

# 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 failure-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 Pronar Z500K round baler. If the information stated 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.

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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 with the sign:



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.

## **REQUIRED MAINTENANCE ACTIVITIES**

Maintenance actions described in the manual are marked with the sign: ➡

Result of maintenance/adjustment actions or comments concerning the performance of actions are marked with the sign: ⇨

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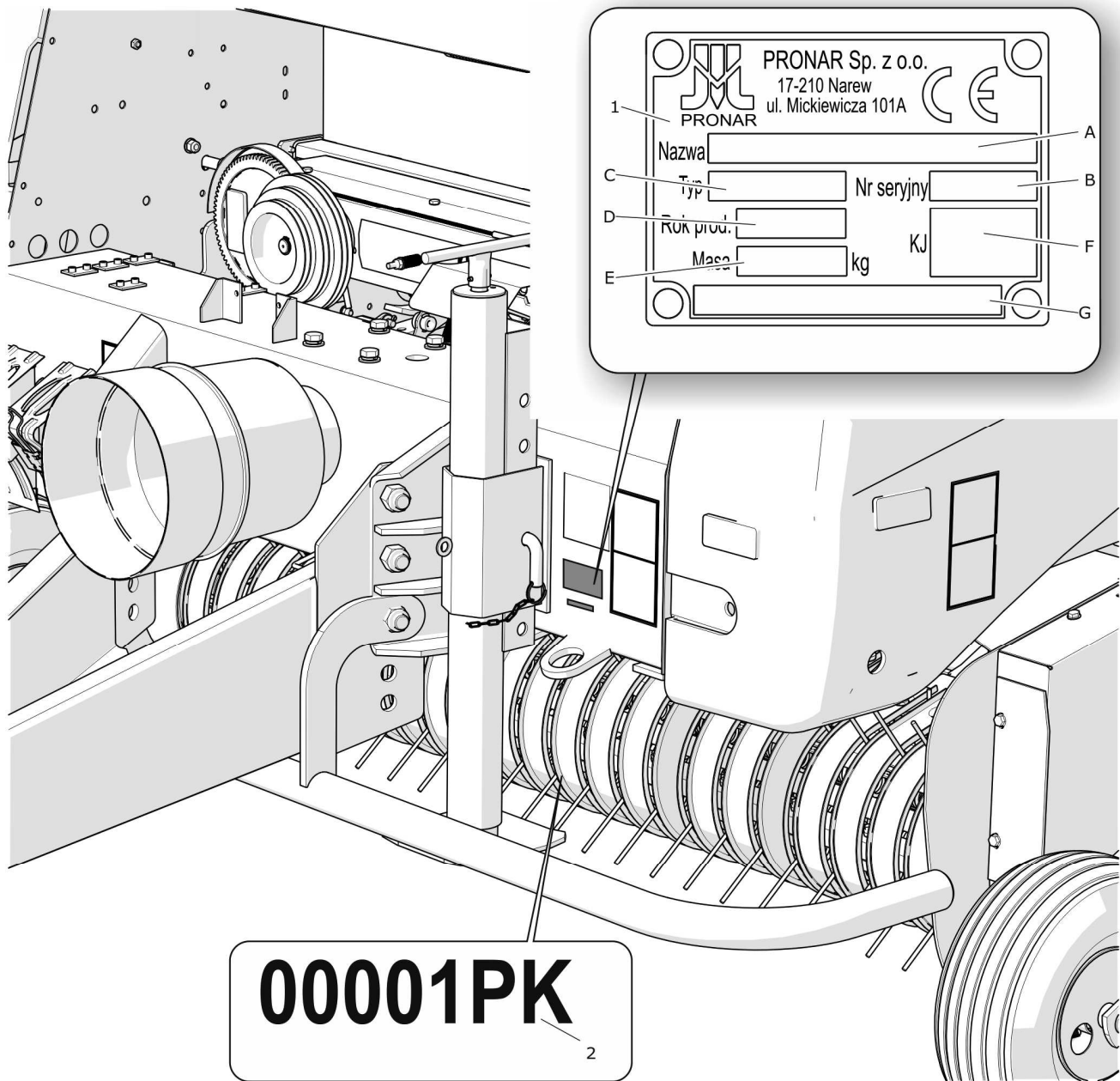
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**BASIC  
INFORMATION**

# 1.1 IDENTIFICATION

## 1.1.1 ROUND BALER IDENTIFICATION



**FIGURE 1.1** Location of the data plate and serial number

(1) data plate, (2) example of serial number

Pronar Z500K round baler is marked with the data plate (1) and the serial number (2) located on a gold painted rectangle. The serial number and the data plate are located on the machine body beam - figure (1.1). When buying the machine check that the serial numbers on the

machine agree with the number written in the *WARRANTY BOOK* and in the sales documents. The meanings of the individual fields found on the data plate are presented in the table below:

**TABLE 1.1      SMarkings on data plate**

ITEM	MARKING
<b>A</b>	Machine name
<b>B</b>	Serial number
<b>C</b>	Type
<b>D</b>	Year of manufacture
<b>E</b>	Machine tare weight
<b>F</b>	Quality Control marking
<b>G</b>	Unfilled box or extension of name (box A)



**TIP**

In the event of ordering a replacement part or in the case of the appearance of problems it is often essential to give the serial number of the round baler, therefore it is recommended that this number is inscribed in the spaces below.

**SERIAL NUMBER OF THE ROUND BALER**

						<b>P</b>	<b>K</b>
--	--	--	--	--	--	----------	----------

## 1.2 INTENDED USE

The round baler is designed for forming bales and wrapping them with twine or net. The bales are formed in the shape of a cylinder with diameter of 1 200 mm and width of 1 200 mm. The machine can be used for baling hay, straw and grass silage. The round baler may be operated only by one operator, from the tractor cab.

The round baler is controlled by means of electro-hydraulic distributor connected with electronic controller. The machine is designed for operation with agricultural tractors equipped with external hydraulic system having two pairs of ISO or ZSR outlets.

## ATTENTION

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



- for transporting people and animals,
- for transporting any materials,
- for baling plants or materials other than those specified in *THE OPERATOR'S MANUAL*,
- for baling swath in adverse weather conditions (dense fog, precipitation).

The round baler is designed according to the current safety requirements and engineering standards. The permissible speed of the baler travelling on public roads is 25 km/h.

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* of the baler, *WARRANTY BOOK* and comply with the recommendations contained in these documents,
- understand the round baler's operating principle and how to operate it safely and correctly,
- adhere to the established maintenance and adjustment plans,
- comply with general safety regulations while working,
- prevent accidents,
- comply with the road traffic regulations in force in a given country, in which the baler is used,
- carefully read the Operator's Manual and comply with its recommendations,
- only hitch the baler to an agricultural tractor which fulfils all the requirements specified by the baler's Manufacturer.

The machine may only be used by persons, who:

- are familiar with the contents of this publication and with the contents of the Operator's Manual of the agricultural tractor,
- have been trained in the round baler operation and work safety,

- have the required driving licence.

**TABLE 1.2 Agricultural tractor's requirements**

CONTENTS	UNIT	REQUIREMENTS
<b>Hydraulic system</b>		
Hydraulic oil	-	L HL 32 Lotos <sup>(1)</sup>
Nominal pressure of the system	bar / MPa	160 / 16
Oil demand:	l	5
<b>Electrical system</b>		
Electrical system voltage	V	12
Connection socket	-	7-pole compliant with ISO 1724
<b>Required tractor hitch</b>		
Type	-	Hitch for single axle trailer
	-	Upper transport hitch
<b>Other requirements</b>		
Minimum power	kW / Horsepower	41 / 55

<sup>(1)</sup> – use of other oil is permitted, on condition that it may be mixed with the oil in the round baler.

Detailed information may be found on the product information card.

## 1.3 EQUIPMENT

**TABLE 1.3 Round baler equipment**

EQUIPMENT	STANDARD	ADDITIONAL
OPERATOR'S MANUAL	•	
WARRANTY BOOK	•	
Bale counter, warranty book of the bale counter	•	

EQUIPMENT	STANDARD	ADDITIONAL
Connection lead for the electrical system	•	
Slow-moving vehicle warning sign		•
PTO shaft <sup>(1)</sup>	•	
Key for opening the side shields	•	
Net wrapping system		•
Warning reflective triangle		•
Audio-visual chamber filling signalling		•
Wheel chocks	•	
Central lubrication system		•
Automatic lubrication system		•
Tarpaulin cover		•

Information concerning tires is provided at the end of this publication in *ANNEX A*.

<sup>(1)</sup> – 71R4101CEWR7098 wide-angle PTO shaft with shear bolt clutch, 1 700 Nm

## 1.4 TERMS OF WARRANTY

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*. 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:

- drawbar hitching eye,
- drive chains,

- reel teeth,
- springs,
- tyres,
- bulbs,
- seals,
- bearings.

The warranty service only applies to factory defects and mechanical damage that is not due to the user's fault.

In the event of damage arising from:

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

the user will lose the right to warranty service.

**TIP**

**Demand that the seller carefully and precisely 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.**

The user is obliged to report immediately on noticing any wear in the paint coating or traces of corrosion, and to have the faults rectified whether they are covered by the warranty or not. For detailed Terms & Conditions of Warranty, please refer to the *WARRANTY BOOK* attached to each machine.

Modification of the machine without the written consent of the Manufacturer is forbidden. 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.

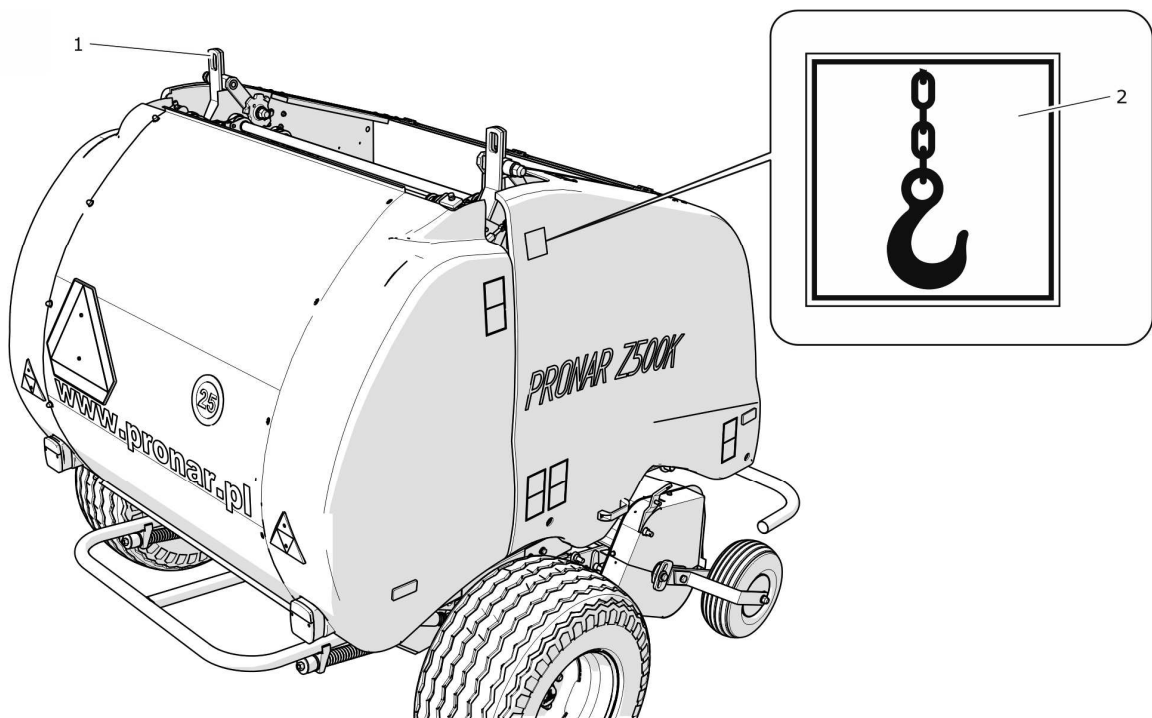
## 1.5 TRANSPORT

The round baler is ready for sale completely assembled and does not require packing. Packing consists solely of machine's technical documentation and possible additional and standard equipment elements. The round baler is delivered to the user either transported on a vehicle or, after being attached to a tractor, independently (towing with a tractor).

### 1.5.1 TRANSPORT ON VEHICLE

Loading and unloading of the round baler from vehicle shall be conducted using loading ramp with the aid of agricultural tractor, overhead crane or hoisting crane. During work, adhere to the general principles of occupational health and safety (OHS) applicable to reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines.

Lifting equipment used for transporting the round baler must be attached to the transport lugs (1) – figures (1.2), marked with the decals (2). Transport lugs are integrated with the round baler body. If necessary, an additional fixing element can be located near the drawbar body.



**FIGURE 1.2** Fixing points for lifting the round baler

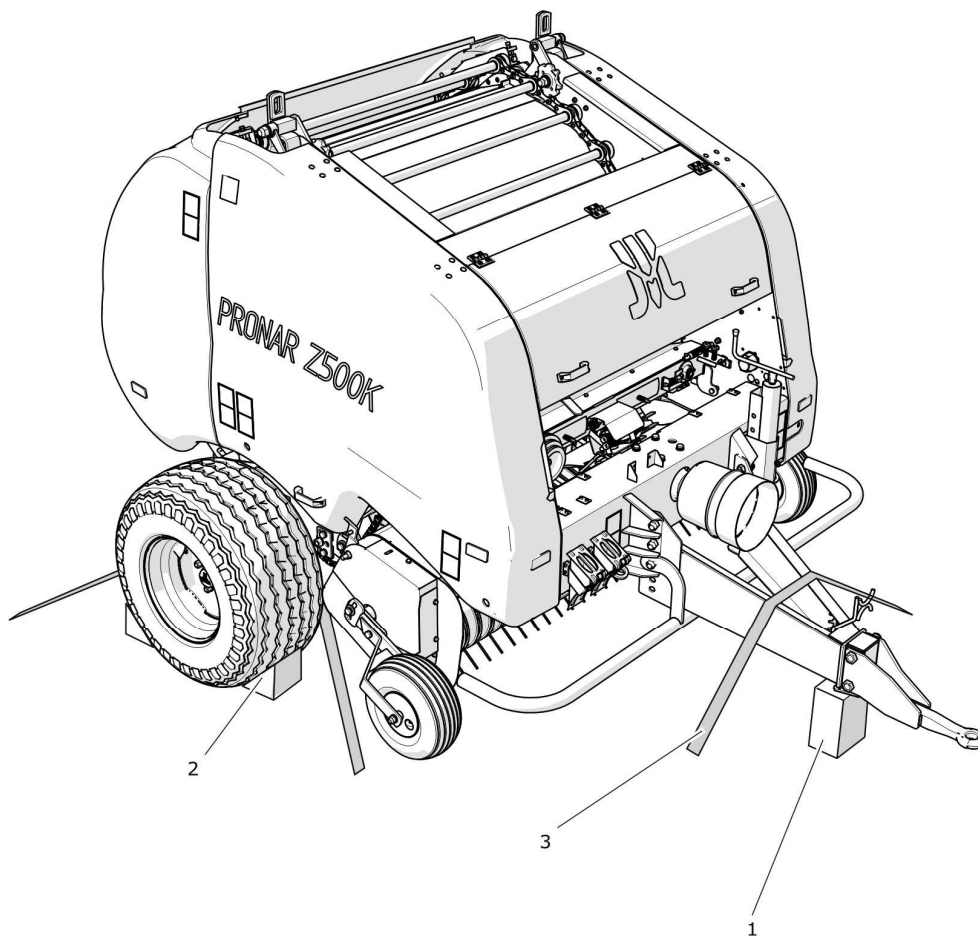
(1) transport lugs, (2) information decal



**ATTENTION**

Do not secure or attach the round baler by drawbar eye.

The baler should be attached firmly to the platform of the vehicle using straps, chains or other securing measures (3) - figure (1.3), fitted with a tightening mechanism. In order to attach the baler in a proper manner, fasten half axles and drawbar. Additionally, support the baler's drawbar with a wooden block (1) of such a height as to prevent the pickup header from hitting against the load platform floor. Chocks (2), wooden blocks or other objects without sharp edges should be placed under the wheels of the round baler to prevent it from rolling. Wheel blocks must be nailed to the vehicle load platform planks or secured in another manner preventing their movement.



**FIGURE 1.3** Example of round baler securing plan

(1) drawbar support, (2) wheel chocks, (3) tensioning elements

Use certified and technically reliable securing measures. Worn straps, cracked securing catches, bent or corroded hooks as well as elements damaged in a different way may be unsuitable for use. Carefully read the information stated in the Operator's Manual for the given securing measure. The number of securing elements (cables, straps, chains and stays etc.) and the force necessary for their tensioning depends on a number of things, including weight of the machine, the construction of vehicle carrying it, speed of travel and other conditions. For this reason it is impossible to define the securing plan precisely. A correctly secured machine does not change its position with regard to the transporting vehicle. The securing elements must be selected according to the guidelines of the Manufacturer of these elements. In case of doubt apply a greater number of securing straps in order to immobilise the machine. If necessary, sharp edges of the round baler should be protected at the same time protecting the securing elements from breaking during transport.

During reloading work, particular care should be taken not to damage parts of the machine's fittings or the paint coating. The tare weight of the round baler is given in table (3.1).

### **ATTENTION**



When being road transported on a motor vehicle the round baler must be mounted on the vehicle's platform in accordance with the transport safety requirements and the regulations.

Driver of the vehicle should be particularly careful during travel. This is due to the vehicle's centre of gravity shifting upwards when loaded with the machine.

Use only certified and technically reliable securing measures. Carefully read the manufacturer's instructions for the securing measures.

### **DANGER**



Incorrect application of securing measures may cause an accident.

## **1.5.2 INDEPENDENT TRANSPORT BY THE USER**

In the event of independent transport by the user, carefully read *THE OPERATOR'S MANUAL* and follow its recommendations. Independent transport involves towing the machine with own agricultural tractor to destination. During transport adjust travel speed to the prevailing road conditions, but do not exceed the maximum design speed.

**ATTENTION**

When transporting independently, the user must carefully read this operator's manual and observe its recommendations.

## 1.6 ENVIRONMENTAL HAZARDS

A hydraulic oil leak constitutes a direct threat to the natural environment owing to its limited biodegradability. The negligible solubility of hydraulic oil in water does not cause extreme toxicity of organisms living in the aquatic environment. The formation of a film of oil on the water may be the direct cause of physical action on organism, perhaps causing change of oxygen values in the water because of lack of direct contact of air with the water. An oil leak into water reservoirs may however lead to a reduction of the oxygen content.

While carrying out maintenance and repair work, which involves the risk of an oil leak, this work should take place on an oil resistant floor or 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 pollution, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container. The container should be kept away from heat sources, flammable materials and food.

**DANGER**

Used hydraulic oil or gathered remains mixed with absorbent material should be stored in a precisely marked container. Do not use food packaging for this purpose.

**TIP**

The hydraulic system of the baler is filled with L-HL32 Lotos hydraulic oil.

**ATTENTION**

Waste oil should only be taken to the appropriate facility dealing with the re-use of this

**type of waste. Do NOT throw or pour oil into sewerage or water tanks.**

Oil, which has been used up or is unsuitable for further use owing to a loss of its properties should be stored in its original packaging in the conditions described above. Waste oil should be taken to the appropriate facility dealing with the re-use of this type of waste. Waste code: 13 01 10. Detailed information concerning hydraulic oil may be found on the product's Material Safety Data Sheet.

## 1.7 WITHDRAWAL FROM USE

In the event of decision by the user to withdraw the baler from use, comply with the regulations in force in the given country concerning withdrawal from use and recycling of machines withdrawn from use. Before proceeding to dismantle equipment oil shall be completely removed from hydraulic system.

### **DANGER**



**During dismantling, use the appropriate tools, equipment (overhead travelling crane, crane or hoist etc.) 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 hydraulic oil to spill.**

Worn out or damaged parts that cannot be reclaimed should be taken to a collection point for recyclable raw materials. Hydraulic oil should be taken to the appropriate facility dealing with the re-use of this type of waste.

**SECTION**

**2**

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**SAFETY ADVICE**

## 2.1 BASIC SAFETY RULES

### 2.1.1 BASIC SAFETY RULES

- Before using the machine, the user must carefully read this Operator's Manual and the Operator's Manual of the PTO shaft. During use all the recommendations laid down in this Operator's Manual should be observed. Do NOT start the machine without knowledge of its functions.
- The user is obliged to acquaint himself with the construction, action and the principles of safe usage of the machine.
- Before using the baler always check the machine, whether it is properly prepared for work, especially in terms of safety.
- If the information stated in the Operator's Manual is difficult to understand, contact a seller, who runs an authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and improper use and operation of the round baler and also non-observance of the recommendations contained in this Operator's Manual, endanger health and life third persons and/or machine operator.
- Be aware of the existence of a residual risk, and for this reason the fundamental basis for using this round baler should be the application of safety rules and sensible behaviour.
- The machine must never be used by persons who are not authorised to drive the agricultural tractors and not trained in the safety principles and use of the machine, including children and people under the influence of alcohol.
- The baler must not be used for purposes other than those for which it is intended. Anyone who uses the machine other than the way intended takes full responsibility for himself 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 warranty.
- Use close fitting protective clothing and ear protection.

- Any modification to the baler frees PRONAR Narew from any responsibility for damage or detriment to health which may arise as a result.
- Before using the machine always check its technical condition, and in particular: technical condition of the drawbar, hydraulic system, safety guards and air pressure in tyres.
- The user is obliged to acquaint himself with the principles of safe operation, adjusting elements and inspection points of the machine and with the risks resulting from operation and maintenance of the machine.
- People, animals or objects must not be carried on the machine.

### **2.1.2 HITCHING AND UNHITCHING FROM TRACTOR**

- Be especially careful when hitching and unhitching the machine.
- While hitching the round baler to the tractor, use the appropriate hitch (the upper or lower transport hitch). After completing the hitching of the machines check the safety of the hitch Carefully read the tractor Operator's Manual. If the tractor is equipped with an automatic hitch, make certain that the coupling operation is completed.
- When hitching, there must be nobody between the tractor and the baler.
- Do NOT hitch the baler to tractor if the tractor does not fulfil the requirements specified by the Manufacturer (minimum tractor power demand, wrong hitch, etc.) – compare table (1.2) *AGRICULTURAL TRACTOR REQUIREMENTS*. Before hitching the machine, make certain that oil in the external hydraulic system of tractor may be mixed with the hydraulic oil in the machine's hydraulic system.
- When connecting the hydraulic conduits to the tractor, make sure that the hydraulic systems of the tractor and round baler are not under pressure. If necessary reduce residual pressure in the system.
- Before hitching round baler to tractor check that both machines are in good technical condition. In particular, check the hitching system and hydraulic, electrical, pneumatic connectors and sockets on the tractor and round baler.
- The machine disconnected from the tractor must be on level ground and be supported by the parking stand and secured against rolling using wheel chocks.

Terminals of hydraulic and electrical lines should be protected against contamination.

### **2.1.3 COLLECTING SWATH AND UNLOADING BALES**

- Before commencing work, ensure proper visibility of the baler and the danger zone. Make certain that there are no bystanders near the round baler and that there are no obstacles preventing proper machine operation.
- Make certain that all flaps are correctly closed and the lock key is removed.
- Do NOT exceed the permissible load weight of the round baler when collecting and baling the swath.
- Ensure that nobody is near the round baler's working area.
- During unloading take special care that the bale does not crush third persons as it rolls away.
- While working on slopes, bales may be unloaded only in such a manner as to prevent them from rolling down the slope.
- Do NOT remove clogging of pickup header during round baler operation. In order to remove clogging, unload the bale, stop the engine and remove key from ignition.
- Do NOT stand near the flap which is being opened or opened and unsecured.
- The baler may only be used when all the safety guards and other protective elements are technically sound and correctly positioned.
- While collecting the swath or baling, adjust travelling speed to the size of swath size, natural topography and other conditions which may affect work safety.
- During unloading the baler the drawbar eye and the tractor hitch are subjected to a great vertical load.
- Do NOT drive with the baling chamber flap raised.
- Incorrectly prepared swath (unevenly distributed) may lead to clogging of the pickup header, which may cause bending of auger ends, rakes and damage to the baler chamber.



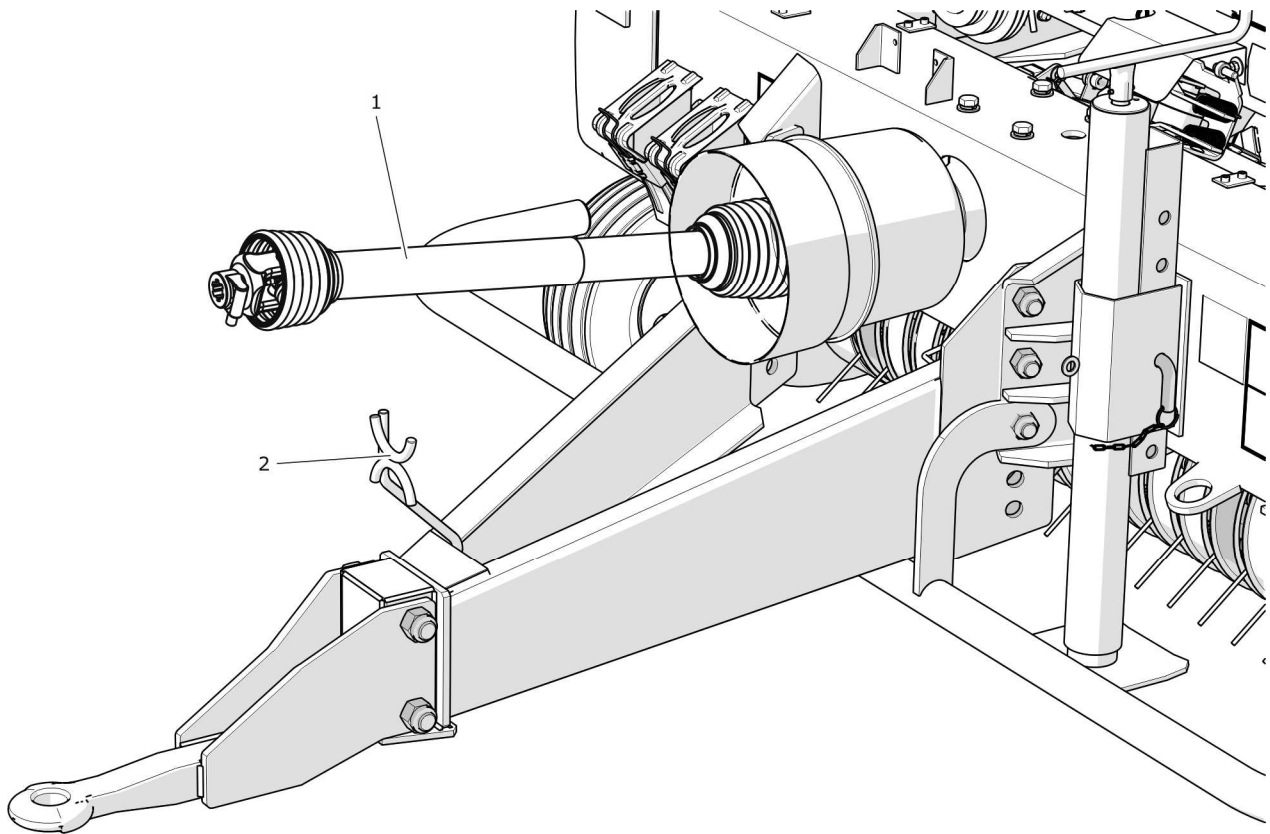
### **2.1.4 HYDRAULIC SYSTEM**

- The hydraulic system is under high pressure when the round baler is operating.
- Regularly check the technical condition of the connections and the hydraulic conduits. There must not be any leaks of hydraulic oil.
- In the event of the hydraulic system malfunction, discontinue using the machine until the malfunction is corrected.
- Before proceeding to maintenance-repair work, make certain that the hydraulic system is not under pressure.
- Rubber hydraulic conduits must be replaced every 4 years regardless of their technical condition.
- Use the hydraulic oil recommended by the Manufacturer.
- After changing the hydraulic oil, the used oil should be properly disposed of. Used oil or oil which has lost its properties should be stored in original containers or replacement containers resistant to action of hydrocarbons. Replacement containers must be clearly marked and appropriately stored.
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.
- Cut-off valve is used for blocking the flap before performing repairs or maintenance work. During normal operation of the baler, this valve must not be used and should be set to OPEN position. During repair-maintenance work which requires raising the rear flap, the flap should be additionally secured against falling with the service support located on the left wall of the baler body and the valve should be set to CLOSED position.

### **2.1.5 OPERATING PTO SHAFT.**

- The user should thoroughly acquaint himself with the PTO shaft Operator's Manual and adhere to the recommendations contained in it.
- The baler may only be connected to the tractor by means of an appropriately selected PTO shaft. Use PTO shaft recommended by the Manufacturer.
- The drive shaft must be equipped with guards. Do NOT use the shaft with damaged or missing guards.

- Before activating the machine, always ensure that all the safety guards are in good condition and in place. Damaged or incomplete sub-assemblies must be exchanged for original new ones.
- After connecting shaft ensure that it is correctly and safely connected to the tractor and to the machine.
- 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.
- Before disconnecting the shaft, turn off the tractor engine and remove the key from the ignition.
- When working in limited visibility conditions, use the tractor's forward working lights to illuminate the articulated shaft and its vicinity.
- During transport the shaft must be stored in the horizontal position to avoid damage to safety guards or other protection elements.
- During shaft operation telescopic pipes must overlap by at least one third of their length.
- When using the PTO shaft and round baler, do not use PTO rotation speed greater than 540 rpm. Do NOT overload shaft and baler and also do NOT engage the clutch suddenly. Before starting PTO shaft make certain that the PTO rotation direction is correct.
- The chains preventing the shaft cover from turning while the shaft is working, shall be secured to a fixed element of the baler structure.
- Do NOT use the securing chains to support the shaft while machine is parked or when transporting the machine. To do this, use proper holder (2) – figure (2.1) located on the baler's drawbar.



**FIGURE 2.1** Fixing the PTO shaft

(1)- PTO shaft; (2)- PTO shaft bracket

- Do NOT go over and under the shaft or stand on it equally during work and also when the round baler is parked.
- The PTO shaft has markings on the casing, indicating, which end of the shaft shall be connected to the tractor.

### 2.1.6 MAINTENANCE

- Maintenance and repair works may be performed after hitching the baler to the tractor. In such a case, turn off the tractor engine, remove the key from the ignition and immobilise the tractor with parking brake. Ensure that unauthorised persons do not have access to the tractor cab. Protect the machine against rolling by placing chocks under the wheels. When performing works that do not require hitching to tractor, position the round baler on level and hard surface, support it using a parking stand and protect it against rolling by placing chocks under the wheels. Place of work should be dry, clean and well-lighted.

- Regularly check the condition of the bolt and nut connections.
- During the warranty period, any repairs may only be carried out by Warranty Service authorised by the manufacturer. After the expiry of the warranty period it is recommended that possible repairs be performed by specialised workshops.
- During work use the proper, close-fitting protective clothing, gloves, protective goggles and appropriate tools.
- In the event of any fault or damage whatsoever, do not use the machine until the fault has been corrected.
- 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.
- Service inspections should be carried out according to the frequency specified in this Operator's Manual.
- Access onto the baler is only possible when the machine is absolutely motionless, the tractor engine is switched off and the ignition key removed from the ignition.
- Before welding or electrical work, the round baler should be disconnected from the power supply (disconnect the negative battery cable (-) from the tractor battery, disconnect connection lead). The paint coating should be cleaned. Burning paint fumes are poisonous for people and animals. Welding work should be carried out in a well lit and well ventilated space.
- In order to reduce the danger of fire, remove the remains of swath accurately from the round baler before welding works. Be especially careful when welding and pay attention to flammable or fusible elements (hydraulic system conduits, electrical system leads, twine, net and other structural elements made of plastics). If there is a risk that they will catch fire or be damaged, they should be removed or covered with non-flammable material before commencing welding work. Before beginning work, prepare a CO<sub>2</sub> or foam extinguisher.
- During welding work, there is a risk of overheating the tension springs or pressure springs. Consequently, these elements will lose their hardness and elastic properties.

- Raised elements must be secured against dropping by means or proper supports. The baling chamber flap should be secured by means of cut-off valve and the support delivered together with the baler.
- In the event of work requiring the round baler to be raised, use properly certified hydraulic or mechanical lift jacks 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 lift jack.
- The baler must not be supported using fragile elements (bricks or concrete blocks).
- After completing work associated with lubrication, remove excess oil or grease. The round baler should be kept clean and tidy.
- Do NOT repair hydraulic valves, selective control valve and hydraulic cylinders by yourself. In the event of damage to these elements, repair should be entrusted to authorised service point or replace elements with new parts.
- Do NOT make repairs to drawbar (straightening, repairing or welding). A damaged drawbar must be replaced.
- Do NOT install additional appliances or fittings not according to the specifications defined by the Manufacturer.
- The baler may only be towed when axles and wheels, lighting system are reliable.
- Regularly check technical condition and mounting of all guards and protective elements.
- 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 damage the machine.
- 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 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).

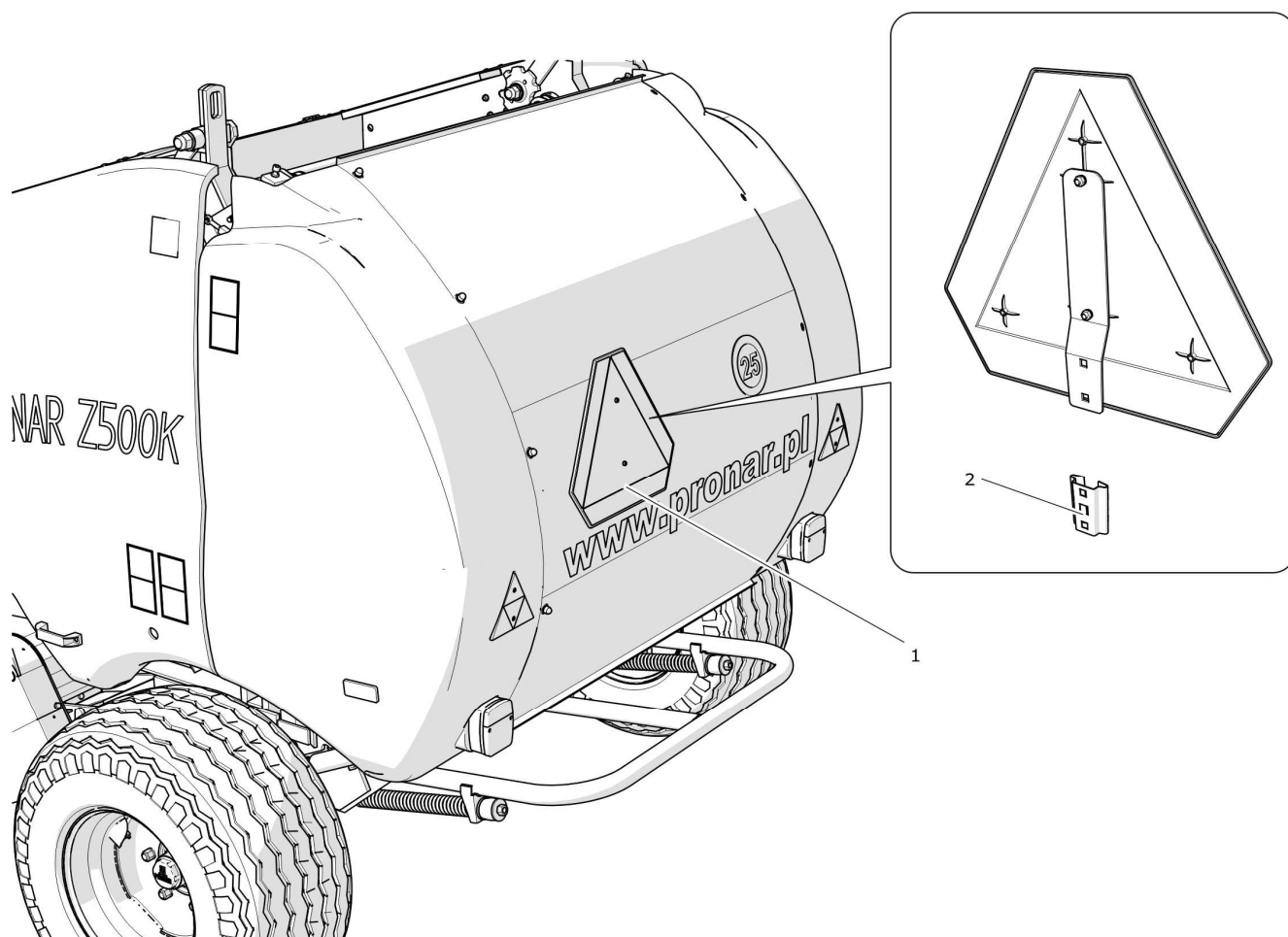
- After completed work, make sure that no tools are left inside the baler. Make sure that the side flaps are correctly closed using the key supplied with the machine.

### **2.1.7 FIRE SAFETY INSTRUCTIONS**

- When using the machine, ensure it is in good technical condition and keep it clean.
- The user should equip the machine with a certified water extinguisher or dry powder extinguisher.
- In case of fire, unload the bale immediately, drive the tractor with the baler away to a safe distance, position the baler against the wind in such a manner as to prevent spreading fire out to the tractor. If possible, open the rear flap and secure it against dropping. Quench the fire using a water extinguisher, water from another intake, a dry powder extinguisher or a CO<sub>2</sub> fire extinguisher. If possible, unhitch the baler and drive the tractor away to a safe distance.

### **2.1.8 DRIVING ON PUBLIC ROADS**

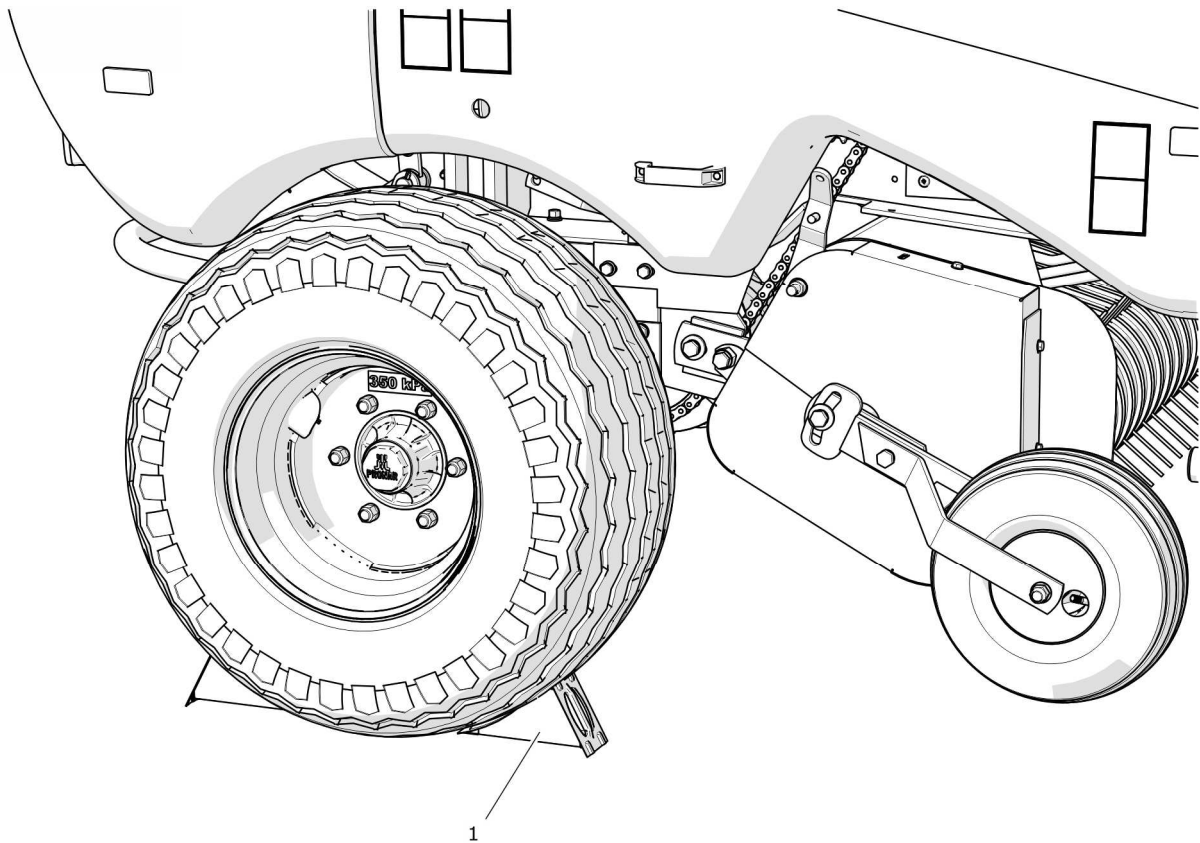
- When travelling, adjust travel speed to road conditions. If possible avoid travelling on uneven terrain and unexpected turning. Comply with road traffic regulations.
- Do NOT exceed permissible travel speed. Excessive speed may cause loss of control over the tractor-baler combination and damage to the baler and/or tractor and may limit braking efficiency of the tractor-baler combination.
- Place the slow-moving vehicle warning sign on the rear wall of the machine – figure (2.2).



**FIGURE 2.2** Mounting place for slow-moving vehicle warning sign

(1) slow-moving vehicle warning sign, (2) attachment point

- Before moving check that the round baler is correctly hitched to the tractor (in particular, check security of hitching pin).
- The machine must NOT be left unsecured. When not connected to the tractor, the baler must be protected against rolling with chocks or other objects without sharp edges placed under wheels - figure (2.3). The wheel chocks should be placed under one half axle, in front and behind the wheel.



**FIGURE 2.3 Method of placing chocks**

*(1) chock*

- Vertical load borne by the round baler drawbar eye affects the steering of the agricultural tractor.
- While driving on public roads the baler must be fitted with a certified or authorised reflective warning triangle.
- Electrical lighting system components and signalling components must be kept in good technical condition. The user is obliged to keep these components clean and ensure good visibility of the machine for other public road users.
- Damaged lighting system components and signalling components must be repaired or replaced with new ones before driving on the public roads.
- Before driving off, the baler pickup header must be raised and secured.
- The baler chamber must be empty.
- Do NOT attempt to climb the machine while travelling.



- Do NOT park the machine on slope.

### **2.1.9 TYRES**

- When working with tyres, the round baler should be secured against rolling by placing chocks under the wheels. Wheels can be taken off the machine axle only when the machine is not loaded.
- Repair work on the wheels or tyres should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- Inspect tightness of nuts before the first use of trailer, after the first travel under load and then every 6 months of use or every 25,000 km. In the event of intensive work, check the nut tightening at least every 100 km. The inspection should be repeated individually if a wheel has been removed from the wheel axle.
- Avoid potholes, sudden manoeuvres or high speeds when turning.
- Check the tyre pressure regularly. Pressure and tyres should be also checked during the whole day of intensive work. Please note that higher temperatures could raise tyre pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed. Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Protect tyre valves using suitable caps to avoid soiling.

### **2.1.10 DESCRIPTION OF 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 round baler for purposes other than those described in the Operator's Manual,
- being between the tractor and the baler while the engine is running and when the machine is being attached,
- being on the machine while the engine is running,
- using unreliable PTO shaft,

- operating the round baler with removed or faulty safety guards,
- not maintaining a safe distance while the round baler is in operation,
- not maintaining safe distance during unloading work,
- operation of the round baler by unauthorised persons or persons under the influence of alcohol
- cleaning, maintenance and technical checks of the baler,
- work of machine on unstable and sloping surface.




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





- prudent and unhurried operation of the machine,
- adherence to the remarks and recommendations contained in the Operator's Manual of the baler and the Operator's Manual of PTO shaft,
- maintaining safe distance from the danger zone,
- a ban on being on the machine when it is operating,
- carrying out repair and maintenance work in line with operating safety rules,
- using close fitting protective clothing,
- ensuring unauthorised persons have no access to the machine, especially children.

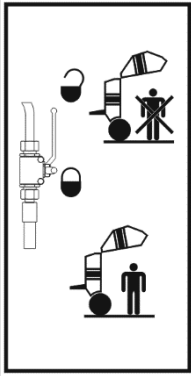

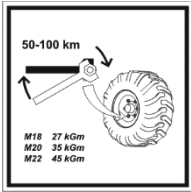

## 2.2 INFORMATION AND WARNING DECALS

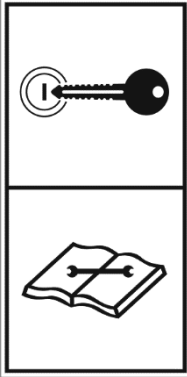


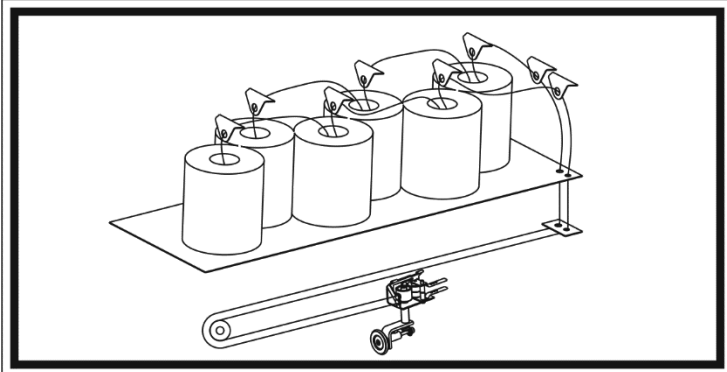
The round baler is labelled with the information and warning decals mentioned in table (2.1). The symbols are positioned as presented in figures (2.4), (2.5) and (2.6). Throughout the time it is in use, the user of the machine is obliged to take care that notices and warning and information symbols located on the round baler are clear and legible. In the event of their destruction, they must be replaced with new ones. Safety decals are available from your PRONAR dealer or directly from PRONAR customer service. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. During round baler cleaning do not use solvents which may damage the coating of information label stickers and do not subject them to strong water jets.

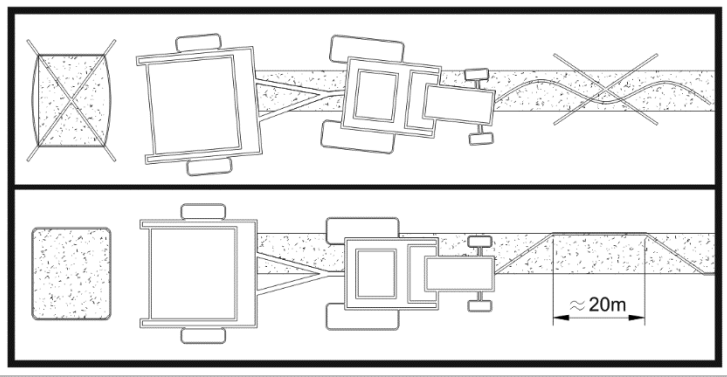

TABLE 2.1 Information and warning decals

NO.	DECAL	MEANING
1		<p>Danger of crushing the whole body.</p> <p>Do not stand under raised cover before installing the protection device.</p>
2		<p>Danger of entrapment of hands by the auger.</p> <p>Do not open and do not remove safety shields when the tractor engine is working.</p> <p>Do not reach into the working area of the baler's rotating components.</p>
3		<p>Danger of crushing hands or fingers.</p> <p>Do not reach into the compression area while lowering the rear flap.</p>

NO.	DECAL	MEANING
4		<p>Danger of entrapment of the whole body by working baler pickup header.</p> <p>Do not reach into the baler pickup header area while the tractor is moving and PTO drive is engaged.</p>
5		<p>Caution!</p> <p>Maximum PTO speed and PTO shaft rotation direction.</p>
6		<p>Transport lug points marking.</p>
7		<p>Do not open and do not remove safety shields when the tractor engine is working.</p> <p>Do not reach into the working area of the baler's rotating mechanisms.</p>

NO.	DECAL	MEANING
8		<p>Do not stand near the opened and unsecured flap.</p> <p>Secure the flap against accidental closing by means of valve.</p>
9		<p>Grease the round baler according to the lubrication schedule included in the <i>OPERATOR'S MANUAL</i>.</p>
10		<p>Regularly check if the nuts and bolts fixing the wheels and other components are properly tightened.</p>
11		<p>Caution!</p> <p>Before starting work, carefully read the <i>OPERATOR'S MANUAL</i>.</p>

NO.	DECAL	MEANING
12		<p>Before beginning servicing or repairs, turn off tractor engine and remove key from ignition Ensure that unauthorised persons do not have access to the tractor cab.</p>
13		<p>Maximum design speed of the baler</p>
14	<p><b>PRONAR Z500K</b></p>	<p>Type of round baler</p>
15		<p>Information decal of bale compaction indicator.</p>
16		<p>Manner of installing of wrapping twine.</p>

NO.	DECAL	MEANING
17		Manner of driving while collecting a narrow swath
18	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>350kPa</b> </div>	Air pressure in the tyres
19		<p>Caution!</p> <p>Before entering under the raised baling chamber flap, secure the cylinder with the locking device.</p>
20	<div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center;"><b>Uwaga:</b></p> <ol style="list-style-type: none"> <li>1. Czytaj instrukcję obsługi i użytkowania.</li> <li>2. Kluczyk jest jednym z elementów wyposażenia prasy.</li> <li>3. W czasie użytkowania prasy ostony muszą być zamknięte na klucz.</li> <li>4. W razie zgubienia klucza należy zakupić u producenta lub w miejscu zakupu prasy.</li> </ol> </div>	Additional information.

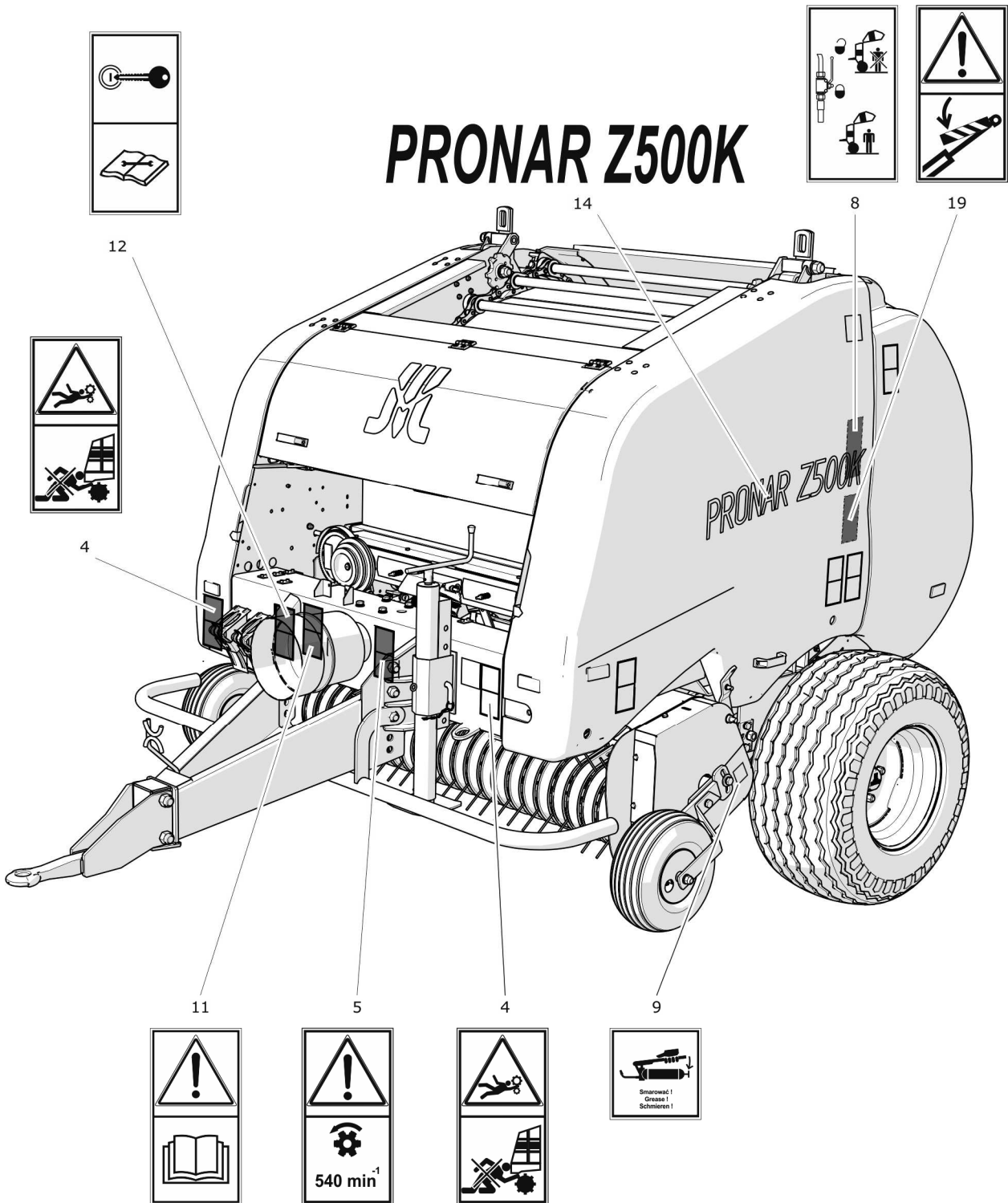


FIGURE 2.4 Locations of information and warning decals, part 1



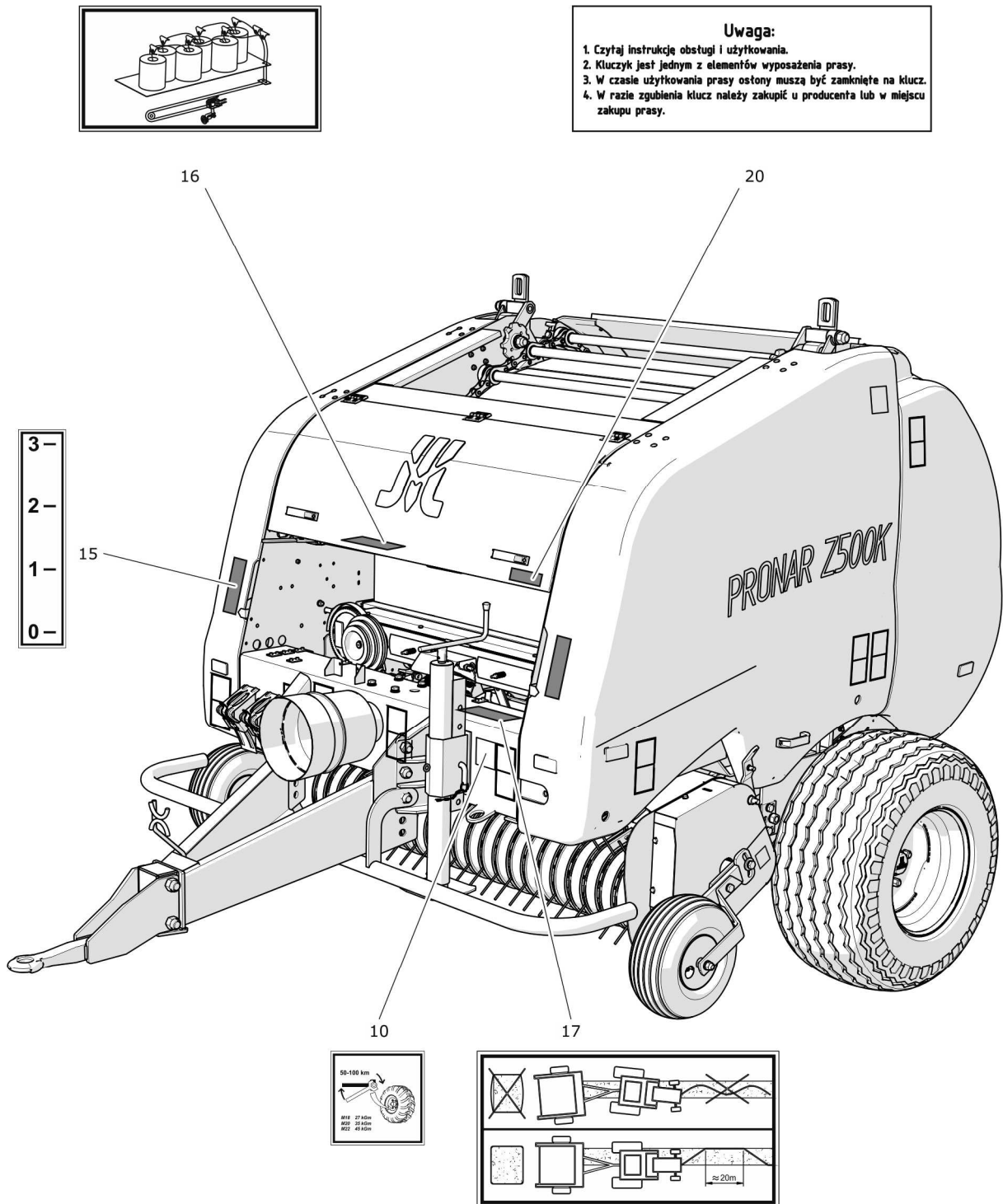


FIGURE 2.5 Locations of information and warning decals, part 2

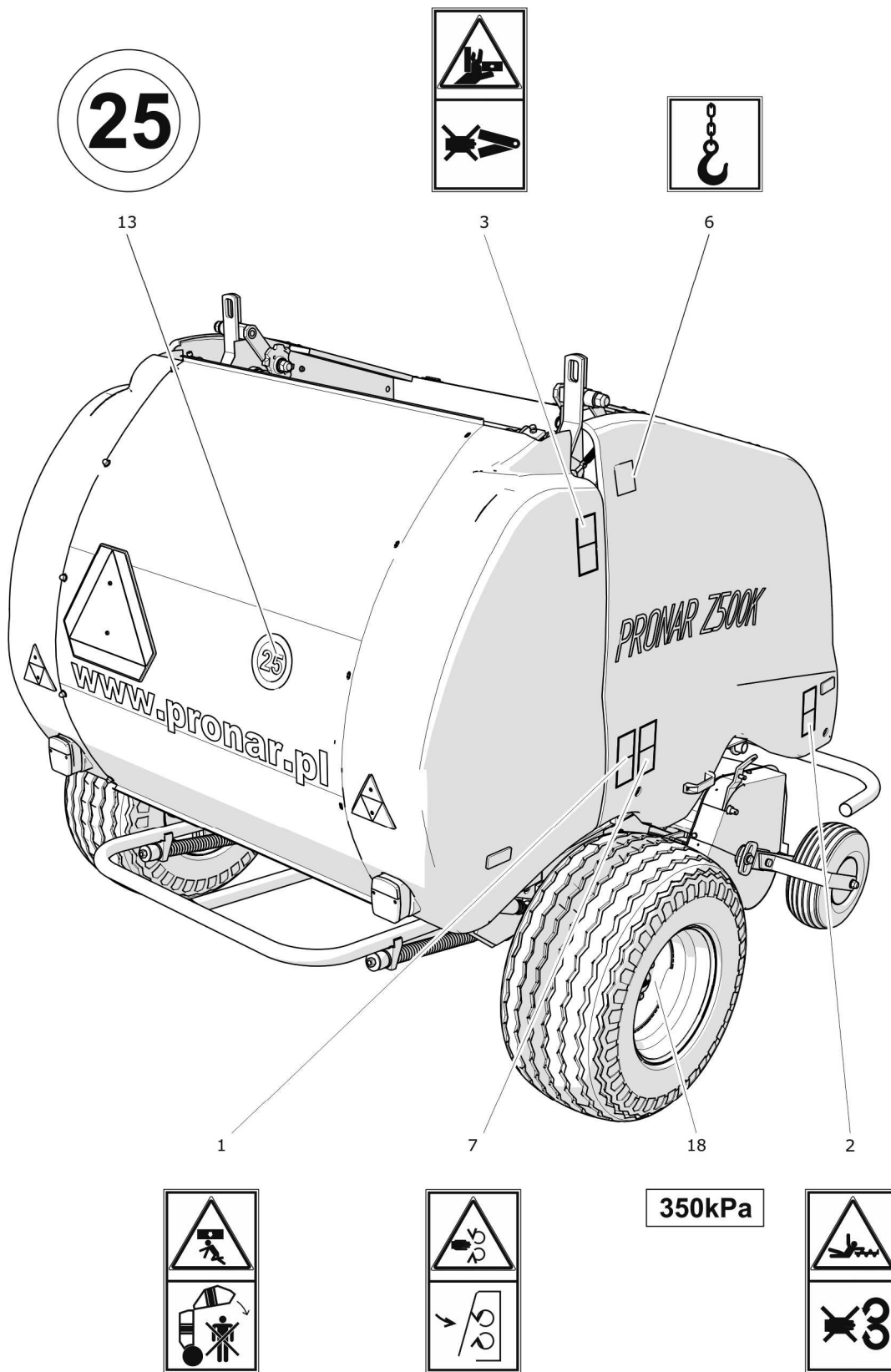


FIGURE 2.6 Locations of information and warning decals, part 3

*SECTION*

**3**

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**DESIGN AND  
OPERATION**

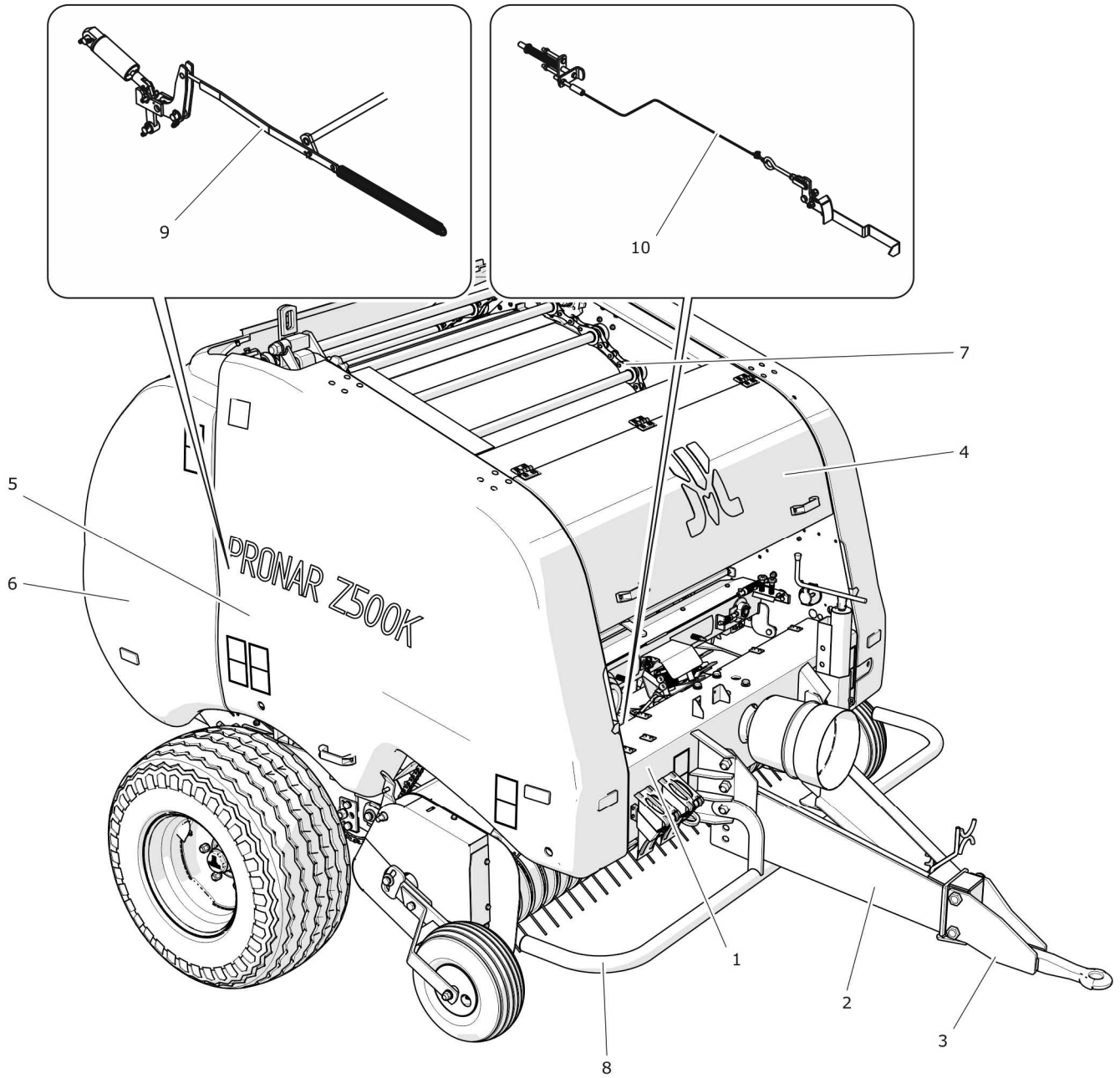
## 3.1 TECHNICAL SPECIFICATION

**TABLE 3.1 Basic technical specification**

CONTENTS	UNIT	Z500K
<b>Dimensions</b>		
Total length	mm	3,490
Total width	mm	2,460
Total height	mm	2,220
Wheel track	mm	2,065
Chamber dimensions (width/height)	mm	1,200/1,200
<b>Pickup header</b>		
Width of collecting	mm	1,800
Number of tines in a row	-	24
Number of rows	-	4
<b>Tractor requirements</b>		
Power demand	kW / Horsepower	41 / 55
PTO speed	RPM	540
Hitch (hitching eye diameter)	mm	Ø50 or Ø40
Electrical system voltage	V	12
Hydraulic selective control valve	-	2 double acting sections with floating position
<b>Weights</b>		
Tare weight	kg	2,220
Maximum gross weight	kg	3,400
<b>Bales</b>		
Width of the bales	mm	1,200
Diameter of bales	mm	1,200

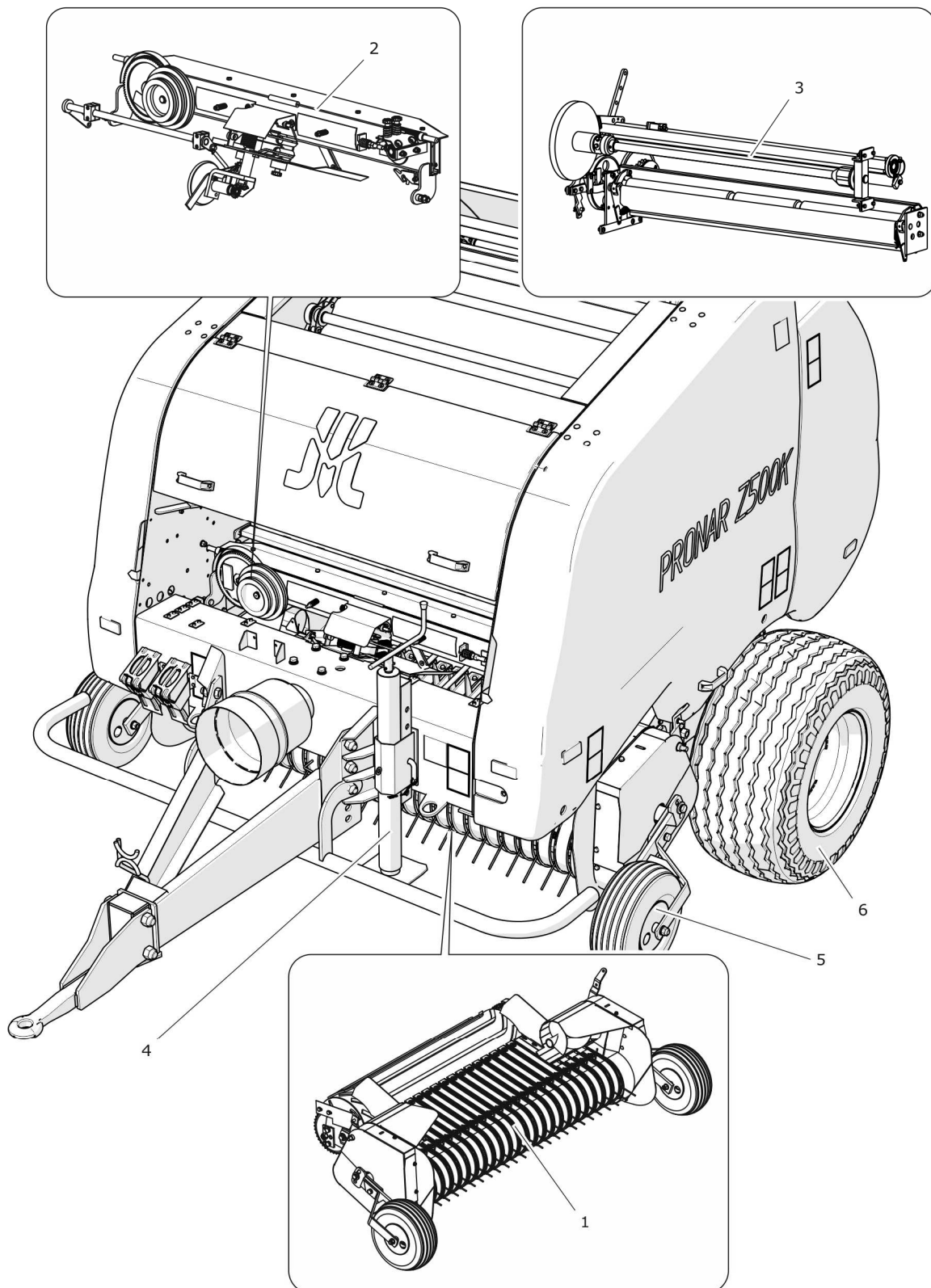
CONTENTS	UNIT	Z500K
<b>Wrapping net</b>		
Width of net	mm	1,230
Length of net coil	m	2,000
Width of roll	mm	1,250
Diameter of roll	mm	75 - 80
External diameter	mm	max. 260
<b>PTO shaft</b>		
Type	-	71R4101CEWR7098
PTO rpm	RPM	540
Type of clutch	-	with shear bolt
Shear moment	Nm	1,700
<b>Electronic counter</b>		
Operating temperature and storage temperature	C	0 – 50
Power supply	V	12
Dimensions	mm	143x80x38
<b>Other information</b>		
Sound power level	dB	82
Maximum vertical drawbar load	kg	700
Pressure rating of the hydraulic system	bar / MPa	160 / 16

### 3.2 BALER DESIGN



**FIGURE 3.1 Round baler design, part 1**

(1) body, (2) drawbar, (3) drawbar hitching eye, (4) twine container, (5) body shields, (6) rear flap, (7) rolling chain, (8) baler pickup header shield, (9) flap bolting mechanism, (10) bale compaction indicator



**FIGURE 3.2** Round baler design, part 2

(1) baler pickup header, (2) twine wrapping system, (3) net wrapping system, (4) straight support, (5) baler pickup header, (6) wheel

Each user is obliged to know the design and the principle of operation of the round baler. Due to high complexity of individual systems of the machine, the practical learning of the machine functioning is recommended.

Very good knowledge of the round baler design and operation ensures efficiency, correct adjustment, proper maintenance and safe use of the machine.

### **3.2.1 TWINE WRAPPING SYSTEM**

Design of the twine wrapping system is presented in figures (3.3) and (3.4). The round baler is equipped with double wrapping system. The system components (excluding guide (8) and reducer wheel (5)) are mounted on the mechanism body. The complete system is connected with the round baler housing and is located in the front of the machine under the twine container, - see figure (3.2).

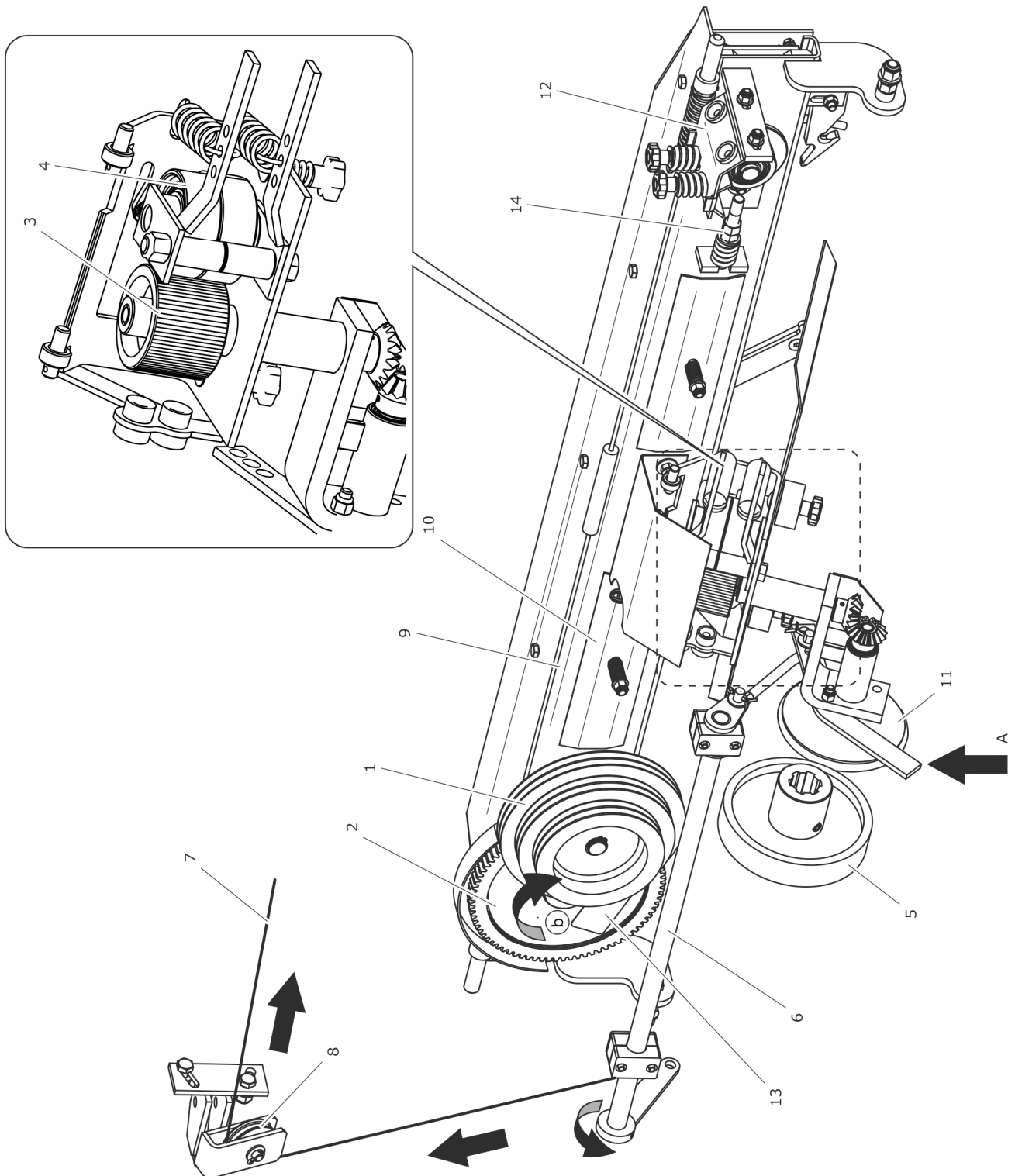
#### **Starting the system**

The system is started from the operator's cab by controlling the hydraulic cylinder (starter cylinder). If the cylinder rod is shifted, the starter cable (7) is tightened and moved in the direction indicated by the arrow - figure (3.3).

Rotating lever (6) tilts the arm supported on the housing structure in point (a). The control system arm lifts the whole mechanism until drive wheel (11) touches reducer wheel (5). Reducer wheel (5), which is continuously moving during baling process, drives wheel (11) which transmits drive to rollers (3) and (4) and through intersecting axis gear.

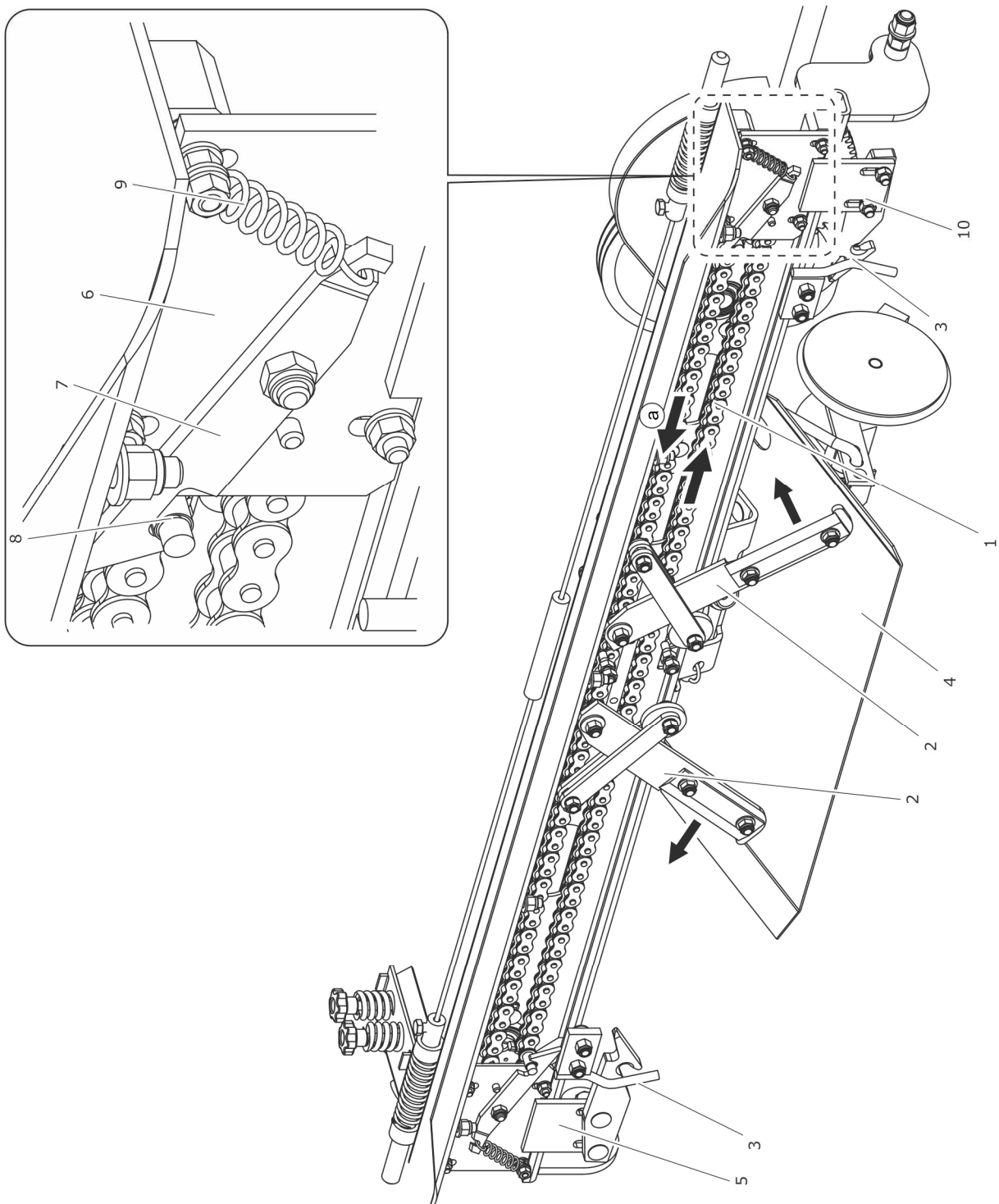
Two threads of wrapping twine, fed from the container, run through brake (12) and are directed through the roller located under the brake to drive wheel (1) and between rollers (3) and (4). The twine shifting into the chamber is pulled into the baling chamber together with the swath in the last phase of bale forming.





**FIGURE 3.3 Twine wrapping system – front view**

(1) drive wheel, (2) gear wheel, (3) knurled roller, (4) rollers (lower + upper), (5) reducer wheel, (6) lever, (7) starter cable, (8) cable guide, (9) cable, (10) chain shield, (11) drive wheel, (12) twine brake, (13) rotation indicator, (14) chain tensioner, (a) arm support point, (b) gear wheel rotation direction



**FIGURE 3.4 Twine wrapping system – rear view**

(1) chain, (2) knife, (3) limiter, (4) plate, (5) left guide, (6) right guide, (7) pawl, (8) pin, (9) spring, (10) guiding arm, (a) chain movement direction

### **Wrapping with twine**

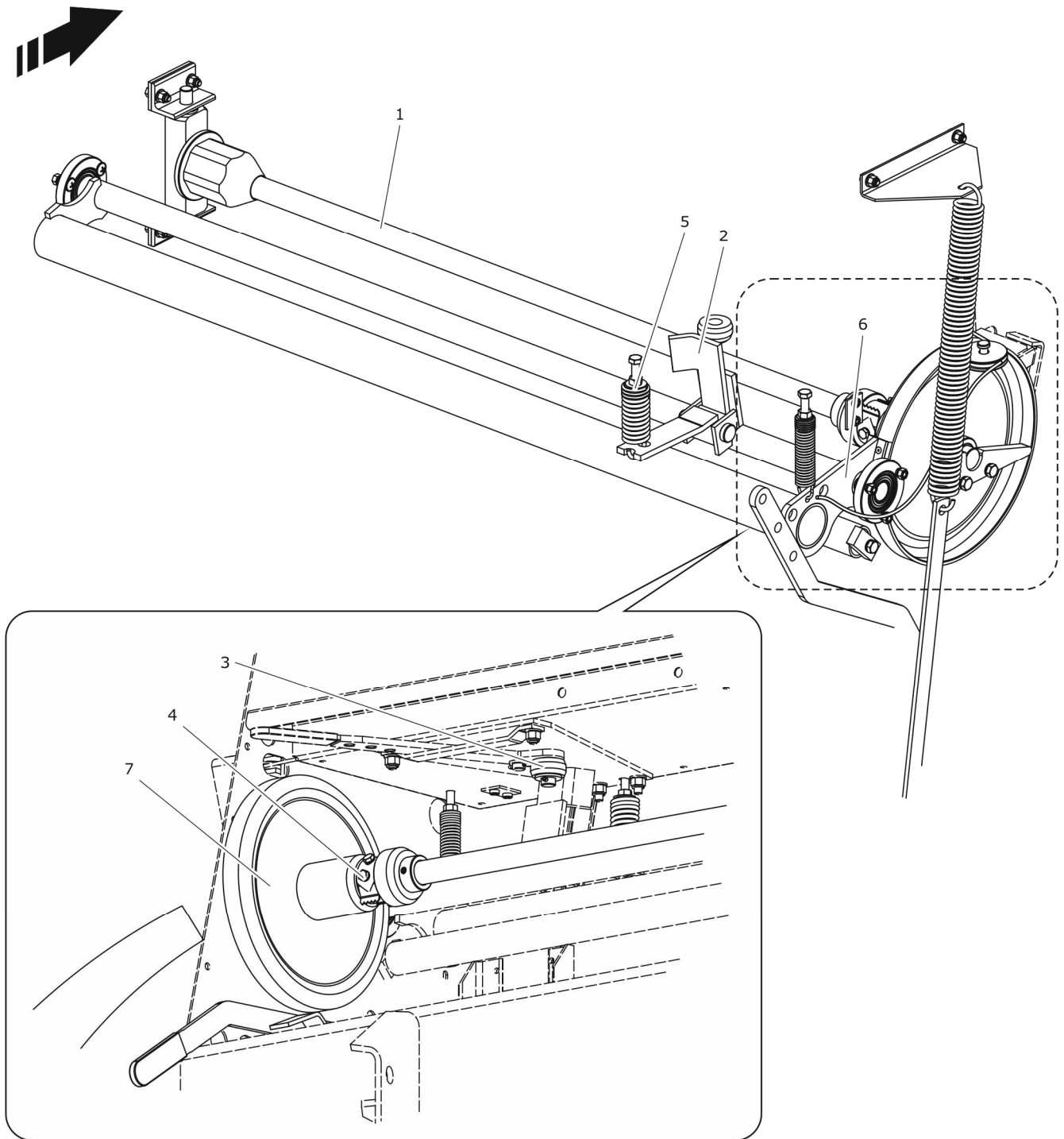
The twine pulled into the swath is automatically tightened and the twine tightening force is great enough to drive the wheel (2) meshed with the drive wheel (1). The starting mechanism should be disengaged (released starter cylinder). Gear wheel (2) rotates clockwise in direction (b). Rotation indicator (13), glued on the wheel surface, informs the round baler operator about the wrapping system operation.

Gear wheel (2) – figure (3.3), transmits drive to chain (1) – figure (3.4), which moves in direction (a). In the initial phase of bale wrapping, the twine guides (5) and (6) are located in the central part of the wrapping mechanism. Twine is wrapped on the central part of the bale. After approximately one rotation of the bale, the twine guides (the left guide and the right guide) move outwards as a result of being pushed by the pins (8) located on the drive chain. Guiding arms (10) shift both twine threads together with the guides and wrap the bale in the outward direction. Tightened twine lifts the cut off knives (2), which return to their original position when the twine is moved further. When the chain pins are moved to their limit position, they engage the guide pawls (7) and return movement occurs. Limiters (3) prevent the twine from sliding off the external edge of the bale. In the final phase of wrapping, the twine moves towards the centre of the bale until it is cut off by the knives' edge. Cable (9) is used for unlocking the twine wrapping system for repair or maintenance work.

### **3.2.2 NET WRAPPING SYSTEM**

#### **Design of the system**

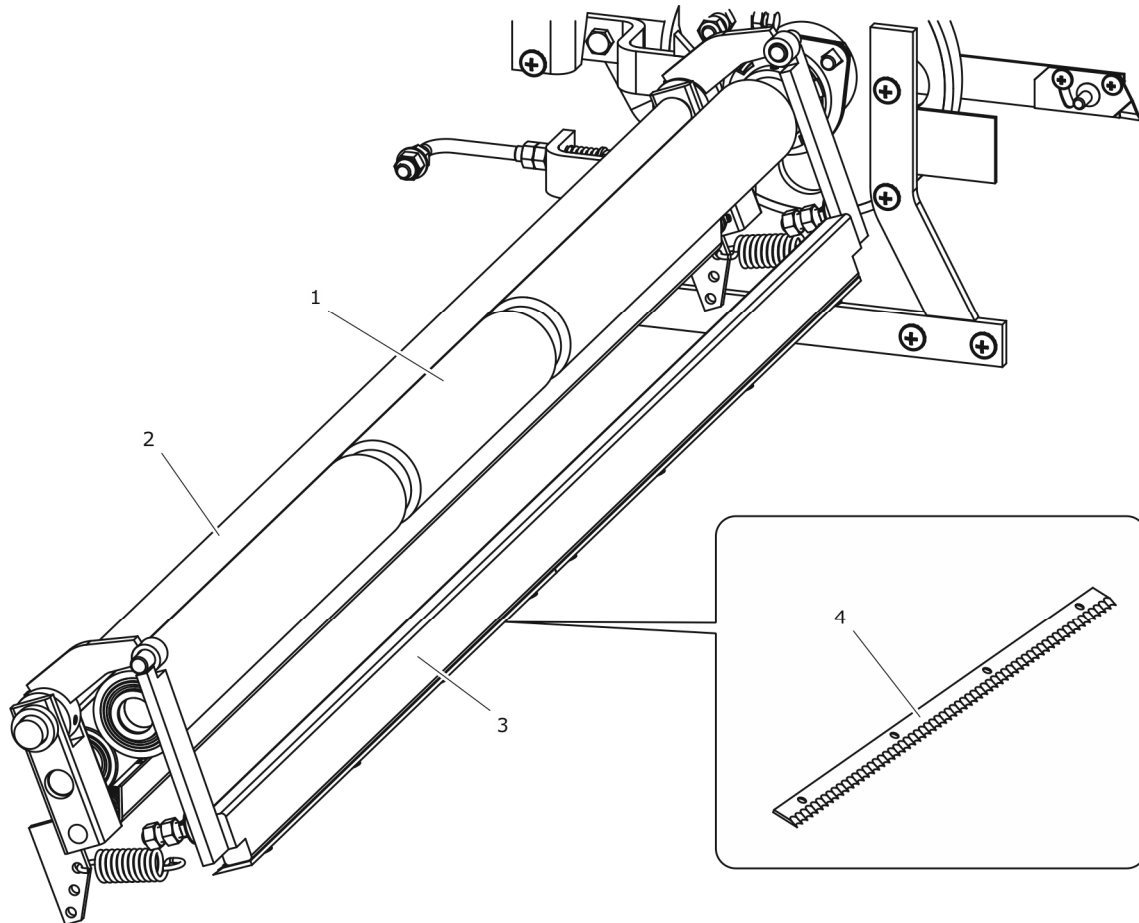
In front of the round baler, directly under the twine container, there is the mounting system (1) for wrapping net roll. Set of serrate plate springs (4) and brake disc (7) are bolted on the right side of the rotating arm. During round baler operation, the springs prevent free rotation of the net roll. The brake disc pressed by shock absorber (6) ensures optimum tension of the net being fed to the baling chamber. Shock absorber (6) cooperates with start lever (2).



**FIGURE 3.5** Net mounting system – rear view

(1) net mounting system, (2) start lever, (3) start lever roll, (4) plate springs, (5) main spring, (6) shock absorber, (7) brake disc

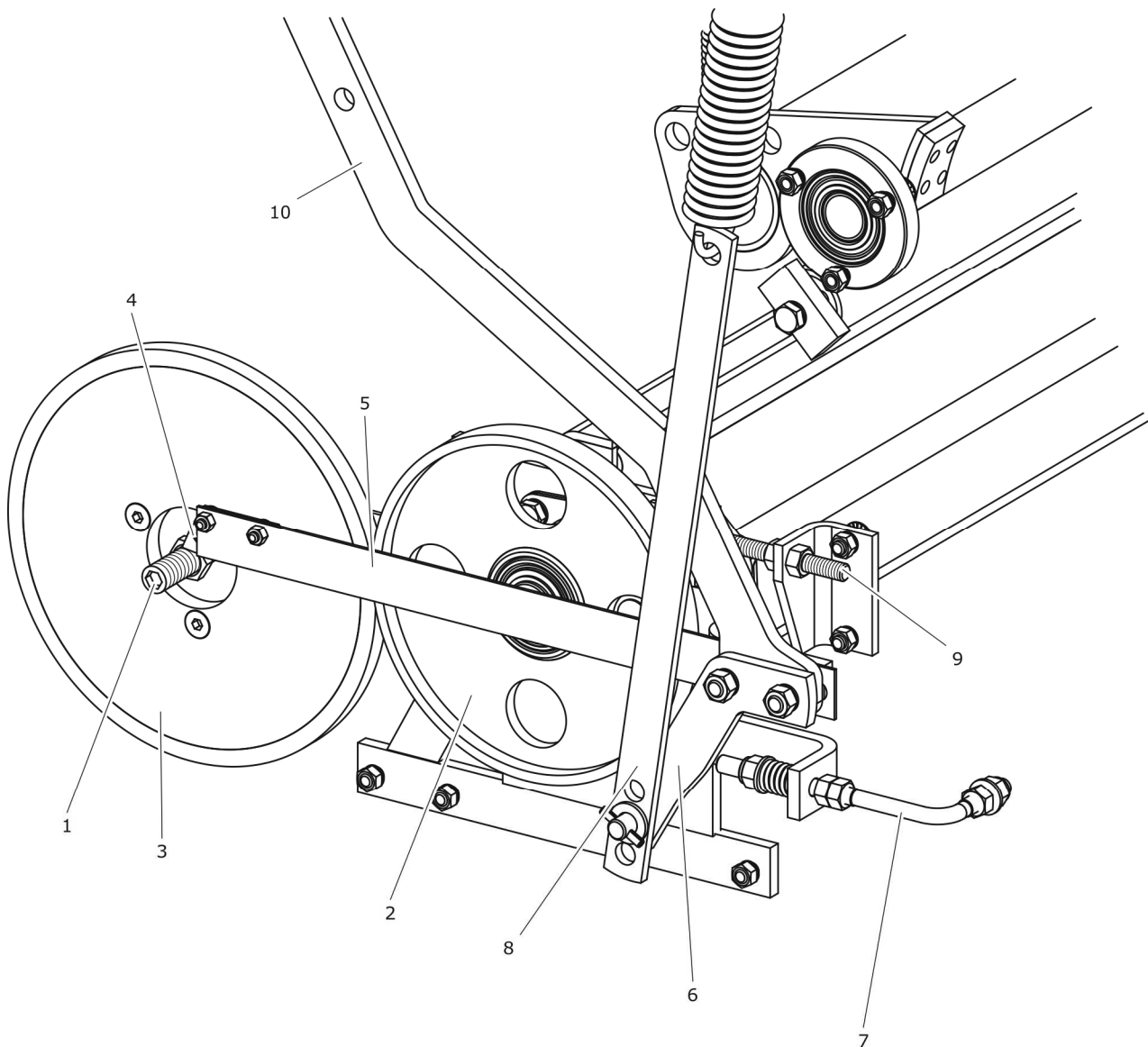
Below the net mounting system there is a housing containing cut off system (3) – figure (3.6), net guide roller – rubber roller (1) and aluminium pressure roller (2).



**FIGURE 3.6 Guide rollers and cut off system**

(1) rubber roller, (2) aluminium roller, (3) cut off system, (4) cutting knife

On the right wall of the baler body – figure (3.7), under the side shields, there is the net system control mechanism. Drive wheel (3) and net wrapping adjustment bolt (1) are mounted on the drive mechanism shaft. Wheel (3) drives the starting wheel (2) connected with the rubber roller. Elastic arm (5) is equipped with pawl (4), which shifts along the surface of threaded adjustment bolt (1) during the system operation. Arm (5) is connected with lever (6), tensioner flat bar (8), wrapping system body and main arm (10). Main arm (10) is connected with start lever (installed under the twine container) by means of a steel cable. The arm has to start the complete net wrapping system.



**FIGURE 3.7 Control mechanism**

*(1) wrapping adjustment bolt, (2) starting wheel, (3) drive wheel, (4) pawl, (5) knife arm, (6) lever, (7) tensioner rod, (8) tensioner flat bar, (9) adjustment bolt, (10) main arm*

**Starting and principle of operation**

The net wrapping system is started by means of hydraulic starter (starting cylinder), in the same manner as in case of twine wrapping system. When the operation is started, the hydraulic cylinder connected with control lever (1) - figure (3.8), shifts the lever in direction (a). The lever presses start lever (3) through roller (2) and tilts the start lever downwards in direction (b). Pressure force applied to the brake disc is reduced. Consequently, the net roll

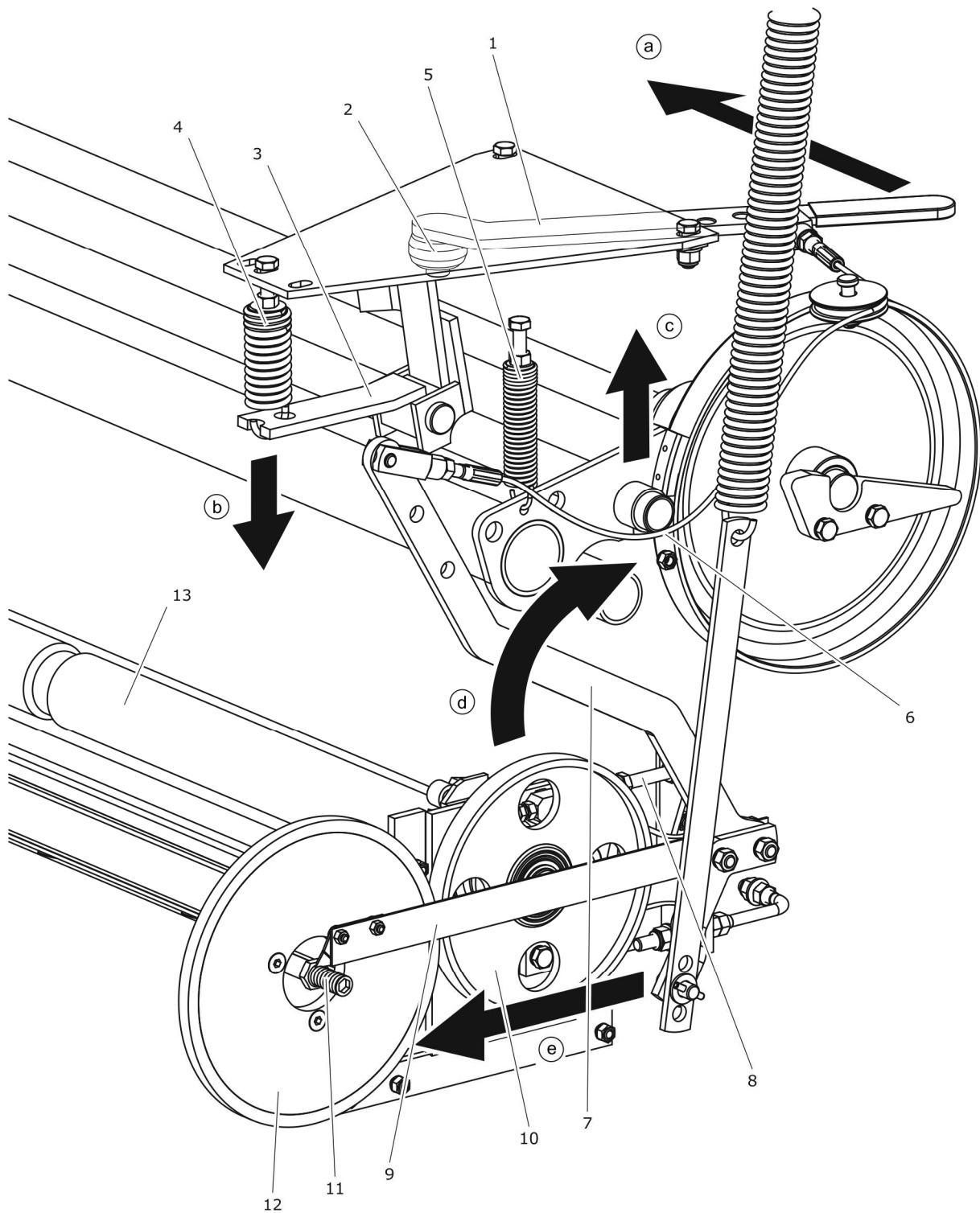
can rotate more freely. However, the net roll movement is still minimally slowed down by the auxiliary spring (5).

When control lever (1) is shifted, control cable (6) simultaneously rotates main arm (7) in direction (d). The start arm (not shown in the figure), located behind start wheel (10) and connected with main arm (7), rests on bolt (8). Consequently, the complete body (with guide rollers and cut off system) is shifted in direction (e). Elastic arm (9), located under bolt (11) before start of the system, is raised.

Drive wheel (12) starts driving the start wheel (10) as a result of the system body movement. Rubber roller (13) connected with wheel (10) makes the net unwind from the drum and shift towards the baling chamber. When the net is pulled into the chamber, the bale automatically starts unwinding the net. The baler operator can recognize this moment observing faster rotation of the net roll visible from the tractor cab. Then, the hydraulic starter cylinder should be released.

Net wrapping system body returns to its original position, the drive wheel and the start wheel uncouple. Elastic arm blade (9) falls onto bolt (11) and moves outwards along the bolt thread. Start lever (3) rotates to its original position as a result of main spring (4) action. Pressure of spring (4) makes the shock absorber arm apply a strong pressure to the brake disc. Unwound net is strongly stretched on the bale.

Having reached the end of bolt (11), the elastic arm blade falls together with the arm to the starting position. Cutting system which cuts the net moves together with the elastic arm blade. All the mechanisms are in starting position. Wrapping process is finished.

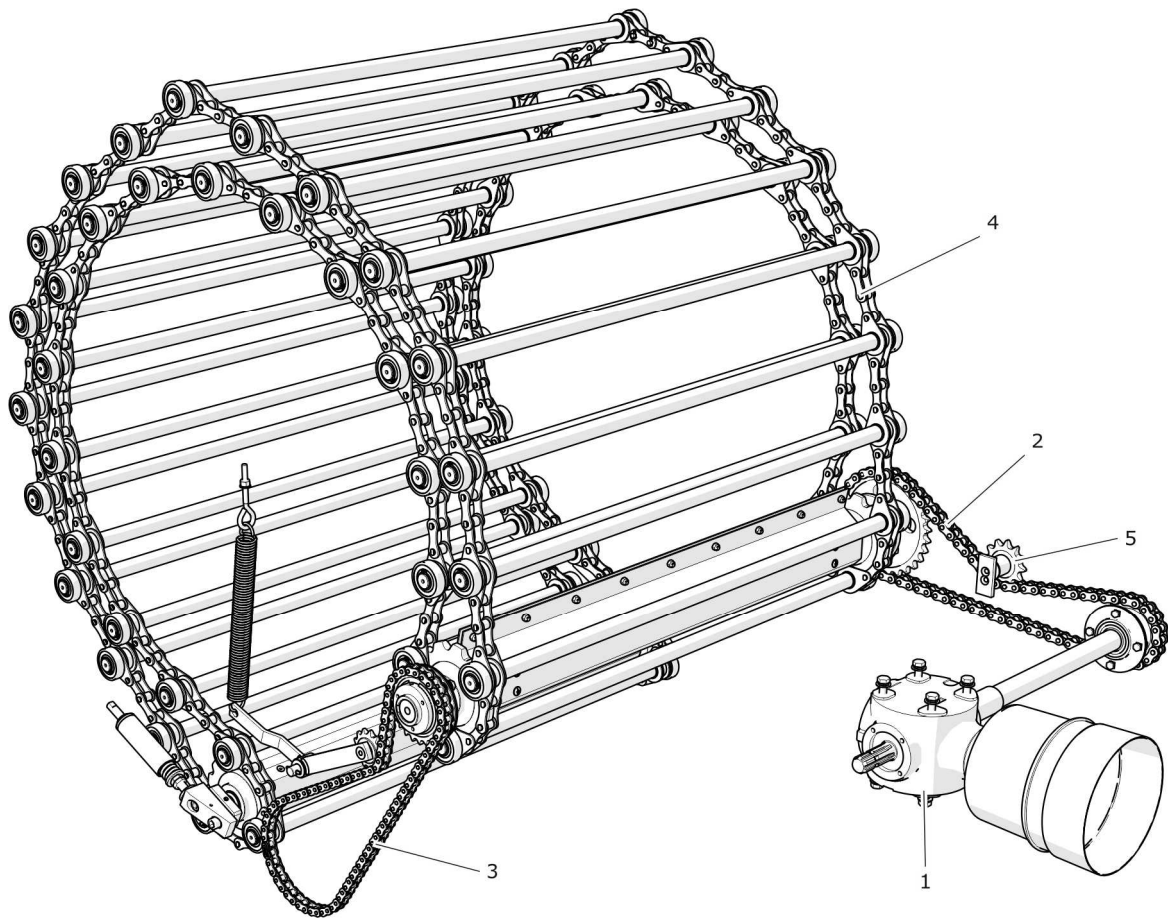


**FIGURE 3.8 Principle of operation of net wrapping system**

(1) control lever, (2) roller, (3) start lever, (4) main spring, (5) auxiliary spring, (6) control cable, (7) main arm, (8) bolt, (9) elastic arm, (10) start wheel, (11) wrapping quantity bolt, (12) drive wheel, (13) rubber roller, (a)...(e) directions of movement of elements



### 3.2.3 DRIVE TRANSMISSION



**FIGURE 3.9 Drive of rolling mechanism and pickup header**

*(1) reducer, (2) drive chain of rolling system, (3) drive chain of pickup header, (4) chain of rolling system, (5) tensioner of rolling system drive*

The round baler is designed for operation with PTO rotation speed of 540 rpm. The arrangement of drive for individual systems is shown in figure (3.9). The machine is connected to the tractor by means of PTO shaft which drives reducer (1). The drive is transmitted from the transmission to the following systems:

- wrapping system,
- rolling mechanism,
- pickup header.

### **Drive of twine wrapping system**

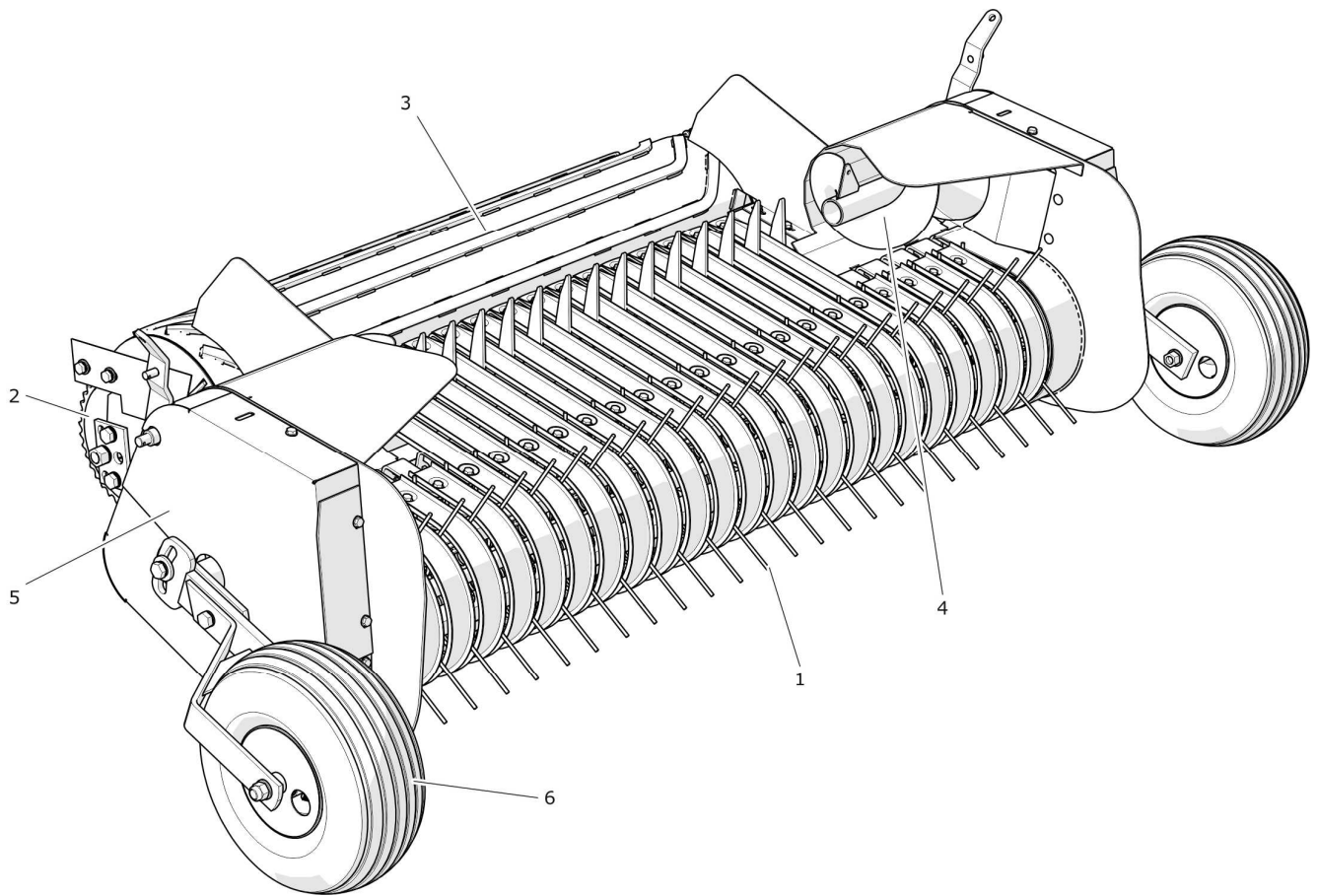
Drive is transmitted through reducer wheel (5) - see figure (3.3), which is installed on the right shaft of the intersecting axis gear. Reducer wheel transmits torque to drive wheel (11), which drives twine feeding rollers through bevel gears.

### **Drive of pickup header and rolling mechanism**

These mechanisms are driven by transmitting torque from reducer (1) – figure (3.9) and chain transmission (2) to rolling chain (4). The front shaft of rolling mechanism transmits drive to pickup header through chain (3). Chain transmissions are equipped with chain tensioning mechanisms.

#### **3.2.4 PICKUP HEADER**

Pickup header design is shown in figure (3.10). The system is installed in the lower part of the round baler. In front of the pickup header, there is pickup mechanism (1), which carries swath into the baler by means of elastic tines. The drive of the complete system is transmitted by chain transmissions. Supporting wheels (6) are mounted on brackets welded to the machine body. During normal operation of the baler, the pickup header is in contact with the ground through supporting wheels. The supporting wheels raise the mechanism on uneven terrain (ground surface tracking) in order to keep a constant distance of the pickup header from the ground. Augers (4), installed on both sides of the pickup header, move the swath towards the baler centre and form a belt of green fodder with a constant width equal to the width of the rolling chamber throat.

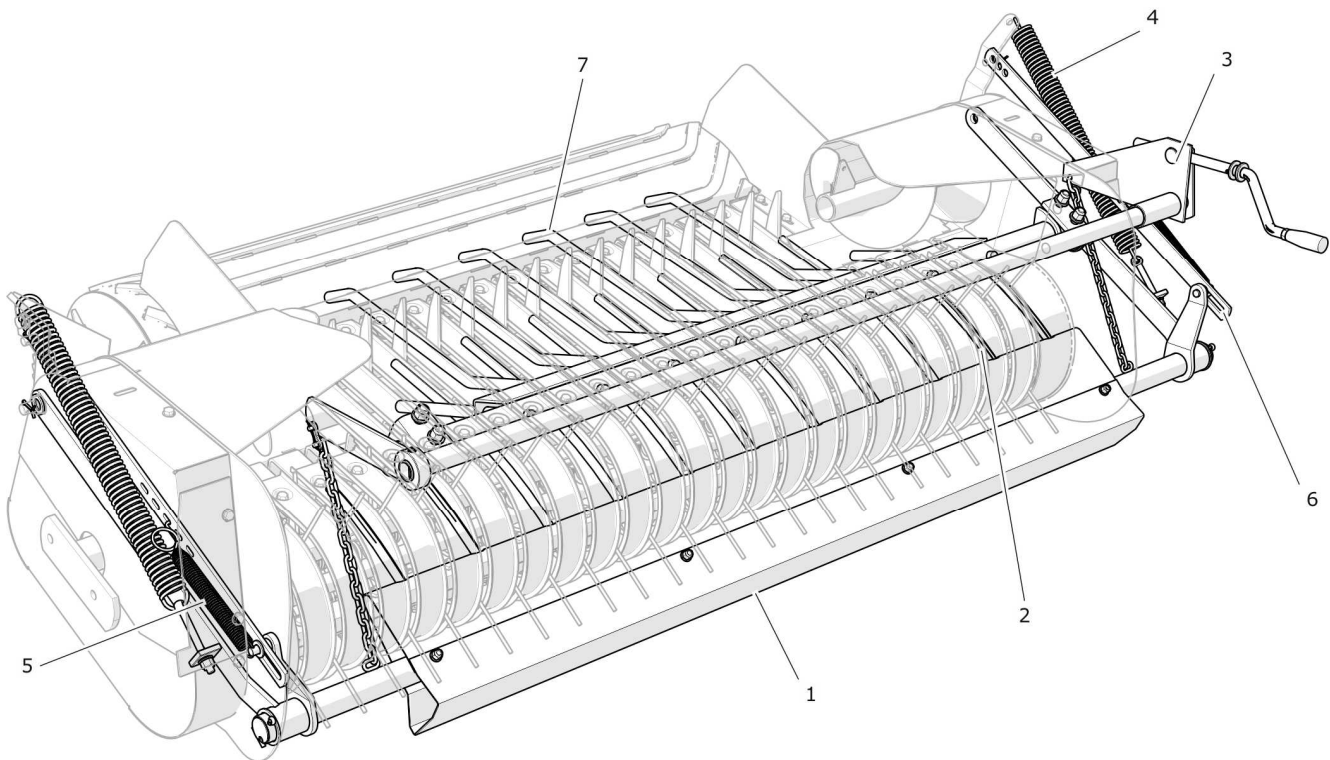


**FIGURE 3.10** Pickup header

*(1) pickup mechanism, (2) drive wheel, (3) rear drum, (4) auger, (5) transmission shield, (6) support wheel*

### 3.2.5 DOSING ELEMENTS

Pressure element with stop plate is installed in front of pickup header – figure (3.11). During the round baler operation, the stop plate (1) distributes collected swath. Picked up swath moves between the pickup header and pressure element (2), which flattens the swath to ensure its uniform thickness. Apart from levelling the swath, the pressure element shields the picked up swath. Dosing rake (7) is mounted in a self-aligning manner in the baler body, above the pickup header. During swath feeding, the rake ensures uniform distribution of the swath fed into the baling chamber.

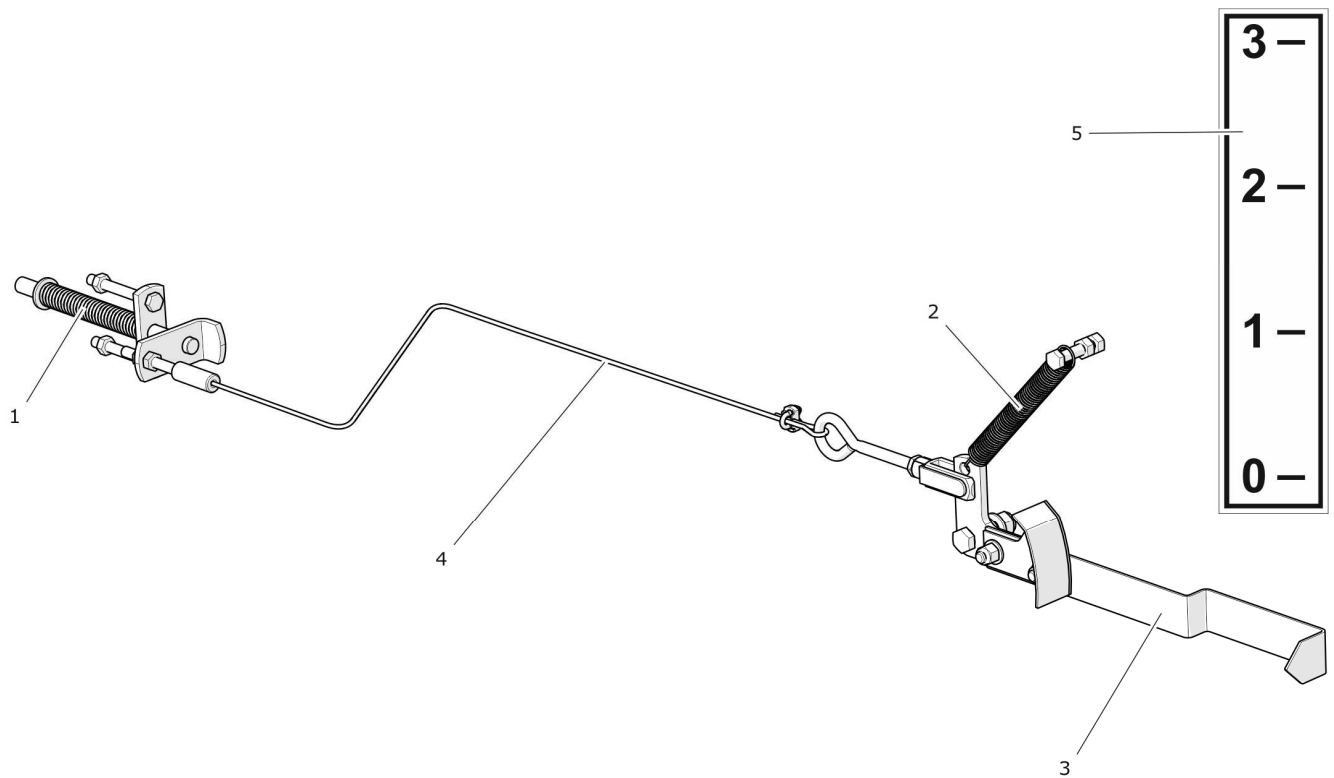


**FIGURE 3.11 Rake and pressure element**

*(1) stop plate, (2) pressure element, (3) adjusting mechanism, (4) shock absorber spring, (5) adjusting spring (6), adjusting strip, (7) dosing rake*

### **3.2.6 BALE COMPACTION INDICATOR**

The mechanism indicating the bale compaction degree is installed on both sides of the baler, on the left side and the right side of the machine body – figure (3.12). Mechanism (1) activating the whole system is bolted into the machine body channel bar. The spring of the mechanism causes tightening of steel cable (4) while raising the baling chamber flap. Cable (4), connected by means of lever, controls the movement of indicator (3), whose arrow indicates the bale compaction degree on information decal during baling. The mechanisms located on the left side and the right side operate independently. In case of uneven swath collection, the indicators on both sides will inform about unsymmetrical baling.

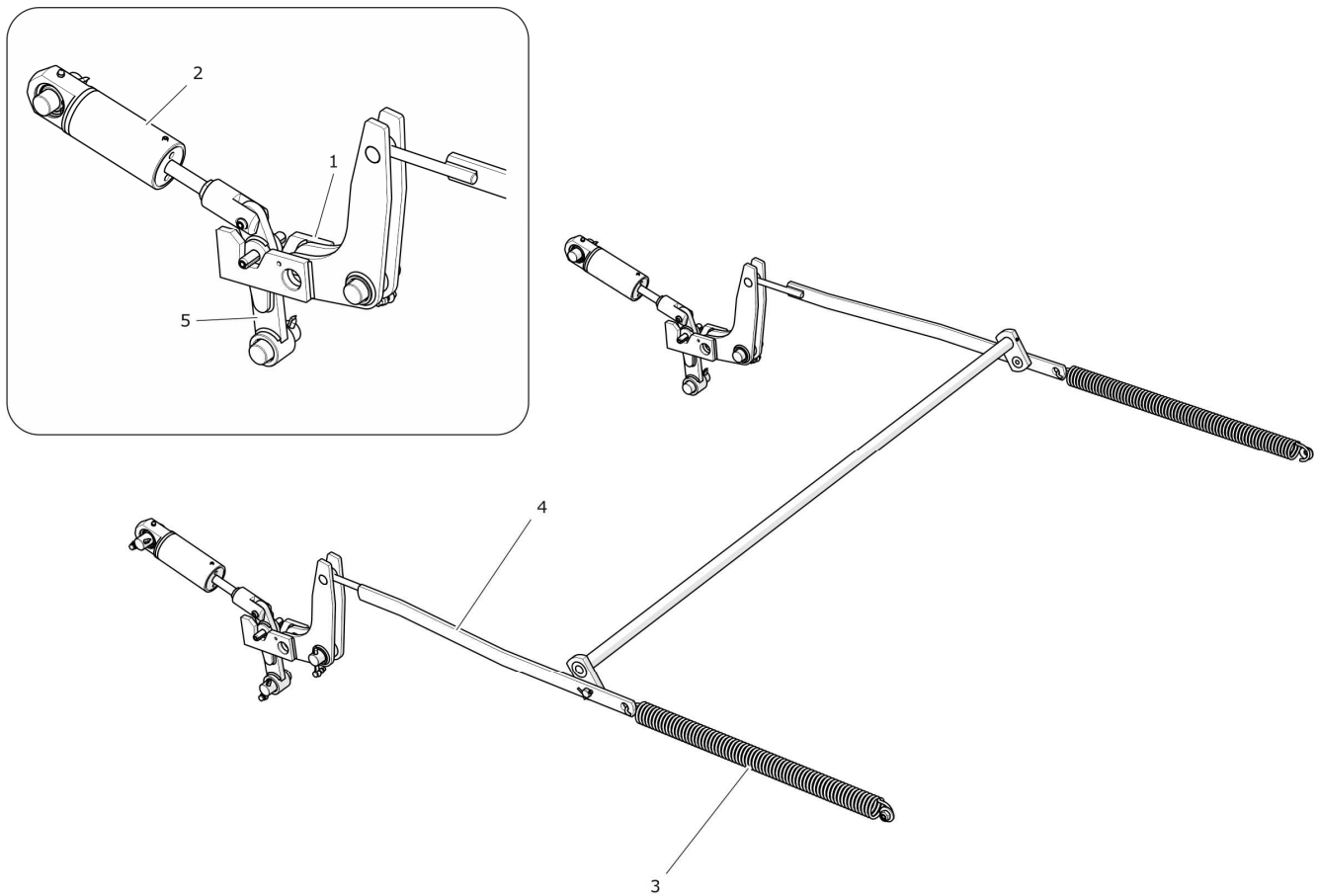


**FIGURE 3.12** Design of the mechanism of the bale compaction indicator

*(1) mechanism, (2) tension spring, (3) indicator, (4) steel cable, (5) information decal*

### 3.2.7 FLAP LOCKING MECHANISM

Flap locking mechanism is controlled by means of hydraulic single-acting cylinders. Design of the system ensures proper flap closing and pressing. In the final phase of wrapping, during baling, the system ensures correct movement of the flap resulting from increasing bale size.



**FIGURE 3.13 Design of rear flap locking system**

*(1) lock, (2) lock blocking, (3) tension spring, (4) string, (5) lock arm*

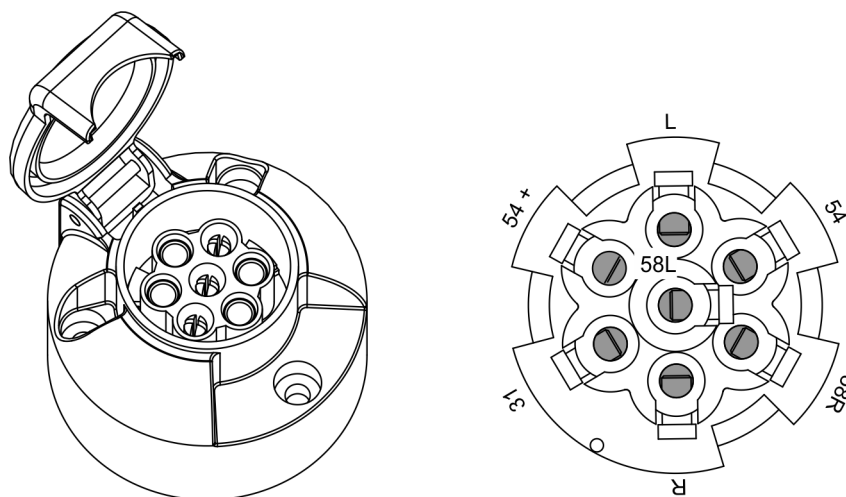
### 3.2.8 ELECTRICAL SYSTEM

The round baler electrical system is designed for supply of 12 V DC. Connection of the baler's electrical system with the tractor is made through connection lead delivered with the machine; the lead is connected to the seven-pin socket on the baler – figure (3.14).

The baler's electrical system consists of four main electrical circuits:

- control circuit – standard equipment,
- lighting circuit – standard equipment,
- signalling circuit – optional equipment,
- oil pump control circuit – optional equipment.

Control circuit, signalling circuit and oil pump control circuit are connected to the central wiring harness. Voltage is supplied to these circuits only if the tractor's parking lights are turned on.



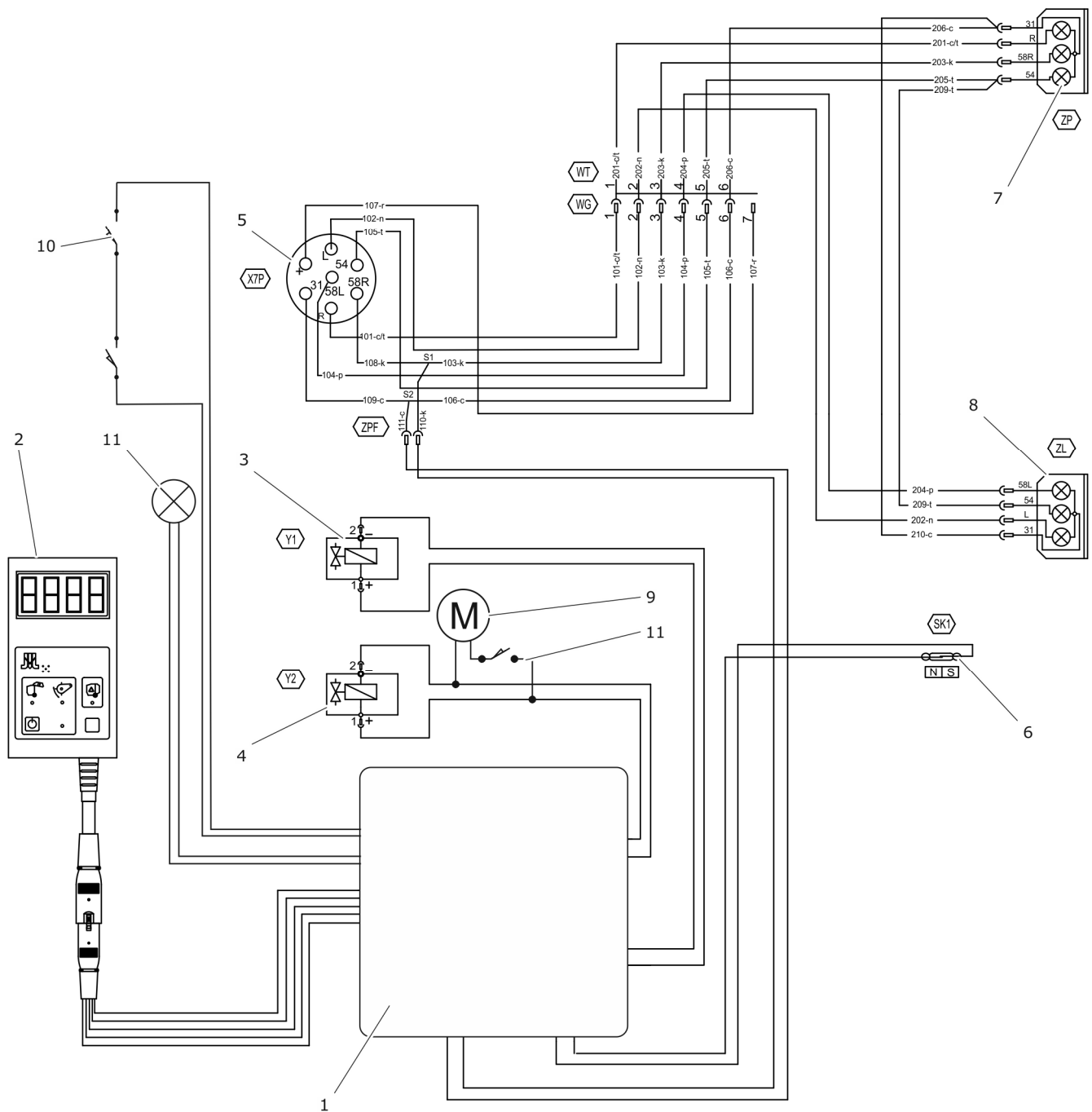
**FIGURE 3.14** Connection socket of the baler

(L) left indicator, (54+) power supply +12V, (31) ground, (R) right indicator, (58R) right parking light, (54) stop, (58L) left parking light

*View of the connection on the side on which the leads are inserted.*

**TABLE 3.2** Markings of lead colours used on diagrams

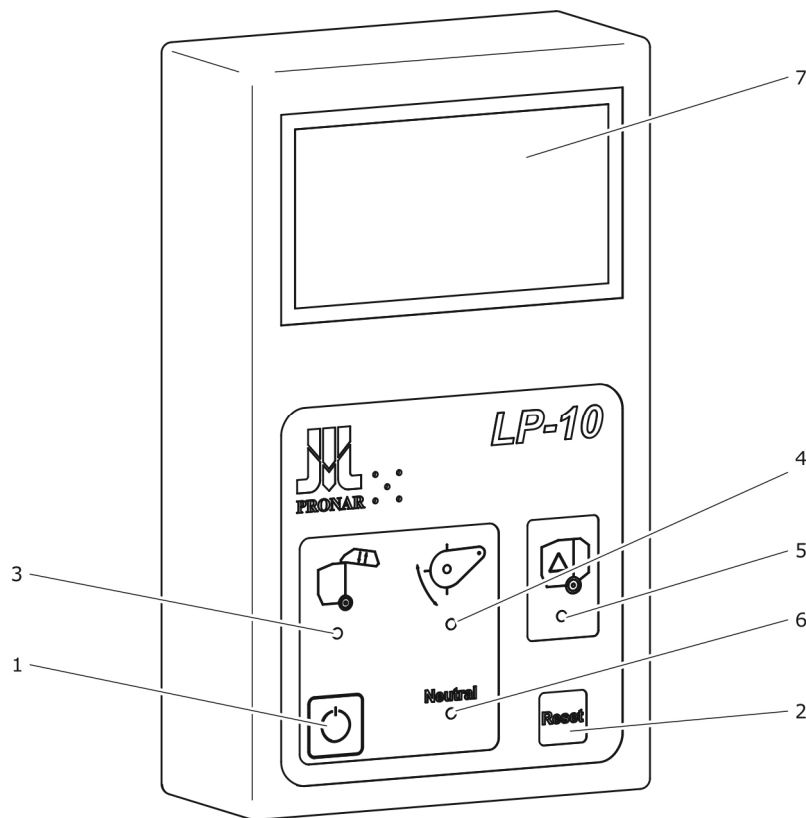
LEAD COLOUR	MARKING	LEAD COLOUR	MARKING
White	N	Brown	O
Black	B	Orange	P
Violet	C	Pink	R
Red	F	Grey	S
Lazurite	K	Green	T
Blue	L	Yellow	Z



**FIGURE 3.15 Electrical system diagram**

(1) counter adapter, (2) LP-10 counter, (3) solenoid valve of pickup header, (4) solenoid valve of baling chamber, (5) seven-pin socket, (6) reed relay sensor, (7) rear right lamp assembly, (8) rear left lamp assembly, (9) oil pump drive motor, (10) limit switch, (11) signalling beacon light





**FIGURE 3.16 LP-10 controller**

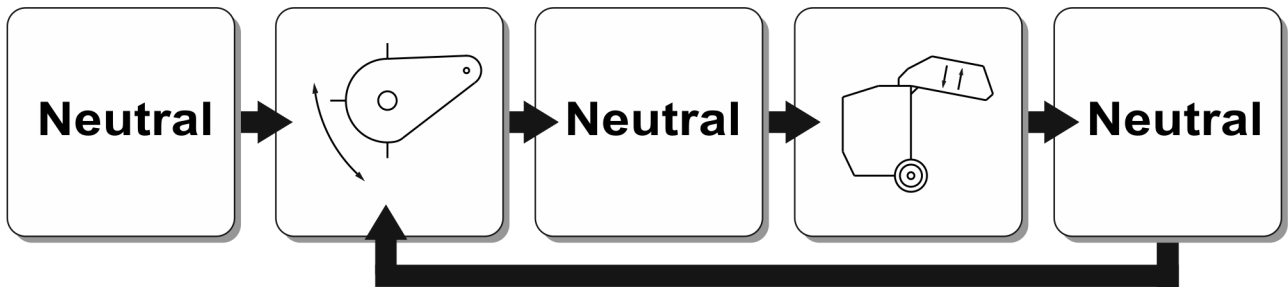
(1) switch / sequence switch, (2) RESET push-button, (3) supply indicator of solenoid valve of baling chamber, (4) supply indicator of solenoid valve of pickup header, (5) chamber overload indicator, (6) neutral position, (7) display

The controller is an electronic device designed for controlling the round baler operation. The controller is designed for counting bales, switching operation mode and indicating actual operating status of the round baler:

- activated chamber opening circuit – green diode (3) – figure (3.16),
- activated pickup header rising circuit – green diode (4),
- chamber overload indicator – red diode (5),
- neutral position – yellow diode (6).

The controller is equipped with two control push-buttons:

- RESET push-button (2) – resetting (zeroing) of daily counter,
- ON/OFF push-button (1) – activation of solenoid valves.



**FIGURE 3.17 Sequence of controller working mode**

If the tractor's parking lights are turned on, the controller shows *NEUTRAL* position, which means that no subassembly of the round baler can be controlled. If *ON/OFF* push-button is pressed once, the pickup header control mode is activated. The complete sequence is shown in figure (3.17).



**TIP**

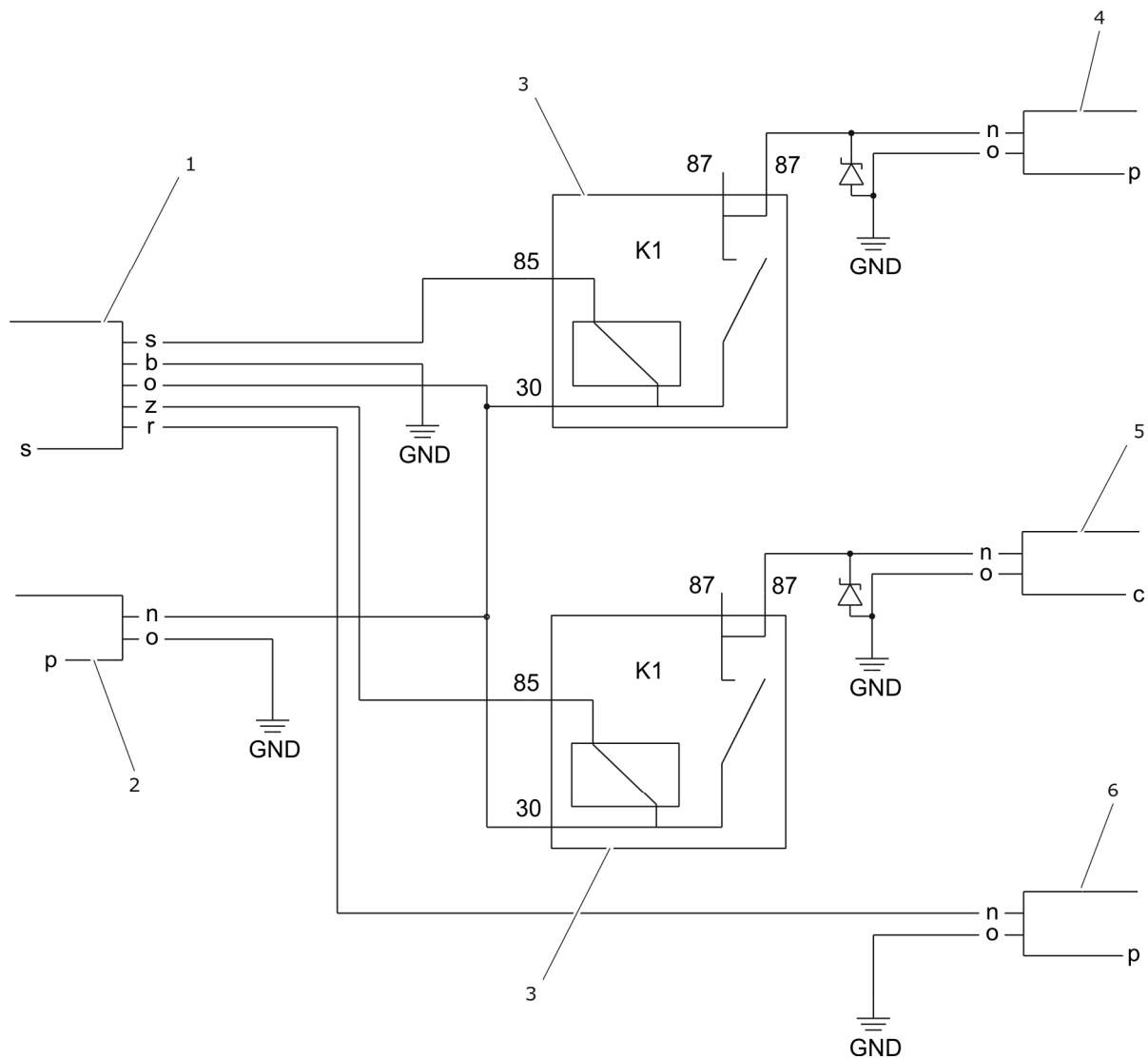
The controller starts automatically if the tractor's parking lights are turned on. Energized controller indicates *NEUTRAL* position.

**Oil pump power supply circuit**

If the round baler is equipped with automatic lubrication system, an additional circuit for controlling the electric motor of oil pump is connected to the circuit adapter. The motor starts automatically when the rear flap is open. The motor is not started when the controller is switched to the rear flap opening position.

**Signalling circuit**

Signalling circuit informs the baler operator about completion of baling process. This circuit is installed as optional equipment. Signalling is performed by activating the beacon light (11) – figure (3.15) and acoustic signal in LP-10 controller.



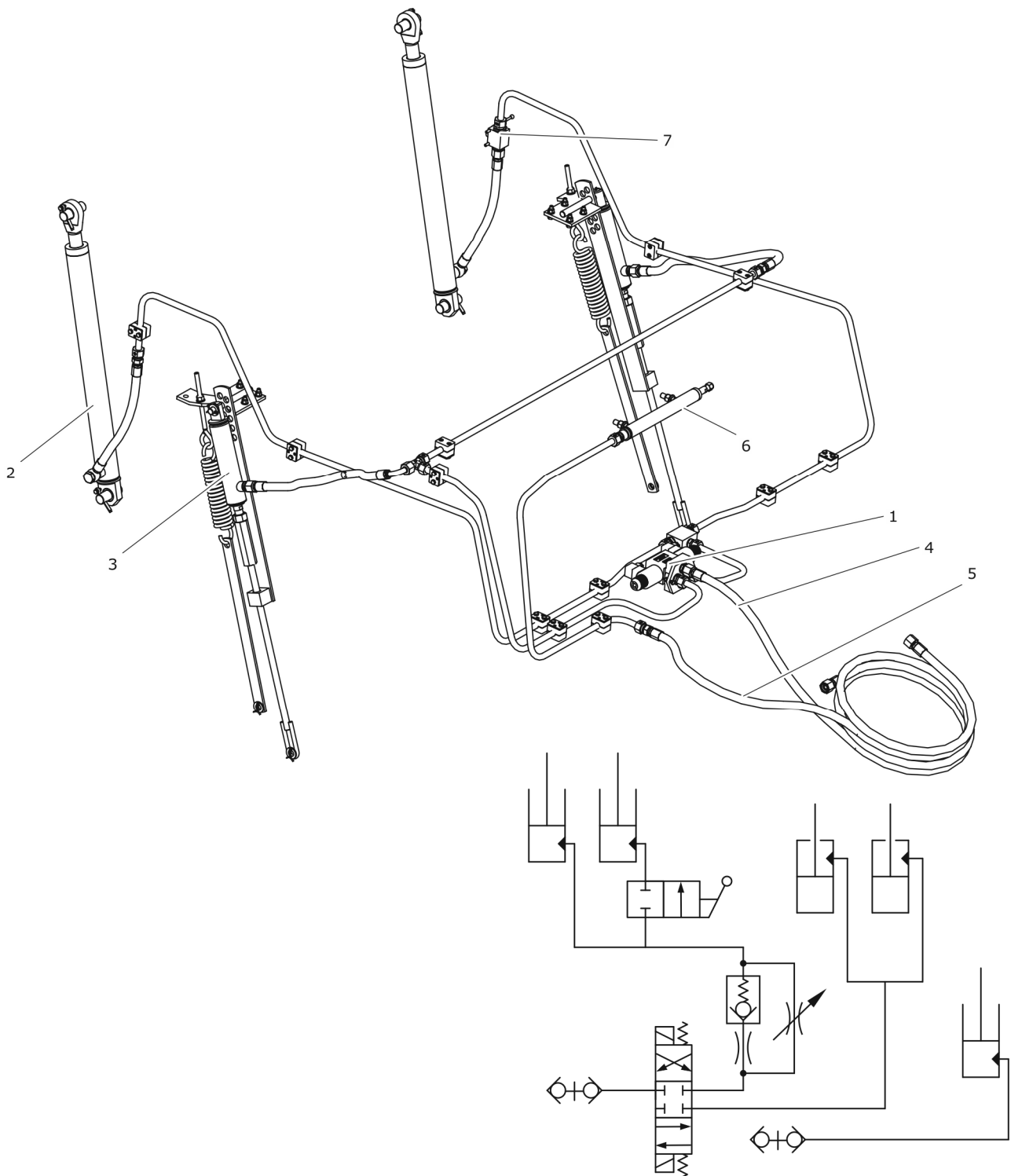
**FIGURE 3.18** Diagram of controller's relay box (standard version)

(1) counter, (2) 12V power supply, (3) 542 - 12V/30A relay, (4) solenoid valve of pickup header, (5) solenoid valve of baling chamber, (6) baling chamber opening sensor

### 3.2.9 HYDRAULIC SYSTEM

Hydraulic system consists of two separate circuits:

- circuit controlling operation of cylinders (2) and (3) – figure (3.19),
- circuit controlling hydraulic starter – cylinder (6).

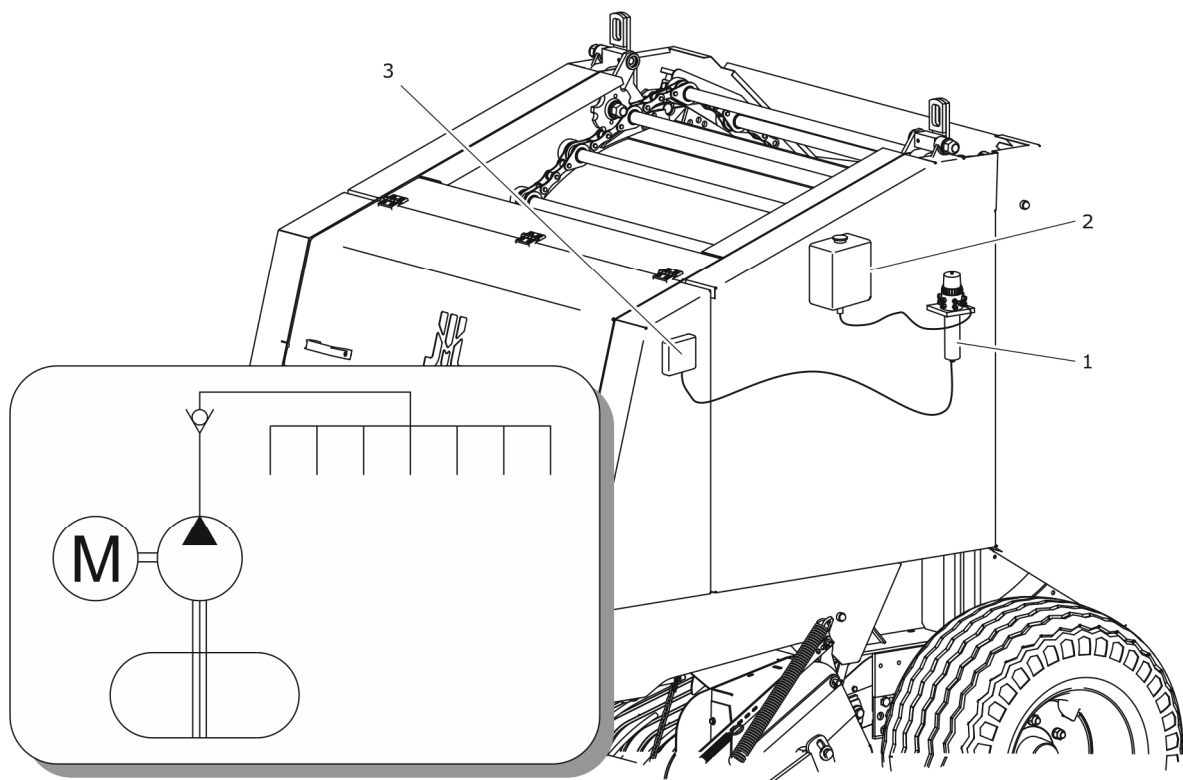


**FIGURE 3.19 Design and diagram of hydraulic system**

(1) electro-hydraulic distributor, (2) flap rising cylinder, (3) pickup header rising cylinder, (4) cylinder control supply conduit, (5) hydraulic starter control supply conduit, (6) hydraulic starter, (7) cut-off valve

Operation mode of flap rising cylinders (2) or pickup header rising cylinders (3) is set in the operator's cab by means of LP-10 controller, which switches power supply of solenoid valves of distributor (1). Cut-off valve (7) closes supply of hydraulic oil to flap cylinders. The valve is used during work which requires raising the baling chamber flap and it protects the flap from dropping. Design and diagram of the hydraulic system is shown in figure (3.19).

### 3.2.10 AUTOMATIC LUBRICATION SYSTEM



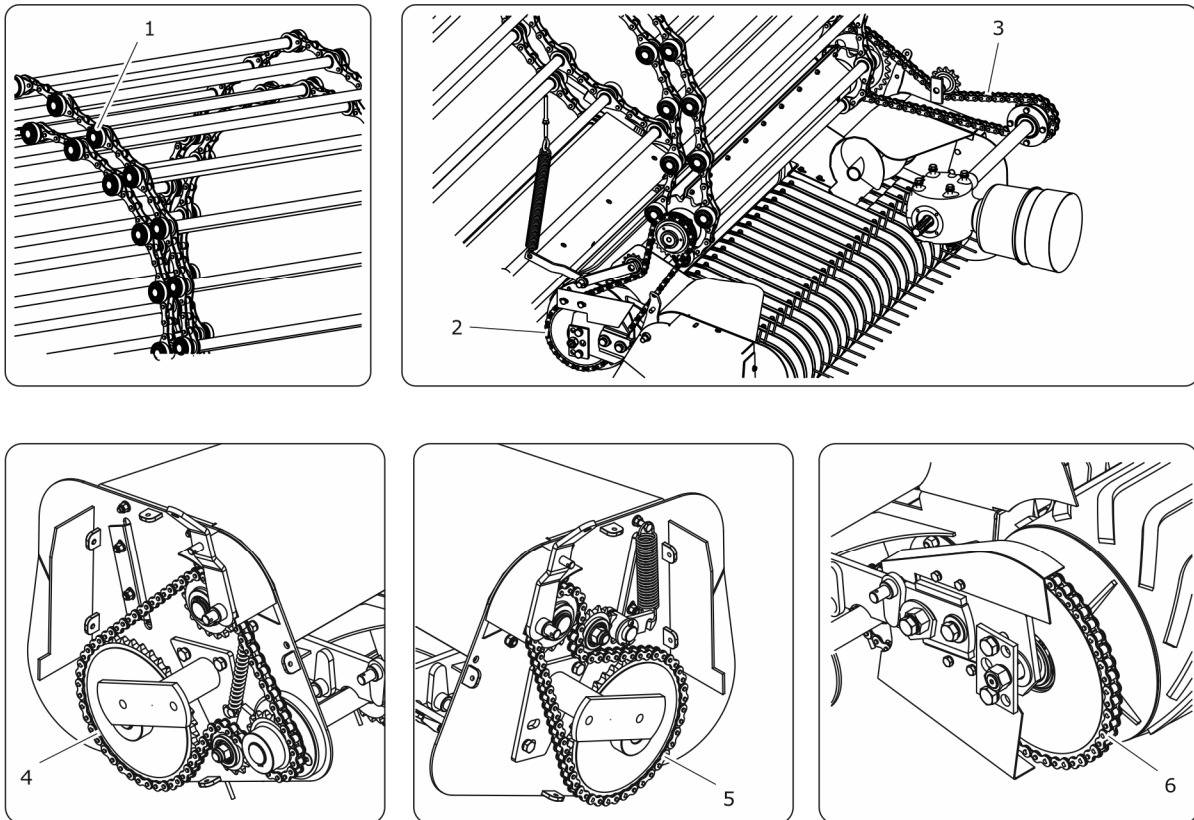
**FIGURE 3.20** Design and diagram of automatic lubrication system

(1) lubricating pump, (2) oil tank, (3) adapter

Automatic lubrication system is an additional equipment of the round baler. Lubricating pump (1) – figure (3.20), and oil tank (2) are installed on the left wall of the baler body, under side shields. Oil tank with capacity of 2 litres is installed above the pump. The system operation is controlled automatically. When raising the rear flap, the pump supply circuit is closed and the system starts working.

The pump supplies oil through conduits to the following lubrication points on the round baler:

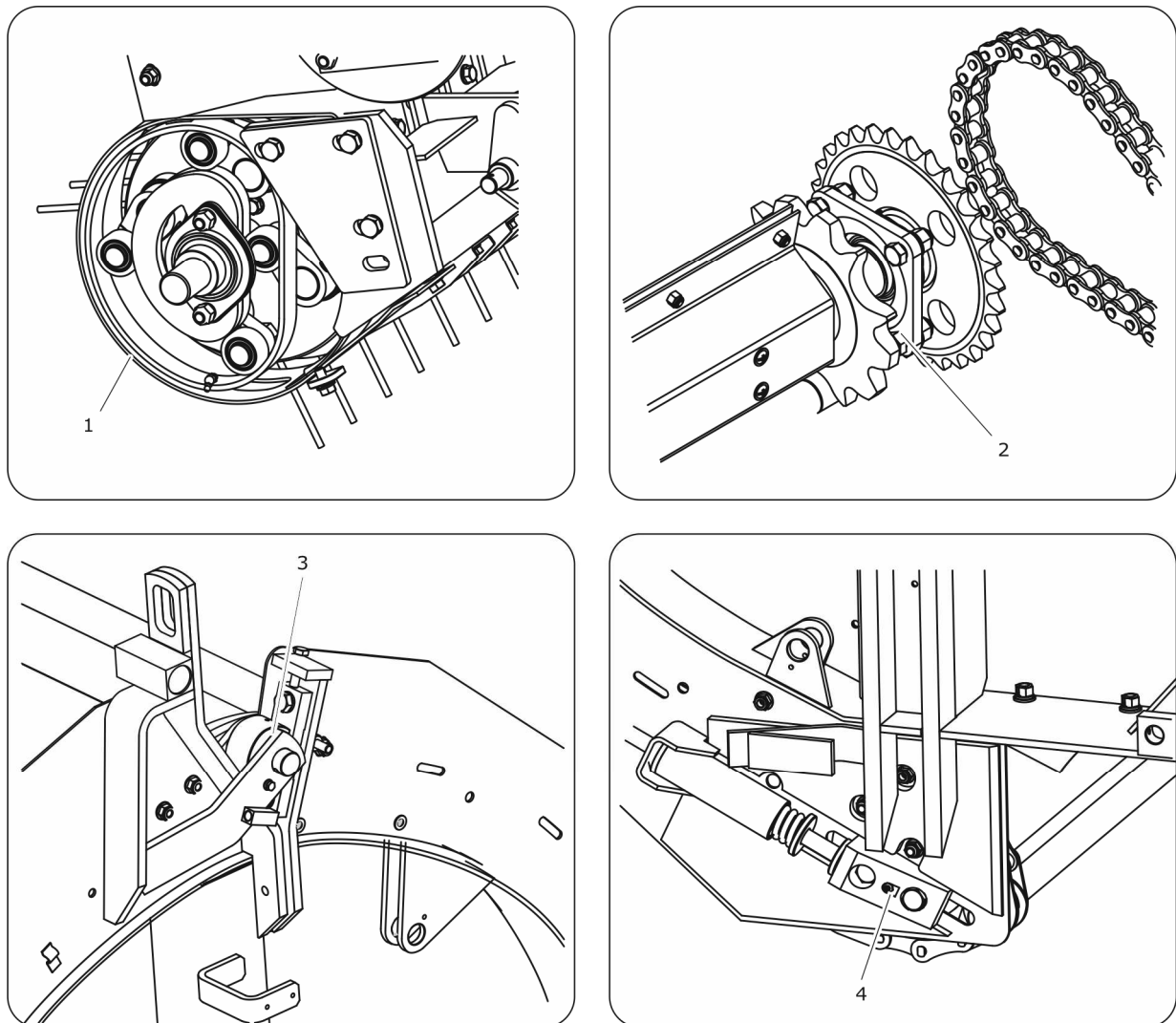
- left and right rolling chain (1) – figure (3.21),
- pickup header drive chain (2),
- main drive chain (3),
- left auger and collector (4) drive chain,
- right auger drive chain (5),
- pickup header drum drive chain (6).



**FIGURE 3.21** Lubrication oil supply points

(1) left and right rolling chain, (2) pickup header drive chain, (3) main drive chain, (4) left auger and collector drive chain, (5) right auger drive chain, (6) pickup header drum drive chain

### 3.2.11 CENTRAL LUBRICATION SYSTEM



**FIGURE 3.22 Grease supply points**

(1) cam guides, (2) main bearing of drive shaft, (3) bearings of baling chamber flap, (4) bracket of springs of tensioning unit of drive system

Central lubrication system is designed for lubricating the most important bearings of the drive system with grease. Blocks with grease nipples are located on the strengthening profile on the left side of the baler body, under side shields.

Grease supplied through conduits lubricates the following subassemblies of the round baler:

- cam guides in pickup header (1) – figure (3.22),
- main bearing of drive shaft (on the side of drive chain), (2).
- bearings of baling chamber flap (3),
- bearings of rolling chain tensioner (4),



*SECTION*

**4**

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**CORRECT  
USE**

## 4.1 HAND-OVER

### 4.1.1 HAND-OVER AND INSPECTION OF THE MACHINE AFTER DELIVERY

The manufacturer guarantees that PRONAR Z500K round baler is fully operational and has been checked according to quality control procedures and is ready for use. When selling the machine, the seller is obliged to train the user in the scope of safe use principles, operation principles, correct adjustment and coupling the machine with tractor as well as other required activities. The complete scope of the seller's duties connected with the machine hand-over is detailed in the form entitled *HAND-OVER PROTOCOL FOR Z500K ROUND BALER*, at the end of this publication. The protocol is made in three copies. The seller is obliged to send *COPY A* to the machine Manufacturer. *COPY B* is for the seller of the round baler and *COPY C* is for the user (owner of the round baler).

#### NOTE



The seller is obliged to conduct the first start up of the round baler in the presence of the user.

The user trained by the seller is not released from the obligation to read this operator's manual carefully.

## 4.2 GENERAL INFORMATION CONCERNING SWATH COLLECTION

The most efficient baling is obtained when the swath width is approximately equal to the pickup header width or slightly smaller than the half of the pickup header width. If the swath width is uneven or excessive, the round baler will form barrel shaped bales (with high density of baled material in the middle and smaller density on the sides of the bale) or bales in the shape of a truncated cone (one side with higher density of collected swath, the other side with lower density). Wrong preparation of swath may lead to frequent clogging of pickup header, problems during wrapping with twine or net or other malfunctions during round baler operation.

The swath should be prepared using mowers, mowers with swath conditioner and rotary rake-tedders.

The height of stalks of crops to be baled should be as high as possible. This makes baling easier and bales are evenly formed and have similar density throughout the bale volume. In case of some plants, especially low and small ones, disintegration of swath is unfavourable for quality of fodder. Intensive disintegration is recommended for plants with large leaves, such as reed or maize. Depending on use of bales, follow the fodder making technology ensuring proper humidity and degree of disintegration of swath.

## 4.3 PREPARING ROUND BALER FOR WORK

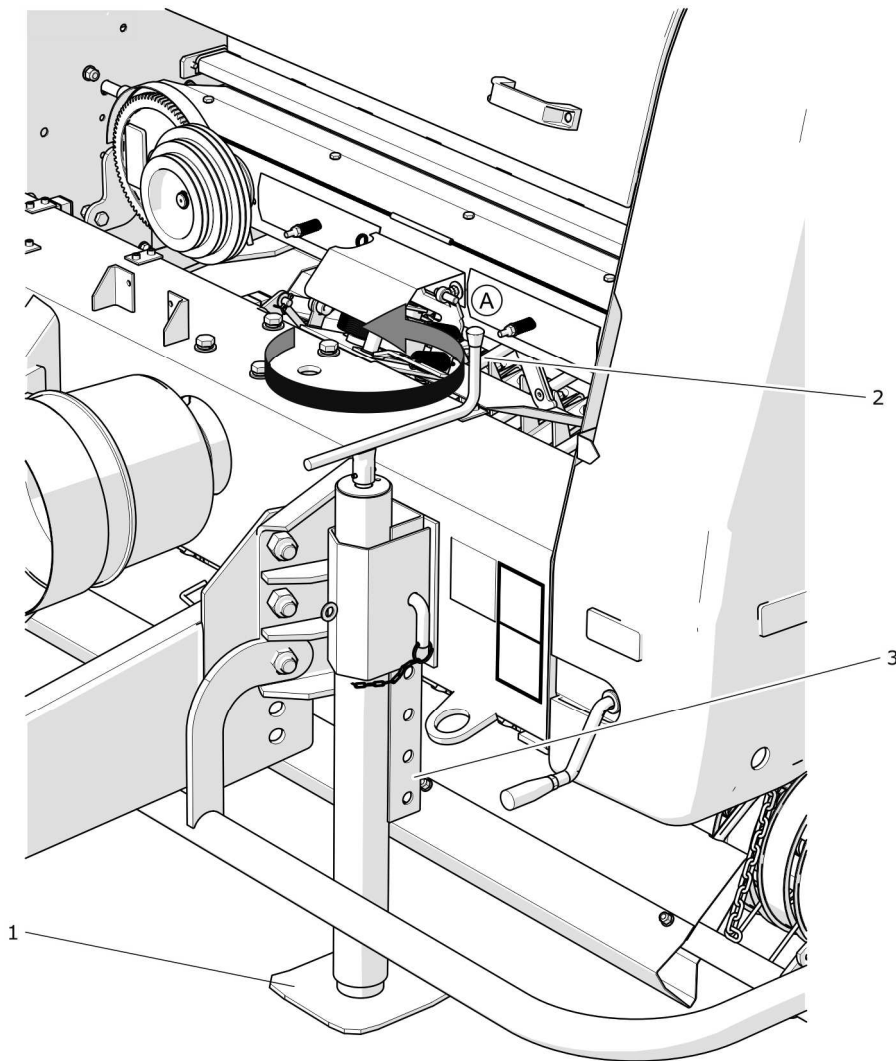
When preparing the round baler for operation check the following:

- tyre pressure,
- tightening of nuts fixing the wheels,
- tightening of drawbar and other bolt and nut connections,
- technical condition of lights and indicators,
- correctness of operation and technical condition of hydraulic system and locking system,
- technical condition and completeness of safety guards,
- technical condition of PTO shaft, its shields and securing chains,
- fixing of reel teeth,
- lubricate elements according to the guidelines presented in section „LUBRICATION POINTS ON THE ROUND BALER“.

## 4.4 HITCHING AND UNHITCHING THE BALER

Ensure that hydraulic and electric connections and the hitch of agricultural tractor are according to the Manufacturer's requirements, if not the baler should not be hitched to the tractor. In order to hitch the round baler to the tractor perform the steps below in the sequence presented.

### Hitching to tractor

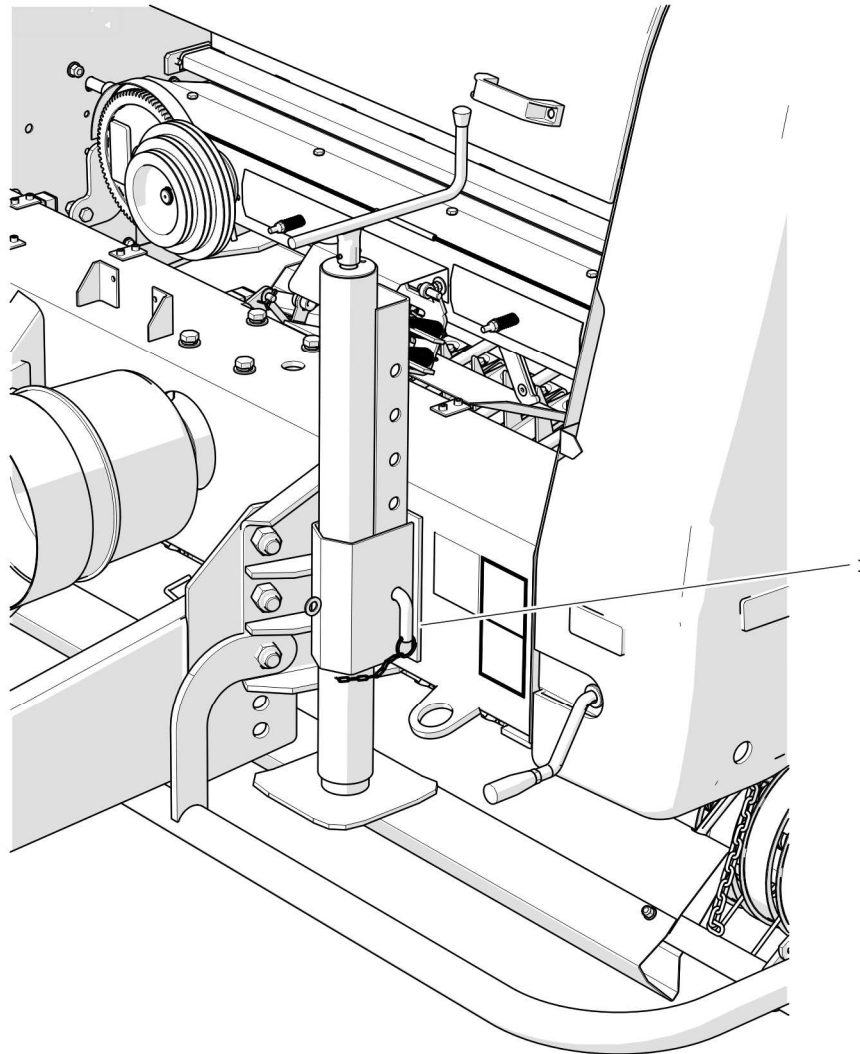


**FIGURE 4.1 Support of round baler in parking position**

*(1) support foot, (2) crank, (3) securing cotter pin, (A) crank rotation direction while lowering the support foot*

- Position agricultural tractor directly in front of baler's drawbar eye.
- Turn the crank in direction (A) – figure (4.1), to slide out the support foot and position drawbar eye at the correct height.
- While reversing the tractor, connect the drawbar eye to the tractor's upper or lower transport hitch, check if the connection is correct and secured.
  - ⇒ Connection of the baler's drawbar eye depends on the tractor hitch and round baler configuration.
- Place electronic controller in the operator's cab.

- ⇒ Attach the controller to the cab window with the aid of a rubber suction in such a place as to ensure easy operation and good visibility of the controller.
- ➔ Turn off tractor engine. Ensure that unauthorised persons do not have access to the tractor cab.



**FIGURE 4.2** Parking support in transport position

*(1) - securing cotter pin*

- ➔ Connect hydraulic conduits to the tractor.
- ➔ Connect electrical leads to the tractor.
- ➔ Connect PTO shaft and secure its shields.
- ➔ Raise the support foot using the crank.

- ➔ Unlock cotter pin (1) – figure (4.2), move the support to the highest possible position – transport position.
- ➔ Check and, if necessary, protect electrical leads and hydraulic conduits against rubbing or other mechanical damage.
- ➔ Just before driving off, remove chocks from under the machine's wheels and place them in their designated holders.

### ATTENTION



Do NOT travel on public roads with machine which has unreliable lighting system or signalling system.

Do NOT use the round baler with leaky hydraulic system.

When turning, hydraulic conduits and electric leads must hang loosely and not become tangled with moving elements of the round baler and tractor.

During travel and operation of the round baler, the support must be in transport position.

If the agricultural tractor is equipped with an automatic coupler, ensure that the hitching operation is completed and that drawbar eye is secured.

Adjust the height of the drawbar to the tractor hitch before hitching the round baler to the tractor for the first time. Correctly positioned round baler should be in horizontal position. The machine may be slightly tilted forwards. Drawbar position is described in section 5.

### DANGER



When hitching, there must be nobody between the round baler and the tractor. When hitching the machine, tractor driver must exercise caution and make sure that nobody is present in the hazard zone.

When connecting the hydraulic conduits to the tractor, make sure that the hydraulic systems of the tractor and round baler are not under pressure.

Ensure sufficient visibility during hitching.

Exercise particular caution during support operation - danger of severing limbs.

After completion of hitching check the security of the hitching pin.

Before starting work, connect the electric lead between the baler and the controller. When connecting the lead to the controller care should be taken not to expose it to accidental mechanical damage. A frequent accident is driving over the lead with a tractor wheel, which

severs the lead from the housing and destroys it permanently. Care should also be taken to ensure that the lead pulled by the tractor wheel (or in any other manner) does not cause the controller to fall from the tractor onto the ground.

**TIP**

Correct drawbar position must be described in detail by the seller when handing over the baler to the buyer.

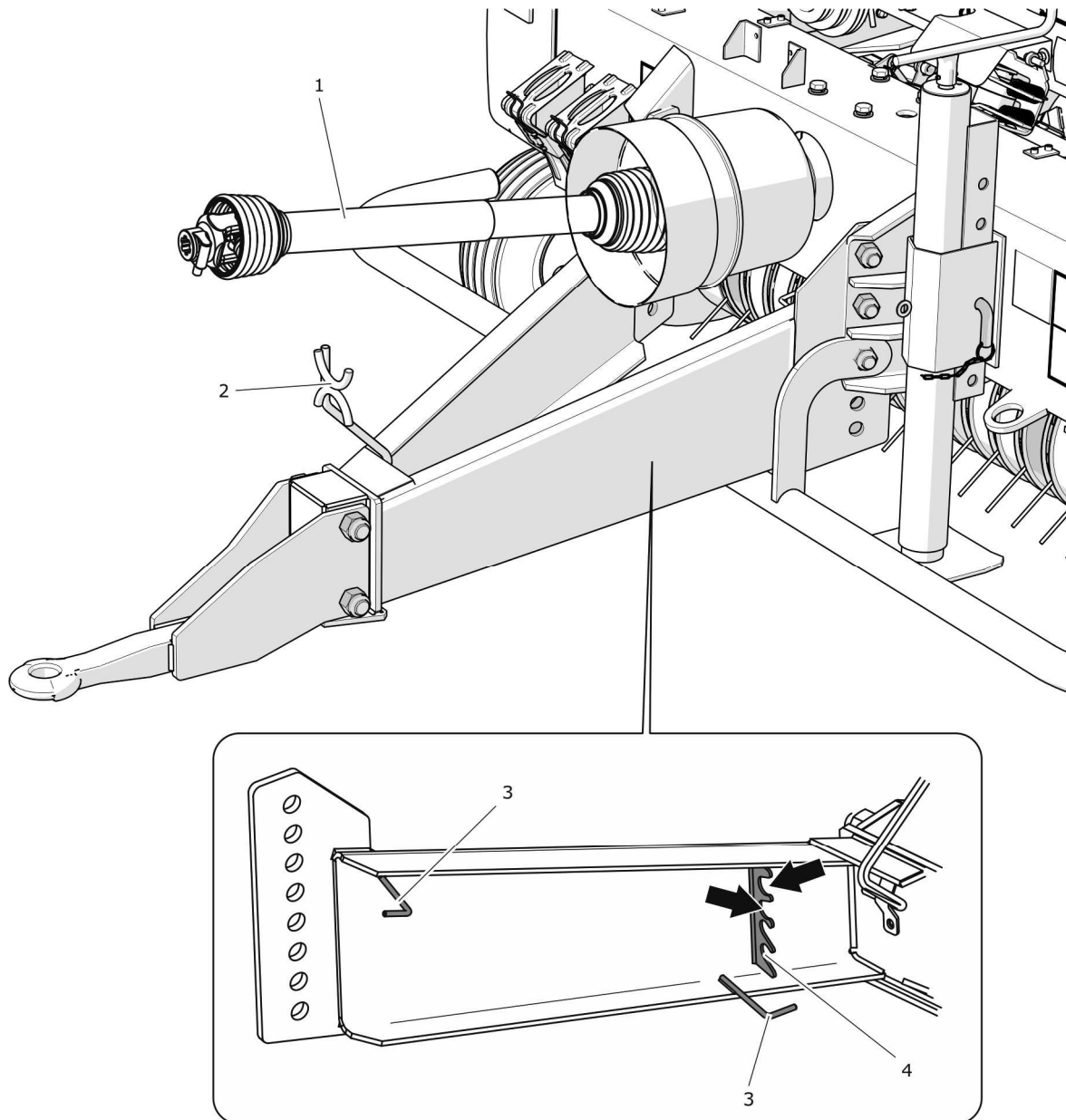
**ATTENTION**

The controller may be permanently damaged if it falls down from even a low height onto a hard surface.

**Unhitching the baler**

In order to disconnect the baler from the tractor follow these steps.

- ➔ Immobilise tractor with parking brake, turn off tractor engine
- ➔ Place chocks under the baler's wheels in order to prevent the machine from rolling.
- ➔ Disconnect the lead from the controller.
- ➔ Ensure that unauthorised persons do not have access to the tractor cab.
- ➔ Take out cotter pin securing the support and set the support in a selected parking position. Install the cotter pin and check the protection.
- ➔ Turn the crank to lower the support foot.
  - ⇒ Set the drawbar eye at such a height that one may safely unlock and unhitch the round baler.



**FIGURE 4.3 PTO shaft bracket**

(1) PTO shaft, (2) shaft bracket, (3) conduit holder, (4) quick coupler holder

- Disconnect PTO shaft from tractor.
  - ⇒ Place PTO shaft in designated holder (2) - figure (4.3).
- Disconnect all hydraulic system conduits from tractor.
  - ⇒ Protect conduit ends with covers.
  - ⇒ Wrap conduits around holders (3) and place quick couplers in two upper sockets of the holder (4) – marked with arrows.



- ➔ Disconnect electric lead.
- ➔ Release tractor hitch, disconnect baler drawbar eye from tractor hitch.

## **DANGER**



Exercise caution when disconnecting round baler from the tractor. Ensure good visibility. Unless it is necessary, do not go between tractor and machine.

Before disconnecting conduits and drawbar eye, close tractor cab and secure it against access by unauthorised persons. Turn off tractor engine.

Do NOT unhitch the round baler with a bale inside the baling chamber.

## **4.5 INSTALLING THE WRAPPING TWINE**

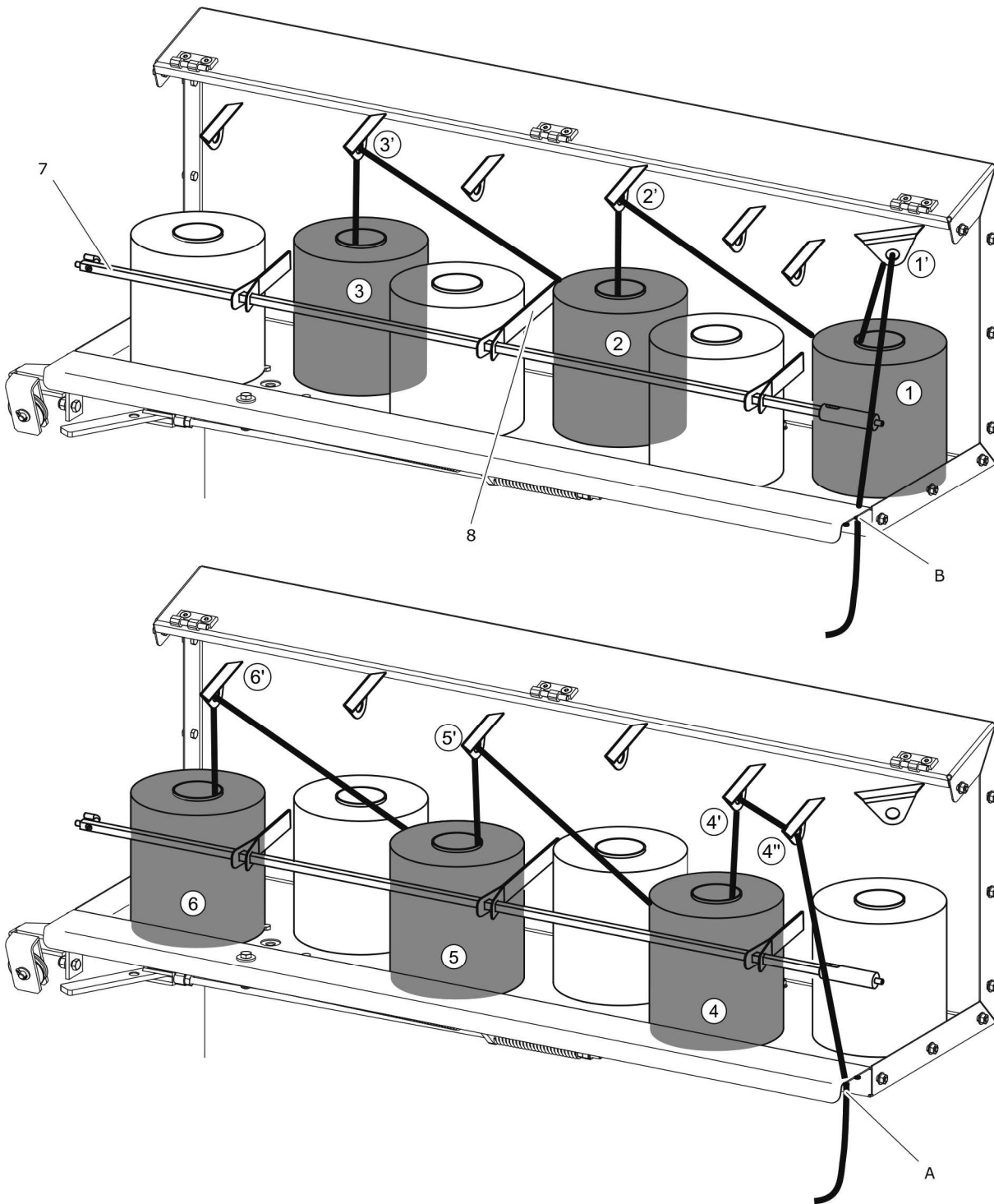
### **4.5.1 SETTING OF THE TWINE WRAPPING SYSTEM**

After a longer standstill of the round baler or after its overhauls, check the setting of the wrapping system before starting the baler. To do this, check the position in which the twine guides were stopped. When the drive wheel is turned clockwise, the drive chain makes the guides move in their normal working direction. The guides should be positioned as close as possible to the centre of the wrapping system, just behind the cut off knives. In this position, during normal operation of the round baler, the twine is cut off and the wrapping process is finished.

### **4.5.2 INSTALLING THE TWINE**

Open the cover, clean the container and place six twine reels in the twine container according to the arrangement shown in figure (4.4). In order to protect the reels from relocation and upsetting, set arms (8) of setter (7) in a manner shown in the figure. Individual reels should be bound and threaded in the sequence given below:

- ➔ Thread the internal end of reel (1) through guides (1') and hole (B) in the bottom of the container – figure (4.4).
  - ⇒ Guiding hole (B) is located closer to the rear wall of the twine container than hole (A).
- ➔ Thread the internal end of reel (2) through guide (2') and connect with the external end of reel (1).

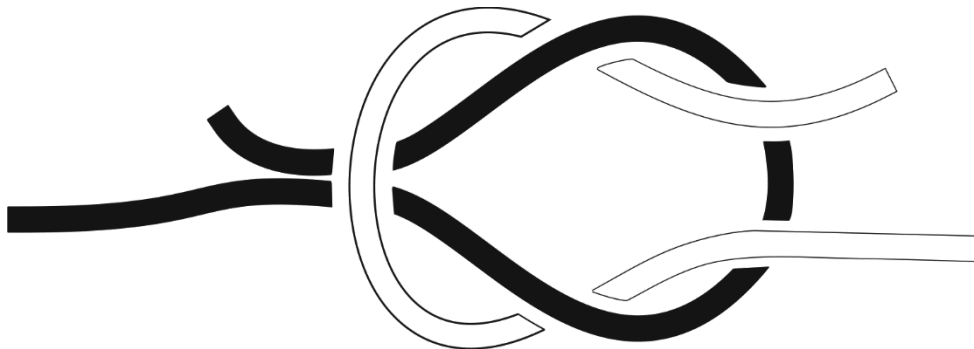


**FIGURE 4.4 Guiding the twine in the container**

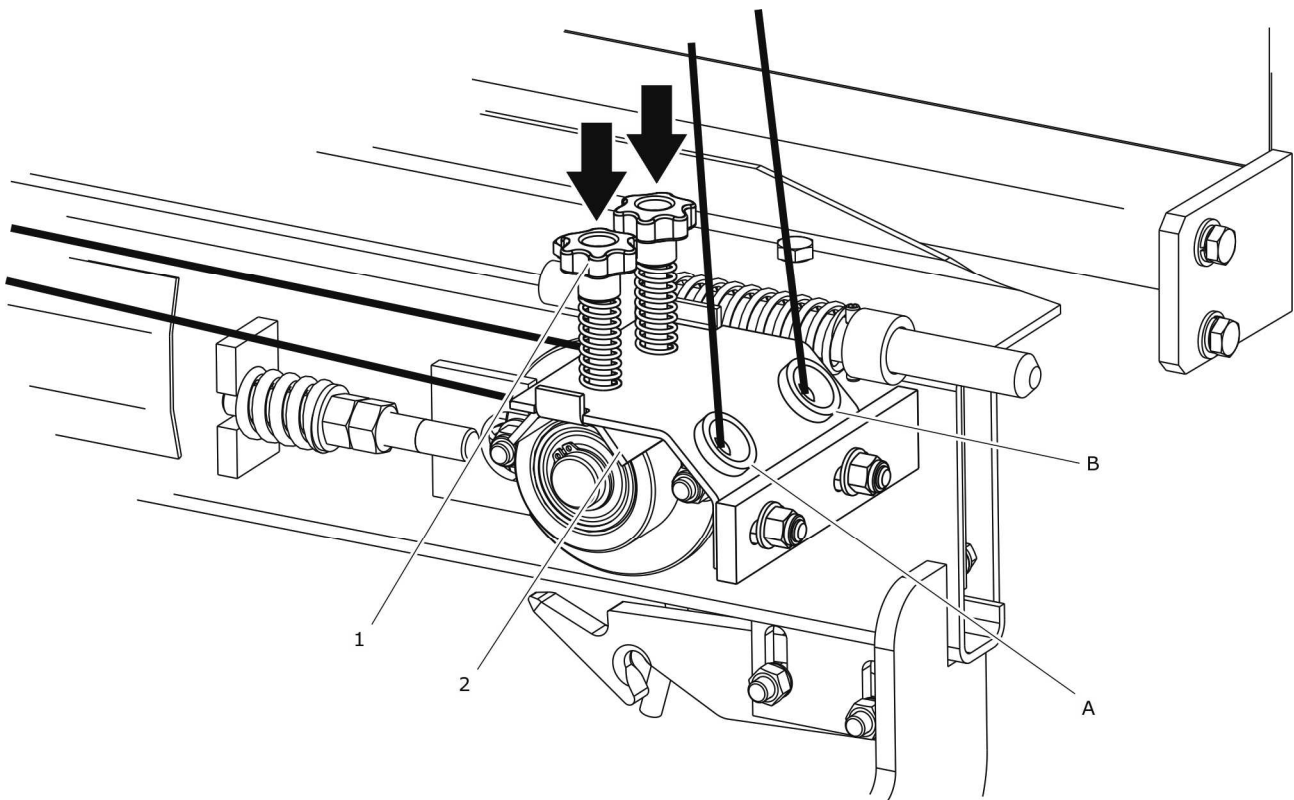
(1) - (3) internal row of twine reels, (4) - (6) external row of twine reels, (7) reel setter, (8) setter arms, (1') – (6') guides welded to the container flap, (A) - (B) twine guiding holes in the container bottom

- ➔ Thread the internal end of reel (3) through guide (3') and connect with the external end of reel (2).
- ➔ Thread the internal end of reel (4) through guides (4') and (4'') and hole (B) in the bottom of the container.
  - ⇒ Guiding hole (A) is located closer to the front edge of the container.
- ➔ Thread the internal end of reel (5) through guide (5') and connect with the external end of reel (4).
- ➔ Thread the internal end of reel (6) through guide (6') and connect with the external end of reel (5).

Bind the twine ends using a flat knot in such a manner as to maximally reduce the knot size. Cut out protruding ends of twine as close as possible to the knot. The below diagram shows the method of twine binding.



**FIGURE 4.5** Method of twine binding



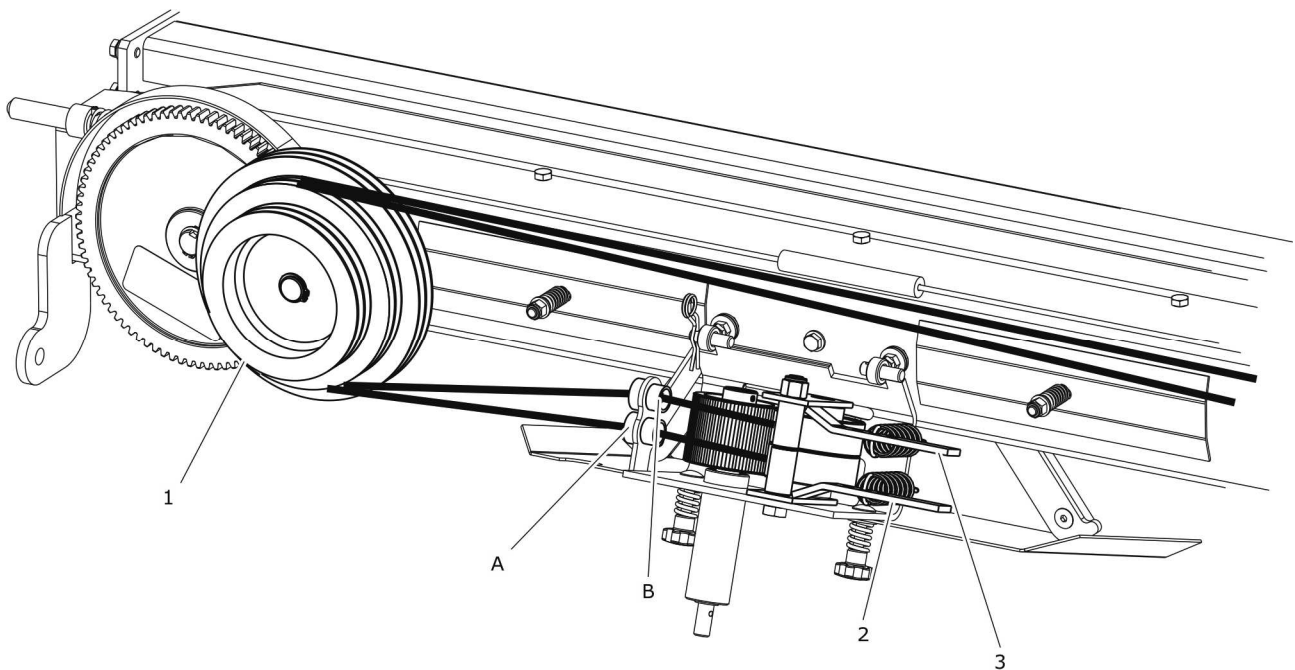
**FIGURE 4.6 Guiding the twine in the brake**

(1) brake clamp bolts, (2) brake pressure plate, (A), (B) twine guides in brake

Pull the twine ends out of the container and thread through the brake.

- Press brake bolts (1) in such a manner as to move pressure plate (2) downwards – figure (4.6).
- Thread the end of twine from container hole (A) through brake hole (A); thread the end of twine from container hole (B) through brake hole (B).
- Guide the twine between the brake plates in the drive wheel direction.

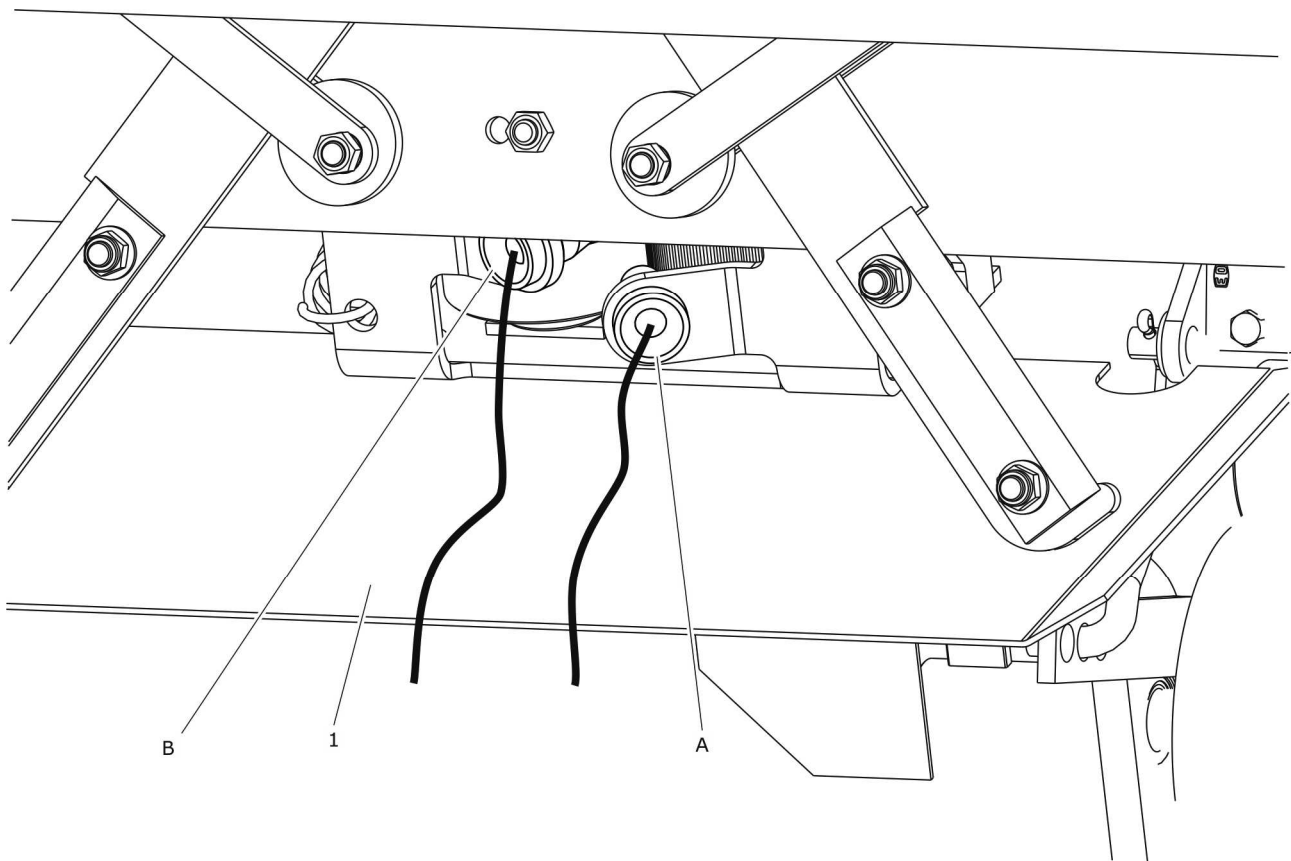
Depending on bale wrapping density, wrap the twine around a proper drive wheel diameter - see *ADJUSTING TWINE WRAPPING DENSITY*.



**FIGURE 4.7 Guiding the twine in the control system**

(1) drive wheel, (2) lower lever, (3) upper lever, (A), (B) front twine guides in the control system

- ➔ Chose proper wrapping diameter – figure (4.7). Wrap the twine from brake hole (A) around the external groove of drive wheel (1) and thread it through control system hole (A).
- ➔ Wrap the twine from brake hole (B) around the internal groove of the wheel and thread it through control system hole (B).
- ➔ Pull out levers (2) and (3) and shift the twine between rollers.
- ➔ Thread the twine from front guide (A) through rear guide (A) of control system - figure (4.8).
- ➔ Thread the twine from front guide (B) through rear guide (B) of control system.
- ➔ Release the levers and tighten the twine gently.
- ➔ Adjust twine tension by means of brake adjustment bolts (1) - figure (4.6).
- ➔ Detach the start cable of the net wrapping system from the start lever and attach the start cable of the twine wrapping system – see section *CHOICE OF WRAPPING MATERIAL*.



**FIGURE 4.8** Introducing twine into baling chamber

*(1) plate, (A), (B) rear twine guides in the control system*

Correctly installed twine will not cross. Free ends of twine must not hang too low. Otherwise, they may get tangled in the pickup system.

### ATTENTION

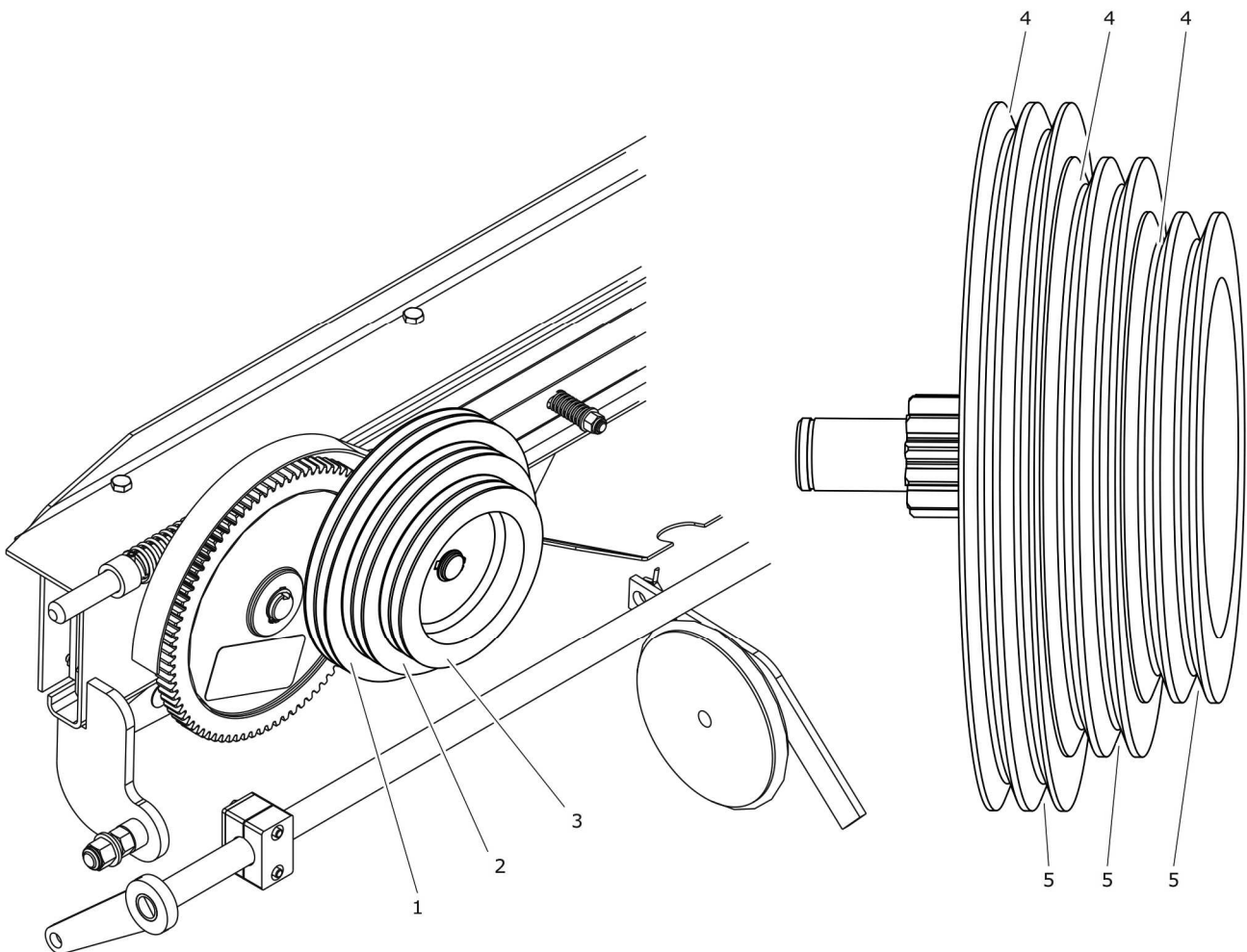


Correctly installed twine must not cross. Before starting the baler, check correctness of twine guidance once again.

Brake pressure force should be selected based on practical experience because it depends on type of (material) twine. Excessive brake pressure may lead to blocking or even breaking the twine. On the other hand, insufficient brake pressure may cause twine tangling and hamper the operation of the drive mechanism of the wrapping system (twine slips on the drive wheel)

### 4.5.3 ADJUSTING TWINE WRAPPING DENSITY

Depending on size and density of collected swath, choose a suitable bale wrapping width. The round baler is equipped with the drive wheel that enables triple step adjustment. The biggest twine density is obtained by installing twine on the first step of adjustment (the largest drive wheel diameter) while the smallest twine density is obtained by installing twine on the third step of adjustment (the smallest drive wheel diameter).



**FIGURE 4.9** Wrapping density adjustment

(1) first step of adjustment, (2) second step of adjustment, (3) third step of adjustment, (4) internal groove, (5) external groove

**ATTENTION**

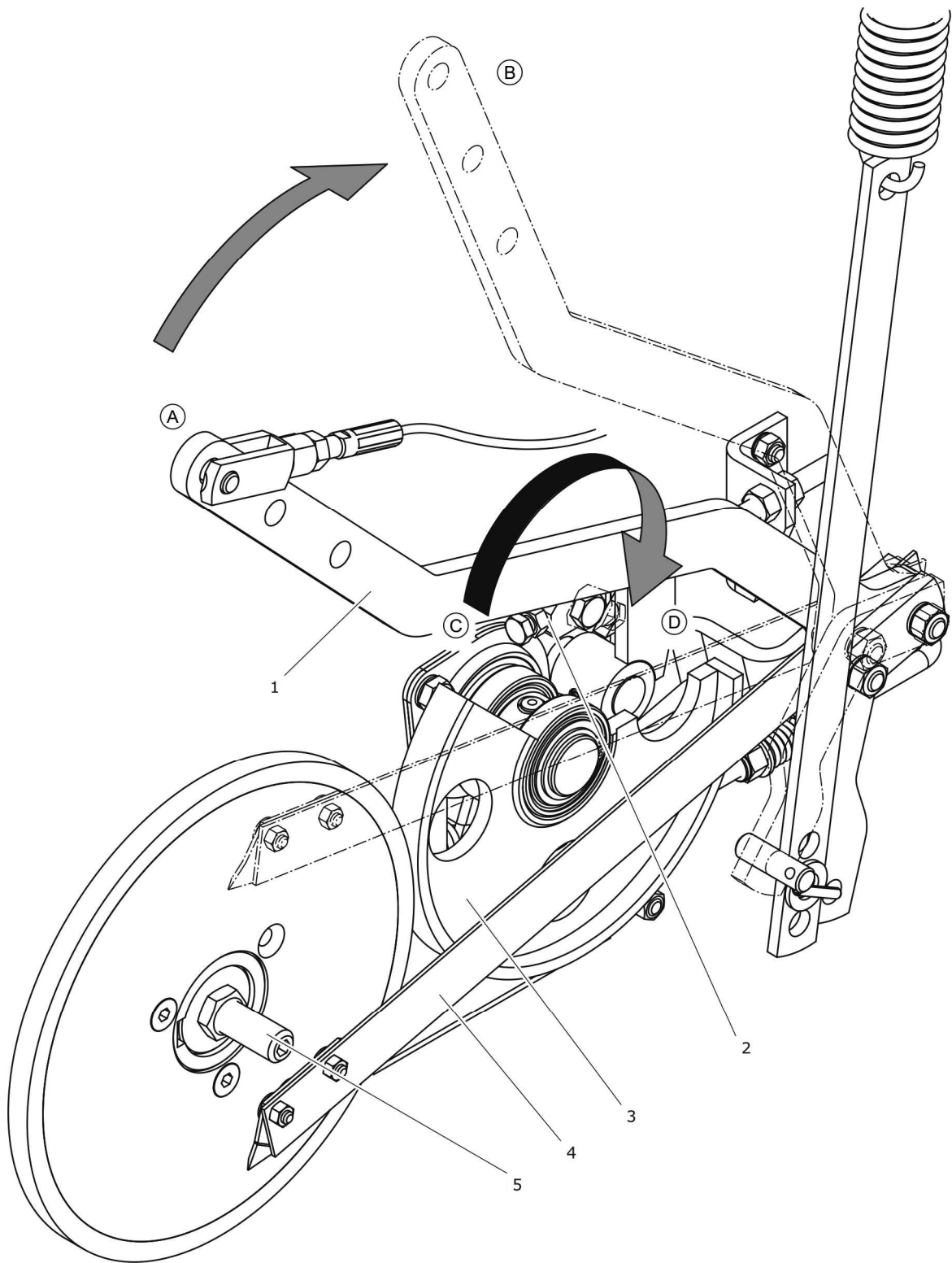
When installing twine, remember that both ends of the twine should be correctly installed in the internal groove and the external groove of a given adjustment step (see section „Installing the twine”). Otherwise, twine may cross or get tangled in the mechanism elements.

Twine can be installed only on one diameter. Twine must not be wrapped around two different steps of the drive wheel.

## 4.6 INSTALLING THE NET

Before installing the net, the net cutting mechanism must be raised to the upper position and locked by means of a limiter. To do this, open the right shield of the round baler using the key supplied with the machine. Turn main arm (1) from position (A) to position (B) shown in figure (4.10). Turn the limiter (2) located behind the start wheel (3) from position (C) to position (D) in the direction indicated by arrow. The limiter movement is hampered by the spring of the flap locking mechanism (not shown in figure). That is why, the spring should be gently levered. Elastic arm (4) will move above bolt (5) adjusting quantity of net wrappings.

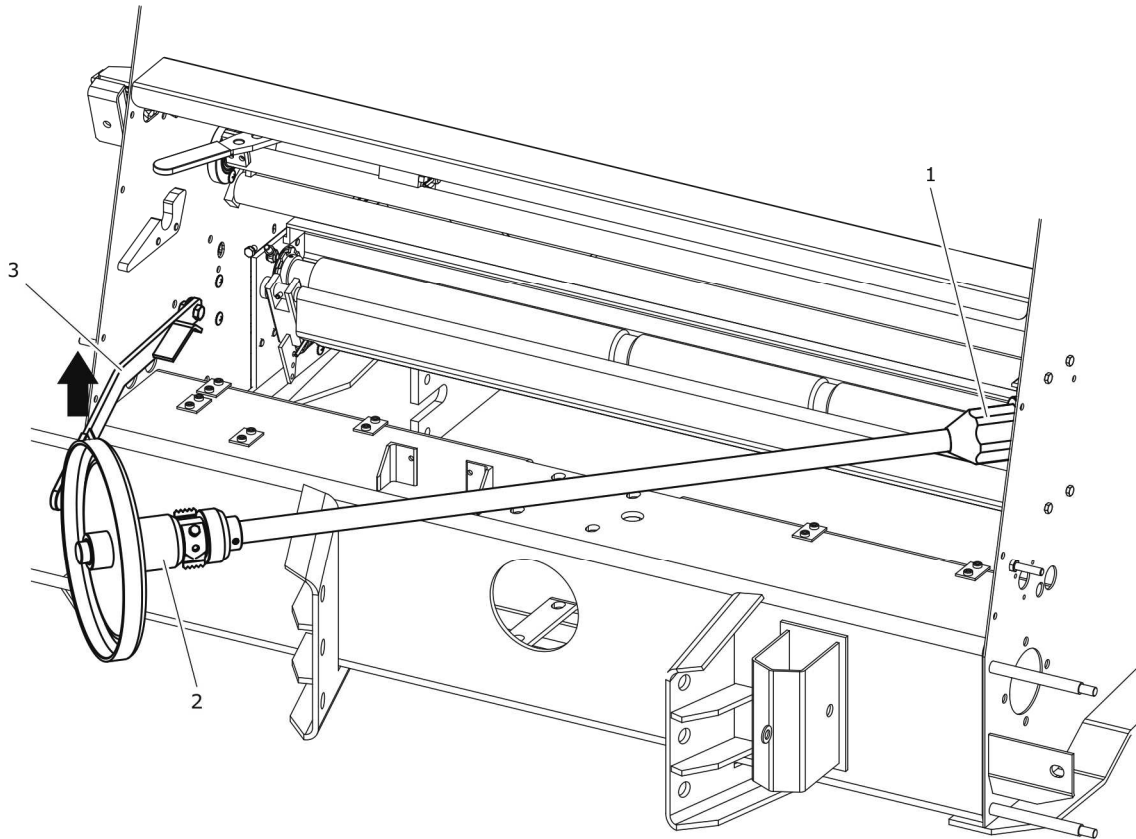




**FIGURE 4.10** Preparing the round baler to net wrapping

(1) main arm, (2) limiter, (3) start wheel, (4) elastic arm, (5) wrapping adjustment bolt, A) – (D) setting positions of limiter and main arm

Net roll is installed on resistance roller (1) and brake disc hub (2) - figure (4.11).

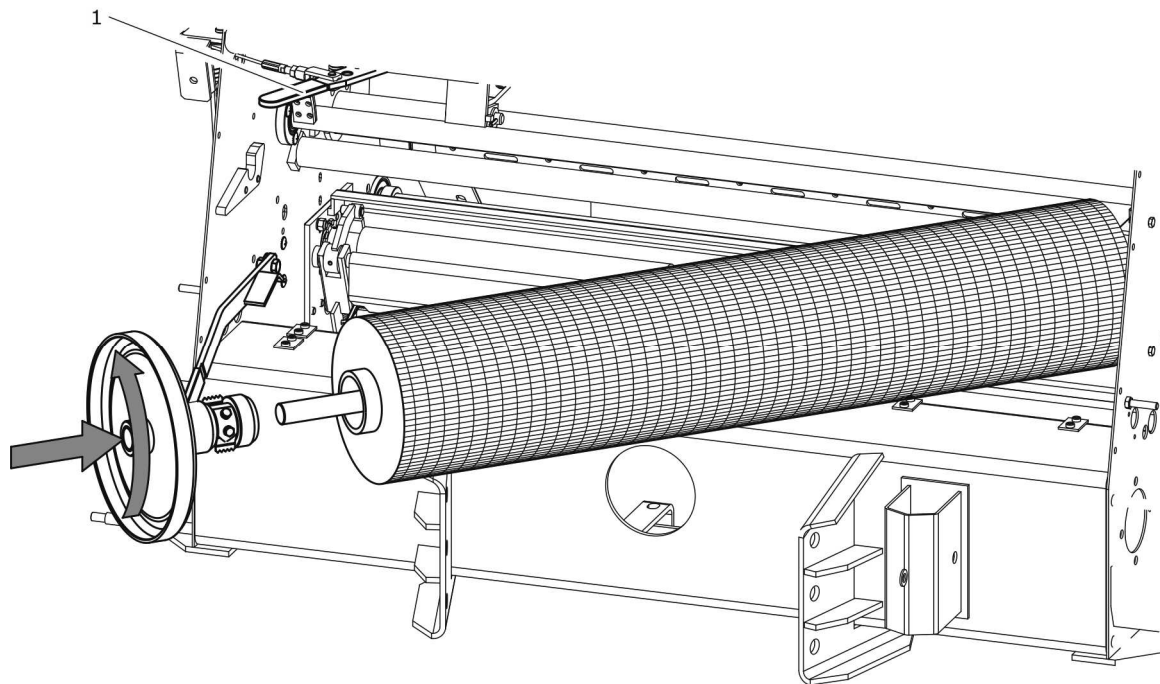


**FIGURE 4.11 Net installation, stage 1**

*(1) resistance roller, (2) brake disc, (3) lever*

### Installing the net

- ➔ Move lever (3) up and pull the whole mechanism.
- ➔ Remove brake disc.
- ➔ Install a net roll and push it maximally, until card board pipe rests on roller (1).
- ➔ Install the brake disc - insert and rotate it counterclockwise – figure (4.12).
  - ⇒ After rotation in the opposite direction, the springs installed on the brake disc will be locked in the card board pipe of the net roll.
- ➔ Press the disc to the net and close the mechanism.



**FIGURE 4.12 Net installation, stage 2**

(1) start lever

The net roll must be placed symmetrically in the mounting system. If the distances between the side edges of the roll and the baler body walls are different, shift the bale in proper direction. A new roll may be protected by means of adhesive tape or other means which should be removed before installing the net.

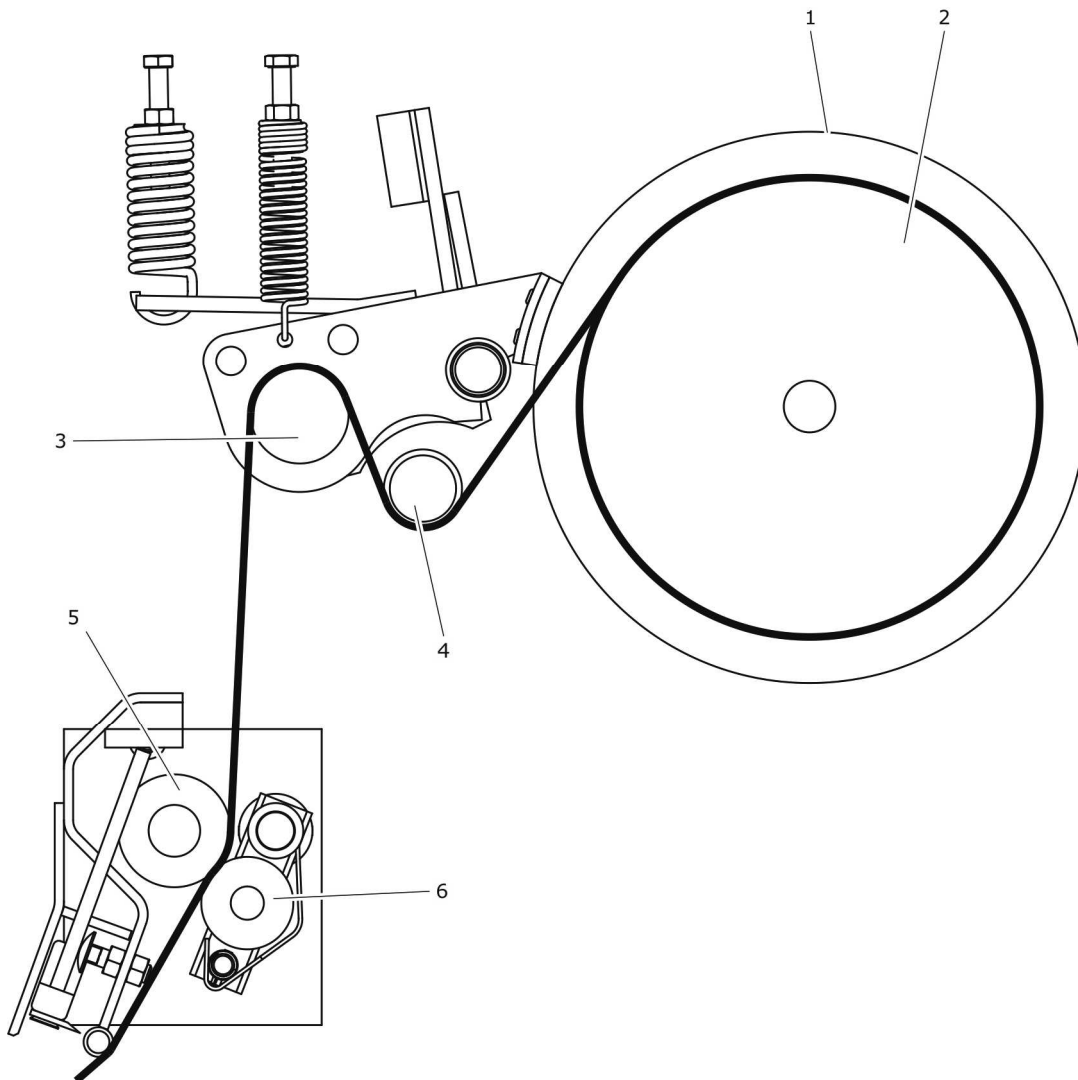


**TIP**

When locking the axis on which the net is installed, the operator can move start lever (1) to the right in order to facilitate net roll installation – figure (4.12).

Grab the beginning of net with one hand and thread it under the pipe of the net mounting system (4) - figure (4.13), and then above the shock absorber pipe (3). Finally, place the net between rubber roller (5) and aluminium pressure roller (6). Turn the start wheel clockwise to pull out about 10 – 15 cm of net below the edge of cutting knives. Installed net is formed in a thick "braid" which will be automatically expanded on the mechanism pipes during bale wrapping. Do not do this by yourself. When a new net is installed, the first bale must be wrapped twice in order to straighten the net.

When threading the net, movement of bale may be more difficult due to strong pressure applied by the brake to the brake disc. In order to reduce the resistance when installing the net, pull the main arm to the right to reduce braking force – figure (4.10), or shift start lever (1) – figure (4.12).

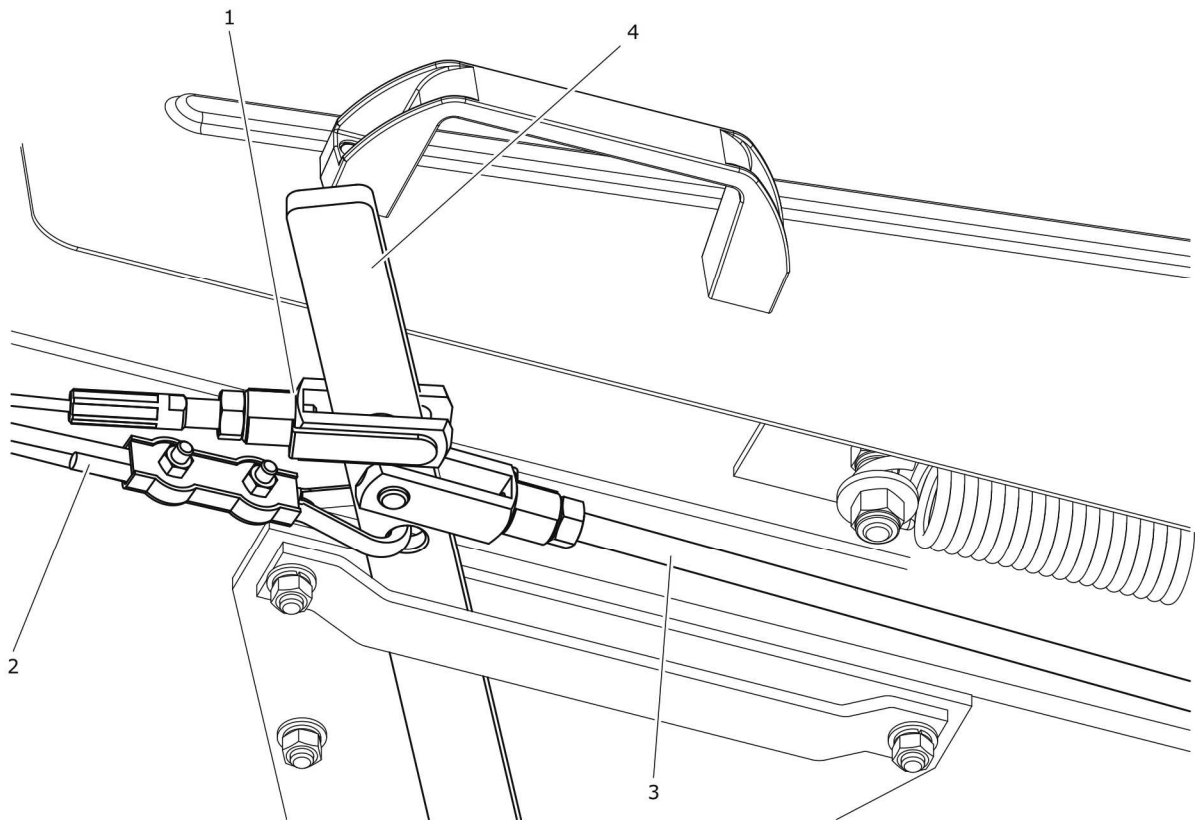


**FIGURE 4.13 Net installation, stage 3**

(1) brake disc, (2) bale with net, (3) shock absorber pipe, (4) guide pipe of net mounting system, (5) rubber pressure roller, (6) aluminium pressure roller

After installing and threading the net, shift limiter (2) – figure (4.10) to position (C) and lower the elastic arm below wrapping adjustment bolt (5). Close the cover and remove the key. Detach the start cable of the twine wrapping system from the start lever and attach the start cable of the net wrapping system.

## 4.7 CHOICE OF WRAPPING MATERIAL



**FIGURE 4.14** Choice of wrapping material

(1) start cable of the net wrapping system, (2) start cable of the twine wrapping system, (3) string, (4) start lever



### TIP

Detached start cable of the net wrapping system or the twine wrapping system should be attached to the wheel located on the right side of the twine container (near the start lever).

When baling and wrapping, only one type of wrapping material can be used (net or twine). When wrapping bales with net, twine must be dismantled from the wrapping system (twine reels may remain in the container). Twine wrapping start cable (2) must be detached from start lever (4). Start cable (1) must be attached to the lever. When wrapping bales with twine, do not install net in the wrapping system. Start cable (1) must be detached and twine wrapping start cable (2) must be attached. Holes for fixing start cables in the lever are shown

in figure (4.14). The figure shows the start lever with the cable connection as seen from below (looking at the twine container bottom).



### ATTENTION

Fixing positions of individual cables must not be changed.

## 4.8 SWATH COLLECTION, BALING



### DANGER

Ensure that nobody is near the round baler's working area.

Ensure sufficient visibility during work.

- ➔ Position the round baler hitched to the tractor in front of the swath.
- ➔ Confirm that the side covers are closed and the key is removed from the locks.
- ➔ Connect the lead to the controller. Switch on the tractor's parking lights and the round baler's controller.
  - ⇒ If the counter shows the value from the latest swath collection, reset the counter with *RESET* push-button - see section *OPERATION OF CONTROLLER*.
- ➔ Set the controller in the position which enables controlling pickup header operation. Lower the pickup header to working position.
- ➔ Switch the controller to the position which enables controlling the chamber rising.
- ➔ Set the divider lever in the tractor in floating position (in case of double acting section dividers) or in neutral position (in case of single acting section dividers).
  - ⇒ When baling, the chamber flap is slightly raised, that is why the oil flow must not be disturbed to enable cylinder movement.

- ➔ Start the round baler drive by engaging the tractor PTO and start working.

**TIP**

The round baler's control system does not work if the tractor's parking lights are switched off.

When collecting the swath, remember that it is necessary to maintain constant travel direction. When collecting the swath narrower than the pickup header width, change the travel route after approximately 20 metres. Correct technique of driving the tractor with the round baler has a decisive influence on quality of baling and shape of bales. Frequent changes of travel direction will result in wrong baling.

**DANGER**

Do NOT exceed the permissible load weight of the round baler when collecting and baling the swath.

Do NOT remove clogging of pickup header during round baler operation. In order to remove clogging, unload the bale, stop the engine and remove key from ignition.

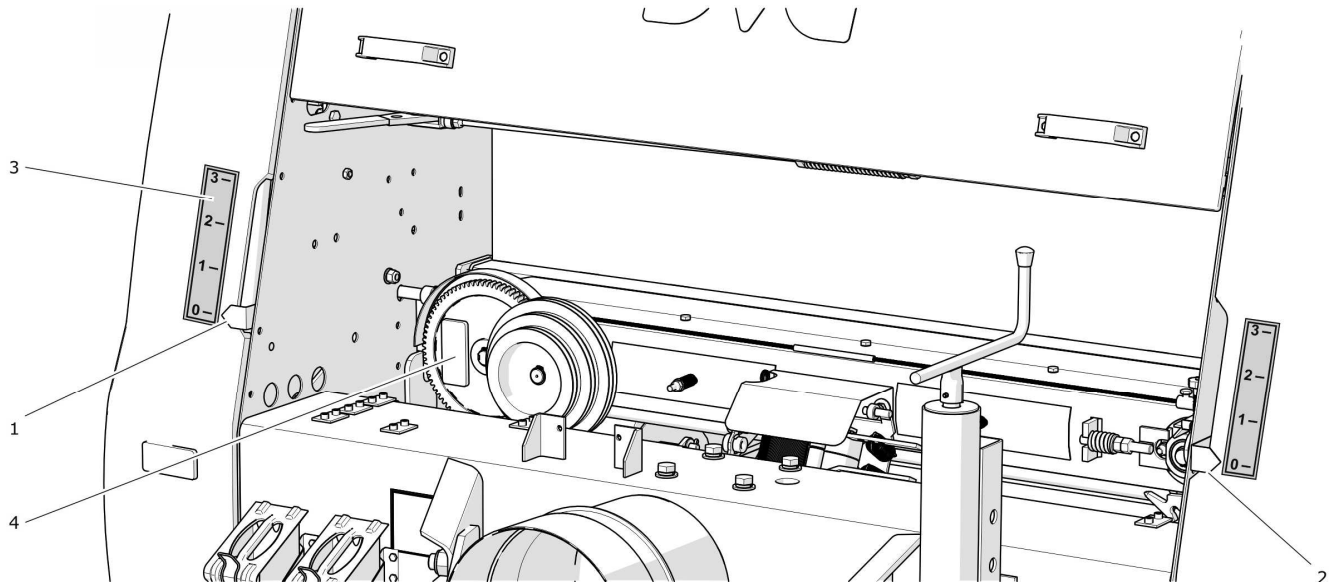
## 4.9 WRAPPING BALES WITH TWINE

Wrapping bales with twine should be started when a required degree of bale compaction is achieved. Then, baling compaction indicator will show the value of 3 on the left and the right side of the baler – figure (4.15). Operator can be also informed about proper degree of bale compaction by means of acoustic signal emitted by the controller and a flashing light signal. Audio-visual chamber filling signalling system is available as optional equipment.

### Wrapping

- ➔ Using the appropriate distributor lever in the tractor cab, activate the starter cylinder.
- ➔ When twine is tensioned, it means that it is pulled into the bale and wrapping is performed automatically.
- ➔ Disengage the starter's cylinder.

- ➔ Stop the tractor. Observe the rotation indicator.
- ➔ When the rotation indicator located on the drive wheel of the wrapping system stops rotating, the wrapping process is finished and twine is cut off.



**FIGURE 4.15 Bale compaction indicator**

(1) right indicator, (2) left indicator, (3) information label, (4) rotation indicator

## 4.10 WRAPPING WITH NET

### Wrapping

- ➔ Using the appropriate distributor lever in the tractor cab, activate the starter cylinder.
- ➔ When net is tensioned, it means that it is pulled into the bale and wrapping is performed automatically.
- ➔ Disengage the starter's cylinder.
- ➔ Stop the tractor.
- ➔ Net will be cut off automatically when a set number of wrappings is achieved.
  - ⇒ See section *ADJUSTING QUANTITY OF NET WRAPPINGS*.



## 4.11 UNLOADING

- ➔ Set the controller in the position which enables flap opening.
- ➔ Using the distributor lever, open the baling chamber flap.
  - ⇒ The bale will automatically roll out of the chamber.
- ➔ Close the flap and start collecting swath for the next bale.

When unloading, do not switch off the round baler's drive. When closing the flap, the remaining material on the bale ejector plate will be pushed into the baling chamber again.

When collecting a large and heavy swath, before unloading, reverse the tractor several metres and unload a bale. Raise the pickup header before reversing.

### ATTENTION



During unloading take special care that the bale does not crush third persons as it rolls away. Ensure proper visibility and make certain that there are no bystanders or animals behind the round baler.

Do NOT stand near the flap which is being opened or opened and unsecured.

While working on slopes, bales may be unloaded only in such a manner as to prevent them from rolling down the slope.


The pickup header may be lowered only during swath collection. When travelling from one field to another, the pickup header must be raised.

## 4.12 OPERATION OF LP-10 CONTROLLER

### 4.12.1 CONNECTING THE CONTROLLER






Before operating the controller, connect it to the round baler's system using a 7-pin plug. Ensure that the plug is correctly inserted into socket. Do not use excessive force when inserting the plug. When the plug is correctly inserted into socket, a catch will lock the plug in the socket. In order to disconnect the controller, press the push-button in the socket (on the counter side) and remove the plug from the socket while holding metal parts of the plug and socket (do not disconnect the controller while holding the leads). When the counter is connected, the tractor's supply plug is inserted into 7-pin socket on the round baler and the

tractor's parking lights are turned on, the display should show [0] or the latest counter indication.

	<p><b>ATTENTION</b></p> <p>The counter may be permanently damaged if it falls down from even a low height onto a hard surface.</p>
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### 4.12.2 OPERATION

**TABLE 4.1**      **Meaning of LP-10 controller's pictograms**

PICTOGRAM	NAME	DESCRIPTION
	ON / OFF function button	Selection of controller working mode.
	RESET function button	Resetting of daily counter
	FLAP	Raising / lowering the baling chamber flap.
	PICKUP HEADER	Raising / lowering the pickup header.
	OVERLOAD	The maximum degree of bale compaction has been reached.
Neutral	NEUTRAL POSITION	Neutral position - the round baler's subassemblies can not be controlled.

#### Setting the round baler's working mode

- ➔ Switch on the tractor's low beams.
  - ⇒ When the lights are on, yellow indicator light should light up (neutral condition) and the display should show [0] or the latest counter indication.
  - ⇒ To reset the counter, press and hold *RESET PUSH-BUTTON*
- ➔ Press *ON / OFF BUTTON*.

- ⇒ Solenoid valve of pickup header will be activated and the green indicator light under the pickup header symbol will light up.
- ➔ Press *ON / OFF BUTTON*.
- ⇒ The controller will be set in neutral position. The pickup header and the baling chamber flap can not be controlled.
- ➔ Press *ON / OFF BUTTON*.
- ⇒ Solenoid valve of baling chamber flap will be activated and the green indicator light under the baling chamber flap symbol will light up.
- ➔ Press *ON / OFF BUTTON*.
- ⇒ The controller will be set in neutral position. The pickup header and the baling chamber flap can not be controlled.

### Overload of baling chamber

Overload of baling chamber is signalled by red indicator light and acoustic signal (option). When the bale is unloaded and the flap is closed, the indicator light will go out. Status of daily counter will be increased by 1.

### Resetting of daily counter

To reset the counter, press *RESET* push-button and hold it until the display shows [0].

## 4.12.3 OPERATION OF CONTROLLER



### ATTENTION

Do NOT press the push-button with fingernail or with the aid of whatever hard objects, because they may damage the elastic membrane.

The counter should be protected against moisture, chemicals, direct atmospheric precipitation, frost, high temperature and strong solar radiation.

The controller can be installed in the tractor in any chosen position that ensures good visibility of the display. The device working location should guarantee its safe use, primarily it should be protected against excessive vibration, impact with tractor structure and, in particular, against the device falling on hard surface which may cause its permanent damage.

The counter can be attached using the vacuum cup located on the rear wall. Please note that the counter housing is not waterproof.

## 4.13 PROPER USE AND MAINTENANCE OF TYRES

- When performing maintenance and servicing of tyres, the round baler must be immobilized by means of 2 chocks placed under the wheels.
- Repair work on the wheels or tyres should be carried out with use of appropriate tools by persons trained and entitled to do so.
- Inspect tightness of nuts before the first use of baler, after the first travel under load and then every 6 months of use or every 25,000 km. In the event of intensive work, check the nut tightening at least every 100 km. The inspection should be repeated individually if a wheel has been removed from the wheel axle.
- Regularly check and maintain correct pressure in tyres according to Operator's Manual (especially if round baler is not used for a longer period).
- Pressure and tyres should be also checked after the whole day of intensive work. Please note that higher temperatures could raise tyre pressure by as much as 1 bar. At high temperatures and pressure, reduce load or speed.
- Do not release air from warm tyres to adjust the pressure or the tyres will be underinflated when temperatures return to normal.
- Protect valves using suitable caps to avoid soiling.
- Do not exceed the round baler's maximum design speed.
- When machine is operated all day, check temperature of tyres.
- Adhere to 30 minutes rest for cooling tyres after driving 75 km or after 150 minutes continuous travel depending on which occurs first.
- Avoid potholes, sudden manoeuvres or high speeds when turning.

## 4.14 DRIVING ON PUBLIC ROADS

To prepare the round baler for travel on public roads:

- ➔ Unload the bale.
- ➔ Attach slow moving vehicle warning plate.
- ➔ Check and possibly clean rear lamp assemblies.
- ➔ Confirm that the support is in its transport position.
- ➔ Disconnect and secure controller lead.

When driving on public roads, adjust tractor driving speed to road conditions. Do NOT exceed permissible design speed (25 km/h) and permissible speed arising from road traffic regulations valid in a given country. When driving on public roads, comply with the road traffic regulations in force in the country, in which the round baler is used.

During travel on public roads do NOT carry whatever the load on the baler, including people or bale. The round baler is not the machine designed for transporting loads.

Before driving on public roads the baler must be cleaned of dirt arising from use of the equipment, e.g. pieces of net, rope, hay, straw etc., which may cause fouling of roads.

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

- Before moving off make sure that there are no bystanders, especially children, near the baler or the tractor. Take care that the driver has sufficient visibility.
- Vertical load borne by the round baler drawbar eye affects the steering of the agricultural tractor.
- In the event of machine or tractor malfunction, pull over on the hard shoulder avoiding any risk to other road users and position reflective warning triangle according to traffic regulations.
- While travelling on public roads the baler must be marked with the slow-moving vehicle warning sign.
- The truck tractor driver shall be equipped with a certified or approved reflective warning triangle.
- When driving, comply with all road traffic regulations, indicate an intention to turn using indicator lamps, keep all road lights and indicator lights clean at all times

and ensure they are in good condition. Any damaged or lost lamps or indicator lights must be immediately repaired or replaced.

- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the round baler 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, avoid sharp turns especially on slopes.
- Please note that the braking distance of the tractor - round baler combination is substantially increased at higher speeds.
- Monitor the round baler's behaviour when travelling on an uneven terrain and adjust driving speed to road and terrain conditions.

***SECTION***

**5**

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**MAINTENANCE**

## 5.1 PRELIMINARY INFORMATION

When using the round baler, regular inspections of its technical condition and the performance of maintenance procedures are essential, which keep the machine in good technical condition. In connection with this the user of the round baler is obliged to perform all the maintenance and adjustment procedures defined by the Manufacturer.

Repairs during the warranty period may only be performed by authorised service points.

Detailed procedures and extent of activities which the user may perform by himself are described in this section. In the event of unauthorised repairs, changes to factory settings and other actions, which are not regarded as possible for the round baler operator to perform, the user shall invalidate the warranty.

## 5.2 OPENING AND CLOSING THE SIDE SHIELDS

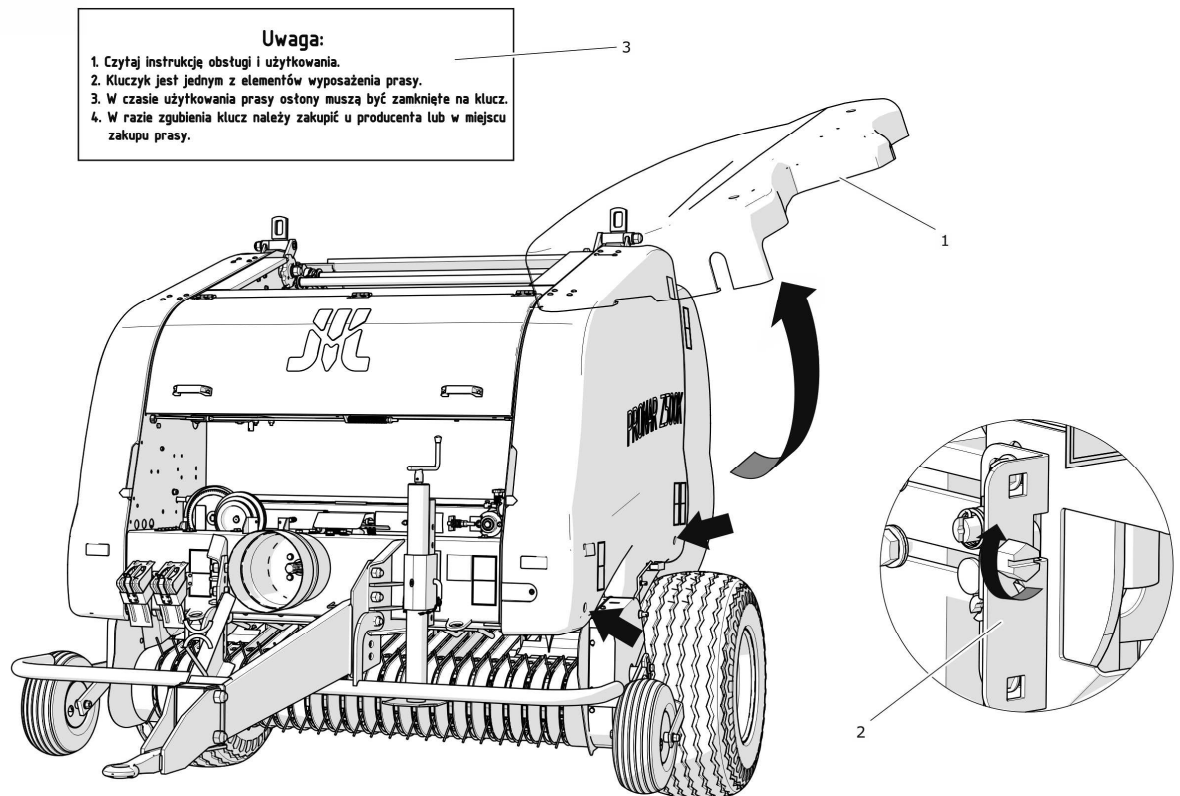
During maintenance, repair or adjustment work, easy access to the round baler's components is required. Some mechanisms are located on the left side and the right side of the machine body, under the side shields.

Side flaps are opened with a hex wrench or screwdriver. Lock (2) releases the bolt by turning to the left (counter clockwise). Release of both bolts allows picking the cover up. The side flap is lifted with the air spring.

Closing the cover is done by snapping the shield bolts. To do this, lower the cover to the lower position and push it around to the front and rear lock. Cover should snap shut with a distinctive sound.

Access to the locks was marked with the arrows.





**FIGURE 5.1** Left side flap

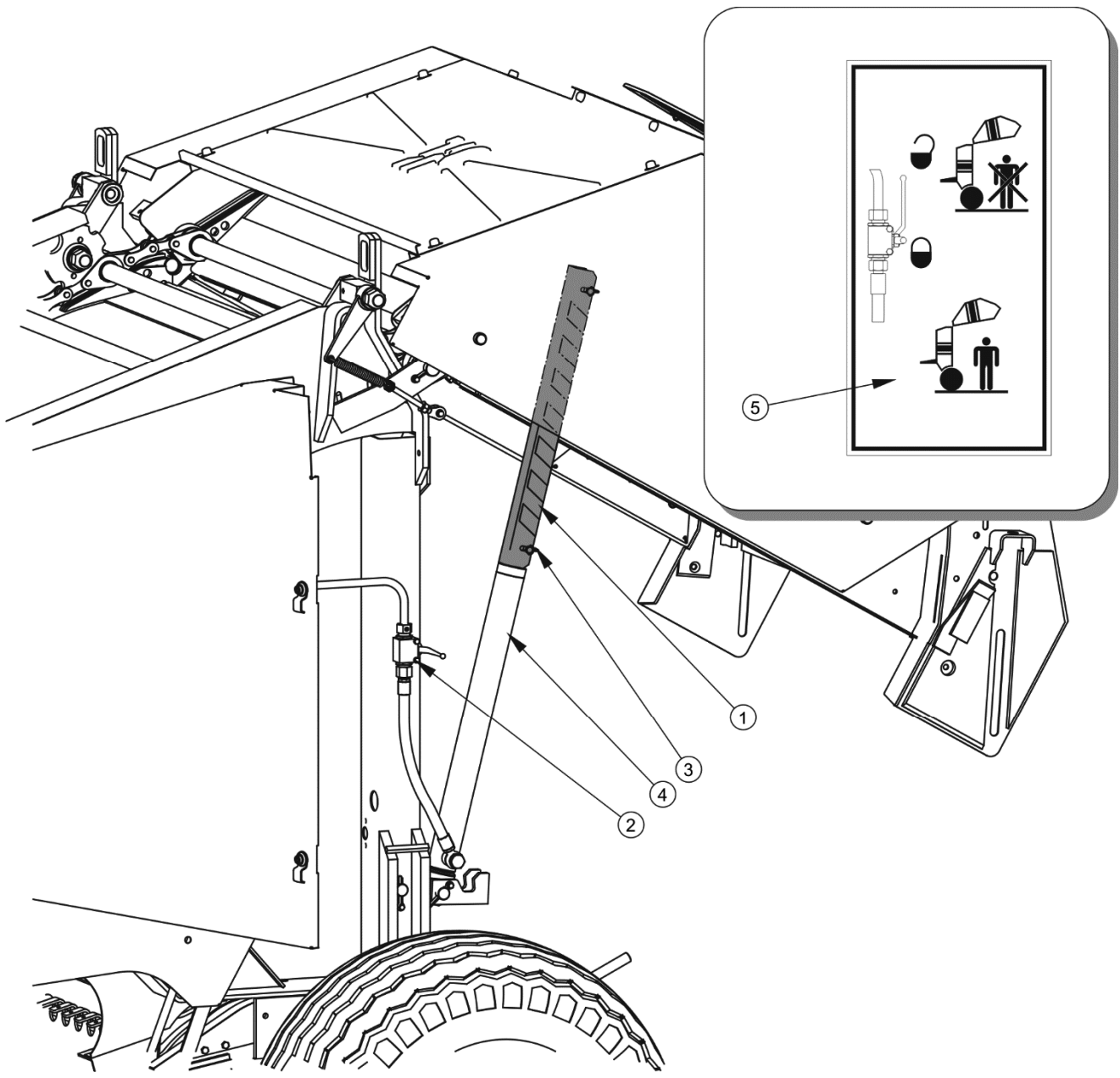
(1) left side flap, (2) side flap locks, (3) information decal



**TIP**

Each time before starting work, ensure that the cover is properly latched.

### 5.3 OPENING AND SECURING THE REAR FLAP



**FIGURE 5.2 Mounting the service support**

(1) service support, (2) cut off valve, (3) cotter pin, (4) flap cylinder, (5) information decal

The access to the interior of the baling chamber is often required in order to perform service and repair activities. Due to high risk of crushing or cutting of limbs, the chamber flap should be secured.

**DANGER**

Persons entering the baling chamber or standing within the range of raised rear flap are exposed to a very high risk of accident. That is why, do NOT enter the baling chamber and do NOT stand under raised rear flap if the flap is not properly secured.

**Required actions**

- ➔ Hitch round baler to tractor.
- ➔ Using the controller, switch the hydraulic system to chamber opening mode and raise the flap.
- ➔ Open the left flap of the shield, set cut-off valve (2) in *CLOSED POSITION*.
- ➔ Dismount service support (1) from the left wall of the round baler's body and mount it on extended hydraulic cylinder rod (4).
- ➔ Secure the service support with two cotter pins (3).

**DANGER**

Before lowering the chamber flap, dismount service support (1) and then, set cut-off valve (2) in *OPEN position*.

**ATTENTION**

Cut-off valve is used for blocking the flap before performing repairs or maintenance work. During normal operation of the baler, this valve must not be used and should be set in *OPEN* position. During repair-maintenance work which requires raising the rear flap, the flap should be additionally secured against falling with the service support located on the left wall of the baler body and the valve should be set in *CLOSED* position.

## 5.4 PREPARING THE ROUND BALER FOR MAINTENANCE OR REPAIR ACTIVITIES

Before maintenance or repairs, the machine must be properly prepared and secured in such a manner as to minimize the risk of accidents.

Majority of activities can be performed without hitching the round baler to the tractor. The round baler should be placed on hard, level ground. Place chocks under the round baler's wheel and support the drawbar on parking stand.

In order to perform some maintenance or repair activities, the machine's mechanisms must be set in specific positions. In such a case, hitch the baler to tractor (see section 4), start the baler to reach a proper position of a mechanism (e.g. rolling chain or reel teeth). Before beginning maintenance or repairs, turn off the tractor's engine and remove key from ignition. Immobilize tractor with parking brake and ensure that unauthorised persons do not have access to the tractor cab. Disconnect PTO shaft from the tractor PTO. Place chocks under round baler wheel.



### **DANGER**

**Do NOT perform any maintenance or repair work when the round baler is hitched to the tractor and the tractor's engine is started.**

## 5.5 HALF AXLE MAINTENANCE

### 5.5.1 PRELIMINARY INFORMATION

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

The responsibilities of the user are limited to:

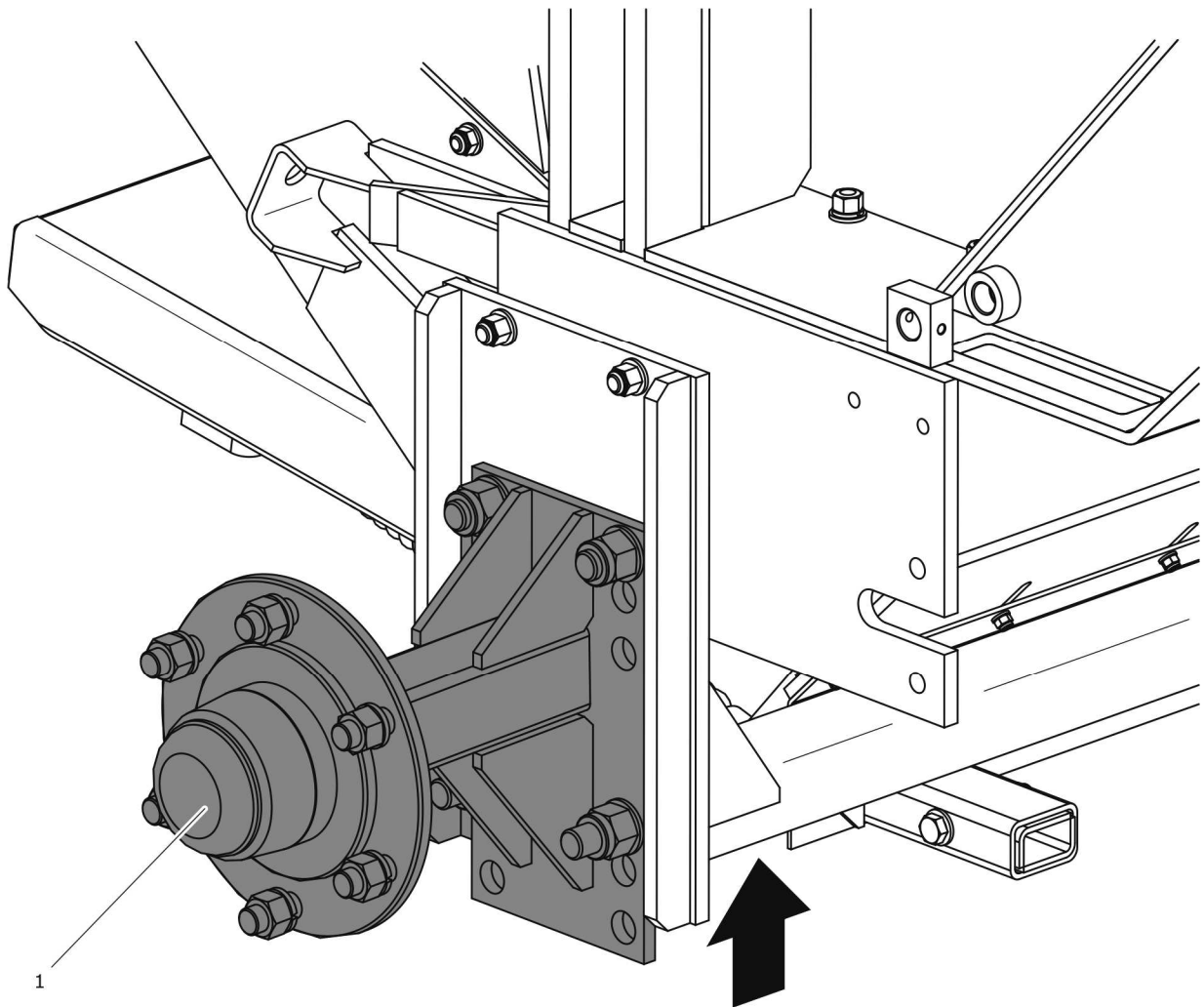
- inspection and adjustment of slackness of half axle bearings,
- mounting and dismounting wheel, inspection of wheel tightening,
- checking air pressure, evaluating technical condition of wheels and tyres.

Procedures connected with:

- changing grease in half axle bearings,
- changing bearings, hub seals,

may be performed by specialist workshops.

### 5.5.2 CHECKING WHEEL HALF AXLE BEARINGS FOR SLACKNESS



**FIGURE 5.3** Lifting jack support point

(1) half axle

#### Preparation procedures

- ➔ Hitch round baler to tractor, immobilize tractor with parking brake.
- ➔ Park tractor and round baler on hard level ground.

- ⇒ Tractor must be placed to drive forward.
- Place securing chocks under a round baler wheel. Ensure that machine will not move during inspection.
- Raise the wheel (opposite to the side where chocks are placed).
  - ⇒ Lifting jack should be positioned in the place indicated by the arrow in figure (5.3). Recommended support points are marked with arrows. Lifting jack must be suitable for the weight of the round baler.

### Checking wheel axle bearings for slackness

- Turning the wheel slowly in both directions check that movement is smooth and that the wheel rotates without excessive resistance.
- Turn the wheel so that it rotates very quickly, check that the bearing does not make any unusual sounds.
- Holding the wheel above and below, try to feel any slackness.
  - ⇒ You may use a lever placed under the wheel supporting the other end on the floor.
- Repeat the inspection procedure on the second wheel.



#### TIP

If hub cover is damaged or missing, contamination and dampness enter the hub, which causes significantly faster wear of bearing and hub seals.

Bearing life is dependent on working conditions of the round baler, loading, speed of travel and lubrication conditions.

If slackness is felt, adjust bearings. Unusual sounds coming from bearing may be symptoms of excessive wear, dirt or damage. In such an event the bearing, together with sealing ring, should be replaced with new parts, or cleaned and greased again

Check condition of hub cover, if necessary replace with new cover. Inspection of bearing slackness may only be conducted when the round baler is hitched to tractor. The machine may not be loaded.



**Check wheel half axle bearings for slackness:**

- after travelling the first 1,000 km,
- before intensive use of round baler,
- every six months use or every 25,000 km.



**DANGER**

Before commencing work the user must read the instructions for lifting jack and adhere to the manufacturer's instructions.

The lifting jack must be stably supported on the ground and so must the half axle.

Ensure that round baler shall not move during inspection of slackness of wheel axle bearings.

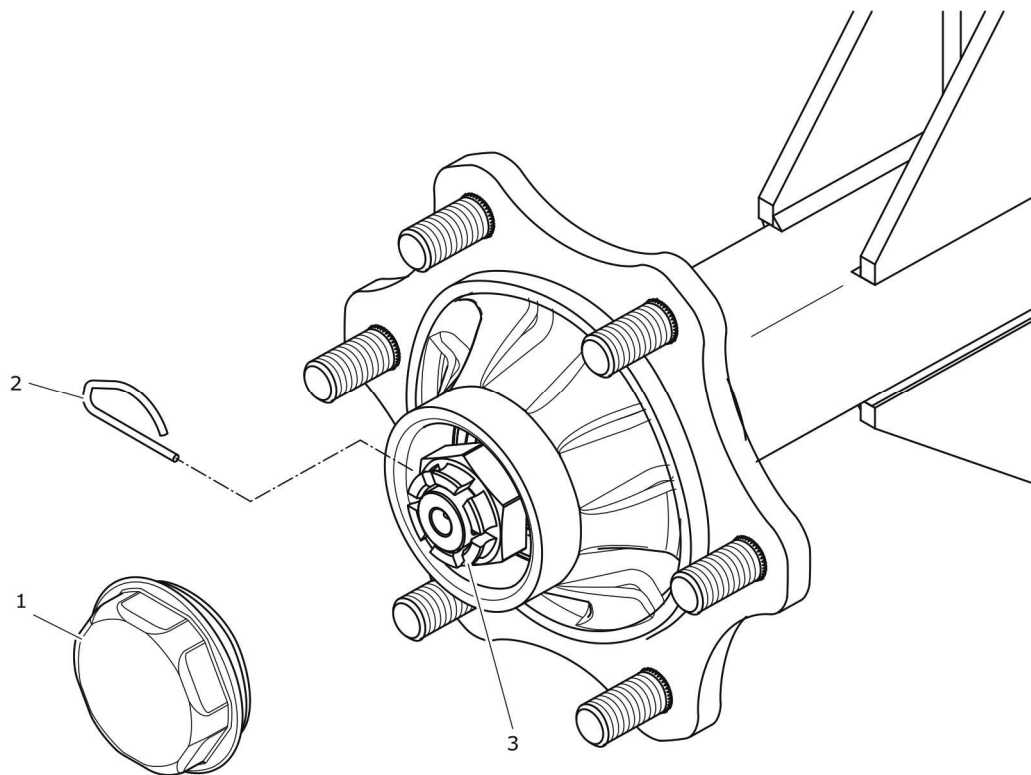
### 5.5.3 ADJUSTMENT OF SLACKNESS OF WHEEL AXLE BEARINGS

#### Preparation procedures

- ➔ Prepare tractor and round baler for adjustment procedures according to description provided in section 5.5.2.

#### Adjustment of slackness of wheel axle bearing

- ➔ Take off hub cover (1) – figure (5.4).
- ➔ Take out split cotter pin (3) securing castellated nut (2).
- ➔ Tighten castellated nut in order to eliminate slackness.
  - ⇒ Wheel should rotate with insignificant resistance.
- ➔ Unscrew nut (not less than 1/3 rotation) to cover the nearest thread groove with alignment to opening in wheel stub axle. Wheel should rotate without excessive resistance.
  - ⇒ Nut may not be excessively tightened. Do not apply excessive pressure because working conditions of the bearings may deteriorate.
- ➔ Secure castellated nut with cotter pin and mount hub cap.
- ➔ Delicately tap hub cap with rubber or wooden hammer.



**FIGURE 5.4 Adjusting half axle bearings**

(1) hub cover, (2) castellated nut, (3) cotter pin

The wheel should turn smoothly without stiffness or detectable resistance. Adjustment of bearing slackness may only be conducted when the round baler is hitched to tractor and the baling chamber is empty.



**TIP**

If the wheel is dismantled, bearing slackness is easy to check and adjust.

**5.5.4 MOUNTING AND DISMOUNTING WHEEL, INSPECTION OF WHEEL NUT TIGHTENING.**

**Dismounting wheel**

- ➔ Place chocks under the wheel that will not be dismantled.
- ➔ Ensure that round baler shall not move during wheel dismantling.



- ➔ Loosen wheel nuts according to sequence given in figure (5.5).
- ➔ Place lifting jack and lift the round baler.
- ➔ Dismount wheel.

### Wheel mounting

- ➔ Remove contaminations from half axle pins and nuts.
  - ⇒ Do not grease thread of nuts and pins.
- ➔ Check condition of pins and nuts, if necessary replace them.
- ➔ Place wheel on hub, tighten nuts so that wheel rim adjoins hub exactly.
- ➔ Lower the round baler, tighten nuts according to recommended torque and given sequence.

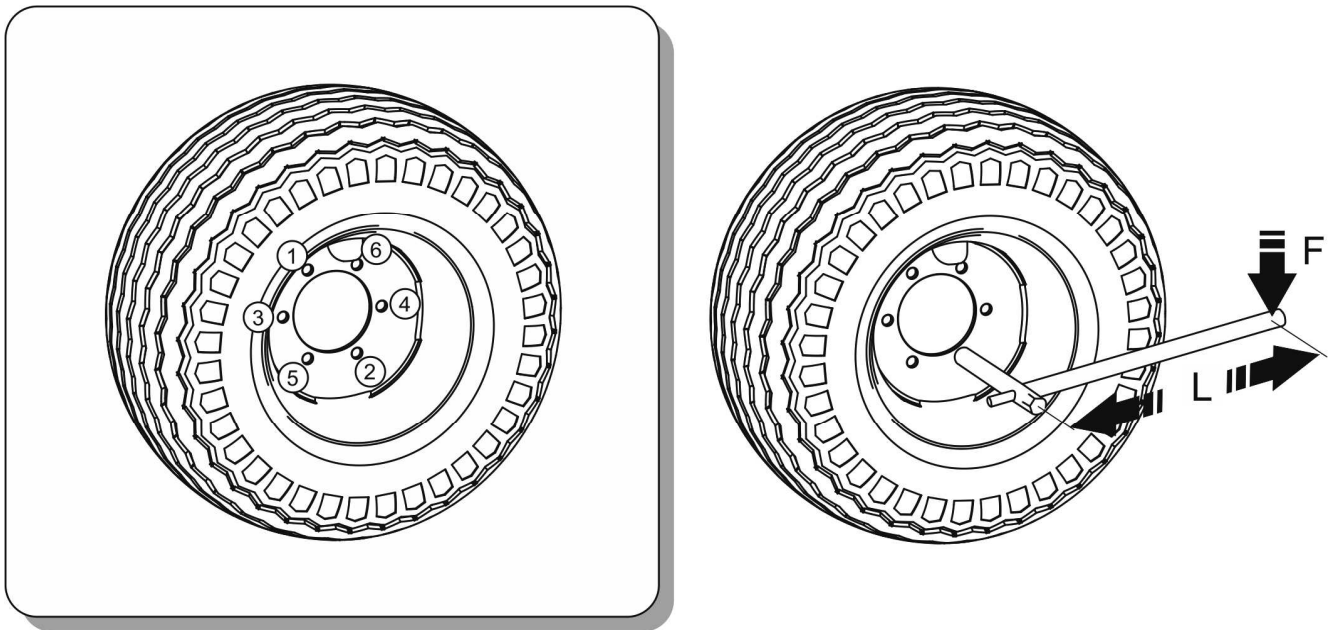
### Tightening nuts



#### TIP


Wheel nuts should be tightened using the torque of 270 Nm - M18x1.5 nuts.

Nuts should be tightened gradually diagonally, (in several stages, until obtaining the required tightening torque) using a torque spanner. If a torque spanner is not available, one may use an ordinary spanner. The arm of the spanner (L) figure (5.5) should be selected according to the weight of the person (F) tightening the nut. Remember that this method of tightening is not as accurate as the use of a torque spanner.



**FIGURE 5.5** Sequence of nut tightening


(1) - (6) sequence of nut tightening, (L) spanner length, (F) user weight



**Check tightening of half axle wheel nuts:**

- after the first use of the baler,
- after first travel with load,
- after travelling the first 1,000 km,
- every six months use or every 25,000 km.

In the event of intensive work checking the nut tightening should be done at least every 100 kilometres. The above actions should be repeated individually if a wheel has been removed from the wheel axle.



**ATTENTION**

Wheel nuts may not be tightened with impact wrench, because of danger of exceeding permissible tightening torque, the consequence of which may be breaking the thread connection or breaking off the hub pins.

The greatest precision is achieved using a torque spanner. Before commencing work, ensure that correct tightening torque value is set.

**TABLE 5.1** Spanner arm

<b>WHEEL TIGHTENING TORQUE</b>	<b>BODY WEIGHT (F)</b>	<b>ARM LENGTH (L)</b>
<b>[NM]</b>	<b>[KG]</b>	<b>[M]</b>
270	90	0.30
	77	0.35
	67	0.40
	60	0.45

### 5.5.5 CHECK AIR PRESSURE, EVALUATE TECHNICAL CONDITION OF TYRES AND STEEL WHEELS

Tyre pressure should be checked each time after changing spare wheel and not less than every month. In the event of intensive use, air pressure in tyres should be checked more frequently. During this time round baler must be unloaded. Checking should be done before travelling when tyres are not heated, or after an extended period of parking.



#### TIP

Tyre pressure values are specified in information decal, placed on wheel or on the frame above the machine wheel.



#### DANGER

Damaged tyres or wheels may be the cause of a serious accident.

While checking pressure pay attention to technical condition of wheels and tyres. Look carefully at tyre sides and check the condition of tread.

In case of mechanical damage consult the nearest tyre service and check whether the tyre defect requires tyre replacement.

Wheels should be inspected with regard to distortion, breaking of material, breaking of welds, corrosion, especially in the area of welds and contact with tyre.

Proper technical condition and appropriate maintenance of wheels significantly extends the life of these components and ensures appropriate level of safety to round baler users.



**Checking air pressure in tyres and visual inspection of steel wheels:**

- every month of use,
- every week during intensive work,
- if needed.

## 5.6 HYDRAULIC SYSTEM OPERATION

### 5.6.1 PRELIMINARY INFORMATION

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

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

- inspecting and checking air tightness of system,
- Checking technical condition of hydraulic connections.



**DANGER**

Do NOT use the baler if hydraulic system is unreliable.

### 5.6.2 CHECKING HYDRAULIC SYSTEM TIGHTNESS

#### Required maintenance activities

- ➔ Hitch round baler to tractor.
- ➔ Connect all hydraulic system conduits according to service instructions.
- ➔ Clean connectors and hydraulic cylinders.
- ➔ Start all hydraulic systems in sequence.
- ➔ Check tightness of hydraulic system, inspect cylinders and hydraulic conduits.

In the event of confirmation of oil on hydraulic ram cylinder bodies ascertain origin of leak. Inspect hydraulic seals when ram cylinders are completely extended. Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of "droplets" stop using the baler until faults are remedied. If leaks appear at connections then tighten the connections.

**Checking tightness:**

- after the first week of use,
- every 12 months of use.

**5.6.3 CHECKING TECHNICAL CONDITION OF HYDRAULIC PLUGS.**

Hydraulic connections must be technically reliable and kept in a clean condition. Each time before connecting, check if socket in tractor are maintained in good working condition. Tractor and baler hydraulic systems are sensitive to the presence of permanent contamination, which may cause damage to precision system components (contamination may cause scratching of hydraulic valves, abrasion of cylinder surfaces etc.)

**Inspection of hydraulic connections and sockets:**

- each time before connecting round baler to tractor.

**5.6.4 HYDRAULIC SYSTEM BLEEDING**

During normal operation of the round baler, there is no need to bleed the hydraulic system.

Bleed the hydraulic system only after repairing the system (replacement of a conduit, repair of a hydraulic cylinder, etc.). Bleeding of the hydraulic system should be performed by specialist workshops.

**5.6.5 REPLACEMENT OF HYDRAULIC CONDUITS**

Rubber hydraulic conduits must be replaced every 4 years regardless of their technical condition. This should be entrusted to specialised workshops.

**Replacement of hydraulic conduits:**

- every 4 years.

## 5.7 OPERATION OF ELECTRICAL SYSTEM AND WARNING ELEMENTS

### 5.7.1 PRELIMINARY INFORMATION

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 responsibilities of the user are limited to:

- technical inspection of electrical system and reflectors,
- changing bulbs

**ATTENTION**

Do NOT travel with unreliable lighting system. Damaged lamp lenses, and burned-out bulbs must be replaced immediately before travelling. Lost or damaged reflective lights must be replaced.

### Required maintenance activities

- ➔ Connect round baler to tractor with appropriate connection lead.
  - ⇒ Check if the connection lead is reliable. Check connection sockets in tractor and round baler.
- ➔ Check completeness and technical condition of round baler lights.
- ➔ Check completeness of all reflectors.
- ➔ Check correct mounting of the slow-moving vehicle warning sign holder.
- ➔ Before driving on to public road check that the tractor is equipped with warning reflective triangle.



**Checking technical condition of electrical system:**

- each time while connecting the round baler.



**TIP**

Before driving away make certain that all lamps and reflective lights are clean.

### 5.7.2 CHANGING BULBS

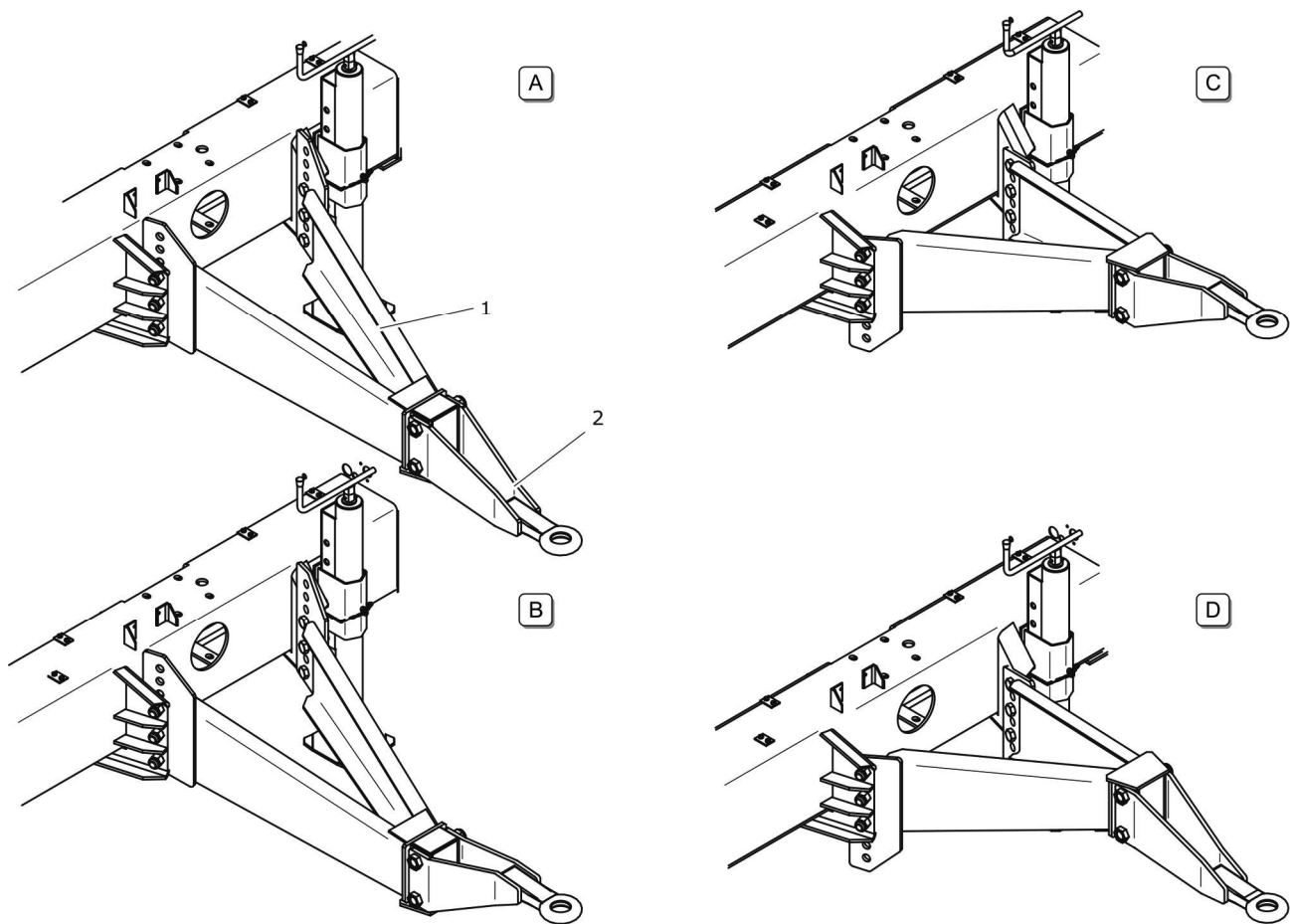
Compatible bulbs are shown in table (5.2). All light lenses are secured by screws and it is not necessary to dismantle whole lamp or round baler subassemblies.

**TABLE 5.2 List of bulbs**

LAMP	LAMP TYPE	BULB / QUANTITY IN 1 LAMP	NUMBER OF LAMPS
Rear left lamp assembly	W 18U	R10W / 1 unit P21W / 2 units	1
Rear right lamp assembly	W 18 U	R10W / 1 unit P21W / 2 units	1

## 5.8 ADJUSTING DRAWBAR TO MATCH TRACTOR HITCH

If the baler hitched to tractor is excessively tilted backward or forward, adjust the drawbar in such a manner as to level the machine. Figure (5.6) shows four available drawbar settings.



**FIGURE 5.6 Settings of drawbar and drawbar hitching eye**

(1) drawbar, (2) drawbar hitching eye, (A) drawbar and drawbar hitching eye in standard position, (B) drawbar in standard position, drawbar hitching eye inverted, (C) drawbar and drawbar hitching eye inverted, (D) drawbar in inverted position, drawbar hitching eye in standard position

### Service operation

- ➔ Position the round baler on a flat surface, put chocks under one wheel.
- ➔ Depending on drawbar setting, undo drawbar nuts and / or drawbar hitching eye nuts, remove bolts and dismount drawbar and drawbar hitching eye.
- ➔ Turn drawbar and / or drawbar hitching eye to a selected position.
- ➔ Tighten the elements using proper tightening torque.

⇒ Use new nuts specified in table 5.3 *INFORMATION ON INSTALLATION*.



- ➔ After a day's work, check if the nuts are properly tightened.

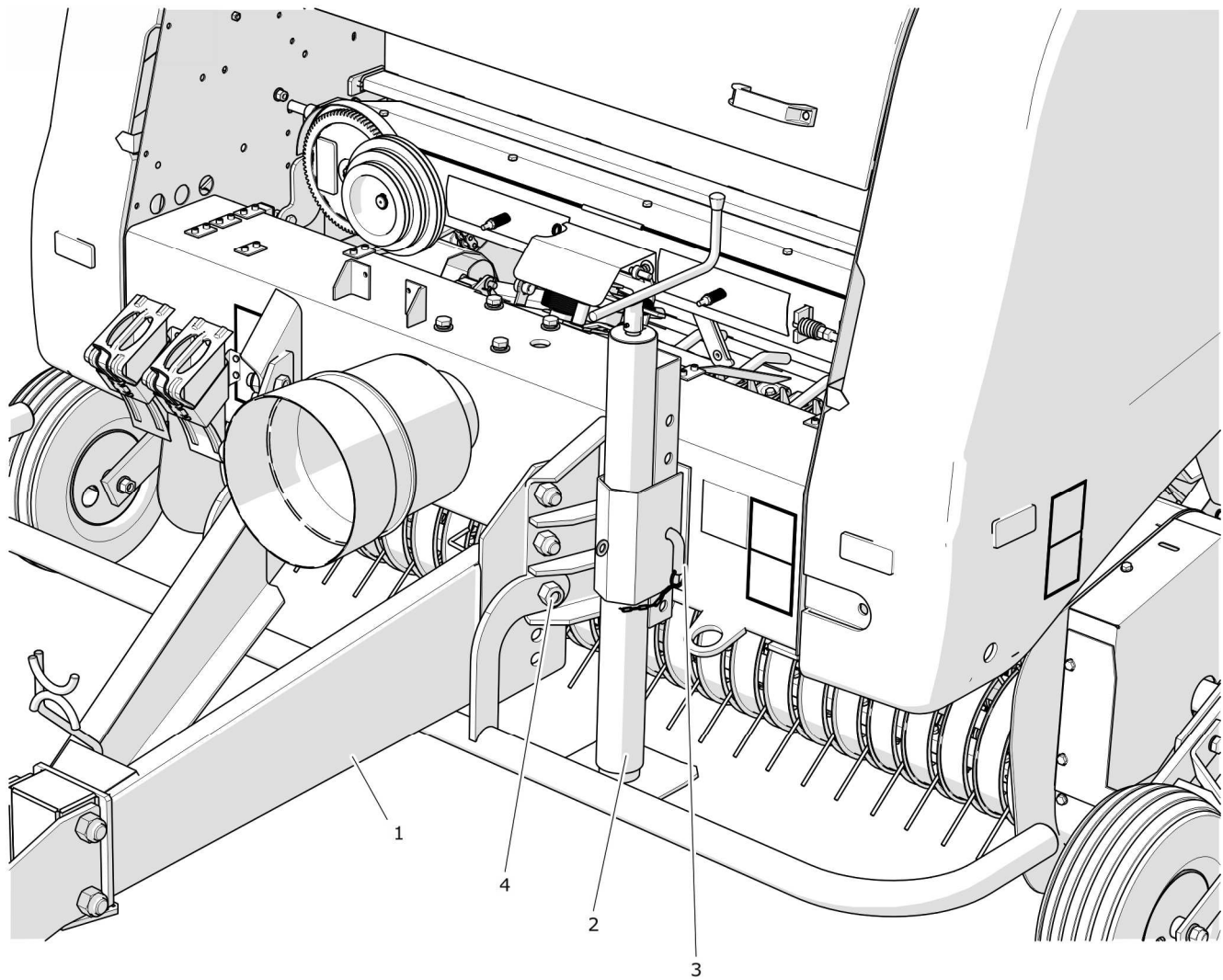
**TABLE 5.3 Information on installation**

<b>CONNECTION OF DRAWBAR HITCHING EYE WITH DRAWBAR</b>	
Bolt (PN-EN ISO 4014:2002)	M24x170-8.8 A2J
Self locking nut (PN-EN ISO 7040:2003)	M24-8-A2J
Tightening torque	470 Nm
<b>CONNECTION OF DRAWBAR WITH FRAME BODY</b>	
Bolt (PN-EN ISO 4014:2002)	M20x50-10.9-A2J
Self locking nut (PN-EN ISO 7040:2003)	M20-8-A2J
Tightening torque	380 Nm
<b>WEIGHT</b>	
Drawbar + drawbar hitching eye	approximately 46 kg

Regardless of setting of drawbar and drawbar hitching eye, drawbar height can be adjusted with regard to round baler body.

### Height adjustment

- ➔ Connect the baler's drawbar eye to the tractor hitch - see section 4.4 *HITCHING AND UNHITCHING THE ROUND BALER*
- ➔ Place securing chocks under a round baler wheel. Immobilise tractor with parking brake.
- ➔ Undo six nuts (4) – figure (5.7), fixing drawbar (1) to the round baler's body, remove bolts and hold the drawbar on the side of the baler's body.
- ➔ Turn the support's crank in order to raise or lower the baler to required level.
- ➔ Set the drawbar, install bolts and tighten nuts using required tightening torque.
  - ⇒ Use new nuts specified in table 5.3 *INFORMATION ON INSTALLATION*.
- ➔ After a day's work, check if the nuts are properly tightened.



**FIGURE 5.7** Preparing the round baler for drawbar height adjustment

*(1) drawbar, (2) support, (3) support lock (4) fixing bolts and nuts*



**DANGER**

Exercise particular caution while adjusting the drawbar. Danger of severing limbs.

Drawbar height adjustment and drawbar position change should be carried out by two persons.

**ATTENTION**

Round baler's drawbar must be bolted with 6 bolts.

After adjustment of drawbar height and change of drawbar and drawbar hitching eye position, check tightening torques of bolt connections after a day's work.

Figure (5.8) shows the heights of drawbar hitching eye from the ground depending on the hitching system setting, for two extreme positions of drawbar mounting to the baler's body, and mounting heights of half axles.

**TIP**

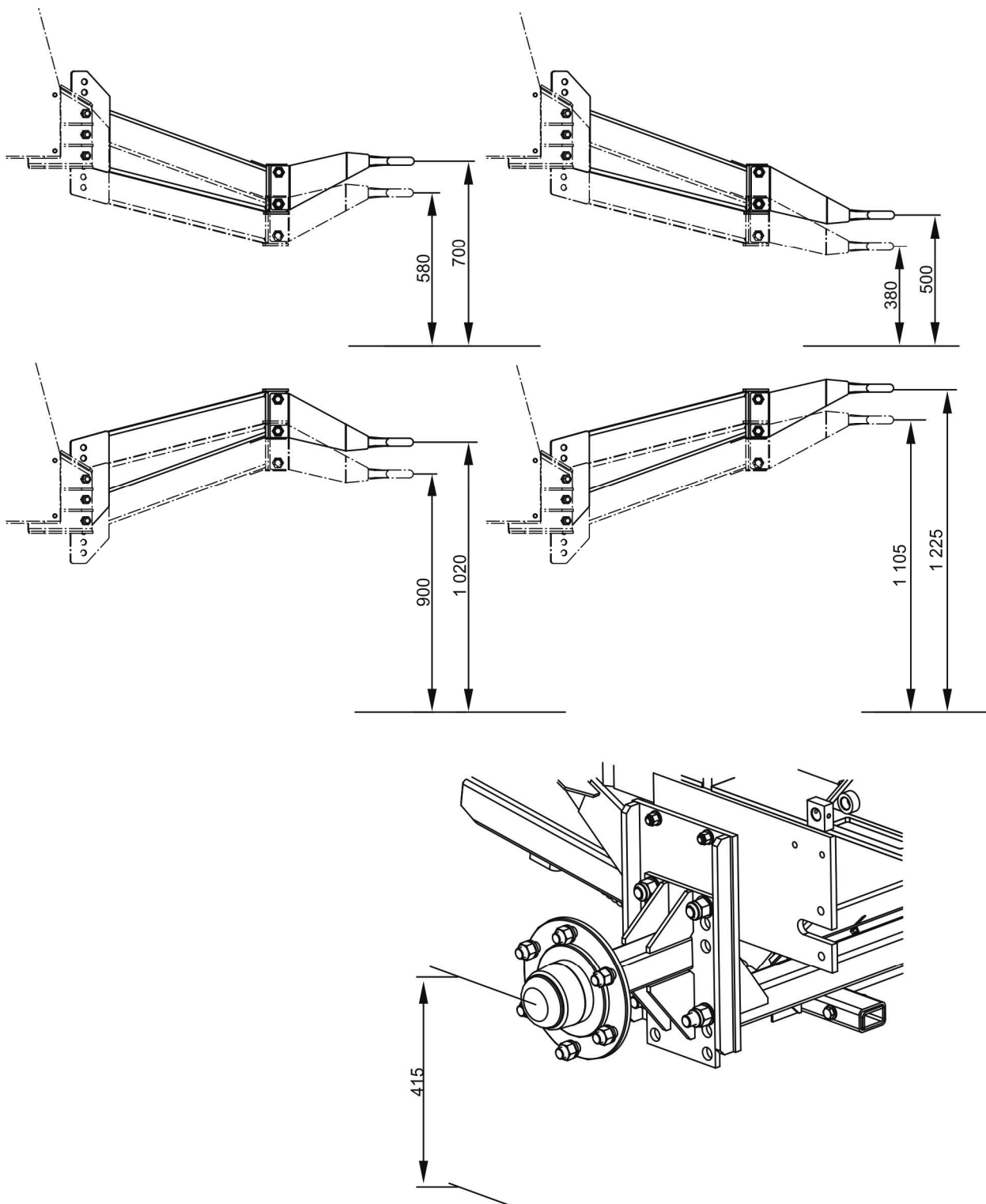
The dimensions shown in figure (5.8) should be treated as approximate ones because their values depend on type of tyres and air pressure in tyres.

Proper position of drawbar and drawbar hitching eye should be selected considering mainly the tractor hitch. Drawbar in inverted position makes it possible to hitch the machine with the upper transport hitch. Drawbar in standard position makes it possible to hitch the machine with the lower agricultural hitch.

**TIP**

Before using the machine, the user should thoroughly acquaint himself with the Operator's Manual of the tractor and adhere to the recommendations contained in it.

Please note that the horizontal position is the optimum operating position of the round baler. Because various types of tractor hitch are available, it may not be possible to achieve this operating position. That is why a slight forward tilt of the baler is permitted.



**FIGURE 5.8** Height of drawbar hitching eye depending on the setting of the hitching system

## 5.9 ADJUSTMENT AND MAINTENANCE OF TWINE WRAPPING SYSTEM

### 5.9.1 ADJUSTMENT OF TWINE LIMITERS

#### Service operation

- ➔ Loosen two nuts (3) – figure (5.9) of left limiter (1) and right limiter (2).
- ➔ Shift the limiters in (a) direction (towards the centre) if twine falls off the bale or is located close to the bale edge.
- ➔ Shift the limiters in (b) direction (to the outside) if the external twine on wrapped bales is too close to the bale centre.
- ➔ Tighten nuts (3).



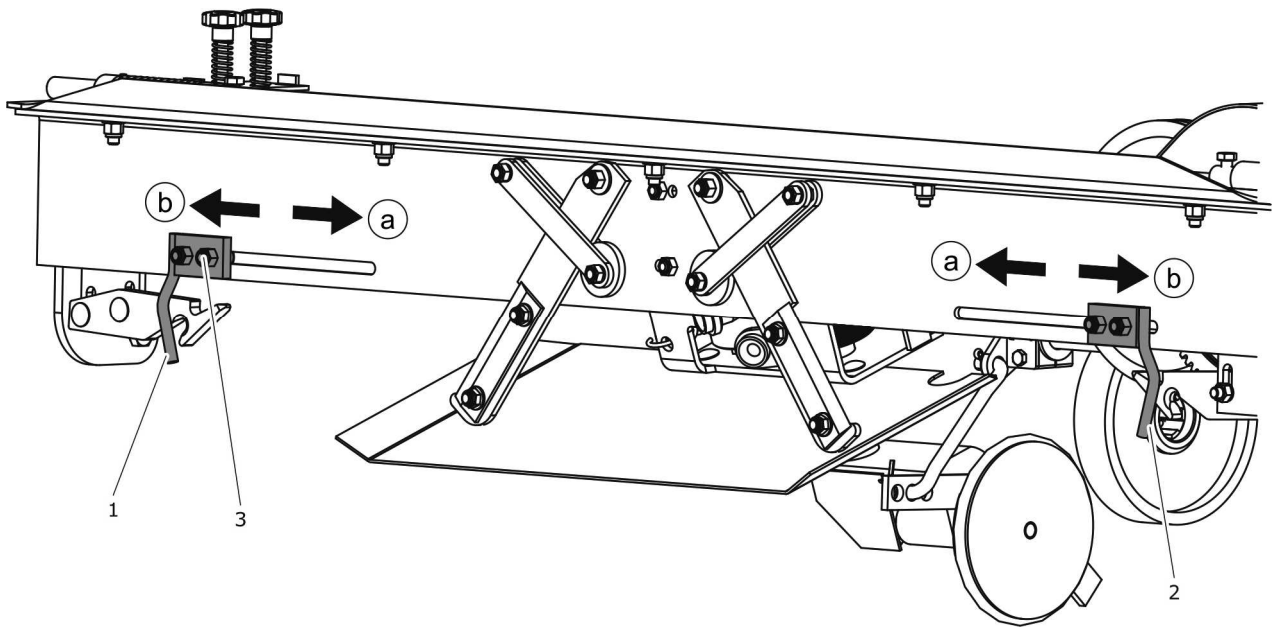
#### TIP

During the adjustment, both limiters should be shifted symmetrically.

Spacing of limiters depends on the length of stalks of collected plants. Instructions concerning the setting of limiters are contained in the below table.

**TABLE 5.4 Adjustment of limiters**

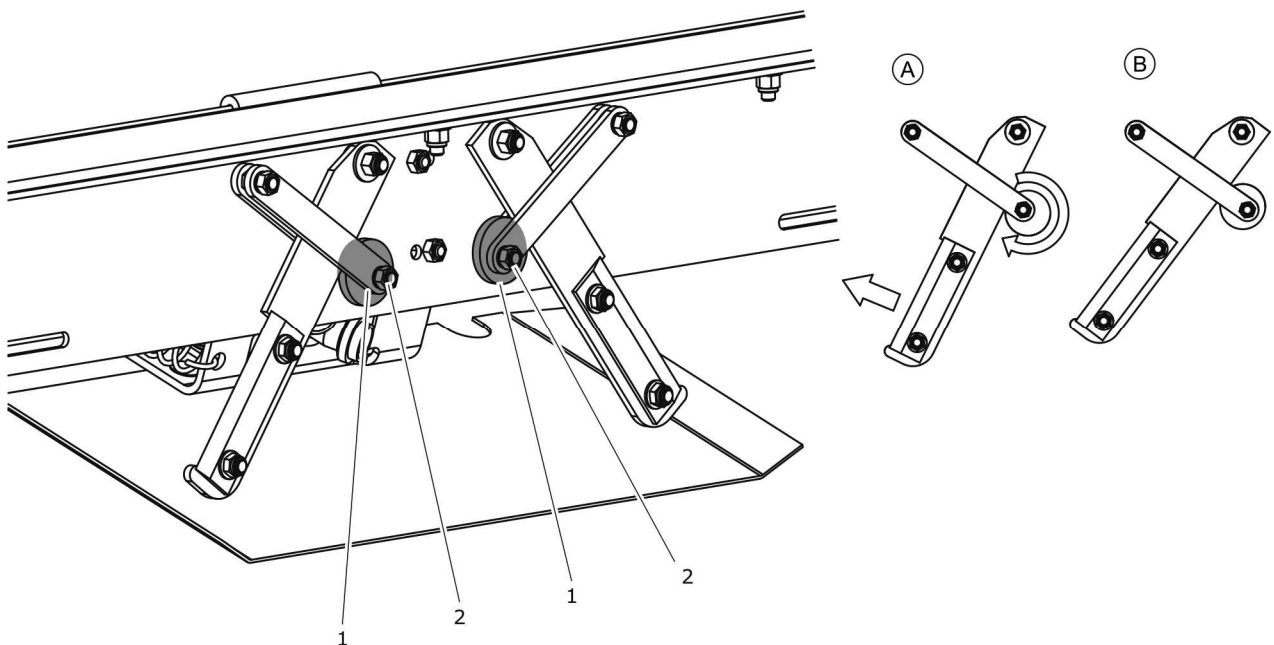
LENGTH OF STALKS OF COLLECTED PLANTS	RECOMMENDED SPACING OF LIMITERS
Short stalk	Internal edge of adjustment hole
Medium stalk	Centre of adjustment hole
Long stalk	External edge of adjustment hole



**FIGURE 5.9 Adjustment of limiters**

*(1) left limiter (2) right limiter (3) nut, (a), (b) adjustment directions*

**5.9.2 ADJUSTMENT OF KNIFE SETTING ANGLE**



**FIGURE 5.10 Principle of adjustment, rear view.**

*(1) eccentric washer, (2) clamp nut, (A) position of knife before adjustment, (B) position of knife after adjustment*

If the knives do not cut twine simultaneously and the cutting edge is sharp, reduce the knife setting angle. The adjustment is carried out by turning the eccentric washer (1) – figure (5.10) in such a manner as to tilt the knife to the outside of the round baler – position (B).



**Make the adjustment only if twine is not cut off despite the fact that the knives are sharp.**

### Required maintenance activities

- ➔ Open the twine wrapping system.
- ➔ Undo nut (1) fixing the eccentric washer.
  - ⇒ After loosening the nut, mark the position of washer (2).
- ➔ Turn the washer (2) in such a manner as to raise the knife – position (A).
- ➔ Tighten nut (1).
- ➔ Repeat the procedure for the second knife.



### TIP

**The adjustment is easier if the twine wrapping system is taken out of the baler body.**

## 5.9.3 REPLACEMENT OF KNIVES

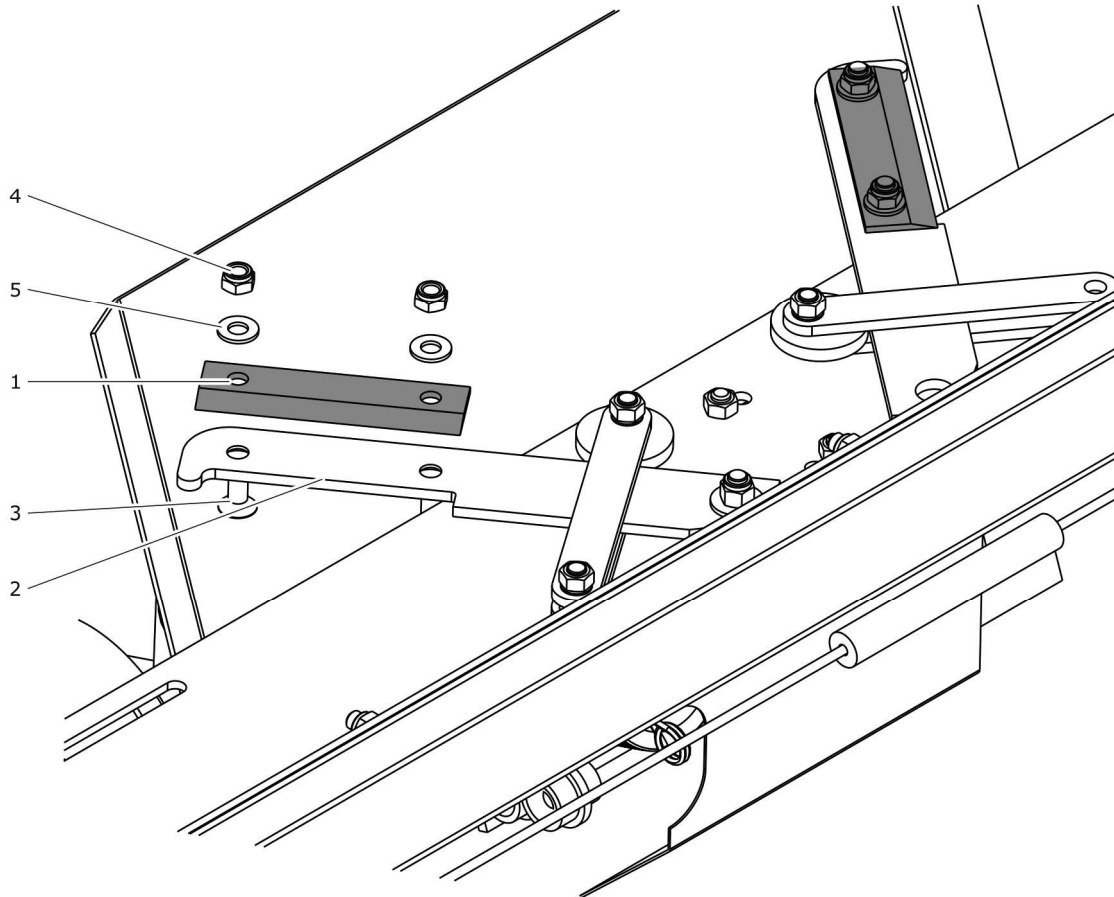
### Required maintenance activities

- ➔ Open the twine wrapping system.
- ➔ Undo nuts (4) – figure (5.11), remove bolts (3) and washers (5).
- ➔ Clean the sliders.
- ➔ Grease each side of new knives with small quantity of lubricating oil.
- ➔ Install new knives in such a manner as to ensure that their blades are directed outwards.
- ➔ Close the twine wrapping system.



**ATTENTION**

Surfaces of knives must not be painted. Maintenance of knives involves only periodic application of lubricating oil to the surfaces of knives.



**FIGURE 5.11** Replacement of knives, view from below, after opening the mechanism.

(1) cutting knife, (2) right slider, (3) bolt, (4) self locking nut, (5) washer



**DANGER**

During work, take particular care due to the risk of serious injury caused by sharp edges of cutting knives.



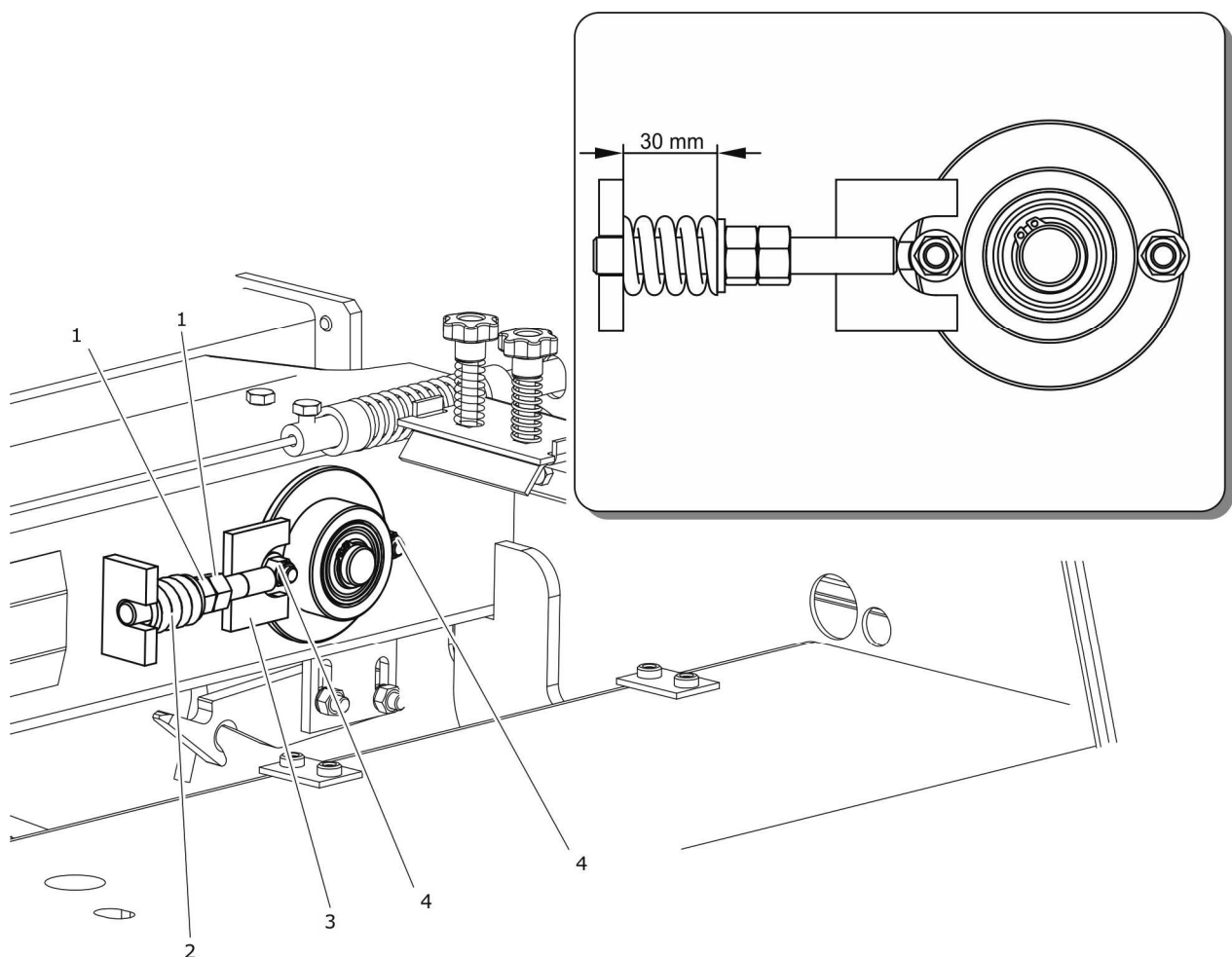
### 5.9.4 ADJUSTMENT OF CHAIN TENSION



#### Adjust tension of drive system chain:

- after making the first 10 bales (one time maintenance),
- every 100 – 120 bales (periodic maintenance)
- before working season (periodic maintenance).

#### Scope of adjustment activities



**FIGURE 5.12 Adjustment of drive chain tension**

(1) nut, (2) tension spring, (3) tensioner, (4) bearing housing nut

Tension of drive chain should be adjusted after making the first 8 - 10 bales. The next inspection should be carried out after making 100 – 120 bales. Tension of drive chain should be carried out before each working season.

- ➔ Loosen nuts (1).
- ➔ Loosen bearing housing nuts (4).
- ➔ Tighten left nut (1) in such a manner as to ensure that the length of spring (2) is 30 mm.
- ➔ Tighten counter nut (1).
- ➔ Tighten bearing housing nuts (4).

## 5.10 ADJUSTMENT OF PICKUP HEADER POSITION

Height of pickup header has a decisive influence on round baler operation. The machine is factory adjusted by the Manufacturer and the factory settings must not be changed. However, depending on natural topography, the operator must adjust the round baler to conditions existing during swath collection.

During normal operation of the round baler, the pickup header height is adjusted from the operator's seat (in the tractor cab). In order to adjust proper pickup header height, set the round baler's controller in the position which enables operation of pickup header rising and lowering cylinders. Set the pickup header at the correct height.

If the operating range of the cylinders is too narrow (the pickup header is positioned too high or too low with regard to the ground), make the adjustment of height range.



### ATTENTION

Inspection and adjustment of pickup header may be carried out only if air pressure in tyres of wheels and support wheels is correct.

### 5.10.1 ADJUSTMENT OF HEIGHT OF SUPPORT WHEELS

To make the adjustment, position the round baler hitched to tractor on flat and level ground. Lower the pickup header in such a manner as to ensure that the support wheels touch the ground or hang just above the ground. Confirm that one of the reel rows is in its extreme lower position. Otherwise, start the feeder for a short time and check the setting once again. Repeat this activity until the reels are positioned in a correct manner.

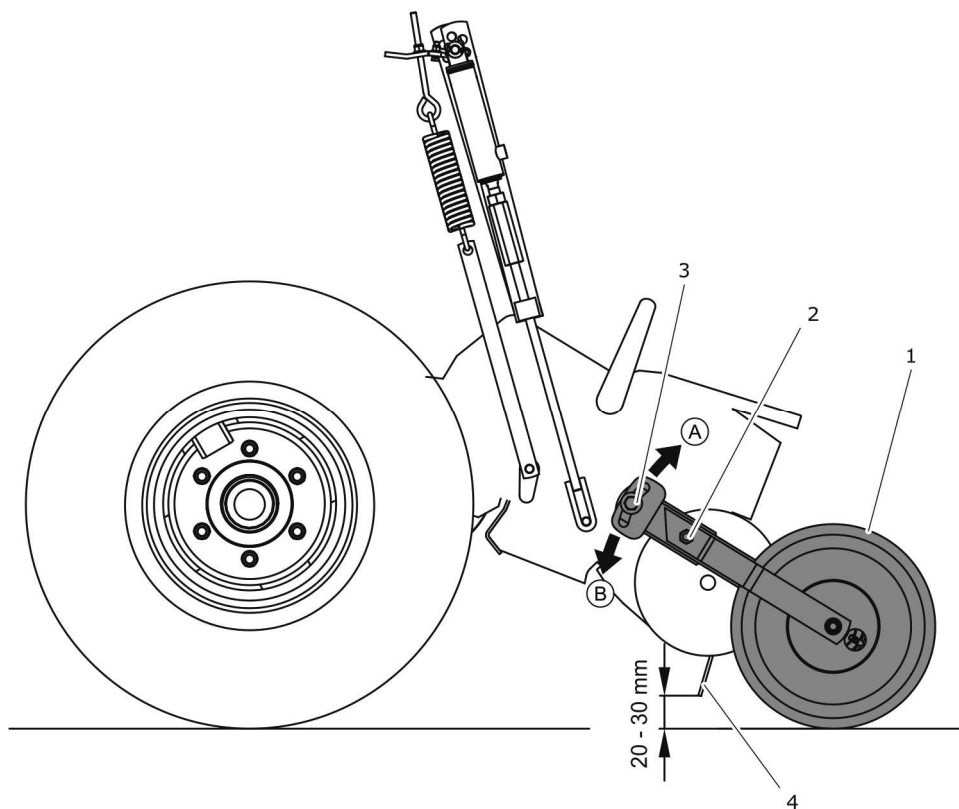
Measure the distance of the reel teeth from the ground (if the support wheels touch the ground) or from the lower part of tyre (if the wheels are above the ground). If the measured distance is outside the range of 20 – 30 mm, make the adjustment.

### Scope of adjustment activities



## DANGER

Before checking and adjusting the reel position, turn off the tractor's engine and remove the key from the ignition. Place the wheel chocks under the round baler's wheel and immobilise tractor with parking brake.



**FIGURE 5.13** Adjustment of support wheels

(1) support wheel, (2) fixing bolt, (3) adjustment bolt, (4) reel teeth

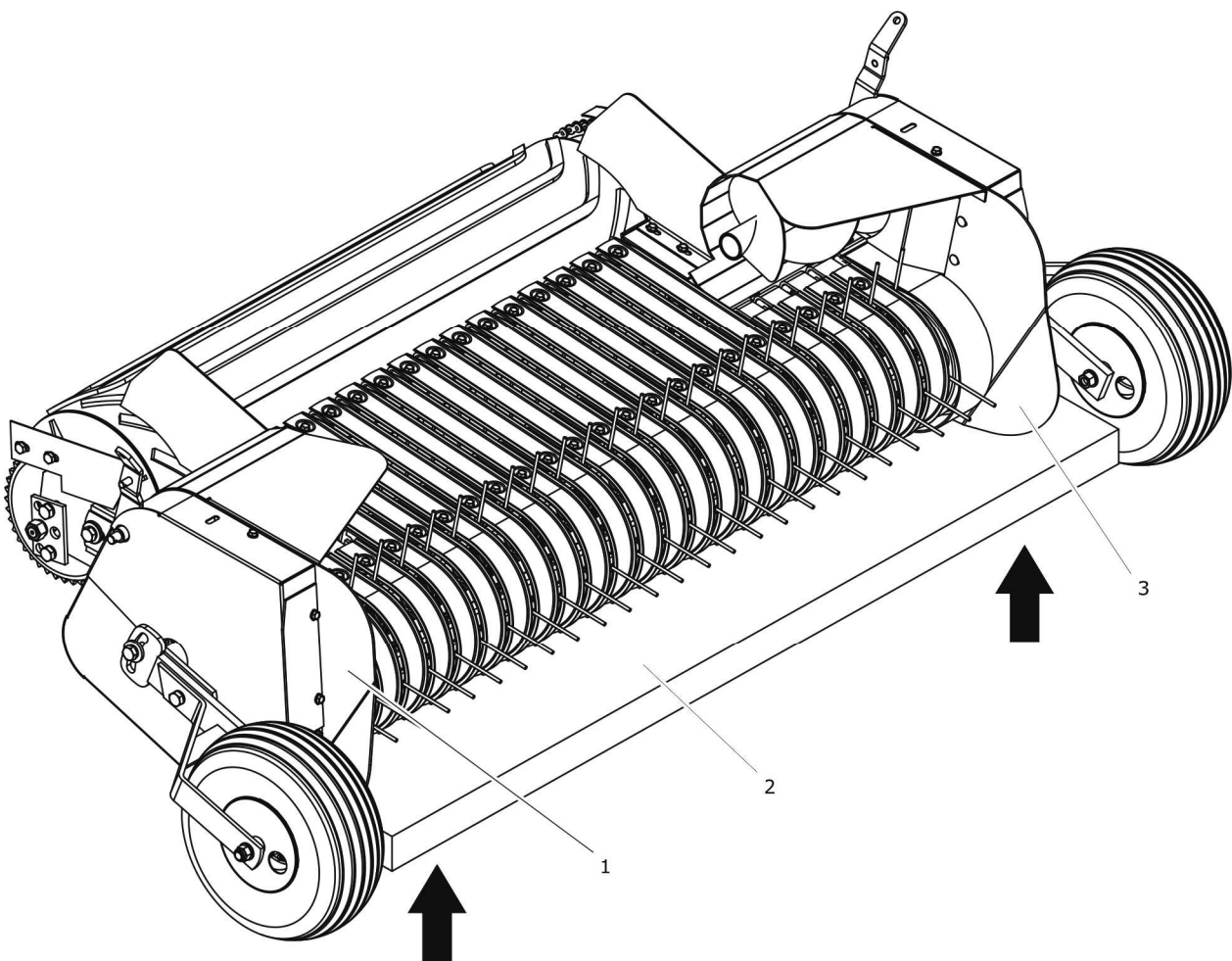
- ➔ Loosen fixing bolt (2) – figure (5.13), and adjustment bolt (3).
- ➔ Set the support wheel.
  - ⇒ If the distance is too small, turn the wheel arm to (A) direction.
  - ⇒ If the distance is too large, turn the wheel arm to (B) direction.

- ➔ Tighten the bolts and repeat the procedure on the other side of the round baler.

### 5.10.2 ADJUSTMENT OF THE MINIMUM HEIGHT OF PICKUP HEADER

When operating the round baler on uneven ground, there is a risk that the reel teeth may hit the ground when the support wheels touch the ground. If the working range of the pickup header rising cylinder is too small, make the adjustment of rising range.

#### Scope of adjustment activities

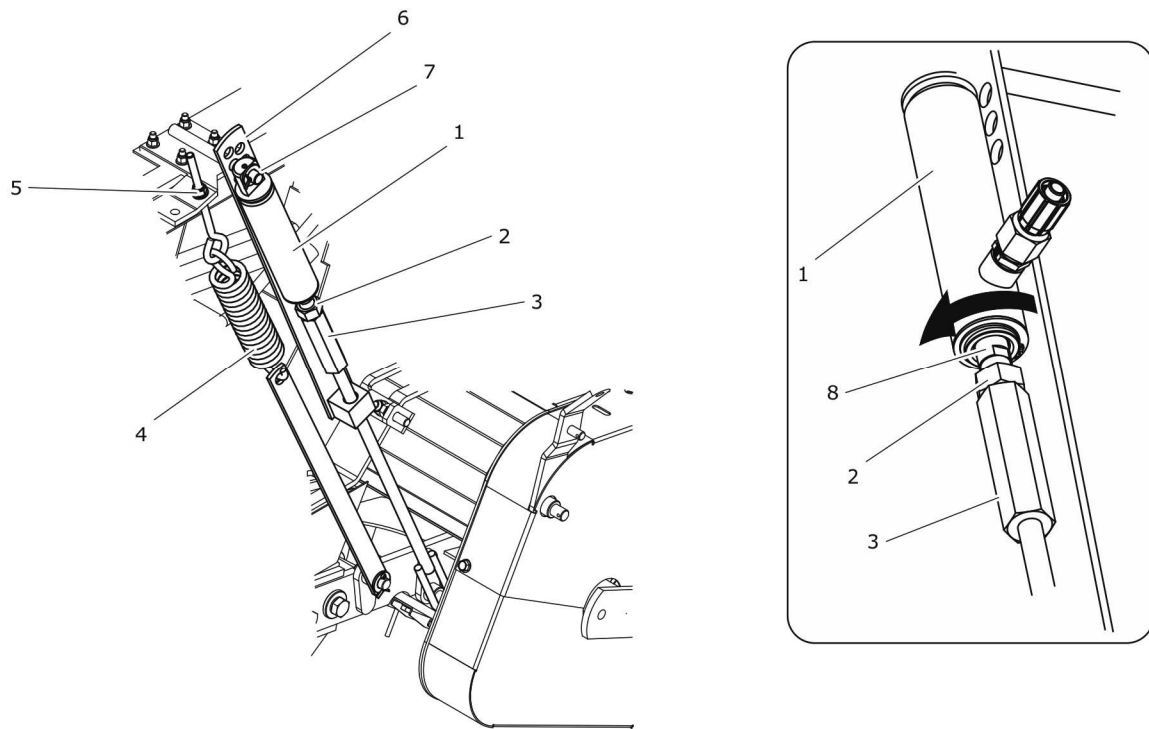


**FIGURE 5.14**      **Positions of jacks**

*(1) metal plate of pickup header, (2) board*

- ➔ Position the round baler on flat and stable surface.
- ➔ Insert board (2) and mechanical or hydraulic jacks under the side metal plate on the left side and the right side of pickup header (1) - figure (5.14).

- ➔ Open flap (7).
- ➔ Lower the pickup header onto the support, switch off the engine and remove key from ignition. Ensure that unauthorised persons do not have access to the tractor cab. Place securing chocks under a round baler wheel.
- ➔ Raise the pickup header slowly by means of jacks until it is possible to dismount hydraulic cylinder (1) and strip (6).
- ➔ Take out securing cotter pin (7) with washer and slide off the cylinder with adjusting strip.
- ➔ Raise the pickup header until it is possible to fix the strip and cylinder in a selected position.
- ➔ Secure the cylinder and strip with washer and cotter pin (7).
- ➔ Make the adjustment symmetrically on the opposite side of the round baler.
- ➔ Lower the jacks and remove the board from under the pickup header.
- ➔ Start the tractor's engine and raise the pickup header very slowly by means of cylinders (1). The other person must control that the pickup header will not hit the other structural elements of the baler in the upper position.
- ➔ Set the pickup header in such a position as to enable normal, failure-free operation of the round baler.
- ➔ Loosen counter nut (2).
- ➔ Hold the nut (3) and screw in the cylinder rod (8) in the direction indicated by the arrow (the pickup header will raise).
- ➔ After setting a correct height, tighten nut (2) to nut (3).
- ➔ Confirm that the adjusted pickup header will not hit the other round baler components.



**FIGURE 5.15 Adjustment of the minimum height of pickup header**

(1) hydraulic cylinder, (2) counter nut, (3) special nut, (4) shock absorber spring, (5) adjustment nut, (6) strip, (7) cotter pin, (8) cylinder rod

In the last stage of the adjustment, set tension of shock absorber spring (4).

- ➔ Lower the pickup header to the extreme lower position.
- ➔ Proper tension of the spring is obtained by tightening the nut (5).

After the adjustment, the support wheel must rest on the ground.

**DANGER**



The jacks used during the adjustment of the pickup header position must ensure safety of operators. Do NOT use out of order jacks.

The pickup header raised on supports must be supported in a stable manner. If stability of support is uncertain, correct the position of jacks and/or board.

## 5.11 ADJUSTMENT OF BALE COMPACTION INDICATOR

Adjustment of bale compaction indicator consists in setting the pointer (5) with regard to information decal concerning bale compaction.

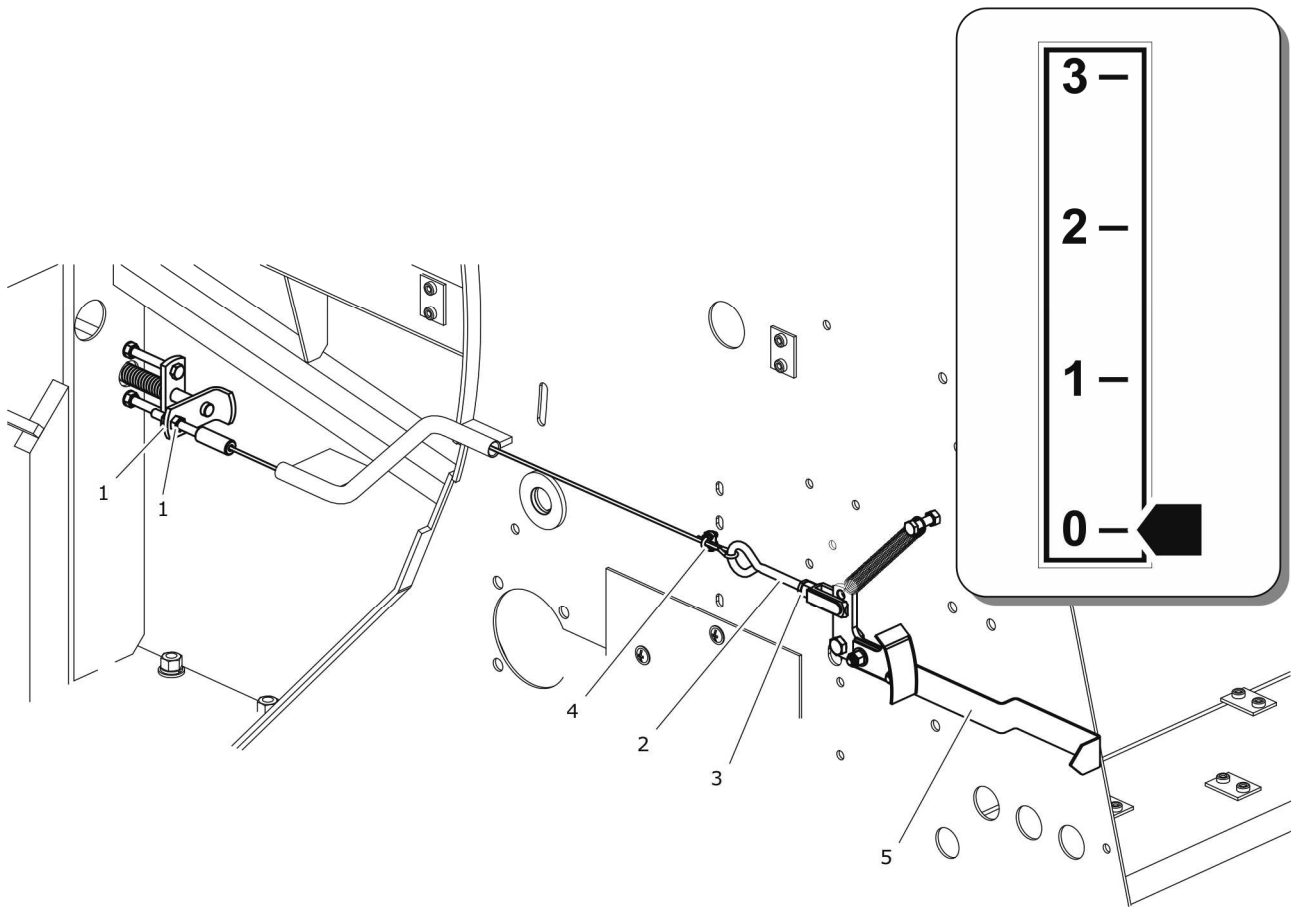
### Scope of adjustment activities

- ➔ Hitch the baler to the tractor, close and lock the flap.
- ➔ Switch off tractor engine, immobilise tractor with parking brake, ensure that unauthorised persons do not have access to the tractor cab.
- ➔ Open the left side flap and the right side flap by means of the key that is a part of the round baler's standard equipment.
- ➔ Secure side flaps against accidental closing.
- ➔ Loosen nuts (1) and adjust the indicator in such a manner as to ensure that the pointer indicates **0** position on the scale.
- ➔ Tighten nuts (1). Repeat this procedure on the other side of the round baler.
- ➔ Close the flaps by means of the key.



### TIP

The adjustment can be also made by means of eye bolt (2).



**FIGURE 5.16** Adjustment of bale compaction indicator

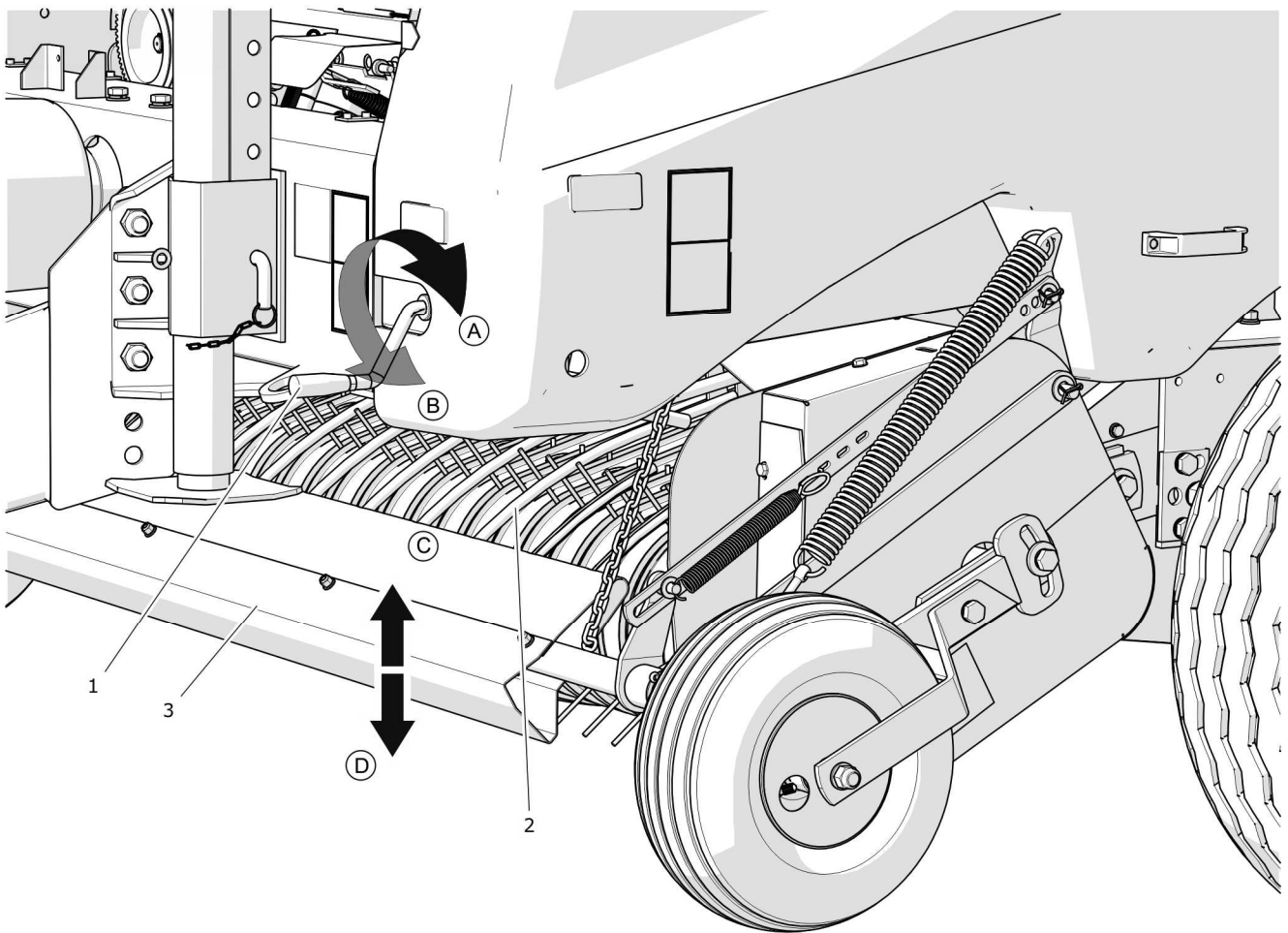
(1) nut, (2) eye bolt, (3) securing nut, (4) U-shaped clamp, (5) pointer

## 5.12 ADJUSTMENT OF PRESSURE RAKE AND STOP PLATE

### 5.12.1 HEIGHT ADJUSTMENT

Height of pressure rake and stop plate depends on swath size. When collecting small plants, pressure rake and stop plate should be set as low as possible. When collecting a large swath, pressure rake and stop plate should be set higher. Make the height adjustment each time before starting the round baler operation.



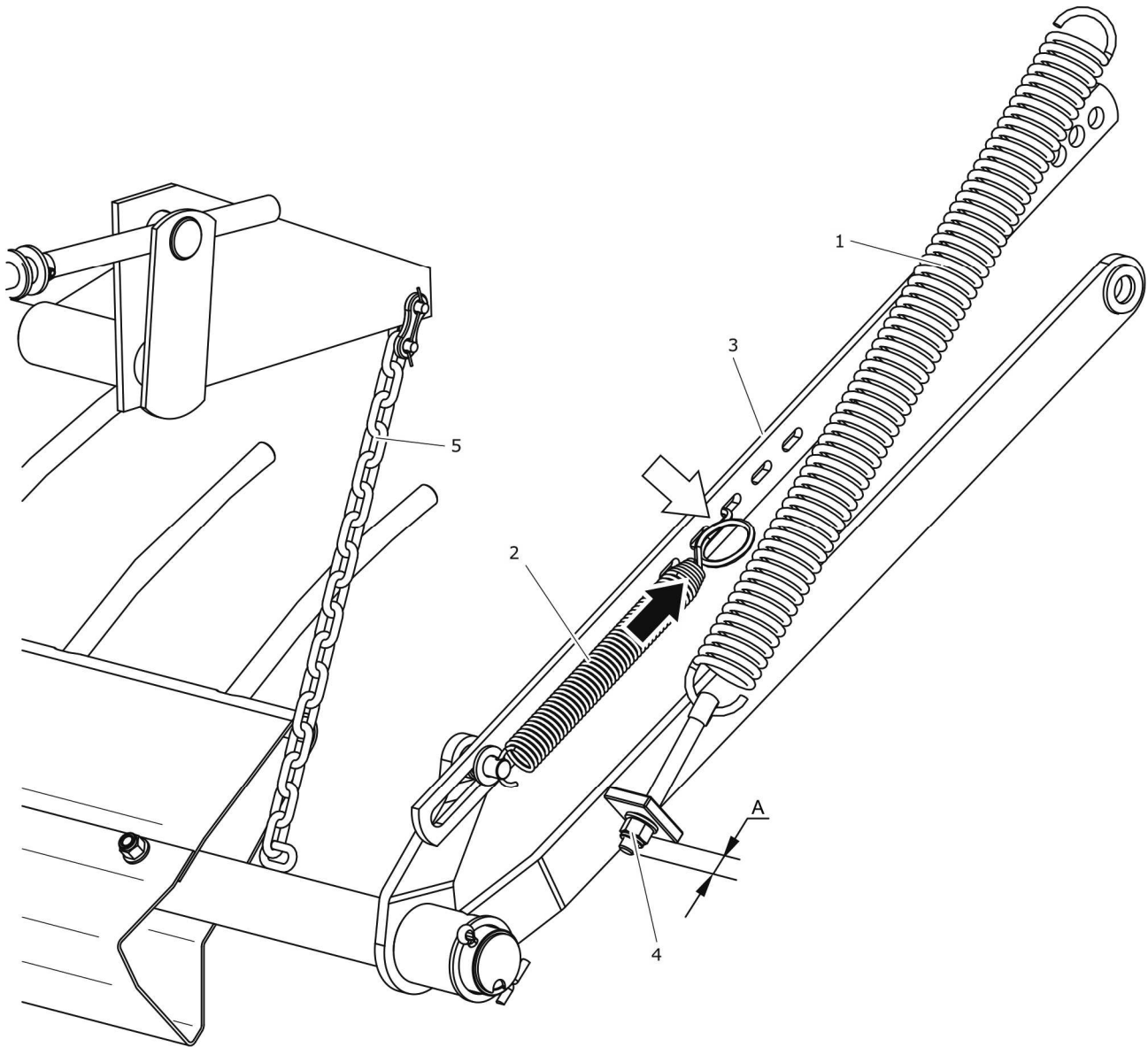


**FIGURE 5.17 Adjustment of height of pressure rake and stop plate**

*(1) crank, (2) pressure rake, (3) stop plate (A) rising the rake, (B) lowering the rake, (C), (D) movement direction of pressure rake and stop plate*

Set proper height by means of crank (1) – figure (5.17), located on the left side of the round baler. Turn the crank in (A) direction to shift the pressure rake and stop plate up – in (C) direction. Turn the crank in (B) direction to lower the pressure rake and stop plate – in (D) direction.

**5.12.2 ADJUSTMENT OF PRESSURE FORCE**



**FIGURE 5.18 Adjustment of pressure force of rake and stop plate**

(1) shock absorber spring, (2) tension spring, (3) adjustment holes, (4) adjustment nut, (A) length of bolt thread

The pressure applied by the rake to the swath can be adjusted by changing the tension of spring (2).

### Scope of adjustment activities

- ➔ Dismount the end of spring (2) – figure (5.18), marked with white arrow, from the strip.
- ➔ Relocate the spring catch to a selected adjustment hole.
  - ⇒ If the spring is tightened more strongly (black arrow), the rake will apply a larger pressure to the swath.
- ➔ Repeat this activity on the other side of the pickup header.

Position and optimal pressure of the pressure rake and stop plate are set depending on size and type of collected swath as well as the surface on which the round baler is working. The adjustment parameters are selected based on practical experience by the round baler operator.



### ATTENTION

Spring catch (2) on the left side and the right side of the baler should be set in the same adjustment hole. Otherwise, collected material will not be pressed uniformly, which may cause frequent clogging of pickup header or wrong bale formation.

### Adjustment of speed of falling of stop plate and pressure rake

Due to various ground surface features and swath thickness, the stop plate with pressure rake must not be rigidly fixed. Pressure system makes oscillating movements during its operation. If pressure rake and stop plate fall violently, make the adjustment.



Each time before starting work, adjust the height of pressure rake and stop plate.

### Scope of adjustment activities

- ➔ Measure (A) distance – figure (5.18) – distance between the end of eye bolt and the stop plate base.
- ➔ If the stop plate falls violently, tighten nut (4).

- ➔ If the stop plate falls too slowly or is excessively raised (chain is too loose (5)), undo nut (4).
- ➔ Make the adjustment on the other side of the stop plate.
- ➔ Check dimension (A) on the left side and the right side of the stop plate. Dimension (A) must be the same on both sides. If necessary, correct the setting.

## 5.13 ADJUSTING THE ROLLING SYSTEM CHAIN TENSION



Tension of drive chain should be adjusted after making the first 8 - 10 bales. The next inspection should be carried out after making 100 – 120 bales. Tension of drive chain should be carried out before each working season.



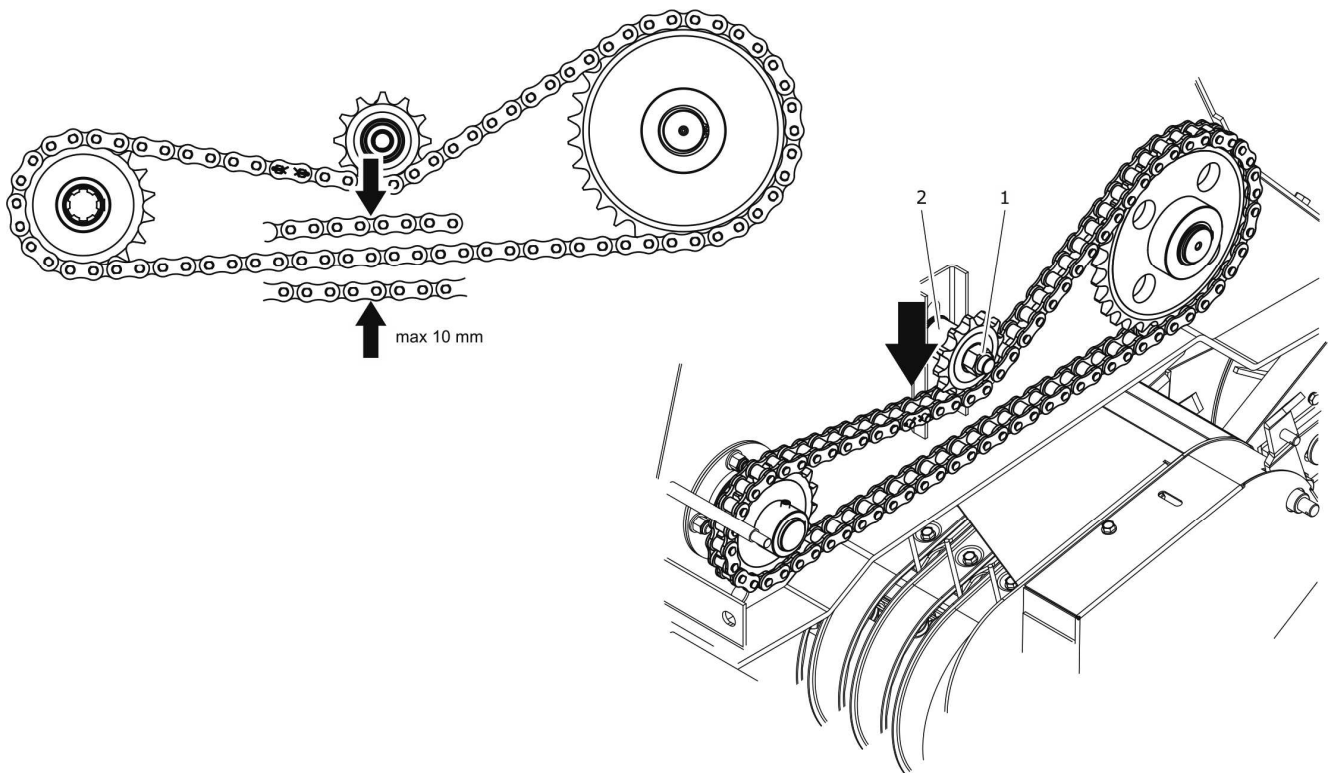
### TIP

Tensioner of the rolling system drive chain is located on the left side of the round baler.

### Scope of adjustment activities

- ➔ Open left flap.
- ➔ Loosen nut (1) and shift tensioner (2) down along the machine body guide.
- ➔ Hold the tensioner and tighten nut (1).
- ➔ Close flap.

The play of correctly adjusted chain should be 10 mm when the force of 300 N is applied. The measurement should be made by moving the lower part of the chain up and down with a specific force.



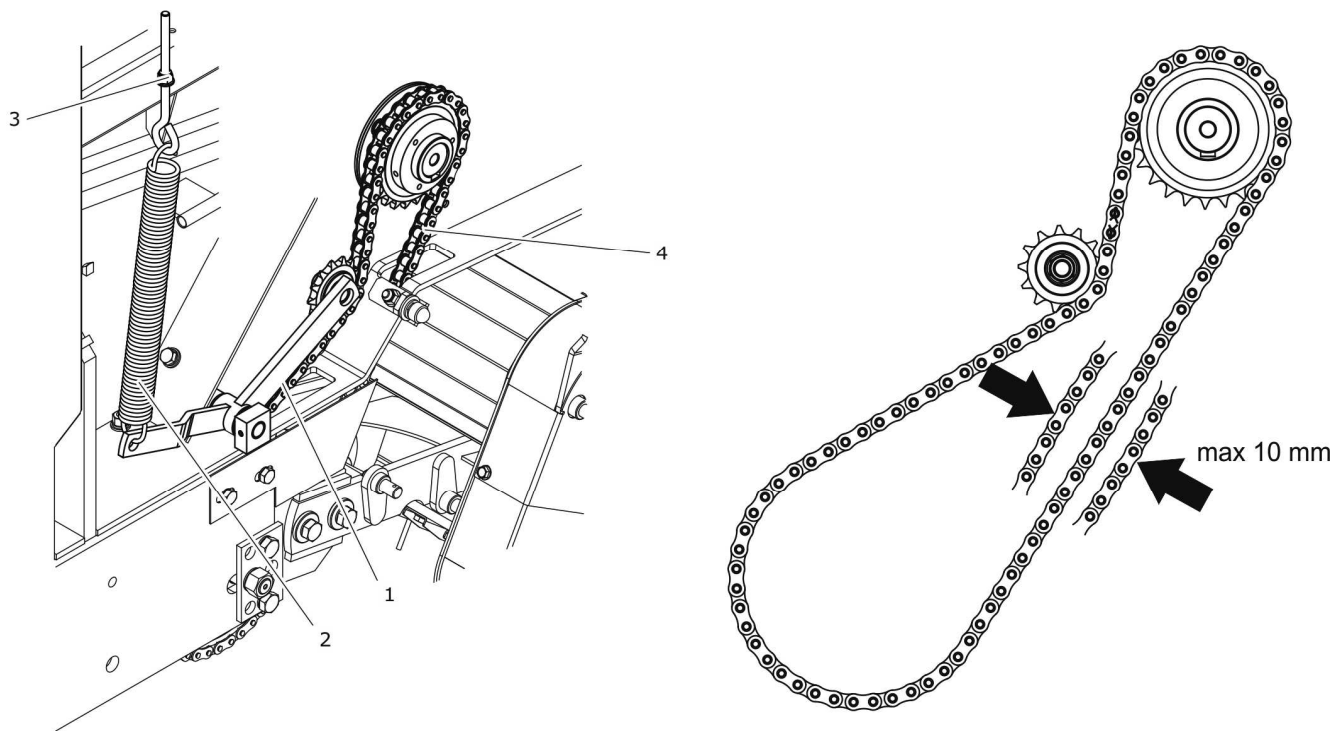
**FIGURE 5.19** Adjustment of the rolling system chain

(1) nut, (2) tensioner

## 5.14 ADJUSTMENT OF PICKUP HEADER DRIVE CHAIN TENSION

### Scope of adjustment and inspection activities

- ➔ Open right flap.
- ➔ Check chain looseness.
  - ⇒ If the chain is too loose, tighten the tensioner spring (2).
- ➔ Using nut (3), tighten spring (2) until proper chain tension is achieved.



**FIGURE 5.20 Adjustment of pickup header drive chain tension**

*(1) tensioner, (2) spring, (3) nut, (4) chain*

The play of correctly adjusted chain should be 10 mm when the force of 300 N is applied. The measurement should be made by moving the lower part of the chain up and down with a specific force.



The pickup header drive chain has the automatic chain tensioning mechanism. However, the tension control is required every 130 – 150 bales.

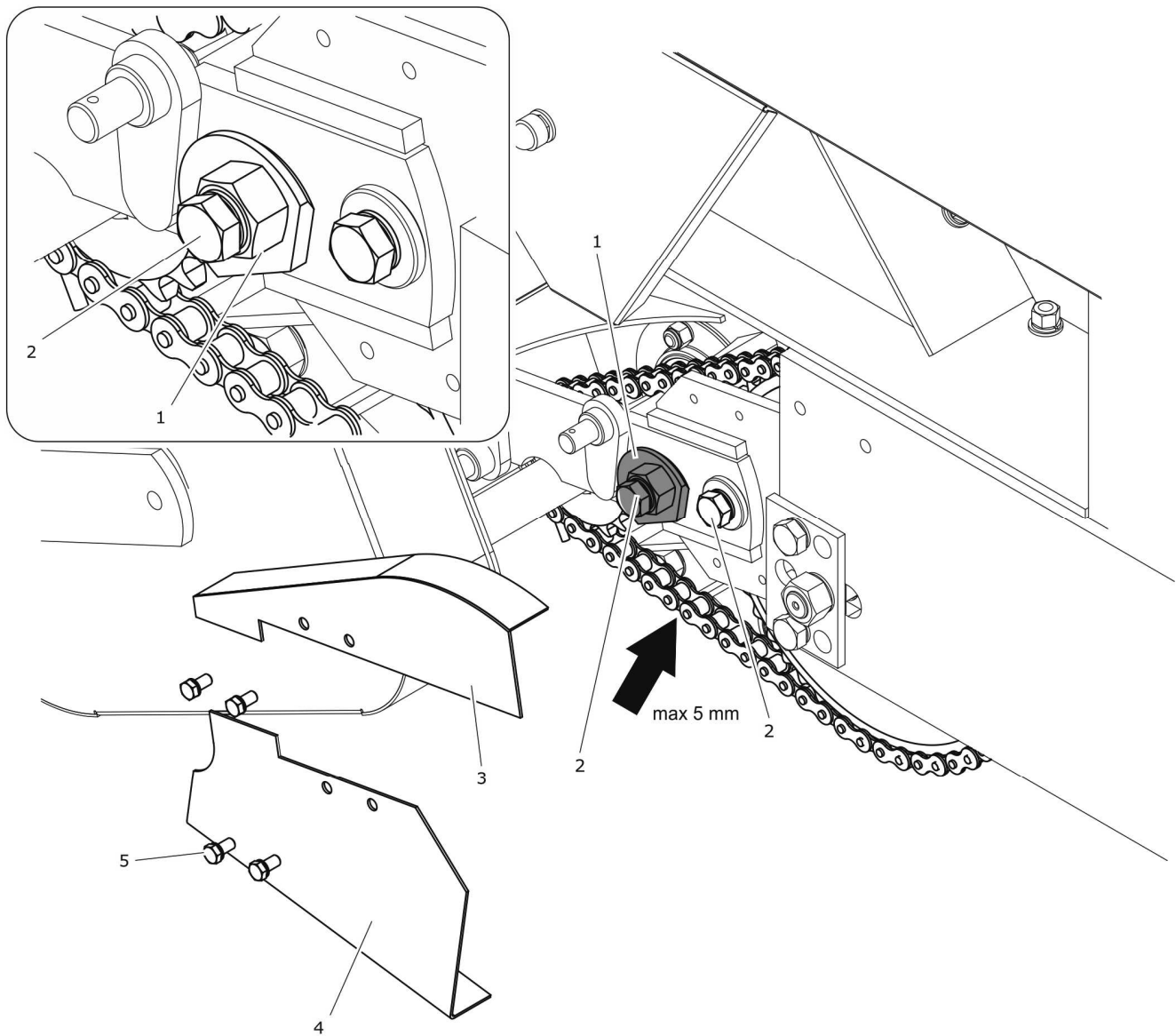
## 5.15 ADJUSTMENT OF REEL DRIVE CHAIN TENSION

Adjustment of reel drive chain tension is made by means of adjustment cam (1). In order to do this:

### Scope of adjustment activities

- ➔ Dismount chain shields (3) and (4) on the left side of the pickup header.

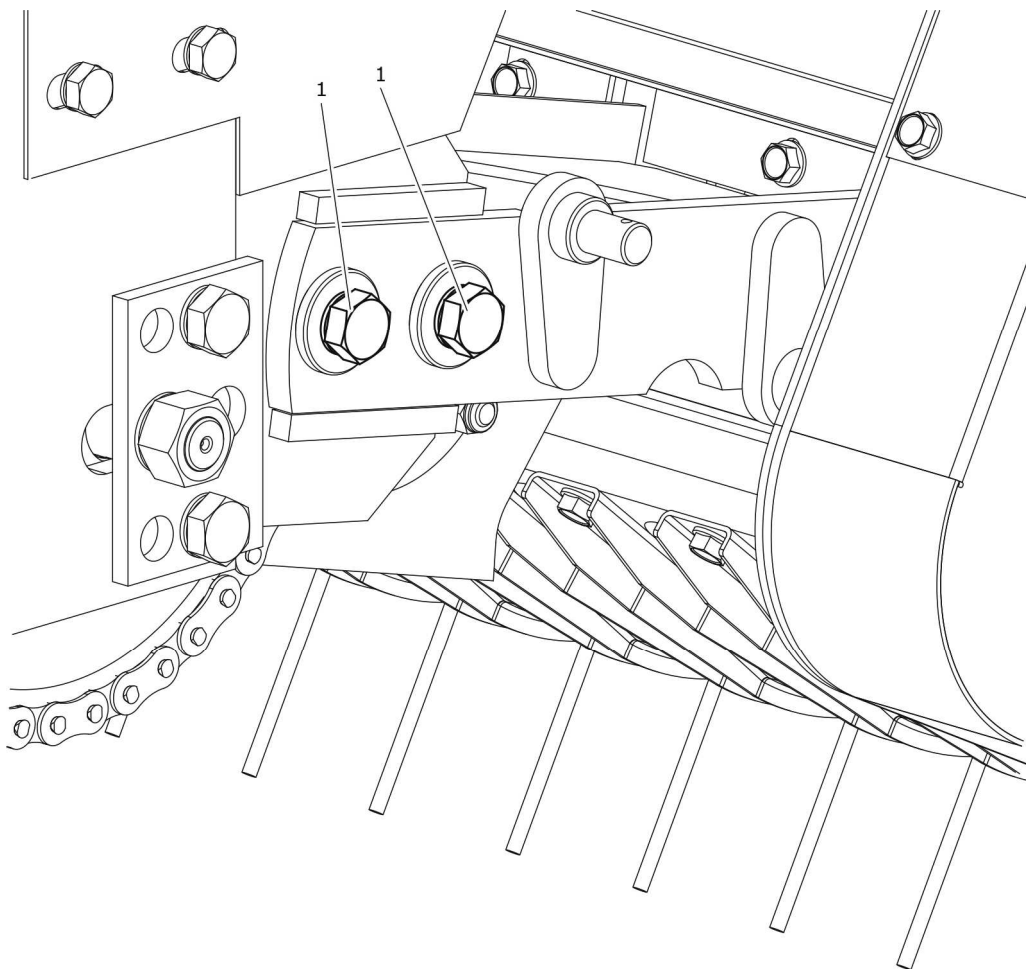
- ➔ Check chain looseness; correctly tensioned chain should be bent by about 5 mm when the force of 300 N is applied.
  - ⇒ Chain looseness should be measured halfway of the chain in the place marked by the arrow.
- ➔ If looseness is too large, unscrew fixing bolts (2) – figure (5.21) on the left side and (1) – figure (5.22) on the right side of the pickup header.
- ➔ Using cam (1) – figure (5.21), increase chain tension, tighten bolts (2) on the left side of the pickup header.
- ➔ Shift the reels from the right side of the round baler and set them in parallel with regard to the rolling drum.
- ➔ Tighten bolts (1) – figure (5.22) on the right side of the pickup header.
- ➔ Install shields.



**FIGURE 5.21** Adjustment of reel drive chain tension, view from the left side

(1) adjustment cam, (2) fixing bolt, (3) upper chain shield, (4) lower chain shield, (5) shield fixing bolts





**FIGURE 5.22** Adjustment of reel drive chain tension, view from the right side

(1) fixing bolt

## 5.16 ADJUSTMENT OF THE ROLLING SYSTEM DRUM POSITION

The rolling system chain has the automatic tensioning system. That is why, maintenance of this mechanism is not required. If the rolling chain is elongated, the distance between the chain and the pickup header drum is changed. This clearance should be checked at least once a year before working season. The clearance must be within 20 - 25 mm.

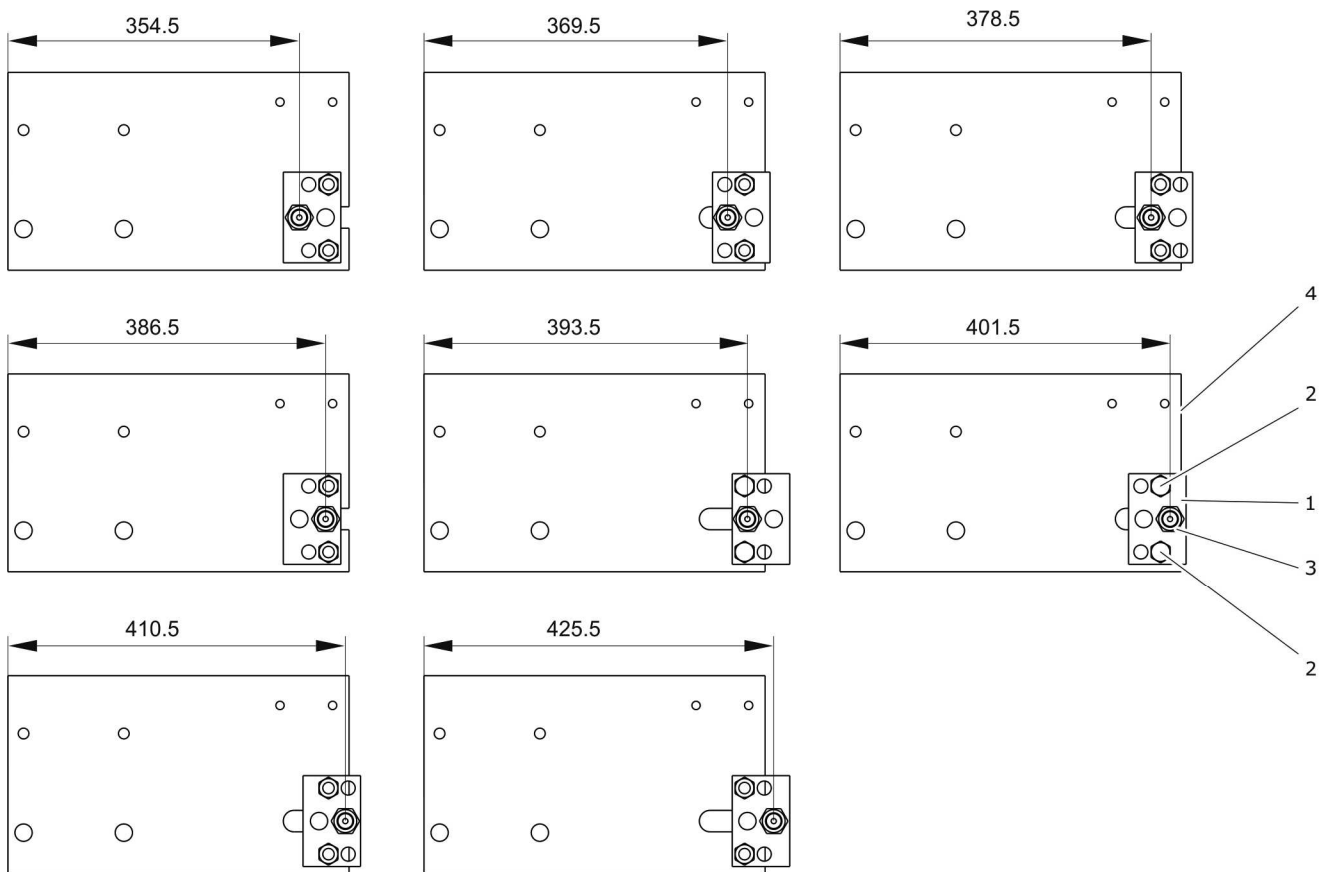
The clearance adjustment consists in changing the position of adjustment plate and the method of fixing the pickup header drum to the round baler body. Plate (1) has unsymmetrical holes. Thanks to this, there are 8 combinations of drum setting depending on the fixing of plate (1) to the body, fixing of drum (3) in plate (1) and the position of plate (1)

with regard to the machine body. All the combinations are shown in the below figure in the ascending order. Plate (4) is an integral part of the round baler's body.

**ATTENTION**

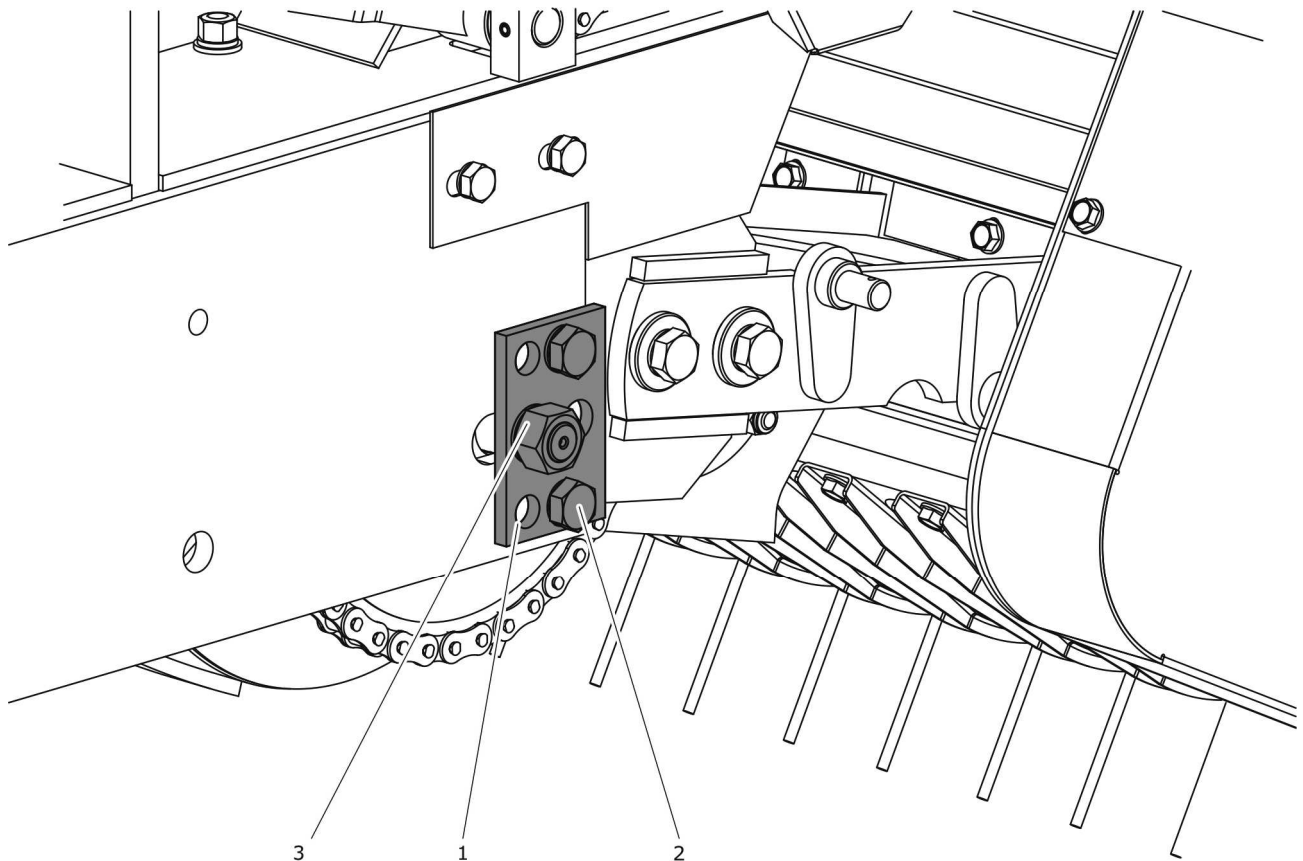


Cross-bars of the adjustment chain must be located in parallel with regard to the pickup header drum. If the setting of both elements is different, check position of adjustment plates on both sides of the round baler. If the clearance is too large, big losses will occur when collecting the swath containing small plants. If the clearance is too small, chains may hit the round baler's elements and damage the machine.



**FIGURE 5.23** Settings of adjustment plate

(1) adjustment plate, (2) fixing bolt, (3) drum axis retaining nut, (4) body plate

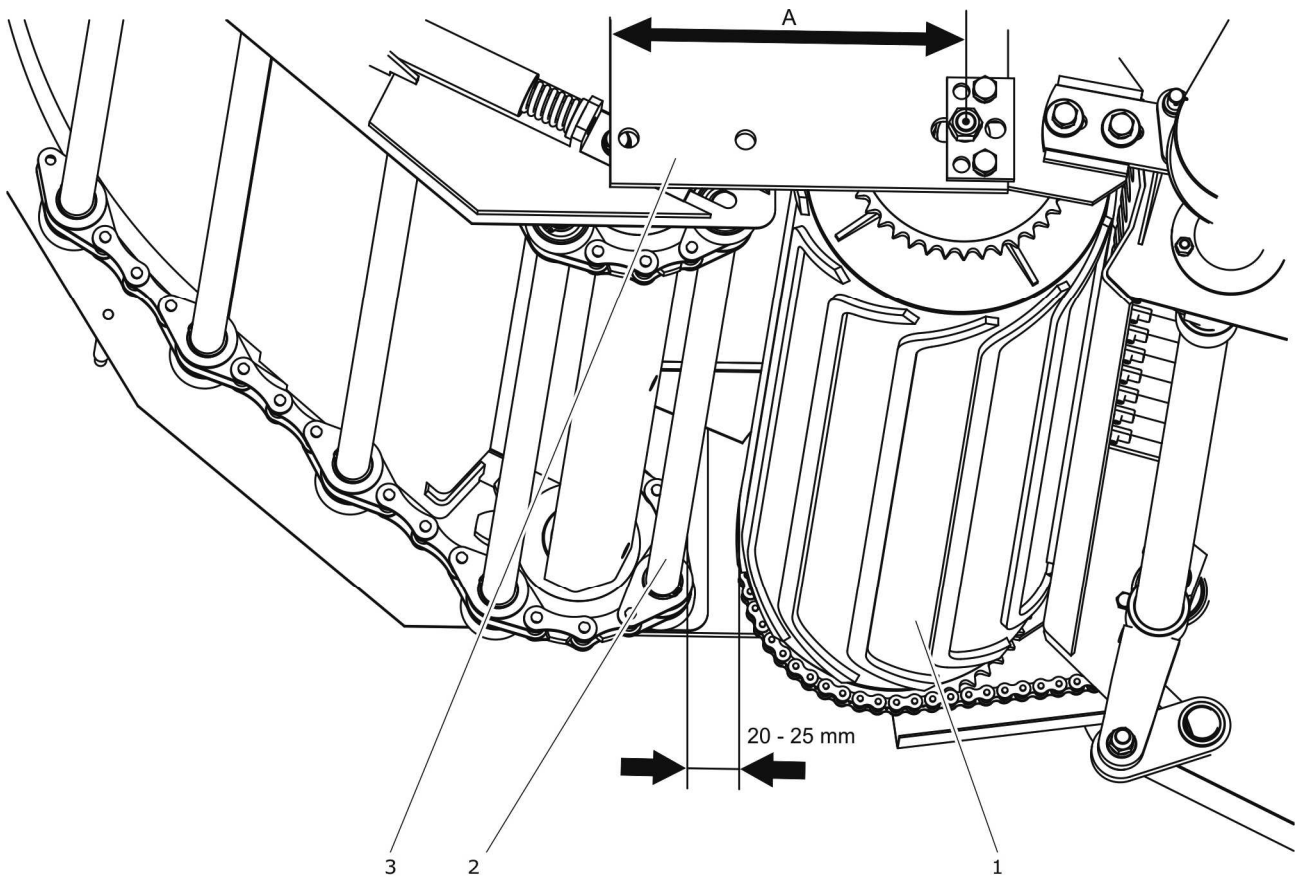


**FIGURE 5.24 Adjustment of the rolling system drum position**

*(1) adjustment plate, (2) fixing bolt, (3) drum axis retaining nut*

#### **Scope of adjustment activities**

- ➔ Measure the distance between drum and rolling chain cross-bar.
  - ⇒ Place of measurement is shown in figure (5.25).
- ➔ Unscrew fixing bolts (2) – figure (5.24).
- ➔ Unscrew nut (3).
- ➔ Dismount plate (1) and mount it in such a manner as to obtain correct clearance.
- ➔ Bolt the plate to the body and tighten nut (3).
- ➔ Repeat the procedure on the other side of the round baler. Remember that the plate must be positioned symmetrically.
- ➔ Check clearance and position of the drum with regard to the chain.



**FIGURE 5.25** Checking the distance between drum and rolling chain cross-bars.

(1) pickup header drum, (2) rolling chain cross-bar, (3) body plate, (A) distance between the drum axis and the body plate edge



**TIP**

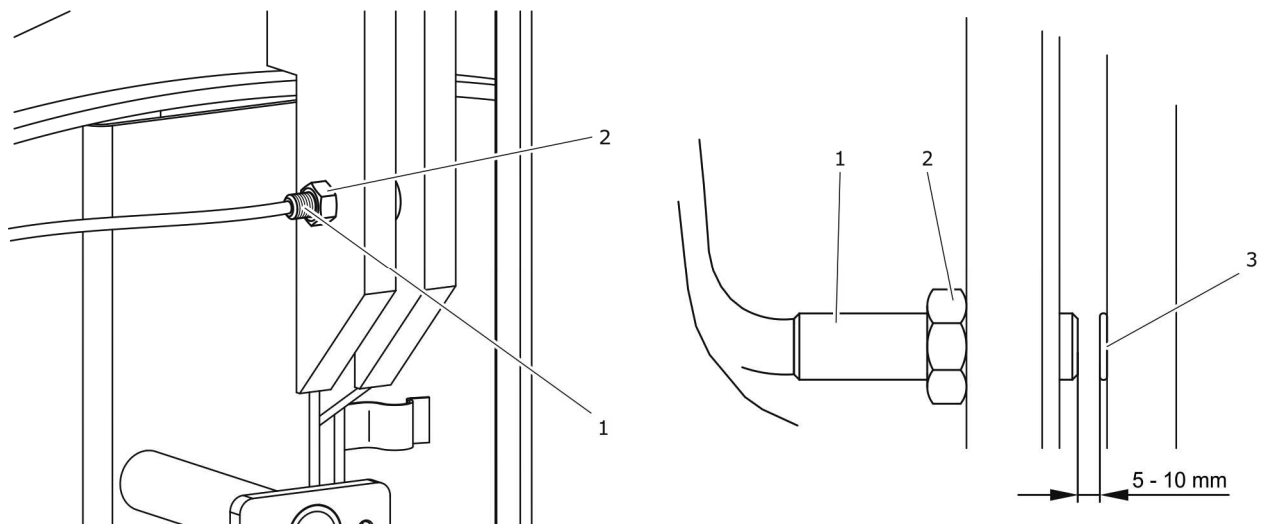
Before measurement of clearance, set the rolling chain precisely with regard to the pickup header drum. Correct chain position and measurement method are shown in figure (5.25).  
When selecting the adjustment plate position, refer to figure (5.23).

**5.17 ADJUSTING THE POSITION OF FLAP CLOSING SENSOR**

Opening of the baling chamber flap increases the counter indication by 1. If the counter indication does not increase, it means that the sensor distance may be incorrectly adjusted. Set the sensor when the baling chamber flap is closed and locked.

**Scope of adjustment activities**

- ➔ Close and lock the baling chamber flap.
- ➔ Open the shield flap on the left side of the round baler and secure it against accidental closing.
- ➔ Measure the distance between the magnet at the sensor.
- ➔ If the distance is smaller than 5 mm or larger than 10 mm, undo counter nut (2).
- ➔ Set the sensor at a distance between 5 and 10 mm from the magnet.
- ➔ Tighten counter nut (2), close the shield flap.

**FIGURE 5.26**      **Sensor adjustment**

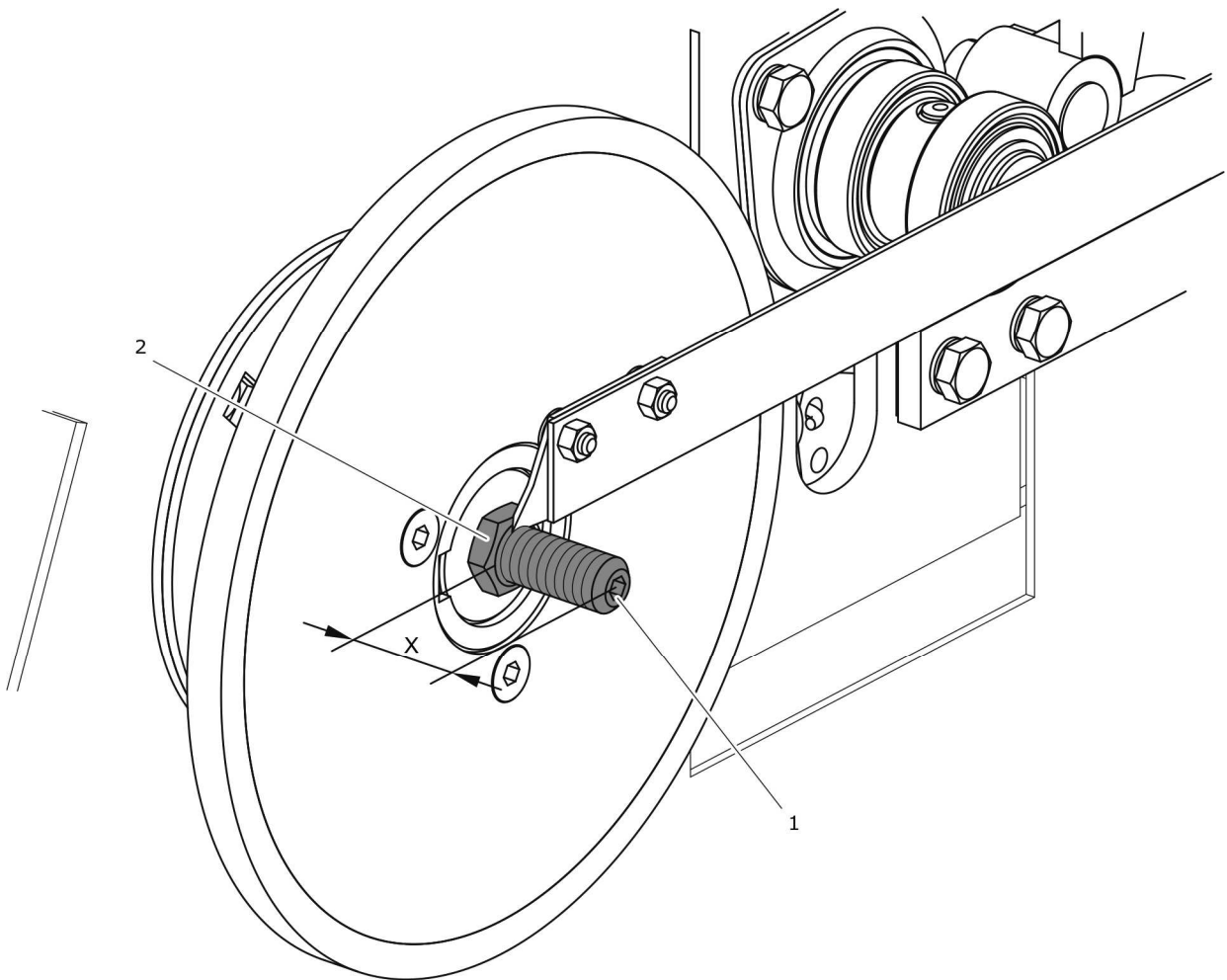
(1) sensor, (2) nut, (3) magnet

**TIP**

The bale counter may also malfunction if the sensor lead is damaged or the magnet got unstuck from the flap cross-bar.

## 5.18 ADJUSTING QUANTITY OF NET WRAPPINGS

Quantity of net wrappings depends on the length of setting bolt along which the elastic arm blade moves during wrapping. The adjustment consists in determining the length of the bolt corresponding to the quantity of net wrappings. Detailed data is contained in table (5.5) Adjustment bolt is located on the drive shaft of the drive wheel of the net wrapping system, on the right side of the round baler.



**FIGURE 5.27**      **Adjusting quantity of net wrappings**

(1) adjustment bolt, (2) counter nut, (X) length of bolt (wrapping quantity setting)

**TABLE 5.5** Adjustment data

LENGTH X [MM]	QUANTITY OF NET WRAPPINGS
12	1
24	2
36	3

**Scope of adjustment activities**

- ➔ Open the right side shield of the round baler.
- ➔ Dismount the lower shield.
- ➔ Hold adjustment bolt (1) using the key, undo counter nut (2).
- ➔ Unscrew (screw in) the bolt to a selected distance (X).
- ➔ Hold the bolt and tighten nut (2).

**TIP**

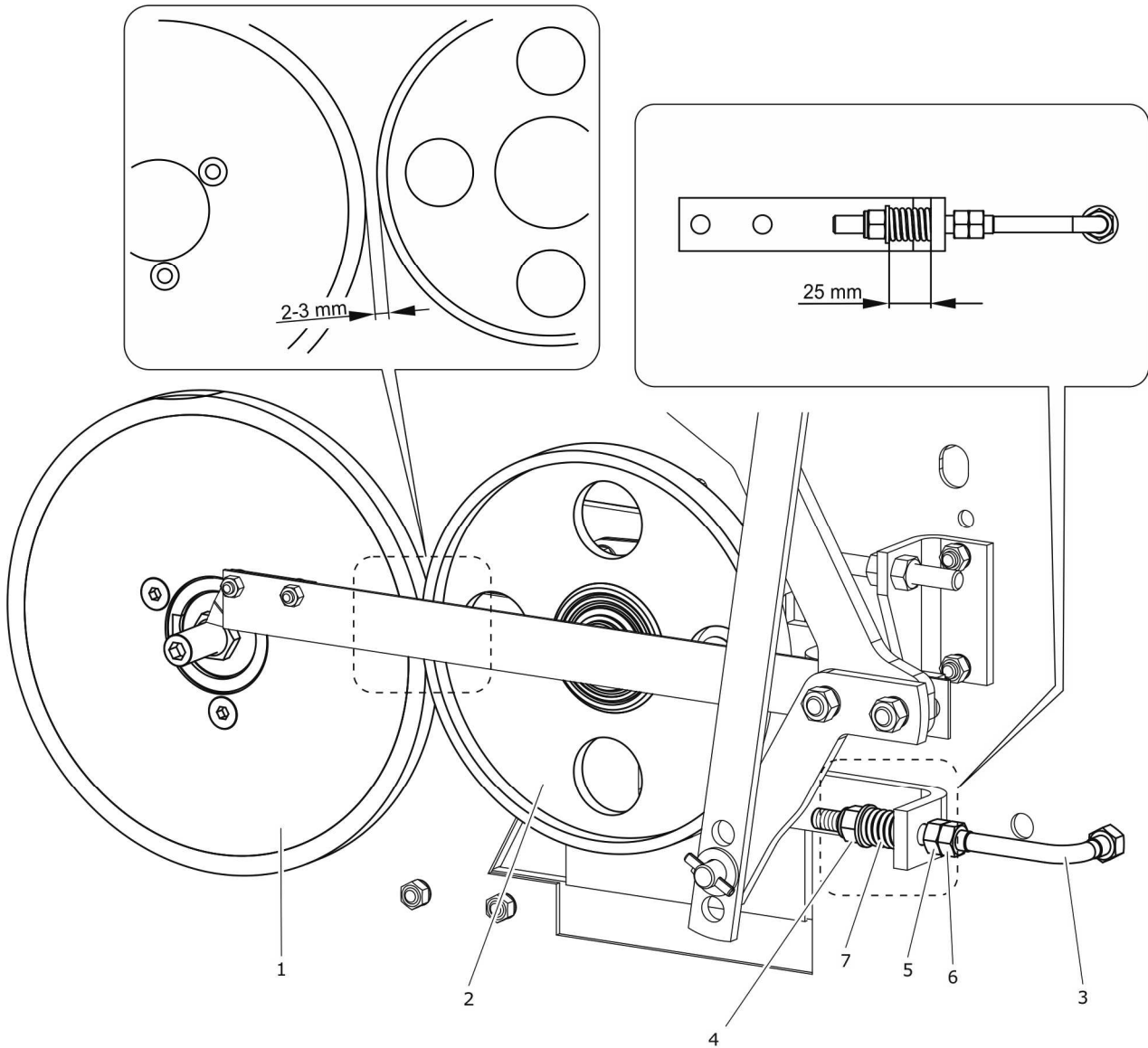
During the adjustment, remember that the adjustment bolt has the left-hand thread. The bolt is tightened anticlockwise.

## 5.19 ADJUSTING THE DISTANCE BETWEEN THE START WHEEL AND THE DRIVE WHEEL

**Scope of adjustment activities**

- ➔ Loosen counter nut (6) and adjusting nut (5).
- ➔ Insert a 2 - 3 mm-thick strip between start wheel (2) and drive wheel (1)
- ➔ Adjust the gap using nut (5).
  - ⇒ When unscrewing, the gap between the wheels is reduced.
- ➔ If it is possible to pull out the strip with slight resistance, tighten counter nut (6).

- ➔ Check tension length of tension spring. If the length exceeds the permissible value of 25 mm, set proper spring tension by means of tightening nut (4).

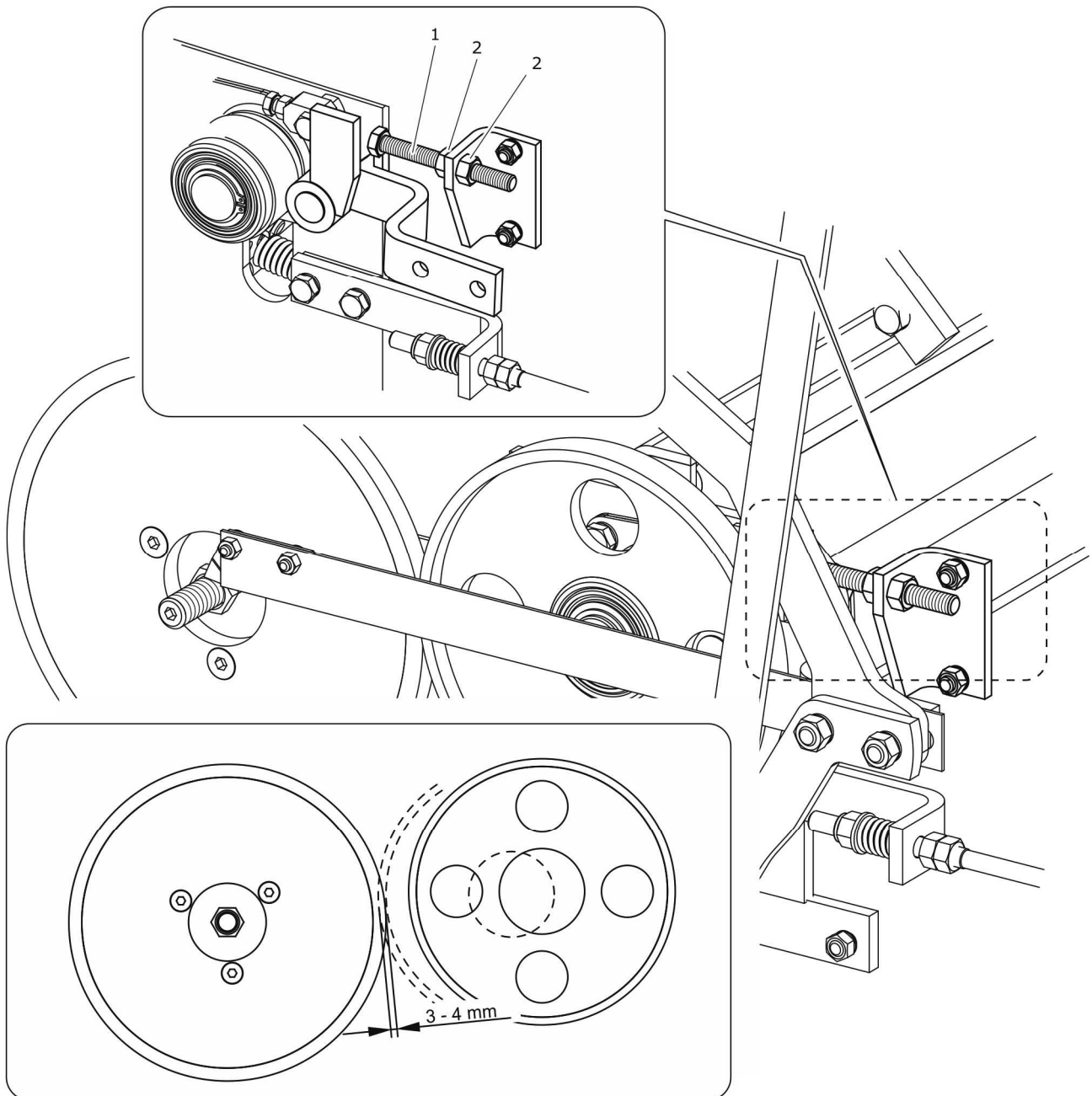


**FIGURE 5.28** Adjusting the distance between the start wheel and the drive wheel

(1) drive wheel, (2) start wheel, (3) tensioner, (4) tightening nut, (5) adjustment nut, (6) counter nut, (7) spring



## 5.20 ADJUSTING THE PRESSURE APPLIED BY THE START WHEEL TO THE DRIVE WHEEL



**FIGURE 5.29** Adjusting the pressure applied by the start wheel to the drive wheel

(1) adjustment bolt, (2) nut

Proper pressure force during net wrapping system operation is required to ensure failure-free drive transmission. Insufficient pressure may cause slipping of some actuators in the system.

## Scope of adjustment activities

- ➔ Check if counter nuts are properly tightened to fork links on start cable.
- ➔ Measure the clearance between start wheel and drive wheel.
- ➔ If the clearance is larger than 3 mm or smaller than 2 mm, adjust the distance - see section (5.19).
- ➔ Tilt the start lever located under the twine container maximally to the left.
- ➔ If the pressure depth is larger or smaller than the permissible range (3 – 4 mm), make the adjustment.
- ➔ Loosen nuts (2), if the pressure depth is too small, unscrew adjustment bolt (1) (maximally by  $\frac{1}{4}$  rotation).
- ➔ Check the pressure depth again.
- ➔ Repeat the adjustment if the distance is still incorrect.

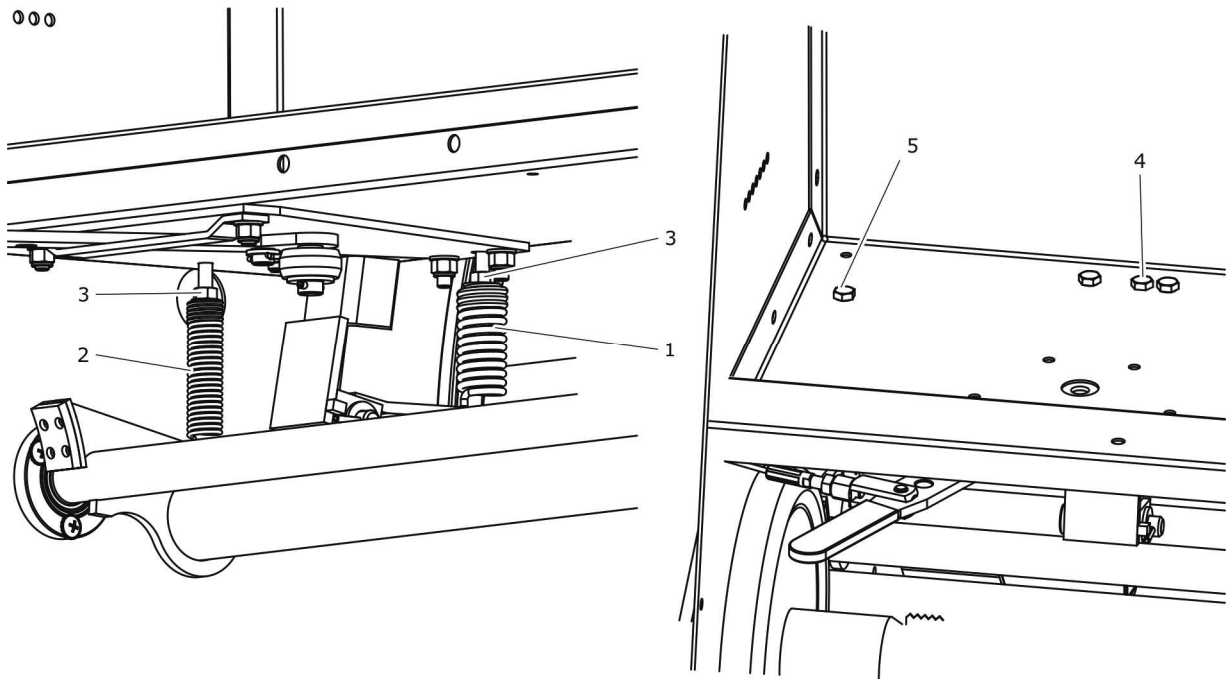
**TIP**

Adjustment work should be performed by two persons.

**ATTENTION**

The adjustment bolt may be unscrewed only by  $\frac{1}{4}$  rotation at a time. Large leverage of the main arm and great forces applied by the hydraulic start system may cause damage to the net wrapping mechanism if the pressure depth adjustment is incorrect.

## 5.21 ADJUSTING TENSION OF MAIN SPRING AND AUXILIARY SPRING



**FIGURE 5.30** Adjusting tension of main spring and auxiliary spring

(1) main spring, (2) auxiliary spring, (3) counter nut, (4) adjustment bolt of main spring, (5) adjustment bolt of auxiliary spring

When net wrapping is started, main spring (1) is tensioned and the resistance of net feeding to the bale is reduced. However, the net must be always tensioned. In the initial stage of wrapping, net tension is ensured by auxiliary spring (2), which applies pressure, through shock absorber lever and friction lining, to brake disc of net mounting system. If the auxiliary spring (2) tension is correct, it should be possible to rotate the brake wheel with net using a slight force (the start lever must be set in the start system working position). The factory setting of working stroke of auxiliary spring is 4 - 6 mm. The problems connected with wrong net cutting or pulling the net to the centre of bale may be caused by insufficient tension of main spring (1), whose purpose is to properly tension the net during bale wrapping.

Tension of springs depends on net material. That is why the tension of these elements must be selected based on practical experience.

**Scope of adjustment activities**

- ➔ Open the twine container.
- ➔ Loosen counter nut (3) of main spring.
- ➔ Screw in the adjustment bolt (4) in twine container - (2 rotations).
- ➔ Tighten counter nut (3).

After the adjustment, the brake disc should rotate with a large resistance. If the wrapping net is still unevenly laid on the bale (pulled to the bale centre) or is unevenly cut off, repeat the main spring adjustment.

Auxiliary spring is tightened in the similar way.

**Scope of adjustment activities**

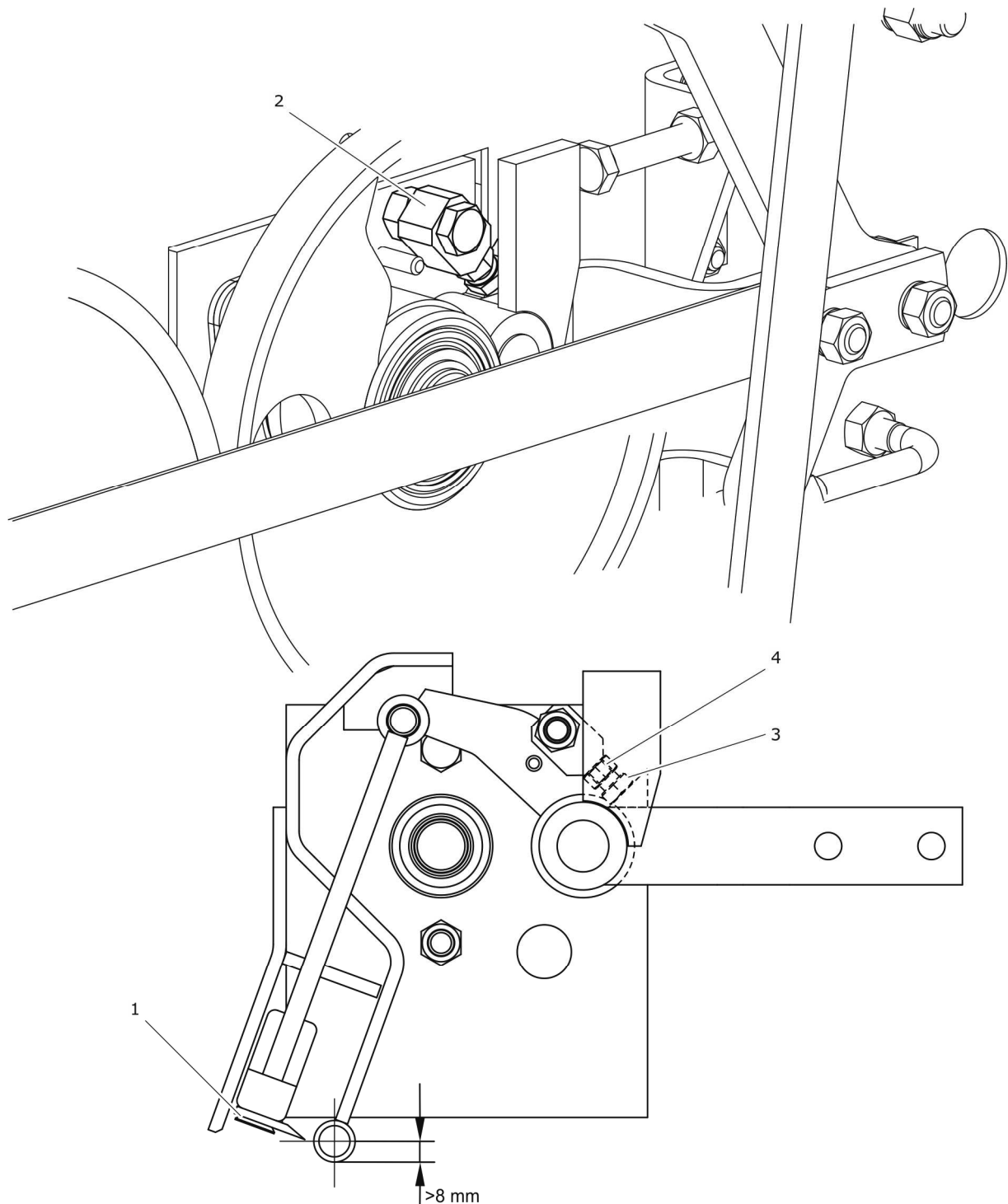
- ➔ Open the twine container.
- ➔ Loosen counter nut (3) of auxiliary spring.
- ➔ Screw in the adjustment bolt (5) in twine container - (2 rotations).
- ➔ Tighten counter nut (3).

The brake disc should rotate with a small resistance (when the start lever is pulled out).



**Check and possibly adjust tension of both springs after the first 10 days of round baler operation or if there are disturbances during net wrapping or cutting off.**

## 5.22 ADJUSTING THE POSITION OF CUTTING KNIFE



**FIGURE 5.31** Adjusting the position of net cutting knife

(1) cutting knife, (2) limiter (complete), (3) adjustment bolt of limiter, (4) counter nut of limiter bolt



**Check position of the knife before start of working season.**

### Scope of adjustment activities

- ➔ Pull the main arm towards the front of the baler.
- ➔ Shift the limiter (2), locking the start arm.
- ➔ Measure the distance between the knife edge and net guiding pipe.
- ➔ If the distance is smaller than 8 mm, undo counter nut (4) and unscrew adjustment bolt of limiter (3) – the knife will move up.
- ➔ Adjust until the knife edge will be at a distance of approximately 8 mm from the guiding pipe (the knife edge will be set in the pipe's axis of symmetry).
- ➔ Tighten counter nut (4).
- ➔ Adjust position of elastic arm.
- ➔ Check and, if necessary, adjust the pressure applied by the start wheel to the drive wheel.



### **DANGER**

**Be especially careful during the measurement because the knife edge is very sharp.**

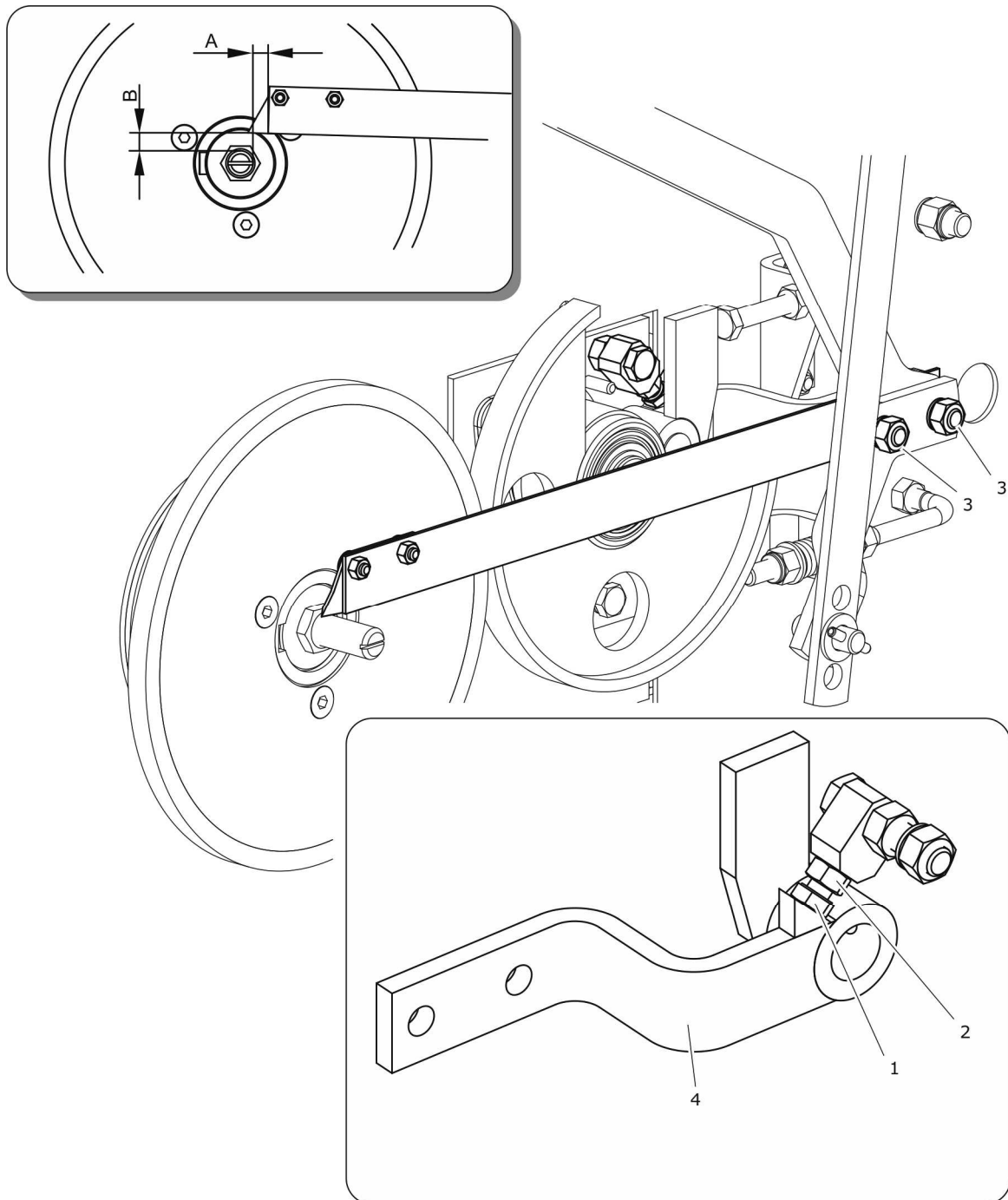


### **TIP**

**After each adjustment of cutting knife position, adjust the position of elastic arm.**

**Adjustment bolt (1) – figure (5.29) must not be supported on the start arm. After adjustment of cutting knife position, check and possibly adjust the depth of pressure applied by the start wheel to the drive wheel.**

## 5.23 ADJUSTING THE POSITION OF ELASTIC ARM



**FIGURE 5.32** Adjusting the position of elastic arm

(1) adjustment bolt, (2) counter nut, (3) securing nuts, (4) start arm

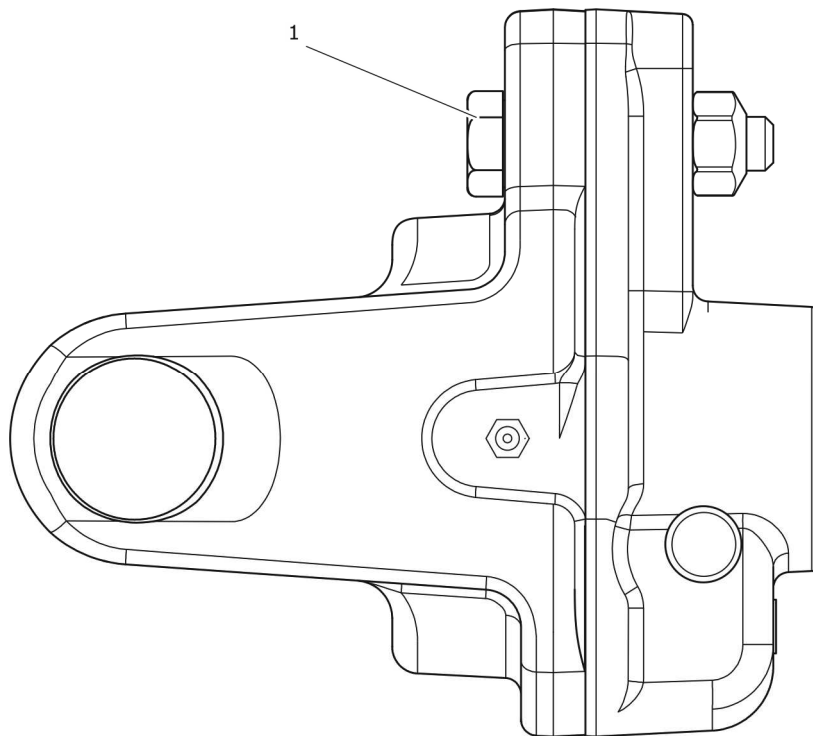
During net wrapping system operation, the blade attached to the elastic arm moves along the bolt thread and determines in this way the quantity of net wrappings on the bale. Correct

setting of the blade with regard to the adjustment bolt ensures failure-free operation of this subassembly. After each adjustment of net cutting knife position, adjust the arm position.

### Scope of adjustment activities

- ➔ Shift the limiter (2) to the position locking the start arm – figure (5.31).
- ➔ Loosen fixing nuts (3) – figure (5.32).
- ➔ Set the elastic arm in such a manner as to ensure that the front edge of the arm is located at a distance of 2 - 3 mm from the bolt thread – dimension (A), and the lower edge of the arm blade at a distance of 9 – 10 mm from the bolt thread - dimension (B).
- ➔ Tighten nuts (3) and shift the limiter.

## 5.24 REPLACING THE CLUTCH BOLT



**FIGURE 5.33** Shear bolt clutch


(1) bolt



PTO shaft supplied together with the round baler is equipped with the clutch protecting the drive system of the round baler and tractor against overloading. If the shear moment is exceeded – see table (5.6), bolt (1) is shorn and should be replaced with a new one. The bolt is shorn mainly if the feeder is clogged with excessive amount of swath material or in case of mechanical failure of the drive system. Before restarting the machine, find and remove the cause of clutch damage.

Standard version of the round baler is equipped with 71R4101CEWR7098 PTO shaft with the maximum torque of 1 700 Nm. The round baler can be optionally equipped with 71R4101CEWR71R0 PTO shaft with the maximum torque of 1 400 Nm.

The shaft is equipped with the clutch bolt with dimensions of M8x45 and strength class of 8.8. Before replacing the bolt, determine the type of PTO shaft and the maximum torque transferred by the tractor's PTO. Wrong bolt may cause damage to the tractor's PTO or round baler drive.

	<p><b>TIP</b></p> <p>Tightening torque for clutch bolt:</p> <ul style="list-style-type: none"> <li>• 25 Nm – for 8.8 class bolt,</li> <li>• 18 Nm – for 5.6 class bolt.</li> </ul>
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**TABLE 5.6** Choice of bolt depending on transferred torque of tractor PTO

PTO SHAFT	SHEAR MOMENT [NM]	BOLT SIZE	STRENGTH CLASS
71R4101CEWR7098	<b>1,700</b>	<b>M8X45</b>	<b>8.8</b>
	1,050	M8x45	5.6
71R4101CEWR71R)	<b>1,400</b>	<b>M8X45</b>	<b>8.8</b>
	860	M8x45	5.6



**ATTENTION**

The use of clutch bolt other than recommended by the manufacturer may cause damage to tractor or round baler.

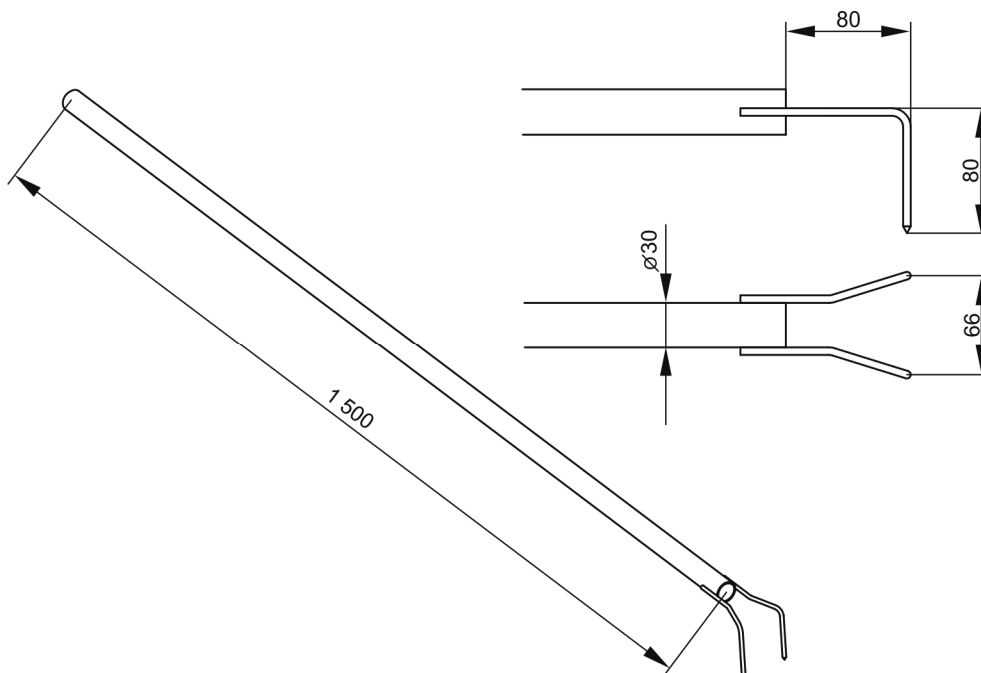
## 5.25 REMOVING PICKUP HEADER CLOGGING

Incorrectly formed swath or excessive driving speed during swath collection may lead to clogging the space between pickup header and baling chamber. Pickup header augers and reels can not transport excessive amount of swath material which is collected in this place and blocks transfer of swath to baling chamber space.



**TIP**

Pickup header clogging should be removed using the tool shown in figure (5.34). The user should make this tool by himself according to the figure



**FIGURE 5.34** Rake for removing pickup header clogging

**DANGER**

**Before removing pickup header clogging, stop the tractor, switch off the engine and remove key from ignition. Immobilise tractor with parking brake.**

To avoid pickup header clogging, pay special attention to swath forming when raking or tedding the crop material for baling. Maintain a low speed of the tractor with round baler (approximately 4 – 6 km/h). If the swath material is accumulated before the swath guides, reduce the speed again to avoid pickup header clogging.

## 5.26 ROUND BALER LUBRICATION

Lubrication of the round baler should be performed with the aid of a manually or foot operated grease gun, filled with recommended grease. Before commencing work insofar as is possible remove old grease and other contamination. Remove and wipe off excess oil or grease. Chains should be cleaned before lubricating with the use of kerosene or preparations designed for washing chains. Chain lubricating should not begin until the cleaning agent has completely dried out.

Parts to be lubricated with machine oil should be wiped with dry clean cloth and then a small quantity of oil should be applied to surfaces (using oil can or brush). Wipe off excess oil.

Change of grease in half axle hub bearings should be entrusted to specialised service points, equipped with the appropriate tools. According to the recommendations of the half axle Manufacturer, dismantle the entire hub, remove the bearing and individual sealing rings. After careful washing and inspection, mount lubricated elements. If necessary, bearing and seals should be replaced with new parts. Lubrication of half axle bearings shall be performed at least once in 2 years or every 50,000 km. In the event of intensive use, lubrication should be performed more frequently.

Empty grease or oil containers should be disposed of according to the recommendations of the lubricant Manufacturer.

**TABLE 5.7 Round baler lubrication schedule**

<b>ITEM</b>	<b>LUBRICATION POINT</b>	<b>NUMBER OF LUBRICATION POINTS</b>	<b>TYPE OF GREASE</b>	<b>FREQUENCY</b>
1	Intersecting axis gear	1	5	50/500 H
2	Transmission splines	1	1	30 H
3	Flap bearings	2	1	50 H
4	Wheel bearings	2	1	24 M
5	Hinges of side flaps	4	2	1 M
6	Bearings of guide roller tensioner	2	2	100 H
7	Rolling chain	1	4	15 H
8	Support bolt	1	1	12 M
9	Girder bolt	1	1	2 M
10	Indicator rotation seat	4	1	6 M
11	Lock blocking rotation pins	4	1	2 M
12	Lock arm rotation pins	2	1	2 M
13	Lock rotation pins	4	1	2 M
14	Indicator mechanism guide	2	1	6 M
15	Chain	1	3	15 H
16	Pickup header chain	1	3	15 H
17	Cam mechanism	1	1	30 H
18	Pickup header chain	1	3	15 H
19	Pickup header chain	1	3	15 H
20	Unloading plate pin	2	1	2 M
21	Sleeve pin	2	1	2 M

ITEM	LUBRICATION POINT	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	FREQUENCY
22	Guide sliding surface	1	1	1 M
23	Chain	1	3	15 H
24	Bearings of hydraulic cylinders	6	1	3 M
25	Tensioner rotation axis	1	1	6 M
26	Slide bearings of rolling system shaft	2	1	30 H
27	Intersecting axis gear	1	1	1 M
28	Start lever pin	1	1	6M
29	Chain	1	3	30 H
30	Pawl sliding surface	2	1	6 M

*lubrication periods – M - month, D – working day, H – working hour*

**TABLE 5.8 Recommended lubricants**

MARKING ACCORDING TO TAB. (5.8)	DESCRIPTION
A	machine general-purpose grease (lithium, calcium grease),
B	ordinary machine oil, silicon grease in aerosol
C	permanent grease for heavily loaded elements with addition of MoS <sub>2</sub> or graphite
D	biodegradable oil
E	gear oil

Detailed description of recommended lubricants is included in section *CONSUMABLES*.

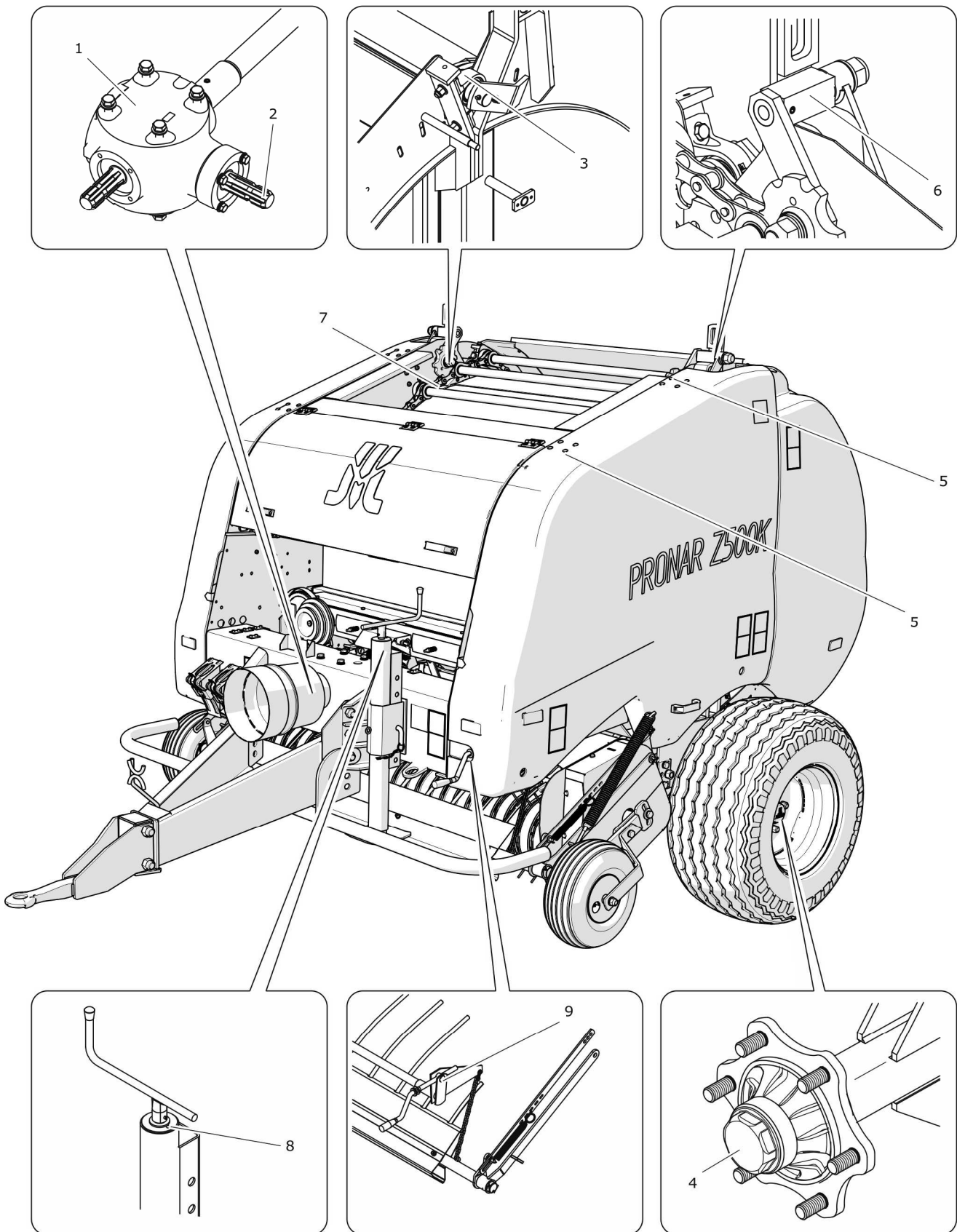


FIGURE 5.35 Round baler's lubrication points, part 1

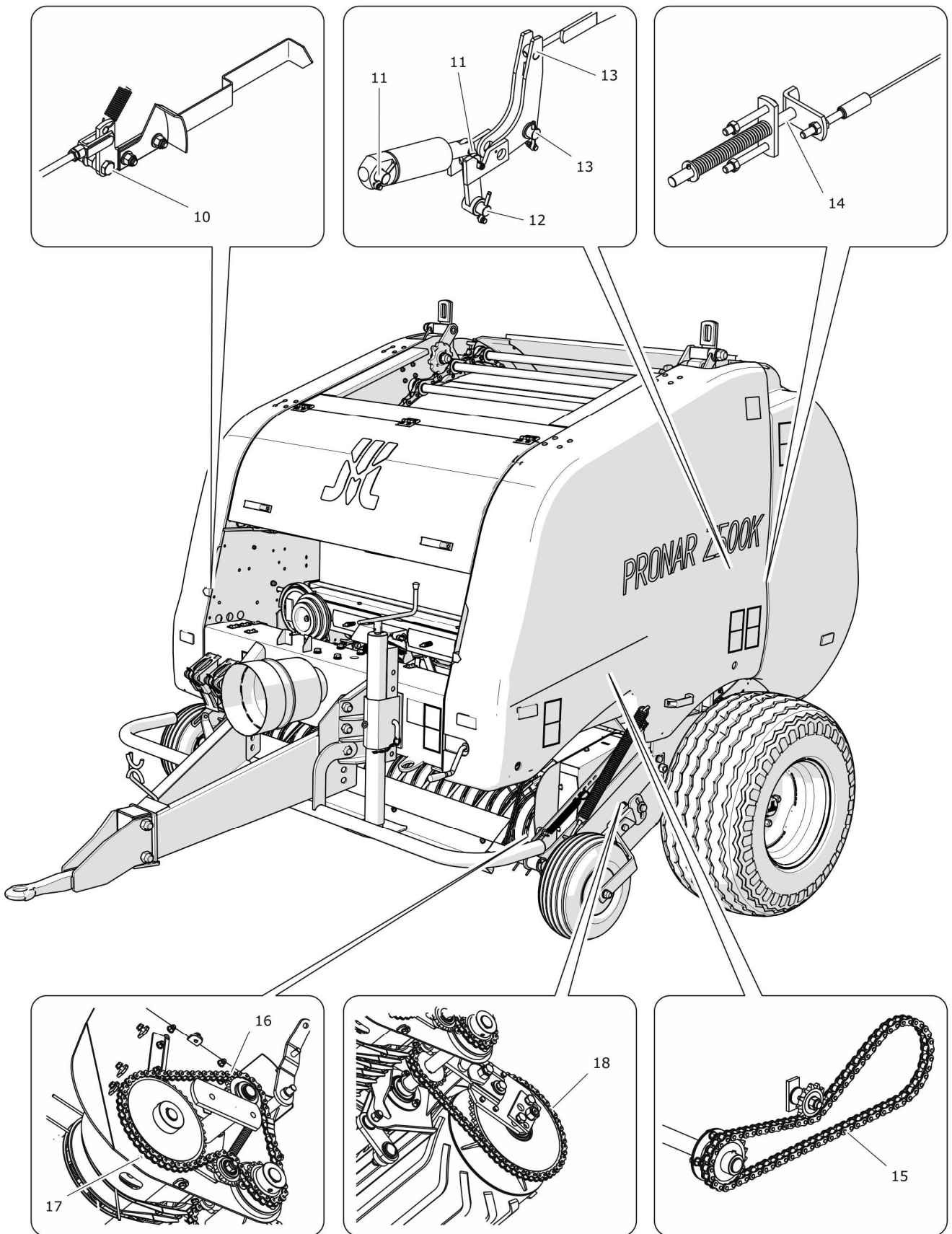


FIGURE 5.36 Round baler's lubrication points, part 2

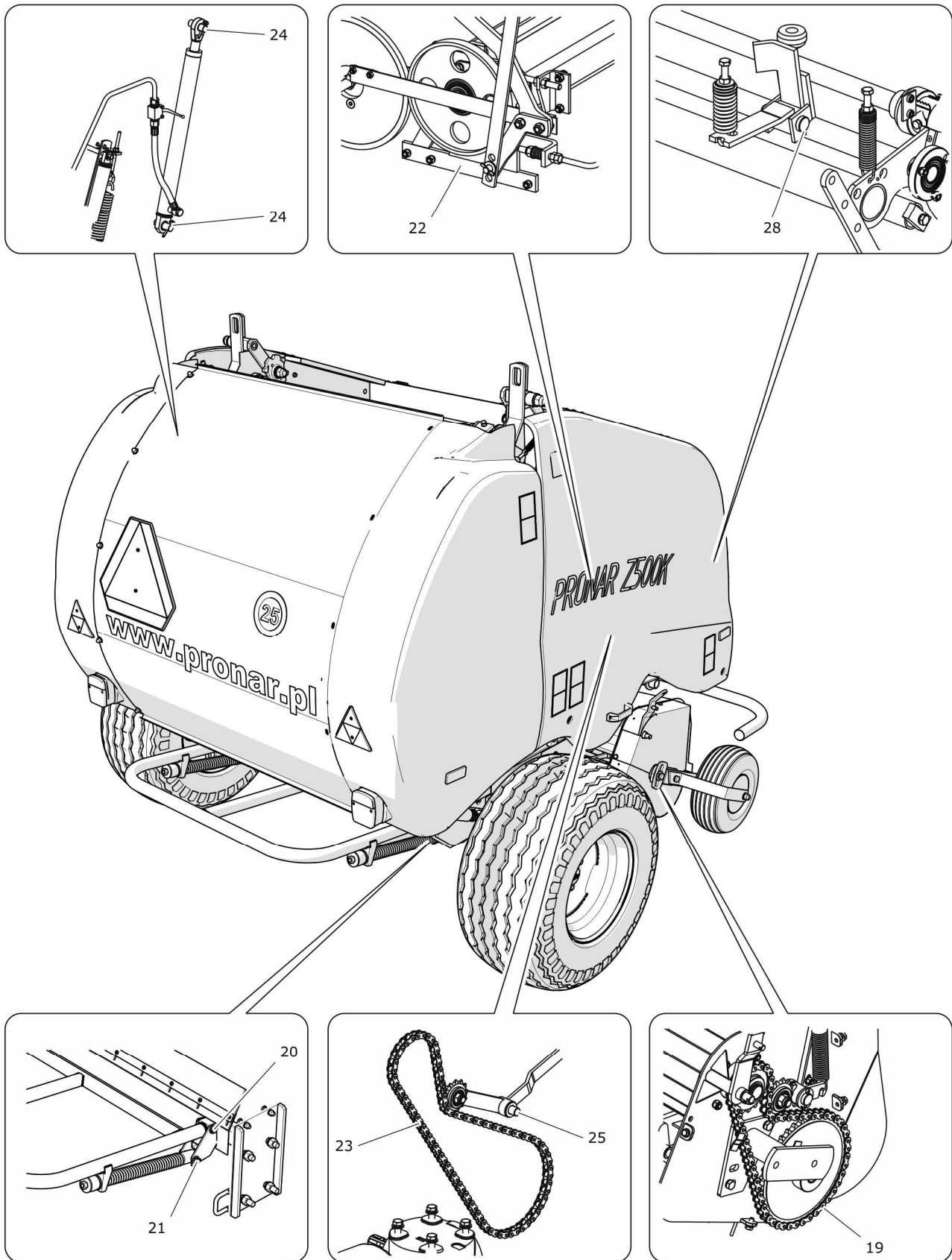


FIGURE 5.37 Round baler's lubrication points, part 3



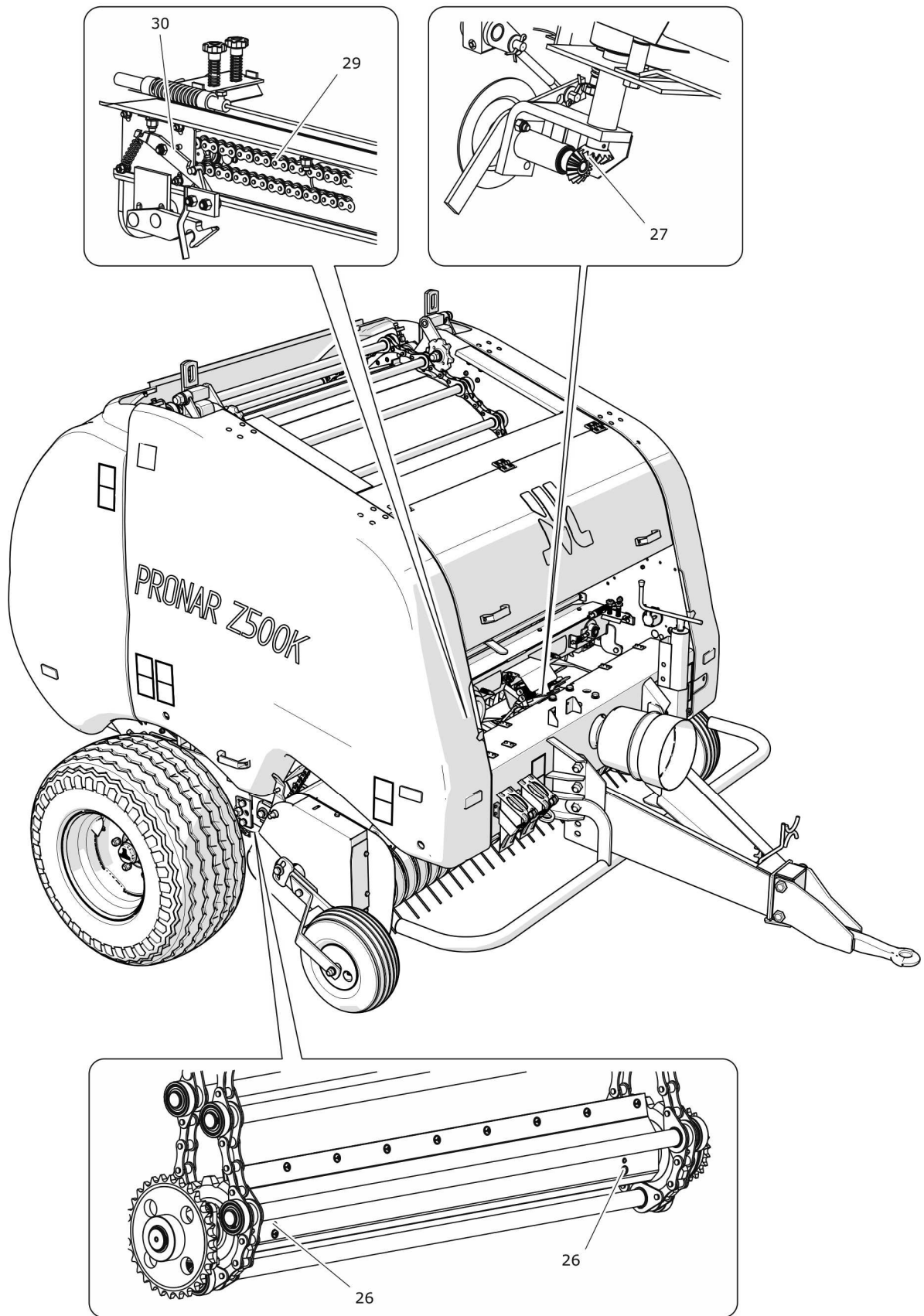


FIGURE 5.38 Round baler's lubrication points, part 4



The first transmission oil change should be performed after the first 50 working hours and then after every 500 working hours.

Check technical condition of the transmission monthly for oil leaks and mechanical damage.

If the round baler is equipped with automatic lubrication system, level of lubricating oil should be regularly checked. Fill the tank with the following oil: EP GEAR SYNTH (or other mineral oil) in the amount of 2 litres.



**ATTENTION**

Lack of lubricating oil in the supply tank may cause damage to the pump of the automatic lubrication system.

**5.27 CONSUMABLES**

**5.27.1 HYDRAULIC OIL**

Always adhere to the principle that the oil in the round baler hydraulic system and in the tractor hydraulic system are of the same type. In the event of application of different types of oil make certain that both hydraulic substances may be mixed together. Application of different oil types may cause damage to round baler or tractor. In a new machine, the hydraulic system is filled with L HL32 Lotos hydraulic oil.

**TABLE 5.9 L-HL 32 Lotos hydraulic oil characteristics**

ITEM	NAME	UNIT	VALUE
1	ISO 3448VG viscosity classification	-	32
2	Kinematic viscosity at 40°C	mm <sup>2</sup> /s	28.8 – 35.2
3	ISO 6743/99 quality classification	-	HL
4	DIN 51502 quality classification	-	HL
5	Flash-point	C	230

If it is necessary to change hydraulic oil for another oil, check the recommendations of the oil Manufacturer very carefully. If it is recommended to flush the system with the appropriate

preparation, then comply with these recommendations. Attention should be given, so that chemical substances used for this purpose do not damage the materials of the hydraulic system. During normal round baler operation, change of hydraulic oil is not necessary, but if required, this operation should be carried out at a specialist service point.

Because of its composition the oil applied 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. Oil fires should be quenched with the use of carbon dioxide, foam or extinguisher steam. Do not use water to quench oil fires.

### **5.27.2 LUBRICANTS**

Gear transmission should be lubricated with gear oil according to SAE90 EP classification.

For parts under great load it is recommended to apply lithium grease with molybdenum disulphide ( $\text{MOS}_2$ ) or graphite additive. In the case of less loaded sub-assemblies the application of general purpose machine greases is recommended, which contain anticorrosive additives and have significant resistance to being washed away by water. Aerosol preparations (silicon greases and anticorrosive-lubricating substances) should have similar characteristics.

Before using the greases, read the information leaflet for a given product. Particularly relevant are safety rules and handling procedures for a given lubricant as well as waste disposal procedure (used containers, contaminated rags etc.). Information leaflet (material safety data sheet) should be kept together with grease.

## **5.28 PREPARATION FOR END OF SEASON**

The round baler is used periodically. It will be easier to start the machine in the next working season and maintain it in good technical condition if the machine is prepared in a proper

manner after the end of working season. The round baler should be kept in a closed or roofed building. Information on round baler cleaning are given in the next section.

### **Required actions**

- Clean the round baler.
- Check technical condition of bearings, shields, chains, electrical system and indicator lights, reel teeth and shields, hydraulic system and other mechanisms.
- Clean drive chains using a thin lubricating oil or cleaning preparations for mechanisms, dry and then, grease with a thick oil or preservation oil.
- Lubricate other round baler components, regardless of the date of previous lubrication.
- Check air pressure in tyres of wheels and support wheels. Every 2 - 3 weeks move the machine a bit so that the place of contact of tyres with the ground is changed. The tyres will not be deformed and maintain proper geometry. Also, air pressure in tyres should be inspected from time to time and, if necessary, pressure should be increased to appropriate value.
- Corroded places should be cleaned of rust, degreased and protected using undercoat paint and then painted with surface paint according to colour scheme.
- Dismantle PTO shaft. Check technical condition of PTO shaft and its shields; lubricate moving elements of the shaft according to the Manufacturer's recommendations.
- Secure the electronic controller and connection leads (they should be stored in a warm and dry place).

Damaged or worn elements should be dismantled and repaired or replaced with new ones. Repairs and replacements of damaged or used parts should be carried out in authorized technical service centres. Unauthorized repairs during the guarantee period will void the guarantee.

## 5.29 CLEANING THE ROUND BALER



Round baler should be cleaned as needed and after each working season.

### Round baler cleaning guidelines

- Hitch round baler to tractor, open the baling chamber flap. Secure the flap using a cut-off valve and service support. Turn off tractor engine and remove key from ignition. Immobilise the tractor with parking brake.
- Remove remains of straw, hay or haylage from the baling chamber and pickup header.
- Blow the round baler with compressed air. Do not wash the round baler with water.
- Using a hard brush, clean the rollers guiding the twine to the baling chamber.
- For cleaning and maintenance of plastic coated surfaces it is recommended to 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. 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 using extraction naphtha or other degreasing agents and then wiped with a moist cloth. Comply with recommendations of the Manufacturer of cleaning agents.



### **DANGER**

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

- Ensure cleanliness of elastic conduits and seals. The plastic from which these elements are made may be susceptible to organic substances and some

detergents. As a result of long-term reaction of some substances, the ageing process may be accelerated and risk of damage increased. Rubber elements should be maintained with the aid of special preparations after previous thorough washing.

- Observe the environmental protection principles. Empty grease, oil or cleaning agent containers should be disposed of according to the recommendations of their manufacturers.

## **5.30 PREPARATION FOR THE BEGINNING OF A NEW WORKING SEASON**

### **Required preparation activities**

- Remove preservation oil from chains and wipe them until dry.
- Lubricate the round baler according to the Manufacturer's recommendations; remove excess of grease and oil.
- Check technical condition and air pressure in tyres.
- Check oil level in transmission, add oil if necessary.
- Check condition of bolt connections; in particular, check condition of drawbar connections and wheel nuts.
- Check and, if necessary, adjust the round baler's mechanisms.
- Check technical condition of drive shaft and shaft shields.
- Check completeness and technical condition of protective shields and locks.
- Check if the controller operates correctly.
- Check operation of the electrical system.
- Check completeness and legibility of inscriptions and warning decals.
- Start the baler without load and check if its mechanisms work correctly.

## 5.31 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

TABLE 5.10 Tightening torque for nut and bolt connections

METRIC THREAD	5.8 <sup>(1)</sup>	8.8 <sup>(1)</sup>	10.9 <sup>(1)</sup>
	Md [Nm]		
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
M27	820	1,150	1,650
M30	1,050	1,450	2,100

<sup>(1)</sup> – strength class according to DIN ISO 898 standard

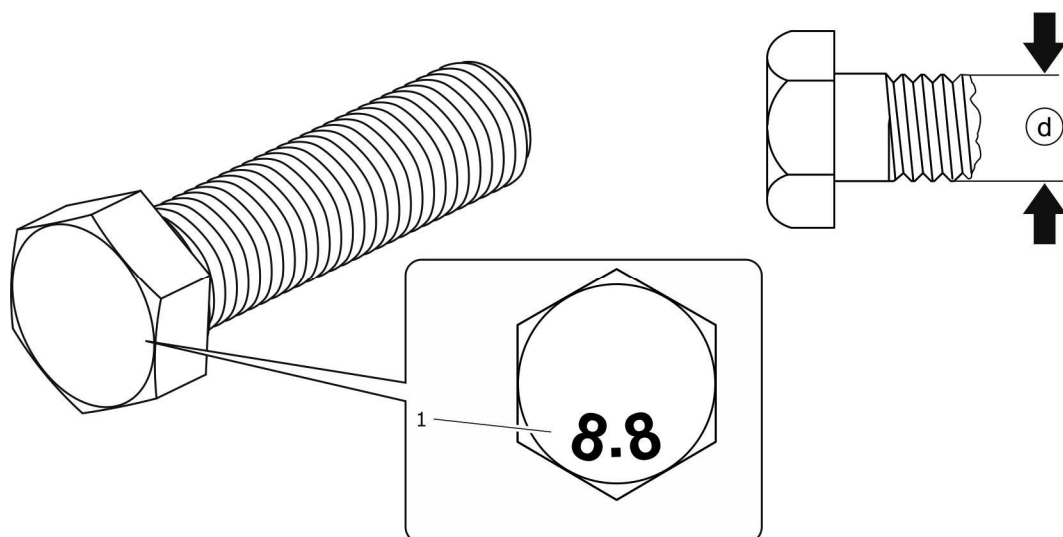


FIGURE 5.39 Bolt with metric thread

(1) strength class, (d) thread diameter

Unless other tightening parameters are given, during maintenance-repair work apply appropriate torque to tighten nut and bolt connections. Recommended tightening torque of most frequently applied nut and bolt connections are given in table (5.10). Given values apply to non-lubricated steel bolts.



**TIP**

Hydraulic conduits should be tightened using torque of 50 – 70 Nm.

## 5.32 STORAGE, MAINTENANCE AND REPAIRS OF LP-10 CONTROLLER

When not in use the controller should be stored in room conditions, protected against damp, chemicals, direct atmospheric precipitation, frost and strong solar radiation. After disconnecting sensor cable, coil it and protect the sensor plug contacts against dirt and moisture, which may cause a corrosion and loss of electric contact, and the consequent incorrect controller operation. The device requires no periodic maintenance. In the event of the controller housing being soiled it may be cleaned with a lightly moistened cloth with added detergents. Organic solvents must NOT be used for this purpose (acetone, petrol, nitro solvent etc.), because they can dissolve the controller housing. In the event of damage to the controller have it serviced by the manufacturer. Independent attempts to repair the controller shall void the warranty.

## 5.33 TROUBLESHOOTING

**TABLE 5.11 Troubleshooting**

FAULT	CAUSE	REMEDY
Noise in axle hubs	Excessive bearing slackness	Check slackness and adjust if needed.
	Damaged bearings	Replace bearings.
	Damaged hub parts	Replace.



FAULT	CAUSE	REMEDY
Incorrect hydraulic system operation	Improper hydraulic oil viscosity	Check oil quality, make sure that the oil in both machines is of the same type. If necessary, change oil in tractor and/or in round baler.
	Insufficient tractor hydraulic pump output, damaged tractor hydraulic pump.	Check tractor hydraulic pump.
	Damaged or contaminated cylinder	Check cylinder rod (bending, corrosion), check cylinder for tightness (cylinder rod seal), if necessary, repair or replace the cylinder.
	Damaged hydraulic conduits	Check and ascertain that hydraulic conduits are tight, not fractured and properly tightened. If necessary, replace or tighten.
Wrong operation of LP-10 controller	Damaged electric cables	Replace electric cables.
	Electric cables are not connected	Connect lines
	Damaged controller	Replace controller
	Incorrect supply voltage	Check the voltage in the tractor's power supply socket. Repair the socket or tractor's circuit.
Incorrect counter reading	Sensor lead or sensor damaged	Replace lead or sensor.
	Incorrectly adjusted sensor position	Check and adjust.
	Magnet is not attached to the baling chamber flap.	Attach a new magnet to the flap.
Insufficient contrast of display digits, incorrect display operation	Damaged display	Repair.
	Incorrect supply voltage.	Check the voltage in the tractor's socket. Repair supply circuit.
Noise from chain	Loose chains	Adjust chain tension.

<b>FAULT</b>	<b>CAUSE</b>	<b>REMEDY</b>
transmission		Excessive stretching of drive chain. Replace chains together with cog wheels.
	Damaged or contaminated bearing	Check bearing, clean and lubricate or replace, if excessively worn.
	Damaged chain tensioner	Repair or replace the tensioner.
Twine breaking	Wrong setting of twine brake	Reduce tension in twine brake
	Low quality of twine	Replace twine

# NOTES

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# ANNEX A

Half axle wheels

TYRES	WHEEL DISC
400/60-15.5 TL 14PR 140 A8	13.00x15.5"



# HAND-OVER PROTOCOL FOR Z500K ROUND BALER

**COPY A** ★

SERIAL NUMBER

YEAR OF MANUFACTURE

This hand-over protocol is prepared in order to ensure the maximum safety for the machine user and failure-free work of the machine. Encircle proper option.

- Conformity of the machine condition, version and equipment with the order has been certified.
- No transport damage to the machine has been found.
- The customer has been informed and instructed how to operate, start and maintain the machine.
- The tractor's specifications and power as well as the number of rotations of PTO shaft have been checked and their conformity has been certified.
- The mechanical functions of the machine have been presented and explained to the customer (how to install twine/net, open the shields, adjust and set the wrapping systems, etc.).
- The procedure of installation and disassembly of the net and twine wrapping system has been explained.
- The machine has been matched to the tractor to ensure proper hitching to the lower or the upper transport hitch.
- Correctness of the factory mounted PTO shaft of the round baler has been checked with regard to:
  - the maximum torque transferred by the tractor PTO clutch,
  - the length of the shaft with regard to the tractor to which the baler will be hitched.

- The user has been informed how to repair shear bolt clutch of PTO shaft.
- Hydraulic conduits have been connected to tractor and correctness of the connection has been certified.
- Functioning of electrical devices has been checked and explained.
- The hydraulic functions of the machine have been presented and explained to the customer (how to open the rear flap, activate the starting mechanism, lower and raise the baler pickup header).
- The trial run has been performed and the functioning of the round baler has been explained to the customer during the trial run.
- It has been explained how to set the machine in working position and in transport position.
- The user has been informed that the Operator's Manual is an integral part of the machine's documentation and that before using the machine, the user must carefully read the Operator's Manual and comply with all recommendations contained in the Operator's Manual. This guarantees safe operation and ensures failure-free work of the machine.
- The user has been informed about responsibility and consequences resulting from violation of principles of proper operation of the round baler specified in THE OPERATOR'S MANUAL.

.....

PLACE, DATE

.....

SIGNATURE OF PERSON HANDING OVER THE MACHINE

.....

SIGNATURE OF PERSON RECEIVING THE MACHINE

★ SIGNED DOCUMENT:

A – SHOULD BE HANDED OVER TO PRONAR, B – SHOULD REMAIN WITH THE SELLER, C – SHOULD BE RECEIVED BY THE CUSTOMER



# HAND-OVER PROTOCOL FOR Z500K ROUND BALER

## COPY B <sup>★</sup>

SERIAL NUMBER

YEAR OF MANUFACTURE

This hand-over protocol is prepared in order to ensure the maximum safety for the machine user and failure-free work of the machine. Encircle proper option.

- Conformity of the machine condition, version and equipment with the order has been certified.
- No transport damage to the machine has been found.
- The customer has been informed and instructed how to operate, start and maintain the machine.
- The tractor's specifications and power as well as the number of rotations of PTO shaft have been checked and their conformity has been certified.
- The mechanical functions of the machine have been presented and explained to the customer (how to install twine/net, open the shields, adjust and set the wrapping systems, etc.).
- The procedure of installation and disassembly of the net and twine wrapping system has been explained.
- The machine has been matched to the tractor to ensure proper hitching to the lower or the upper transport hitch.
- Correctness of the factory mounted PTO shaft of the round baler has been checked with regard to:
  - the maximum torque transferred by the tractor PTO clutch,
  - the length of the shaft with regard to the tractor to which the baler will be hitched.

- The user has been informed how to repair shear bolt clutch of PTO shaft.
- Hydraulic conduits have been connected to tractor and correctness of the connection has been certified.
- Functioning of electrical devices has been checked and explained.
- The hydraulic functions of the machine have been presented and explained to the customer (how to open the rear flap, activate the starting mechanism, lower and raise the baler pickup header).
- The trial run has been performed and the functioning of the round baler has been explained to the customer during the trial run.
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- The user has been informed about responsibility and consequences resulting from violation of principles of proper operation of the round baler specified in THE OPERATOR'S MANUAL.

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PLACE, DATE

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SIGNATURE OF PERSON HANDING OVER THE MACHINE

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SIGNATURE OF PERSON RECEIVING THE MACHINE

★ SIGNED DOCUMENT:

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# HAND-OVER PROTOCOL FOR Z500K ROUND BALER

## COPY C <sup>★</sup>

SERIAL NUMBER

YEAR OF MANUFACTURE

This hand-over protocol is prepared in order to ensure the maximum safety for the machine user and failure-free work of the machine. Encircle proper option.

- Conformity of the machine condition, version and equipment with the order has been certified.
- No transport damage to the machine has been found.
- The customer has been informed and instructed how to operate, start and maintain the machine.
- The tractor's specifications and power as well as the number of rotations of PTO shaft have been checked and their conformity has been certified.
- The mechanical functions of the machine have been presented and explained to the customer (how to install twine/net, open the shields, adjust and set the wrapping systems, etc.).
- The procedure of installation and disassembly of the net and twine wrapping system has been explained.
- The machine has been matched to the tractor to ensure proper hitching to the lower or the upper transport hitch.
- Correctness of the factory mounted PTO shaft of the round baler has been checked with regard to:
  - the maximum torque transferred by the tractor PTO clutch,
  - the length of the shaft with regard to the tractor to which the baler will be hitched.

- The user has been informed how to repair shear bolt clutch of PTO shaft.
- Hydraulic conduits have been connected to tractor and correctness of the connection has been certified.
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- The trial run has been performed and the functioning of the round baler has been explained to the customer during the trial run.
- It has been explained how to set the machine in working position and in transport position.
- The user has been informed that the Operator's Manual is an integral part of the machine's documentation and that before using the machine, the user must carefully read the Operator's Manual and comply with all recommendations contained in the Operator's Manual. This guarantees safe operation and ensures failure-free work of the machine.
- The user has been informed about responsibility and consequences resulting from violation of principles of proper operation of the round baler specified in THE OPERATOR'S MANUAL.

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PLACE, DATE

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