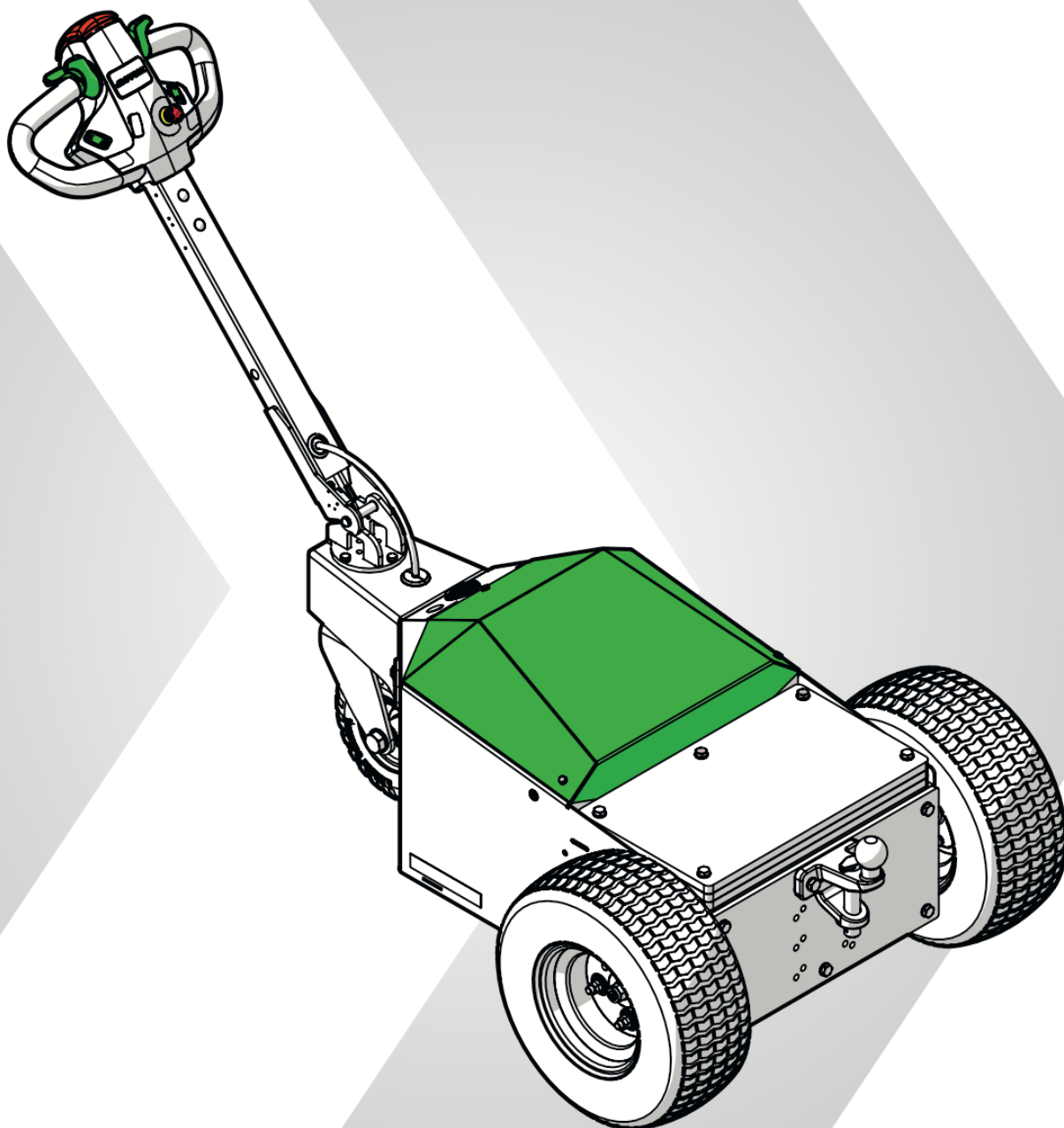




User manual

TT2500-S-AT

M010

2024-10

Product images TT2500-S-AT

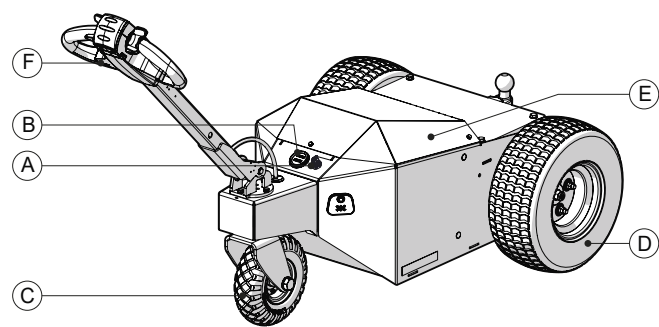


Figure 1. Product overview

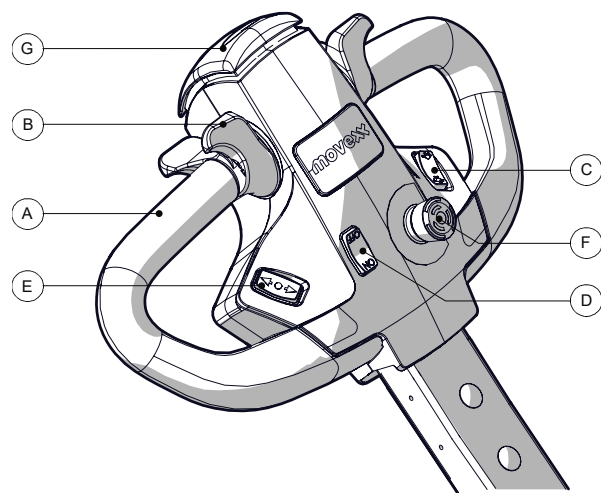


Figure 2. Tiller head overview

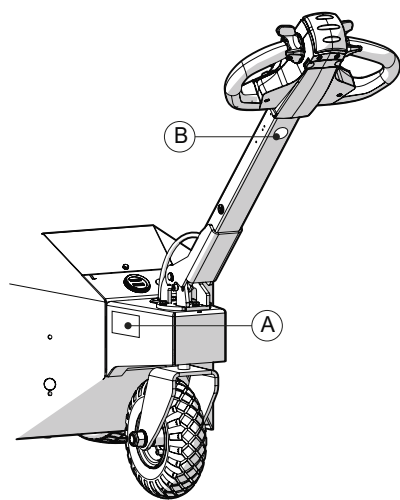


Figure 3. Product identification

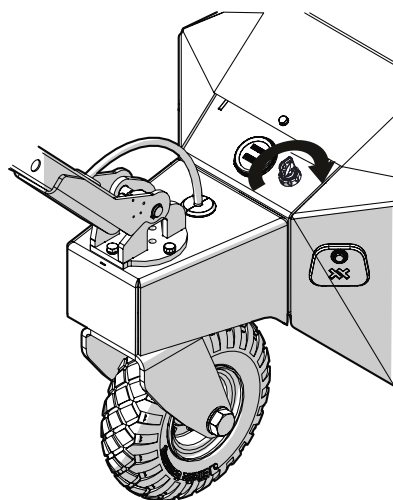


Figure 4. Turning on the product

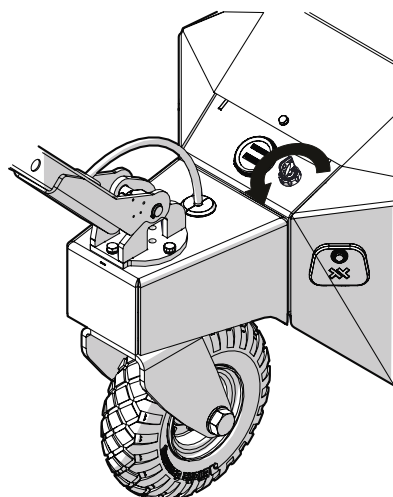


Figure 5. Turning off the product

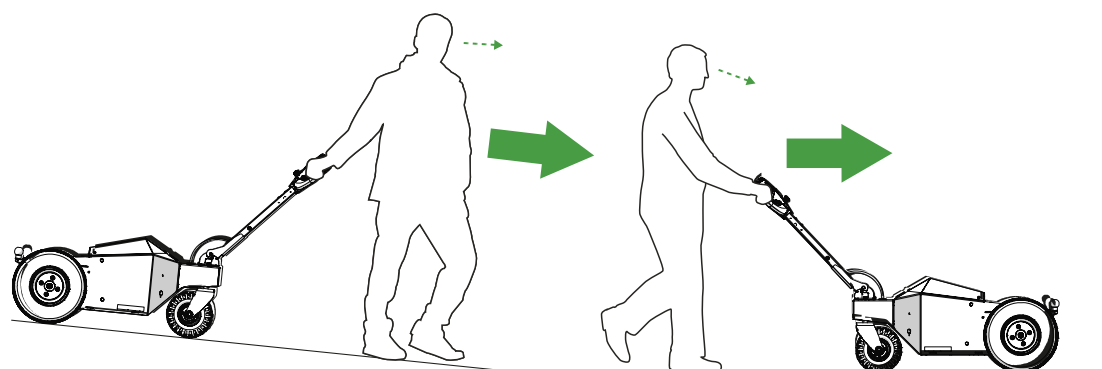


Figure 6. Driving on slopes. Reduced load on slopes. See machine capacity chart.

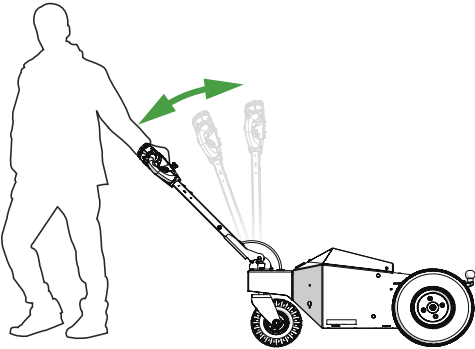


Figure 7. Tiller head height

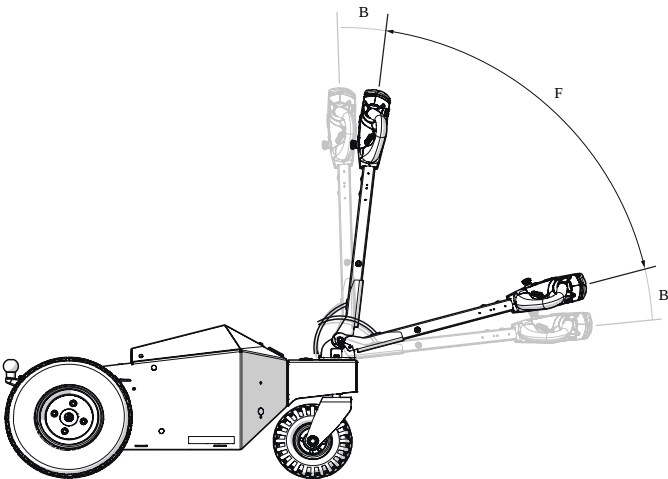
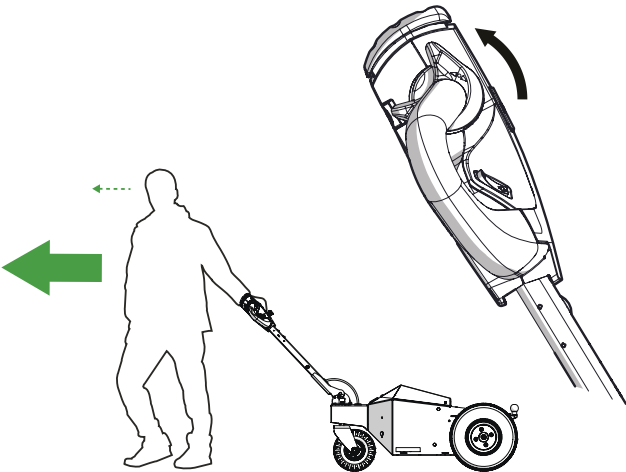


Figure 8. Tiller arm range



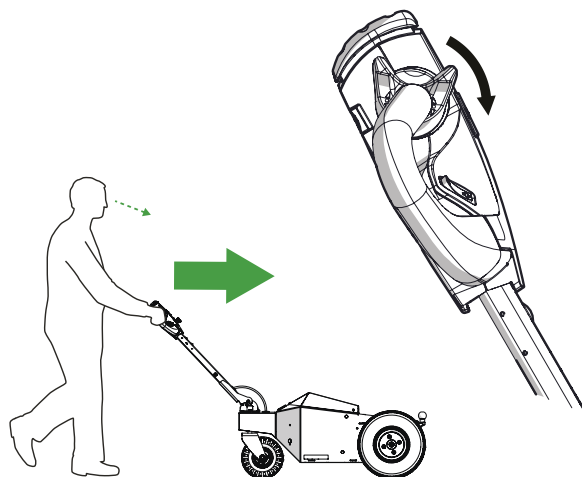


Figure 9. Drive control lever (DCL)

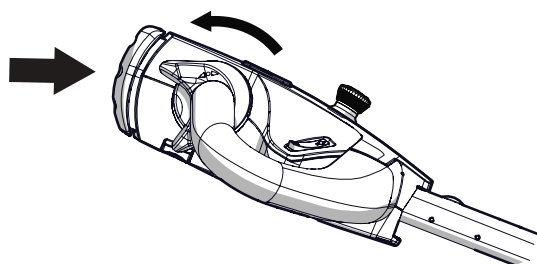


Figure 10. Safety reverse switch

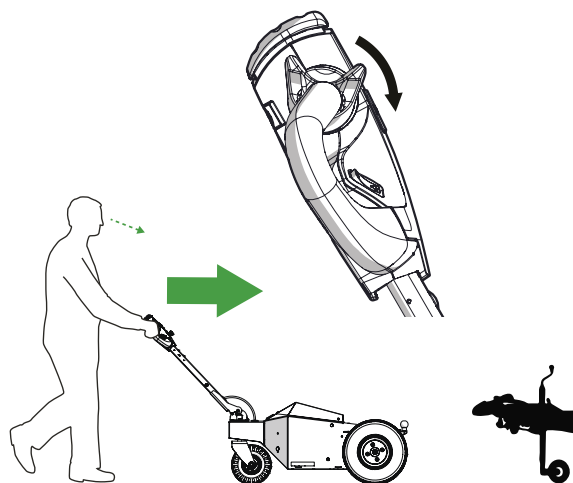


Figure 11. Connecting the load



Figure 12. Battery indicator

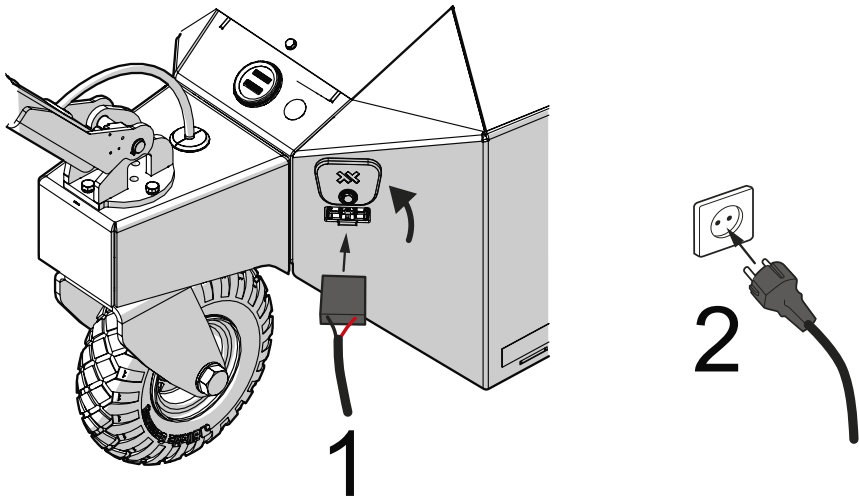


Figure 13. Charging the battery

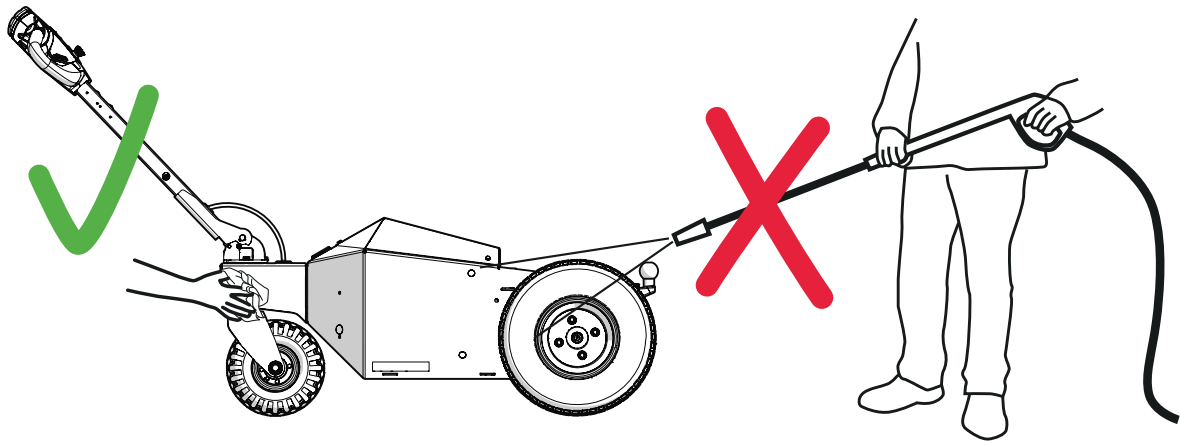


Figure 14. Cleaning the product

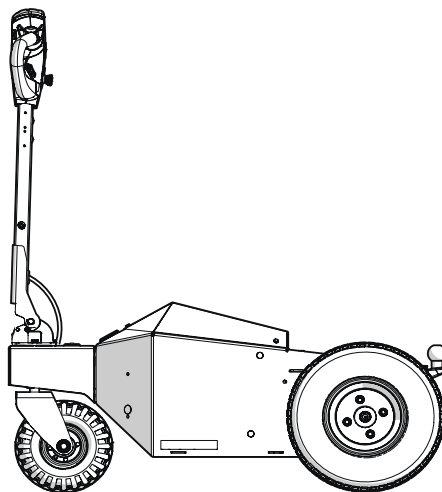


Figure 15. Transporting the product

VDI TT2500-S-AT (M010)

Weights Characteristics	1.1	Manufacturer			Movexx International B.V.
	1.2	Manufacturer's type designation			TT2500-S-AT
	1.3	Drive			Electric with LiFe-Po4 battery
	1.4	Operator type			Pedestrian
	1.5*	Rated capacity/rated load	Q [t]	2,5	
	1.7**	Rated drawbar pull	F [N]	620	
	1.9	Wheelbase	y [mm]	805	
	2.1	Weight incl. battery	kg	300	
	2.3	Axle load without load	front/rear	kg	181/119
	3.1	Tyres	front/rear	Pneumatic	
Wheels/Tyres	3.2	Tyres size	front	mm	250 x 84
	3.3	Tyres size	rear	mm	406 x 165
	3.4	Auxiliary wheel size		mm	-
	3.5	Wheels, number front/rear (x = driven)			1/x2
	3.6	Tread width	front/rear	b10/b11 [mm]	-/675
Dimensions	4.9	Tiller height	min./max.	h14 [mm]	820-1210
	4.12	Tow coupling height		h10 [mm]	135-310
	4.19	Total length		l1 [mm]	1160
	4.21	Total width		b1 [mm]	845
	4.32	Ground clearance, center of wheel base		m2 [mm]	95
Performance	4.35	Turning radius		Wa [mm]	1250
	5.1	Travel speeds	with/without load	km/h	4/4,5
	5.1.1	Travel speed backwards	with/without load	km/h	3/3,5
	5.5**	Max drawbar pull (S2 = 60 Min)	with/without load	N	620
	5.6**	Max drawbar pull (S2 = 5 Min)	with/without load	N	1350
Other Drive	5.8*	Maximum slope (5 min)	with/without load	%	0/24
	5.9	Acceleration	with/without load	s	8/6
	5.10	Service brake			Electromagnetic
	6.1	Drive motor output (S2 = 60 Min)		kW	0,8
	6.4	Battery voltage/rated capacity		V/Ah	24/80
	6.5	Battery weight +/- 5%		kg	48
	8.1	Drive control			DC
	10.7	Sound level at operator's ear		dB(A)	< 65

*The maximum payload is affected by the type of slope, operating time and floor type. See the graphic below for an indication of the allowable slope to load ratio (depending on slope surface/wheel type/machine weight).

**The maximum drawbar load on the hook [N] is determined by the engine power of the machine but is affected by the type of wheels of the machine and of the towed trolley/load, the type of surface and the driveable weight of the machine.

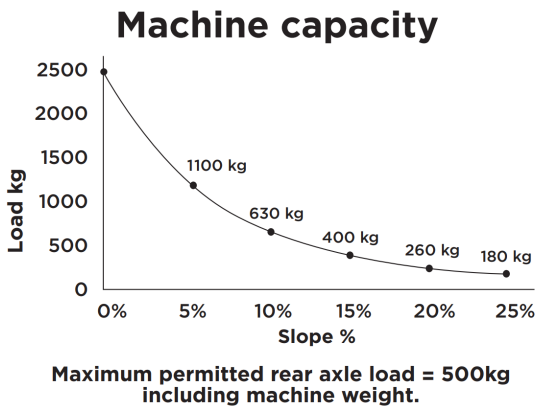


Figure 16. Machine capacity

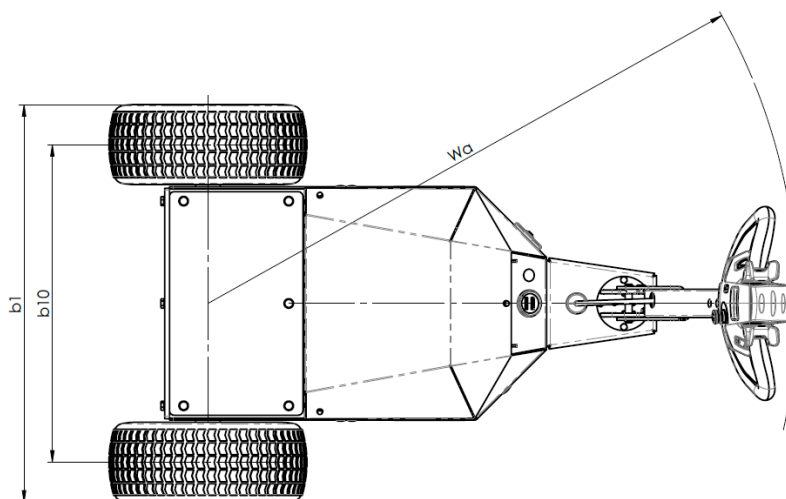


Figure 17. Product dimensions (top view)

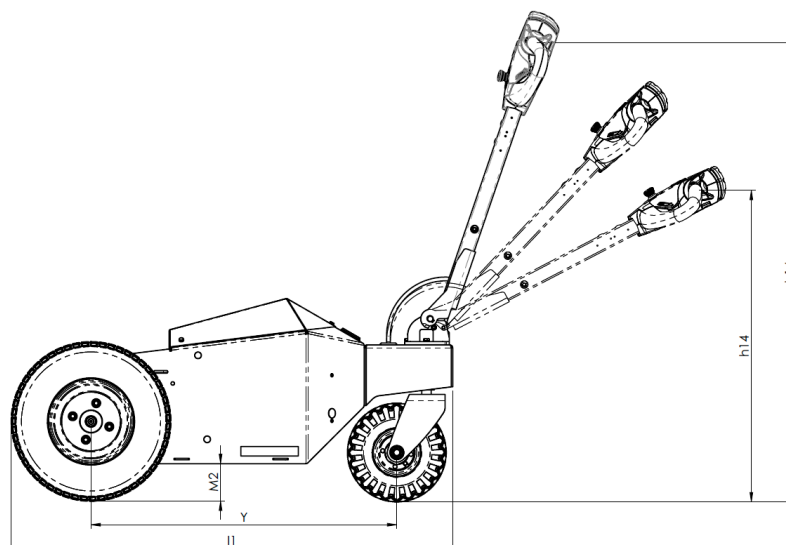


Figure 18. Product dimensions (side view)

Preface

Congratulations on the purchase of this Movexx TT2500-S-AT electric tug! This user manual contains all the information necessary to operate the electric tug correctly, efficiently and safely.

Please read the manual carefully before operating the electric tug. Make sure the manual is accessible at all times. If the electric tug changes ownership, this manual must be handed over along with the CE documentation.

Definitions

Table 1. Definition table

Definition	Description
Electric tug	The generic name of the Movexx TT2500-S-AT.
Qualified	With permission of the owner/employer.
Skilled	The mental, intellectual, and/or physical condition (build, age, and condition) that allows one to operate the electric tug properly.
Declaration of Conformity	Manufacturer's signed document containing all standards and guidelines applied in the design and testing of the electric tug (CE Document).
DCL (Drive Control Levers)	The (green) control handles on both sides of the tiller head, which control the different driving directions (forwards/backwards) and speeds of the electric tug.
Safety reverse switch	The red button on the tiller head. When this button is pressed, the electric tug will drive in the reverse direction for a few (programmable) seconds to avoid entrapment of the user.
Hook	Connection to cart/roll container.
Manufacturer	Movexx International B.V. also referred to as Movexx.
Distributor	A by Movexx recognized reseller which usually also provides service and maintenance to the machines. Also called (certified) dealer.
Service/Maintenance Technician	Trained and qualified person with knowledge to safely perform maintenance work on the electric tug.
Drive Controller	Electronic device which controls the speed, acceleration, braking time, etc.
Operator	The person/employee who works with the electric tug.
Tiller head support	Construction between the chassis and the tiller head.
Tiller head	Control module.
Pull Position	Direction of travel with the electric tug and cart behind the operator.
Pushing Position	Direction of travel with the electric tug and cart in front of the operator.
Hazard/Risk	The possibility of (potential) harm in various situations.
Trolley	Commonly wheeled platform used to transport goods. Also called roll container or load. A trolley must have at least 1 fixed wheel on 1 side. The opposite side must be fully equipped with swivel wheels.
PPE	Personal Protective Equipment. For example, safety shoes, safety glasses, gloves.

Contents

Product images TT2500-S-AT..... II

VDI TT2500-S-AT (M010)..... VIII

Preface..... X

Definitions..... XI

1. Introduction..... 1

 1.1. Reading guide..... 1

 1.2. Intended use..... 2

 1.3. Unintended use..... 2

 1.4. Operating conditions..... 2

 1.5. Information about the Manufacturer..... 3

 1.6. Copyright..... 3

 1.7. Disclaimer..... 3

 1.8. Liability..... 3

 1.9. Warranty..... 4

 1.10. Declaration of conformity..... 5

2. Safety..... 6

 2.1. Safety Features..... 6

 2.2. Flooring requirements..... 7

 2.3. Conditions for the operator..... 7

 2.4. Using the electric tug..... 8

 2.5. Connecting/disconnecting the load..... 8

 2.6. Battery..... 9

 2.7. Maintenance and repairs..... 9

 2.8. Cleaning..... 9

 2.9. Residual Risks..... 10

3. Description of the electric tug..... 10

 3.1. Identification of the electric tug..... 11

 3.2. Components..... 11

 3.3. Tiller head..... 11

4. Operation..... 12

 4.1. Operating the electric tug..... 12

 4.2. Turning on the electric tug..... 12

 4.3. Testing the electric tug..... 12

 4.4. Turning off the electric tug after use..... 13

 4.5. Controlling the electric tug..... 13

 4.6. Connecting/disconnecting the load..... 14

 4.6.1. Connecting the load..... 14

 4.6.2. Disconnecting the load..... 14

 4.7. Battery..... 14

 4.8. Technical specification and performance..... 14

 4.9. Battery indicator..... 15

 4.10. Charging the battery..... 16

 4.11. Recycle..... 16

5. Maintenance..... 17

 5.1. General visual inspection..... 17

 5.2. Maintenance table..... 17

 5.3. Technical Support..... 18

6. Transport, storage and recycling..... 18

6.1. General transport information.....	18
6.2. Transport in a crate/box.....	19
6.3. Transport in a lorry/trailer.....	19
6.4. Storage.....	19
6.5. Unboxing.....	19
6.6. Disassembly/Recycling.....	19

1. Introduction

Please read the manual carefully before operating the electric tug. Make sure the manual is accessible at all times. If the electric tug changes ownership, this manual must be handed over along with the CE documentation.

This manual has been written in compliance with the following Standards:

- EN 1175:2020
- EN-ISO 12100:2010
- VDI 3973

This manual has been written in compliance with the following Guidelines:

- Machinery Directive 2016/42/EG
- EMC Directive 2014/30/EU
- EN-IEC 60204-1: 2006

1.1. Reading guide

The user manual is intended for users who will be operating the electric tug as part of their job.

Please read the manual carefully before operating the electric tug. Make sure the manual is accessible at all times. If the electric tug changes ownership, this manual must be handed over along with the CE documentation.

This manual contains important warnings and notes that identify hazardous situations. These warnings and notes have been categorised and represented as follows:

⚠ DANGER	
	Major safety hazard Indicates a hazardous situation that will result in serious injury or death if safety instructions are not followed.
⚠ WARNING	
	Safety hazard Indicates a hazardous situation that could result in serious injury or death and/or serious damage to the product or environment if the safety instructions are not followed.
⚠ CAUTION	
	Possible hazard Indicates a hazardous situation that could result in minor or moderate injury and/or damage to the product or environment if the safety instructions are not followed.
NOTE	
Relevant information Provides information that is considered important but is not injury-related (e.g., information related to property damage).	
	Remember: Information that's important for future use.

i Tip: Useful snippets of information regarding the context.

1.2. Intended use

The electric tug is intended for moving on unbraked wheels within the given operating conditions, with the appropriate attachments and according to the proper procedures described in this manual. The maximum weights are defined in this manual, see the .

In all deviating situations, the manufacturer or an authorized dealer must be consulted in advance.

1.3. Unintended use

The electric tug is not intended for the following uses:

- trolleys with four swiveling wheels (special options, or alternative machine needed);
- passenger and/or animal transport;
- transport of explosive, or in any way dangerous goods;
- dragging/pushing loads without wheels;
- hoisting loads;
- public road use.
- children and/or young people;
- people with impaired physical, sensory or mental capacity;
- people who are not able to recognize potential hazards;
- people who are under the influence of alcohol or drugs;
- people who are under the influence of medication that affect their driving ability;
- people who are not familiar with the contents of this user manual.

Testing of the operator capability is the responsibility of the buyer or employer.

1.4. Operating conditions

Transport must take place on a floor that is suitable for transporting carts/trolleys used. There must be no liquids or other substances on the floor that could cause slippery conditions.

The electric tug itself is not sensitive to wind gusts. However, the user must ensure that high or light loads do not endanger the combination in strong winds.

Do not use the electric tug:

- in conditions where visibility is poor (e.g. due to fog or lack of light);
- under potentially explosive or hazardous conditions;
- on slippery surfaces, such as snow, ice or a contaminated surface;
- on uneven surfaces;
- do not exceed the maximum towing capacity. Check the specifications for the maximum permitted towing weight (see [VDI table \(on page VIII\)](#));
- driving with a load on slopes steeper than those indicated in the VI table. This is because slopes affect the vehicle's stability and braking ability (see [VDI table \(on page VIII\)](#));
- on a slope risking reduced traction due to sand and/or other contamination;
- in conditions where the air humidity is less than 30% or more than 80%;
- in conditions cooler than -10°C (14°F) or warmer than 40°C (104°F);
- in situations with large temperature fluctuations that can cause condensation.

1.5. Information about the Manufacturer

Movexx International B.V.

Generatorstraat 17-19

3903 LH Veenendaal

The Netherlands

Telephone: +31 (0)318 51 99 00

info@movexx.com

www.movexx.com

Your Movexx dealer:

--

1.6. Copyright

This user manual or any portion thereof may not be reproduced or translated in any manner whatsoever without the express written permission given by Movexx International B.V.

1.7. Disclaimer

While every care and precaution has been taken in the preparation of this manual, it is possible that the information presented may be incorrect or incomplete. The content of this manual is in accordance with the design and construction of the electric tug at the time of publication. Movexx International B.V. pursues a policy of continuous product improvement and reserves the right to make design changes and/or modify the manual without notice.

Additional copies of this manual can be ordered from Movexx International B.V. or from your local Movexx dealer. Always refer to the machine version number (M...) on the front of this manual when ordering additional copies.



Remember: Users are free to contact Movexx International B.V. at any time to request further information in addition to the information already contained in this manual. In addition, suggestions for improvement are also welcome.

Trade names, usage names, trademarks, etc. used by Movexx International B.V. may not be considered free under trademark protection legislation.

All product images shown in this document are indicative only. The actual products may differ from the displayed images. No rights can therefore be derived from the images shown.

1.8. Liability

The manufacturer and distributor are not responsible for damage and/or injury resulting from:

- applying non-original parts;
- incorrectly assembled parts;
- applying attachments that are not suitable for the electric tug and the load;
- damages resulting from work performed by third parties;

- failure to observe the use and maintenance instructions;
- other usage than specified in this manual;
- wear and tear, negligence, collateral damage due to neglect of previous symptoms, overload, third-party accidents;
- failure to comply with the technical specifications regarding power supply as mentioned in this manual;
- use that does not comply with the legislation on machine safety and/or with the standards included in the applicable legislation;
- exceptional events and/or circumstances;
- use by unqualified, unauthorised and/or untrained personnel as indicated by Directives 89/391/EEC and 2009/104/EC regarding worker safety in the workplace.

1.9. Warranty

If problems arise within the warranty period that can be traced back to material and/or production faults of the machine, the machine will be repaired or replaced under warranty. In order to take advantage of your warranty, all safety and operating instructions provided by the manufacturer must be followed.

The modification of (parts of) the electric tug is not allowed, unless express written permission is granted by Movexx International B.V.. In the event of unauthorized modifications, the warranty of the electric tug and the liability of Movexx International B.V. will be voided.

When not observing the use and maintenance instructions, other uses than indicated in this manual, usage wear, negligence, collateral damage due to neglect of previous symptoms and overloading, no claim can be made for warranty.

The latest version of the Movexx International B.V. warranty terms can be downloaded from our website www.movexx.com.

Item	Warranty duration
Electric tug	1 year
AGM battery	6 months
Hook	1 year

1.10. Declaration of conformity

EN



Movexx International B.V.
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The Netherlands

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info@movexx.com

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BTW NL 81235670B01
IBAN NL53 ABNA 0414 2476 12

movexx.com

Declaration of Conformity

(2016/42/EC; 2014/30/EU)



We,
Manufacturer

Movexx International B.V.
Generatorstraat 17-19
3903 LH Veenendaal
The Netherlands

herewith declare, that our product:

Product designation	electric pull assistant
Model	TT2500-S-AT
Type	Pedestrian

which this declaration refers to, is in accordance with the following Directives:

Machinery Directive	2016/42/EC
EMC-Directive	2014/30/EU

By which following standards are used:

EN 1175:2020 - Safety of industrial trucks - Electrical/Electronic requirements

EN-ISO 12100:2010 - Safety of machinery - General principles for design - Risk assessment and risk reduction

VDI 3973 - Industrial trucks - Tractors with non-braked trailers

Veenendaal, The Netherlands, 06-12-2022

Iris van Ravenswaaij-van Vlastuin, CEO

» move your work easier

2. Safety


WARNING



Safety hazard

Do not use the electric tug if it shows signs of malfunction and/or breakage. This could be potentially hazardous. Stop the electric tug, park the electric tug and report it to the maintenance manager or person in charge.

- The operator of the electric tug is fully responsible at all times for compliance with locally applicable safety regulations and guidelines.
- The electric tug must only be operated by competent, trained and authorized personnel.
- The operator of the electric tug should not use any equipment (e.g. mobile phone) that could create distractions and could lead to dangerous driving behaviour.
- Do not install or mount equipment onto the electric tug unless it is stipulated or supplied by the manufacturer.
- Keep the electric tug in good condition to minimize risks, periodic maintenance can guarantee the performance of the electric tug.
- Carefully read and follow all safety instructions listed on the electric tug.
- Do not park the electric tug in front of fire extinguishers or emergency exits or where it will block a passageway.
- Do not ride on loose or unstable surfaces (stairs, sidewalks, etc).
- Driving with a maximum load on slopes steeper than those indicated in the VDI table is prohibited. This is because slopes affect the vehicle's stability and braking ability. More information can be found in the [VDI table \(on page VIII\)](#).
- Reduce your speed at ramps by half (using the turtle mode) and never turn on a slope while moving a load.
- Do not exceed the maximum towable load, and check the specifications for the maximum permitted towing weight as described in the [VDI table \(on page VIII\)](#).
- Avoid collisions, as they can affect the entire construction of the electric tug.
- Any defect (squeaking, leaks, etc.) must be promptly reported and/or corrected. If left unattended, this could lead to more serious malfunctions/defects.
- Do not remove or sabotage any of the safety features installed on the electric tug.
- Do not remove any of the warning, signalling or identification stickers/labels placed on the electric tug.

2.1. Safety Features

The electric tug is equipped with the following safety features:

- Tiller head support safety switch; When the tiller-arm is in the fully upright or fully down position this safety switch is activated and prevents the electric tug from driving. Move the tiller head to the operating range ((F) see [Figure 8: Tiller arm range \(on page IV\)](#)) to drive the electric tug.
- DCL; the electric tug slows down until it comes to a controlled stop if this lever is released (and is in neutral position), remaining under total control at all times.
- At standstill or power loss the parking brake engages after a few (programmable) seconds;
- Safety reverse switch on tiller head; if activated, the electric tug will automatically drive in the opposite direction for a few seconds (in case the user would get trapped between the electric tug and an obstacle).
- Emergency stop: after operating an emergency stop, the electric motor is de-energized and the parking brake activated, the electric tug can then no longer make any movements. To deactivate the emergency stop the button should be pulled with a twisting motion and the electrical circuit will be supplied with power again.

2.2. Flooring requirements

WARNING



Safety hazard

Slippery, wet and/or dirty surfaces can seriously affect the traction of the electric tug.

CAUTION



Possible hazard

Any dirt or objects in the pathway which can seriously affect the traction, must be cleaned or removed immediately.

Because of the high ground clearance of 95 mm, the electric tug can handle rough terrain. Make sure the electric tug has enough traction to pull the desired load.

2.3. Conditions for the operator

WARNING



Safety hazard

Operators and other people near the electric tug shall not wear loose hanging clothing and/or accessories that could become entangled or trapped in the electric tug. People with long hair should keep it tied or bound behind the neck.

The operator of the electric tug is fully responsible for compliance with locally applicable safety regulations and guidelines at all times.

The operator may only use the electric tug within the limits of its performance and in accordance with what is described in this manual. The trained and authorized operator must be familiar with the controls and performances of the electric tug. Any improper use or use other than that intended should be avoided.

The operator must be knowledgeable and familiar with the electric tug, in order to better diagnose any malfunctions and to inform and/or assist maintenance personnel.

WARNING



Safety hazard

The operator should not let go of the electric tug until it has come to a complete stop.

WARNING



Safety hazard

The operator should never generate (additional) traction by applying force to the tiller head.

To operate the electric tug, the operator must:

- have fully read and understood this manual;
- be of legal age. Always follow local rules and regulations;
- be physically, sensory and mentally capable of operating the electric tug;

- not be under the influence of alcohol, drugs and/or medication affecting the ability to drive;
- check with their doctor or supplier if any medical aids they are using will affect their ability to operate the electric tug;
- wear safety shoes of at least safety class S1 or higher, suitable to the work environment.

2.4. Using the electric tug

 **WARNING**



Safety hazard
Never put an incomplete and/or damaged electric tug into service. Have it repaired by your distributor.

 **WARNING**



Safety hazard
Do not use the electric tug if it is likely that people and/or animals may collide with it.

 **WARNING**



Safety hazard
Use the emergency stop only in emergencies.

When operating the electric tug, operators should always ensure that:

- they have a clear view of the surroundings and the path that the electric tug will be following;
- there is a second person watching along when the load blocks the view while pushing the load;
- they keep a sufficient distance away from people and objects so that they can brake safely and in sufficient time;
- they drive slowly in curves and through narrow passages. Excessive speeds may cause the electric tug to tip over;
- the attached load does not tip over or become disconnected in strong winds;
- the attached load does not stick out and is properly secured;
- they wear the appropriate protective equipment applicable in the environment.

2.5. Connecting/disconnecting the load

- Use the electric tug only with a suitable hook and check that it is in good condition. If in doubt, consult your distributor.
- Verify that the trolleys used are in good condition and can be attached at the correct height.
- Watch out for your own and others' safety when connecting and disconnecting the trolley.
- Beware of clamping hazards with electrically powered equipment.
- Do not connect loads that are heavier than the maximum allowable towing weight of the electric tug. For more information, refer to the [VDI table \(on page VIII\)](#).
- Do not connect loads that are not suitable for the hook fitted. If in doubt, consult your distributor.
- Always check that the hook is secure before driving off. If there is a locking device, make sure it is locked.
- When driving on slopes; ensure that the hook and load are suitable for this purpose. If in doubt, consult your distributor. Do not connect or disconnect the load on a slope.
- Slow down gradually before driving down a slope.
- Only drive on a slope with half speed by using the turtle mode.
- Never park on a slope.

- Do not turn on a slope.
- Make sure the slope is clean and not slippery. The surface should be level and clear of obstacles.
- Never exceed the maximum incline/weight combination as shown in the [VDI table \(on page VIII\)](#).

2.6. Battery

⚠ DANGER	
	Fire hazard Do not open, disassemble, puncture, burn or heat the battery. Do not short-circuit, or get the battery wet. Smoke, fire, explosion may result from improper use. Do not use a damaged battery.
⚠ WARNING	
	Electrical hazard Charge the battery only with the supplied (external) battery charger and original charging cord. Charge the battery only in a dry area with adequate ventilation and a room temperature between 0°C - 40°C (32°F - 104°F).



Note: Always follow the instructions stated on the battery.

2.7. Maintenance and repairs

Maintenance and repairs to the electric tug may only be carried out by qualified maintenance technicians from certified distributors or service centres.

The person in charge of maintenance must have suitable technical knowledge to work on electromechanical vehicles, acquired through training and/or as a result of valid work experience.

The manufacturer recommends that you only perform maintenance or repair work on a electric tug that is switched off and has its battery removed or disconnected.

The person performing the maintenance must absolutely not wear necklaces, ties, belts, chains, jewellery or other objects that could get caught in the electric tug or cause short circuits; furthermore, the person in charge of the maintenance must use:

- safety shoes;
- safety glasses in acid-resistant material;
- protective gloves.

Tools, instruments and workbenches used for maintenance or repairs must be in good condition in accordance with the requirements of the standards on safety and ergonomics. Tools must be electrically insulated to prevent accidental short circuits.

Check with your distributor for suggested periodic maintenance.

2.8. Cleaning

An important part of periodic maintenance is cleaning. Before any cleaning process is started, make sure that the electric tug is turned off and (if possible) has its battery removed or disconnected and the charging plug cover is closed. This to prevent the risk of short circuiting and/or unwanted movement of the electric tug or its components. Clean the electric tug with a slightly damp cloth. Do not use high-pressure spray and/or chemicals for cleaning (see [Figure 14: Cleaning the product \(on page VI\)](#)). When cleaning the electric tug pay immediate attention to things that stand out such as; loose bolts/nuts, damaged cables, wear on the hook and/or wheels.

2.9. Residual Risks

The electric tug has been developed to standards that minimize the risk associated with its use. The operator should observe the guidelines in this manual at all times.

The residual risks associated with the use of the electric tug are mainly:

- Risks of colliding with persons or objects while driving; The operator should exercise extreme caution while driving, avoiding narrow spaces that do not allow the desired manoeuvres to be performed safely. They should also avoid routes where there are other persons or animals.
- Risks of tipping the electric tug and/or the load if the electric tug is used on sloping and/or uneven terrain; During operation, the operator must operate the tiller head in such a way as to prevent the loss of control and balance of the electric tug.
- Risks of short circuits due to accidental and significant impacts. In the event of an accident, the operator should stop the electric tug and verify that the electrical system and batteries are still intact.
- Danger of crushing (parts of) the body against an obstacle: danger that exists during reversing and is mainly due to the design of the steering side of the electric tug. The operator must be extremely attentive when driving in reverse; they should, if possible, avoid performing the movement with behind their back, columns, scaffolding and other obstacles in general.
- Risk of crushing the lower limbs by the wheels: danger which exists when changing direction of travel, starting to reverse or encountering an obstacle of a certain height. The operator must pay particular attention to the movement of the drive- and swivel-/steering wheel during use and manoeuvring; they are also required to wear appropriate PPE (safety footwear, at least class S1).
- Risk of crushing that occurs during insertion of the battery and/or closing the lid of the battery compartment. They must work with both feet firmly on the ground and both hands on the relevant handle of the battery or lid; he/she is required to wear the appropriate work gloves.
- Risk of the tires losing traction. The operator should avoid using the electric tug on slippery or frozen terrain.
- Risk of operator strain due to vibrations. Vibrations are mainly caused by driving over uneven ground and are transmitted to the operator through contact with the tiller head, while driving the electric tug.
- Potential risk of reduced motor braking power due to overheating of the drive control unit. During continuous intensive use, the drive control unit will thermally cut-back the electric tug in performance when it nears its critical temperature. Meaning, it will have reduced de-/acceleration power. Driving slowly (turtle setting) is strongly recommended in these situations.

The residual risks associated with commissioning and maintenance are mainly:

- Risks of limb crushing associated with work of disassembly and assembly of portions of the electric tug;
- Risks of excessive effort in handling the electric tug and its components;
- Risks of electrocution, burning, poisoning, corrosion, fire and explosion associated with battery inspection and repair work.

Residual risks when using trolleys/carts/containers/other types of loads:

- When using the electric tug with a load, the operator should pay attention to the risks of traction loss of the drive wheels during acceleration and deceleration, due to the inertia of the load.
- Use the electric tug within the limits indicated in the [VDI table \(on page VIII\)](#) and according to the instructions listed in [Using the electric tug \(on page 8\)](#).

3. Description of the electric tug

The electric tug is an electrically powered transport aid that drives steplessly forward and backward. The load is connected to the rear of the electric tug by means of a hook.

The high ground clearance in combination with the pneumatic tires of the electric tug, allow the operator to use it outdoors and on unpaved surfaces.

The steering mechanism is located at the front of the electric tug. It consists of the tiller head which is connected to a steering wheel.

The operator controls the electric tug while walking along with the electric tug. The tiller head is used to determine the direction of travel and the speed.

The drive wheels are driven by a motor with an electromagnetic brake. When the DCL is released, the electric tug slows down until it comes to a controlled stop. At standstill, the parking brake automatically engages. The parking brake is a separate electromagnetic brake. For extra braking power, press the DCL in opposite direction.

The motor and other electrical systems are powered by an internal battery that is located inside the electric tug's housing.

3.1. Identification of the electric tug

Each electric tug has a unique nameplate that contains the following information:

- model designation;
- serial number;
- production date;
- contact information for Movexx International B.V..

In addition, the electric tug has an inspection sticker that indicates when the next inspection needs to take place.

The type plate (A) is located on the frame and the inspection sticker (B) is located under the tiller head, see [Figure 3: Product identification \(on page II\)](#).

3.2. Components

The electric tug is a motorized tool with 2 drive wheels and 1 steering or swivel wheel. The electric tug contains a drive motor powered by a battery. The electric tug is made up of the following components, see [Figure 1: Product overview \(on page II\)](#).

- A. An Ignition key (optional)
- B. LED Battery indicator and hour tracker
- C. Steering/swivel wheel
- D. Drive wheels
- E. Internal battery
- F. Tiller head

The configuration of components is intended solely for the specified machine and the load it has been designed to move. The electric tug configuration is supplied by Movexx International B.V. or your distributor. Ask your distributor for information about components and their application.

3.3. Tiller head

The tiller head is the machine's control unit. [Figure 2: Tiller head overview \(on page II\)](#) shows the following control elements of the tiller head:

- A. Butterfly handlebar
- B. Drive forwards/backwards with stepless speed DCL
- C. Select the turtle for slow drive mode or the rabbit for fast drive mode
- D. Press On/Off to turn power on or off
- E. Press Up/Down for lifting/lowering the electric height adjustment (option)
- F. Emergency stop
- G. Safety reverse switch

4. Operation

The use of the electric tug is permitted only within the limits of its intended use, conditions of use and performance, according to the specifications as indicated in the [VDI table \(on page VIII\)](#).

4.1. Operating the electric tug

 **WARNING**



Safety hazard
Never put an incomplete and/or damaged electric tug into service. Have it repaired by your distributor.
An improperly adjusted electric tug can cause injury. Never adjust the electric tug while driving.

It is recommended that the battery is fully charged before the electric tug is put into operation, also to verify the operation of the battery charger, see section [Charging the battery \(on page 16\)](#).

1. Check that the electric tug is complete. The following parts must be present:
 - a suitable coupling/hook for the electric tug;
 - the equipment supplied and correctly assembled;
 - an internal battery;
 - an ignition key (optional);
 - this manual.
2. Check the electric tug for damage, loose bolts, and other discrepancies.
3. Adjust the height of the tiller head, see [Figure 7: Tiller head height \(on page IV\)](#).

 **Note:** The safety reverse switch should be in front of your abdomen in the working position.

4. Check that there are no people and/or animals in the immediate vicinity of the electric tug.
5. Check that all operating conditions are met, see section [Operating conditions \(on page 2\)](#).

NOTE

Relevant information
Always allow the electric tug to acclimate after the electric tug has been stored for an extended period of time and/or comes from a room with a significantly different climate.

4.2. Turning on the electric tug

1. Turn on the electric tug by switching the 'on/off' button to 'on', or by turning the ignition key to 'on' (see [Figure 4: Turning on the product \(on page III\)](#)). The battery indicator light will show the battery charge level.
2. Check the battery charge level and charge the battery if necessary, see section [Battery indicator \(on page 15\)](#).

4.3. Testing the electric tug

Test the electric tug thoroughly before each use by following the steps below. Testing of the electric tug should be performed in a safe area, spacious and without obstacles or people!

1. Take your position and turn on the machine, see [Figure 4: Turning on the product \(on page III\)](#). The battery indicator light will indicate the battery charge level.
2. Place your hands on the handle of the tiller head.

- a. Press the DCL while the tiller head is in the fully upright position (safety range (B) see [Figure 8: Tiller arm range \(on page IV\)](#)), the electric tug should not be able to drive.
 - b. Move the tiller head towards you to place the tiller head in the operating range ((F) see [Figure 8: Tiller arm range \(on page IV\)](#)).
3. Test if the electric tug drives away from you: Push the DCL upward with your thumb, see [Figure 9: Drive control lever \(DCL\) \(on page IV\)](#).
4. Test if the electric tug is braking and stopping correctly: when the DCL is released the electric tug should now come to a complete stop within a specified (programmable) time.
5. Test if the electric tug drives toward you: Push the DCL downward with your thumb, see [Figure 9: Drive control lever \(DCL\) \(on page IV\)](#).
6. Check that the electric tug is steering correctly to the left: move the tiller head to the left, while driving in the pulling direction.
7. Check that your electric tug is steering correctly to the right: move the tiller head to the right, while driving in the pulling direction.
8. Test again if the electric tug is braking and stopping correctly: when the DCL is released the electric tug uses the motor brake to come to a complete stop within a specified (programmable) time. For extra braking power, press the DCL in opposite direction.
9. Press the safety reverse switch ([Figure 10: Safety reverse switch \(on page V\)](#)) while driving in the pulling direction and verify that it does indeed turn off driving and briefly reverses the direction of travel such that the electric tug drives away from the operator.
 - a. Press the DCL while the tiller head is in the fully down position (safety range (B) see [Figure 8: Tiller arm range \(on page IV\)](#)), the electric tug should not be able to drive.

If the electric tug fails one or more of the above tests, turn it off and do not use the electric tug. Have the electric tug checked and if necessary repaired by the manufacturer or your distributor.

4.4. Turning off the electric tug after use

1. Park in a safe, dry and well-ventilated place with a temperature between -10°C / 40°C (14°F / 104°F).
2. Turn off the electric tug by switching the 'on/off' button to 'off', or by turning the ignition key to 'off', see [Figure 5: Turning off the product \(on page III\)](#).

Power is automatically turned off after 10 minutes of inactivity. The electric tug then goes into sleep mode (two red LEDs flash). If this is the case, the electric tug can be turned on again by switching the 'on/off' button to 'off' and switch it back 'on' (or by turning the ignition key). Now the electric tug is ready for use again.

The electromagnetic parking brake is automatically activated in the absence of power and/or after 2 seconds (programmable) of inactivity of the electric tug. It is automatically released when the operator starts to drive again. The parking brake will also be activated when the emergency stop is pressed.

In case of placing the electric tug in idle mode for more than a month, it is recommended to connect the battery to the external charger. The trickle charge function will keep the battery continuously charged.

4.5. Controlling the electric tug

1. Turn on the electric tug, see [Figure 4: Turning on the product \(on page III\)](#).
2. Place your hands on the handle of the tiller head and move the tiller head to the operating range ((F) see [Figure 8: Tiller arm range \(on page IV\)](#)).
3. Control the electric tug as follows. When doing so, always look in the direction of travel of the electric tug, see [Figure 9: Drive control lever \(DCL\) \(on page IV\)](#).
 - Using your thumb, push the DCL upward to drive the electric tug away from you.
 - Using your thumb, push the DCL downward to drive the electric tug toward you or drive forward with the load attached (for the procedure of coupling/uncoupling a load see chapter [Connecting/disconnecting the load \(on page 8\)](#)).
 - Move the tiller head to the left or right to determine the direction of travel of the electric tug.

- Release the DCL to make the electric tug stop. For additional braking power, push the DCL in the opposite direction that the electric tug was traveling. The operator must be aware of the braking distance which may vary in relation to the weight carried and/or the surface on which the electric tug is used!

4.6. Connecting/disconnecting the load

Connecting/disconnecting should always be done with the electric tug and load on level ground to avoid unwanted movements (of either one).

Driving with a connected load always causes the braking distance to increase. Consequently, the operator should moderate the speed and carry out the starts and stops gradually. The operator should pay close attention to the weight being pulled (which must never exceed the limits specified in the [VDI table \(on page VIII\)](#)) but especially on the type of surface (sufficient traction) on which the electric tug will be used.

The operator must at least check the load, the brake system, the condition of the hitching point, the condition of the wheels and the general condition.

4.6.1. Connecting the load

1. Position the electric tug with the pin/ball joint at the front (caster-/swivel wheel side) of the load to be transported, see [Figure 11: Connecting the load \(on page V\)](#).
2. Connect the load to the pin/ball joint.
3. Check the connection.

4.6.2. Disconnecting the load

1. Release the pin/ball joint from the load.
2. Drive the electric tug away from the load.

4.7. Battery

 **DANGER**



Fire hazard

Do not open, disassemble, puncture, burn or heat the battery.

Do not short-circuit, or get the battery wet.

Smoke, fire, explosion may result from improper use.

Do not use a damaged battery.

NOTE

Relevant information

Always follow the instructions listed on the battery.

Do not operate the electric tug while it is charging.

4.8. Technical specification and performance

 **WARNING**



Safety hazard

Do not change pre-programmed values without permission from the manufacturer or your distributor.

For the complete overview of technical specifications and performance of the electric tug please see the complete [VDI table \(on page VIII\)](#).

NOTE

Relevant information

Acceleration, travel speeds and braking times are freely programmable by your distributor. Consult your distributor for information on the pre-programmed values of your electric tug.

Table 2. Technical specifications

Specification	Value
Nominal voltage	24 V
Nominal capacity	80 Ah/1920 Wh
Discharge temp.	-40° / 50° C (-40° – 122° F)
Charging temp.	0° / 40° C (-32° – 104° F)*
Storage temp.	-10° / 40° C (-14° – 104° F)
Cycle life	>500 x (50% discharge)
Warranty	6 Months
Declarations for dangerous goods	No
Total discharge	No, is not allowed
Weight	47 kg
Safety test for the cell	CE

*charging outside of this temperature range may cause damage to the battery.

4.9. Battery indicator

See [Figure 12: Battery indicator \(on page VI\)](#)

* At 20% (or lower) the electric tug will only drive in slow mode: charge as-soon-as-possible.

Table 3. AGM battery indicator

Indication	Meaning	What to do
Green, continuous	Battery is charged	Use the machine
Orange, continuous	Battery is nearly discharged	Drive to a charging point and charge/replace the battery ASAP*
Red, flashing	Battery is discharged	Charge/replace the battery on the spot

* charge as-soon-as-possible to prevent deep-discharging of the AGM battery and reduction of its service life.

When the electric tug is equipped with a LiFePO4 battery, the LCD battery indicator is of a different type. This battery indicator shows the battery charge level in percent.

Table 4. Lithium battery indicator

Indication	Meaning	What to do
100%	Battery is charged	Use the machine
30%	Battery is nearly discharged	Finish the current task and drive to a charging point to charge the battery.
20%	Battery is discharged	The display shows the text line "charge". Charge the battery.

4.10. Charging the battery

 **WARNING**



Electrical hazard

Charge battery only with the original supplied external battery charger. Check the cable for damage at each use.

Only charge the battery in a dry area with adequate ventilation, separated from areas where other activities are carried out, which does not contain flammable and/or explosive substances and a ambient temperature between 0°C - 40°C (32°F - 104°F).

 **WARNING**



Electrical hazard

The charging cycle must always be fully completed (no opportunity charging!) to avoid damaging the battery.

For charging, use only a suitable electrical outlet, grounded and protected by a fuse.

In case the electric tug has been in idle mode for more than 1 month it is recommended to connect the external charger to the machine the power cable to the machine. The charger will keep the batteries in optimal condition.

If the battery is fully charged and the charger remains connected, the charger and the cooling fan stop working and a trickle charge function starts automatically.

The charging time depends on the charge level of the battery. The battery may not be drained for more than 50% (most right orange LED on battery indicator, AGM), the charging process may take up to 8 hours (80 Ah with 10 A charger for AGM). If the charge level after charging is lower than 100% or if the battery gets drained very quickly, it is advisable to check the battery and replace it if necessary.

Follow the steps below to charge the battery with the external battery charger:

1. Insert the original charging cable in the connector socket of the electric tug, see [Figure 13: Charging the battery \(on page VI\)](#).
2. Insert the charger's power supply plug into the power outlet.
3. Remove the cable in the reverse order only when the battery indicator indicates that the battery is fully charged.

When the capacity of the battery is getting less and the electric tug can only be used for a short period of time, the battery is at the end of its service life. The battery should be replaced. Please consult your distributor.

 **Note:**

Optional 120 Ah LiFePO4 battery:

Charging is the same as with the AGM battery except opportunity charging is possible.

4.11. Recycle

Batteries must always be recycled.

The battery must be dismantled and disassembled safely and in an environmentally friendly manner, in accordance with the regulations established by the national authorities. Never dismantle yourself, but offer the battery to a specialized recycling company.

5. Maintenance

WARNING



Safety hazard

Do not use a pressure washer, water jet, or similar to clean the electric tug (see [Figure 14: Cleaning the product \(on page VI\)](#)).

The electric tug should be cleaned regularly (depending on usage and the environment), to prevent the formation of deposits or residues which could lead to reduced performance or even damage to the electric tug.

For cleaning the electrical system and the motor, we recommend the use of filtered and dehumidified compressed air (less than 6 bars at a min. distance of 20 cm).

Keep the battery clean and dry. Dirt and water can cause a loss of current which reduces the capacity of the battery.

Wipe dry dirt on metal parts and frame parts with a dry soft cloth. Wipe mud and other wet dirt with a damp cloth. Then dry the parts using a dry soft cloth.

Never use abrasive or aggressive cleaning agents. These may scratch or stain the electric tug. Do not use organic solvents such as paint thinner, benzene or white spirit. Be careful with water in connection with the electronic components.

5.1. General visual inspection

After/during a thorough cleaning of the electric tug, visually examine each section of the electric tug to detect any damage, deformation, loose bolts, wear or any other abnormality.

On a thorough visual inspection, the tires must not show cuts and/or tears; the tire pressure should be 1,9 bar (28 psi/190 kPa).

As far as is visible, the electric cables must not show any cuts, abrasions or burns. As for the electrical contacts or terminals, they must be tightened securely and show no signs of oxidation.

5.2. Maintenance table

With the exception of the control checks which can only be performed with the electric tug activated, the electric tug must be de-activated before carrying out any other interventions of maintenance, by carrying out the following steps:

- relocate the electric tug to the maintenance site;
- disable the electric tug by removing the ignition key (optional) or turning off the on/off switch;
- disconnect the internal battery connector from the electric tug.

Have the electric tug checked once a year or, in case of intensive use, once every six months by the manufacturer/distributor. The table below shows the maintenance that you can perform yourself.

Table 5. Maintenance table

Item	Actions
Whole electric tug	See General visual inspection (on page 17) .
Safety reverse switch	Visual inspection + operation check by pressing the safety reversing switch while driving in the pulling direction.
Emergency stop	Visual inspection + operation check by pressing the emergency stop while driving.
Battery charger	Visual inspection + operation check + in case of long-term storage of the electric tug, the battery must be charged at least 1x per month.
Battery indicator	Visual inspection + operation check.
Condition of the hook	Visual inspection + operation check.
Tyre pressure	Visual inspection + measure pressure + inflate/deflate accordingly

5.3. Technical Support

Questions about support and spare parts can be directed to Movexx International B.V., your distributor or an authorized service centre. They are always happy to help you.

For any question about your electric tug, please have the following information available:

- Model designation;
- The serial numbers of the electric tug and battery;
- Production date;
- Part number or a picture of the relevant part(s).

You can find this information on the identification plate of the electric tug. Also see [Identification of the electric tug \(on page 11\)](#).

6. Transport, storage and recycling

6.1. General transport information

NOTE
Relevant information The electric tug must be adequately protected against the effects of the weather and the environment during transport. The centre of gravity will not always be in the middle of the transport box. Always transport and set down the packaged electric tug in an upright position.

When moving the packaged electric tug, always observe the locally applicable safety regulations and guidelines.

Use a suitable transport/lifting device with sufficient load capacity to move the packed electric tug. The weight is indicated on the outside of the packaging.

When moving the packaging and/or the electric tug on a means of transport, there is a risk of injury to the personnel responsible for the work and to third parties, as well as risks of damage to objects, mainly due to dangers of falling, bumping and/or tilting of the load associated with this work.

6.2. Transport in a crate/box

1. Drive the electric tug into the crate/box.
2. Switch off the electric tug and, if present, remove the key.
3. Allow the tiller head to return to its neutral position (fully upright) and secure it (see [Figure 15: Transporting the product \(on page VII\)](#)).
4. Secure the electric tug in the crate/box.
5. Close the crate/box and attach the necessary transport documents.

6.3. Transport in a lorry/trailer

1. Place the electric tug against a side wall or against the front bulkhead.
2. Switch off the electric tug and, if present, remove the key.
3. Tightly secure the electric tug.

6.4. Storage

NOTE

Relevant information

For prolonged storage > 1 month, provide adequate grease on all uncoated steel parts.

For prolonged storage > 3 months, place the electric tug on stands so that it is not resting on its wheels

When storing an electric tug that you will not use for a longer period of time ($\geq$ one month):

1. Make sure the electric tug is switched off;
2. Charge the battery at least once a month or leave the charging cable connected so that the trickle charge function remains active. This prevents the battery from being deeply discharged and failing;
3. Store the electric tug in a dry, safe and frost-free place.

If, after delivery to the dealer or user, the electric tug must remain packaged in storage for a long period, the corresponding packaging must be stored in a sheltered, dry and well-ventilated place, protected from direct sunlight and with a temperature of between -10°C / 40°C (14°F / 104°F). The batteries should also be recharged periodically as indicated in [Charging the battery \(on page 16\)](#).

6.5. Unboxing

Unboxing the electric tug should be carried out in a protected, spacious, unobstructed area and separated from areas where other activities are carried out, according to the following procedure:

1. Put the crate/box in the chosen location for unboxing, in accordance with the previously mentioned requirements;
2. Cut loose the plastic straps that are wrapped around the crate/box;
3. Remove any items placed on the crate/box of the electric tug;
4. Proceed to take the manual and, after consulting it, further remove the electric tug from the crate/box (by cutting loose the plastic straps that are wrapped around the electric tug);
5. Due to shipping requirements, the electric tug can be shipped partially assembled; the necessary assembly work is part of the commissioning, which must be carried out by Movexx International B.V. or an authorized dealer.

6.6. Disassembly/Recycling

Disassembly/recycling of the electric tug should be done in an environmentally friendly and safe manner, according to nationally applicable regulations.

