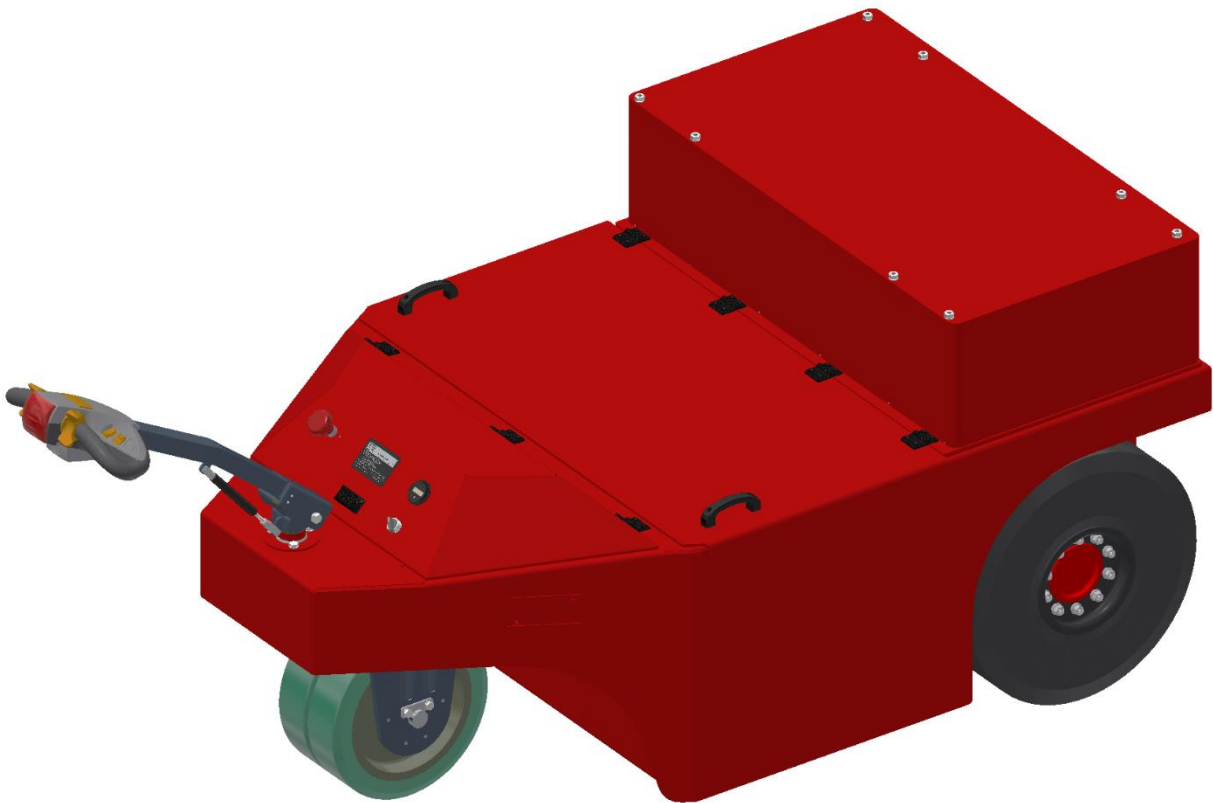


# USER MANUAL

Original document

## V-move 4XL



Version 1.1 April 2019

## Introductory remarks

This user manual has been compiled for all those tasked with working on or with the V-move 4XL. Before you start working with or on the V-move 4XL, this manual should be read.

The user manual contains important instructions/information about how the V-move 4XL can be used in a safe, competent and economic way, and must always be available at the place where the V-move 4XL is used.

The user manual must be supplemented by existing national regulations with respect to accident prevention and environmental protection.

Verhagen Leiden BV cannot be held liable for any direct or indirect damage as a result of operating faults, the lack of proper maintenance, or any use of the machine other than described in this manual.

The liability of Verhagen Leiden BV also no longer applies if you or third parties carry out activities such as adaptations or extensions on the V-move 4XL without prior written permission.

The V-move 4XL is only suitable for process and ambient conditions as mentioned in the 'Specifications and Tolerances' section in this manual. Any other use is forbidden by Verhagen Leiden BV and can result in danger to the driver and/or his/her environment.

This product is supplied under the general delivery and payment conditions issued by the Metaalunie and designated as METAALUNIE CONDITIONS or as SMECOMA CONDITIONS.

The text applies from 1 September 1993 and was deposited at the Court Registry of the District Court of Rotterdam on 1 September 1993. Published by the Metaalunie, PO Box 2600, 3430 GA Nieuwegein, the Netherlands.

The following guarantee provisions apply unless otherwise agreed in writing:

- Verhagen Leiden BV provides a guarantee to the first user for a period of 12 months after delivery.
- Faults must be reported to Verhagen Leiden BV before the end of the guarantee period.
- The guarantee is applicable to faults that:
  - occur during normal use of the V-move 4XL.
  - originate due to defective construction or materials.
- The guarantee is no longer applicable to faults that occur due to:
  - normal wear.
  - incompetent or inappropriate use.
  - the use of other consumer goods than those specified.
- In the event of faults, Verhagen Leiden BV will:
  - replace the parts. Verhagen Leiden BV becomes the owner of the replaced parts.
  - repair the faults.
  - choose another replacement solution if a repair is not reasonably possible.
- The customer must give Verhagen Leiden BV the opportunity to rectify any faults.
- For built-in parts from third parties, the guarantee conditions of the supplier concerned are applicable. The guarantee period can differ from that stipulated above.

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## 1. Technical specifications and tolerances



The V-move 4XL may only be used within the limits for specifications and tolerances as specified in the order, on the assembly drawing and in this manual. If the V-move 4XL is not used according to these specifications, Verhagen Leiden BV no longer bears any responsibility for the V-move 4XL.



The V-move 4XL has been designed to transfer heavy loads on wheels. The V-move 4XL is only suitable as a drive-along tug by using driving switches on the tiller head and the remote control. This tug is not intended for lifting loads.



Do not use the V-move 4XL for other purposes than those for which Verhagen Leiden BV has made the appliance. This can result in damage and danger to the driver and his/her environment.



The control unit for the V-move 4XL is supplied with a set of adjustable variables. Apart from setting these variables, no changes may be made to the control unit or its software.

The height of the tiller arm is adjustable and the battery pack is interchangeable.

<b>Specifications</b>	
Year of manufacture	See rating plate.
Connection details	See rating plate.
Dimensions	L = 2,025 W = 1,215 H = 823/1,540 mm
Speed when empty	0-5 km/hour (depending on tiller position)
Temperature limits	-20/60°C
Mover Base Weight	1,760 kg
Counterweight	1,780 kg
Front wheel axle pressure	Maximum 3,000 kg
Maximum pulling load	Max. 40,000 kg, on rails and flat floor
Maximum pulling force	30,000 N
Maximum gradient, with/without load	10% / 20%
Motor controller	Curtis 1234E, 48 V 350 A / 2 min, 175 A / 2-60 min (X 2)
Power	8 KW AC 48 V (X 2)

## 2. Safety

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The V-move 4XL is built using the latest technology and in accordance with the recognised technical safety regulations. Nevertheless, its use can cause danger of injury or death to the user or third parties. Its use can also cause damage to the V-move 4XL or other goods.







### 2.1 Instructions

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1. Operation and maintenance of the V-move 4XL must be carried out by competent personnel while respecting the warnings on the V-move 4XL and according to the user manual.
2. The V-move 4XL is suitable for use outdoors. Electrical components are only splash-proof.
3. The V-move 4XL is only suitable for ambient conditions as mentioned in the 'Specifications and Tolerances' section in this manual. Any other use is forbidden by Verhagen Leiden BV and can result in danger to the driver and/or his/her environment.
4. Only move safe and stable loads. The V-move 4XL is unsuitable for transporting trailers with persons. Passengers may not be transported with the V-move 4XL or on the tugged vehicle.
5. Make sure that the capacity of the V-move 4XL is sufficient for the weight of the load to be transported.
6. The V-move 4XL is unsuitable for moving goods containing toxic, explosive, dangerous or flammable substances.
7. The V-move 4XL is not licensed for driving on public roads.
8. Check whether your V-move 4XL has been licensed for driving in your work environment or have this checked, for example for environments with a fire hazard or danger of explosion. When driving, sparks can be caused when switching on and off.
9. No connection or safety provision whatsoever may be removed while the V-move 4XL is switched on. Only use the V-move 4XL when all protective devices and safety-dependent measures are in place and ready for operation.
10. Deadlines for periodic inspections and maintenance prescribed or mentioned in the user manual must be complied with.
11. If a machine part becomes damaged or no longer works in the correct way, work must immediately be stopped. Resumption is only allowed when the machine part has been repaired or replaced and has been checked.
12. The V-move 4XL may not be modified without prior written approval from Verhagen Leiden BV.
13. In addition to the user manual, generally applicable legal and other compulsory schemes with regard to safety, accident prevention and environmental protection must also be complied with. These include, for example, rules for personal protection equipment and traffic regulations.
14. Only have the V-move 4XL maintained and repaired by competent and skilled personnel and only use original replacement parts.
15. Inform operating personnel before starting maintenance work. Shut off the supply voltage before you start inspecting or maintaining the V-move 4XL. The battery power must first be disconnected from the rest of the machine.
16. At the end of the working life, parts must be disposed of in accordance with the local laws and regulations.

## 2.2 Signs

Explanation of the signs:

Sign	Meaning
	Warning. Important points for attention and/or instructions concerning safety and/or damage prevention are marked with this warning sign.
	Read and understand this manual before bringing the V-move 4XL into use and/or maintaining it.
	Switch the ignition off and remove the ignition key, disconnect the charging plug and press the emergency stop button. Refer to the user manual.
	Danger of injury due to collision due to the load swinging out. Danger of trapping.
	Danger of serious injury due to heavy loads tipping over on gradients. The V-move 4XL is only intended for driving on flat, dry, paved and sufficiently load-bearing surfaces.
	Always wear safety shoes during all work with the V-move 4XL.

## 2.3 Definitions

**Driver:** Person who drives, checks, supervises the operation of and can start or stop the V-move 4XL, etc. It is the responsibility of the company to train the driver adequately.

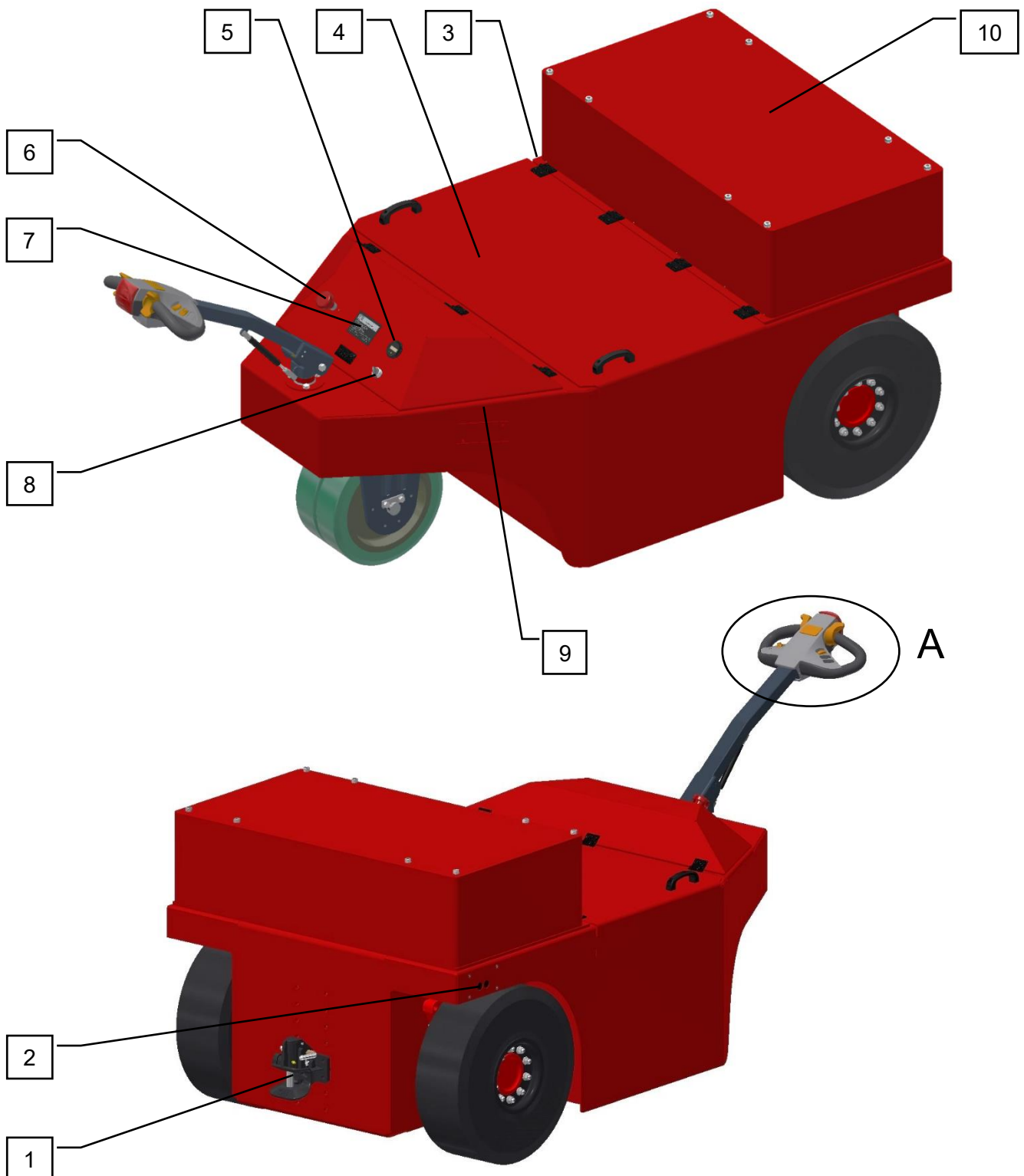
Only persons with thorough (internal) theory and practical training for driving the V-move 4XL may drive the V-move 4XL.

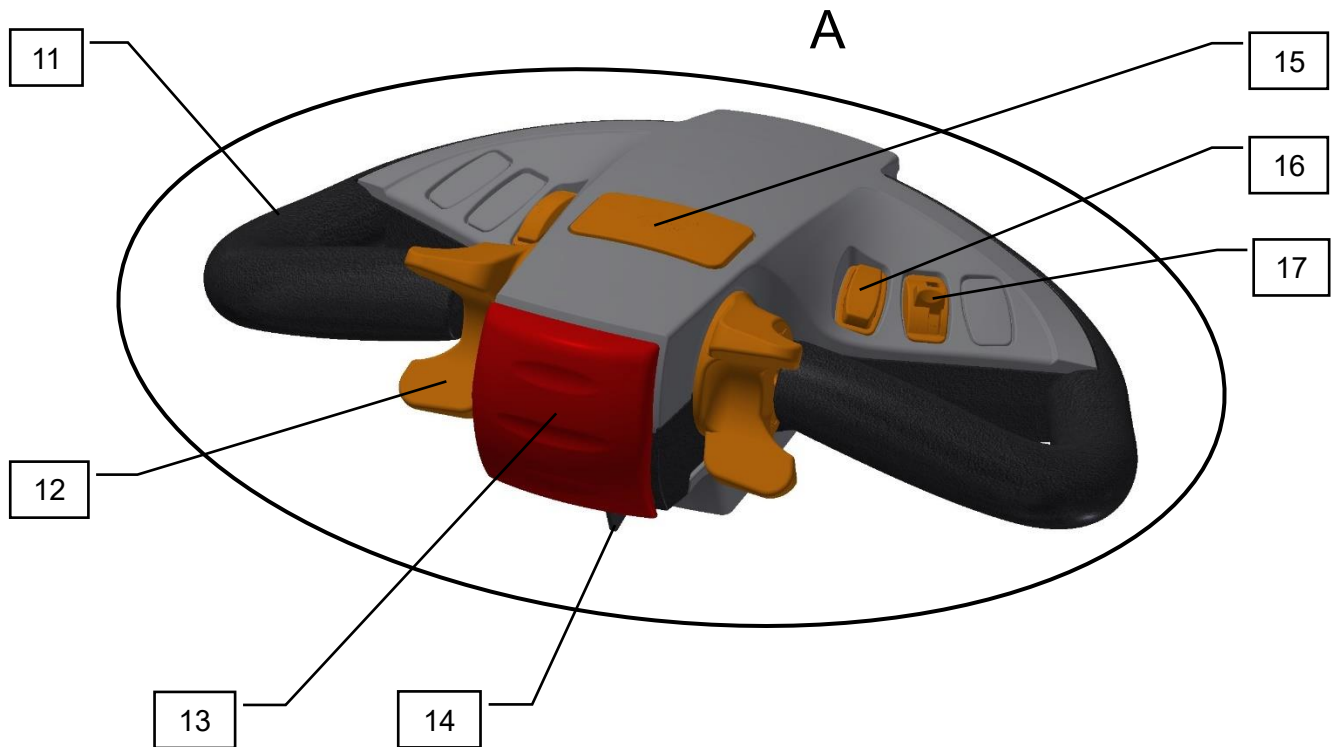
Drivers must strictly comply with the safety instructions.

**Maintenance mechanic:** Person who is familiar with the whole V-move 4XL, can adjust the safety devices and can maintain the V-move 4XL. The maintenance mechanic is familiar with the functions and safety standards and is trained to maintain the V-move 4XL. It is the responsibility of the company to ensure that maintenance personnel are sufficiently schooled and trained.

### 3. Description of parts

#### 3.1 Machine summary V-move 4XL





1. Coupling point.
2. Inching buttons
3. Motor housing cover plate.
4. Battery housing cover plate.
5. Motor controller indicator.
6. Emergency stop button.
7. Rating plate.
8. Remote / manual operation switch
9. Programming connection.
10. Counterweight.
11. Tiller head handle.
12. Driving switch forwards/reverse with continuously variable speed control.
13. Safety switch (belly button).
14. Ignition (key switch).
15. Horn.
16. Low-high speed switch.
17. Continuously variable speed control potentiometer.



## 4. Transport

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Follow all instructions as described in this manual, in particular in the safety section.

Instructions:

1. A stable loading surface with sufficient carrying capacity must be used.
2. The V-move 4XL must be secured against tipping over or slipping.
3. The following is forbidden:
  - a. Going onto or under the V-move 4XL when it is being lifted.
  - b. Going within the tipping range of the V-move 4XL when loading.

Report damage during or immediately after delivery to the transporter and to Verhagen Leiden BV. Take all the necessary measures to prevent further damage.

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### 4.1 Loading on and off

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Prevent injury and damage by wrongly positioning the lifting forks of the fork-lift truck.

If the V-move 4XL has to be moved with a forklift truck, the lifting forks must be positioned so that the centre of gravity lies between the forks. The easiest way is to pick up the V-move 4XL from one side. The centre of gravity usually lies between the front wheel and the rear axle. Depending on the lifting capacity and the position of the forklift, the counterweights would need to be removed to get an even balance.

Another option is to use a forklift transporter ramp. Let the V-move 4XL drive gently, under its own power and tailfirst, onto the ramp.

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### 4.2 Moving, dragging the V-move 4XL

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The V-move 4XL may only be moved by driving under its own power or lifting using a fork-lift truck. Towing causes serious damage to the drive gear.

## 5. Bringing into use

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### 5.1 Inadvertent use

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The V-move 4XL is unsuitable for transporting trailers with persons.

The V-move 4XL is unsuitable for moving goods containing toxic, explosive, dangerous or flammable substances.

The V-move 4XL is not licensed for driving on public roads.

The electrical components and wiring are splash-proof so the V-move 4XL must be stored in a dry place.

### 5.2 Checks before bringing into use

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Besides good maintenance, the driver of the V-move 4XL must check the following points after each work period:

- Check whether there is damage to the exterior of the vehicle.
- Check the coupling point for damage.
- Check whether the batteries are sufficiently charged.
- Drive forwards and backwards and check brake performance.
- While driving slowly, check the total manoeuvrability of the V-move 4XL.
- Check the trapping protection device on the tiller head handle by pressing the safety switch; the V-move 4XL should then not start.



If you observe a defect, or are in doubt about the functioning of the V-move 4XL, the V-move 4XL may no longer be used. Immediately alert Verhagen Leiden BV.

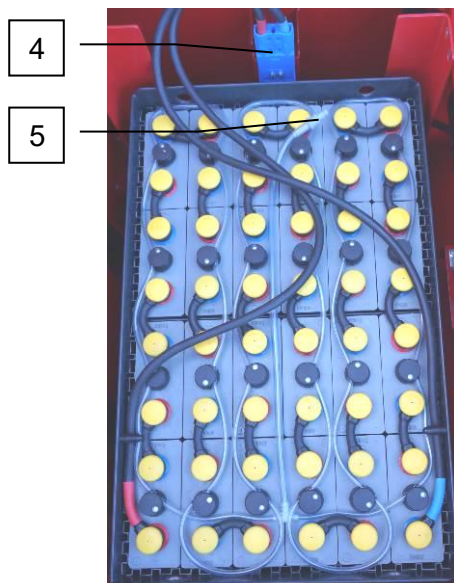
### 5.3 Top up battery water

The battery level must be checked regularly. The level is too low if the white indicators on the cells are not right at the top in the cap (see illustration). Battery water must then be topped up.



Procedure for topping up battery water:

1. Charge the battery fully.
  - a. Note: If the battery has not been fully charged before being topped up, the battery may overflow on charging.
2. Switch off the V-move 4XL.
3. Open the battery housing cover plate.
4. Disconnect the battery's electric connections.
5. Connect a water reservoir to the filling tube.



Connect the filling tube to the water reservoir. Then connect the end of this tube to the tube found within the battery housing. This filling tube has a drip mechanism.



6. Allow water to run into the battery.
  - a. Use only distilled water for this.
  - b. Once a battery cell is full, the indicator rises and the battery is closed off. Water then runs to the next cell until the entire battery has been filled.
7. Disconnect the water reservoir.
8. Connect the battery's electric connections to the machine.
9. Close the battery housing cover plate.

## 6. Operation

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Follow all instructions as described in this manual, in particular in the safety section.



The V-move 4XL may only be moved by driving under its own power or lifting using a fork-lift truck. Towing causes serious damage to the drive gear.

### 6.1 Coupling the products to be moved

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The V-move 4XL has a coupling point to which the container to be moved is coupled.

Procedure:

1. To open the coupling on the V-move 4XL, move the largest lever up so that the coupling pin latches in the up position.
2. Drive the V-move 4XL carefully in reverse to the container to be moved.
3. Position the V-move 4XL so that the ring on the container's coupling aligns with the pin.
4. Drive all the way until the pin latches automatically on to the container.



Never put your hands between the V-move 4XL coupling.

### 6.2 Start

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Procedure:

1. Unlock the emergency stop button if this has been pressed.
2. Switch the ignition on.
3. To switch to remote control, please read paragraph 6.5 and return to step 5 in this paragraph.
4. Move the tiller arm down. Note: only for manual control
5. Follow the traffic rules.
6. Drive carefully by operating the driving switches.
  - a. Only switch the driving direction to forwards or backwards when the V-move 4XL is standing still.



Pay close attention to the driving area. At crossings and in places where there is not a good view, reduce your speed and sound a signal. Drive slowly in narrow lanes. Avoid bends if possible and exercise caution at gradients, thresholds, etc. Reduce speed at sharp bends.



The V-move 4XL may only drive at a speed at which it can be stopped in good time, for example if there is an obstacle in the driving area.



Accelerating, stopping, steering and making manoeuvres must always be done slowly so the stability of the vehicles being towed is not endangered.



Exercise care if the vehicle is driving on a slight gradient or on slippery ground.



When pressing the safety switch (danger of trapping), the V-move 4XL immediately drives in the opposite direction.

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## 6.3 Stop

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Procedure:

1. Release the driving switches.
2. Switch the ignition off.
3. When you leave the V-move 4XL, always remove the ignition keys.

If the V-move 4XL is not to be used for a certain period, you must:

- Connect the battery charger.
- Place the V-move 4XL on blocks, so that the tyres do not touch the ground.

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## 6.4 Emergency stop

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There is an emergency stop button on the dashboard.

Procedure:

1. Press the emergency stop button if there is a possible danger. The emergency stop disconnects the batteries so the electrical system is no longer powered. The V-move 4XL will then slow down and stop.

After the emergency stop situation has been resolved, the V-move 4XL can be started up again.

Procedure:

1. Pull out the emergency stop button.

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## 6.5 Remote control

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The V-move 4XL can be operated by the controls on the machine and a remote control. Both cannot be used at the same time and therefore it is necessary to switch between the two.

Procedure:

1. Make sure the steering arm is raised and leave it in the upright position.
2. Wait for the interlock/relays to switch off – you will hear 2 noises.
3. Once you have heard these sounds, turn the switch on the mover from manual to remote.
4. Wait a few seconds for a fault to appear on the controller.
5. Turn the mover off, wait a few seconds, turn the mover back on.
6. The fault on the controller has now disappeared.
7. Turn on remote control using the black button on the side of the controller.  
You will hear 2 sounds.
8. Once you have heard the sounds, press the green horn button on the opposite side of the controller to activate.
9. At first you will not be able to drive the mover forward, this is for safety. You have to move the throttle joystick two times for it to start moving.
10. To control the mover, use the left-hand lever for forward and reverse functions, and the right-hand lever for left and right operation.

Repeat the first 6 steps to change the mover back to manual operation.



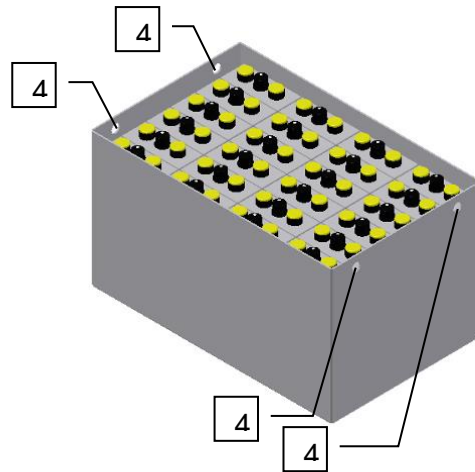
Read the instructions in paragraph 6.2 on how to drive safely.

## 6.6 Changing the battery

The batteries of the V-move 4XL can be switched.

Procedure:

1. Switch the machine off.
2. Open the battery housing cover plate.
3. Remove the battery plug.
4. Attach the battery pack to an effective hoisting system by the lifting eyes.
5. Hoist the battery pack out of the V-move 4XL.
6. Switch the battery pack.
7. Slide the battery pack in.
8. Insert the battery plug.
9. Close the battery housing cover plate.



## 6.7 Charging the battery



The charging location must be well ventilated because explosive gases (fulminating gas) are continuously released during charging.



Avoid naked flames or sparks at the charging location during charging. An explosive gas can be released during charging.

When the batteries have discharged to 30% of their capacity, the V-move 4XL will only drive at 50% of its normal speed. The V-move 4XL must then be charged. When the batteries have discharged to 20% of their capacity, the V-move 4XL will stop.

Procedure:

1. The connection plug for the battery charger is under the battery housing cover plate.
2. Take the plug out of the machine.
3. Insert the plug into the charging connection of the charger and connect the battery charger to the mains supply. The “charge” led should turn on.
4. The automatic battery charger will charge all elements to maximum voltage.
5. The battery charger automatically switches off. The “stop” led turns on.

Regularly check that the battery charger automatically stops when the battery is full.

Both led's flashing indicates that there is something wrong. Please refer to the chargers manual.

## 6.8 Vehicle control display

There is a vehicle control display on the V-move 4XL dashboard:

- Red = system error.
- Yellow = battery charging level less than 20%.
- Green = hour counter active.
- Battery voltage.
- Motor Controller temperature.
- Battery charging level.
- Motor rpm.
- Electricity consumption in ampere.
- At red (system error) an error code comes up on the screen/display.

## 7. Maintenance



Follow all instructions as described in this manual, in particular in the safety section.



The V-move 4XL may only be moved by driving under its own power or lifting using a fork-lift truck. Towing causes serious damage to the drive gear.



Maintenance of the V-move 4XL must be carried out by competent personnel while respecting the warnings on the V-move 4XL and according to the user manual.



Before you remove the batteries, always shut off all current consumers because of spark formation.



Battery fluid is a corrosive acid. Avoid contact with clothing, skin and eyes. Immediately wash off any splashes of battery acid on clothing or the skin with soap and water, then rinse with copious amounts of water. Rinse acid splashes in the eyes for at least 5 minutes with clean water and immediately see a doctor.

### 7.1 Preventive maintenance

The V-move 4XL is lubricated, set and has been test run at your supplier.

Normal usage is assumed for the following maintenance instructions. For intensive use or use in extreme conditions, the maintenance must be performed at shorter intervals.

Item	Once every...	Remarks
Batteries	Day	Check charging.
V-move 4XL	Day	Check for external damage or faults.
Tyres	Week	Check for tyre wear. If the wheels skid on sudden braking, they must be replaced - rear wheels (solid tyres 225-75-10), front wheel 400 x 80 (X 2).
Signs	Week	Check their legibility and replace if necessary.
Cleaning	Year	See section 6.7.
Maximum speed		It should be possible to reach the maximum speed with gentle acceleration. If this is not the case, contact Verhagen Leiden BV.
Lubrication	Year	Lubricate grease nipples on bearings, drive wheels and castors.
Bolts, turning points, hinge points	1 year	Check that all bolts are still tight and check the turning and hinge points and guides for wear and clearance.

## 7.2 Faults and repairs



During the guarantee period it is forbidden to perform repairs, changes or modifications to the V-move 4XL; the guarantee then automatically lapses.

V-move 4XL does not move:

Cause	Solution
Flat batteries	Charge batteries.
Emergency stop button pressed in.	Pull out emergency stop button.
Driving direction switch defective.	Replace switch.

V-move 4XL works intermittently:

Cause	Solution
Loose wiring.	Check wiring.
Relay does not 'switch' properly due to soiling or defect.	Clean or replace.

The speed is not (properly) adjustable or immediately drives at high speed:

Cause	Solution
Speed regulator defective.	Have replaced.
Relay defective.	Have replaced.

In case of a fault with the cause not immediately clear, we advise you to contact Verhagen Leiden BV by telephone.

## 7.3 Spare parts and parts subject to wear

The following details must be mentioned when ordering parts or spare parts from Verhagen Leiden BV: order number, description, drawing number, position number, Amperage (if applicable) and the required quantity.

Only original Verhagen Leiden BV parts and accessories may be used for the V-move 4XL.

## 7.4 Cleaning



When cleaning, do not use a high pressure cleaner or hard water jet because the electrical and electronic system is not waterproof and can be damaged.

The bottom will become soiled after use inside and outside.

It is necessary to regularly remove this soiling because this can impede the operation of the drive gear.



## 7.5 Battery life



Batteries can wear quickly if they are not used correctly. Fast wear falls outside the guarantee.

Tips for a long battery life:

1. It is recommended never to drive until the battery is completely flat. Further charging a nearly full battery is also advised against.
2. Immediate charging of an empty battery considerably lengthens the working life. Discharging more than 20% affects the working life.
3. Never interrupt charging and allow the battery to charge fully.
4. If the V-move 4XL is taken out of use (for a lengthy period), it is advisable to keep the battery charger connected. This automatically keeps the battery charged. Make sure that the charger is connected to mains voltage, else it will drain the batteries instead of charging them.
5. If the batteries are overly stressed, this will greatly shorten the working life. It is then necessary to adapt the pulling load of the vehicle. Also make sure to use the proper voltage for charging.
6. It is advisable to not fully discharge the batteries. If this happens too often, faster wear will be the result. Keep a close eye on the battery condition meter. Connect the battery charger in good time.
7. The batteries must be charged with the correct charger and for a certain time. If the charging current is too low or the duration of charging is too short, the batteries will not be fully charged and the capacity of the batteries will be too low for your use, with faster wear as a consequence. If the charging current is too high or the duration of charging is too long, the battery will become overcharged. The plates in your battery will then become overheated and can be damaged.
8. If the batteries are only e.g. 60% empty and connected to the charger again, the batteries will not have time to rest. The temperature of the batteries will rise with faster wear as a consequence. The battery voltage will also be higher than the actual energy state so a discharge limiter will no longer work properly.
9. The temperature of the battery may not become too high. This makes the acid more aggressive. Working with and charging in a cool space lengthens the working life.
10. If the batteries are used on more than 3 days a week, they will wear more quickly.
11. A battery gradually empties by self-discharging. If a battery remains in a discharged state, sulphation will occur, resulting in irreparable damage. We therefore recommend recharging a stored V-move 4XL at least every 3 months.

When replacing the battery, the old battery must be disposed of according to the locally applicable regulations.



To avoid overheating of the battery charger it has to be mounted vertically to a wall. Warm air needs to be able to go up for proper heat dissipation. Air outlets must not be blocked.

CE declaration of conformity  
Declaration of conformity for complete machinery  
(Directive 2006/42/EC, Annex II, sub A)



Verhagen Leiden B.V.  
Hoge Rijndijk 267  
2314 AG Leiden  
The Netherlands

declares that:

### **V-move 4XL**

- is in conformity with Machinery Directive 2006/42/EC;
- meets the requirements of harmonised European Standards:

Harmonised European Standard	Description	Harmonised European Standard	Description
NEN-EN-ISO 12100_2010	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology	NEN-EN-ISO 13857	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
NEN-EN-IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements		

The Netherlands, Leiden  
March 2017

A.W.J.M. Verhagen  
Director