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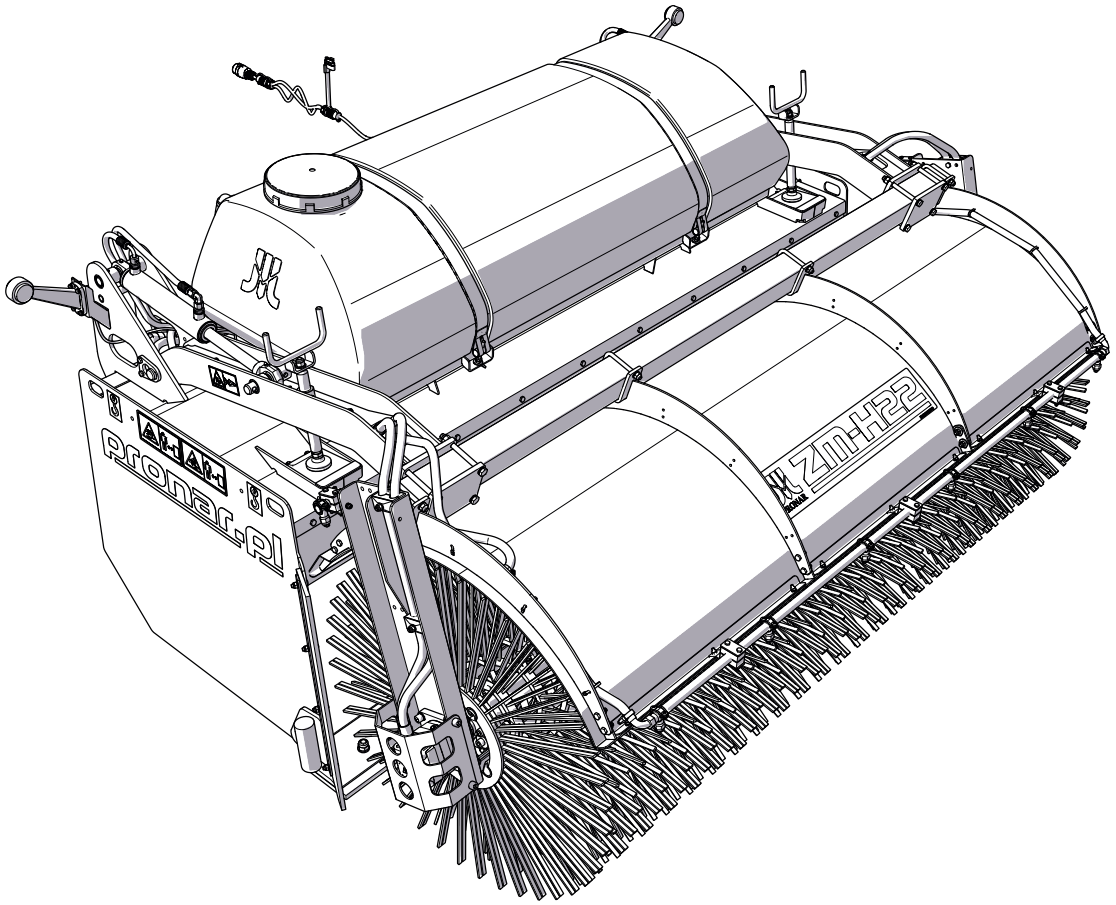
OPERATOR MANUAL

SWEEPER

PRONAR ZM-H22

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



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EN

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This Operator Manual contains important safety and operating instructions for the machine. The Operator Manual should be kept near the machine so that it is accessible to authorized operators.

Keep this manual for future reference. If the Operator Manual is lost or damaged, contact the seller or the manufacturer for a copy.

Spis treści

CHAPTER 6.
PERIODIC INSPECTION AND MAINTENANCE

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CE

EC Declaration of Conformity

PRONAR Sp. z o.o. declares, with full responsibility, that the machine:

Machine description and identification data	
General description and purpose:	**Sweeper**
Type:	**ZM-22H**
Model:	-
Serial number:	
Commercial name:	**Sweeper PRONAR ZM-22H**

referred to in this declaration meets the requirements of Directives:

- **2006/42/EC- MD** - Machine Directive,
- **2014/30/EU- EMC** - Electromagnetic Compatibility Directive,
- **2014/35/EU LVD** - Low Voltage Directive,
- **2016/1628 amended by 2020/1040** - Regulation of the European Parliament and of the Council (EU) of 14 September, 2016. on requirements for internal combustion engines.

The machine has been designed for and meets the requirements of the following standards:

PN-EN ISO 12100; PN-EN ISO 4413; PN-EN 60204-1; PN-EN 13021; PN-EN ISO 4254-1; PN-EN ISO 13524+A1; PN-EN 953+A1

This declaration applies exclusively to the machine in the condition, in which it was sold and does not include components or parts added or subsequent modifications made by the final user.

The operator's manual is an integral part of the machine.

The Implementation Department Manager of PRONAR Sp. z o.o., 17-210 Narew, ul. Mickiewicza 101A is authorised to provide the technical documentation.

Z-CA DYREKTORA
d/s technicznych
członek zarządu
Roman Ołdakowiuk

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Narew, on 2023-01-20
Date and place issued

Full name of the authorised person, position, signature

CHAPTER 1.

INTRODUCTION

Pronar ZM-H22

1.1 DEAR USER

The manual instruction is intended for the end user. For this reason, some required maintenance is listed in the inspection tables but the procedure is not described in this publication. To perform them, call the manufacturer's authorized service center.

Before starting the machine, you will be familiarized with its construction, principle of operation, available equipment and operation, and above all safety rules. The operator and qualified personnel should be trained during final reception.

Remember!!! You can run the machine only when you have read the content of this "User Manual", you have been trained and you can handle it safely. In case of any doubts, contact the seller to clarify the problem.

The most important thing during operation is your safety, therefore, regardless of everything, all recommendations contained in the "User's Manual" should be observed and guided by reasonable procedure. Remember that the correct service, in accordance with the manufacturer's instructions, reduces the risk of an accident to a minimum, and working with the machine is more efficient and less emergency.

When buying machines, check the compatibility of serial numbers placed on the machine with the number entered in the "Warranty card" and in the sales documents. For information on identifying the machine, see "Basic information" chapter. We recommend that you have the most important serial numbers entered the field below.

Machine serial number:

WST.3.B-001.01.EN

1.2 RULES FOR USING THE USER'S MANUAL

The information contained in the publication is current as at the date of publication. As a result of improvement, some sizes and illustrations contained in this publication may not correspond to the actual state of the machine delivered to the user.

The drawings contained in this publication are aimed at clarifying the principle of machine operation and may differ from the facts. This can not be a reason for any claims for this. The manufacturer reserves the right to introduce constructional changes in the manufactured machines to facilitate operation and improve the quality of their work, without making any current changes to this publication.

The operating instruction is the basic equipment of the machine. If the information contained in this study prove not fully understandable to ask for aid to the point of sale in which the machine has been purchased or directly to the manufacturer.

The machine was constructed in accordance with applicable standards, documents and current legal regulations.

Separate studies can be attached to this manual that can be found in the chapter "*Attachments and additional materials*".

WST.3.B-002.01.EN

1.3 TARGET AUDIENCE

This Operator's Manual is intended for persons operating the machine hereinafter referred to as end users, and qualified persons, such as electricians, mechanics, plumbers. Detailed information on the competences and responsibilities of end users and qualified persons can be found below in this chapter.

1.3.1 End user (user, authorized user, operator)

Who is the end user?

The end user, otherwise known as the user or operator, is the person authorized to operate the machine. The user may be authorized to operate the machine if the following conditions are met.

- The user has read and understands this "*Operator's Manual*."
- Carefully read the carrier vehicle's Operator Manual and comply with its recommendations.
- Comply with the road traffic regulations and transport regulations in force in the given country, in which the machine is used,
- Has been trained to follow established maintenance and adjustment plans.
- Have driving licenses (vehicle combinations) required in the country of use.

Duties and responsibilities

The knowledge acquired by the user allows the machine to be operated safely. In accidental situations, the user should follow reasonable procedures and first of all ensure her/his own safety and safety persons nearby the operating machine and other road users.
The user's knowledge and skills entitle to operate the machine, carry out maintenance and perform repairs or adjustments to the extent specified by the manufacturer. Activities that can be performed by the operator are marked with the pictogram:

1.3.2 Qualified person(s)

Who is a qualified person?

A qualified person is a person authorized to perform certain maintenance, repair or adjustment work to the extent specified by the machine manufacturer and has acquired suitable technical training in a specific profession which is confirmed by an appropriate document, completed training conducted by autho-

rized manufacturer or seller and is able to perceive and counteract hazards. The acquired professional experience and professional skills entitle a qualified person to carry out some repairs on the machine and perform basic maintenance operations to the extent envisioned by the manufacturer. In addition to the necessary knowledge, a qualified person has the skills to use specialized equipment necessary to perform the responsibilities. Qualified persons include the following:

- qualified mechanic,

- qualified electrician

- qualified plumber.

Activities that a qualified mechanic can perform are marked with a pictogram:
Activities that a qualified electrician can perform are marked with a pictogram:

Activities that a qualified plumber can perform are marked with a pictogram:

1.3.3 Service technicians

Who are the service technicians?

The service technicians, otherwise known as the manufacturer's service technicians, is a person or group of qualified persons with much more experience and knowledge to perform specific repairs and maintenance than qualified persons. Service technicians have the right tools to carry out the work. The manufacturer's service technicians have the required qualifications and represent the machine or other equipment manufacturer.

1.3.4 Unauthorized user

Who is an unauthorized user?

An unauthorized user, also known as a bystander, is a person who has not been trained by the manufacturer or authorized seller, has not been familiarized with the basic safety rules, has little or no knowledge of the machine, has not read the entire operator’s manual and therefore is not authorized to operate the machine. A bystander must not be allowed to work with the machine.

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1.4 SYMBOLS AND TAGS USED IN THE MANUAL

1.4.1 Danger

Information, descriptions of hazards and precautions as well as instructions and orders related to the safety of use in the content of the manual are marked with a frame with the word **DANGER**. Failure to comply with these recommendations may endanger the health or life of persons operating the machine or bystanders.

1.4.2 Caution

Particularly important information and recommendations, the observance of which is absolutely necessary, are highlighted in the text with a frame and word **CAUTION.** Failure to comply with these recommendations creates the risk of damage to the machine due to improper handling, adjustment or use.

1.4.3 Advice

Additional instructions contained in the manual describe useful information on operating the machine and are marked with a frame with the word **ADVICE.**

1.4.4 Personal protective equipment pictograms

	Work shoes
	reflective vest
	industrial helmet
	working clothes
	respiratory protection
	safety goggles
	protective gloves
	hearing protectors

1.4.5 Qualification pictograms

	operator
	qualified mechanic
	qualified plumber
	qualified electrician

1.4.6 Typography of the User Manual

Bulleted list

The bulleted list presents actions to perform whose order is not relevant.

Example of using a bulleted list

- ....
- Check the condition of connections and hydraulic and pneumatic hoses. Hydraulic oil leaks and air defects from a leaky installation are unacceptable.
- In the event of a hydraulic or pneumatic installation failure, the trailer should be turned off from operation until the failure is removed.
- .....

Comment on the text

Comment is most often a supplement and additional explanation to order a specific activity. Additional information can also be included in the comment.

An example of a comment

The required air pressure is described on the sticker placed on the machine frame, over the wheel.

Defined list

List shows the to-do, which execution order is important.

Example of using a defined list

1. .....
2. Unscrew the handles (2) securing the crank (1).
3. Insert the crank into a square shaft of the gear and turning the clock clockwise on the direction of the clock.
4. ....

References to pages

Reference to chapter (place in the manual) related thematically

An example of a reference application

📖 *page 9.4*

WST.3.B-004.02.EN

1.5 GLOSSARY OF TERMS

agricultural tractor

A motor vehicle designed for use in combination with implements for agricultural, forestry and horticultural work; the agricultural tractor can be also adapted for towing a trailer and for earthwork.

tractor unit

A motor vehicle designed exclusively for towing a trailer; this term refers to semi-trailer truck and ballast tractor.

carrier vehicle

A motor vehicle made in a special way so that it not only pulls tools but also carries them on itself, and can work with implements attached or suspended from the rear or front of the vehicle.

final acceptance

A number of activities related to getting the finished product ready for delivery and actual delivery of the product. The final acceptance includes delivery of documentation, basic training, acceptance for transport and first start of the machine.

bystander

see - unauthorized user

qualified person

A qualified person is a person authorized to perform certain maintenance, repair or adjustment work to the extent specified by the machine manufacturer and has acquired suitable technical training in a specific profession which is confirmed by an appropriate document, completed training conducted by authorized manufacturer or seller and is able to perceive and counteract hazards.

lorry

A motor vehicle designed for transporting goods; this term also refers to goods and passenger carrier vehicles that are designed for carrying goods and

people (from 4 to 9 persons including a driver).

danger zone

A danger zone is an area around the machine where people's health or life is endangered.

THREE-POINT LINKAGE

Three-point linkage - a lever system used in agricultural tractors to hitch machines and implements suspended on a hydraulic linkage.

end user

Otherwise referred to as the user, authorized user or operator — a person authorized to operate the machine.

unauthorized user

Also referred to as a bystander — a person who has not been trained and has not been allowed to operate the machine.

PTO

PTO - Power Take-Off Shaft - a shaft transmitting drive from the vehicle to the machine being moved.

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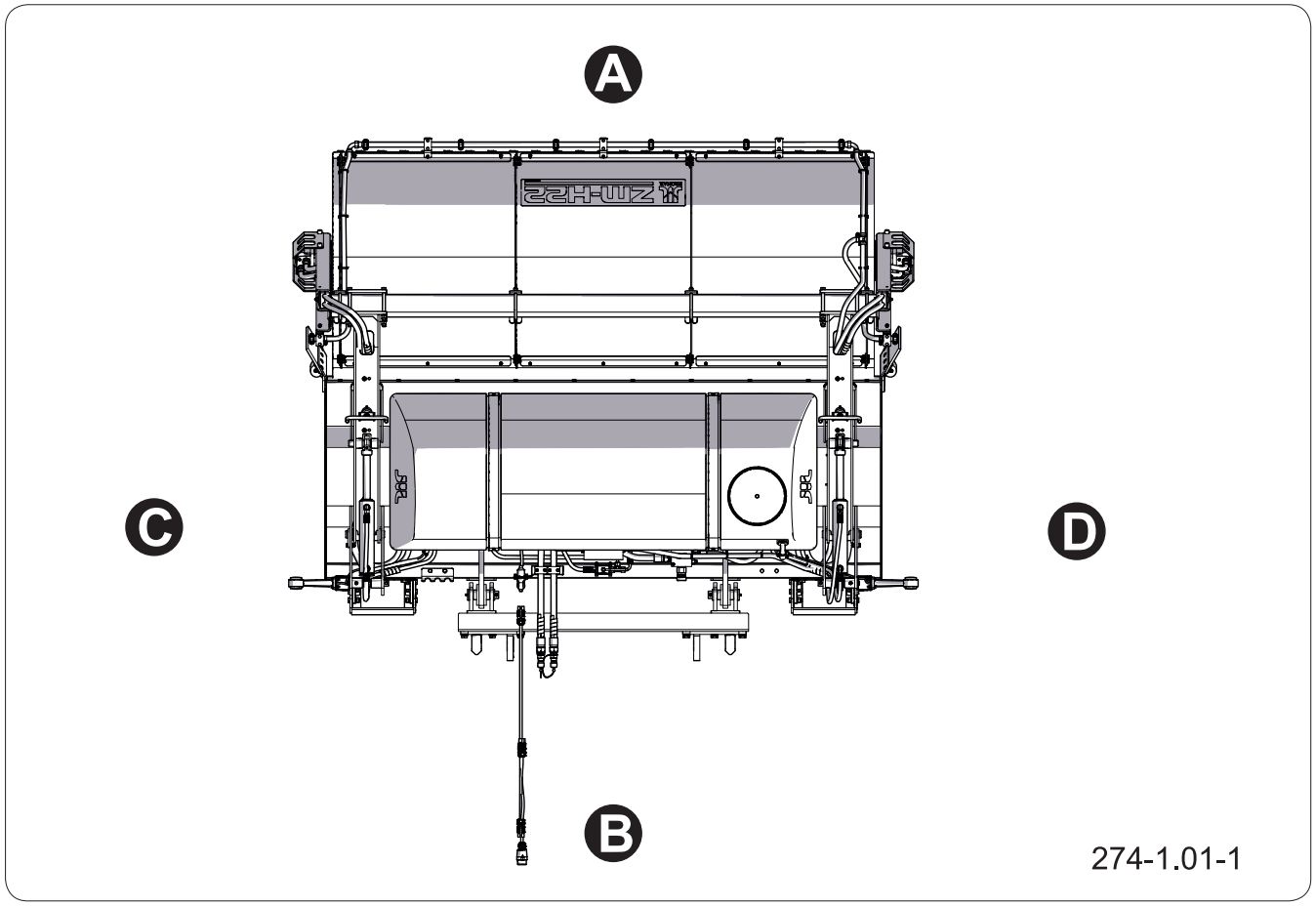
1.6 DIRECTIONS USED IN THIS OPERATOR MANUAL



Rysunek 1.1 Directions used with reference to the machine
(A) front *(B) rear* *(C) left side*
(D) right side

Left side – side to the left hand of the operator facing in the direction of machine's forward travel.

Right side – side to the right hand of the operator facing in the direction of machine's forward travel.

Rotation to the right – clockwise rotation of a mechanism (the operator is facing the mechanism).

Rotation to the left – counterclockwise rotation of a mechanism (the operator is facing the mechanism).

WST.2.6-001.01.EN

1.7 FINAL ACCEPTANCE

1.7.1 Preliminary information

Final acceptance is carried out upon delivery of the machine. Final acceptance includes the following:

- provide the required documents, including the "*Operator Manual*", "*Warranty Book*" and other documents,
- information from the seller about the machine use, risks resulting from using the machine contrary to its intended purpose and about hitching the machine to a carrier vehicle and operation.
- inspect the machine upon delivery,
- first start-up of the machine and discussion of the use and operation of the machine.

1.7.2 Inspect the machine upon delivery

The scope of inspection

- Check completeness of the machine according to order:
- Check technical condition of safety guards.
- Check condition of paint coating; check the machine for traces of corrosion.
- Check the machine for damage resulting from wrong transport of the machine to its destination (crushing, piercing, bending or breaking of parts etc.).
- Check technical condition of elastic hydraulic lines. Make sure the systems are tight.
- Inspect hydraulic cylinders for leaks, as well as their piston rods for possible surface damage.

1.7.3 First start-up of the machine

Start-up must be preceded by training conducted by the Seller or authorized employees of the Seller.

The scope of operations during the first start-up

- Make sure that the hydraulic and electrical connections on the carrier vehicle comply with the manufacturer's requirements.
- Make sure that the hitching system of the implement is compatible with the hitching system in the carrier vehicle,
- Check all lubrication points and regrease if necessary.

If the condition of the machine is satisfactory, proceed to a test drive:

- Connect the machine to the appropriate carrier vehicle hitch (front extension axle enabling raising and tipping of the sweeper)
- Connect the hydraulic and electrical lines.
- Turn on individual lights and check the correct operation of the electrical system.
- By controlling the appropriate circuits of the carrier's hydraulic distributor, check the correct operation of the hydraulic system.
- Perform test drive.

If during test run worrying symptoms occur such as:

- noise and abnormal sounds originating from the abrasion of moving elements of the machine design,
- Hydraulic oil leak,
- Incorrect hydraulic system operation,

or other faults, find the cause of the problem. If a fault cannot be rectified or the repair could void the guarantee, please contact the dealer for additional clarifications or to make a repair.

After completing the test run, check the tightening of the suspension nuts.

WST.2.6-002.01.EN

1.8 ENVIRONMENTAL HAZARD

DANGER

Used oil or collected residues mixed with absorbent material should be stored in an accurately marked container. Do not use food packaging for this purpose.

CAUTION

Oil waste may only be delivered to a point dealing with the utilization or regeneration of oils. Under no circumstances should oils be poured into drains or water bodies.

A leakage of hydraulic, lubricating or diesel oil is a direct threat to the natural environment due to the limited biodegradability of the substance.

When carrying out maintenance and repair works where there is a risk of leakage, perform these works in rooms with an oil-resistant surface. In the event of a substance leak into the environment, first secure the source of the leak, and then collect the spilled substance using available means. Collect the remaining oil with sorbents or mix with sand, sawdust or other absorbent materials. The collected contaminants should be stored in a sealed and marked container, resistant to hydrocarbons, and then transferred to a disposal point. The container should be kept away from heat sources, flammable materials and food.

Used oils or oils that cannot be reused due to the loss of their properties are recommended to be stored in their original packaging in the same conditions as described above.

WST.3.B-008.01.EN

1.9 PERSONAL PROTECTIVE EQUIPMENT

1.9.1 General

CAUTION

Personal protective equipment should be used in accordance with the recommendations of the security manufacturer.

Follow local regulations regarding personal protective equipment.

The personal protective equipment listed below is a minimum protection for the operator against the effects of unfavourable external factors and is only a recommendation for use.

We recommend carrying out a risk assessment at the machine's workplace and adjusting the personal protective equipment of operator depending on the actual working conditions.

1.9.2 Work clothing

Work clothing should fit the operator's body correctly. The material from which the clothing is made should be characterized by high tear strength. Clothing must not have any protruding elements that may be accidentally caught by the mechanisms of the machine.

1.9.3 Hearing protectors

It is recommended to use of ear muffs for use with a protective industrial helmet for hearing protection. The selection of the damping value should be selected individually depending on the noise level at the location of the machine, which is the result of various sources (e.g. tractor, loader, belt conveyors, etc.).

Remember to properly store and maintain your hearing protectors. Poorly stored and maintained hearing protectors lose their protective properties over time. Periodically replace the soundproofing cushions according to the manufacturer's recommendations.

1.9.4 Work shoes

Work shoes should have the following properties:

- non-slip sole,
- sole material made of a material resistant to oils, gasoline and other organic solvents.
- toe cap resistant to impact with an energy of 200 J,
- insert securing the foot against piercing of the sole.

The above properties correspond to the S3 shoe category according to PN-EN ISO 20345.

1.9.5 Warning vest

The warning (reflective) vest is designed to increase the operator's visibility to other users. Instead of a reflective vest, you may wear work clothes that meet the requirements of EN471. It is recommended that the warning vest (or work clothing) be class 2.

1.9.6 Protective gloves

Protective gloves should be selected depending on the currently performed work.

Strong protective gloves

Strong protective gloves for hand protection are used for protection during heavy work such as cleaning the machine, removing clogs and the like, where there is a risk of damaging the hands. Protective gloves should protect the hands from cuts, scratches, abrasions, punctures and similar injuries to the skin and

against light burns in contact with hot surfaces.

Light protective gloves

For light work (general operation, minor maintenance etc.), we recommend using light protective gloves for work in a dry or slightly oily environment. The working surface of the gloves (internal part should be covered with an impermeable material, e.g. nitrile.

Nitrile gloves

Nitrile gloves designed for working with urea, fuel or lubricants. They are designed for light work where there is a risk of skin contact with lubricants, fuel, urea, gear oil and hydraulic oil.

1.9.7 Safety glasses with side shields

Safety glasses to protect the eyes against contact with hazardous substances, splashing liquids or dust and airborne of the machine dust. Safety glasses with side shields increase the level of protection.

1.9.8 Industrial protective helmet

The industrial safety helmet is designed to protect the head against injuries related to the fall of thrown objects, parts or materials. The design of the helmet should be in accordance with the EN397 standard. During normal machine operation, wearing lightweight industrial helmets will not protect the user from injury and is therefore not recommended.

The protective helmet must fit correctly to the anatomical shape of the skull. There are adjustment straps for this purpose. The helmet has a limited shelf life.,

After this date, the material from which it was made loses its properties and does not fulfil the assumed task. The helmet must be replaced.

1.9.9 Anti-dust respirator

CAUTION

Remember that personal protective equipment should be regularly maintained and used in accordance with the recommendations of the product manufacturer. Following these guidelines will ensure safe use and the best protection.

Dust can become airborne when operating the machine. It is recommended to use disposable respirators with an exhalation valve to protect the respiratory tract.

The size of the mask should match the operator's face. The mask should fit snugly against the skin. The nasal part should be adjusted using the adjustment plate. Remember that facial hair can make it difficult to seal the face mask.

Minimum half mask recommendations:

- type FFP1, in accordance with EN-149: 2001 + A1: 2009, protection against non-toxic liquid or solid aerosols,
- P1 class.

WST.3.C-004.01.EN

CHAPTER 2.

BASIC INFORMATION

Pronar ZM-H22

2.1 IDENTIFICATION

2.1.1 Machine identification

TIP

Demand that the seller carefully and accurately fills out the *Warranty Book* and warranty repair coupons. A missing date of purchase or sale point stamp, may make the user ineligible for any warranty repair or refund.

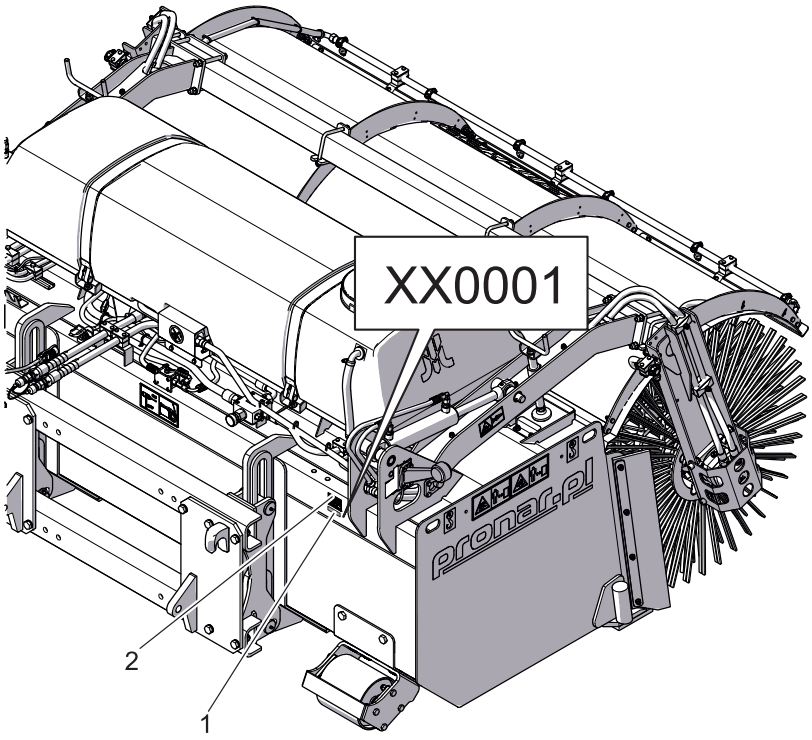


Figure 2.1 Machine identification
(1) serial number *(2) nameplate*

The machine is marked with the nameplate (2) and the factory number (1) located on a distinguished rectangular field on the machine frame.
When buying the sweeper check that the serial numbers on the machine agree with the number written in the *Warranty Book*, in the sales documents and in the *Operator Manual*.

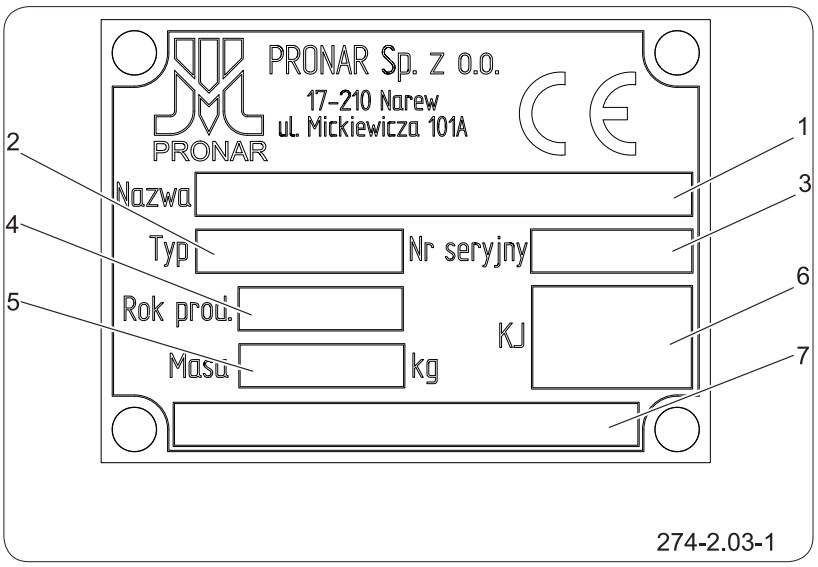


Figure 2.2 Name plate

1- machine name
2 - type
3 –serial number
4 – year of manufacture
5 – machine tare weight [kg]
6 – quality Control stamp
7 – unfilled box or extension of name (box A)

INF.2.6-001.01.EN

2.2 INTENDED USE OF THE MACHINE

2.2.1 Intended use

DANGER

The machine must not be used for purposes other than those for which it is intended.

The ZM-22H mounted sweeper is used to collect dirt and snow from access roads, squares, parking spaces, extensive warehouse areas, external surroundings of buildings with paved surfaces as asphalt, concrete paving blocks, concrete. The sweeper may be used by road maintenance services for cleaning the roadbed prior to application of asphalt layer on renovated road sections.

The sweeper is designed to work with carrier vehicles equipped with an extension arm (device)
enabling lifting and tipping of sweepers (loaders) that meet the requirements contained in Table *"Requirements of a carrier vehicle equipped with a front extension arm"*.

During the use of the machine comply with all road traffic regulations and transport regulations in force in the given country, and any breach of these regulations is regarded by the Manufacturer as use contrary to the intended use of the machine.

Using it as intended also involves all actions connected with the safe and proper operation and maintenance of the machine.

Due to the above, the user is obliged to:

- carefully read the Operator Manual and comply with its recommendations,
- understand the machine's operating principle and how to operate it safely and correctly,
- comply with general safety regulations while working,
- prevent accidents,
- comply with road traffic regulations.

The machine may only be used by persons, who:

- are familiar with this publication and with the carrier vehicle's Operator Manual,

- have been trained in machine operation and safe working conditions,
- have the required authorisation to drive the vehicle and are familiar with the road traffic regulations and transport regulations.

2.2.2 Anticipated misuse

The sweeper ZM-22H must not be used for purposes other than those for which it is intended, in particular:

- the machine must never be used by unauthorised persons, including children and people under the influence of alcohol or other drugs.
- transporting any loads,
- performing construction and excavation works;
- transporting people and animals,
- working with a damaged machine;
- working without covers;
- working around other people;
- working with an unrecommended carrier vehicle and with unrecommended parameters;
- working with an excessively worn brush;

Do NOT allow anyone without qualifications and required skills or anyone who has not been trained in the safe use, health and safety, to operate the machine.

When operating the machine, do NOT:

- stay in the danger zone,
- climb on the machine when it operates,
- making unauthorised alterations to machine design,
- allow unauthorized and unqualified person to repair and service the machine

INF.2.6-002.01.EN

2.3 CARRIER VEHICLE (FRONT LOADER) REQUIREMENTS

Tabela 2.1. Requirements of a carrier vehicle equipped with a front extension arm

Contents	Unit	Requirements
		PL
Hydraulic system		
Hydraulic oil	-	L-HL 46 (1)
Maximum system pressure	bar/MPa	250 / 25
Hydraulic oil demand	l/min	50-70
The required tractor hydraulic outlets		sockets 12.5 ISO 7241-1 Type A 1 pair of mushroom quick connectors for continuous operation with the possibility of changing the direction of hydraulic oil flow
Electrical system		
Electrical system voltage	V	12 or 24
Electric socket	-	3-pin socket compliant with DIN 9680,
Implement attachment system		
linkage system enabling lifting and tipping	-	lockable EURO (2)
Minimum extension arm lifting capacity	kg	2500
Other requirements		
-	-	-
-		-

(1) – use of other oil is permitted on condition that it may be mixed with the oil in the machine. Detailed information can be found on the product information sheet attached.
(2) – Other sweeper linkage on request

INF.2.6-003.01.EN

2.4 MACHINE EQUIPMENT

Tabela 2.2. Equipment

Contents	Standard	Additional	Optional
Operator Manual	●		
Warranty Book	●		
EURO linkage	●		
Connection wire for the electrical system		●	
Electrical lighting system 12V / 24V		●	
Electrical lighting system for sprinkler system 12V / 24V		●	
12V sprinkler		●	
Water pump 24V			●
Hard brush			●
Soft brush			●
Support rollers		●	
Jockey wheels			●

(1) Some standard equipment components, which are listed in the table, may not be present in the delivered machine. This allows the possibility of ordering new machines with a different set of optional equipment, replacing standard equipment.

INF.2.6-004.01.EN

2.5 TRANSPORT

ATTENTION

Do NOT secure lifting slings or any types of securing elements to hydraulic and electrical system components and fragile elements of the machine (e.g. shields, lines)

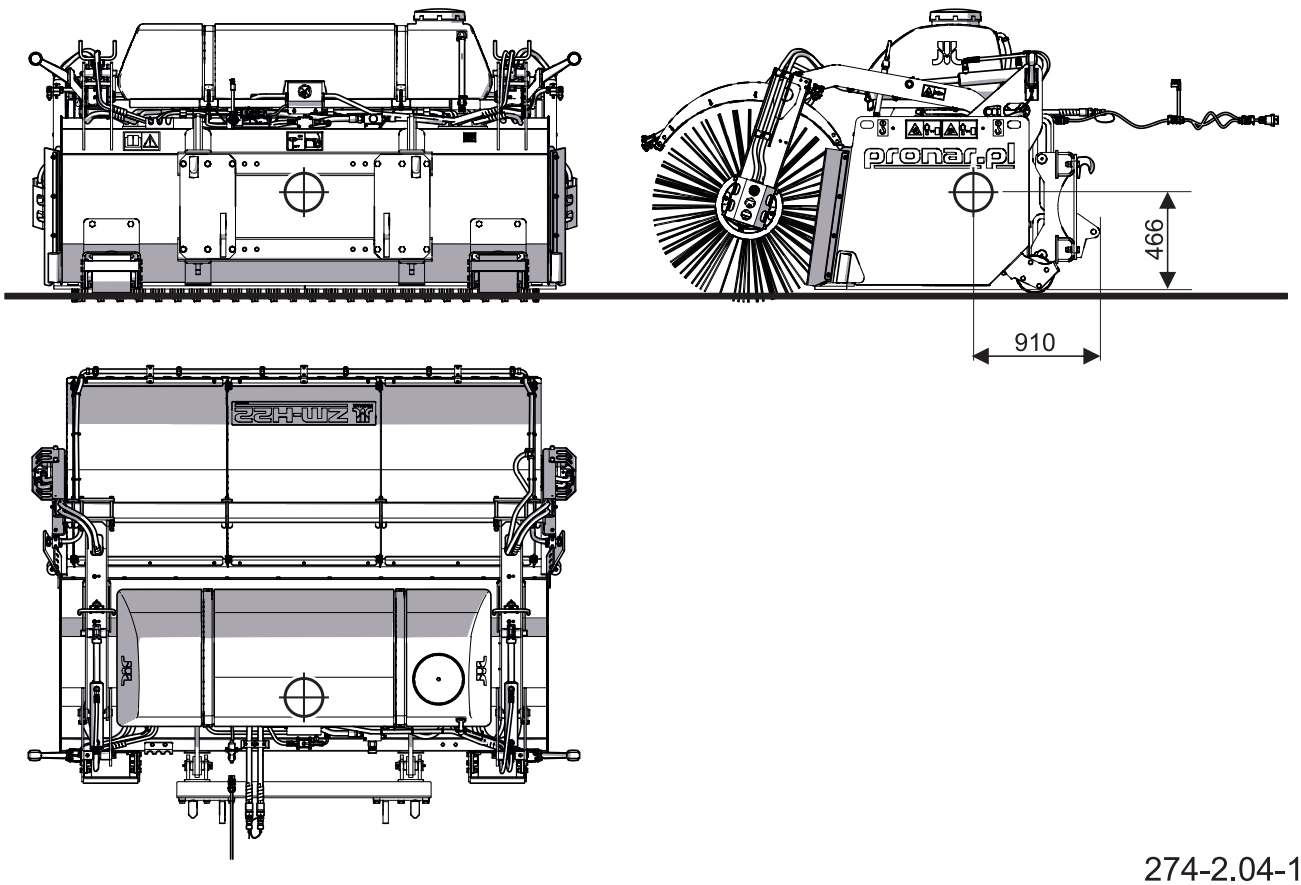
ATTENTION

When transporting independently, the user must carefully read this Operator Manual and observe all its instructions.

The machine is prepared for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation and any extra accessories (e.g. wiring harness). Delivery is either by transport on a vehicle or independently.

Transport of the machine is permissible connected to a carrier vehicle provided the vehicle's driver familiarises himself with the machine's Operator Manual and particularly with information concerning safety and principles of hitching and transport on public roads.

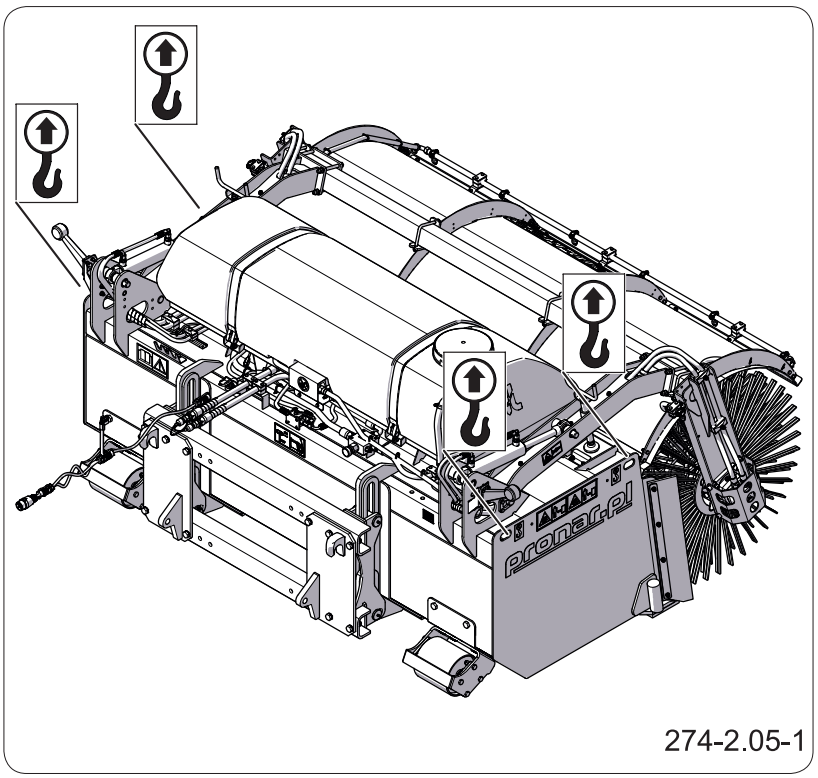
When loading and unloading the machine, follow the general health and safety regulations for reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines. The machine should be attached to lifting



Rysunek 2.3 Machine's centre of gravity

ATTENTION

When transporting independently, the aggregated machine must not cover the carrier's road lighting.



Rysunek 2.4 Attachment points

equipment in places specially designed for this purpose and marked (Figure "*Attachment points*").
The sweeper should be firmly secured on the transport vehicle platform with belts or chains equipped with a tensioning mechanism. The fastening equipment used must have a valid safety certificate. Exercise due caution when lifting the machine. During reloading work, special care should be taken not to damage the paint coating.

INF.2.6-005.01.EN

2.6 TERMS & CONDITIONS OF WARRANTY

TIP

Demand that the seller carefully and accurately fills out the Warranty Book and warranty repair coupons. A missing date of purchase or sale point stamp may make the user ineligible for any warranty repair or refund.

PRONAR Sp. z o.o., Narew guarantees the reliable operation of the machine when it is used according to its intended purpose as described in the Operator Manual. Defects discovered during the warranty period will be removed by the Warranty Service. The repair period is specified in the *Warranty Book*.

The warranty does not cover those parts and sub-assemblies of the machine which are subject to wear in normal usage conditions, regardless of the warranty period.

The warranty service only applies to such cases as: mechanical damage which is not the user's fault, factory defects of parts, etc.

In the event of damage arising from:

- mechanical damage which is the user's fault, damage caused by road accidents,
- incorrect use, adjustment or maintenance, use of the machine for purposes other than those for which it is intended,
- use of damaged machine,
- repairs carried out by unauthorised persons, repairs carried out improperly,
- making unauthorised alterations to machine design,

the user will lose the right to warranty service.

Do NOT attempt to modify the machine without the written consent of the Manufacturer. In particular, do NOT weld, drill holes in, cut or heat the main structural elements of the machine, which have a direct impact on the machine operation safety.

INF.2.6-006.01.EN

2.7 ENVIRONMENTAL RISK

DANGER

Used oil or collected residues mixed with absorbent material should be stored in an accurately labelled container. Do not use food packaging for this purpose.

CAUTION

Oil waste may only be taken to an oil recycling or reclamation centre. It is forbidden to discharge or pour oil into drains or bodies of water.

ADVICE

The machine's hydraulic system is filled with L-HL 46 oil.

A hydraulic oil spill poses direct environmental risks due to its limited biodegradability. Maintenance and repair work where there is a risk of oil spills should be carried out in rooms with an oil-resistant surface. In the event of a spill into the environment, the source of the spill must first be secured and the spilled substance must then be collected using available means. Collect oil residues with sorbents or mix with sand, sawdust or other absorbent materials. Collected oil contaminants should be stored in a sealed and labelled hydrocarbon-resistant container and then taken to an oil waste disposal facility. Keep the container away from heat sources, flammable materials and food.

Used oil or oil unsuitable for reuse due to loss of its properties is recommended to be stored in the original packaging under the same conditions as described previously.

INF.2.6-007.01.EN

2.8 WITHDRAWAL FROM USE

DANGER

Reduce the residual pressure in the hydraulic system before dismantling.

DANGER

During dismantling, use appropriate tools and equipment (overhead cranes, elevators, lifts, etc.) and use personal protective equipment, i.e. protective clothing, footwear, gloves, glasses, etc.

Avoid oil contact with skin. Do not allow oil to leak.

If the user decides to withdraw the machine from use, follow the disposal and recycling regulations of the end-of-life machines in your country.

Reduce the residual pressure in the hydraulic system before dismantling, completely remove the oil.

In the event of parts being replaced, worn or damaged sent them to a recycling centre. Used oil as well as rubber or plastic elements send to plants dealing with the utilization of this type of waste.

Tabela 2.3. The codes for the waste arising from disassembly machines

Item	Code	Meaning
1	07 02 13	Plastic waste
2	13 01 10	Other hydraulic oils
3	13 02 04*	Mineral engine, transmission and lubricating oils containing organochlorines
4	13 02 06*	Synthetic engine, transmission and lubricating oils
5	13 02 08*	Other engine, transmission and lubricating oils
6	13 05 02*	Sludges from oil drainage in separators
7	13 05 08*	A mixture of wastes from sandblasting and oil drainage in separators
8	15 01 10*	Packaging containing or contaminated with residues of dangerous substances
9	15 02 02*	Sorbents, filter materials and protective clothing contaminated with hazardous substances
10	16 01 17	Ferrous metals
11	16 01 22	Other items not listed

INF.2.6-008.01.EN

CHAPTER 3.

SAFETY OF USE

PRONAR ZM-H22

3.1 SAFE USE

ATTENTION

If the information in this Operator Manual is difficult to understand, contact the seller who runs the authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.

- Before use, the user must carefully read this Operator Manual and the Warranty Book. When operating the machine, follow all instructions in these documents.
- The machine may only be used and operated by persons qualified to drive carrier vehicle and trained in the use of the machine. Sweeper can be operated by a single person only.
- Careless and improper use and operation of the machine, and failure to comply with the instructions of this Operator Manual is dangerous to your health as well as health of bystanders.
- Be aware of the residual risk. Use caution when operating this machine and follow all relevant safety instructions.
- The machine must never be used by persons who are not authorised to drive carrier vehicle, including children, and people under the influence of alcohol or other drugs.
- The machine must not be used for purposes other than those for which it is intended. Anyone who uses the machine for purposes other than those for which it is intended takes full responsibility for any consequences of this potentially incorrect use.
- Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the guarantee.
- The machine may only be used when all the protective features (i.e. safety guards, bolts, cotter pins, warning decals) are technically sound and correctly positioned. In the event of loss or damage to the protective features, they must be replaced with new ones.

BHP.2.6-001.01.EN

3.2 SAFETY WHEN HITCHING THE MACHINE

- Connect and transport the machine only with a carrier vehicle that meets the requirements set by the Manufacturer - see table "*Requirements for a carrier vehicle equipped with a front extension arm"*.
- Do NOT hitch the machine to carrier vehicle if hydraulic oil in the two machines is of different types.
- After completion of hitching the machine, check the safeguards.
- The carrier vehicle to which you will connect the machine must be technically functional.
- Be especially careful when hitching and unhitching the machine.
- When hitching, there must be nobody between the machine and the carrier vehicle.
- Before disconnecting the equipment from the carrier vehicle, empty the bucket and lower the brush as much as possible.
- Lift the brush on the screws so as not to deform the bristles.
- Disconnect the machine from the carrier vehicle in such a place that it is placed on a horizontal, sufficiently hard surface to enable it to be reconnected.

BHP.2.6-002.01.EN

3.3 SAFETY RULES WHEN MAINTAINING HYDRAULIC SYSTEM

- The hydraulic system is under high pressure when operating.
- Regularly check the technical condition of the hydraulic lines and connections. There must be no oil leaks.
- In the event of the hydraulic system malfunction, discontinue using the machine until the malfunction is corrected.
- When connecting hydraulic lines to carrier vehicle, make sure that the hydraulic system is not under pressure. If necessary, reduce residual pressure in the system.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may find its way under the skin and cause infections. In the event of contact of oil with eyes, rinse eyes with a large quantity of water and if irritation occurs, consult a doctor. In the event of contact of oil with skin wash the area of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene).
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.
- Rubber hydraulic lines must be changed every 4 years regardless of technical condition.
- Repair and replacement of hydraulic system elements should be entrusted to the appropriately qualified persons.

BHP.2.6-003.01.EN

3.4 SAFETY DURING TRANSPORT TRAVEL

Before driving on the roads:

1. Make sure the machine is properly coupled to the carrier vehicle.
2. All travel back and forth during loading/unloading should be with the implement lowered down so that it does not obscure visibility and does not have any contact with the ground.
3. Check whether lights work correctly.

Also:

- When driving on public roads, observe all road traffic regulations in force in the country, in which the machine is used.
- Do not exceed the maximum speed resulting from road conditions and design restrictions (maximum of 25 km/h). Adjust your speed to the road conditions.
- Do NOT ride on the machine or transport any materials on it.
- Before using the machine always check its technical condition, especially in terms of safety. In particular, check the technical condition of the hitch system and elements connecting the hydraulic system.
- Reckless driving and excessive speed may cause accidents.
- When driving the machine on uneven terrain, exercise particular caution and reduce the travel speed as the carrier and the machine may become damaged or overturned.

BHP.2.6-004.01.EN

3.5 MAINTENANCE AND CLEANING

- During the warranty period, any repairs may only be carried out by warranty service authorised by the Manufacturer. It is recommended that necessary repairs to machine should be undertaken by specialised workshops.
- In the event of any fault or damage, do not use the machine until the fault has been corrected.
- During work, use appropriate, close-fitting protective clothing, gloves and appropriate tools. When working on hydraulic system, use oil-resistant gloves and protective glasses.
- Any modification of the machine releases the manufacturer from any responsibility for damage or detriment to health which may arise as a result.
- Before commencing any work on the machine, turn off the carrier vehicle engine and wait until all rotating parts have come to a stop.
- Regularly check the technical condition of the safety devices and correct tightening of bolt connections.
- Regularly perform service inspections of machine as recommended by the Manufacturer.
- Do NOT perform maintenance or repair work under raised and unsupported machine.
- Reduce the oil pressure before starting repair work on the hydraulic system.
- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately rinsed and disinfected. In the event of more serious injuries, seek a doctor's advice.
- Repair, maintenance and cleaning work should be carried out with the carrier vehicle engine turned off and the ignition key removed. Immobilise the

carrier vehicle with parking brake. Ensure that unauthorised persons do not have access to the carrier vehicle (agricultural tractor) cab.

- Should it be necessary to change individual parts, use only original parts. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and invalidate the warranty.
- Regularly check technical condition and mounting of all guards and protective elements.
- In the event of work requiring the machine to be raised, use properly certified hydraulic or mechanical lifts for this purpose. After lifting the machine, stable and durable supports must also be used.
- The machine must not be supported using fragile elements (bricks or concrete blocks).
- After completing work associated with lubrication, remove excess oil or grease.
- In order to reduce the danger of fire the machine must be kept in a clean condition.
- Before using the pressure washer the user is obliged to acquaint himself with the operating principles and recommendations concerning safe use of this equipment.
- Use only clean running water. Cleaning detergents with neutral pH may be used, which do not react aggressively with the mobile conveyor's structural elements.
- The use of pressure washers increases the effectiveness of washing, but be careful when using them. During washing, the washer nozzle may not be placed closer than 50 cm from the cleaned surface.
- Water temperature should not exceed 55 ^{0}C.
- Do not aim the water jet directly at system components and equipment, i.e. control valves,

DANGER

Carefully read the instructions for application of detergents and maintenance preparations.

While washing with detergents, wear appropriate protective clothing and goggles protecting against splashing.

bearings, electric and hydraulic plugs, lights, electrical connectors, information and warning decals, nameplate, cable connectors, lubrication points, control panels, safety switches etc. High pressure water jet may penetrate the machine, resulting in mechanical damage or corrosion.

- Do not apply organic solvents, preparations of unknown origin or other substances, which may cause damage to lacquered, rubber or plastic surfaces. In the event of doubt it is recommended to make a test on an unseen surface area.
- Surfaces smeared with oil or grease should be cleaned by application of white spirit or other degreasing agents and then washed with clean water with added detergent. Follow the cleaning agent manufacturer instructions.
- Washing detergent should be kept in original containers, optionally in replacement containers, but very clearly marked. Preparations may not be stored in food and drink containers or in unmarked containers.
- Observe the environmental protection rules, wash the machine in places designed for this purpose.
- Washing and drying the machine must take place at temperature above 0 ^{0}C.
- Each time after washing lubricate the machine.

BHP.2.6-005.01.EN

3.6 SAFETY DURING MACHINE OPERATION

DANGER

The machine may create dust and can throw objects at considerable distances during operation. The affected danger zone is about 10 m.

Stop the machine when bystanders are in the affected danger zone.

- Before starting the machine make sure that there are no bystanders (especially children) or animals in the danger zone. The machine operator is obliged to ensure proper visibility of the machine and the working area.
- Before starting work, the user must carefully acquaint himself with the workplace and its surroundings.
- Before lifting or lowering the implement hitched to the loader, make sure that there are no bystanders near the machine.
- During implement operation do not occupy a different position than that of the operator in the vehicle's cab. Do NOT leave the cab, when the machine is in operation.
- Do NOT stand within the implement's working zone.
- The front loader and the implement may not be fitted with lifting slings or used for loading, unloading and mounting work with such equipment, because the safety of the employees in the working zone is not guaranteed and may cause damage to machine.
- Keep a safe distance from overhead electric power lines during work with raised implement.
- Do not exceed the maximum speed of 6 km/h when travelling with the implement.
- Do not raise the sweeper to extreme heights on gradients or slopes. Take note of uneven terrain and its load bearing capacity.
- When driving with loads do not make sharp turns or brake suddenly.
- When driving with load, braking distance is increased, therefore be particularly careful when travelling on gradients or slippery surfaces.

- Do not leave raised and unsecured implement. When parked, the implement should be lowered.
- Before using the implement always check its technical condition, especially in terms of safety. In particular, check the technical condition of the securing elements and the hydraulic system.
- Do NOT stay between the carrier and the machine.
- Do NOT approach the machine until the rotating parts come to a complete stop.

BHP.2.6-006.01.EN

3.7 RESIDUAL RISK

Pronar Sp. z o. o. in Narew has made every effort to eliminate the risk of accidents. There is, however, a certain residual risk, which could lead to an accident, and this is connected mainly with the actions described below:

- using the machine for purposes other than those for which it is intended,
- being between the carrier vehicle and the machine while the engine is running and when the machine is being attached,
- being on the machine while the engine is running,
- operating the machine with removed or faulty safety guards,
- failure to maintain a safe distance from the danger zone or being within the zones while the machine is operating,
- machine operation by unauthorized persons or persons under the influence of alcohol or psychoactive substances
- cleaning, maintenance and technical checks when carrier vehicle is connected and engine is running.
- sweeping surfaces where there may be long elements (wire, ropes, cables)
- sweeping surfaces with protruding elements (risk of encountering an invisible obstacle);
- excessive driving speed,
- careless maintenance and replacement of sharp brush elements.

The residual risk may be kept to a minimum by following the recommendations below:

- operate the machine in prudent and unhurried manner,
- reasonably apply all the remarks and recommendations stated in the Operator Manual,

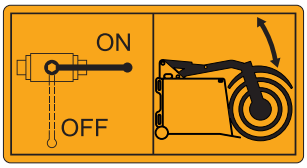
- carry out repairs and maintenance work in line with operating safety rules,
- repair and maintenance work should be carried out by persons trained to do so,
- use close fitting protective clothing,
- ensure unauthorised persons have no access to the machine, especially children,
- maintain a safe distance from prohibited or dangerous places
- do not climb on the machine when it is operating or transported

BHP.2.6-008.01.EN

3.8 INFORMATION AND WARNING DECALS

The machine is labelled with the information and warning decals mentioned in table 2.1. Throughout the machine use, you must ensure that any warning messages and information decals located on the machine are clear and legible. If any are destroyed or damaged, they must be replaced with new. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. During machine cleaning do not use solvents, which may damage the coating of information decals and do not subject them to strong water jets.

Tabela 3.4. Information and warning decals

Item	Decal	Meaning
1		Brush raising valve operation Position "open" - "closed" **274N-00000025**
2		Thrown out objects endanger the whole body. Keep a safe distance. **12N-00000008**
3		Pressurised liquid jet. Keep a safe distance. **12N-00000009**

Item	Decal	Meaning
4		Danger of crushing or cutting limbs. Keep a safe distance. **178N-00000005**
5		Before starting work, carefully read the Operator Manual. **35N-27000007**
6		Transport belts or chains fastening points **35N-27000009**
7	pronar.pl	Decal PRONAR **566N-97000000-03**
8	PRONAR ZM-H22	Machine type **274N-00000018**

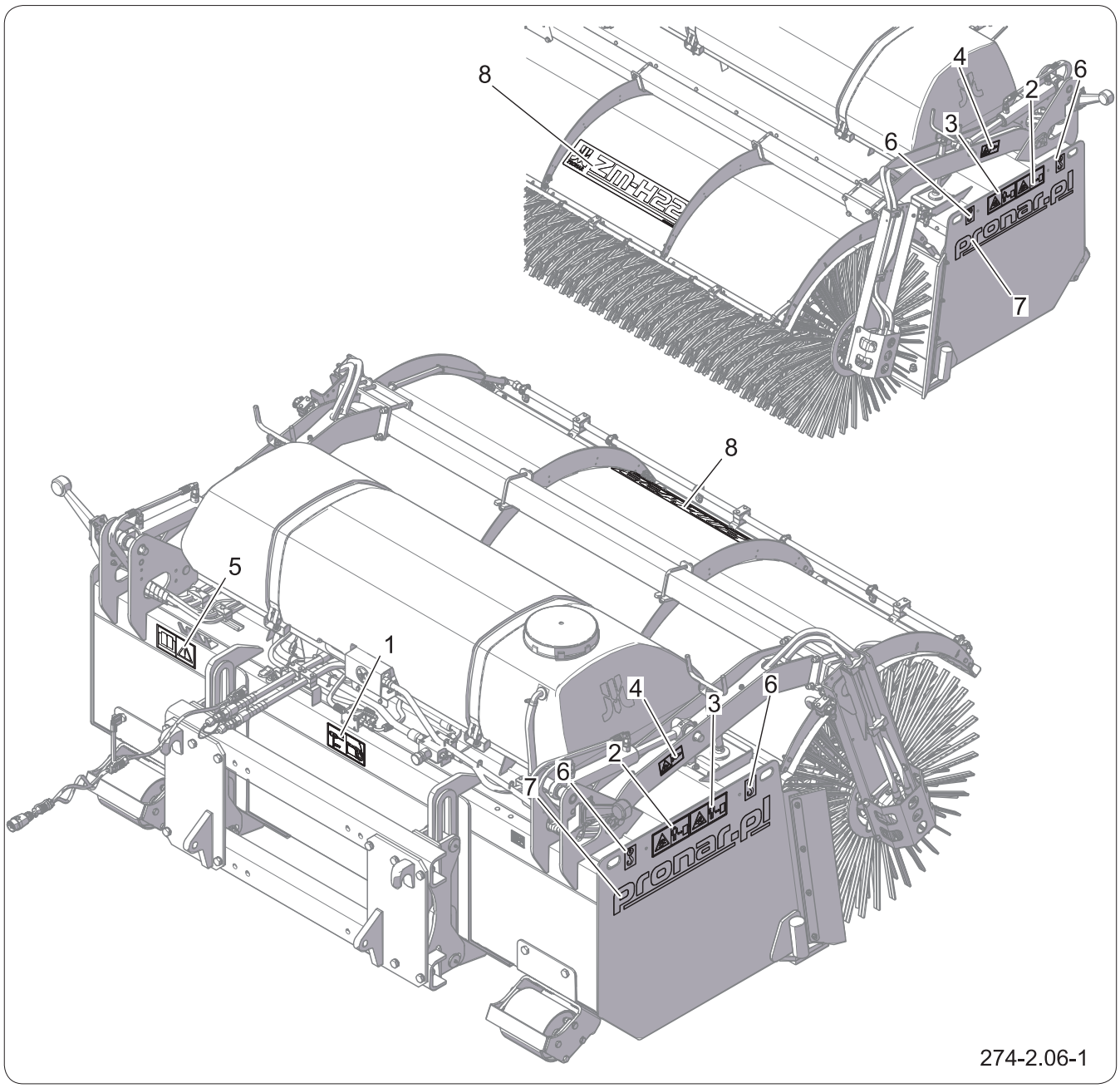


Figure 3.1 Locations of information and warning decals

BHP.2.6-009.01.EN

CHAPTER 4.

CONSTRUCTION AND PRINCIPLE OF OPERATION

PRONAR ZM-H22

4.4 TECHNICAL SPECIFICATION

Contents	Unit	ZM-H22
Dimensions		
Width	mm	2545
Height without water tank	mm	1220
Height with water tank	mm	1370
Length	mm	2140
Technical specification		
Sweeping width	mm	2200
Capacity of the tank	l	1300
Tare weight	kg	995 (basic version)
Method of attachment to carrier vehicle	-	Front media extension arm
Linkage		EURO*
Brush diameter	mm	910
Rotation speed of brush (max)	rpm	280
Operating speed	km/h	(0-6)**
Maximum transport speed**	km/h	25
Nominal pressure in the hydraulic system (hardware limited to 21MPa	MPa (bar)	16-21 (160-210)
Hydraulic quick coupler plug		CNV082/1615 M
Oil delivery	l/min	50-70
Emitted sound pressure level $L_{WAśr}$	dB	86,75 +/-3
Other information	-	single person operation

**) - standard, other types of linkage on request.*

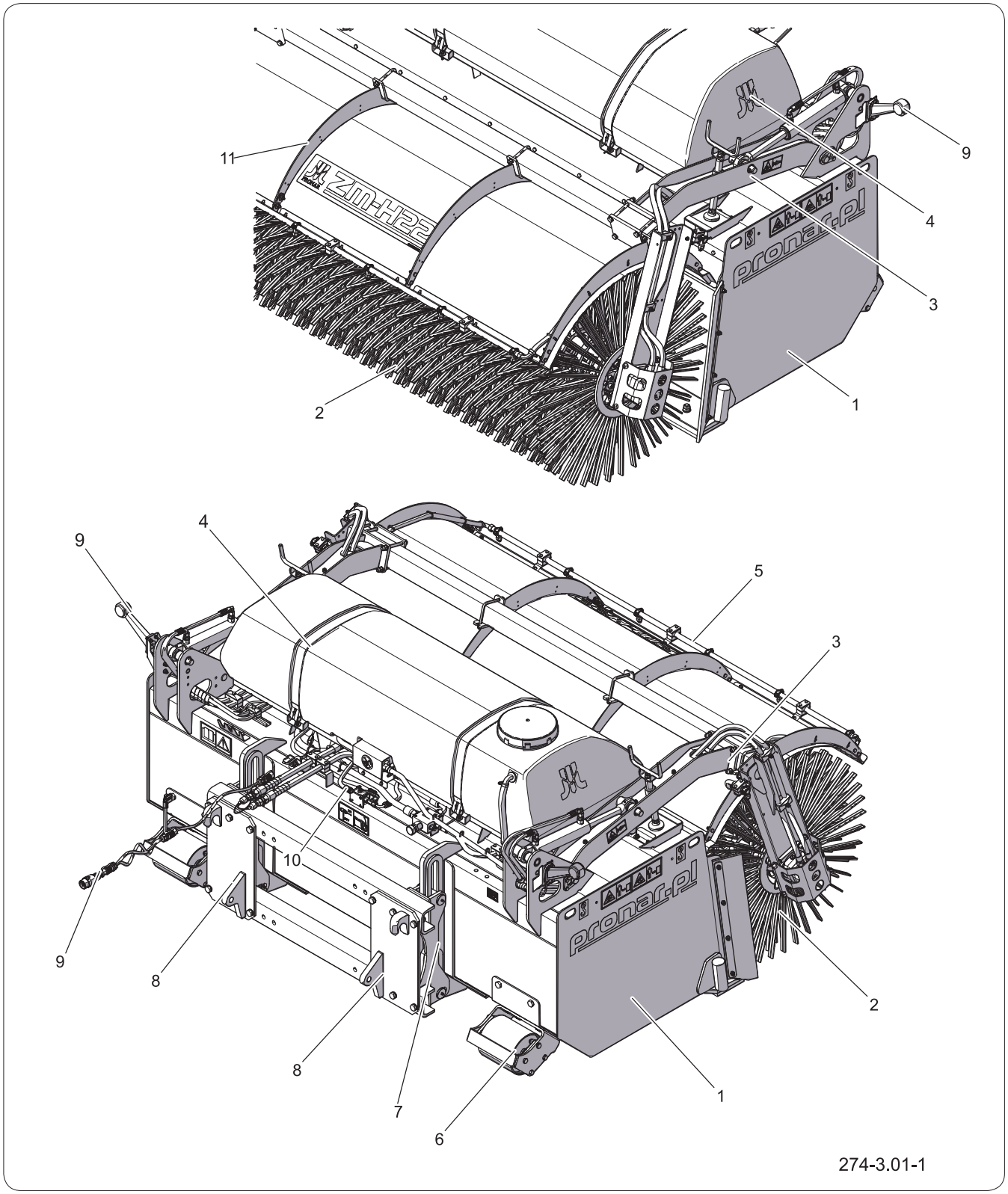
***) - operating speed should be adapted to the type and amount of collected material and the terrain*

ATTENTION

Some technical parameters may vary depending on additional equipment of the machine.

BIZ.2.6-001.01.EN

4.5 DESIGN AND OPERATION



Rysunek 4.1 Machine design

(1) Sweeper tank
(2) Brush
(3) Brush arm
(4) Water tank
(5) Sprinkler system
(6) Roller
(7) Frame
(8) Linkage
(9) Lighting system
(10) Hydraulic system
(11) Brush shields

The ZM-22H sweeper is a machine suspended on the front extension arm of carrier vehicle (such as wheel loaders and agricultural tractors with front loaders) using a linkage system (8) adapted to a specific carrier vehicle.

The machine consists of a metal waste container (1) equipped with a replaceable blade made of abrasion--resistant steel. At the rear of the waste container there is an adapter with a floating function (7) to which the suspension system (8) is screwed. In front of the container, on arms (3) lifted by two hydraulic cylinders, there is a cylindrical brush (2) driven by two hydraulic motors. The brush consists of a shaft on which replaceable brush rings with bristles made of plastic or wire are placed.

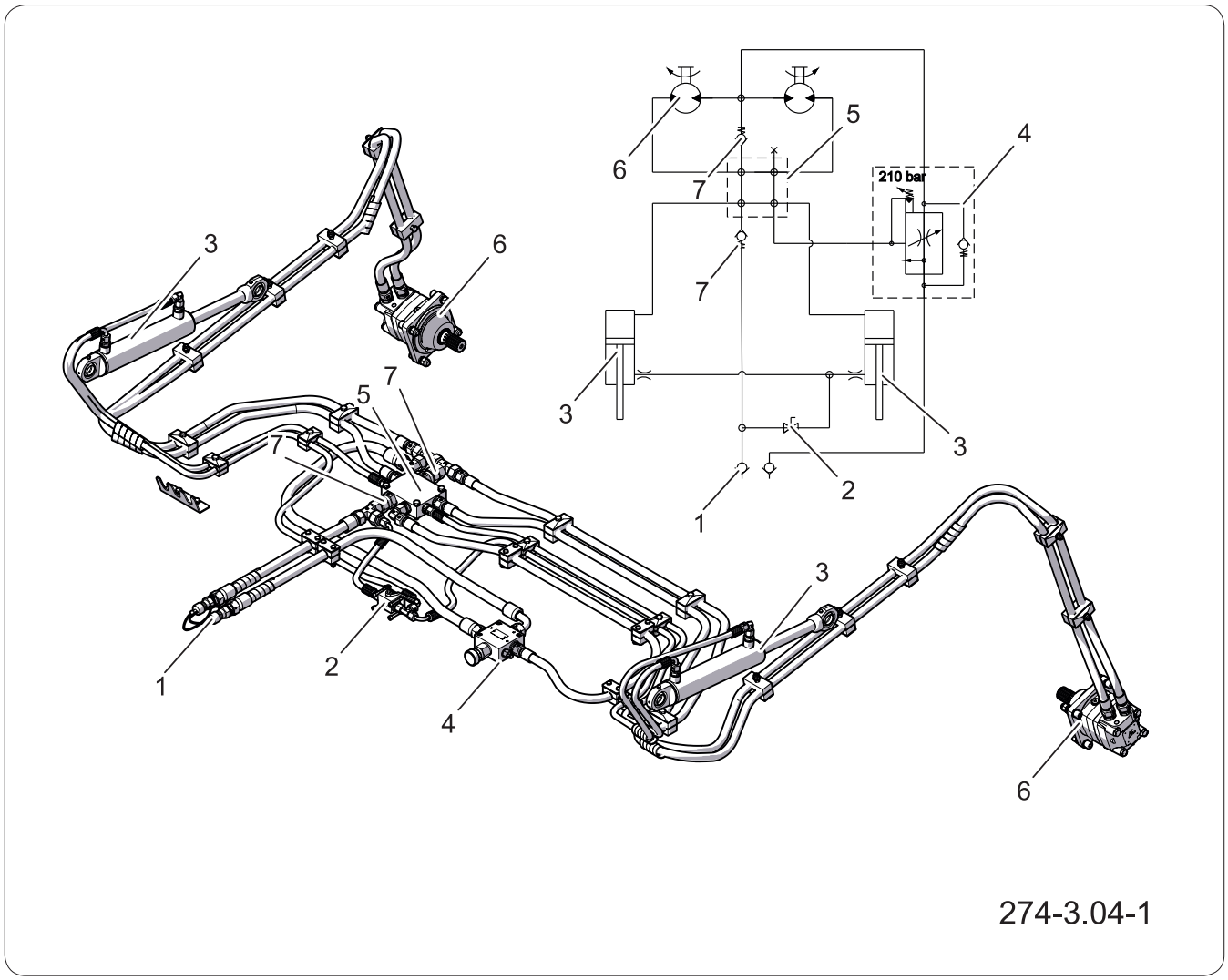
If the machine is lowered as much as possible, the sweeper will rest on the bottom of the tank (1) or optionally on rollers (6) or support wheels located at the rear of the sweeper.

Covers (11) are used to protect against elements thrown out of the container (1).

The machine can be equipped with clearance lamps (9) and a sprinkler system (5) with a water container (4).

BIZ.2.6-002.01.EN

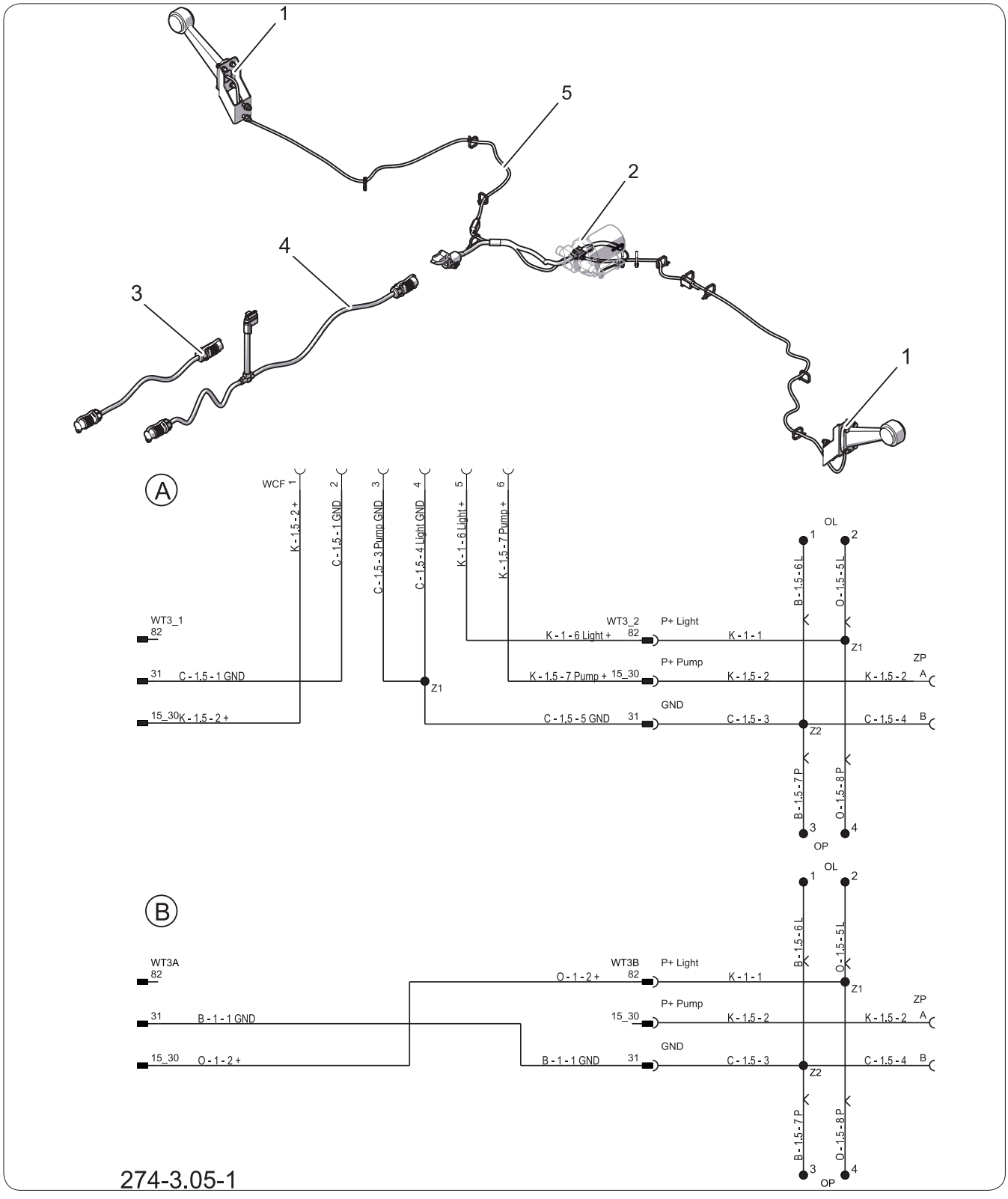
4.6 HYDRAULIC SYSTEM



Rysunek 4.2 Design of hydraulic system of ZM-22H sweeper
(1) hydraulic connections (2) safety valve (3) cylinder
(4) three-way flow regulator (5) body (6) hydraulic motor
(7) check valve

BIZ.2.6-004.01.EN

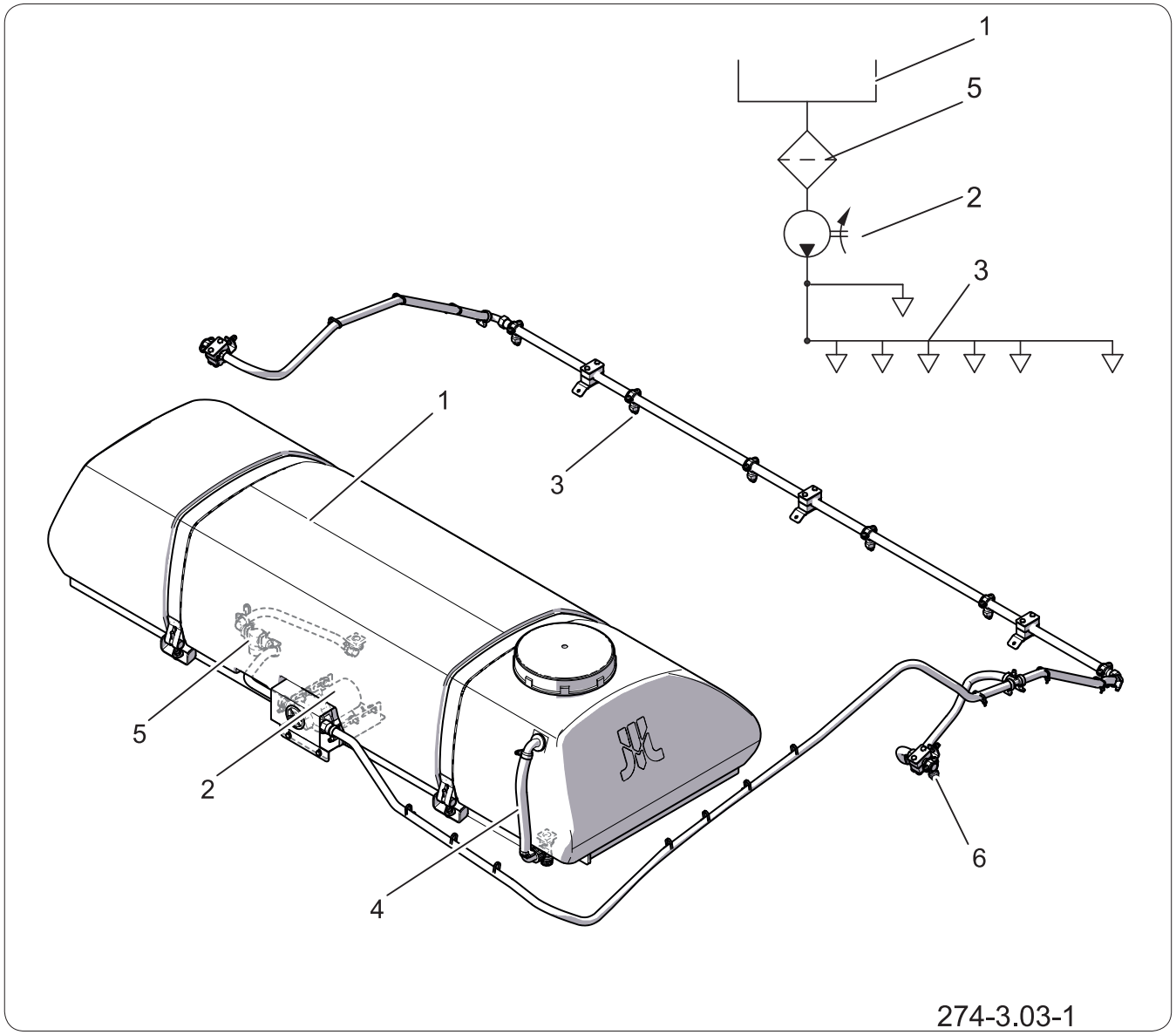
4.7 ELECTRICAL SYSTEM



Rysunek 4.3 Design of electric system of ZM-2H sweeper
(A) Wiring diagram for lighting and water pump
(B) Electric lighting system diagram
(1) clearance lights, *(2) water pump* *(3) connection cable version B*
(4) connection cable version A *(5) sweeper harness*

BIZ.2.6-005.01.EN

4.8 SPRAY SYSTEM



Rysunek 4.4 Spray system design
(1) water tank *(2) water pump* *(3) sprinkling nozzles of roller brush* *(4) water level indicator* *(5) water filter* *(6) side sprinkling nozzles for brush*

BIZ.2.6-006.01.EN

CHAPTER 5.

RULES OF USE

PRONAR ZM-H22

5.1 GET READY FOR OPERATION

DANGER

Before using the machine, the user must carefully read this Operator Manual

Careless and incorrect use and operation of the machine, and failure to follow instructions in this Operator Manual is dangerous to your life and health.

DANGER

The machine must never be used by persons who are not authorised to drive carrier vehicles, including children and people under the influence of alcohol or other drugs.

Non-compliance with the safety rules of this Operator Manual can be dangerous to the health and life of the operator and others.

ATTENTION

Before using the machine always check its technical condition. In particular, check the technical condition of the linkage system, drive system, completeness of protective covers and lighting.

ATTENTION

Before beginning work lubricate all lubrication points.

The manufacturer guarantees that the machine is fully operational and has been checked according to quality control procedures and is ready for use. This does not release the user from an obligation to check the machine's condition after delivery and before first use. The machine is delivered to the user completely assembled. Prior to connecting to the carrier vehicle (tractor), machine operator must verify the machine technical condition.

In order to do this:

- the user must carefully read this Operator Manual and observe all recommendations, understand the design and the principle of machine operation,
- make sure that the machine's linkage is compatible with that of the carrier vehicle.
- check the compatibility and technical condition of the hydraulic and electric system, including compatibility of the hydraulic connectors,
- inspect machine's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components),
- check the technical condition of the brush (wear, damage, foreign bodies)
- check technical condition of protective shields and pins and check if they are correctly installed,

If all the above checks have been performed and there is no doubt as to the machine's good technical condition, it can be connected to carrier vehicle, started and all its individual systems checked. In order to do this:

- hitch the machine to carrier vehicle (see Section “HITCHING TO CARRIER VEHICLE”),

DANGER

Before starting the machine, ensure that there are no bystanders in the danger zone.

DANGER

When starting machine for the first time as well as after servicing the hydraulic system, extreme caution should be exercised because the aerated hydraulic system causes accelerated movement of the powered components.

- after connecting hydraulic system lines and electrical system wiring, check the correct operation of systems and inspect the hydraulic system for tightness,
- In the event of a disruption in the operation of the machine immediately discontinue its use, find and remove the fault. If a fault cannot be rectified or the repair could void the warranty, please contact the Manufacturer for additional clarifications.

OBS.2.6-001.01.EN

5.2 CONNECTING THE SWEEPER TO THE CARRIER VEHICLE

DANGER

Use only genuine pins and safeguards to hitch the machine to the carrier vehicle.

DANGER

When hitching, there must be nobody between the machine and the carrier vehicle. When hitching the machine, driver must exercise due caution and make sure that nobody is present in the hazard zone.

The equipment can be hitched to a carrier vehicle that meets the requirements contained in the Table "*Requirements for a carrier vehicle equipped with a front extension arm*".

Before hitching the implement to the carrier vehicle, check the compatibility of the implement linkage with the front loader linkage.

When connecting the equipment to a carrier vehicle equipped with the EURO implement mounting system, you should:

- unlock the mechanism fixing the implement in the loader frame (depending on the loader type),
- lower the arm and turn the frame downwards (A)

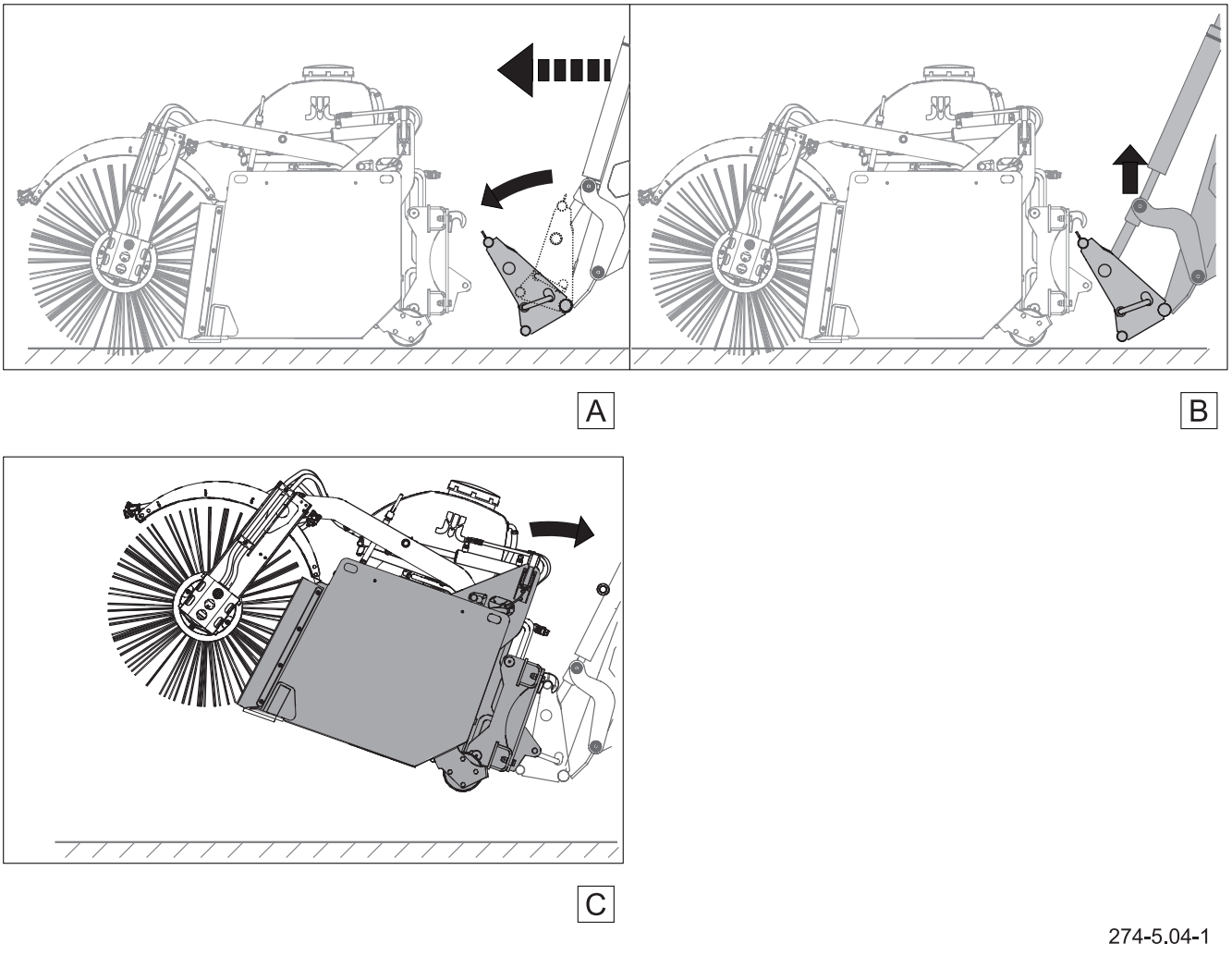


Figure 5.1 Hitching to a extension arm (front loader)
(A), (B),(C)- successive stages of hitching

DANGER

Reduce pressure in the carrier vehicle system prior to connecting the machine to the hydraulic system.

ATTENTION

Before hitching the implement to carrier vehicle, read the Operator Manual.

ATTENTION

Ensure compatibility of oils in carrier vehicle and machine hydraulic systems.

ATTENTION

Hydraulic and electric lines should be routed in such a way that they do not get caught in the moving parts of the machine and the carrier and are not exposed to kinking or cutting. .

so that mounting points on the mounting frame are below the mounting hooks of the implement,

- drive the loader close to the implement and insert the mounting points into the appropriate places in the front loader frame,
- lift arm (B), so that the upper mounting points are place in the implement hooks,
- while controlling the arm swivel the frame backward (C), causing locking of the mounting mechanism (depending on loader type)
- check correct hitching and engage the quick securing mechanism (depending on the loader type).
- connect hydraulic system conduits and electrical system leads,

The above hitching method is described only for reference and may vary depending on the loader model. A detailed method of hitching the implements is described in the front loader Operator Manual.

OBS.2.6-002.01.EN

5.3 CONNECTING AND DISCONNECTING THE HYDRAULIC SYSTEM

Requirements

DANGER

Do NOT use an inoperative or faulty machine.

Be especially careful, the hydraulic system may be under high pressure.

ATTENTION

Secure the disconnected cables with the plug caps and place them on the cable support.

1. Connect the carrier's implement linkage system to the sweeper;
2. Reduce the pressure in the carrier's hydraulic system;
3. Secure the machine against rolling away.
4. Turn off the engine.

Connecting the system

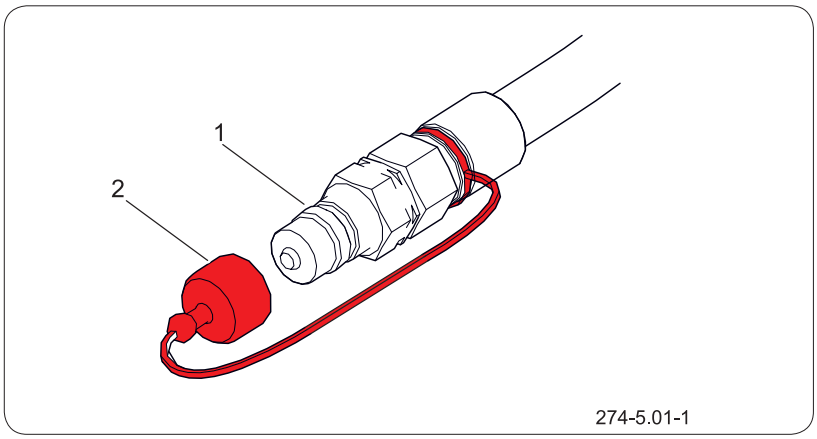


Figure 5.2 Hydraulic system connection
(1) hydraulic plug *(2) colored cap*

1. Check the technical condition and cleanliness of the cable plugs and the carrier's hydraulic distributor.
2. Connect the hydraulic system plugs (1) to the appropriate sockets of the carrier's external hydraulics distributor.

Disconnecting the system

1. Reduce the residual pressure of the machine's hydraulic system with the carrier's hydraulic system.

   Due to the variety of hydraulic systems of carriers, the machine manufacturer is not able to determine a universal method of reducing pressure in the hydraulic system. Refer to the carrier's instruction manual.

2. Disconnect the hydraulic system conduit plugs (1) from the carrier vehicle distributor sockets.
3. Place the cable plugs (1) on the cable support.

ATTENTION

Do not open the safety valves when the brush is raised and the machine is disconnected from the carrier vehicle.

DANGER

Be especially careful when loosening the connections because the oil is under pressure.

Reduction of residual pressure

The hydraulic system is designed in such a way that when the machine is operated correctly, there is no residual pressure. However, during use of the machine, situations may arise in which pressure appears in the hydraulic system. This situation occurs when at the same time:

- the machine is disconnected from the carrier vehicle,
- the sweeper brush is raised,
- the safety valve is open.

To relieve the pressure in this case:

- close the safety valve
- try to push in the quick connector plug or slightly loosen the hydraulic connector.

OBS.2.6-004.01.EN

5.4 CONNECTING AND DISCONNECTING THE ELECTRICAL SYSTEM

ATTENTION

Before driving, check the operation and completeness of the electrical system.

Do NOT use the machine if the lighting system is unreliable.

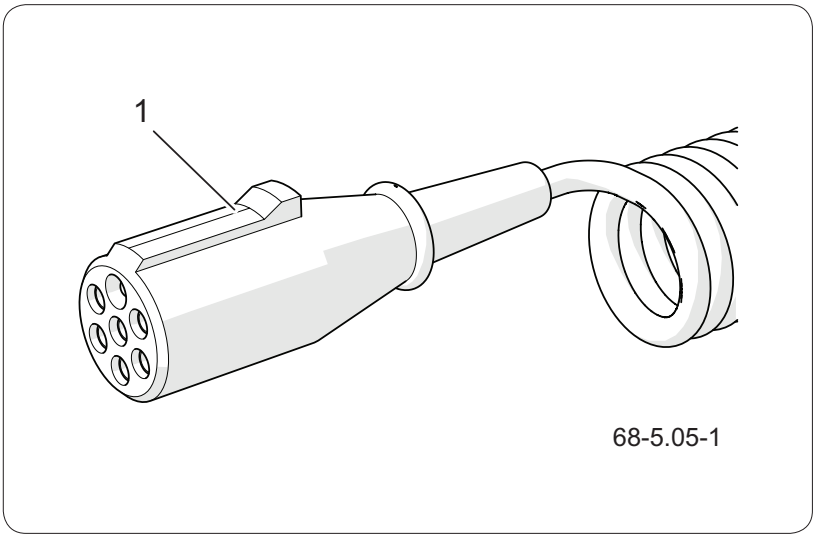


Figure 5.3 Electrical system connection
(1) 7-pin plug

ATTENTION

Connection wires and lines of electrical system should be routed in such a way that they do not get caught in the moving parts of the machine and the carrier and are not exposed to kinking or cutting.

Requirements

1. Secure the machine against rolling away.
2. Connect the machine to the carrier vehicle.
3. Turn off the carrier vehicle engine. Secure the carrier vehicle with the parking brake.

Connect

1. Connect the power plug to the 7-pin socket on the carrier vehicle.
2. Check operation of the system.
3. If the carrier vehicle does not have appropriate sockets or the sockets are of a different type, entrust the installation to qualified personnel.

Disconnect

1. Unplug the power cord.
2. Secure the carrier vehicle and machine sockets with covers.

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5.5 SWEEPER OPERATION

DANGER

Bystanders must not approach the machine during maintenance.

DANGER

When driving the machine in the transport position on uneven terrain, exercise particular caution and reduce the travel speed as the carrier and the machine may become damaged or overturned.

DANGER

During operation people and animals may not be present within a 10 m radius of the machine.
Operation from the carrier vehicle only.

The sweeper consists of a metal waste container, a hydraulically driven and lifted cylindrical brush. At the rear of the waste container there is an adapter with a floating function, to which a linkage system adapted to a specific carrier vehicle is screwed. The hydraulic system has a regulator that allows you to manually set the brush rotation speed and protects against oil flow exceeding the allowable limit.
One pair of quick connectors is required to drive the sweeper.
The working cycle of the loader (carrier vehicle) with the sweeper is as follows:

- getting to the workplace, lowering the sweeper to the ground to the working position,

  If the set does not include wheels or rollers, the sweeper basket rests on the ground with the blade (avoid rubbing the rear of the container due to wear of the non-replaceable slides). Set the floating system pins halfway along the oblong holes.

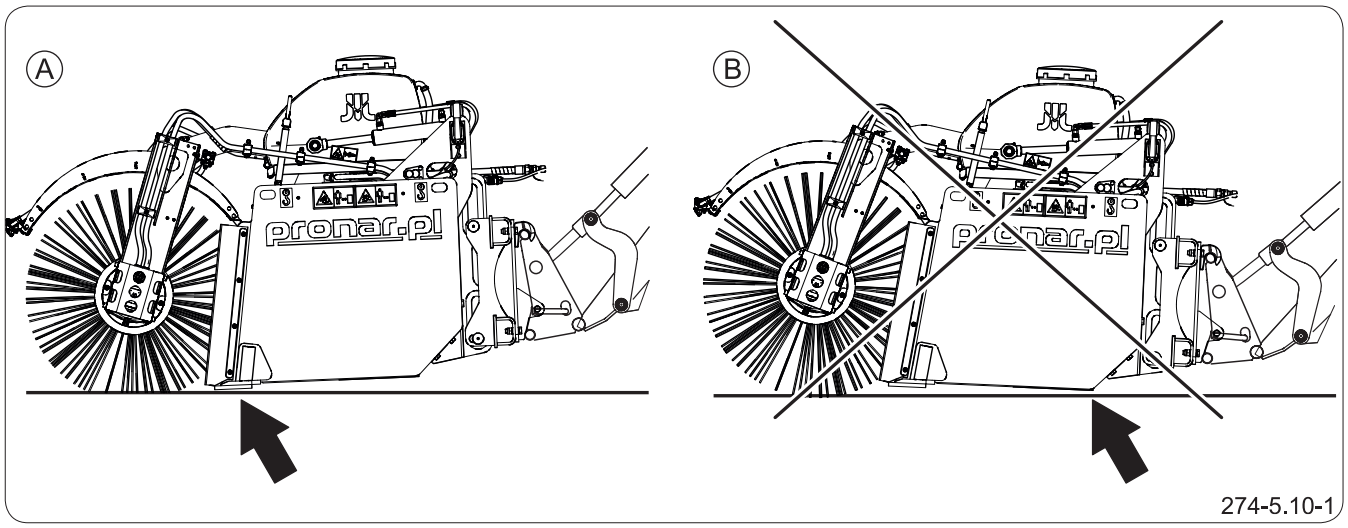

Figure 5.4 Setting the sweeper inclination
A- correct container positioning B- incorrect positioning of the container

ATTENTION

Do not exceed the maximum working speed of 6 km/h.

DANGER

During machine operation do not occupy a different position than that of the operator in the tractor cab. Do NOT leave the cab, when the machine is in operation.
Do NOT stay between the carrier and the machine.
The operator must NOT approach the machine until the sweeping roller come to a full stop.

ATTENTION

The machine is designed to operate on even surfaces without obstacles such as humps, raised wells, steep climbs. Exercise extreme caution when crossing such obstacles. It is recommended to reduce the speed and even raise the machine.

If there are wheels/rollers, the basket can be positioned freely and the blade can be raised slightly so that it does not touch the ground. Set the floating system pins halfway along the oblong holes.

- setting the brush pressure using the arm adjustment screws so that the brush is lowered approximately 2 cm below its outline.

  Too much brush pressure (excessive lowering of the brush) will cause the bristles to wear out quickly.

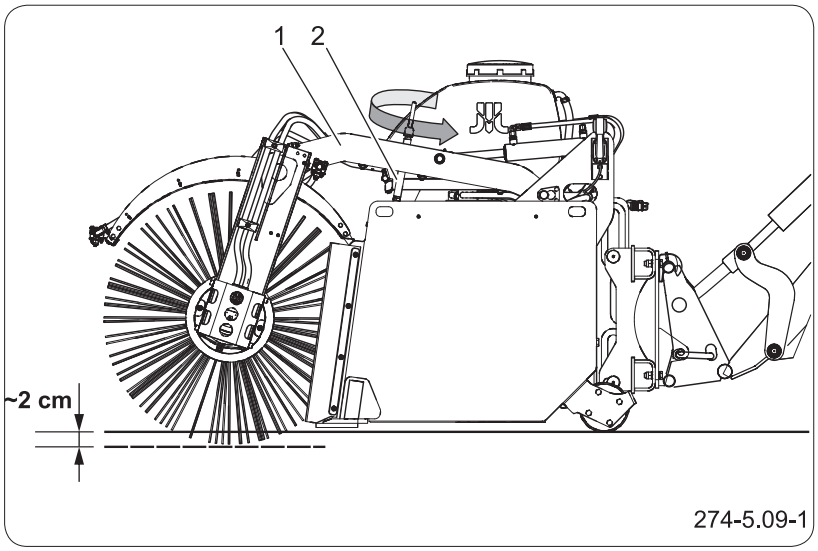

Figure 5.5 Adjustment of brush pressure
(1) brush arm *(2) brush pressure adjustment screw*

- applying oil in the first direction starts the brush, the brush arms fall, sweeping mode occurs;
- after supplying oil in the other direction, the brush arms raise, the brush stops and is ready for unloading mode,
- reaching the unloading point with the sweeper raised to the minimum height;
- raising the sweeper to the required height enabling unloading and placing it above the unloading site;

- unloading waste by leaning forward;
- turning the sweeper horizontally to avoid collision with the loading wall of the means of transport when withdrawing the carrier vehicle;
- retracting the carrier vehicle to a distance enabling the sweeper to be lowered and closed;
- travel to the workplace

The front loader's implements can be controlled only from the operator cab.
When driving forward, the machine may leave small dirt getting under the blade of the sweeper bucket, much better sweeping results are achieved when driving backward.
When working with a carrier vehicle with a sweeper, you should tilt the sweeper "on itself" from time to time to move the dirt deeper into the bucket and increase the efficiency of sweeping and the frequency of unloading.
While driving with loaded sweeper, do not exceed the maximum permitted speed of 6 km/h and drive with the implement in the lowest possible working position.
The sweeper may be raised to the required height and work action may be completed only at the unloading place.
Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the carrier vehicle with the loader to suddenly tilt.
Driving near ditches or canals is dangerous as there is a risk of the wheels sliding down the slope or the slope collapsing. Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.

Brush rotation adjustment

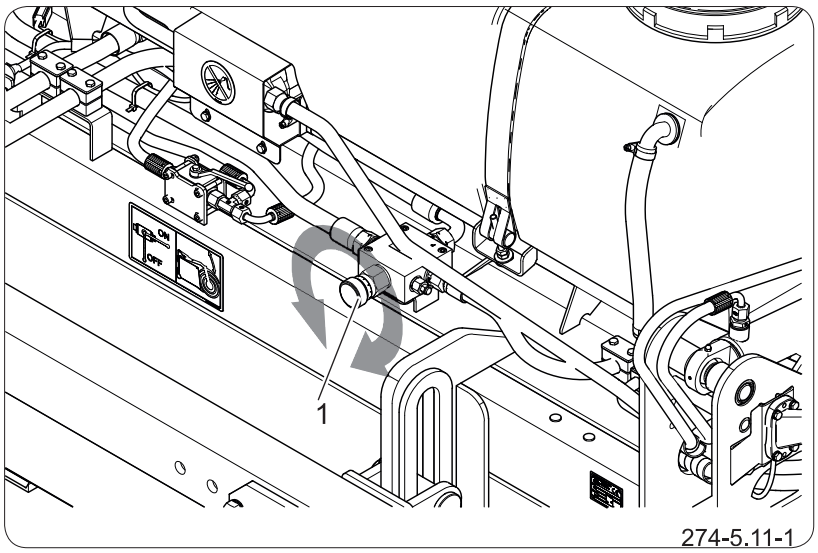

Figure 5.6 Flow regulator
(1) Flow regulator knob

Depending on the type of surface being swept and the type of contamination, the brush rotation speed can be adjusted in the range of 0 - 280 rpm.
Adjustment is made using the flow regulator knob (1).

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TIP

Too high brush rotation will result in throwing dirt from under the sweeper.

5.6 SPRAY SYSTEM

ATTENTION

If there is no water in the tank, turn off the spray system.

ATTENTION

If there is a risk that temperatures drop below 0°C, drain water from the spray system, remove filters from spray nozzles and start the water pump without water for about 15 seconds.

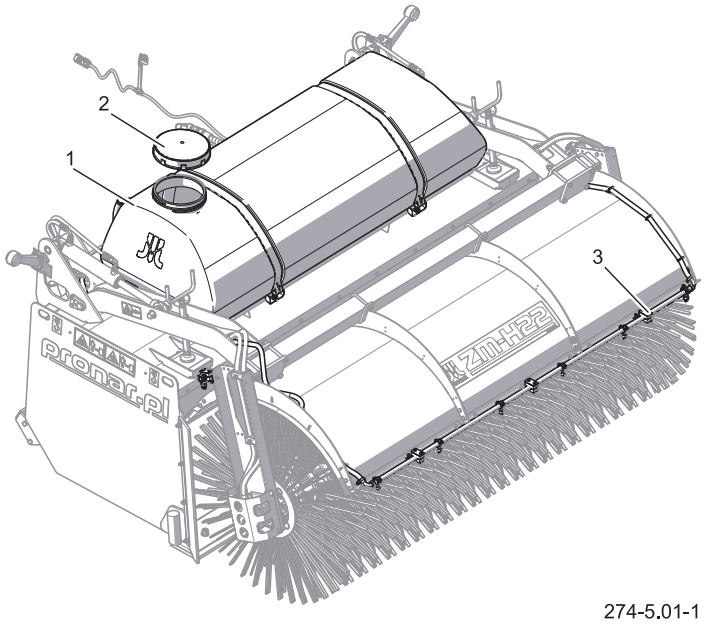

Figure 5.7 Sprinkler system's water tank
(1) water tank *(2) filler plug*
(3) Sprinkler system

Fill the tank (1) with water through the filler opening, after unscrewing plug (2) (Figure: *"Water tank of spray system"*). Water tank cubic capacity is 310 litres.
To control the sprinkler system, connect electrical system plug (2) to 12V 3-pole socket in the carrier

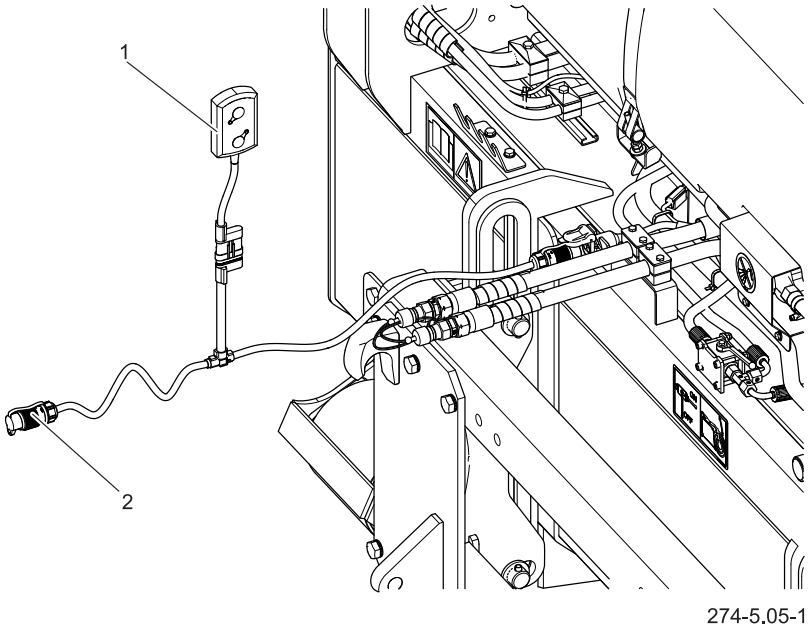

Figure 5.8 Spray system control
(1) - sprinkler system switch *(2) 3-pole socket plug*

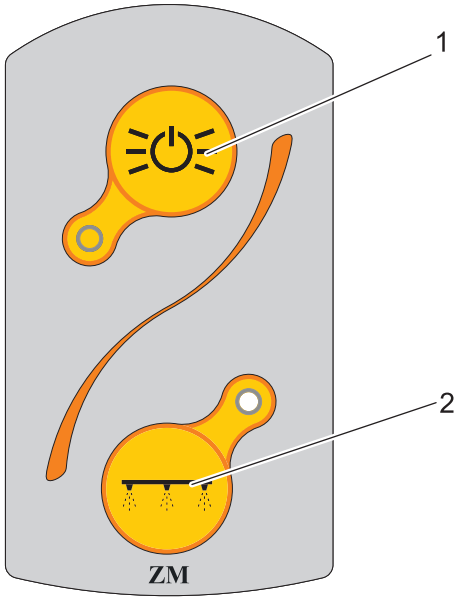

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Figure 5.9 Control panel
(1) Clearance light on/off button
(2) Spraying pump on/off button

vehicle. The clearance light are turned on and off using the switch (1) located on the control panel (Figure: *"Spray system control"*). Turning on the spraying (button 2) is only possible when button 1 is active (on).

Place the switch in the operator cab in an easily accessible place.

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5.7 DRIVING ON PUBLIC ROADS

When driving on public roads, respect the road traffic regulations, exercise caution and prudence. Listed below are the key guidelines.

- Before moving off make sure that there are no bystanders, especially children, near the machine and the carrier vehicle (tractor). Ensure that the driver has sufficient visibility.
- Make sure that the machine is correctly attached to the carrier vehicle, and linkage is properly secured.
- When driving with raised machine set it so as not to obscure the lights or restrict the visibility of the operator.
- Use clearance lamps.
- Do not exceed the speed limit specified in road traffic regulations and in this manual. Ground speed should be adjusted to existing road conditions, pavement condition and other conditions.
- While operating the machine, turn on the orange beacon light in the carrier vehicle.
- While driving on public roads, the machine should be marked with slow-moving vehicle warning sign placed on the rear of the machine.
- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- When driving on uneven terrain, reduce speed due to dynamic loads and the risk of damage to the machine or tractor.

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5.8 CLEANING

DANGER

Carefully read the instructions for application of detergents and maintenance preparations.

While washing with detergents, wear appropriate protective clothing and goggles protecting against splashing.

DANGER

When the sweeper is connected to the carrier vehicle, you can only be near the machine when:

- the carrier vehicle engine is turned off,

- brush is lowered,

- the sweeper rests on the ground,

- brush is raised and secured - valves closed.

ATTENTION

While washing do not direct a strong water or steam jet at information and warning decals, bearings, hydraulic lines or electrical wires.

Every day, after finishing work, thoroughly clean the sweeper of any remaining dirt. Before using the pressure washer the user is obliged to acquaint himself with the operating principles and recommendations concerning safe use of this equipment.

Machine cleaning guidelines

Stop the carrier vehicle with the machine on a flat, level surface.

- Raise the brush .
- Turn off the vehicle's engine and remove the key from the ignition;
- Apply carrier vehicle parking brake.
- Secure carrier vehicle against access of unauthorised persons.
- Close the valves on the actuators;
- Remove dirt from the machine surface,
- If necessary, cut off the dirt wrapped around the brush;
- Clean and wash the sweeper with a strong stream of water and leave to dry in a dry and airy place.

The use of pressure washers increases the effectiveness of washing, but be careful when working. During washing, washer nozzle may not be closer than 50 cm from the surface being cleaned.

Water temperature should not exceed 55^{0}C.

Using excessive pressure for washing may damage lacquer coating.

Do not direct the water jet directly at the system and equipment elements of the machine, i.e. valves, actuators, water pump, bearings, electrical and hydraulic plugs, lights, electrical connector, information and warning stickers, nameplate, cable connections, lubrication points, etc. High jet pressure water may

ATTENTION

After each use, clean the sweeper of any remaining waste material.

After finishing washing wait until the machine is dry and then grease all lubrication points according to recommendations. Remove excess oil or grease with a dry cloth.

During work, use appropriate, close-fitting protective clothing, gloves and appropriate tools.

TIP

After washing and drying the machine, apply a layer of oil to the actuator piston rods to protect against corrosion.

damage these components.

- For cleaning and maintenance of plastic coated surfaces, use clean water or special preparations designed for this purpose.
- Do not apply organic solvents, preparations of unknown origin or other substances, which may cause damage to lacquered, rubber or plastic surfaces. If in doubt, test on an inconspicuous surface.
- Surfaces smeared with oil or grease should be cleaned by application of white spirit or other degreasing agents and then washed with clean water with added detergent. Follow the cleaning agent manufacturer instructions.
- Store detergents intended for washing in their original containers. Preparations may not be stored in food and drink containers.
- Observe the rules of environmental protection and wash the machine in a place designed for this purpose.
- Washing and drying the machine must take place at temperature above 0 ^{0}C.

  In winter, freezing water may cause damage to paint coating or machine elements.

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5.9 UNHITCHING THE MACHINE FROM CARRIER VEHICLE

DANGER

Before unhitching the machine from the carrier vehicle, turn off the carrier vehicle's engine, engage parking brake and secure cab against access of unauthorised persons.

Be especially careful when unhitching the machine from the carrier vehicle.

DANGER

When disconnecting the machine, no unauthorized persons should be nearby due to the possibility of being crushed.

DANGER

Keep enough space around the implement to avoid contact with buildings or overhead power lines.

DANGER

Reduce pressure prior to disconnecting the hydraulic system.

ATTENTION

It is recommended to empty the container before disconnecting the sweeper from the carrier vehicle.

Before lowering the implement on the ground, set it horizontally. Before disconnecting the sweeper from the loader:

- raise the brush,
- extend the brush arm limiters (1) so that the brush bristles do not come into contact with the ground
- lower the brush,

If the sweeper roller brush rests on the ground, the brush bristle may get deformed.

Unhitched implement should be positioned in such a place so that it is possible to hitch it again.

To unhitch the implement from a loader equipped with a EURO connector, proceed as follows:

- lower the arm until the bucket rests on the ground, turn off the engine,
- reduce pressure in the implement control hydraulic system by moving the control lever of the

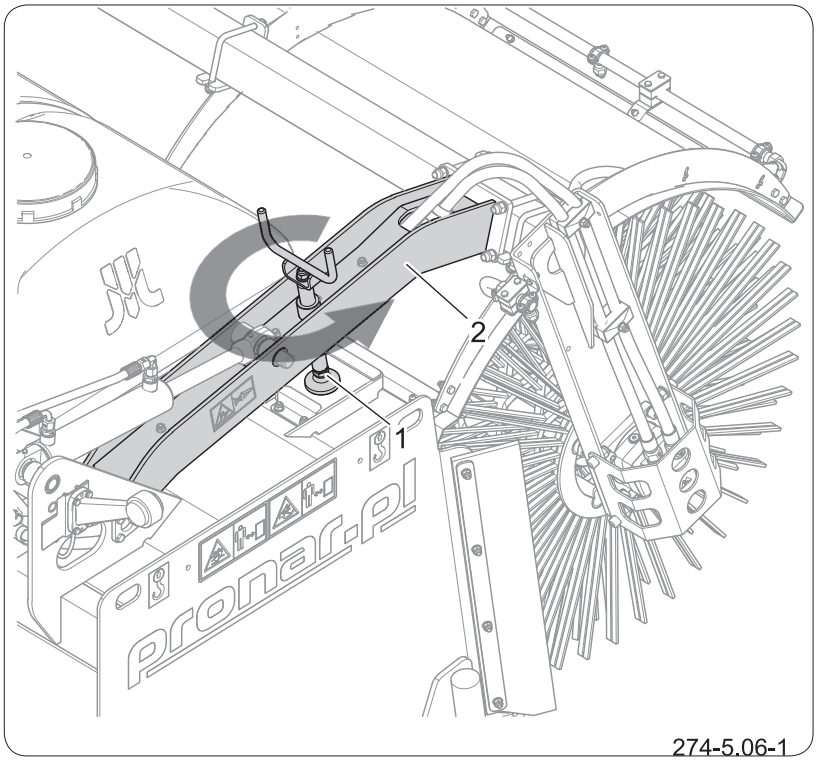

Figure 5.1 Brush adjustment

(1) Brush arm limiter (2) Brush arm

ATTENTION

The procedure for disconnecting the carrier vehicle from the sweeper may vary depending on the connector type.

Disconnect in accordance with the carrier's operating instructions.

section of the manifold (depending on the loader type),

- unlock the mechanism fixing the implement in the loader frame (depending on the loader type and equipment);
- disconnect hydraulic lines of the implement from the front loader's system, protect them with plugs and put in a special bracket :
- disconnect the electric cable, if present,
- start the carrier vehicle's engine and tilt the loader arm frame forward until the frame rods are disconnected from the implement hooks, drive the loader away from the implement.
- The implement unhitched from the carrier vehicle should not be moved or carried using other implements with the exception of pallet forks if the implement is secured to the pallet.

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5.10 STORAGE

After finishing work, clean and wash the sweeper thoroughly with a water jet.

After cleaning, inspect the whole machine, inspect technical condition of individual elements. Repair or replace any used or damaged components.

In the event of damage to the paint coat, clean rust and dust from damaged area, degrease and then paint with undercoat and after it is dry paint with surface coat paint retaining colour uniformity and even thickness of protective coating. Until the time of touch-up painting, the damaged place may be covered with a thin layer of grease or anticorrosion preparation.

If the machine will not be used for an extended period of time, protect it against adverse weather conditions.

Sweeper should be lubricated according to the instructions provided regardless of the date of the last lubrication. Protect against corrosion all cooperating elements i.e. pins, articulated joints, cylinder rods. Cover them with a thin layer of grease.

Hydraulic plugs secured and hung in the bracket.

If the control system panel is removed from the carrier vehicle, it should be stored so that it is protected against weather conditions.

Sweeper should be stored in a roofed building inaccessible for unauthorized people and animals. The machine unhitched from the carrier vehicle should be placed on level, sufficiently hard surface in a way as to ensure that it is possible to hitch it again.

The bristles of the brush should not come into contact with the ground.

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CHAPTER 6.

PERIODIC INSPECTION AND MAINTENANCE

PRONAR ZM-H22

6.1 BASIC INFORMATION

CAUTION

It is forbidden to use a defective machine.

Repairs during the guarantee period may only be carried out by authorised service centres.

When using the sweeper, it is necessary to constantly check the technical condition and perform maintenance procedures that will allow the machine to be kept in good technical condition. Compulsorily carry out all maintenance and adjustment activities specified by the Manufacturer according to the established schedule.

Repairs during the warranty period may only be carried out by Authorised Sales and Service Outlets (APSiO). The warranty inspection of the machine is only carried out by an authorised service centre.

In the event of unauthorised repairs, changes to the factory settings or operations not included as possible by the machine operator (not described in this manual), the user will forfeit the warranty.

For detailed information on the maintenance schedule, refer to the chapter entitled*" Maintenance and Inspection Schedule* ".

After the warranty expires, it is recommended that servicing is carried out by specialised repair shops.

Use appropriate protective clothing and equipment when working.

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6.2 MAINTENANCE AND INSPECTION SCHEDULE

Table 6.1. Inspection categories

Category	Type of inspection	Carried out by	Frequency
A	Daily	Operator	Inspection conducted daily before the first start or every 10 hours of continuous operation in shift mode.
B	Maintenance inspection	Operator	Inspection performed periodically every month of machine operation. Daily inspection should be carried out each time before this inspection.
C	Maintenance inspection	Operator	Inspection carried out periodically every 3 months. Daily inspection and monthly inspection should be carried out each time before this inspection.
D	Maintenance inspection	Operator	Inspection made periodically every 6 months. Daily inspection, monthly inspection and 3-monthly inspection should be carried out each time before this inspection.
E	Maintenance inspection	Operator	Inspection made periodically every 12 months. Daily inspection, monthly inspection and 3-monthly inspection should be carried out each time before this inspection.
F	Warranty inspection	Authorised Points of Sale and Service (APSS)(1)	Inspection carried out against payment after the first 12 months of trailer use, after user notification.
G	Maintenance inspection	Service (2)	Inspection carried out every 4 years of the machine use

(1) - Authorized Point of Sale and Service
(2) - post-warranty service

Table 6.2. Inspection schedule

Description of activities	A	B	C	D	E	F	G
Condition of protective covers and warning stickers	•						
Condition of the blade, bucket slides, bearings, support wheel tire tread,	•						
Correct mounting of the sweeping roller and wear of the brush ring, condition of the brush clutch	•						
Kontrola wtyków i gniazd przyłączy	•						
Check operation of lights and indicators (if present).	•						
Kontrola maszyny przed rozpoczęciem jazdy	•						
Check the tightness of screw connections in the brush coupling (always perform when replacing the brush)			•				
The tightening condition of the most important screw connections				•			
Kontrola instalacji hydraulicznej					•		
Replace hydraulic lines							•
Smarowanie	See table: *Lubrication schedule*						

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6.3 LUBRICATION

TIP

Lubrication frequency (see table Machine lubrication schedule):

D - working day (8 hours of machine use)

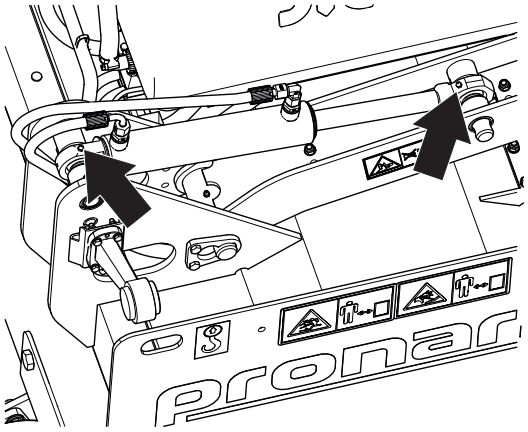
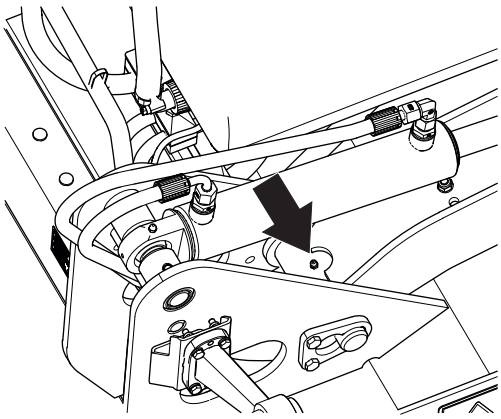
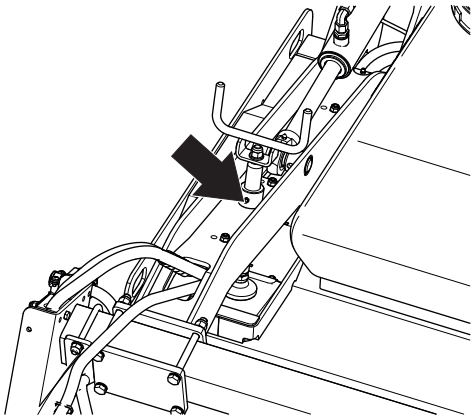
M - month

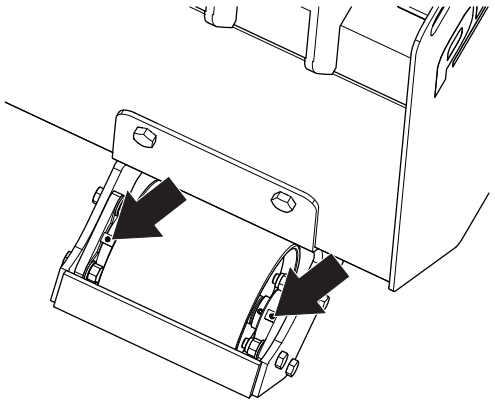
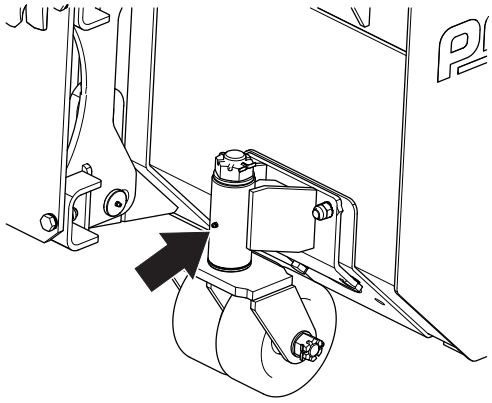
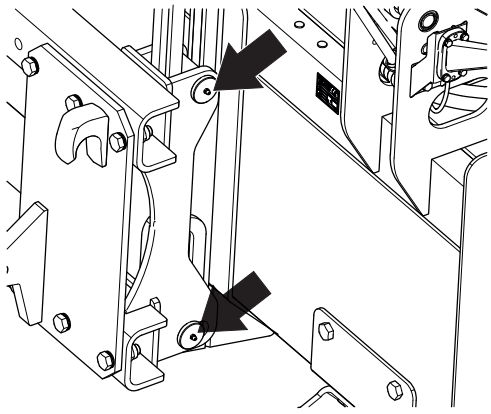
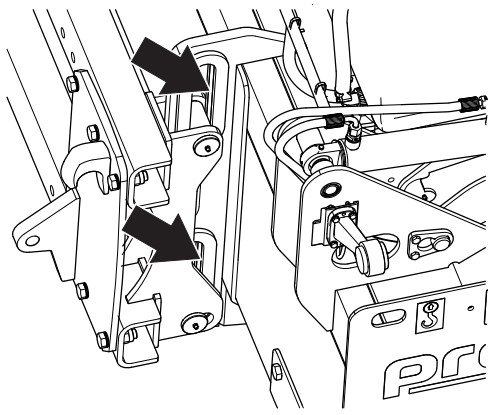
- Lubricate the machine using a grease gun filled with the recommended lubricant. Before starting lubrication, remove old grease and other contamination. After completed lubrication, wipe off excess grease.
- Parts to be lubricated with machine oil should be wiped with dry clean cloth. Apply oil to their surfaces using a brush or oil can. Wipe off excess oil.
- Empty grease or oil containers should be disposed of according to the recommendations of the lubricant Manufacturer.

Table 6.3. Lubricants

Item	Symbol	Description
1	A	machine general-purpose grease (lithium, alkaline),
2	B	Grease for heavily loaded elements with addition of MoS_2 or graphite
3	C	anticorrosion preparation in aerosol
4	D	ordinary machine oil, silicon grease in aerosol

Table 6.4. Machine lubrication schedule

The name of the lubrication point.	Number of lubrication points	Type of grease	Frequency	
Actuator pins	4	A	5D	 274-6.08-1
Brush arm pins	2	A	1D	 274-6.09-1
Brush arm limiter screw	2	A	1D	 274-6.10-1

Support roller bearing	4	A	5D	 274-6.12-1
Jockey wheel bearing	2	A	1D	 274-6.14-1
Suspension frame pins	4	A	5D	 274-6.11-1
Suspension frame pin slides	4	A	1D	 274-6.18-1

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6.4 TIGHTENING TORQUES FOR SCREW CONNECTIONS

During maintenance and repair work, apply appropriate tightening torques to screw connections, unless other tightening parameters are given. Recommended tightening torques for the most commonly used bolted connections are shown in the Table *"Tightening torques for screw connections"*. The given values apply to non-lubricated steel bolts.

Hydraulic lines and other hydraulic components with rubber seals should be tightened with torque according to the Table *"Tightening torques of hydraulic elements"*.

Check the tightness using a torque wrench. During daily inspection of the machine pay attention to loose connections and tighten the connector if necessary. Replace the lost elements with new ones.

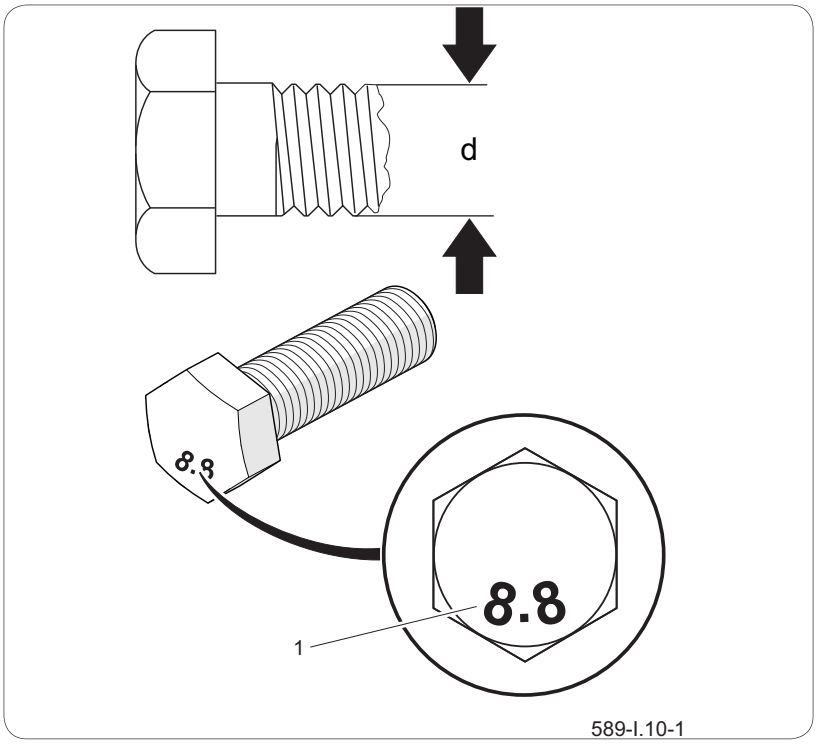

Figure 6.1 Screw with metric thread
(1) strength class, (d) thread diameter

Table 6.5. Tightening torques for screw connections

Metric		
	8.8(*)	**10.9**(*)
M8	25	36
M10	49	72
M12	85	125
M14	135	200
M16	210	310
M20	425	610
M24	730	1,050
M27	1,150	1,650
M30	1,450	2,100

(*) - strength class according to DIN ISO 898

Table 6.6. Tightening torques of hydraulic elements

Thread of nuts	Wire diameter DN (inch)	Tightening torques [Nm]
M10x1 | M12x1.5 | M14x1.5	6 (1/4”)	30÷ 50
M16x1.5 | M18x1.5	8 (5/16”)	30÷ 50
M18x1.5 | M20x1.5 | M22x1.5	10 (3/8”)	50÷ 70
M22x1 | M24x1.5 | M26x1.5	13 (1/2”)	50÷ 70
M26x1.5 | M27x1.5 | M27x2	16 (5/8”)	70÷ 100
M30x1.5 | M30x2 | M33x1.5	20 (3/4”)	70÷ 100
M38x1.5 | M36x2	25 (1”)	100÷ 150
M45x1.5	32 (1.1/4”)	150÷ 200

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6.5 OPERATION OF THE SPRAY SYSTEM

TIP

The condition of spray nozzles system should be inspected regularly while using the machine. Frequency of filter cleaning depends on amount and size of water contamination.

In sweepers equipped with a spraying system, the nozzles and the cleanliness of their filters and the power supply filter should be periodically checked. The filter with a mesh cartridge (2) under the water tank must be periodically checked and cleaned (Figure *Filters in the sprinkler system*). To clean the mesh cartridge (2), drain the water, unscrew the

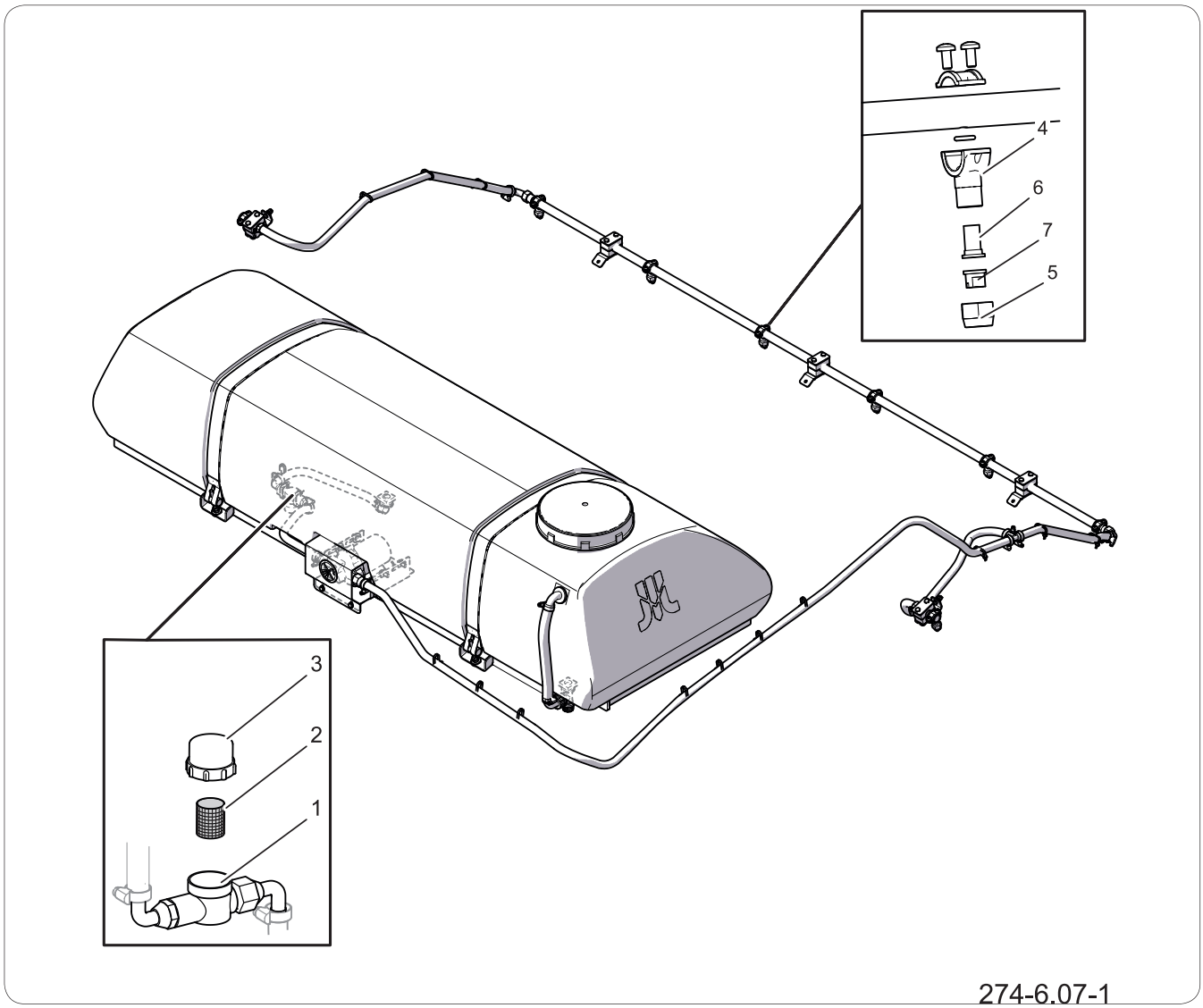

Figure 6.2 Filters in the sprinkler system

(1) - filter housing *(2)- filter mesh cartridge* *(3)- cover*
(4) - spray nozzle housing; *(5)- nut;* *(6) - stub pipe valve;*
(7) - slotted sprayer

TIP

If there is a leakage in the spray system, water is sprayed in a wrong manner.

TIP

If temperature drops below 0°C, the machine should be stored in a building at a temperature above 0°C, because there is a risk that water in the water pump will freeze and damage the pump. Do not start frozen water pump.

TIP

It is recommended to clean water filters at least once a week. Frequency of filter cleaning depends on amount and size of water contamination.

cover (3), remove the cartridge (2) from the housing (1) and wash it with water under pressure or blow with compressed air. Install cartridge, tighten filter housing and check tightness of connection. There is a filter () inside each spray nozzle. In order to clean the spray nozzle filter (6), unscrew housing and wash or blow the filter with compressed air. Before installing the filter, confirm that the spray nozzle is not blocked. Check technical condition of spray nozzles and, if necessary, replace them. The list of spray nozzle components is presented in Table *List of spray nozzle components*.

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6.6 ROLLER BRUSH OPERATION

TIP

Technical condition of the sweeper brush should be inspected regularly while using the machine.

DANGER

The bristles of the brush may be tangled and very sharp, so be careful when assembling or disassembling.

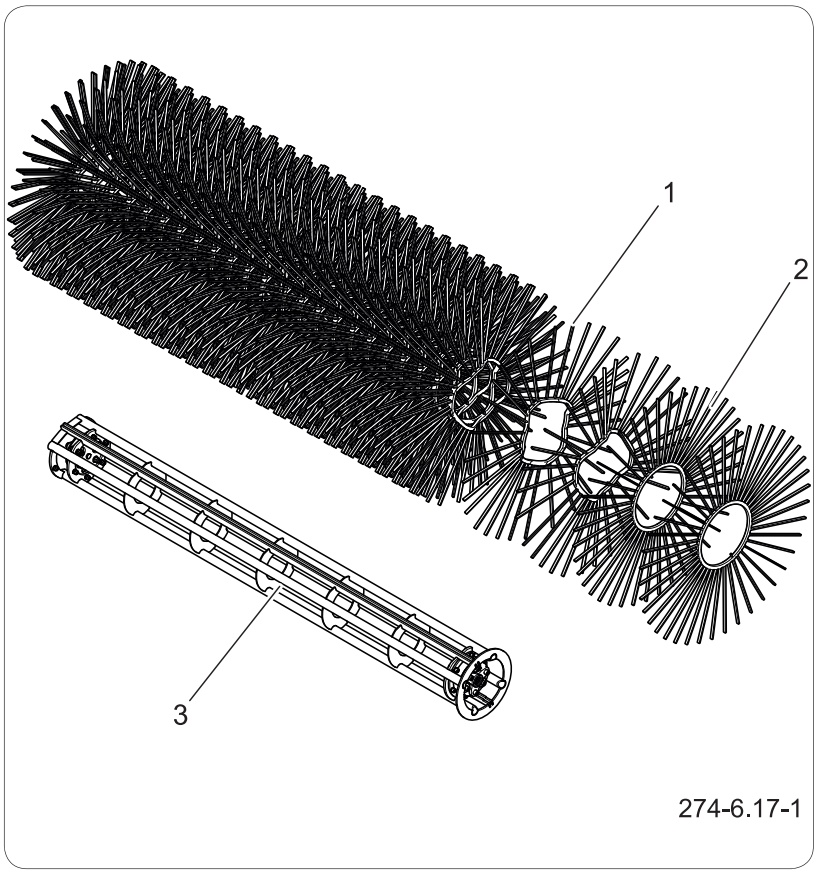

Figure 6.3 Brush design
(1) (2)- segment of roller brush, (3) - brush shaft;

Excessively worn or damaged brush should be replaced. Before starting the replacement, make sure that the sweeper is disconnected from the hydraulic power supply.

The sweeping roller consists of segments (1), (2), the so-called ring brushes placed on a common shaft (3) (Drawing *Brush design*).

Depending on customer needs, four types of roller brushes are available, differing in hardness and filling method.

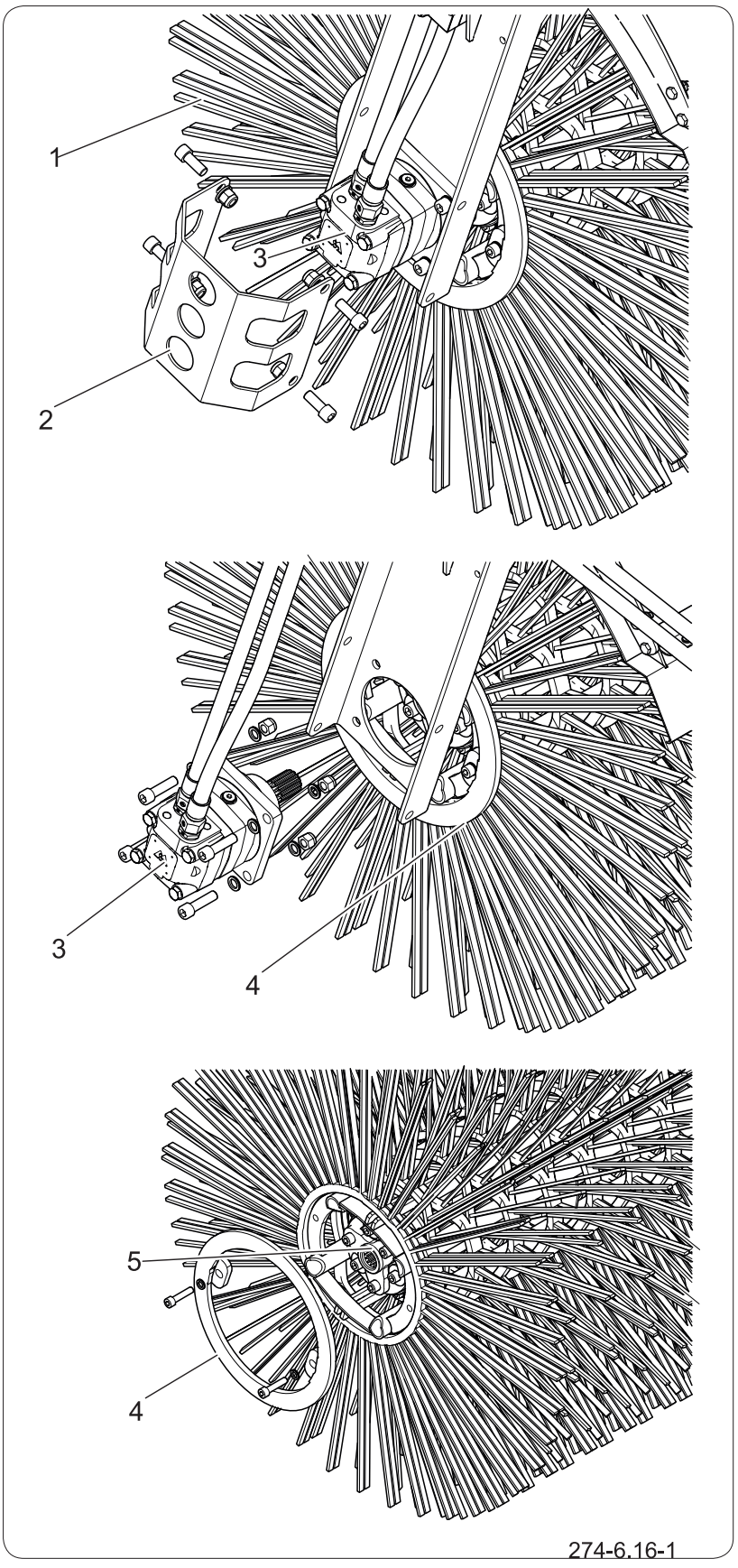

Figure 6.4 Brush replacement
(1) - roller brush, (2) - hydraulic motor shield:
(3) - hydraulic motor (4) - retaining ring
(5) - brush shaft clutch,

To remove the sweeper roller:

• remove the covers of the hydraulic motors (2)

• dismantle the hydraulic motors (3) from the brush arm and slide them out of the brush pin sockets.

• remove the retaining ring (4).

The arm can be raised and secured against lowering. Remove the roller, slide the brush segments and replace with new. To mount the sweeping roller perform these steps in reverse order.

When replacing the brush, check the condition of the rubber clutch and the tightening of the clutch screws. Replace the clutch if necessary.

The list of brushes and the design are described in the chapter " *Roller brush design*".

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6.7 ROLLER BRUSH DESIGN

6.7.1 A roller brush with straight segments

DANGER

The bristles of the brush may be tangled and very sharp, so be careful when assembling or disassembling.

The roller brush consists of individual segments, which must be properly mounted on the shaft before mounting on the machine (Figure "*Assembling a roller brush from straight segments* "). If you select a hard brush, start and finish the assembly of the segments on the shaft on the outer segment (D). When installing the hard brush, the segments (A) and (C) should be mounted alternately on the shaft. Between each straight segment of the brush, distance rings (2) should be used. After inserting all segments on the end of the shaft, install the locking ring (3). Brushes

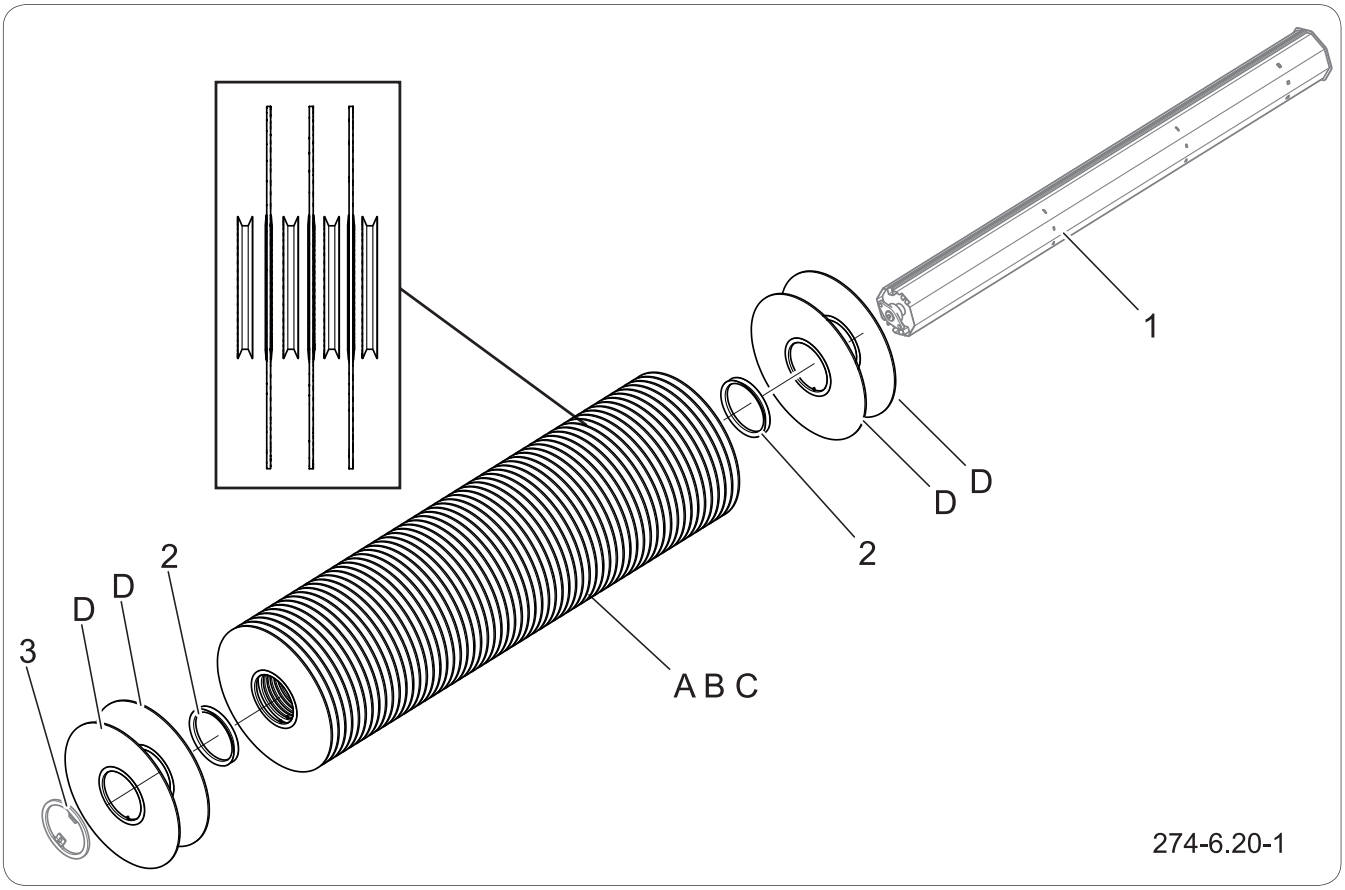

Figure 6.5 A roller brush with straight segments
(1) - shaft (2) - spacer ring (3) - closing ring
(A), (B), (C) -brush segments depending on the hardness

having various parameters and designed for various applications are available depending on the customer's requirements.
The list of types of straight segments is presented in (Table *List of elements of a roller brush made of straight segments*).

Table 6.1. List of straight segment roller brush components

Roller brush hardness	Brush segments	Quantity	Segment part number
Hard (wire)	A	48	274N-00000019
	2	57	---
Soft (PPN)	B	48	274N-00000020
	2	57	---

6.7.2 A roller brush with curved segments

In the case of assembling a roller brush consisting of bent segments (Drawing *"Assembling a honeycomb roller brush"*), assembly onto the shaft should begin and end with a straight outer segment (D). When installing the curved bent segments (A, B, C), position them so that they form a honeycomb. In the case of a hard brush, segments (A) and (C) should be installed alternately.
Do not use spacer rings between the brush segments. After inserting all segments on the end of the shaft, install the locking ring (2). The list of types of bent segments is presented in (Table *List of elements of a roller brush made of bent segments*)

Table 6.2. List of curved segment roller brush components

Roller brush hardness	Brush segments	Quantity	Segment part number
Soft (plastic)	A	48	274N-00000022
	D	4	274N-00000020
Hard (wire)	B	48	274N-00000021
	D	4	274N-00000019

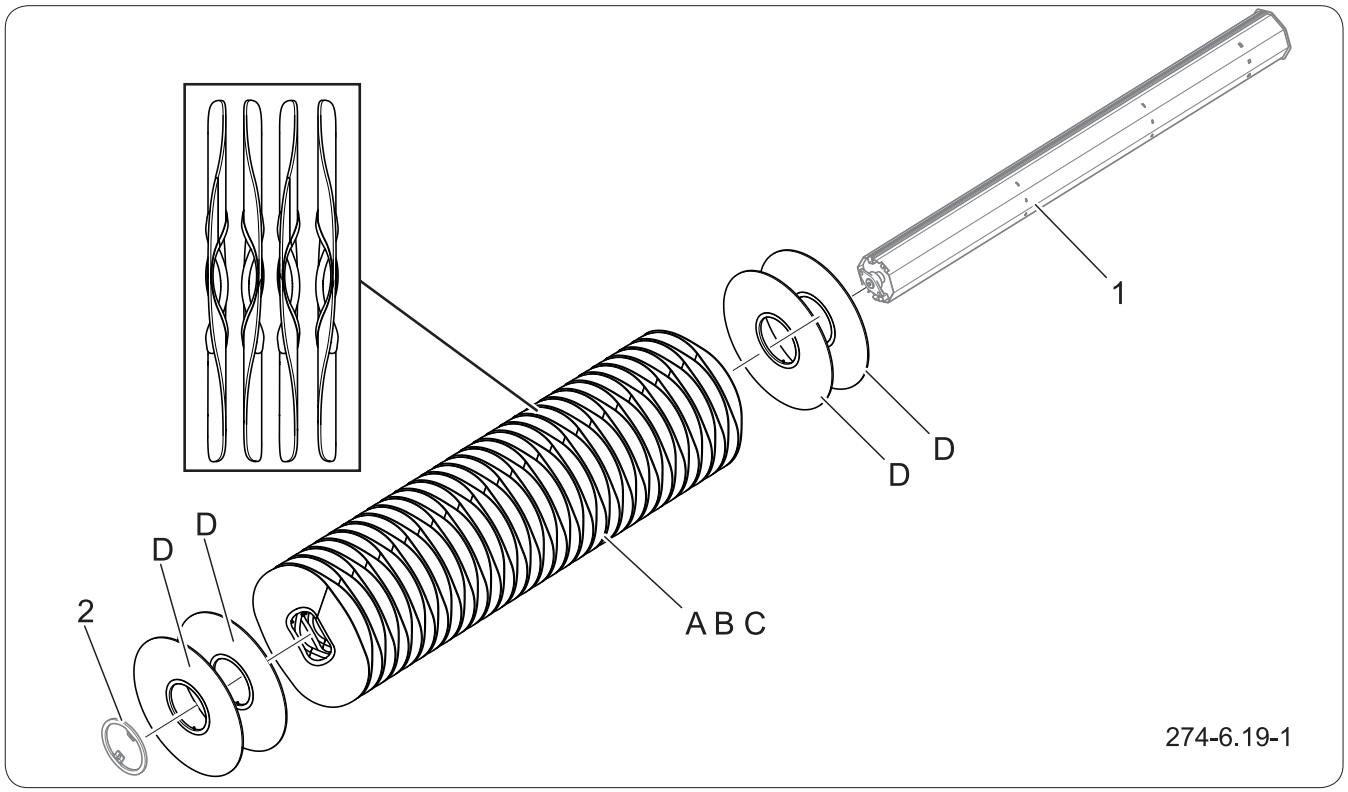

Figure 6.6 Honeycomb roller brush design
(1) - shaft (2) - closing ring (A),(B),(C) - bent brush segments, (D) - straight outer segments

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6.8 CLUTCH OPERATION

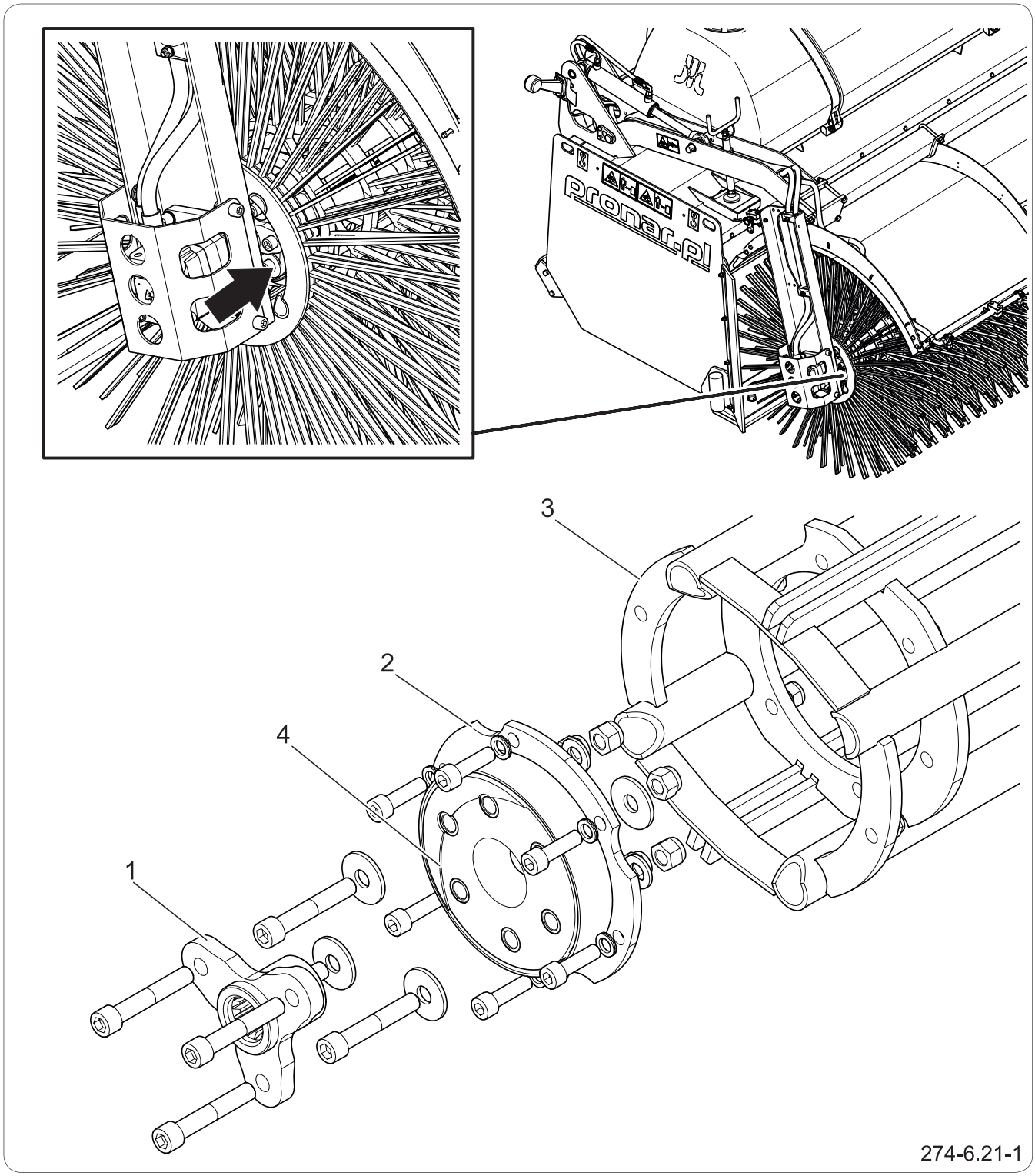

Figure 6.7 Brush clutch
(1) - hub, *(2) - clutch* *(3) - brush shaft;*
(4) - rubber insert

Roller brush couplings are subject to heavy loads and require regular inspection. Every day, before starting work, check whether the clutch rubber is worn out and whether the clutch bolts are installed correctly.
In the case of brush service work, e.g. replacing the bristles, check the tightening torque of the clutch mounting screws and tighten them if necessary.
Replace the rubber clutch insert if there are visible signs of wear, at least once every 4 years.

Table 6.3. List of consumables of a brush clutch

Name of component	Quantity	Segment part number
Clutch insert	2	585N-09000001 (303-710-000085)

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6.9 WASTE TANK OPERATION

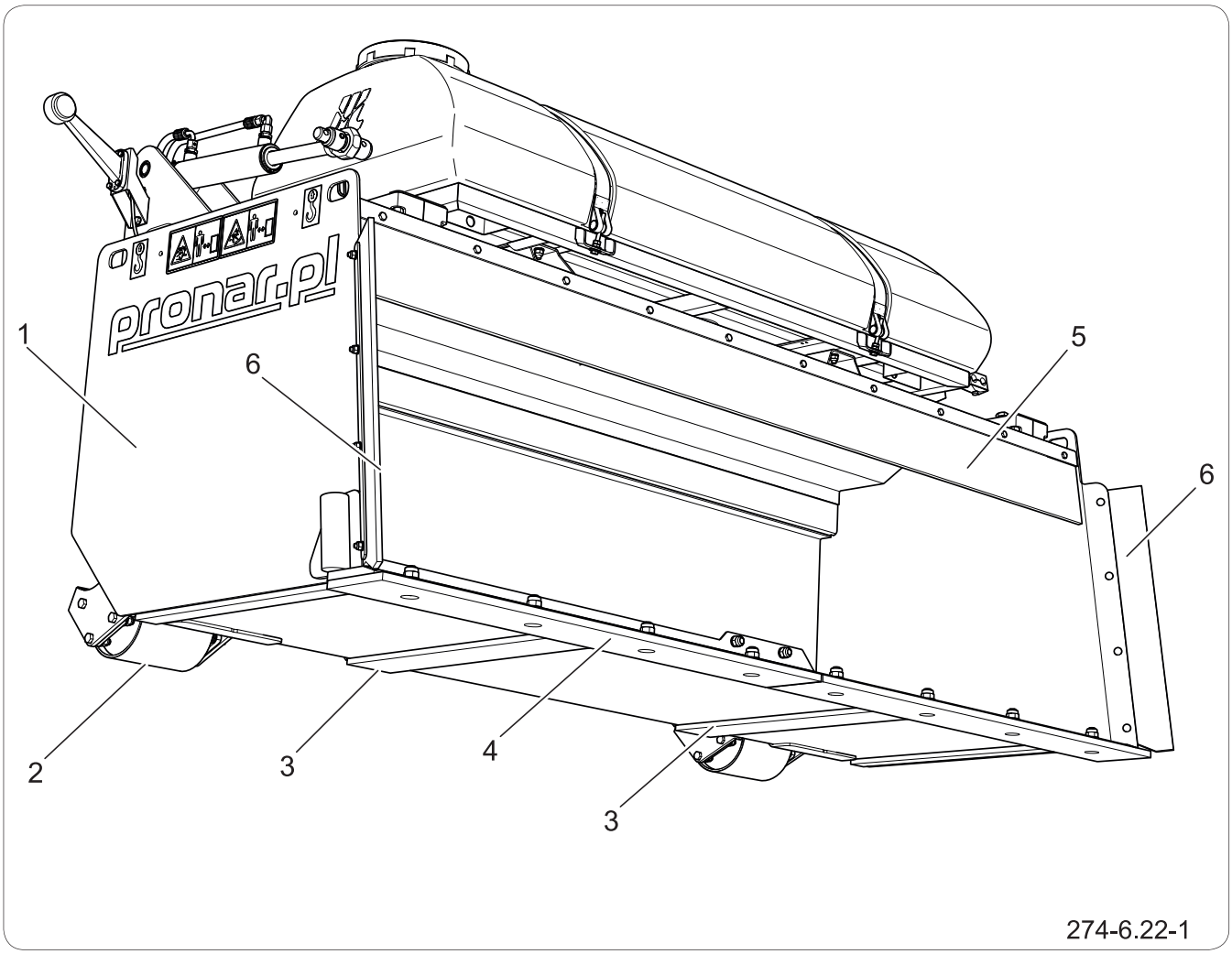

Figure 6.8 Waste container
(1) - bucket, *(2) - drive roll* *(3) - bucket slide;*
(4) - bucket blade *(5) - upper cover* *(6) - side cover*

Blade operation

While operating the sweeper, the blade may rub against the ground. If the element is worn out, replace it with a new one. A worn element is considered to be one whose thickness at the working edge is less than 5 mm.

Bucket slide operation

It is possible to operate the sweeper without rollers or wheels, and then the bucket slides often wear out - the element wears out. The degree of wear of the elements should be regularly checked. If necessary, new elements made of hard-wearing sheet metal should be welded.

Use of shields

The shields protect the operator, bystanders and property from ejection of waste from inside the bucket. You should always ensure that they are all installed and in good technical condition. If necessary, replace them with new ones.

Operation of rollers

When working with a sweeper equipped with rollers, pay attention when cornering. When making sudden, sharp turns, the rollers rub against the ground, the rollers may damage the cleaned surface, and the roller track wears out faster.

It is recommended to lift the rear of the tank when turning to prevent damage to the ground surface and the roller.

Table 6.4. List of consumables of the waste tank

No.	Name of component	Quantity	Item catalog number
1	Blade	2	274N-00000001
2	Upper shield	1	274N-00000005
3	Side cover	2	274N-00000024

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6.10 REPLACEMENT OF HYDRAULIC HOSES

Rubber hydraulic hoses should be replaced every 4 years regardless of their technical condition. This operation should be entrusted to specialized workshops.

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6.11 MAINTENANCE OF ELECTRICAL SYSTEM AND WARNING ELEMENTS

ATTENTION

Do NOT travel with out of order lighting system. Damaged lamp lenses must be replaced immediately before travelling.

Before driving off, make certain that all lamps are clean.

Work connected with the repair, change or regeneration of electrical system components should be entrusted to specialist establishments, having the appropriate technology and qualifications for this type of work.

The duties of the user include only technical inspection of electrical system.

Procedure

1. Connect the sweeper to the carrier vehicle with the appropriate connection cable.
2. Check if the connection wire is reliable. Check connection sockets in carrier vehicle and machine.
3. Check completeness and technical condition of machine lights.
4. Check wiring harnesses for damage (abrasion of insulation, broken leads, etc.). Check the completeness of the lamps.

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6.12 CONSUMABLES

6.12.1 Hydraulic oil

ADVICE

L-HL 46 Lotos oil was used in the machine's hydraulic system.

Absolutely observe the principle that the oil in the machine's hydraulic system and in the tractor's hydraulic system should be of the same grade. When using different types of oil, make sure that the two hydraulic agents can be mixed together. Using different grades of oil can cause damage to the machine or the carrier. On the new machine, the system is filled with L-HL46 hydraulic oil.

If you need to change to a different hydraulic oil, read the oil manufacturer's recommendations carefully. If he recommends flushing the installation with a suitable preparation, follow these recommendations. Ensure that the chemicals used for this purpose do not have an aggressive effect on the materials of the hydraulic system. During normal operation of the machine, it is not necessary to change the hydraulic oil, but if this is necessary, it should be entrusted to a specialist service centre.

The oil used is not classified as a hazardous substance due to its composition; however, prolonged exposure to skin or eyes may cause irritation. In the event of contact of oil with skin, wash the area

Table 6.7. Oil characteristics L-HL 46

ITEM	Name	Unit	
1	Viscosity classification according to ISO 3448VG	-	46
2	Kinematic viscosity at 40°C	mm^2/s	41.4-50.6
3	Quality classification according to ISO 6743/99	-	HL
4	Quality classification according to DIN 51502	-	HL
5	Flash point	C	190

DANGER

Do not use water to extinguish an oil fire!

of contact with water and soap. Do not use organic solvents (petrol, kerosene). Remove soiled clothing to prevent oil getting on the skin. If the oil gets into your eyes, rinse them with very large amounts of water and if irritation occurs, contact your doctor.
Hydraulic oil does not have a harmful effect on the respiratory tract under normal conditions. The danger is only present when the oil is highly atomised (oil mist), or in the event of a fire, during which poisonous compounds can be released. If oil ignites, extinguish with carbon dioxide, foam or vapour extinguisher

6.12.2 Lubricants

Lithium lubricants with molybdenum disulphide (MoS_2) or graphite are recommended for highly loaded parts. For less heavily loaded components, it is recommended to use general-purpose machine lubricants that contain anti-corrosion additives and are highly resistant to water washout. Similar properties should characterise aerosol formulations (silicone lubricants, anti-corrosive agents).
Before using lubricants, read the information leaflet for your chosen product. In particular, safety rules and how to handle the lubricant in question and how to dispose of waste (used containers, contaminated rags, etc.) are important. Keep the information leaflet (product data sheet) with the lubricant.

ADVICE

Lubrication frequency (table Lubrication schedule of the machine):

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6.13 TROUBLESHOOTING

Table 6.8. Troubleshooting

Problem	Possible cause	Solution
Waste is not collected	Excessive ground speed	Reduce ground speed.
	Brush rotation speed too low	Increase the speed using regulator
	Pressure applied to the surface by the roller brush is incorrectly set	Adjust according to the Operator Manual
	Waste container height set incorrectly	Adjust according to the Operator Manual
	Brushes excessively worn	Replace
Sprinkler system not working	Spray system turned off	Set the sprinkler system switch to "ON" position
	Water pump electrical power supply not connected	Check the connection of the power lead plug. Check the connection of the sprinkling system switch
	No water in the tank	Top up water
	Faulty water pump	Notify service point
Brush does not raise (lower)	Set the closed safety valve to the "open" position	
	Hydraulic connections not connected	Connect the hydraulic couplers to the implement control system
	Defective the loader's implement control system	Find the cause and remove the defect
The brush falls down autonomously	Damaged hydraulic lines	Check technical condition of hydraulic lines, if necessary, repair them at an authorised service point
	Defective the loader's implement control system	Find the cause and remove the defect
	Damaged hydraulic cylinder seals or damaged sliding surface of cylinder piston	Repair at an authorised service point
Spray nozzle does not spray (pours)	Leakage in the spraying system	Remove leaks

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