TUCHEL

ECO Broomsweeper

Operating Instructions & Spare Parts Manual

Read & follow these instructions before the initial setup. Keep for future reference

Agri Quip

Ph: 06 759 8402

Feb 2022

Introduction

Dear Customer,

You have decided on a quality product from the comprehensive product range of the Tuchel Maschinenbau GmbH. We thank you for your confidence in us.

On receipt of this sweeper, please check for any transport damage or whether parts are missing. On the basis of the delivery note check completeness of the delivered sweeper including any special equipment you ordered. Only immediate claims can be eligible for compensation.

Read and observe this operating manual before first start-up and especially the safety instructions. After careful reading, you will be able to make full use of the advantages of your new vehicle-mounted sweeper.

Ensure that all operators of the sweeper read this operating manual before they use the machine.

The sweeper can be supplied with special equipment. Owing to the individual features of your sweeper, it is possible that not all the descriptions in this operating manual will apply to your particular sweeper. Special equipment items are marked in this operating manual.

If you have any queries about the handling of this sweeper or this operating manual, please do not hesitate to contact us.

Regular servicing and timely replacement of worn or damaged parts will increase the life expectancy of your sweeper.

User assessment

Dear reader,

Our operating manual is regularly updated. Your suggestions for improvements will help us to design an even more user-friendly operating manual. Please send your proposals by fax or e-mail to:

Tuchel Maschinenbau GmbH

Postal address:	Holsterfeld 15
	D-48499
	Salzbergen
Tel.:	+ 49 (0) 5971-9675-0
Fax.:	+ 49 (0) 5971-9675-30
E-mail:	info@tuchel.com

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1 General

The present operating instructions are valid for the Sweeper Eco.

1.1 Intended applications

The Eco sweeping machine is intended for the usage on tractors, yard loaders and small fork lifters.

Due to its robust construction and the variety of operating widths, the sweeping machine is suitable for use on roads, paths and yards. It is designed for the quality- and cost-conscious farmer.

The basic equipment includes height-adjustable notched support wheels, the mechanical side adjustment including shear-off protection, a universally deployable sturdy PP drum brush, and the 3-point linkage.

The conversion from front to rear attachment with 3-point linkage is easy and does not require additional parts.

The machine may be attached via coupling triangle, yard / front loader attachment, or fork arm receptacle, all including level compensation, permitting perfect attachment to tractors, yard loaders and forklifts.

Various additional equipment permits adaptation to a wide range of work environments (see list).

1.2 The additional equipment consists of: Information on the product

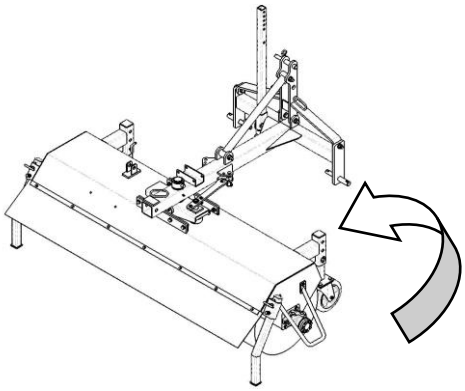
1.2.1 Manufacturer's address

Tuchel Maschinenbau GmbH
Holsterfeld 15
D-48499 Salzbergen
Phone: +49 (0)5971 9675-0
Fax: +49 (0)5971 9675-30
E-mail: info@tuchel.com
Spare parts: service@tuchel.com

1.2.2 Descriptive label

The descriptive label can be found on the nameplate.

Model	
Serial No.	
Build-year / Job No.	
Max. operating pressure [bar]	
Max. oil flow [l/min]	
Weight [kg]	



NOTE The overall descriptive label (nameplate, safety label, etc.) has the status of a certificate. It must not be changed or rendered illegible and must be replaced if damaged or missing.

1.2.3 Conformity declaration

EC conformity declaration

..... as defined in the EC Machinery Directive 2006/42/EC

The manufacturer:

Tuchel Maschinenbau GmbH

Holsterfeld 15

D-48499 Salzbergen

Herewith declares that the following described machine:

Make:	**Sweeper Eco**
Type:	**1352**
Machine No.:	.....

Is in conformity with the provisions of the following EU Directives:

- Machine Directive 2006/42/EC
- EMV Directive 2004/108/EC (electromagnetic compatibility)

Applicable standards and technical specifications:

- DIN EN ISO 12100:2011
- DIN EN 13857:2008
- DIN EN 349:2008
- DIN EN 982:2009
- DIN EN 4254:2013
- DIN EN 703:2009

Salzbergen, August 2019

Dieter Beckmann
Managing Director

1.2.4 Information for inquiries and orders

When placing orders for spares or accessories, please provide the type designation, serial no. and the year of manufacture for the Sweeper Eco.

Address: see manufacturer's address

Tel.:	+ 49 (0) 5971-9675-24
Fax:	+ 49 (0) 5971-9675-45
Online:	http://www.tuchel.com
E-mail:	info@tuchel.com

- The use of accessories or spare parts from other manufacturers is not permitted.
- Original accessories and original spare parts promote safety.
- The use of other accessories / spare parts voids any liability for resulting consequences.

1.2.5 Formal information for operating instructions

Document number:	59000.0303.0000.00.002-01
Date of creation:	August 2019

1.2.6 Details of operating pressures

Maximum operating pressure for continuous use 175 bar

Type of oil:	Hydraulic oil ISO VG 46 DIN 51524 (e.g. Vitam GF 46 from Aral)

1.2.7 Connections

Hydraulic connections: see following table

• Hydr. drive	1 x EW
• Hydr. drive • Dirt hopper	1 x DW
• Hydr. drive • Dirt hopper • Side brush	1 x DW
• Hydr. drive • Dirt hopper • Electro-hydr. lateral adjustment	2 x DW
• Hydr. drive • Dirt hopper • Electro-hydr. lateral adjustment • Side brush	2 x DW
• Hydr. drive • Dirt hopper • Electro-hydr. lateral adjustment • Electro-hydr. swinging side brush	2 x DW

EW = Single-action control circuit

DW = Double-action control circuit

1.2.8 Approved utilisation

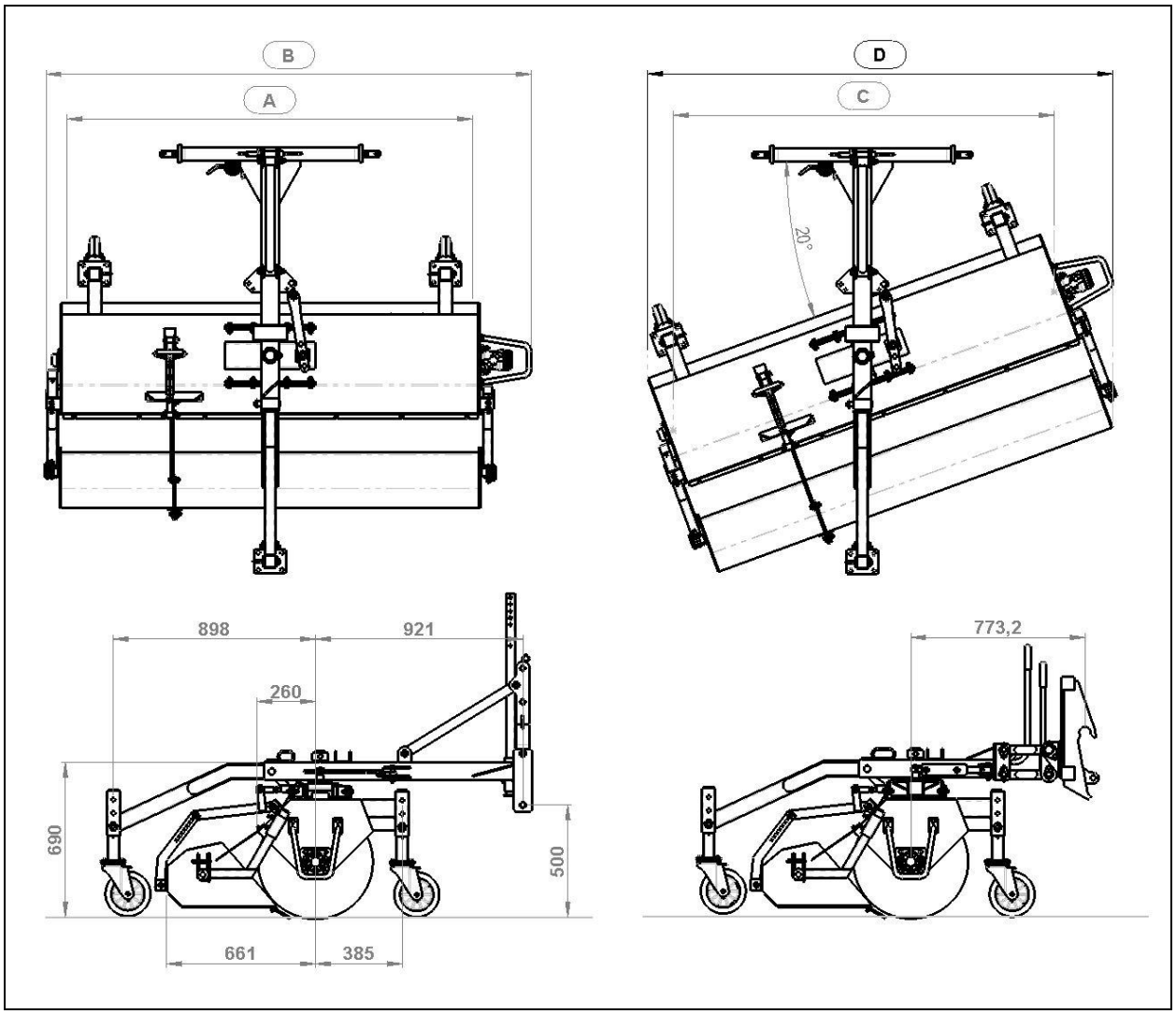
The Eco sweeping machine is a machine that is set in motion via a hydraulic circuit and through the attachment to a suitable carrier vehicle. Used for cleaning sealed surfaces with normal soiling (see also Chapter 1.1 Purpose)

The intended usage includes the adherence to the manufacturer's requirements regarding operation, service and maintenance as well as the connected conditions.

Any other use is defined as not intended.

The manufacturer does not accept any liability for damage arising from incorrect use; the risk rests solely with the user.

1.2.9 Technical data sheet



Technical Data Eco		1.50	1.80	2.30	2.60
A = working width	mm	1500	1800	2300	2600
B = total width	mm	1855	2455	2605	2905
C = working width at 20° angle setting	mm	1410	1691	2114	2396
D = overall width at 20° angle setting	mm	1785	2067	2490	2772
Weight of basic machine	kg	194	205	225	237
Weight of basic machine + hopper	kg	264	283	316	336
Volume of dirt hopper	l	135	161	200	226
Ø Main brush	mm	520			
Ø Side brush	mm	600			
required oil quantity (at 160bar)	l/min	28		35	

2 Safety information

This chapter contains important information for the owner and the operator for safe and problem-free operation of the sweeper.

Please observe all the safety instructions of this operating manual.

Most accidents are caused by the simplest safety rules not being observed.

By observing all the safety instructions in this operating manual, you are helping to prevent accidents.

2.1 Safety-conscious working practices

The machine described is built in accordance with state of the art technology and the recognised safety regulations. However, in the use of the sweeper hazards and impairments can arise:

- to life and limb of the operator or third parties,
- to the sweeper itself,
- to other goods or equipment.

For the safe working of the sweeper please observe

- this operating manual, especially:
  - The basic safety instructions, the operation-related safety instructions and the operating instructions,
  - The information on approved utilisation.
- the warning instructions on the sweeper,
- the generally applicable national regulations for safety at work , for accident prevention and for the protection of the environment,
- the national traffic regulations for road transport.

Operate the sweeper only in a technically safe and perfect condition.

WARNING

Danger to persons due to squashing, cutting, catching, pulling-in or impact can occur when the vehicle and sweeper do not possess adequate safety preparation for use in traffic and in operation.

Before each use, check the vehicle and sweeper for traffic and operating safety.

2.2 Organisational measures

The operating manual:

- Should always be kept at the place of use of the sweeper.
- Must be freely available at all times for operator and service personnel.

2.2.1 Obligations of the owner

The owner is under obligation

- to observe the generally applicable national regulations for safety at work, for accident prevention and for the protection of the environment,
- to only permit persons to work with/on the sweeper who:
  - are familiar with the fundamental regulations of safety at work and accident prevention,
  - are trained in working with / on the sweeper,
  - have read and understood this operating manual.
- to keep all warning instructions about the sweeper in a legible condition,
- to renew damaged warning instructions,
- to provide the necessary personal protective equipment such as:
  - protective goggles,
  - working gloves according to DIN EN 388,
  - safety shoes,
  - protective suit,
  - skin-protection products, etc.

2.2.2 Obligations of the operator

All persons who are tasked with working with/on the sweeper are obligated, before starting to work:

- to observe the national generally applicable regulations for works protection, for accident prevention and for the protection of the environment,
- to read and observe the Chapter "Basic safety instructions" from pages 2-6 of this operating manual,
- to read the "Warning information and instructions information" from pages 2-16 of this operating manual and to observe the warning instructions when operating the sweeper,
- to familiarise themselves with the sweeper,
- to read the chapters of the operating manual that is important for the implementation of the working duties allocated to them.

In the event that the operator finds that a safety item is not in perfect condition, then the operator must remove this defect immediately. If this is not within the working duties of the operator or if the relevant knowledge is missing then the operator must report the defect to his superior or the owner.

2.2.3 Qualifications of the persons and activities carried out

Only trained and instructed persons may work with/on the sweeper. The owner must clearly define the responsibilities of the persons for its operation, servicing and maintenance.

A person in training may only work with/on the sweeper under the supervision of an experienced person.

The operator may only carry out the work described in this operating manual.

Only specialised workshops that have specialised expertise may carry out work on the sweeper. Specialised workshops have qualified personnel and suitable aids (tools, lifting and support equipment) for carrying out technical and safe work.

This applies to all works.

- that are not mentioned in this operating manual,
- and which are marked in this operating manual in the appendix "Workshop work".

Activity \ Persons	Specially trained persons [1)]	Trainedperson [2)]	Individuals with subject-specific training (workshop) [3)]
Loading / transport	X	X	X
Start-up	--	X	X
Setting up, equipping	--	X	X
Operation	--	X	X
Cleaning, servicing and maintenance	--	X	X
Error search and repair	--	X	X
Disposal	X	--	--

Key: X..permitted **--**..not allowed

1) A person who can undertake a specific task and can carry it out for a correspondingly qualified company.

2) Trained persons are those who have been instructed about and, where appropriate, trained on their appointed duties and on the possible hazards due to incorrect actions and also about the required protective equipment and protective measures.

3) Specialists are persons with trade-specific training (skilled technician). Based on their technical training and the knowledge of the applicable regulations, they are in a position to assess the work assigned to them and recognise possible hazards.

Note:
A qualification equal to that of a specialist training can also be obtained by several years' experience gained in the relevant field of work.

2.3 Product safety

2.3.1 Safety-oriented operation of the sweeper

The sweeper may only be operated by a person from the driver's position of the vehicle when there is no person within the danger area around the vehicle. For this purpose, take note of the Chapter "Safety conscious working practices", Page 2-7.

2.3.2 Safety and protection equipment

- Operate the sweeper only when all safety and protective equipment has been attached and is fully functional.
- Defective or disassembled safety and protective equipment can lead to dangerous situations.
- Check all safety and protective equipment for externally visible damage and functionality before taking the sweeper into use.

2.3.3 Structural modifications

- Structural modifications as well as additions to or conversions of the sweeper may only be carried out after you have obtained the written approval of the manufacturer.
- The conformity declaration and the CE stamp for the sweeper lose their validity in the event of unauthorised structural modifications as well as additions or conversions.
- Only use original equipment spare parts or conversion components or accessories approved by the manufacturer so that:
  - The conformity declaration and the CE stamp of the sweeper retain their validity.
  - The proper function of the sweeper is ensured.
- The manufacturer accepts no liability for damage due to:
  - unauthorised modifications of the sweeper,
  - non-approved conversion equipment and accessories,
  - welding or drilling works on load-bearing parts of the sweeper.

2.3.4 Spare parts, wear parts and consumables

Immediately replace equipment parts that are not in perfect condition.

For this purpose, use only original parts from the manufacturer or parts approved by the manufacturer. In the event of use of spare and wearing pars from third party manufacturers, there is no guarantee that they have been designed and produced for the loading and safety requirements.

The manufacturer accepts no liability for damage caused by the use of non-approved spare and wearing parts or consumables.

2.3.5 Warranty and liability

In principle, our "General sales and delivery conditions" apply. These have been handed to the operator at the latest with the signing of the contract.

Guarantee and liability claims for personal injury and damage to property are excluded when derived from one or more of the following causes:

- Improper use of the sweeper,
- Unprofessional fitting, start-up, operation or servicing of the sweeper,
- Operating the sweeper with defective safety equipment or improperly attached or non-functioning safety and protective equipment,
- Non-observance of the instructions in the operating manual as regards start-up, use and servicing,
- Unauthorised structural modifications of the sweeper,
- Defective monitoring of the component parts subject to wear,
- Unprofessionally conducted repairs,
- Catastrophe cases caused by the effects of foreign bodies or force majeure.

2.4 Basic Safety Instructions

Basic safety instructions:

- Apply fundamentally for safety-oriented operation of the sweeper.
- Are summarised in the following sub-chapters.

2.4.1 General safety and accident prevention instructions

- Besides the safety instructions in this chapter, also observe the generally applicable national safety and accident prevention instructions.
- Wear your personal protective equipment when working on the sweeper.
- Observe the warning information and instructions affixed to the sweeper. They will supply you with important advice for safety-oriented and trouble -free operation of the sweeper.
- Besides the basic safety instructions of this chapter, also observe the activity related safety instructions of the other chapters.
- Instruct people to leave the surroundings of the sweeper before moving it or setting the sweeper into operation. Pay special attention to children.
- Do not carry persons or objects on the vehicle. The transport of persons or objects on the sweeper is prohibited.
- Drive in such a manner that the vehicle with the attached sweeper is always under safe control.
- Take into account your personal capabilities, the road, traffic, visibility and weather conditions, the driving characteristics of the vehicle, as well as the influence of the sweeper.

a) Coupling and uncoupling the sweeper

- Couple and transport the sweeper only with a carrier vehicle that is suited for the purpose.
- Couple the sweeper to the specified equipment in the prescribed manner.

- Ensure that the following values are not exceeded when coupling the sweeper to the front of the vehicle:
  - The permissible overall weight of the vehicle,
  - The permissible axle loads of the vehicle,
  - The permissible support load at the point of coupling of the vehicle,
  - The permissible trailer load of the coupling attachment,
  - The permissible tyre load capacity of the vehicle.
- Secure the vehicle and sweeper against rolling away before coupling or uncoupling the sweeper.
- Persons are not permitted to be between vehicle and sweeper when the vehicle moves towards the sweeper.

  Those present may only be there to give directions next to the vehicles and are only to step between the vehicles when the latter are stationary.
- During coupling and uncoupling, secure the required support equipment into the support position (stability).
- When activating the support equipment, be aware of the danger of crushing and shearing action.
- Be particularly careful when coupling to or uncoupling the sweeper from the vehicle. Between the vehicle and the sweeper there are points where crushing or shear-action could occur in the area around the couplings.
- Persons are not allowed to be positioned between the vehicle and sweeper when operating the three-point hydraulics.
- Check the coupled supply lines. Coupled supply lines:
  - must be able to easily accommodate all movements when driving round curves without tension, bending or rubbing.
  - must not rub against other components.
- Always position the uncoupled sweeper so that it is stable (cannot fall over).

b) Use of the sweeper

- Before starting work, familiarise yourself with all the equipment and operating elements of the sweeper as well as with their functions. Trying to do this while working on it is too late
- Wear tight-fitting clothing. Loose clothing increases the danger of catching onto or winding round drive shafts.
- Operate the attachment only if all protective devices have been fitted and positioned to provide protection.
- Note the maximum loading of the sweeper and the permissible axle and support loads of the vehicle. If possible, drive with only partly filled load compartment.
- The presence of persons is prohibited:
  - in the working / hazard area of the sweeper,
  - in the dirt ejection region of the sweeper,
  - within the rotation and swinging areas of movable parts of the sweeper,
  - under raised and unsecured movable parts of the sweeper.

- There are squashcrushing and shear-action points on moving parts of the sweeper operated by external-forces (e.g. hydraulics)
- You must only activate external-force operated parts of the sweeper when there is no person present in the hazard area of the sweeper.
- Secure the vehicle against inadvertent starting and rolling, before leaving the vehicle.
- Support raised covers securely before staying under the raised covers.

c) Transporting the sweeper

- Before transporting check:
  - The proper connection of the supply lines,
  - The hydraulic system for obvious defects,
- Always ensure sufficient steering and braking ability of the vehicle.

  The sweeper attached to the vehicle and the rear loads influence the movement ability as well as the steering and braking of the vehicle.
- Use rear weights if required
- Always fix the rear weights to the provided fixing points according to the instructions.
- Take into account the maximum loading of the attached sweeper and the permissible axle and support loads of the vehicle.
- Check the braking before moving off. The vehicle must achieve the prescribed braking interval for the combination of vehicle plus sweeper.
- When driving round curves with attached sweeper take the broad slewing radius and the centrifugal mass of the sweeper into account.
- Avoid sudden swerves, in particular when driving on a slope, uphill, downhill or across the axis of the slope.
- Before transporting place all movable parts of the sweeper into transport position.
- Before transporting secure all movable parts of the sweeper are in their transport position. For this purpose make use of the transport fixings provided.
- Adapt your driving speed to the prevailing conditions.

2.4.2 Hydraulic system

The hydraulic system is at high pressure.

- Ensure correct connection of the hydraulic hose lines.
- When connecting the hydraulic hose lines, ensure that the hydraulic system of the vehicle is de-pressurised.
- Do not block any operating levers on the vehicle that serve for direct operation of hydraulic or electrical movement of components, e.g. folding, swinging and pushing processes.

  The respective movements must stop automatically when the corresponding levers are released.

  This does not apply to movements of equipment:
  - that are continuous,

- that are automatically regulated,
- that require a floating or pressure loaded position due to their function.

- Before working on the hydraulic system:
  - lower the sweeper,
  - secure raised movable parts of the sweeper against unintended lowering,
  - depressurise the hydraulic system,
  - switch off engine of the vehicle,
  - apply the parking brake,
  - remove the ignition key.
- Have the hydraulic hoses checked for operating safety and condition at least once a year by an expert.
- Replace any hydraulic hoses with obvious defects, damage and ageing. Use only original hydraulic hose lines.
- The period of use of the hydraulic hose lines must not exceed six years including a possible storage time of at most two years.

  Hoses and hose connections are subject to natural ageing even with proper storage and permissible level of use, so that their storage time and period of use are limited. Deviations this period of use can be determined according to the experience values, especially when taking the hazard potential into account. The same guidelines apply for hoses and hydraulic hose lines in thermoplastic materials.
- Never attempt to seal leaking hydraulic hose lines with your hand or fingers!

  Escaping high pressure fluid (hydraulic fluid) may pass through the skin and ingress into the body, causing serious injuries!

  In the case of injury from hydraulic oil, contact a doctor immediately. Danger of infection.
- Because of the possible serious infection danger, never feel for leaks with the naked hand. When searching for possible leaks use suitable aids (cleaning spray, special leak-searching spray).

2.4.3 Sweeper

- Only one person may operate the sweeper. Instruct people to leave the hazard zone of the sweeper.
- It is prohibited:
  - To climb onto the upper container edge of the collecting container,
  - To climb or reach into the collecting container hopper when the motor is running.
- It is prohibited for anyone to remain within the sweeper working area.

  Danger due to objects flung out of the sweeper discharge opening.
- Warn people leave the working area of the sweeper before operating the sweeper.
- Do not put any foreign objects in the collecting hopper.

2.4.4 Cleaning, servicing and maintenance

- Carry out the defined works for cleaning, servicing and maintenance at the proper times.
- Secure the vehicle and sweeper against inadvertent starting or rolling before the sweeper is cleaned, serviced or maintained.
- Existing mechanical or hydraulic electronical residual energies can cause inadvertent movement of the sweeper.

  When working on servicing and maintenance, take account of the presence of residual energy in the sweeper. Warning instructions designate components with residual energy. Detailed instructions are found in the respective chapters of this operating manual.
- Secure all operating media, such as hydraulic oil against inadvertent start-up.
- Carefully fix and secure larger assemblies onto their lifting gear when carrying out replacement work on these larger assemblies.
- Regularly check secure seating of bolts and nuts. Retighten any loosened bolts and nuts.
- Secure the lifted sweeper or lifted parts of the sweeper against inadvertent lowering before cleaning, servicing or maintaining the sweeper.
- When replacing working tools with cutting edges use suitable tools and gloves.
- Check loosened bolt connections for tight seating. Check the function of safety and protective equipment after completion of maintenance works.
- Dispose of oils, greases and filters in a proper manner.
- Properly handle and dispose of substances and materials for cleaning the sweeper, especially:
  - when working with lubricating systems and installations,
  - when cleaning with solvents.
- Disconnect the cable from the dynamo and battery of the vehicle before carrying out electrical welding works on the vehicle or the attached sweeper.
- Spare parts must satisfy at least the defined technical requirements of the manufacturer. This is ensured by the use of original parts.
- Please observe the service intervals for wearing parts.

2.5 Actvity-related safety instructions and important information

The operating manual contains activity-related safety instructions and important information. The purpose of signal words and symbols is to make activity-related instructions and important safety information visible at a glance.

Activity-related safety instructions:

- Warn of danger that can occur in a particular situation or in connection with a certain behaviour,
- Are mentioned in the individual chapters immediately in front of an activity associated with danger,
- Are characterised by the triangular safety symbol and a preceding signal word. The signal word describes the seriousness of the threatening danger.

DANGER 	**DANGER** **Indicates an immediate danger with high risk that can cause very serious injury (loss of limbs or long-term injury) or death if it is not avoided.** **Non-observance of the safety instructions marked with "DANGER" means the possibility of very serious injury, possibly resulting in death.**

WARNING 	**WARNING** **Indicates possible hazards with medium risk of serious injuries or death when they are not avoided.** **Non-observance of the safety instructions marked with "WARNING" means the possibility of very serious injury possibly resulting In death.**

CAUTION. 	**CAUTION.** **Indicates possible hazards with a small risk of light or medium injuries or property damage if they are not avoided.** **Non-observance of the safety instructions marked with "CAUTION" means the possibility of light or medium injuries or property damage.**

2.6 Warnings and instruction notes

The following instructions are affixed to the sweeper:

- Warning instructions indicate danger points on the sweeper and warning of dangers that can occur in a particular situation or in connection with certain behaviour.
- Instructions contain information regarding proper handling of the sweeper.

Always keep these instructions in a clean and easily legible condition. Replace illegible instructions. Obtain the warning instructions on the basis of the order number from the dealer.

A warning instructions consists of 2 pictograms:

(1) Pictogram describing the danger

The pictogram illustrates the danger, surrounded by a triangular safety symbol.

(2) Pictogram for avoiding the danger

The pictogram illustrates the instruction how to avoid the danger..

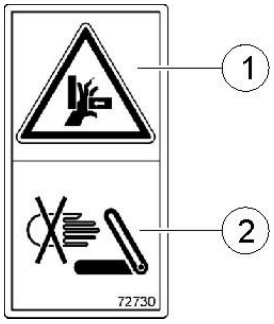


Fig. 2.1

Notes on the warnings

The following list contains:

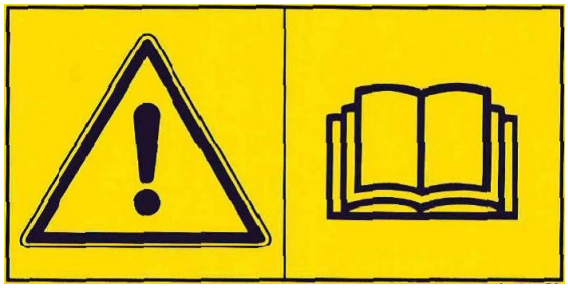
- in the right column all warnings fixed to the sweeper,
- In the left column the information relative to the warning shown on the right:

1. Order number.
2. Description of danger, e.g. "Danger of crushing for finger or hand caused by accessible, movable parts of the sweeper."
3. The consequences of non-observance of the instruction(s) for avoiding the danger, e.g. "This danger can cause serious injury with loss of limbs."
4. The statement(s) for avoiding the hazard, e.g. "Never reach into the danger area as long as the engine of the vehicle is running with hydraulic system connected. Instruct people to leave the danger zone around the sweeper before moving any parts of the sweeper."

Order number and explanation	Warning instructions

40000340

Read and observe the operating manual and safety instructions before using the sweeper.



40000342

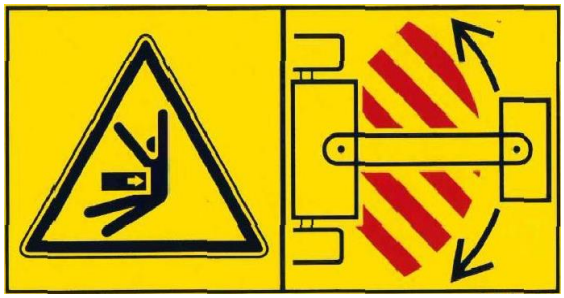
When lowering the vehicle, keep at a sufficient distance!

- Instruct persons and animals to leave the hazard area.
- Wait until all movable parts of the sweeper are inactive before reaching into the danger point.

40000343

Do not enter the slewing area during operation!

- Warn persons and animals out of the hazard area.
- Wait until all movable parts of the sweeper are inactive before reaching into the danger point.



40000338

Danger of cutting or loss of finger and hand caused by accessible, moving working tools!

This danger can result in serious injuries with loss of body parts.

- Never reach into the danger point as long as the engine is running with hydraulic system connected.
- Wait until all movable parts of the sweeper are inactive before reaching into the danger point.

3 Product description

This chapter contains:

- Comprehensive information on the construction of the sweeper.
- The names of the individual components.

If possible, read this chapter in the immediate vicinity of the sweeper.
This is the best way to familiarize yourself with the sweeper.

3.1 Overview – Components

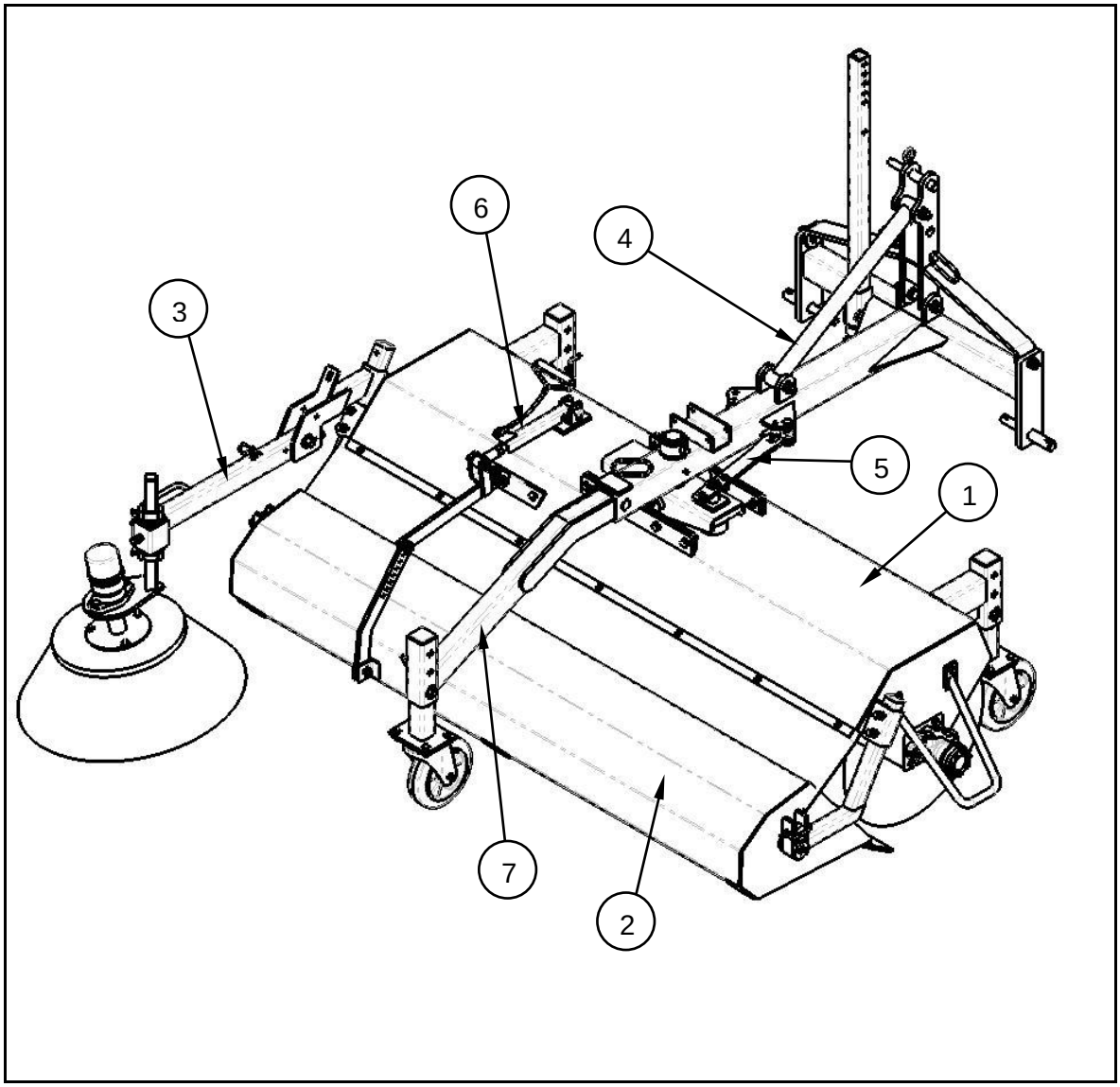


Fig. 3.1

1) Sweeper chassis
2) Dirt hopper
3) Side brush
4) Attachment system (three-point linkage)
5) side adjustment
6) Side marker lights, prescribed for driving on public roads
7) 3rd support wheel

3.1.1 Description of product and accessories

- The sweeping machine is designed for both pickup and open sweeping usage. By unmounting the dirt collection vessel, the machine is converted to the open sweeping mode.
- The frame is made of a robust and torsion-free welded construction.
- The brushes are adjusted via the height-adjustable support wheels.
- An external, high-powered hydraulic motor, equipped with a collision protector, directly drives the sweeping drum.The revolution speed of the sweeping drum depends on the oil flow and on the equipment of the carrier vehicle.
- The standard equipment includes a PP drum brush with a diameter of 520 mm.
- The opening and closing of the dirt collection vessel is accomplished from the carrier vehicle. It is operated via a bowden control or by operating a hydraulic cylinder.
- The Eco sweeping machine is equipped with a direct attachment option that matches the carrier vehicle. The respective attachment type is connected to the machine frame via a swivel construction.
- The pendulum compensation ensures a level-compensating usage, even on uneven ground.
- With the mechanical or hydraulic side adjustment, the sweeping machine may be swivelled by 20° to the right or to the left.

3.2 Add-on parts

- Extra sturdy castor wheels.
- Dirt collection vessel with mechanical emptying.
- Vulkollan rail on the dirt collection vessel for improved guidance across the ground.
- Hydraulic emptying of the collection Vessel.
- 3rd support wheel for even ground guidance, height-adjustable.
- Hydraulic side adjustment, inclination of the sweeping machine using a hydraulic cylinder. This requires a double-acting control valve on the carrier vehicle.

3.2.1 Main brush

The brush diameter is 520 mm.

With brush rings.

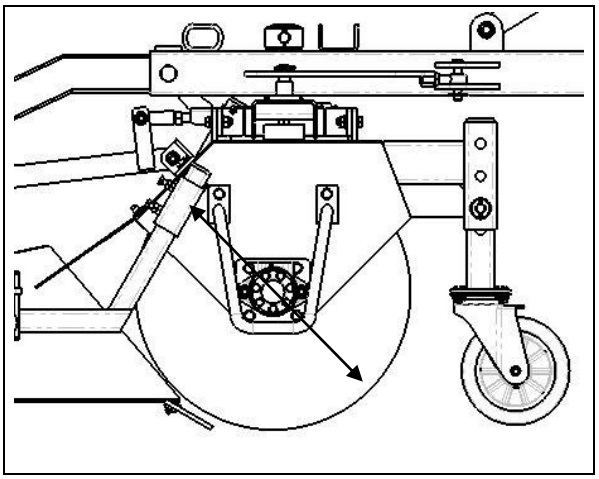


Fig. 3.2

3.2.2 Guide rollers

The size of the guide rollers is 250 x 50 mm.

Optionally also 200 x 50 mm strengthened construction.

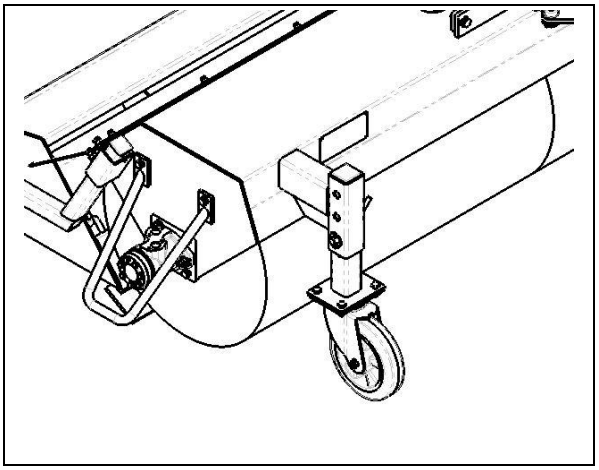


Fig. 3.3

3.2.3 Lateral adjustment

The lateral adjustment occurs via a double-acting hydraulic cylinder or mechanical lever.

The Sweeper Eco can thus be slewed 20° to the left or right.

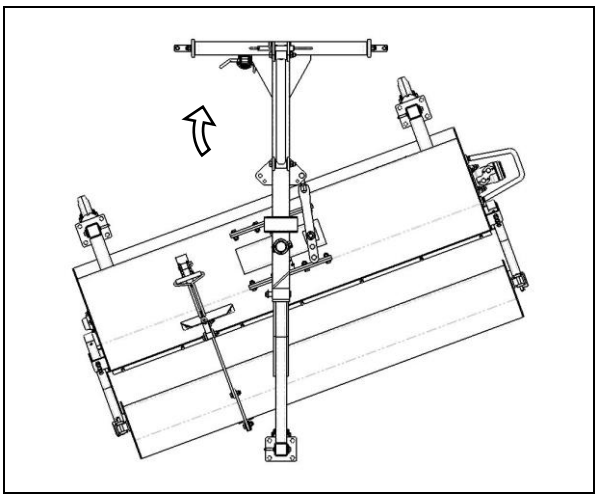


Fig. 3.4

3.2.4 3rd Support wheel

3rd support wheel for an equalised guidance over the ground, height adjustable.

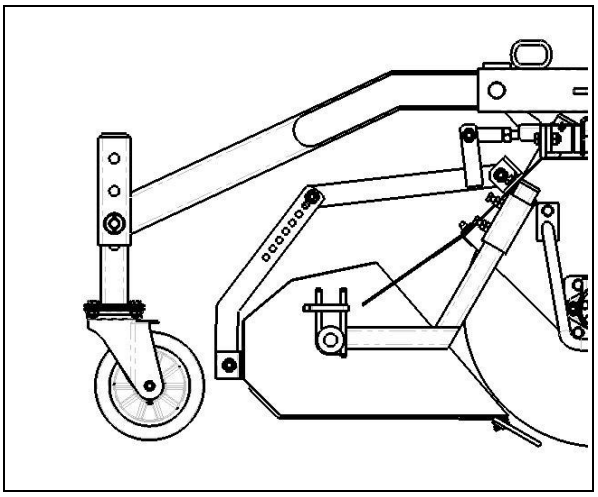


Fig. 3.5

3.2.5 Water-spray system:

With 100 or 200 litre tank.

Water pump (12 or 24 Volts).

Spray jets also for side brushes.

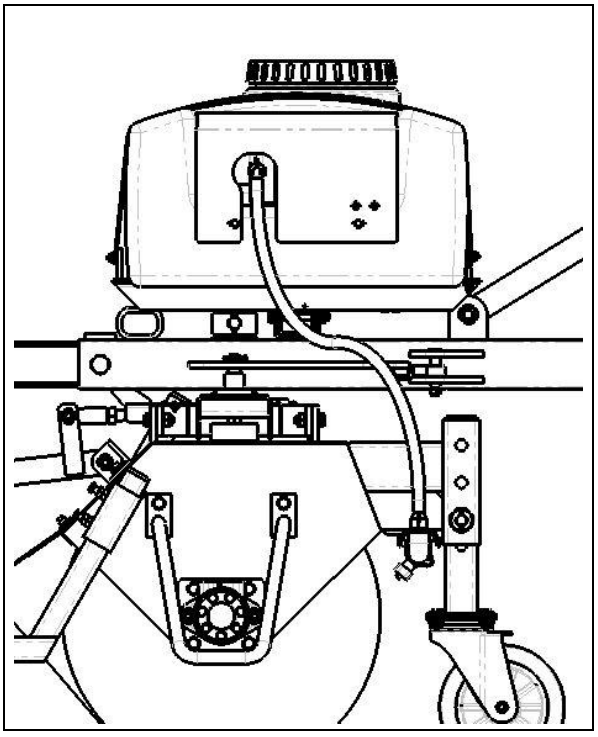


Fig. 3.6

4 Coupling and uncoupling the sweeper

- When coupling and uncoupling the sweeper also take note of the Chapter "Safety-oriented working", page 2-7.
- With each coupling and uncoupling check the sweeper for obvious defects. In this take into account the Chapter "Obligations of the operator", page 2-8

WARNING

Danger of crushing or impact of persons in the lifting region of the three-point hydraulics of the vehicle when coupling and uncoupling the sweeper.

Activate the operating lever for the three-point hydraulics of the vehicle:

- Only from the particular defined working place,
- Never when persons are present in the hazard area between the vehicle and the sweeper.
- Never when you are in the hazard area between the vehicle and the sweeper.

WARNING

Danger of crushing or impact of persons can occur if the vehicle and sweeper inadvertently starts or rolls during coupling and uncoupling.

Ensure that the vehicle is protected against inadvertent starting and rolling before entering the hazard area between the vehicle and the sweeper for coupling and uncoupling, see page 2-4.

4.1 First installation onto carrier vehicle

- In the first installation of the Sweeper Eco with water spray system or lighting equipment, it is necessary to install the switch box in a suitable position inside the carrier vehicle.

- Insert plug (1) into the dashboard socket or connect directly to the battery.
- Socket (2) for electrical connection cable of Sweeper Eco.
- Fuse (3)
- On / Off switch (4)

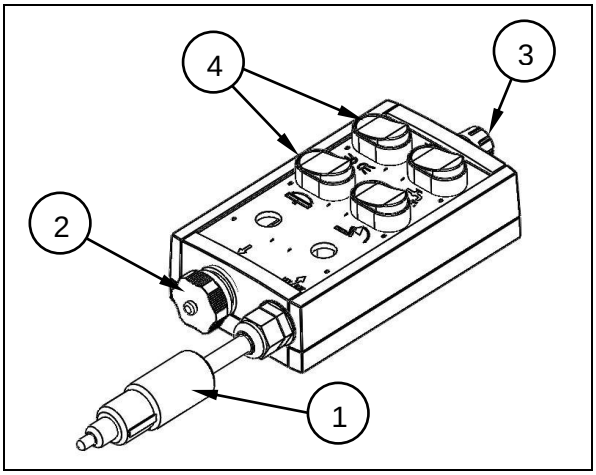


Fig. 4.1

4.2 Installation of Sweeper Eco

WARNING

Danger of crushing or impact of persons can occur if persons are present between vehicle and sweeper during coupling and uncoupling.

Instruct persons to leave the danger area between the vehicle and the sweeper before moving in front of the sweeper.

Any helpers present may only be positioned next to carrier vehicle to give directions and are only allowed to step between vehicle and sweeper when both have come to a full standstill.

WARNING

Danger through failure of the energy supply between vehicle and sweeper can occur due to damaged supply lines.

Pay attention to the run of the supply lines when coupling the lines. The supply lines:

- must easily adapt to all movements without tension, bending or rubbing,
- must not rub against other parts.

WARNING

Danger due to crushing, dragging -in, catching and impact for persons can occur if the sweeper inadvertently separates from the vehicle.

- Note the maximum permissible support loads, towing and axle loads of the vehicle.
- Make proper use of the equipment provided for connecting vehicle and sweeper.
- Before starting to move with the sweeper coupled, check whether the quick-release unit of the four-point mounting frame is correctly locked.

4.2.1 Three-point linkage rear attachment

- The safety regulations from chapter 4.2 apply.
- Undertake work on the sweeper only with engine switched off and after depressurising the hydraulics. Remove the ignition key, secure carrier vehicle against inadvertent starting up or rolling.
- Check three-point hitch for contamination and clean if necessary.

- Drive the carrier vehicle towards the sweeping machine.
- Select the bolt diameter (1) according to the attachment category, hook and lock the draft link hook rods.
- Use upper hook bolts (2) according to the attachment category and lock with upper hook.

  ⓘ ***Adjust the upper hook so that the attachment receptacle is perpendicular to the ground. (See also operating manual of the carrier vehicle)***

  ➔ ***Verify the correct seating of the attachment receptacle.***

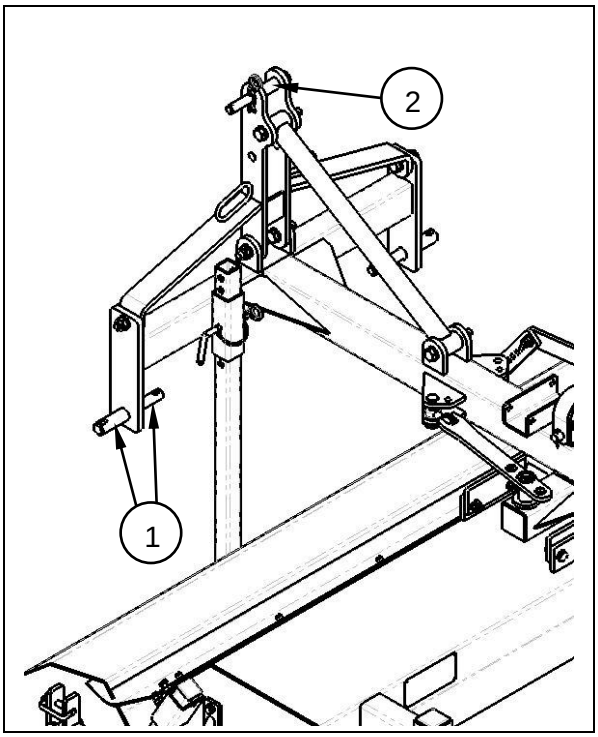


Fig. 4.2

- Unscrew clamping T-bolt (3) and shift the support (4) upwards and secure it again, if it exists.
- Connect the hydraulic lines according to the instructions of the vehicle manufacturer.
- Lift the sweeping machine and carry out a functionality check.

  ⓘ The Eco sweeping machine with 3-point linkage can also be attached at the front. Conversion see next page!

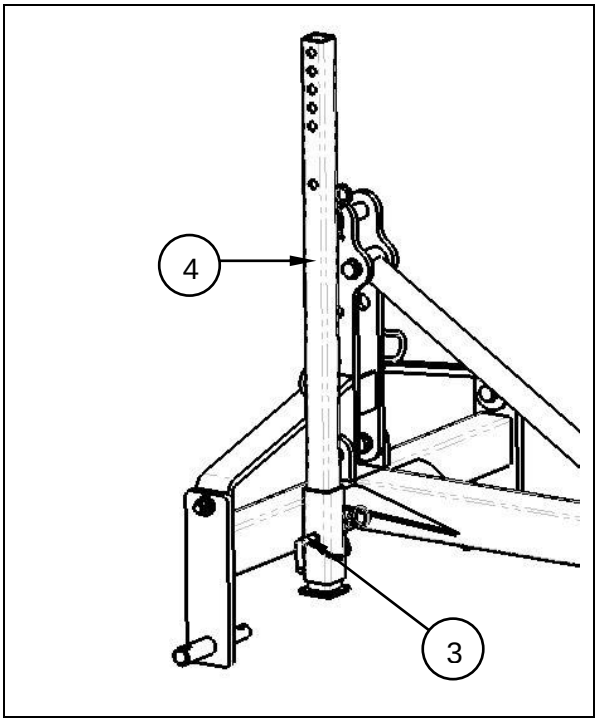


Fig. 4.3

4.2.2 Three-point linkage - Conversion for front attachment

- The safety regulations from chapter 4.2 apply.
- Undertake work on the sweeper only with engine switched off and after depressurising the hydraulics. Remove ignition key, secure carrier vehicle against inadvertent starting up or rolling.

- Remove the hydraulic hoses from the loop of the 3-point linkage.
- Detach the spring plug (7) and bolt (8).
- Move the pitch rod (9) or pitch control cylinder to the side.
- Unmount bolt (11) using the splint pin (10) and pull the barrel (12) off the central bolt (13).
- Lift the 3-point linkage from the central bolt and set down rotated by 180 degrees.

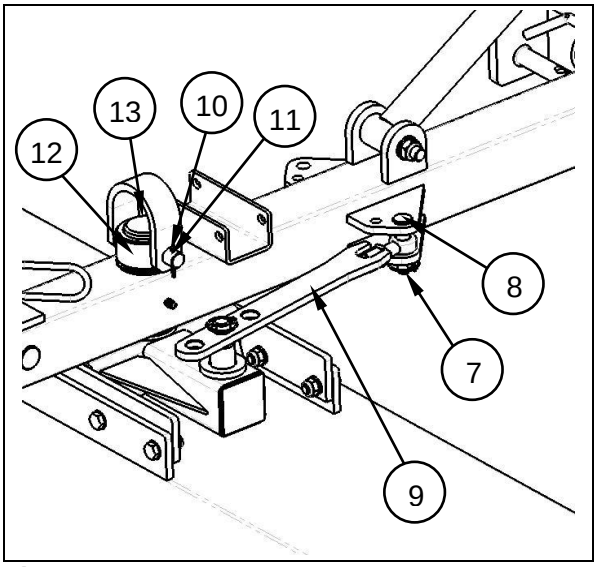


Fig. 4.4

- Reinstall the barrel (12) together with the bolt (11) and the splint pin (10) on the central bolt.
- Secure the pitch rod (9) or pitch control cylinder, using the bolt (7) and spring plug (8).
- Hang the hydraulic hoses back into the loop of the 3-point linkage.

  ➔ The positioning of the hydraulic hoses must be checked, as damage occurs if they get entangled or squashed.

  ⓘ For the Eco sweeping machine with dirt collection vessel, the emptying mechanism must be converted.
- Convert parts (14), (15), (16), and (17) according to the attachment version and secure again (see diagram).

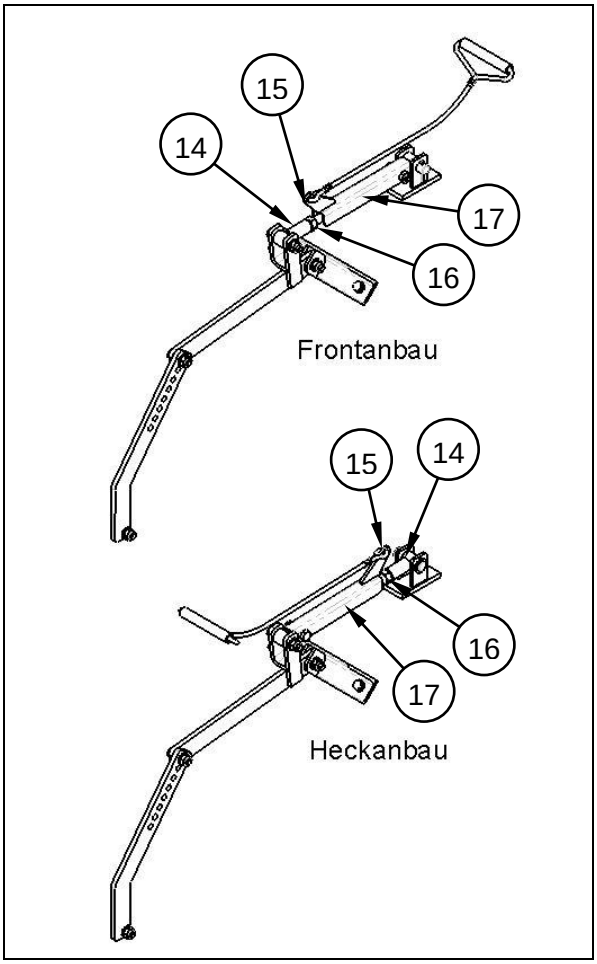


Fig. 4.5

4.2.3 Yard loader - Attachment

- The safety regulations from chapter 4.2 apply.
- Undertake work on the sweeper only with motor switched off and depressurised hydraulics. Pull out ignition key, secure carrier vehicle against inadvertent starting up and rolling.
- Check for contamination and clean if necessary.

- Lower the receptacle of the carrier vehicle below the receptacle of the Eco sweeping machine.
- Insert the receptacle of the carrier vehicle into the receptacle and lock it as described in the operating manual of the carrier vehicle.

  ➔ ***Verify the correct seating of the receptacle and its lock.***

- Connect the hydraulic lines according to the instructions of the vehicle manufacturer.

- Lift the sweeping machine and carry out a functionality check.

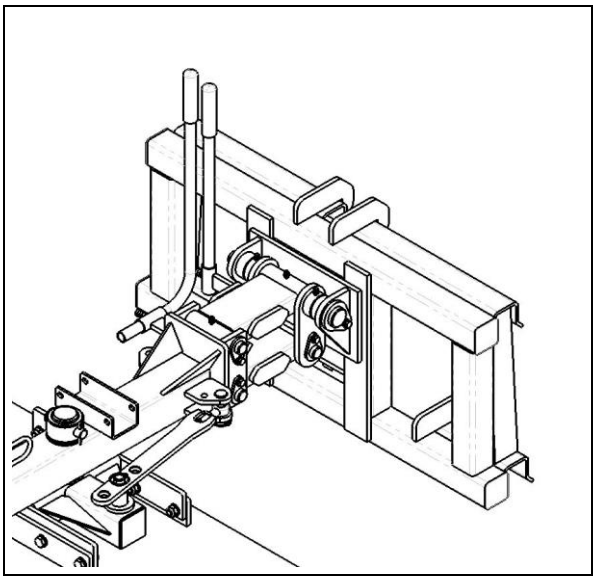


Fig. 4.6

4.2.4 Fork arm - Attachment

- The safety regulations from chapter 4.2 apply.
- Check fork-arm attachment and fork arms for contamination and clean if necessary.
- The distance between the forks must be set before approaching it to the carrier vehicle.

- Drive the fork arms fully into the receptacle.
- The fork arm receptacle must be secured with a chain.
- The chain must be pulled tightly through the loop and the slide carriage of the carrier vehicle and must be secured with the spring hook.

  ➔ ***The chain must not touch the guide rails of the lifting gear. Ensure a tight fit of the chain.***

- Connect the hydraulic lines according to the instructions of the vehicle manufacturer.
- Lift the sweeping machine and carry out a functionality check.

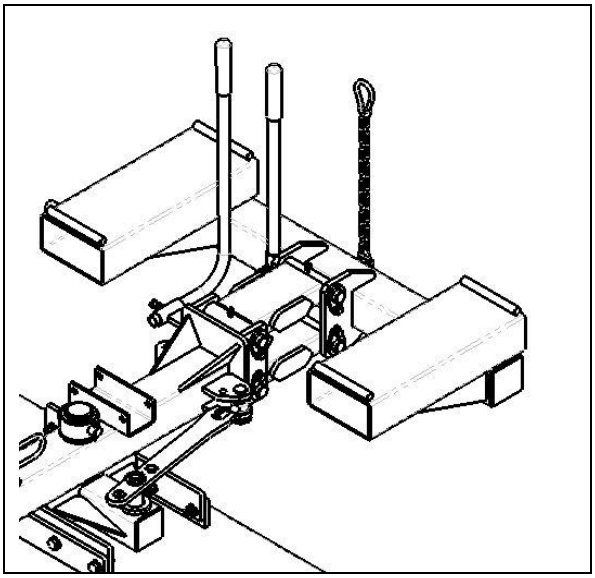


Fig. 4.7

4.2.5 Front attachment - coupling triangle

- The safety regulations from chapter 4.2 apply.
- Undertake work on the sweeper only with engine switched off and after depressurising the hydraulics. Remove ignition key, secure carrier vehicle against inadvertent starting up or rolling.
- Check attachment system for contamination and clean if necessary.

- Compare connecting height of the carrier vehicle´s attachment with that of the sweeper´s attachment.
- To re-locate the attachment system, unscrew the screws (1) on either side; adjust the perforated bar (2) and secure with the screws and new locknuts.

  ➔ Compensating the wear and tear of the locking tongue at the device triangle

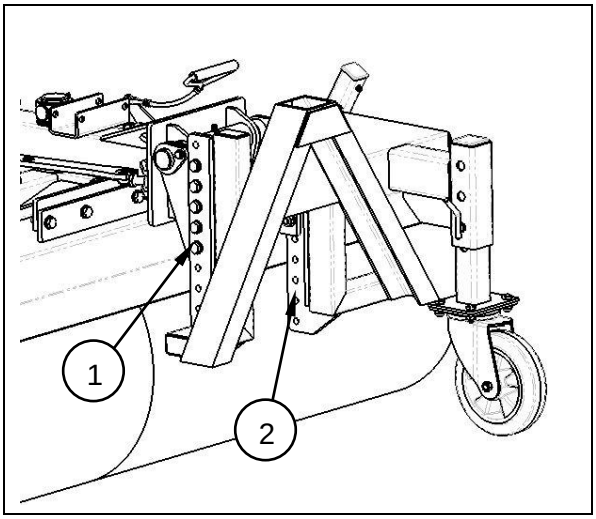


Fig. 4.8

- Loosen the countersunk screw (1) in order to be able to move the locking handle (2).
- Turn check nut (3) of the adjustment screw (4) towards the screw head.
- Readjust the locking handle (2) using the adjustment screw (4) (see also operating manual of the carrier vehicle).
- You must move the locking handle (2) upwards until the locking tongue securely connects the opposing triangle (5) again.
- Tightly turn the check nut (3) against the barrel (6).
- Tighten the countersunk screw (1) at the locking handle (2).

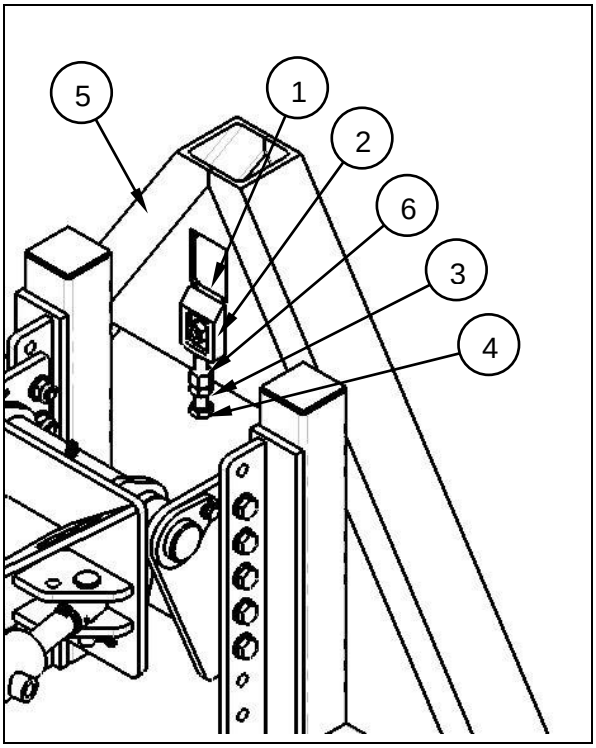


Fig. 4.9

- Insert the receptacle triangle into the device triangle and lock it.

  ➔ ***Verify the correct seating and the lock of the attachment receptacle.***

4.3 Operation

- First read chapter 4.2 and attach Sweeper Eco.

4.3.1 Transport trips

- Observe the safety instructions from Chap. 2.3.

ⓘ Transport trips may only be made with an empty dirt collection vessel.

➔ Safeguard the operating elements for the sweeping machine against unintended use.

- For open sweeping usage, the sweeping machine must be positioned straight, see Chapter 4.3.6 Side adjustment for open sweeping.
- Lift sweeping machine out.

4.3.2 Start-up

- The safety regulations from chapter 4.2 apply.

- For open sweeping usage, shift the two supports at the sweeping machine frame upwards and secure them.
- **The maximum driving and sweeping speed is 6 km/h.**
- When operating the sweeping machine, a sweeping profile of 6 - 10 cm appears. (for adjustment of the sweeping profile see Chapter 4.3.7).
- Hydraulic hoses must be positioned without danger of getting squashed (see initial attachment in Chapter 4.1).

Sweeping machine - Position in front of the carrier vehicle

- Lower the sweeping machine until the two (or three) castor wheels touch the ground.
- Place the receptacle structure perpendicular to the ground.
- All attachments, except for the 3-point linkage, are delivered with level compensation.
- Vertically move the sweeping machine with level compensation until the attachment is in the middle of the height compensation.

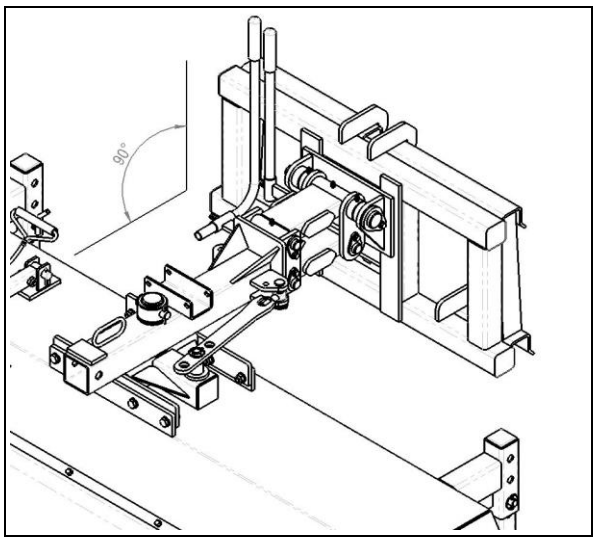


Fig. 4.10

4.3.3 Rpm adjustment

- The safety regulations from chapter 4.2 apply.

- **The revolution speed is adjusted via the oil power of the carrier vehicle. This depends on the type of the carrier vehicle and its equipment.**

4.3.4 Emptying the dirt collection vessel

- The safety regulations from chapter 4.2 apply.

- Lift the sweeping machine.

⚠ ***No person must be present below the machine during emptying.***

ⓘ ***If a high-level filling flap is mounted, it swings away from the dumping area during emptying.***

Mechanic operation

The dirt collection vessel is opened via the Bowden control (1) that was installed into the cabin.

- Pull on the bowden control and the dirt collection vessel (3) is opened by the levers (2) for emptying and closes itself.

Hydraulic operation

The dirt collection vessel is opened via a hydraulic cylinder.

- Flip the respective control lever for the sweeping machine hydraulics in the carrier vehicle. The flow direction of the working hydraulics changes and the collector vessel opens.

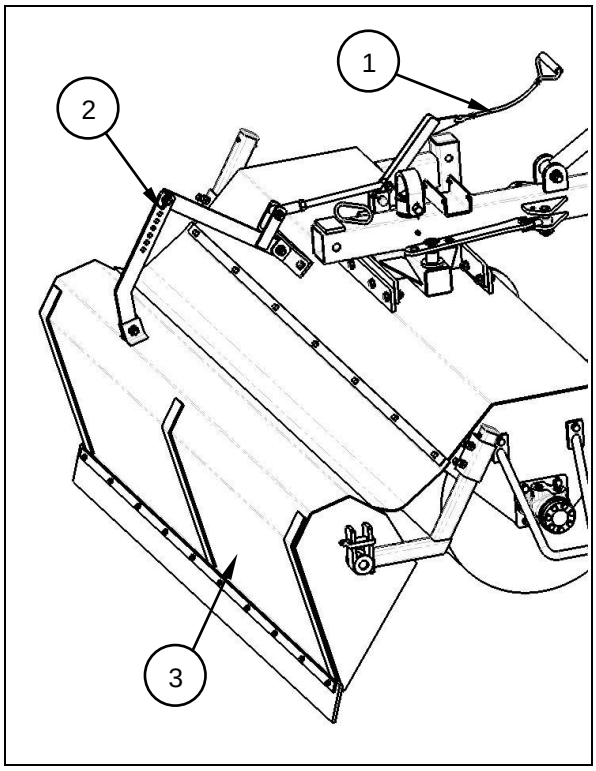


Fig. 4.11

- Close collector vessel by flipping back the previously mentioned control lever. (flow direction changed again)
- Lower the sweeping machine.

4.3.5 Conversion to the open sweeping Eco sweeping machine

- The safety regulations from chapter 4.2 apply.

ⓘ ***Empty the dirt collection vessel before deinstallation.***

⚠ ***Only remove the dirt collection vessel while the sweeping machine is attached to the vehicle.***

⚠ ***Carry out conversions only if the hydraulic drive if switched off. Pull the ignition key and secure the carrier vehicle against unintended restart and movement!***

- Remove the attachment screw (4) from the perforated rails (5) and (6).
- Remove both spring plug bolts (7).

  ⓘ Mechanical vessel emptying: Remove the bowden control from the carrier vehicle, place it into the collector vessel and remove the spring hook (8).

  ⚠ ***Accident hazard! The bowden control is a tripping hazard on the ground. Put the bowden control into the collection vessel.***
- Lift out the dirt collection vessel and put it down on a level, dry and clean area.
- Clean the collector vessel thoroughly. Dirt attracts humidity and leads to the formation of rust. If necessary, repair paint damage.

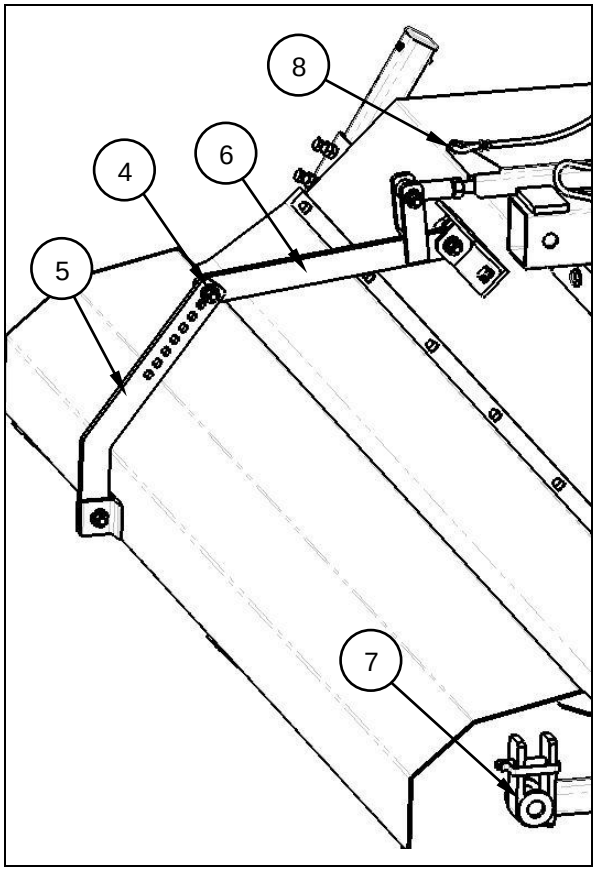


Fig. 4.12

4.3.6 Inclination for open sweeping

- The safety regulations from chapter 4.2 apply.

ⓘ ***Side adjustment towards road shoulder for open sweeping usage.***

⚠ ***Lift sweeping machine up or out, but keep it close to the ground.***

Mechanic operation

- Remove linchpin (1).
- Pull the pitch rod (3) upwards.
- Tilt the sweeping machine towards the desired angle of the sweeping direction (material to be swept up to the left or to the right) and put the pitch rod onto the appropriate hole (2).
- Insert and secure the linchpin (1).

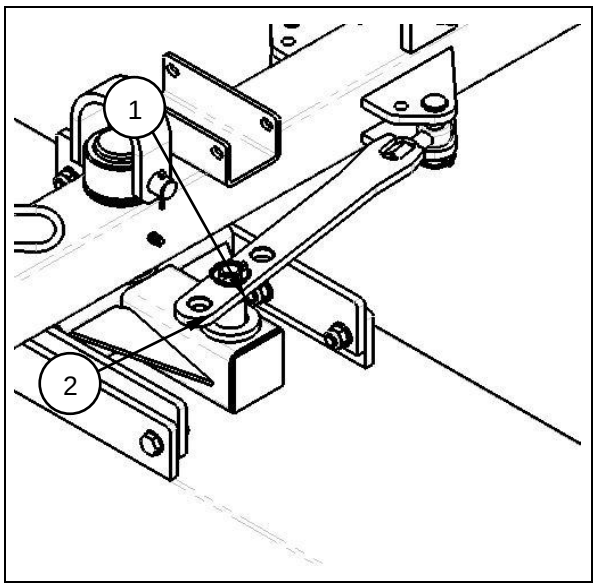


Fig. 4.13

Hydraulic operation

The tilting of the Eco sweeping machine is carried out by a hydraulic cylinder. This requires an additional double acting control circuit.

- Operate the appropriate control lever of the hydraulic system in the carrier vehicle.

  ⚠ ***While the sweeping machine is tilted, no person must be present close to the machine.***

- The Eco sweeping machine tilts to the right or left.
- Lower the sweeping machine.

  ➔ ***Secure the operating lever for the second control circuit in the carrier vehicle against unintended operation.***

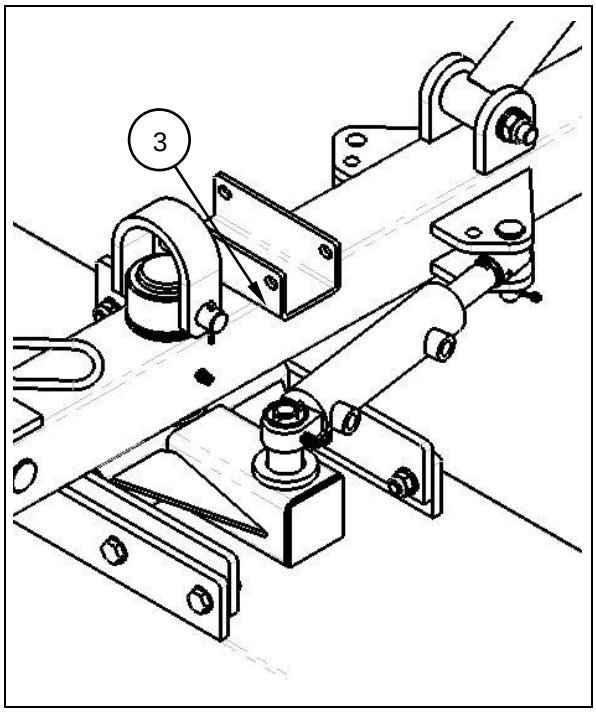


Fig. 4.14

4.3.7 Readjustment of the sweeping profile

- The safety regulations from chapter 4.2 apply.

➔ ***When operating the sweeping machine, a sweeping profile of a = 6 - 10 cm width should appear. (lift sweeping machine, the swept area should have a width of 6-10 cm).***

- The wear and tear of the broom bristles is compensated by adjusting the support wheels and the dirt tray.
- With the carrier vehicle standing still and the sweeping machine lowered, carry out the adjustment so that a sweeping profile of 6 - 10 cm width appears.

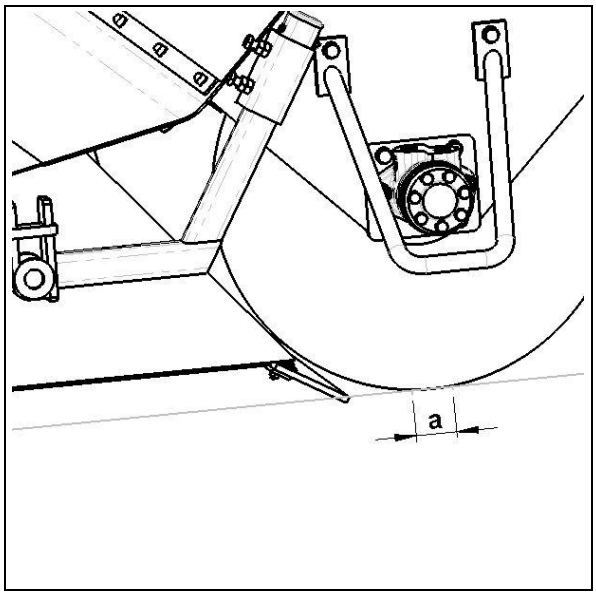


Fig. 4.15

- Given the arrangement of the perforated rails (2) and (1), the height of the support wheels (3) can be adjusted in 2 cm steps.

➔ ***Evenly adjust the two wheels and the third support wheel, if they exist.***

⚠ ***Carry out modifications on the sweeping machine only the hydraulic drive is switched off. Pull the ignition key and secure the carrier vehicle against unintended restart and movement!***

⚠ ***Take the sweeping machine's own weight into account!***

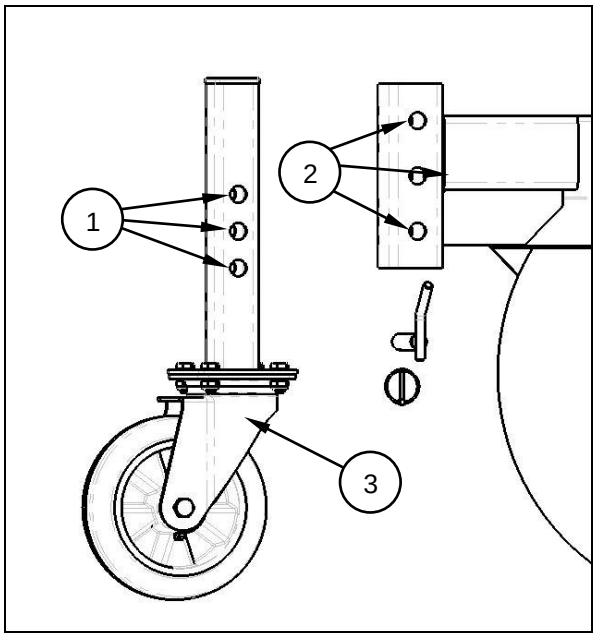


Fig. 4.16

- Remove the locking of the bolt (4).
- Remove bolt (4) and change the height of the support wheel.
- Insert bolt (4) into the hole exposed in the perforated rail (5) and secure it again.
- Keep the distance (a) from the sweeping rail to the ground small.

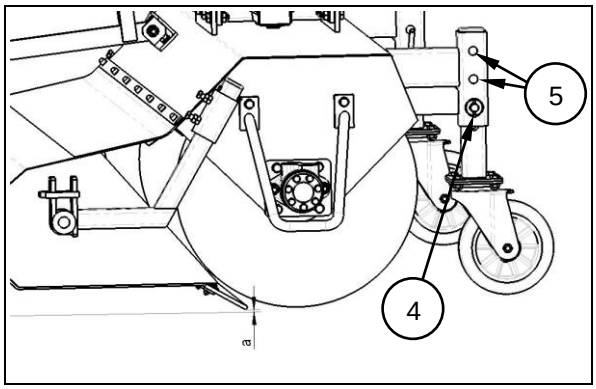


Fig. 4.17

ⓘ ***The horizontal and vertical positioning of the dirt tray with respect to the broom is adjusted via the arm (6) and the screw connection (7). Adjust so that a distance (b) = 50 mm to the ground is achieved.***

- Adjust the perforated rail (8) for the emptying mechanism, too.

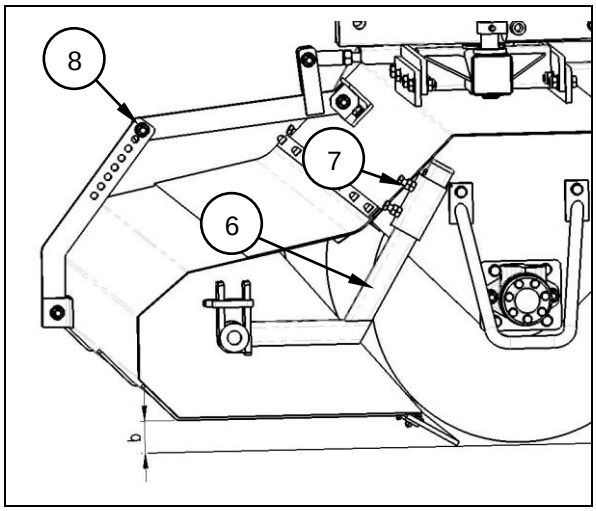


Fig. 4.18

4.4 Detachment

- The safety regulations from chapter 4.2 apply.
- Undertake work on the sweeper only with engine switched off and after depressurising the hydraulics. Remove the ignition key, secure carrier vehicle against inadvertent starting up or rolling.
- Place sweeper on a solid and even surface in a dry and clean place and keep it secure against rolling away.
- Danger of accident. Ensure safe positioning of the Sweeper Eco.

➔ ***During the detachment, follow the operating manual of the carrier vehicle! Only one example is described and shown here for each case.***

- Only detach the sweeping machine with the dirt collection vessel closed and empty.
- Park the sweeping machine on a firm and level surface in a dry and clean place and secure it against rolling away.

  ⚠ ***Accident hazard! Ensure a secure standing of the sweeping machine.***
- Disconnect hydraulic hoses at the vehicle and put them onto the sweeping machine, together with the Bowden control.

  ⚠ ***Accident hazard! Hydraulic hoses and bowden control are a tripping hazard on the ground. Put the hydraulic hoses and the bowden control across the sweeping machine.***

  ➔ ***Seal hydraulic connector barrels with dust caps. Soiling leads to damage on the hydraulic system.***
- Lower the Eco sweeping machine until all castor wheels touch the ground.
- For open sweeping machines, place the two supports on the sweeping machine frame onto the ground and secure with the clamping T-bolt.

4.4.1 Three-point linkage - Detachment

- The safety regulations from chapter 4.2 apply.

- Pull out the clamping T-bolt (3) of the support (4). Place the support onto the ground and secure it with the clamping T-bolt (1), if present.
- Remove the 3-point linkage rods from the carrier vehicle on the 3-point linkage of the sweeping machine.

  ⓘ ***Drive carrier vehicle away, backwards in the case of frontal attachment and forward in case of rear attachment.***

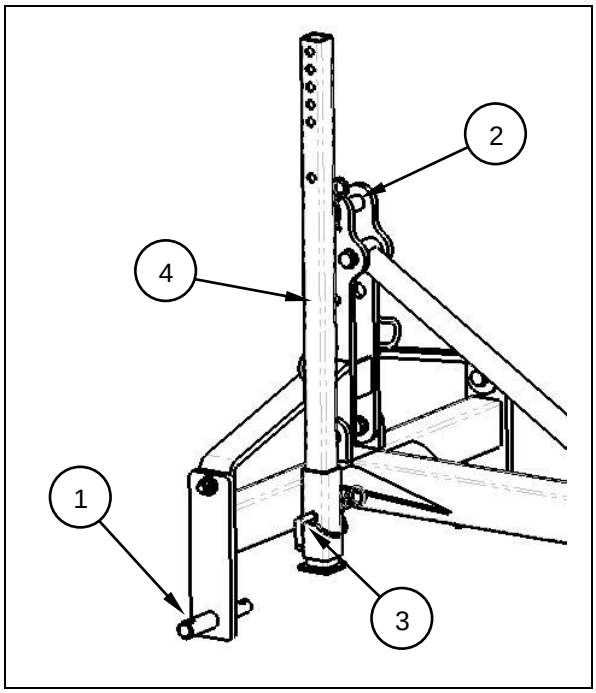


Fig. 4.19

4.4.2 Yard loader - Detachment

- The safety regulations from chapter 4.2 apply.

- Unlock the receptacle as described in the carrier vehicle's operating manual.
- Drive vehicle backwards.

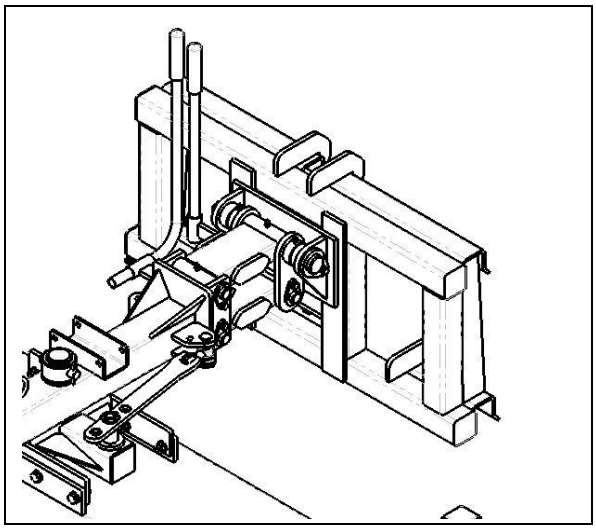


Fig. 4.20

4.4.3 Coupling triangle – Detachment

- The safety regulations from chapter 4.2 apply.

- Undo the lock and lower the coupling triangle from the carrier vehicle.
- Drive vehicle backwards.

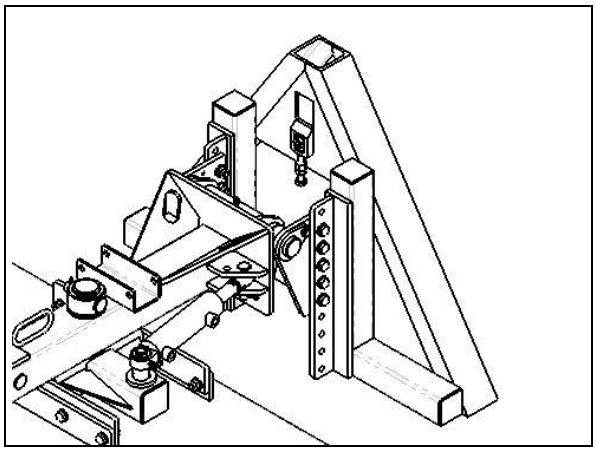


Fig. 4.21

4.4.4 Fork arm receptacle - Detachment

- The safety regulations from chapter 4.2 apply.

- Disconnect the safety chain from the carrier vehicle and place across the machine's cover.
- Move the fork arms out of the receptacle openings of the fork arm receptacle.

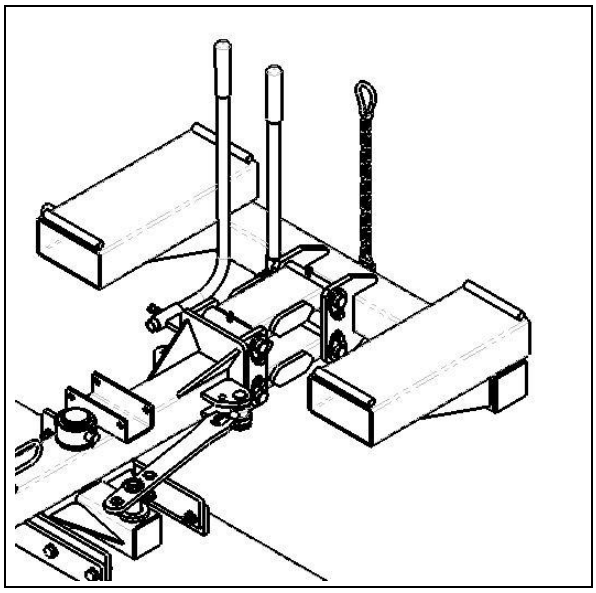


Fig. 4.22

4.5 Storage

- The safety regulations from chapter 4.2 apply.

⚠ ***Park sweeping machine on a firm and level surface in a dry and clean place.***

⚠ ***Accident hazard! Ensure a secure standing of the sweeping machine.***

- support wheels (1) and third support wheel (2) must point backwards towards the carrier vehicle. (Exception: 3-point linkage rear receptacle!)

➔ ***If stored for longer, the sweeping machine must be placed so that the bristles of the sweeping drum do not carry any load.***

Take the ground pressure off the sweeping Drum

⚠ ***Take the sweeping machine's own weight into account.***

- Remove the bolts (3) of the support wheel receptacle (4), slide the support wheels out and secure them again using the bolt (3).

ⓘ ***Carry out the setting evenly on both sides.***

- Fully extend the support (5) of the 3-point linkage, if present.
- Bristles of the sweeping drum must no longer touch the ground.

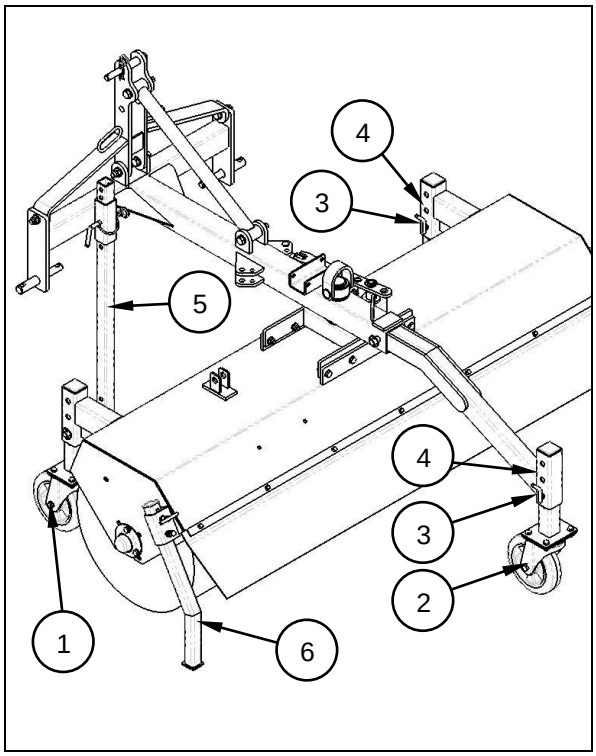


Fig. 4.23

Sweeping machine without collector vessel

- For the open sweeping Eco sweeping machine, shift the supports (6) downwards and secure them.

ⓘ If necessary, clean the sweeping machine thoroughly. Dirt attracts humidity and leads to the formation of rust.

- If necessary, repair paint damage.
- Kehrmaschine Eco gründlich abschmieren.

5 Hydraulic system

5.1 Hydraulic hoses

WARNING

Danger of infection for persons can occur when hydraulic oil escapes under high pressure and enters the body.

When coupling and uncoupling the hydraulic hose lines ensure that the hydraulic system at the vehicle and at the sweeper is depressurised. Move all the operating levers of the working hydraulics of the vehicle several times in both directions.

In the event of injury from hydraulic oil, contact a doctor immediately.

5.1.1 Coupling hydraulic hoses

WARNING

Danger for persons due to crushing, cutting, catching, dragging-in and impact can arise if malfunctions occur as a result of incorrectly connected hoses.

- When coupling the hydraulic hoses, pay attention to the coloured markings on the hydraulic plug connectors.
- Check arrangement of the hydraulic hose lines to the individual hydraulic components on the sweeper, in case the coloured markings (dust covers) are missing:
  - P = Pressure line
  - T = Return line

- Note the maximum permissible operating pressure of the hydraulic oil of 180 bar.
- Only couple clean hydraulic plug connectors.
- Ensure when coupling and uncoupling the hydraulic hoses that no oil spills into the surrounding area.
- Insert the hydraulic plug connector as far as possible into the hydraulic socket until the plug is noticeably locked.
- Check the coupling points of the hydraulic hose lines for proper and tight seating.
- Coupled hydraulic hose lines:
  - must easily adapt to all movements for driving round curves without tension, bending or rubbing,
  - must not rub against other parts.

1. Pull the parking brake of the vehicle into the “on” position..
2. Switch engine of vehicle off and remove ignition key.
3. Move all the operating levers of the working hydraulics of the vehicle several times in both directions.

   → The hydraulic system is now depressurised.
4. Clean the hydraulic plug connectors of the hydraulic hose lines before coupling them into the hydraulic sockets.
5. Couple all hydraulic hoses of the sweeper to the quick-acting couplers of the vehicle.

5.1.2 Uncoupling hydraulic hoses

1. Pull up the parking brake of the vehicle into the “on” position
2. Switch engine of vehicle off and remove ignition key.
3. Move all the operating levers of the working hydraulics of the vehicle several times in both directions.

   → The hydraulic system is now depressurised.
4. Release the hydraulic plug connectors from the hydraulic sockets.

6 Cleaning, servicing and maintenance

When carrying out cleaning, servicing and maintenance, observe the instructions of the Chapters:

- "Obligations of the user", on pages 2-8,
- "Qualifications of the persons", on page 2-9,
- "Fundamental safety instructions", from pages 2-11,
- "Warning instructions and instructions", from page 2-16.

Observing these chapters further ensures your safety.

WARNING

Danger due to crushing, shearing, cutting, severing, catching, windingon, dragging-in and impact for persons can occur when:

- **The raised and unsecured sweeper inadvertently sinks or is inadvertently lowered.**
- **Vehicle inadvertently starts and rolls.**
- Secure the raised sweeper against inadvertent lowering before working in the area of the raised sweeper.
- Secure the vehicle against inadvertent starting and rolling before cleaning, servicing or maintaining the sweeper connected to the vehicle. For this purpose see Chapter "Securing the vehicle against inadvertent starting and rolling", page 2-15.
- Wait for the sweeper to come to a stop before entering the hazard area of the sweeper.

WARNING

Danger due to crushing, shearing, cutting, severing, catching, winding-on, pullingdragging--in and impact for persons can occur when danger areas are unprotected.

- Re-fit any protective equipment that has been removed for cleaning, servicing or maintenance of the sweeper.
- Replace defective protective equipment items with new ones.

WARNING

Dangerous conditions can arise when load-bearing parts break during mechanical work on frame components.

The following are categorically prohibited:

- Drilling on the frame or chassis.
- The widening of holes in the frame or chassis.
- Welding on load-bearing parts.

6.1 Cleaning

- Clean the sweeper regularly and thoroughly. Dirt attracts moisture and leads to rusting.
- After cleaning, lubricate the sweeper. Avoid moisture when cleaning. Blowing moisture off is usually sufficient.
- Observe the legal regulations for the handling and dispos of cleaning agents.
- Repair damage to paintwork if necessary.
- Monitor the hydraulic hose lines particularly carefully.
- Never treat hydraulic hoses with petrol, benzine, petroleum or mineral oils.
- If the sweeper is not used for a longer time period, then, after cleaning, it should be lubricated, sprayed with oil and the piston rods of the hydraulic cylinder greased.

Cleaning with high-pressure cleaner / steam spray

Pay special attention to the following points if a high-pressure or steam spray is used for cleaning.

- Never direct the cleaning spray from the cleaning jet from a high-pressure cleaner / steam spray directly onto lubrication and bearing surfaces.
- Always keep a minimum jet distance of 300 mm between the high-pressure cleaner / steam spray and the sweeper.
- Observe the safety regulations when handling high-pressure cleaners.

6.2 Replacing wearing parts

- Maintenance, repair and replacement works on the Sweeper Eco must only be carried out after switching off the hydraulic drive and uncoupling the hydraulic connections. Secure the carrier vehicle against inadvertent starting, rolling or lowering.
- Do not enter or work under the raised sweeper.

WARNING

- Always secure the opened dirt hopper by operating the shut-off valve. Additional mechanical means of prevention against closing the hopper is necessary.
- Renew brush rings only when sweeper is attached to the carrier vehicle.

6.2.1 Replacing sweeping drums

The safety regulations from chapter 4.2 apply.

⚠ ***Replace brush rings only when the sweeping machine is attached to the carrier vehicle.***

ⓘ ***Uninstall the collector vessel before replacing the brush rings. (see Chapter 4.2.2 Conversion to the open sweeping Eco sweeping machine)***

ⓘ ***Replace attachment nuts each time after they are unscrewed.***

ⓘ ***Turn off the pressure on the hydraulic hoses of the Eco sweeping machine in the carrier vehicle.***

- Remove attachment nut (1).
- Pull the hydraulic motor (2) back until the sweeping drum is exposed.

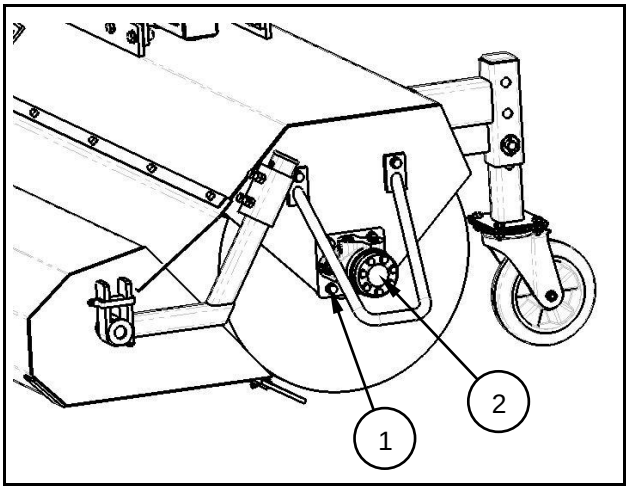


Fig. 6.1

- Unscrew attachment screws (3).
- Remove bearing shell I (4) with bearing protection (5).
- Unscrew attachment screws (6).
- Loosen threaded bolt (7) and unmount with bearing (8).
- Unmount bearing shell II (9).
- Lift sweeping machine out.

⚠ ***Do not walk, move or work underneath the lifted sweeping machine.***

⚠ ***Secure sweeping machine and carrier vehicle against unintended restart, sagging and movement!***

- Roll sweeping drum away.
- Remove the holding plate (10) from the brush shaft.
- Pull off worn-out sweeping drums.

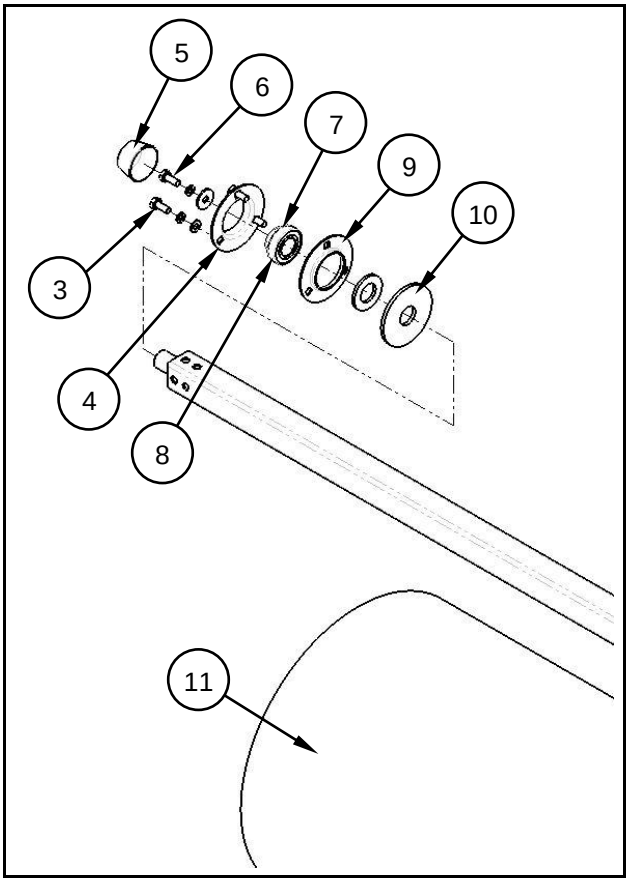


Fig. 6.2

- Push the new sweeping drums (11) onto the brush shaft.
- Before assembly, clean all parts and replace if necessary.
- The assembly of the brush shaft is carried out in the opposite order to the disassembly.

  ⓘ ***See Chapter 4.3.7 for adjustment of the sweeping profile***

6.2.2 Replacement of the Vulkollan rail

The safety regulations from chapter 4.2 apply.

⚠ ***Replace Vulkollan rail only when the sweeping machine is attached to the carrier vehicle and lifted.***

⚠ ***Do not move underneath the lifted machine.***

ⓘ ***The dirt collection vessel must be empty and completely open.***

⚠ ***Secure sweeping machine and carrier vehicle against unintended restart, sagging and movement! Pull the ignition key.***

- Unscrew the attachment screws (2) with the locking tooth nuts (4) along the entire length of the Vulkollan rail (1) and remove the old Vulkollan rail (1) and the impact rail (3).

  ⓘ ***Take into account the weight of the impact rail and the Vulkollan rail.***

- Attach the Vulkollan rail (1). The installation is carried out in the opposite order.

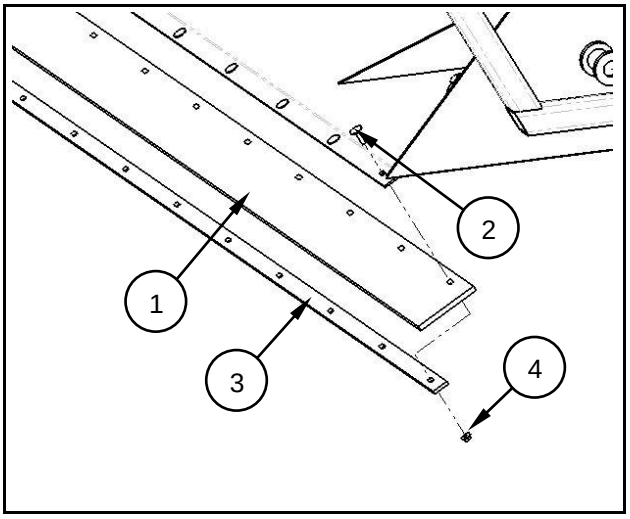


Fig. 6.3

6.2.3 Replacing fuse

The safety regulations from chapter 4.2 apply.

- Unscrew the fuse holder (1).
- Insert a new fuse.
- Screw the fuse holder closed again (1).

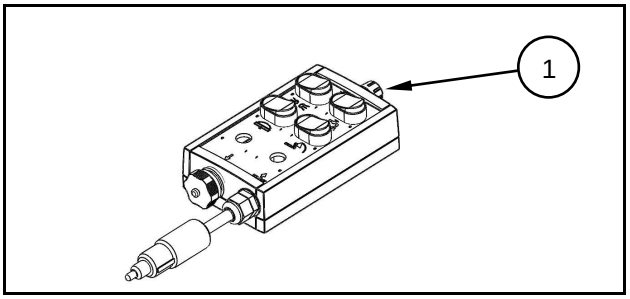


Fig. 6.4

6.2.4 Cleaning of water-spray system

The safety regulations from chapter 2.1 apply.

➔ ***You will find the water filter on the inward suction hose (4) inside the water tank (1).***

- Unscrew the water tank cap (2).
- Pull the suction hose (4) out of the water tank opening. Unscrew the housing cover (7).
- Clean filter sieve (6) with water.
- Screw housing cover (7) with filter sieve (6) onto the housing (5).
- Place suction hose (4) into the water tank (1) again and screw the water tank cover (2) back on.

➔ ***The condition of the filter sieve must be checked every 50 operating hours and cleaned if necessary.***

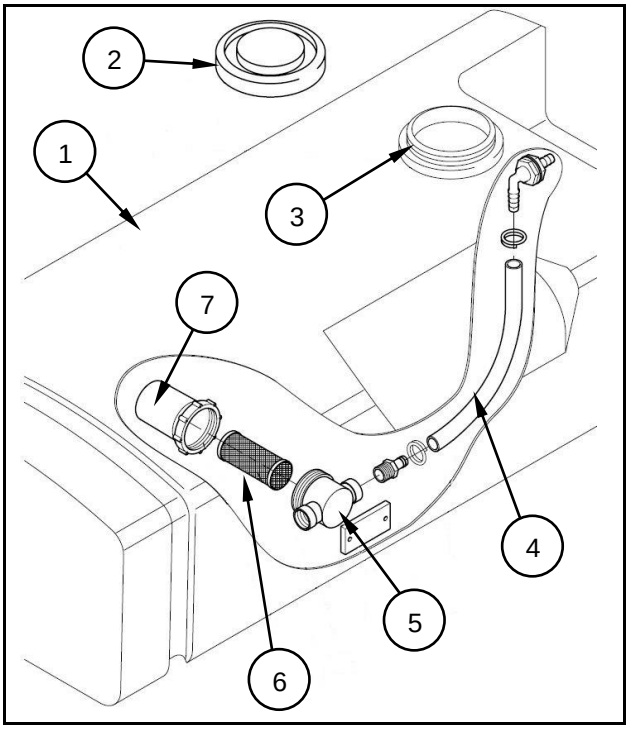


Fig. 6.5

6.3 Lubrication - Overview

- Lubricate all bearings and lubricating points according to the lubrication plan.
- Remove dirt from the lubrication nipples.
- Use environmentally friendly biodegradable oil and greases where lubricants can enter into any animal feed or the ground. Find out more at your specialist for agricultural machinery.
- Lubricate bearing points weekly with grease according to DIN 51502 (e.g. Gresalit 2 of the company Westfalen).

Lubrication points on sweeper and accessories **= Grease weekly!**

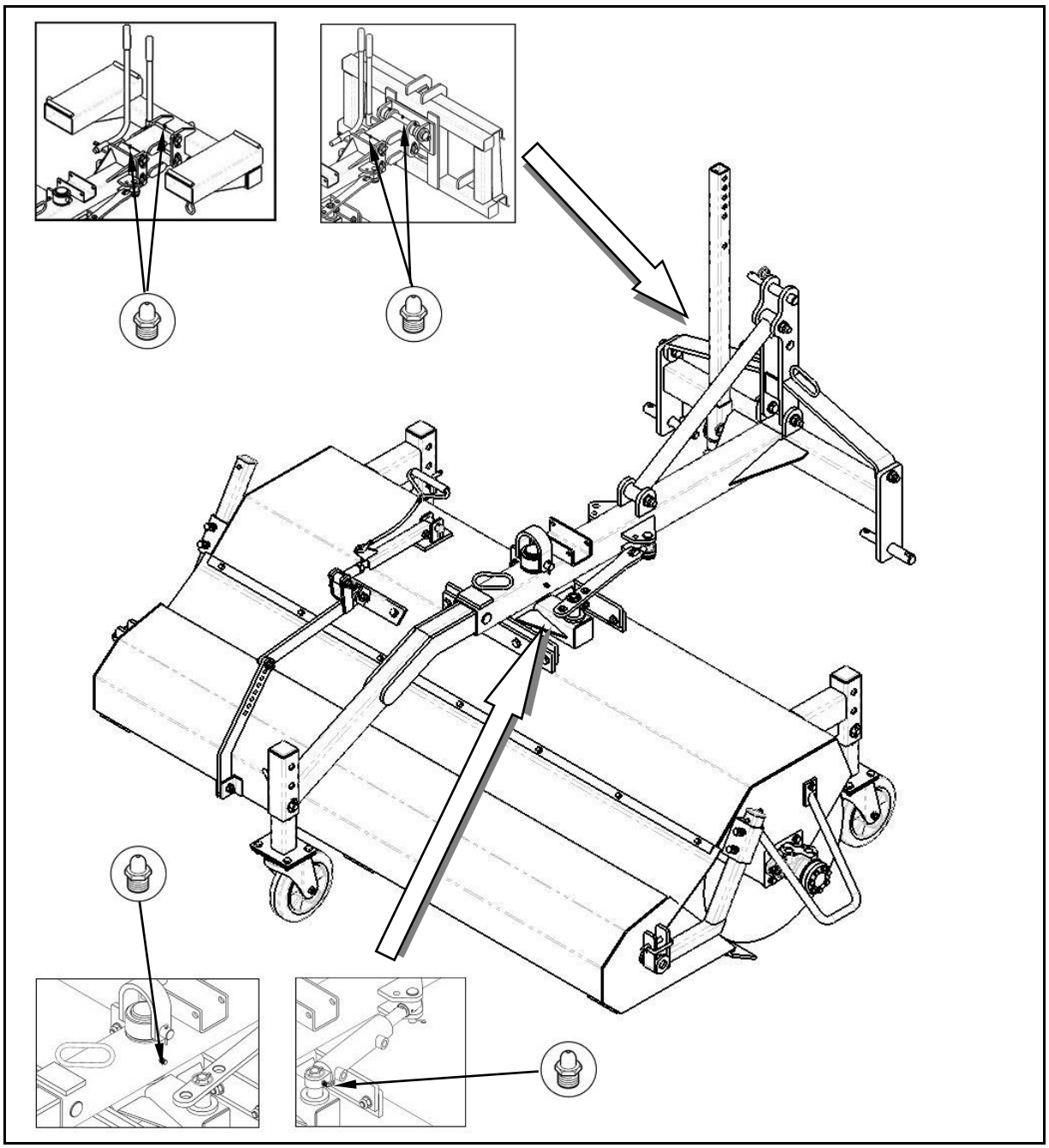


Fig. 6.6

6.4 Faults: Causes and remedies

Fault	Cause	Remedy
1. Sweeping drum does not turn	• Hydraulic connections not correct • Pressure or volume flow too low • Hydraulic motor defective	• Check connections • Ask a qualified workshop • Ask a qualified workshop
2. Dirt collection vessel does not pivot upwards (mechanically)	• Rope at the emptying mechanism is attached incorrectly	• Attach rope correctly, see Chapter 3.4.5 Emptying the dirt collection vessel, mechanically
3. Dirt collection vessel does not tilt upwards (hydraulically)	• Hydraulic connections not correct • Hydraulic cylinder defective	• Check connections • Ask a qualified workshop
4. Sweeping result unsatisfactory	• Broom adjustment	• Readjust broom
5. Hydraulic side adjustment without functionality	• Hydraulic connections not correct • Pressure or volume flow too low • Hydraulic cylinder defective	• Check connections • Ask a qualified workshop • Ask a qualified workshop

6.5 Hydraulic system

WARNING

Danger of infection for persons can occur when hydraulic oil escapes under high pressure and enters the body.

- Only an expert workshop may carry out work on the hydraulic system.
- Depressurise the hydraulic system before starting work on the hydraulic system.
- Make sure to use suitable aids when searching for leaks.
- Never attempt to seal leaking hydraulic hose lines with the hand or fingers.
- Because of the high pressure, fluids (hydraulic oil) can penetrate the skin and enter the body and cause serious damage.
- In the case of injury from hydraulic oil, contact a doctor immediately. Danger of infection!

- When coupling and uncoupling the hydraulic hose lines to the hydraulic system of the vehicle, ensure that the hydraulic system is depressurised.
- Ensure correct connection of the hydraulic hose lines.
- Regularly check all hydraulic hose lines and couplings for damage and contamination.
- Have the hydraulic hoses checked for working safety and condition at least once a year by an expert.
- Replace hydraulic hoses in case of damage and ageing. Use only manufacturer's original hydraulic hoses.
- The period of use of the hydraulic hoses must not exceed six years including a possible storage time of at most two years.
- Hoses and hose connectors are subject to natural ageing even with proper storage and permissible level of use; so that their storage time and period of use is limited. However, the period of use can be determined according to experience, especially when taking the danger potential into account. Other guidelines may apply for hoses and hose lines of thermoplastics.
- Store oil safely, out of the reach of children.
- Ensure that no hydraulic oil enters the ground or water.

6.5.1 Marking of hydraulic hose lines

The marking on the valve (Fig. 6.13) provides the following information:

(1) Mark of the manufacturer of the hydraulic hose line (A1HF)

(2) Manufacture date of the hydraulic hose line (04 / 02 = year / month = Feb. 2004).

(3) Maximum operating pressure (210 BAR)

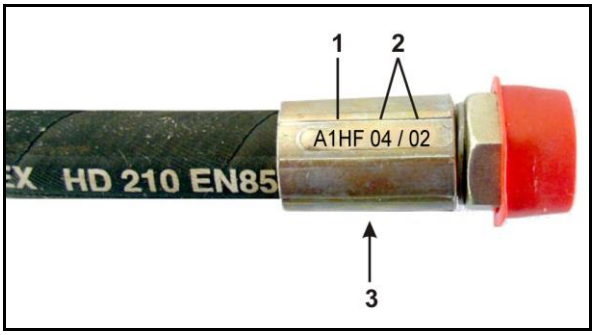


Fig. 6.13

6.5.2 Servicing intervals

After the first 10 operating hours and then every 50 operating hours.

1. Check all components of the hydraulic system for leaks.
2. If necessary, retighten the screw connections.

Before every start-up:

1. Check the hydraulic hose lines for obvious defects.
2. Correct any worn areas on hydraulic lines and pipes.
3. Immediately replace worn or damaged hydraulic hose lines.

6.5.3 Inspection criteria for hydraulic hose lines

For your own safety:

Replace hydraulic hose lines immediately you observe one of the following defects:

- Damage to the outer layer down to the reinforcement (e.g. from rubbing points, cuts, tears).
- Brittleness of the outer layer (recognisable by crack formation of the hose material).
- Unnatural deformations of the hydraulic hose lines, e.g. layer separation, bubble formations, areas of crushing or kinking.
- Leaks.
- Damage, deformation or leaks of the hose fittings. Slight surface damage is not grounds for replacement.
- Detachment of the hose from the fittings.
- Corrosion of the valve/fitting that can impair its function and strength.
- Unprofessionally laid hydraulic hose lines, e.g. bending radii not adhered to, positioning over sharp edges.

- The period of use of 6 years is exceeded.

  The period of use is calculated from the date of manufacture of the hydraulic hose line plus 6 years.

  Example (Fig. 6.13): The date of manufacture of hydraulic hose line is indicated on the valve, for example, (07/10 = year / month = October 2007). The period then ends in October, 2013.

6.5.4 Installation and removal of hydraulic hose lines

Make sure to observe the following instructions in the installation and removal of hydraulic hose lines:

- Use only hydraulic hose lines from the manufacturer.
- Ensure cleanliness.
- It is necessary to install hydraulic hose lines in such a manner that in all operating conditions:
  - tensile loading does not occur except as a result of inherent weight,
  - there is no axial compression load along short lengths,
  - external mechanical influences on the hydraulic hose lines are prevented.

    Prevent rubbing of the hydraulic hose lines on components or against one another by proper arrangement and fastening. If necessary, protect the hose lines by means of protective covers. Cover sharp-edged components.
  - the permissible bending radii are not made smaller than allowed.
- When connecting to moving parts it is required that the hose lengths of a hydraulic hose line, are dimensioned such that:
  - In the overall moving area the smallest permissible bending radius is not below what is allowed.
  - The hydraulic hose line is not subjected to tensile force.
- Fix the hydraulic hose line to the defined fastening points. Avoid additional hose supports that impair the natural movement and changes of length of the hydraulic hose lines.
- Painting of the hydraulic hose line is prohibited.

6.6 Bolt torques

Thread A=Ø	Spanner gap [mm]	Torque [Nm] depending on the bolt / nut quality classification		
		8.8	10.9	12.9
M 8	13	25	35	41
M 8x1		27	38	41
M 10	16 (17)	49	69	83
M 10x1		52	73	88
M 12	18 (19)	86	120	145
M 12x1.5		90	125	150
M 14	22	135	190	230
M 14x1.5		150	210	250
M 16	24	210	300	355
M 16x1.5		225	315	380
M 18	27	290	405	485
M 18x1.5		325	460	550
M 20	30	410	580	690
M 20x1.5		460	640	770
M 22	32	550	780	930
M 22x1.5		610	860	1050
M 24	36	710	1000	1200
M 24x2		780	1100	1300
M 27	41	1050	1500	1800
M 27x2		1150	1600	1950
M 30	46	1450	2000	2400
M 30x2		1600	2250	2700

- **Check the bolts and nuts for tight seating for the first time after 5 operating hours, then regularly (approx. every 50 operating hours); tighten up if required.**

A = Thread size (tensile strength classification found on bolt head)

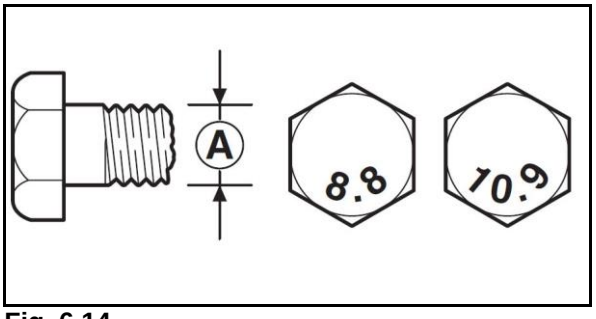


Fig. 6.14

7 Appendix

7.1 Hydraulic circuit diagrams

Hydraulic circuit diagram for Eco

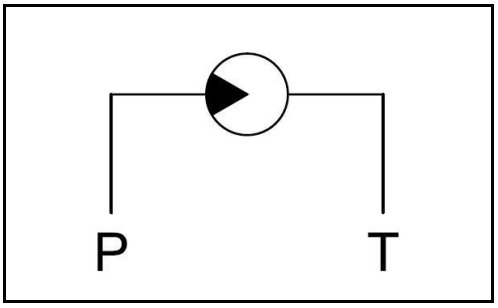


Fig. 7.1

Hydraulic circuit diagram for Eco with hydraulic vessel emptying

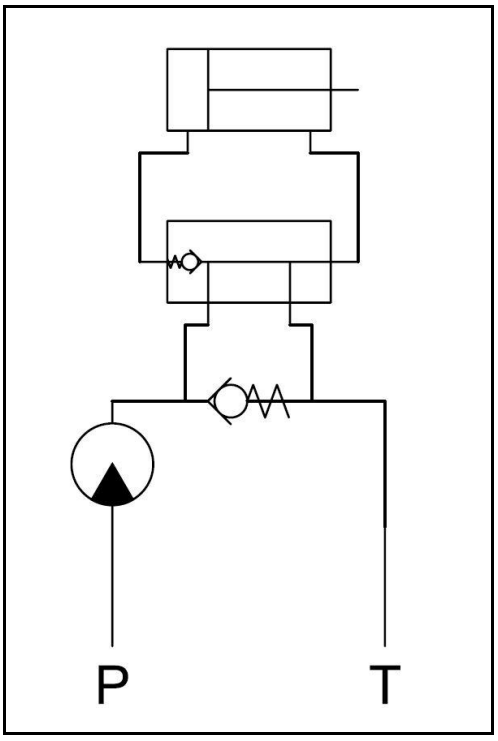


Fig. 7.2

Hydraulikschaltplan für Eco hydraulische Schrägstellung

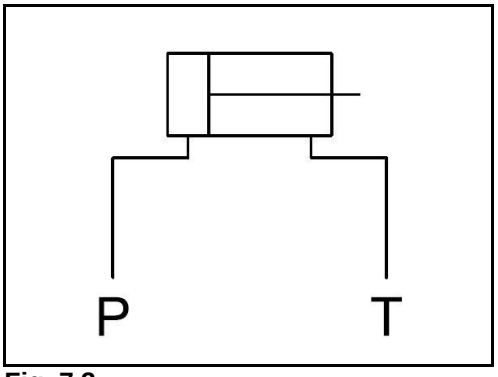


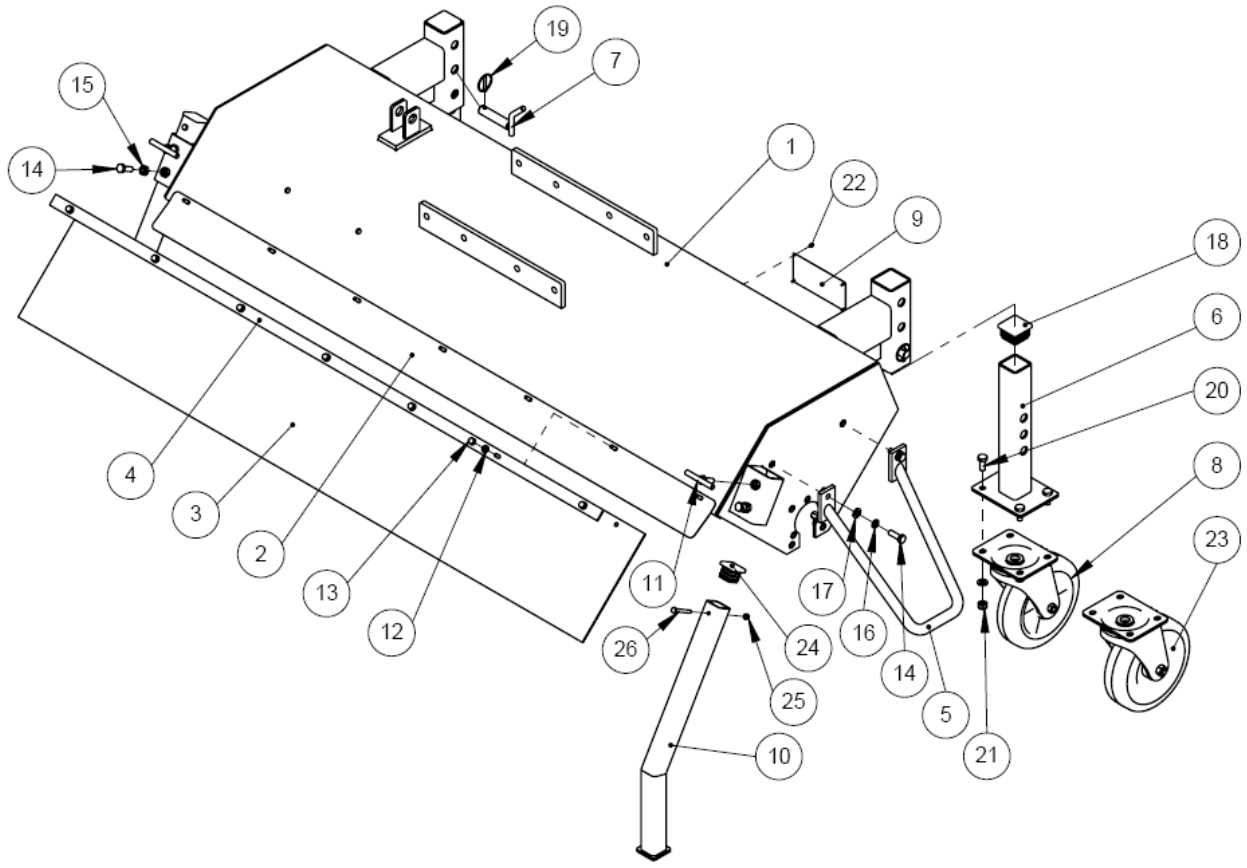
Fig. 7.3

7.2 Notes

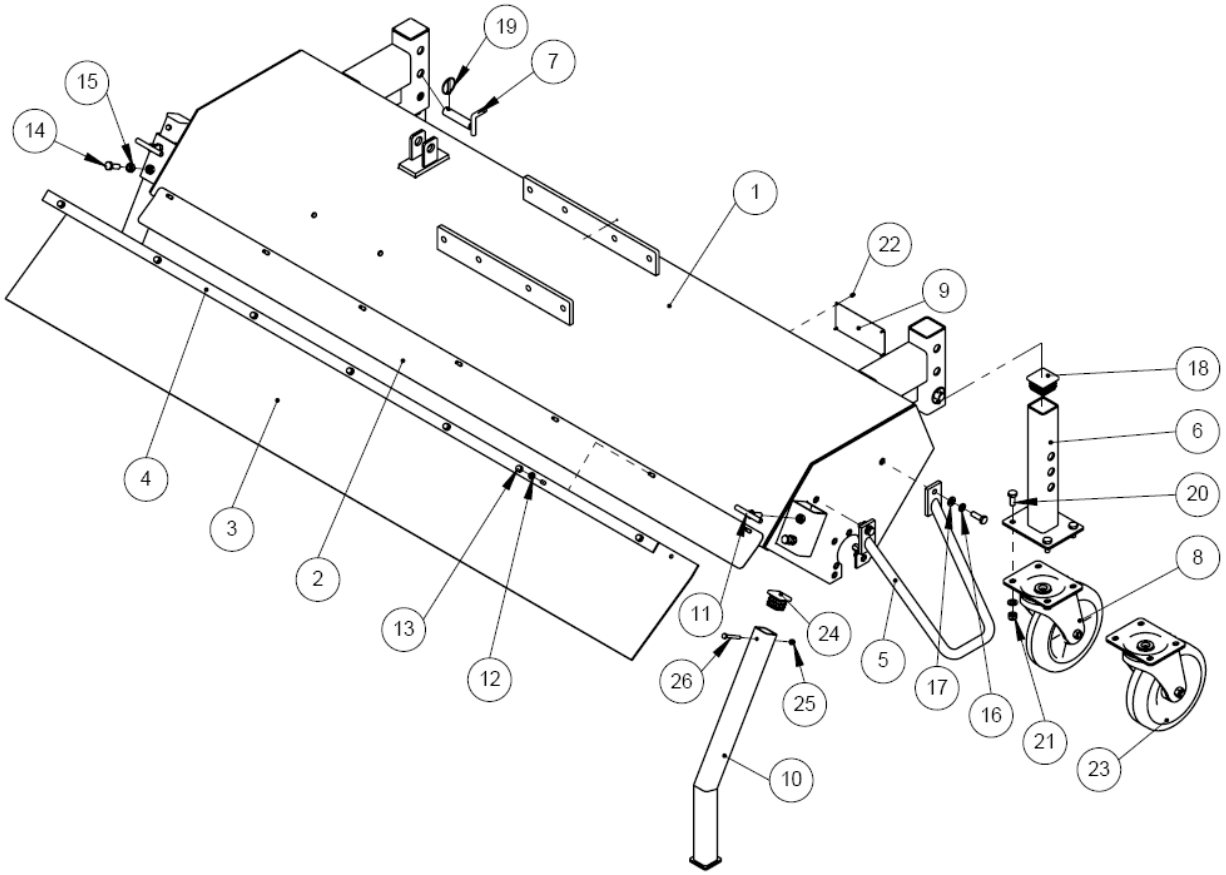
8. Parts Section - Eco Broomsweeper

Contents

Frame Eco 1.50m

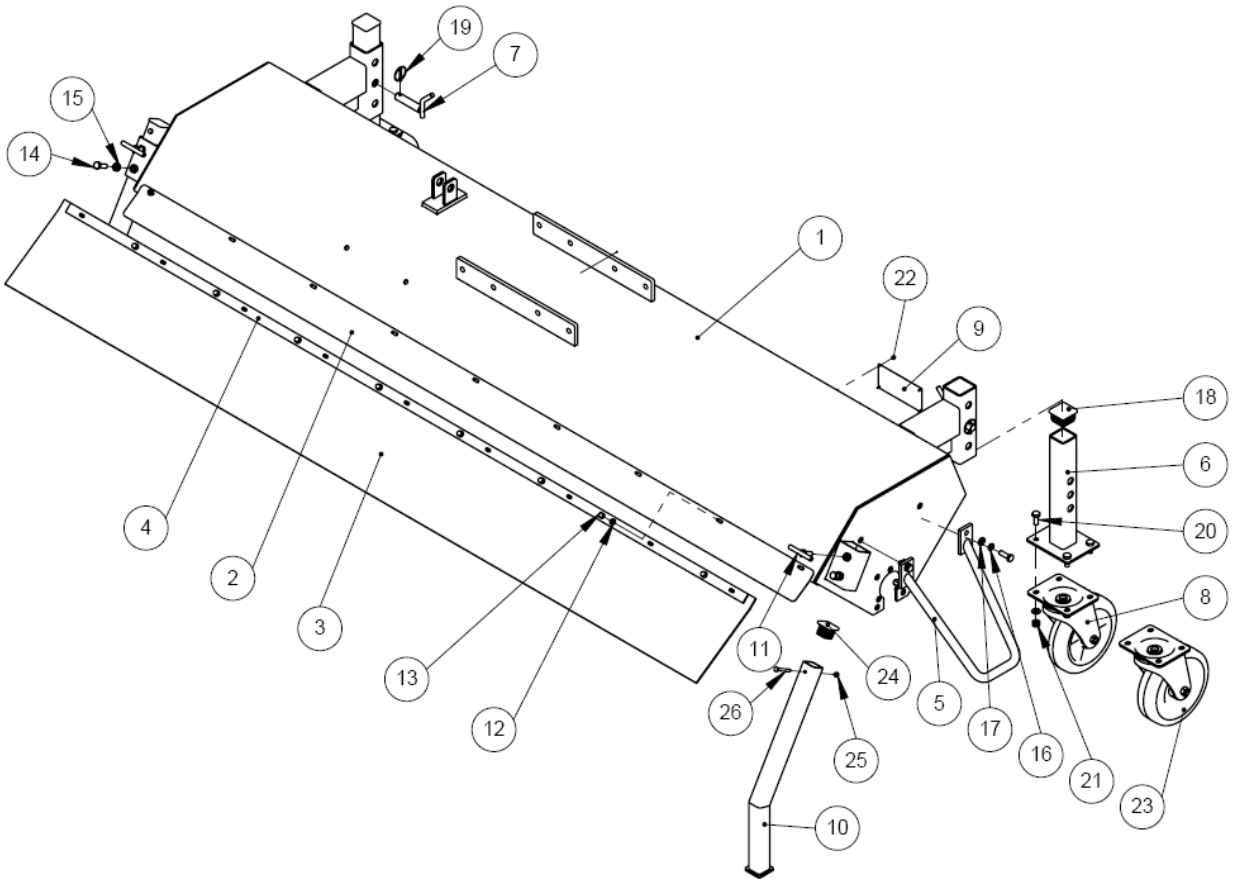


Ref.	Part No.	Description	Qty
1	10018037	Frame - Eco	1
2	10015294	Support Plate Eco 1.5m	1
3	80007-0030	Dust Flap - Eco	1
4	80006-0064	Strap - Flap Eco	1
5	10003021	Motor Guard	1
6	10003023	Leg, Adjustable - Support Wheel	2
7	10003024	Pin – Support Wheel Leg	2
8	40000036	Swivelling Castor Wheel - Standard - 200 x 50	2
9	40001422	Identification Plate	1
10	10003022	Parking Support Leg	2
11	10002671	Toggle Screw	2
12	40000021	Nyloc Nut	7
13	40000023	Nylon Protective Nut Cap	7
14	40000020	Hex Head Screw M10x30	4
15	40000026	Hex Nut M10	2
16	40000049	Spring Washer A10	2
17	40000041	Washer A10,5	10
18	40000652	Plastic Plug - Square 50x50x4	2
19	40000088	Lynch Pin ø4,5x32	2
20	40000050	Hex Head Screw M10x25	8
21	40000043	Hex Nut M10	8
22	40001423	Blind Rivet ø3x10	4
23	40000310	Swivelling Castor Wheel – Heavy Duty 200x50 (Optional)	2
24	40000651	Plastic Plug - Square 40x40x4	2
25	40000019	Hex Nut M6	2
26	40000024	Hex Head Screw M6x50	2

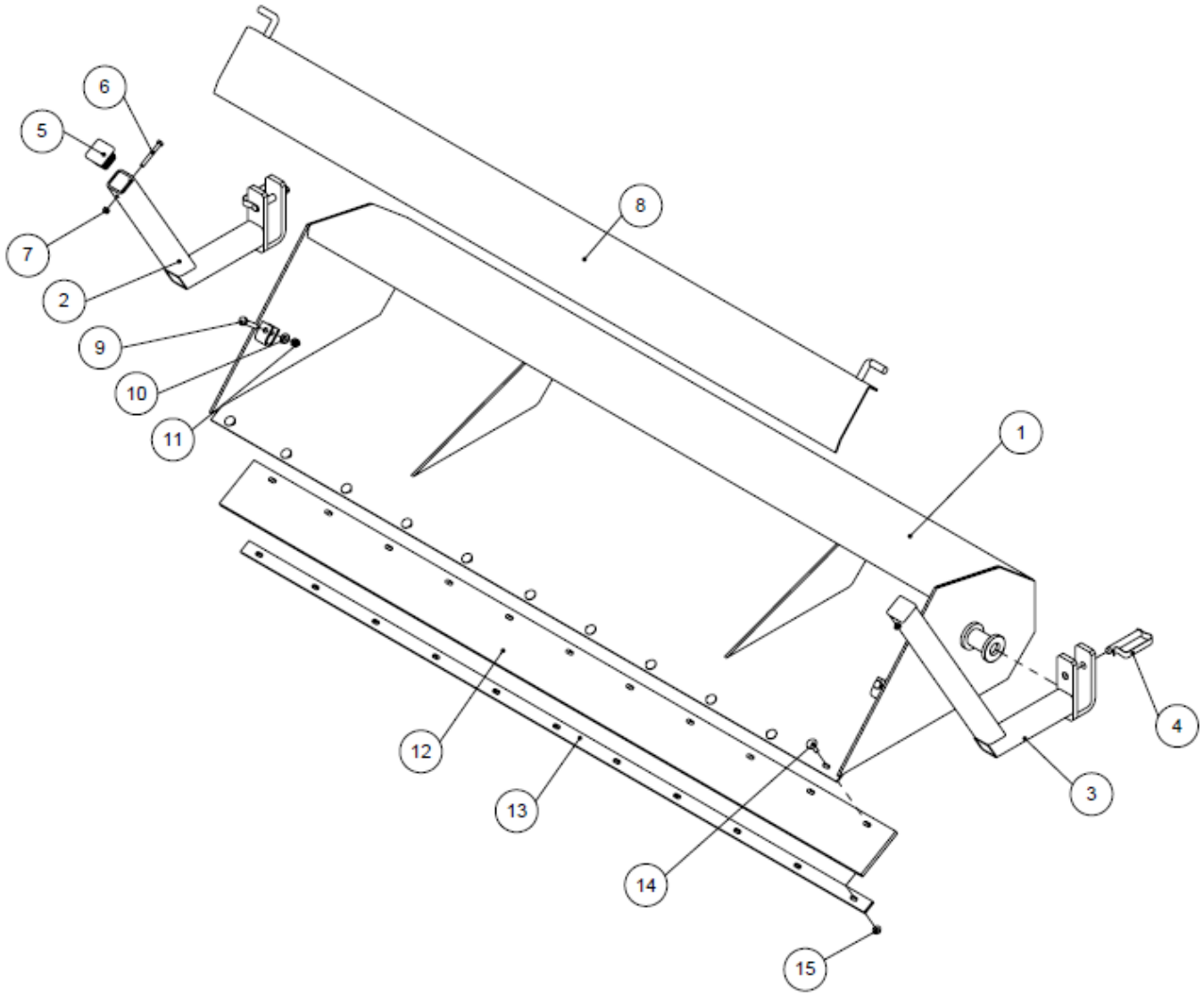


Ref.	Part No.	Description	Qty
1	10018039	Frame - Eco	1
2	10015295	Support Plate Eco 1.8m	1
3	80007-0031	Dust Flap - Eco	1
4	8006-0065	Strap - Flap Eco	1
5	10003021	Motor Guard	1
6	10003023	Leg, Adjustable - Support Wheel	2
7	10003024	Pin – Support Wheel Leg	2
8	40000036	Swivelling Castor Wheel - Standard - 200 x 50	2
9	40001422	Identification Plate	1
10	10003022	Parking Support Leg	2
11	10002671	Toggle Screw	2
12	40000021	Nyloc Nut	7
13	40000023	Nylon Protective Nut Cap	7
14	40000020	Hex Head Screw M10x30	4
15	40000026	Hex Nut M10	2
16	40000049	Spring Washer A10	2
17	40000041	Washer A10,5	10
18	40000652	Plastic Plug - Square 50x50x4	2
19	40000088	Lynch Pin ø4,5x32	2
20	40000050	Hex Head Screw M10x25	8
21	40000043	Hex Nut M10	8
22	40001423	Blind Rivet ø3x10	4
23	40000310	Swivelling Castor Wheel – Heavy Duty 200x50 (Optional)	2
24	40000651	Plastic Plug - Square 40x40x4	2
25	40000019	Hex Nut M6	2
26	40000024	Hex Head Screw M6x50	2

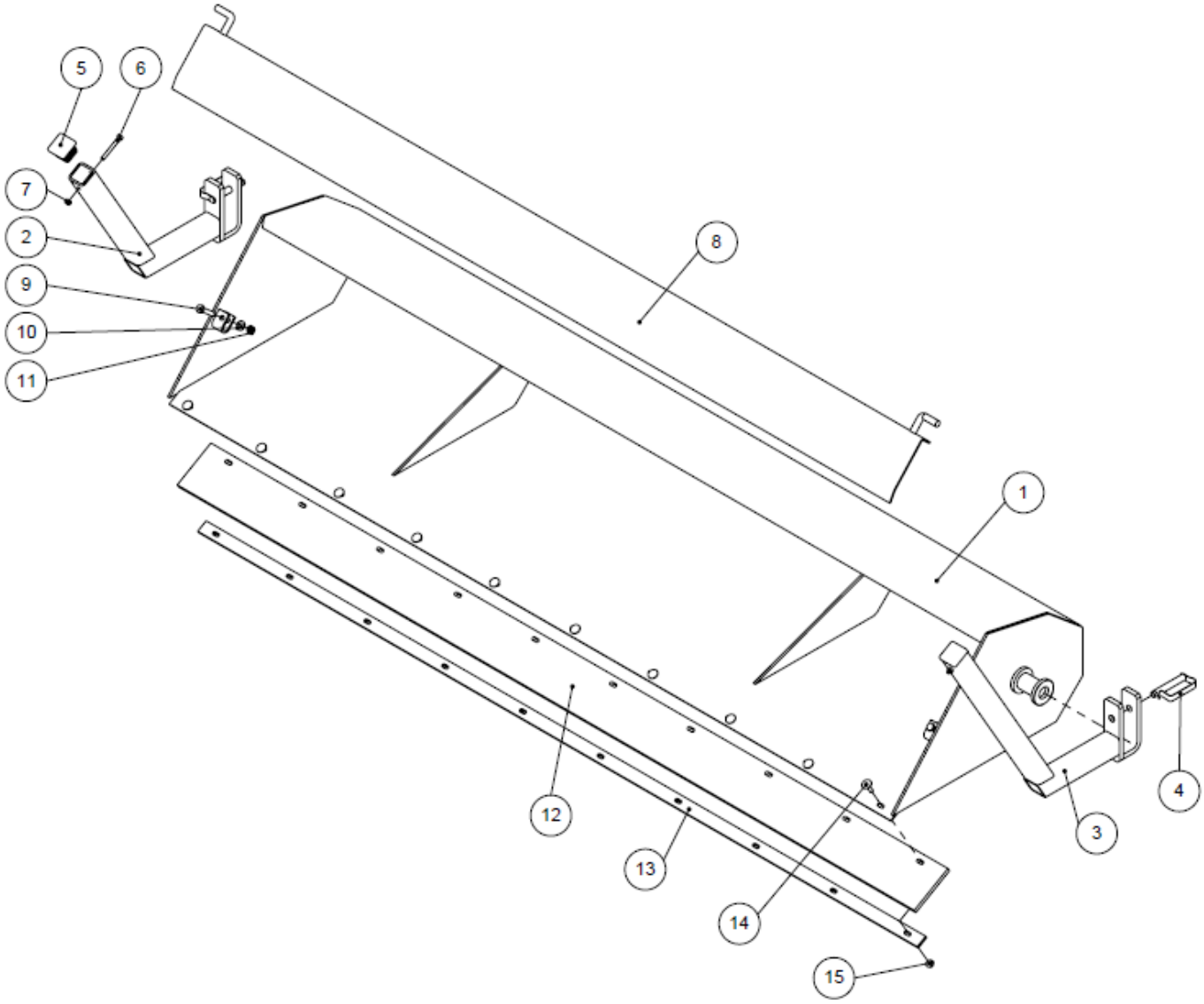
Frame Eco 2.30m



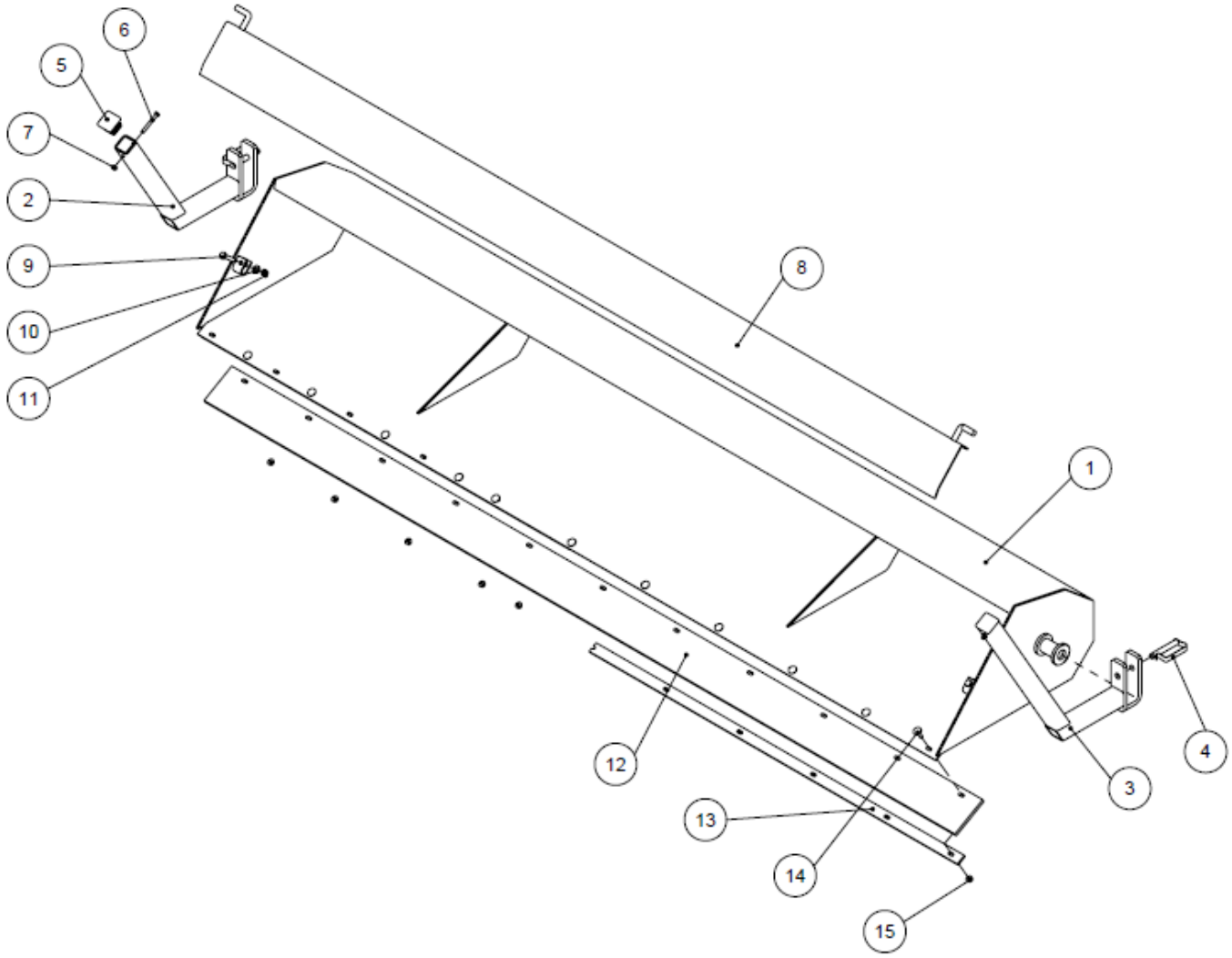
Ref.	Part No.	Description	Qty
1	10018040	Frame - Eco	1
2	10015296	Support Plate Eco 2.3m	1
3	80007-0032	Dust Flap - Eco	1
4	80006-0034	Strap - Flap Eco	1
5	10003021	Motor Guard	1
6	10003023	Leg, Adjustable - Support Wheel	2
7	10003024	Pin – Support Wheel Leg	2
8	40000036	Swivelling Castor Wheel - Standard - 200 x 50	2
9	40001422	Identification Plate	1
10	10003022	Parking Support Leg	2
11	10002671	Toggle Screw	2
12	40000021	Nyloc Nut	9
13	40000023	Nylon Protective Nut Cap	8
14	40000020	Hex Head Screw M10x30	4
15	40000026	Hex Nut M10	2
16	40000049	Spring Washer A10	2
17	40000041	Washer A10,5	10
18	40000652	Plastic Plug - Square 50x50x4	2
19	40000088	Lynch Pin ø4,5x32	2
20	40000050	Hex Head Screw M10x25	8
21	40000043	Hex Nut M10	8
22	40001423	Blind Rivet ø3x10	4
23	40000310	Swivelling Castor Wheel – Heavy Duty 200x50 (Optional)	2
24	40000651	Plastic Plug - Square 40x40x4	2
25	40000019	Hex Nut M6	2
26	40000024	Hex Head Screw M6x50	2



Ref	Part No.	Description	Qty
1	80040-0001	Collection Bin Eco 1.50m	1
2	10003028	Mounting Arm	1
3	10003930	Mounting Arm for SKB	1
4	40000033	Spring Pin ø12x65	2
5	40000651	Square Plug 40x40x4	2
6	40000024	Hex Head Screw M6x50	2
7	40000019	Nyloc Nut M6	2
8	80005-0026	Dust Flap Eco 1.50m	1
9	40000031	Hex Head Screw M8x40	2
10	40000032	Flat Washer	2
11	40000028	Nyloc Nut M8	2
12	80008-0041	Vulkollan Strip Eco	1
13	80017-0035	Steel Strip Eco	1
14	40000022	Coach Bolt M6x25	11
15	40000021	Flanged Nut M6	11

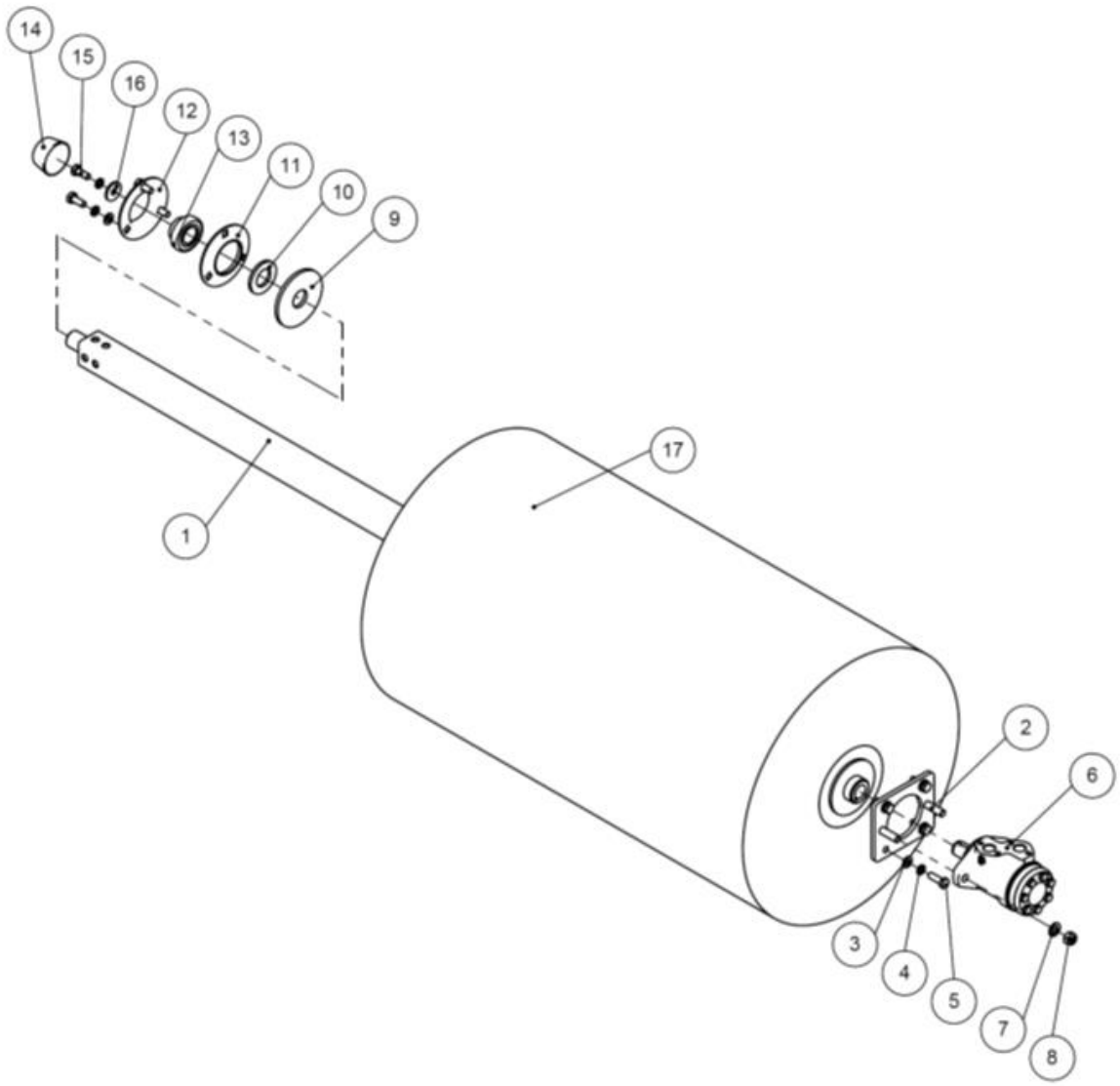


Ref	Part No.	Description	Qty
1	80040-0002	Collection Bin Eco 1.80m	1
2	10003028	Mounting Arm	1
3	10003930	Mounting Arm for SKB	1
4	40000033	Spring Pin ø12x65	2
5	40000651	Square Plug 40x40x4	2
6	40000024	Hex Head Screw M6x50	2
7	40000019	Nyloc Nut M6	2
8	80005-0027	Dust Flap Eco 1.80m	1
9	40000031	Hex Head Screw M8x40	2
10	40000032	Flat Washer	2
11	40000028	Nyloc Nut M8	2
12	80008-0047	Vulkollan Strip Eco	1
13	80017-0036	Steel Strip Eco	1
14	40000022	Coach Bolt M6x25	10
15	40000021	Flanged Nut M6	10

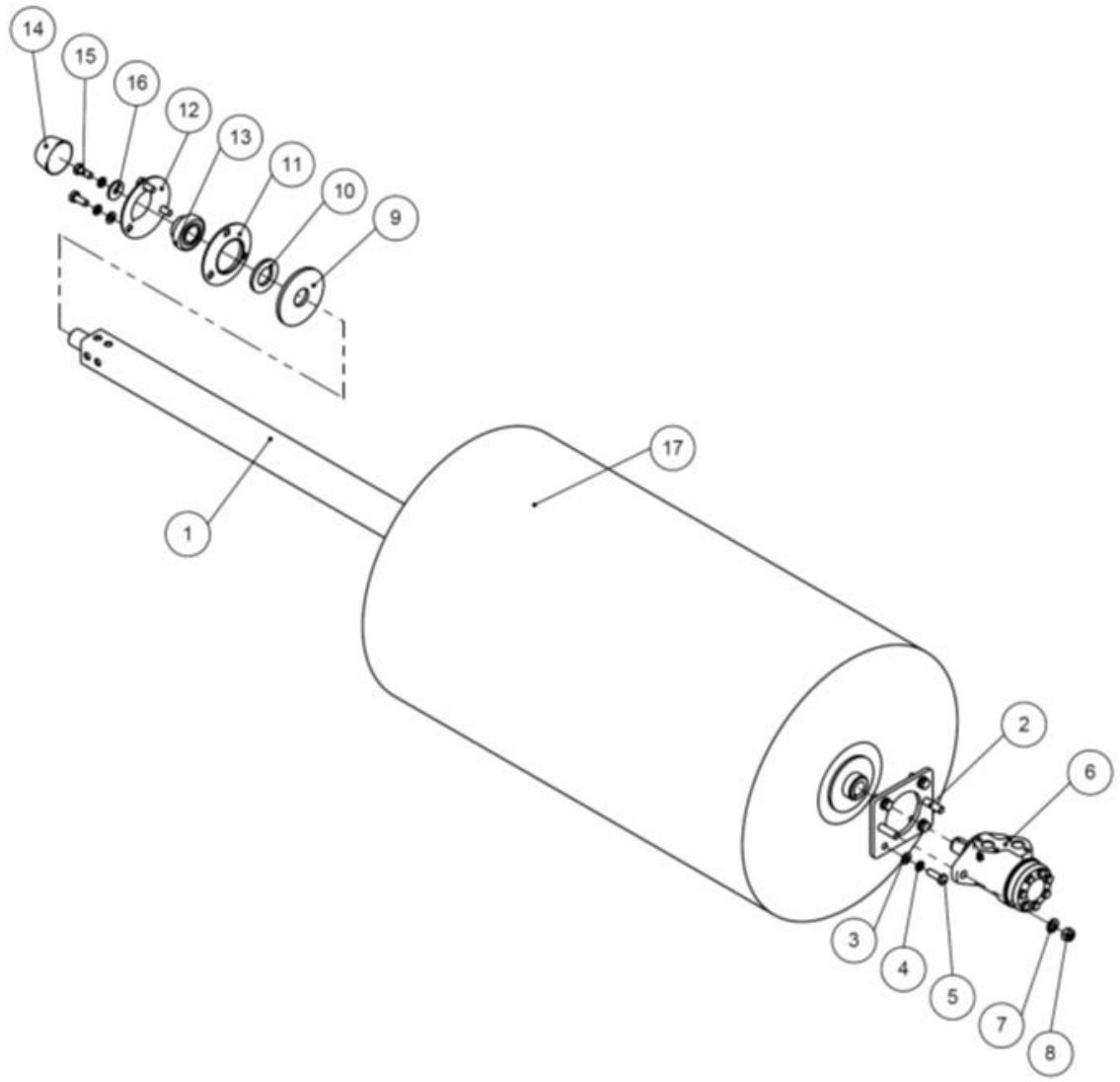


Ref	Part No.	Description	Qty
1	80040-0003	Collection Bin Eco 2.30m	1
2	10003028	Mounting Arm	1
3	10003930	Mounting Arm for SKB	1
4	40000033	Spring Pin ø12x65	2
5	40000651	Square Plug 40x40x4	2
6	40000024	Hex Head Screw M6x50	2
7	40000019	Nyloc Nut M6	2
8	80005-0028	Dust Flap Eco 2.30m	1
9	40000031	Hex Head Screw M8x40	2
10	40000032	Flat Washer	2
11	40000028	Nyloc Nut M8	2
12	80008-0044	Vulkollan Strip 2.30m Eco	1
13	10012126	Steel Strip Eco	2
14	40000022	Coach Bolt M6x25	11
15	40000021	Flanged Nut M6	11

Brush Shaft & Hydraulic Motor – Eco 1.50m

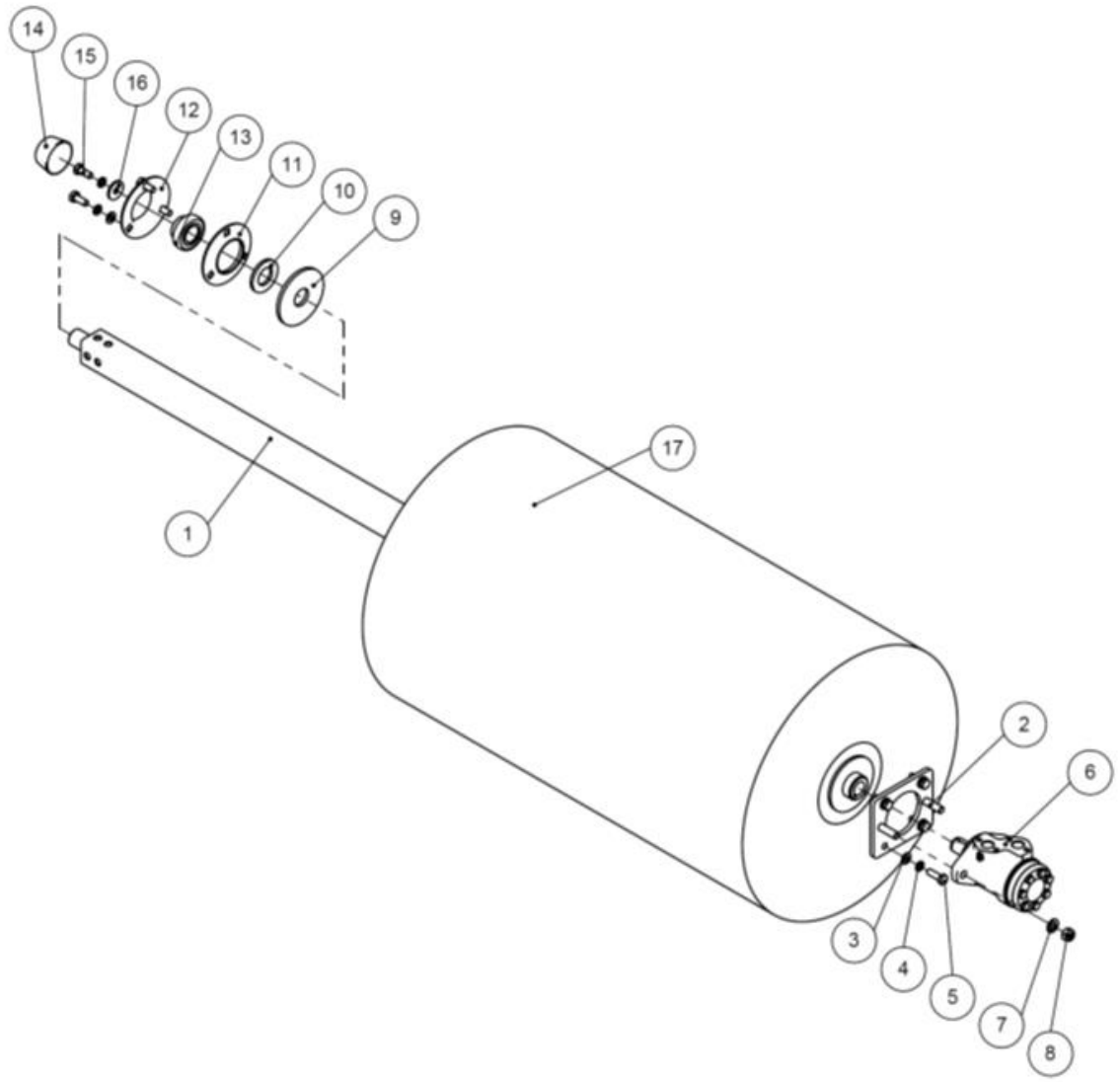


Ref.	Part No	Description	Qty
1	80039-0004	Brush Shaft Eco 1.50m	1
2	10003020	Motor plate 2-Bolt	1
3	40000041	Flat Washer	7
4	40000049	Spring Washer	8
5	40000020	Hex Head Bolt M10x30	4
6	40005221	Hydraulic motor SMR 160 with HPS-Gasket	1
7	40000042	Flat Washer	2
8	40000044	Hex Nut M12	2
9	40000653	Disc	1
10	40000132	Washer	1
11	40000056	Bearing Flange	1
12	40000059	Bearing Flange	1
13	40000058	Bearing Insert SB 206	1
14	40000057	Bearing Protection Cap	1
15	40000050	Hex Head Screw M10x25	4
16	40000051	Flat Washer	1
17	40000701	Brush Section PPN ø510x750	2

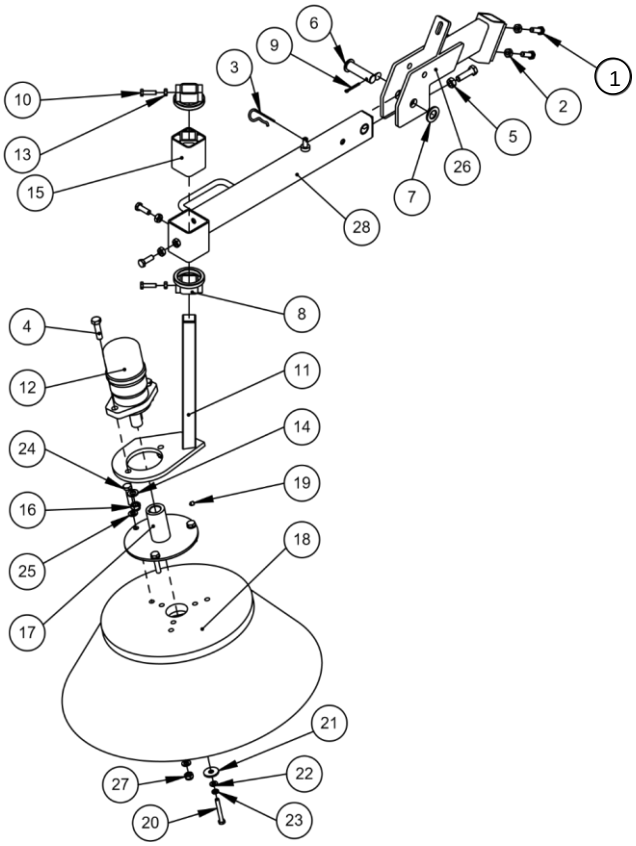


Ref.	Part No	Description	Qty
1	80039-0005	Brush Shaft Eco 1.80m	1
2	10003020	Motor plate 2-Bolt	1
3	40000041	Flat Washer	7
4	40000049	Spring Washer	8
5	40000020	Hex Head Bolt M10x30	4
6	40005221	Hydraulic motor SMR 160 with HPS-Gasket	1
7	40000042	Flat Washer	2
8	40000044	Hex Nut M12	2
9	40000653	Disc	1
10	40000132	Washer	1
11	40000056	Bearing Flange	1
12	40000059	Bearing Flange	1
13	40000058	Bearing Insert SB 206	1
14	40000057	Bearing Protection Cap	1
15	40000050	Hex Head Screw M10x25	4
16	40000051	Flat Washer	1
17	40000702	Brush Section PPN ø510x900	2

Brush Shaft & Hydraulic Motor – Eco 2.30m

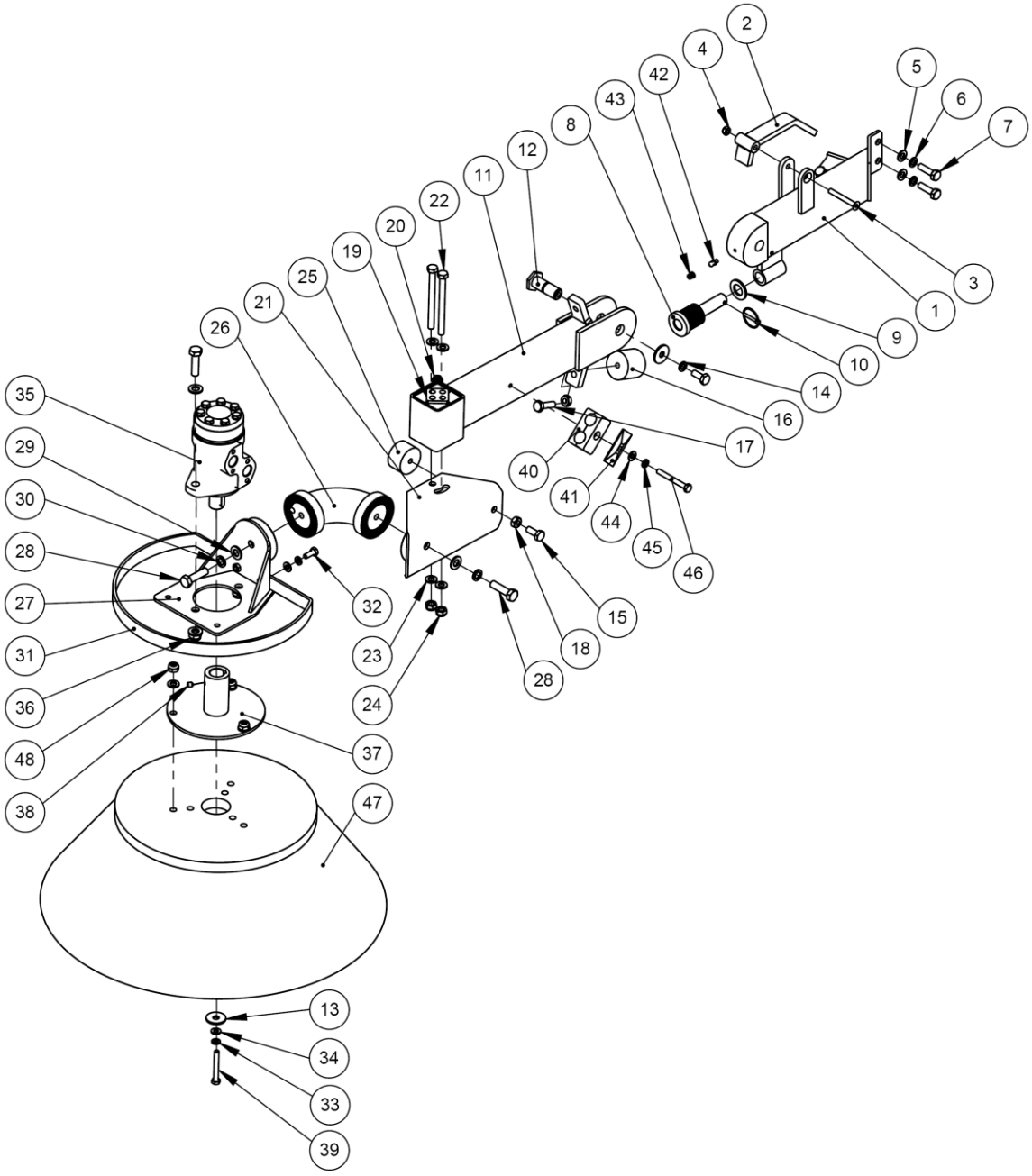


Ref.	Part No	Description	Qty
1	80039-0006	Brush Shaft Eco 2.30m	1
2	10003020	Motor plate 2-Bolt	1
3	40000041	Flat Washer	7
4	40000049	Spring Washer	8
5	40000020	Hex Head Bolt M10x30	4
6	40004776	Hydraulic motor SMR 200 with HPS-Gasket	1
7	40000042	Flat Washer	2
8	40000044	Hex Nut M12	2
9	40000653	Disc	1
10	40000132	Washer	1
11	40000056	Bearing Flange	1
12	40000059	Bearing Flange	1
13	40000058	Bearing Insert SB 206	1
14	40000057	Bearing Protection Cap	1
15	40000050	Hex Head Screw M10x25	4
16	40000051	Flat Washer	1
17	40000701	Brush Section PPN ø510x750	3



Ref	Part No.	Description	Qty
1	40000020	Hex Head Screw M10x30	4
2	40000026	Hex Nut M10	4
3	40000162	R-Clip	1
4	40000111	Hex Head Screw M12x45	3
5	40000121	Hex Nut M12	1
6	40001286	Pin ø20x75	1
7	40000064	Flat Washer	1
8	10003131	Clamp Flange	2
9	40000080	Split Pin ø4x40	1
10	40001339	Hex Head Screw M8x30	2
11	10003132	Motor Mounting Bracket	1
12	40002963	Hydraulic Motor GFS	1
13	40000011	Hex Nut M8	2
14	40000042	Flat Washer	2
15	40001354	Rubber Spring Element DR-S 38x80	1
16	40000352	Hex Nut M12	2
17	10002582	Brush Mounting Spindle	1
18	40000098	Side Brush ø350/ 600	1
19	40000096	Grub Screw M8x10	1
20	40000081	Hex Head Screw M8x60	1
21	40000051	Flat Washer ø 11/34x3	1
22	40000032	Flat Washer	1
23	40000082	Spring Washer	1
24	40001300	Hex Head Screw M10x45	3
25	40000041	Flat Washer	6
26	10012327	Mounting SKB Eco	1
27	40000043	Hex Nut M10	3
28	10012444	Swivel Arm SKB Eco Right	1

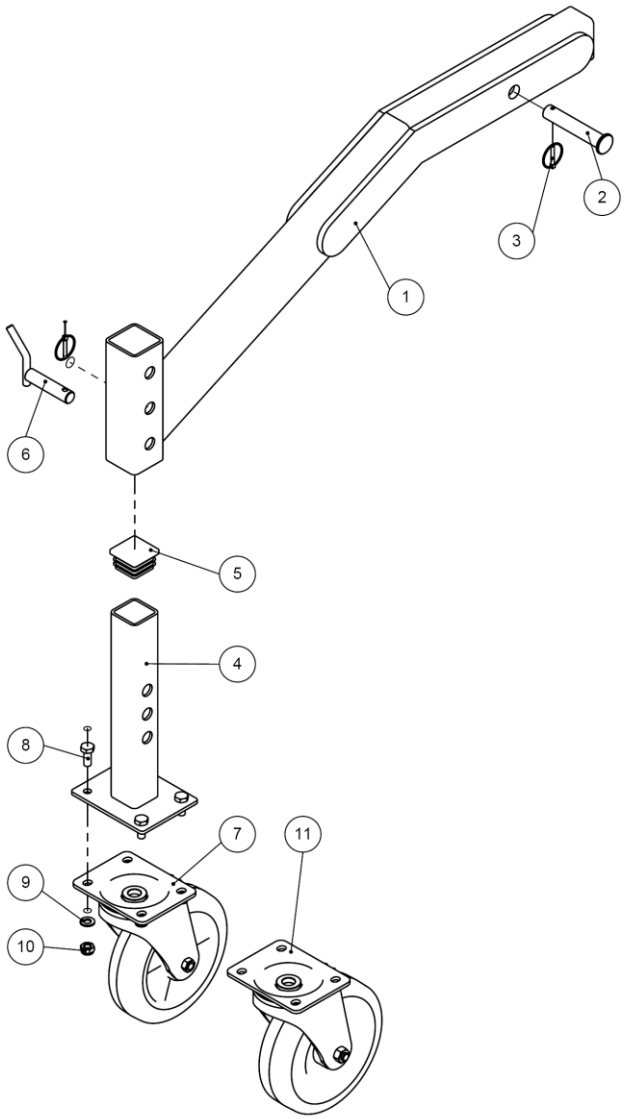
Side Brush - Left Hand – Heavy Duty



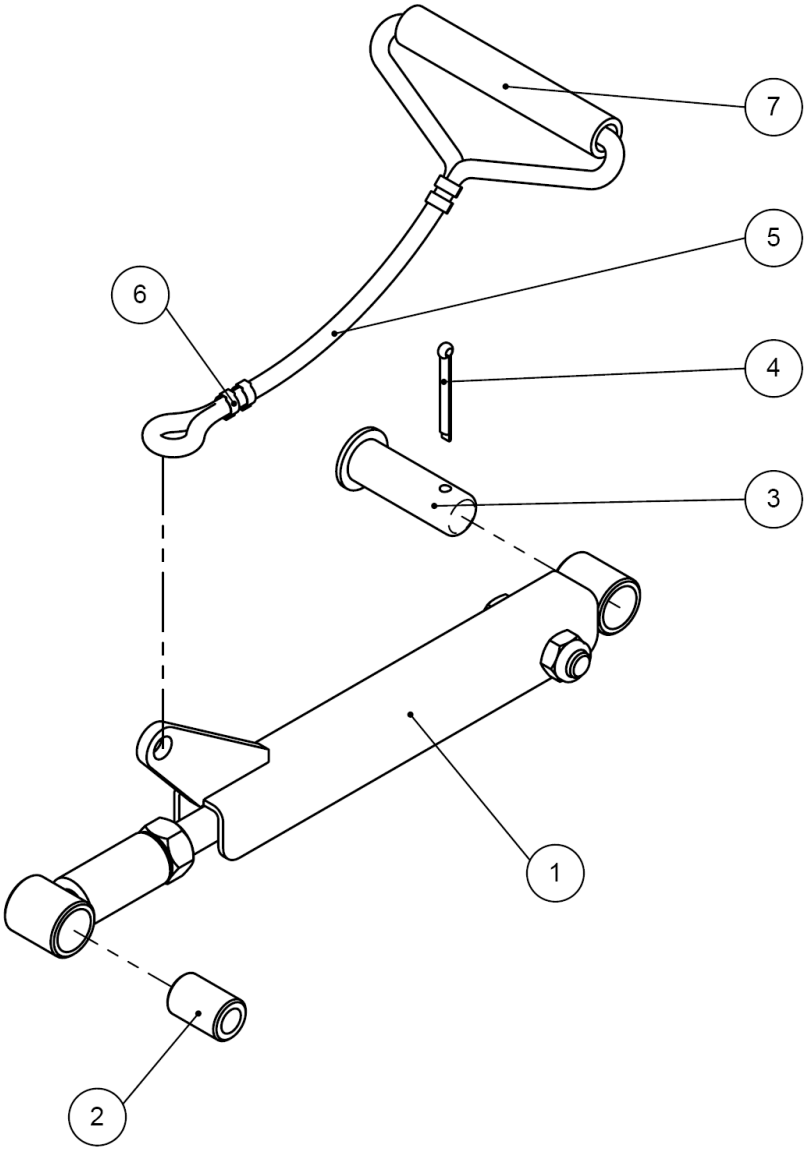
Ref	Part No.	Description	Qty
1	10003061	Support arm Left	1
2	10002576	Lever	1
3	40000089	Countersunk screw M8x65	1
4	40000028	Hex nut M8	1
5	40000041	Flat Washer	6
6	40000049	Spring Washer	3
7	40000106	Hex screw M10x35	3
8	10002578	Stop pin	1
9	40000064	Flat Washer	14
10	40000088	Linch Pin ø4,5x32	1

Ref	Part No.	Description	Qty
11	10009060	Swivel arm	1
12	10002577	Bearing bolts	1
13	40000051	U-disc shape R ø11/34x3	2
14	40000049	Spring Washer	1
15	40000050	Hex screw M10x25	2
16	40000090	Rubber buffer ø50x45	1
17	40000106	Hex screw M10x35	1
18	40000026	Hex nut M10	4
19	40000091	Rubber spring segment	1
20	40000020	Hex screw M10x30	2
21	10002580	Swivel Mounting Plate	1
22	40000092	Hex screw M10x120	2
23	40000041	Flat Washer	4
24	40000043	Hex nut M10	2
25	40000093	Rubber buffer	1
26	10002581	90 Deg Mounting Connection - Adjustable	1
27	10002579	Motor carrier	1
28	40000111	Hex screw M12x45	4
29	40000042	Flat Washer	6
30	40000048	Spring Washer	2
31	10002584	Brush protection	1
32	40000095	Hex screw M8x20	2
33	40000082	Spring Washer	3
34	40000032	Flat Washer	3
35	40000094	Hydraulic motor OMP160	1
36	40000044	Hex nut M12	2
37	10002582	Brush Spindle Flange	1
38	40000096	Grub Screw M8x10	1
39	40000081	Hex screw M8x60	1
40	40002287	Hose clamp series B RBP322X	1
41	40000340	Plate – Hose Clamp	1
42	40000054	Grease nipple straight M6	1
43	40000055	Grease nipple cap M6	1
44	40000032	Flat Washer	1
45	40000082	Spring Washer	1
46	40001618	Hex screw M8x70	1
47	40000098	Side brush ø350/ 600	1
48	40000043	Hex nut M10	3

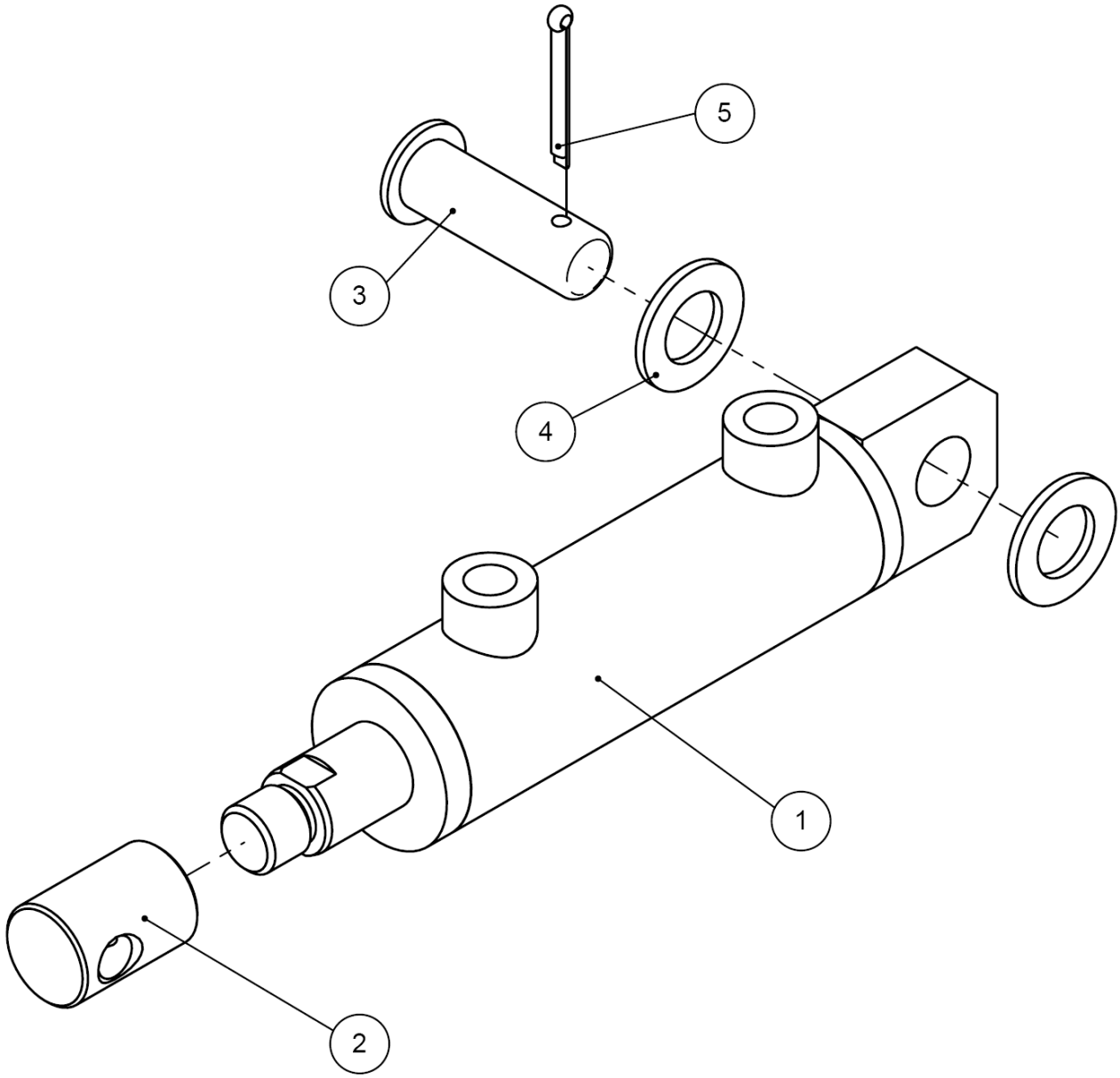
Third Support Leg Assembly



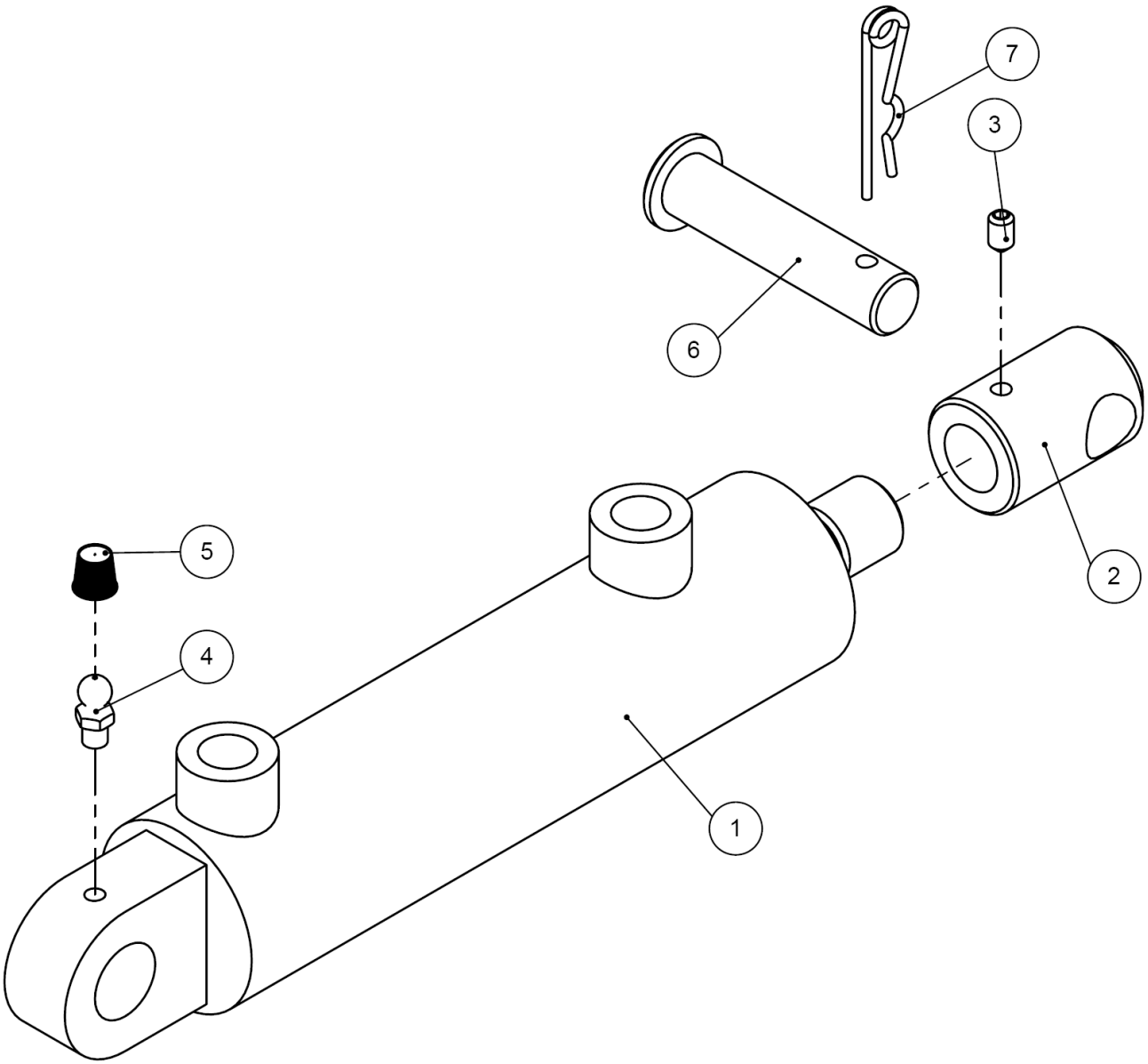
Ref	Part No.	Description	Qty
1	10001453	Support Wheel Carrier Eco	1
2	40000187	Pin ø 20x 110	1
3	40000088	Lynch Pin ø4,5x32	2
4	10003023	Support Wheel Inner Tube	1
5	40000652	Plug Plastic 50x50x4	1
6	10003024	Pin – Height Adjust	1
7	40000036	Castor Wheel 200 x 50	1
8	40000050	Hex Head Screw M10x25	4
9	40000041	Flat Washer	4
10	40000043	Hex Nut M10	4
11	40000037	Castor Wheel 200x50 Optional Heavy Duty	1



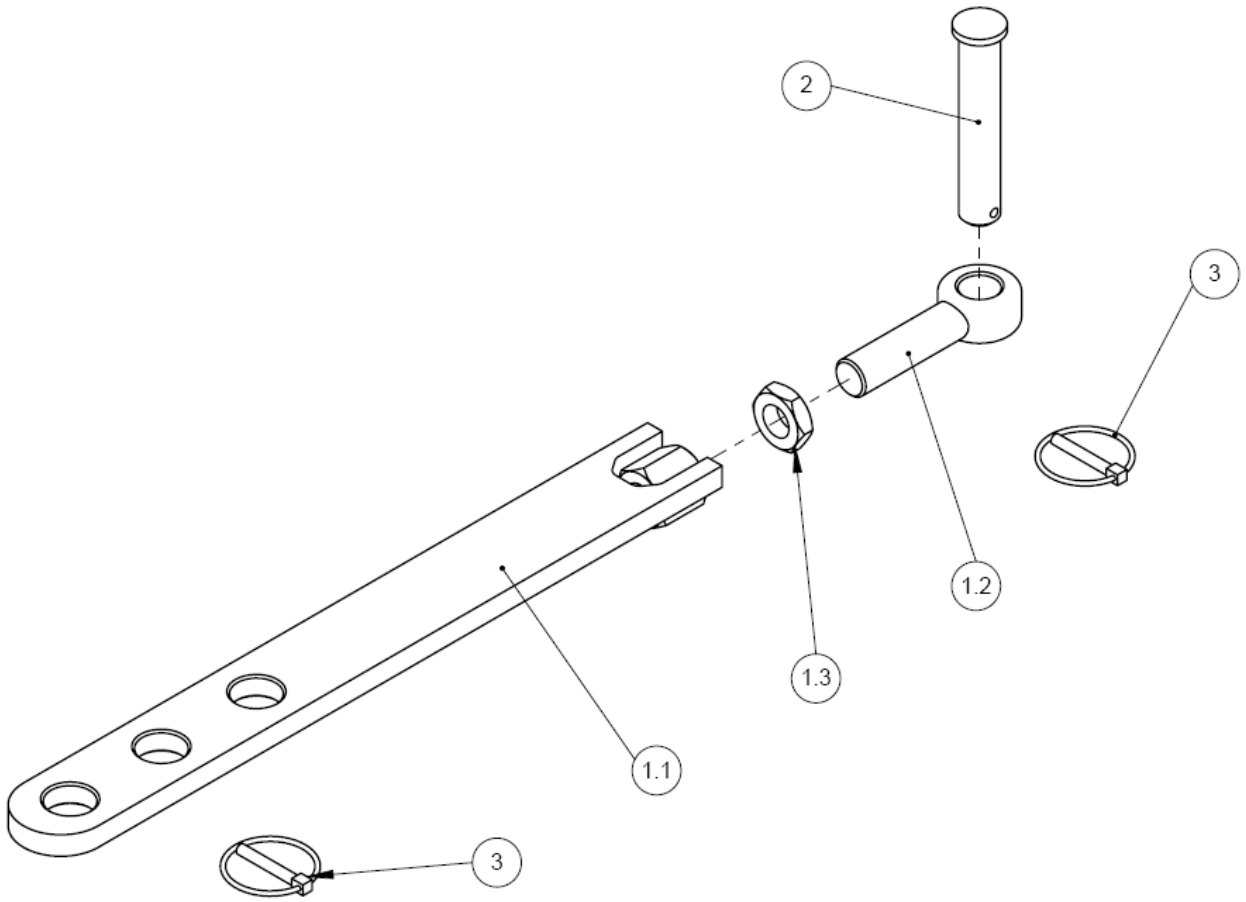
Ref	Part No.	Description	Qty
1	10003033	Manual Bin Emptying Mechanism - Eco	1
2	10003032	Bushing	1
3	40001673	Pin ø 20x 60	1
4	40000740	Split Pin Ø4,5x40	1
5	40000084	Rope Handle	1
6	40000802	Rope Crimp	4
7	40000087	Hose	1



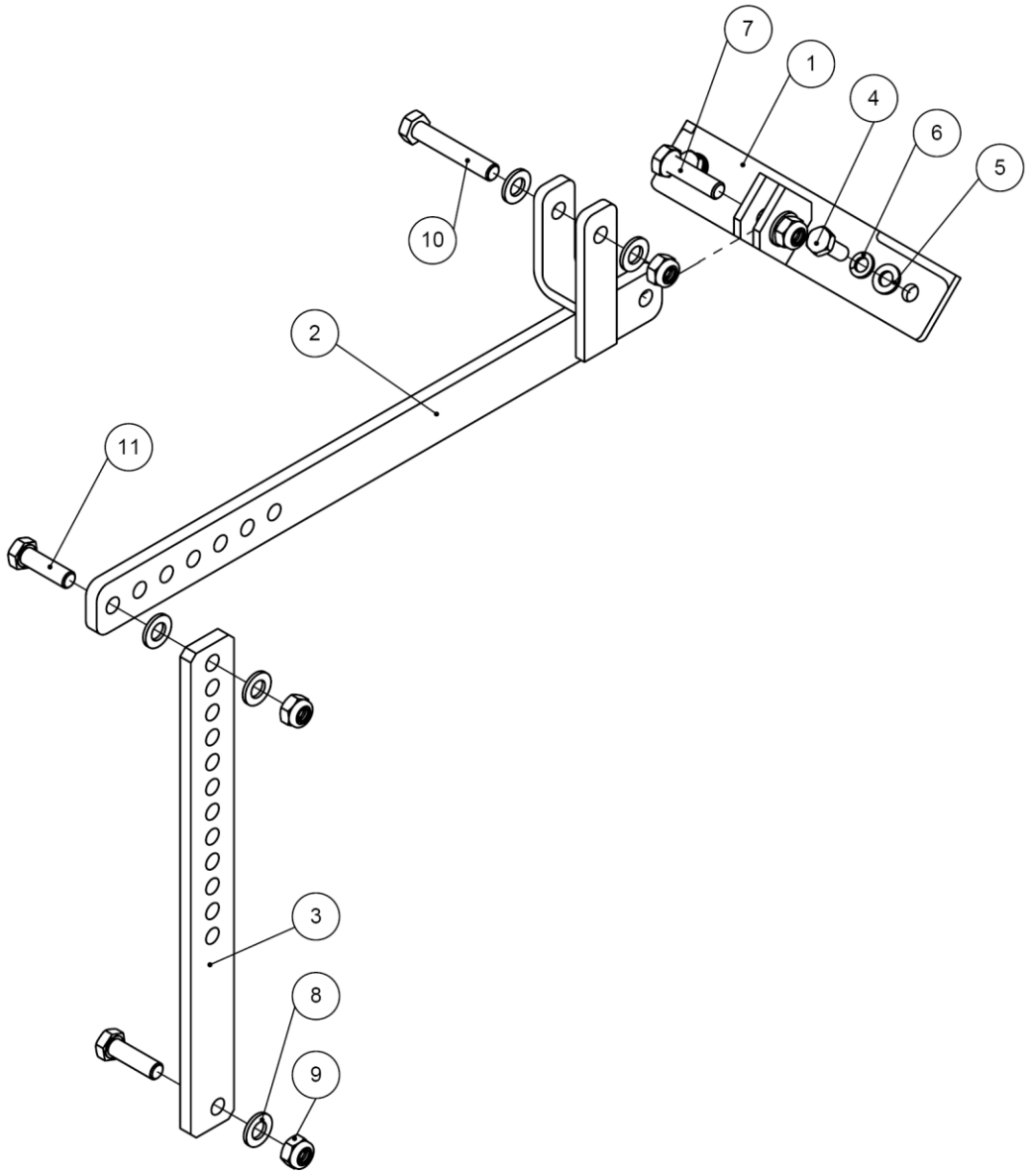
Ref	Part No.	Description	Qty
1	10002615	Hydraulic Cylinder	1
2	10002705	Cylinder Eye	1
3	40001673	Pin ø 20x60	1
4	40000064	Flat Washer	2
5	40000740	Split Pin Ø4,5x40	1



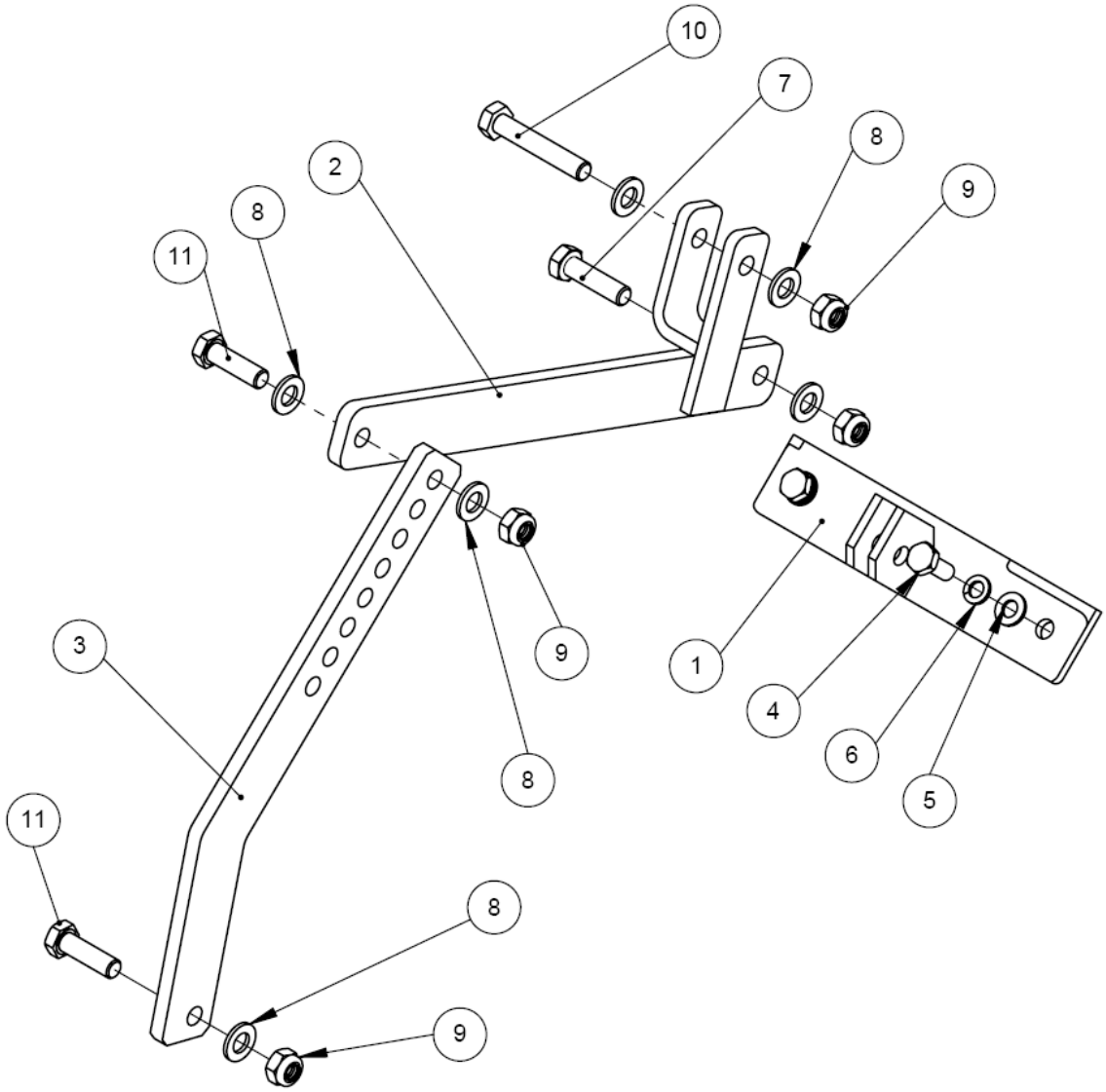
Ref	Part No.	Description	Qty
1	10002547	Hydraulic Cylinder	1
2	10002548	Cylinder Eye	1
3	40000134	Grub Screw M6x10	1
4	40000054	Grease Nipple M6	1
5	40000055	Grease Nipple Cap	1
6	40001672	Pin	1
7	40000161	R-Clip	1



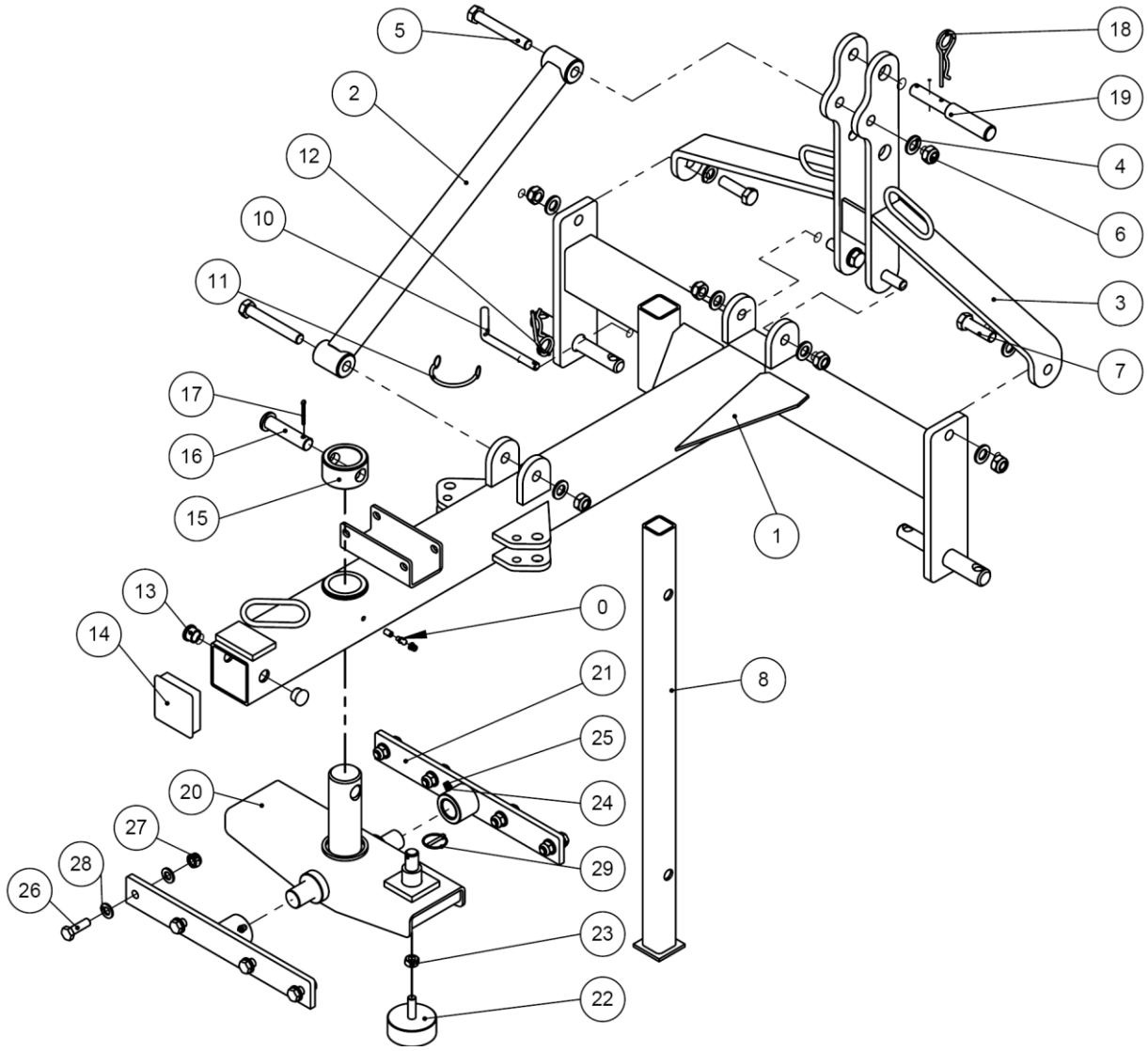
Ref	Part No.	Description	Qty
1	10013122	Angle Adjustment Arm - Adjustable	1
1.1	10013120	Adjustment Arm	1
1.2	10013121	Eye Bolt	1
1.3	40003133	Nut	1
2	40000140	Pin	1
3	40000088	Lynch Pin	2



Ref	Part No.	Description	Qty
1	10003031	Mounting Bracket	1
2	10003030	Connecting Arm	1
3	10003124	Connecting Arm – Collection Bin	1
4	40000050	Hex Head Bold M10x25	2
5	40000041	Flat Washer	2
6	40000049	Spring Washer	2
7	40000111	Hex Head Bolt M12x45	1
8	40000042	Flat Washer	6
9	40000044	Nyloc Nut M12	4
10	40000113	Hex Head Bolt M12x70	1
11	40000040	Hex Head Bolt M12x40	2

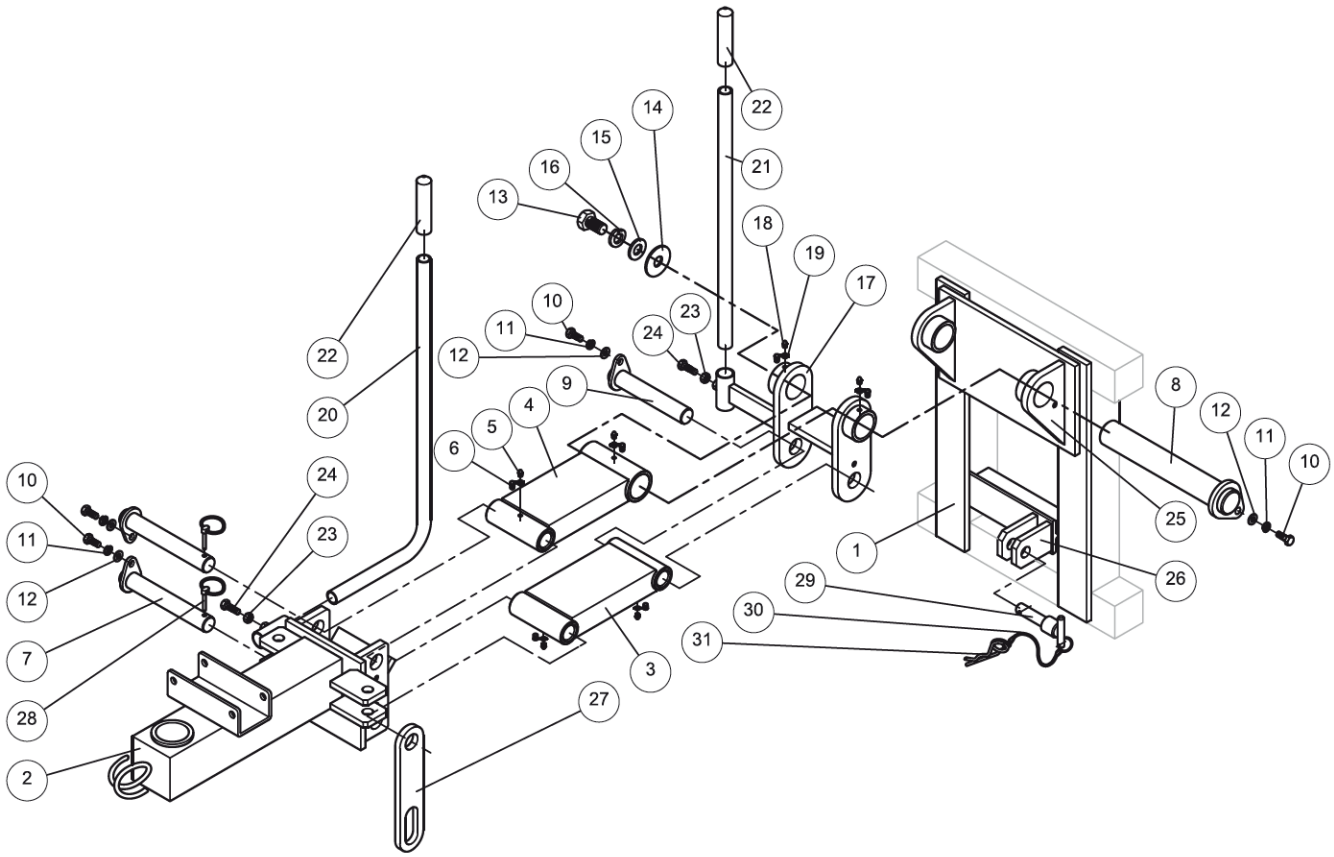


Ref	Part No.	Description	Qty
1	10003031	Mounting Bracket	1
2	10012787	Connecting Arm	1
3	10012788	Connecting Arm – Collection Bin	1
4	40000050	Hex Head Bolt M10x25	2
5	40000041	Flat Washer	2
6	40000049	Spring Washer	2
7	40000111	Hex Head Bolt M12x45	1
8	40000042	Flat Washer	6
9	40000044	Nyloc Nut M12	4
10	40000113	Hex Head Bolt M12x70	1
11	40000040	Hex Head Bolt M12x40	2



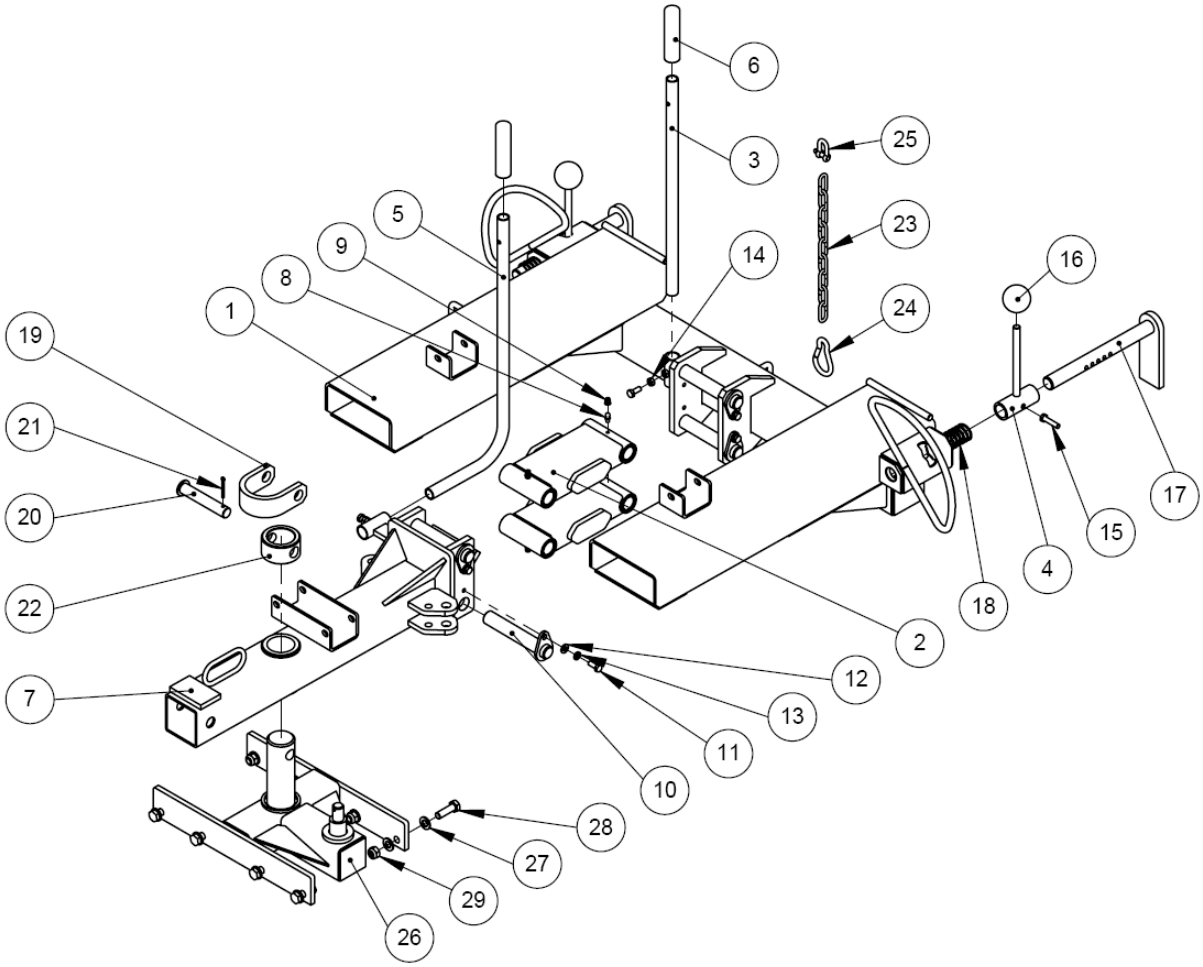
Ref	Part No.	Description	Qty
1	10001426	Three-Point Linkage Boom	1
2	10001437	Prop Connection Link	1
3	10001433	Top Link Frame Assembly	1
4	40000130	Flat Washer	12
5	40000114	Hex Head Bolt M16 x 110	2
6	40000060	Nyloc Nut M16	6
7	40001448	Hex Head Bolt M16 x 55	4
8	10002685	Parking Support Leg	1
9	40000147	Thread Insert M6x12	1
10	10002545	Pin	1
11	40000029	Pin Retainer Strap - PVC	1
12	40000030	R-Clip	1
13	40000153	Plug – Plastic Rnd	2
14	40000154	Plug - Square	1
15	10002592	Locking Collar	1

Ref	Part No.	Description	Qty
16	40000136	Pin	1
17	40000080	Split Pin	1
18	40000030	R-Clip	1
19	40000138	Top Link Pin	1
20	10002688	Frame Mounting Pintle Assembly	1
21	10002689	Pintle Attaching Bracket	2
22	40000158	Rubber Buffer ø 75x30	2
23	40000121	Hex Nut	2
24	40000054	Grease Nipple M6	2
25	40000055	Grease Nipple Cap	2
26	40000040	Hex Head Bolt M12x40	8
27	40000044	Nyloc Nut M12	8
28	40000042	Flat Washer	16
29	40000088	Lynch Pin 4.5x32	1



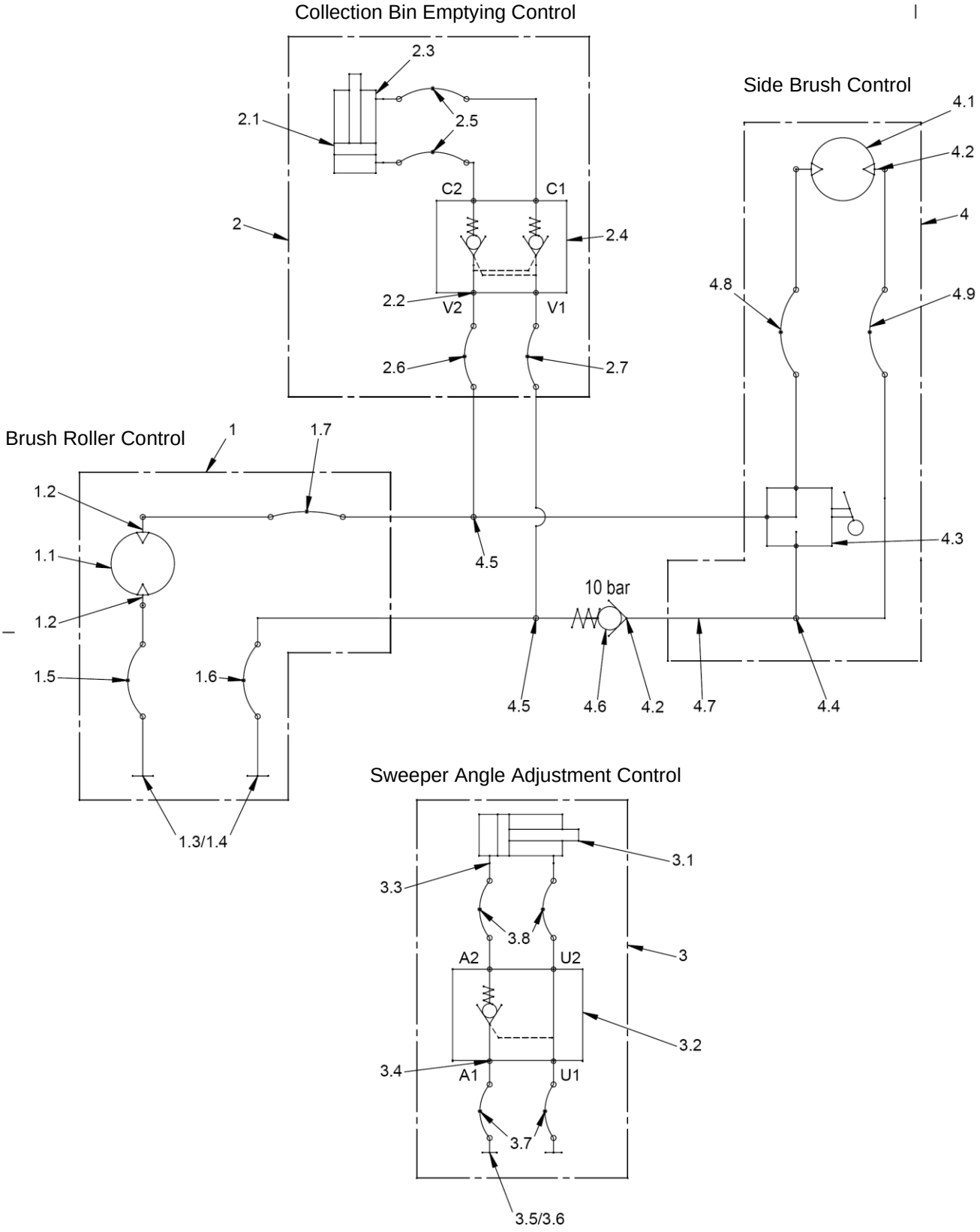
Ref	Part No.	Description	Qty
1	38.66.00025	Euro Hitch Frame	1
2	38.66.00075	Swivel Mounting Arm	1
3	10002727	Arm – Parallelogram – 25 & 25mm	1
4	10002728	Arm - Parallelogram – 25 & 40mm	1
5	40000054	Grease Nipple Straight M6	4
6	40000055	Grease Nipple Cap	4
7	10002717	Pin – Parallelogram 25mm	2
8	38.66.00275	Pin - Parallelogram 40mm Dia	1
9	38.66.00060	Pin – Parallelogram 25mm	1
10	40000095	Hex Head Bolt M8x20	4
11	40000082	Spring Washer M8	4
12	40000032	Flat Washer M8	4
13	00.AA.00206	Hex Head Bolt M16x30	1
14	40002365	Flat Washer Heavy 17x50x3mm	1
15	40000130	Flat Washer M16	1
16	40000133	Spring Washer M16	1
17	38.66.00250	Parallelogram Pivot Connecting Bracket	1
18	40000054	Grease Nipple Straight M6	2
19	40000055	Grease Nipple Cap	2
20	10002718	Height Indicator Tube 90 Degree	1
21	10002730	Height Indicator Tube Straight	1
22	40000245	Sleeve PVC	1

Ref	Part No.	Description	Qty
23	40000011	Nyloc Nut M8	1
24	40000102	Hex Head Screw M8x25	1
25	(38.66.00300)	Top Pivot Mounting Block (Welded to frame)	1
26	(38.66.00310)	Lower Pivot Mounting Bracket (Welded to Frame)	1
27	38.66.00290	Transport Securing	1
28	40000088	Linch Pin 4.5x32	2
29	38.66.00295	Transport Pin	1
30	40000029	Securing Chain	1
31	40000030	R-Clip 4x78mm	1



Ref	Part No.	Description	Qty
1	10002745	Fork Tine Pocket Assembly	1
2	10002727	Arm - Parallelogram	2
3	10002730	Height Indicator Tube - Straight	1
4	10002747	Locking Handle	2
5	10002718	Height Indicator Tube – 90 Degree	1
6	40000245	Sleeve PVC	2
7	10001396	Swivel Mounting Arm HG/HH	1
8	40000054	Grease Nipple Straight M6	5
9	40000055	Grease Nipple Cap	5
10	10002717	Pin - Parallelogram	4
11	40000095	Hex Head Screw M8x20	6
12	40000032	Flat Washer	4
13	40000082	Spring Washer	6
14	40000011	Nyloc Nut M8	2
15	40000103	Hex Head Screw M8x35	2
16	40000258	Knob – Round	2
17	10002748	Safety Stop Bracket	2
18	40000259	Compression Spring	2
19	10002591	Transport Eyelet	1
20	40000187	Pin	1

Ref	Part No.	Description	Qty
21	40000080	Split Pin ø4x40	1
22	10002592	Retaining Collar	1
23	40000260	Chain 5mm, 1m Long	1
24	40000363	Carabiner 8mm	1
25	40000262	Shackle ø8mm	1
26	10002590	Attachment Mounting Pintle	1
27	40000042	Flat Washer	16
28	40000040	Hex Head Bolt M12x40	8
29	40000044	Nyloc Nut M12	8



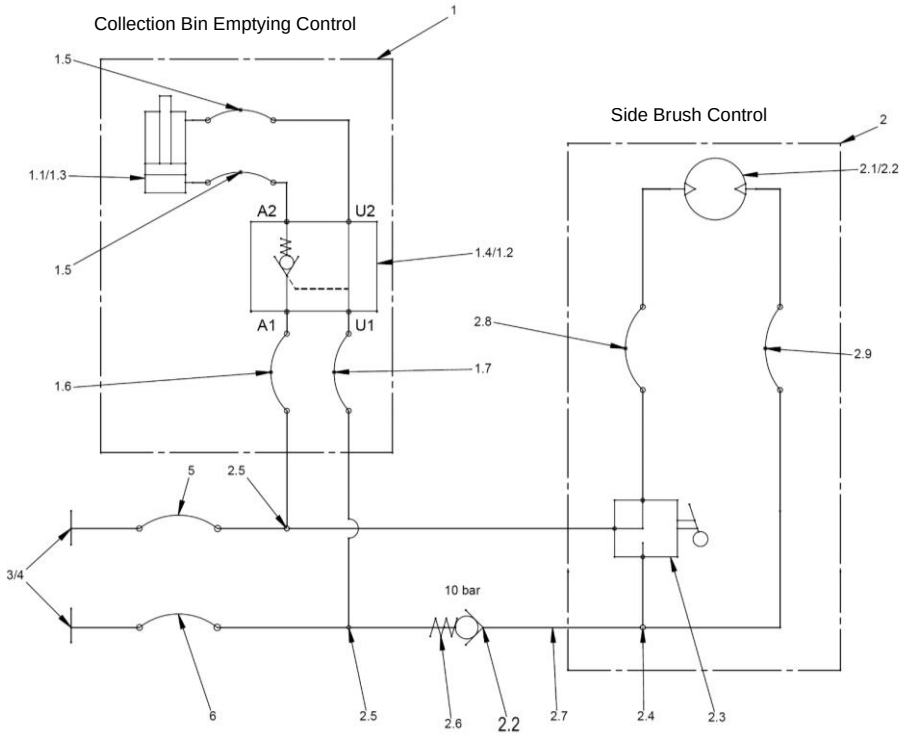
Hydraulic Circuit Diagram - ECO

with hydraulic bin emptying, side brush & hydraulic angle adjustment

Required control circuit: 2x double-acting

Ref	Part No.	Description	Qty
1		Brush Roller Control	1
1.1	40002958	Hydraulic Motor GKS 160 C2 A2 U	1
1.2	40001388	Hydraulic Adaptor - Straight	2
1.3	40001409	Quick Release Coupling Plug	2
1.4	40001411	Dust Protection Cap for QRC Plugs	2
1.5	80011	Hydraulic Hose	1
1.6	80011	Hydraulic Hose	1
1.7	80011	Hydraulic Hose	1
2		Hydraulic Collection Bin Emptying Control	1
2.1	10002615	Hydraulic Cylinder	1
2.2	40001366	Hydraulic Adaptor - Straight	4
2.3	40001381	Fitting – Hydraulic Ram	2
2.4	40001432	Dual Pilot Operated Check Valve	1
2.5	80011-0078	Hydraulic Hose	2
2.6	80011	Hydraulic Hose	1
2.7	80011	Hydraulic Hose	1
3		Sweeper Angle Adjustment Control	1
3.1	10002615	Hydraulic Cylinder	1
3.2	40001430	Pilot Operated Check Valve	2
3.3	40001381	Fitting – Hydraulic Ram	4
3.4	40001366	Hydraulic Adaptor - Straight	2
3.5	40001409	Quick Release Coupling Plug	2
3.6	40001411	Dust Protection Cap for QRC Plugs	2
3.7	80011-0065	Hydraulic Hose	2
3.8	80011-0011	Hydraulic Hose	2
4		Side Brush Control	1
4.1	40002963	Hydraulic Motor	1
4.2	40001388	Hydraulic Adaptor - Straight	4
4.3	10004186	3/2 Way Ball Valve	1
4.4	40001390	T-Adaptor	1
4.5	40001391	90 Deg Fitting	2
4.6	40006027	Check Valve 10 Bar	1
4.7	40001376	Straight Adaptor Fitting	1
4.8	80011-0043	Hydraulic Hose	1
4.9	80011-0067	Hydraulic Hose	1

Hydraulic Circuit Diagram



Ref	Part No.	Description	Qty
1		Hydraulic Collection Bin Emptying Control	1
1.1	10002615	Hydraulic Cylinder	1
1.2	40001366	Hydraulic Fitting – Straight	4
1.3	40001381	Fitting – Hydraulic Ram	2
1.4	40001430	Pilot Operated Check Valve	1
1.5	80011-0078	Hydraulic Hose	2
1.6	80011	Hydraulic Hose	1
1.7	80011	Hydraulic Hose	1
2		Side Brush Control	1
2.1	40002963	Hydraulic Motor	1
2.2	40001388	Hydraulic Fitting – Straight	4
2.3	10004186	3/2 Way Ball Valve	1
2.4	40001390	T-Adaptor	1
2.5	40001391	90 Deg Fitting	2
2.6	40006027	Check Valve 10 Bar	1
2.7	40001376	Straight Adaptor Fitting	1
2.8	80011-0043	Hydraulic Hose	1
2.9	80011-0067	Hydraulic Hose	1
3	40001409	Quick Release Coupling Plug	2
4	40001411	Dust Protection Cap for QRC Plugs	2
5	80011	Hydraulic Hose	1
6	80011	Hydraulic Hose	1