

KS 1200 | KS 1600

Sweeping suction combination type E800 / E1200



Art.Nr.: 10045132

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Kugelmann Maschinenbau e.K.
Gewerbepark 1-5
87675 Rettenbach a.A.
GERMANY

www.kugelmann.com
office@kugelmann.com
+49 (0) 8860 | 9190-0

*

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Gewerbepark 1-5

87675 Rettenbach a.A. (Germany)

Tel.: +49 (0) 8860 / 9190-0

Fax: +49 (0) 8860 / 9190-19

Mail: office@kugelmann.com

Web: www.kugelmann.com

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We are constantly developing our products to offer our customers maximum convenience. Therefore, we ask for your understanding that the manual can deviate from the product in some regards.

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3 General information

This chapter gives you information on the following:

- Chapter 3.1 "Identification of the machine", page 6
- Chapter 3.2 "Service information", page 7
- Chapter 3.3 "EC Declaration of Conformity in terms of the EC Machinery Directive 2006/42/EC", page 8

3.1 Identification of the machine

Nr.: DO1101

CE

Type / type: E800 / E1200

Fabr.-Nr. / serial no.:

Art. / code:

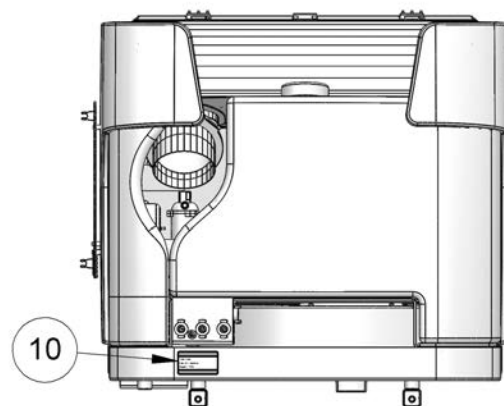
Baujahr / YOM:

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D-87675 Rettenbach a. A. Made in Germany

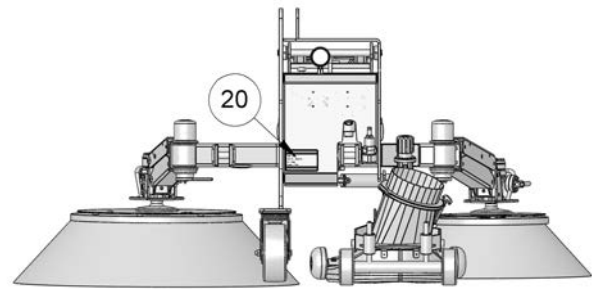
kugelmann*

The type plate refers to device type, serial number, article number, year of construction and manufacturer.

Type plate (Pos. 10) at rear part.



Type plate (Pos. 20) at brush unit.



3.2 Service information

Customer service:

Tel.: +49 (0) 8860 / 9190-90

Fax: +49 (0) 8860 / 9190-49

E-Mail: service@kugelmann.com

3.3 EC Declaration of Conformity in terms of the EC Machinery Directive 2006/42/EC



We herewith declare that the machine designated below complies with the relevant essential health and safety requirements of the respective EC Directives due to its design and construction, and in the version supplied by us.

If the machine is modified without our consent, this declaration shall cease to apply.

Designation: Sweeping suction combination

Machine type: KS 1200 / KS 1600

Relevant EC machinery directives:

EN standards:

DIN EN 292-1/292-2/1553

EMC standards:

72/245/EEC

Rettenbach a.A., December 2016

Josef Kugelmann

4 Operating instructions

This chapter gives you information on the following:

- Chapter 4.1 *"Target group"*, page 10
- Chapter 4.2 *"Use"*, page 10
- Chapter 4.3 *"Conventions used"*, page 11
- Chapter 4.4 *"Change history"*, page 11

4.1 Target group

These operating instructions are intended for skilled persons who are responsible for the following work at the sweeping suction combination:

- Commissioning
- Control system
- Operation
- Use
- Maintenance

At least once a year, all personnel must be trained in the operation of the sweeping suction combination in accordance with the guidelines of the business liability insurance. The use of the sweeping suction combination by untrained or unauthorized persons is prohibited.

4.2 Use

These operating instructions contain all necessary data and information for a secure control, operation and maintenance of the sweeping suction combination.





Make sure that all persons responsible for operation or maintenance of the sweeping suction combination or persons working in the immediate environment of the machine are familiar with the operating and maintenance instructions as well as the safety information in this manual.

These operating instructions are part of the product and have to be kept in a safe place. In case of resale or transfer of the machine to third parties, these operating instructions have to be included.

All information, illustrations and technical data correspond to the technical state at the time of printing. Subject to technical modifications.

4.3 Conventions used

This manual uses the following typographic conventions:

Symbol	Signal word	Meaning
	Danger	Indicates an imminent dangerous situation, which - in case of non-observance of the safety instructions - will entail death or grievous bodily harm.
	Warning	Indicates a possibly dangerous situation, which - in case of non-observance of the safety instructions - may entail death or grievous bodily harm.
	Caution	Indicates a possibly dangerous situation, which - in case of non-observance of the safety instructions - may result in minor injuries or damage to property.
	Notice	Contains useful information with respect to proper handling of the machine.

4.4 Change history

Date	Version	Modification
02.12.2016	1.1	First edition
30.03.2017	1.2	Constructive changes/enhancements
20.06.2017	1.3	Change of machine type, addition of options
27.06.2018	1.4	Constructive changes/enhancements

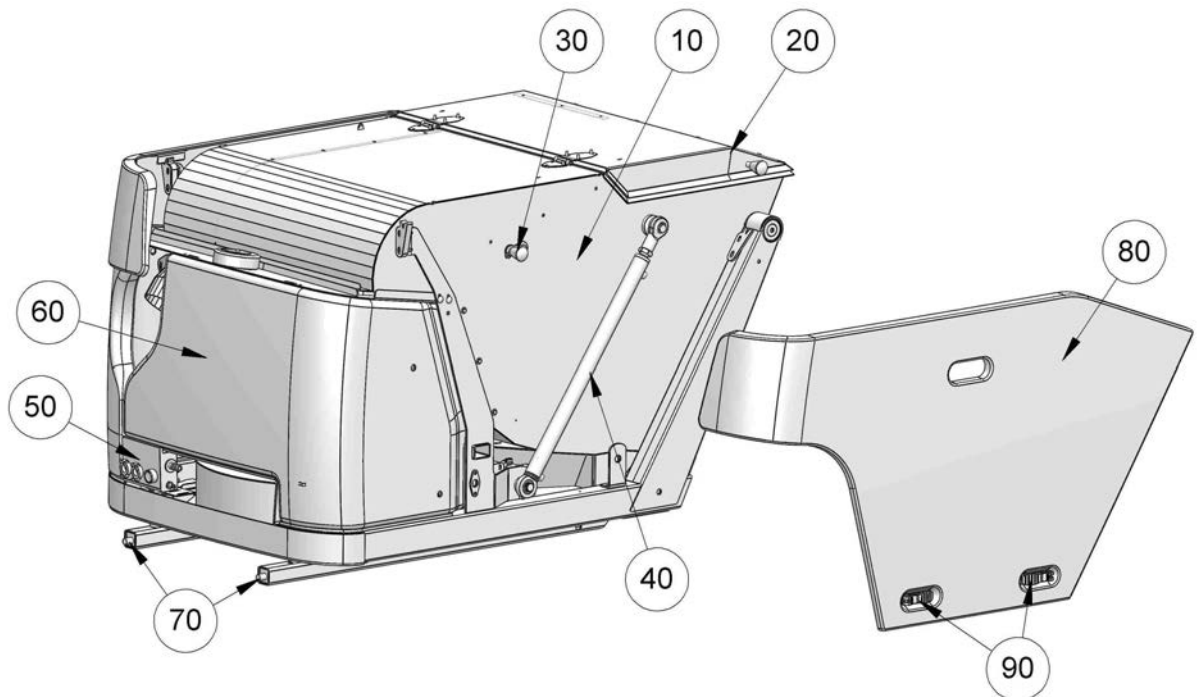
5 General description

This chapter gives you information on the following:

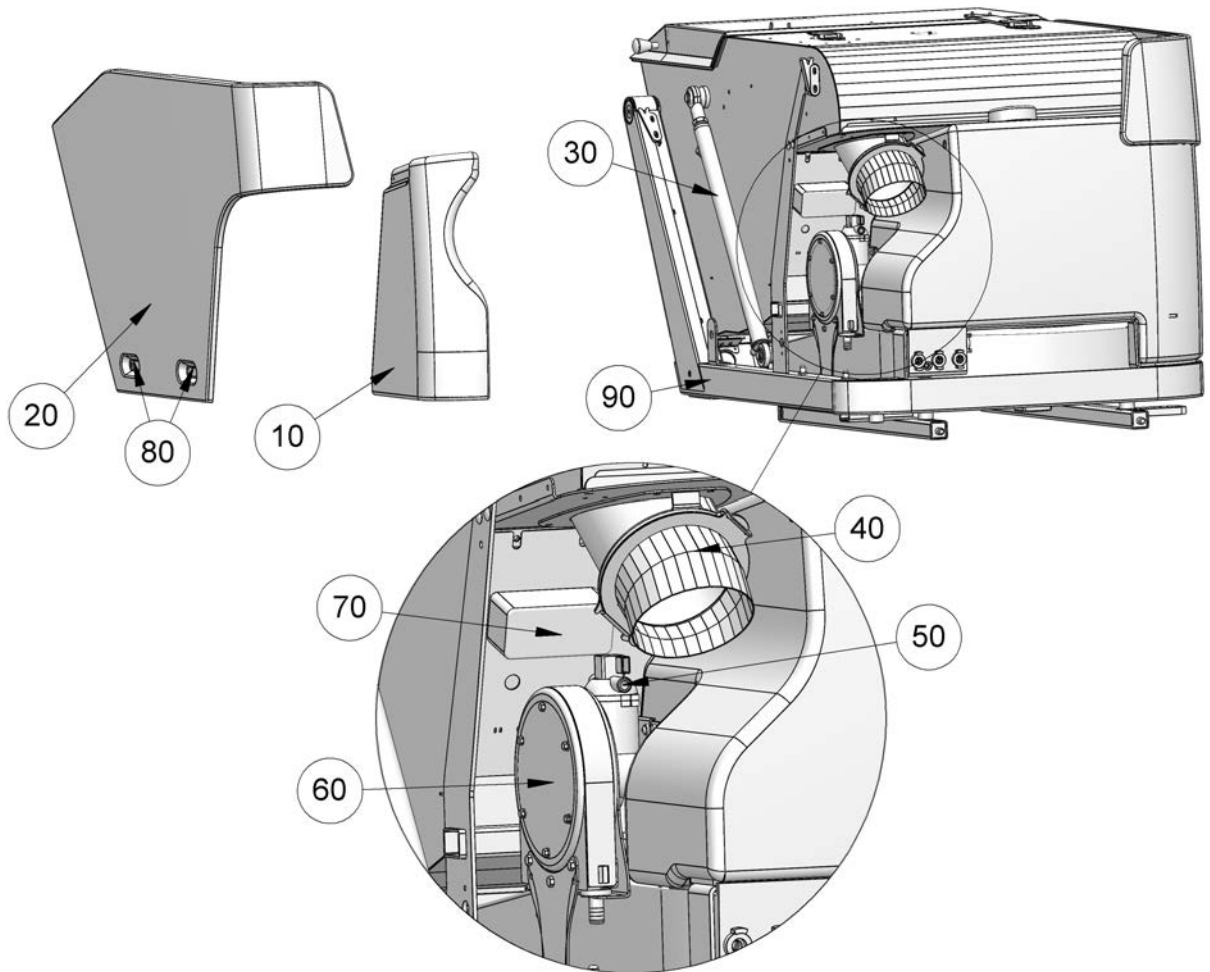
- Chapter 5.1 "Components container unit", page 12
- Chapter 5.2 "Components brush unit", page 15
- Chapter 5.3 "Designated use", page 17
- Chapter 5.4 "Obvious misuse", page 17

5.1 Components container unit

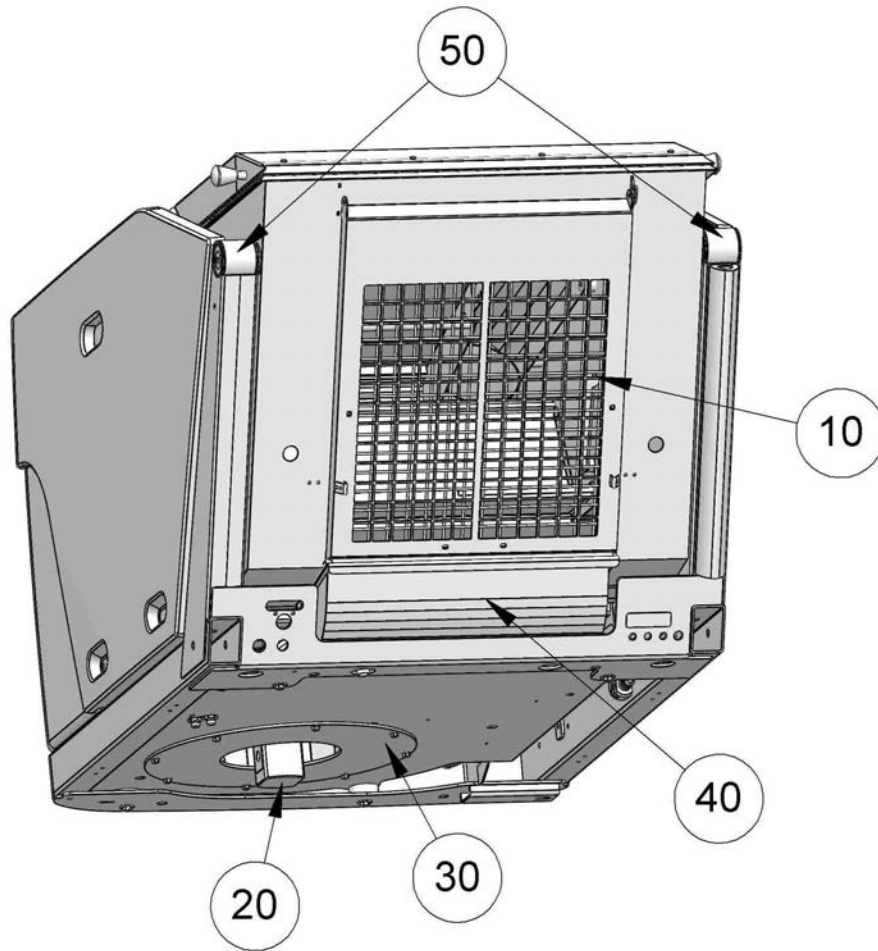
Please see the following illustration for components of the container unit:



Pos. No.	Component
10	Debris container
20	Container cover
30	Leaf rake to clean the intake grille (option) (see Chapter 9.1 "Leaf rake", page 56)
40	Lifting cylinder
50	Water distributor (see Chapter 8.4 "Water supply", page 51)
60	Fresh water tank
70	Base rails
80	Side cover
90	Tilting quick lock to remove the side cover (Pos. 80)



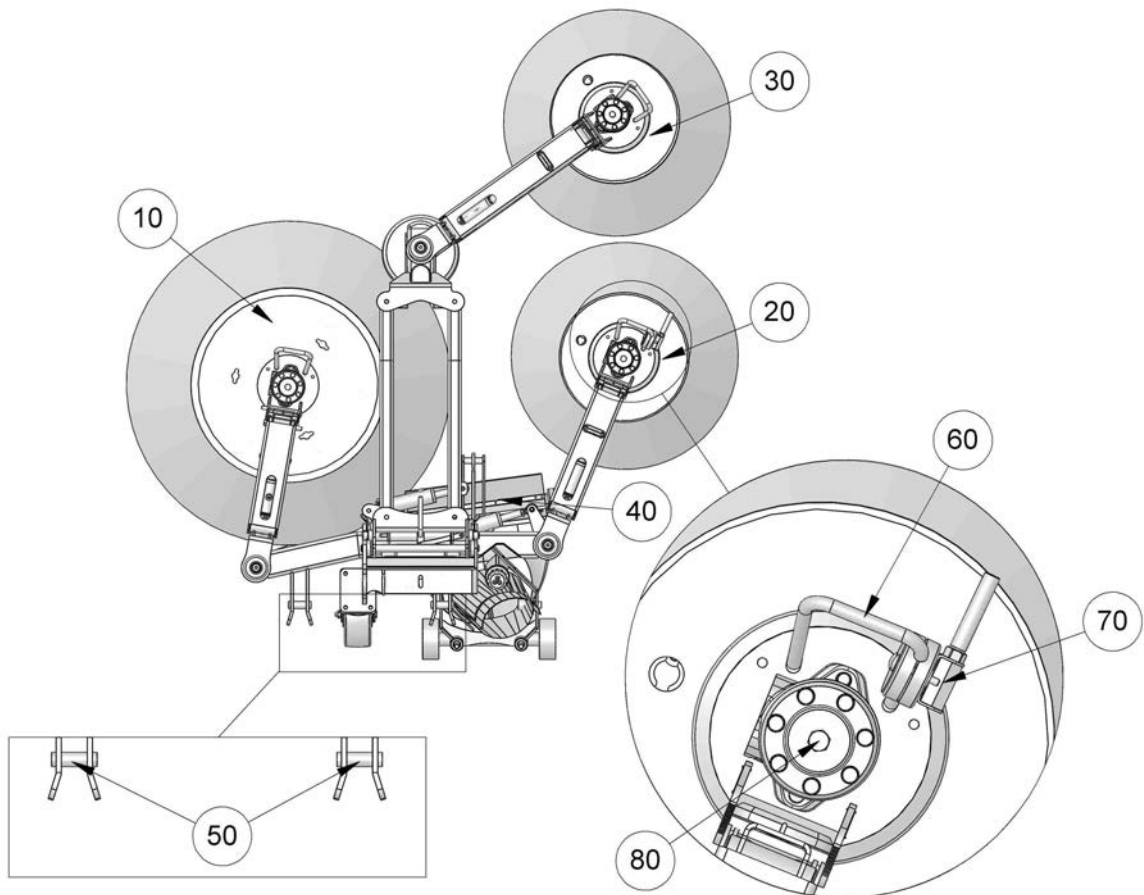
Pos. No.	Component
10	Side panel
20	Side cover
30	Lifting cylinder
40	Hose flange
50	Electrical water pump for the supply of the water jets at the brush units (see Chapter 8.4.2 "Fresh water", page 53)
60	Hose pump for recirculating water (see Chapter 8.4.1 "Recirculating water", page 52)
70	Power box
80	Tilting quick lock to remove the side cover (Pos. 20)
90	Base frame



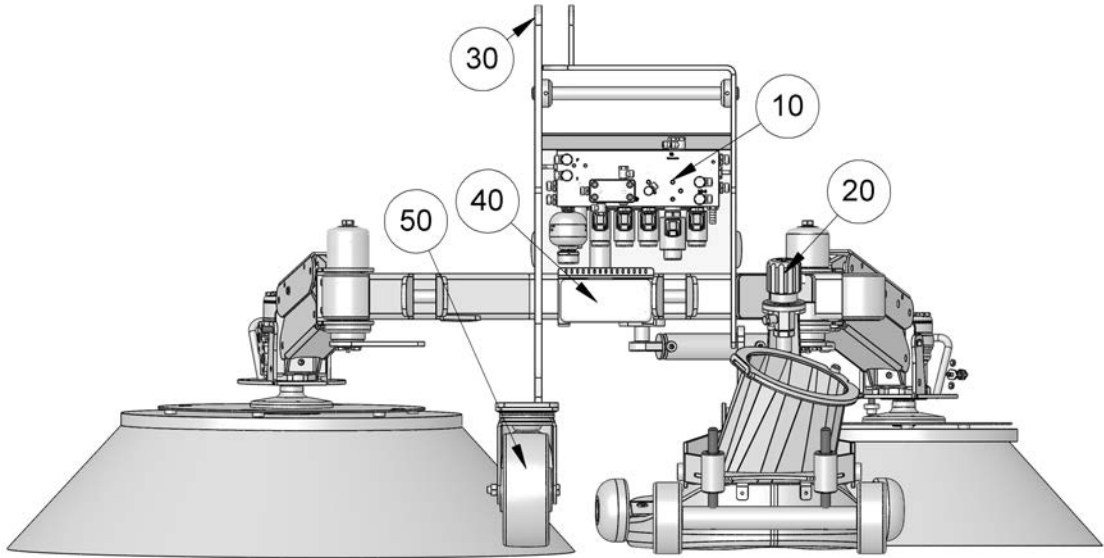
Pos. No.	Component
10	Filter frame
20	Blower motor
30	Blower housing
40	Air exit
50	Center of rotation of container

5.2 Components brush unit

Please see the following illustration for components of the brush unit:



Pos. No.	Component
10	Brush 2L
20	Brush 2R
30	Brush 3 (option)
40	Suction mouth
50	Seating of lower link (three-point linkage)
60	Hand lever
70	Water jet with stopcock
80	Brush motor



Pos. No.	Component
10	Hydraulic block
20	Coarse dirt flap cylinder
30	Seating of upper link
40	Power box
50	Feeler wheel

5.3 Designated use

With this sweeping and suction combination, only sweeping and suction of the following debris is permitted:

- Grit
- Sand
- Dust
- Leaves

The manufacturer assumes no liability or responsibility for any use which goes beyond these limits.

Use, maintenance and reconditioning of the sweeping suction combination may only be carried out by trained and competent personnel.

To operate the equipment within the limits of its designated use, please note the following:

- These operating instructions as well as all enclosed documentation.
- Road traffic regulations.
- The relevant accident prevention regulations.
- The generally recognized rules relating to technical safety requirements and occupational health.
- The operating instructions of the carrier vehicle.

5.4 Obvious misuse

The sweeping suction combination may not be used to carry persons or goods.

The sweeping suction combination and its attached parts may not be used as climbing aid.

6 Safety instructions

This chapter gives you information on the following:

- Chapter 6.1 "General safety instructions", page 18
- Chapter 6.2 "Commissioning", page 19
- Chapter 6.3 "Use", page 23
- Chapter 6.4 "Maintenance", page 27
- Chapter 6.5 "Designations", page 31

6.1 General safety instructions



Warning

Use or maintenance of the sweeping suction combination by untrained persons.

Risk of serious injury.

- Make sure that all persons responsible for operation or maintenance of the sweeping suction combination are trained in the operation of the same and are familiar with the operating and maintenance instructions as well as the safety information in this manual!
 - Insist on compliance with the applicable safety regulations!
-



Warning

Loose-fitting garments.

Risk of serious injury.

- Always wear tight-fitting clothes during the operation of the sweeping suction combination!
-

**Warning**

Non-observance of guidelines.

Risk of serious injury or death.

- Please observe the regulations relating to accident prevention!
 - Please observe the generally applicable safety regulations, industrial standards and medical guidelines!
 - Please observe the road transport guidelines!
 - Please pay attention to the general advice in these operating instructions!
-

**Caution**

Accidental ignition of residual dirt.

Risk of injury or property damage.

- Please make sure that the sweeping suction combination is always kept in a clean condition!
-

**Caution**

Modifications at the sweeping suction combination.

Impairment of functionality and danger of property damage.

- Do not make any changes at the sweeping suction combination!
-

6.2 Commissioning

**Danger**

Carrier vehicle rolls away when mounting the sweeping suction combination.

Risk of serious injury or death.

- Before mounting the sweeping suction combination onto the carrier vehicle, apply the parking brake, stop the engine and remove the ignition key!
 - Never stand between carrier vehicle and sweeping suction combination while the sweeping suction combination is mounted!
 - Apply all locking bolts and screws at the carrier vehicle and secure them!
-

**Danger**

Lifting of vehicle.

Risk of serious injury or death.

- Switch off hydraulic system during transportation!
-

**Warning**

Lifting of vehicle.

Risk of injury, death or damage to property.

- Only single-acting operation of front hydraulic during sweeping and mowing!
-

**Warning**

Overload or possible tilting of the carrier vehicle.

Risk of injury, death or damage to property.

- Please observe axle load limits and admissible overall weight!
-

**Warning**

Mounting of sweeping suction combination at a malfunctioning carrier vehicle.

Risk of serious injury or death.

- Please make sure that the carrier vehicle is in a safe and proper condition!
 - Please make sure that the carrier vehicle is equipped with an appropriate braking system!
 - Make sure that the carrier vehicle may transport the sweeping suction combination!
 - Before every journey, make sure that the sweeping suction combination is securely attached to the carrier vehicle!
-

**Warning**

Loose screwed or bolted connections.

Risk of injury or property damage.

- After having mounted the sweeping suction combination, please make sure that all screwed and bolted connections are always in place and secure!
-

**Warning**

Starting movement of the blower or brushes when connecting the hydraulic lines.

Risk of serious injury.

- Connect hydraulic lines only if the hydraulic cycle of the carrier vehicle and the sweeping suction combination are depressurised!
-

**Warning**

Damaged hydraulic lines.

Risk of serious injury.

- Damaged hydraulic lines must be replaced immediately!
 - After 6 years at the latest, replace hydraulic lines even if they are not damaged!
-

**Warning**

Flying debris.

Risk of serious injury.

- Never stay in the working range of the sweeping suction combination!
-

**Caution**

First commissioning without instruction.

Risk of injury or property damage.

- First commissioning of the sweeping suction combination must be accomplished by employees of the dealer, the manufacturer or a representative of our works!
-

**Caution**

Sweeping suction combination is not jacked up high enough.

Danger of property damage.

- When mounting or removing the sweeping suction combination, please make sure that it is jacked up high enough!
-

**Caution**

Jacking up the sweeping suction combination on uneven or soft ground.

Risk of injury or property damage.

- Make sure that the sweeping suction combination is jacked up on even, solid and stable ground!
-

**Caution**

Wrong position of center of gravity.

Danger of property damage.

- When mounting the sweeping suction combination, please make sure that the center of gravity is correctly placed on the carrier vehicle!
-

**Caution**

Commissioning without making sure that the machine is in perfect technical condition.

Risk of injury or property damage.

- Check all important parts before commissioning!
 - Check all safety-related protection devices before commissioning!
 - If applicable, please replace damaged parts!
-

6.3 Use



Danger

Carrying persons on the sweeping suction combination.

Risk of serious injury or death.

- Do not carry persons on the sweeping suction combination!
-



Warning

Persons present in working range of sweeping suction combination.

Risk of serious injury or death.

- Do not stay in the working range of the sweeping suction combination!
-



Warning

Careless start-up.

Risk of serious injury or death.

- Before starting up the sweeping suction combination or during operation, check the area near the sweeping suction combination!
 - Ensure sufficient visibility!
 - Start the vehicle only with no person or good in the surroundings of the vehicle!
 - Before starting the vehicle, make sure that the sweeping suction combination is correctly attached and secured!
-



Warning

Changed handling and braking behavior.

Risk of serious injury or death.

- Please adjust your driving behavior to the dimensions and the additional weight of the sweeping suction combination!
 - Adjust the driving speed to the road conditions as well as to road and traffic environment!
-

**Warning**

Rotating parts.

Risk of serious injury or death.

- Never put your hands into the brushes during operation!
 - During the whole operation at the sweeping suction combination, all lids must remain closed and mounted!
 - During works at rotating parts, switch off the hydraulic system and the motor of the carrier vehicle, disconnect the vehicle and remove the ignition key!
-

**Warning**

Bursting of high-pressure hoses.

Risk of serious injury.

- A damaged high-pressure hose must be replaced immediately.
-

**Warning**

Flying debris.

Risk of serious injury.

- Always wear appropriate protective clothing and protective goggles to protect yourself from splashing water or waste!
-

**Warning**

Danger of high-pressure jets passing through the skin.

Risk of serious injury or property damage.

- Do not direct the high-pressure jet at yourself, other persons, animals or active electrical equipment!
-

**Caution**

Injuries caused by water jets.

Risk of injury.

- The lever of the manual spray gun must not be clamped!
 - 2-hand operation must be guaranteed!
-

**Caution**

Opening the debris container during operation.

Risk of injury.

- Switch off the blower before controlling the filling level of the debris container!
-

**Caution**

Transport journeys without lifting the brushes.

Risk of injury or property damage.

- Transport journeys only with lifted brush unit (secured in parking position)!
-

**Caution**

Transport journeys without lowering the debris container.

Risk of injury or property damage.

- Carry out transport journeys only with completely lowered debris container!
-

**Caution**

Limbs getting caught.

Risk of injury.

- Never put your hands between moving parts!
-

**Caution**

Parts continue to run.

Risk of injury.

- Please wait until all parts stand still and disconnect hydraulic lines before performing any work!
-

**Caution**

The hydraulic system is under high pressure.

Risk of injury or property damage.

- If any hydraulic fluid that leaks out passes through the skin, seek medical advice immediately!
-

**Caution**

Heat at parts which use circulating oil as a coolant or at rotating parts.

Risk of injury or property damage.

- Do not touch any hot components!
 - Do not touch any rotating parts!
-

**Caution**

Carrying goods on the sweeping suction combination.

Danger of property damage.

- Do not carry goods on the sweeping suction combination!
-

**Caution**

Non-observance of regulations for operating attachments on public roads.

Risk of injury or property damage.

- Follow the pertinent rules and regulations of the information sheet for attachments (Gazette of the Federal Ministry of Transport 1990, page 562)!
 - Take measures to compensate limitations of the field of vision!
-

**Caution**

Non-observance of regulations concerning road safety.

Risk of injury or property damage.

- Please make sure that the sweeping suction combination complies with the regulations concerning road safety!
 - Apply the prescribed lighting applications, warning and protection devices!
 - Comply with the existing guidelines concerning dimensions and weight, the maximum permissible axle load, the tyre carrying capacity, the overall weight and the speed limit valid in the respective country!
-

**Caution**

Operation of sweeping suction combination in case of malfunction.

Risk of injury or property damage.

- In the event of malfunction, please stop the sweeping suction combination immediately!
 - Resolve the error immediately or ask a workshop!
-

**Caution**

Placing the sweeping suction combination in an unprotected area.

Risk of injury or property damage.

- Never place the sweeping suction combination in a highly frequented area or an area accessible to children!
-

**Caution**

Placing the sweeping suction combination on uneven or soft ground.

Risk of injury or property damage.

- Make sure that the sweeping suction combination stands on even, solid and stable ground!
-

6.4 Maintenance

**Warning**

Non-observance of safety regulations.

Risk of serious injury or death.

- Comply with the safety regulations during all maintenance work!
-

**Warning**

Electric shocks during maintenance work.

Risk of serious injury or death.

- Interrupt power supply before executing work at an electrical device!
-

**Warning**

Draining oil during maintenance work.

Risk of serious injury or death.

- Interrupt the hydraulic supply to carrier vehicle and make sure that the hydraulic cycle is depressurised before working at a hydraulic device!
-

**Caution**

Damage of electronic system and hoses.

Danger of property damage.

- Before tilting the base frame (carrier vehicle), unplug the connection cable and camera cable (suction device) at the connection box and disconnect the hose connections to the front!
-

**Caution**

Freezing of installation.

Danger of property damage.

- Before winter/storage, fill in antifreeze into the system and ensure that the whole installation is flushed with antifreeze!
 - Recommendation: Radiator antifreeze MC 30, silicate-free
-

**Caution**

High-pressure cleaner.

Danger of property damage.

- Clean the machine without high-pressure!
-

**Caution**

Feeding of blower.

Risk of injury or property damage.

- When eliminating obstructions in the suction hose or when fitting the manual suction, please switch off the motor and wait until the blower comes to a stop!
-

**Caution**

Non-observance of maintenance intervals.

Risk of injury or property damage.

- Please pay attention to the prescribed maintenance intervals!
-

**Caution**

Use of wrong spare parts.

Risk of injury or property damage.

- Do only use original parts for repair work!
-

**Caution**

Maintenance work without necessary technical knowledge or appropriate tooling.

Risk of injury or property damage.

- Only carry out maintenance work if you have the necessary expertise as well as suitable tools!
-

**Caution**

Carelessness when handling oil or lubricants.

Risk of injury.

- Avoid skin contact with oil and lubricants!
 - Protect your skin with skin-protection lotion or oil-resistant gloves!
 - Never use oil or lubricants to clean your hands!
 - Change dirty or oily clothes as soon as possible!
 - Wear protective goggles.
-

**Caution**

Oil leakage at hydraulic system.

Risk of injury or property damage.

- Periodically check all tubes, lines, couplings and connecting elements concerning leaks and external damage!
 - Only use appropriate tooling during the check!
 - Occurring damages have to be removed immediately!
 - Replace hydraulic lines after 6 years at the latest!
-

**Caution**

Cleaning of metallic surfaces.

Risk of material damage due to detergents.

- Do not use aggressive detergents!
-

**Caution**

Welding operations at the electric cable system.

Danger of property damage.

- Separate the battery connection to the carrier vehicle before carrying out welding operations at the mounted sweeping suction combination!
-

**Caution**

Loose bolted/screw connections.

Danger of property damage.

- Retighten loose screwed connections after repair and maintenance work!
-



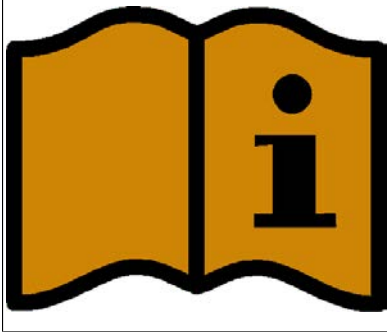
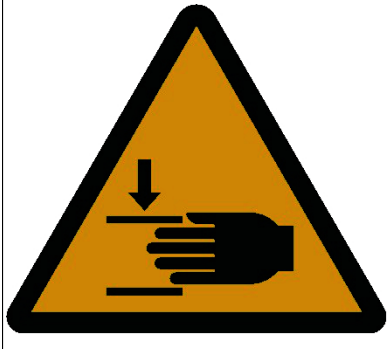
**Caution**

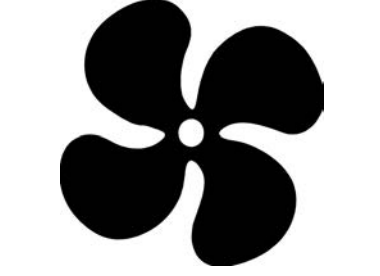
Tightening of screw connections.


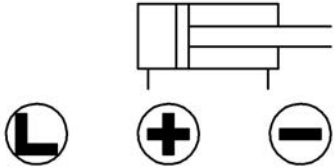

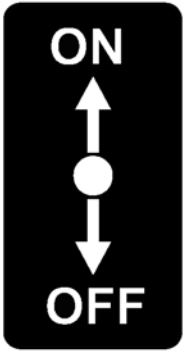


Danger of property damage.

- When tightening screw connections, always use the prescribed tightening torque (see Chapter 15. "Tightening torques", page 77)!
-

6.5 Designations

Marking	Explanation
	<p>Basis for Declaration of Conformity</p>
	<p>Do not enter the danger zone of the machine!</p>
	<p>Prior to commissioning, read and observe operating and safety instructions!</p>
	<p>Risk of crushing hands!</p>

Marking	Explanation
	Warning of counter-rotating rotation bodies!
	Do not reach into the area!
	Filling connection of fresh water tank
	Blower operation/cleaning
	Connection of recycled water

Marking	Explanation
	<p>Operation of high-pressure cleaner</p>
	<p>Connection of hydraulic system</p>
	<p>max. hydraulic oil volume current 50 l/min</p>
	<p>Switch on/off water jet in suction mouth via ball valve.</p>
 <p>Bei Transportfahrt Hydraulik aus!</p> <p>Beikehr- und Mähbetrieb!</p>	<p>Switch off hydraulic system during transportation! Only single-acting operation of front hydraulic during sweeping and mowing!</p>
 <p>Kabel- und Schlauchverbindungen beim Kippen trennen!</p> <p>Disconnect cable and hose connections when tilting!</p>	<p>Before tilting the base frame (carrier vehicle), unplug the connection cable and camera cable (suction device) at the connection box and disconnect the hose connections to the front!</p>

7 Commissioning

This chapter gives you information on the following:

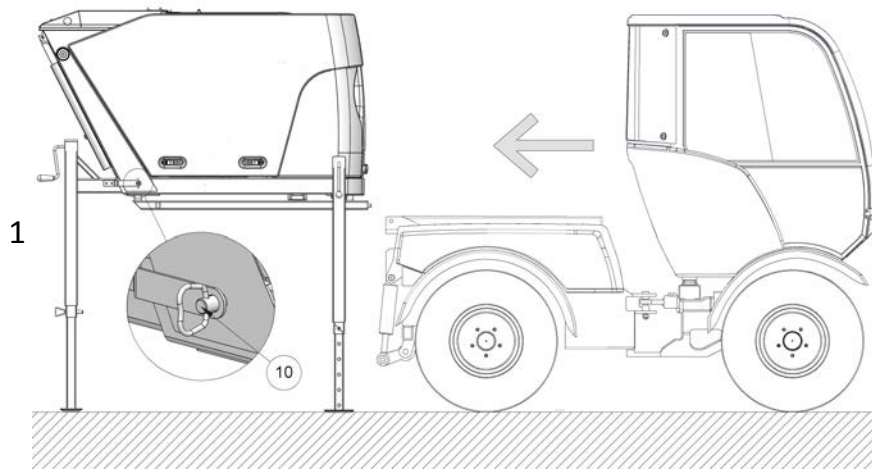
- Chapter 7.1 *"Fitting"*, page 34
- Chapter 7.2 *"Wiring diagram hydraulic system"*, page 37
- Chapter 7.3 *"Controller"*, page 39
- Chapter 7.4 *"Settings for commissioning"*, page 41
- Chapter 7.5 *"Deactivate pendulum compensation"*, page 44
- Chapter 7.6 *"Starting the sweeping suction combination"*, page 45
- Chapter 7.7 *"Transport journey"*, page 46

7.1 Fitting

The fitting procedure of the sweeping suction combination also depends on the carrier vehicle. Comply with the operating instructions of the carrier vehicle.

The sweeping suction combination must only be fixed at the setting points and fixing points provided for this purpose!

The procedure with tripods (optional) is described in the following:



Drive the carrier vehicle carefully under the jacked up sweeping suction combination. Make sure that the safety bolts of the tripods (Pos. 10) are inserted.



Caution

Sweeping suction combination is not jacked up high enough.

Danger of property damage.

- When mounting the sweeping suction combination, please make sure that it is jacked up high enough!

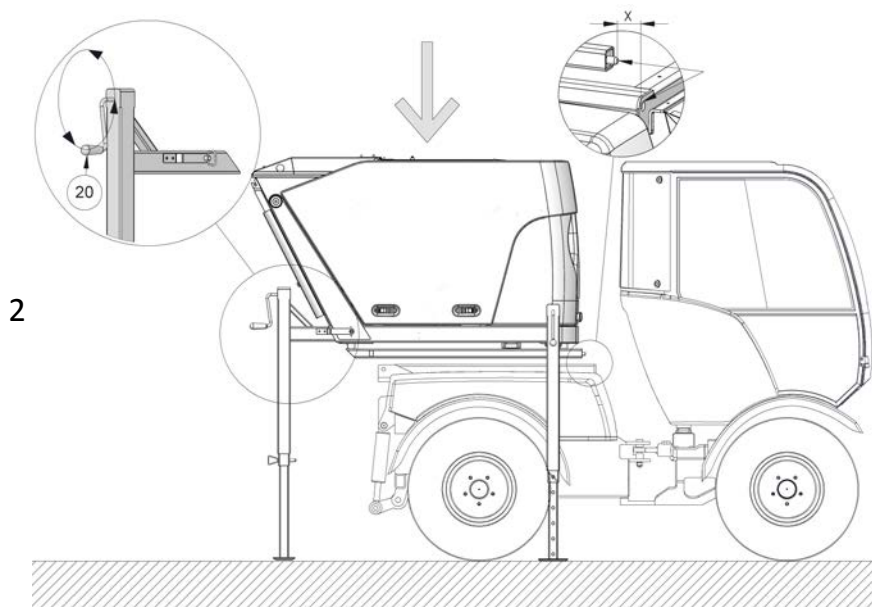


Caution

Jacking up the sweeping suction combination on uneven or soft ground.

Risk of injury or property damage.

- Make sure that the sweeping suction combination is jacked up on even, solid and stable ground!



After positioning the carrier vehicle, lower the sweeping suction combination consistently with the cranks (Pos. 20).

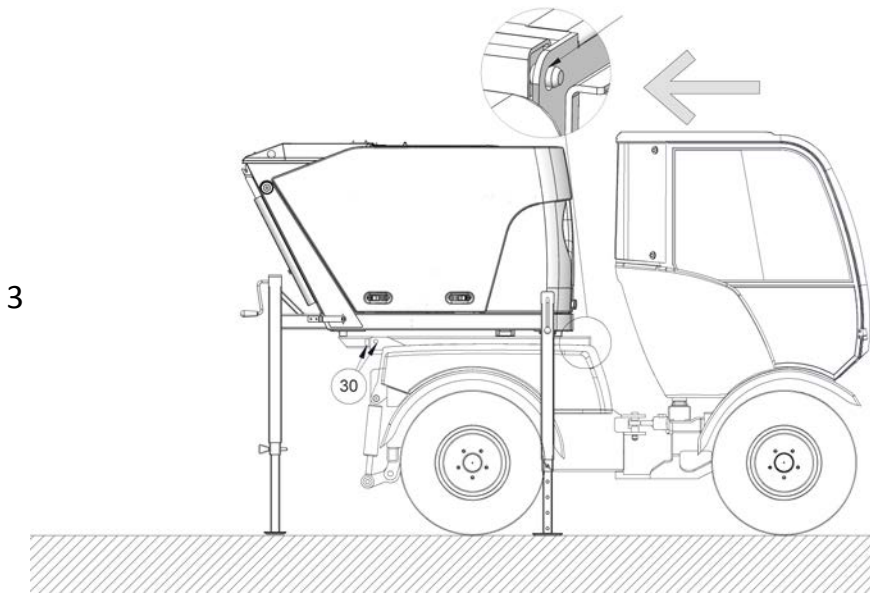


Caution

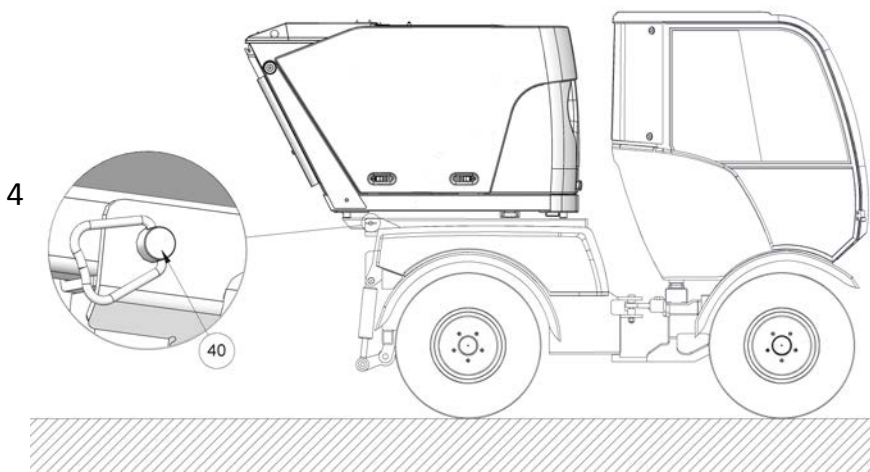
Wrong position of center of gravity.

Danger of property damage.

- When mounting the sweeping suction combination, please make sure that the center of gravity is correctly placed on the carrier vehicle!



Move back the carrier vehicle as soon as the base rails have disappeared in their guidance in the carrier vehicle. Move back until the guide pins are inserted in the base frame and the bores correspond (Pos. 30).



Unplug safety bolts (Pos. 40) and remove tripods.



Warning

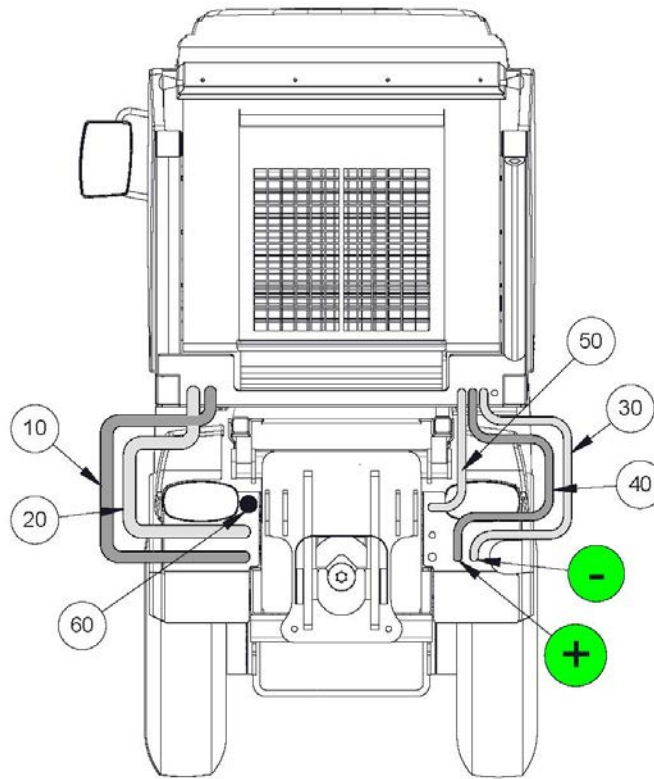
Loose screwed or bolted connections.

Risk of injury or property damage.

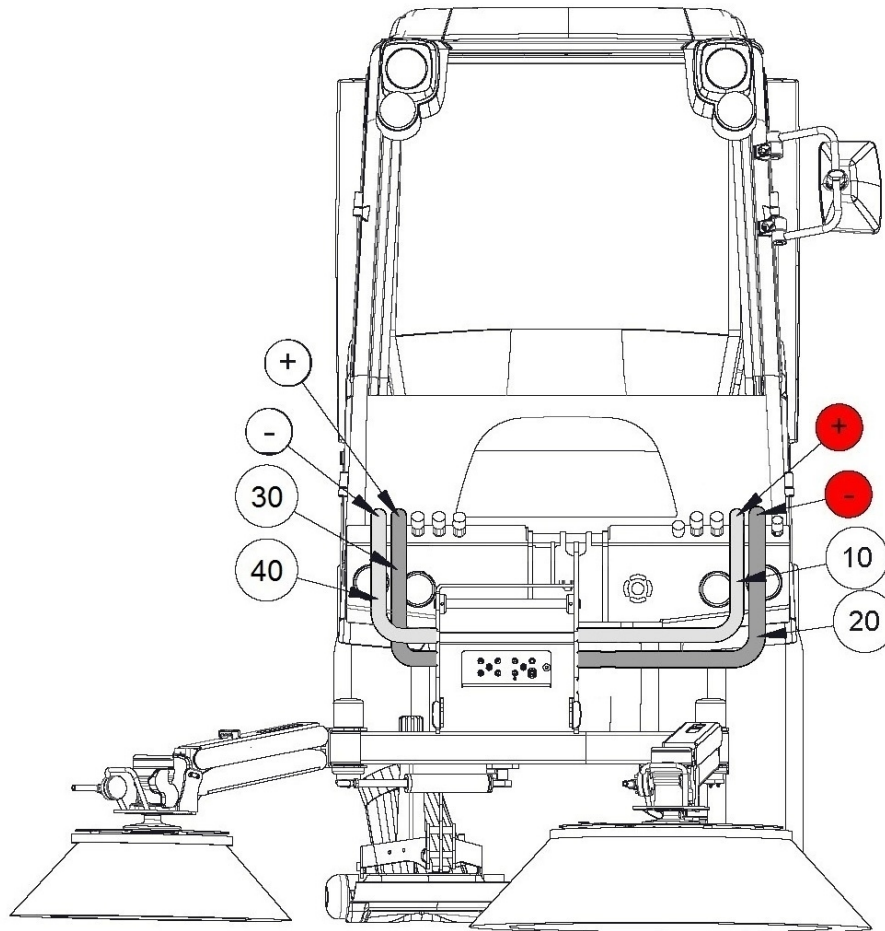
- After having mounted the sweeping suction combination, please make sure that all screwed and bolted connections are always in place and secure!

7.2 Wiring diagram hydraulic system

Connect the hydraulic hoses as follows:



Pos. No.	Hose/component
10	Supply P Blower drive
20	Return T Blower drive
30	Lifting cylinder (green) lifting / optional yellow control device
40	Lifting cylinder (green) lowering / optional yellow control device
50	Leak oil
60	Coding plug 50 l/min



Pos. No.	Hose/component
10	Advance P (red) brush drive, flow divider 1
20	Return T (red) brush drive, flow divider 1
30	Control device (black)
40	Control device (black)



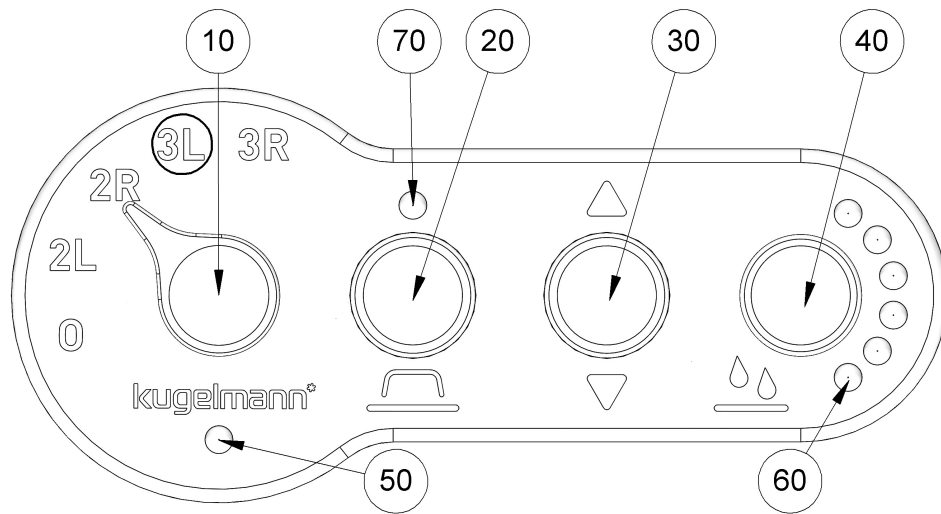
Warning

Starting movement of the blower or brushes when connecting the hydraulic lines.

Risk of serious injury.

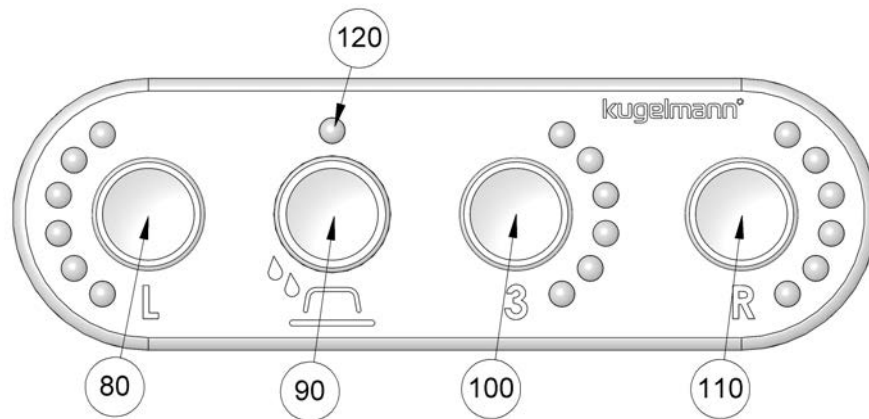
- Connect hydraulic lines only if the hydraulic cycle of the carrier vehicle and the sweeping suction combination are depressurised!

7.3 Controller



Pos. No.	Meaning
10	<p>Operating mode regulator:</p> <ul style="list-style-type: none"> 0 : Parking (brush arms are lifted and parked in the middle to save space). ⇒ Press joystick to the left until LED (Pos. 50) is off. 2L : Control of left-hand brush with two-brush operation. 2R : Control of right-hand brush with two-brush operation. 3L : Control of brush 3 - left-hand side (in direction of travel), parking spot sweeping function with two-brush operation (option). 3R : Control brush 3 right-hand side (in direction of travel).
20	<p>Coarse dirt flap:</p> <ul style="list-style-type: none"> Lift-up coarse dirt flap (red LED (Pos. 70) illuminated). Lowered coarse dirt flap (red LED (Pos. 70) off). <p>The diagram shows a side view of the coarse dirt flap mechanism. A red LED (Pos. 70) is shown illuminated when the flap is in the up position and off when it is in the down position.</p>
30	<p>Lifting / lowering of brush (brush 2 or 3) selected in operating mode regulator (Pos. 10).</p>

Pos. No.	Meaning
40	<p>Regulator water jets at brush / recirculating water:</p> <ul style="list-style-type: none"> Press briefly: Switch on/off water pump for the water jets at the brushes. Turning, green LEDs: Change water quantity at the water jets. Hold down and turn, red LEDs: Change quantity of recirculating water / switch it off (no LED illuminated) / standard (factory settings): 2 LEDs.
50	<ul style="list-style-type: none"> LED off: Parking process finished. Blinking LED: Blower speed too low. Red LED: not ready for operation. Green LED: ready for operation. Blue LED: Debris container open.



Pos. No.	Meaning
80	<ul style="list-style-type: none"> Green LED: Setting of speed of left-hand brush. Press and hold, red LED: Setting of brush load of left-hand brush unit, higher load with increasing LED number.
90	<p>Option:</p> <ul style="list-style-type: none"> Water jet in suction mouth on (red LED (Pos. 120) illuminated). Water jet in suction mouth off (LED (Pos. 120) off).
100	<p>Option:</p> <ul style="list-style-type: none"> Green LED: Setting speed of third brush. Press and hold, red LED: Setting of brush load of third brush, higher load with increasing number of LEDs.
110	<ul style="list-style-type: none"> Green LED: Setting speed of right-hand brush. Press and hold, red LED: Setting of brush load of right-hand brush unit, higher load with increasing LED number.

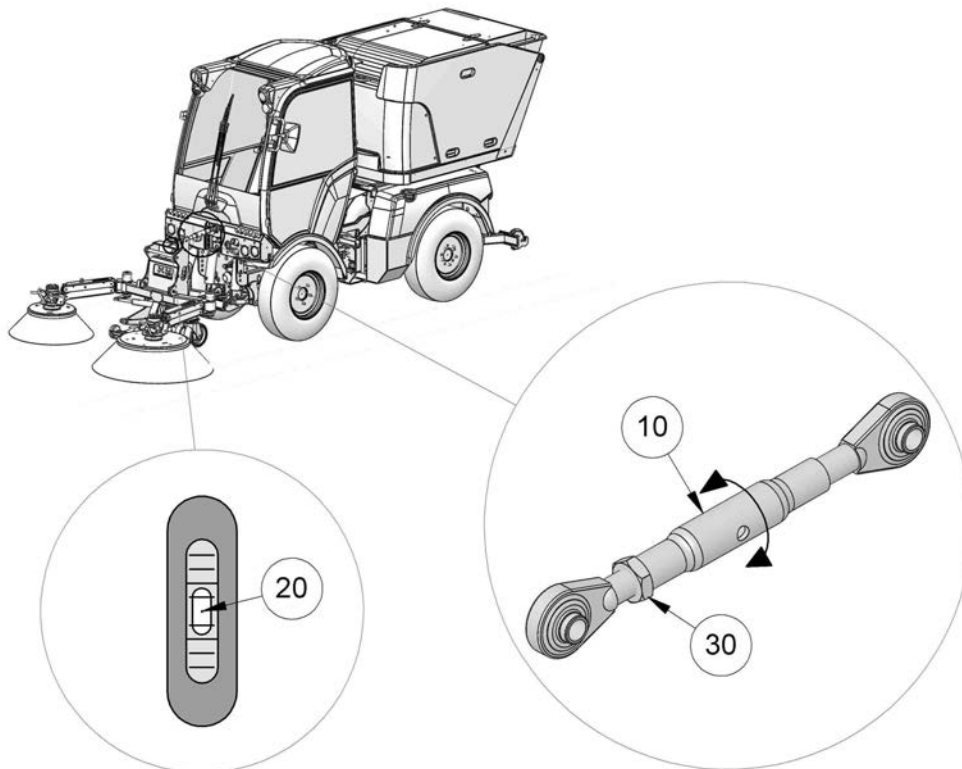
7.4 Settings for commissioning

This chapter gives you information on the following:

- Chapter 7.4.1 "Setting of attachment frame", page 41
- Chapter 7.4.2 "Setting of sweeping area", page 42

7.4.1 Setting of attachment frame

Setting of front three-point attachment as follows:



- 1 Turn the upper link (Pos.10) until the air bubble in the spirit level (Pos. 20) is positioned exactly in the center.
- 2 Secure position of the upper link with conical nuts (Pos. 30).



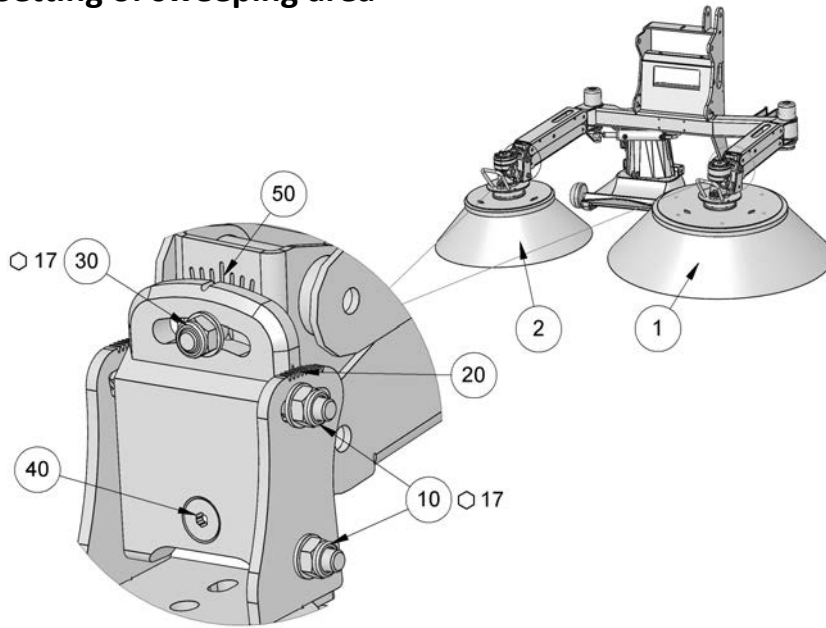
Caution

Setting of attachment frame on uneven ground.

Danger of property damage.

- Setting of attachment frame only on even ground. In case of nonobservance of these prerequisites, it is not possible to set the suction mouth correctly (see Chapter 8.1.2 "Setting of suction mouth", page 48)

7.4.2 Setting of sweeping area



Pos. No.	Component
1	Brush L
2	Brush R
10	Clamping nuts
20	Scale 1
30	Clamping nut
40	Clamping screw
50	Scale 2

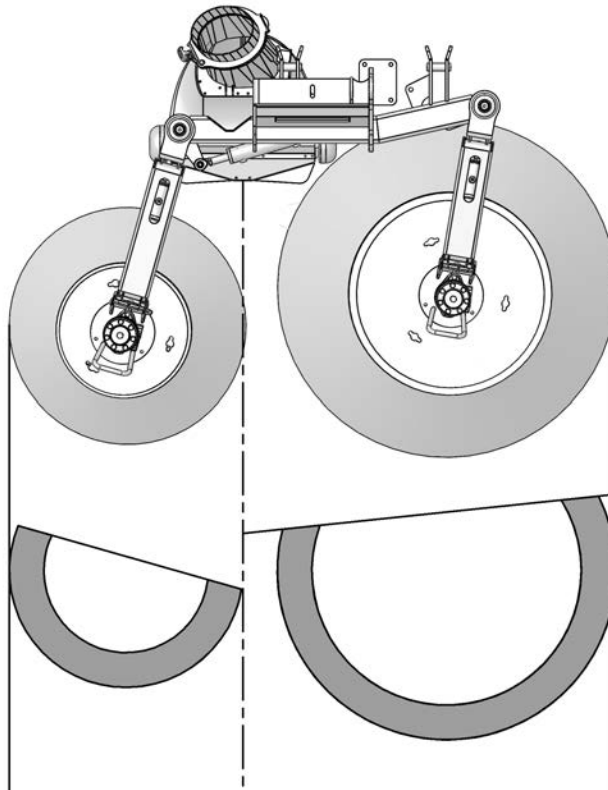


Hinweis

The following setting values are recommendations by the factory, changes because of brush wear and sweeping situation possible!

	Brush 2R (Pos. 2)	Brush 2L (Pos. 1)
Scale 1 (Pos. 20)	<p>front ←</p> <p>former setting: 4</p>	<p>front ←</p> <p>former setting: 3.5</p>
Scale 2 (Pos. 50)	<p>1</p>	<p>1</p>

The following area must result if the sweeping area is correctly set:



Caution

Maintenance work without necessary technical knowledge or appropriate tooling.
Risk of injury or property damage.

- Only carry out maintenance work if you have the necessary expertise as well as suitable tools!

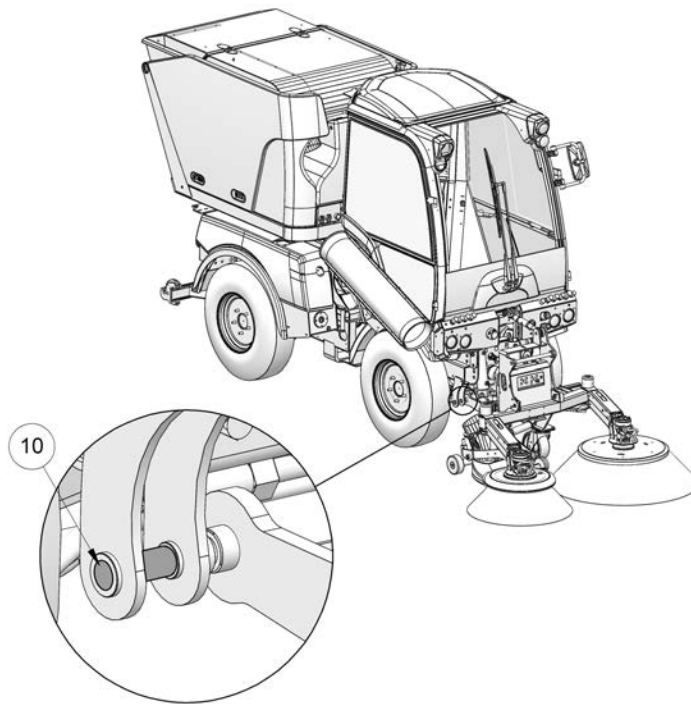


Caution

Tightening of screw connections.
Danger of property damage.

- When tightening screw connections, always use the prescribed tightening torque (see Chapter 15. "Tightening torques", page 77)!

7.5 Deactivate pendulum compensation



The locking pin (Pos. 10) must be engaged and secured to deactivate the pendulum compensation.



Hinweis

With mowing unit, the pendulum compensation must be activated, i.e. the locking pin (Pos. 10) must be removed!



Warning

Loose screwed or bolted connections.

Risk of injury or property damage.

- After having mounted the sweeping suction combination, please make sure that all screwed and bolted connections are always in place and secure!



Caution

Limbs getting caught.

Risk of injury.

- Never put your hands between moving parts!

7.6 Starting the sweeping suction combination

- 1 Start the combustion engine of the carrier vehicle (see documentation of carrier vehicle).

Speed setting of combustion engine:

Carrier vehicle	recommended combustion engine speed with variable pump (1/min)
<ul style="list-style-type: none"> • S 990 	1850
<ol style="list-style-type: none"> 2 <ul style="list-style-type: none"> • C 250 / C 270 / C 65 SC / C 70 SC • C 370 / C 65 TC / C 70 TC • B 250 	1750
<ul style="list-style-type: none"> • S100 / S115 / S130 	1500
<ul style="list-style-type: none"> • M 480 	1550

Hinweis



Lower combustion engine speeds are possible.

Though, the suction power decreases (LED (Pos. 50) at controller flashes red (see Chapter 7.3 "Controller", page 39))

- 3 Switch on hydraulic system (Pos. 60).
- 4 Set front lift (Pos. 10) to single-acting.
- 5 Switch on push-button (Pos. 40).

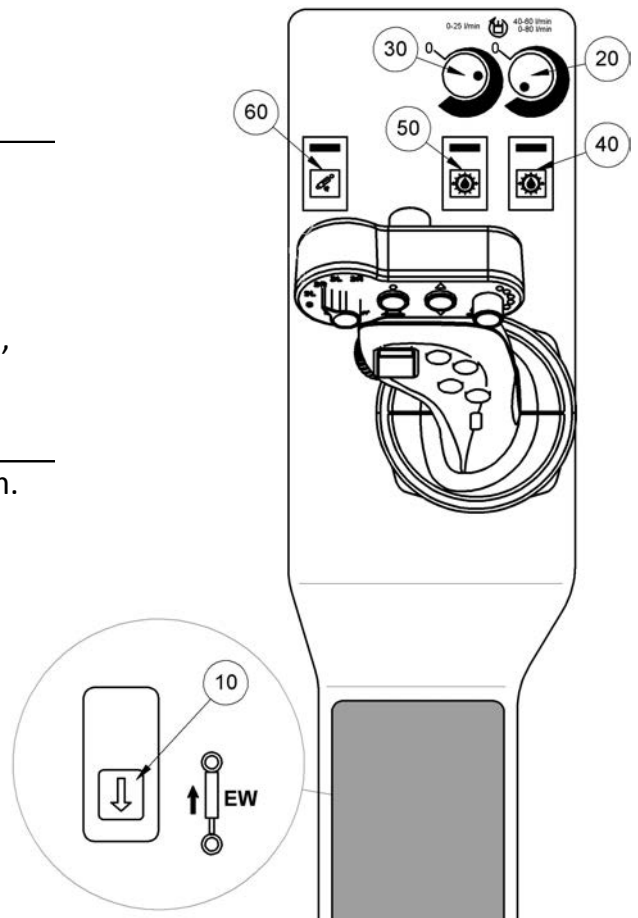
Hinweis



After switching off and on the combustion engine (carrier vehicle), the push-button (Pos. 40) must be switched off and on again, although the light of the push-button is illuminated.

- 6 Set blower speed (Pos. 20) to maximum.
- 7 Switch on push-button (Pos. 50).

- 8 Set MT 1 (Pos. 30) to maximum.



**Warning**

Lifting of vehicle.

Risk of injury, death or damage to property.

- Only single-acting operation of front hydraulic during sweeping and mowing!
-

**Warning**

Flying debris.

Risk of serious injury.

- Never stay in the working range of the sweeping suction combination!
-

**Caution**

Danger of property damage.

- Before starting, make sure that the container is closed!
-

**Caution**

Commissioning without making sure that the machine is in perfect technical condition.

Risk of injury or property damage.

- Check all important parts before commissioning!
 - Check all safety-related protection devices before commissioning!
 - If applicable, please replace damaged parts!
-

7.7 Transport journey

- 1 Brush in parking position (see Chapter 7.3 "Controller", page 39).
 - 2 Switch off hydraulic system (see Chapter 7.3 "Controller", page 39 (Pos. 60))!
-

**Danger**

Lifting of vehicle.

Risk of serious injury or death.

- Switch off hydraulic system during transportation!
-

8 Operating instructions

This chapter gives you information on the following:

- Chapter 8.1 "Settings", page 47
- Chapter 8.2 "Lifting", page 49
- Chapter 8.3 "Empty container", page 50
- Chapter 8.4 "Water supply", page 51
- Chapter 8.5 "Multifunction tool / cleaning lance", page 54

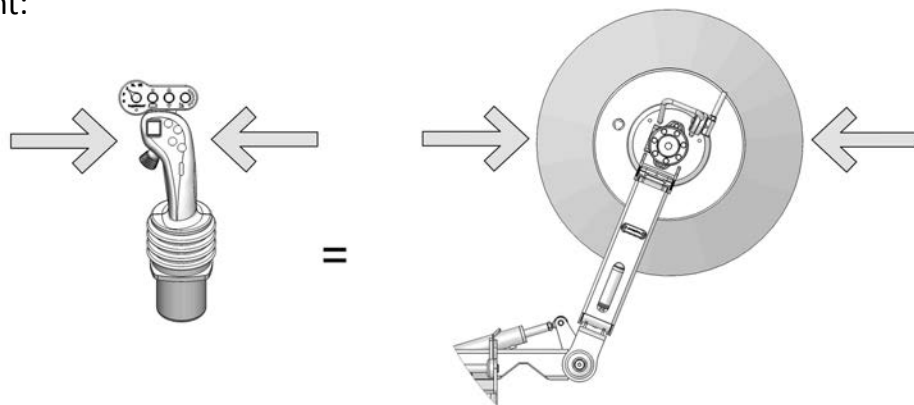
8.1 Settings

This chapter gives you information on the following:

- Chapter 8.1.1 "Setting of brush arms", page 47
- Chapter 8.1.2 "Setting of suction mouth", page 48

8.1.1 Setting of brush arms

- 1 Select operating type (brush) at controller (see Chapter 7.3 "Controller", page 39) (in this example brush R)
- 2 Move joystick to the left or right in order to pivot brush L, R or 3 to the left or to the right:



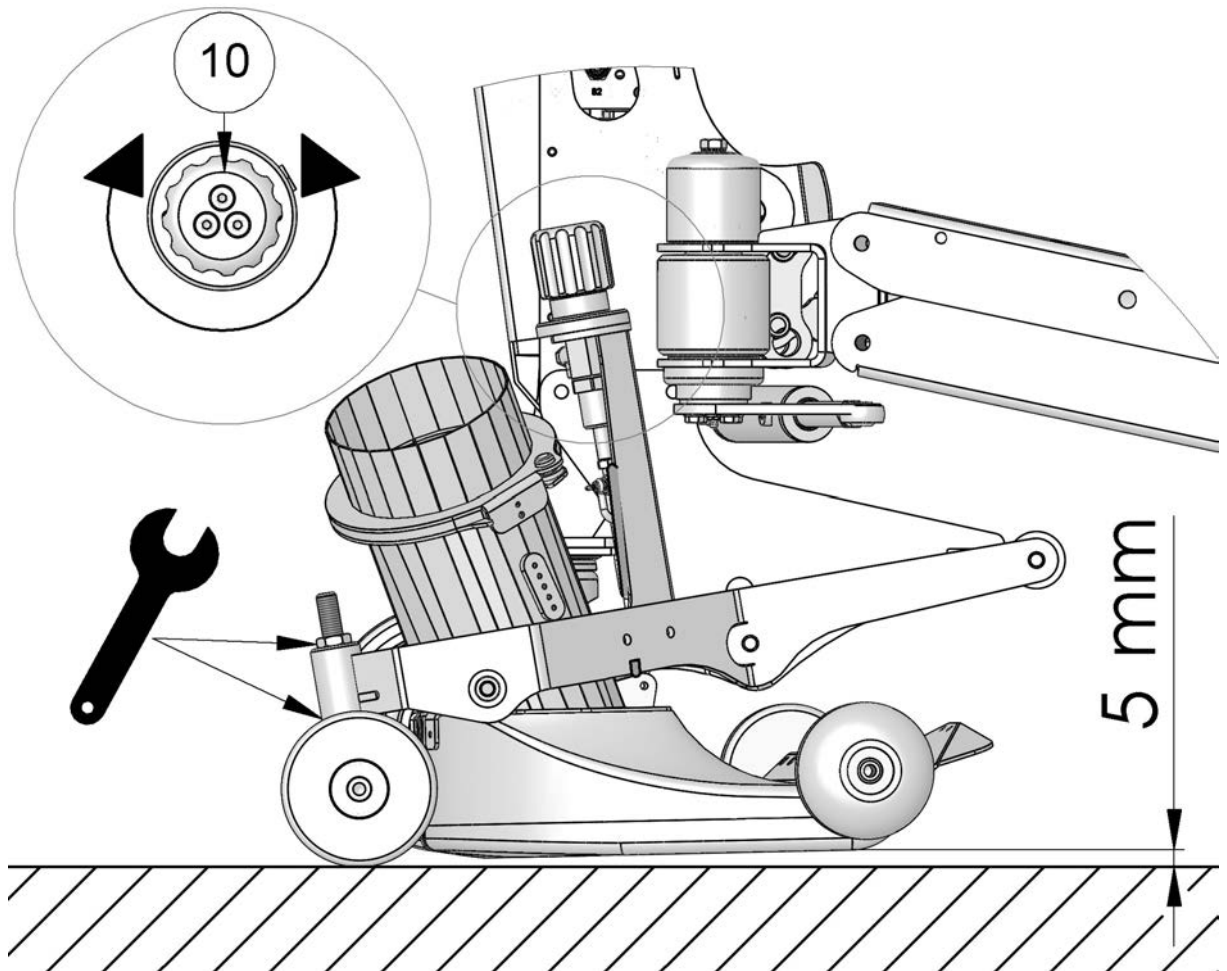
Caution

Limbs getting caught.

Risk of injury.

- Never put your hands between moving parts!

8.1.2 Setting of suction mouth



- 1 Adjusting the distance to the axis r (Only necessary in case of commissioning or replacement of spare parts!).
- 2 Turn the handle (Pos. 10) of the coarse dirt flap cylinder until the distance of the coarse dirt flap to the ground is 5 mm.



Caution

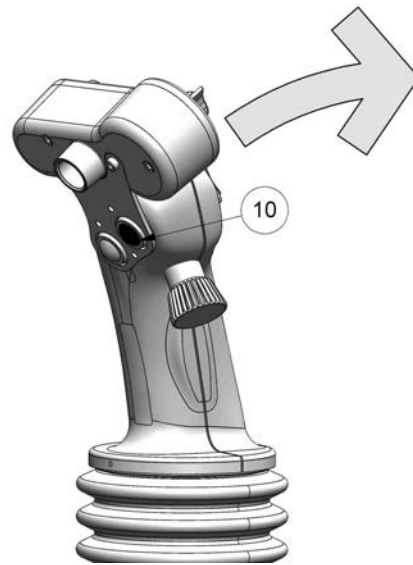
Limbs getting caught.

Risk of injury.

- Never put your hands between moving parts!

8.2 Lifting

- Pull joystick and **keep it pulled**



⇒ Front linkage and brush are lifted

- Release joystick
- Press black button (Pos. 10) at joystick

⇒ Brushes lower

⇒ Front linkage of carrier vehicle lowers



Hinweis

Compared to park position P (see Chapter 7.3 "Controller", page 39), this function has the advantage that all brush settings remain stored.



Hinweis

With Holder M 480, lifting according to this procedure is only possible to a limited extent!



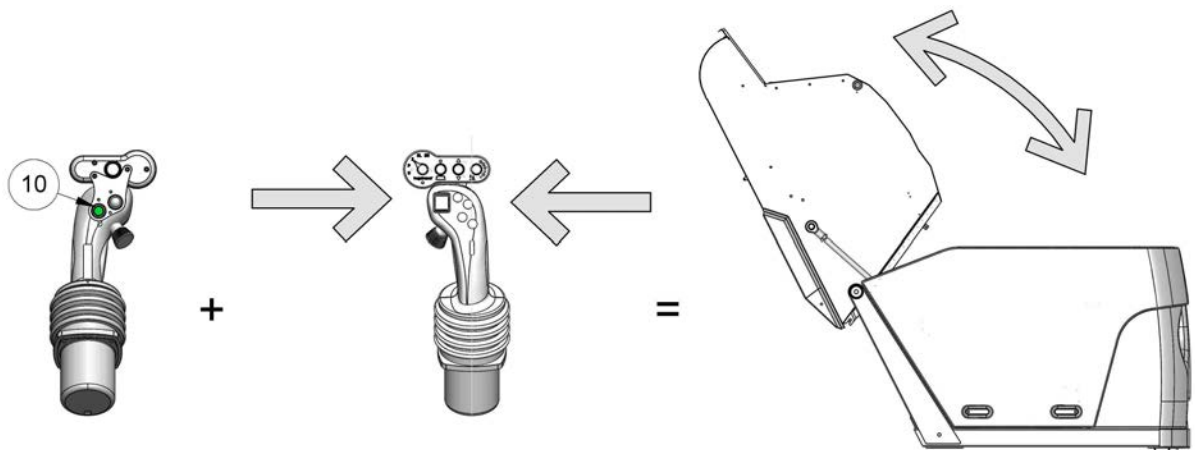
Caution

Limbs getting caught.

Risk of injury.

- Never put your hands between moving parts!

8.3 Empty container



Empty container:

- 1 Press green or yellow button (Pos. 10) and hold it pressed.
- 2 Move joystick to the **right**.
- 3 Container is tilting and can be emptied.

Close container:

- 1 Press green or yellow button (Pos. 10) and hold it pressed.
- 2 Move joystick to the **left**.
- 3 Container moves back to its initial position.



Warning

Persons present in working range of sweeping suction combination.

Risk of serious injury or death.

- Do not stay in the working range of the sweeping suction combination!



Caution

Opening the debris container during operation.

Risk of injury.

- Switch off the blower before controlling the filling level of the debris container!



Caution

Limbs getting caught.

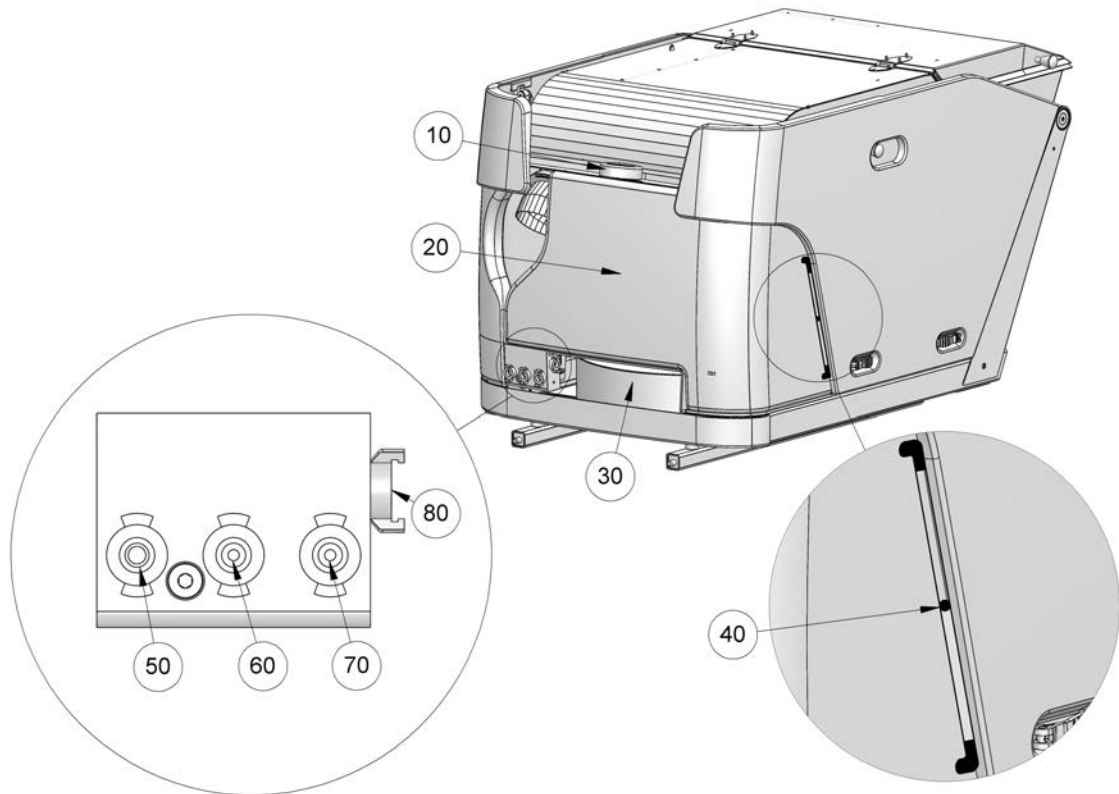
Risk of injury.

- Never put your hands between moving parts!

8.4 Water supply

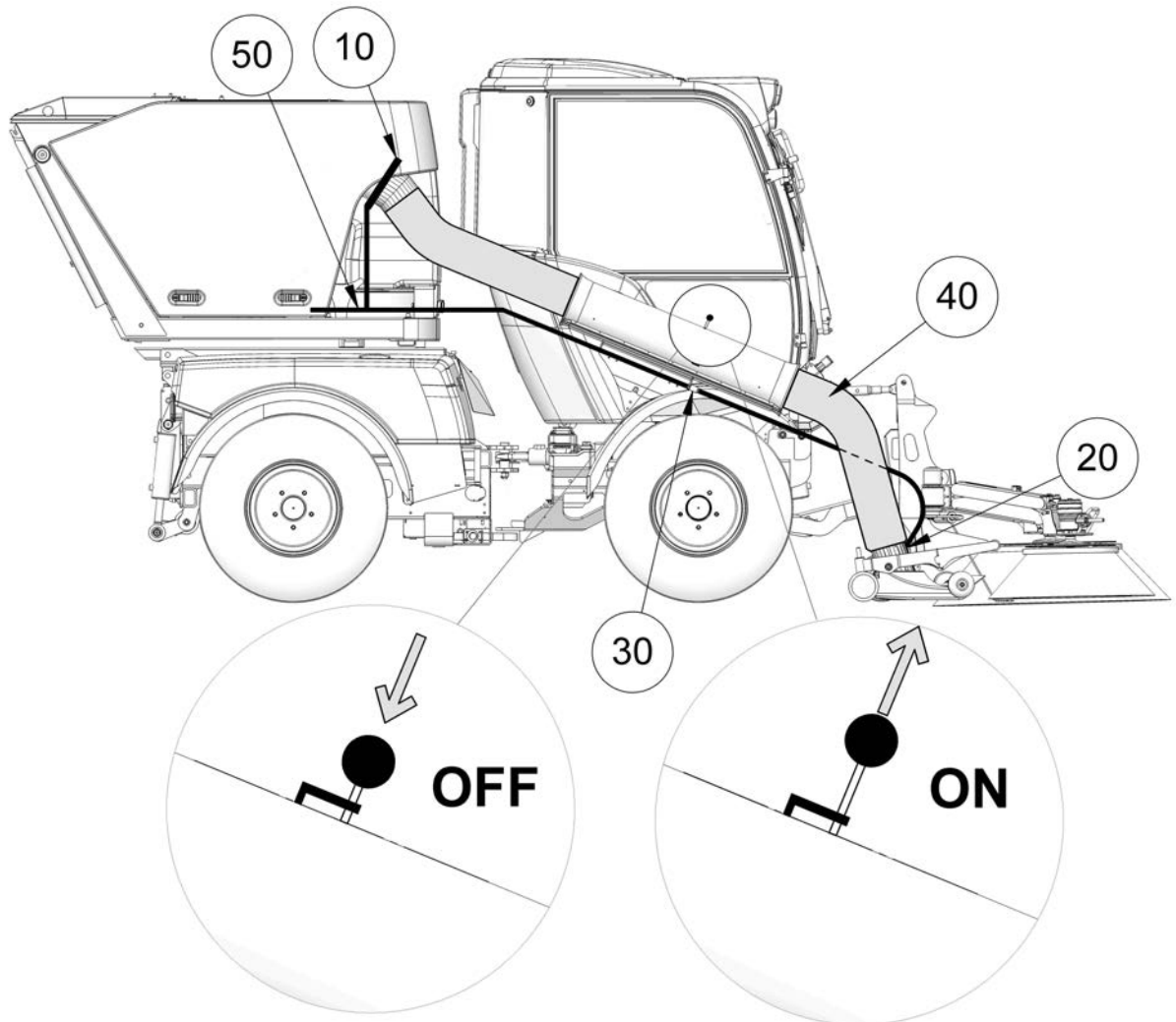
This chapter gives you information on the following:

- Chapter 8.4.1 "Recirculating water", page 52
- Chapter 8.4.2 "Fresh water", page 53

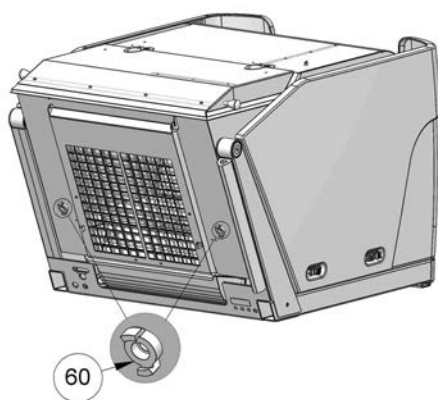


Pos. No.	Component/function
10	Venting of fresh water tank (Pos. 60)
20	Fresh water tank
30	Blower
40	Water level display
50	Filling of fresh water tank (see Chapter 8.4.2 "Fresh water", page 53)
60	Cleaning connection for blower
70	Cleaning and filling connection recirculating water
80	Recirculating water connection for suction mouth (see Chapter 8.4.1 "Recirculating water", page 52)

8.4.1 Recirculating water



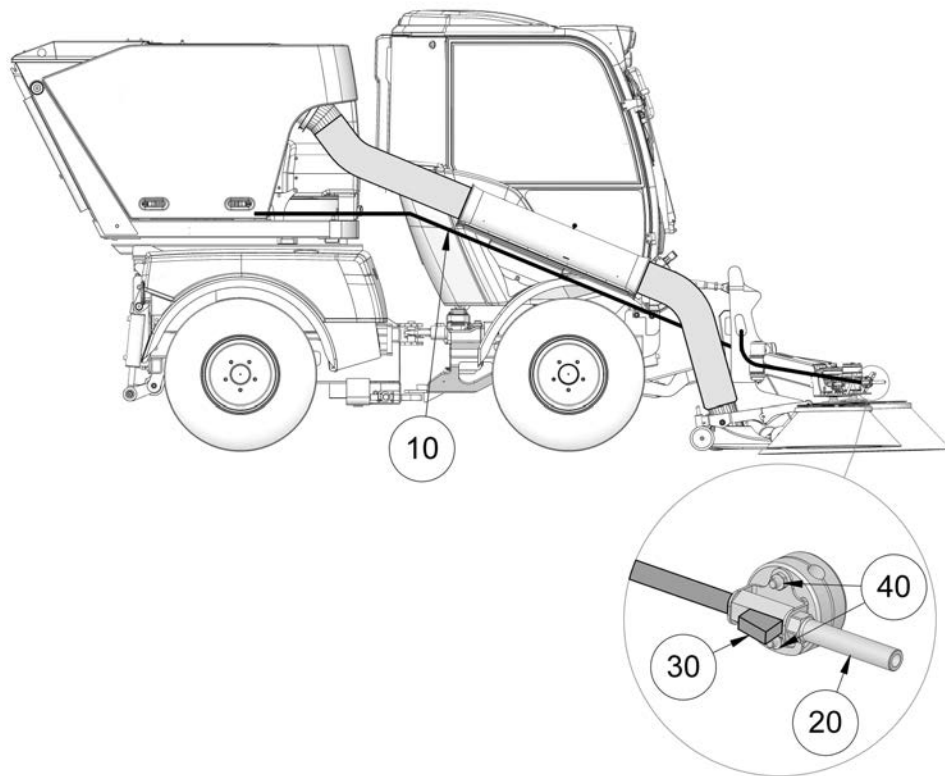
- Constant recirculating water supply (Pos. 50) to dust-binding water jet (Pos. 10).
- Switch on (ON) or off (OFF) the water jet in the suction mouth (Pos. 20) by means of the ball valve (Pos. 30).



Fill in recirculating water:

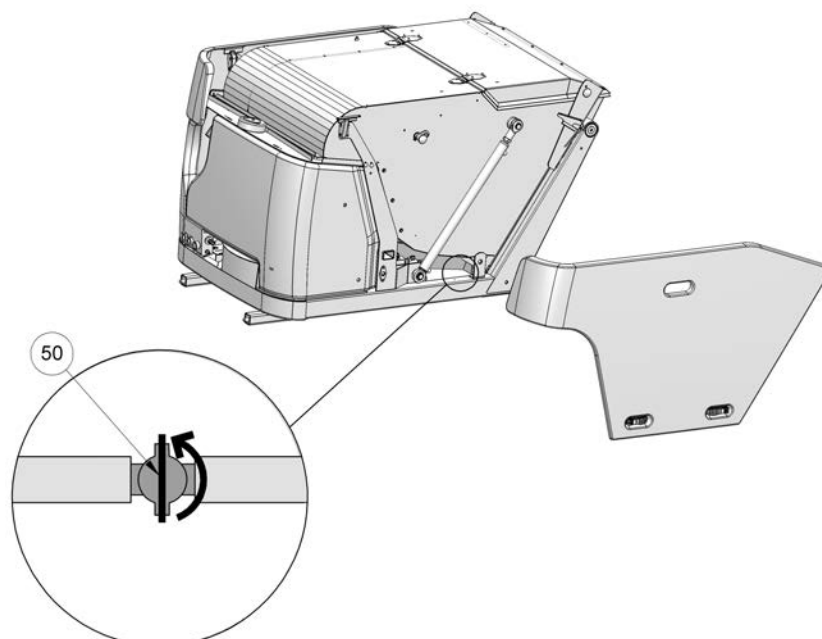
- One Geka coupling (Pos. 60) for filling.
- The other Geka coupling (Pos. 60) to check the water level.
- 2 possible filling levels.

8.4.2 Fresh water



- Fresh water line (Pos. 10) to supply the water jets (Pos. 20).
- Setting of water jets (Pos. 20) (see Chapter 7.3 "Controller", page 39).
- Alternative stopcock (Pos. 30) to set the water jets.
- Slacken hexagon nuts (Pos. 40) to change the direction of the spray jet.

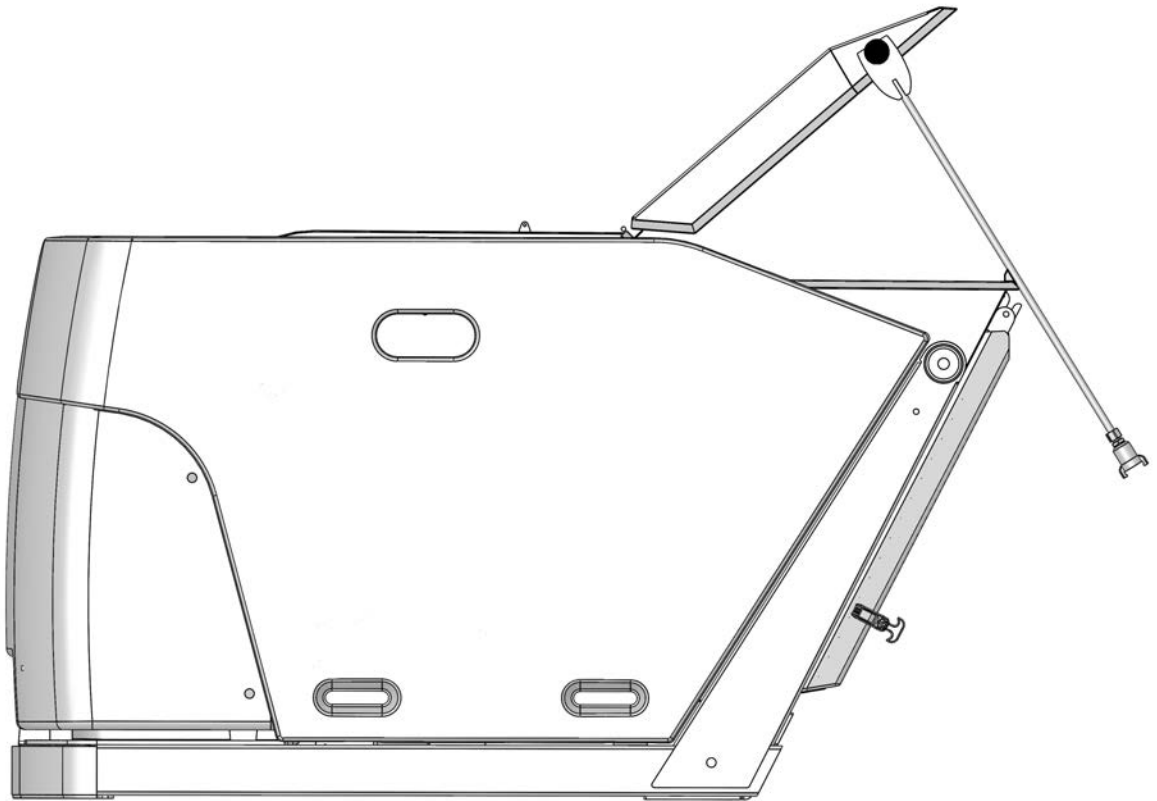
To empty the fresh water, actuate the discharge cock (Pos. 50) as follows:



8.5 Multifunction tool / cleaning lance

Functions:

- 1 Cleaning of sweeping suction combination.
- 2 Spatula to clean the suction mouth.
- 3 Open container and keep it open:

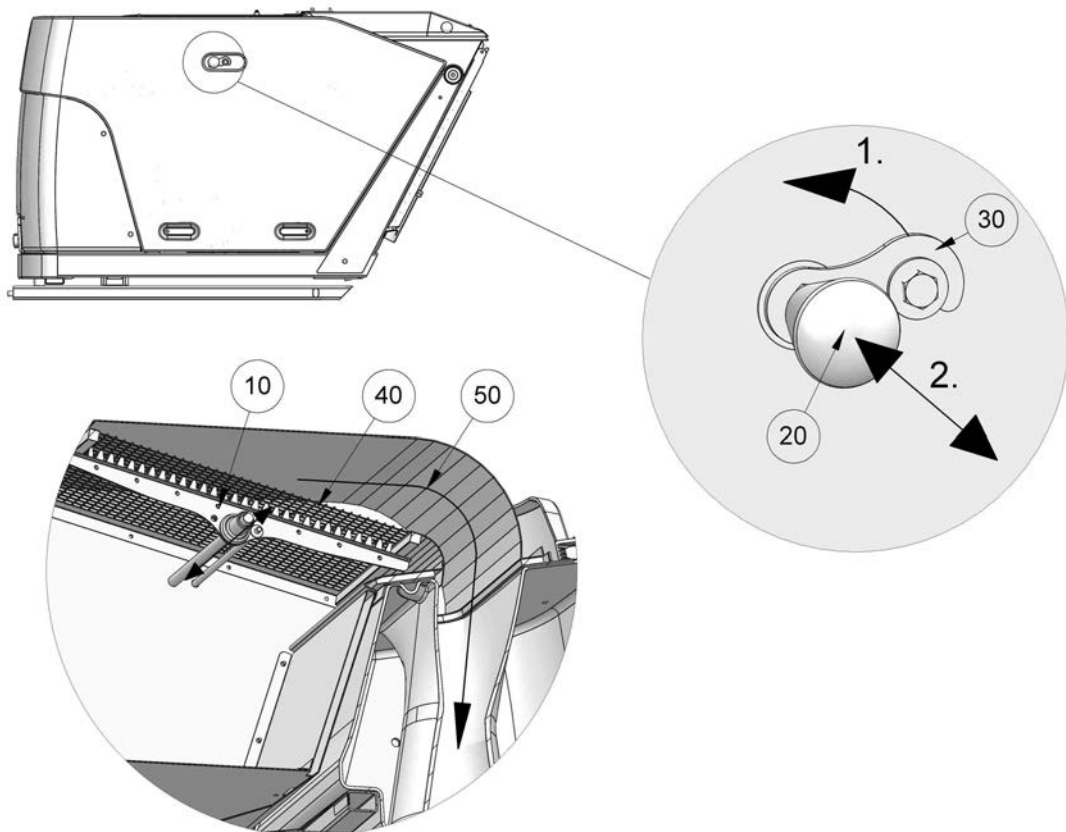


9 Options

This chapter gives you information on the following:

- Chapter 9.1 *"Leaf rake"*, page 56
- Chapter 9.2 *"Manual suction"*, page 57
- Chapter 9.3 *"High-pressure cleaner"*, page 59

9.1 Leaf rake



Actuation:

- 1 Turn handle (Pos. 20) to the left to unlock notch (Pos. 30).
- 2 By means of handle (Pos. 20), pull and push the leaf rake (Pos. 10) to wipe off impurities at the intake grille (Pos. 40) and thus keep the way for suction (Pos. 50) clear.



Caution

Limbs getting caught.

Risk of injury.

- Never put your hands between moving parts!

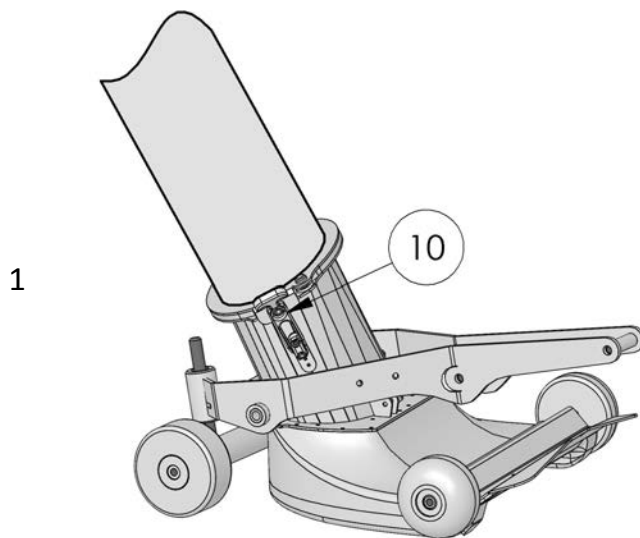


Caution

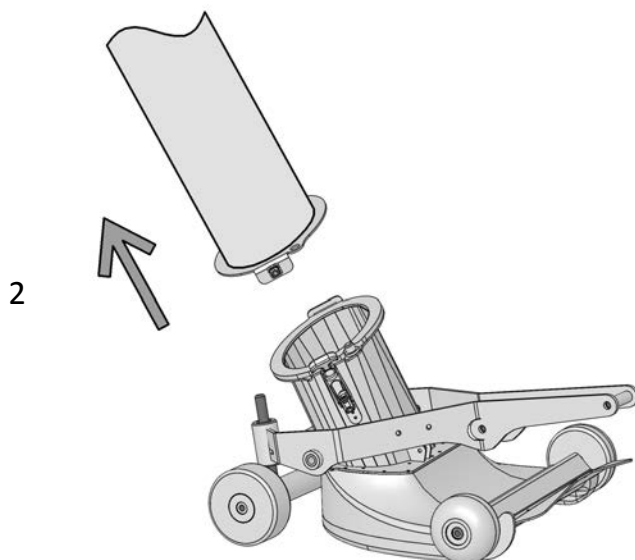
Danger of property damage.

- At termination, push back the handle (Pos. 20) with leaf rake back to the initial position and lock it!

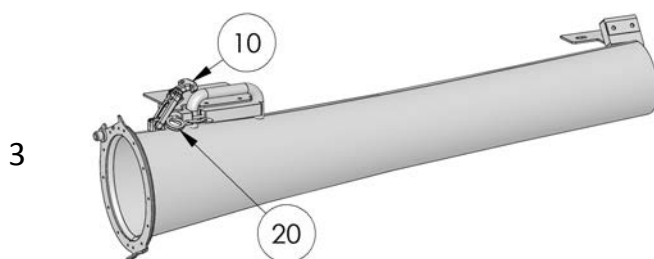
9.2 Manual suction



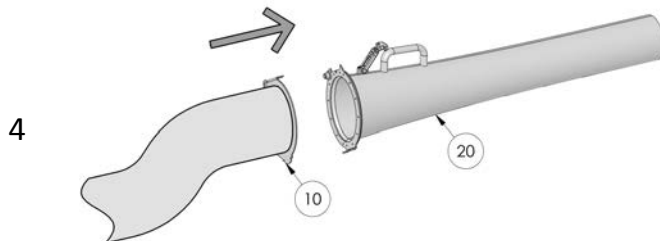
Open fastener (Pos. 10) at suction mouth.
In return, close the water jet at the suction mouth (see Chapter 8.4.1 "Recirculating water", page 52)



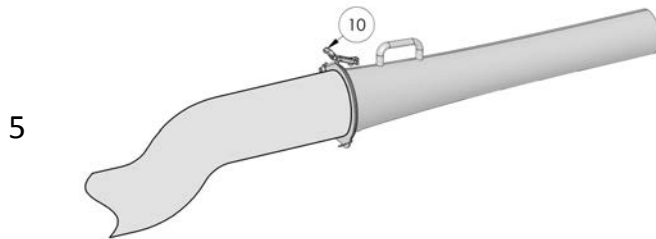
Remove hose flange.



Open collapsible pipe at carrier vehicle.
Open fastener (Pos. 10) and flat connection (Pos. 20), take out manual suction.



Install hose flange (Pos. 10) onto manual suction (Pos. 20).



Close fastener (Pos. 10)!



Hinweis

Cleaning tip in case of impurities within the suction hose / manual suction pipe:

Insert manual suction pipe with mounted hose into suction mouth from above and open water jet (see Chapter 8.4.1 "Recirculating water", page 52). By intake of recirculating water, the manual suction pipe is cleaned.



Danger

Carrier vehicle rolls away.

Risk of serious injury or death.

- Before changing to manual suction, switch type of running to neutral and apply the parking brake of the carrier vehicle!
- Never stand between carrier vehicle and the sweeping suction combination!



Warning

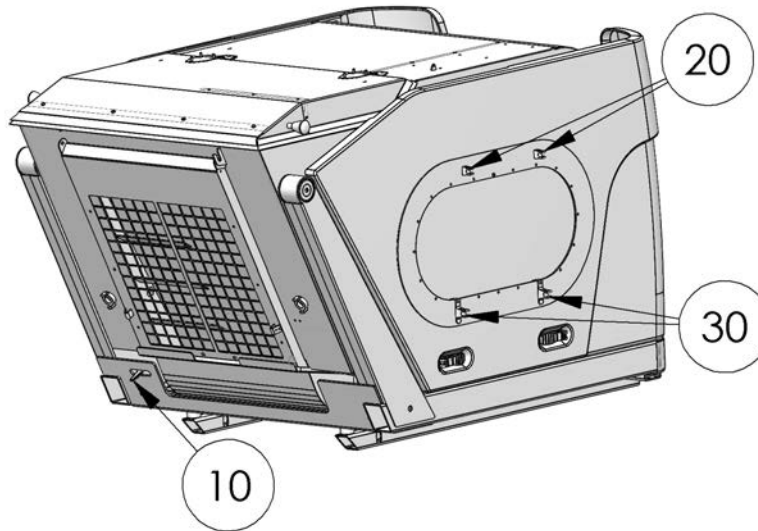
Rotating parts.

Risk of serious injury or death.

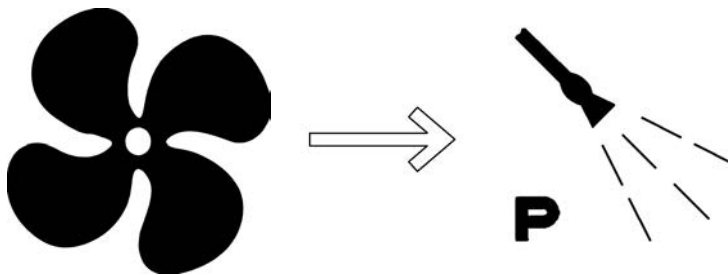
- During work at rotating parts, switch off the hydraulic system!

9.3 High-pressure cleaner

- To change to high-pressure cleaner operation, turn the following lever:



Pos.	Function
10	Lever for switching between blower and high-pressure cleaner
20	Holder for high-pressure cleaner lance
30	Holder for water pipe



The lever can also be switched during blower operation.

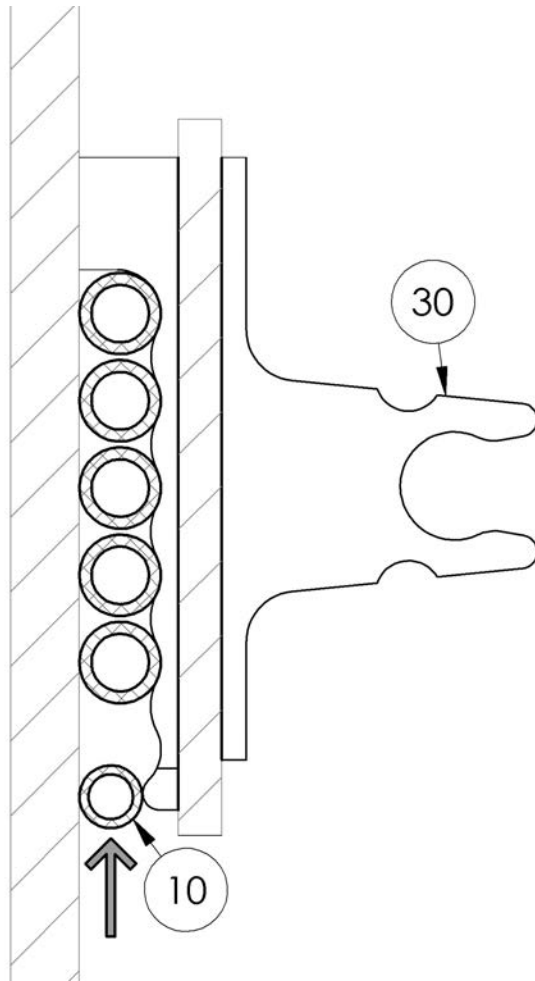


Hinweis

The motor speed of the carrier vehicle is proportional to the pressure of the high-pressure cleaner.

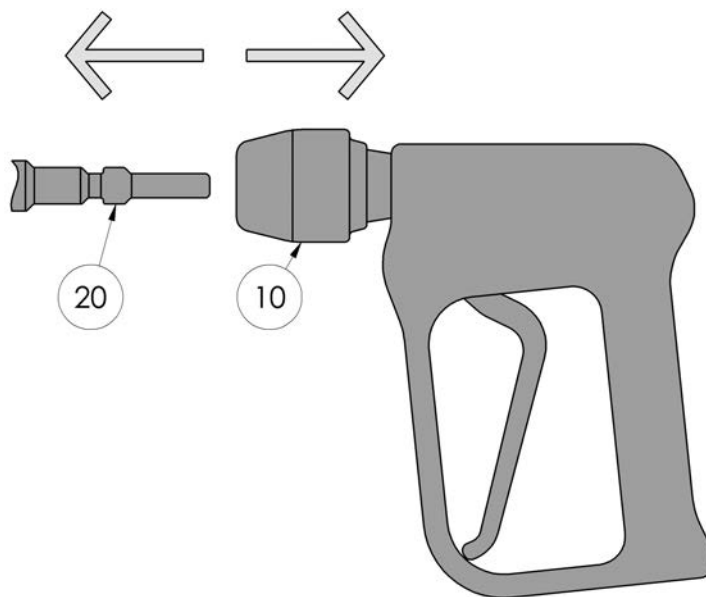
For normal operation, the idle speed of the carrier vehicle is sufficient.

- Coil up hose:



Depressurize manual spray gun!
 Pull hose (Pos. 10) to reduce its diameter and thus be able to insert it into the grooves provided for this purpose.

- Changing between high-pressure cleaner lance / water pipe:



Pull quick-change coupling (Pos. 10) to change to water pipe / high-pressure cleaner lance (Pos. 20).

**Warning**

Bursting of high-pressure hoses.

Risk of serious injury.

- A damaged high-pressure hose must be replaced immediately.
-

**Warning**

Flying debris.

Risk of serious injury.

- Always wear appropriate protective clothing and protective goggles to protect yourself from splashing water or waste!
-

**Warning**

Danger of high-pressure jets passing through the skin.

Risk of serious injury or property damage.

- Do not direct the high-pressure jet at yourself, other persons, animals or active electrical equipment!
-

**Warning**

Damaged hose.

Risk of serious injury.

- A damaged high-pressure hose must be replaced immediately!
-

**Caution**

Injuries caused by water jets.

Risk of injury.

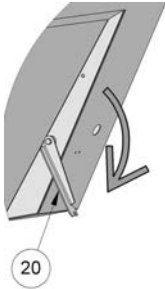
- The lever of the manual spray gun must not be clamped during operation!
 - 2-hand operation must be guaranteed!
-

10 Maintenance

This chapter gives you information on the following:

- Chapter 10.1 *"Checklist for cleaning"*, page 63
- Chapter 10.2 *"Maintenance intervals"*, page 66
- Chapter 10.3 *"Wear parts"*, page 68
- Chapter 10.4 *"Lubrication schedule"*, page 69
- Chapter 10.5 *"Safety"*, page 71

10.1 Checklist for cleaning

Cleaning procedure	see Chapter
1 Empty debris container and close it again.	8.3 "Empty container", page 50
2 Hang out filter frame and clean it separately.	5.1 "Components container unit", page 12
3 Screw down rear water connections (Geka).	
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">4</div> <div style="margin-right: 10px;">  </div> <div> <p>Open base flap:</p> <ul style="list-style-type: none"> • Hang out both levers (Pos. 20) and bend them down. • The base flap in the inside of the debris container opens. </div> </div>	
<hr/>	
<div style="display: flex; align-items: center;"> <div style="background-color: #003366; color: white; padding: 5px; margin-right: 10px; text-align: center; width: 30px; height: 30px; line-height: 30px;">i</div> <div> <p>Hinweis</p> <p>Activate blower and brush.</p> </div> </div>	7.3 "Controller", page 39
<hr/>	
5 Clean brush with water.	5.2 "Components brush unit", page 15
6 Spray water into suction mouth and prime.	5.2 "Components brush unit", page 15
7 Open suction mouth flange and check it for cleanliness.	
8 Clean blower.	8.4 "Water supply", page 51
9 Reduce blower speed and switch off brush.	7.3 "Controller", page 39
10 Open debris container.	8.3 "Empty container", page 50
11 Clean sealing flange with the debris container half open.	
12 Clean debris container with cleaning lance.	8.5 "Multifunction tool / cleaning lance", page 54

-
- 13 Clean support surface, container and base frame.

 - 14 Connect recirculating water and rinse (rear cleaning). *8.4 "Water supply", page 51*
 - ⇒ Leave debris container open.
 - ⇒ Keep the blower switched off.
 - ⇒ Rinse until clear water comes out of the container and the lines are free.

 - 15 Increase blower speed and leave the recirculating water connected (front cleaning). *7.3 "Controller", page 39*
 - ⇒ Water jets open at the front. *8.4.2 "Fresh water", page 53*
 - ⇒ Check water jets at the front and at the debris container. *5.1 "Components container unit", page 12*

 - 16 Switch off blower. *7.3 "Controller", page 39*

 - 17 Close debris container. *8.3 "Empty container", page 50*

 - 18 Close base flap again (Pos. 10).

 - 19 Remount filter frame. *5.1 "Components container unit", page 12*

 - 20 Clean Geka lid and close it again.
-



Caution

High-pressure cleaner.

Danger of property damage.

- Clean the machine without high-pressure!
-



Caution

Freezing of installation.

Danger of property damage.

- Before winter/storage, fill in antifreeze into the system and ensure that the whole installation is flushed with antifreeze!
 - Recommendation: Radiator antifreeze MC 30, silicate-free
-



Caution

Cleaning of metallic surfaces.

Risk of material damage due to detergents.

- Do not use aggressive detergents!
-

10.2 Maintenance intervals

In order to ensure proper operation, please carry out the following maintenance work in the indicated time intervals:

Interval	Work
Before each use	<ul style="list-style-type: none"> • Visual inspection of sweeping suction combination. • Check hydraulic oil level at carrier vehicle. • Check cooler of carrier vehicle regarding impurities. • Check hydraulic lines. • Check connection to carrier vehicle. • Check suction mouth and set it (see Chapter 7.4.2 "Setting of sweeping area", page 42).
After each use,	<ul style="list-style-type: none"> • clean the carrier vehicle and the sweeping suction combination (see Chapter 10.1 "Checklist for cleaning", page 63). • Check wear parts and replace it, if necessary (see Chapter 10.3 "Wear parts", page 68).
Monthly	<ul style="list-style-type: none"> • Check screw connections. • Lubrication (see Chapter 10.4 "Lubrication schedule", page 69). • Check hydraulic connections regarding tightness.
Yearly	<ul style="list-style-type: none"> • Check load-bearing parts. • Check by an expert. • Removal of damage to the paintwork.



Hinweis

Observe operating instructions of optional additional devices.

**Warning**

Electric shocks during maintenance work.

Risk of serious injury or death.

- Interrupt power supply before executing work at an electrical device!
-

**Warning**

Draining oil during maintenance work.

Risk of serious injury or death.

- Interrupt the hydraulic supply to carrier vehicle and make sure that the hydraulic cycle is depressurised before working at a hydraulic device!
-

**Caution**

Non-observance of maintenance intervals.

Risk of injury or property damage.

- Please pay attention to the prescribed maintenance intervals!
-

**Caution**

Maintenance work without necessary technical knowledge or appropriate tooling.

Risk of injury or property damage.

- Only carry out maintenance work if you have the necessary expertise as well as suitable tools!
-

**Caution**

Tightening of screw connections.

Danger of property damage.

- When tightening screw connections, always use the prescribed tightening torque (see Chapter 15. "Tightening torques ", page 77)!
-

10.3 Wear parts



Hinweis

Wear parts are:

- Disc brush
 - Feeler wheels and support wheels of the brush unit
 - Suction mouth seal (horseshoe)
 - All other seals
 - Collision protection disc brush
 - Water filter
 - Recirculating water pump (hose+rolls)
 - Suction hoses
 - Water hoses from brush to container unit
 - Container seals
 - Exhaust air filter
 - Hoses, fasteners, clamps and sleeves
 - Intake grille and drainage grille
 - Hydraulic lines (replace every 6 years!)
 - Manual suction (option)
 - Leaf rake rubber finger (option)
-



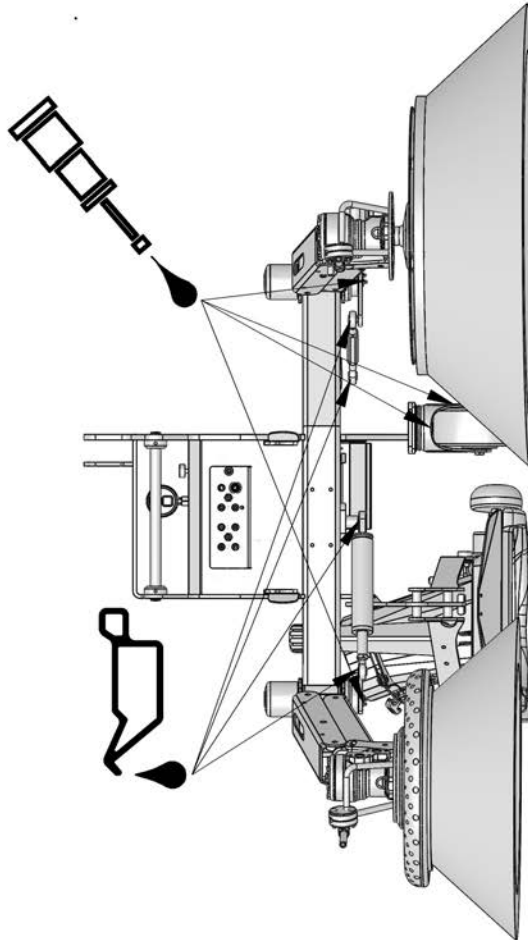
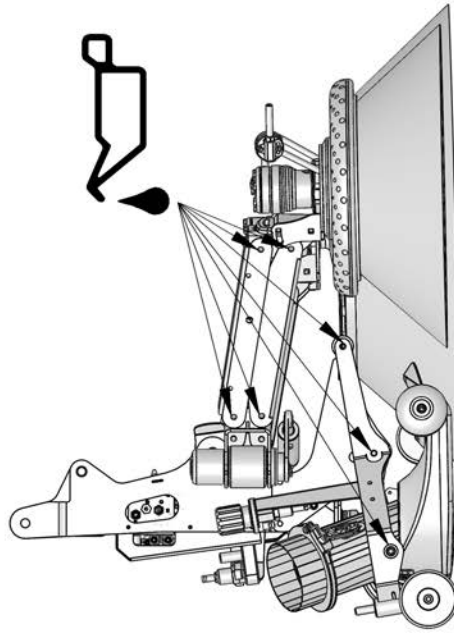
Caution

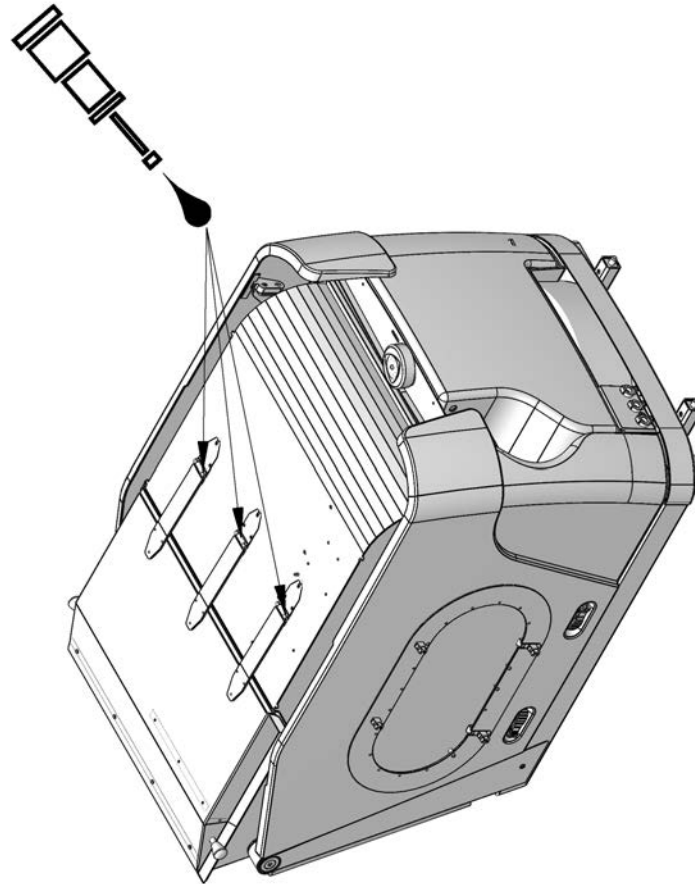
Use of wrong spare parts.

Risk of injury or property damage.

- Do only use original parts for repair work!
-

10.4 Lubrication schedule





Spray oil/maintenance oil



Grease gun



Caution

Carelessness when handling oil or lubricants.

Risk of injury.

- Avoid skin contact with oil and lubricants!
- Protect your skin with skin-protection lotion or oil-resistant gloves!
- Never use oil or lubricants to clean your hands!
- Change dirty or oily clothes as soon as possible!
- Wear protective goggles.

10.5 Safety

During cleaning and maintenance work, please pay attention to the following:

- Make sure that all hydraulic lines are depressurised.
- Switch off the motor of the carrier vehicle and remove the ignition key.
- Disconnect the hydraulic and electrical connection to the carrier vehicle.
- Make sure that the sweeping suction combination as well as the carrier vehicle are placed on even, solid and stable ground.
- Never use components of the sweeping suction combination as climbing aid.
- When tightening screw connections, always use the prescribed tightening torques (see Chapter 15. *"Tightening torques"*, page 77).
- Please observe the safety instructions for maintenance (see Chapter 6.4 *"Maintenance"*, page 27).

11 Transport

This chapter informs you on necessary precautions that have to be taken when transporting the sweeping suction combination.



Warning

Improper transport of sweeping suction combination.

Risk of injury or property damage.

- For transport, use only the correct attachment and lashing points provided at the sweeping suction combination!
 - Make sure that the sweeping suction combination does not slip or fall over during transport!
 - Make sure that all locking pins are secured!
-

12 Storage

This chapter informs you on necessary precautions that have to be taken when storing the sweeping suction combination.



Hinweis

- Always store the sweeping suction combination on secured tripods.
- Always store the sweeping suction combination empty.
- Always store the sweeping suction combination covered.
- Protect the sweeping suction combination against direct sunlight.
- If you disconnect the hydraulic connectors, close the ends of the hydraulic connections with sealing plugs.
- Clean the interior of the sweeping suction combination.
- Repaint damages to the paintwork.
- After cleaning and repainting, seal the sweeping suction combination inside and outside with a suitable protective agent, e.g. protective wax or anti-rust spray.



Caution

Freezing of installation.

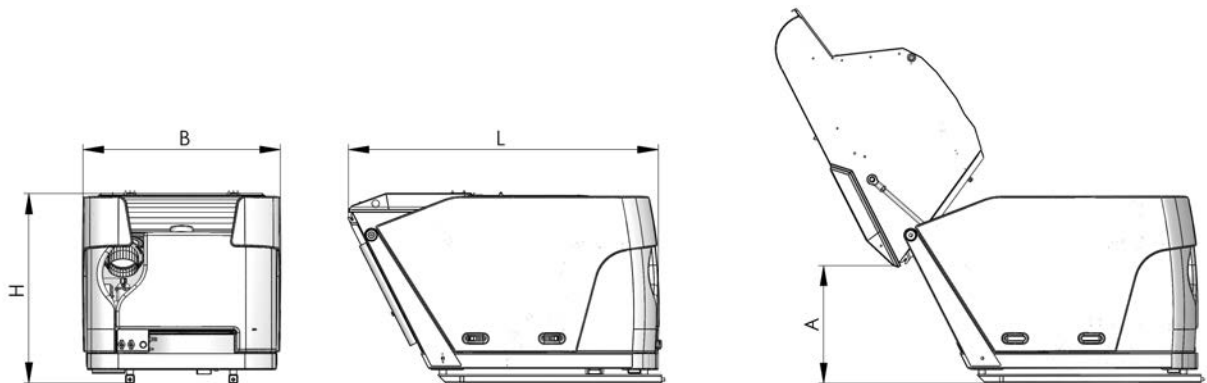
Danger of property damage.

- Before winter/storage, fill in antifreeze into the system and ensure that the whole installation is flushed with antifreeze!
- Recommendation: Radiator antifreeze MC 30, silicate-free

13 Disconnecting the system

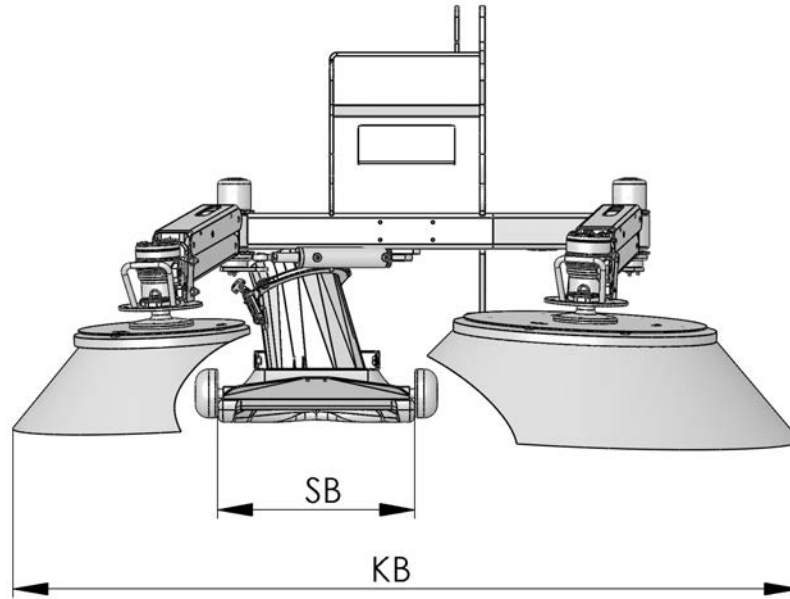
The sweeping suction combination must be disposed of in accordance with local or state regulations. Depending on material, dispose of parts with residual waste or hazardous waste or recycle. Kugelmann takes no responsibility for disposal.

14 Technical Data



Type	KS 1200	KS 1600
Capacity of debris hopper, gross* ² [l]	abt. 1200	abt. 1500
Capacity of debris hopper, net [l]	800	1150
Width of hopper W [mm]	1150	1150
Total height H (from bottom edge of mounting rail * ¹) [mm]	1100	1100
Total length L [mm]	1820	2220
Dumping height A (from bottom edge of mounting rail* ¹) [mm]	700	700
Capacity of water tank (fresh water/service water) [l]	215+140	215+220
Empty weight blower with container [kg]	440	530
max. power requirement blower ($Q_{\max}=45$ l/min) [kW]	8	8
Sound pressure level according to DIN EN ISO 3744 /2011 [dB]	max. 78	max. 78

table 14-1: Rear structure



Type	KS 1200	KS 1600
Sweeping width KB (Brush Ø700/1000) [mm]	1450-1900 (2150) *5	1450-1900 (2150) *5
Width of suction mouth SB [mm]	450	450
Weight of brush unit [kg]	190	190

table 14-2: Brush unit

Type	KS 1200	KS 1600
for Holder equipment carrier:	B 250 C 250 / C 270 C 350 / C 370 C 65 SC / C 70 SC C 65 TC / C 70 TC M 480	S 990 / S 1090 S 100 / S 115 / S 130

All indications without engagement, subject to modifications.

*1 Measure ground-to-bottom edge_ mounting rail must be added to the total height of the vehicle (depending on vehicle/tyres)

*2 gross capacity incl. blower space, suction hose, suction area...

*5 with option 3rd brush

15 Tightening torques

Shaft screws stainless steel

- Metric standard thread
- Property class 70
- $\mu = 0.12$ (Anti-seize paste)

Thread	M5	M6	M8	M10	M12	M14	M16
Tightening torque [Nm]	4	7	16	33	56	93	136

shaft screws steel

- metric standard thread
- zinc-plated
- property class 8.8 and 10.9
- $\mu = 0.14$ (unlubricated)

Thread	M5	M6	M8	M10	M12	M14	M16
Tightening torque [Nm] 8.8	6	10	25	50	85	140	210
Tightening torque [Nm] 10.9	9	15	35	75	130	200	310

shaft screws steel

- metric standard thread
- zinc-flake coated
- property class 8.8 and 10.9
- $\mu = 0.12$ (unlubricated)

Thread	M5	M6	M8	M10	M12	M14	M16
Tightening torque [Nm] 8.8	6	9	24	48	84	133	205
Tightening torque [Nm] 10.9	8	14	34	70	120	180	280

Warranty

Kugelmann Maschinenbau e.K., 87675 Rettenbach a.A., warrants its machines to be free from defects in material and workmanship and undertakes to replace free of charge all parts ex works which have been purchased by relevant Kugelmann dealers and have been acknowledged as defective after having been checked by Kugelmann. The warranty expressly given shall be limited to a period of 12 months from the date of delivery of the machine to purchaser. All further claims by the customer shall be excluded.

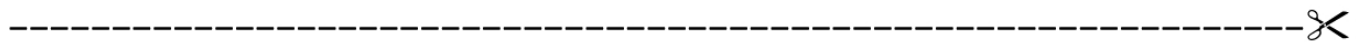
All wear parts are excluded from warranty.

The manufacturer takes no responsibility for third-party products not produced at the works of Kugelmann. However, we assign our claims against the supplier to the customer. No warranty will be given for machines purchased second-hand or used and modified or converted machines.



Hinweis

Please make sure that you fill in your warranty card and send it back to the manufacturer immediately. Claims have to be notified with a warranty claim in writing after their occurrence without undue delay (after 30 days at the latest).



<i>Company</i>	Device type:
<i>Kugelmann Maschinenbau e.K.</i>	Serial number:
<i>Gewerbepark 1-5</i>	Vehicle identification
	number:
<i>87675 Rettenbach a.A.</i>	Year of construction:
<i>Germany</i>	Address of dealer:
	
	
	Address of user/owner:
	
	

I have read the operating instructions.

Signature of user:

The warranty card has to be sent directly to the manufacturer.

ATTENTION: Warranty claims are only accepted with the warranty card of Kugelmann Maschinenbau e.K.

