



Technical Handbook

BRW150 BR08/SW08



Berg Hortimotive

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The machine is manufactured by:



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Machine type plate

The *BRW150 BR08/SW08* is fitted with a machine type plate which contains the following information: address details for Berg Hortimotive, CE mark, serial and type reference, serial number and year of construction.

 BERG HORTIMOTIVE +31(0) 174 51 77 00 WWW.BERGHORTIMOTIVE.NL	BERG HORTIMOTIVE WWW.BERGHORTIMOTIVE.NL BURG. CREZEELAAN 42A 2678 KZ DE LIER HOLLAND
	Year: 20xx Type nr: XXXX.XX.XXXX Serial nr: XXX Made in Holland 

<u>YOUR DEALER</u>	BERG HORTIMOTIVE WWW.BERGHORTIMOTIVE.NL BURG. CREZEELAAN 42A 2678 KZ DE LIER HOLLAND
DEALER LOGO	YEAR: 20xx TYPE NR: XXXX.XX.XXXX SERIAL NR: XXXX MADE IN HOLLAND 
DEALER ADRESS	

BRW150 BR08

BRW150 SW08

Hose reel

1. Declaration

1.1 Copyright

Berg Hortimotive
De Lier, 2019

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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 *BRW150 BR08/SW08*, 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
- changes to the *BRW150 BR08/SW08* include the following:
 - alterations to the controls
 - welding, mechanical works, etc
 - extensions to the *BRW150 BR08/SW08* or its controls

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 *BRW150 BR08/SW08* - e.g. interruption of business, delays, etc.

1.3 Guarantee

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. The terms and conditions of delivery are available 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.

1.4 Approval Spraying Installation (only for type SW08)

Your national or local authorities can oblige you to check and examine your spray installation to minimize the environmental impacts from pesticides or chemicals. The SW08 Pipe rail spray trolley will be approved but must be checked in combination with your liquid supply system such as; airlock, pump and liquid tank. The checks are (for example in England) part of the NSTS (National Sprayer Testing Scheme).

More information about this testing scheme can be found at the Agricultural Engineers Association (England) or the Plant Health and Seed Inspection Service (Poland)

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2. Foreword

This handbook describes the *BRW150 BR08/SW08* .

This handbook provides you with information including the safety aspects, a description of the *BRW150 BR08/SW08* 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 *BRW150 BR08/SW08* should be operated and maintained. By reading this handbook and then using the *BRW150 BR08/SW08* , you, or anyone else, will be assisted in using the *BRW150 BR08/SW08* 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.

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3. Introduction

3.1 General

You have made a good choice by purchasing the Berg Hortimotive *BRW150 BR08/SW08*. You are the owner of an first class piece of equipment that has been manufactured with great care. You will gain the most advantage from the equipment provided that you carefully follow the instructions given in this handbook with regard to safety, operating and maintenance.

Please study this user's handbook carefully before starting to use the *BRW150 BR08/SW08*. Always follow the safety instructions and recommendations given in this handbook.

Berg Hortimotive does not accept liability for damage or indirect damage resulting from not following the operating and safety instructions contained in this handbook.

Neither does Berg Hortimotive accept liability whenever you or a third party make modifications to the pipe rail wagon or its accessories, without receiving prior written permission from the manufacturer.

The *BRW150 BR08/SW08* is supplied in accordance with the conditions of sale of the Dutch METAALUNIE, as determined by the registrar of the law court of Rotterdam and in accordance with the most recent text contained therein. A copy of the terms and conditions of supply can be provided on request. You can also contact the Koninklijke Metaalunie, PO Box 2600, 3430 GA Nieuwegein, the Netherlands.





3.2 Supplier Information

In the event of breakdowns or defects occurring on the *BRW150 BR08/SW08* please contact your Berg Hortimotive dealer.

4. Safety

4.1 Explanation of safety terms used

Safety terminology:

Danger		: Indicates serious or even fatal injury may occur if the instructions in the handbook are ignored.
Warning		: Indicates injury if the instructions described in this handbook are ignored.
Caution		: Indicates damage may occur to the equipment if the instructions described in this handbook are ignored.
Warning		: Indicates possible problems if the instructions described in this handbook are ignored.

4.2 Safety regulations

Read the following safety instructions carefully.

After reading the safety instructions they should be strictly observed at all times.

If the *BRW150 BR08/SW08* safety instructions are not observed while it is being operated, it will become substantially more dangerous and may lead to serious physical injury.

DANGER!


- ***Read the manual carefully. Observe instructions, safety regulations, etc., at all times.***
- ***De BRW150 BR08/SW08 is only suitable for operating on pipe rail systems that comply with the horticulture sector guidelines, the health and safety catalog in force in the Netherlands (see 7.2).***
- ***The BRW150 BR08/SW08 should only be used on the correct type of pipe rail system. Check that the centre-to-centre measurement of the rails and the pipe rail wagon correspond, check the pictogram on the trolley.***
- ***Never exceed the maximum carrying capacity of 120 kg.***
 - *One person incl. load (e.g. tools); see the pictogram on the trolley.*
- ***Never exceed the sideways manual force of 110 N (towing capacity of 11 kg).***
 - *It is forbidden to carry out maintenance work on the BRW150 BR08/SW08.*
- ***Using the BRW150 BR08/SW08 when tilting more than 2 ° (linearly and/or crosswise) is strictly forbidden.***
- ***Only use the BRW150 BR08/SW08 for maintenance (BR08) or spraying (SW08) crops in a greenhouse.***
- ***When working with the spraying Trolley (SW08), wear protective clothing and take the appropriate protective measures, as stipulated in the instructions of the additive (chemicals/pesticides) used.***
- ***After using the Spray Trolley (SW08) the pipes and hoses should be cleared of chemicals and liquids. This is done to prevent the occurrence of Legionella bacteria in the still water. Always clean the hose and the supply-pipe with clear water and empty the hoses***
- ***Never exceed the maximum (valve)pressure of 40 bar!.***
- ***The operator of the Spray Trolley (SW08) must be certified to use toxic chemicals when used as additive.***
- ***The BRW150 BR08/SW08 may only be operated by specially trained personnel who are familiar with the nature of the work activities.***
- ***Only use legally allowed pesticide!***
- ***Never use the BRW150 BR08/SW08 outside!***
- ***It is forbidden to enter a greenhouse in which spraying activities are being carried out.***
- ***Any loads must be positioned centrally and secured on the work platform.***
- ***It is forbidden to enter the platform with more than one person at the same time.***

- ***It is forbidden to remove the safety fence.***
- ***It is strictly forbidden to increase the lifting height in whatever way.***
 - ***Always stand on the work platform.***
- ***Keep at a safe distance from power cables and parts of the greenhouse construction.***
- ***The BRW150 BR08/SW08 Trolley should not be used, for drawing steel cables or screens.***
- ***It is forbidden to enter a path where a BRW150 BR08/SW08 is being operated, whether by persons or pets. Never use more than one pipe rail trolley on the same path!***
- ***All protective screens and covers should be in place and closed during use.***
- ***Additional options, accessories and parts must be manufactured and/or supplied by Berg Hortimotive.***

WARNING!



- ***Operating the BRW150 BR08/SW08 may only take place when there are no other persons in the vicinity (apart from the operator) of the machine.***
- ***The BRW150 BR08/SW08 may only be operated by persons of 18 years or older who have received thorough instruction about the BRW150 BR08/SW08, who are fully familiar with this instruction handbook and are completely aware of the dangers associated with operating the machine.***
- ***The BRW150 BR08/SW08 should only be operated if positioned correctly on the pipe rail system.***
- ***All personnel working in the vicinity of the BRW150 BR08/SW08 should be fully familiarized with the safety provisions and regulations - Employer's instruction***
- ***The BRW150 BR08/SW08 should only be repaired by specially trained personnel by Berg Hortimotive***
- ***Never carry out work on the BRW150 BR08/SW08 while it is being operated by someone else. Always switch it off using the emergency stop switch and remove the charging plug from the trolley before carrying out maintenance.***
- ***Check the BRW150 BR08/SW08 every day for defects and provide it with regular maintenance, see chapter 9: maintenance.***
- ***Clean controls and safety pictograms in good time.***
 - ***operating functions and safety pictograms used must be visible at all times.***
- ***The BRW150 BR08/SW08 must always be switched off using the emergency stop switch after use.***
- ***Do not carry out any modifications to the BRW150 BR08/SW08 without written consent from Berg Hortimotive***
- ***When leaving a path, first stop and check whether anybody is standing in the direct vicinity before continuing on the concrete path.***
- ***It is forbidden to transport loose loads with the BRW150 BR08/SW08.***
- ***Stack loads so that they are no more than 40 cm above the working platform, loads must always be properly secured.***

- ***Before entering a path, ensure that there are no obstacles such as plant remains, etc. lying on the rail.***
- ***Never clean the BRW150 BR08/SW08 with a water hose, high-pressure water gun or steam cleaner.***
- ***Never use the BRW150 BR08/SW08 outside or on the public road.***
- ***If a trolley is not in the lowest position, take care when stepping off, it is recommended to use the option 'ladder with 3 treads'.***
- ***Follow the batteries' safety specifications, see Appendix 3.***
- ***Beware of feet and toes when operating the lifter of the BRW150 BR08/SW08! The trolley moves a few centimetres sideways when putting down! While moving the BRW150 BR08/SW08 sideways, always hold the lifting bar! (this will prevent the lifting bar from unintentionally shooting up)***
- ***Never leave the Pipe rail trolley unattended if it is connected to a separate pump set while it is in operation.***
- ***It is mandatory to wear shoes with protective toe caps (S1).***
- ***Disconnect the charger before using the BRW150 BR08/SW08.***
- **CAUTION** 
- ***Always keep the workplace tidy.***
 - *An untidy working area can lead to dangerous situations.*
- ***Always concentrate on the task in hand.***
 - *Always keep your wits about you when operating the BRW150 BR08/SW08 . Never operate the BRW150 BR08/SW08 when you are unable to concentrate properly or when taking medicine whereby it is not advisable to operate machines or drive in traffic.*



No.	Explanation symbols:	Position symbols:
1	Be careful! Read manual before use!	Front side near charge plug
2	Be careful! Read instruction manual before maintenance!	Front side near charge plug
3	Be careful! Dangerous chemical battery; battery acid and explosive gases!	Front side near charge plug
4	Be careful! Risk of impact by movement.	Side panel battery box
5	Be careful! Risk of fingers and hand becoming pinched, keep away from pulleys, V-belt and rotating parts!	Side panel and top cover from hose reel
6	Be careful! Risk of fingers and hand becoming pinched, keep away from chain wheels, chain and rotating parts!	Side panel battery box
7	Safety signals on batteries: Ventilate sufficient!, Read manual!, Fire and smoking prohibited!, Corrosive acid!, Wear safety glasses!, Explosive gas!, Recycle, do not throw away! Contains lead.	On batteries behind battery cover

4.4 Residual risks

Despite the best possible design and the use of risk-reducing devices and the warnings about the dangers given in the handbook and applied to the machine itself, it is still possible that dangerous situations can arise. Beware of the following:

- Danger of hands and fingers becoming pinched while adjusting the height of the scissors platform!
- Danger of hands, fingers, arms becoming trapped in rotating parts of the hose reel!
- The danger of becoming trapped while standing under the wagon when depositing or picking up items with lifting system!
- Danger of getting hit when folding back the lifting bar, never let go of the lifting bar while moving the pipe rail trolley sideways!
- The trolley may topple on an unsuitable pipe rail system!
- Danger of collision if careless while the *BRW150 BR08/SW08* turns onto the main path!
- Risk of working with chemicals, take precautions as recommended by the manufacturer of the chemicals.

5. Intended application

5.1 Area of application

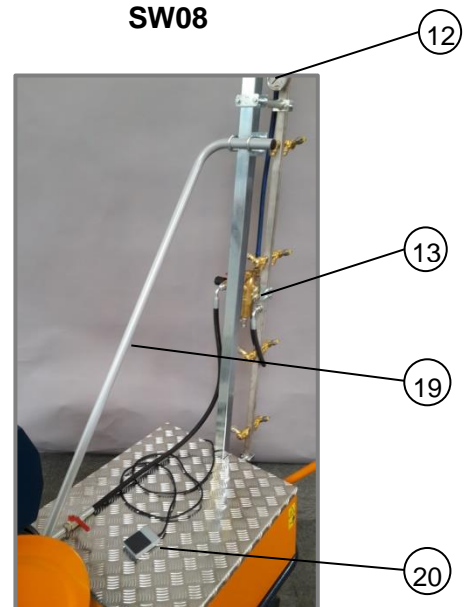
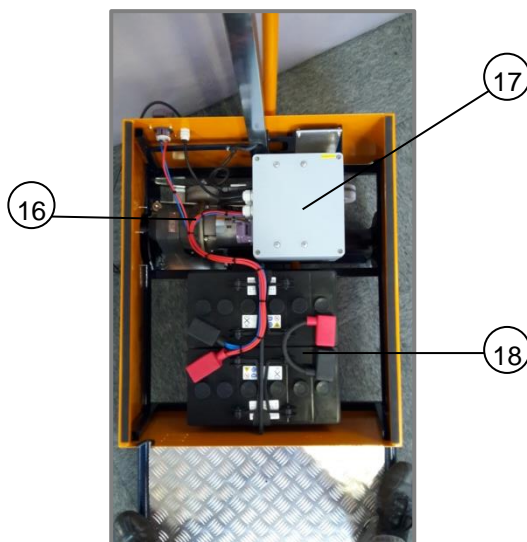
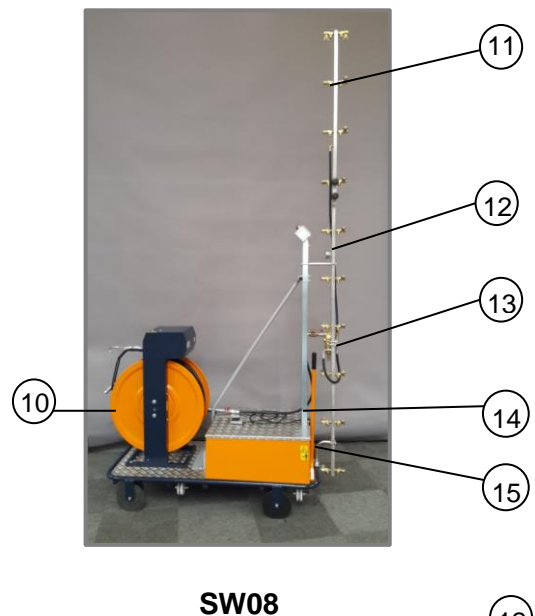
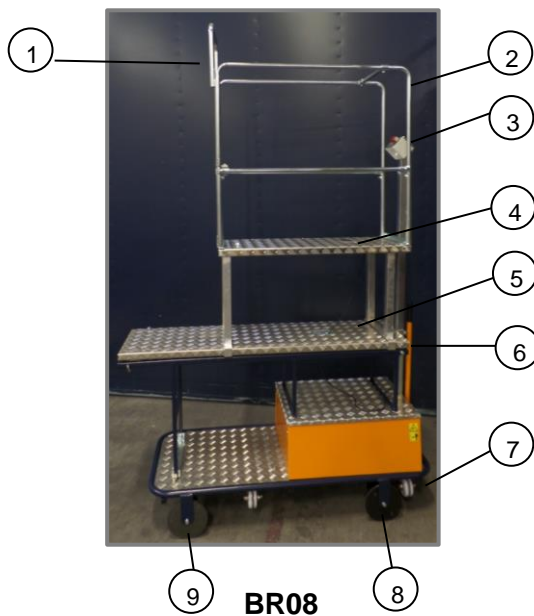
The *BRW150 BR08/SW08* is intended for professional use in the greenhouse horticulture sector.

The controls may only be operated by one person with a minimum age of 18 years who has received thorough instruction with respect to the *BRW150 BR08/SW08* and the safety instructions and has read this handbook, and fully understood it.

The *BRW150 BR08/SW08* running over a pipe rail system installed in accordance with the Health & Safety catalogue applicable in the Netherlands, and intended as an aid for the care and/or maintenance (spraying) of crops. The *BRW150 SW08* spray trolley is fed with the liquid to be sprayed by a separate pump set with hose. The use of the *BRW150 BR08/SW08* for other purposes than those described above is forbidden.

It is forbidden to use the BRW150 BR08/SW08 outside or on a inadequate pipe rail system!

5.2 Position and names of the parts



1	Door	11	Spray boom
2	Fencing/safety railing	12	Pressure meter
3	Control panel	13	Press filter
4	Fixed step (Platform)	14	Supply hose
5	Scissor platform on feet	15	Charge plug
6	Lift lever	16	Motorreductor
7	Wheel for sideways movement	17	Switchbox
8	Drive roller	18	Batteries
9	Rear flange roller	19	Support
10	Hose reel	20	Foot pedal

6. Transport

The *BRW150 BR08/SW08* is supplied as a separate vehicle, follow the recommendations below during transport.

6.1 External transport

When transporting the *BRW150 BR08/SW08* be sure the Trolley is conditioned as followed:

- Emergency button is activated (pressed)
- The *BRW150 BR08/SW08* must stand on its flange wheels on a hard, level surface
- The *BRW150 BR08/SW08* must be kept dry and frost-free at all times during transportation!
- Make sure the *BRW150 BR08/SW08* cannot slide or roll within the transportation space. Secure properly with for example transport straps
- Before use undo all described items above and check the machine as described in 7.1

6.2 Internal transport

It is also possible to transport the *BRW150 BR08/SW08* internally (in the greenhouse). It is preferred that the wagon is moved on the flange rollers and lift wheels, but it can also be moved by forklift truck for example. Moving with a forklift truck is done as follows:



Please note!

- ***Never lift higher than necessary!***
- ***Ensure that the forklift truck can lift at least 500 kg weight!***
- ***Secure the pipe rail trolley to the fork lift truck using e.g. tension straps!***
- ***Remove anything lying loosely on the platform before lifting!***
- ***In the case of a spray trolley, first disconnect the supply hose before lifting!***
- ***Drive slowly and carefully!***



- Place the forks underneath the lifting wheels (white) of the Trolley (see photo).
- Check before lifting if the forklift forks are positioned in the right place in order to prevent damage to the *BRW150 BR08/SW08*.
- Before transporting with the fork lift truck, secure the *BRW150 BR08/SW08* properly to the truck's forks with tension straps to prevent the *BRW150 BR08/SW08* from rolling off while moving.
- Never lift higher than necessary and put the *BRW150 BR08/SW08* down carefully.

7. Commissioning

The *BRW150 BR08/SW08* Spray Trolley is specifically designed for driving over a pipe rail system. When leaving the Berg Hortimotive factory, the *BRW150 BR08/SW08* is checked for proper functioning and safety. The Spray Trolley should be inspected on all points outlined in section 7.1 before being put into operation.

The pipe rail system must comply with the requirements as laid down in the horticulture sector guidelines. The minimum specifications are given at Article 7.3 for the track width, pipe diameter and supports. These pipe rail specifications have been taken from the horticulture sector guidelines for pipe rail systems from the health and safety catalog in force in the Netherlands. For the complete contents of the policy regulation please contact the Ministry of Social Affairs & Employment.

7.1 *Inspection before starting operations*

The following points must be checked before taking the *BRW150 BR08/SW08* into service:

- No mechanical damage to the *BRW150 BR08/SW08*, mechanical scissors, reel and spray boom if applicable
- Driving pulley, rear pulley and lifting wheels must rotate freely
- Batteries charged
- No damage to controls and/or safety pictograms
- No damage or leaks to batteries, hoses and/or couplings
- Safety guards in place
- Lifter operates properly
- The scissors step and fencing is fitted to the trolley chassis
- The door locks shut
- The hoses are properly connected to the reel and spray boom
- Check the direction and adjustment of the nozzles, for nozzle specifications see appendix 4.

7.2 *Horticulture sector guidelines for pipe rail systems*

The *BRW150 BR08/SW08* has been designed to run on a pipe rail system. This means that there are rails on the paths between the plants which consists of two pipes of the same diameter and having a fixed width between them (centre-to-centre measurement). The pipes are often used as heating pipes and are supported along fixed distances. The pipe rail system must satisfy the most recent requirements of the horticultural sector guidelines for pipe rail systems. In Article 7.3, the minimum requirements are also given for the pipe rail systems which are taken from the sector guidelines for pipe rail systems. The pipe rail system on which the *BRW150 BR08/SW08* is intended to be used, must also comply with these requirements. All the above-mentioned items should also be checked periodically in accordance with the Working Equipment Guidelines. It is absolutely prohibited to use a pipe rail system that does not comply with the sector guidelines or policy regulations. A number of tests are described in the policy regulations for determining whether it is possible to operate safely with the wagons on the pipe rail system. These tests should be implemented prior to working with the combination of the pipe rail wagon and the available pipe rail system.

7.3 Minimum requirements for the pipe rail system

The rails (normally heating pipes) must have an external diameter of either 51 mm or 45 mm and a wall thickness of at least 2 mm. The minimum material specifications for the pipes is as follows: Steel 37 (S235JR). The distance between the pipe rail system supports may not exceed 1.25 metres (centre-to-centre). When combining pipes with a diameter of 45 mm to a track width of 42 cm, the distance between the rail supports should not exceed 1 metre. The pipe rail supports used should be in accordance with, or equivalent to the following specifications: 1.5 mm thick steel base plate with reinforcing profile - base plate width of at least 115 mm - the length should be such that the base plate protrudes at least 70 mm from the two vertical supports which carry the load of the pipes. The centre-to-centre distance between the pipes should be at least 42 cm. The pipes must be properly secured, precisely installed and with a maximum tilt of no more than 2° in both length or in width. The pipes must also be properly attached to the supports and the concrete track. Loose fitting pipes must not be used! A soil test bore should be carried out using probing equipment (see policy regulation). It should have a so-called cone value on the top layer of more than 0.4 Mpa (62 psi).

The use of rail systems not covered by the policy regulations is permitted on the condition that a stabilisation test is carried out in accordance with the policy regulations from which it appears that the pipe rail wagon / pipe rail system combination would be stable. Furthermore, the supports for these other pipe rail systems must be installed no more than 1 metre apart, and the tilt must not exceed 2 degrees in both length and width.

→ The tubes are similar or at least equal to the specifications given in the table below.

The conditions for the axle load stand in the table below.

Cat.	Track-width	Tube-diameter / thickness	Support-distance	Permissible axle load at center to center size			
				420mm [kg]	500mm [kg]	550mm [kg]	600mm [kg]
1	420 t/m 600	51 / 2,25	max. 1000	507	548	573	593
2	420 t/m 600	51 / 2,25	max. 1250	406	438	458	475
3	420 t/m 600	45 / 2	max. 1000	345	372	372	403
4	420 t/m 600	45 / 2	max. 1250	276	298	276	323

→ Quality steel 37 (St37)

→ Wheelbase between 62.5% and 125% of the support distance.

→ All values for other pipe and tube rail supports should be calculated separately.

Source: The Dutch health and safety catalog in force in the Netherlands
<https://agroarbo.nl/catalogus/buisrailsysteem/>

7.4 Assembly of the spray boom

Carry out the following steps to connect a Spray boom to the *BRW150 SW08*:

- Unpack the stainless steel spray boom incl. the support brackets
- Mount the spray boom onto the pipe rail trolley using the support brackets (A and B)
- Connect the spray boom supply hose to the hose reel ball valve (C).

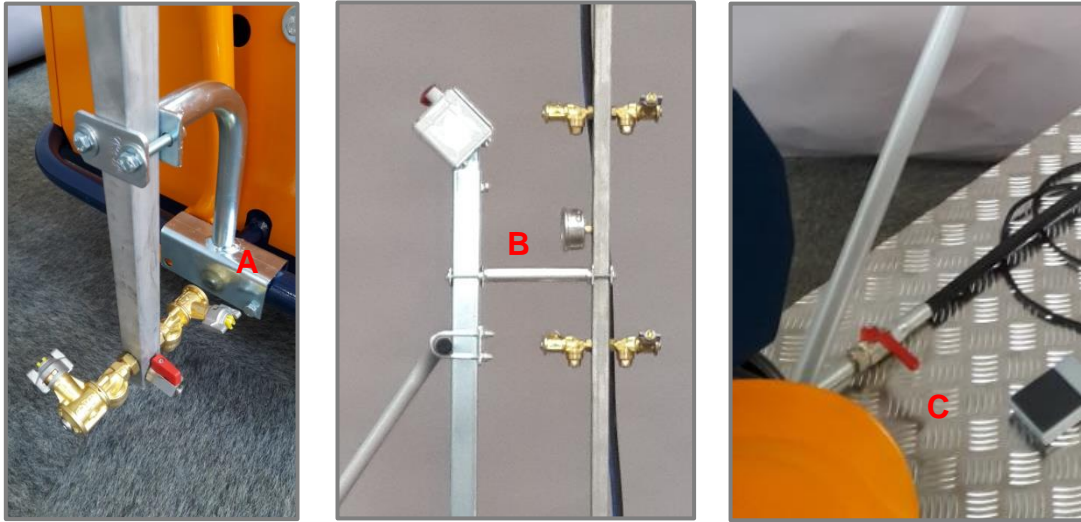


Figure 7.1: Spray boom assembly

7.5 Assembly of the pipe hook



Figure 7.2: Assembly of the pipe hook

Mount the pipe hook to the hose reel high pressure hose.

Recommendation: for the supply hose to the pipe hook, use a flexible hose (without a hard core) that is resistant to the maximum system pressure.

8. Operation

Make sure that you are familiar with the *BRW150 BR08/SW08* and the controls. Make sure that the person operating the *BRW150 BR08/SW08* has received instructions and has read the safety instructions and understood them.

- The *BRW150 BR08/SW08* may only be operated if one is sure that no-one is in the immediate vicinity of the *BRW150 BR08/SW08*.
- Before use, remove crop remains and other waste or obstacles from the pipe rail system.
- Keep the *BRW150 BR08/SW08* clean, regularly remove dirt accumulations. Switch off with the emergency stop before cleaning.
- Only take the *BRW150 BR08/SW08* into service if the previous pages have been studied properly and you have no questions.
- Provide an approved spraying system in accordance with national regulations, carried out by a certified inspection body for inspecting spraying equipment (see 1.4).
- After using the *BRW150 BR08/SW08*, switch it off and if necessary immediately connect it to a suitable battery charger.
- Regularly maintain the *BRW150 BR08/SW08* and store it in a dry space if it is not used for a long period and charge the batteries at least once every 4 weeks or connect a trickle charger.

Charge the batteries at least twice a week! Charging less affects battery life, the motor and running controls. An acoustic pulsing signal in combination with a flashing direction of travel indicator indicates the Pipe rail trolley *BRW150 BR08/SW08* should be charged immediately. Charging must not be interrupted until the charge indicates fully charged, after approx. 12 hours. (for this see the battery charger manual). Brief charging during coffee and lunch breaks must be avoided as this can cause serious damage to the batteries. Charging too soon (e.g. every day) will result in a shorter battery lifespan because the batteries wear with each charging cycle, avoid unnecessary charging!



WARNING! DANGER OF INJURY WITH 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 seek 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 compartment must be free of damage. Loose plating or dents can cause short circuits!

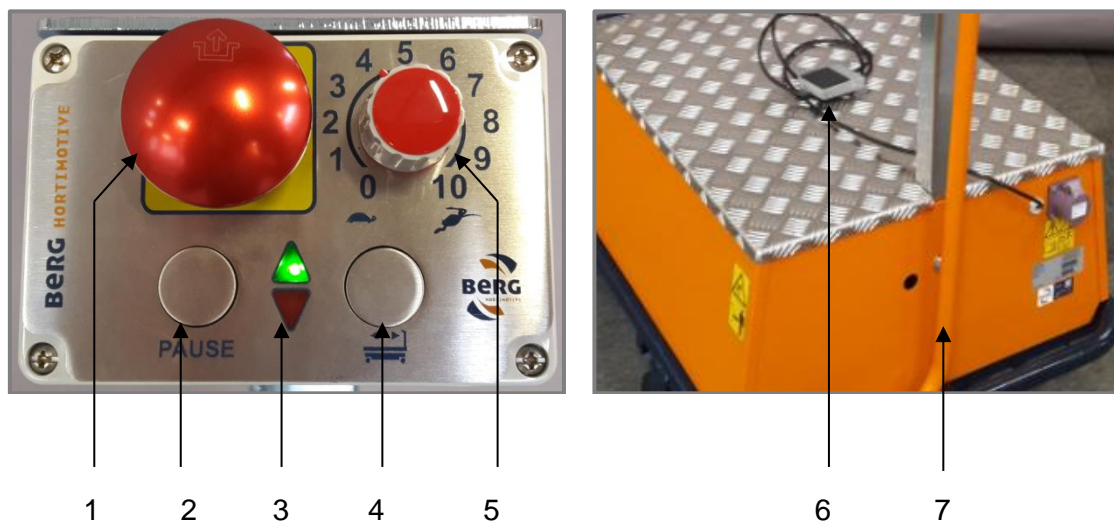
Explosive gas is released when the batteries are being charged. Keep away from the batteries in the event of sparks and/or fire during (and after) charging.

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. A short circuit could melt a ring resulting in serious burn injuries.

8.1 Operation



Emergency stop (1)

- Press = stop
- Pull out = unlock

The emergency stop button is intended for switching the pipe rail trolley off in an emergency. When switching on, after an emergency stop, the standard adjustment will activate, the green arrow will burn continuously (forwards). **ATTENTION!** Only use the emergency stop in an emergency or if the pipe rail trolley needs to be switched off at the end of the work activities. If driving needs to be stopped, step off of the foot pedal (6).

Important! After use, always switch off the *BRW150 BR08/SW08* by pressing the Emergency stop, this is to avoid unnecessary power consumption.

If necessary, the batteries must also be charged after use.

For type *BRW150 BR08* (Pipe rail trolley for crop care), the batteries must be charged about once every three working days.

For type *BRW150 SW08* (Pipe rail trolley), the batteries must be charged after each use.

See also chapter 9.9 for recommendations on the correct use of the batteries.

Standby button (2)

This button no longer has a use since year of manufacture 2016.

Direction of travel indicator (3)

The direction of travel indicator indicates the selected direction of travel.

When in the 'FORWARDS' position, the top part of the GREEN LED will light up.

When 'REVERSE' has been selected, the bottom part of the red LED will light up.

Even if the direction of travel indicator is flashing and no pulsing audio signal can be heard, the batteries must still be charged. Do this immediately and always fully complete a charging cycle without interruptions.

Direction of travel push button (4)

The direction of travel will change on pressing the button. The direction of travel is indicated by the direction of travel indicator (3).

Speed control (5)

The speed can be set using the turning knob. The maximum speed is 40 m/min. (position 10) with a crop care pipe rail trolley of type *BRW150 BR08*. The maximum speed is 60 m/min. (position 10) with a Pipe rail trolley of type *BRW150 SW08*. The reel winding speed is coupled to the driving speed; the faster the Pipe rail trolley runs, the faster the reel will wind up.

0 = idle 10 = maximum speed

Foot pedal (6)

A foot pedal (6) has been mounted on the work platform. The Pipe rail trolley will start to drive when the pedal is pushed. On releasing the foot pedal, the Pipe rail trolley will stop.

The lifter (7)



The lifter is used to move the Pipe rail trolley sideways to the next harvesting path.

Stand on the right-hand side of the Pipe rail trolley. Hold the battery cover with your left hand and with your right hand press the lifting bar (manual lifting bar (7)) downwards. The Pipe rail trolley will rise and stand on the four lifting wheels. You can now move the Pipe rail trolley sideways.

- ***Only lift it on a flat surface and never operate the manual lifter on the rail!***
- ***When lowering the trolley (lifting bar up), beware of your toes or other objects (e.g. supply hoses) under the trolley and also for getting trapped between the lifting bar and the Pipe rail trolley.***

Adjusting the height of the control post



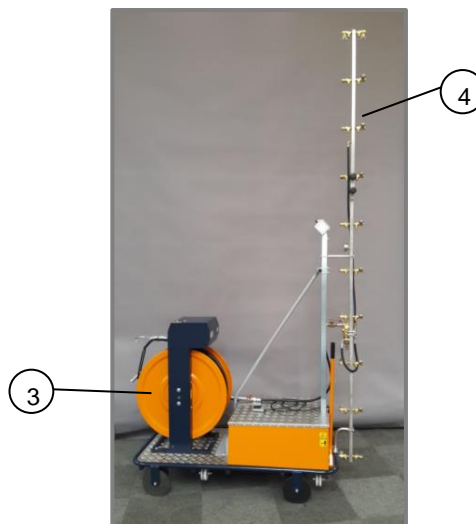
The control post can be adjusted for height between min. 195 cm and max. 275 cm. (measured from the top of the pipe rail system)

Attention! The top piece may be pulled out no more than 85 cm.

Unscrew bolt (A) a little using a 13 mm spanner and slide the post down to the required height, then tighten bolt (A) again.

8.2 Options

Pipe rail trolleys *BRW150 BR08* and *BRW150 SW08* can be expanded with various options to make them suitable for the intended purpose.



8.2.1 Scissors platform (1)

The scissors step can be used to raise the working height of the Pipe rail trolley (manually) to an ergonomic working height.
Make sure that the scissors step is mounted to the Pipe rail trolley using the assembly parts supplied.

Attention!

- After making a height adjustment, make sure that the two fixing bolts in the platform and the locating pin are mounted in the bottom guide rails. The locating pin must be locked with the spring clip supplied, the scissors step may not be used without a spring clip in place!
- Never work without a safety railing when working at a height!

Various models are available, inform at your dealer.

8.2.2 Fixed step / platform (2)

The total working height can be increased by sliding a fixed step over the scissors step platform.
Make sure that the fixed step is mounted to the Pipe rail trolley operating pedal using the assembly parts supplied.

Attention!

- Never work without a safety rail when working at a height!

Various models are available, inform at your dealer.

8.2.3 Hose reel (3)

This option can only be mounted onto Pipe rail trolley type *BRW150 SW08*, this type has a connection for the hose reel power cable.
When running forwards (direction of travel indicator LED is green), the reel will unwind, for this hook the pipe hook behind the rails of the opposite path. If the Pipe rail trolley is put into reverse (red), the reel will wind up when the trolley runs back to the main path.
The reel's winding speed will automatically follow the Pipe rail trolley speed.

Various models are available, inform at your dealer.

8.2.4 Spray boom (4)

This option can only be mounted onto Pipe rail trolley type *BRW150 SW08*, this type also has a hose reel.
The spray boom will spray the crop protection products evenly onto the crops.

Various models are available, inform at your dealer.

8.3 Out of use

When the *BRW150 BR08/SW08* is not being used it should be stored with fully charged batteries in a dry and frost-free environment. The batteries should be recharged at least once every 4 weeks. Ensure that the ground underneath is level. When the *BRW150 BR08/SW08* is not used for longer periods, cover it with a protective tarpaulin. When bringing the *BRW150 BR08/SW08* back into use after a lengthy period of storage, it is advisable to inspect it as described at 7.1 (inspection before starting up).

8.4 Cleaning

Regularly remove any remains of plants, leaves etc, and brush off any sand and dust. Clean the *BRW150 BR08/SW08* with a dry or slightly damp cloth, and never pour water over the *BRW150 BR08/SW08* or clean it using a steam or high-pressure water cleaner which can lead to serious damage being caused to the electrical circuits in the equipment! After usage, particularly after using chemicals, thoroughly clean the hoses, couplings and other spraying equipment with plain water (no additives).

Wash after using the filters and nozzles of the spray boom by means of flushing with clean water or after disassembly in clean water.

Some additives will quickly calcify which can lead to blockages when inadequate attention is for maintenance after spraying!

For other maintenance see section 9 *Maintenance & Repairs*.

8.5 Problems, causes and solutions

Problem A : *Pipe rail trolley BR08/SW08* does not run.

Cause : *Emergency stop locked*

Solution : *Release the emergency stop*

Batteries empty

Charge batteries

Speed control set to 0

Set a speed

Battery terminals make poor contact.

Clean the battery terminals, remount the clamps

Defective foot pedal

Replace foot pedal

Foot pedal cable broken.

Repair cable or replace pedal switch

30 A fuse defective or 25 A circuit breaker in 0-position

Consult your dealer

Other causes.

Consult your dealer

Problem B : Speed can be poorly adjusted.

Cause B : Speed control button is defective
Solution : Consult your dealer
Drive motor control is defective
Consult your dealer

Problem C : The Hose reel doesn't wind up.

Cause C : Loose plug
Solution : Insert the plug in the reel socket
16A circuit breaker in 0-position
Consult your dealer
V-belt too loose
Truss the V-belt

Problem D : Pipe rail trolley BR08/SW08 has toppled over.

Cause D : - Careless transport
- Unstable pipe rail system
- Too much manual force
- Overloaded
- Has been running next to the concrete path rails
- Lifting on uneven surface
Solution : 1. Switch the trolley off
2. Set the trolley upright
3. Remove covers
4. Disconnect the batteries
5. Clean the trolley
6. Observe the damage
7. Locate the cause and solve (remove)
8. Check according to the table in chapter 7
9. Check according to 7.1
!!!BEWARE of liquids, battery acid is very corrosive!!!

8.6 Dismantling

When you have to dispose of your *BRW150 BR08/SW08* you should return it to your dealer or a company that specialises in dismantling vehicles. Never take your *BRW150 BR08/SW08* to a scrap metal dealer or a waste dump. The *BRW150 BR08/SW08* should be dismantled and the chemical components removed (oil and batteries).

Faulty batteries should be handed into the local authority or your supplier.
Oil should be handed in as chemical waste.



9. Maintenance and Repairs

The *BRW150 BR08/SW08* is a very high quality product. The following maintenance instructions must be strictly followed to safeguard this quality. Repairs and maintenance activities must be noted in the maintenance manual, see Appendix I. Moreover, an employer is at all times obliged to have his work equipment periodically inspected in accordance with the Work Equipment Directive.

Before carrying out maintenance work, switch the *BRW150 BR08/SW08* off with the emergency stop.

Maintenance - Checks	Tools	Daily	Weekly	Monthly	Yearly
Clean immediately after use	See 8.4, 9.8 and appendices 4 & 5	X			
Sufficiently charged battery, charge: For model BR08, once every three working days For model SW08, immediately after use Immediately charge with pulsing direction indicator and buzzer.	Work (charging) schedule Direction indicator and buzzer	X			
Damage to control components	Visually	X			
Damage to/visibility of pictograms and stickers	Visually	X			
Cleaning the control panel	Damp cloth	X			
Check for leakage and damaged cables, hoses and valves	Visually		X		
Check for ingrained dirt or string wrapped around wheels and chain (see 9.4)	Visually		X		
General mechanical damage	Visually		X		
Charge batteries in accordance with schedule (BR08) or after use (SW08) and subsequently at least once a month (see 9.9)	Battery charger			X	
Check that battery fluid level plates are submerged 1 cm below fluid level and check battery terminals for corrosion (see Appendix 3)	Distilled water, gloves and glasses Acid-free Vaseline			X	
Tension and grease drive chain (see 9.4)	Open ended spanner, chain lubricant or other universal lubricant			X	
Check chain tension (see 9.4)	Open ended spanners			X	
Check V-belt tension (see 9.5)	Open ended spanners			X	
Grease lifting wheels and hinged parts (see 9.6)	Spray grease / WD40 / lubricating grease			6 monthly	
Clean the motor's carbon brushes and have those smaller than 1 cm replaced (see 9.7)	Compressed air / Visually				X
Check construction welds for hairline cracks and rust	Visually				X

If the above checks indicate that there is a fault with the *BRW150 BR08/SW08*, contact your *BRW150 BR08/SW08* dealer immediately. Continuing to use the *BRW150 BR08/SW08* after identifying defects could lead to dangerous situations and is therefore forbidden!

9.1 Specialist maintenance

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

- Activities on electrical components / wiring,
- All activities to the drive motor with reduction gear except: Cleaning, readjustment of the chain and V-belt, checking the carbon brush length and blowing it clean.

9.2 *Maintenance and inspection by the operator*

All the work given in the above table that is not excluded at item, 9.1 Specialist Maintenance, must be carried out periodically. Some of the actions are described below. You will find instruction film clips on our website that show how certain maintenance activities should be carried out.



www.berghortimotive.com



9.3 **Berg Service Alert**

Berg Hortimotive takes customer satisfaction very seriously. A satisfied customer is the best ambassador for our products and company!

No matter how well we manufacture our products, after a period of time they are going to need servicing and maintenance carried out. Like most people, you also know that a good maintenance schedule considerably increases the lifespan of the product. So that we can provide you and our dealers with even better support, Berg Hortimotive has started sending out the "Berg Service Alerts" (BSA).

BSA means that you can expect an email from us periodically that contains a link that takes you to a page with lots of tips and recommendations for maintaining the same Berg Hortimotive products that you own and operate. We include pictures and images as much as possible so that the information is easy to understand and apply.

Our tip: Visit our website and subscribe to BSA!

If as a result of these tips and recommendations you come across maintenance work that you are either unable, or do not want to carry out, please consult our extensive dealer network to find assistance. The dealers are trained by us on a regular basis and therefore have the necessary knowledge, experience and access to the original spare parts for providing you with assistance quickly and efficiently.

9.4 **Drive maintenance (see BSA on our website)**

Clean the drive chain, cogwheels and rollers and remove any jammed leaf and string. If necessary, tension the chain by tightening the tightening nut. The tightening nut (A) is in the battery compartment near the drive motor (remove the aluminium checker plate cover).

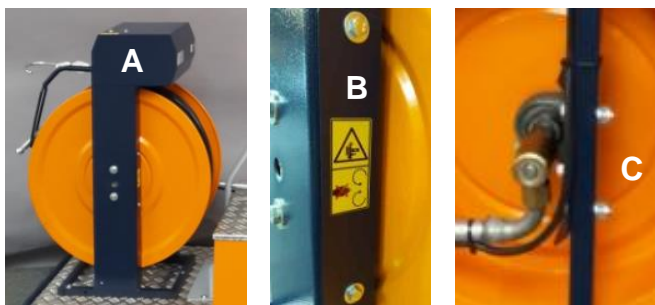


The chain may not be tensioned too tightly (open ended spanner 13) (B), the minimum play should be about 1 cm (C). The chain of the *BRW150 BR08/SW08* was properly lubricated on delivery ex-factory. The chain may only be lubricated if it feels dry. This means that the chain may only be lubricated with oil after spraying for the first time with type SW08 and in accordance with the maintenance schedule for type BR08.

9.5 **Tension hose reel V-belt**

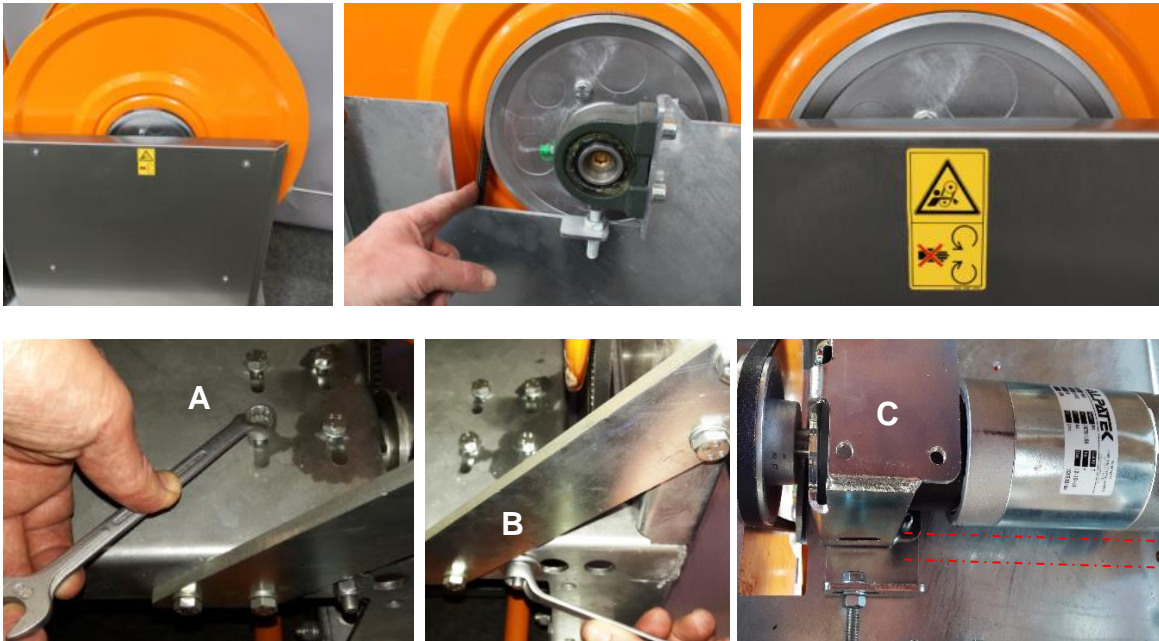
Various models of hose reel are available, whereby the V-belt must be tensioned in one of the following ways:

Model with 'swivel arm hose guide':



- Dismantle the cover (A) by unscrewing the two assembly bolts (spanner 13).
- Check the condition and tensioning of the V-belt, if the motor belt pulley slips when the reel rotates with a locked drum, the belt needs tensioning. To perform this test, put the *BRW150 BR08/SW08* on the rear wheels and allow the spray trolley to run backwards and restrain the reel drum.
- Unscrew the two bolts 'B' (spanner 10) and remove the cover plate.
- Unscrew the assembly bolts of the bearing block a little (2x spanner 17), the hose reel weight will tension the V-belt.
- If necessary, align the hose drum by unscrewing the two bolts of the bearing block a little on side 'C' (2x spanner 17).
- Secure all guards before taking the hose reel into use again.

Model with 'linear hose guide':

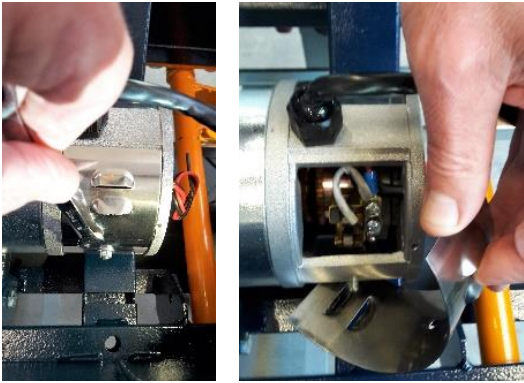


- Dismantle the SS panel on the V-belt side.
- Check the condition and tensioning of the V-belt, if the motor belt pulley slips when the reel rotates with a locked drum, the belt needs tensioning. To perform this test, put the *BRW150 BR08/SW08* on the rear wheels and allow the spray trolley to run backwards and restrain the reel drum.
- Unscrew the four motor bolts 'A' half a turn.
- Tighten the locknut 'B' a little (clockwise) so that the V-belt is more taut.
- Make sure that the reel motor 'C' is aligned before tightening the motor bolts 'A'.
- Secure all guards before taking the hose reel into use again.

9.6 Maintenance the lift lever (see BSA on our site)

- Clean the wheels regularly.
- Adjust the lifting wheel lever nuts in such a way that the lever is stiff but still easy to operate.
- Oil the wheels and rotation points monthly.
- Replace any damaged wheel.

9.7 Inspecting the carbon brushes (drive motor)



Dismantle the carbon brush guard using an 8 mm spanner.



1) Blow the carbon brushes clean with (dry) compressed air. 2) push the carbon brush spring away 3) and pull the carbon brush out of the holder by the thread.



Have carbon brushes shorter than 1 cm replaced, consult your dealer.

9.8 *Inspecting the carbon brushes (reel motor)*



Dismantle the carbon brush guards and carefully pull the carbon brushes out of the holders.



1) Blow the carbon brushes clean with (dry) compressed air. 2) Have carbon brushes shorter than 1 cm replaced, consult your dealer.

9.9 *Cleaning*

- Keep the *BRW150 BR08/SW08* Pipe rail trolley clean!
- Rinse off aggressive pesticides immediately after use using clean water!
- Clean the *BRW150 BR08/SW08* Pipe rail trolley with a brush or blow clean with compressed air.
- Never spray clean the *BRW150 BR08/SW08* Pipe rail trolley with a high-pressure / steam jet! (This will cause damage to the electric circuit).
- See also appendix 5.

9.10 *Charging the batteries*

Battery advice

The following chapter gives advice on efficient use, safety and maintenance.

Efficient use of the Pipe rail trolley and batteries

The following recommendations are aimed at facilitating the efficient use of the Pipe rail trolley and to improve the life-cycle of the batteries.

Basic principles:

- The battery goes flat sooner when running at higher speeds.
- High levels of starting and stopping also increase electrical energy consumption.
- Through using the Pipe rail trolley, the remaining capacity and battery voltage gradually reduces, while simultaneously the current consumption increases. This results in increasing heat generation from the motor and speed regulator as the batteries gradually lose their charge.
- Worn rollers or rollers with wound string and rusty chains (poor maintenance) all result in higher energy consumption. (for maintenance instructions, visit our website: <http://www.berghortimotive.com/service/bsa-film>)
- Allowing batteries to go (completely) flat also reduces the life-span.
- Charging when required and good maintenance help to increase the life-cycle of the batteries.
- Charging when required also lowers the generation of heat in the motor and speed regulator, as well as the battery charger.

Efficient usage:

Adjust the driving speed as much as possible to the working speed using the speed control (5)

- If the speed is set optimally, fewer stops and starts are required which has a very positive effect on the wear of the Pipe rail trolley.
- By following the above recommendations, the productivity of the workers will increase too.

Safe use of the batteries

Below are some recommendations for use and maintenance.

WARNING!

- **When charging the batteries, an explosive gas is formed: fire, naked flame and smoking is prohibited!**
- **Only charge in properly ventilated spaces using a suitable charger!**
- **The fluid level must be checked every month! The battery fluid must be at least 1 cm higher than the plates.**
- **Only replenish using distilled (demineralised) water (use gloves)!**
- **Always replenish the batteries AFTER charging and never fill above the level mark at the battery cell filler hole (also see the traction battery instruction sheet).**



Discharging for more than 20% (residual capacity) adversely affects the lifespan of the batteries and charger. Use a battery tester to determine this. Charge at the right moment, this will benefit the lifespan of the batteries, the motor and the drive control! Always immediately charge an empty battery, this will significantly benefit the lifespan. So preferably check the acid concentration every week, but check at least every month with a hydrometer (fig. A+B and table below).

With fully charged batteries, the specific mass (SM) should be 1280 g/l:

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

Switch off the *Pipe rail trolley* with the emergency stop before charging. When about to charge, always first connect the batteries to the charger, and afterwards switch on the charger. When charging is complete, first switch off the charger, then disconnect the battery.

Charging the batteries 'too much' can cause damage to the batteries because the battery fluid will boil for a longer period of time.

The use of a modern battery charger with automatic cut-off, available from Berg Hortimotive, is recommended. **Only use a charger that is suitable for the batteries used! (see charger instructions)**

Never interrupt charging, completely finish charging, see indication on charger.

Do not repair, clean or carry out other activities on the *Pipe rail trolley* while charging.

To dismantling the batteries, always switch off all the current consumers, due to sparks. When dismantling the battery, first disconnect the earth cable (-). When mounting, connect the earth cable (black) last of all.

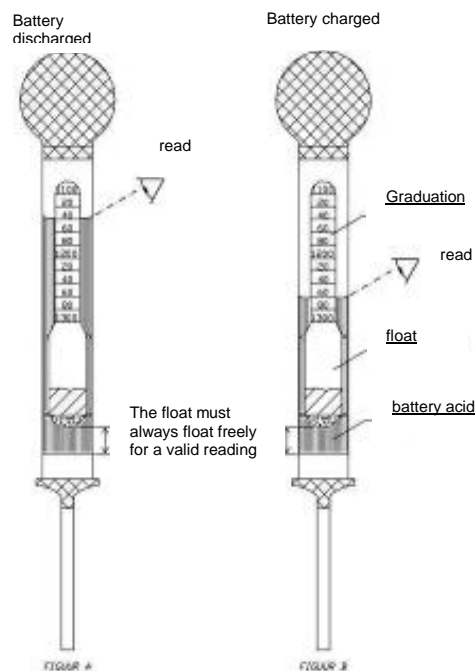
WARNING!

Always connect the plus (+ = red) to the plus terminal and minus (- = black) to the negative terminal.

Battery fluid is a corrosive acid, prevent touching it with clothes, the skin and eyes.

Immediately wash any splashes of battery acid from clothing or the skin using water and soap, afterwards rinse with copious amounts of water.

In the event of any splashes in the eyes, rinse for at least 5 minutes with clean water and consult a doctor immediately!



Remark

Check how many battery chargers you can connect to one circuit. You can check this by multiplying the number of amperes of the fuse with the voltage. E.g.: $16\text{ A} \cdot 230\text{ V} = 3680\text{ W}$

Subsequently check the battery charger power rating. Divide the total power by the battery charger's power. E.g.: $3680/700 = 5.25$. In this case, five battery chargers can be connected.

Also check that the voltage at the charging location corresponds with the voltage indicated on the battery charger. There may be voltage loss with long cables. If this is the case, you should consult your installer.

Check that it is the correct charger for your machine. The battery specifications that can be used with the charger are indicated on the charger or in the user manual!

Only use a charger that is suitable for 24 V - 110 Ah/5 h Wet batteries! (see charger instructions)

See also the instructions contained in Appendix 3 battery safety sheet!

9.11 *Pipe rail system maintenance*

The pipe rail system on which the *BRW150 BR08/SW08* runs should be checked on a regular basis. The system must always comply with the Health and safety catalogue for Pipe rail systems in the horticulture sector (see 7.2). It is prohibited to use the Pipe rail trolley on a pipe rail system that does not satisfy these guidelines. The employer is also responsible for periodically checking tools and equipment according to the current Working Equipment Guidelines.

Ensure that all the pipes have sufficient support with a maximum separation distance of 1.25 m and that the supports are attached to and not out of line with respect to the pipes. Moreover, the pipes on the concrete path should be secured and must not be loose. At the pipe ends (in front of the wall) there should be an end-stop welded on that is at least 5 cm high - at the end of each season check whether the stops are not flat, folded, crooked or broken. The ground under the pipe rail system should be dry, flat and hard. Soft or damp spots should be repaired and surface indentations permanently solved.

10. Technical Specifications

Type: Group BRW150 BR08/SW08	
Dimensions [mm]:	
Centre-to-centre	420-800
Length	1500
Breadth	h.o.h. + 130
Height of control panel	2750
Max. Load capacity [kg]	120
Maximum lateral pressure [N]	110
Weight [kg] (c-to-c 550)	160
Motor power Moving [kW] (BR08/SW08)	0.18/0.37
Motor power Hose reel [kW]	0.18
Maximum speed on rails [m/min] (BR08)	40
Maximum speed on concrete path [m/min] (BR08)	80
Maximum speed on rails [m/min] (SW08)	60
Maximum speed on concrete path [m/min] (SW08)	120
Maximum fluid pressure [bar]	40
Voltage [Volt DC]	24
Battery capacity [Ah]	2x110
Noise level [dB]	<70

Physical operating conditions

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

The machine is not designed to be used outdoors.
The machine is not suitable for operating in explosive atmospheres.

11. EC-Declaration of Conformity

(in accordance with Appendix IIA of the Equipment Directive)

Berg Hortimotive
Burg. Crezeelaan 42a
2678 KZ De Lier - Holland
+31 (0)174 - 517700

Hereby declares to take full responsibility that the following product:

- ***Piperailtrolley BRW150cm BR08, manual lifting wheels, touch-key adjustable operation pole 195/275 cm, traction battery 24V 110Ah.
Type nr. 5000.xx.xxxx***
- ***Electric piperail spraytrolley 150 cm SW08, manual lifting wheels, touch-key adjustable operation pole 195-275cm, with traction battery 24V-110Ah.
Type nr. 5001.xx.xxxx***
- ***Elect. reel SW08 0,15 kW 24V "attached" for piperailtrolley SW08 with purple CEE-form plug + aut. guide for hose incl. pipe hook.
Type nr. xxxx.xx.xxxx***

Type no.:

Serial no.:

- Complies with the provisions of the Machinery Directive 2006/42/EC

Complies with the following other EC directives:

- Electromagnetic Compatibility Directive (EMC), 2004/180 / EC (as last amended)
- NEN-EN 1175-1:1998+A1:2010 Safety of industrial trucks.
- EN ISO 12100:2010 Safety of Machinery

Authorized person to compile technical construction file:

Ing. Ron Bijman
R&D Manager
Burg. Crezeelaan 42a
2678 KZ De Lier - Holland

De Lier, the Netherlands.

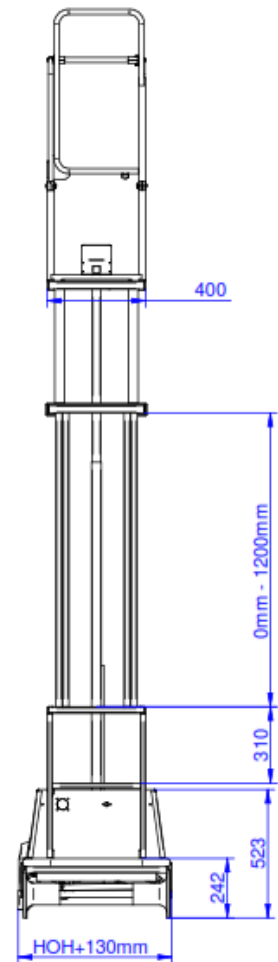
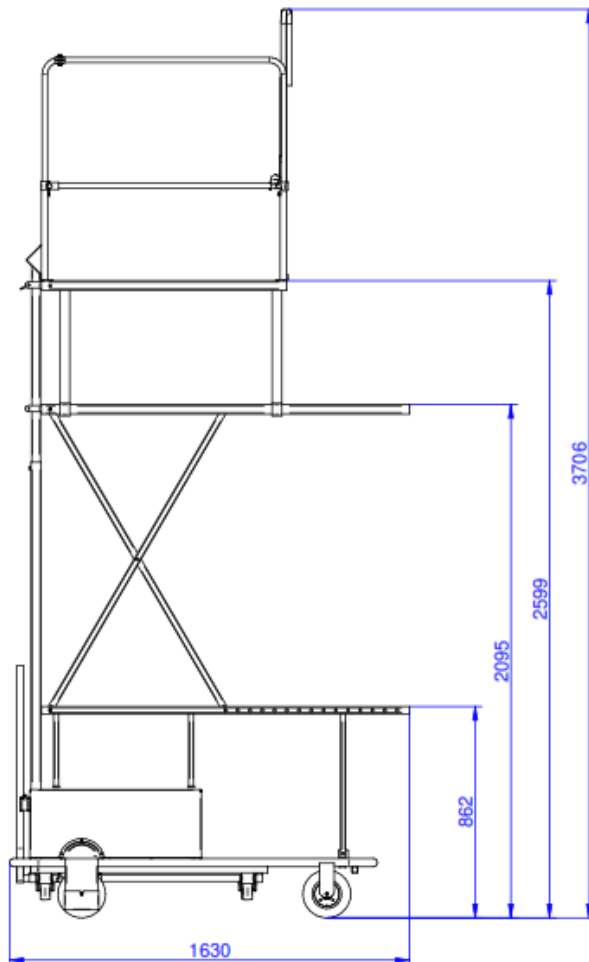
Date-.....-.....

Signature of management or other authorized representative.

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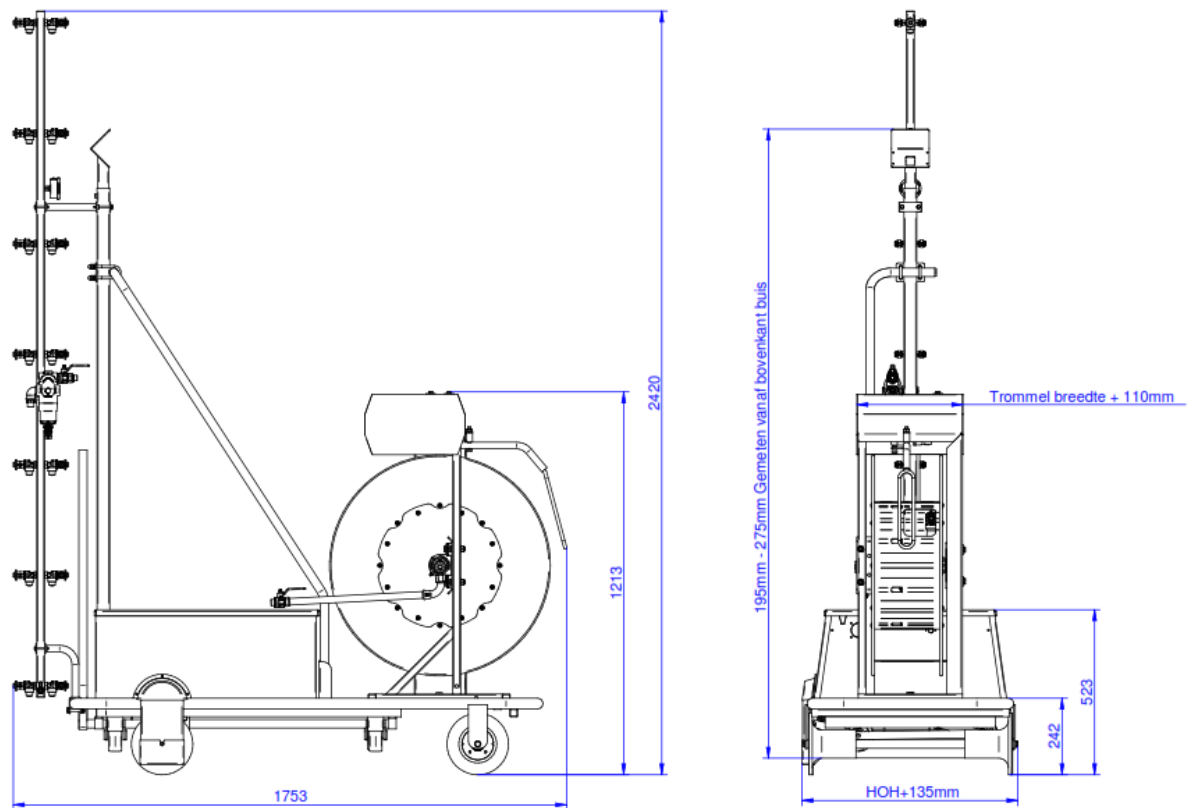
Appendix 2: Technical drawings

Dimensions in mm.



BRW150 BR08 Type: 5000.xx.xxxx

Dimensions in mm.



BRW150 SW08 Type: 5001.xx.xxxx & 7241.30.7000

Appendix 3: Battery safety sheet

Battery recommendations

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

Safe use of batteries

Below are recommendations for usage and maintenance.

BEWARE!

- **Explosive gas is created while the batteries are being charged, therefore no fires, naked flames or smoking are permitted!**
- **Charging should only take place in well ventilated spaces!**
- **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 water (demineralised) only - always wear gloves!**
- **Always top up the batteries AFTER charging and never fill higher than the level marker in the cell opening. (see also the instruction sheet for traction batteries)**



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 for at least 5 minutes in clean water and a doctor consulted immediately!



INSTRUCTIONS TRACTIONBLOCKS



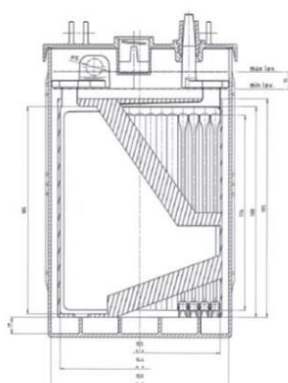
Daily maintenance EW159T:

- Only discharge the battery to 80% maximum (Electrolyte level 1130 SG)
- Connect the battery to the charger, switch on charger and charging should start automatically
- Do not disconnect the battery until charge cycle has finished
- When charge cycle has completed make sure charger is switched off before disconnecting the DC plug

Weekly maintenance EW159T:

- Check the level of the Electrolyte on the battery
Only top up battery with demineralised water
- Only top up after charge cycle has completed
- The battery should only need topping up every 2 weeks
- If required more frequently please contact the manufacturer
- Check for signs of corrosion on cables or bolts clean as required
- The battery tops should be kept clean and dry
No smoking or naked flames to be in the area of charging

Only top up the battery after the charging cycle has been completed to avoid electrolyte spilling from the battery!
No smoking or naked flames to be in the area of charging.



Green is
maximum
level

Red is
minimum
level



Always follow the
manufactures
instructions



No smoking or
naked flames



Electrical Hazard



Danger risk of
explosion



Always wear the
correct PPE



Avoid contact of
skin and eyes



Room must be well
ventilated




All disused batteries
must be recycled

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	TREM-CARD	<div style="border: 2px solid black; padding: 5px; text-align: center;">UN 2794</div>
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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.

Appendix 4: Spray nozzle specifications

Cleaning and sent out from the spray nozzles EN-V1



Avoid clogging:

Clean after each spray activity the pipes, filters and nozzles with clean water. The flow and flushing prevents residues accumulate resources. Without rinsing there is a risk of clogging in the cap and precipitate on the outside of the nozzle. This can cause an abnormal spray pattern.

Check before spraying the nozzles with clean water for obstructions.

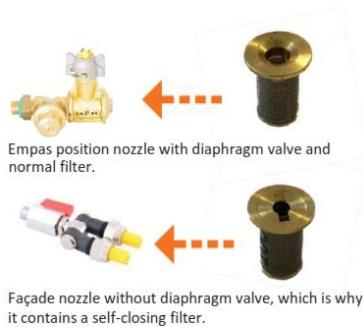
Maximum pressure on the spray boom is 15 bar!

**Spray nozzle table
TeeJet**

	Pressure	Send out Ltr / min
8001 orange	4	0.46
	5	0.51
	6	0.56
	7	0.60
	10	0.72
	20	1.00
80015 green	4	0.68
	5	0.75
	6	0.82
	7	0.88
	8	0.94
	9	1.00
	10	1.04
	11	1.10
	12	1.15
	13	1.19
	14	1.23
	15	1.28
	16	1.32
8002 yellow	4	0.90
	5	1.01
	6	1.10
	7	1.18
	8	1.26
	9	1.33
	10	1.40
	11	1.47
	12	1.53
	13	1.59
	14	1.65
	15	1.70
	16	1.75
8003 blue	4	1.37
	5	1.52
	6	1.67
	7	1.80
	8	1.93
	9	2.04
	10	2.15
	11	2.25
	12	2.35
	13	2.45
	14	2.54
	15	2.63
	16	2.72



Empas spraying booms



What is the difference between a diaphragm valve in a position nozzle and a self-closing filter in a façade nozzle?

- A position nozzle contains a diaphragm valve. Façade masts do not contain a diaphragm valve but rather a self-closing filter. Both have the same purpose: Both open and close at 0.7 bar to prevent leakage before or after.

Filter cleaning

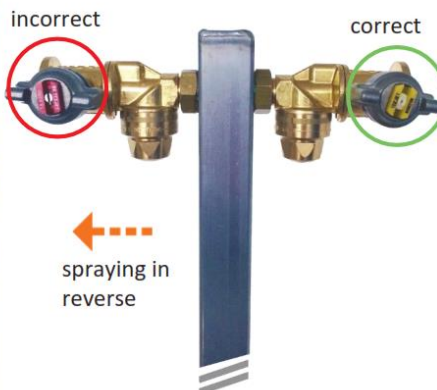


- Filters behind the nozzles must be cleaned every 10 hours or so (based on contamination) by rinsing them under the tap. The pressure filter must be cleaned every time.

Checking and cleaning nozzles



- Check the nozzles every spray application; check whether the spray pattern is still correct. A poor spray pattern can be corrected by cleaning the nozzles with water and a toothbrush.



Explanation of bayonet fitting on position nozzles

- During normal spray application one first follows the tramline without spraying and then sprays (in reverse) on the way back. The nozzles are positioned so that spraying occurs alternately. The tips are rotated 15 degrees so the leaves are lifted, bottom of the leaf first. This way they are not sprayed towards each other and therefore do not affect the spray pattern.



Bleeding air from the spraying boom

- Spraying masts longer than 18 nozzles have an air bleed valve (see figure). Open the valve to bleed out air. On shorter spraying booms the uppermost tip can be opened to bleed air.

Appendix 5: Cleaning the powder coating

The importance of cleaning and maintenance:

- It retains the appearance and image of the product over a longer period.
- It extends the life-span.
- It prevents corrosion.
- It helps prevent the spread of plant diseases.
- It stimulates employees to operate the machines with care.

Removing contamination periodically prevents any chemical substances that may be present from affecting the powder coating. The protective layers are vulnerable to acids, salts and corrosive substances which cause premature aging. Moreover, thick layers of dirt and contamination absorb more moisture which increases the effects of corrosion on the protective layers.

The cleaning frequency depends on the following factors:

- The level of contamination depends on what is being grown.
- Type of product, or usage between the crops or, e.g. usage only on concrete tracks.
- Exposure to chemical fluids (spraying equipment).
- Exposure to chemical vapours or mists (treating the air space in the greenhouses).
- Exposure to sunlight and UV rays.
- Humidity in the air and condensation.

The above results in a load factor that depends on the type of usage, and where applicable, the following cleaning schedule should be followed.

When to clean:

- | | |
|------------------------------------------------------------|------------------------------|
| • Plant and product residues. | daily |
| • Earth and sand | 2x weekly |
| • Glass, string, plastic, elastic, clips, wire hooks, etc. | 2x weekly |
| • Exposure to chemicals | immediately after use |
| • Dullness or contamination on the top layer | periodically after detection |

How to clean:

- Remove dirt or contamination on the top layer using a soft brush or cloth, or a compressed air line (<6 bar).
- Chemical contamination should be removed using a coarse sponge or soft cloth drenched in tap water.
- Clean a dull or contaminated top layer using a neutral cleaning agent with a pH value between 5 and 8 (check the label on the packaging) and a sponge or soft cloth.
- Tip, when a cleaning agent is used for the first time it is recommended to initially test the agent on a small section of the top layer before continuing.

What you must not do:



- Never clean the powder coating using an abrasive or burnishing cleaning agent.
- Never use cleaning equipment with an abrasive surface (steel wool, pot scourer, etc).
- Pressing down, polishing or scrubbing, etc, is not permitted.
- Never use organic cleaning solutions for cleaning or maintaining the powder coating.
- Pouring over water, using a water hose or high pressure cleaner can cause damage.

After cleaning:

- Ensure that the cleaned surfaces are properly dry and temporarily remove overlapping protective covers and screens.
- All pivots and hinges, etc, that have been in contact with cleaning agents should be lubricated according to the recommendations given in the maintenance schedule in the user manual.
- Treat any damaged areas on the powder coating layer with lacquer or paint.

Please note:

The above are only recommendations and therefore responsibility for the proper cleaning remains with the person carrying it out. Please contact the manufacturer if you have any queries regarding the appropriate cleaning products to be used.