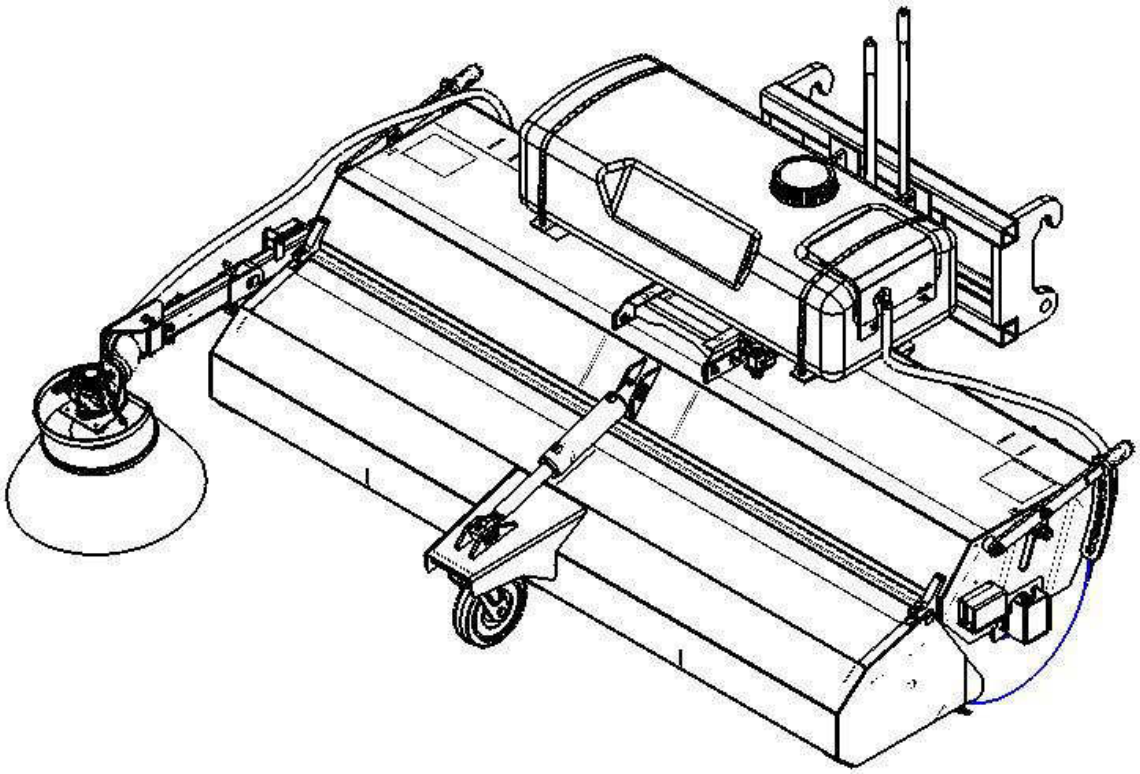
TUCHEL MASCHINENBAU GmbH

Operating Manual

Sweeper

PROFI 660



TUCHEL MASCHINENBAU GmbH

CE

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10.2015
Printed in Germany

GB

Read and observe this operating manual before first usage!
Keep for future reference!

Introduction

Dear Customer,

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

When unpacking this sweeper, check for transport damage or missing parts! Check for the completeness of the delivered sweeper including the ordered special equipment on the basis of the delivery note. Only immediate claims for damages are valid!

Read and observe this operating manual before first usage and especially the safety instructions. After carefully reviewing this manual, you can make full use of the sweeper's advantages.

Ensure that all operators of the sweeper read this operating manual before operation of the device.

The sweeper may be supplied with special equipment. Due to the individual features of your sweeper it is possible that not all the descriptions in this operating manual will apply to your sweeper. Special equipment is marked in this operating manual.

In the case of queries in the handling of this sweeper or regarding this operating manual, please do not hesitate to contact us.

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

User assessment

Dear reader,

Our operating manual is updated regularly. Your suggestions for improvement will aid us in designing a user-friendly operator's manual. Please send your suggestions by fax or e-mail to:

Tuchel Maschinenbau GmbH

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

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1 General

This operating manual applies to the PROFI 660 sweeper.

1.1 Intended use

The PROFI 660 sweeper is designed for fitting to wheel loaders and construction machinery.

Because of its robust construction and the various working widths, this sweeper is suited for permanent use on roads and paths.

The attachment of the PROFI 660 sweeper occurs by means of the mechanical or hydraulically activated quick hitch unit of the respective carrier vehicle, insertion of a palette fork in the fork tooth pocket or coupling triangle or adding-on to a three-point linkage.

The PROFI 660 sweeper is suitable as a free-sweeping base machine and thus for cleaning large fixed surfaces.

The various accessories such as the dirt collector with integrated third support wheel, the water spray system for fixing dust, one or two side brushes for sweeping near borders, a hydraulically adjustable side setting for easing the work load, strengthened castor wheels, limiting lights and warning flags, allow for adaptation to various working environments.

1.2 Information about the product

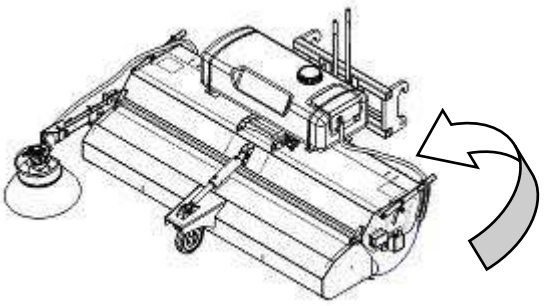
1.2.1 Manufacturer's address

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

1.2.2 Characterisation

The characterisation is found on the type plate

Model	
Serial No.	
Year of Manufacture / Job No.	
Max. operating pressure [bar]	
Max. oil flow [l/min]	
Weight [kg]	



INFORMATION

The overall characterisation (type plate, safety label, etc.) is certified. It may not be changed or rendered illegible and must be replaced if damaged or missing.

1.2.3 Conformity declaration

EG Conformity Declaration

As defined by the EU Directive for Machines 2006/42/EG

Manufacturer:

Tuchel Maschinenbau GmbH

Holsterfeld 15

D-48499 Salzbergen

Herewith declares that the machine described as follows:

Make: **PROFI 660 sweeper**

Type: **1552**

Machine No: .....

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

- Machine Directive 2006/42EG
- EMV Directive 2004/108/EG (electro-magnetic compatibility)

Applied standards and technical specifications:

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

Salzbergen, October 2015

.....

Dieter Beckmann
Managing Director

1.2.4 Information for queries and orders

Should there be a need for a spare parts or accessories order, please provide the type designation, serial no. and the year of manufacture of the PROFI 660 sweeper.

Address: see manufacturer's address

Tel: + 49 (0) 5971-9675-24

Fax: + 49 (0) 5971-9675-45

Internet: http://www.tuchel.com

E-Mail: info@tuchel.com

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

1.2.5 Formal information for operating instructions

Document number: 59000.0315.0000.00.001-01

Date of creation: October 2015

1.2.6 Loading information

Maximum operating pressure for continuous loading 180 bar

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

1.2.7 Connections

Hydraulic connections see following table

• Hydr. drive:	1 x EW
• Hydr. drive: • Dirt collector	1 x DW
• Hydr. drive: • Dirt collector • Side brush	1 x DW
• Hydr. drive: • Dirt collector • Electro hydr. side adjustment	1 x DW
• Hydr. drive: • Dirt collector • Electro hydr. side adjustment • Side brush	1 x DW
• Hydr. drive: • Dirt collector • Electro hydr. side adjustment • Electro hydr. folding side brush	1 x DW

EW= single-action control circuit

DW= double-action control circuit

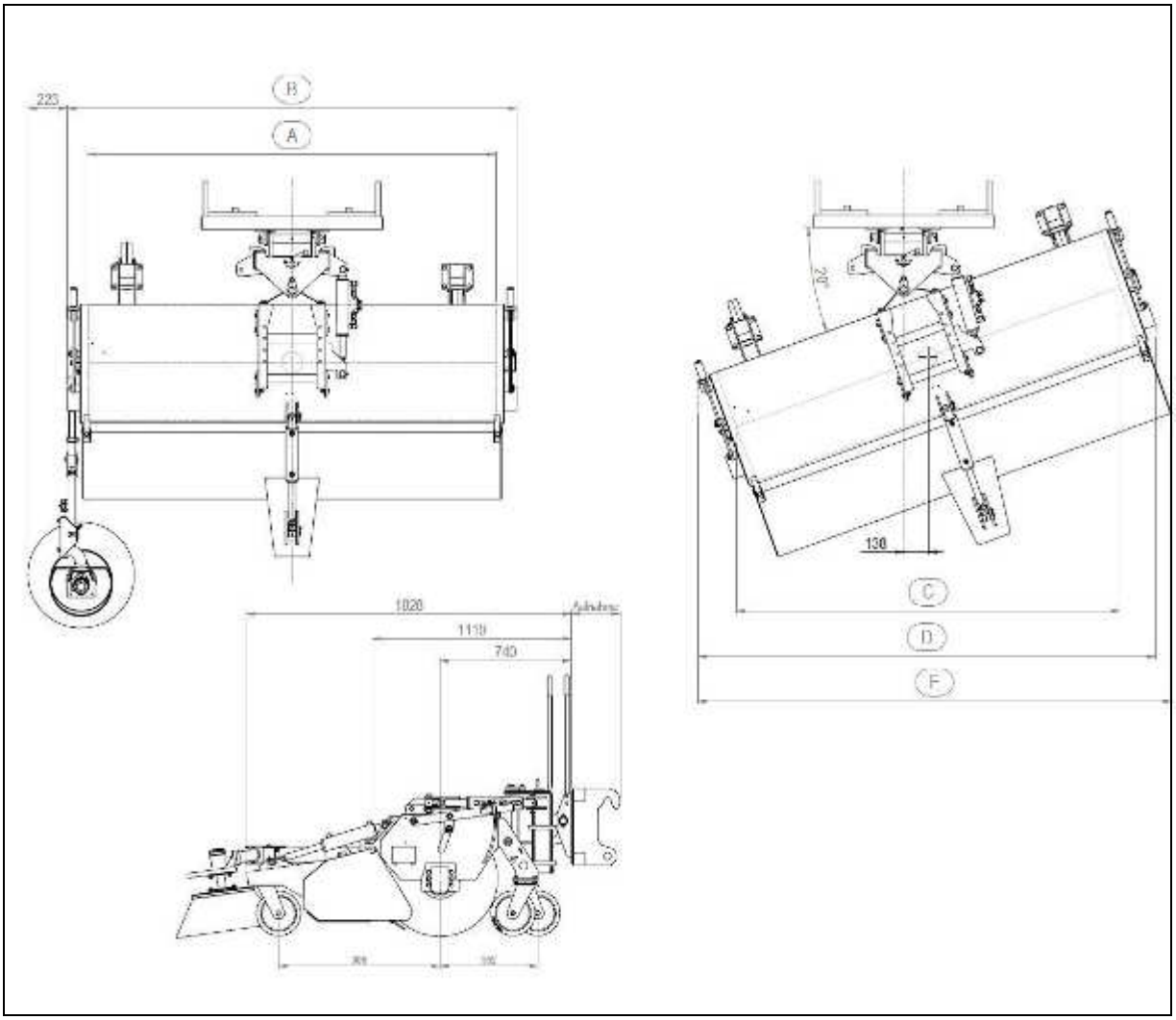
1.2.8 Intended purpose

The PROFI 660 sweeper is a machine that can be set into motion by means of a hydraulic circuit and due to the adaptation to the corresponding carrier vehicle. Its purpose is the cleaning of fixed surfaces with normal soiling.

We, as manufacturer, accept no liability for safety if the machine is used for a purpose other than that described above; the risk for this solely rests with the user.

In addition, the adherence to the servicing and maintenance instructions as well as associated conditions form part of proper usage.

1.2.9 Technical datasheet



Technical data PROFI 660		2.00	2.30	2.60	2.80
A = working width straight	mm	2000	2300	2600	2800
B = overall width straight	mm	2230	2530	2830	2990
C = working width at 20° angle setting	mm	1879	2161	2443	2594
D = overall width at 20° angle setting (without colleting container)	mm	2297	2579	2860	3011
E = overall width at 20° angle setting (with collector)	mm	2386	2668	2949	3100
Weight basic machine	kg	475	498	521	534
Weight basic machine + collector	kg	609	643	677	695
Volume dirt collector	L	315	361	407	431
Ø Roll brush	mm	660	660	660	660
Ø Side sweeper broom	mm	600	600	600	600

2 Safety information

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

Observe all the safety instructions in this operating manual!

Most accidents are caused by not observing simple safety rules.

By observing all the safety instructions of this operating manual, you are contributing to accident prevention.

2.1 Safety-oriented working

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

- To the body and life of third party operators
- To the device
- To other objects

For a safe operation of the sweeper observe

- This operating manual especially
  - The basic safety instructions, the handling-related safety measures and the handling instructions
  - The information on proper use
- The warning instructions on the sweeper
- The national generally applicable regulations for occupational safety, accident prevention and for the protection of the environment
- The national road ordinances for transport movement

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

WARNING

If the machine and sweeper do not possess sufficient traffic and operating safety measures, dangers to persons including squashing, cutting, catching, pulling-in or pushing may occur!

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

2.2 Organisational measures

The operating manual:

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

2.2.1 Obligations of the owner

The owner is obligated:

- To observe the national generally applicable regulations for occupational safety, accident prevention and the protection of the environment
- To only permit persons to use the sweeper who:
  - Are familiar with the fundamental regulations of work safety and accident prevention
  - Are trained in working with the sweeper
  - Have read and understood this operating manual
- Keep all warning instructions with the sweeper in a legible condition
- Renew damaged warning instructions
- Are in possession of personal protective equipment such as:
  - Protective goggles
  - Working gloves according to DIN EN 388
  - Safety shoes
  - Protective suit
  - Skin protection products, etc.

2.2.2 Personal Obligations

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

- To observe the national generally applicable regulations for occupational safety, accident prevention and the protection of the environment
- To read and observe the Chapter "Basic safety instructions" from pages 2-7 of this operating manual
- To read the "Warning information and instructions information" from pages 2-16 of this operating manual and to observe the warning instructions when operating the sweeper
- To familiarise themselves with the sweeper
- To read the chapters of the operating manual, which are important for the implementation of the working duties allocated to them

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

2.2.3 Qualifications of the persons and exercised activities

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

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

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

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

This applies to all servicing.

- Not mentioned in this operating manual
- Those marked in this operating manual with the additional "Workshop work"

Activity \ Persons	Specially trained persons for the activity [1]	Trained person	Persons with special training (specialised workshop) [3]
Loading / transport	X	X	X
Start-up	--	X	X
Adjusting, equipping	--	X	X
Operating:	--	X	X
Cleaning, servicing and maintenance	--	X	X
Error search and repair	--	X	X
Disposal	X	--	--

Legend X..permitted **--**..not permitted

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

[2] Trained persons who have been instructed and trained on their appointed duties and on the possible hazards of incorrect actions and also the required protective equipment and protective measures.

[3] Persons with trade-specific training are seen as specialists. Based on their technical training and the knowledge of the specific conditions, they are in a position to assess the work assigned to them and recognise potential hazards.

Remarks:
One of the criteria for an equal qualification is also several years' experience gained in the respective activity.

2.3 Product safety

2.3.1 Safety-oriented operation of the sweeper

The sweeper may only be operated by a person from the driver's position of the machine when there is nobody in the danger area of the machine. For this reason, take note of the Chapter "Safe working", Page 2-7.

2.3.2 Safety and protective equipment

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

2.3.3 Structural changes

- Structural changes, add-ons or rebuilding of the sweeper may only be carried out with the manufacturer’s written consent.
- The sweeper’s conformity declaration and the CE stamp lose their validity for non-permitted structural changes, add-ons or rebuilding.
- Only use original rebuilding, spare parts or those approved by the manufacturer to:
  - Retain the validity of the sweeper’s conformity declaration and the CE stamp.
  - Ensure the perfect functioning of the sweeper.
- The manufacturer accepts no liability for damage due to:
  - Unilateral changes to the sweeper
  - Non-approved rebuilding and spare parts,
  - Welding or drilling works on load-bearing parts of the sweeper.

2.3.4 Spare and wear parts as well as consumables

Immediately replace equipment parts that are not in perfect condition.

Use only original parts from the manufacturer or parts approved by the manufacturer. When using spare and wear parts from third-party manufacturers, there is no guarantee that they have been designed and produced for the load and safety requirements.

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

2.3.5 Guarantee and liability

Fundamentally our "General condition of sales and delivery" apply. These have been handed to the owner at the latest with the closing of the contract.

Guarantee and liability claims for personal injury and damaged objects are excluded when the following occurs:

- Improper use of the sweeper
- Unprofessional assembly, start-up, operation and servicing of the sweeper
- Operating the sweeper with defective safety equipment or improperly attached or non-functioning safety and protective equipment
- Non-observance of the instructions in the operating manual as regards start-up, use and servicing
- Unilateral structural changes to the sweeper
- Poor monitoring of the component parts subject to wear
- Unprofessional repair jobs
- Catastrophic cases of caused by the impacts of foreign matter or force majeure

2.4 Basic safety instructions

Basic safety instructions:

- Apply fundamentally for the sweeper's safety-oriented operation
- Are summarised in the following sub-chapters

2.4.1 General safety and accident prevention instructions

- Besides the safety instructions of this chapter, also observe the generally applicable national safety and accident prevention instructions!
- Wear your personal protective equipment when working on the sweeper!
- Observe the warning information and instructions affixed to the sweeper. You will obtain important advice for safety-oriented and interruption-free operation of the sweeper!
- Besides the basic safety instructions of this chapter, also observe the handling-referenced safety instructions of the other chapters.
- Alert persons in the neighbourhood as to the sweeper before moving or putting the sweeper into operation! Pay special attention to children!
- Do not allow persons or objects to ride on the machine! The transport of persons or objects on the sweeper is strictly prohibited!
- Arrange your method of driving in such a manner that the machine with the attached sweeper is always under safe control.
- Take your personal capabilities, the track, traffic sight and weather conditions, the driving characterises of the machine as well as the influence of the sweeper into account.

Coupling and uncoupling the sweeper

- Couple and transport the sweeper only with a vehicle that is suited for the purpose!
- Couple the sweeper to the defined equipment according to instructions!

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

  Those present may only be there to give directions next to the vehicles and only to step between the vehicles when stopped.
- During coupling and uncoupling, secure the required support equipment into the support position (stability)!
- When activating the support equipment there is the danger of squashing and cutting!
- Be particularly careful when coupling to or uncoupling the sweeper from the machine! Between the machine and the sweeper there are squashing and cutting points in the region of the couplings!
- Persons are not allowed to be positioned between the machine and sweeper when operating the three-point hydraulics!
- Check the coupled supply lines. Coupled supply lines:
  - Must be able to easily accommodate all movement in curves without stress, kinking or rubbing.
  - Must not rub against other parts!
- Always position the uncoupled sweeper in a stable manner!

Usage of the sweeper

- Before starting work, familiarise yourself with all the equipment and operating elements of the sweeper as well as with their functions. Doing this when working with the machine is too late!
- Wear tight fitting clothing! Loose flowing garments increase the danger of catching or winding on to the drive shafts!
- Only put the sweeper into operation when all protective equipment is attached and in the protective position!
- Note the maximum loading of the sweeper and the permissible axle and support loads of the machine! If possible, drive with only partly filled loading space!
- The presence of persons is prohibited:
  - Within the working / hazard area of the sweeper
  - In the throw-out region of the sweeper
  - In the rotation and swinging areas of movable parts of the sweeper
  - Under raised and unsecured movable parts of the sweeper

- There are squashing and cutting points on external force operated (e.g. hydraulic) moving parts of the sweeper!
- You must only activate external-force operated parts of the sweeper when there is no person present in the hazard area of the sweeper!
- Before leaving the machine, secure the machine against inadvertent starting and rolling!
- Before looking under the raised covers, support raised covers securely!

Transport of the sweeper

- Check the following before transport:
  - The proper connection of the supply lines
  - The hydraulic system for obvious defects
- Always ensure sufficient steering and braking of the machine!

  The sweeper attached to the machine and the rear loads influence the moving ability as well as the steering and braking of the machine.
- Possibly use rear weights!
- Always fix the rear weights to the provided fixing points as indicated in the instructions.
- Take note of the maximum load of the attached sweeper and the permissible axle and support loads of the machine!
- Check the braking before moving! The machine must provide the defined braking delay for the combination machine plus sweeper!
- In curve driving with attached sweeper, take into account the broad extensions and the swing mass of the sweeper.
- Avoid sudden curve driving in the case of uphill, downhill and lateral movement into a slope.
- Before transport movement, place all movable parts of the sweeper into transport setting!
- Before transport movement ensure all movable parts of the sweeper are in transport setting. For this purpose, make use of the transport fixings provided!
- Adapt your movement speed to the existing conditions!

Hydraulic system

The hydraulic system is at high pressure.

- Ensure correct connecting of the hydraulic hose lines!
- When connecting the hydraulic hose lines, ensure that the hydraulic system is de-pressurised!
- Do not block any of the machine's operating levers, which serve for direct implementation of hydraulic or electrical movement of the components, e.g. fold, swinging and pushing processes!

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

  This does not apply to movements of the equipment:
  - That are continuous
  - That are automatically regulated
  - That requires a floating or pressure setting due to their function

- Before working on the hydraulic system:
  - Lower the sweeper
  - Secure raised movable parts of the sweeper against inadvertent sinking
  - De-pressurise the hydraulic system
  - Switch off engine of the machine
  - Pull up the hand brake
  - Remove ignition key
- Have the hydraulic hoses checked at least once a year by an expert for operational safety and condition!
- Replace hydraulic hoses with obvious defects, damage and ageing! Use only original hydraulic hose lines!
- The hydraulic hose lines' period of use may not exceed six years including a possible storage time of, at most, two years!

  Hoses and hose connections are subject to natural ageing even with proper storage and permissible loading; therefore, their storage time and period of use is limited. Deviating from this, the period of use can be determined according to the experience values, especially when taking the danger potential into account. The same guidelines apply for hoses and hydraulic thermoplastic hose lines.
- Never attempt to seal leaking hydraulic hose lines with hands or fingers!

  Because of the high pressure, exiting fluids (hydraulic oil) can penetrate the skin into the body and cause serious damage!

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

2.4.2 Sweeper

- Only one person may operate the sweeper! Alert people present in the sweeper's hazard zone!
- The following is prohibited:
  - Climbing onto the upper container edge of the collector,
  - Climbing or holding onto the connecting container while the motor is running!
- The presence inside the working area is prohibited!

  There is a danger of objects being flung out of the exit opening.
- Before operating the sweeper warn people to stay out of the sweeper's working area!
- Do not place objects on the collector!

2.4.3 Cleaning, servicing and maintenance

- Carry out the defined works for cleaning, servicing and maintenance at the proper times.
- Secure the machine and sweeper against inadvertent starting and rolling before the sweeper is cleaned, serviced or maintained!
- Existing mechanical or hydraulic electronic remainder energies may cause inadvertent movement of the sweeper.

  When servicing and conducting maintenance, the presence of remaining energies in the sweeper should be taken into account. Warning instructions characterise components with remainder energies. Detailed instructions are found in the respective chapters of this operating manual.
- Secure all operating media, such as hydraulic oil against inadvertent starting.
- Carefully fasten and secure larger components to the lifting bar before replacement.
- Regularly check proper seating of bolts and nuts! Pull up loosened bolts and nuts!
- Before the sweeper is cleaned, serviced or maintained, secure the lifted sweeper or lifted parts of the sweeper against inadvertent dropping!
- When replacing working tools with cutters use suitable tools and gloves!
- Check loosened bolt connections for tight seating. Check the function of safety and protective equipment after completing maintenance works.
- Dispose oils, greases and filters in a proper manner!
- Properly handle and dispose substances and materials for cleaning the machine in a proper manner, especially:
  - When working with lubricating systems and installations
  - When cleaning with solvents
- Disconnect the machines lighting and battery cable before carrying out electrical welding works on the machine and the attached sweeper!
- Spare parts must minimally satisfy the defined technical requirements of the manufacturer! This is assured through the usage of original parts!
- Note the service intervals for wearing parts!

2.5 Action-related safety instructions and important information

The operating manual contains action-related safety instructions and important information. The purpose of symbol words and symbols is to make action-related instructions and important safety information noticeable at a glance.

2.5.1 Action-related safety instructions

Action-related safety instructions:

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

DANGER 	**DANGER** **Characterises an immediate danger with high risk that can cause very serious injury (loss of limbs or long term injury) or may be fatal if not avoided.** **With the non-observance of the safety instructions marked with "DANGER" there is the possibility of very serious injury, which can be fatal.**

WARNING 	**WARNING** **Characterises possible hazards with medium risk of serious injuries or fatality when they are not avoided.** **With the non-observance of the safety instructions marked with "WARNING" there is the possibility of very serious injury possibly resulting in death.**

CAUTION! 	**CAUTION!** **Characterises possible hazards with little risk of light or medium injuries or damage to objects if not avoided.** **With the non-observance of the safety instructions marked with "CAUTION" there is the possibility of light or medium injuries or damage to goods.**

2.6 Warning instructions and instructions

The following instructions are affixed to the sweeper:

- Warning instructions characterise the sweeper's danger points and warns of dangers, which may occur in a particular situation or in connection with certain behaviour.
- Instructions contain information of the sweeper's proper handling.

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

2.6.1 Warning instructions

A warning instructions consists of 2 pictograms:

(1) Pictogram for describing the danger

The pictogram shows the pictured description of the danger surrounded by a triangular safety symbol

(2) Pictogram for avoiding the danger

The pictogram shows the pictured description of avoiding the danger.

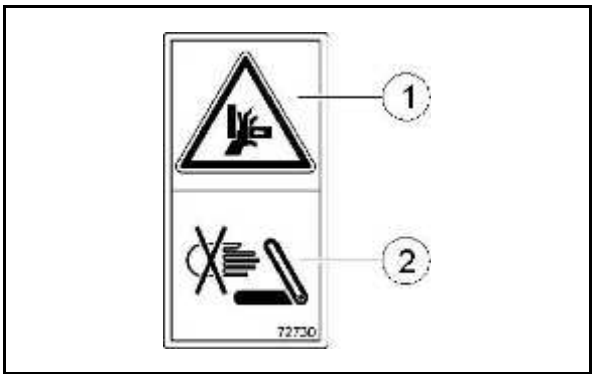


Fig. 2.1

Explanation of the warning instructions

The following list contains:

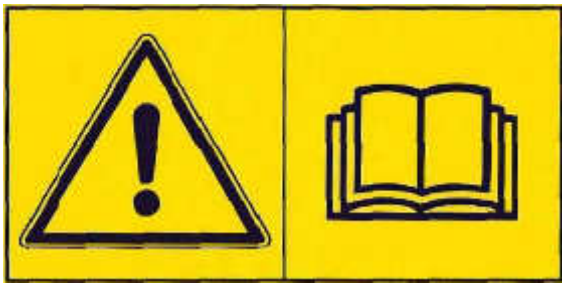
- In the right column, all the warning instructions on the sweeper
- In the left column, the following information on the warning instructions on the right:

1. The order number.
2. The description of the danger, e.g. "Danger of squashing of a finger or hand caused by accessible, movable pars of the sweeper!"
3. The consequences of a non-observance of the instruction(s) in avoiding a danger, e.g. "This danger can cause serious injury with loss of limbs."
4. The instruction(s) for avoiding dangers, e.g. "Never reach into the ganger point as long as the engine of the machine is running with connected hydraulic system. Warn persons out of the hazard area of the sweeper before moving parts of the sweeper."

Order number and explanation	Warning instructions

40000340

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



40000342

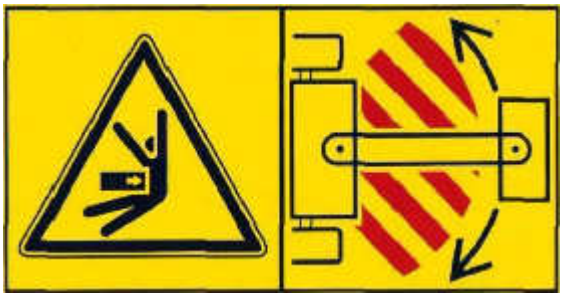
Keep well away when lowering the machine!

- Warn persons and animals to stay away from the danger area.
- Wait for the complete stopping of all movable parts of the sweeper before reaching into the points of danger.

40000343

Do not enter the swinging area during operation!

- Warn persons and animals to stay away from the hazard area.
- Wait for the complete stopping of all movable parts of the sweeper before reaching into the danger point.



40000338

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

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

- Never reach into the points of danger as long as the engine is running with connected hydraulic system.
- Wait for the complete stopping of all the sweeper's movable parts before reaching into the points of danger.

3 Product description

This chapter contains:

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

Read this chapter possibly directly at the sweeper. This is the best way to become familiar with the sweeper.

3.1 Overview - components

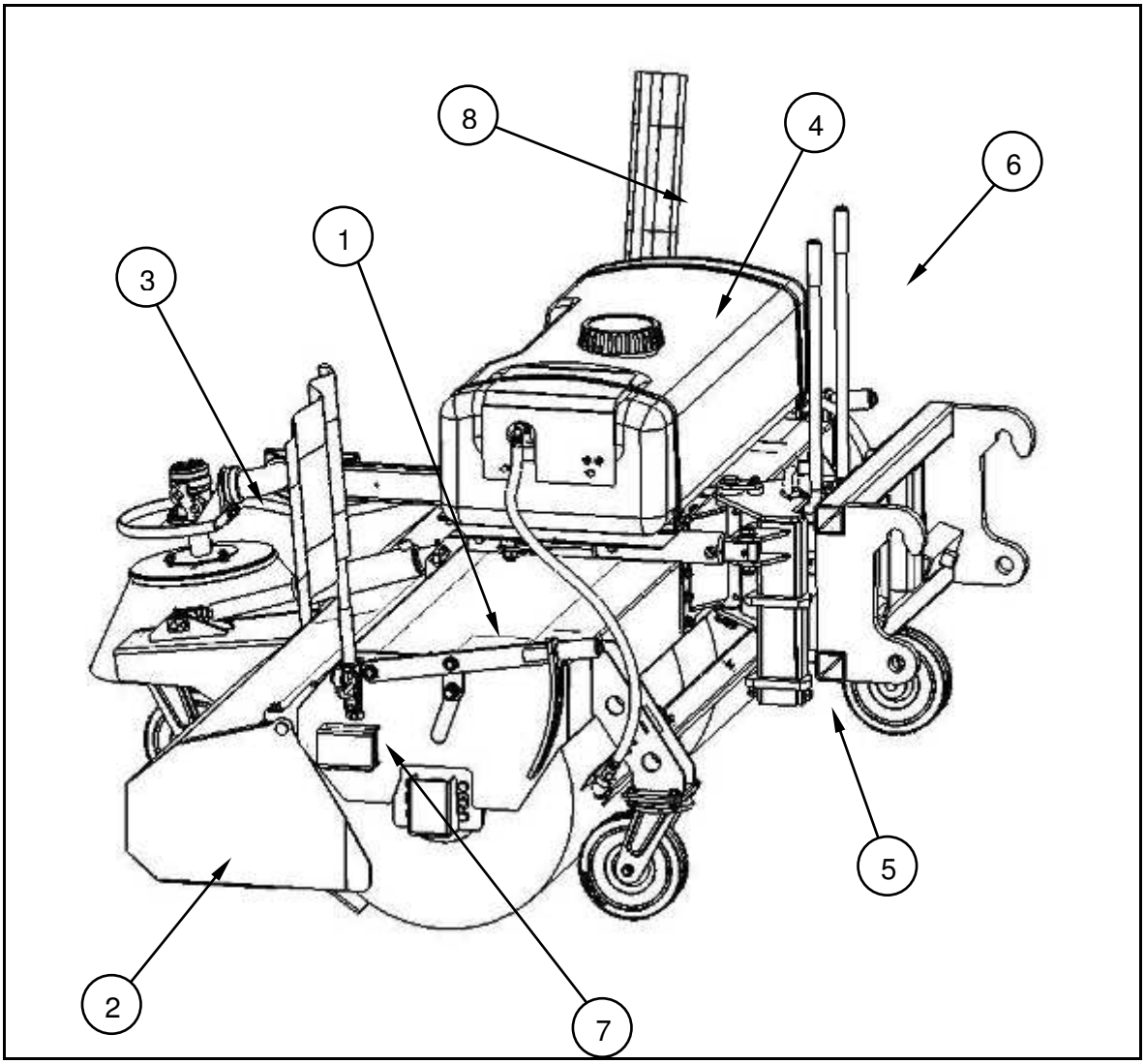


Fig. 3.1

1) Sweeper frame
2) Dirt collector
3) Side brush
4) Water tank with sprayer
5) Swinging unit with arrangement of roller floating tunnel
6) Height display
7) Side marker lamps (acc. German Road Traffic Licensing Regulations)
8) Warning flags

3.1.1 Description of product and accessories

- The PROFI 660 sweeper permits collecting as well as free-sweeping operation. The free-sweeping occurs without disassembly of the collector.
- The frame consists of a robust and distortion-free welded structure.
- The turning roll is freely suspended in the frame with a lever system. The brush setting occurs by means of a spacing bar. By means of the lever action, the sweeper roller, when required, is adjusted via the ratchet lever and thus ensures an even, good sweeping result.
- An internal powerful hydraulic motor with a skirting protection drives the sweeper roller directly. The revolutions of the sweeper roller are dependent on the oil flow and the equipment of the carrier vehicle.
- The sweeper roller is provided as standard with 100% PP-Beeline brush rings. The brush rings have a diameter of 660 mm.
- The opening and closing of the collector occurs by operating a hydraulic cylinder. The controls are operated from the carrier vehicle. The wear-resistant Vulkollan lip is attached to the lower edge of the dirt collector over the whole length in order to guide the collector edge evenly and without damage above the ground.
- The PROFI 660 sweeper is suitably equipped for the respective carrier vehicle with a direct attachment possibility. With the direct attachment the add-on variant (quick hitch, three-point attachment) is fastened to the machine frame with a support roller carrier.
- The support roller carrier of the add-on variant is used in the guidance of the arrangement of roller floating tunnel for running and level compensation use even for coarse ground unevenness.
- With the aid of the mechanical or hydraulic side adjustments it is possible to swing the PROFI 660 sweeper 20° to the right or the left.

3.2 Add-on parts

- **Water spray system:**
  For settling the dust with 200 litre water tank and 12 V (24 V) run-dry pump.
- **Hydr. side adjustment:**
  Slant setting the PROFI 660 sweeper by means of a hydraulic cylinder. A double-acting h control circuit is needed and the carrier vehicle.
- **Hydr. side brush**
  Kerb-side sweeping with rotation regulation.
- **StVZO equipment**
  Consisting of warning flags and/or side marker lamps. Both are prescribed and to be used in public road traffic according to the regulations of the StVZO.
- **Dirt collector:**
  With integrated 3rd support wheel, hydraulic emptying occurs via 1 cylinder with shut-off cock for free-sweeping (disassembly of the collector is not necessary).

3.2.1 Sweeper roller

The brush diameter is 660 mm.

With brush rings or as sweeper roller.

Optimised sweeping angle

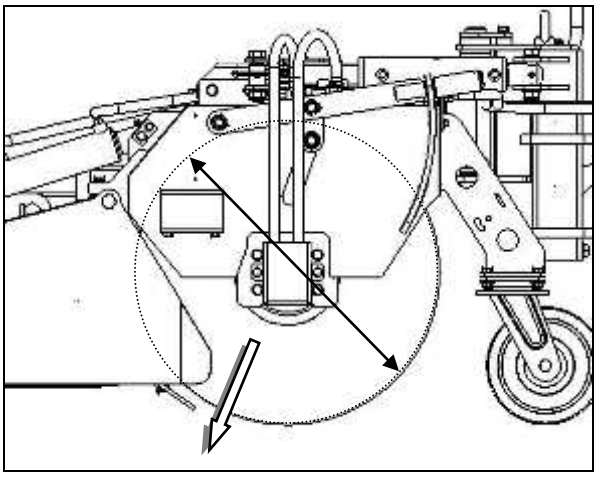


Fig. 3.2

3.2.2 Castor wheels

The size of the castor wheels in 250 x 60 mm

Optional also 250 x 80 mm.

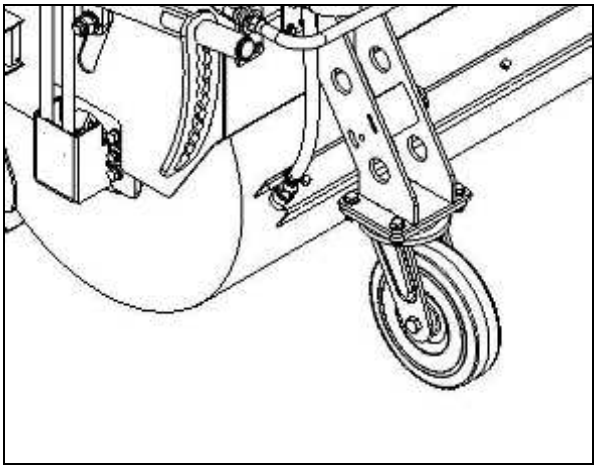


Fig. 3.3

3.2.3 Inclination

The inclination occurs via a double-acting hydraulic cylinder or by means of mechanical inclination.

The PROFI 660 sweeper machine can thus be swung 20° to the left or right.

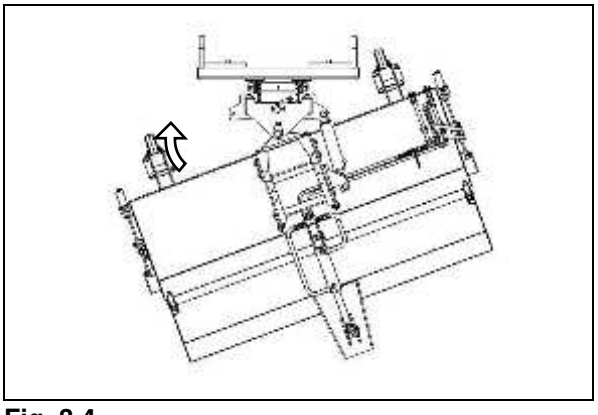


Fig. 3.4

3.2.4 Arrangement of roller floating tunnel

The NUTR 40 arrangement of roller floating tunnel makes a height compensation of +/- 100 mm.

Pendular compensation = 20°

Level compensation = +/- 5°

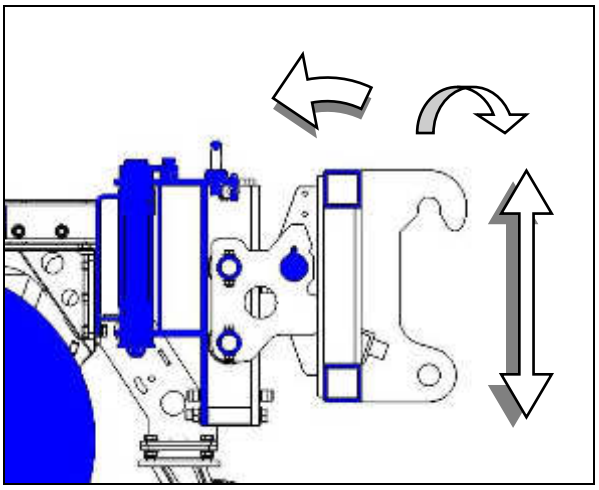


Fig. 3.5

3.2.5 StVZO equipment

StVZO equipment 12 or 24 Volts

Warning flag holders and/or side marker lamps with LED illumination.

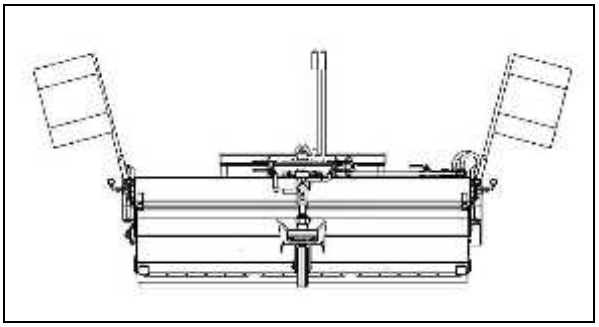


Fig. 3.6

3.2.6 Water spraying system

With 200 litre tank.

Water pump (12 or 24 Volts).

Spray jets also for side brushes.

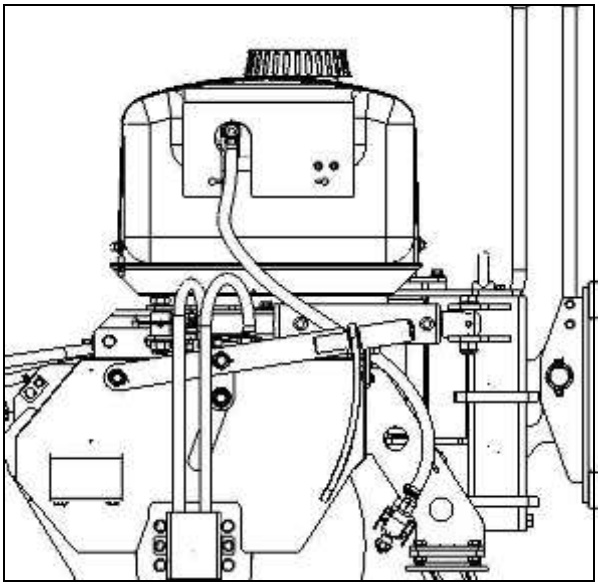


Fig. 3.7

4 Coupling and uncoupling the sweeper

- When coupling and uncoupling the sweeper also take note of the Chapter "Safety-oriented working" page 2-7.
- With each coupling and uncoupling check the sweeper for obvious defects. Take note of the Chapter "Obligations of the owner" page 2-8

WARNING

Danger of squashing and pushing of persons in the lifting region of the three-point hydraulics of the machine when coupling and uncoupling the sweeper!

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

- Only from the defined working place
- Never when persons are present in the areas of danger between the machine and sweeper.
- Never when you are in the hazard area between the machine and the sweeper.

WARNING

Danger of squashing and pushing of persons may occur if the machine and sweeper inadvertently starts or rolls during coupling and uncoupling!

Ensure that the machine is protected against inadvertent starting and rolling before entering the hazard area between machine and sweeper for coupling and uncoupling. See Page 2-4.

4.1 First installation

In the first installation of the water spray system or lighting equipment on the PROFI 660 sweeper, it is necessary to install the switchbox in a suitable position in the carrier vehicle

- Insert plug (1) into the dashboard socket or connect directly to the battery.
- Socket (2) for electrical connecting line of the PROFI 660 sweeper.
- Fuse (3)
- On / Off switch (4)

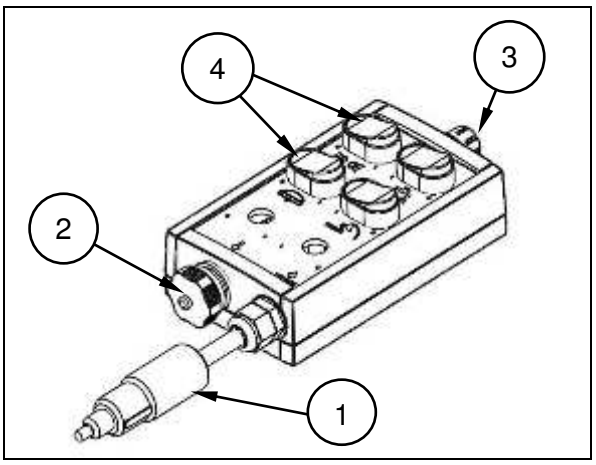


Fig. 4.1

4.2 Attachment of PROFI 660 sweeper

WARNING

Danger of squashing and pushing of persons can occur if persons are present between machine and sweeper during coupling and uncoupling!

Warn persons out of the danger area between machine and sweeper before moving to the sweeper.

Those present may only be present to give directions next to the vehicles and only when stopped allowed to step between the vehicles.

WARNING

Danger of failure of the energy supply between machine and sweeper may occur due to damaged supply lines!

Take care of the run of the supply lines when coupling the lines. The supply lines:

- Should easily absorb all movements without stress, kinking or rubbing,
- Must not rub against other parts.

WARNING

Danger of squashing, pulling-in, catching and pushing for persons may occur if the sweeper inadvertently separates from the machine!

- Note the maximum permissible support, towing and axle loads of the machine.
- Make proper use of the provided equipment for connecting machine and sweeper.
- Before moving with the coupled sweeper, check whether the quick-acting unit is correctly locked by the four-point attachment frame.

4.2.1 Quick hitch attachment

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

- Move carrier vehicle up to 300 mm to the PROFI 660 sweeper.
- Lower the locating bolts of the carrier vehicle under the locating opening (1) of the PROFI 660 sweeper
- Move carrier vehicle nearer and raise lifting frame.
- Feed locking pins into the holes (2).

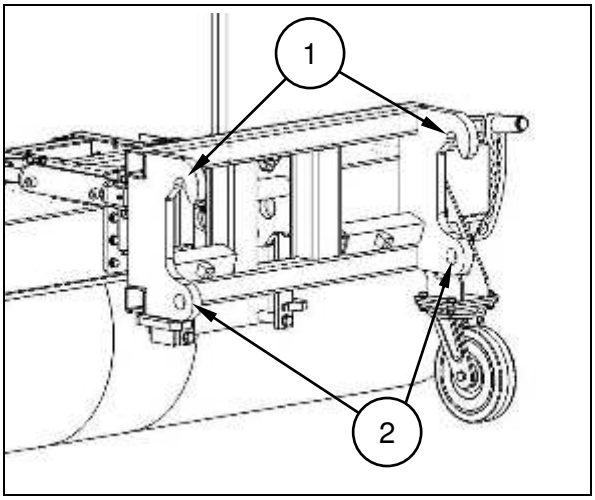


Fig. 4.2

- Connect hydraulic lines according to the instructions of the vehicle manufacturer.
- Connect electric lines for water spraying system or lighting to the switchbox in the carrier vehicle.
- Raise sweeper and carry out function test.

4.2.2 Three-point linkage

- The safety regulations from chapter 4.2 apply.
- Undertake work on the sweeper only with motor switched off and de-pressurised hydraulics. Take out ignition key, secure carrier vehicle against inadvertent starting up and rolling.
- Check three-point linkage for dirt and clean if necessary.

- Move carrier vehicle up to 300 mm to the PROFI 660 sweeper.
- Mount pin diameter (1) or (2) according to the mounting category of the vehicle manufacturer and secure with spring cotter pin (3).
- Mount upper link and secure according to the instructions of the manufacturer.

➔ ***The setting of the upper link is to be undertaken such that the sweeper is vertical to the ground.***

➔ ***Check correct positioning of the sweeper.***

- Connect hydraulic lines according to the instructions of the vehicle manufacturer.
- Connect electrical lines for water spraying system or lighting to the switchbox in the carrier vehicle.
- Raise sweeper and carry out function test

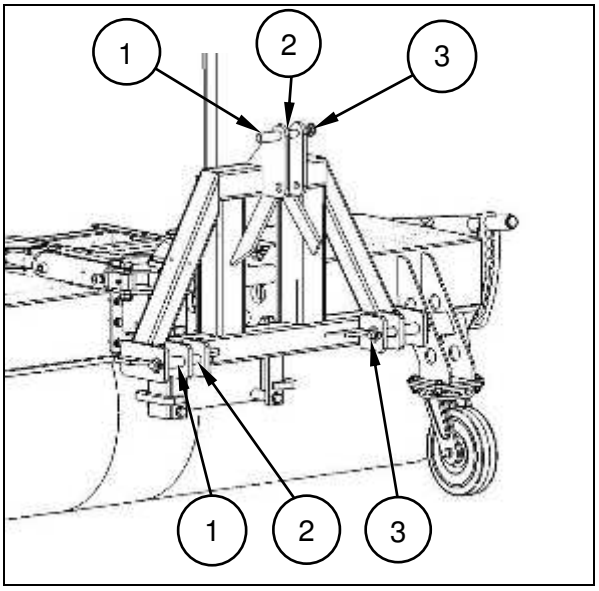


Fig. 4.3

4.2.3 Fork tines attachment

	• The safety regulations from chapter 4.2 apply. • Check fork tines attachments and fork tines for dirt and clean if necessary.

- Set distance (1) of the fork tines before moving into the carrier vehicle!
- Locking hooks must point to the ground (2).
- Push fork tines into the take-up (3).
- Carry out steps (arrows) 4-7 Insert locking hooks (Fig 4.5).

  ➔ ***The lever ratchets into the hole (Click).***

- Adapt distance (8) between fork tines and lock by displacing the screwing (9).
- In addition, the fork tines are to be secured by means of a chain (10).
- Lead the chain tightly about the slide of the carrier vehicle and secure with the snap hook (11).

  ➔ ***Check correct locking of the safety catch behind the fork tines. Ensure a tight seat of the chain.***

- Connect hydraulic lines according to the instructions of the vehicle manufacturer.
- Connect electrical lines for water spraying system or lighting to the switchbox in the carrier vehicle.
- Raise sweeper and carry out function test.

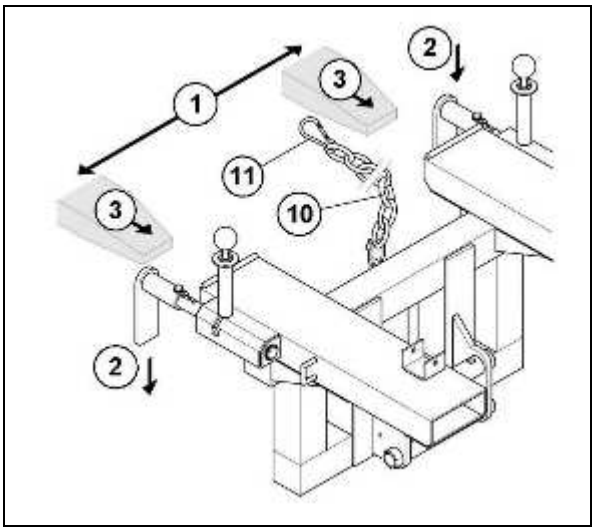


Fig. 4.4

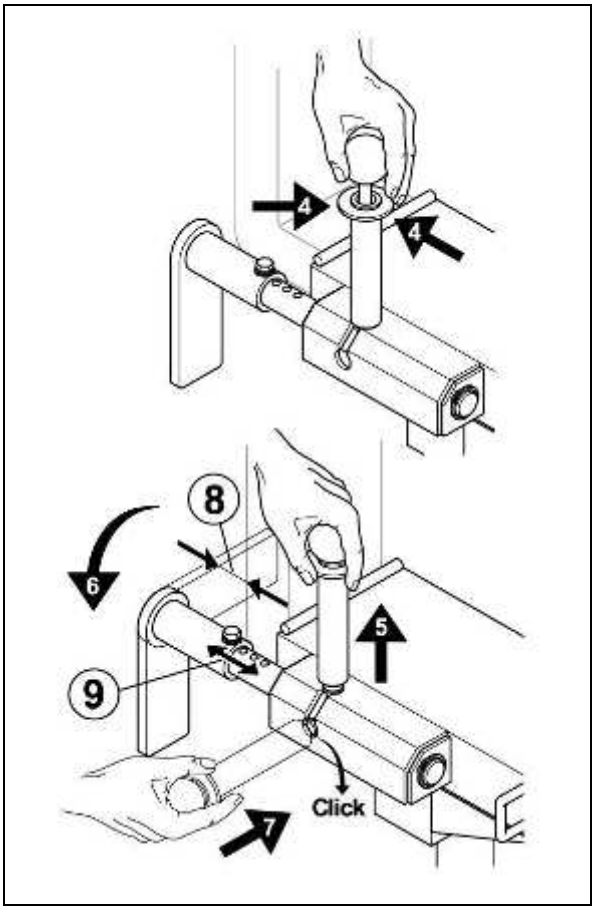


Fig. 4.5

4.3 Operation

	• The safety regulations from chapter 4.2 apply.

4.3.1 Transport

	• Observe safety regulations from Chapter 2.3.

➔ ***Carry out transport only with empty dirt collector.***

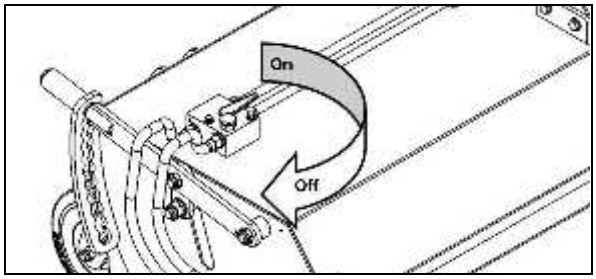


Fig. 4.6

- Close stopcock to hydraulic motor of the side brush (Fig 4.6) as well as hydraulic cylinder of the collector (Fig 4.7).

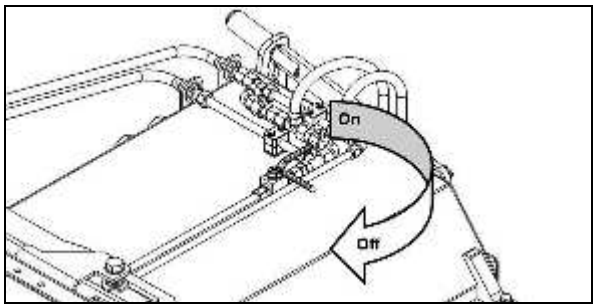


Fig. 4.7

- Swing side brush (Fig 4.8) upwards and secure (1).
- Set machine straight (see Chapter 4.3.7).

Transport with attached sweeper

- Raise PROFI 660 sweeper and secure the operating lever of the sweeper in the carrier vehicle against inadvertent activation.

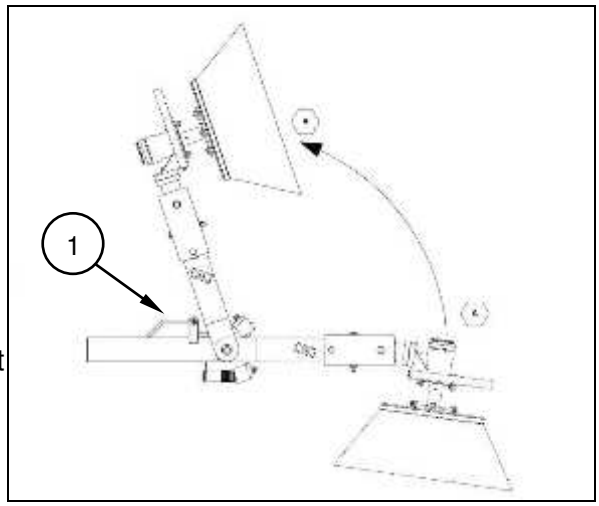


Fig. 4.8

4.3.2 Start-up

	• The safety regulations from chapter 4.2 apply.

- With free-sweeping PROFI 660 sweeper, place the two supports (Fig 4.9) upwards and secure with tommy screw.

- **Maximum moving or sweeping speed is 6 km/h.**

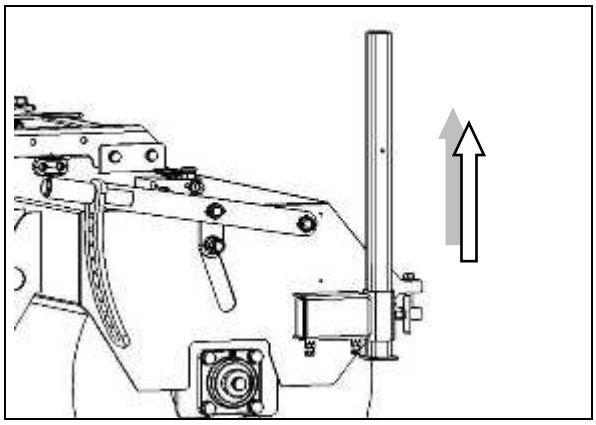


Fig. 4.9

- Open stopcock to the hydraulic motor of the side brush (Fig. 4.10) as well as hydraulic cylinder of the collection container (Fig. 4.11).

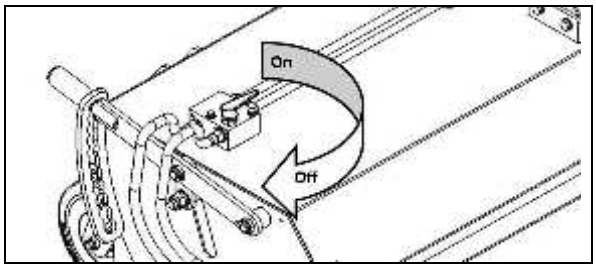


Fig. 4.10

- In the operation of the sweeper there is a swept width of 6 to 10 cm. (see Chapter 4.3.8 for setting swept width).
- Run hydraulic hoses and electric cables without danger of squashing (see Chapter 3.2).

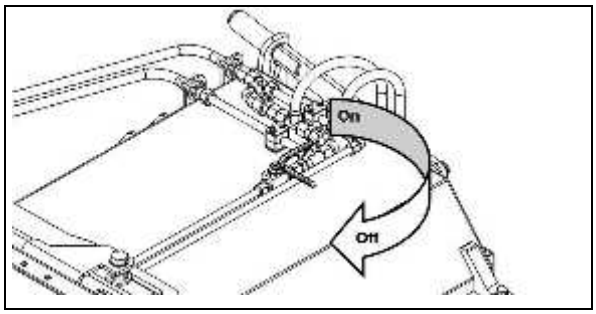


Fig. 4.11

Swinging side brushes into working position

- Pull lever (2) out of the arrest position (3) then swing side brush from B to A (as shown in the picture at the side).

  ➔ ***Note the inherent weight of the side brush!***

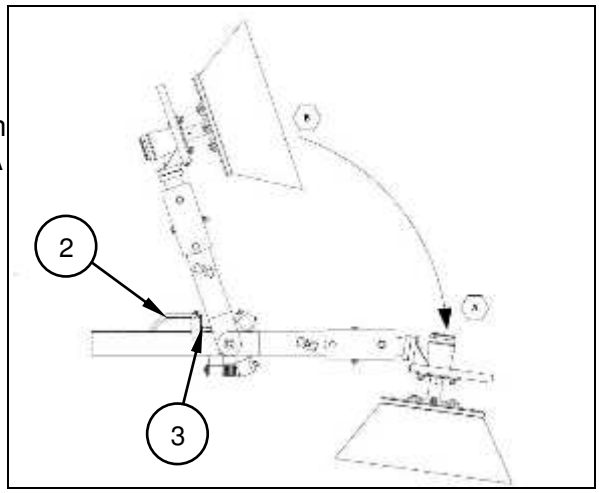


Fig. 4.12

Position of the sweeper when in use in front of the carrier vehicle.

- Lower sweeper until the two or three swinging rolls (4) make contact with the ground.
- The take up arrangement must be vertical to the ground. (Take-up arrangement plumb to the ground in the roll direction).

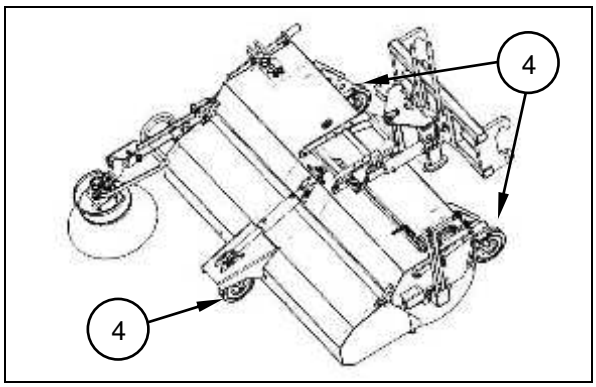


Fig. 4.13

- Raise or lower the device carrier of the vehicle until the attachment take-up (5) with the support roll carrier is situated in the middle of the roll guide (6). Height display with the green caps (7) are at the same height (= 0).
- Once again check that the height display of the take-up and the height display of the swinging part are at the same angle (= 0) to each other (better seen from the sweeper side), possibly swing device carrier in or out.

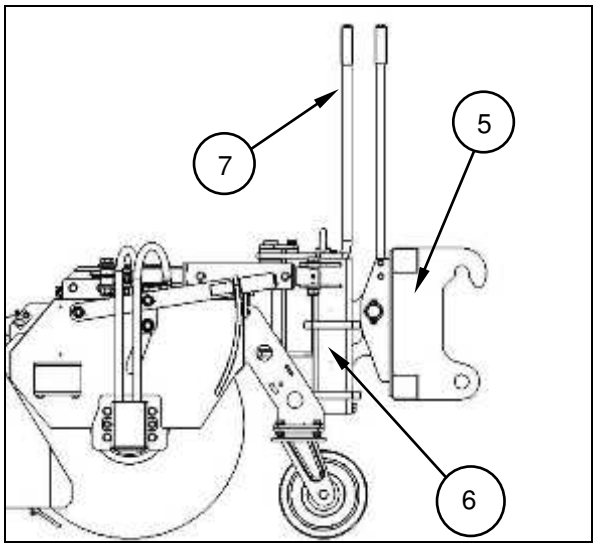


Fig. 4.14

4.3.3 Set / adjust side brush

	• The safety regulations from chapter 4.2 apply.

➔ ***Take the inherent weight of the side brush into account when adjusting.***

- The outrider (1) lies on the pin (2) when the sweeper is 3 - 6 cm above the ground.
- Adjustment possibilities: Remove the splint (3), pull the pin (2) out and remove some distance sheets (4). In this wide the side brush is moved downwards.

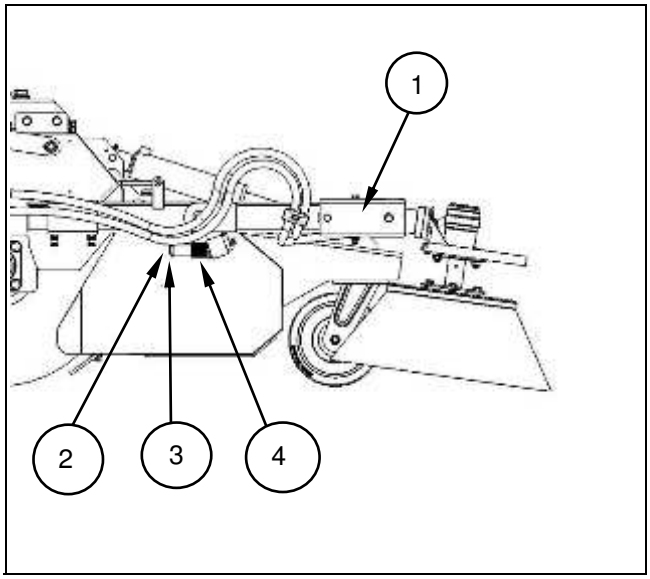


Fig. 4.15

Adapt working width

- Loosen bolt connection (5) and adjust side brush in the region of the slot.
- Move the bolt connection (6) from the stop.

  The side brush changes the position further inwards or outwards (7).

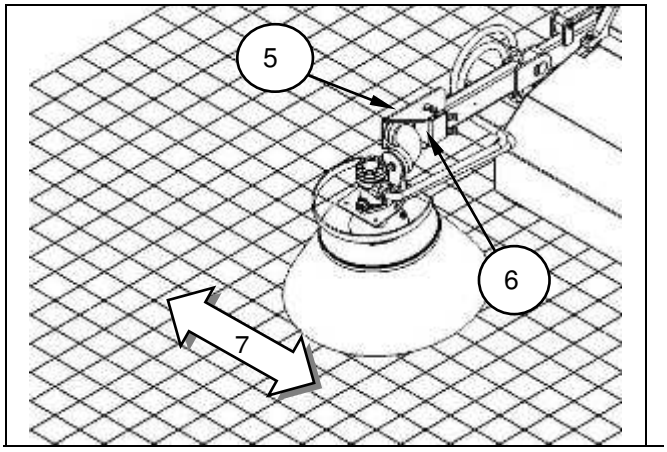


Fig. 4.16

Side brush - adjusting contact point

- The side brush should sweep the side edge in clockwise region from 12 - 3 o'clock (see curve (7)).
- Move clamping plates (8). Slope (9) is moved.
- Move clamping plates (10). Angle of attack (11) is set.
- Carry out function test.

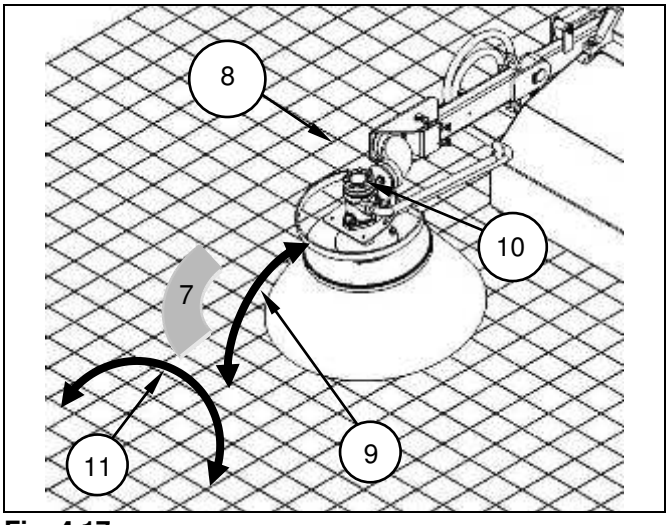


Fig. 4.17

➔ ***Check all bolt connections for tight seating.***

4.3.4 Speed setting

- The safety regulations from chapter 4.2 apply.

Brush shaft

With sweepers with direct access to the hydraulic motor, the adjustment of the speed occurs through the oil performance of the carrier vehicle. This is dependent on the type of carrier vehicle and its equipment.

The adjustment of the roll brush of the PROFI 660 sweeper with a 3-way current regulation valve and sweeping brush servo control occurs at the set-screw (1) of the current regulating valve (2).

(In clockwise direction = acceleration, counter-clockwise direction = deceleration).

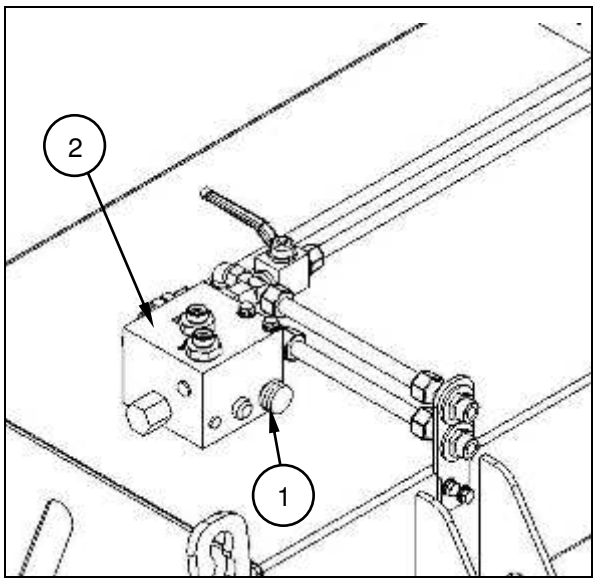


Fig. 4.18

Side brush

The speed setting of the side brush occurs at the set screw (3) of the control unit - side brush (4).

(In clockwise direction = acceleration, counter-clockwise direction = deceleration).

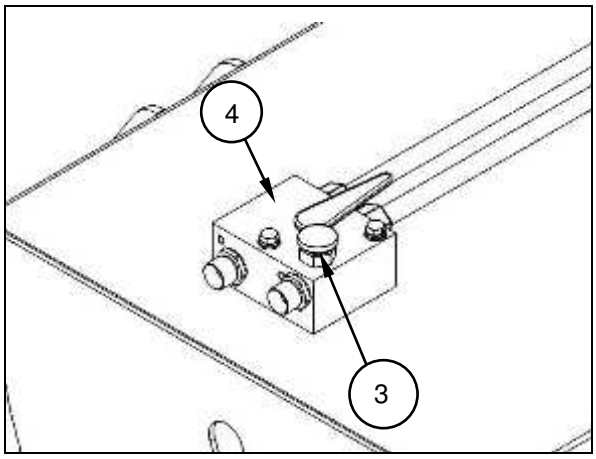


Fig. 4.19

4.3.5 Emptying the dirt collector

	• The safety regulations from chapter 4.2 apply.

The opening of the dirt collector occurs through the hydraulic cylinder (1). The stopcock (2) for the emptying must be opened.

- The inside of the dirt collector (3) contains an oscillating filling height flap. This filling height flap serves for enlarging the sweeping goods volume. When emptying the dirt collector this filling height flap oscillates out of the emptying region.
- Raise the PROFI 660 sweeper.

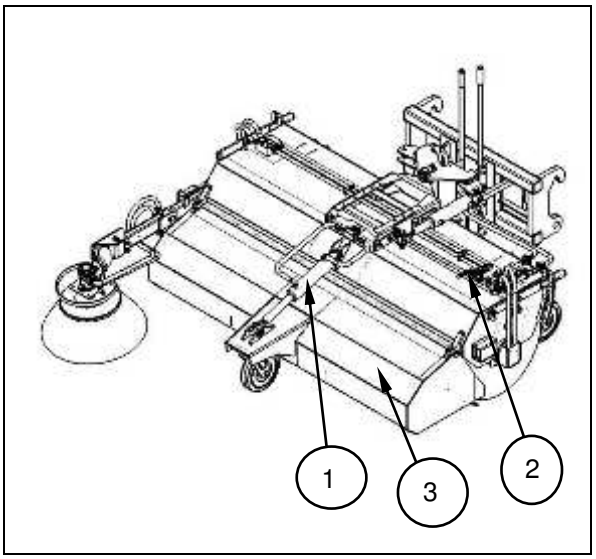


Fig. 4.20

➔ ***When emptying, no one should be under the machine.***

- Turn the control lever for the sweeper hydraulics in the carrier vehicle. The flow direction is changed and the collector is opened.

➔ ***Open the collector ONLY in the raised position.***

- Close the collector by turning the abovementioned control lever in the carrier vehicle.

➔ ***Close the collector ONLY in the raised position.***

- In the case of wet swept goods, it makes sense to shortly activate the control lever several times to simplify emptying.

4.3.6 Free-sweeping

	• The safety regulations from chapter 4.2 apply.

- Raise PROFI 660 sweeper and keep close to ground.
- Turn the corresponding control lever for the sweeper hydraulics in the carrier vehicle. The direction of flow is changed. Open dirt collector (3) completely.
- Lower the PROFI 660 sweeper until all the steering rolls make contact with the ground and the sweeper is situated horizontally to the ground to be cleaned.

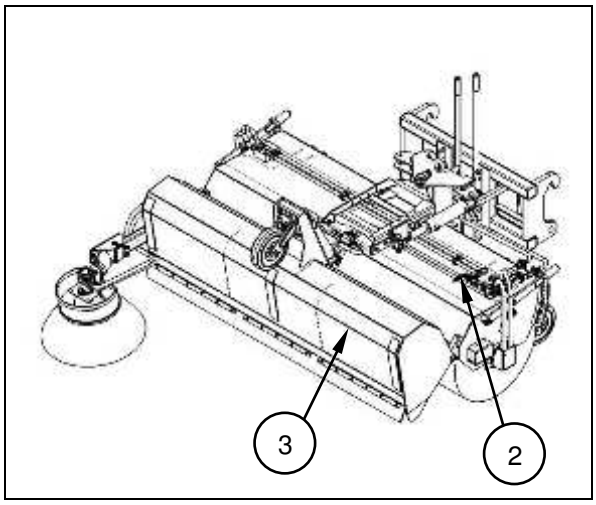


Fig. 4.21

- Close supply line to the hydraulic cylinder of the collector. The stopcock (2) points to the middle of the sweeper.
- Arrest the opened collector by turning the control lever (remains open).

➔ ***When operating, position the sweeper in front of the carrier vehicle, see Chapter 4.3.2 Start-up!***

4.3.7 Lateral adjustment for free-sweeping operation

	• The safety regulations from chapter 4.2 apply.

In the application of the PROFI 660 sweeper as free-sweeping, a lateral setting to the edge of the road is to be undertaken (sweeping angle / sweeping goods to the left or right).

Mechanical lateral adjustment

The lateral setting occurs via the adjusting bar (1) at the hinge point of the sweeper.

- Raise machine slightly.
- Switch engine off and remove ignition key.
- Ensure the carrier vehicle against inadvertent start-up.

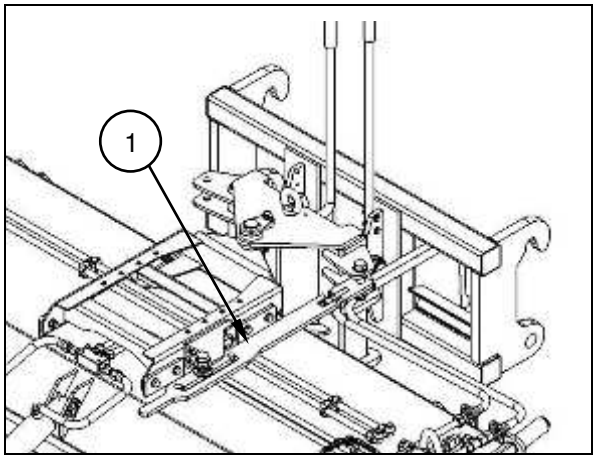


Fig. 4.22

- Raise the adjusting bar (1) and then turn the sweeper to the left or the right, the desired sweeping angle is achieved by turning the machine about the swivel point.
- When the sweeping angle is set, the adjusting bar (1) latches into the provided hole.

Hydraulic lateral adjustment

The lateral adjustment occurs via the hydraulic cylinder (2) between the swing console and the sweeper frame.

- Raise machine slightly.
- Activate the control lever for the second double-acting control circuit. The sweeper swings to the right or the left.

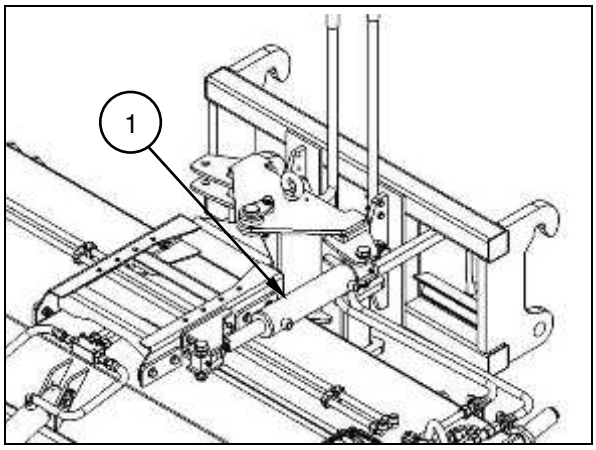


Fig. 4.23

4.3.8 Adjust the sweeping width

	• The safety regulations from chapter 4.2 apply.

During the PROFI 660 sweeper's operation, there should be a swept width of a = 6 - 10 cm width (when raising the sweeper, the width of the swept surface should be 6 - 10 cm).

➔ ***Check swept width on level ground.***

If there is not sufficient width or if the pressure on the ground is too low, then the hanging of the roll brush must be adjusted evenly on both sides by means of the latch lever system.

➔ ***Note the inherent weight of the roll brush!!***

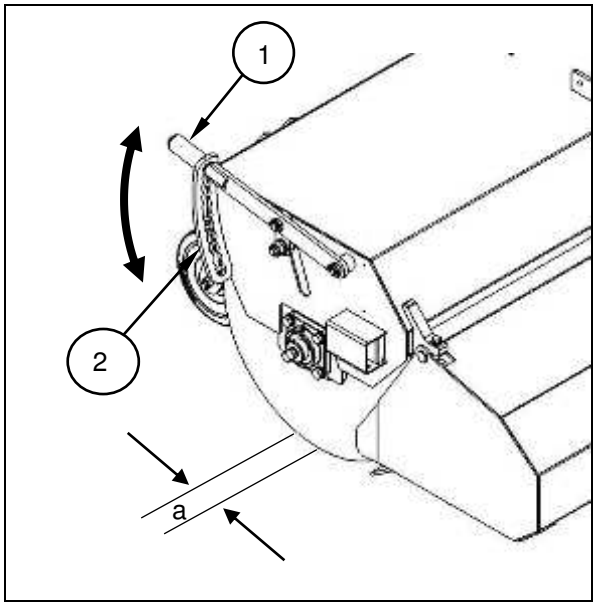


Fig. 4.24

➔ ***Note twist and kink-free run of the hydraulic hose lines.***

- Raise sweeper and keep close to ground.
- Pull ratchet lever (1) of the ratchet adjustment to the rear.
- Latch the ratchet level into the desired position at the adjusting catch (2).
- Carry out the ratchet adjustment of the roll brush evenly on both sides.
- Check swept width a = 6 - 10 cm width.

4.4 Disassembly

- The safety regulations from chapter 4.2 apply.
- Undertake work on the sweeper only with motor switched off and de-pressurised hydraulics. Take out ignition key, secure carrier vehicle against inadvertent starting up and rolling.
- Place sweeper on a solid and even ground as well as on a dry and clean place. Secure against rolling away.
- Danger of accident! Make certain of the safe positioning of the PROFI 660 sweeper.

➔ ***If the PROFI 660 sweeper is not being directly further used, then after disassembly also the storage point (Chapter 4.5) must be taken into account.***

- Lower sweeper until the castor wheels make contact with the ground. The castor wheels face the carrier vehicle.
- Disassemble the sweeper with closed collecting and empty container.
- Close stopcock for the hydraulic cylinder of the collector (1).
- Close stopcock to the hydraulic motor of the side brush (2). Swing side brush upwards and secure (see Chapter 4.3.1 Transport).

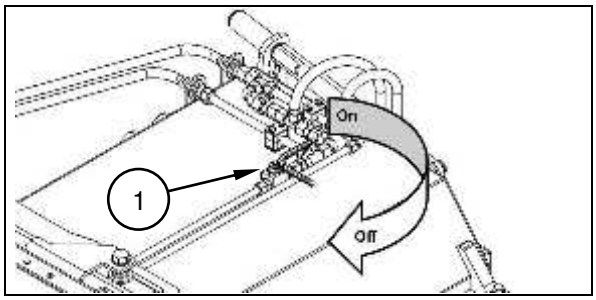


Fig. 4.25

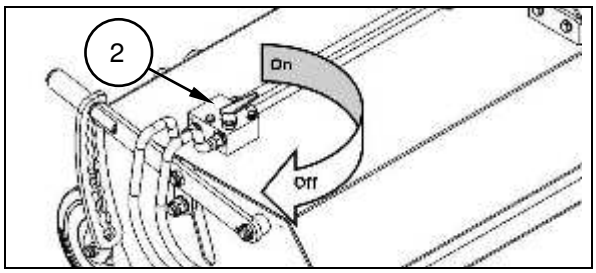


Fig. 4.26

- With the free-sweeping PROFI 660 sweeper, place the two supports (3) downwards and secure with tommy screw.
- Release the hydraulic hose lines and electric lines at the vehicle.

  ➔ ***Close hydraulic plug connection with dust covers. Soiling leads to damage of the hydraulic system.***

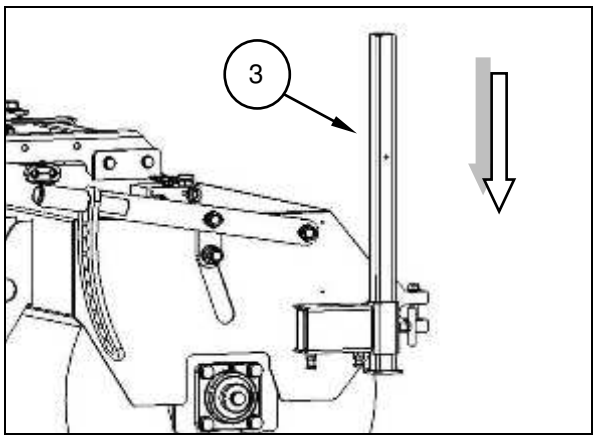


Fig. 4.27

- Danger of accident! Do not place hydraulic hoses and electric lines on the ground, they can be stumbled over. Place the hoses and lines over the PROFI 660 sweeper.

4.4.1 Quick hitch attachment

	The safety regulations from chapter 4.2 apply.

- Loosen the hydraulic lock (4) of the take-up by activating the corresponding control lever in the carrier vehicle.
- Loosen the mechanical lock (4) of the take-up by removing the corresponding safety pins.
- Lower the lifting frame until the take-up pins are situated below the take-up opening (5).

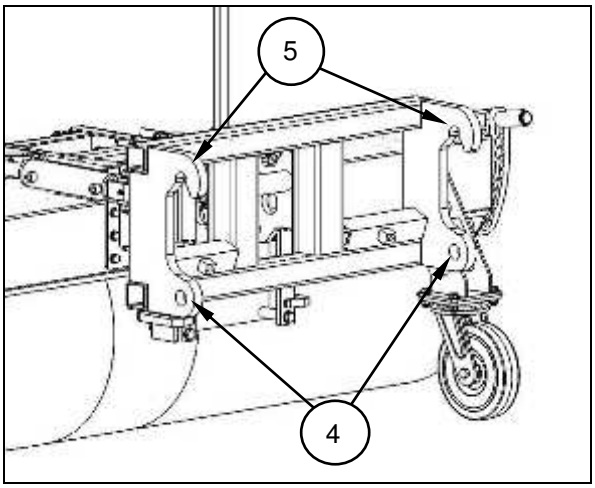


Fig. 4.28

- Ensure that the backward movement is free.
- Move vehicle backwards.

4.4.2 Three-point linkage

	The safety regulations from chapter 4.2 apply.

- Unlock the upper and lower guides according to the vehicle manufacturer's instructions. See the operating manual of the carrier vehicle.
- Lower the upper and lower guides until they are completely hooked out and free up the take-up pins (6).
- Ensure that the backward movement is free.
- Move the carrier vehicle backwards away from the sweeper.

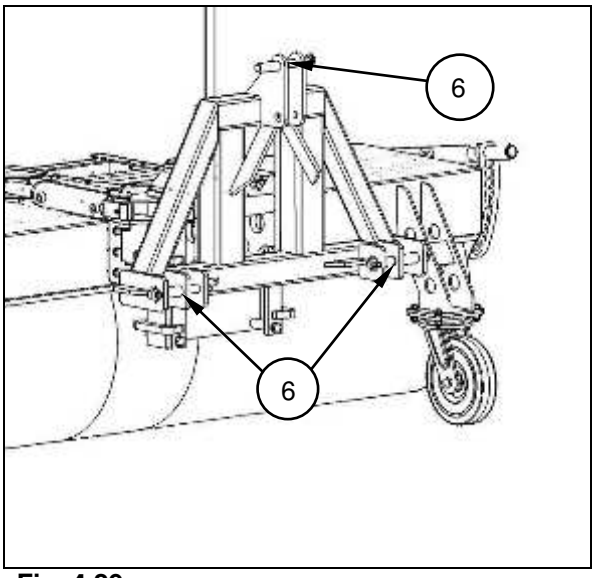


Fig. 4.29

4.4.3 Fork tines attachment

	The safety regulations from chapter 4.2 apply.

- Move safety catches downwards (in reverse sequence as described for attachment in chapter 4.2.3.
- ***The lever latches into the hole (Click) carry out step 4-7.***
- Loosen the safety chain from the carrier vehicle and place over the roof of the machine.
- Move fork tines from the take-up opening of the fork tines take-up.
- Move vehicle backwards.

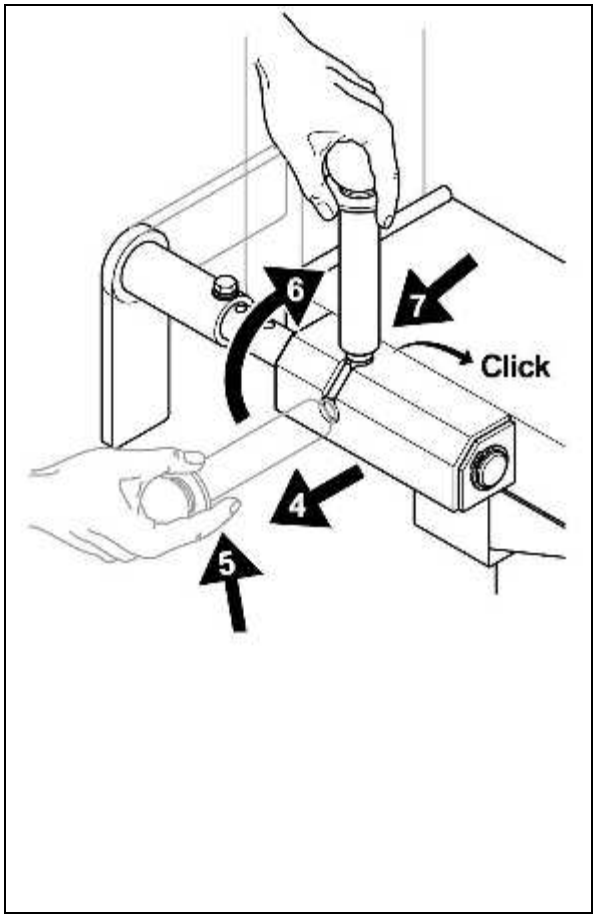


Fig. 4.30

4.5 Storage

	The safety regulations from chapter 4.2 apply.

- Place sweeper on solid even underground and in a dry clean place.

  ➔ ***Danger of accident! Make certain of a safe positioning of the PROFI 660 sweeper.***

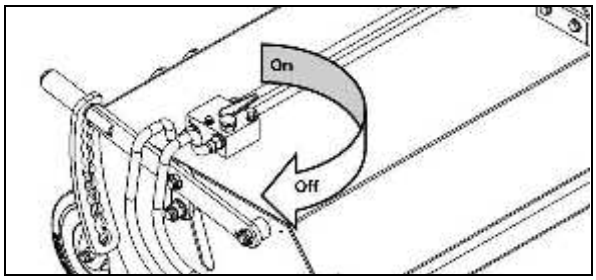


Fig. 4.31

- Close the stopcocks for the hydraulic motor of the side brushes (Fig. 4.31) and to the hydraulic cylinder of the collector (Fig. 4.32).
- The support wheels (1) must point backwards.

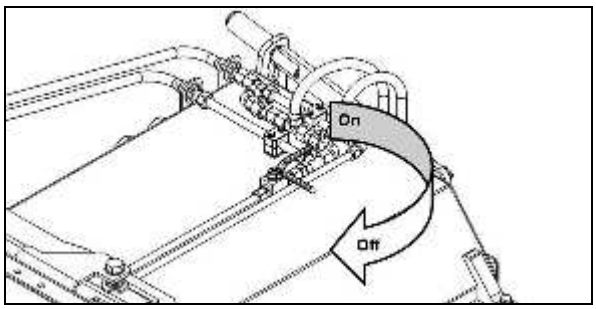


Fig. 4.32

Relieve pressure of the roll brush on ground.

- Pull the grippers (2) of the ratchet lever system on both machine sides one after the other and set the levers in the displacing ratchet in the uppermost position.

  ➔ ***Note the inherent weight of the roll brush when moving!***

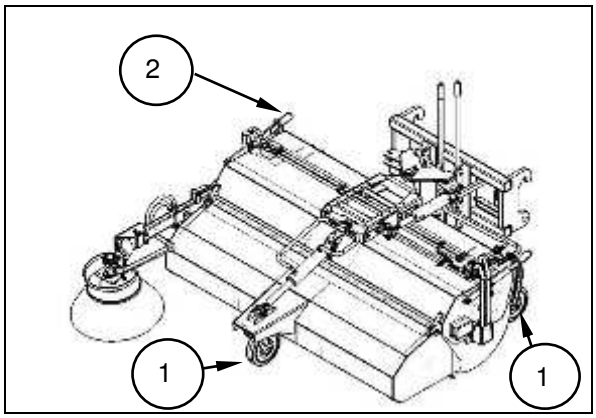


Fig. 4.33

PROFI 660 sweeper without collector

- With free-sweeping sweeper move the supports (3) to the ground and secure with tommy screw.

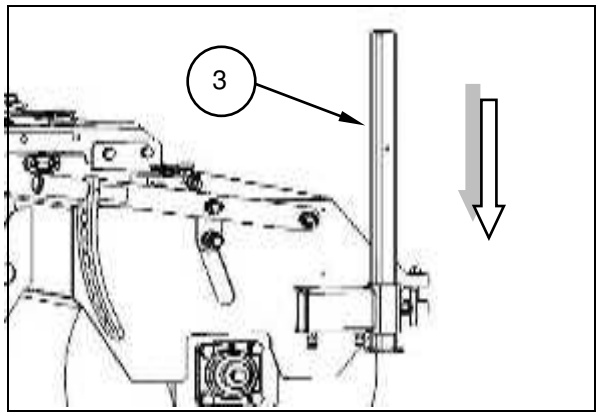


Fig. 4.34

Swinging the side brushes out of the working area

- Move the side brushes from position A to position B.
- Lever (4) locks the side brushes by means of the latching bar (5).

  ➔ ***The lever (4) must be fully latched in (5).***

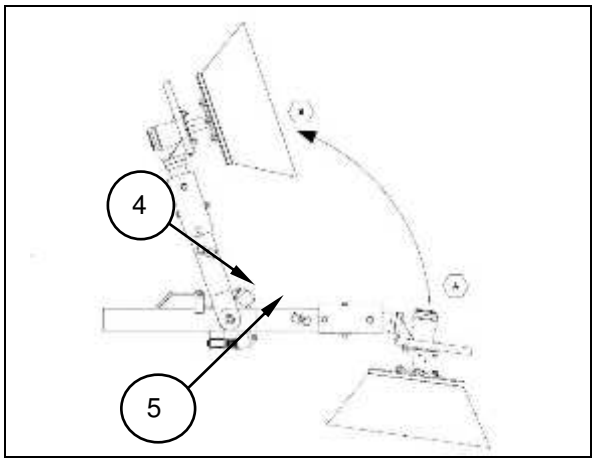


Fig. 4.35

Water spray attachment:

- Emptying the water tank (6). Open drain plug (7) (underside of tank).
- If there is danger of frost, allow pump of the water spray system to run for 10 to 15 seconds until there is no remaining water in the pipe.

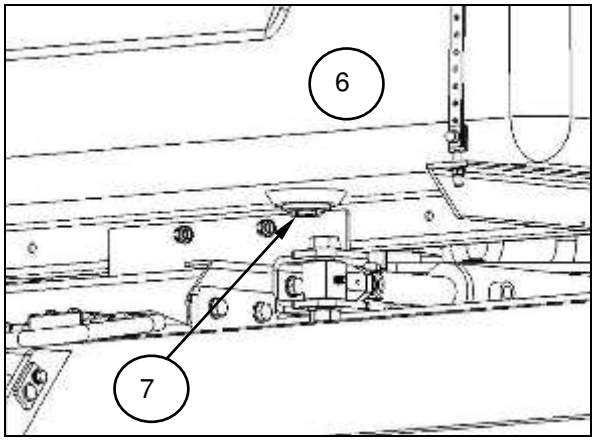


Fig. 4.36

- Danger of accident! Hydraulic hoses and electrical lines on the ground lead to the danger of stumbling. Place them over the PROFI 660 sweeper.
- Close hydraulic plug with dust cover

- If necessary, clean sweeper thoroughly. Dirt attracts moisture and leads to rusting.
- Lubricate PROFI 660 sweeper thoroughly.
- Repair damage to paintwork if necessary.

5 Hydraulic system

The hydraulic system consists of the following aggregates:

- Two single acting hydraulic cylinders.

The hydraulic system is ready for operation when the hydraulic system of the machine is coupled with the hydraulic system of the carrier vehicle.

5.1 Hydraulic hoses

WARNING 	**Danger of infections may occur when hydraulic oil escapes under high pressure and penetrating skin!** When coupling and uncoupling the hydraulic hose lines ensure that the hydraulic system at the machine and sweeper are de-pressurised. Never move all the operating levels of the working hydraulics of the machine several times in both directions. In the case of injury from hydraulic oil, immediately contact a doctor.

5.1.1 Coupling hydraulic hoses

WARNING 	**Malfunctions occurring from incorrectly connected hoses may lead to a danger of squashing, cutting, catching, pulling-in and pushing.** • When coupling the hydraulic hoses take note of the coloured markings at the hydraulic plugs. • Check the arrangements of the hydraulic hose lines to the individual hydraulic components at the sweeper in the case that the markings (dust covers) are missing: o P = Pressure line o T = Return line

	• Note the maximum permissible operating pressure of the hydraulic oil of 180 bar. • Only couple clean hydraulic plugs. • Ensure when coupling and uncoupling the hydraulic hoses that no oil spills into the environment. • Insert the hydraulic plug so far into the hydraulic socket until the plug is noticeably locked. • Check the coupling points of the hydraulic hose lines for proper and tight seating. • Coupled hydraulic hose lines: o Must easily absorb all movements for curve movements without stress, kinking or rubbing, o Must not rub against other parts.

1. Pull up the hand brake of the machine.
2. Switch engine of machine off and remove ignition key.
3. Never move all the operating levers of the working hydraulics of the machine several times in both directions.

→ The hydraulic system is depressurised.

4. Clean the hydraulic plugs of the hydraulic hose lines before coupling them with the hydraulic sockets.
5. Couple all hydraulic hoses of the sweeper to the quick-acting couplers of the machine.

5.1.2 Uncoupling hydraulic hoses

1. Pull up the machine's hand brake.
2. Switch engine of machine off and remove ignition key.
3. Never move all the operating levers of the working hydraulics of the machine several times in both directions.

→ The hydraulic system is depressurised.

4. Unlock the hydraulic plugs from the hydraulic sockets.

6 Cleaning, servicing and maintenance

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

- "Obligations of the user" Pages 2-8
- "Qualifications of the persons" on Page 2-9
- "Fundamental safety instructions" from Page 2-11
- "Warning instructions and instructions" from Page 2-16

Observing these chapters furthers your safety.

WARNING

Danger of squashing, shearing, cutting, loss, catching, winding, pulling-in and pushing for persons may occur when:

- **The raised and unsecured sweeper inadvertently sinks or is inadvertently lowered.**
- **Machine inadvertently starts and rolls!**
- Secure the raised sweeper against inadvertent sinking before working in the area of the raised sweeper.
- Secure the machine against inadvertent starting and rolling before cleaning, servicing or maintaining the sweeper connected to the machine. See Chapter "Securing the machine against inadvertent starting and rolling" Page 2-15.
- Wait for the stopping of the sweeper before entering the hazard area of the sweeper.

WARNING

Danger of squashing, shearing, cutting, loss, catching, winding, pulling-in and pushing for persons may occur when danger areas are unprotected!

- Mount the protective equipment that has been removed for cleaning, servicing and maintenance of the sweeper.
- Replace defective protective equipment with new ones.

WARNING

Dangerous conditions may arise when load-bearing parts break during mechanical works on frame components.

Fundamentally prohibited is:

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

6.1 Cleaning

- Regularly and thoroughly clean the sweeper. Dirt attracts moisture and leads to rusting.
- After cleaning, lubricate the sweeper. Avoid moisture when cleaning. Blowing off is usually sufficient.
- Note the legal requirements for handling and disposing of cleaners.
- Repair damage to paintwork if necessary.
- Monitor the hydraulic hose lines particularly carefully.
- Never treat hydraulic hoses with benzene, benzol, petroleum or mineral oils.
- If the sweeper is not used for a longer time period, then, after cleaning, the sweeper should be lubricated, sprayed with oil. Grease piston rods of the hydraulic cylinder.

Cleaning with high-pressure cleaner / steam spray

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

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

6.2 Replacing wearing parts

- Maintenance, repair and replacement works on the PROFI 660 sweeper must only be carried out with switched-off hydraulic drive and uncoupled hydraulic connections. Secure carrier vehicle.
- Do not enter or work under the raised machines against inadvertent starting, rolling and lowering!

WARNING

- Always secure the opened collector by turning the stopcock. Additional mechanical safety against closing the container is necessary.
- Renew brush rings in the attached condition of the sweeper to the carrier vehicle.

6.2.1 Brush shaft, inside motor

The safety regulations from chapter 4.2 apply.

- Raise the PROFI 660 sweeper (approx. 200 mm and open collector.

  ➔ ***Secure the sweeper and carrier vehicles against inadvertent starting, rolling and lowering!***

- Close stopcock (1) for the emptying cylinder (Fig. 6.1) (must face rear turning roll).

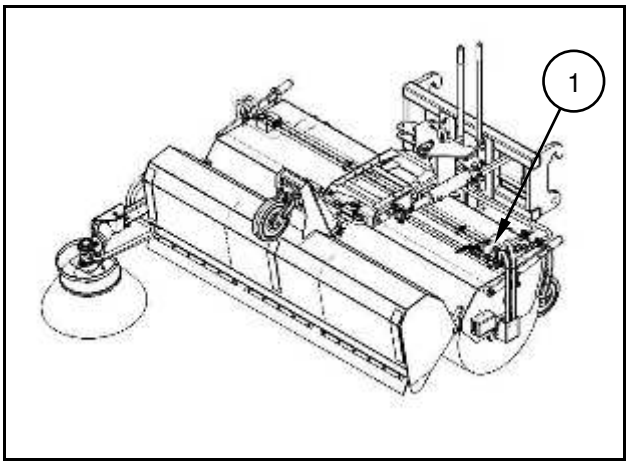


Fig. 6.1

- Set the ratchet lever system (2) on both sides to the lowest position (Fig. 6.2).
- Lower sweeper until the complete brush shaft is on the ground.

  ➔ ***De-pressurise the hydraulic lines of the sweeper.***

- Loosen and remove the fastening bolts (3) of the motor carrier (4) and the bearing (5) and remove (Fig. 6.3).

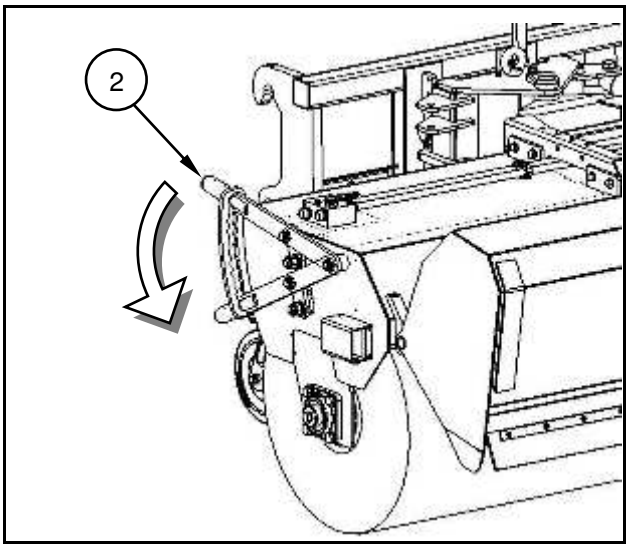


Fig. 6.2

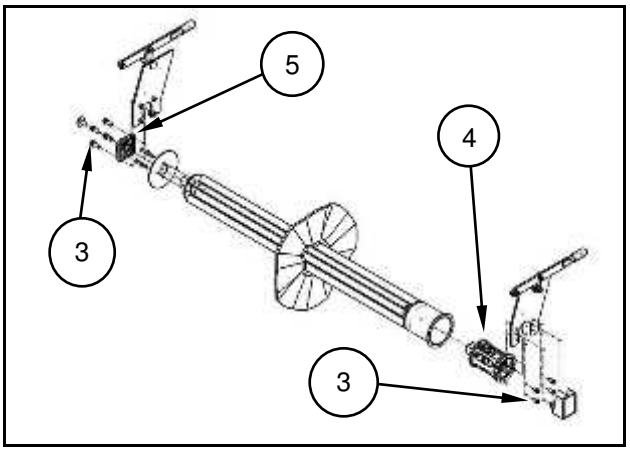


Fig. 6.3

- Set ratchet lever system (2) on both sides to the topmost position.
- Raise sweeper frame until the brush shaft is completely free (note hydraulic hoses!).

➔ ***Damage can occur with hooking and squashing hydraulic hoses.***

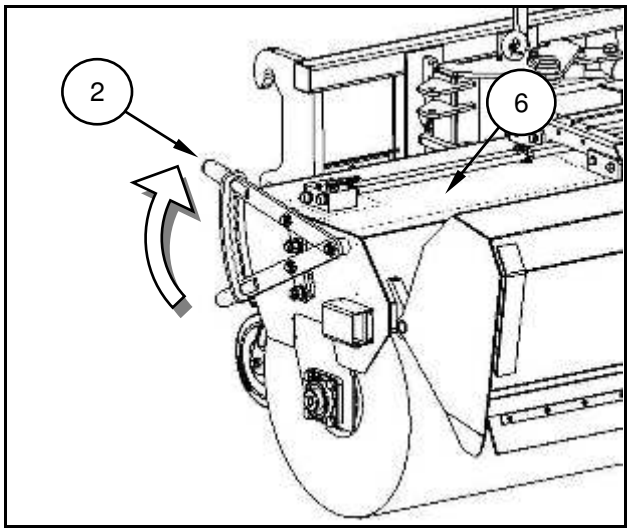


Fig. 6.4

➔ ***Mechanical securing against lowering the collector necessary (Squashing position between the side parts of the sweeper frame and collector.).***

➔ ***Secure sweeper and carrier vehicle against inadvertent starting, rolling and lowering!***

- Pull motor carrier (4) with hydraulic motor (7) out of the roll shaft (8).
- Pull the roll shaft (8) away from under the sweeper.
- Lower sweeper frame (6) and place on the rear support rolls.
- Unscrew four countersunk bolts (9) and dismount holder plate (10).

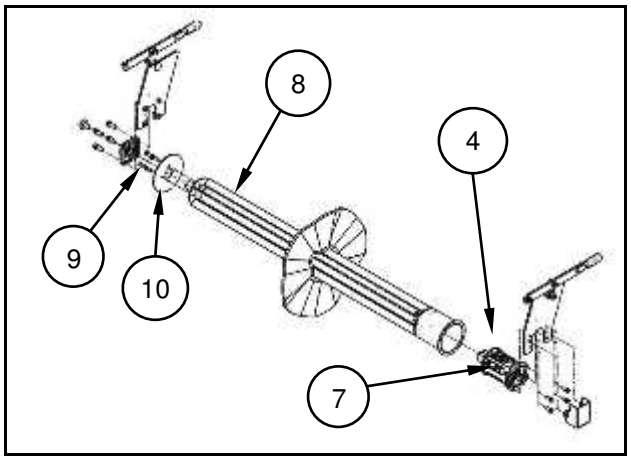


Fig. 6.5

- Replace worn brush rings (11) (for number of brush rings see spare parts list), Ring replacement Snowline, Sunline, Beeline, 50% Sunline and 50% wire brush are possible.
- Before assembly, clean all parts and replace as necessary.
- Assembly and installation of the brush shaft in reverse order of the disassembly.

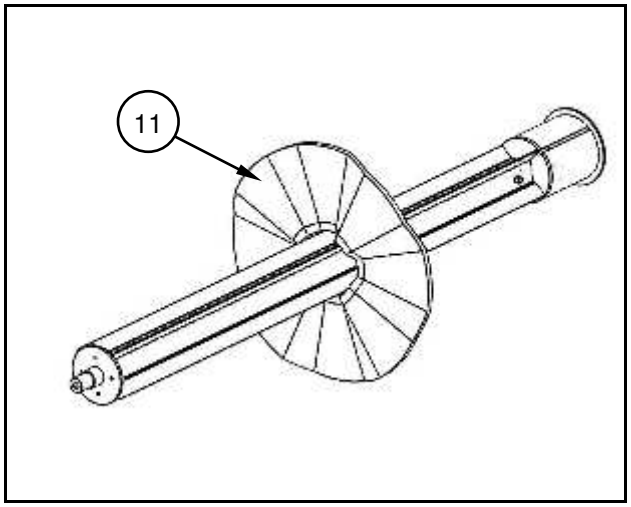


Fig. 6.6

6.2.2 Renew disc broom

Replacement service on the PROFI 660 sweeper must only be carried out with switched-off h drive and uncoupled hydraulic connections. Secure carrier vehicle against inadvertent starting and rolling!

- Lift up side brush (from position A to position B) and engage (2) lever (1) (see Chapter 4.3.1).
- Remove three hexagon nuts (3).

➔ ***Note inherent weight of the disc brooms.***

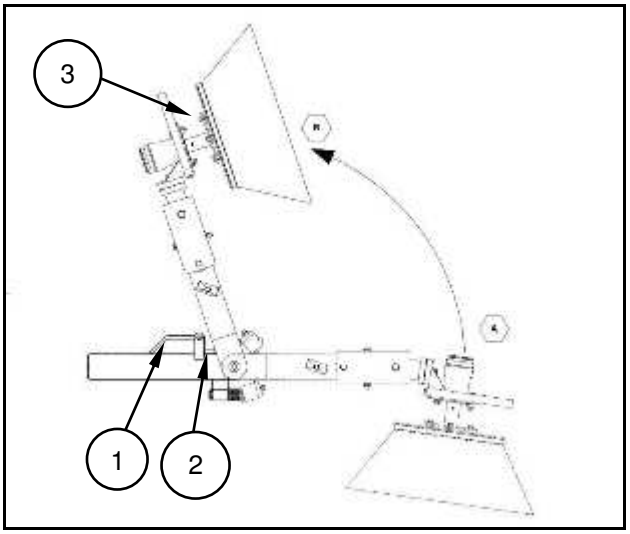


Fig. 6.7

- Remove old disc brooms (4) and insert new disc brooms with hole diameters corresponding to the flange (5).
- Secure disc broom with new locknuts.
- Fold side brushes into the working position and adjust in accordance with Chapter 4.3.2.
- For hydraulic foldable side brushes, the broom must be folded in the up position. The changing of the disc broom corresponds to that of the mechanical foldable side brush.

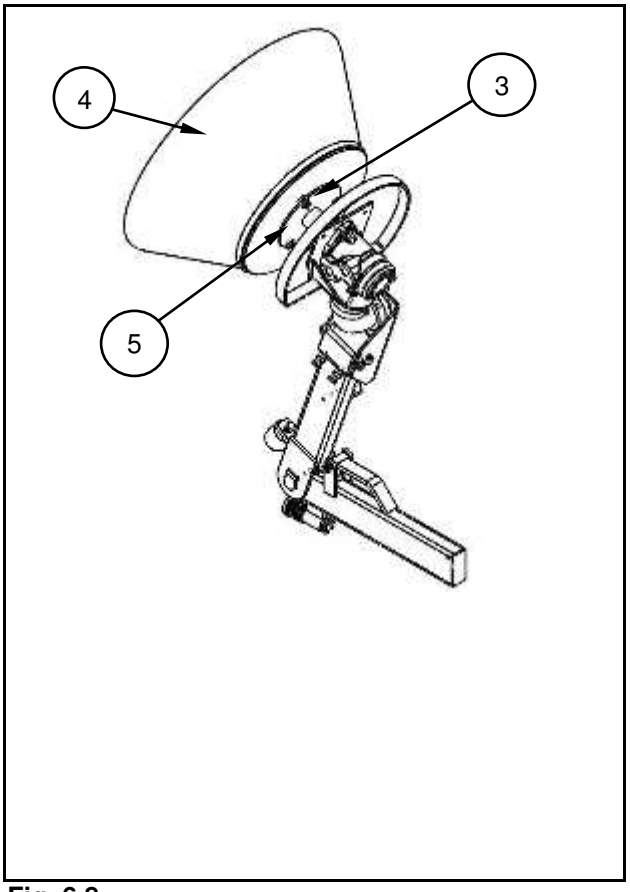


Fig. 6.8

6.2.3 Renew Polyurethane lip

The safety regulations from chapter 4.2 apply.

➔ ***Replace Polyurethane lip only in the attached and raised condition of the sweeper.***

➔ ***The collector must be empty and completely opened.***

- Do not enter or work under the raised machine.
- Secure sweeper and carrier vehicle against inadvertent starting, rolling and lowering!
- Always secure the opened collector by turning the stopcock. Additional mechanical safety against closing the container is necessary.
- Note the inherent weight of the push bar and Polyurethane lip.

- Loosen the fastening nuts (3) and bolts (4) along the whole length of the Polyurethane lip (1).
- Remove the pushing strip (2) and the old Polyurethane lip (1).
- Renew Polyurethane lip (1).

➔ ***Assembly takes place in reverse sequence***

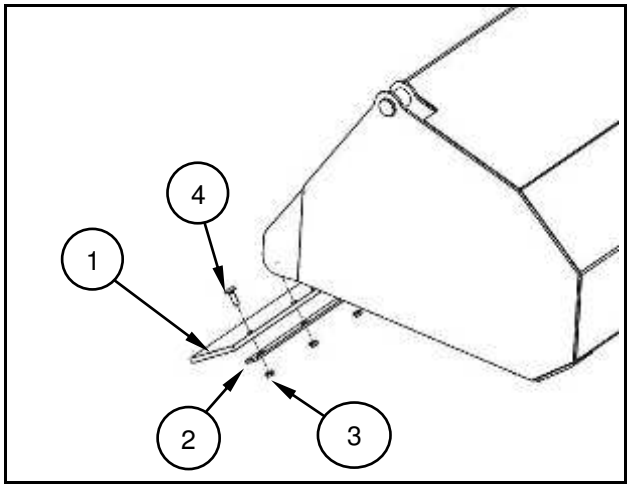


Fig. 6.9

6.2.4 Replace fuse

The safety regulations from chapter 4.2 apply.

- Unscrew the fuse holder (1).
- Replace fuse.
- Screw up the fuse holder (1).

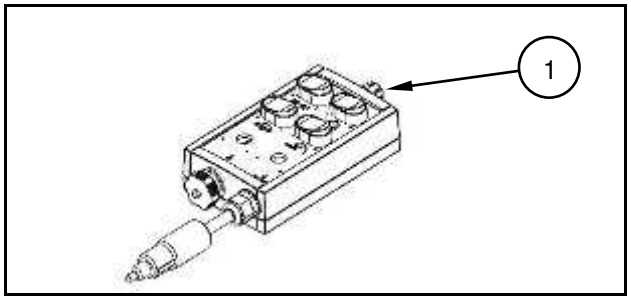


Fig. 6.10

6.3 Water spray system

	The safety regulations from chapter 2.1 apply.

➔ ***The water filter is situated in the suction hose (4) in the water tank (1).***

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

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

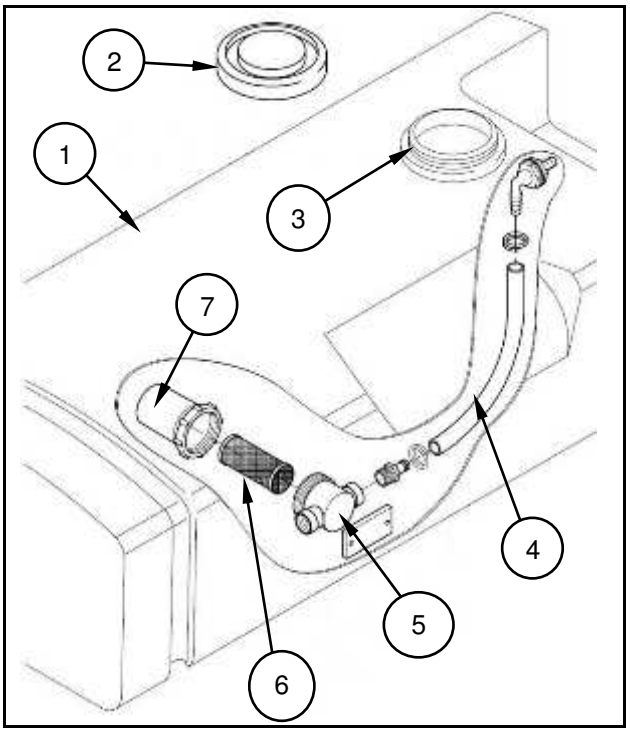


Fig. 6.11

6.4 Lubrication - overview

- Lubricate all bearings and lubricating points according to the lubricating plan.
- Remove dirt from the lubrication nipples.
- Use environmentally friendly biologically degradable oil and greases where lubricants can enter into the food bearing area or the ground. Inform yourself at your agricultural equipment company.
- Lubricate bearing points weekly with grease according to DIN 51502 (e.g. Gresalit 2 of the Westfalen Company).

6.4.1 Lubrication points at the sweeper and attachments

= Lubricate weekly!

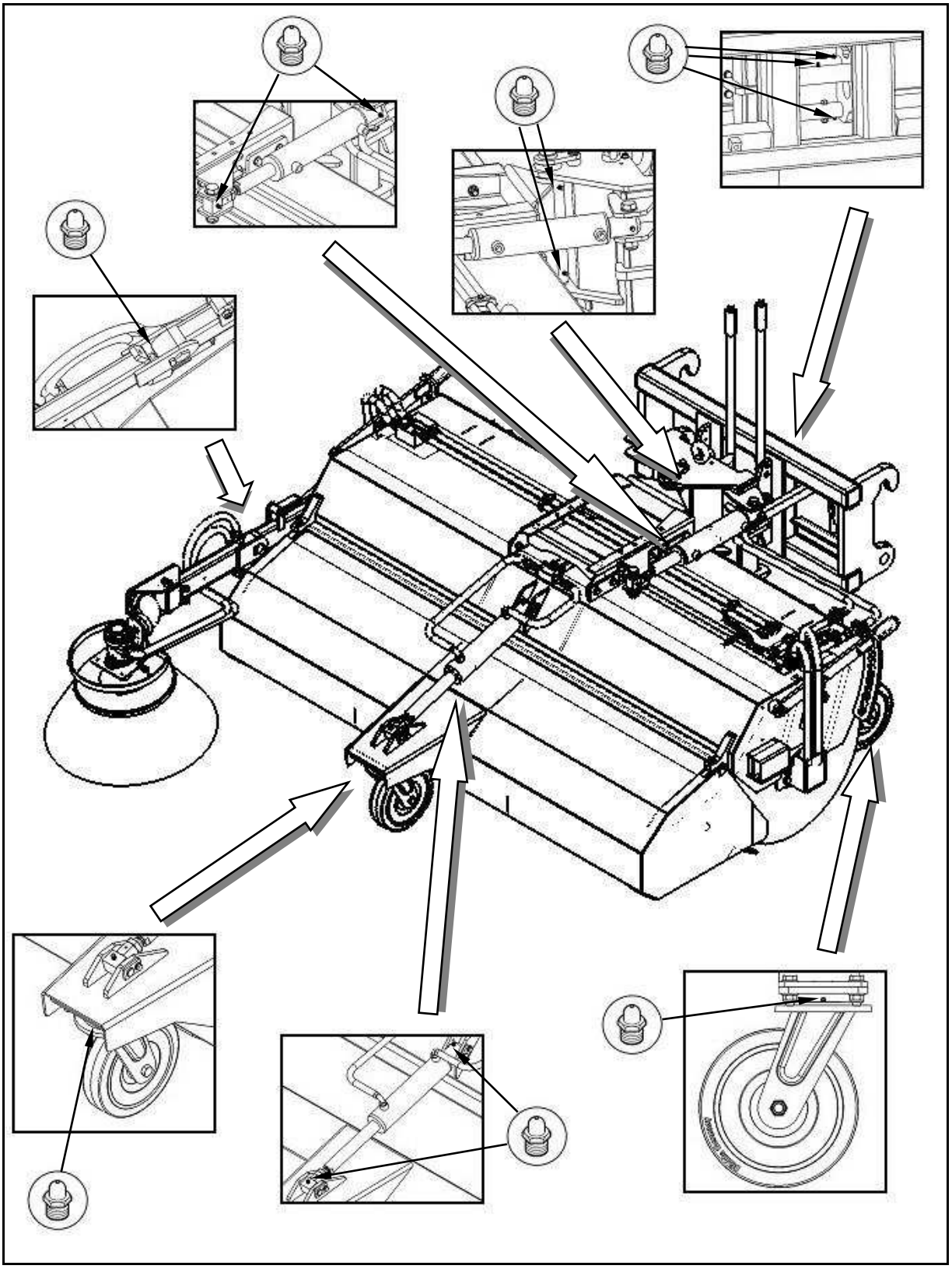


Fig. 6.12

6.5 Errors: causes and repairs

	Error	Cause	Repair
1	Sweeping shaft not rotating	• Incorrect hydraulic connections • Too little pressure or volume flow • Hydraulic motor defective • Setting of current regulating valve	• Check connections • Consult specialised workshop • Consult specialised workshop • Remove threaded joint at collector
2	Dirt collector does not swing upwards	• Supply line closed • Incorrect hydraulic connections • Hydraulic cylinder defective	• Turn 2-way valve • Check connections • Consult specialised workshop
3	Water spay installation not functioning	• Water tank empty • Fuse in switchbox defective • Water filter blocked • Sprays blocked	• Fill with water • Replace fuse • Clean water filter • Clean sprays
4	Side brush not rotating	• Supply line closed • Incorrect hydraulic connections • Setting of current regulating valve • Hydraulic motor defective	• Turn 2-way valve • Check connections • Check settings on current regulating valve • Consult specialised workshop
5	Poor sweeping result	• Broom settings • Broom revolutions too quick / slow	• Regulate broom via ratchet lever system • Adapt broom rotations
6	Lighting not working	• Electric lines incorrect • Fuse in switchbox defective • Cable fracture	• Check connections • Replace fuse • Consult specialised workshop

6.6 Hydraulic system

WARNING

Danger of infection may occur when hydraulic oil escapes under high pressure and penetrates the body.

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

- When coupling and uncoupling the hydraulic hose lines to the hydraulic system of the machine, ensure that the hydraulic system is de-pressurised.
- Ensure correct connecting of the hydraulic hose lines!
- Regularly check all hydraulic hose lines and couplings for damage and soiling.
- Have the hydraulic hoses checked for working safety and condition at least once a year by an expert!
- Replace hydraulic hoses in case of damage and ageing! Use only original hydraulic hose lines!
- The period of use of the hydraulic hoses must not exceed six years including a possible storage time of at most two years!
- Hoses and hose connection are subject to natural ageing even with proper storage and permissible loading; therefore, their storage time and period of use is limited. Deviating from this the period of use can be determined according to the experience values, especially when taking the danger potential into account. Other guidelines may apply for hoses and hose lines of thermoplastics.
- Dispose of old oil according to the regulations. In case of problems with disposal speak to your oil supplier.
- Store oil out of the reach of children!
- Ensure that no hydraulic oil enters the ground or water.

6.6.1 Marking of hydraulic hose lines

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

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

(2) Date of manufacture of the hydraulic hose line (04/02 = Year / month = Feb. 2004)

(3) Maximum permissible operating pressure (210 bar)

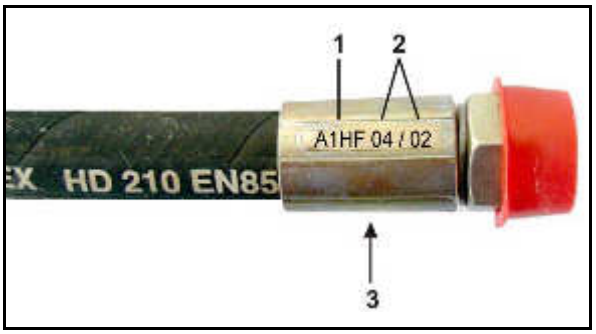


Fig. 6.13

6.6.2 Servicing intervals

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

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

Before every start-up:

1. Check the hydraulic hose lines for obvious malfunctions.
2. Remove wear places to hydraulic lines and pipes.
3. Immediately replace worn or damaged hydraulic hose lines.

6.6.3 Inspection criteria for hydraulic hose lines

For your own safety:

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

- Damage to the outer layer down to the insert (e.g. due to rubbing points, cuts, tears).
- Brittleness of the outer layer (recognisable by crack formation of the hose material).
- Unnatural deformations of the hydraulic hose lines, e.g. layer separation, bubble formations, squashing or kinking places.
- Leaks.
- Damage, deformation or leaks of the hose equipment. Slight surface damage is not grounds for replacement.
- Movement of the hose out of the equipment.
- Corrosion of the valve that can impair the function and strength.
- Unprofessionally laid hydraulic hose lines, e.g. bending radii not adhered to, running over sharp edges.

- The life of 6 years is exceeded.

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

  Example (Fig. 6.13): the manufacturing date of the hydraulic hose line is shown on the valve, e.g. (07 / 10 = Year / month = October 20070. The period of use then ends in October 2013.

6.6.4 Installation and removal of hydraulic hose lines

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

- Use only hydraulic hose lines from the manufacturer.
- Ensure cleanliness.
- It is necessary to install hydraulic hose lines in such a manner that in all operating conditions:
  - Tensile loading does not occur except due to its inherent weight.
  - There is no compression load in short lengths.
  - External mechanical effects on the hydraulic hose lines are prevented.

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

6.7 Bolt torques

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

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

A = thread size (classification found on bolt head)

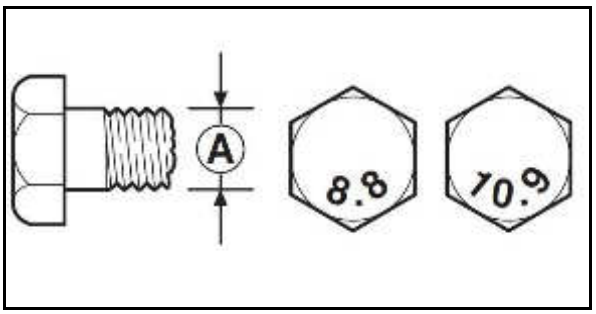


Fig. 6.14

7 Appendix

7.1 Hydraulic wiring diagrams

Hydraulic side adjustment

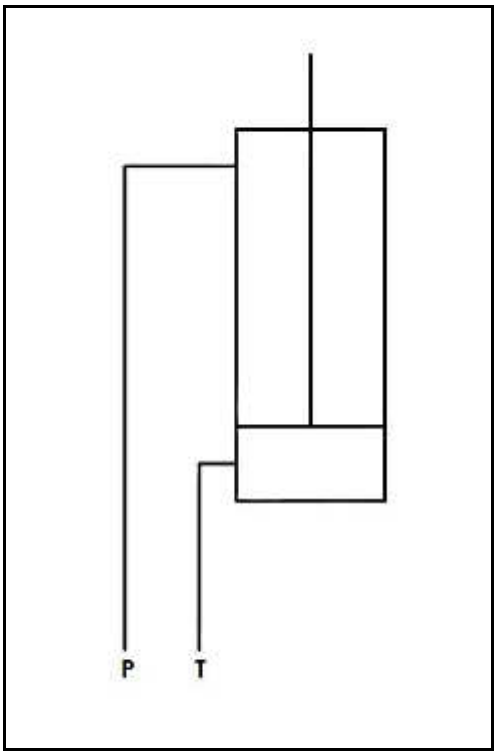


Fig. 7.1

Hydraulic collector -emptying

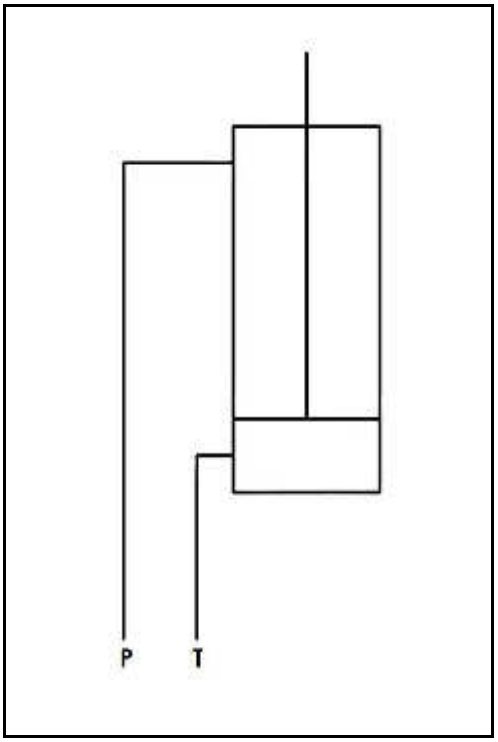


Fig. 7.2

7.2 Notes