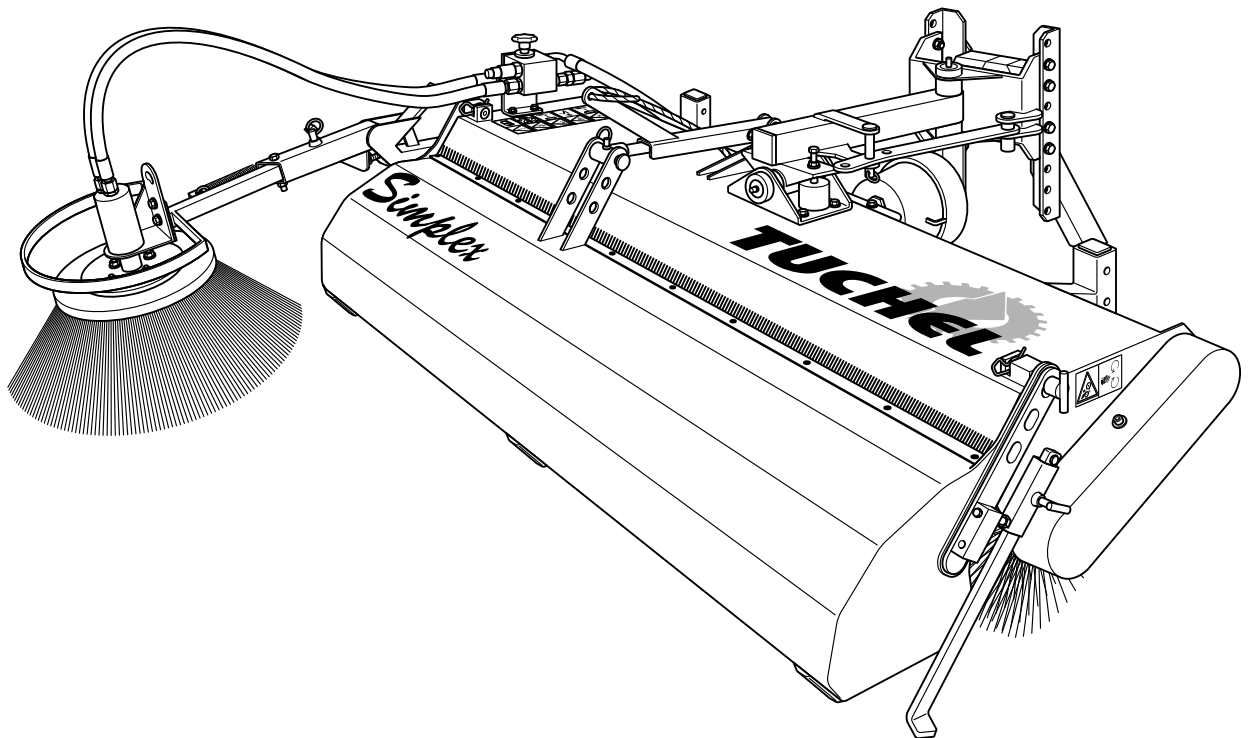




Operating manual

Simplex



Sweeper

Foreword	5
1 General information about this operating manual	6
A word about this operating manual.....	6
Declaration of conformity.....	7
2 Safety	9
General safety information	9
Intended use	9
Safety instructions in the operating manual	10
Safety stickers on the accessory equipment.....	11
Safety regulations	12
Safety devices	12
Clothing.....	12
Modifications to the accessory equipment	13
Before leaving the host vehicle	13
Preventing injuries.....	13
Operating the accessory equipment.....	13
Basic safety instructions when operating the articulated shaft drive.....	14
Transporting	14
Safety measures during maintenance	15
Before performing maintenance work	15
During the maintenance	15
3 Technical data	16
Dimensions.....	16
Work values	17
Working hydraulics.....	17
Attachment with mount	17
Additional equipment (option).....	17
4 Description / overview	18
General view	19
Accessories (optional).....	20
Debris collector	20
Side broom.....	20
Hydraulic lateral adjustment.....	21
Splash guard	21
Type plate	22
Identification marking locations.....	23
5 Operation	24
Working with accessory equipment.....	24
Safety regulations when working with accessory equipment.....	24
Placing into operation	25
Checks before placing into operation.....	25
Installing the sweeper.....	26

Initial installation.....	26
Mounting the A-frame	27
Mounting the three-point linkage	29
Hitching the PTO shaft to the host vehicle	31
Attaching accessories (optional).....	31
Operating the sweeper	32
Adjusting the parking jacks	32
Adjusting the sweeping profile	33
Adjusting the revolution speed.....	33
Simple sweeping mode.....	34
Containing the sweepings (optional).....	35
Emptying the debris collector (optional)	36
Swivelling the side broom to the operating/normal position (optional)	37
Installing the sweeper	38
Preparing for disassembly	38
Unlocking the A-frame	40
Unlocking the three-point linkage	40
Placing out of operation.....	41
Turning off of the accessory equipment safely	41
Storing the accessory equipment over longer periods of time	41
6 Operation	42
Adjusting the compensation system	42
Re-adjusting the sweeper	42
Adjusting the support wheels	43
Debris collector (optional)	44
Disassembling the debris collector	44
Adjusting the debris collector.....	45
Adjustment of the Vulkollan rubber wear tip (optional).....	46
Side broom (option).....	47
Adjusting the circular brush	47
Setting the inclination and contact of the side broom	47
Adjusting the revolution speed.....	48
Splash guard	49
Installing the splash guard	49
Adjusting the clearance between splash guard and ground.....	49
7 Maintenance	50
Safety measures	50
Safety-relevant parts	50
Maintenance preparation	51
Lubricants and operating materials.....	52
Screw connections	52
Wearing parts/spare parts	53
Lubricating points.....	55
Replacing the sweeper cylinder	56
Re-tensioning the chain	59
Replacing the Vulkollan rubber wear tip (optional).....	60

Replacing the splash guard (option).....	61
Changing the circular brush (option).....	61
Hydraulic circuit diagrams	62
8 Troubleshooting	65
9 Index	66

Foreword

Dear Customer,

The "Simplex" sweeper you have purchased has been manufactured to the highest quality standards. In order to eliminate any possibility of damage to persons or property, you must read and observe the respective safety and warning instructions in this manual and on the accessory equipment before using or servicing the accessory equipment.

Before placing the accessory equipment into operation, all machine operators must make themselves familiar with the handling of the accessory equipment using this operating manual. The safety regulations are to be strictly adhered to. Adherence to the valid safety regulations for your country is also obligatory.

1 General information about this operating manual

A word about this operating manual

A professional operation and conscientious care and maintenance of the device are necessary in order to maintain the safety and utilisability of the accessory equipment. This operating manual will help you to use the accessory equipment for its intended purpose and to avoid damages to persons and property. The manual takes the necessary legal conditions and guidelines into account and contains important information.

The operating manual is part of the device and should be stored so that it is readily available at any time. If the operating manual becomes soiled or gets lost, a new replacement manual can be requested from Tuchel Maschinenbau GmbH at any time. If the device is sold, the operating manual must be transferred to the new owner.

The owner of the device bears the responsibility for the following points:

- Every operator must be at least the legal minimum age and be physically as well as mentally fit to reliably fulfil the tasks assigned to them.
- Every person who operates or services the accessory equipment must have read and understood the operating manual beforehand.
- The accessory equipment may only be used for its intended purpose and in accordance with applicable regulations.
- The accessory equipment may not be modified or altered.

The declaration of conformity of the Tuchel Maschinenbau GmbH expires if the owner allows safety-relevant modifications to be performed on the accessory equipment. The party performing the modifications must issue a new declaration of conformity. If you have questions concerning this, please contact Tuchel directly.

Declaration of conformity

The "Simplex" sweeper satisfies the "essential health and safety requirements" of the Machinery Directive 98/37/EC and is authorised to carry the CE mark.

Furthermore, the harmonised European Standards DIN EN 292-1/2, DIN EN 982, DIN EN 474-1/3/4, DIN EN 1553 and the German Regulations for the prevention of industrial accidents (UVV) were used for the development of the machine. These are documented in the EC declaration of conformity.

The manufacturer's address is located on the back side of the operating manual.



NOTE!

The declaration of conformity is depicted on the following page.

EG-KONFORMITÄTSERKLÄRUNG
entsprechend der EG-Richtlinie 98/37/EG

DÉCLARATION «CE» DE CONFORMITÉ
Conforme à la directive de la 98/37/CE

EC DECLARATION OF CONFORMITY
conforming to directive 98/37/EC

Wir,
Nous, Tuchel Maschinenbau GmbH
We, Holsterfeld 15
DE-48499 Salzbergen



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Tel. +49(0) 59 71 96 75-0 · Fax 96 75-30
Internet: <http://www.tuchel.com>
E-Mail: info@tuchel.com
USt.-ID-Nr.: DE812353510

erklären in alleiniger Verantwortung, dass das Produkt
déclarons sous notre seule responsabilité que le produit
declare in sole responsibility, that the product

(Fabrikat, Typ / Marque, modèle / Fabricant / type)

(Serien-Nr. / No.)

auf das sich diese Erklärung bezieht, im Ausrüstungsumfang der Werksauslieferung den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der EG-Richtlinie 98/37/EG entspricht.

Faisant l'objet de la déclaration est conforme aux prescriptions fondamentales en matière de sécurité et de santé stipulées dans la directive de la 98/37/CE.

To which this certificate applies, conforms to the basic safety and health requirements of EC-Declaration 98/37/EC.

Zur sachgemäßen Umsetzung der in den EG-Richtlinien genannten Sicherheits- und Gesundheitsanforderungen wurden insbesondere folgende Normen und technische Spezifikationen herangezogen:

Pour mettre en pratique dans les règles de l'art les prescriptions en matière de sécurité et de santé stipulées dans les Directives de la CE, il a été tenu compte des normes et des spécifications techniques suivantes:

To effect correct application of the safety and health requirements stated in EC-Directions. The following standards and /or technical specifications were consulted:

DIN EN 292-1/2	DIN EN 474-1/3/4	Unfallverhütungsvorschriften (UVV)
DIN EN 982	DIN EN1553	

(Titel und /oder Name sowie Ausgabedatum der Normen und der technischen Spezifikationen / Titre et/ou numéro et date de publication des normes et/ou spécifications techniques / Titel and/or number and date of issue of the other EC-Directions)

Salzbergen, den 07.03.2008

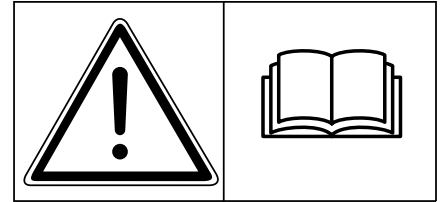
(Ort und Datum der Ausstellung /
Lieu et date /
Plate and date of issue)

(Unterschrift des Befugten /
Nom de la personne autorisée /
name of authorized person)

2 Safety

General safety information

Most accidents are caused by the disregard of the essential safety regulations. In order to prevent accidents and thus eliminate any possibility of damage to persons or property, you must have read and understood the respective safety and warning instructions in this manual and in the manual of the host vehicle before performing any work.



Intended use

The accessory equipment is designed to be used solely for the purpose defined in chapter "Description / overview", *Page 18* and in conjunction with the approved components.

Any other use does not comply with the regulations/requirements or intended use. The manufacturer cannot assume liability for any damages resulting from an unintended use. The user/owner alone bears the risk for this.

Follow the corresponding safety instructions and working steps from this operating manual and the manual of the host vehicle. These also pertain to the intended use.

Safety instructions in the operating manual

In the operating manual at hand, the following signal words and signs are used to make the safety instructions recognisable as such at a glance:



This is the hazard warning. It warns you about the risk of injury.

- Compliance with all activities labelled with the hazard warning in order to prevent injuries or fatal injuries is mandatory.



DANGER! – Risk of fatal injuries

Identifies risks that can result in severe injuries to health or lead to death if the respective danger warning is not observed or is not observed sufficiently.



WARNING! – Bodily injuries

Identifies risks that can cause physical injury if the respective warning is not observed or is neglected.



CAUTION! – Minor injuries

Identifies risks that can cause minor bodily injury.



This is the cautionary sign. It warns you about the risk of property damage. It differs from the hazard warning since it warns about property damage and not about bodily injury.

- Compliance with instructions provided on cautionary signage is mandatory. It is intended to prevent property damage and damage caused to the environment.



ATTENTION! – Property damage

Identifies solely the risk of potential property damage and damage caused to the environment.



NOTE!

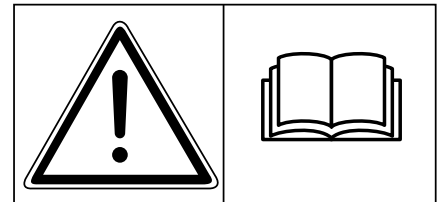
Identifies application tips and useful information.

Safety stickers on the accessory equipment

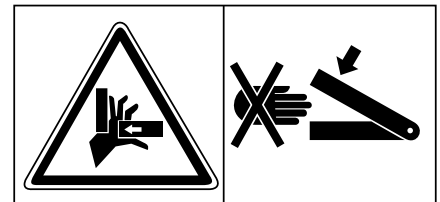
Information and symbols attached directly to the accessory equipment such as safety stickers must be observed without fail. Safety stickers must not be removed and must be kept legible.

The following information and symbols are attached to the accessory equipment:

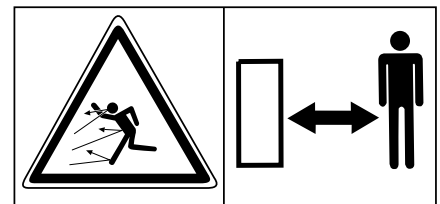
Read and observe the operating manual and safety instructions before placing into operation.



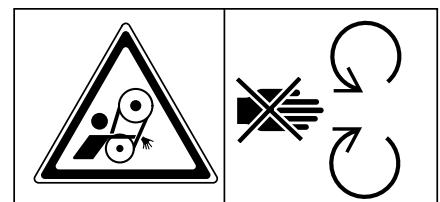
Crush hazard! Do not reach inside danger zone. Keep hands clear of moving parts.



Risk of debris ejected from sweeper's rotating cylinder. . Stay clear!



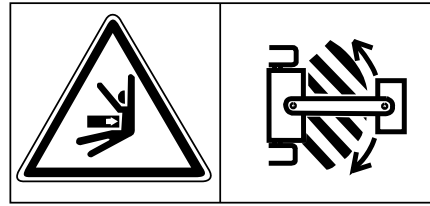
Do not operate machine with guards open or removed. Crush hazard! Keep hands clear of moving parts.



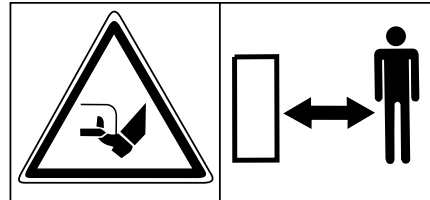
Do not reach into rotating machine parts. Wait until the machine parts have come to a standstill.



Stay clear of rotating/pivoting parts.



Crush hazard! Keep feet clear. Stay out of hazard zone. Keep back a sufficient distance.



Safety regulations

You may only operate or perform maintenance work on the accessory equipment if you have been trained accordingly and are authorised to do so.

Observe all regulations, measures and safety instructions when operating or performing maintenance work on the accessory equipment.

When working in a team, hand signals that are intended to be used during specific tasks must be discussed and agreed upon. A coordinating person must be designated before starting the work.

Safety devices

Ensure that all guards and covers are properly attached to the accessory equipment.

Make sure that damaged guards and covers are repaired.

Under no circumstances may any safety installations be removed such as e.g. the protective grating.

Clothing

You may not wear loose-fitting clothing, jewellery or wear your hair open. These items could get caught in control elements or in moving or rotating parts and cause severe injuries.

Change clothing that is soiled with highly inflammable substances immediately.

Always wear the operationally required protective equipment e.g. hearing protection, protective glasses, safety shoes, dust mask or gloves when operating or performing maintenance work on the machine.

Make sure that no unauthorised person(s) are remaining in the hazard area.

Modifications to the accessory equipment

Tuchel Maschinenbau GmbH assumes no liability for modifications that are made without the express permission of the manufacturer.

Tuchel Maschinenbau GmbH assumes no responsibility for injuries or damages caused by unapproved modifications.

Before leaving the host vehicle

Lower the accessory equipment to the ground.

Secure the hydraulics system and place it into its neutral position.

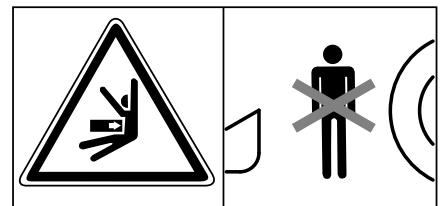
Activate the holding brake of the host vehicle and turn off the engine.

Remove the ignition key from the host vehicle and keep it in safe custody.

Preventing injuries

Stay clear of moving parts, e.g. do not reach between accessory equipment and host vehicle. Always stay clear of hazardous areas.

When activating the support system, some equipment may extend beyond its untoleranced dimensions. This may lead to serious injuries.



Operating the accessory equipment

When driving

Drive particularly slowly when driving on uneven terrain and ensure that the path of travel is free from obstacles.

When working

Ensure that no one stays near the accessory equipment or behind the host vehicle.

Perform work in the direction that the wind is blowing as much as possible to protect yourself from dust and limited visibility.

High visibility

When working in dark areas, provide additional lighting for the working area.

Stop working when visibility is poor e.g. during fog, rain or snow and wait until the visibility has improved enough to ensure that work can continue safely.

Basic safety instructions when operating the articulated shaft drive.

It is the owners responsibility to ensure that the user of the machine is thoroughly familiar with the inherent hazards of the articulated shaft and that he/she has adequate knowledge of the operating instructions provided by the drive shaft manufacturer.

The machine shall only be operated with original drive shafts. Their length, size, type of overload clutch, and free-wheel clutch are indented specifically for this purpose. Any application other than the intended use of the articulated shaft drive, overload and free-wheel clutch is not permitted.

Prior to the machine's use, please ensure that all safety equipment are properly installed onto the articulated shaft and the host vehicle. Verify that the accessory equipment is fully functional.

Only use OME parts to replace damaged components or retrofit missing part according to instructions.

Before starting any daily work routine, verify that the articulate shaft is mounted securely to the host vehicle and accessory equipment.

Prior to entering the work area and before starting any maintenance work.

Shut-off the motor, remove the key from the ignition and keep it in a secure place.

For your own safety, never wear loose-fitting clothes, belts or any other loose items. Risk of accidents!

Never exceed the extension length while moving or working on the equipment. Regardless of the application, the profiled pipes must overlap at least 1/3 of their length.

Use small but consistent angular movements. Shut down the power take-off shaft if the articulation angle exceeds 35°.

Transporting

Loading and transporting

Use the host vehicle to lift the accessory equipment onto the loading area.

Place suitable cushioning material (rubber mats) underneath.

Follow the transporting instructions from the operating manual of the host vehicle.

Position the accessory equipment correctly onto the transporting vehicle and secure the accessory equipment onto the loading space using belts.

In order to prevent the accessory equipment from slipping or dropping off the vehicle, use proper safety precautions.

Safety measures during maintenance

Personnel

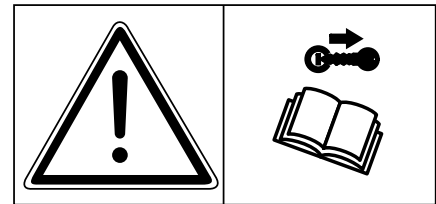
You may only perform service or repair work on the machine if you are a qualified specialist or if you have been carefully instructed about the work to be performed by a qualified specialist.

Before performing maintenance work

Read and observe the operating manual and, in particular, the safety instructions when you perform maintenance work on the accessory equipment.

If maintenance work is being performed on the accessory equipment, the engine of the host vehicle may not be started and operating elements may also not be activated without prior consultation. This can lead to accidents with severe injuries.

Remove the key from the ignition and secure the host vehicle in order to prevent unauthorised start-up.



Tools

Use appropriate tools only. The use of damaged, poor quality, faulty or makeshift tools can lead to injuries.

During the maintenance

Keeping the accessory equipment clean

Always keep the accessory equipment clean.

Do not clean the accessory equipment with a high pressure cleaner.

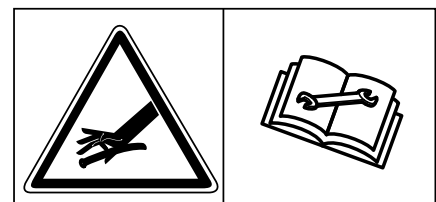
Never use fuel to rinse off or clean parts.

High-pressure hoses

Do not kink the high-pressure hoses. Never hit against the high-pressure hoses with hard objects. Do not use hydraulic lines or hoses with cracks or kinks. They will burst under use.

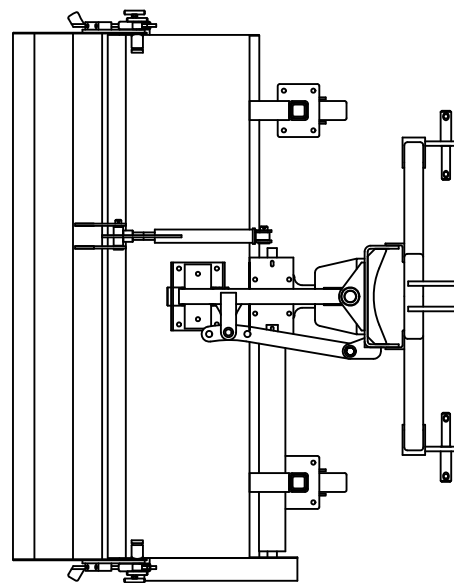
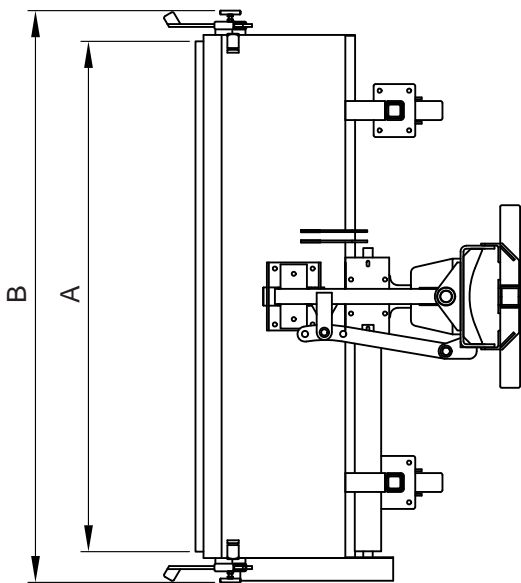
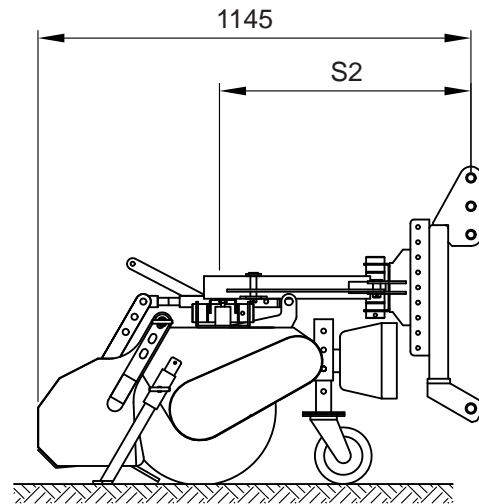
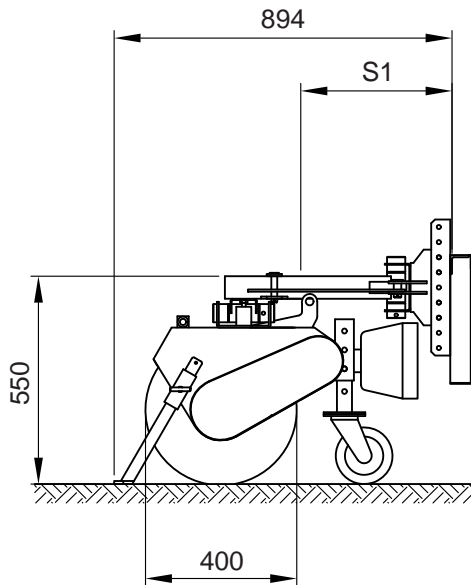
Exposure to high pressure oil

Always remember that the hydraulic system is under high pressure. To depressurise the hydraulic circuits, follow the instructions in the separate operating manual of the host vehicle.



3 Technical data

Dimensions



000114

* The centre of gravity changes depending on the sweeper's equipment and when the sweeper's debris collector is full

Work values

Type: Sweeper "Simplex"		120	135	150
Working width "A"	[mm]	1200	1350	1500
Working width when tilted 20°	[mm]	1130	1270	1410
Total width "B"	[mm]	1360	1510	1660
Empty weight (basic machine)	[kg]	90	95	100
Empty weight (incl. debris collector)	[kg]	113	120	127
Debris collector (volume)	[L]	70	80	90
Sweeper cylinder Ø	[mm]		400	
Sweeping power at 6 km/h [m ² /h]		7200	8100	9000

Centre of gravity spacings

A-frame, simple sweeping	S1 [mm]	400
A-frame attachment, incl. debris collector	S2 [mm]	500
Attachment of three-point linkage, simple sweeping	S1 [mm]	560
Attachment of three-point linkage, incl. debris collector	S2 [mm]	660

Working hydraulics

Type: Sweeper "Simplex"		120	135	150
Working hydraulics	Working pressure (max.)	[bar]	140	
	required flow		20	

Attachment with mount

Three-point linkage	incl.
A-frame	incl.
Hitching system for front mower (direct mount)	excl.

Additional equipment (option)

Type: Sweeper "Simplex"		120	135	150
Side broom (circular brush Ø)	[mm]		500	

4 Description / overview

The "Simplex" sweeper is an accessory device for the sweeping and gathering dirt. This type of sweeper is only approved for front installation.

The sweeper is suitable for the sweeping, collecting, and removing dirt and sand from streets, walkways, and any paved surfaces.

The three-point linkage or the A-frame are used to mount the sweeper to any municipal tractor vehicle. When using a front mower, the attachment system is used for the direct mounting.

An articulated shaft or the host vehicle's hydraulic system is used to activate the sweeper.

A chain drive rotates the sweeper's cylinder. The rotational speed of the sweeper's cylinder depends on the speed of the power take-off shaft or the oil flow of the host vehicle.

The contact pressure of the sweeper cylinder onto the ground is adjusted by raising or lowering the support wheels.

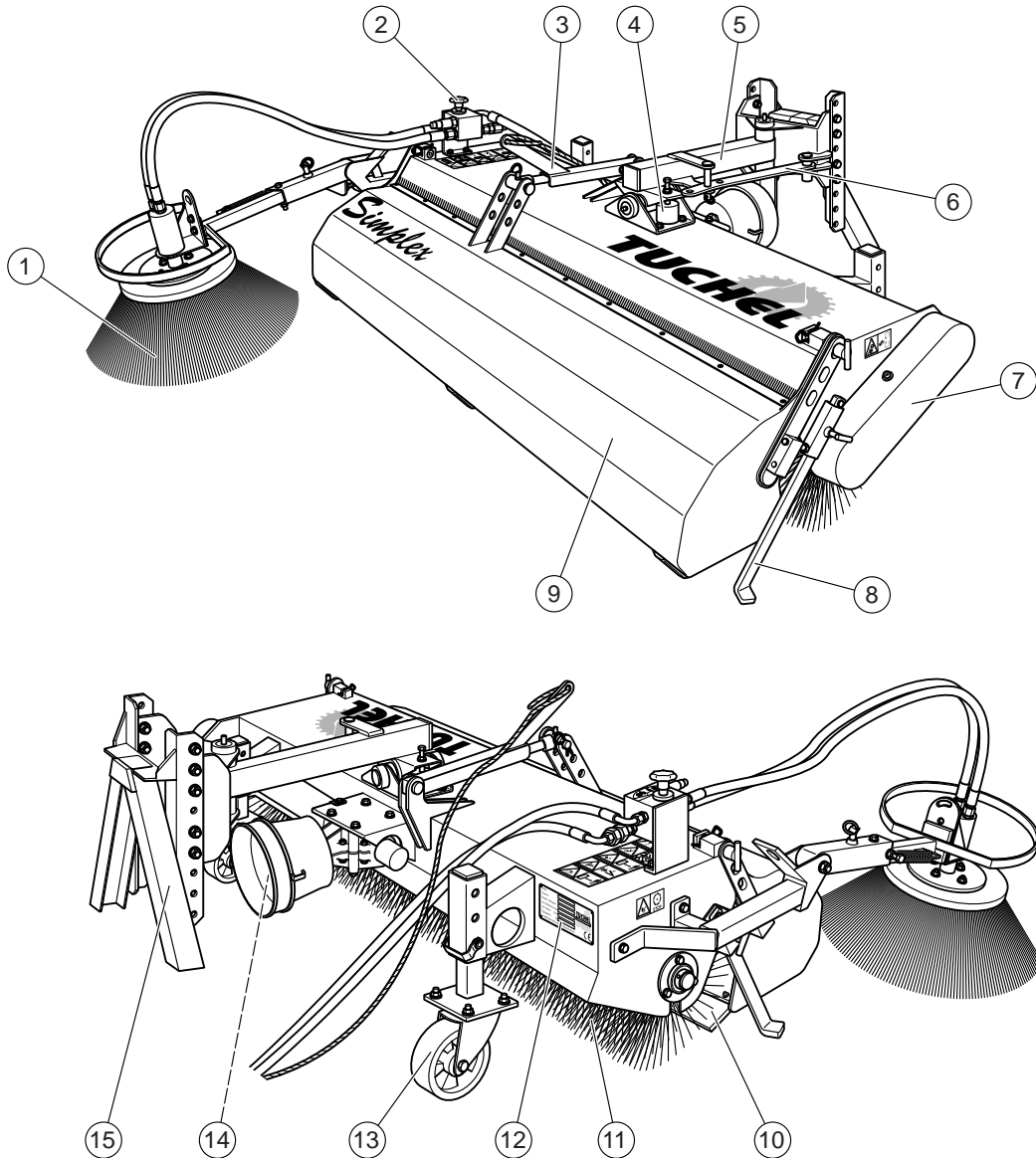
As a rule, the sweeper cylinder is equipped with a full bristol brush made of 100% PPN. The sweeper cylinder has a diameter of 400 mm.

The machine frame of the sweeper is made of a robust and torsion-free welded construction.

The sweeper "Simplex" can be equipped with the following accessories:

- Splash guards for services during the winter time.
- Debris collector for gathering sweepings
- Hydraulic system for emptying the debris collector
- Side broom for sweeping close to corners
- Hydraulic lateral adjustment for simple sweeping applications and adaptation to various work environments
- Hydraulic drive of the sweeper cylinder

General view



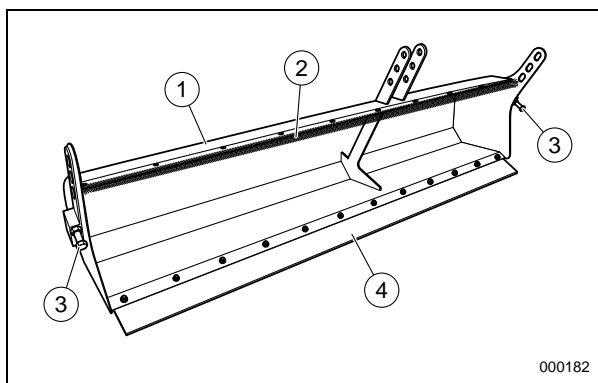
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- | | |
|---|---------------------------------|
| 1 Side broom (circular brush) | 9 Debris collector |
| 2 Rotational speed adjustment of side broom | 10 Vulkollan rubber wear tip |
| 3 Emptying, using a pulley system | 11 Sweeper cylinder |
| 4 Level compensation system | 12 Type plate |
| 5 Support beam | 13 Support wheels |
| 6 Mechanical lateral adjustment | 14 Articulated shaft connection |
| 7 Chain protection | 15 A-frame |
| 8 Parking jacks | |

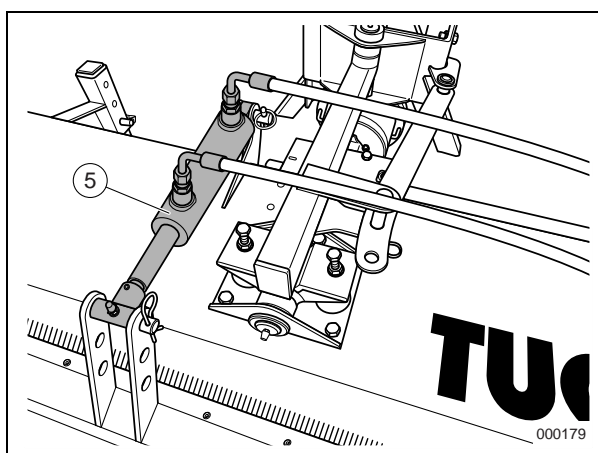
Accessories (optional)

Debris collector

- 1 Debris collector
- 2 Broom strip
- 3 Set screws
- 4 Vulkollan rubber wear tip

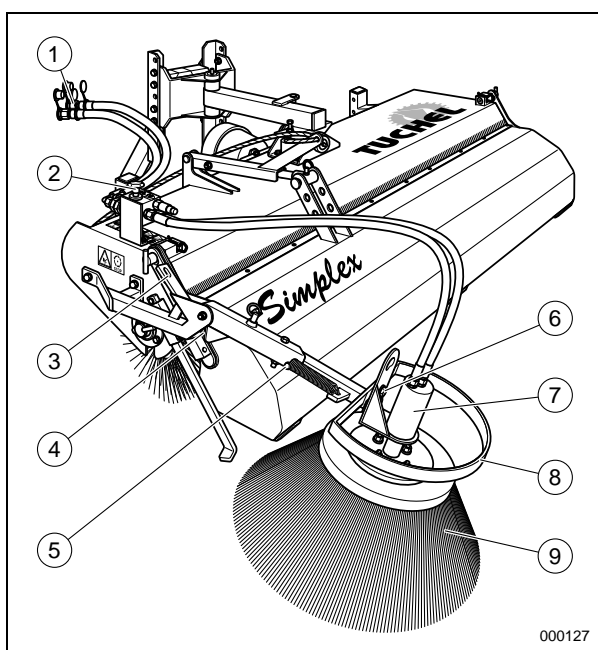


- 5 Hydraulic emptying (hydraulic cylinder)



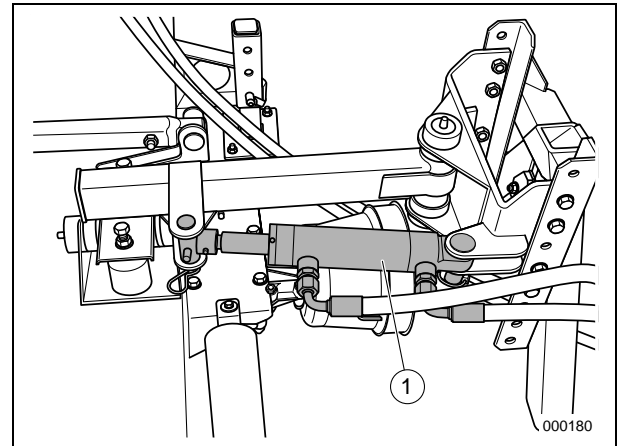
Side broom

- 1 Hydraulic connections
- 2 RPM adjustment (control valve)
- 3 Locking device for normal position
- 4 Inclination precision adjustment
- 5 Swivelling range setting
- 6 Pressure angle setting
- 7 Hydraulic motor
- 8 Bumper
- 9 Circular brush



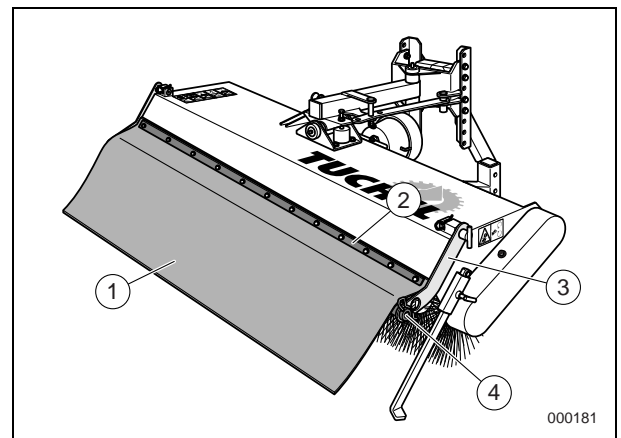
Hydraulic lateral adjustment

- 1 Hydraulic cylinder



Splash guard

- 1 Rubber cloth
- 2 Bumper
- 3 Bracket
- 4 Pipe (spacer)



Type plate

Model _____

Serial no. _____

Year of manufacture / order no. _____

max. operating pressure [bar] _____

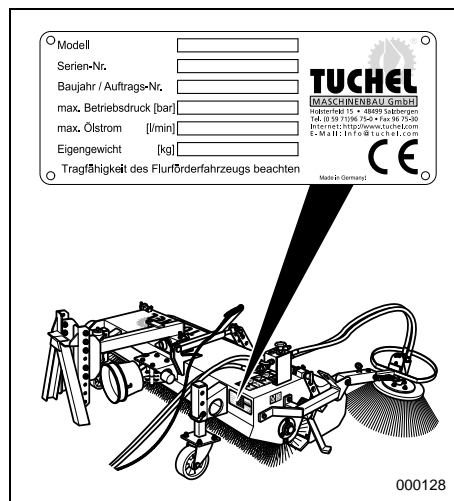
max. oil flow rate [l/min] _____

Unladen weight [kg] _____

Enter the data here so that the specifications are readily available at any time.

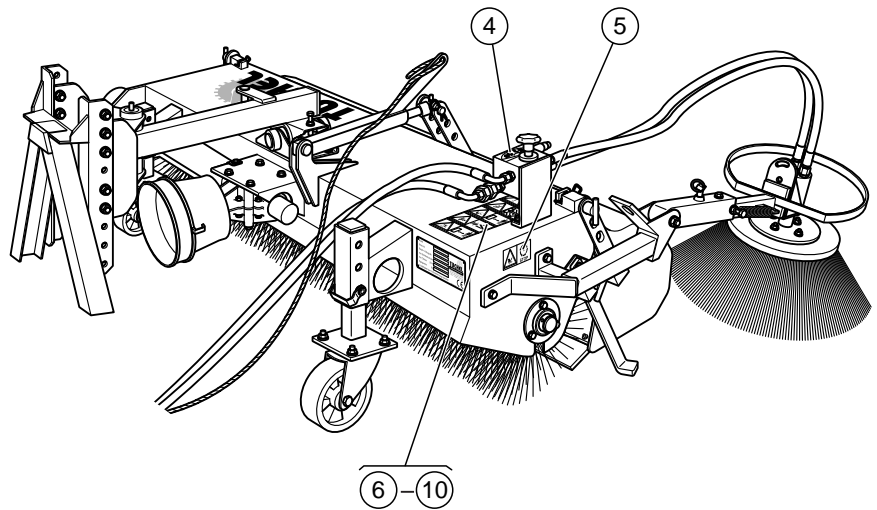
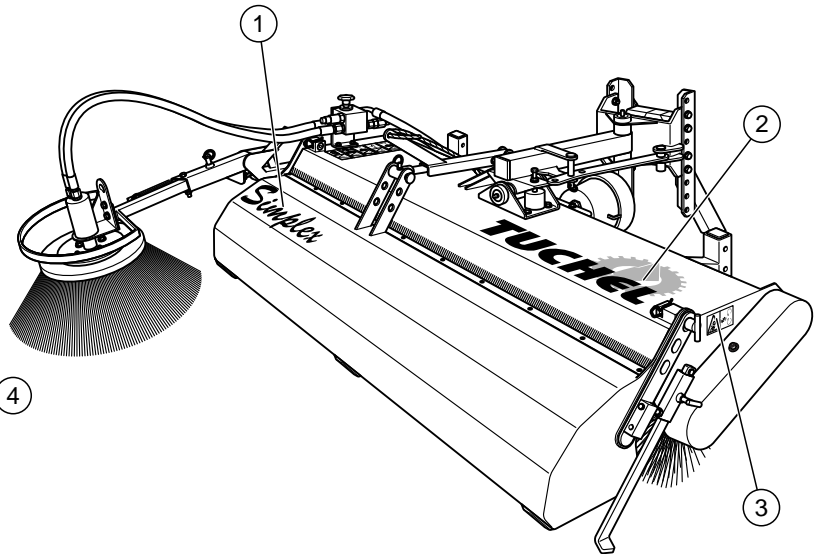
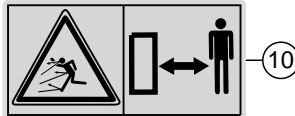
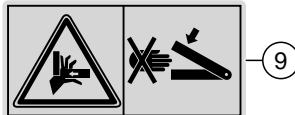
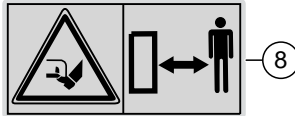
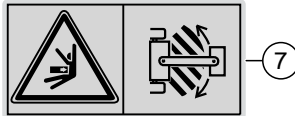
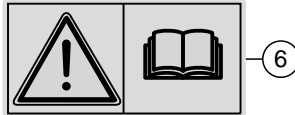
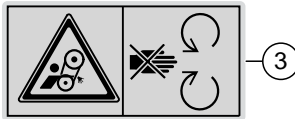
The complete identification marking has the value of a certificate and may not be modified or made irrerecognisable.

The identification marking must be replaced if it is damaged or has faults.



Identification marking locations

Simplex ①
TUCHEL ②



- 1 "Simplex" manufacturer's name plate
- 2 "Tuchel" manufacturer's nameplate
- 3 Warning sticker "Do not reach into rotating machine parts"
- 4 Label "RPM setting/side broom"
- 5 Warning sticker "Do not reach into rotating machine parts/Wait for components to stop moving"

- 6 Warning sticker "Read operating manual before initial start-up"
- 7 Warning sticker "Stay clear of the swinging/pivoting range"
- 8 Warning sticker "Do not enter! Risk of crushing"
- 9 Warning sticker "Do not reach into crushing zone"
- 10 Warning sticker "Dirt and/or foreign particle may be ejected"

000115

5 Operation

The "Operation" chapter contains the following descriptions that are required for the use of the accessory equipment:

- Placing into operation
- Safety regulations when working with accessory equipment
- Installing the accessory equipment
- Working methods
- Removing the accessory equipment
- Placing out of operation
- Storing over longer periods of time

Handling of the accessory equipment is described in the chapter "Operation".

Working with accessory equipment

Safety regulations when working with accessory equipment

- The accessory equipment may only be attached to a host vehicle that is equipped with a compatible quick-change unit. If you have questions, please contact your specialist dealer.
- Only host vehicles that are designed for use with the accessory equipment may be used.
 - Check the approved total weight, axle loads and transport dimensions with the manufacturer specifications of the host vehicle.
 - If a counterweight is required on the host vehicle, attach this according to the specifications of the manufacturer.
 - Observe the accessory equipment's centre of mass. The centre of mass changes depending on the material and the collected amount of sweepings.
- The attachment must not be modified or altered.
- When attaching accessory equipment, the instructions in the operating manual of the host vehicle must be observed.
- When mounting the accessory equipment, the host vehicle must be on level and solid ground.
- The quick-release couplings must be depressurised before attaching the accessory equipment.
- Run the hydraulic lines so that they are not crushed, pinched or placed under tension.
- Check the accessory equipment for proper locking and functioning after every installation before you start to use it.
- Before leaving the host vehicle, always observe that the accessory equipment is sitting securely and that the holding brake of the host vehicle is activated.
- The maximum driving speed when sweeping is 6 km/h.

Placing into operation

Before placing the machine into operation, every operator must have carefully read and understood the available operating manual as well as the operating manuals for the host vehicle and the accessory equipment.



WARNING!

Damage or defects on the sweeper or the host vehicle can lead to accidents.

- If defects are found during the following test, the sweeper may not be operated until it has been properly repaired.
- The sweeper may only be operated in a technically sound state and used for its intended purpose in accordance with regulations.

Checks before placing into operation

Check that the sweeper and the host vehicle are safe to operate before activating the sweeper.

Perform the following checks:

- Visual inspection of the machine:
 - Exterior components must not be broken or deformed.
 - The hydraulic system may not exhibit any damages or leakages. Damaged hoses must be replaced.
 - The sweeper must be properly attached and securely locked. See also "Installing the sweeper", *Page 26*.

Ensure all guards and covers are properly attached to the accessory equipment.

Installing the sweeper

Initial installation

The spacing between the host vehicle and the sweeper must be selected based on the length of the PTO shaft and the host vehicle.

The length of the articulated shaft is based on the specifications provided by the drive shaft manufacturer. Please refer to the operating instructions of the articulated shaft.

Depending on the host vehicle, the length of the front end of the support beam may have to be increased.

In order to maintain the centre of gravity close to the sweeper, the length of the front end must be kept as short as possible. This will prevent the front axle of the host vehicle to be subjected to unnecessary loads.

Setting the front end length

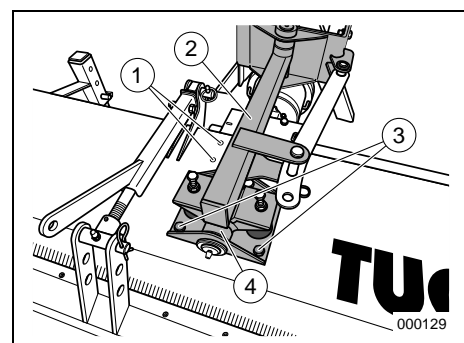


WARNING!

Risk of accident through falling load.

- Please consider the weight of the support beam, the A-frame and/or the three-point linkage.
- Before loosening the fasteners on the flange, ensure to shore up the support beam

1. Remove the plastic caps (1) from the respective bores.
2. Unscrew the bolts (3).
3. Place the support beam (2) onto the respective hole pattern.
4. Align the hole pattern of the self-aligning bearing (4) with the hole pattern of the frame cover.
5. Screw in the bolts (3).
6. Tighten the bolts.



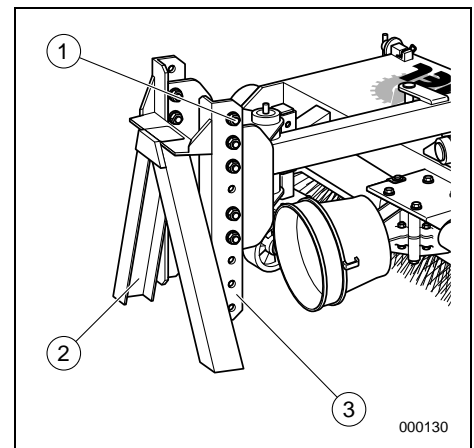
NOTE!

After adjusting the length of the front end, mount the sweeper. Depending on the design, use either an A-frame or a three-point linkage.

Mounting the A-frame

Height adjustment of the A-frame

1. Ensure to align the mounting height of the A-frame (2) with the attachment system of the respective host vehicle.
 - In order to move the front end support underneath the A-frame, it must be possible to lower the front end support sufficiently.
 - It must be possible to raise the sweeper high enough in order to maintain adequate clearance to the ground during the transport. The same conditions apply when crossing a ramp.
2. Remove the screws (1) on both sides of the support.
3. Position the perforated strip (3) at the proper height.
4. Replace the screws (1) and use locknuts to secure the fasteners.
5. Adjust the upper link on the host vehicle and ensure the mounting device is perpendicular to the ground. See operating manual of the host vehicle.



Mounting the articulated shaft to the sweeper

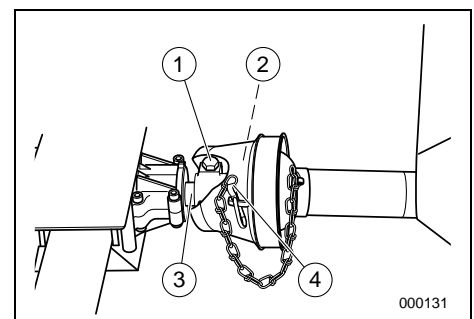


ATTENTION!

Improper installation of the articulated shaft may damage the drive. When shortening the PTO shaft, please consult the information provided by the manufacturer.

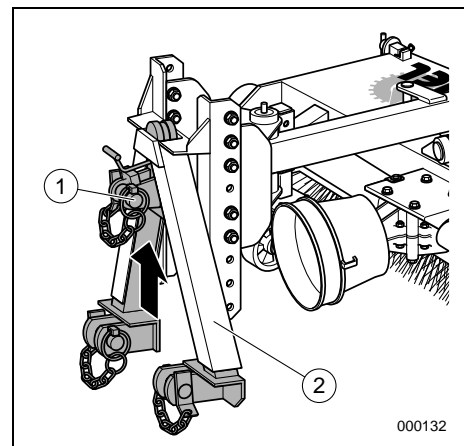
- Proceed as described in the articulated shaft's operating manual.

1. Push the clevis (2) onto the drive shaft (3).
2. Tighten the clamping bolt (1).
For torque information, please refer to the operating instructions of the articulated shaft.
3. Install the chain (4) of the anti-twist device.



A-frame support

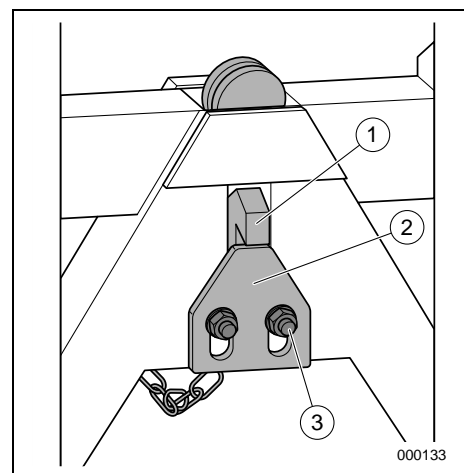
1. Clean the front end support (1) of the host vehicle and the A-frame.
2. Drive the host vehicle to the sweeper so that the front end support unit (1) engages exactly with the A-frame (2).
3. Please verify the correct fit of the A-frame.



Using the locking lug

If the A-frame is engaged properly, it will be secured by snapping onto the locking lug (1).

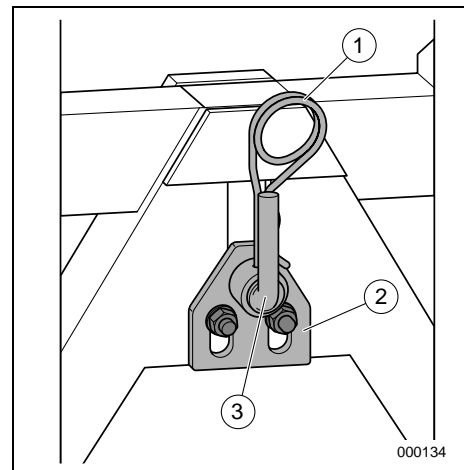
1. If necessary, the position of the locking plate (2) may require a slight adjustment. Proceed as follows:
 - Loosen nuts (3).
 - Shift the locking plate (2) and ensure the locking lug (1) engages.
 - Tighten the counter nuts (3) again.



Using a lock pin

Alternatively, a lock pin (3) may be used.

1. Pull out the spring cotter (1).
2. Push the locking pin (3) through the locking plate (2) as far as it will go.
3. Replace the spring cotter (1) to secure the locking pin (3)
4. Check the position of the locking plate (2).
Adjust the locking plate using a similar procedure as described under "Using the locking lug"

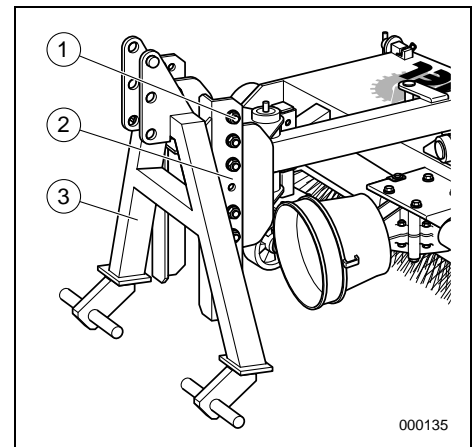


✓ The sweeper is now ready to be used.

Mounting the three-point linkage

Height adjustment of the three-point linkage

1. Ensure to align the mounting height of the three-point linkage (3) with the attachment system of the respective host vehicle.
 - It must be possible to bring the upper and lower link down far enough to mount the attachment system.
 - It must be possible to raise the sweeper high enough in order to maintain adequate clearance to the ground during the transport. The same conditions apply when crossing a ramp.
2. Remove the screws (1) on both sides of the support.
3. Position the perforated strip (2) at the proper height.
4. Replace the screws (1) and use locknuts to secure the fasteners.



Mounting the PTO shaft to the sweeper

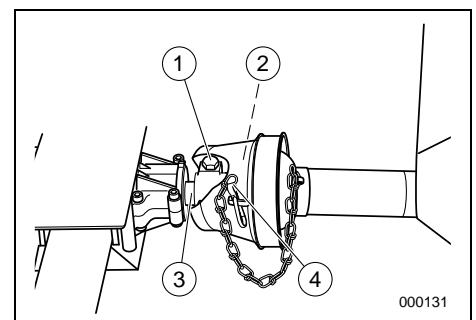


ATTENTION!

Improper installation of the articulated shaft may damage the drive. When shortening the PTO shaft, please consult the information provided by the manufacturer.

- Proceed as described in the PTO shaft's operating manual.

1. Push the clevis (2) onto the drive shaft (3).
2. Tighten the clamping bolt (1).
For torque information, please refer to the operating instructions of the articulated shaft.
3. Install the chain (4) of the anti-twist device.



Attaching the three-point linkage

1. Clean the front end support of the host vehicle and the three-point linkage.
2. Drive the host vehicle to the mounting device of the sweeper.
3. Install the lower link:
 - Place the lower link onto the appropriate pin (2) or (3).



Note:

Depending on the hitch category, the pins (2) and (3) use different diameters. They must match the diameter of the support point of the lower link.

- Use a spring cotter to secure the lower link on both sides.

4. Install the upper link:
 - Insert the upper link pin (1) into the appropriate bore (2) or (3).

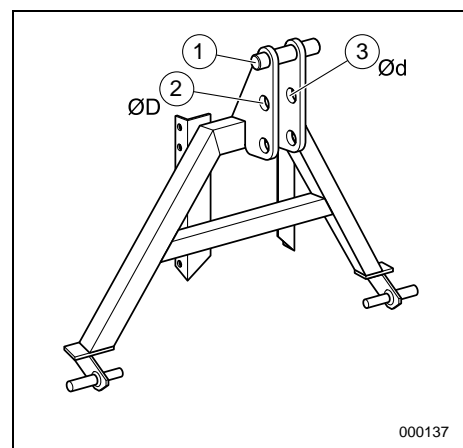
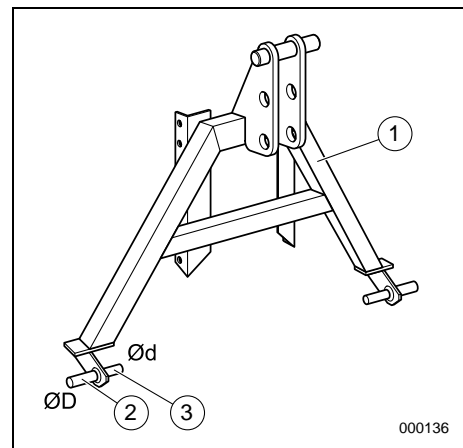


Note:

Depending on the hitch category, the bores (2) and (3) use different diameters. They must match the diameter of the upper link pin (1).

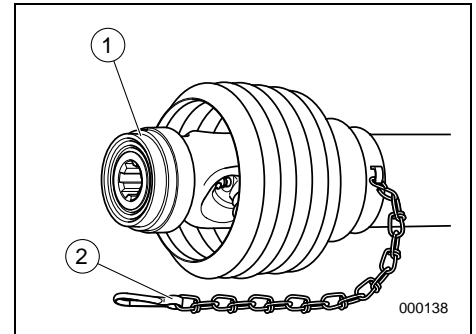
- Use a spring cotter to secure the upper link pin (1).
- Insert the upper link and ensure the mounting device is perpendicular to the ground. See operating manual of the host vehicle.

5. Please verify the correct fit of the three-point linkage.



Hitching the PTO shaft to the host vehicle

1. Pull back the sleeve (1) and place the shaft onto the power take-off shaft of the host vehicle
2. Release the sleeve (1), The locking mechanism will engage.
3. Hang the chain (2) of the anti-twist device at an appropriate point.



Attaching accessories (optional)

1. Connect the hydraulic lines, if available. Proceed as described in the operating manual of the host vehicle.
2. If the sweeper is equipped with a debris collector and a mechanical emptying system, install the pulley system in the driver's cabin.
3. Attach the pulley system inside the host vehicle at an appropriate location.

✓ The sweeper is now ready to be used.



NOTE!

Prior to starting the daily work routine, check the functions of the sweeper.

Operating the sweeper

The adjustment and handling of the controls may vary from each other depending on the host vehicle used. Observe the operating manual of the respective host vehicle.

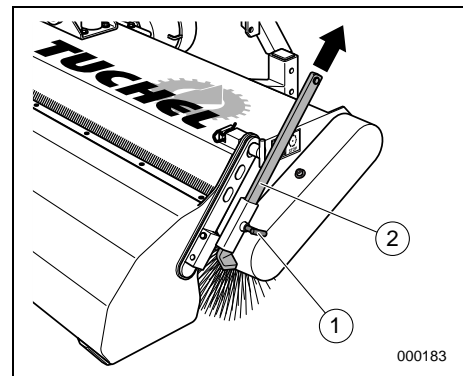
1. Make yourself comfortable in the host vehicle.
2. Raise the sweeper off the ground.
3. Drive the host vehicle and the sweeper to the site of operation.

During the sweeping operation ensure to place the operating lever used for raising and lowering the front end into its floating position. This ensures a perfect adjustment of the sweeper to the peaks and valleys of the pavement. Please read the operating instructions of the host vehicle.

Adjusting the parking jacks

Before starting the sweeping operation, ensure to raise the parking jacks on both sides of the sweeper.

1. Loosen the clamping bolt (1).
2. Push the parking jack (2) up as far as it will go
3. Tighten the clamping bolt (1) again.



Adjusting the sweeping profile

We recommend adjusting the sweeping profile as follows to achieve the best possible results:

The width (b) of the contact surface between the sweeper cylinder and ground should not exceed of 6 - 10 cm.

1. Check the sweeping profile:
 - Place the sweeper on level ground.
 - Allow the sweeper cylinder to rotate at that position.
 - Stop the sweeper cylinder and raise the sweeper off the ground.
 - Measure the width (b) of the cleaned area.

If the width (b) is less than stated above, the height of the support wheels must be raised. See chapter "Adjusting the support wheels", *Page 43*.

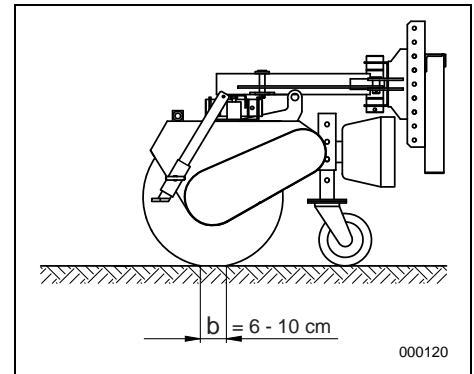
If the sweeper is equipped with a debris collector, this attachment must be raised as well. See chapter "Debris collector (optional)", *Page 44*.

2. Check the sweeping profile again as described in step 1.

Adjusting the revolution speed

The speed of the sweeper cylinder is dependent on the power output of the host vehicle. This implies, an increase in the engine's RPM will also increase the rotational speed of the sweeper cylinder.

1. Therefore, vary the engine speed of the host vehicle in order to adjust the sweeper cylinder's rotational speed.



Simple sweeping mode

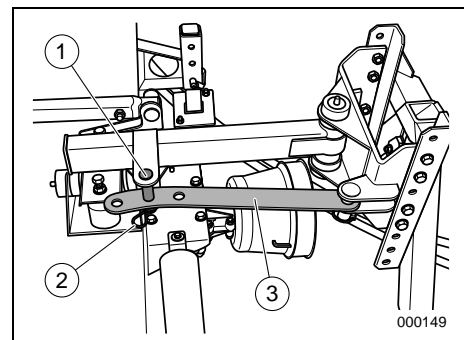
Simple sweeping refers to a cleaning method whereby dirt and debris is removed without adding the sweepings into the debris collector.

In this case, the sweeper is adjusted in an angle to the street. This will simply remove the sweepings from the left- or right-hand side of the kerb.

The max. sweeping angle is 20°. Depending on the model, the sweeping angle can be adjusted mechanically or hydraulically.

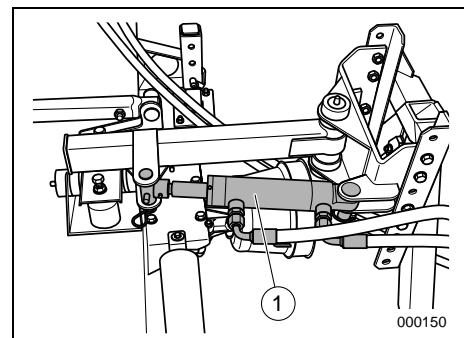
Mechanical lateral adjustment

1. Raise the sweeper and maintain close contact to the ground.
2. Turn off the engine and remove the ignition key.
3. Secure the host vehicle to prevent unauthorised start-up.
4. Pull out the spring cotter (2).
5. Remove the pin (1).
6. Rotate the sweeper to the left and then to the right.
7. Insert the pin (1) into the respective bore of the perforated bar (3).
8. Secure the pin with the spring cotter (2).
9. See "Simple sweeping" below and follow the description.



Hydraulic lateral adjustment

1. Raise the sweeper and maintain close contact to the ground.
2. Activate the respective control lever inside the host vehicle.
The hydraulic cylinder (1) swings the sweeper to the left and right.
3. Secure the control system of the vehicle's hydraulic to prevent unauthorised activation.



WARNING!

Crush hazard! Keep clear of moving parts.

- During the tilting operation no personnel is permitted in the hazard zone.
- Crush hazard! Do not reach inside danger zone. Keep hands clear of moving parts.

4. See "Simple sweeping" below and follow the description.

Simple sweeping

If a side broom is installed:

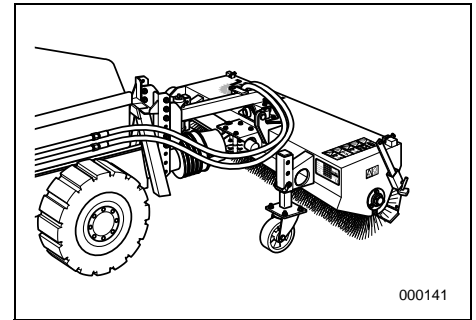
1. Before starting the simple sweeping action, ensure the side broom is in its home position See chapter "Adjusting the circular brush", Page 47.

If a debris collector is installed:

2. Use the respective control lever inside the host vehicle to open the shovel compartment.

If the sweeper is equipped with an mechanical emptying feature, the debris collector must be detached before 'simple' sweeping can be started. See chapter "Disassembling the debris collector", Page 44.

3. Carefully lower the sweeper. Ensure the support wheels maintain contact with the ground and the mounting device is perpendicular to the surface.



000141



WARNING!

Risk of the sweepings being flung forward by the rotating sweeper cylinder.

- Persons must maintain a safe distance of at least 5 m.

4. Allow the sweeper cylinder to turn.
 5. Drive forwards to clean the surface.
- ✓ Sweepings will be pushed to the side.

Containing the sweepings (optional)

Gathering sweepings necessitates mounting a debris collector onto the sweeper.

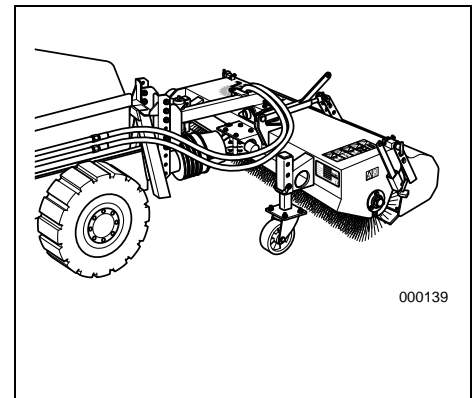
1. Carefully lower the sweeper. Ensure the support wheels maintain contact with the ground and the mounting device is perpendicular to the surface.



WARNING!

Risk of the sweepings being flung forward by the rotating sweeper cylinder.

- Persons must maintain a safe distance of at least 5 m.



000139

2. Allow the sweeper cylinder to turn.
 3. Drive forwards to clean the surface.
- ✓ The sweepings will be brushed into the debris collector.

Emptying the debris collector (optional)

If the sweeper is fitted with a debris collector, a pulley system is used to empty it either mechanically or hydraulically; however, this depends on the type of equipment.

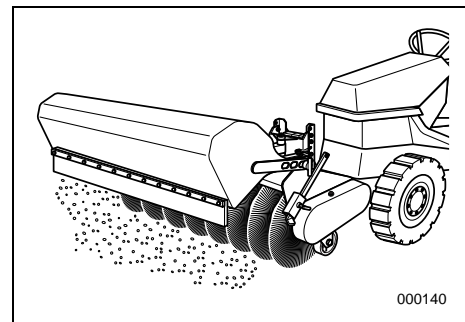


WARNING!

Risk of the sweepings being flung forward by the rotating sweeper cylinder.

- Persons must maintain a safe distance of at least 5 m.

1. Stop the rotation of the sweeper cylinder
 2. Raise the sweeper.
 3. Tug on the pulley or activate the respective control valve to open the debris collector.
The emptying mechanism or the hydraulic cylinder opens and empties the debris collector.
 4. Release the pulley or activate the respective control valve to close the debris collector.
- ✓ The sweeper is ready to be used again.



NOTE!

When closing the debris collector, ensure the emptying mechanism engages completely.

Swivelling the side broom to the operating/normal position (optional)

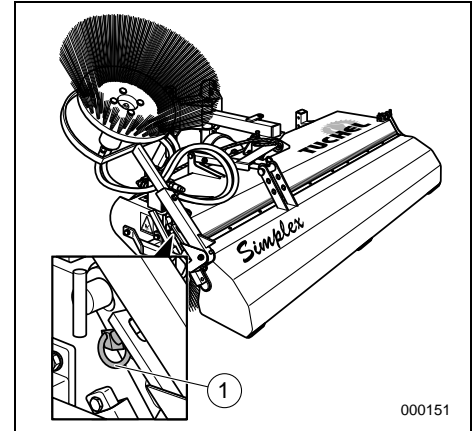
1. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", Page 51.
2. Pull the spring cotter (1).



WARNING!

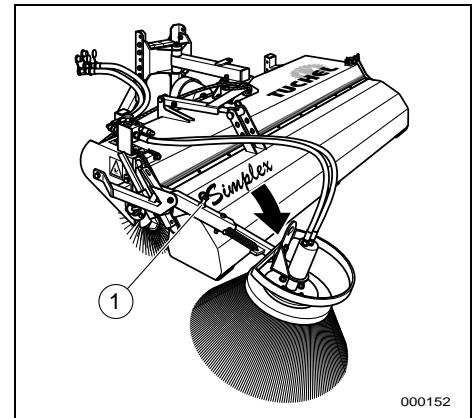
There is the risk of back injuries due to the unladen weight of the side broom when lifting it and also the risk of accident by the side broom falling down abruptly.

- Take the weight of the side broom into account.



3. Swivel the side broom down to the ground.
4. Reinsert the spring cotter (1).
5. Check whether the side broom is connected to the hydraulic system and the control valve is open. See chapter "Adjusting the revolution speed", Page 48.

The side broom is ready for operation.



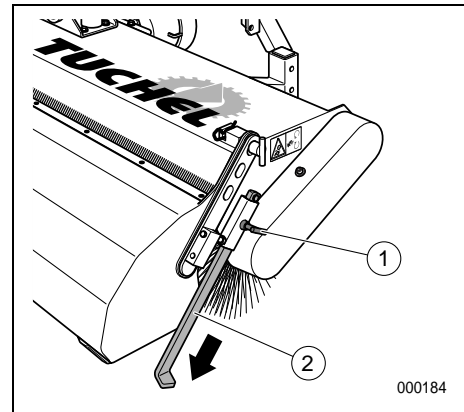
To bring the side broom into the normal position, proceed in the reverse order.

Installing the sweeper

Preparing for disassembly

Shutting down the sweeper

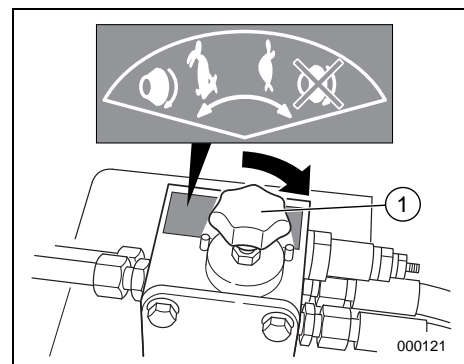
1. Empty the debris collector (if installed).
2. Loosen the clamping bolt (1).
3. Push the parking jack (2) down far as it will go.
4. Tighten the clamping bolt (1) again.
5. Proceed in a similar fashion with the parking jack on the opposite side of the sweeper
6. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", Page 51.



NOTE!

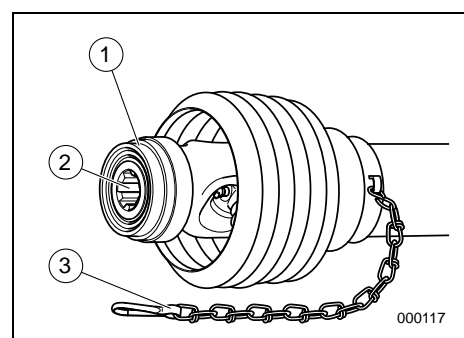
If the sweeper will not be used for a longer period of time, follow the instructions in chapter "Storing the accessory equipment over longer periods of time", Page 41..

7. If a side broom is installed, tighten the set screw (1), see arrow.
8. Position the side broom in its normal position. See chapter "Adjusting the circular brush", Page 47.



Removing the PTO shaft from the host vehicle

9. Disconnect the PTO shaft from the host vehicle.
 - Remove the chain (3) of the anti-twist device.
 - Simultaneously pull back the sleeve (1) and the connecting socket (2) off the PTO shaft of the host vehicle
 - Use the chain to attach the PTO at an appropriate point either on the A-frame or the three-point linkage.
10. Ensure to keep the connecting socket (2) clean at all times.





WARNING!

Caution! Hydraulic hoses and pulley create a potential trip hazard.

- Lay the hydraulic hoses and the connection cable over the sweeper.

11. When using the mechanical emptying feature: Remove the pulley from the driver's cabin

If hydraulic system is connected:

12. Move all operating levers of the hydraulic system to both sides repeatedly.

The hydraulic system is decompressed.

13. Disconnect the hydraulic hoses from the host vehicle.

14. Seal the quick-release couplings with dust caps.

15. Lay the ends of the hydraulic hoses over the sweeper.

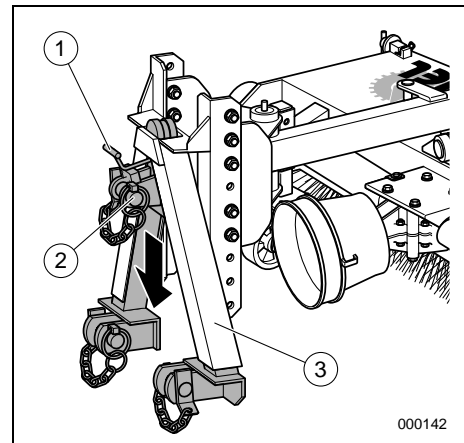


NOTE!

In order to disconnect the sweeper from the host vehicle, unlock the A-frame or the three-point linkage (depending on model). See next page.

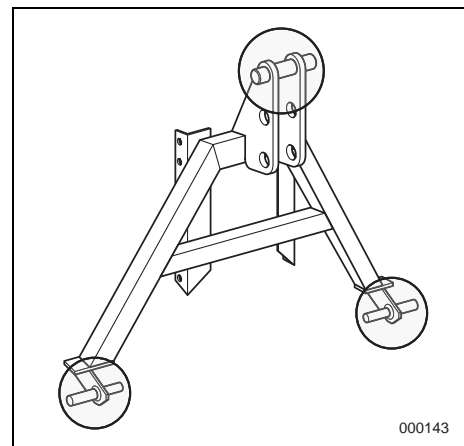
Unlocking the A-frame

1. Unlock the front end support (1) by activating the interlocking lever (2).
 2. Lower the front end support (1) until it unhooks from the A-frame (3)
 3. Ensure there are no obstacles behind the vehicles.
 4. Reverse the host vehicle, moving it away from the sweeper.
- ✓ The sweeper is now disconnected from the host vehicle.



Unlocking the three-point linkage

1. When unlocking the upper and lower link, follow the vehicle manufacturer's instructions. Please read the operating instructions of the host vehicle.
 2. Lower the upper and lower link until it is completely unhooked and the support pins are free; see enlargement.
 3. Ensure there are no obstacles behind the vehicles.
 4. Reverse the host vehicle, moving it away from the sweeper.
- ✓ The sweeper is now disconnected from the host vehicle.



Placing out of operation

Turning off of the accessory equipment safely

1. Park the accessory equipment on level and solid ground.
2. Operate the operating lever of the working hydraulics to lower the quick-change unit or the accessory equipment to the ground.
3. Apply the holding brake.
4. Place all operating levers of the working hydraulics in the neutral position.
5. Shut off the engine of the host vehicle and keep the ignition key in safe custody so that the machine is secured against unauthorised starting.
6. Move all operating levers of the hydraulic system to both sides repeatedly.

The hydraulic system is decompressed.

- ✓ The machine is secured to prevent unauthorised start-up.

Storing the accessory equipment over longer periods of time

The following measures must be carried out if the accessory equipment is to be placed out of service over a longer period of time:

Before placing out of service

1. Thoroughly clean the entire accessory equipment and allow it to dry.
2. Park the accessory equipment in a dry, clean and frost-free location.

We suggest that you also cover the accessory equipment with a tarp to protect it against dust.

3. Grease the accessory equipment.
4. Swivel the side broom to the normal position.

After placing out of service

1. Grease the accessory equipment.
2. Please verify the safe operating condition of the accessory equipment. Refer to "Checks before placing into operation" *Page 25*.

6 Operation

The "Operation" chapter contains handling instructions that you must perform if you want to use the auxiliary equipment or if special working conditions exist.

In addition, the activities described are only relevant if the accessory equipment is equipped with the corresponding accessories.

Adjusting the compensation system

In order to adjust for any unevenness in road, the sweeper is equipped with a compensation system. The rubber pads (3) limit the swinging motion perpendicular to the road.

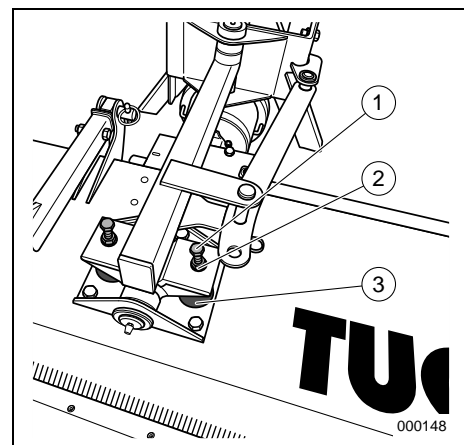
Use the set screws to limit the range of the swinging motions.

1. Park the host vehicle and the sweeper securely on level and solid ground. Refer to "Maintenance preparation", Page 51.
2. Loosen the counter nut (2).
3. Tighten or loosen the set screws (1) on both sides by a similar amount.

Loosening the screw = increases the swing area

Tightening the screw = decreases the swing area

4. Tighten the counter nut (2) again.



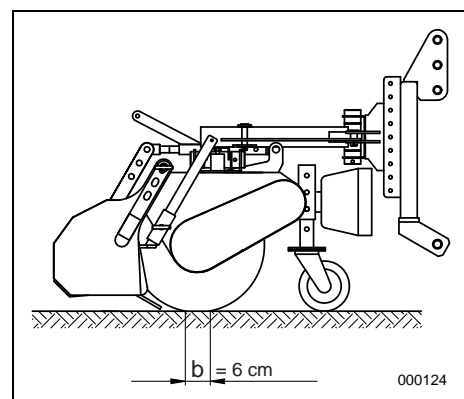
Re-adjusting the sweeper

Marginal contact of the sweeper shaft with the ground will reduce the optimum effectiveness of dirt removal. An insufficient sweeping profile is proof of this.

If the wear of the sweeper cylinder increases to a point at which the width (b) of the contact area is reduced to less than 6 cm, the sweeper cylinder must be adjusted.

Depending on the sweeper model, follow the instructions below and in the recommended sequence:

1. Adjusting the support wheels, Page 43
2. Adjusting the debris collector, Page 45
3. Adjustment of the Vulkollan rubber wear tip (optional), Page 46
4. Adjusting the circular brush, Page 47 and/or Setting the inclination and contact of the side broom, page 47.
5. Adjusting the circular brush, page 47 or Mounting the three-point linkage, page 29
6. Adjusting the sweeping profile, Page 33.



Adjusting the support wheels

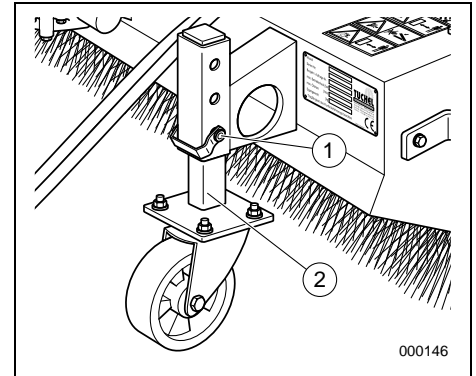
1. Raise the sweeper.
2. Turn off the engine and remove the ignition key.

**WARNING!**

Accidental lowering of the sweeper may cause injuries!

- Keep feet clear of sweeper.
- Secure the host vehicle to prevent unauthorised star-up.

3. Pull out the pin (1).
4. Use the square pipe to move the support wheel (2) in the respective notch.

**NOTE!**

The height adjustment of the support wheels and the adjustment of the debris collector must always match.

This means, if the debris collector had to be adjusted due to the wear of the sweeper cylinder, the support wheels must be raised by an additional notch.

Please refer to "Re-adjusting the sweeper, Page 42" and follow the instructions.

5. Reinsert the pin (1).
6. Re-adjust the second support wheel in a similar manner.
7. Lower the sweeper onto the support wheels.

Debris collector (optional)

Disassembling the debris collector

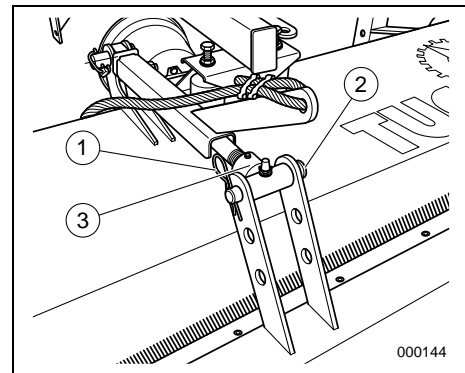
If removing the 'simple' sweeping feature, the mechanically activated debris collector must also be removed.



NOTE!

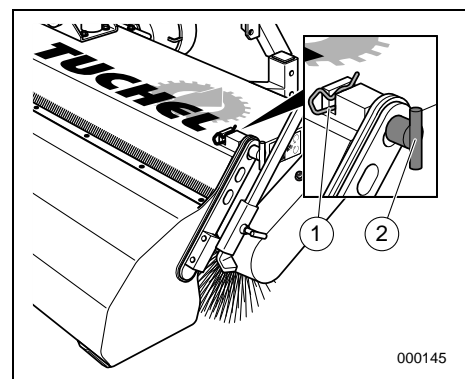
Only disassemble the debris collector if the sweeper is still attached to the host vehicle.

1. Turn off the engine and remove the ignition key.
2. Pull out the spring cotter (1).
3. Remove the pin (2).
4. Place the draw bar (3) or the hydraulic cylinder onto the sweeper.



5. Remove the spring cotters (1) on both sides of the sweeper.
6. Remove the pin (2).
7. Remove the debris collector from the sweeper.

To attach, follow the reverse order of the removal.



Adjusting the debris collector

The debris collector must be adjusted if the sweeper cylinder is worn to a point at which width (b) of the contact surface is less than 6 cm.

1. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", Page 51.
2. Disassemble the debris collector as described in section "Disassembling the debris collector", page 44.

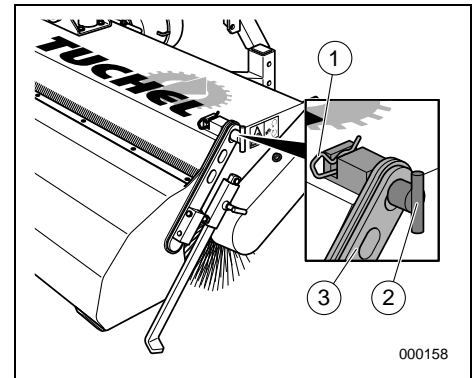
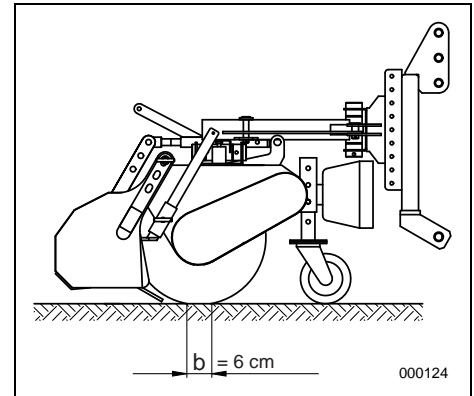


WARNING!

Careful when lifting the debris collector. It is very heavy and the potential risk of back injuries is imminent.

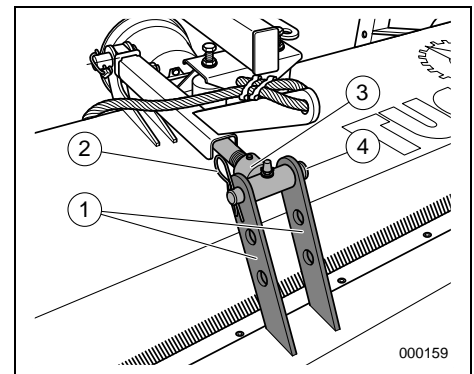
- Please consider the weight of the debris collector.

3. Raise the the bracket (3) on both sides by one notch.
4. insert pin (2) on both sides.
5. Secure the pin with the spring cotter (1).



When adjusting the debris collector, the spacing of the emptying mechanism must also be changed.

6. Lower the draw bar (3) between the perforated bar (1) by one notch.
7. Reinsert the pin (4).
8. Secure the pin with the spring cotter (2).



Once the debris collector is mounted, follow the instructions below:

9. Re-adjust **the height** of the support wheels. See chapter "Adjusting the support wheels", Page 43.
10. Adjust the distance of the Vulkollan tip to the sweeper cylinder. See chapter "Adjustment of the Vulkollan rubber wear tip (optional)", Page 46.



NOTE!

If the sweeper cannot be lowered anymore after the debris collector has been adjusted, the height of the A-frame or the three-point linkage must be adjusted as well. See section "Mounting the A-frame," page 27 or section "Mounting the three-point linkage", page 29. Please refer to "Re-adjusting the sweeper, Page 42" and follow the instructions.

Adjustment of the Vulkollan rubber wear tip (optional)

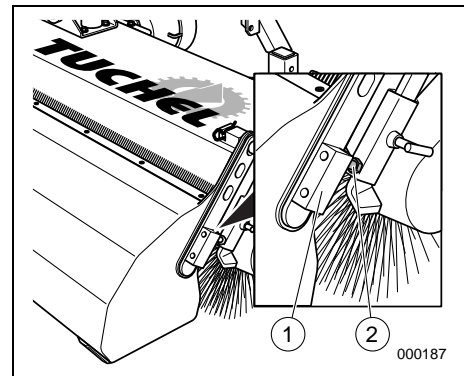
Two set screws (2) on both sides of the sweeper can be adjusted to modify the spacing of the Vulkollan moulding to the sweeper cylinder

Depending on the position of the debris collector, adjustment of the set screws in the bracket may be necessary.

1. Park the host vehicle and the sweeper securely on level and solid ground. Refer to "Maintenance preparation", Page 51.

If required

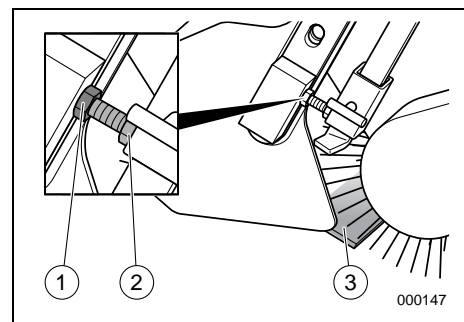
1. Unscrew the set screws (2).
2. Insert the set screw into the open threaded bore of the bracket (1).



Adjustment

The following steps apply to both sides:

1. Loosen the counter nut (1).
2. Tighten the set screws (2).
 - Ensure the Vulkollan tip (3) only touches the ground slightly.
 - The spacing between the brushes and the Vulkollan tip should be marginal, without touching each other.
3. Tighten the counter nut (1) again.

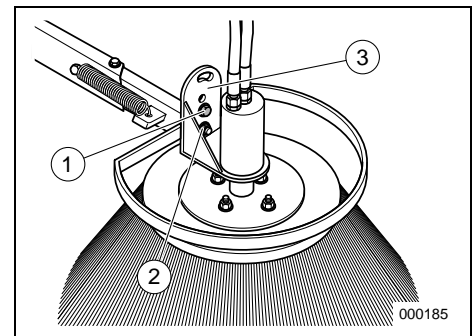


Side broom (option)

Adjusting the circular brush

The circular brush can be mounted in two positions on the cantilever beam of the side broom. Depending on the setting of the support wheels, the height of the circular brush must be adjusted.

1. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", Page 51.
2. Pivot the side broom into its working position. See chapter "Adjusting the circular brush", Page 47.
3. Remove the nut (1) and the clamping bolt (2)
4. Use bracket (3) to place the circular brush into an open notch.
5. Replace the nut (1) and the clamping bolt (2).
6. Follow the instructions below in order to adjust the side broom.

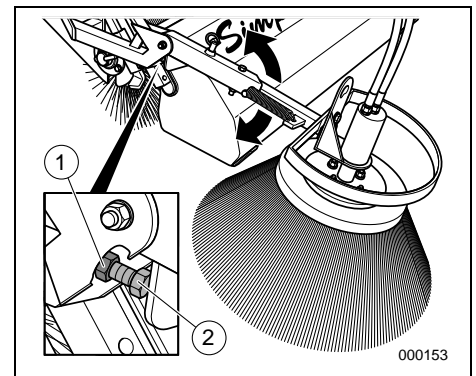


Setting the inclination and contact of the side broom

Park the host vehicle and the sweeper securely before making any adjustments. Refer to "Maintenance preparation", Page 51.

Precision adjustment of the inclination

1. Loosen the counter nut (1).
2. Turn the set screw (2) to change the contact surface and thus the contact pressure of the side broom.
 Unscrewing the screw = reducing the contact pressure
 Screwing in the = increasing the contact pressure
3. Tighten the counter nut (1) again.



Setting of the pressure angle

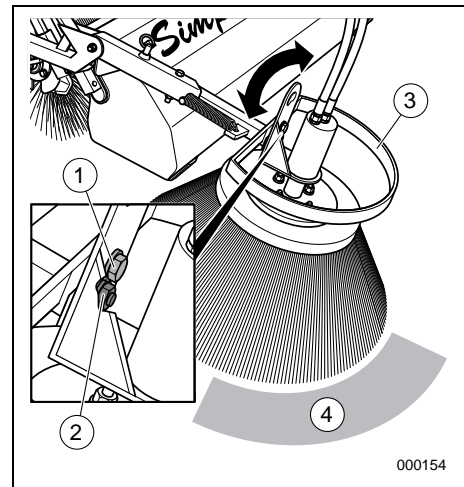
1. Loosen the nut (2) and the clamping bolt (1)
2. Grab the bumper (3) and tilt the side broom until the pressure angle is set appropriately.



NOTE!

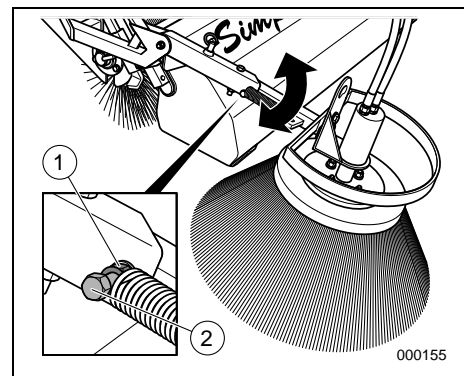
The pressure angle should be adjusted so that the contact surface of the side broom is equal to a quarter circle (4).

3. Tighten the nut (1) and the clamping bolt (2).



Adjusting of the swivelling range

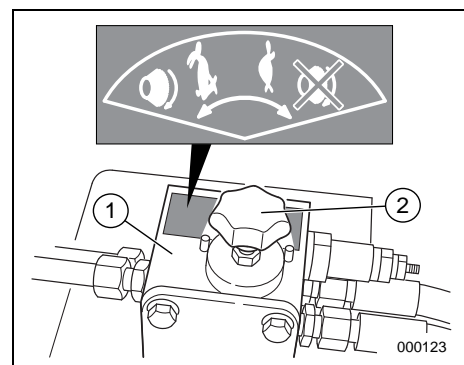
1. Loosen the counter nut (1).
2. Change the swivelling range by screwing the bolt (2) in or out.
Unscrewing the bolt = increasing the swiveling range
Screwing the bolt in = reducing the swiveling range
3. Tighten the counter nut (1) again.



Adjusting the revolution speed

use the control valve (2) to adjust the rotational speed of the side broom. The symbol on the sticker indicates the function of the control valve.

1. Turn the set screw (2) into the respective direction:
The "rabbit" symbolises increasing the rotational speed.
The "turtle" symbolises decreasing the rotational speed.
If the set screw (2) is closed completely, the side broom will stop.

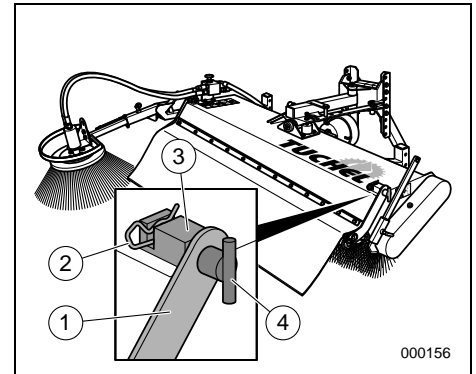


Splash guard

Installing the splash guard

Upon request, the sweeper can be equipped with a splash guard. The splash guard is particularly useful during the wintertime. It is highly recommended to use the splash guard only during 'simple' sweeping in order to prevent the ejection of sweepings onto the street.

1. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", Page 51.
2. Disassemble the debris collector (if installed). See chapter "Disassembling the debris collector", Page 44.
3. Disconnect the bracket (1) from the bearings (2).
4. Insert pin (3) on both sides.
5. Secure the pin with the spring cotter (4).

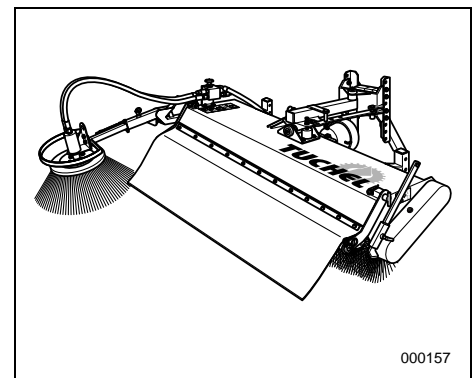


Adjusting the clearance between splash guard and ground

The bracket (2) is fitted with two bores. Use these bores to adjust the clearance between ground and splash guard.

If the pipe (4) is in the uppermost notch, the splash guard reaches the lowest. This will keep the ejected sweeping closer to the ground. The opposite applies if the pipe is positioned in the lower notch.

1. Turn off the engine and remove the ignition key.
2. Remove the spring cotters (1) on both sides.
3. Place the pipe into the open notch (3).
4. Reinsert the spring cotter (1).



7 Maintenance

This chapter contains the scheduled maintenance that is to be performed by qualified personnel or the operator.

Perform the described maintenance work in the specified time intervals.

Safety measures

- Observe the applicable regulations when handling fuels. This also applies to the storage and disposal.
- Observe the applicable provisions and safety regulations for the respective lubricant and consumable item.
 - Wear suitable protective clothing.
- Compliance with safety information provided in chapter "Safety" is mandatory.
- The industrial safety and accident prevention regulations of the relevant Employers' Liability Insurance Association are binding.

Safety-relevant parts

- Damaged safety-relevant parts cause accidents. Replace damaged parts immediately.

The following parts in particular are safety-relevant parts:

 - Safety elements (e. g. spring cotter pins, locking pins, fastening bolts)
 - Hydraulic components (e. g. hoses, fittings, valves)
 - Safety equipment and covers
- The safety-relevant parts must be checked regularly by a specialist repair shop and replaced.

Maintenance preparation

1. Park the host vehicle with the accessory equipment on level and solid ground.
2. Activate the operating lever of the hydraulic system to lower the hitching system or the accessory equipment to the ground.
3. Apply the holding brake.
4. Place all operating levers of the working hydraulics in the neutral position.
5. Shut off the engine of the host vehicle and keep the ignition key in safe custody so that the machine is secured against unauthorised starting.
6. Move all operating levers of the hydraulic system to both sides repeatedly.

The hydraulic system is decompressed.

Lubricants and operating materials

	Lubricants and operating fluids	BI code designation	Quality classes	Temperature ranges	Viscosity classes	Fill volumes in litres approx.
Lubricating nipple	Multi-purpose lithium soap based grease	MPG-A	KP2N-20	–	NLGI 2	–

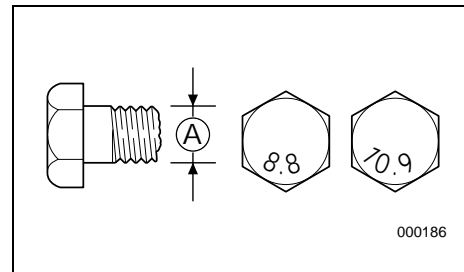
Screw connections

1. Check the screw connections for tightness the first time after 5 operating hours, thereafter weekly or every 50 operating hours.
2. If necessary, tighten the bolts, see the following table.
3. Replace self-locking nuts after every removal.

All torques M_A are suggested values for standard metric threads according to DIN13. Friction value 0.14 - new fastener, no lubrication. The values indicated in the following tables are recommended by the manufacturer of the fastener. However, we cannot be held liable for the use of such applications.

A = size of thread

Strength category, see head of fastener



A ø	3.6	5.6	6.8	8.8	10.9	12.9
	M_A (Nm)					
M6	3.43	4.51	8.73	10.3	14.71	17.65
M7	5.59	7.45	14.22	17.16	24.52	28.44
M8	8.24	10.79	21.57	25.50	35.30	42.17
M10	16.67	21.57	42.17	50.01	70.61	85.32
M12	28.44	38.25	73.55	87.28	122.58	147.10
M14	45.11	60.80	116.70	135.27	194.17	235.36
M16	69.63	93.16	178.46	210.84	299.10	357.94
M18	95.13	127.40	245.17	289.3	411.88	490.34
M20	135.33	180.44	348.14	411.88	576.50	669.26
M22	162.40	245.17	470.72	558.98	784.45	941.44
M24	230.46	308.91	598.21	710.99	1000.28	1196.42

Wearing parts/spare parts

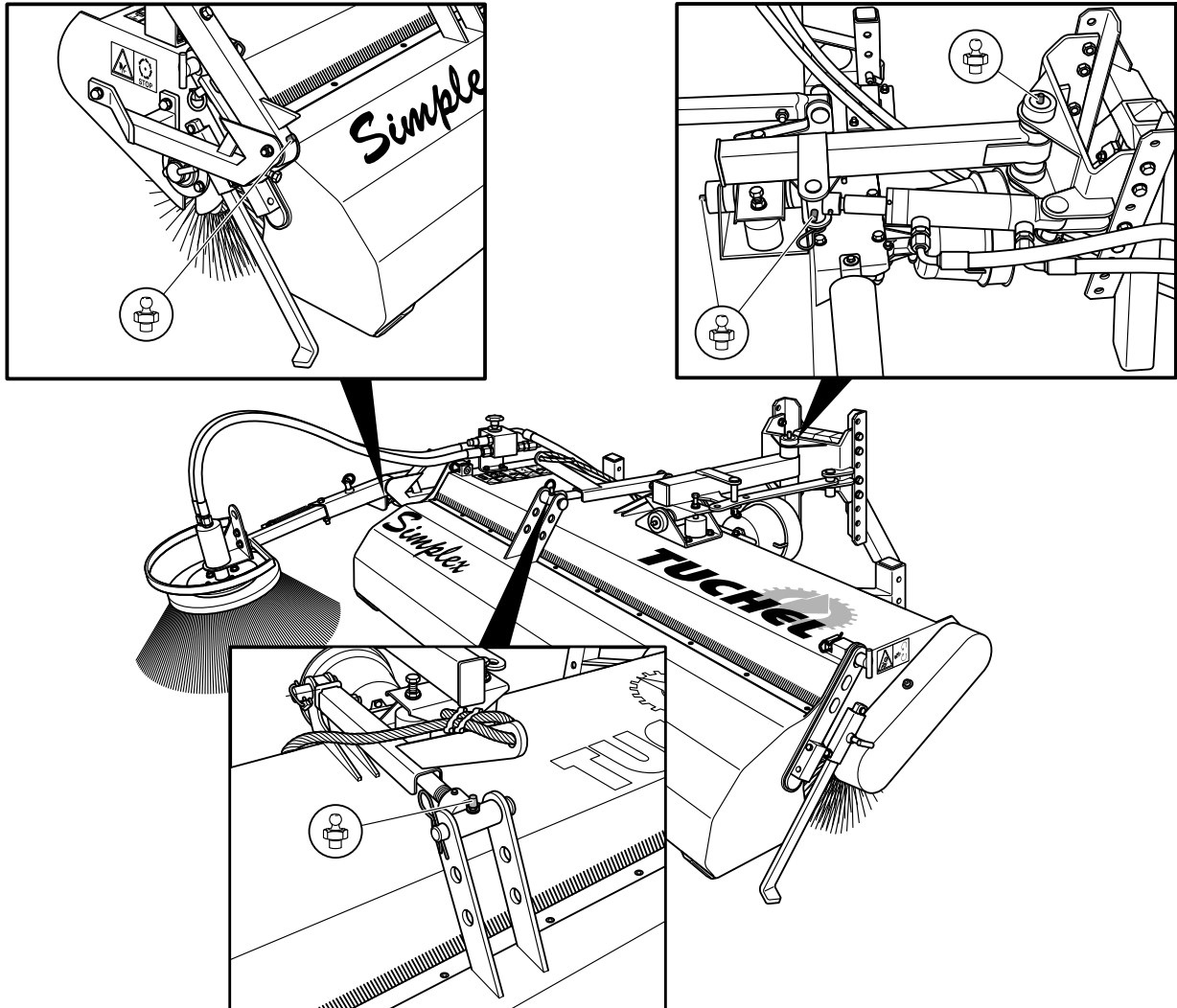
- Use only original replacement parts. Do not use any replacement parts from other manufacturers. No liability can be assumed for damages which arise from the use of unapproved replacement parts.
- Original replacement parts serve to protect your safety.
- Please provide the following information when ordering replacement parts:
 - Type designation
 - Serial no.:
 - Year of manufacture of the machine

Pos.	Article no.	Article	Type		
			120	135	150
			Quantity		
1	40 000 315	Casters Ø 150x50	2	2	2
		Sweeper cylinder			
2	40 001 321	PP bristol brush (Ø 400x600 PPN)	2	1	
3	40 001 324	PP bristol brush (Ø 400x750 PPN)		1	2
4	40 001 322	PPWD mixed brushes (Ø 400x600 St/PPN)	2	1	
5	40 001 325	PPWD mixed brushes (Ø 400x750 St/PPN)		1	2
6	40 001 323	Snow (Ø 400x600 swirl)	2	1	
7	40 001 326	Snow (Ø 400x750 swirl)		1	2
8	80008 - 10 000 402	Vulkollan rubber wear tips	1		
9	80008 - 10 000 403			1	
10	80008 - 10 001 215				1
11	80007 - 10 001 812	Splash guard (rubber)	1		
12	80007 - 10 001 813			1	
13	80007 - 10 001 280				1
		Circular brush			
14	40 000 349	Full bristol brush (Ø 300x500 PPN)	1	1	1
15	40 000 350	Full bristol brush (Ø 300x500 WDR/PPN)	1	1	1

Pos.	Article no.	Article	Type		
			120	135	150
			Quantity		
		Bearing (mechanical drive)			
16	40 000 250	Bearing cup PF 205	6	6	6
17	40 000 248	Bearing insert SB 205	3	3	3
		Bearing (hydraulic drive)			
18	40 000 250	Bearing cup PF 205	4	4	4
19	40 000 248	Bearing insert SB 205	2	2	2
20	10 001 199	Chain tensioner	1	1	1
		Hydraulic motor gasket kit			
21	40 001 433	Motor gasket kit, side broom	1	1	1
22	40 001 434	Motor gasket kit, sweeper cylinder	1	1	1

Lubricating points

1. Grease the bearing points weekly or every 50 operating hours.
Use lubricant specified in table "Wearing parts/spare parts", page 53.
2. Lubricate PTO shaft according to manufacturer's instructions.



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Lubricating points

Replacing the sweeper cylinder

If the sweeper cylinder cannot be adjusted anymore, individual segments of the sweeper cylinder must be replaced.



NOTE!

The sweeper must be attached to the host vehicle to replace the sweeper cylinder.

1. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", Page 51.
2. If installed: Place the side broom in its normal position. See chapter "Adjusting the circular brush", Page 47.
3. Dismantle the debris collector, if necessary. See chapter "Disassembling the debris collector", Page 44.

Disassembly from the drive side

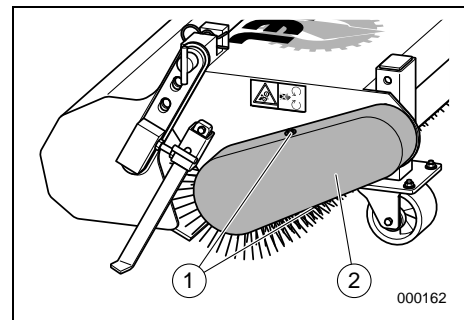


WARNING!

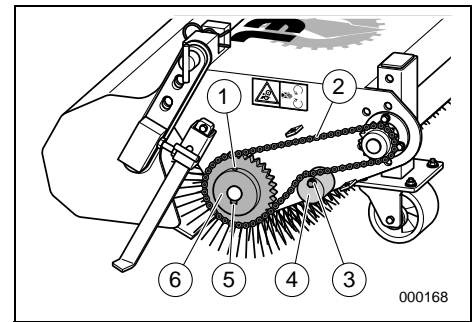
Risk of severe injuries! Do not reach between the chain and the sprocket wheels.

- Stay clear of moving parts!
- Wait until the machine parts have come to a standstill.
- Secure the host vehicle to prevent unauthorised star-up.

1. Unscrew the bolts (1).
2. Remove the chain protection (2).

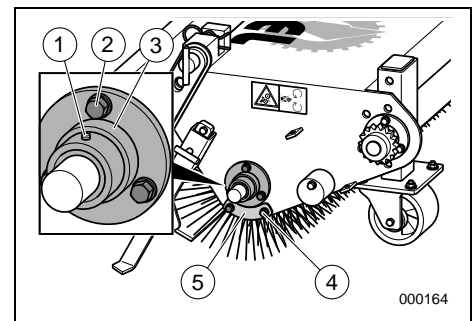


3. Loosen the clamping bolt (3).
4. In order to loosen the chain, turn the chain tensioner (4).
5. Remove the chain (2).
6. Remove the threaded pin (1).
7. Pull the sprocket wheel (6) off the shaft.
8. Remove the fitted key (5).



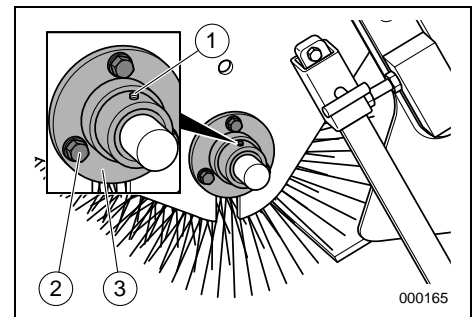
i **NOTE!**
keep the fitted key for future assembly.

9. Loosen the threaded pin (1).
10. Remove the three bolts (2).
11. Pull the flanged bearing (3) off the shaft.
12. Remove the bolts (4).
13. Remove the dust cover (5).



Disassembly from the bearing side

1. Loosen the threaded pin (1).
2. Remove the three bolts (2).
3. Pull the flanged bearing (3) off the shaft.



4. Raise the sweeper far enough in order to clear the sweeper cylinder.



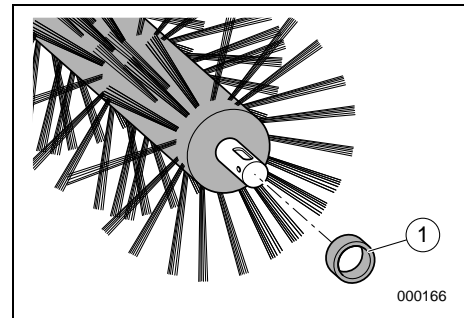
WARNING!

Accidental lowering of the sweeper may cause injuries!

- Keep feet clear of sweeper.
- Secure the host vehicle to prevent unauthorised start-up.

5. Reverse the host vehicle.
6. Lower the sweeper onto the support wheels.
7. Park and secure the host vehicle.
8. Secure the host vehicle to prevent unauthorised star-up.

9. Pull the locating ring (1) off the shaft.
10. Pull both sweeper cylinders off the shaft and replace with new sweeper cylinders.



To attach, follow the reverse order of the removal. please follow the instructions below:

- Clean all components.
- Replace all damaged parts.
- All sprocket wheels must be perfectly aligned with another when installed.
- The chain must be installed such that the chain' master link is closed in the direction of the chain's normal movement
- Refer to section "Re-tensioning the chain", *page 59* for instructions on how to tension the chain.
- Please refer to "Re-adjusting the sweeper, *Page 42*" and follow the instructions.

Re-tensioning the chain

1. Park the host vehicle and the sweeper securely. Refer to "*Maintenance preparation*", Page 51.

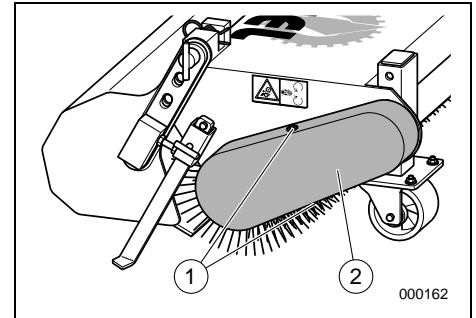


WARNING!

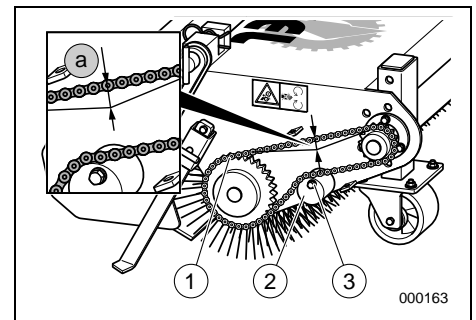
Risk of severe injuries! Do not reach between the chain and the sprocket wheels.

- Stay clear of moving parts!
- Wait until the machine parts have come to a standstill.
- Secure the host vehicle to prevent unauthorised start-up.

2. Unscrew the bolts (1).
3. Remove the chain protection (2).



4. Check the chain's tension setting.
Distance "a" = max. 10 mm, min. 3 mm
5. If necessary, re-tension the chain (1):
 - Loosen clamping screw (3).
 - Turn the chain tensioner (2).
 - Re-tighten the clamping bolt (3) again.
 - Check the chain's tension setting again.
6. Grease the chain.
7. Once the tension of the chain is set properly, replace the chain protection.

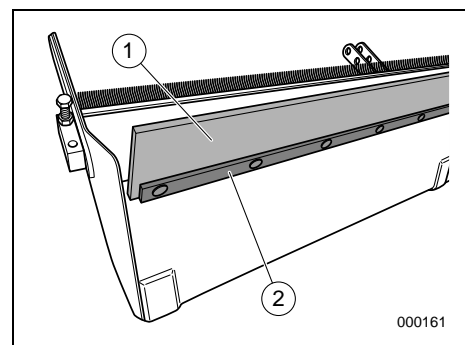
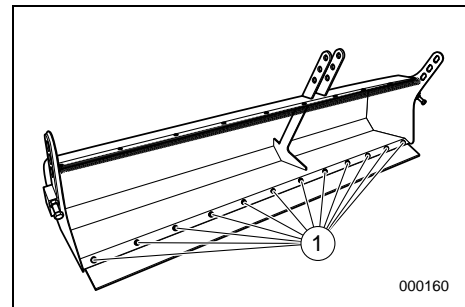


Replacing the Vulkollan rubber wear tip (optional)

The Vulkollan rubber wear tip is a component of the debris collector unit. The debris collector is part of the optional equipment.

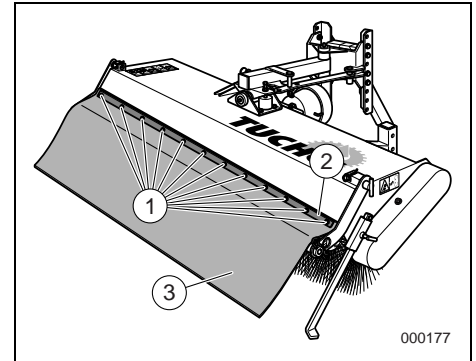
1. Empty the debris collector as described in section "Emptying the debris collector (optional)", *page 36*.
2. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", *Page 51*.
3. Disassemble the debris collector as described in section "Disassembling the debris collector", *page 44*.
4. Remove all nuts (1).

5. Remove the Vulkollan tip (1) and the bumper (2).
6. Replace the Vulkollan tip (1) with a new one.
7. Attach the Vulkollan tip (1), the bumper (2), and the fasteners to the debris collector.
8. Use the nuts to tighten the Vulkollan tip.



Replacing the splash guard (option)

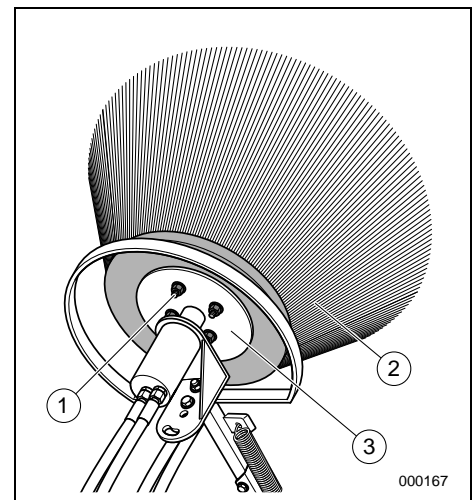
1. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", Page 51.
2. Remove all plastic caps and nuts (1).
3. Remove the bumper (2).
4. Remove the worn out splash guard (3)
5. Place the new splash guard onto the bolts.
6. Install the bumper (2).
7. Use the nuts (1) to tighten the splash guard.
8. Press the plastic caps onto the nuts.



Changing the circular brush (option)

1. Park the host vehicle and the sweeper securely. Refer to "Maintenance preparation", Page 51.
2. Pivot the side broom in its normal position. See chapter "Adjusting the circular brush", Page 47.
3. Dismantle the circular brush.
 - Remove nuts (1).
 - Remove the circular brush (2).
4. Bolt on the circular brush to the circular brush flange (3) using new self-locking nuts (1).

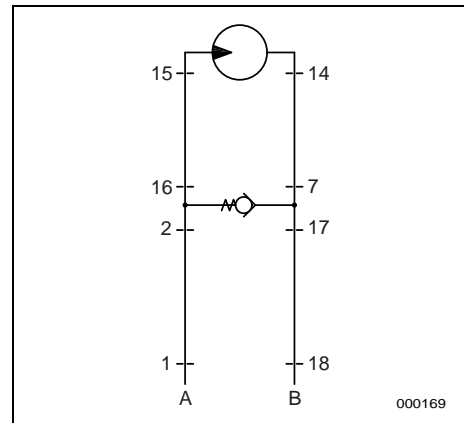
Readjust the side broom after replacing the circular brush. See chapter "Adjusting the circular brush", Page 47.



Hydraulic circuit diagrams

Hydraulic drive

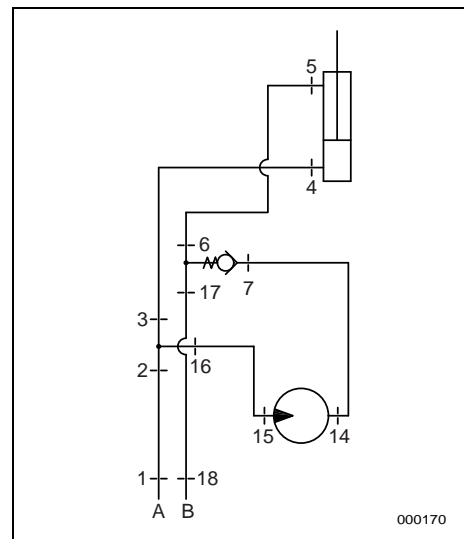
- required hydraulic control circuits: 1x simple activation



Hydraulic emptying feature

Hydraulic drive

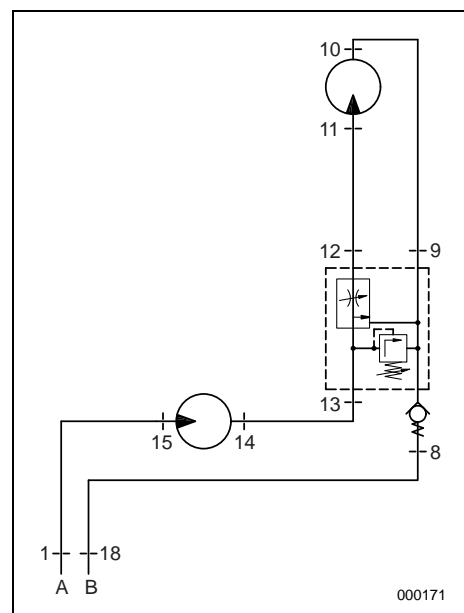
- required hydraulic control circuits: 1x simple activation



Side broom, right-hand side

Hydraulic drive

- required hydraulic control circuits: 1x simple activation

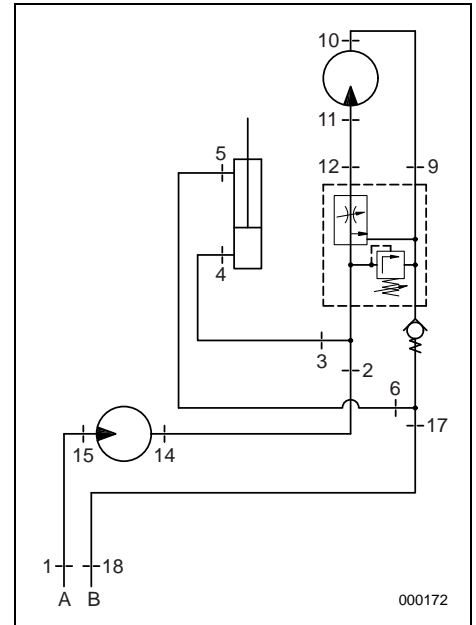


Side broom, right-hand side

Hydraulic emptying feature

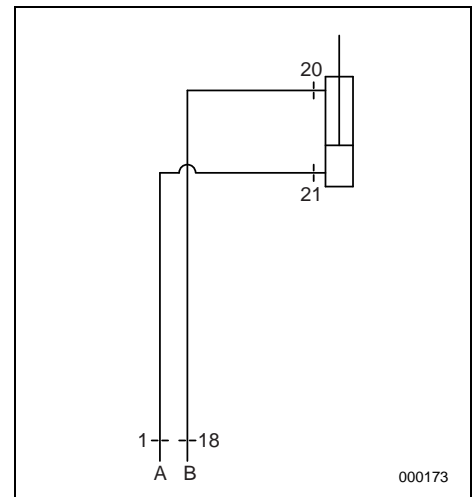
Hydraulic drive

- required hydraulic control circuits: 1x simple activation



Hydraulic lateral adjustment

- required hydraulic control circuits: 1x simple activation

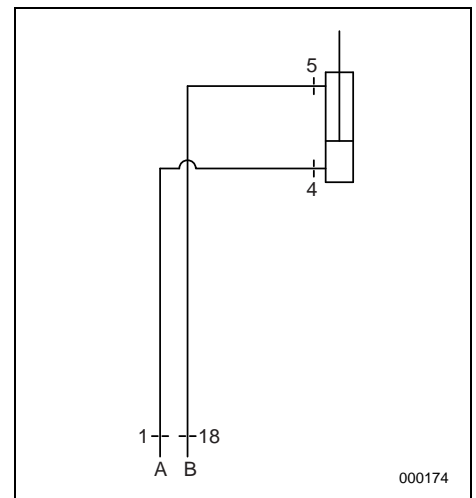


Emptying, hydraulically, direct or

Hydraulic emptying feature

Mechanical drive

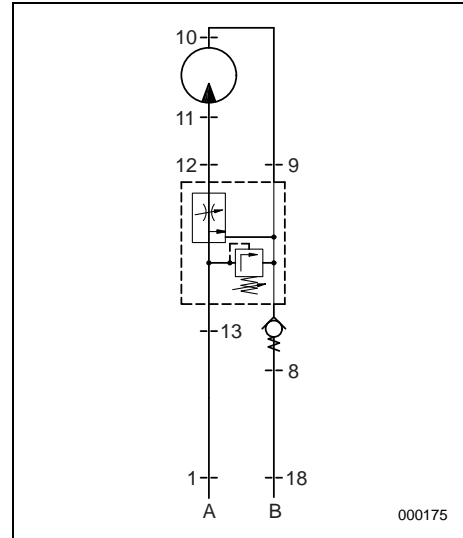
- required hydraulic control circuits: 1x simple activation



Side broom hydraulically direct, right-hand side *or*
 Side broom, right-hand side

Mechanical drive

- required hydraulic control circuits: 1x simple activation

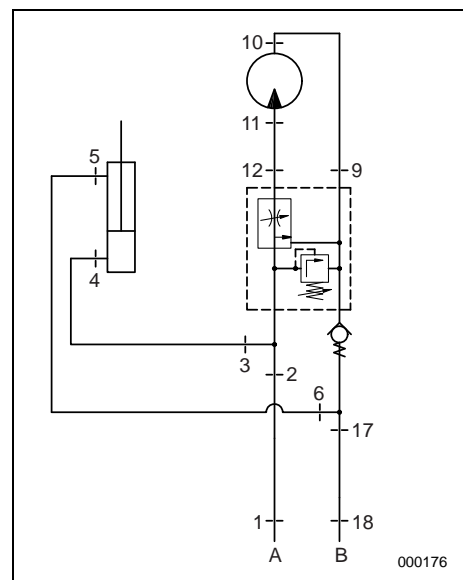


Side broom, right-hand side

Hydraulic emptying feature

Mechanical drive

- required hydraulic control circuits: 1x simple activation



8 Troubleshooting

Malfunctions that are not listed below must be remedied in every case by the relevant dealer.

Malfunction	Cause	Remedy
1. Sweeper cylinder does not turn. (mechanical drive)	PTO shaft not switched on	Switch on PTO shaft
	Shear pin broken	Seek out a specialist repair shop.
	Chain skipped off or broken	Tension chain or replace, if necessary.
2. Sweeper cylinder does not turn. (hydraulic drive)	Hydraulic lines are not properly connected.	Check the connections.
	Oil level in the hydraulic tank of the host vehicle too low.	Check oil level, refill if necessary.
	Pressure or volume flow is too low.	Seek out a specialist repair shop.
	Hydraulic motor defective.	Seek out a specialist repair shop.
	Chain skipped off or broken	Tension chain or replace, if necessary.
3. Debris collector unit cannot be raised.	Hydraulic lines are not properly connected.	Check the connections.
	Hydraulic cylinder defective.	Seek out a specialist repair shop.
4. Side broom not functioning.	Feed line is closed.	Open control valve.
	Hydraulic lines are not properly connected.	Check the connections.
	Hydraulic motor defective.	Seek out a specialist repair shop.
5. Sweeping results poor.	Setting of the brush not optimal.	Re-adjust sweeping cylinder
	Brush worn.	Replace brush.
	Rotational speed of the sweeper cylinder is too fast or too slow.	Adjust RPM to match the rotational speed of the host vehicle
	Setting of the side broom is not optimal.	Adjust the inclination and pressure angle.
	Worn out side broom (circular brush).	Replace circular brush.

9 Index

A		K	
Accessories.....	20	Keeping the accessory equipment clean	15
Accessory equipment	24	L	
Additional equipment	17	Lateral adjustment	34
A-frame	27, 39	Length of front end	26
After placing out of service	41	Loading and transporting	14
Articulated shaft	27	Locking lug	28
Articulated shaft drive	14	Locking plate	28
B		Lubricants.....	52
Before leaving the host vehicle.....	13	Lubricating points	55
Before placing out of service	41	M	
C		Maintenance.....	50
Chain.....	59	Maintenance preparation	51
Checks before placing into operation	25	Modifications to accessory equipment.....	13
Circular brush.....	47, 61	O	
Clothing.....	12	Operating manual	6
Compensation system	42	Operating materials.....	52
D		Operating the accessory equipment	13
Damping feature	42	Operating the sweeper.....	32
Debris collector	20, 44, 45	Operation	24
Declaration of conformity	7	P	
Description / overview.....	18	Parking jacks.....	32
Dimensions	16	Personnel	15
Disassembling the sweeper	38	Placing into operation	25
Driving in reverse	13	Placing out of operation	41
During the maintenance.....	15	Preventing injuries	13
Dust cover	57	PTO shaft	38
E		R	
Emptying the debris collector.....	36	Re-adjusting the sweeper cylinder.....	42
Exposure to high pressure oil	15	Replacement parts	53
F		Rotational speed of the side broom	48
Flanged bearing	57	Rotational speed of the sweeper cylinder.....	33
Foreword.....	5	S	
G		Safety	9
General view	19	Safety devices.....	12
H		Safety instructions.....	10
High-pressure hoses.....	15	Safety measures	50
Hydraulic circuit diagrams.....	62	Safety measures during maintenance	15
Hydraulic emptying	20	Safety regulations	12
Hydraulic lateral adjustment	20	Safety regulations when working with accessory equipment.....	24
Hydraulic system.....	17	Safety sticker.....	11
I		Safety-relevant parts	50
Identification marking locations.....	23	Shutting down the sweeper.....	38
Initial installation.....	26	Side broom	20, 61
Installing the accessory equipment.....	24	Side broom.....	37
Installing the sweeper	26	Simple sweeping	34
Intended use	9	Simple sweeping mode	34
		Splash guard	49, 61
		Splash guard cloth	21

Storing the accessory equipment over longer periods of time	41	Type plate	22
Support wheels	43	V	
Sweeper cylinder	56	Visibility	13
Sweeping	35	Visual inspection	25
Sweeping profile	32	Vulkollan rubber wear tip	46, 60
T		W	
Technical data	16	Wear parts	53
Tensioning the chain	59	When driving	13
Three-point linkage	39	When working	13
Transporting	14	Work values	16
Troubleshooting	65	Working with accessory equipment	24
Turning off the accessory equipment.	41		



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