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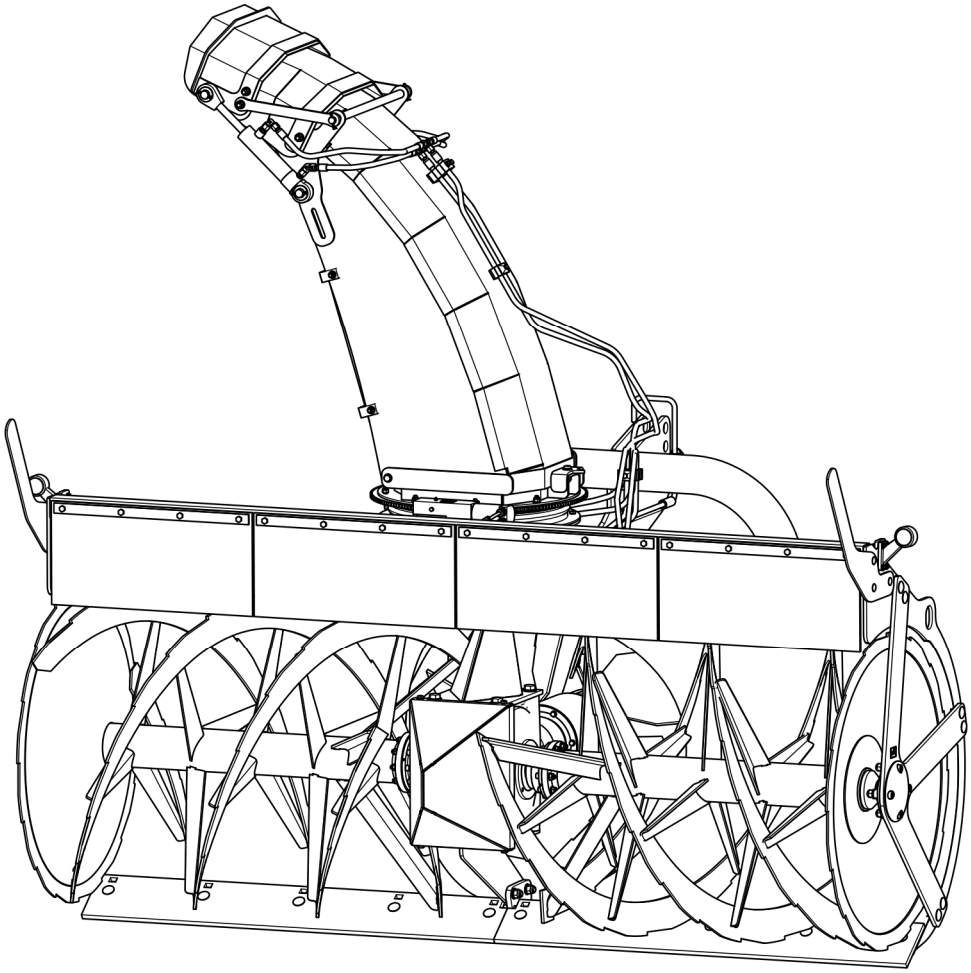
OPERATOR'S MANUAL

SNOW BLOWER

PRONAR OFW2.6

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



ISSUE 1A-10-2011

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EN

SNOW BLOWER

PRONAR OFW2.6

MACHINE IDENTIFICATION

TYPE: ……

SERIAL NUMBER:

INTRODUCTION

Information contained herein is current at date of publication. As a result of improvements, some numerical values and illustrations contained in this publication may not correspond to the factual specification of the machine supplied to the user. The manufacturer reserves the right to introduce design changes in machines produced that facilitate operation and improve the quality of their work, without making minor amendments to this Operator's Manual.

This Operator's Manual is an integral part of the machine's documentation. Before using the machine, the user must carefully read this Operator's Manual and observe all recommendations. This guarantees safe operation and ensures malfunction free work of the machine. The machine is designed to meet obligatory standards, documents and legal regulations currently in force.

The manual describes the basic safety rules and operation of the machine. If the information contained in the Operator's Manual needs clarification then the user should refer for assistance to the sale point where the machine was purchased or to the Manufacturer.

MANUFACTURER'S ADDRESS:

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CONTACT TELEPHONES

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SYMBOLS APPEARING IN THIS OPERATOR'S MANUAL

Information, descriptions of danger and precautions and also recommendations and prohibitions associated with user safety instructions are marked:

and also preceded by the word **"DANGER”.** Failure to observe the instructions may endanger the machine operator's or other person's health or life.

Particularly important information and instructions, the observance of which is essential, are distinguished in the text by the sign:

and also preceded by the word **"ATTENTION".** Failure to observe the instructions may lead to damage to the machine as a result of improper operation, adjustment or use.

In order to focus the user's attention on the need to perform maintenance, the relevant section of the Operator's Manual is marked with the pictogram:

Additional tips and advice for machine operation are marked:

and also preceded by the word **„TIP”**.

DIRECTIONS USED IN THIS OPERATOR'S MANUAL

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.

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EC DECLARATION OF CONFORMITY OF THE MACHINERY

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

Description and identification of the machinery	
Generic denomination and function:	**Snowblower**
Type:	**OFW2.6**
Model:	–
Serial number:	
Commercial name:	**Snowblower PRONAR OFW2.6**

to which this declaration relates, fulfills all the relevant provisions of the Directive **2006/42/EC** of The European Parliament and of The Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (Official Journal of the EU, L 157/24 of 09.06.2006).

The person authorized to compile the technical file is the Head of Research and Development Department at PRONAR Sp. z o.o., 17-210 Narew, ul. Mickiewicza 101A, Poland.

This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

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

Narew, the 2016-12-20

Place and date

Full name of the empowered person position, signature

TABLE OF CONTENTS

SECTION

1

BASIC INFORMATION

1.1 IDENTIFICATION

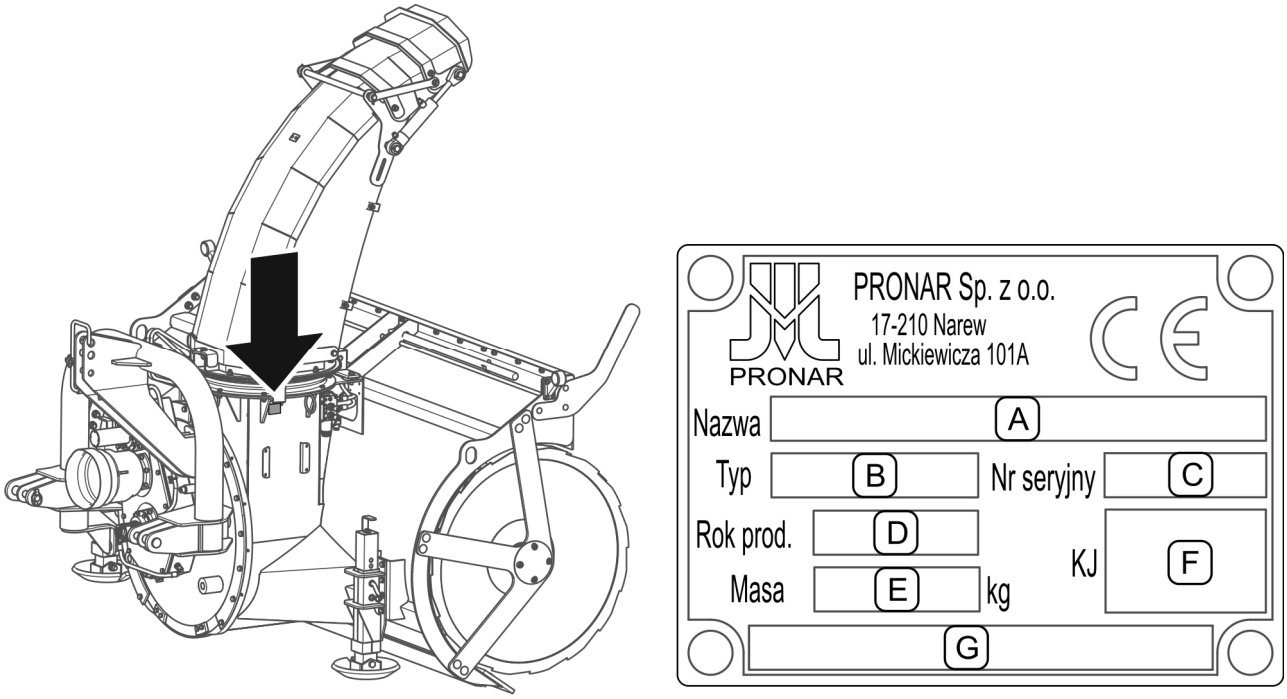


FIGURE 1.1 Location of the nameplate

Meaning of nameplate items (FIGURE 1.1):

A - machine name

B – type

C – serial number

D – year of manufacture

E – machine tare weight [kg]

F – Quality Control stamp

G – extension of name (box A)

The factory number is located on the nameplate and on the frame under the nameplate. The nameplate is placed on the right side of the frame, under the discharge chute rotator (FIGURE 1.1). When purchasing the machine, check that the serial number corresponds with that indicated in the *WARRANTY BOOK*, in the sales documents and in the *OPERATOR'S MANUAL*.

1.2 INTENDED USE

Rotary snow blower is used for removing snow and ice blocks from flat surfaces by collecting and ejecting snow and ice on the road shoulder or on the trailer. It is designed for mounting on the front two or three-point linkage of an agricultural tractor or other carrying vehicle that is equipped with a mounting plate according to DIN 76060 standard or SETRA and meets the requirements set out in Table 1.1.

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'S 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 Operator's Manual of the tractor,
- have been trained in machine operation and work safety,
- have the required authorisation to drive the vehicle and are familiar with the road traffic regulations and transport regulations.

IMPORTANT

The machine must not be used for purposes other than those for which it is intended, in particular for:

- **snow clearing when the drive is disengaged**
- **for transporting people and animals.**

Do not operate the rotary snow blower if bystanders, animals, buildings or vehicles are in the snow discharge area.

TABLE 1.1 Requirements for carrying vehicle, depending on the snow blower version

Snow blower mounted on the tractor's front three-point linkage:

	UNIT	REQUIREMENTS
Mounting method	-	Front three-point linkage category II and III according to ISO 730-1 with a floating position
Power take-off shaft (PTO)		
Required power of PTO shaft	hp (kW)	136 (100)
Rotation speed	rpm	1,000
Rotation direction*	-	right or left
Hydraulic system		
Hydraulic oil	-	HL 32
Nominal pressure in the system	MPa	18.5
Number of hydraulic sockets	pc.	2 sockets of one hydraulic section 1/2" ISO 7241-1 (mushroom type) with the possibility of changing the direction of oil circulation
Electrical system		
Power supply for the solenoid valve unit and lights	-	3-pin socket DIN 9680
Electrical system voltage	V	12
Other requirements		
Beacon light	-	orange light
Creep gears	-	< 1km/h

* - *right direction – clockwise, looking at the shaft front*

* - *left direction – anticlockwise, looking at the shaft front*

Snow blower mounted on the mounting plate according to DIN 76060 standard or SETRA

	UNIT	REQUIREMENTS
Mounting method	-	faceplate (mounting plate) TYPE A or TYPE B according to DIN 76060 standard or SETRA
Power take-off shaft (PTO)		
Required power of PTO shaft	hp (kW)	136 (100)
Rotation speed	rpm	1,000
Rotation direction*	-	left
Hydraulic system		
Hydraulic oil	-	HL 32
Nominal pressure in the system	MPa	18.5
Number of hydraulic sockets	pc.	4 pairs of hydraulic sockets (flush-face), size 1/2'' ISO16028
Electrical system		
Power supply for the electro-hydraulic unit and lights	-	7-pin socket ISO1185
Electrical system voltage	V	24
Other requirements		
Beacon light	-	orange light
Creep gears	-	< 1km/h

* - left direction – anticlockwise, looking at the shaft front

1.3 EQUIPMENT

The equipment of the machine includes:

- Operator’s Manual
- Warranty Book

Additional (optional) equipment:

- PTO shaft 2x1 3/4’’, 6 splines *part number 302-850-000438*
- Set of support wheels *part number 416N-19000000-01*

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’S 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: Consumables include the following parts/sub-assemblies:

- blades,
- bearings,
- slides or support wheels

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

The user loses the warranty in case of damage resulting from:

- mechanical damage which is the user's fault,
- inappropriate use, adjustment or maintenance, use of the machine for purposes other than those for which it is intended,
- use of damaged or malfunctioning machine,
- caused by road accidents,
- repairs carried out by unauthorised persons, repairs carried out improperly,
- Unauthorised user modifications of the machine structure.

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.

For detailed Terms & Conditions of Warranty, please refer to the WARRANTY BOOK attached to each newly purchased machine.

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

1.4 TRANSPORT

The machine is prepared for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation, electrical equipment elements and additional equipment elements.

Delivery is either by transport on a vehicle or independently, after being attached to a tractor. Transport of the machine is permissible connected to a carrier vehicle provided the vehicle's driver familiarises himself with the machine's Operator's Manual and particularly with information concerning safety and principles of connection and transport on public roads.

During road transport the machine should be secured on the carrier platform by certified straps or chains fitted with pulley.

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.

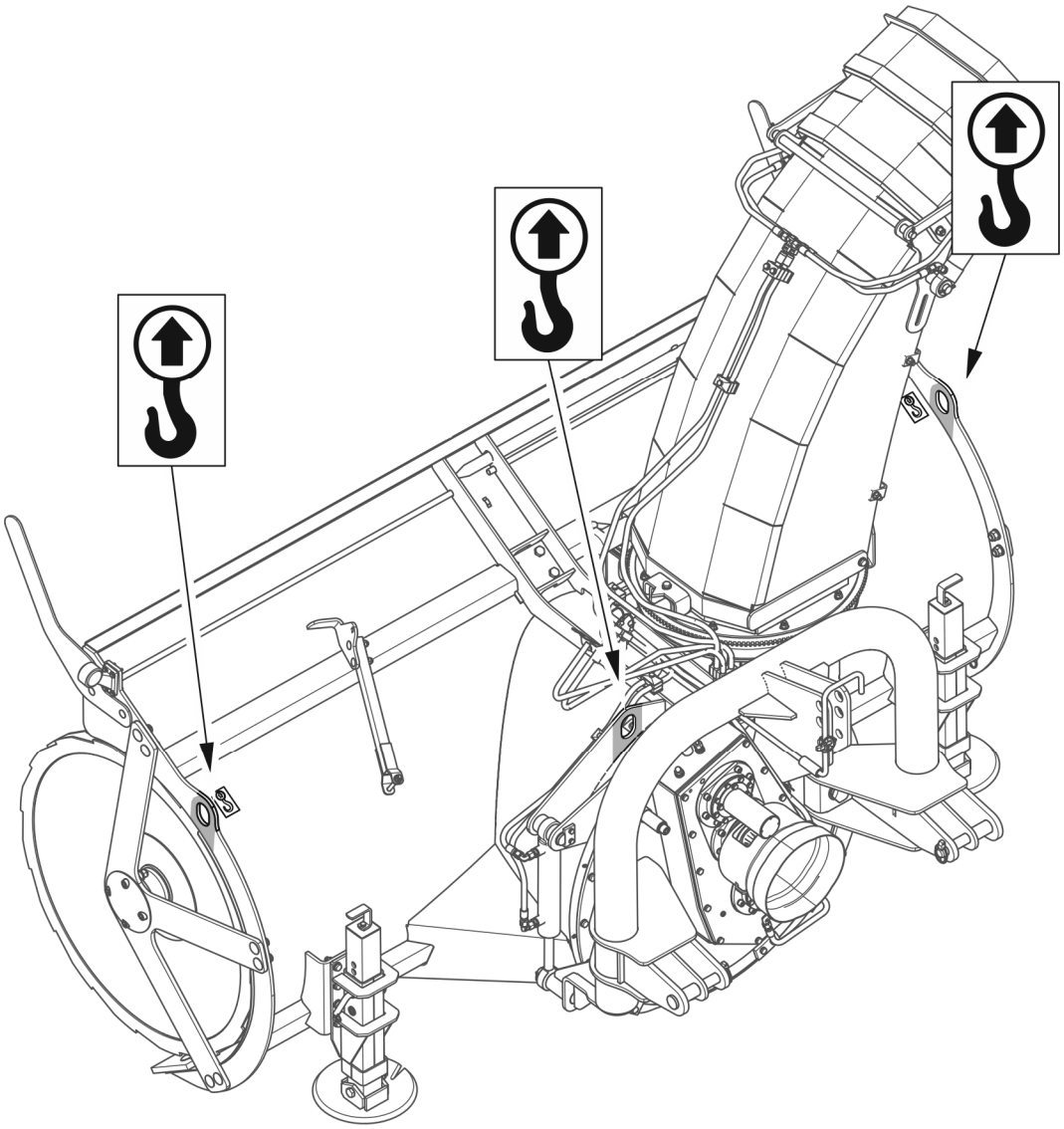


FIGURE 1.2 Transport lugs

The machine should be attached to lifting equipment in places specially designed for this purpose (FIGURE 1.2). Suspension points are identified with information decals. When lifting the machine take special care to avoid tipping over the machine and the risk of injuries from protruding parts. To keep lifted machine in the correct direction it is recommended to apply additional guy cables. During reloading work, special care should be taken not to damage the paint coating.

NOTE

Do NOT secure lifting slings or any types of load securing elements to hydraulic and electrical system components and fragile elements of the machine

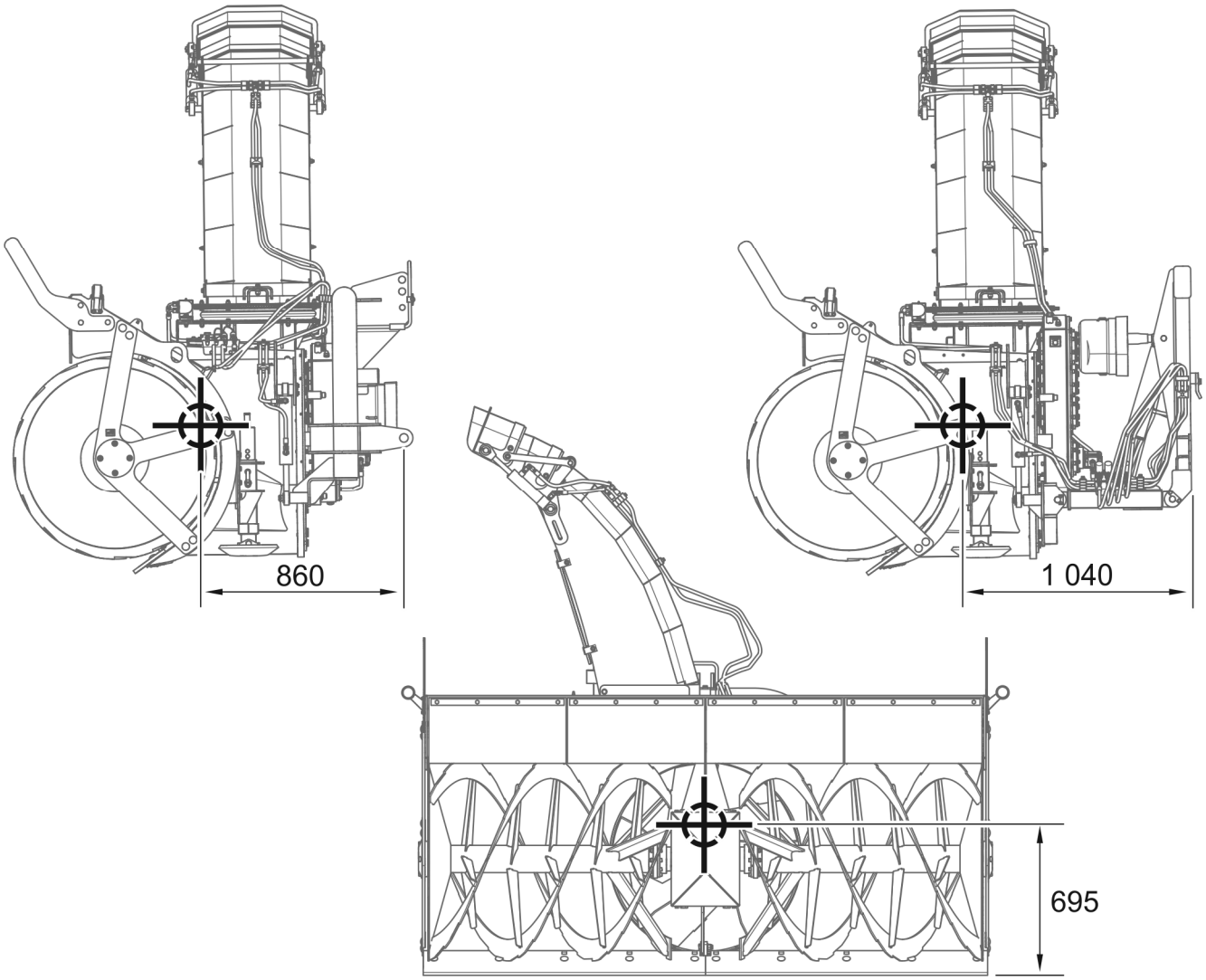


FIGURE 1.3 Centre of gravity

Dimensions given in millimetres [mm]

NOTE

Depending on the machine equipment and discharge chute setting, centre of gravity varies in the range of ± 50 mm

DANGER

When transporting independently, the user must carefully read this Operator's Manual and observe all its instructions. When being transported on a motor vehicle the machine must be mounted on the vehicle's platform in accordance with the transport safety requirements. The driver of the vehicle should use extreme caution while transporting the machine. This is due to the vehicle's centre of gravity shifting upwards when the machine is loaded.

1.5 ENVIRONMENTAL RISK

A hydraulic oil leak constitutes a direct threat to the natural environment owing to its limited biodegradability. Maintenance and repair work which involves the risk of an oil leak should be performed in the rooms with oil resistant surface. In the event of oil leaking into the environment, first of all contain the source of the leak, and then collect the leaked oil using available means. Remaining oil should be collected using sorbents, or by mixing the oil with sand, sawdust or other absorbent materials. The oil contaminations, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container, and then passed on to the appropriate oil waste recycling centre. The container should be kept away from heat sources, flammable materials and food.

Oil which has been used up or is unsuitable for further use owing to loss of its properties should be stored in its original packaging in the conditions described above.

1.6 WITHDRAWAL FROM USE

Should you decide to withdraw the machine from use, comply with the regulations in force in the given country regarding withdrawal from use and recycling of machines withdrawn from use.

Before proceeding to dismantle equipment, oil shall be completely removed from hydraulic system and transmission. Locations of drain plugs in the transmission are shown in section 5.

When spare parts are changed, worn out or damaged parts should be taken to a collection point for recyclable raw materials. Used oil and also rubber and plastic elements should be taken to the appropriate facilities dealing with the recycling of this type of waste.

IMPORTANT

During dismantling, use the appropriate tools, equipment and use personal protection equipment, i.e. protective clothing, footwear, gloves and eye protection etc.

Avoid contact of skin with oil. Do not allow used oil to spill.

SECTION

2

SAFETY ADVICE

2.1 BASIC SAFETY RULES

2.1.1 MACHINE USE

- 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.
- 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.
- 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.
- 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.
- Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.
- The machine must not be used for purposes other than those for which it is intended. Anyone who uses the machine in any other way than the way intended takes full responsibility for any consequences of this 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 safety guards and other protective elements are technically sound and correctly positioned. In the event of loss or damage to the protective features, they must be replaced with new ones.
- Before using the machine always check its technical condition, especially in terms of safety. In particular, check the technical condition of the linkage and drive.

2.1.2 HITCHING AND UNHITCHING THE MACHINE

- Carefully read the carrier vehicle Operator Manual.
- Do NOT link the machine to the carrier vehicle if the categories of the three point linkage systems of the machine and carrier vehicle are not compatible.
- To hitch the machine to tractor use only genuine pins and safeguards.
- The carrier vehicle to which the machine will be coupled must be technically reliable and must meet all manufacturer's requirements.
- Be especially careful when linking and disconnecting the machine.
- After completed hitching of the machine, check the safeguards.
- When hitching, there must be nobody between the machine and the carrier vehicle.
- Machine unhitched from the carrier vehicle must be placed on level, sufficiently hard surface in such a manner as to ensure that it is possible to connect it again.

2.1.3 HYDRAULIC SYSTEM

- The hydraulic system is under high pressure when operating.
- Regularly check technical condition of the hydraulic lines and connections. There must be no oil leaks.
- In the event of malfunction of the hydraulic system elements, do not use 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 penetrate the skin and cause infections. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation 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).
- Use the oil recommended by the Manufacturer. Never mix two types of oil.

- Used oil or deteriorated oil should be stored in original containers or replacement containers resistant to hydrocarbons. Replacement containers must be clearly marked and appropriately stored.
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.
- Hydraulic lines must be changed every 4 years regardless of their technical condition.
- Repair and replacement of hydraulic system elements should be entrusted to the appropriately qualified persons.

2.1.4 TRANSPORTING THE MACHINE

- Before driving on public roads, check operation of lights.
- 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. Adjust speed to the prevailing road conditions and other limitations arising from road traffic regulations.
- Do NOT leave the machine raised and unsecured while the carrier vehicle is parked. When parked, the machine should be lowered to the ground.
- People or animals or whatever materials must not be carried on the machine.
- During transport, the carrier vehicle's linkage should be locked in the up position to prevent its accidental lowering.
- Reckless driving and excessive speed may cause accidents.

2.1.5 MAINTENANCE

- 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 proper protective clothing, gloves and appropriate tools.

- Any modification to the machine frees the manufacturer from any responsibility for damage or detriment to health which may arise as a result.
- 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.
- Before beginning work on hydraulic system, reduce oil pressure.
- 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 cleaned 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's engine turned off and the ignition key removed. The vehicle shall be immobilized with the parking brake and secured against unauthorized access.
- 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.
- Do NOT weld, drill holes in, cut or heat the main structural elements, which have a direct impact on the machine operation safety.
- 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. Do NOT perform any work under raised and unsupported machine.
- 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.

2.1.6 OPERATING SNOWBLOWER

- Before starting the carrier vehicle with the connected machine, make sure that the machine drive is not engaged, otherwise it can lead to uncontrolled operation of the machine.
- Before lowering the machine, make sure there are no bystanders near the machine.
- Before starting the machine make sure that there are no bystanders or animals in the danger zone. The machine operator is obliged to ensure proper visibility of the machine and the working area.
- During snow removal, the driver should use personal protective equipment (protective ear guards).
- 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.
- Person must not stand in the machine operation area and also between the carrier vehicle and the machine.
- Do not direct discharge chute toward operator cabin.
- Exercise due caution due to the limited field of view obstructed by the snow blower discharge chute.

2.1.7 OPERATION OF PTO SHAFT

- The machine may only be connected to the carrier vehicle by appropriately selected PTO shaft recommended by the Manufacturer.
- The PTO shaft has markings on the casing, indicating which end of the shaft shall be connected to the carrying vehicle.
- Never use a damaged PTO drive shaft, it may cause an accident. A damaged shaft must be repaired or replaced.
- Disconnect the PTO shaft drive each time when it is not necessary to drive the machine.
- Secure the chains preventing the shaft cover from turning while the shaft is working, to a fixed structural element.

- Do NOT use the securing chains to support the shaft while machine is parked or when transporting the machine.
- Before using the machine, the user should carefully read the Operator Manual of the PTO shaft and adhere to the recommendations contained in it.
- The shaft must be equipped with guards. Do NOT use the shaft with damaged or missing guards.
- After connecting shaft, ensure that it is correctly and safely connected to the carrier vehicle and to the machine.
- Before starting the machine, make sure that the linkage is connected to the appropriate gearbox connection (the gearbox has two connections - it applies to the snow blower with three-point linkage)
- Before disconnecting the shaft, turn off the carrier vehicle's engine and remove the key from the ignition.
- Do NOT wear loose clothing, straps or whatever that may become wrapped round the rotating drive shaft. Contact with rotating PTO shaft may cause severe injuries.
- Do NOT go over and under the shaft or stand on it equally during work as also when the machine is parked.

2.2 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 hitched,
- being on the machine while the engine is running,
- operating the machine with removed or faulty safety guards,
- not maintaining 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
- cleaning, maintenance and technical checks when tractor is connected and engine is running.

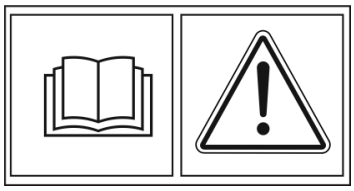
The residual risk may be kept to a minimum by following the recommendations below:

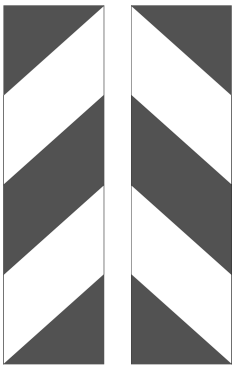
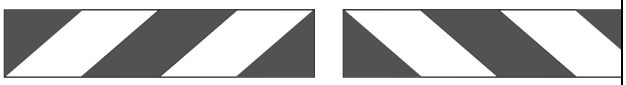
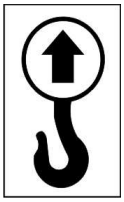
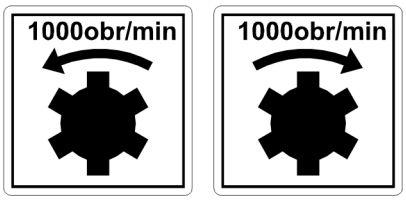
- operate the machine in prudent and unhurried manner,
- sensible application of the remarks and recommendations contained in the Operator Manual,
- carry out repairs and maintenance work in line with operating safety rules,
- repair and maintenance work should be carried out by persons trained to do 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

2.3 INFORMATION AND WARNING DECALS

All signs should always be legible and clean, visible to the operator and also to persons possibly being in the vicinity of the machine in operation. If any safety sign is lost or illegible, it should be replaced with a new one. All elements having safety signs replaced during repairs should be affixed with these signs. Safety signs and decals may be purchased from the Manufacturer or the Seller.

TABLE 2.1 Information and warning decals

ITEM	SYMBOL	DESCRIPTION
1		Before starting work, carefully read the Operator Manual.
2		During machine operation objects and blocks of ice can be thrown, which pose a risk of injury for the whole body. The operator should keep a safe distance from people, animals and buildings.
3		Danger associated with the PTO shaft. Do not approach or touch the rotating elements.
4		Important! Remove blocking snow only when the snowplough and blower are turned OFF. Use only wooden pegs or shovels enclosed with the snowplough.

ITEM	SYMBOL	DESCRIPTION
5		Do not reach into the compression area. Danger of crushing hands or fingers
6		Rear clearance marking
7		Front clearance marking
8		Transport suspension points
9		Machine model
10		Lubrication points
11		Speed and rotation direction of the shaft (depending on the machine version)

Numbers in the Item column correspond to decals (FIGURE 2.1)

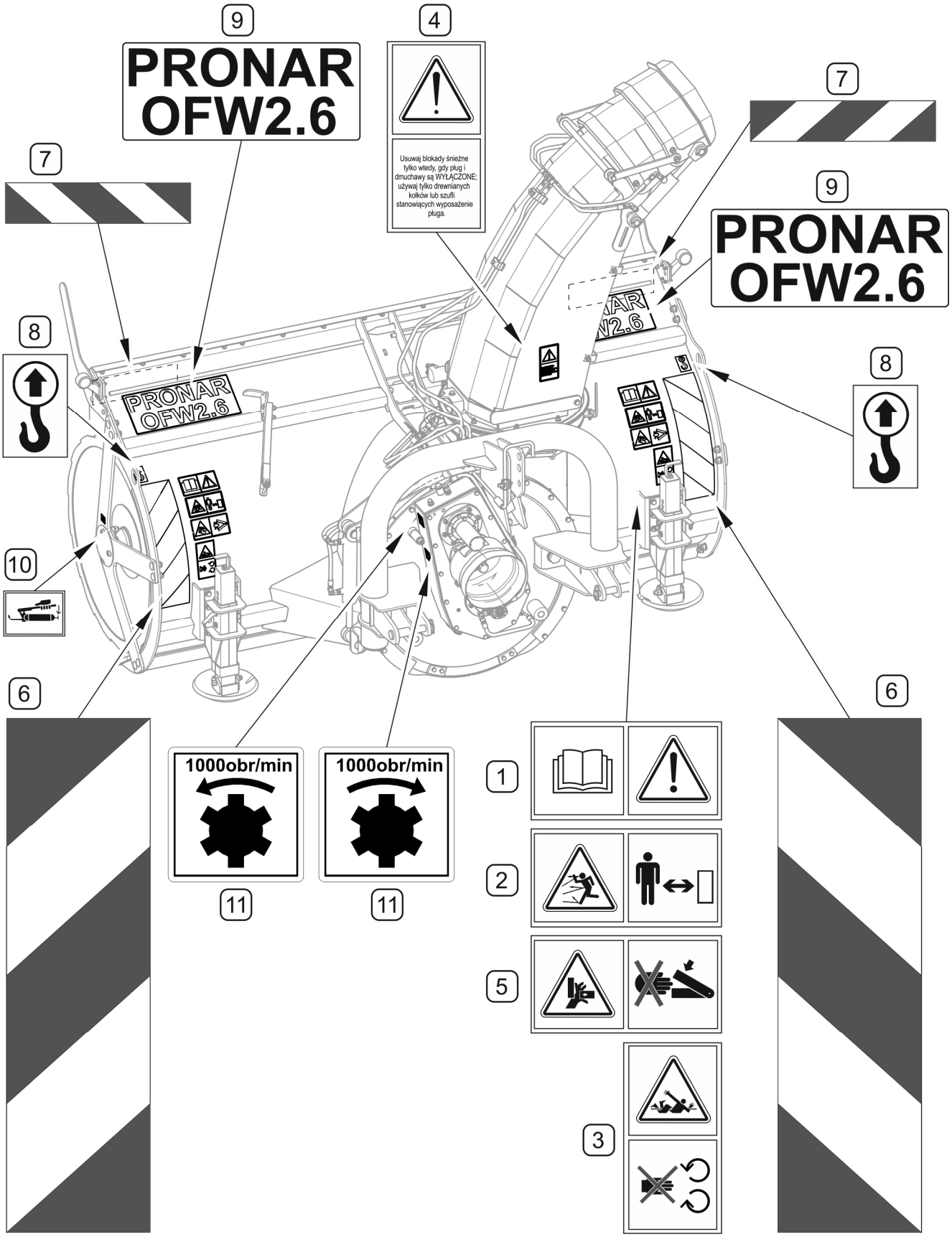


FIGURE 2.1 Locations of information and warning decals

Meaning of symbols used in the Figure is given in TABLE 2.1

SECTION

3

DESIGN AND OPERATION

3.1 TECHNICAL SPECIFICATION

TABLE 3.1 BASIC SPECIFICATIONS OF ROTARY SNOW BLOWER

	Unit		
Model	-	OFW2.6	
Method of mounting (depending on machine version)	-	Front three-point linkage Cat. II and III according to ISO 730-1	Front mounting plate TYPE A or TYPE B according to DIN76060 or SETRA
Working width	mm	2,640	
Working height	mm	1,245	
Discharge distance	m	5 – 30	
Capacity	m^3/min	4,600	
Working speed	km/h	up to 2	
Auger diameter	mm	950	
Rotor diameter	mm	880	
Weight	kg	1,670	1,800
Power transmission	-	power take-off shaft	
Control (depending on the machine version)	-	using the control panel and the external hydraulic system	using the external hydraulic system of the carrying vehicle
External dimensions:			
- length	mm	1,900	2,170
- width	mm	2,685	
- height	mm	2,510	
Power demand	kW	100	
Nominal rotation speed of the machine power input connection shaft	rpm	1,000	
Other information	-	single person operation	

3.2 GENERAL DESIGN

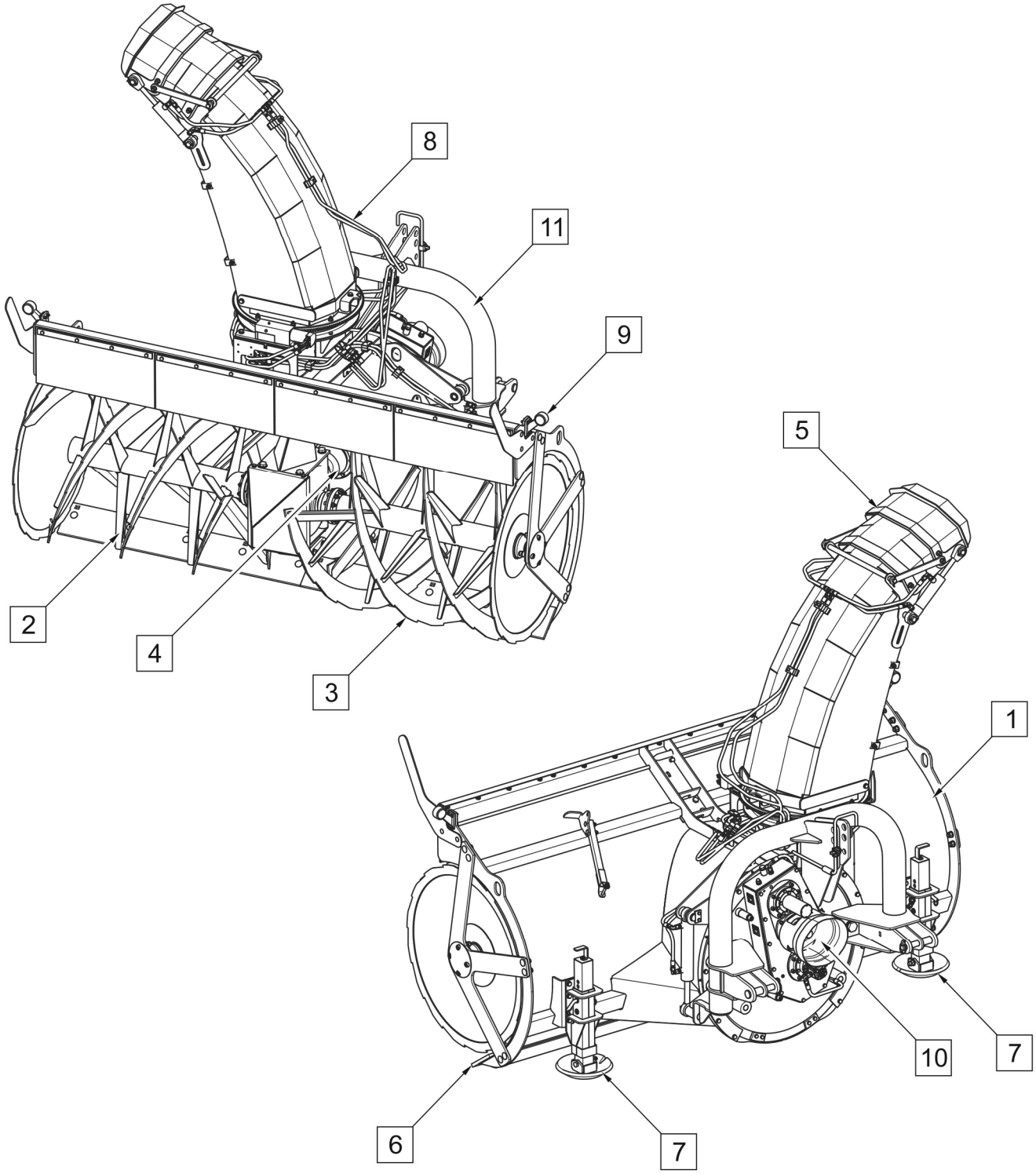


FIGURE 3.1 General design

(1) - frame; (2) - right auger; (3) - left auger; (4) - rotor; (5) - discharge chute; (6) - collecting blade; (7) - slides or support wheels; (8) - hydraulic system; (9) - electrical system; (10) - transmission; (11) - linkage

Rotary snow blower consists of frame (1) in which operating elements are embedded: blade (6) separating the layer of snow (ice) from the ground, augers (2) and (3) which cut and transport snow inside the machine and rotor (4) ejecting snow through discharge chute (5). The rotation of the discharge chute (5) and the discharge distance are controlled from the driver's cab. Using suitable linkage (11), the snow blower is hitched to a tractor or carrying vehicle equipped with a mounting plate. During operation, the machine moves on the ground on two adjustable slides (7) or support wheels (option).

3.3 DRIVE TRANSMISSION

The drive is transmitted from the carrying vehicle's PTO shaft through PTO shaft to gear transmission (1) and then through clutch assembly (2) to intersecting axis gear (3) driving the augers.

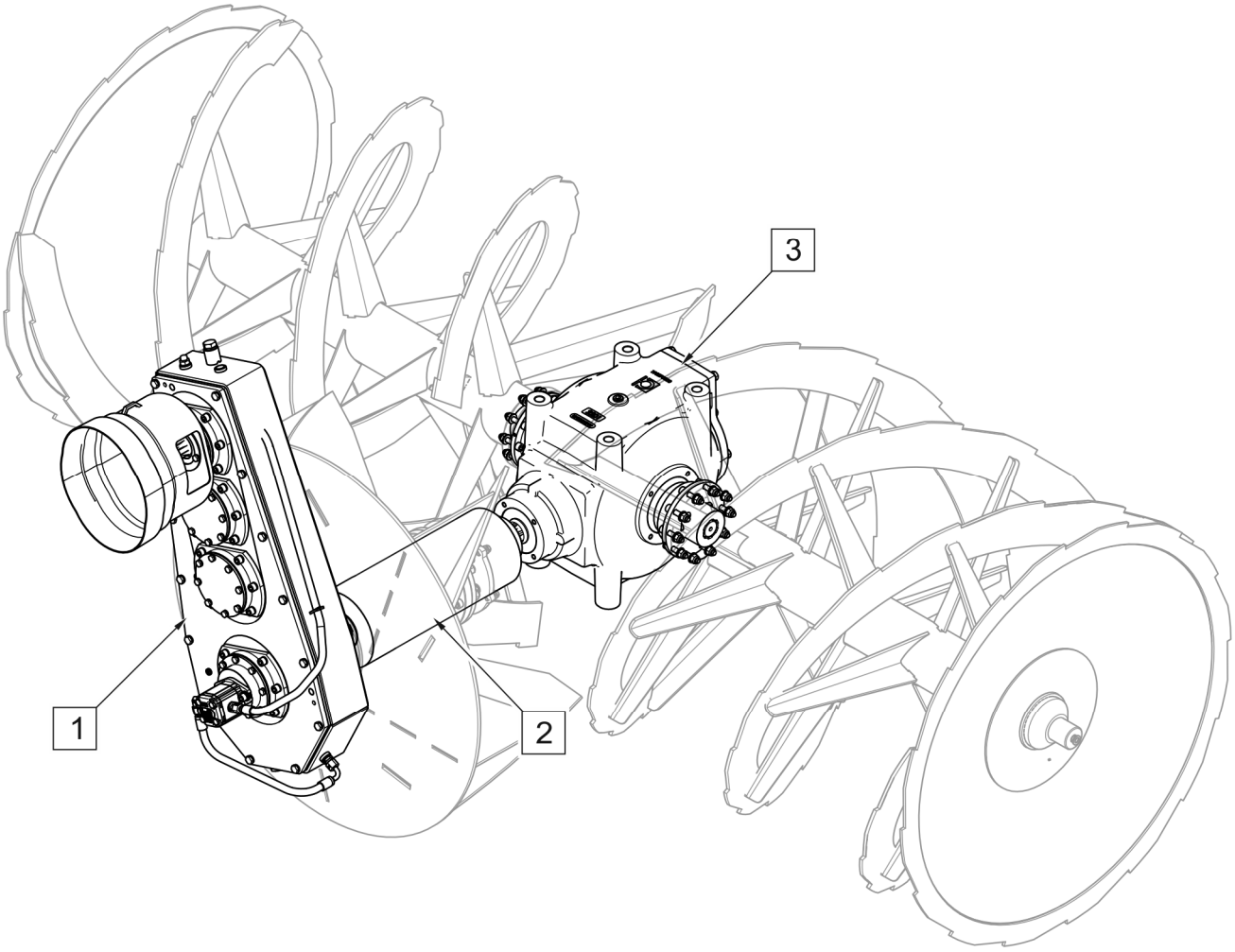


FIGURE 3.2 Design of drive transmission system

(1) - transmission; (2) - clutch assembly; (3) - intersecting axis gear

3.4 HYDRAULIC SYSTEM

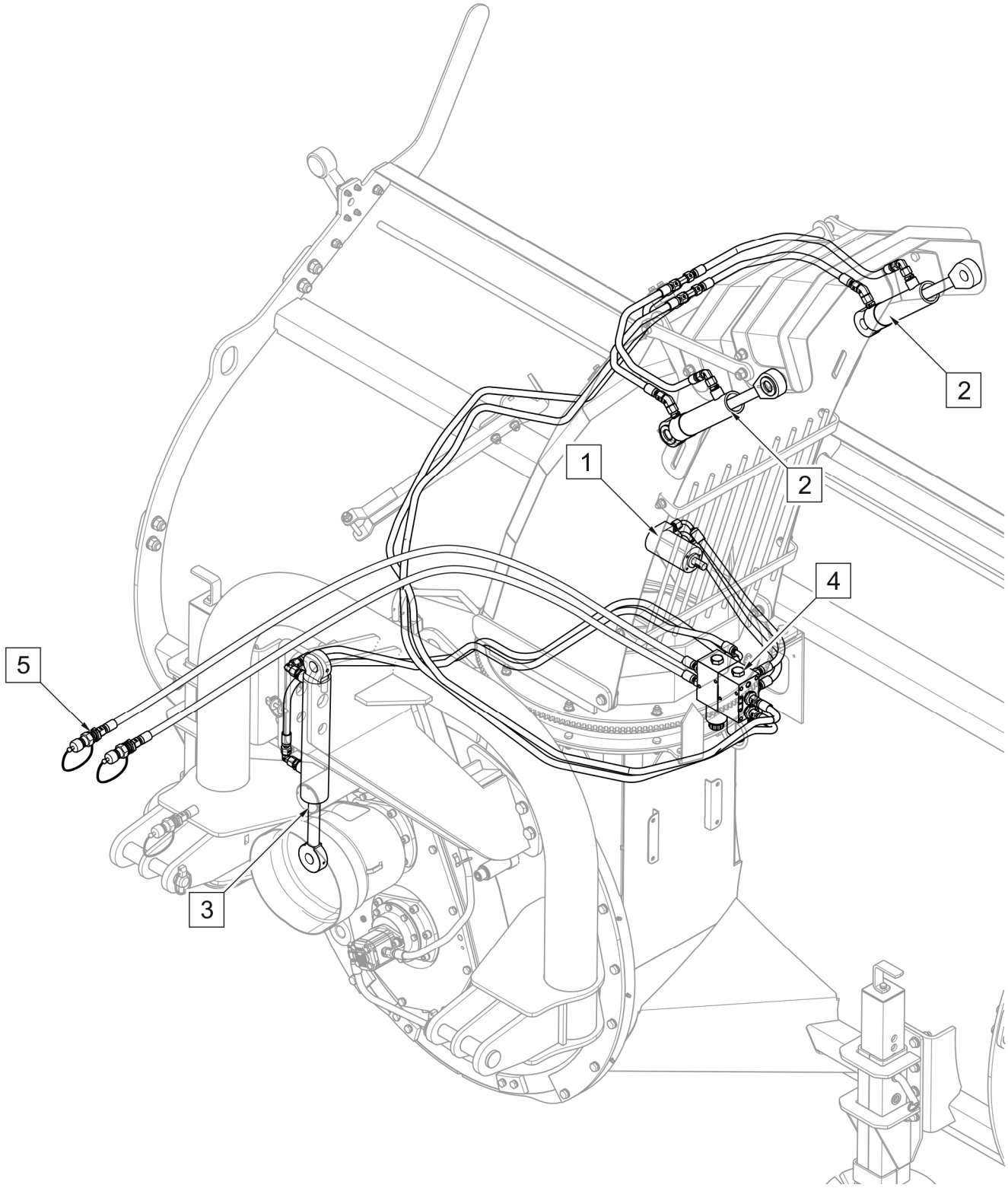


FIGURE 3.3 Hydraulic system design (machine mounted on three-point linkage)

(1) - hydraulic motor for discharge chute rotation; (2) - hydraulic cylinder for adjusting discharge range; (3) - snow blower tilt hydraulic cylinder; (4) - hydraulic solenoid valve; (5) - hydraulic quick couplers

In the snow blower mounted on the front three-point linkage, the hydraulic system (FIGURE 3.3) can alternately control hydraulic motor (1) for discharge chute rotation, hydraulic cylinders (2) for adjusting discharge range and snow blower tilt hydraulic cylinder (3).

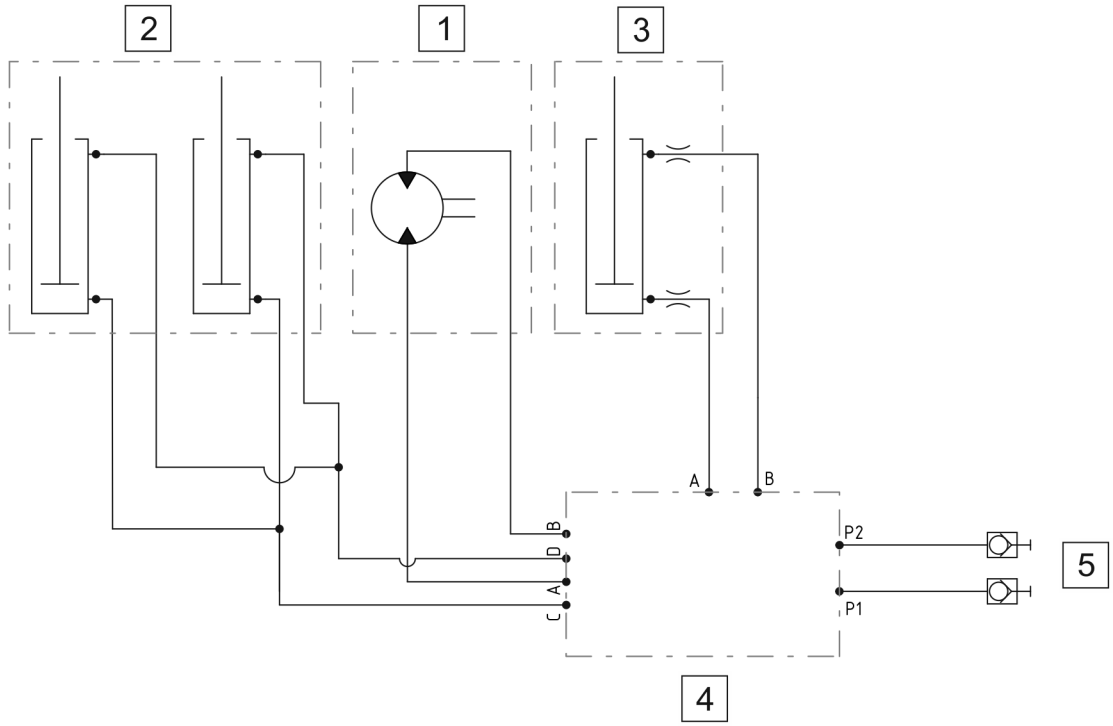


FIGURE 3.4 **Hydraulic system concept diagram** (machine mounted on three-point linkage)

(1) - hydraulic motor for discharge chute rotation; (2) - hydraulic cylinder for adjusting discharge range; (3) - snow blower tilt hydraulic cylinder; (4) - hydraulic solenoid valve; (5) - hydraulic quick couplers

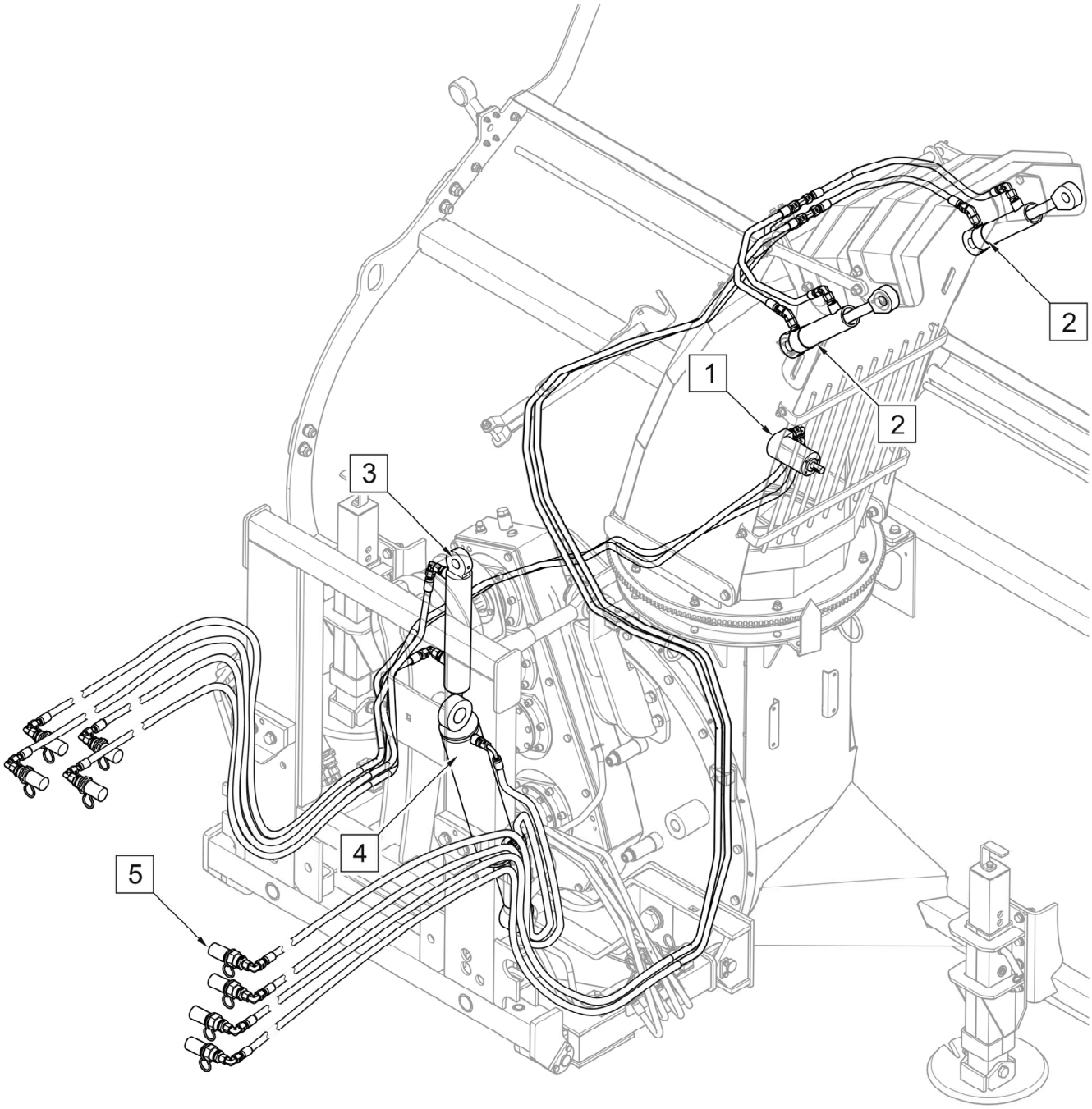


FIGURE 3.5 Hydraulic system design (machine mounted on faceplate)

(1) - hydraulic motor for discharge chute rotation; (2) - hydraulic cylinder for adjusting discharge range; (3) - snow blower tilt hydraulic cylinder; (4) - hydraulic cylinder for lifting/lowering; (5) - hydraulic quick couplers

Hydraulic system of the snow blower mounted on the DIN or SETRA plate (FIGURE 3.5) is used for rotating the discharge chute, setting snow discharge distance, changing the machine tilt angle as well as raising and lowering the machine.

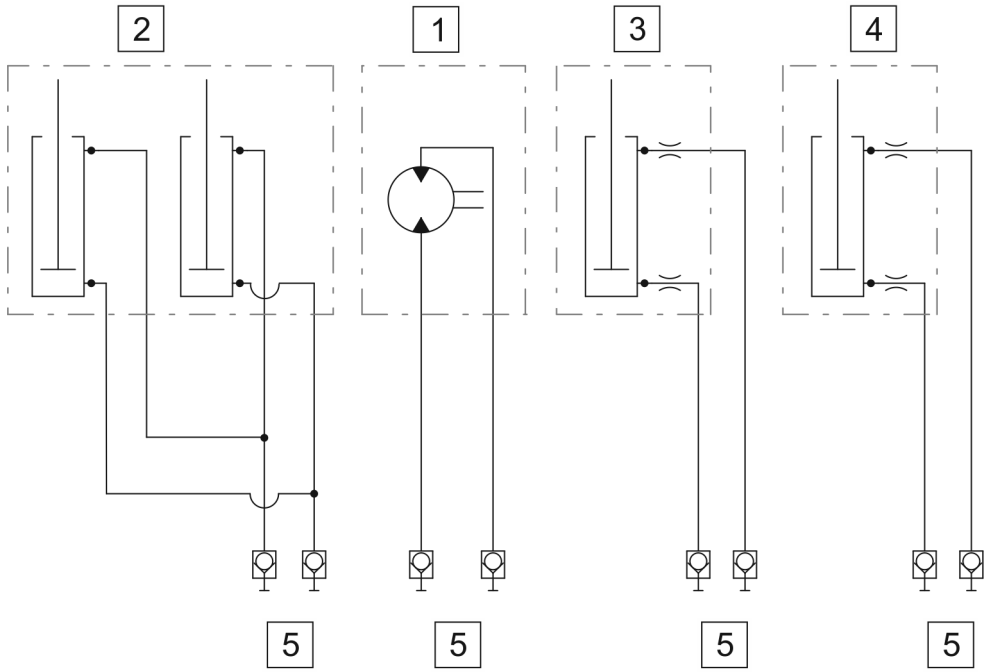


FIGURE 3.6 **Hydraulic system concept diagram** (machine mounted on the carrying vehicle faceplate)

(1) - hydraulic motor for discharge chute rotation; (2) - hydraulic cylinder for adjusting discharge range; (3) - snow blower tilt hydraulic cylinder; (4) - hydraulic solenoid valve; (5) - hydraulic quick couplers

3.5 ELECTRICAL SYSTEM DESIGN

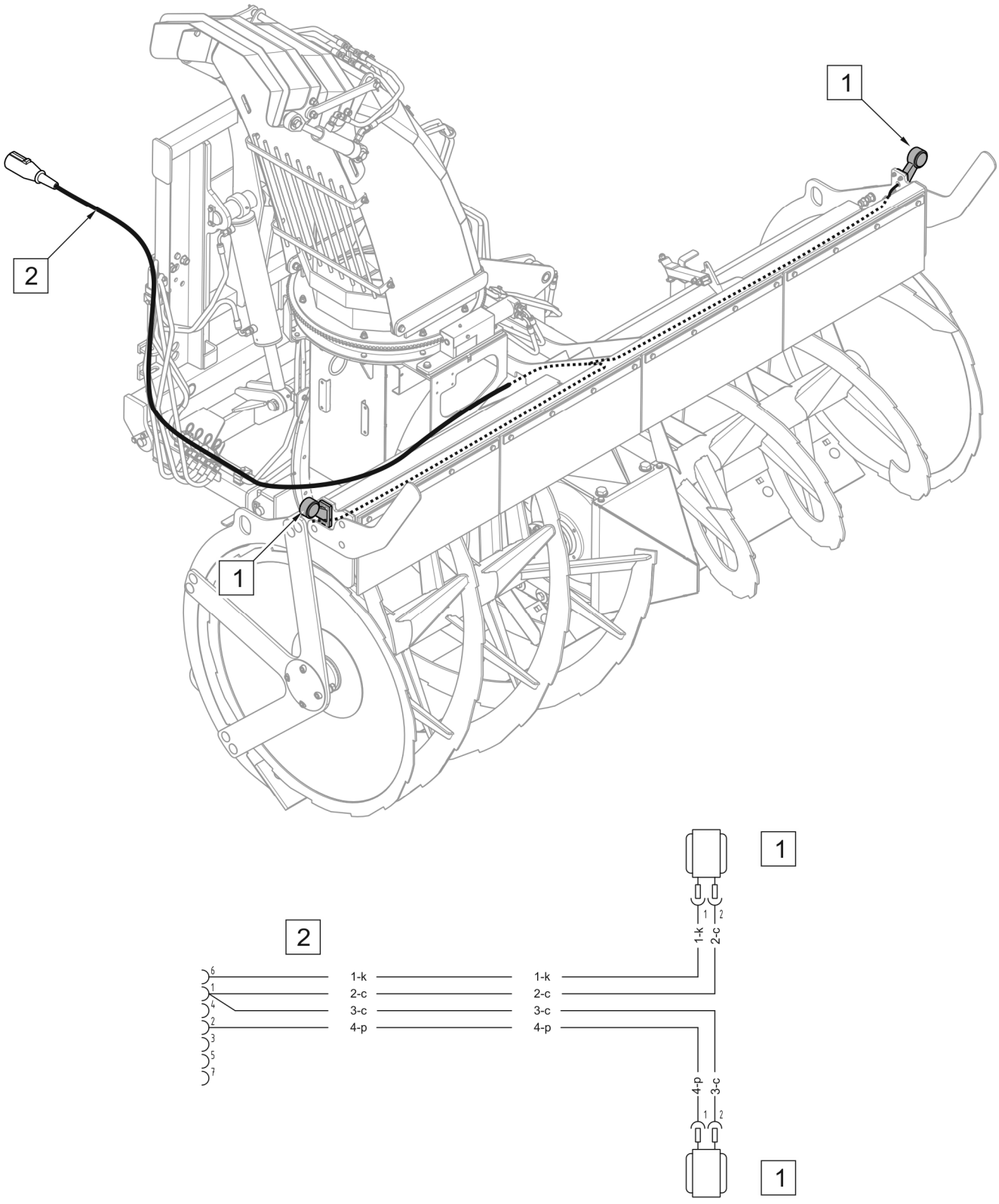


FIGURE 3.7 Electrical system design (machine mounted on the carrying vehicle faceplate**)**

(1) - clearance light; (2) - power supply wiring harness

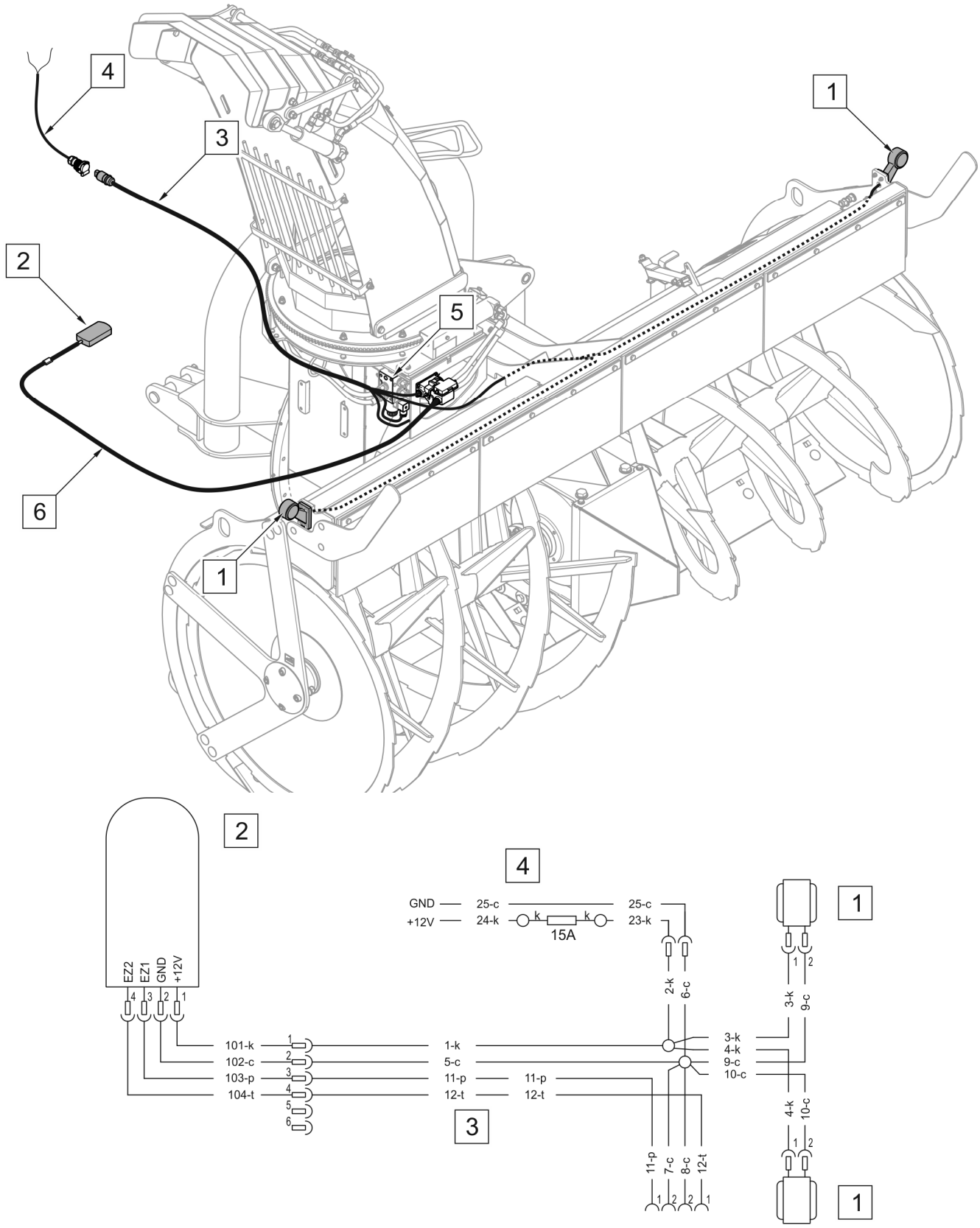


FIGURE 3.8 Electrical system design (machine mounted on three-point linkage**)**

(1) - clearance light; (2) - control panel; (3) - power supply wiring harness (snow blower); (4)- power supply wiring harness (carrying vehicle); (5) - solenoid valve; (6) - control panel wiring harness

SECTION

4

CORRECT USE

4.1 PREPARING FOR WORK

DANGER

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

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

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.

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

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

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 tractor, machine operator must verify the machine technical condition. In order to do this:

- the user must carefully read this Operator's Manual and observe all recommendations, understand the design and the principle of machine operation,
- inspect machine's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components),
- check all the lubrication points, lubricate the machine as needed according to recommendations provided in section 5,
- make sure that the machine's linkage is compatible with that of the carrier vehicle.
- make sure that power take-off shaft is compatible, e.g. PTO tip type, RPM, rotation direction,
- check compatibility of the hydraulic system sockets and electrical system sockets,
- check technical condition of augers and rotor.
- check technical condition of protective guards and check if they are correctly installed,
- check technical condition of drive transmission and PTO drive shaft (optional equipment).

DANGER

Before starting the carrying vehicle with the connected machine make sure the machine drive is not engaged, otherwise it can lead to uncontrolled operation of the machine.

NOTE

Failure to follow instructions in this Operator's Manual or starting the machine incorrectly may cause damage to the machine.

The technical condition before starting the machine must be no cause for concern.

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 carrying vehicle (see 4.3 HITCHING TO CARRYING VEHICLE),
- connect hydraulic conduits and electrical lead,
- connect PTO drive shaft,
- check operation of drive transmission system and tightness of transmission,
- check operation of discharge chute rotation and raising mechanism,
- check rotation direction (if necessary transfer PTO drive shaft to the other end of transmission).

NOTE

Before starting work, check the rotation direction of the augers. The augers' direction of rotation is correct when the snow is collected under the augers and directed towards the centre of the machine.

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.

NOTE

Before using the machine always check its technical condition.

4.2 TECHNICAL INSPECTION

To get the machine ready for use, check components according to guidelines presented in Table 4.1.

TABLE 4.1 TECHNICAL INSPECTION SCHEDULE

DESCRIPTION	MAINTENANCE ACTIVITIES	FREQUENCY
Technical condition of safety guards	Check the technical condition of safety guards, if complete and correctly mounted,	before beginning work
Technical condition of augers, rotor and drive transmission system components	Assess the technical condition, if complete and correctly mounted	
Technical condition of hydraulic conduits and wiring harnesses.	Visually inspect the technical condition	
Lights	Check that the lights are working properly	
Check if all main nut and bolt connections are properly tightened	Tightening torque should be according to table *5.5*	every 50 hours of work
Oil level in transmission and reducer	Check as outlined in chapter *DRIVE TRANSMISSION SYSTEM MAINTENANCE*	once a year, before commencing the machine use season
Lubrication	Lubricate elements according to table *LUBRICATION*	according to table *5.4*

NOTE

Do NOT use a malfunctioning or incomplete machine.

4.3 HITCHING TO VEHICLE

4.3.1 HITCHING TO CARRYING VEHICLE EQUIPPED WITH THE FRONT THREE POINT LINKAGE

NOTE

Before hitching the machine to carrying vehicle, read the carrying vehicle Operator's Manual.

DANGER

Exercise caution when hitching the machine to carrying vehicle.

No one is allowed between the carrying vehicle and the machine during hitching.

Snow blower can be hitched to a carrying vehicle that meets the requirements presented in Table 1.1 REQUIREMENTS FOR CARRYING VEHICLE. Before mounting the machine on the carrying vehicle, check the linkage compatibility.

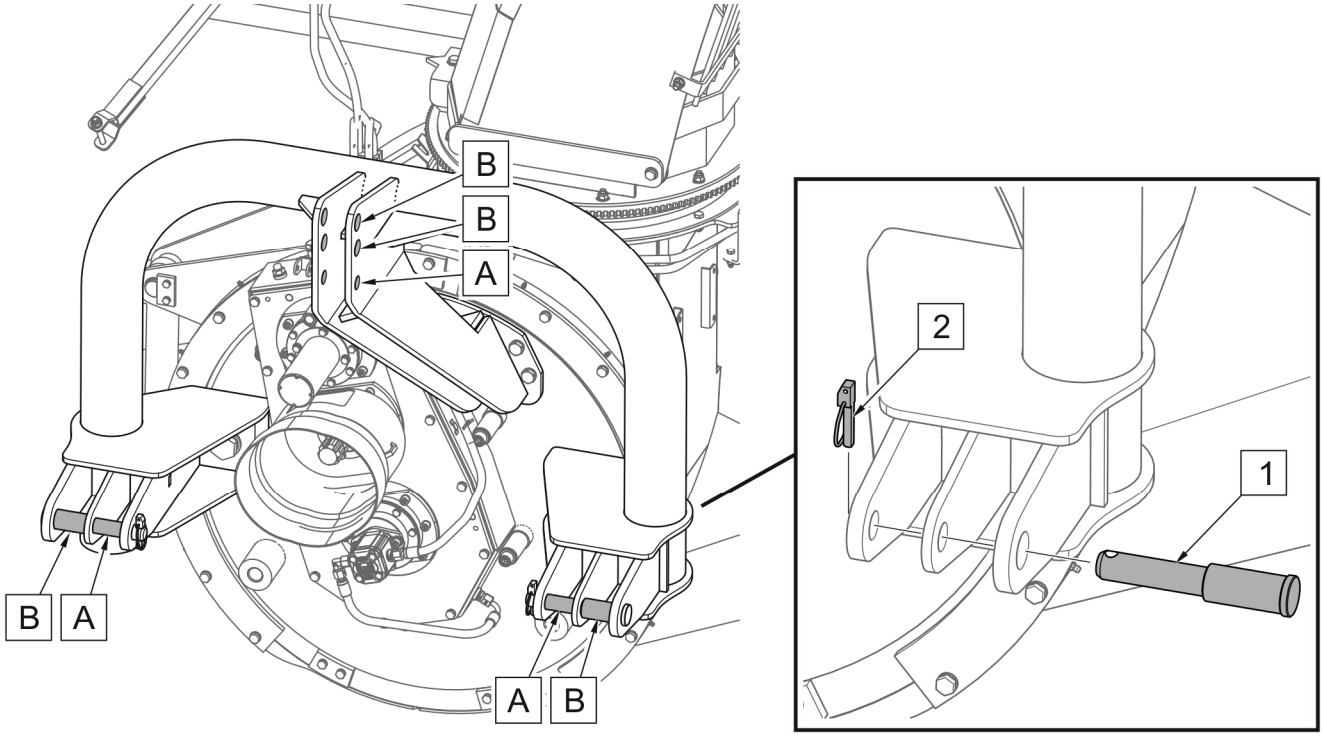


FIGURE 4.1 Attachment points of three-point linkage cat. II and III according to ISO

(A) - category II attachment points; (B) - category III attachment points; (1) - lower pin; (2) - cotter pin

To connect the snow blower to the carrying vehicle's three-point linkage:

- Remove the lower pins (1) secured with cotter pins (2) (FIGURE 4.1),
- move the lower rods of tractor (carrying vehicle's) three-point linkage to the lower linking points of the snow blower; set lower rods at an appropriate height
- turn off vehicle's engine and prevent it from moving,
- connect lower points of the machine linkage with the three-point linkage links by means of pins (1) and secure with cotter pins (2),
- connect upper link (central connector) to the upper attachment point of the snow blower's linkage,
- eliminate lateral movements of machine by appropriate adjustment of the lower arm stabilisers; both lower links of the three-point linkage are recommended to be set at the same height,
- lift machine using carrying vehicle's three point linkage.

DANGER

To hitch the machine to carrying vehicle use only genuine pins and safeguards.

DANGER

Before connecting the PTO shaft, turn off the tractor engine and remove the key from the ignition. Ensure that unauthorised persons do not have access to the tractor.

The use of PTO shaft and its technical condition must be in accord with the operator's manual of PTO shaft.

Before connecting the PTO shaft it is absolutely necessary to carefully read the Operator's Manual attached by the Manufacturer of the shaft and observe the instructions contained in it. Before connecting to the carrier vehicle, check technical condition of shaft guards, completeness and condition of protecting chains and general technical condition of the shaft. To connect the drive transmission of the machine to carrying vehicle PTO shaft, use a PTO shaft recommended by the Manufacturer (optional equipment).

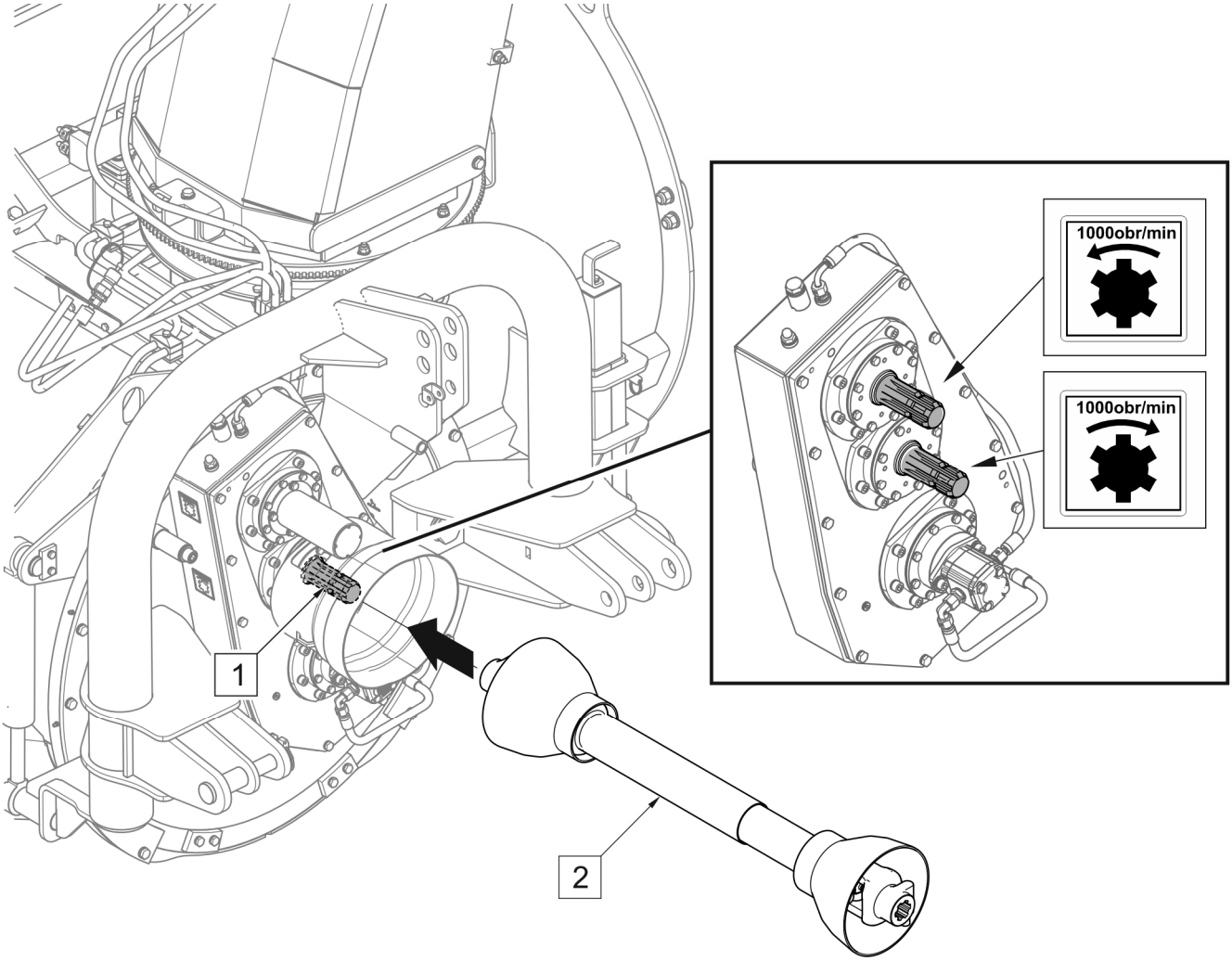


FIGURE 4.2 **Connecting PTO shaft** (machine mounted on the carrying vehicle's front three point linkage)

(1) - gear shaft; (2) - PTO shaft (additional equipment)

Depending on the rotation direction of the carrying vehicle's PTO, the PTO shaft (3) must be connected to the appropriate gear shaft (1) or (3) (FIGURE 4.2). The upper gear shaft turns counterclockwise while the lower shaft turns clockwise (*looking at the shaft front*).

The shaft end terminated with a clutch should be connected on the machine side.

TIP

The machine should be driven using the PTO shaft, part number 302-850-000438, which is an accessory of the machine.

NOTE

PTO drive shaft end terminated with a clutch should be connected to the machine' shaft.

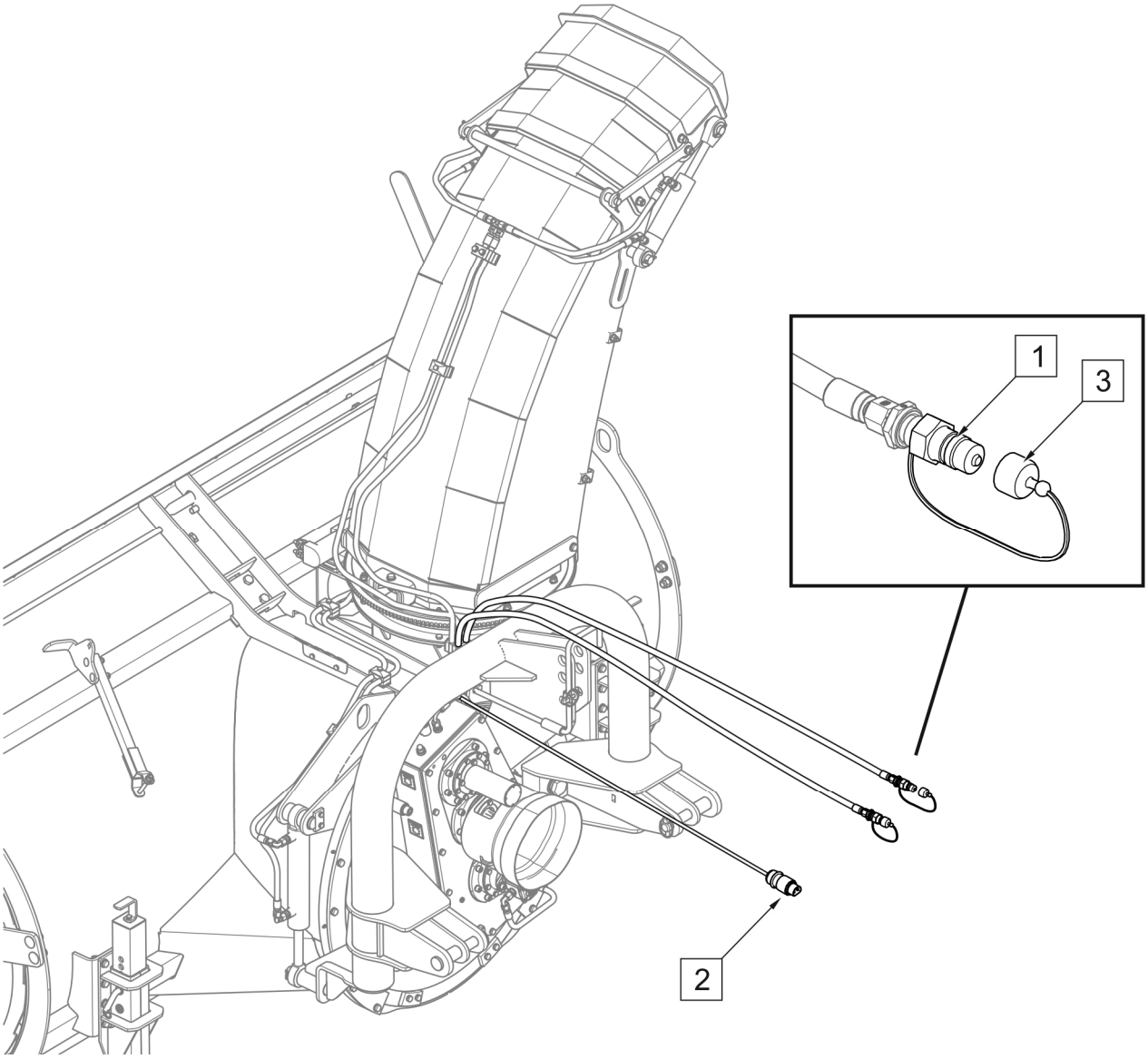


FIGURE 4.3 **Connecting hydraulic system and electrical system** (machine mounted on the carrying vehicle's front three point linkage)

(1) - hydraulic quick coupler; (2) - 3-pole plug; (3) - protective plug

NOTE

When connecting the hydraulic conduits, make sure that the hydraulic system of the carrying vehicle is not under pressure.

Hydraulic quick couplers (1) should be connected to the sockets of one section of the carrying vehicle's external hydraulic system (FIGURE 4.3). Connect the plug (2) to the 3-pole 12V DIN 9680 socket on the front of the carrying vehicle. If the carrying vehicle is not equipped with such a socket or is equipped with a different type of socket, install the socket according to the diagram (FIGURE 4.4).

NOTE

The hydraulic conduits and electrical leads should be so arranged as to prevent their damage during operation.

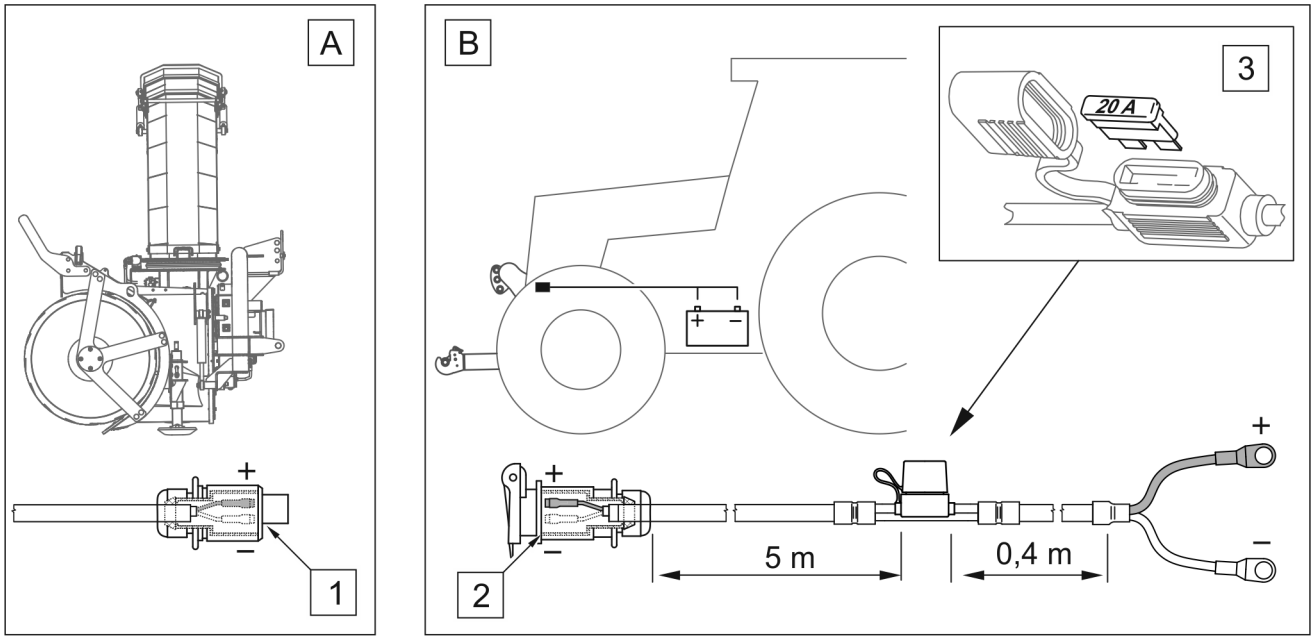


FIGURE 4.4 Installing the power lead for the electrical system (machine mounted on the front three point linkage)

(A) - components of the snow blower's electrical system; (B) - power lead in the carrying vehicle; (1) - 3-pin plug; (2) - 3-pin socket; (3) - UNIVAL 20A fuse

The power lead (B) should be connected to the carrying vehicle's electrical system (FIGURE 4.4), and the socket (2) should be placed near the front three-point linkage. Power lead (B) has an UNIVAL 20 A fuse (3) on the supply lead „+".

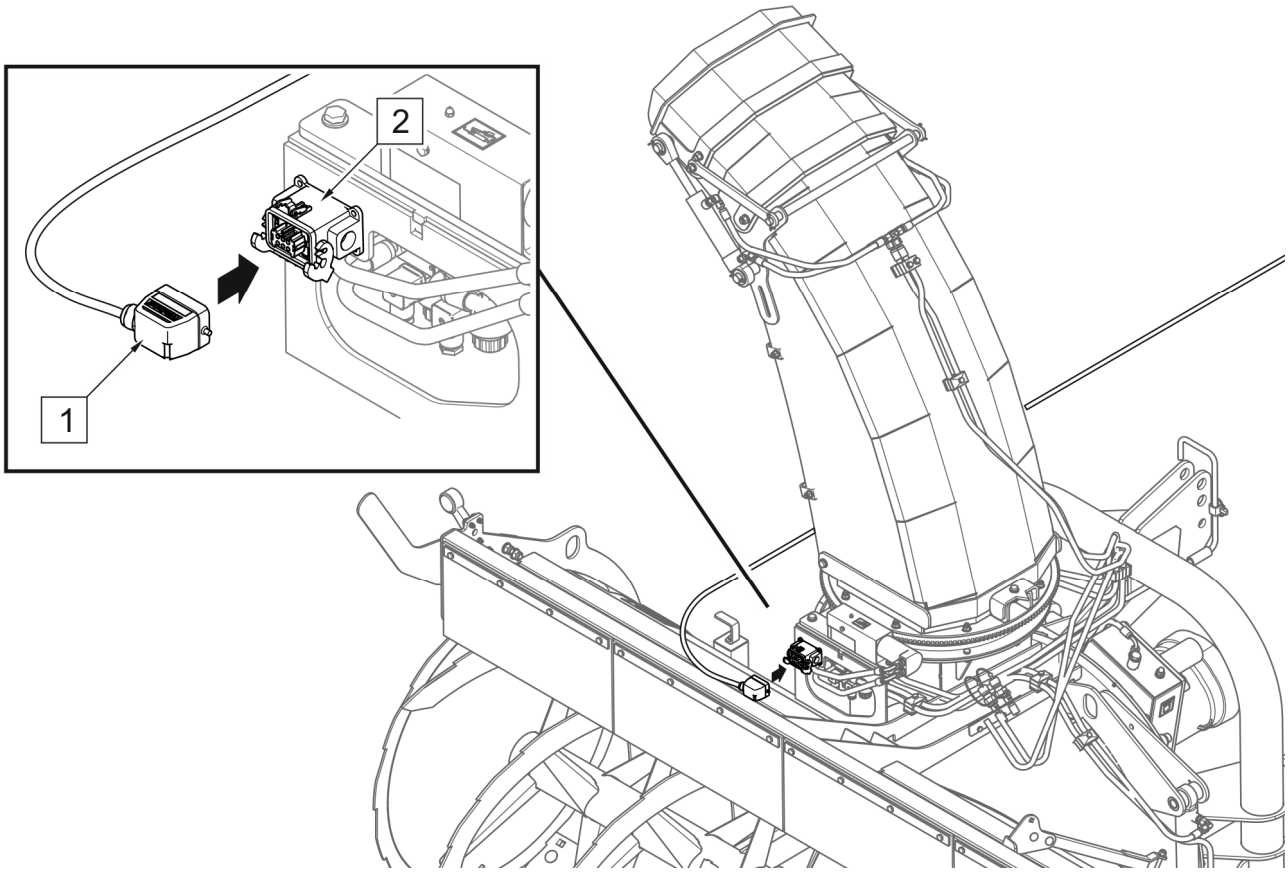


FIGURE 4.5 Connecting the control panel wiring harness (machine mounted on three-

(1) - control panel wiring harness plug; (2) - socket

Connect the control panel wiring harness (1) to the socket (2) located in front of the discharge chute (FIGURE 4.5)

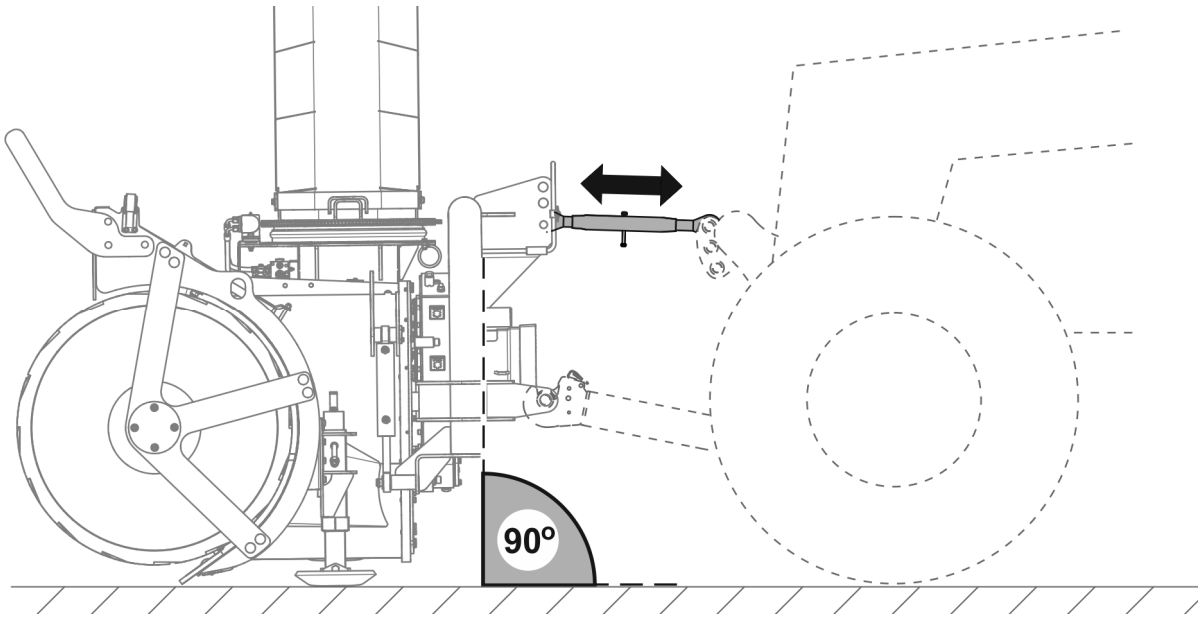


FIGURE 4.6 Angle adjustment

For optimum operation, set the snow blower linkage at the angle of 90^{o} to the ground surface (FIGURE 4.6). The adjustment is made by adjusting the length of the central link.

4.3.2 HITCHING TO CARRYING VEHICLE EQUIPPED WITH THE DIN OR SETRA PLATE

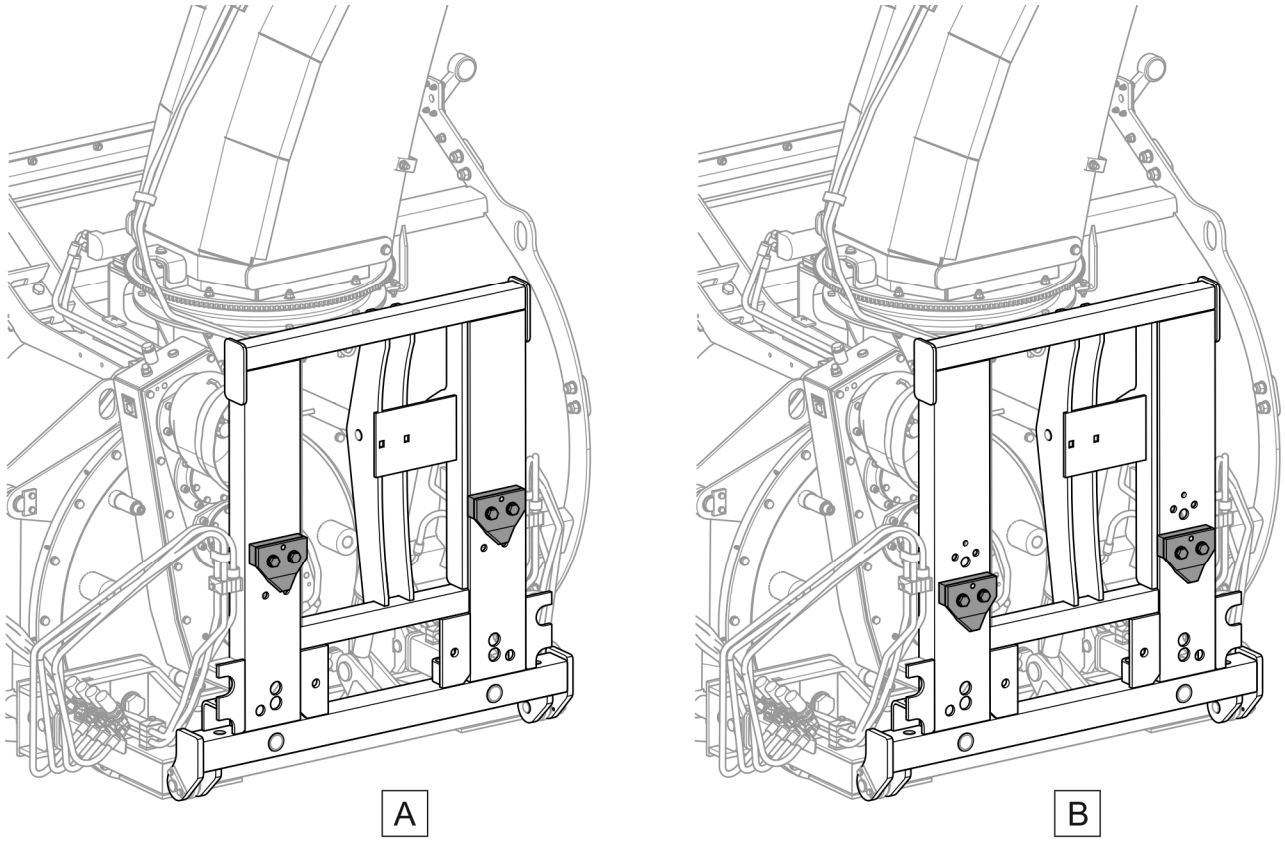


FIGURE 4.7 Attachment points to the carrying vehicle's faceplate

(A) - type A according to DIN 76060; (B) - type B according to DIN 76060

Depending on machine version, the snow blower can be equipped with type A or B linkage according to DIN 76060 (FIGURE 4.7) or SETRA plate.

TIP

The carrying vehicle's faceplate should be mounted vertically in the vehicle's axis of symmetry. The upper edge of the plate should be 1 000±60mm from the ground.

Connect hydraulic conduit connectors (FIGURE 4.8) to four pairs of ISO 16028 sockets located on the front of the carrying vehicle. Connect the connectors (C) to the hydraulic section with a floating function. Connect the clearance lights power supply plug (2) (FIGURE 4.8) to the 7-pin 24V ISO 1185 socket on the carrying vehicle.

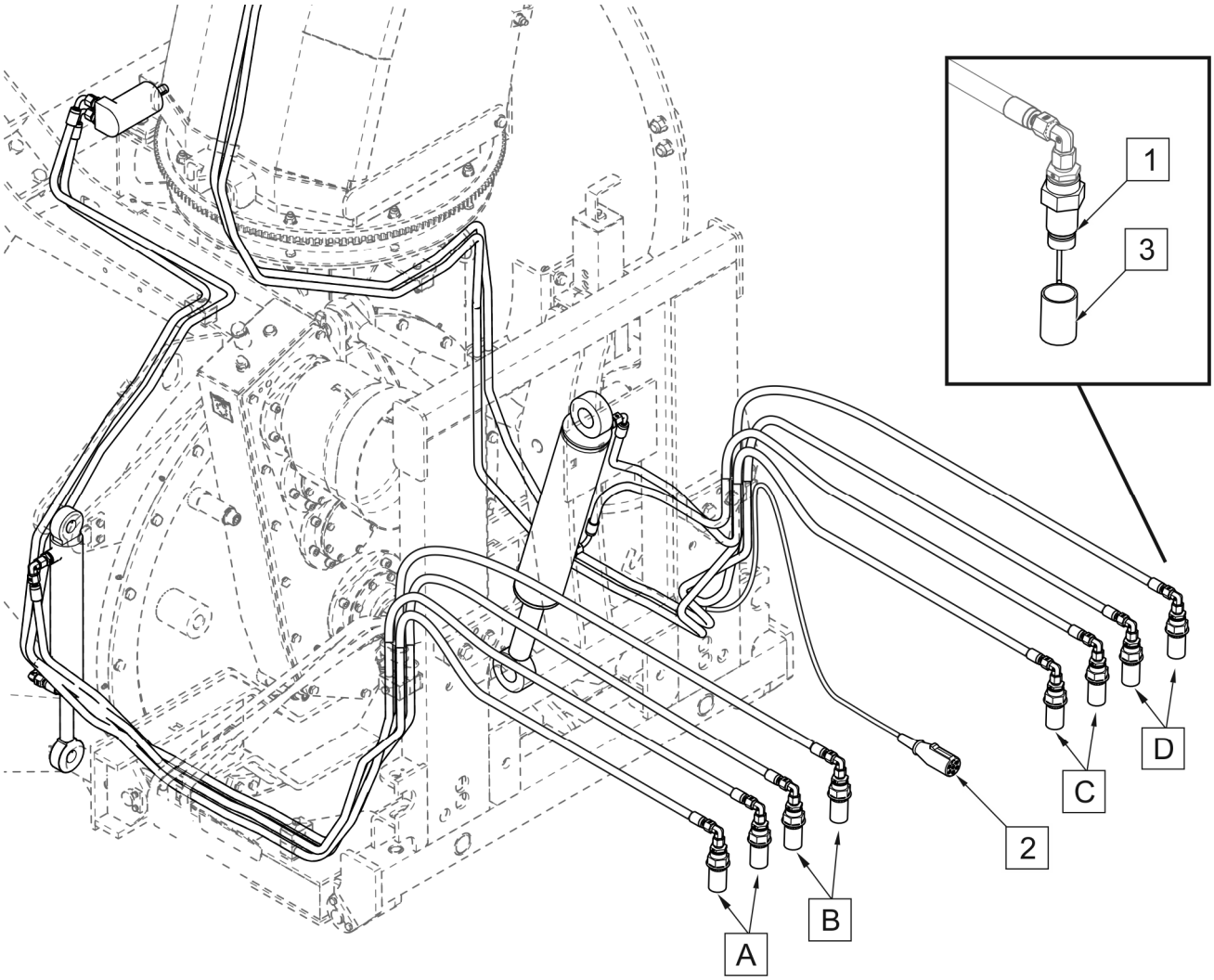


FIGURE 4.8 **Connecting hydraulic system and electrical system** (machine mounted on the carrying vehicle's faceplate)

(A) - discharge chute rotation control connectors; (B) - snow blower tilt adjustment connector; (C) - snow blower raising/lowering connectors; (D) - hydraulic connectors for adjusting discharge range; (1) - hydraulic quick coupler; (2) - 7-pin 24V clearance lights power supply plug

NOTE

Operation of the machine without the floating function of the raising cylinder may result in damage to the machine or the carrying vehicle.

NOTE

The connecting cables should be routed so that they do not get entangled in moving machine parts.

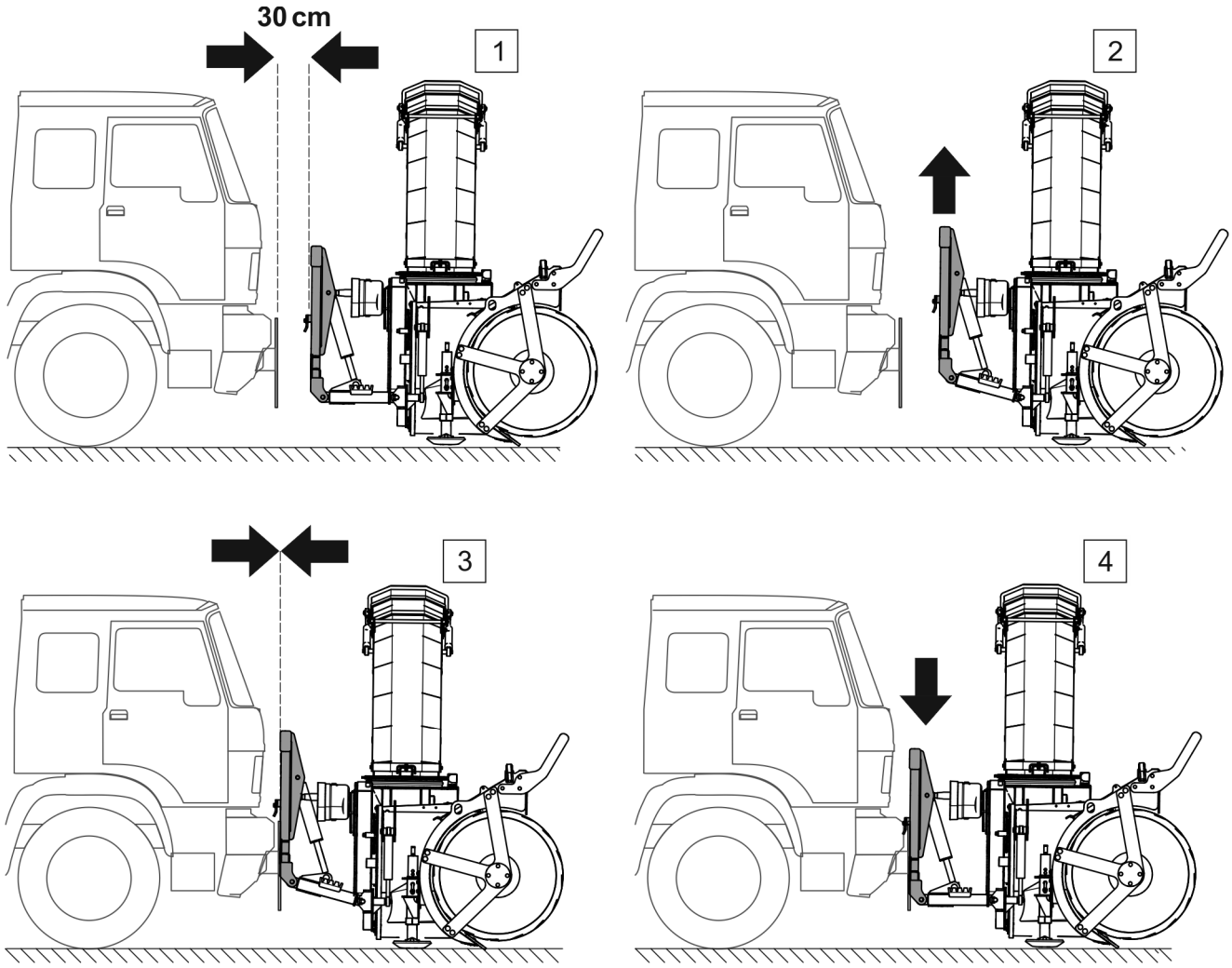


FIGURE 4.9 Mounting the snow blower on the carrying vehicle's faceplate

(1,2,3,4) - successive stages of hitching the machine to the carrying vehicle

Before mounting the machine on the carrying vehicle, check the linkage compatibility.

To mount the snow blower on the carrying vehicle equipped with a faceplate (FIGURE 4.9):

1) Drive the carrying vehicle to a distance of about 30 cm from the snow blower linkage, immobilize the vehicle and turn off the engine. Connect hydraulic conduit connectors (FIGURE 4.8) to corresponding sockets of the external hydraulic system on the front of the carrying vehicle.
2) Using the carrying vehicle's hydraulic system, raise the snow blower linkage in such a manner as to position the mounting hooks above the seats of the carrying vehicle's faceplate.
3) Drive the carrying vehicle carefully to the snow blower linkage and immobilize the vehicle.

4) If the mounting hooks and the carrying vehicle's faceplate are correctly aligned, lower the snow blower linkage until the mounting hooks are set in the seats of the carrying vehicle's faceplate.

Raise the machine and check if correctly mounted. Using appropriate bolts, connect the machine linkage frame with the carrying vehicle's faceplate. Connect the clearance lights power supply plug (2) to the 7-pin socket of the carrying vehicle's electrical system (FIGURE 4.8).

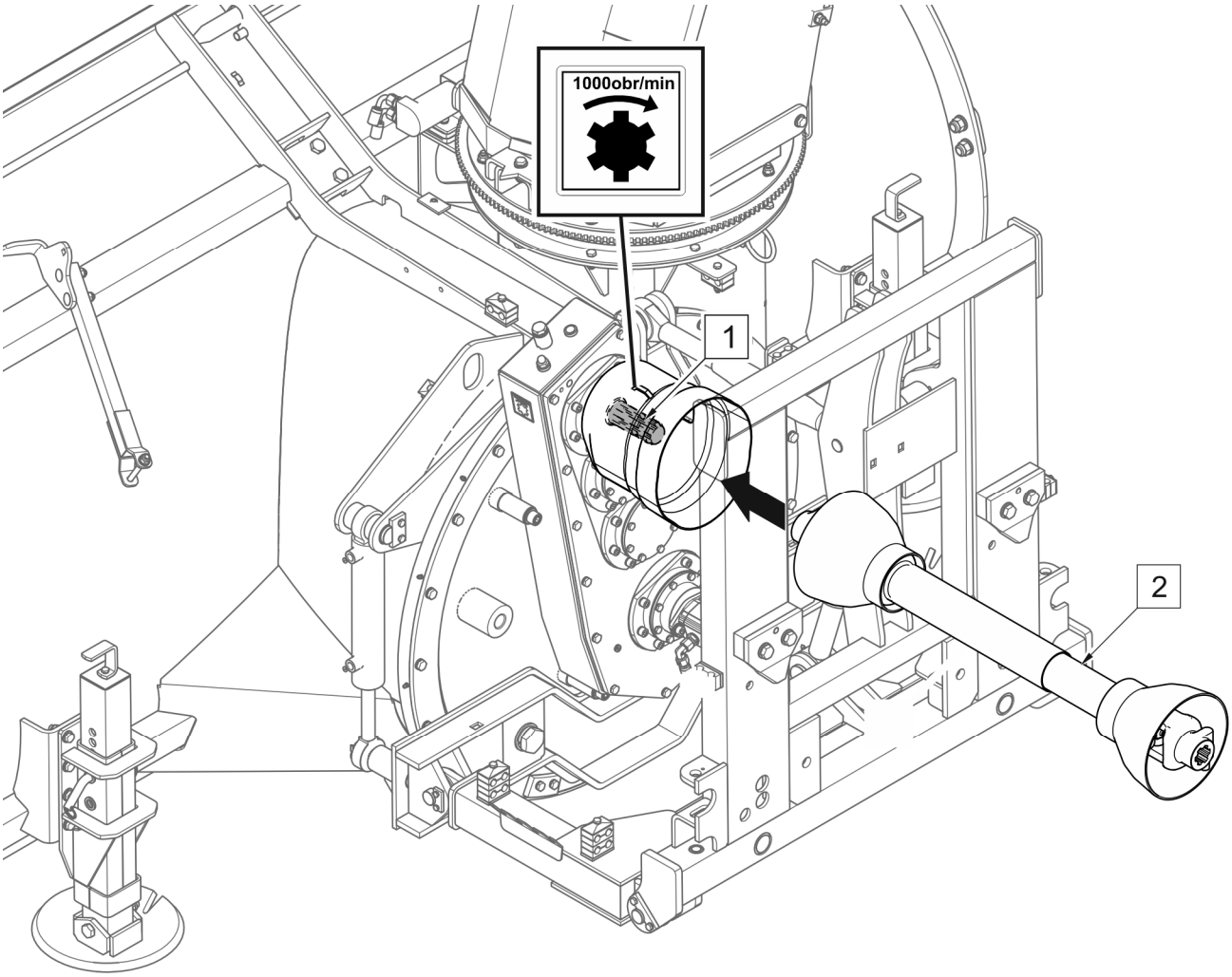


FIGURE 4.10 Connecting PTO shaft (machine mounted on the carrying vehicle's faceplate)

(1) - gear shaft; (2) - PTO shaft (additional equipment)

Before connecting the PTO shaft it is absolutely necessary to carefully read the Operator's Manual attached by the Manufacturer of the shaft and observe the instructions contained in it. Before connecting to the carrier vehicle, check technical condition of shaft guards, completeness and condition of protecting chains and general technical condition of the shaft.

To connect the drive transmission of the machine to carrying vehicle PTO shaft, use a PTO shaft recommended by the Manufacturer (optional equipment).

TIP

The machine should be driven using the PTO shaft, part number 302-850-000438, which is an accessory of the machine.

4.3.3 BALLASTING THE CARRYING VEHICLE

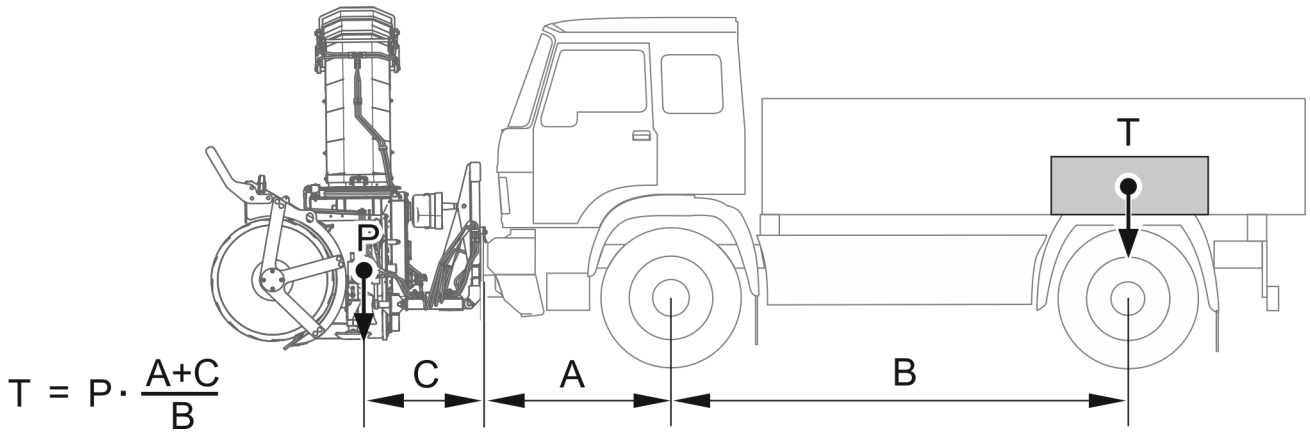


FIGURE 4.11 Ballasting the carrying vehicle

The ballast of the carrying vehicle's rear axle should be checked after the machine is mounted. Amount of additional ballast can be calculated using the following formula (FIGURE 4.11). Additional ballast should be placed above the rear axle of the carrying vehicle.

4.4 OPERATING THE SNOW BLOWER

4.4.1 SETTING WORKING HEIGHT

The slides or wheels (option) are used in order to maintain a proper distance between the ground and collecting blades, to reduce thickness of scraped material layer and to limit the depth of blade sinking into soft ground.

DANGER

Setting the working height should be performed only when the engine is stopped, and the machine is raised and secured.

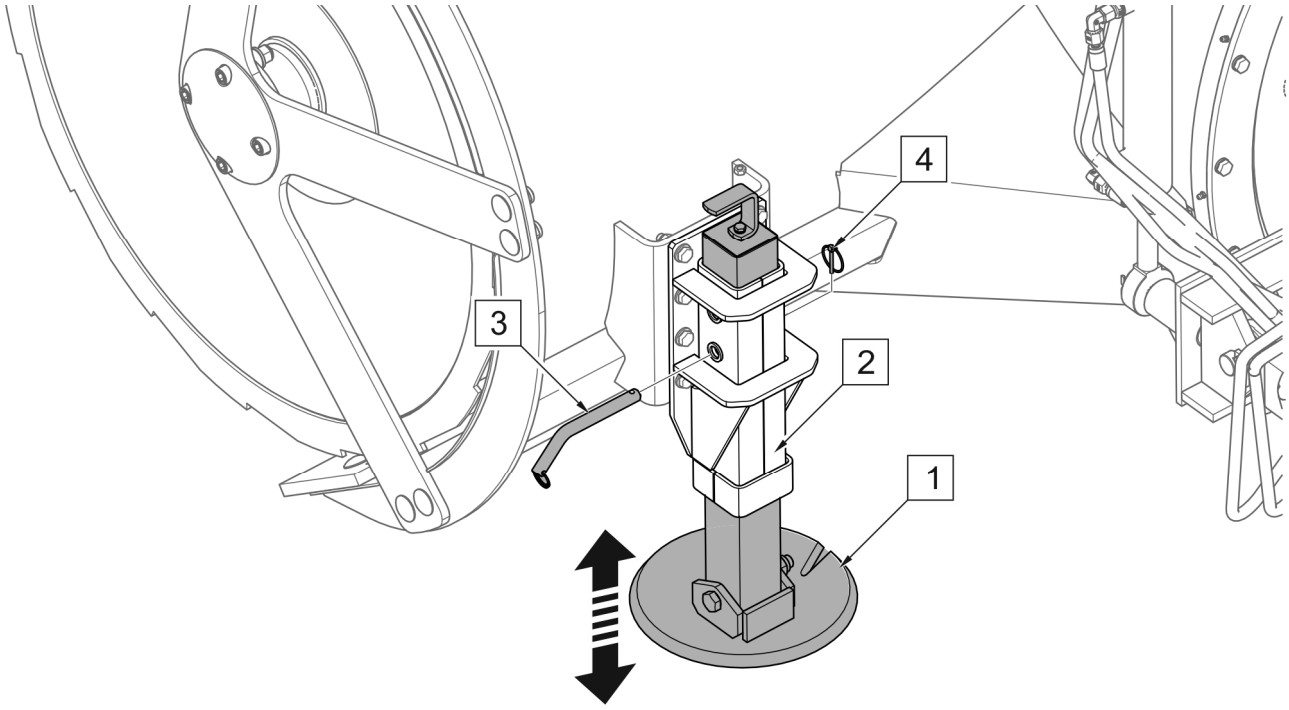


FIGURE 4.12 Working height adjustment in the snow blower equipped with slides

(1) - slide, (2) - slide guide (3) - pin, (4) - locking cotter pin

In the snow blower equipped with slides (FIGURE 4.12), the height adjustment is performed by unlocking pin (4) and proper sliding out or sliding in slide (1) mounted in guide (2). Location of the slide can be changed every 7 mm using one of the three openings in the guide. When the height is set, slides must be protected with a pin (3) and spring cotter pin (4).

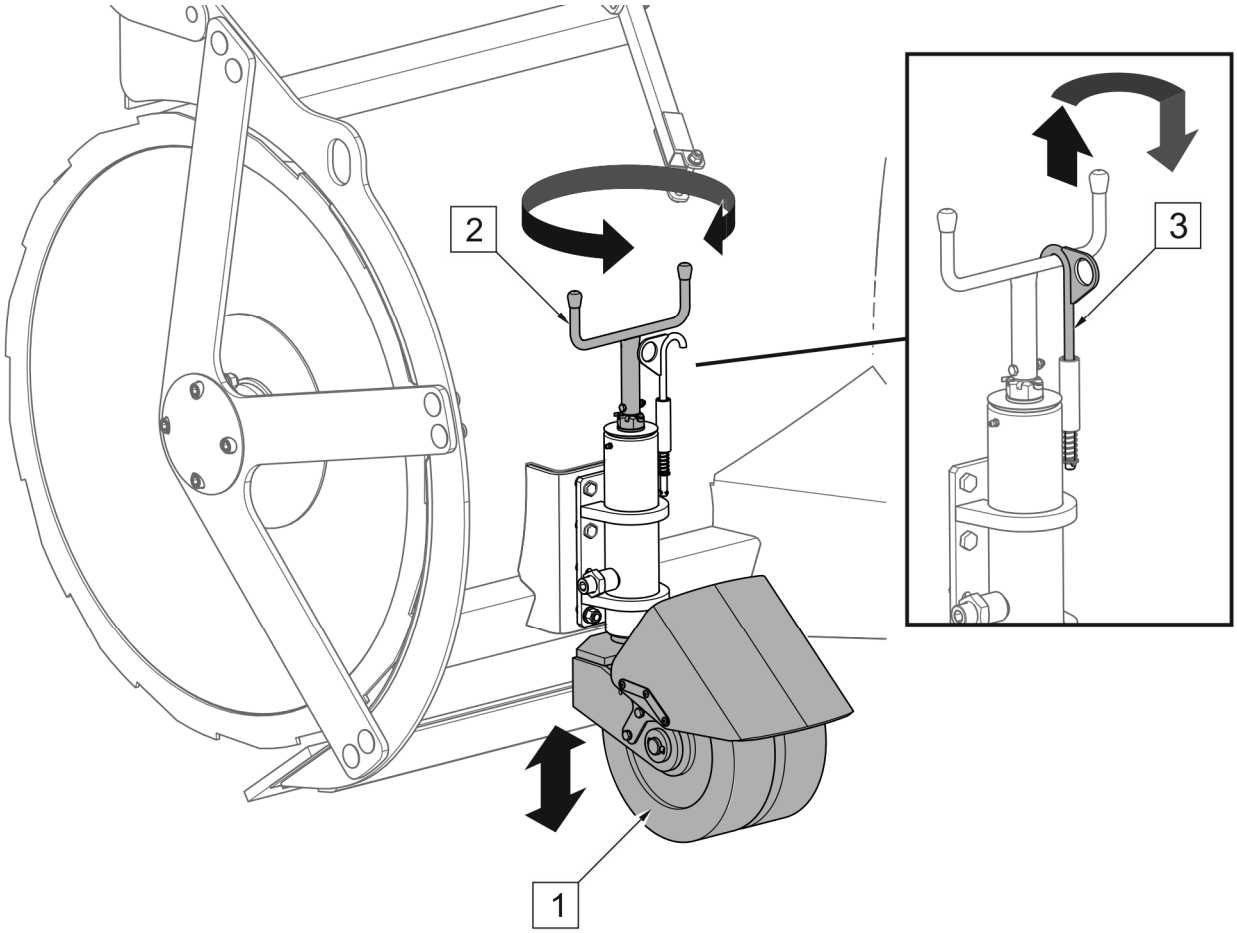


FIGURE 4.13 Working height adjustment in the snow blower equipped with wheels

(1) - wheel; (2) - handle; (3) - handle lock

Working height adjustment in the snow blower equipped with support wheels (FIGURE 4.13) is carried out by proper setting of wheel height. Adjustment of wheel (1) height is performed by means of the handle (2). Before starting the adjustment, lift the lock (3) and remove it from the handle (2). After setting the wheel height, secure the handle (2) again with the lock (3).

4.4.2 ADJUSTING THE RANGE AND DIRECTION OF SNOW DISCHARGE

DANGER

Heavy objects in the snow, i.e. stones, blocks of ice can be thrown out through the discharge chute to a much greater distance than snow.

Snow discharge distance can range from 5 to 30 m, depending on the discharge chute settings, properties of snow and the rotor speed.

The range and direction of snow discharge (FIGURE 4.14) are adjusted from operator cab using the external hydraulic system of the carrying vehicle.

In the snow blower mounted on the carrying vehicle's faceplate, the discharge chute rotation and discharge range are adjusted independently from the operator cab by activating the appropriate circuit of the external hydraulic system.

In the snow blower mounted on the front three-point linkage of the carrying vehicle, after selecting the appropriate function on the control panel, you can control the discharge chute rotation, discharge range or inclination using one section of the external hydraulic system. Activation of the appropriate function is signalled by the yellow light next to the button on the control panel. Without selecting the appropriate function on the control panel (without the control panel connected), you can control only the discharge range (A).

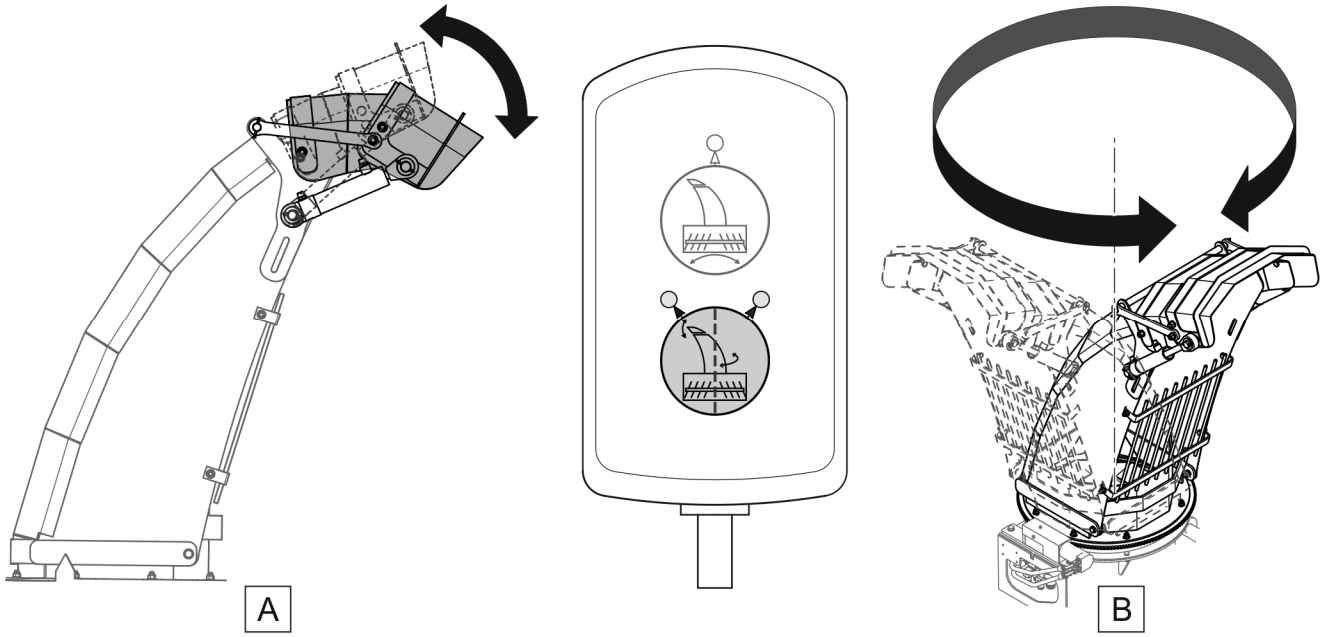


FIGURE 4.14 Adjusting the range and direction of snow discharge (snow blower mounted on the front three-point linkage of the carrying vehicle)

(A) - discharge range adjustment; (B) - discharge direction adjustment

Discharge chute rotation angle is limited by hydraulic conduits of hydraulic cylinders of the discharge chute hood. The discharge chute rotation direction is changed from the operator cab by changing the hydraulic oil flow direction in the hydraulic section of the selective control valve of the carrying vehicle's external hydraulic system .

IMPORTANT

When rotating the discharge chute, pay attention to position of the hydraulic conduits of the hydraulic cylinder for discharge chute hood raising.

4.4.3 SNOW BLOWER TILT ADJUSTMENT

To adapt to uneven ground, the working angle of the snow blower can be changed within the range of ±10˚. In the snow blower mounted on the carrying vehicle's mounting plate, the snow blower body tilt is changed independently using the appropriate circuit of the external hydraulic system.

In the snow blower mounted on the carrying vehicle's three point linkage, the snow blower tilt is changed using the external hydraulic system after activating the appropriate function on the control panel (FIGURE 4.15). Activation of the function is signalled by the green light next to the button on the control panel.

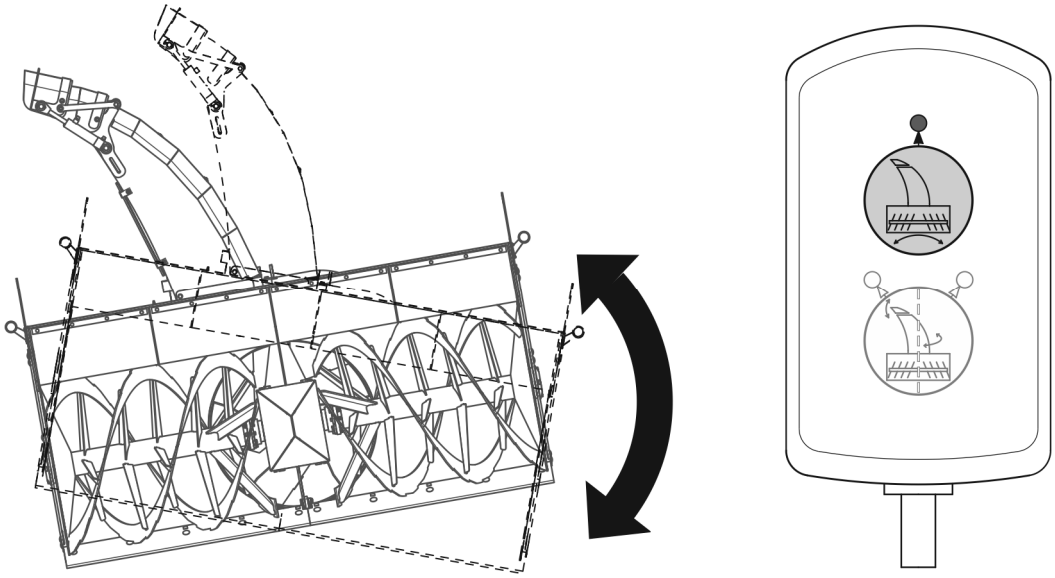


FIGURE 4.15 Snow blower tilt adjustment (machine mounted on the carrying vehicle's

4.4.4 CLEARING SNOW

DANGER

Before you start clearing snow, check the work area and, if possible, remove any objects which might get into the machine and any obstacles the snow blower might strike. They can cause an accident or damage the machine.

DANGER

During work, pay attention to persons, vehicles and buildings that may be within the snow discharge range. Appropriately set the range and direction of snow discharge.

Having made sure that all the protective elements and all the connections are properly installed, one may commence working with the machine. Drive to the place of work, lower the machine until it fully rests on the ground. Set linkage to "floating position" to allow ground surface tracking when clearing the snow. Initially set the discharge range and direction. Engage the machine drive at an appropriately low engine speed and gradually increase the speed to nominal and then start driving.

IMPORTANT

Do not start clearing the snow until the machine drive reaches the nominal speed.

NOTE

During work, set the carrying vehicle's linkage to floating position to allow ground surface tracking. Tractor (carrying vehicle) weight must not be transferred to the machine, as it could result in damaging it.

Driving speed should be adjusted to the amount and properties of snow. Maintain constant speed of the machine drive when clearing snow.

Augers stopping during machine operation may indicate that the overload coupling was activated (*see "4.4.5 REMOVING BLOCKAGES"*). Stopping of the machine drives may be caused by wet, compacted snow and excessive driving speed.

If there is a risk that snow contains stones, gravel, rubble or other items and they could be collected by the machine blade, increase working height (see 4.4.1SETTING WORKING HEIGHT)

IMPORTANT

Operation of the machine is allowed only in the adjustment range of the slides or support wheels - option.

HIGH NOISE LEVEL WARNING

During machine operation, the driver should use personal protective equipment (ear protectors).

In order to reduce the level of noise during work, the operator cab windows and door should be closed.

IMPORTANT

Before raising the machine, disengage the PTO drive.

4.4.5 REMOVING BLOCKAGES

DANGER

If the machine drive transmission or discharge chute is jammed, disengage the PTO, immobilize the vehicle and secure the cab against unauthorized access before leaving the cab.

A wooden peg (FIGURE 4.16) supplied with the machine is used for removing blockages The peg (1) is fixed on the right side of the machine housing.

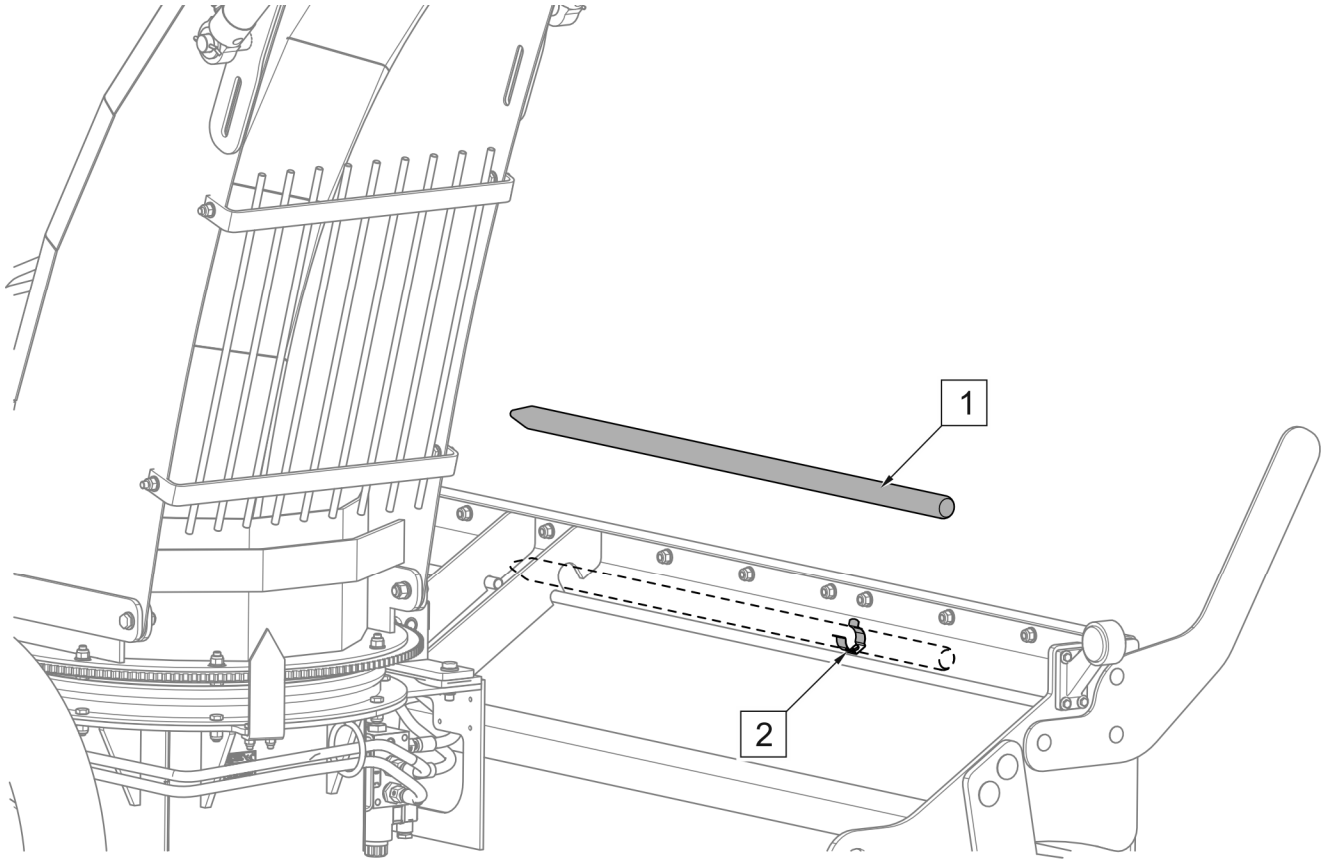


FIGURE 4.16 Removing blockages

(1) - wooden peg, (2) - bracket

If the machine drive has been disengaged as a result of activation of the overload coupling in the machine drive transmission, switch off the machine drive, check and remove the reason for the machine blockage.

4.5 TRANSPORTING THE MACHINE

The discharge chute can be folded for transporting the machine mounted on the carrying vehicle. To fold the discharge chute (FIGURE 4.17) :

- rotate the discharge chute so that the marks on the chute (1) and the body (2) are aligned,
- mount the discharge chute support (3) in the raised position;
- remove the bolt (4) securing the discharge chute
- fold the chute until it rests on the support (3),
- connect the chute to the support using the bolt (5), nut and washer

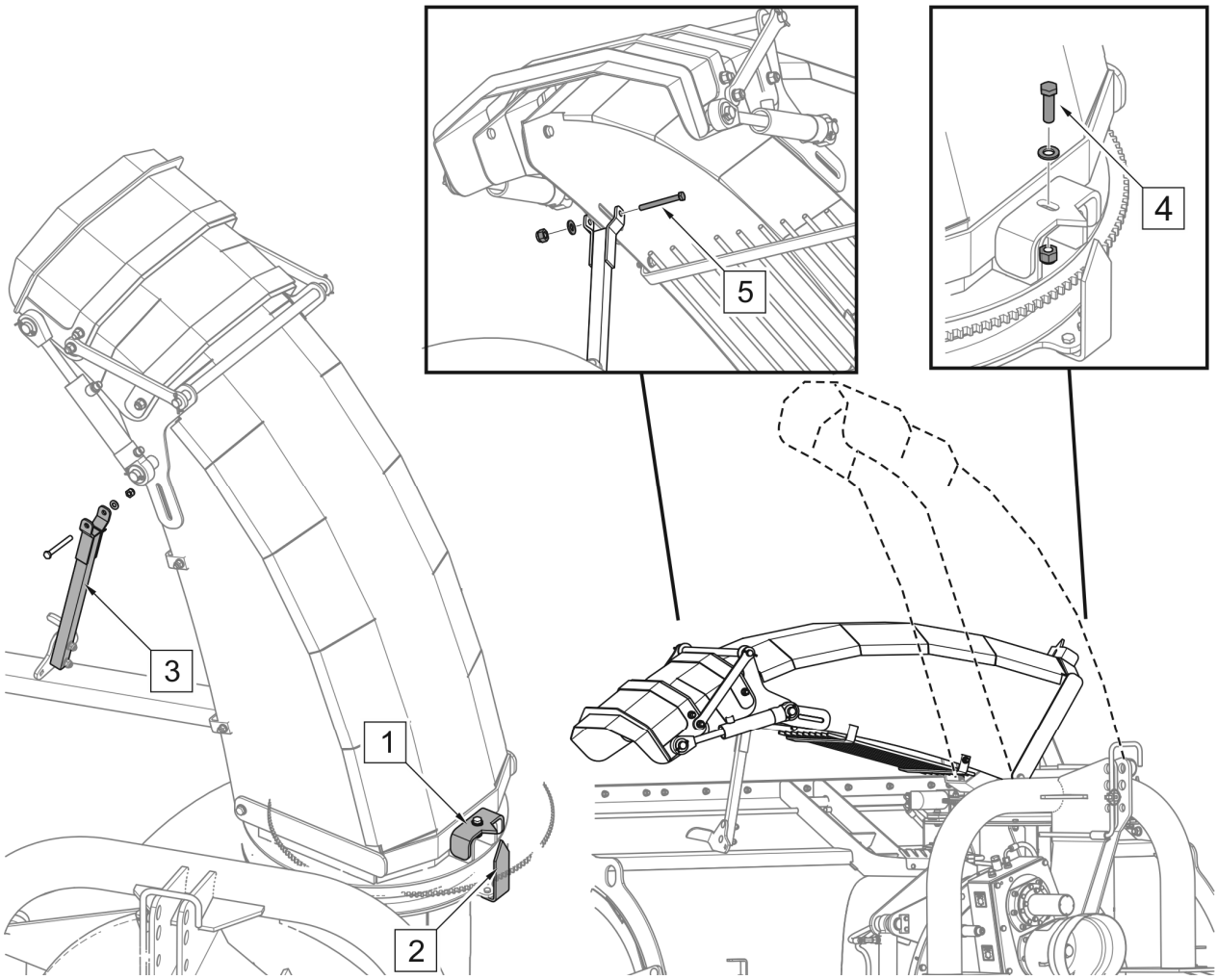


FIGURE 4.17 Folding the discharge chute

(1) - mark on the discharge chute; (2) - mark on the body; (3) - discharge chute support; (4) - bolt securing the chute; (5) - bolt connecting the chute to the support

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

- Make sure that the machine is correctly attached to the carrying vehicle, and linkage is properly secured.
- Disengage the PTO drive before lifting the machine.
- Do not exceed the maximum speed allowed by road traffic regulations. Ground speed should be adjusted to prevailing road conditions, pavement condition and other conditions.
- While driving on public roads, use the additional lights on the carrying vehicle's front.
- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the machine or the tractor 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.
- When driving on uneven terrain with the implement raised reduce speed due to dynamic loads and the risk of damaging the machine or carrying vehicle.
- When driving with raised machine, secure the carrying vehicle's linkage against falling or accidental dropping.

4.6 UNHITCH THE MACHINE FROM THE CARRYING VEHICLE

DANGER

Before leaving the vehicle's cab, turn off the engine and immobilise the vehicle with parking brake. Ensure that unauthorised persons do not have access to the vehicle cab.

IMPORTANT

Unhitching the snowplough from the carrying vehicle should be performed on level, even and sufficiently hard surface in such a manner as to ensure that it is possible to hitch it again.

The machine unhitched from the carrying vehicle should rest on the ground on blades and slides (or support wheels)

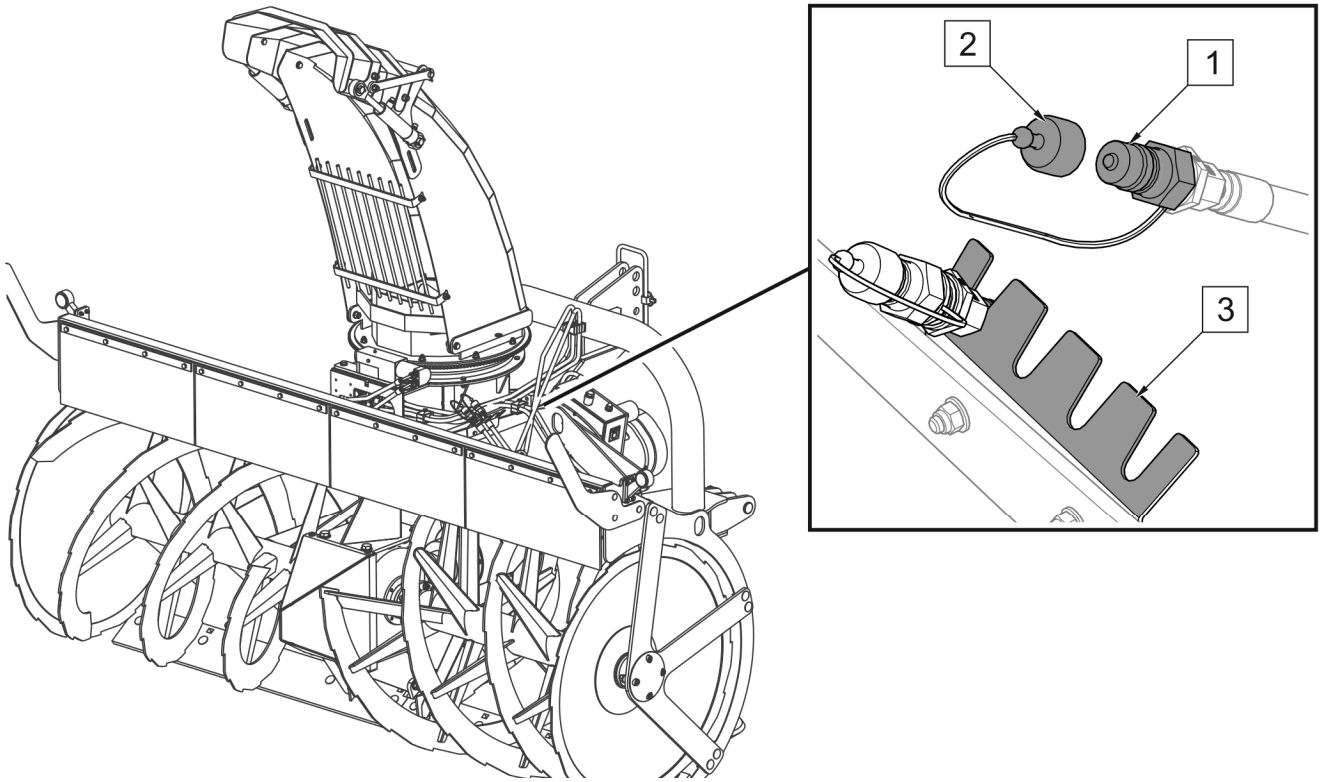


FIGURE 4.18 Protection of hydraulic conduit connectors (machine mounted on the front three point linkage)

(1) - hydraulic quick-couplers, (2) - protective caps; (3) - conduit bracket

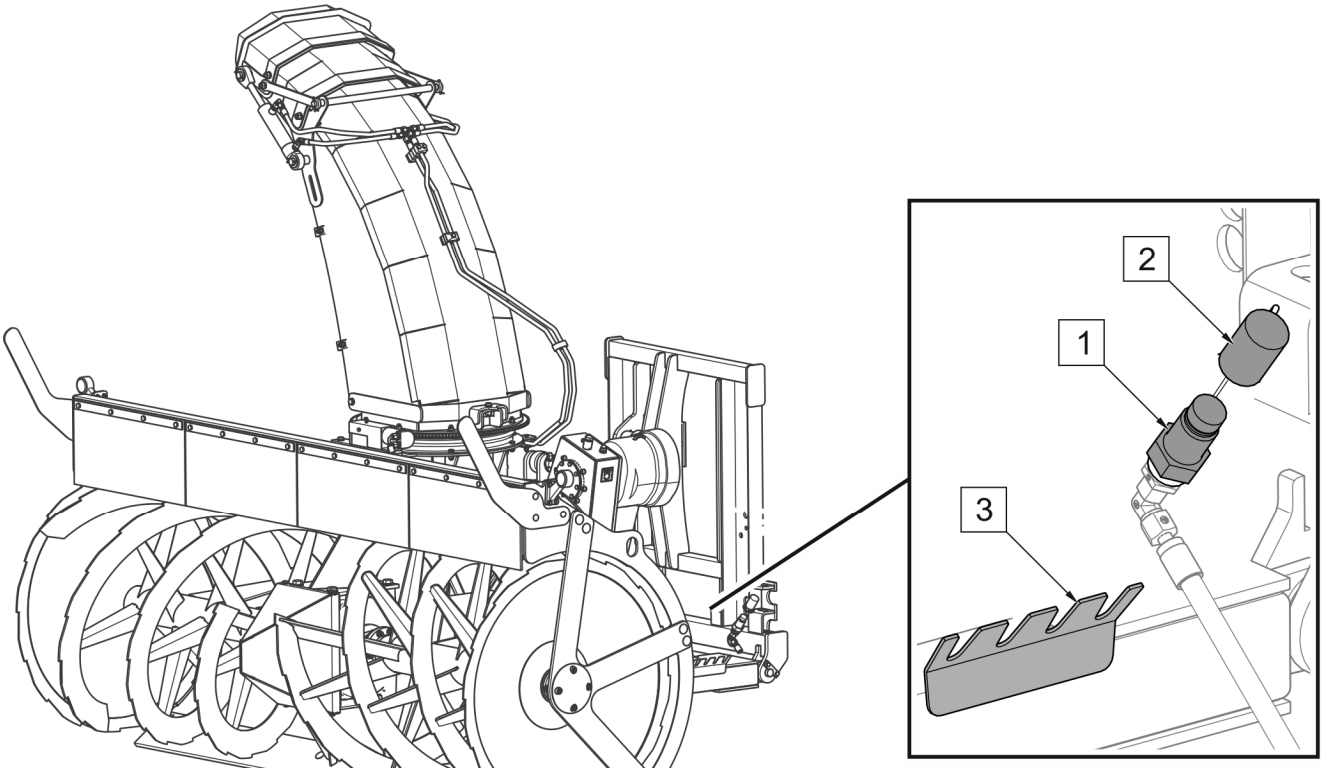


FIGURE 4.19 Protection of hydraulic conduit connectors (machine mounted on the faceplate)

(1) - hydraulic quick-couplers, (2) - protective caps; (3) - conduit bracket

To unhitch the snow blower mounted on the carrying vehicle's front three point linkage:

1) Lower the machine until it fully rests on the ground, on the slides or support wheels.
2) Switch off engine, remove key from ignition and engage parking brake.
3) Reduce residual pressure in the hydraulic system by moving the appropriate control lever of the hydraulic circuit in the carrier.
4) Disconnect hydraulic conduit connectors, secure them with caps and put in special bracket on the snow blower frame (FIGURE 4.18).
5) Disconnect the electrical lead from the 3-pin socket and disconnect the control panel.
6) Disconnect PTO shaft and place it on PTO shaft bracket (FIGURE 4.20).
7) Disconnect top link (so-called central connector), dismount lower arms and drive carrying vehicle away from the machine.

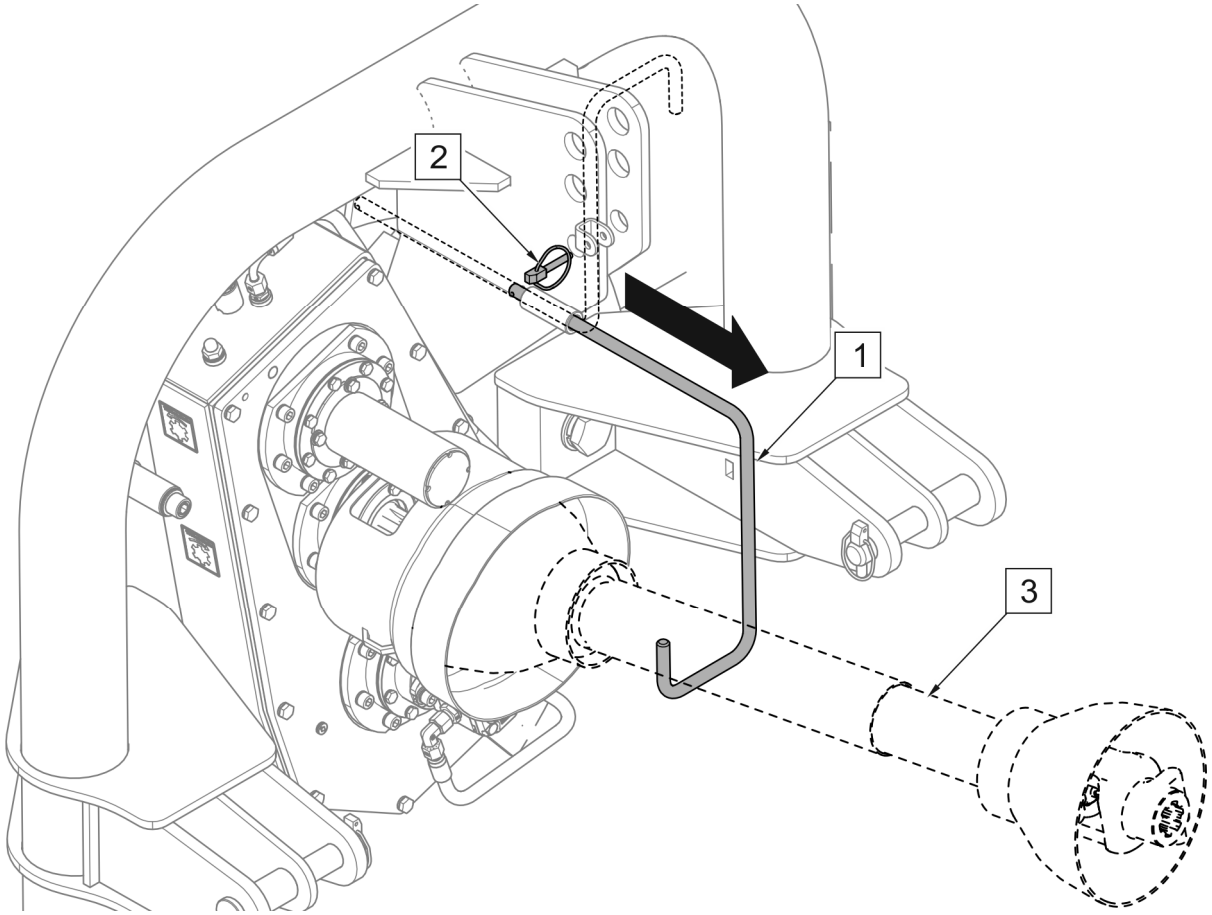


FIGURE 4.20 PTO shaft bracket (machine mounted on the front three point linkage)

(1) - bracket; (2) - cotter pin (3) - PTO shaft

To unhitch the snow blower mounted on the carrying vehicle's faceplate:

1) Lower the machine until it fully rests on the ground, on the slides or support wheels. Disconnect the carrying vehicle's faceplate from the snow blower linkage and disconnect PTO shaft.
2) Control the appropriate circuit of the carrying vehicle's external hydraulic system to raise the snow blower linkage to position the hooks of the linkage plate above the sockets of the carrying vehicle's faceplate.
3) Carefully drive the carrying vehicle away from the machine to a distance of about 30 cm, immobilize the vehicle and turn off the engine. Reduce residual pressure in the hydraulic system. Disconnect hydraulic conduit connectors, secure them with caps and put in special bracket on the snow blower frame (FIGURE 4.19)
4) Disconnect the electrical lead of clearance lights. Drive the carrying vehicle away from the machine.

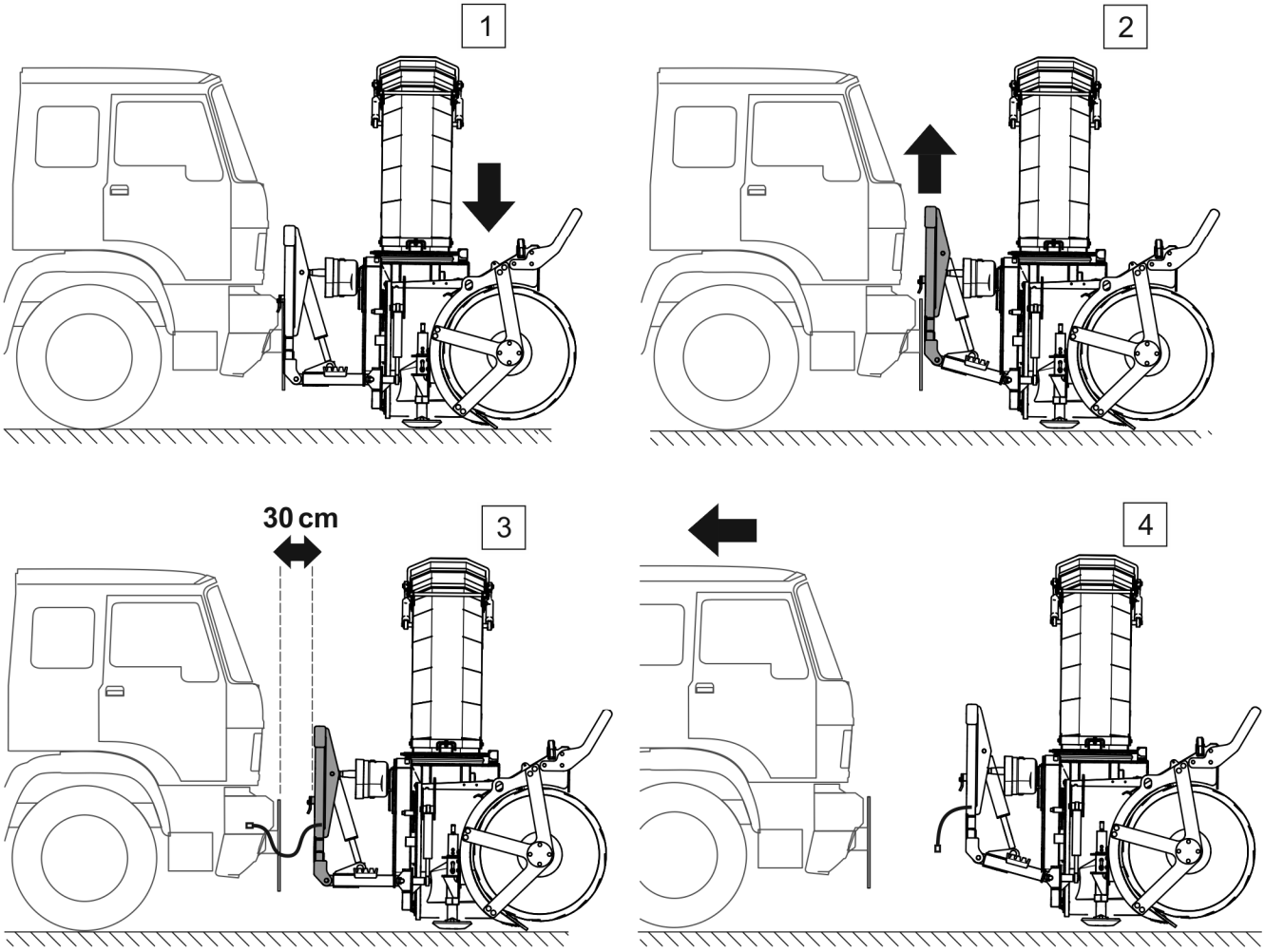


FIGURE 4.21 Unhitching the snow blower mounted on the carrying vehicle's faceplate

(1,2,3,4) - stages of unhitching the snow blower mounted on the carrying vehicle's faceplate

NOTE

Do NOT use the securing chains to support the shaft while machine is parked or when transporting the machine.

SECTION

5

MAINTENANCE

5.1 HYDRAULIC SYSTEM MAINTENANCE

The duties of the operator connected with the hydraulic system maintenance include:

- checking leaktightness of hydraulic connections;
- checking technical condition of hydraulic conduits, quick couplers and hydraulic cylinders;
- checking leaktightness of hydraulic transmissions;

DANGER

Do not repair hydraulic system on your own. All hydraulic system repairs must be performed only by suitably qualified personnel.

NOTE

Before starting work, visually inspect the hydraulic system components.

The condition of hydraulic system should be inspected regularly while using the machine.

The hydraulic system of new machine is factory filled with HL32 hydraulic oil. Because of its composition, the oil is not classified as a dangerous substance, however long-term action on the skin or eyes may cause irritation. In the event of contact of oil with skin wash the place of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory tract. A hazard only occurs when oil is strongly atomised (oil vapour), or in the case of fire during which toxic compounds may be released.

DANGER

Oil fires should be quenched with carbon dioxide (CO_2), foam or extinguisher steam. Do NOT use water for fire extinguishing!

TABLE 5.1 HL32 hydraulic oil specification

ITEM	NAME	VALUE
1	ISO 3448VG viscosity classification	32
2	Kinematic viscosity at 40°C	28.8 – 35.2 mm^2/s
3	ISO 6743/99 quality classification	HL
4	DIN 51502 quality classification	HL
5	Flash point, [°C]	Above 210°C
6	Maximum operating temperature, [°C]	80

Spilt oil should be immediately collected and placed in a marked tight container. Used oil should be taken to the appropriate facility dealing with recycling or regeneration of oils.

The hydraulic system must be tight. Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of "droplets" stop using the machine until faults are remedied.

The hydraulic system is vented automatically during machine operation.

DANGER

Before commencing whatever work on hydraulic system reduce the residual pressure in the system.

DANGER

During work on hydraulic system, use the appropriate personal protection equipment i.e. protective clothing, footwear, gloves and eye protection. Avoid contact of skin with oil.

Hydraulic conduits should be replaced after 4 years.

5.2 DRIVE TRANSMISSION SYSTEM MAINTENANCE

5.2.1 CHECK AND CHANGE OIL IN MAIN TRANSMISSION

DANGER

Only check the oil level in the main transmission when the machine is lowered and turned off.

The main transmission (FIGURE 5.1) is factory filled with gear oil of SAE90 class. The main transmission is equipped with a circulating lubrication system with an oil pump (4).

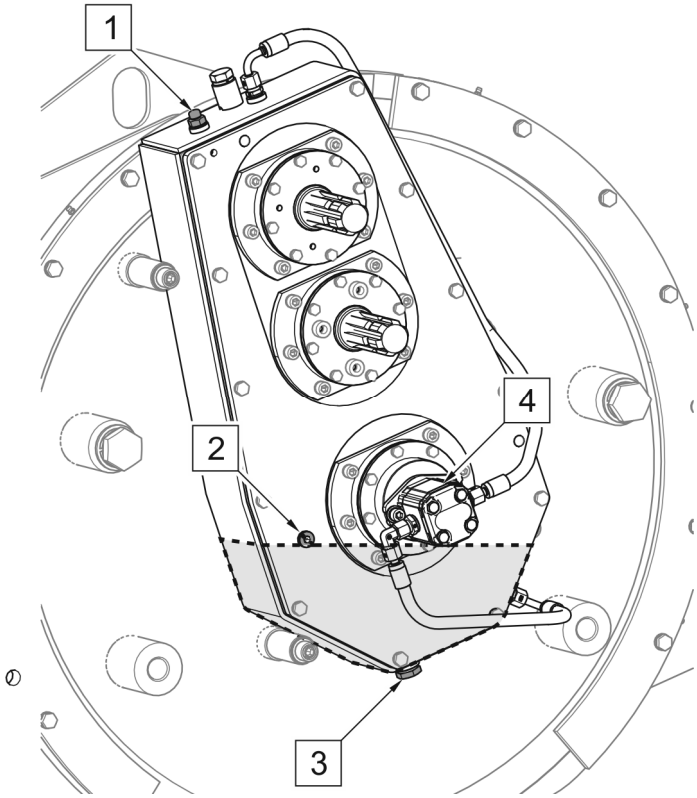


FIGURE 5.1 Checking and change of oil in the main transmission

(1) filler plug, (2) inspection plug, (3) drain plug; (4) - oil pump

Transmission maintenance involves periodical checking of oil level and changing oil. To check the oil level in the main transmission (FIGURE 5.1)

- lower the machine to the ground,
- unscrew inspection plug (2),
- oil level should reach the lower edge of the inspection plug opening (2),
- if necessary, add oil through the filler plug (1)

It is recommended to check oil level in transmission once a year, before working season (provided that there are no oil leaks). Oil in the transmission must be replaced every 2000 hours of work.

DANGER

When checking oil level and changing oil, use appropriate personal protection equipment i.e. protective clothing, safety shoes, gloves, safety goggles. Avoid contact of skin with oil.

It is best to change oil immediately after completing work when the transmission is still hot and impurities are suspended in oil. Before changing oil in the transmission (FIGURE 5.1):

- prepare a container for oil and place it under the transmission,
- unscrew the inspection plug (2), filler plug (1) and drain plug (3) at the bottom of the transmission,
- drain oil into the previously prepared container and tighten drain plug (3),
- add oil to the lower edge of the inspection plug (2),
- tighten inspection plug (2) and filler plug (1)

TIP

To lubricate the transmission use gear oil of SAE90 class in the amount of 5 l (litres)

The procedure concerning gear oil is the same as the procedure for hydraulic oil (see 5.1Hydraulic system maintenance). Used oil should be taken to the appropriate facility dealing with recycling or regeneration of oils.

If a leak is noticed, carefully inspect seals and check oil level. Operating the main transmission and reducer with insufficient amount of oil or without oil may cause permanent damage to these mechanisms.

Repair of transmission and reducer during warranty period may only be performed at authorised mechanical workshops.

5.2.2 CHECKING AND CHANGE OF OIL IN INTERSECTING AXIS GEAR

The intersecting axis gear of the snow blower (FIGURE 5.2) is factory filled with oil of SAE90 class. Intersecting axis gear maintenance involves periodical checking of oil level and changing oil. To check the oil level in the gear:

- lower the snow blower to the ground,
- remove the housing (3),
- unscrew inspection-filler plug (1),
- oil level should reach the lower edge of the plug opening (1),
- if necessary, add oil through the filler plug (1),
- install the housing (3)

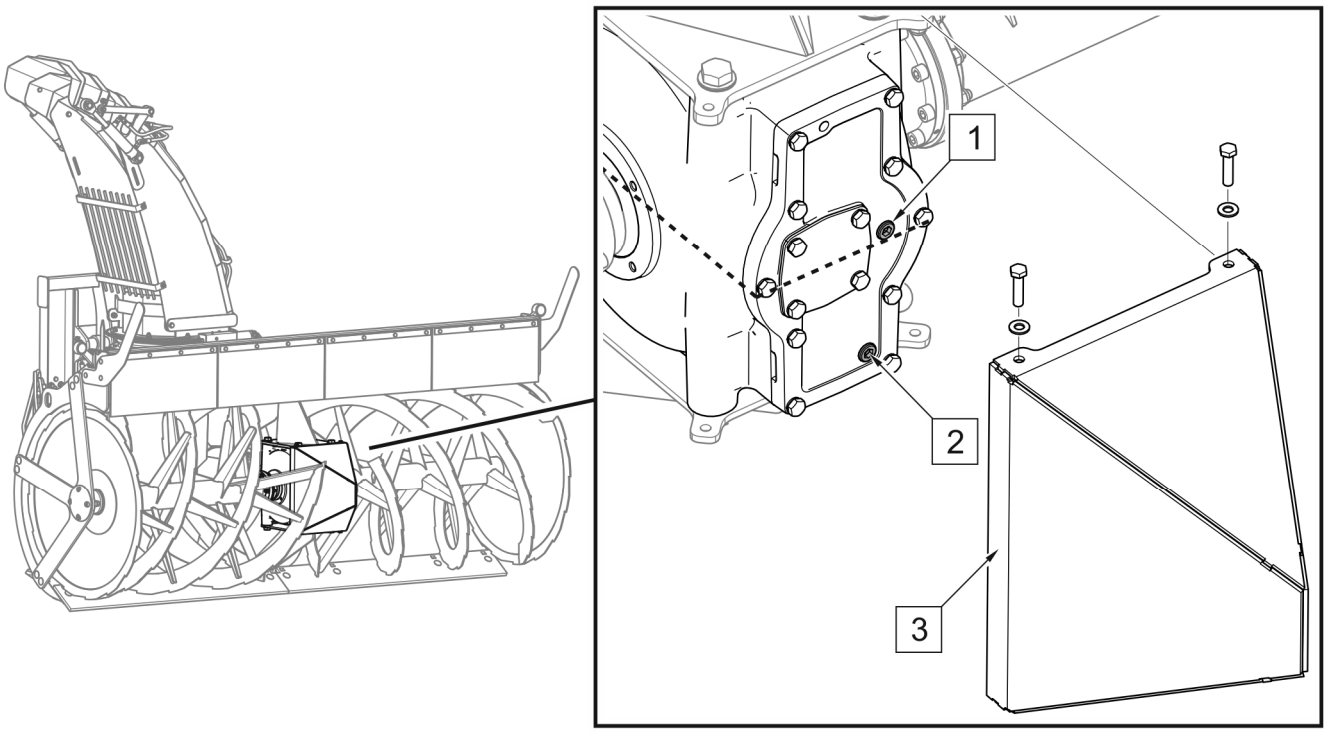


FIGURE 5.2 Checking and change of oil in intersecting axis gear

(1) - inspection-filler plug; (2) - drain plug; (3) - housing

It is recommended to check oil level in the reducer once a year, before working season (provided that there are no oil leaks). Oil in intersecting axis gear must be changed every 2000 working hours.

Before changing oil in the intersecting axis gear (FIGURE 5.2):

- lower the machine to the ground, remove the housing (3), prepare a container for oil and place it under the gear,
- unscrew the inspection-filler plug (1) and drain plug (2),
- drain oil into the previously prepared container and tighten drain plug (2),
- add oil to the lower edge of the inspection-filler plug (1),
- tighten the plug (1) and install the housing (3)

The procedure concerning gear oil is the same as the procedure for hydraulic oil (see 5.1Hydraulic system maintenance). Used oil should be taken to the appropriate facility dealing with recycling or regeneration of oils.

TIP

To lubricate the intersecting axis gear use gear oil of SAE90 class in the amount of 8 l (litres).

5.3 REPLACING THE COLLECTING BLADE

DANGER

If the machine is connected to the carrying vehicle, then before checking and replacing the blade, turn off the machine drive and ensure that unauthorised persons have no access to the vehicle cab.

Do NOT perform maintenance or repair work under raised and unsupported machine.

Snow blower is equipped with two collecting blades (FIGURE 5.3). If the blade edge is excessively worn, install the blades in holes (II). If the blade is excessively worn or damaged, it should be replaced with a new one. The list of blade elements TABLE 5.2.

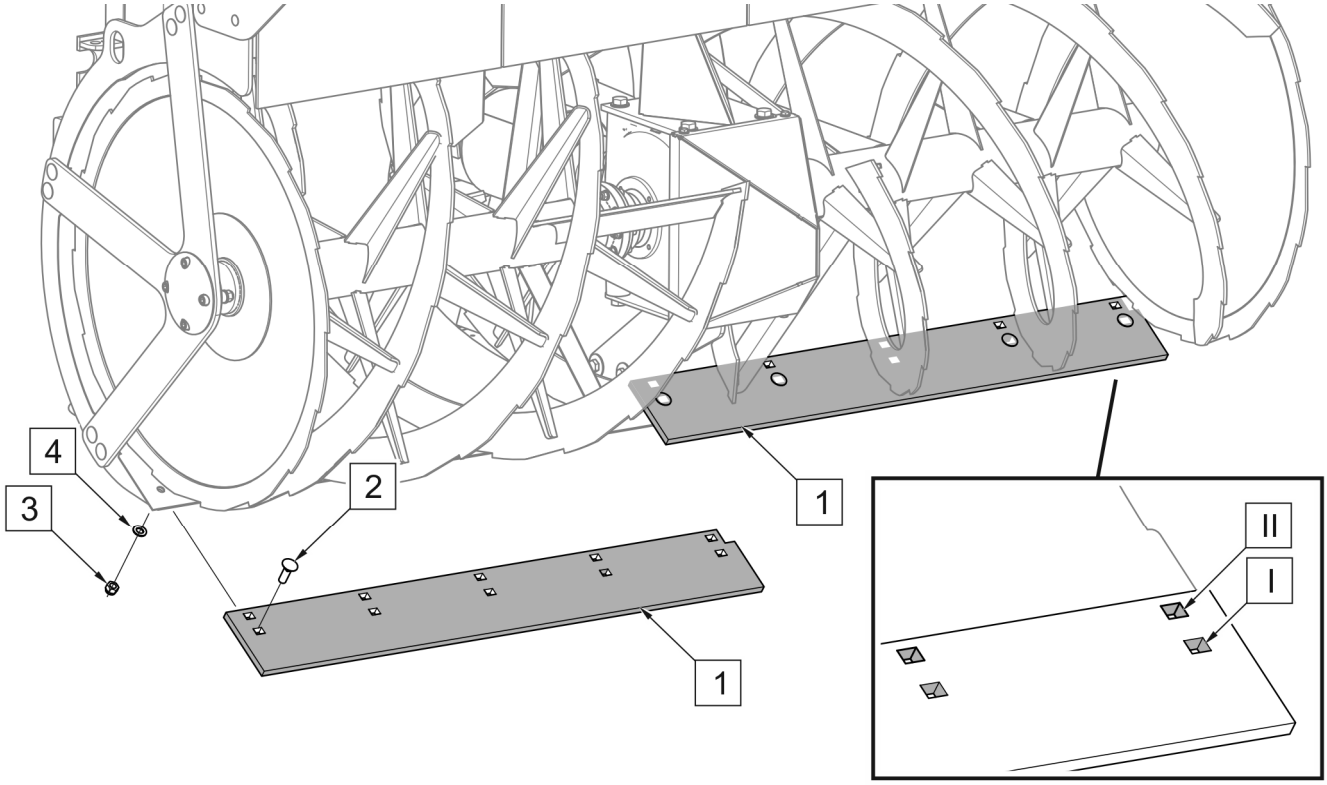


FIGURE 5.3 Replacing the collecting blade

(1) - blade; (2) - bolt; (3) - nut; (4) - washer; (I, II) - mounting holes

Technical condition of the blade should be inspected periodically and attention should be paid to mechanical damage, excessive wear and any missing securing elements. Tightening torques for nut and bolt connections are given in FIGURE 5.5.

TABLE 5.2 THE LIST OF BLADE ELEMENTS

Marking FIGURE 5.5	**Name / Part No.**	**Quantity** [pcs]
1	Blade / 417N-00000003	2
2	Bolt M16x50-8.8-A2J PN/M-82406	10
3	Self-locking nut. M16-8 PN-EN ISO 7040	10
4	Washer 16-200HV PN-EN ISO 7091	10

5.4 SLIDE REPLACEMENT

DANGER

Do NOT perform maintenance or repair work under raised and unsupported machine.

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. Do NOT carry out work under a machine, which has only been raised with the three point linkage.

Excessively worn or damaged slides must be replaced with new ones. In order to do this raise the snow blower and support with sufficiently stable and strong supports. If the machine is hitched and raised on the linkage, protect it from falling and immobilise the carrying vehicle (turn off the engine and engage the parking brake.) Undo the nuts (4), remove the bolts (3) mounting the skid (1) to the frame (FIGURE 5.4). The list of skid elements with catalogue numbers is shown in TABLE 5.3.

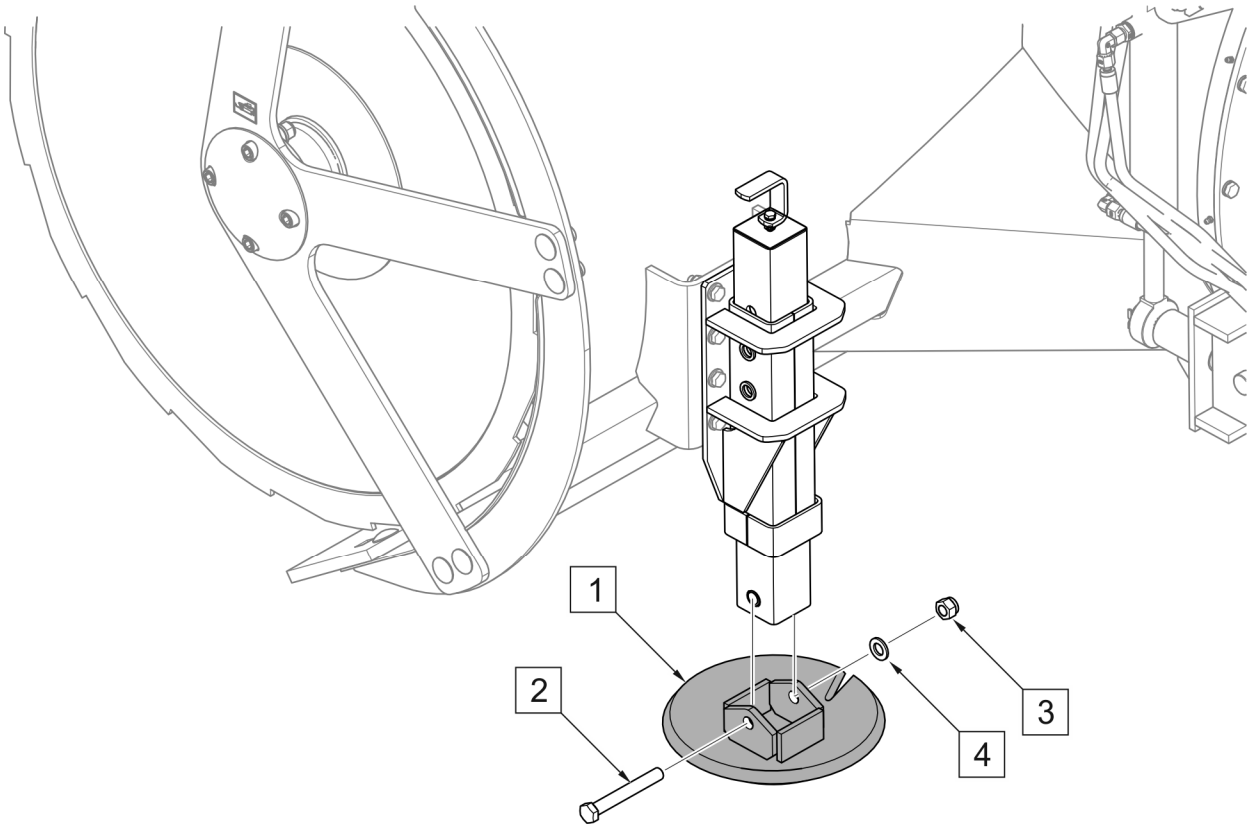


FIGURE 5.4 Skid replacement

(1)- skid; (2)- bolt; (3)- nut; (4)- washer

TABLE 5.3 LIST OF SKID COMPONENTS

Marking FIGURE 5.6	**Name / Part No.**	**Quantity** [pcs]
1	Skid / 517N-08020000	2
2	Bolt M16x120-8.8 PN-EN ISO 4017	2
3	Self-locking nut. M16-8 according to PN-EN 7040	2
4	Washer 16-100HV PN-EN ISO 7091	2

When mounting skids, pay attention to install bolts in suitable holes in the skid, because proper position of bolts has influence on the height of blade above the surface being cleared. Both skids should be attached at the same height. Arrangement of holes in the skid enables gradual skid adjustment, every 11 mm. Tightening torques for nut and bolt connections are given in TABLE 5.5 .

5.5 LUBRICATION

Before commencing lubrication insofar as is possible remove old grease and other contamination. Remove and wipe off excess oil or grease The following grease is recommended for lubrication: ŁT-43-PN/C-96134.

DANGER

Lubrication may only be performed when the machine is disconnected from the tractor.

When using the machine the user is obliged to observe lubrication instructions according to attached schedule. Excess lubricant causes depositing of additional contaminants in places requiring lubrication, therefore it is essential to keep individual machine components clean.

TABLE 5.4 LUBRICATION POINTS AND LUBRICATION FREQUENCY

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
A	Discharge chute rotation worm gear teeth	1	grease	40 hours
B	Augers bearings	2	grease	20 hours
C	Intersecting axis gear	1	According to point 5.2.1	
D	Main transmission	1	According to point 5.2.2	
E	Support wheels	2	grease	40 hours
F	Rotation plate	10	grease	20 hours
G	Eye of cylinder ram and cylinder	2	grease	50 hours
H	Shaft surface	1	grease	20 hours
I	PTO shaft*	*	*	*

** - optional equipment For detailed information on operation and maintenance please refer to the operator's manual delivered with the shaft.*

Marking description in Item column (TABLE 5.4) conforms with numbering shown (FIGURE 5.5)

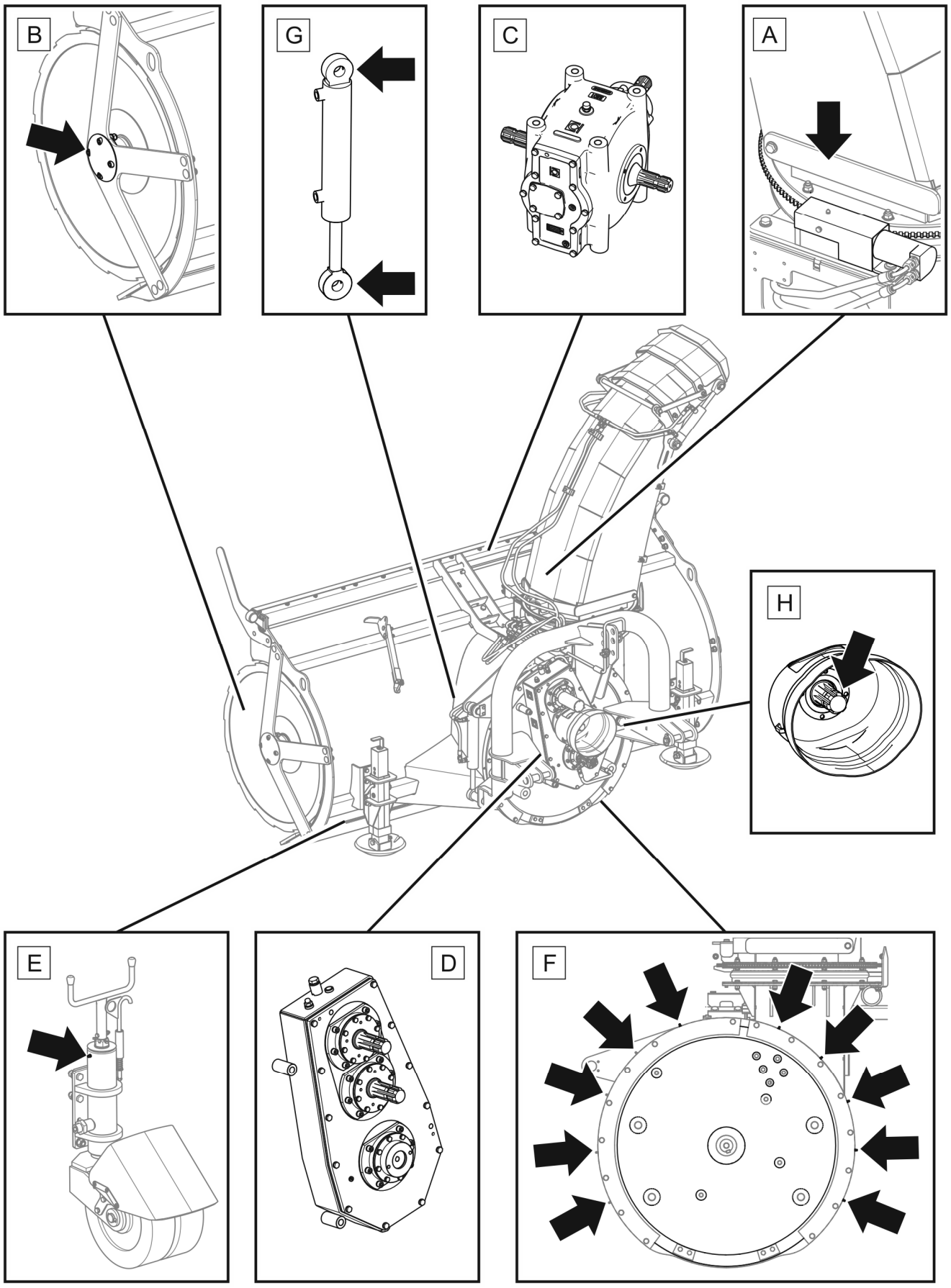


FIGURE 5.5 Lubrication

Lubrication points are described in Table 5.4

5.6 ELECTRICAL SYSTEM MAINTENANCE

DANGER

Do not independently repair electrical system, except items described in chapter ELECTRICAL SYSTEM MAINTENANCE. All electrical system repairs must be performed only by suitably qualified personnel.

In the snow blower mounted on the DIN or SETRA faceplate, the maintenance of the electrical system consists in periodic checking of the operation of the clearance lights.

In the snow blower mounted on the carrying vehicle's front three point linkage, the maintenance of the electrical system consists in periodic checking of the operation of individual functions and lights. There is a fuse (2) on the power lead (1) with a 3-pin socket connected to the vehicle's electrical system (FIGURE 5.6). To check the fuse, remove the cover and take it out of the holder. Blown fuse should be replaced with a new one (UNIVAL 20A.)

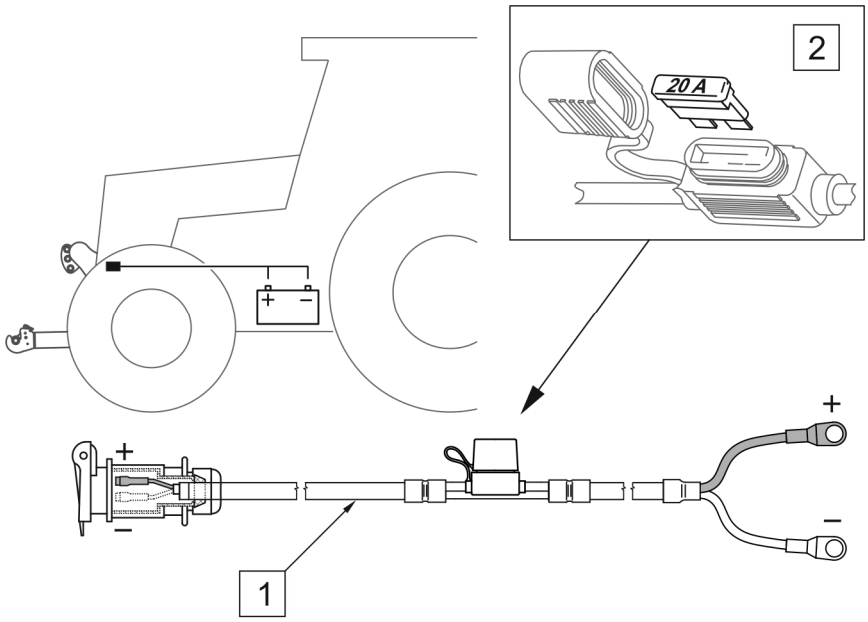


FIGURE 5.6 Fuse replacement

(1) - power lead; (2) - UNIVAL 20A fuse

5.7 STORAGE

After finishing work, clean and wash the machine thoroughly with a water jet. While washing, do not direct a strong water or steam jet at information and warning decals or hydraulic lines and electrical wires. Nozzle of pressure or steam washer should be kept at a distance of not less than 30 cm from cleaned surface.

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. Machine should be kept in a closed or roofed building.

If the machine will not be used for an extended period of time, protect it against adverse weather conditions. When the machine is not in operation, PTO shaft should be disconnected. In the snow blower with three-point linkage, disconnect the control panel cable and secure the socket with a plug (delivered with the machine)

In the event of a prolonged storage, it is essential to lubricate all components regardless of the date of the last lubrication. Additionally, before winter, apply grease to hitching system pins.

5.8 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

During maintenance and replacement of individual parts, use appropriate tightening torques for nut and bolt connections (unless other parameters are specified for a particular connection). Recommended tightening torque values apply to non-greased steel bolts (FIGURE 5.5)

NOTE

Should it be necessary to change individual parts, use only original parts or those indicated by the Manufacturer. Non-adherence to these requirements may put the user and other people's health and life at risk, and also cause damage to the machine.

TABLE 5.5 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

THREAD DIAMETER [mm]	**5.8**	**8.8**	**10.9**
	TIGHTENING TORQUE [Nm]		
M6	8	10	15
M8	18	25	36
M10	37	49	72
M12	64	85	125
M14	100	135	200
M16	160	210	310
M20	300	425	610
M24	530	730	1,050

5.9 TROUBLESHOOTING

TABLE 5.6 TROUBLESHOOTING

TYPE OF FAULT	POSSIBLE CAUSE	REMEDY
The augers do not rotate	Telescopic PTO shaft disconnected	Connect PTO shaft
	Wrong rotation direction of the carrying vehicle's PTO	Check the required rotation direction
	The carrying vehicle's PTO drive not connected or faulty	Check the carrying vehicle's PTO drive
	Locked overload coupling in the drive transmission system	Check and remove snow blockage
	Damaged transmission	Check for damage, refer repair to service, if necessary
Augers rotate in wrong direction	Incorrect connection of PTO shaft (applies to the snow blower mounted on the three point linkage)	If necessary, transfer the shaft to the other end of the gear
The discharge chute rotation mechanism does not work	Snow blower hydraulic conduits not connected	Connect hydraulic conduits to corresponding sockets of the carrying vehicle's external hydraulic system
	Solenoid valve electrical system is not connected (applies to the snow blower mounted on the three point linkage)	Connect the electrical lead and the control panel
Incorrect discharge	Incorrect machine settings	Set the range and direction if discharge, test operation and adjust the settings.
	Engine RPM is too low	Increase PTO rotation speed
	Discharge chute partially jammed	Check and clean if necessary
Snow blower drive stops too frequently	Wet, dense snow Excessive driving speed	Increase the engine speed, reduce driving speed
	Frozen snow on snow blower working elements	Check and clean if necessary
Layer of snow is not collected	Slides or support wheels are set too high	Check and adjust, if necessary
	Incorrectly positioned central link of linkage	Adjust by changing the length of the central link
	Excessively worn or damaged collecting blade	Replace with a new one

NOTES