



Technical Handbook

BeTrac 1 AGV



Berg Hortimotive

**Burg. Crezeelaan 42a
2678 KZ De Lier
The Netherlands**

Tel: +31 (0) 174- 517 700

**Email: info@berghortimotive.com
Internet: www.berghortimotive.com**

Version 7, October 2019

The machine is manufactured by:



Berg Hortimotive

Burg. Crezeelaan 42a
2678 KZ De Lier
The Netherlands

Tel: +31 (0) 174- 517 700

Email: info@berghortimotive.com
Internet: www.berghortimotive.com



1 Declaration

1.1 Copyright

Berg Hortimotive
De Lier, 2019

No part of this publication may be reproduced and/or published by way of print, photocopy, film or by any other means without the prior written consent of Berg Hortimotive, registered at De Lier, the Netherlands.

Exceptions to this include parts of the documentation which are intended for reproduction, such as abridged instructions and specifications on the machine itself.

1.2 Liability

Berg Hortimotive does not accept liability for dangerous situations, accidents and damage that occur as a result of ignoring warnings or instructions, such as those shown on the BeTrac 1 AGV, or contained in this documentation - for example:

- inexperienced or incorrect usage or maintenance
- being used for applications other than those for which it was designed, or in circumstances other than those given in this documentation
- the use of components or spare parts which are not prescribed
- repairs carried without the consent of Berg Hortimotive and/or a certified dealer
- modifications made to the BeTrac 1 AGV. This includes:
 - alterations to the controls
 - welding, mechanical works, etc.
 - extensions to the BeTrac 1 AGV or its controls
 - changes in the route or processing line.

Berg Hortimotive does not accept liability when:

- customers do not meet their obligations with respect to Berg Hortimotive (financial or otherwise)
- consequential damage is caused by defects on the BeTrac 1 AGV and/or route controls
 - e.g. interruption of business, delays, etc.

1.3 Warranty

For a period of 6 months after delivery, Berg Hortimotive gives the client a warranty on material and manufacturing defects that occur during normal use. This warranty does not apply if the defects are caused by improper use or causes other than by material and manufacture, if Berg Hortimotive - following consultation with the client - delivers used material or used goods or if the cause of the defects cannot be demonstrated clearly. The warranty provisions are set out in the METAALUNIE CONDITIONS as they read according to the most recent relevant text. A copy of the terms and conditions of supply can be provided on request.

The warranty given by Berg Hortimotive for all goods and materials not manufactured by Berg Hortimotive will never be more than that given by its supplier. The warranty is ex works. Faulty machines and/or parts must be sent postage paid.

When it is not possible to send out machines or systems, any travel and subsistence expenses will be payable by the client.

Sold and delivered goods with manufacturer's, importer's or wholesaler's warranties are subject only to the warranty provisions set by the suppliers.

Hydraulic pumps are subject only to the manufacturer's warranty, provided the pump comes with an undamaged safety seal from the supplier.

Berg Hortimotive accepts responsibility for the availability of replacement parts, provided they are available from its suppliers at reasonable conditions.

2 Foreword

This handbook describes the BeTrac 1 AGV.

This handbook provides you with information including the safety aspects, a description of the BeTrac 1 AGV together with the working principles, as well as the operating instructions and maintenance of the machine.

Potentially dangerous situations are indicated together with recommendations for avoiding them.

It is important that this handbook is carefully read in order to learn how the BeTrac 1 AGV should be operated and maintained. By reading this handbook and then using the BeTrac 1 AGV, you, or anyone else, will be assisted in using the BeTrac 1 AGV in the correct manner thereby helping to avoid personal injury as well as damage to the machine.

Berg Hortimotive produces safe machines. The machines are designed to meet the latest standards and are manufactured in accordance with the latest CE approval markings. The user remains responsible for the proper operation and for carrying out maintenance on the machine.

Table of contents

1	DECLARATION	3
1.1	COPYRIGHT	3
1.2	LIABILITY	3
1.3	WARRANTY	3
2	FOREWORD	4
3	OVERVIEW OF SAFETY MEASURES	7
3.1	NOTIFICATIONS IN THE TEXT	7
3.2	SAFETY PICTOGRAMS.....	7
	<i>NEVER LEAVE THE BeTRAC 1 AGV UNATTENDED UNLESS THE MAIN SWITCH IS SWITCHED OFF AND THE IGNITION KEY HAS BEEN REMOVED FROM THE DASHBOARD!</i>	8
3.3	MACHINE TYPE PLATE	8
3.4	GENERAL SAFETY MEASURES	9
4	GENERAL DESCRIPTION OF THE BETRAC 1 AGV.....	11
4.1	INTENDED USE.....	12
4.2	PRINCIPAL COMPONENTS OF THE BeTRAC 1 AGV.....	13
4.3	OPERATING PANEL.....	13
4.4	STEERING CONTROL	14
4.5	BRAKE PEDAL	14
4.6	OTHER COMPONENTS	15
5	TRANSPORTATION	16
5.1	EXTERNAL TRANSPORT	16
6	PUTTING INTO OPERATION	17
6.1	INSPECTION BEFORE TAKING INTO SERVICE	18
6.2	MINIMUM REQUIREMENTS FOR INDUCTION TECHNOLOGY	18
7	OPERATING INSTRUCTIONS.....	19
7.1	STATUSES OF VISUAL AND ACOUSTIC SIGNALS	21
7.1.1	Status LED green (Figure 2: Operation of the BeTrac 1 AGV).....	21
7.1.2	Start Auto / Pause / status light green / bumper reset (A) (Figure 2: Operation of the BeTrac 1 AGV)	21
7.1.3	Beeper	21
7.2	SWITCHING ON THE BeTRAC 1 AGV	22
7.3	SWITCHING OFF THE BeTRAC 1 AGV	22
7.4	CHARGING THE BATTERIES OF THE BeTRAC 1 AGV	23
7.5	BeTRAC 1 AGV DRIVING MANUALLY.....	24
7.6	BeTRAC 1 AGV DRIVING AUTOMATICALLY (INDUCTION TECHNOLOGY)	25
7.7	STOPPING AUTOMATIC DRIVE.....	25
7.8	USE OF A DISTANCE SENSOR	25
7.9	USE OF THE EMERGENCY STOP.....	26
7.10	STARTING UP AFTER ENGAGING THE EMERGENCY STOP	26
7.11	STARTING UP AFTER ENGAGING THE BUMPER	26
7.12	CONNECTING TRANSPORT TROLLEYS	27
7.13	TAKING THE MACHINE OUT OF OPERATION FOR A PROLONGED PERIOD OF TIME	27
7.14	MACHINE SOUND	27
7.15	DISCARDING THE BeTRAC 1 AGV.....	28
8	MAINTENANCE REGULATIONS	28
8.1	MAINTENANCE SCHEDULE	29

8.2	LUBRICATE ROTATIONAL POINTS BUMPER AND MECHANICAL BRAKE.....	30
8.3	MAINTENANCE OF THE BATTERIES.....	30
8.4	DRIVE WHEELS AND BRAKE CONTROL.....	31
8.5	DIFFERENTIAL CHECK FOR LEAKS.....	32
8.6	CHECK WEAR OF FRONT WHEELS.....	32
8.7	SPECIALIST MAINTENANCE.....	32
8.8	CLEANING PROCEDURE.....	33
8.9	REPAIRS.....	33
9	PROBLEMS, CAUSES AND SOLUTIONS.....	34
10	SPECIFICATIONS.....	36
11	DECLARATION OF CONFORMITY.....	37
12	TECHNICAL APPENDIX.....	39
	APPENDIX 1: MAINTENANCE LOGBOOK.....	39
	APPENDIX 2: TECHNICAL DRAWINGS.....	40
	APPENDIX 3: ELECTRIC DIAGRAM (ON REQUEST).....	40
	APPENDIX 4: BATTERY SAFETY SHEET.....	41
	APPENDIX 5: CLEANING VARNISH POWDER COAT.....	45

3 Overview of safety measures

3.1 Notifications in the text



IMPORTANT: Indicates that this has a strong effect on the BeTrac 1 AGV in terms of its maintenance and operation.



WARNING: Indicates a potentially hazardous situation which can result in serious injury or death, if not prevented.



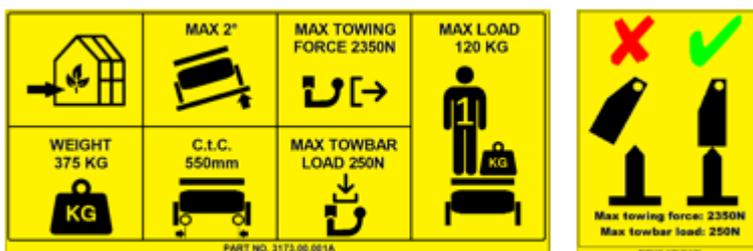
DANGER: Indicates a potentially hazardous situation which will result in serious injury or death, if not prevented.

3.2 Safety pictograms

On the BeTrac 1 AGV a number of safety pictograms have been applied. These pictograms warn the operator about possible dangers or dangerous situations. Always observe the warnings and contact your suppliers whenever the actual danger illustrated by the pictogram is not clear.

Always make sure that the pictograms are visible and undamaged!

The BeTrac 1 AGV operator must have read and fully understood this handbook. When the operator does not understand the warnings given in either this handbook or on the machine (e.g. they speak another language), all the instructions, potential dangers, warnings and functions must be fully explained to them by a responsible person so that they can fully understand them.



Only to be used indoors

Own mass in kg

Maximum tilted position 2°

Suitable for the centre-to-centre pipe rail system measurement

Maximum towing force in Newton

Maximum towbar load in Newton

Maximum total load in kg (maximum 1x person)

Driving with an open or disassembled towbar lock is prohibited!

The values depend on the type of BeTrac 1 AGV!

Read the instructions before operation!

*Impact hazard!
Automatic vehicle!
Keep distance!*

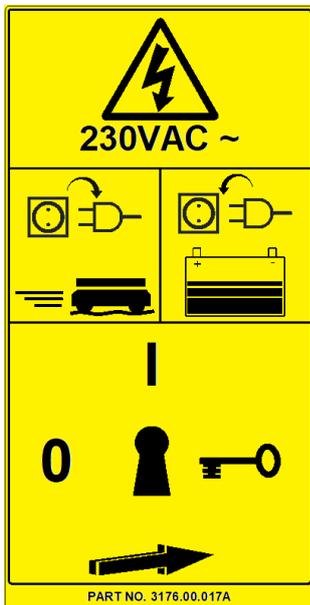
Disconnect power supply before maintenance!



Attention!

*Danger! Chemical battery:
explosive gas and
corrosive battery acid!*

Danger of electric shock!



Danger of electric shock!

Before driving, always check whether the charging plug has been removed!

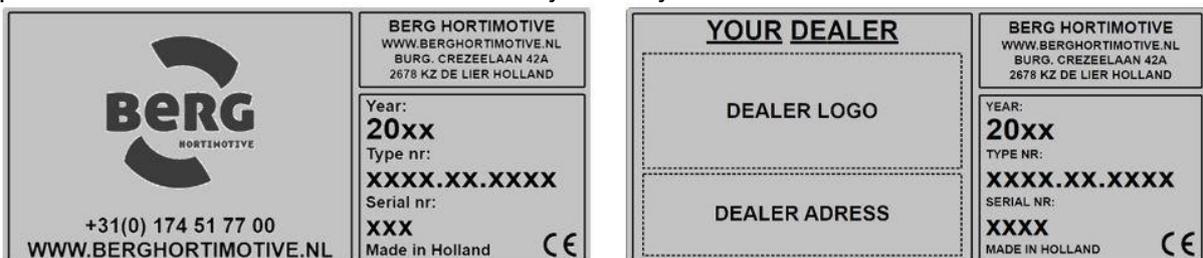
If the batteries need to be charged, connect the BeTrac 1 AGV to a 230V wall outlet by means of 230V charge lead.

Never leave the BeTrac 1 AGV unattended unless the main switch is switched off and the ignition key has been removed from the dashboard!

3.3 Machine type plate

The BeTrac 1 AGV is fitted with a machine type plate which contains the following information: address details for Berg Hortimotive, CE mark, serial or type reference, serial number, year of construction, system voltage, the nominal power of the electric motor expressed in kW and the weight of the configuration expressed in kg.

If you would like to contact the Berg Hortimotive dealer with respect to this BeTrac 1 AGV, please ensure that this information is always readily available.



3.4 General safety measures

- Prior to starting the work, always carefully read the manual and strictly follow the directions and instructions stated therein. In the event of doubt or uncertainties, you must contact Berg Hortimotive.
- Never exceed the maximum hauling capacity of the BeTrac 1 AGV, as indicated in the specifications, see chapter 10.
- Sitting on the BeTrac 1 AGV is not permitted, as this poses the risk of sustaining injury or causing damage to machine parts.
- Do not switch on the BeTrac 1 AGV if its protective housing/covers have been taken off or opened up. Prior to switching on the BeTrac 1 AGV, all protective housing/covers must have been replaced and closed.
- Always switch off the BeTrac 1 AGV prior to carrying out maintenance or repairs. Always switch off the BeTrac 1 AGV by means of the central lock and take the key out of the machine.
- After use, the BeTrac 1 AGV must always be switched off using the key switch and central lock by turning it into the horizontal position.
- Never leave the BeTrac 1 AGV unattended with the key in the lock and the central lock in vertical position.
- The BeTrac 1 AGV can be used as an automatic means of transport and, therefore, can start or stop moving following an acoustic or visual signal.
- The BeTrac 1 AGV must be operated by authorised personnel only, who have received the appropriate training and are at least 18 years of age. Personnel must be familiar with the directions and instructions stated in this manual. Always maintain the appropriate level of concentration when operating the BeTrac 1 AGV. Do not operate the BeTrac 1 AGV when unable to concentrate properly, when you are under the influence (alcohol or drugs) or when using medication that can impair your reaction times when operating machinery or participating in traffic. Driving recklessly is not permitted.
- All personnel working within the active radius of the BeTrac 1 AGV must be familiar with the relevant safety rules and precautions that apply to the BeTrac 1 AGV. The employer must ensure that all personnel are familiar with these safety precautions.
- It is forbidden to approach a moving BeTrac 1 AGV, always wait until the BeTrac 1 AGV has come to a complete standstill before connecting or disconnecting transport vehicles.
- The BeTrac 1 has been fitted with a special "fast-forward functionality" for driving manually without a load. The employer is responsible for those permitted to use this "fast-forward functionality" (200 m/min). When this function is activated, hauling a load is strictly forbidden!
- Only use this BeTrac 1 AGV for the purpose it was designed for. The BeTrac 1 AGV may only be used indoors, on even, concrete floors. Never use the BeTrac 1 AGV outdoors or on the public road.

- Only place BeTrac 1 AGV in the correct travel direction on the induction route for driving automatically.
- Never introduce the BeTrac 1 AGV into the induction route near crossing, junctions and doors, as in that case, the BeTrac 1 AGV cannot be properly reported to the route controls which can lead to the collision and other incidents.
- Ensure the recommendations from the manual for the battery charger are implemented with regard to electric voltage (V) and frequency (Hz). Remove the charging plug before using the BeTrac 1 AGV (see 7.4).
- Keep the BeTrac 1 AGV in a proper operating condition by carrying out periodic safety inspections as described in this document. Any unsafe situations must be dealt with immediately.
- Assembly, installation, adjustment, maintenance and repair work must be carried out by professional, qualified personnel only.
- In order to operate the BeTrac 1 AGV correctly, it must be free of any obstacles. The BeTrac 1 AGV may only be operated when there are no other persons in the vicinity (apart from the operator) of the machine.
- In order to prevent the risk of becoming trapped or stuck, you must apply due care and attention. Keep both hands on the wheel and both feet and legs within the BeTrac 1 AGV frame, at all times.
- Be extra vigilant when reversing, drive slowly!
- Be extra vigilant when the "fast-forward functionality" is activated. Bear in mind a longer brake path and moderate your speed in bends. Do not use this functionality if the situation is unclear.
- It is forbidden to use BeTrac 1 AGV in insufficiently lit rooms!
- Before start-up and after maintenance and repair, check whether no tools or separate parts have been left behind in or on the BeTrac 1 AGV.
- Keep a safe distance from fixed and/or moving parts within the greenhouse and processing hall.
- Pulling or pushing items other than the BeTrac 1 AGV transport trolleys intended for the harvested produce is forbidden.
- Be careful accessing the route/track on which the BeTrac 1 AGV runs automatically.
- Additional options, accessories and spares must be ordered and supplied exclusively by the manufacturer, Berg Hortimotive.
- Only use original Berg Hortimotive parts for the BeTrac 1 AGV route and processing line.
- The safety pictograms which have been fitted on the BeTrac 1 AGV (see chapter 3.2: Repetition of the safety pictograms used) must be visible at all times.

- Keep the BeTrac 1 AGV clean. Accumulated dirt must be removed on a regular basis. Never clean the BeTrac 1 AGV with a water hose, steam cleaner or aggressive chemical agents.
- In order to prevent potential risks with the batteries, you must adhere to the battery safety instructions. See chapter 8.5: Maintenance of the batteries.
- When working with the BeTrac 1 AGV, wearing shoes with protective toe caps (S1) is mandatory.



Work that has not been detailed in this document must be carried out by trained personnel of your dealer or in consultation with Berg Hortimotive.



This documentation forms an integrated part of BeTrac 1 AGV!
Therefore, carefully store this documentation for future reference, or in the event of a repair or maintenance.
It is recommended you keep one copy with the BeTrac 1 AGV and to store another elsewhere (for example in the archive of the technical department).
An additional copy is available from Berg Hortimotive on request. Alternatively, your dealer can download a copy from the Berg Hortimotive site.

4 General description of the BeTrac 1 AGV

The BeTrac 1 AGV is an automatically guided vehicle intended for professional use i.e. pulling transport trolleys with harvested produce from the greenhouse to the processing hall.

The machine may only be operated by one person with a minimum age of 18, who has received thorough instructions in the operation of the BeTrac 1 AGV and who is familiar with the safety instructions and this user manual and fully understands these.

The BeTrac 1 AGV is an automatic traction unit, running on an even, paved floor and is intended as an auxiliary tool in a greenhouse or processing hall.

In addition, the BeTrac 1 AGV is fitted with induction technology. This technology moves the BeTrac 1 AGV 'automatically' along the main track. In this instance, an induction wire is milled into the principal track. The AGV is fitted with a steering wheel and integrated induction tracker. The BeTrac 1 AGV will follow the induction wire in the track and thus move to the desired position.

Customised systems can have various dimensions, as a result of which the machine supplied may slightly deviate from the illustrations in this manual. If so, reference is made to the composition drawing (see chapter 12: Technical Appendices) of the machine concerned.

4.1 Intended use

The BeTrac 1 AGV has been designed as an auxiliary tool for hauling transport trolleys intended for harvested produce from the greenhouse. Passenger transport is strictly forbidden!



Using the BeTrac 1 AGV in a manner other than described in this document is not permitted. Berg Hortimotive does not warrant the correct operation of the BeTrac 1 AGV when used improperly.



The BeTrac 1 AGV is only suitable for running on an even (concrete) floor which is rough enough to be able to drive and stop safely.

If the BeTrac 1 AGV nonetheless needs to be used for a different application, please contact Berg Hortimotive first. Berg Hortimotive will be able to tell you whether the BeTrac 1 AGV needs adjusting in order to guarantee the proper operation of the machine.

4.2 Principal components of the BeTrac 1 AGV

The principal components of the BeTrac 1 AGV are illustrated in figure 1.

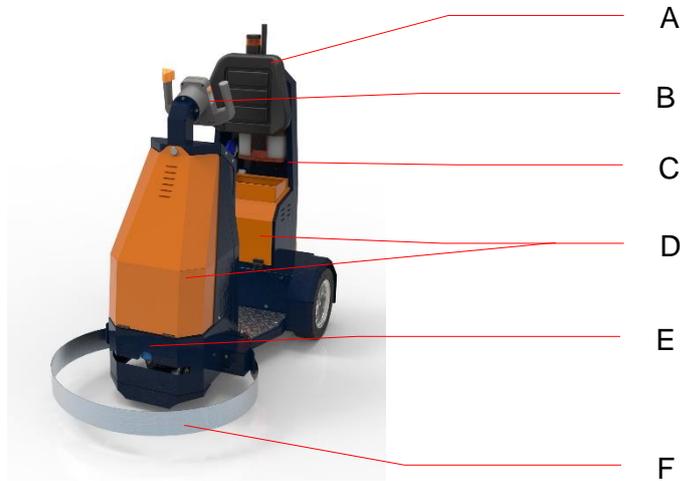


Figure 1: Principal components of the BeTrac 1 AGV

- A. Back support
- B. Steering wheel
- C. Battery charger
- D. Cover
- E. Distance sensor
- F. Bumper

4.3 Operating panel

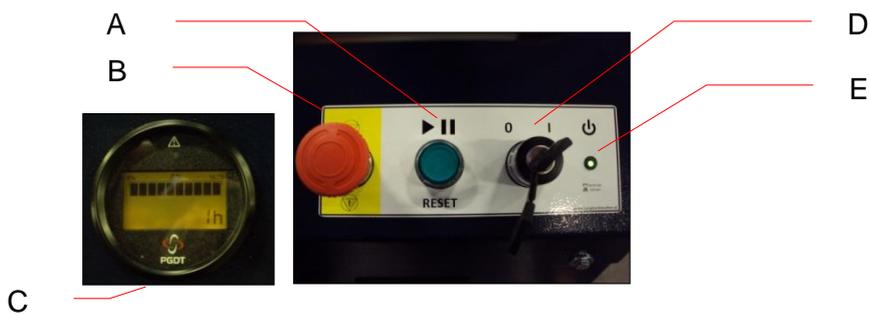


Figure 2: Operation of the BeTrac 1 AGV

- A. Start Auto / Pause / status light green / bumper reset
- B. Emergency stop
- C. Battery status indicator
- D. Key switch / fast-forward function
- E. Status LED

4.4 Steering control



Figure 3: Steering control of the BeTrac 1 AGV

- A. Drive release button
- B. Horn
- C. Throttle / Direction selector

4.5 Brake pedal



Figure 4: Brake pedal of the BeTrac 1 AGV

4.6 Other components

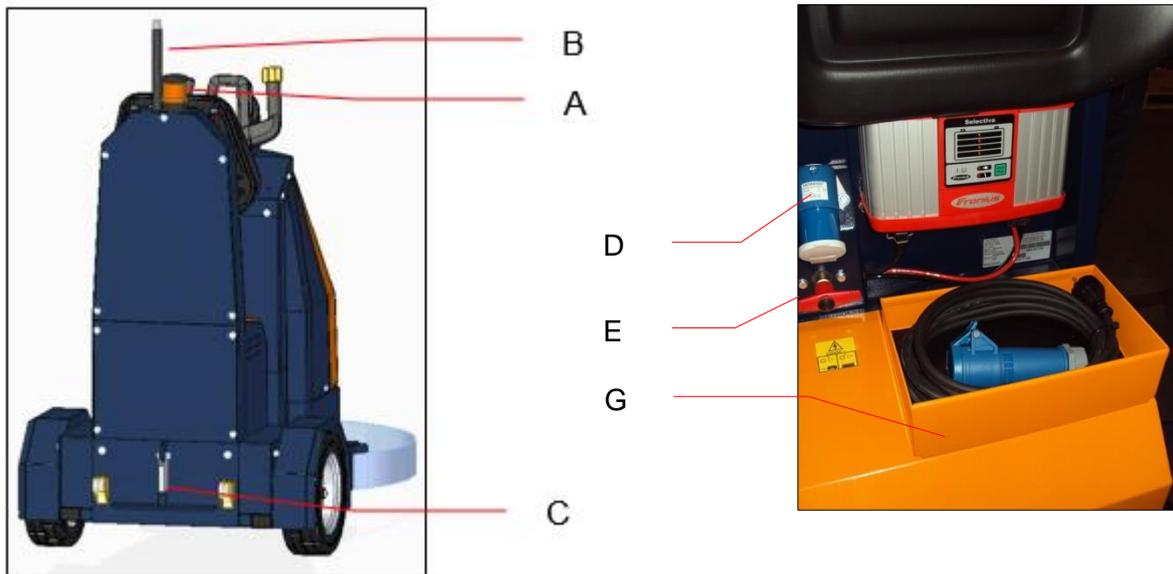


Figure 5: Other components of the BeTrac 1 AGV

- A. Flash light.
- B. Wi-Fi antenna.
- C. Towing hook with locking pin.
- D. Device outlet (for Battery charger).
- E. Central lock.
- G. Charger lead Tray



5 Transportation



The BeTrac 1 AGV must be transported with the utmost care in order to prevent damage and accidents.

5.1 External transport

If the BeTrac 1 AGV needs to be transported, please follow the procedure below (see figure 6):

1. Switch off the BeTrac 1 AGV, turn the key switch to 0 and turn the central lock to the horizontal position.
2. The BeTrac 1 AGV may only be lifted by the "yellow-marked" lifting eyes provided for this purpose.
3. There are 2 lifting eyes at the rear and 1 lifting eye behind the front cover.
4. Use only approved lifting straps and harp closures (D-closures), which are approved for the load of 375 kg.
5. Do not lift the BeTrac 1 AGV higher than necessary and place it on a solid transport pallet, or similar. Properly secure the BeTrac 1 AGV with straps, thus preventing it from sliding, rolling or toppling.
6. Ensure that the BeTrac 1 AGV remains dry and frost-free during transportation.
7. After having arrived at its destination, the BeTrac 1 AGV must be set up in accordance with the points described at chapter 6.



Figure 6: Transport instructions

6 Putting into operation



The BeTrac 1 AGV is only suitable for running on an even (concrete) floor which is rough enough to be able to drive and stop safely.



Do not switch on the BeTrac 1 AGV if its protective housing/covers have been taken off or opened up. Prior to switching on the BeTrac 1 AGV, all protective housing/covers must have been replaced and closed.



Only use this BeTrac 1 AGV for the purpose it was designed for. The BeTrac 1 AGV has been designed as an auxiliary tool for hauling transport trolleys intended for harvested produce from the greenhouse. Passenger transport is strictly forbidden!

Never use the BeTrac 1 AGV outdoors or on the public road.



Ensure the recommendations for the battery charger are implemented with regard to electric voltage (V) and frequency (Hz). Consult the manual of the battery charger for this. Remove the charging plug before using the BeTrac 1 AGV (see 7.4).



Additional options, accessories and spares must be ordered and supplied exclusively by the manufacturer, Berg Hortimotive.



The safety pictograms which have been fitted on the BeTrac 1 AGV (see chapter 3.2: Repetition of the safety pictograms used) must be visible at all times.



Be extra vigilant during the installation!

The risk of incorrect functioning whilst putting into operation is higher than normal. If the BeTrac 1 AGV has not been set up correctly, it may pose a hazard. Be sure that all fixings have been locked and secured correctly.

The BeTrac 1 AGV runs automatically and is fitted with induction technology. This technology allows the BeTrac 1 AGV to move along the main track. In this instance, an induction wire is milled into the track.

The BeTrac 1 AGV was checked for proper functioning and safety, before leaving the Berg Hortimotive factory. Prior to starting up the BeTrac 1 AGV, the items described in article 6.1 must be inspected.

6.1 Inspection before taking into service



Only use this BeTrac 1 AGV for the purpose it was designed for (see chapter 4.1 Intended use).



Visually check the BeTrac 1 AGV for any damage. The BeTrac 1 AGV may only be used after having been inspected and found to be in order in terms of damage, functioning and completeness.



Do not switch on the BeTrac 1 AGV if its protective housing/covers have been taken off or opened up. Prior to switching on the BeTrac 1 AGV, all protective housing/covers must have been replaced and closed.



The safety pictograms which have been fitted on the BeTrac 1 AGV (see chapter 3.2: Repetition of the safety pictograms used) must be visible at all times.

The following points must be checked before starting up the BeTrac 1 AGV:

- No loose electrical connections (all the functions and buttons work properly);
- No damaged cables;
- Wheels not damaged and rotate freely;
- Batteries must be charged (see chapter 7.4);
- No 'general' mechanical damage;
- No damage to and impaired visibility of the control components, pictograms and symbols;
- All the screens and protective caps and covers are firmly in place and mounted correctly.
- Mechanical brake operation, then check it every day before starting work;
- Operation of flash lamp, beeper and horn.

If you are in doubt about the proper functioning of the BeTrac 1 AGV, you must contact the technical department of your dealer or the Berg Hortimotive service department, before starting to work with the BeTrac 1 AGV.

6.2 Minimum requirements for induction technology

The induction system must be fitted with original Berg Hortimotive parts. In all other cases, the proper functioning cannot be guaranteed.

- The induction route control cabinet that houses the induction generator must be properly installed.
- No induction wire may be visible or exposed to the surface of the concrete path.
- The entire induction route must be free from obstacles.

7 Operating instructions

This chapter contains instructions for the operation of the BeTrac 1 AGV.

The BeTrac 1 AGV is designed for operation by one person. This person must be at least 18 years of age and be familiar and comply with the contents of this technical manual. A special training course is not required, although some experience in working with this type of equipment *is* required.



Do not switch on the BeTrac 1 AGV if its protective covers have been taken off or opened up. Prior to switching on the BeTrac 1 AGV, all protective housing/covers must have been replaced and closed.



Never exceed the maximum hauling capacity of the BeTrac 1 AGV, as indicated in the specifications, see chapter 10.



After use, the BeTrac 1 AGV must be switched off by means of the key switch and central lock, at all times.



Sitting on the BeTrac 1 AGV is not permitted, as this poses the risk of sustaining injury or causing damage to machine parts.



Never leave the BeTrac 1 AGV unattended with the key in the machine.

The BeTrac 1 AGV must be operated by authorised personnel only, who have received the appropriate training and are at least 18 years of age. Personnel must be familiar with the directions and instructions stated in this manual. Always maintain the appropriate level of concentration when operating the BeTrac 1 AGV. Do not operate the BeTrac 1 AGV when unable to concentrate properly, or when using medication that can impair your reaction times when operating machinery or participating in traffic. In addition, operating this machine whilst under the influence (of alcohol or drugs) is forbidden. Driving recklessly is not permitted.



All personnel working within the active radius of the BeTrac 1 AGV must be familiar with the relevant safety rules and precautions that apply to the BeTrac 1 AGV. The employer must ensure that all personnel are familiar with these safety precautions.



It is forbidden to approach a moving BeTrac 1 AGV, always wait until the BeTrac 1 AGV has come to a complete standstill to connect or disconnect transport vehicles.



The BeTrac 1 has been fitted with a special "fast-forward functionality" for driving manually without a load. The employer is responsible for those permitted to use this "fast-forward functionality" (200 m/min). When this function is activated, hauling a load is strictly forbidden!



Only use this BeTrac 1 AGV for the purpose it was designed for. The BeTrac 1 AGV may only be used for the transportation of harvested produce from the greenhouse by means of a Berg Hortimotive-approved transport trolley. Never use the BeTrac 1 AGV outdoors or on the public road.



Using the BeTrac 1 AGV when tilting more than 2 degrees (linearly and/or crosswise) is strictly forbidden.



Ensure the recommendations for the battery charger are implemented with regard to electric voltage (V) and frequency (Hz). Consult the manual of the battery charger for this. Remove the charging plug before using the BeTrac 1 AGV



In order to operate the BeTrac 1 AGV correctly, it must be free of any obstacles. The BeTrac 1 AGV may only be operated when there are no other persons in the vicinity (apart from the operator) of the machine.



In order to prevent the risk of becoming trapped or stuck, you must apply due care and attention. Keep both hands on the wheel and both feet and legs within the BeTrac 1 AGV frame, at all times.



Keep a safe distance from fixed and/or moving parts within the greenhouse and processing hall.



Pulling or pushing items other than the BeTrac 1 AGV transport trolleys intended for the harvested produce is forbidden.



Be extra vigilant when reversing, drive slowly!

Be extra vigilant when the "fast-forward functionality" is activated. Bear in mind a longer brake path and moderate your speed in bends. Do not use this functionality if the situation is unclear.



It is forbidden to use the BeTrac 1 AGV in insufficiently lit rooms!



Be careful accessing the route/track on which the BeTrac 1 AGV runs automatically.



When working with the BeTrac 1 AGV, wearing shoes with protective toe caps (S1) is mandatory.

7.1 Statuses of visual and acoustic signals

Whilst operating the BeTrac 1 AGV, the user will be alerted of the status the machine is in by means of various signals. Familiarise yourself with the signals and notifications below so you recognise these when operating the machine.

7.1.1 Status LED green (Figure 2: Operation of the BeTrac 1 AGV)

On: AGV is ON, after operating Start Auto button

Off: AGV is OFF (with central lock) or on standby after 2 hours

7.1.2 Start Auto / Pause / status light green / bumper reset (A) (Figure 2: Operation of the BeTrac 1 AGV)

Off: AGV is OFF or on standby after 2 hours

Off: emergency stop / bumper engaged

Continuously on: the AGV is in manual mode and start driving button has been released

Blinking fast: induction signal has been detected, auto mode not started / paused

Blinking fast 5x: start automatic action

Blinking slowly: the AGV is running or stationary on the induction wire, in auto mode

Blinking slow pulse: the AGV is on without having detected an induction signal and is waiting for operation

Blinking attention with beeper: operation is not possible, operate throttle in manual mode without releasing the start drive button and without braking and operating the throttle at the same time.

In the event of a breakdown, the status light will blink along with the beeper.

7.1.3 Beeper

1x beep: after Start button and delay of approx. 14 seconds the AVG is ON

1x beep: start beep induction signal is detected

1x beep: tag read

5x beep fast: induction drive, repeats every time driving restarts!

Beeping attention with green light: operation is not possible, operate throttle in manual mode without releasing drive release button or without braking and operating the throttle at the same time.

Beeping attention: short beep every 1.5 seconds during induction drive.

Long beep: the machine has been moved away from the induction wire by approx. 3 metres and is therefore taken off route control. The BeTrac 1 is no longer included in the route, as a result of which crossings and doors are released.

Beeping fast with dip: signal lost during induction drive.

Beeping slowly with green light: breakdown in train pulse, see chapter 9.

7.2 Switching on the BeTrac 1 AGV



Whilst driving the BeTrac 1 AGV, you can stop the machine by operating the emergency stop, if so required. The BeTrac 1 AGV will immediately come to a complete standstill.

1. After having completed chapter 6 (putting into operation), you can switch on the BeTrac 1 AGV.
2. Ensure the emergency stop is released.
3. Turn the central lock to the vertical position and turn the key switch in position "1". The BeTrac 1 AGV is now ON.
4. By pressing the green button, the BeTrac 1 AGV will start and the green Status LED comes on. You must wait for a double beep signal, after which initialisation of the control motor will start. This will take approx. 7 seconds after which the motor can be heard. Subsequently, the green light will come on in short pulses (AVG does not have an induction signal)
5. When completing step 4 whilst the AVG is on the induction wire, another beep can be heard after initialisation of the control motor, followed by fast-blinking green light. Press the green button again in order to allow the AGV to run on the induction wire automatically. If switched off after a 2-hour timeout, restarting with the green button is not needed.

7.3 Switching off the BeTrac 1 AGV



Always switch off the BeTrac 1 AGV prior to carrying out maintenance or repairs. Always switch off the BeTrac 1 AGV by means of the central lock and take the key out of the machine.

1. Stop all operations (when working manually).
2. Or the BeTrac 1 AGV has stopped automatically in the route, e.g. at the unloading location.
3. Switch off the BeTrac 1 AGV by turning the key switch to "0". The BeTrac 1 AGV is now OFF. You must also remove the key from the ignition if leaving the BeTrac 1 AGV behind unattended. Turn the central lock to the horizontal position also.

7.4 Charging the batteries of the BeTrac 1 AGV



In order to prevent potential risks with the batteries, you must adhere to the battery safety instructions. See chapter 8.5: Maintenance of the batteries.

When the batteries of the BeTrac 1 AGV are nearly empty, the battery status indicator (C, figure 2) will indicate this. In that case, the batteries must be charged by means of the battery charger.

If halfway the working day the status indicator shows empty, you must charge more often, daily if need be! If at the end of the working day the discharge indicator shows $\frac{3}{4}$ full, there is no need to discharge. Prevent frequent unnecessary charging as this can have an adverse effect on the service life of the batteries. Charge at least once a week, regardless of the frequency of use. *Always remove the charging plug when carrying out maintenance.* Only use a charger suitable for this application - see the specifications on the charger for this.



Figure 7: Charging instructions

1. Move the BeTrac 1 AGV to a properly ventilated charging location.
 2. Switch off the BeTrac 1 AGV by turning the key switch to OFF.
 3. Switch off the central lock by turning it into the horizontal positions and insert the 230V charge plug into the charge device outlet of the BeTrac 1 AGV. Check whether the lead is free of damage before use!
 4. Once the charge plug has been connected, the charge indicator next to the plug symbol will come on. The batteries will be charged if the status indication in the battery symbol starts blinking. Depending on the charge status, more LEDs will start to blink.
 5. Once the batteries have been fully charged, all LEDs in the battery symbol will be on continuously. The charger is now switched off. **NEVER STOP THE CHARGING PROCESS BEFORE IT HAS FULLY COMPLETED. THIS CAUSES DAMAGE TO THE BATTERIES AND SHORTENS THEIR SERVICE LIFE.**
 6. Once the charging process has completed, remove the plug (230V) from the device outlet
 7. Clear away the lead to ensure it remains free of damage.
 8. The BeTrac 1 AGV is ready for use once the BeTrac 1 AGV is switched on again (see chapter 7.2: Switching on the BeTrac 1 AGV).
- Also consult the battery charger manual!**

7.5 BeTrac 1 AGV driving manually



Moderate your speed!

This certainly applies if you are not yet familiar with the driving properties of the BeTrac 1 AGV.



Never brake and accelerate at the same time as this damages drive control and mechanical brake!



Throttle / Direction selector

Drive release button

Brake pedal



Figure 8: Operating components

Complete the following steps:

1. Switch on the BeTrac 1 AGV (see 7.2)
2. Get on the BeTrac 1 AGV and stand firm by leaning your back against the back support.
3. Keep both hands on the steering wheel (also whilst driving!)
4. Press the drive release button (green light is now on continuously).
5. Carefully turn the throttle in the desired driving direction and speed.
6. When the throttle is released, the BeTrac 1 AGV will free-roll to a complete standstill. Use the pedal brake if you want to reduce speed quicker.
7. After a period of 2 seconds during which the throttle has not been operated, the drive release button must be pressed again if you want to drive.

If induction signals are recognised whilst driving manually, the green light will start to blink quickly combined with a single beep. This only works at crawling speed! (<1Km/hour)

The fast-forward functionality:

The BeTrac 1 has been fitted with a special "fast-forward functionality" for driving manually without a load. The employer is responsible for those permitted to use this "fast-forward functionality" (200 m/min). When this function is activated, hauling a load is strictly forbidden!

1. Repeat steps 1 to 4 as described above.
2. Within 2 seconds, turn the key switch to the right until the end and release.
3. Carefully turn the throttle in the forward direction. The BeTrac 1 AGV will now be able to drive at a maximum speed of 200m/min (12km/hour). Be careful!
4. After steps 6 and 7, the fast-forward functionality will need to be reactivated.

7.6 BeTrac 1 AGV driving automatically (induction technology)

In order for the BeTrac 1 AGV to run automatically on the induction route, the following steps need to be completed:

1. Manually manoeuvre (7.5) the BeTrac 1 AGV in the correct direction on the induction route until a single beep is heard and the green light start blinking fast. The antenna is now suspended above the induction wire. The BeTrac 1 AGV must be at a maximum linear angle of 30 degrees in relation to the induction route. Make sure there are no obstacles on the track.
2. Start automatic drive by pressing the green button. The green button starts blinking slowly (auto mode started!).
3. The steering wheel will seek the centre position of the induction wire.
4. The BeTrac 1 AGV will issue 5 beep signals and drive slowly for the first 30 cm and accelerates to normal speed for driving automatically thereafter.
5. During induction drive, the BeTrac 1 AGV will issue a beep every 1.5 seconds combined with a flashlight.

7.7 Stopping automatic drive

The BeTrac 1 AGV automatic drive can be stopped in different ways:

1. Stop "pause" by pressing the green auto button.
2. Drive release button, light is on for 2 seconds continuously and reverts to blinking fast if foot operation has been released and the vehicle has not yet been driven away from the induction wire manually.
3. Foot brake generates "pause", the light blinks fast.
4. Direction selector (throttle) generates "pause", the light blinks fast.
5. Stopping by means of the distance sensor (see illustration below). The set distance of the distance sensor ensures that the BeTrac 1 AGV decelerates and ultimately stops. The green light continues to blink slowly (auto mode started and still active).
6. Engaging the emergency stop or stop bumper. The BeTrac 1 AGV regards bumper engagement as an emergency stop and the green light will go out (auto mode stopped). Use the green button to start up again (press and hold until bumper has been deactivated, see also 7.11: Starting up after engaging the bumper), after which other functions can be started from the manual mode.
7. Stopping at a stop position. The route can include various stop positions. These can be inserted by means of a stop marking (tag). The control system that monitors the route ensures that the BeTrac 1 AGV stops and starts again, in combination with an acoustic signal.

7.8 Use of a distance sensor

The distance sensor has 2 sensor zones. Zone 2 ensures that the BeTrac 1 AGV will start driving slowly. Zone 1 ensures that the BeTrac 1 AGV stops. The adjustment of the two zones strongly depends on the environment. The two sensor zones must at all times be adjusted by a qualified person.

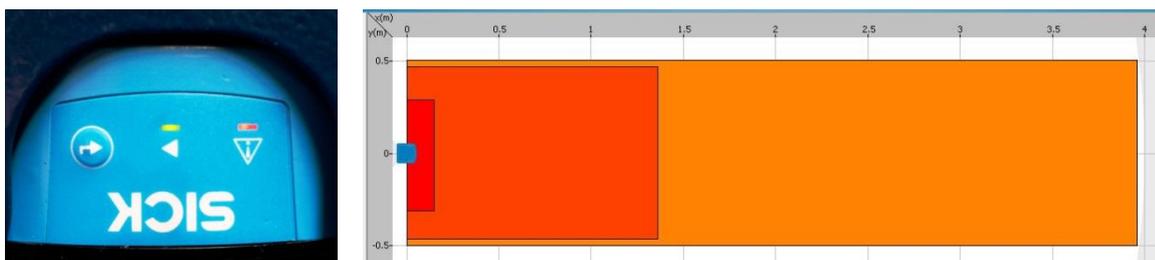


Figure 9: The distance sensor (Area photocell)

7.9 Use of the emergency stop

The BeTrac 1 AGV is fitted with an emergency stop (B, figure 2). In the event of an emergency, the BeTrac 1 AGV can swiftly be brought to a standstill by engaging this emergency stop. The emergency stop is easy to recognise by its red colour and yellow background. If the emergency stop is engaged, the BeTrac 1 AGV will stop immediately and the green light goes out.

The emergency stop switch continues to be mechanically blocked and the BeTrac 1 AGV cannot be restarted. This enables assistance to be provided straight away in the event of a personal accident.

The emergency stop can also be used in the event of sudden and imminent danger, for example a process that has gone out of control.

Once the danger has been removed, the emergency stop switch can be released (see chapter 7.10 Starting up after engaging the emergency stop).

7.10 Starting up after engaging the emergency stop



Never release an emergency stop (reset) if you do not know who engaged the emergency stop and why.

1. Check whether the situation is safe to switch on the BeTrac 1 AGV.
2. Now release the locked emergency stop.
3. By pressing the green button, the BeTrac 1 AGV will start in manual/auto mode, in loop situation. The green light blinks with short pulses / blinks fast as the loop is recognised; restart via the green button.

7.11 Starting up after engaging the bumper



Never restart the BeTrac 1 AGV (reset) stop (reset) if you do not know who engaged the bumper and why.

1. Check whether the situation is safe to switch on the BeTrac 1 AGV.
2. Press and hold the drive release button and the green start button to manually reverse away from the obstacle and to release the bumper. During this action, the AGV beeps twice at fixed intervals as multiple buttons are operated simultaneously.
3. After the bumper has been released, the BeTrac 1 AGV will respond to all functionalities once more. The green button can be released and the double beep will stop.

7.12 Connecting transport trolleys

The BeTrac 1 AGV must be supplied with a towing hook suitable for the relevant transport trolleys. If this is not the case or in the event of doubt about the correct combination, the BeTrac 1 AGV must not be taken into service. Consult your dealer!

The towing hook is fitted with a locking pin which ensures that the transport trolleys remain secured to the towing hook when running over dilatation seams in the concrete path.

Driving without or with an unsecured towing hook is forbidden!



Figure 10: The towing hook locking pin

1. Open the towing hook locking pin.
2. Slide the triangle eye across the towing hook.
3. Close the towing hook locking pin.

7.13 Taking the machine out of operation for a prolonged period of time

If the BeTrac 1 AGV is taken out of service, switch it off at the central lock (and remove the key) and store it in a dry and frost-free area, with fully-charged batteries. It is recommended to connect the batteries on the BeTrac 1 AGV to a trickle charger. If no trickle charger is present, the batteries must be charged at least every month (also when the BeTrac 1 AGV is stored for longer periods). Ensure that the ground underneath is level and lock the wheels. If after a certain length of time (longer than 2 weeks) the BeTrac 1 AGV is put back into operation, it must first be inspected as described in chapter 6.1 (Inspection before taking into service).

7.14 Machine sound

Unfamiliar sounds generated by the BeTrac 1 AGV are often an indication of wear, loose or broken parts or a wrong adjustment of the BeTrac 1 AGV. These defects must be repaired as soon as possible in order to prevent further wear or damage to the BeTrac 1 AGV and/or peripheral equipment.

Provided the BeTrac 1 AGV is used in accordance with the instructions, the noise level will remain below 70 dB.

7.15 Discarding the BeTrac 1 AGV

If the BeTrac 1 AGV is going to be scrapped, the regulations for waste processing, as applicable at the time and location of scrapping, must be taken into account.

The BeTrac 1 AGV has been manufactured using commonly known materials. At the time of manufacturing, waste processing options were available for these types of materials without causing any particular risks to the persons charged with the scrapping.



The BeTrac 1 AGV must be dismantled and any chemical parts removed. Batteries must be handed in at the appropriate waste collection point.

8 Maintenance regulations

Whilst working on the BeTrac 1 AGV, the power supply must be switched off by means of the central lock.



Do not switch on the BeTrac 1 AGV if its protective covers have been taken off or opened up. Prior to switching on the BeTrac 1 AGV, all protective housing/covers must have been replaced and closed.



Always switch off the BeTrac 1 AGV prior to carrying out maintenance or repairs. Always switch off the BeTrac 1 AGV by means of the central lock and take the key out of the machine.



Never leave the BeTrac 1 AGV unattended with the key in the machine.



Keep the BeTrac 1 AGV in a proper operating condition by carrying out periodic safety inspections. Any unsafe situations must be dealt with immediately.



Assembly, installation, adjustment, maintenance and repair work must be carried out by professional, qualified personnel only.



Before start-up and after maintenance and repair, check whether no tools or separate parts have been left in or on the BeTrac 1 AGV.



Keep the BeTrac 1 AGV clean. Accumulated dirt must be removed on a regular basis. Never clean the BeTrac 1 AGV with a water hose, steam cleaner or chemical disinfectants.



In order to prevent potential risks with the batteries, you must adhere to the battery safety instructions.

8.1 Maintenance schedule

Thanks to its robust design, the BeTrac 1 AGV requires little regular maintenance. However, in order to guarantee an efficient operation, it is vital that the maintenance schedule given below is strictly adhered to. Repairs and maintenance work must be noted down in the maintenance logbook (see appendix 1). The employer is also responsible for periodically checking tools and equipment according to the current Working Equipment Guidelines that cover this (or arrange for this to be checked).

Maintenance - Checks	Tools	Daily	Weekly	Monthly	Yearly
Sufficiently charged battery	Battery status indicator	X			
Damage to control components and bumper		X			
Damage to/visibility of pictograms and stickers		X			
Inspection of towing hook locking pin		X			
Checking the operation of the flashlight, beeper and horn		X			
Operation check AREA SENSOR AND BUMPER		X			
Check the operation of the foot brake daily before starting work	Drive slowly and then brake	X			
Cleaning control panel	Damp cloth		X		
Check for damage to cables			X		
Check for ingrained dirt or string wrapped around wheels			X		
General mechanical damage			X		
Charge batteries (minimal)	Battery charger		X		
Check battery fluid levels (plates submerged 1 cm below liquid level) (8.3)	Distilled water			X	
Lubricate rotational points bumper (8.2)	Oil			X	
Check wear on wheels (8.6)	Visual and measuring			6 months	
Lubricate hinged components of the mechanical brake	Oil			6 months	
Remove any rust	Varnish			6 months	
Check construction welds for (hair)cracks					X
Check and tighten wheel nuts (8.4)					X
Check brake wear (8.4)	Visual and measuring				X
Differential check for leaks (8.5)	Visual and flashlight				X

Maintenance schedule

If the above checks indicate that there is a fault with the BeTrac 1 AGV, contact your Berg Hortimotive dealer immediately. Continuing to use the BeTrac 1 AGV after identifying defects could lead to dangerous situations and is therefore forbidden!

8.2 Lubricate rotational points bumper and mechanical brake



Figure 11: Maintenance points

Each month, lubricate the rotational points of the bumper using thin oil, thereby ensuring that the system springs back to its neutral position after engagement. Lubricate the rotational points of the mechanical brake very six months.

8.3 Maintenance of the batteries

Avoid the battery fluid (electrolyte) coming into contact with skin, wear safety goggles and gloves as battery acid is highly corrosive. Wash with soap and water if contact is made. If it comes into contact with the eyes, immediately rinse in running water for a period of at least five minutes and call for medical assistance. Always ensure there is sufficient soap and water in the vicinity and that assistance is within calling distance when people have to work near batteries. Avoid short circuits (sparks), and ensure that there is no electrical connection between the battery poles. The battery cover must be free of damage. Bare patches or dents can cause short circuits!

Explosive gas is released when the batteries are being charged. Keep sparks, naked flames or cigarettes away from batteries. Ensure that the place where batteries are charged and/or stored is well ventilated. Ensure that no metal objects can fall on top of the batteries as this could cause short circuits or sparks which in their turn could lead to an explosion.

Remove all personal objects including rings, bracelets, neck chains and wrist watches when working in the vicinity of batteries. For example, a short circuit could melt a ring resulting in serious burn injuries.

Follow any further advice as described in the battery safety sheet (see appendix 4).

Open the battery covers to maintain the 4 batteries:



Figure 12: Battery maintenance

8.4 Drive wheels and brake control

Every year the brakes must be inspected and cleaned with compressed air, proceed as follows.



Figure 11: Disassemble wheels

Remove the rear wheels (one by one) by loosening the middle wheel nut (key size 30 mm). Unscrew this approx. 1 turn when the BeTrac is still on the ground, lift the BeTrac 1 AGV a little (see instruction in chapter 5.1) and remove the wheel. Clean the brake lining and brake shoes with compressed air.



Figure 11: Measure brake shoe lining

A new brake shoe lining is 4.5 mm thick, if the brake shoe lining is under 1.5 mm thick, the brake shoes need to be renewed, consult your dealer for this.

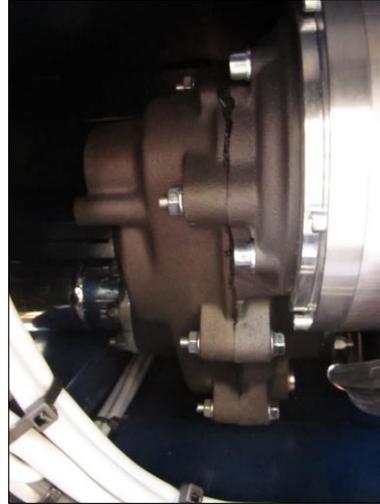
After inspection, the wheel can be mounted again, if the BeTrac 1 AGV is standing with the wheels on the ground, the wheel nut can be properly tightened.

8.5 Differential check for leaks

The differential must be checked annually for oil leakage, proceed as follows.



Figure 12: Check for leaks



Remove the "towbar panel" by loosening the 4 M10 bolts, behind this panel is the drive motor with differential. Check visually if there is no oil leakage. If the leakage is very small, this can be cleaned with a cloth, do this inspection again after one month to check whether the leakage continues. If there is a leak, consult your dealer.

8.6 Check wear of front wheels

Every six months, the front wheels must be checked for wear on the rubber tread. This wear has a lot of influence on the correct reading of the induction signal. Replace the front wheels if they are worn out by 10 mm!



Figure 15: Check for wear, measure example

New front wheels have a tread of 34 mm thick, if the treads are under 24 mm thick, the front wheels must be renewed, consult your dealer for this.

8.7 Specialist maintenance

Maintenance and repairs to the items listed below may only be carried out by approved Berg Hortimotive dealers:

- All work concerning the electric components and wiring.
- All work concerning the control and induction system.
- All work concerning the drive motor.

8.8 Cleaning procedure



Before cleaning, always switch off the BeTrac 1 AGV by means of the central lock and take the key out of the machine.



If cleaning work is carried out by persons other than the operating personnel of the machine (e.g. cleaning department or an external cleaning company), these persons must be properly instructed first to ensure they can clean safely.



When cleaning batteries, you must take into account the requirements as stated on the battery safety sheet (see appendix 4).

Regularly remove any remains of plants, leaves, etc. and brush off any sand and dust. Clean the BeTrac 1 AGV with a dry/damp cloth and soft brush. Cleaning the BeTrac 1 AGV with dry, compressed air is also permitted. Never pour water over the BeTrac 1 AGV and/or clean the machine using a steam or high-pressure water cleaner, as this can cause serious damage to the electrical circuits.



Prior to using a cleaning agent, you must check whether it is suitable for use in combination with the materials of the BeTrac 1 AGV. In the event of doubt, contact Berg Hortimotive.

For further recommendations, see Appendix 5 Cleaning varnish powder coat

8.9 Repairs

During the warranty period, repairs may only be carried out under the supervision of Berg Hortimotive.

Repairs and maintenance work must be noted down in the maintenance logbook (see appendix 1).

All parts that need to be replaced must at least meet the specifications of the original parts.



Deviating from the above regulations can compromise the safety of the machine. Berg Hortimotive does not accept responsibility for this.

9 Problems, causes and solutions

By following the directions below, causes can be quickly traced in the event of malfunctions. In addition, it can contribute to formulating a clear breakdown diagnosis if the service department of your dealer needs to be contacted.

The BeTrac 1 AGV:

Machine is dead after having been switched on

Cause:	Solution:
Start-up time not yet completed	Wait 14 seconds until beep signal and green light
Emergency stop still engaged	Release the emergency stop button
Bumper still engaged	Release the bumper

Machine is dead after having been switched on and beeps 6x

Cause:	Solution:
Button, direction, emergency bumper and/or brake pedal engaged	Deactivate the engaged function

Beeps attention together with green lamp

Cause:	Solution:
Multiple buttons operated simultaneously	Stop double operation
Accelerate without releasing the push Button	First press release button
Accelerate and brake	Check brake pedal release

Beeps 4x

Cause:	Solution:
Steering (left/right) not in position during the initialization of the steering motor or required steering action	Steering wheel locked, must be able to turn freely! Tensioning the timing belt from steer motor Check free turning front wheels, remove rope / dirt, lubricate bearings. Consult your dealer

Beeps 5x

Cause:	Solution:
Too large measurement error in steering angle signals from the steering wheel during manual driving	Too fast steering movement Replace steering angle potentiometer
Steering angle potmeters worn out	Consult your dealer
Steering wheel communication error	Press the Reset button

Beeps 6x

Cause:	Solution:
Button operated during switching on	Deactivate operated function

Beeps 7x

Cause:	Solution:
No distance pulses whilst driving	Consult your dealer

Beeps 8x

Cause:	Solution:
No communication with drive motor Controller	Press the Reset button Consult your dealer

Beeps continuously with short dip

Cause:

Induction signal lost

Solution:

Check power supply, consult your dealer

Stopped during induction drive

Cause:

Stop zone photocell area (red LED on)

Emergency bumper has been operated

Start/auto button operated

Direction has been operated

Release button has been operated

Brake pedal has been engaged

Waiting for stop tag

Waiting stop tag, no Wi-Fi

Solution:

Remove obstacle

Remove obstacle

Press Start/auto button again

Check neutral position of the speed button

Press Start/auto button

Press Start/auto button

Consult route control operating panel

Consult route control operating panel

Check antennas and status LEDs for access point

Consult your dealer

Does not beep while passing marker tag

Cause:

RFID tag antenna or processing of signals disturbed

Solution:

Consult your dealer

Does not drive

Cause:

Breakdown in motor control

Solution:

Check whether battery indicator is blinking

Switch AGV on and off and try again

Inform your dealer of the blinking code

AGV cannot find induction signal

No inductions signal present on the route

Induction antenna faulty

Solution:

Check display route control cabinet

Physically check BeTrac antenna / consult dealer

10 Specifications

Type:	8801.55.1100
Dimensions [mm]:	
Length	1477
Width	680
Height	1472
Wheelbase [mm]	750
Max. hauling capacity [N]	2350
Max vertical towbar load [N]	250
Weight [kg]	375
Max load 1 person [kg]	120
Motor power Driving [kW]	1,2
Motor power Steering [kW]	0,072
Standard manual driving speed [m/min]-[km/h]	100-6
Maximum manual driving speed [m/min]-[km/h]	175-10,5
Maximum driving speed Automatic induction drive [m/min]	60-3,6
Voltage [Volt DC]	24
Battery capacity [Ah]	180
Noise level [dB]	<70

Physical operating conditions

Ambient temperature, Transport & Storage	: 5 to +40 degrees Celsius
Operative	: 5 to +40 degrees Celsius
Rel. Humidity (RH)	: 0% to 90%, <u>not condensing</u>
Lighting	: Normal ambient lighting.

The machine is not designed for use outdoors.
The machine is not suitable for operation in explosion risk zones.

11 DECLARATION OF CONFORMITY

Berg Hortimotive, Burg. Crezeelaan 42a, 2678 KZ De Lier, the Netherlands, +31 (0) 174-517 700

Client:
Order number:
Order date:

Delivery date:

We, Berg Hortimotive,
while taking full responsibility, hereby declare that the product:

Type no.: 8801.55.1100 serial number:
Product description BeTrac 1 AGV

which this declaration relates to, conforms to the standard(s) or to other normative document(s):

EN- ISO 3691- 4

(Motorised transport equipment - Safety requirements and verification - Part 4: Uncontrolled, motorised transport equipment and their systems)

EN- ISO 3691- 5

(Motorised transport equipment - Safety requirements and verification - Part 5: Manually driven transport equipment)

EN- ISO 12100

(Machine safety - Basic design definitions - Risk assessment and risk reduction)

EN- ISO 13849- 1

(Machine safety - Components of control systems with a safety function - Part 1: General design rules)

EN- ISO 13850

(Machine safety - Emergency stop - Design principles)

EN 953

(Machine safety - Protective covers - General requirements for the design and construction of fixed and moveable protective covers)

EN 981

(Machine safety - System of acoustic and hazard signals and informative signals)

EN 1175- 1

Safety if motorised transport equipment - Electric requirements - Part 1: General requirements for battery-powered transport equipment)

EN 60204- 1

(Machine safety - Electric equipment of machines - Part 1: General requirements)

EN 61310- 1

(Machine safety - Signalling, marking and operation - Part 1: Requirements of visible, audible and tangible signals)

EN 61310- 2

(Machine safety - Signalling, marking and operation - Part 2: Requirements to markings)

EN 61310- 3

(Machine safety - Signalling, marking and operation - Part 3: Requirements to the position and operation of operating elements)

NEN 5509

(User manuals - Contents, structure, formulation and presentation)

in accordance with the provisions of the following Directives:

2006/ 42/ EC	(Machine Directive)
2004/ 108/ EC	(EMC Directive)
2006/ 95/ EC	(Low-Voltage Directive)

De Lier,
24-8-2012

the Netherlands, De Lier, date-.....-.....

Signature of director or authorised signatory

.....

Appendix 4: Battery safety sheet

Battery recommendations

The following chapter provides recommendations for efficient usage, safety and maintenance.

Efficient use of the BeTrac 1 AGV and batteries

The following recommendations are aimed at facilitating the efficient use of the BeTrac 1 AGV and to improve the service life of the batteries.

Basic principles:

- The battery will deplete sooner when running at higher speeds.
- Frequent starting and stopping increases energy consumption.
- Whilst using the BeTrac 1 AGV, the remaining capacity and battery voltage gradually reduce, whereas power consumption increases. This increases the heat generation from the motor and speed regulator as the batteries gradually lose their charge.
- Allowing batteries to be (fully) depleted also reduces the service life.
- Timely charging and proper maintenance help to increase the service life of the batteries.
- Timely charging also lowers the generation of heat in the motor and speed regulator, as well as the battery charger.

Efficient usage:

- Drive carefully and at a continuous speed.
- Preferably, select "auto mode" when operating the BeTrac 1 AGV. If the speed is set optimally, fewer stops and starts are required which has a very positive effect on the wear of the BeTrac 1 AGV.

Regardless of the frequency of use, charge the batteries at least once a week using a suitable charger! Prevent the batteries from being fully depleted before charging!

Safe use of batteries

Below are recommendations for usage and maintenance.

WARNING!

- Explosive gas is created while the batteries are being charged, therefore no fires, naked flames or smoking are permitted!
- The batteries must be charged in properly ventilated spaces only!
- The battery fluid levels must be checked at least once a month! The battery fluid must be at least 1 cm above the level of the plates
- Top up batteries with distilled (demineralised) water only (wear gloves)!



Discharging the battery by more than 80% of its capacity has a negative effect on both the battery and the charger. Charge the batteries at least once a week, as this improves the service life of the batteries, electric motor and drive control! Always recharge a depleted battery immediately, as this substantially increases its service life. It is important to check the specific gravity of the battery acid at least once a week, though it should certainly be done each month using a hydrometer (fig. A+B p.23 and table below).

The specific gravity (sg) of a fully charged battery should be 1280 g/l:

100%	sg 1280 g/l	=	12.7 volt
80%	1240		12.5
60%	1210		12.3
40%	1170		12.1
20%	1140		11.9

Before charging, disconnect the *BeTrac 1 AGV* at the main switch. Always connect the batteries to the charger first before switching the charger on. After the batteries have been charged, switch off the charger and disconnect the batteries, in that order.

Overcharging can cause damage to the batteries due to boiling the battery acid dry.

It is advisable to use a modern battery charger with an automatic cut-off - these are available from Berg Hortimotive. **Only use a charger type that is suitable for the batteries! (see charger instructions)**

The charging process should never be interrupted - charging must be completed - see the charge indicator.

When charging the batteries, do not make repairs to the *BeTrac 1 AGV* or carry out cleaning or any other activities.

Switch off all power consumption components before removing the batteries - this reduces the risk of creating sparks.

When removing the batteries, always disconnect the earth cable (-) first. When reinstalling the batteries, connect the earth cable (black) last.

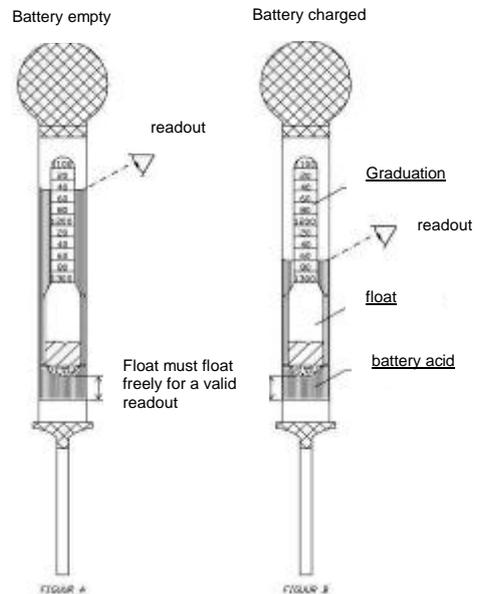
WARNING!

Always connect the positive terminal (+ = red) to the positive pole and the negative terminal (- = black) to the negative pole on the battery.

Battery fluid is corrosive - avoid contact with clothing, skin and eyes.

Wash battery acid splashes on clothing or skin immediately with soap and water - thereafter thoroughly rinse in running water.

Any acid splashes to the eyes must be rinsed in clean water for at least 5 minutes and a doctor consulted immediately!



Note

Check the amount of chargers that can be connected to one group. This can be calculated by multiplying the amperage by the voltage. E.g.: $16A \cdot 230V = 3680W$

Now check the output of the battery charger. Divide this total amount by the output of the battery charger. E.g.: $3620/700 = 5.25$. In this case 5 battery chargers can be connected.

Also check whether the voltage at the charging location corresponds with the required voltage stated on the battery charger. Long cables can lead to a voltage drop. If so, please consult your dealer.

Check whether the charger is suitable for your machine. The battery specifications suitable for the charger are stated on the actual charger!

	TREM-CARD	UN 2794
---	-----------	----------------

Substance	Batteries wet, filled with acid, electric storage
UN Number	27
HIN	80
ADR Label	8
ADR Class	8
Packing group	-



Emergency Response Information

CORROSIVE SUBSTANCE

1. Characteristics

- Corrosive, causing damage to skin, eyes and air passages
- Not flammable

2. Hazards

- Heating of container(s) will cause pressure rise with risk of bursting and subsequent explosion (BLEVE).
- Gives off corrosive and irritant fumes, also when burning
- May attack metals and produce hydrogen gas which may form explosive mixture with air
- The vapour may be invisible and is heavier than air. It spreads along the ground and may enter sewers and basements

3. Personal protection

- Chemical protection suit.
- Respiratory mask equipped with ABEKP1 filter

4. Intervention actions

4.1 General

- Keep upwind. Put on protective equipment before entering danger area.

4.2 Spillage

- Stop leaks if possible.
- Dilute spillage with water spray as far as necessary to reduce hazard. Contain run off by any means available.
- If substance has entered a water course or sewer, inform the responsible authority.
- Ventilate sewers and basements where there is no risk to personnel or public

4.3 Fire (involving the substance)

- Keep container(s) cool with water
- Extinguish with water fog (spray)
- Do not use water jet to extinguish
- Use water spray to knock down fire fumes if possible
- Avoid unnecessary run-off of extinguishing media which may cause pollution.

5. First aid

- If substance has got into eyes, wash out with water for at least 15 minutes and seek immediate medical attention.
- Remove contaminated clothing immediately and drench affected skin with plenty of water.
- Persons who have been in contact with the substance or have inhaled fumes should get immediate medical attention. Pass on all available product information.
- Mouth to mouth resuscitation should be avoided. Use alternative methods, preferably with oxygen or compressed air driven apparatus

6. Essential precautions for product recovery

- Use acid resistant equipment
- Recover spilled product in vented container fitted with absorption filter

7. Precautions after intervention

7.1 Undressing

- Drench contaminated suit and breathing apparatus with water before removing facemask and suit.
- Use chemical protection suit and self contained breathing apparatus while undressing contaminated co-workers or handling contaminated equipment.

7.2 Equipment clean up

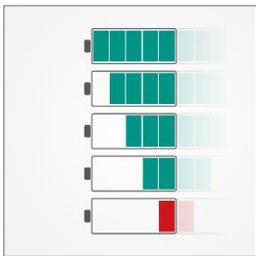
- Drench with water before transporting from incident.

DAILY



At the end of the work shift, recharge the battery as follows:

- open the lid of the battery compartment (if the battery is charged in situ on the truck)
- the caps on the individual cells must remain closed
- connect the battery to the charger and start charging



Check the electrolyte level after charging. For batteries with central filling systems or probes, check that the level indicator shows full.



When necessary, top up the battery with distilled water, when charging is complete.



WEEKLY



Perform a thorough visual inspection.



Perform an equalisation charge. MIDAC MIDATRON battery chargers automatically equalise the battery at the normal completion of the recharging cycle. Other brands and/or older chargers may require you to manually start equalisation.



CAREFULLY READ THE MANUAL SUPPLIED WITH EACH BATTERY.

MONTHLY



At the end of the charging phase, check and note the voltage (Fig. 1) and density (Fig. 2) of each single battery cell. The electrolyte voltage and density, at the nominal temperature of 30°C (Fig. 3), should be OCY-2, 10 VPC and SG 1,29 ±0,01 kg/L. If there is considerable variation in the results, contact customer service. Batteries with centralised filling: check the presence of electrolyte in all cells, sampling it using a hydrometer through the cap openings. Check the battery charger operation.



2



3



Cleaning the battery is especially important for proper operation and the following operations are also necessary:

- at the end of the charging operation, carefully dry and clean the cell lids and all of the external parts of the battery
- check and siphon away any liquid present inside the tank using the tubes that come with the batteries.



Check that all screws are tight, especially on the battery terminals:

- cable Tech terminals 25 Nm
- cable Tech connectors 25 Nm



Check that all screws are tight, especially on the battery terminals:

- cable Tech terminals 25 Nm
- cable Tech connectors 25 Nm



When replacing old batteries, return them to your supplier or hand them in at the municipal waste disposal department.

Appendix 5: Cleaning varnish powder coat

The importance of cleaning and maintenance:

- The exterior and appearance of the product are preserved for longer.
- The service life is extended.
- Corrosion is delayed.
- The spread of plant diseases is reduced.
- Stimulates staff to handle machines with due care and attention.

By periodically removing any dirt, any chemical substances therein are prevented from corroding the varnish powder coat. Protective layers are sensitive to acids, salts and other aggressive agents and therefore age quicker. In addition, thick layers of dirt can absorb and retain more moist, which can enhance the aggressive effect on the protective layer.

The cleaning frequency depends on:

- The pollution load is crops-related.
- Product type used in-between crops or, for example, only on the concrete paths.
- Exposure to the chemical liquids (spray equipment).
- Exposure to the chemical vapours (spatial treatment in greenhouses).
- Exposure to sunlight and UV light.
- Atmospheric humidity and condensation.

The items above represent a load factor which depends on use. If applicable, the following cleaning schedule must be adhered to.

Cleaning frequency:

- | | |
|--|------------------------------|
| • Plant and product remnants. | daily |
| • Soil and sand. | twice per week |
| • Glass, rope, plastic, elastic, clips, wire hooks, etc. | twice per week |
| • Chemical exposure. | immediately after usage |
| • Tarnished and polluted varnish layer. | periodically after detection |

Cleaning method:

- Remove pollution on the varnish layer by means of auxiliary equipment (soft brush, cloth or compressed air (<6bar!)).
- Clean off chemical exposure by means of coarse sponge or soft cloth drenched in water.
- Clean tarnished and polluted varnish layer with neutral cleaning agent of PH value ranging between 5 and 8 (see label of the cleaning agent), sponge and soft cloth.
- **Tip:** if a cleaning agent is used for the first time, it is recommend trying it out on small (hidden) area first, before cleaning the entire machine.

The following must be prevented at all times:



- Cleaning powder coating with abrasive or polishing cleaning agents.
- Using materials with abrasive surfaces (steel wool, scourers etc.).
- Using excessive force, brushing, scrubbing etc. is not permitted.
- Using organic solvents to clean or preserve varnish power coat.
- Pouring over with water, hosing down or using a high-pressure cleaner can cause damage.

After cleaning:

- Ensure that cleaned surfaces can dry properly, temporarily take overlapping protection covers off.
- Lubricate rotational points which have been in contact with clean agents, in accordance with the recommendations from the maintenance schedule of the user manual.
- Treat damage in the varnish powder coat with varnish.

Note:

The above advice are **recommendations**. The responsibility for cleaning rests with the party providing the cleaning service. If you have any questions in relation to the cleaning product to be used, you must contact the manufacturer.