller firstly to the braking zone.		

Table 5: Trouble shooting

If the truck has malfunctions and can't be operated out of the working zone, jack the truck up and go with a load handler under the truck and safe the truck securely. Then move truck out of the aisle.

12. WIRING/ CIRCUIT DIAGRAM

a. Electrical circuit diagram



FU 1 : 10A
FU 2: 1.5A
FU 3: 0.5A
FU01: 150A
FU02: 80A
FU03: 30A

Fig. 23: Electric diagram EPS (CE)

Table 6:	Descri	otion of	electrical	diagram

Code	Item	Code	Item
GB	Battery	SU	Micro switch
SM	DC switch	YV	Electromagnetic valve
FU1	Fuse 10A	SA	Inter-lock switch
FU2	Fuse 1.5A	SB	Button switch
FU3	Fuse 0.5A	HA	Horn
FU01	Fuse 150A	SB1	Inter-lock switch 1
FU02	Fuse 80A	SB2	Inter-lock switch 2
FU03	Fuse 30A	SB3	Inter-lock switch 3
SY	Key switch	SB4	Inter-lock switch 4
KMt	Main contactor	SJ1	Micro switch 1
Et	Controller	SJ2	Micro switch 2
Мр	Pump motor	SL	Pin-code panel
Mt	Driving motor	Es	Steering Controller
YB	Electromagnetic brake	Ms	Steering motor
K	Relay	SQ	Feedback potentiometer
P	Indicator	RP	Two phase potentiometer
B	Tiller	USB	USB
С	Capacitor	SD	Proximity switch

b. Hydraulic circuit







Fig. 25: 25EPR-X Hydraulic circuit